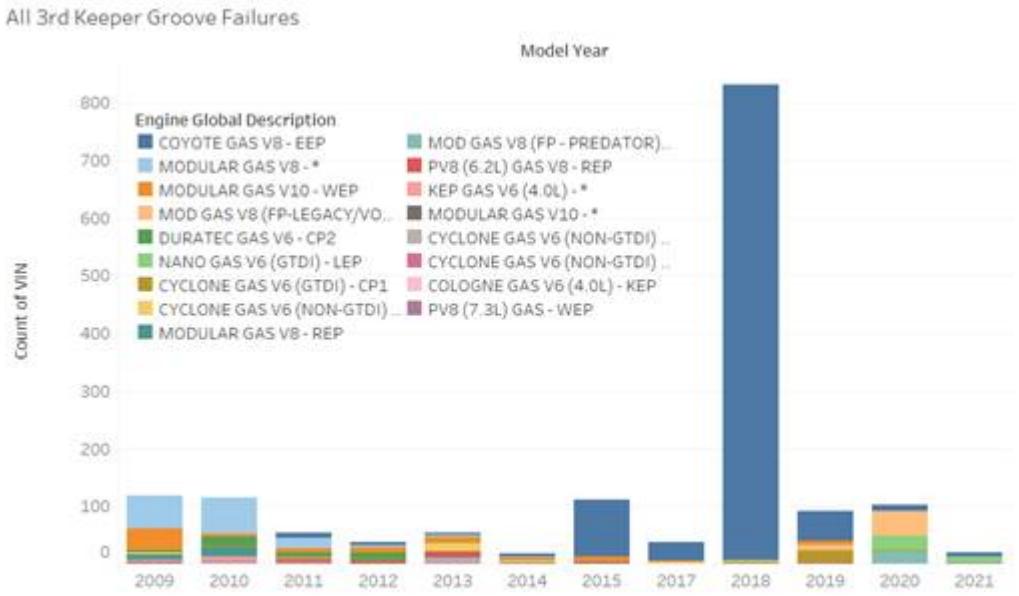
This file represents a consolidation of multiple files sent by the manufacturer. Please use the bookmarks to navigate to each file. (Each bookmark label is the name of the original file.)

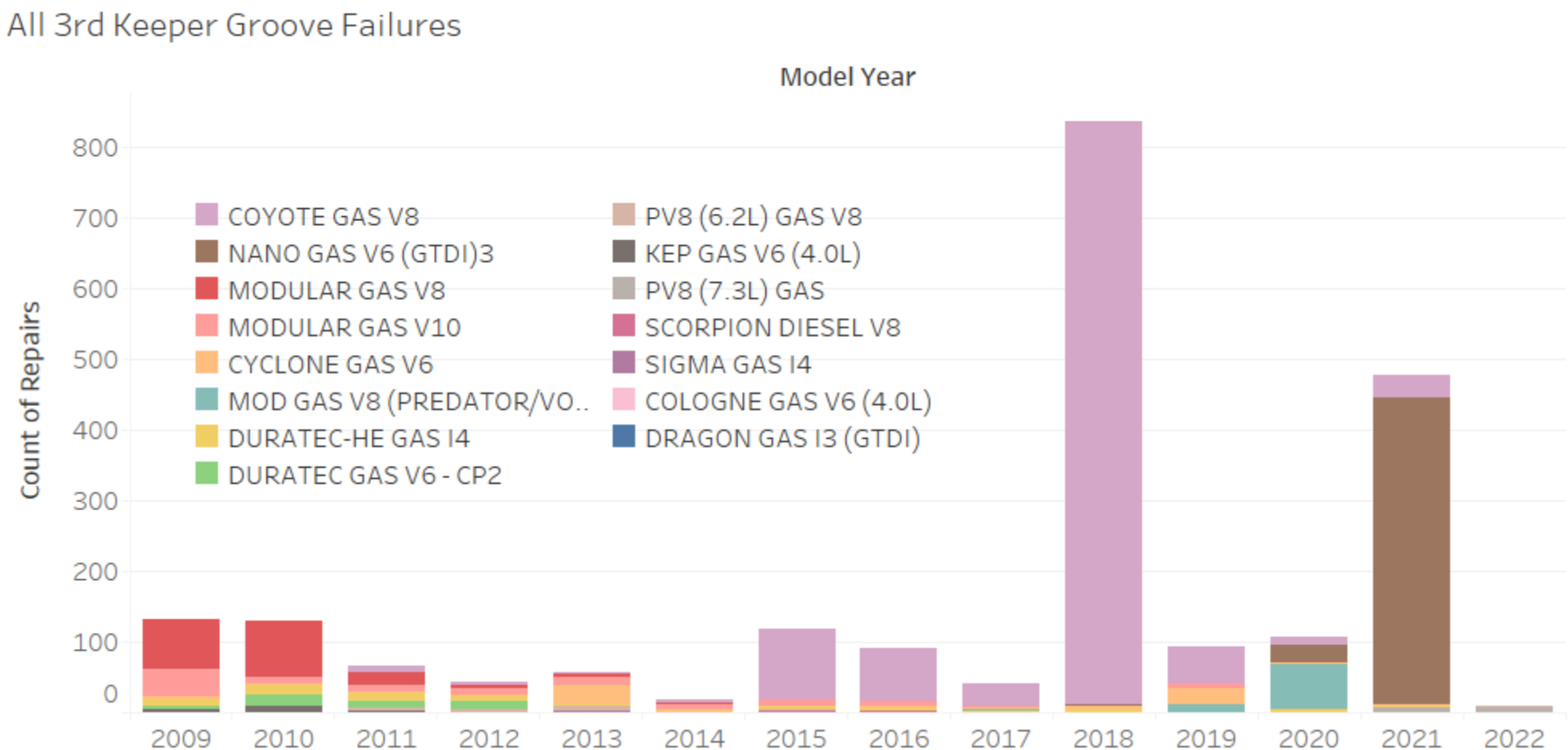
From: Knott, Tim (.)
Sent: Monday, August 9, 2021 4:31 PM
To: Strand, Tim (T.A.) (tstrand2@ford.com)
Subject: 3rd Keeper Failures by MY

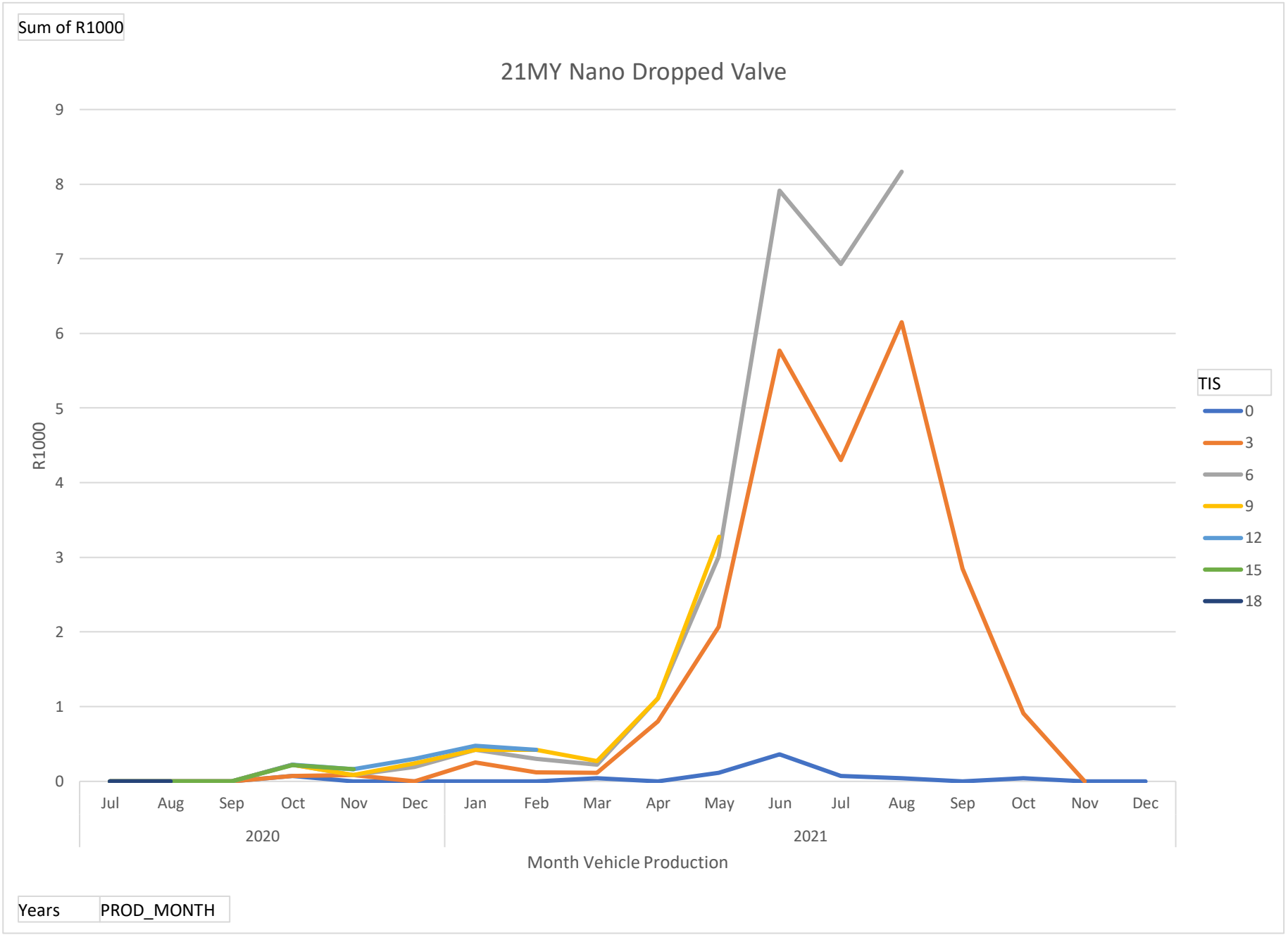
I dropped I4 & diesel engines for clarity.



From: Knott, Tim (.)
Sent: Thursday, April 28, 2022 1:39 PM
To: Beyer, Laura (L.D.)
Subject: 3rd keeper groove failures since 2009

These are the Quarterback tracked 3rd keeper groove failures on all North American vehicles.

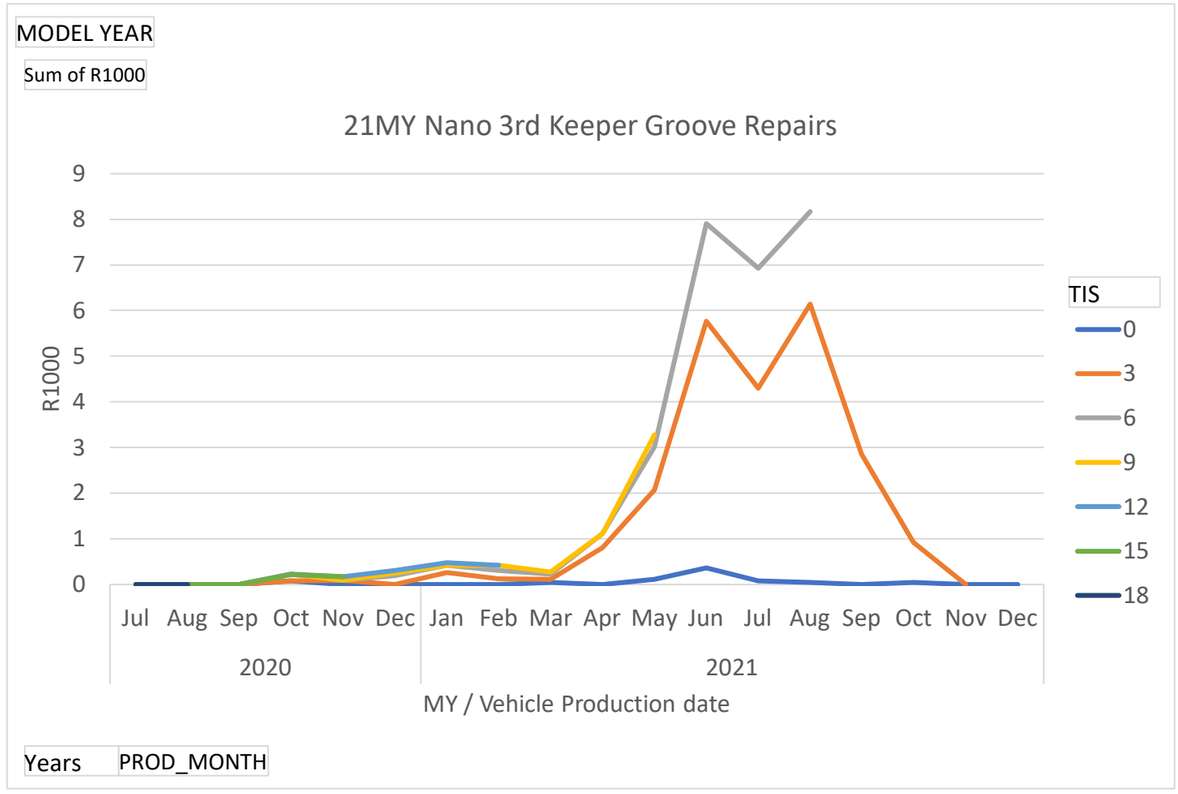



Sum of R1000
21MY Nano Dropped Valve
R1000
9
8
7
6
5
4
3
2
1
0
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
Month Vehicle Production
TIS
0
3
6
9
12
15
18
Years
PROD_MONTH

Sum of R1000	Column Labels							
Row Labels	**0**	**3**	**6**	**9**	**12**	**15**	**18**	**Grand Total**
2020	**0.07**	**0.15**	**0.49**	**0.54**	**0.68**	**0.38**	**0**	**2.31**
Jul	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0		0
Oct	0.07	0.07	0.22	0.22	0.22	0.22		1.02
Nov	0	0.08	0.08	0.08	0.16	0.16		0.56
Dec	0	0	0.19	0.24	0.3			0.73
2021	**0.66**	**23.33**	**28.07**	**5.5**	**0.9**			**58.46**
Jan	0	0.25	0.42	0.42	0.48			1.57
Feb	0	0.12	0.3	0.42	0.42			1.26
Mar	0.04	0.11	0.22	0.27				0.64
Apr	0	0.8	1.11	1.11				3.02
May	0.11	2.07	3.01	3.28				8.47
Jun	0.36	5.77	7.91					14.04
Jul	0.07	4.3	6.93					11.3
Aug	0.04	6.15	8.17					14.36
Sep	0	2.85						2.85
Oct	0.04	0.91						0.95
Nov	0	0						0
Dec	0							0
Grand Total	**0.73**	**23.48**	**28.56**	**6.04**	**1.58**	**0.38**	**0**	**60.77**

MODEL YEAR (All)

Sum of R1000	Column Labels							
Row Labels	**0**	**3**	**6**	**9**	**12**	**15**	**18**	**Grand Total**
2020								
Jul	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0		0
Oct	0.07	0.07	0.22	0.22	0.22	0.22		1.02
Nov	0	0.08	0.08	0.08	0.16	0.16		0.56
Dec	0	0	0.19	0.24	0.3			0.73
2021								
Jan	0	0.25	0.42	0.42	0.48			1.57
Feb	0	0.12	0.3	0.42	0.42			1.26
Mar	0.04	0.11	0.22	0.27				0.64
Apr	0	0.8	1.11	1.11				3.02
May	0.11	2.07	3.01	3.28				8.47
Jun	0.36	5.77	7.91					14.04
Jul	0.07	4.3	6.93					11.3
Aug	0.04	6.15	8.17					14.36
Sep	0	2.85						2.85
Oct	0.04	0.91						0.95
Nov	0	0						0
Dec	0							0
Grand Total	**0.73**	**23.48**	**28.56**	**6.04**	**1.58**	**0.38**	**0**	**60.77**



Report Info Status=Fin Request N Description Run Date / Completion Job Size=2 Execution Precalc Pr Cut Off Da
Data Selec Model Yea Cost Categ Claim Key[Trace Com Engine Global = NANO GAS V6 (GTDI) - LEP[E2277],
Report Sel Report Nar Destination CSV Name Model Yea Order By = TIS Rows S YTD Colun Minimum D Logic = Co
Minimum Divisor Selected:100

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE
1		0	0.05	12	264060	130356.1	0.49	10863.01	2021
1		1	0.55	144	261815	1513599	5.78	10511.1	2021
1		2	1.14	294	255619	3150624	12.18	10716.41	2021
1		3	1.6	406	243145	4459112	17.56	10983.03	2021
1		4	1.97	487	219903	5352569	21.63	10990.9	2021
1		5	2.19	531	194332	5846642	24.17	11010.63	2021
1		6	2.3	550	174929	6057253	25.37	11013.19	2021
1		7	2.35	557	153166	6126344	25.82	10998.82	2021
1		8	2.38	561	138260	6167004	26.12	10992.88	2021
1		9	2.39	563	122238	6192150	26.32	10998.49	2021
1		10	2.41	565	109183	6218606	26.57	11006.38	2021
1		11	2.42	566	92420	6226567	26.65	11001	2021
1		12	2.42	566	66298	6226567	26.65	11001	2021
1		13	2.42	566	46085	6226567	26.65	11001	2021
1		14	2.42	566	29327	6226567	26.65	11001	2021
1		15	2.42	566	15908	6226567	26.65	11001	2021
1		16	2.42	566	8394	6226567	26.65	11001	2021
1		17	2.42	566	3903	6226567	26.65	11001	2021
1		18	2.42	566	2141	6226567	26.65	11001	2021
1		19	2.42	566	848	6226567	26.65	11001	2021
1	7/1/2020	0	0	0	1044	0	0	0	2021
1	7/1/2020	1	0	0	1044	0	0	0	2021
1	7/1/2020	2	0	0	1044	0	0	0	2021
1	7/1/2020	3	0	0	1044	0	0	0	2021
1	7/1/2020	4	0	0	1044	0	0	0	2021
1	7/1/2020	5	0	0	1044	0	0	0	2021
1	7/1/2020	6	0	0	1043	0	0	0	2021
1	7/1/2020	7	0	0	1042	0	0	0	2021
1	7/1/2020	8	0	0	1042	0	0	0	2021
1	7/1/2020	9	0	0	1042	0	0	0	2021
1	7/1/2020	10	0	0	1041	0	0	0	2021
1	7/1/2020	11	0	0	1040	0	0	0	2021
1	7/1/2020	12	0	0	1037	0	0	0	2021
1	7/1/2020	13	0	0	1035	0	0	0	2021
1	7/1/2020	14	0	0	1032	0	0	0	2021
1	7/1/2020	15	0	0	1023	0	0	0	2021
1	7/1/2020	16	0	0	1005	0	0	0	2021
1	7/1/2020	17	0	0	983	0	0	0	2021
1	7/1/2020	18	0	0	938	0	0	0	2021
1	7/1/2020	19	0	0	809	0	0	0	2021
1	8/1/2020	0	0	0	1577	0	0	0	2021
1	8/1/2020	1	0	0	1577	0	0	0	2021
1	8/1/2020	2	0	0	1577	0	0	0	2021
1	8/1/2020	3	0	0	1577	0	0	0	2021
1	8/1/2020	4	0	0	1577	0	0	0	2021
1	8/1/2020	5	0	0	1577	0	0	0	2021
1	8/1/2020	6	0	0	1577	0	0	0	2021
1	8/1/2020	7	0	0	1577	0	0	0	2021
1	8/1/2020	8	0	0	1576	0	0	0	2021

1	8/1/2020	9	0	0	1574	0	0	0	2021
1	8/1/2020	10	0	0	1573	0	0	0	2021
1	8/1/2020	11	0	0	1571	0	0	0	2021
1	8/1/2020	12	0	0	1565	0	0	0	2021
1	8/1/2020	13	0	0	1563	0	0	0	2021
1	8/1/2020	14	0	0	1558	0	0	0	2021
1	8/1/2020	15	0	0	1539	0	0	0	2021
1	8/1/2020	16	0	0	1481	0	0	0	2021
1	8/1/2020	17	0	0	1392	0	0	0	2021
1	8/1/2020	18	0	0	1164	0	0	0	2021
1	9/1/2020	0	0	0	2476	0	0	0	2021
1	9/1/2020	1	0	0	2476	0	0	0	2021
1	9/1/2020	2	0	0	2476	0	0	0	2021
1	9/1/2020	3	0	0	2474	0	0	0	2021
1	9/1/2020	4	0	0	2471	0	0	0	2021
1	9/1/2020	5	0	0	2467	0	0	0	2021
1	9/1/2020	6	0	0	2466	0	0	0	2021
1	9/1/2020	7	0	0	2462	0	0	0	2021
1	9/1/2020	8	0	0	2458	0	0	0	2021
1	9/1/2020	9	0	0	2449	0	0	0	2021
1	9/1/2020	10	0	0	2430	0	0	0	2021
1	9/1/2020	11	0	0	2402	0	0	0	2021
1	9/1/2020	12	0	0	2362	0	0	0	2021
1	9/1/2020	13	0	0	2315	0	0	0	2021
1	9/1/2020	14	0	0	2245	0	0	0	2021
1	9/1/2020	15	0	0	2151	0	0	0	2021
1	9/1/2020	16	0	0	1895	0	0	0	2021
1	9/1/2020	17	0	0	1489	0	0	0	2021
1	10/1/2020	0	0.07	1	13495	10243.61	0.76	10243.61	2021
1	10/1/2020	1	0.07	1	13488	10243.61	0.76	10243.61	2021
1	10/1/2020	2	0.07	1	13483	10243.61	0.76	10243.61	2021
1	10/1/2020	3	0.07	1	13476	10243.61	0.76	10243.61	2021
1	10/1/2020	4	0.15	2	13456	22511.76	1.67	11255.88	2021
1	10/1/2020	5	0.15	2	13427	22511.76	1.67	11255.88	2021
1	10/1/2020	6	0.22	3	13385	30734.75	2.29	10244.92	2021
1	10/1/2020	7	0.22	3	13346	30734.75	2.29	10244.92	2021
1	10/1/2020	8	0.22	3	13255	30734.75	2.29	10244.92	2021
1	10/1/2020	9	0.22	3	13118	30734.75	2.29	10244.92	2021
1	10/1/2020	10	0.22	3	12837	30734.75	2.29	10244.92	2021
1	10/1/2020	11	0.22	3	12271	30734.75	2.29	10244.92	2021
1	10/1/2020	12	0.22	3	11492	30734.75	2.29	10244.92	2021
1	10/1/2020	13	0.22	3	10293	30734.75	2.29	10244.92	2021
1	10/1/2020	14	0.22	3	8685	30734.75	2.29	10244.92	2021
1	10/1/2020	15	0.22	3	6567	30734.75	2.29	10244.92	2021
1	10/1/2020	16	0.22	3	3974	30734.75	2.29	10244.92	2021
1	11/1/2020	0	0	0	13120	0	0	0	2021
1	11/1/2020	1	0	0	13113	0	0	0	2021
1	11/1/2020	2	0	0	13100	0	0	0	2021
1	11/1/2020	3	0.08	1	13082	13838.27	1.06	13838.27	2021
1	11/1/2020	4	0.08	1	13053	13838.27	1.06	13838.27	2021
1	11/1/2020	5	0.08	1	13016	13838.27	1.06	13838.27	2021
1	11/1/2020	6	0.08	1	12967	13838.27	1.06	13838.27	2021
1	11/1/2020	7	0.08	1	12884	13838.27	1.06	13838.27	2021
1	11/1/2020	8	0.08	1	12773	13838.27	1.06	13838.27	2021

1	11/1/2020	9	0.08	1	12574	13838.27	1.06	13838.27	2021
1	11/1/2020	10	0.16	2	12235	26359.36	2.08	13179.68	2021
1	11/1/2020	11	0.16	2	11585	26359.36	2.08	13179.68	2021
1	11/1/2020	12	0.16	2	10608	26359.36	2.08	13179.68	2021
1	11/1/2020	13	0.16	2	9149	26359.36	2.08	13179.68	2021
1	11/1/2020	14	0.16	2	7256	26359.36	2.08	13179.68	2021
1	11/1/2020	15	0.16	2	4589	26359.36	2.08	13179.68	2021
1	12/1/2020	0	0	0	20673	0	0	0	2021
1	12/1/2020	1	0	0	20667	0	0	0	2021
1	12/1/2020	2	0	0	20655	0	0	0	2021
1	12/1/2020	3	0	0	20644	0	0	0	2021
1	12/1/2020	4	0	0	20620	0	0	0	2021
1	12/1/2020	5	0.15	3	20580	28897.57	1.4	9632.52	2021
1	12/1/2020	6	0.19	4	20503	37707.71	1.83	9426.93	2021
1	12/1/2020	7	0.19	4	20370	37707.71	1.83	9426.93	2021
1	12/1/2020	8	0.19	4	20200	37707.71	1.83	9426.93	2021
1	12/1/2020	9	0.24	5	19905	47075.92	2.3	9415.18	2021
1	12/1/2020	10	0.3	6	19207	61011.71	3.03	10168.62	2021
1	12/1/2020	11	0.3	6	17820	61011.71	3.03	10168.62	2021
1	12/1/2020	12	0.3	6	15776	61011.71	3.03	10168.62	2021
1	12/1/2020	13	0.3	6	12396	61011.71	3.03	10168.62	2021
1	12/1/2020	14	0.3	6	8512	61011.71	3.03	10168.62	2021
1	1/1/2021	0	0	0	23697	0	0	0	2021
1	1/1/2021	1	0.08	2	23692	25093.02	1.06	12546.51	2021
1	1/1/2021	2	0.21	5	23673	61173.53	2.58	12234.71	2021
1	1/1/2021	3	0.25	6	23656	74945.48	3.17	12490.91	2021
1	1/1/2021	4	0.38	9	23587	111362	4.71	12373.55	2021
1	1/1/2021	5	0.38	9	23509	111362	4.71	12373.55	2021
1	1/1/2021	6	0.42	10	23412	125171.1	5.3	12517.11	2021
1	1/1/2021	7	0.42	10	23221	125171.1	5.3	12517.11	2021
1	1/1/2021	8	0.42	10	22955	125171.1	5.3	12517.11	2021
1	1/1/2021	9	0.42	10	22400	125171.1	5.3	12517.11	2021
1	1/1/2021	10	0.42	10	21185	125171.1	5.3	12517.11	2021
1	1/1/2021	11	0.48	11	18948	133131.5	5.72	12102.87	2021
1	1/1/2021	12	0.48	11	15143	133131.5	5.72	12102.87	2021
1	1/1/2021	13	0.48	11	9295	133131.5	5.72	12102.87	2021
1	2/1/2021	0	0	0	16819	0	0	0	2021
1	2/1/2021	1	0.06	1	16814	7523.47	0.45	7523.47	2021
1	2/1/2021	2	0.06	1	16792	7523.47	0.45	7523.47	2021
1	2/1/2021	3	0.12	2	16773	21909.6	1.31	10954.8	2021
1	2/1/2021	4	0.3	5	16730	52173.72	3.11	10434.74	2021
1	2/1/2021	5	0.3	5	16643	52173.72	3.11	10434.74	2021
1	2/1/2021	6	0.3	5	16541	52173.72	3.11	10434.74	2021
1	2/1/2021	7	0.36	6	16362	59357.27	3.55	9892.88	2021
1	2/1/2021	8	0.36	6	16067	59357.27	3.55	9892.88	2021
1	2/1/2021	9	0.42	7	15548	75134.76	4.57	10733.54	2021
1	2/1/2021	10	0.42	7	14405	75134.76	4.57	10733.54	2021
1	2/1/2021	11	0.42	7	12258	75134.76	4.57	10733.54	2021
1	2/1/2021	12	0.42	7	8276	75134.76	4.57	10733.54	2021
1	3/1/2021	0	0.04	1	27563	15077.62	0.55	15077.62	2021
1	3/1/2021	1	0.04	1	27527	15077.62	0.55	15077.62	2021
1	3/1/2021	2	0.04	1	27444	15077.62	0.55	15077.62	2021
1	3/1/2021	3	0.11	3	27349	39814.16	1.45	13271.39	2021
1	3/1/2021	4	0.15	4	27048	53070.45	1.94	13267.61	2021

1	3/1/2021	5	0.18	5	26655	60314.65	2.21	12062.93	2021
1	3/1/2021	6	0.22	6	25914	71328.45	2.64	11888.08	2021
1	3/1/2021	7	0.22	6	24691	71328.45	2.64	11888.08	2021
1	3/1/2021	8	0.27	7	23491	85044.88	3.22	12149.27	2021
1	3/1/2021	9	0.27	7	21933	85044.88	3.22	12149.27	2021
1	3/1/2021	10	0.27	7	19667	85044.88	3.22	12149.27	2021
1	3/1/2021	11	0.27	7	14486	85044.88	3.22	12149.27	2021
1	4/1/2021	0	0	0	10074	0	0	0	2021
1	4/1/2021	1	0.4	4	10038	46839.97	4.67	11709.99	2021
1	4/1/2021	2	0.5	5	9994	58797.88	5.86	11759.58	2021
1	4/1/2021	3	0.8	8	9923	98864.49	9.9	12358.06	2021
1	4/1/2021	4	1.11	11	9737	127816.2	12.87	11619.65	2021
1	4/1/2021	5	1.11	11	9430	127816.2	12.87	11619.65	2021
1	4/1/2021	6	1.11	11	8549	127816.2	12.87	11619.65	2021
1	4/1/2021	7	1.11	11	7649	127816.2	12.87	11619.65	2021
1	4/1/2021	8	1.11	11	6509	127816.2	12.87	11619.65	2021
1	4/1/2021	9	1.11	11	5531	127816.2	12.87	11619.65	2021
1	4/1/2021	10	1.11	11	4564	127816.2	12.87	11619.65	2021
1	5/1/2021	0	0.11	1	8746	8406.36	0.96	8406.36	2021
1	5/1/2021	1	1.03	9	8726	101128.2	11.59	11236.46	2021
1	5/1/2021	2	1.61	14	8694	149860.8	17.19	10704.35	2021
1	5/1/2021	3	2.07	18	8653	189720.1	21.8	10540	2021
1	5/1/2021	4	2.53	22	8591	235521.9	27.13	10705.54	2021
1	5/1/2021	5	3.01	26	8441	274112.7	31.7	10542.8	2021
1	5/1/2021	6	3.01	26	8162	274112.7	31.7	10542.8	2021
1	5/1/2021	7	3.01	26	7878	274112.7	31.7	10542.8	2021
1	5/1/2021	8	3.28	28	7367	293289.8	34.31	10474.63	2021
1	5/1/2021	9	3.28	28	6125	293289.8	34.31	10474.63	2021
1	6/1/2021	0	0.36	6	16760	63310.5	3.78	10551.75	2021
1	6/1/2021	1	2.63	44	16707	437703.1	26.19	9947.8	2021
1	6/1/2021	2	4.68	78	16602	768850.2	46.13	9857.05	2021
1	6/1/2021	3	5.77	96	16501	965514.1	58.05	10057.44	2021
1	6/1/2021	4	6.88	114	16290	1152435	69.53	10109.08	2021
1	6/1/2021	5	7.44	123	15919	1250409	75.68	10165.92	2021
1	6/1/2021	6	7.91	130	15008	1323579	80.56	10181.37	2021
1	6/1/2021	7	8.2	134	13768	1364863	83.55	10185.54	2021
1	6/1/2021	8	8.29	135	10528	1372629	84.29	10167.62	2021
1	7/1/2021	0	0.07	1	13426	13844.6	1.03	13844.6	2021
1	7/1/2021	1	1.2	16	13307	156848.3	11.78	9803.02	2021
1	7/1/2021	2	2.81	37	13041	378091.4	28.74	10218.69	2021
1	7/1/2021	3	4.3	56	12794	592069.1	45.47	10572.66	2021
1	7/1/2021	4	5.99	77	12407	817897.6	63.67	10622.05	2021
1	7/1/2021	5	6.51	83	11517	903715.1	71.12	10888.13	2021
1	7/1/2021	6	6.93	87	9612	953938.3	76.35	10964.81	2021
1	7/1/2021	7	7.18	89	7877	974561.7	78.96	10950.13	2021
1	8/1/2021	0	0.04	1	25601	11255.09	0.44	11255.09	2021
1	8/1/2021	1	2.05	52	25361	554615.2	21.86	10665.68	2021
1	8/1/2021	2	4.52	113	24738	1234267	49.34	10922.72	2021
1	8/1/2021	3	6.15	152	23885	1687125	68.3	11099.5	2021
1	8/1/2021	4	7	171	22206	1907767	78.23	11156.53	2021
1	8/1/2021	5	7.92	189	19762	2110227	88.48	11165.22	2021
1	8/1/2021	6	8.17	193	15751	2155589	91.36	11168.85	2021
1	9/1/2021	0	0	0	14981	0	0	0	2021
1	9/1/2021	1	0.74	11	14846	125783.2	8.47	11434.84	2021

1	9/1/2021	2	1.64	24	14509	277705.9	18.94	11571.08	2021
1	9/1/2021	3	2.85	41	14040	489962.8	34.06	11950.31	2021
1	9/1/2021	4	3.41	48	12521	571406.8	40.57	11904.31	2021
1	9/1/2021	5	3.7	51	10306	604495.7	43.78	11852.86	2021
1	10/1/2021	0	0.04	1	25865	8218.33	0.32	8218.33	2021
1	10/1/2021	1	0.12	3	25476	32742.86	1.28	10914.29	2021
1	10/1/2021	2	0.61	15	24524	189033	7.65	12602.2	2021
1	10/1/2021	3	0.91	22	23017	275105.6	11.39	12504.8	2021
1	10/1/2021	4	0.96	23	18526	286768.7	12.02	12468.2	2021
1	11/1/2021	0	0	0	20547	0	0	0	2021
1	11/1/2021	1	0	0	19890	0	0	0	2021
1	11/1/2021	2	0	0	17872	0	0	0	2021
1	11/1/2021	3	0	0	14218	0	0	0	2021
1	12/1/2021	0	0	0	7557	0	0	0	2021
1	12/1/2021	1	0	0	7027	0	0	0	2021
1	12/1/2021	2	0	0	5362	0	0	0	2021

Load Date= Currency E Generated By=TKNOTT

Cost Type Use Group Currency = Distance = Descriptions = Yes

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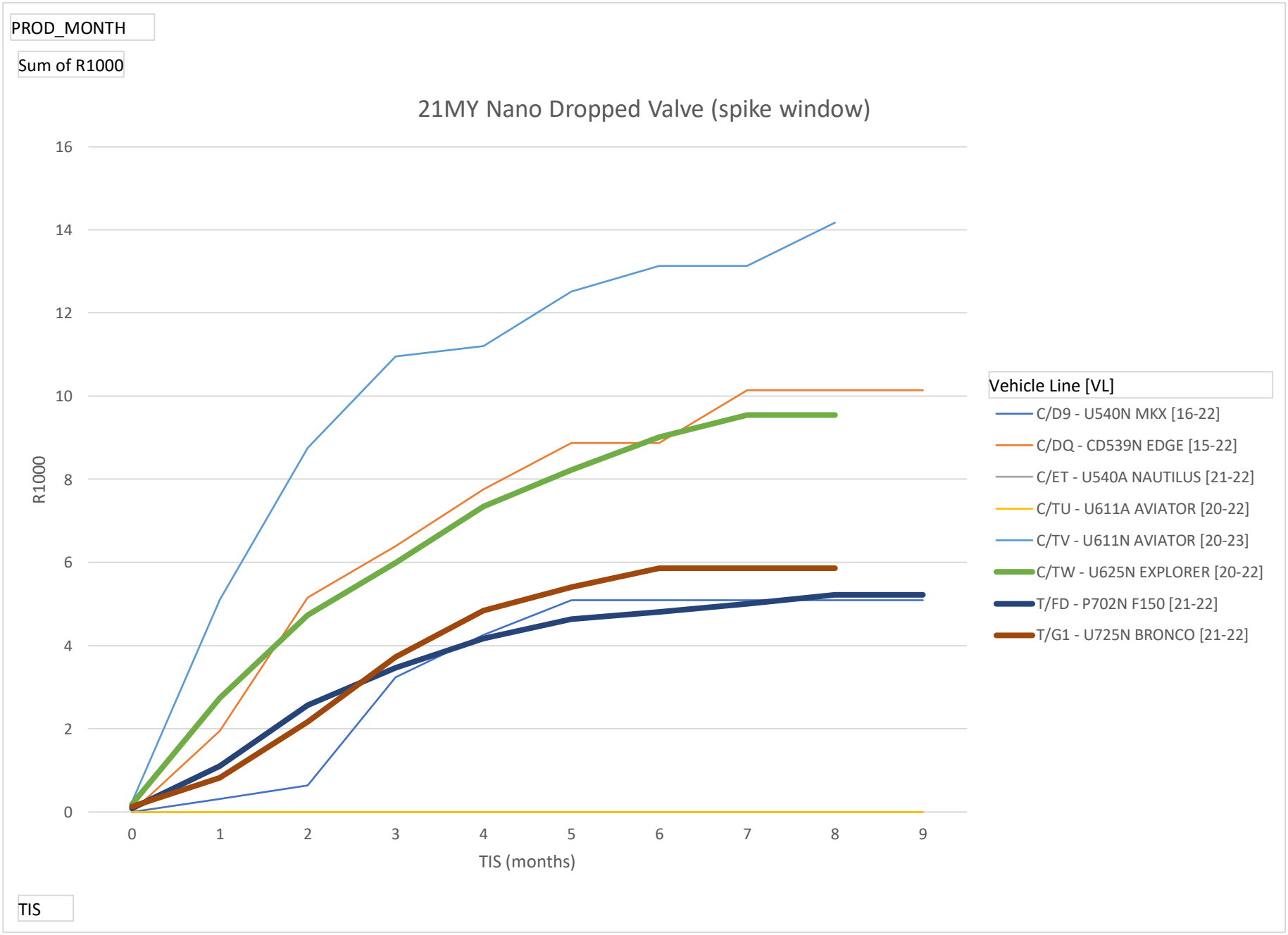
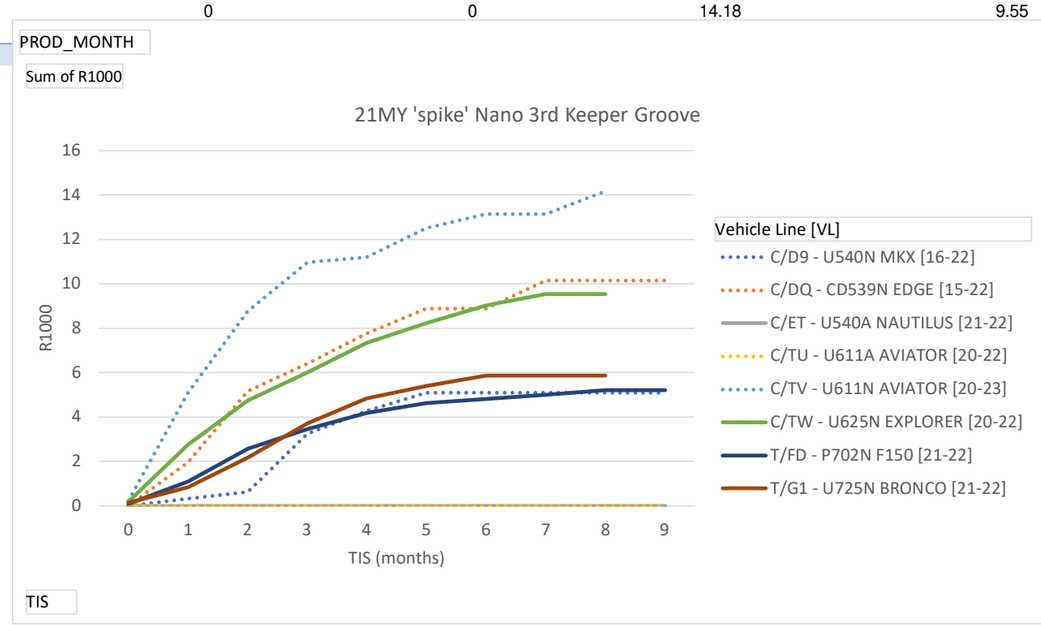
PROD_MONTH	(blank)
TIS	0

Row Labels	Sum of VEHICLES
T/FD - P702N F150 [21-22]	46,800
C/TW - U625N EXPLORER [20-22]	16,527
T/G1 - U725N BRONCO [21-22]	14,914
C/TV - U611N AVIATOR [20-23]	4,127
C/D9 - U540N MKX [16-22]	3,245
C/DQ - CD539N EDGE [15-22]	2,607
C/TU - U611A AVIATOR [20-22]	1,933
C/ET - U540A NAUTILUS [21-22]	1,257
Grand Total	**91,410**


PROD_MONTH
Sum of R1000
21MY Nano Dropped Valve (spike window)
R1000
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
9
TIS (months)
TIS
Vehicle Line [VL]
C/D9 - U540N MKX [16-22]
C/DQ - CD539N EDGE [15-22]
C/ET - U540A NAUTILUS [21-22]
C/TU - U611A AVIATOR [20-22]
C/TV - U611N AVIATOR [20-23]
C/TW - U625N EXPLORER [20-22]
T/FD - P702N F150 [21-22]
T/G1 - U725N BRONCO [21-22]

PROD_MONTH (blank)

Sum of R1000 Row Labels	Column Labels C/D9 - U540N MKX [16-22]	C/DQ - CD539N EDGE [15-22]	C/ET - U540A NAUTILUS [21-22]	C/TU - U611A AVIATOR [20-22]	C/TV - U611N AVIATOR [20-23]	C/TW - U625N EXPLORER [20-22]	T/FD - P702N F150 [21-22]	T/G1 - U725N BRONCO [21-22]	Grand Total
0	0	0	0	0	0.24	0.18	0.09	0.13	0.64
1	0.31	1.95	0	0	5.1	2.74	1.1	0.82	12.02
2	0.63	5.15	0	0	8.75	4.73	2.56	2.16	23.98
3	3.24	6.39	0	0	10.95	5.99	3.46	3.72	33.75
4	4.26	7.76	0	0	11.2	7.34	4.17	4.84	39.57
5	5.09	8.87	0	0	12.51	8.22	4.63	5.4	44.72
6	5.09	8.87	0	0	13.13	9.01	4.81	5.86	46.77
7	5.09	10.15	0	0	13.13	9.55	5	5.86	48.78
8	5.09	10.15	0	0	14.18	9.55	5.22	5.86	50.05
9	5.09	10.15					5.22		20.46
Grand Total	**33.89**	**69.44**					**36.26**	**34.65**	**320.74**



Report Info Status=Fin Request N Description Run Date / Completion Job Size=3 Execution ' Precalc Pr Cut Off Da
Data Selec Model Yea Cost Categ Claim Key[Trace Com Engine Glc Production Date[Typed] Between [01-May-20
Report Sel Report Nar Destination CSV Name Model Yea Order By = TIS Rows S YTD Colun Minimum I Logic = Co
Minimum Divisor Selected:100

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE
1		0	0	0	3245	0	0	0	2021
1		1	0.31	1	3223	11703.63	3.63	11703.63	2021
1		2	0.63	2	3161	21574.49	6.75	10787.25	2021
1		3	3.24	10	3067	124342.5	40.26	12434.25	2021
1		4	4.26	13	2925	159730.5	52.36	12286.96	2021
1		5	5.09	15	2414	180092.1	60.79	12006.14	2021
1		6	5.09	15	1734	180092.1	60.79	12006.14	2021
1		7	5.09	15	1022	180092.1	60.79	12006.14	2021
1		8	5.09	15	310	180092.1	60.79	12006.14	2021
1		9	5.09	15	191	180092.1	60.79	12006.14	2021
1	5/1/2021	0	0	0	303	0	0	0	2021
1	5/1/2021	1	0	0	303	0	0	0	2021
1	5/1/2021	2	0	0	301	0	0	0	2021
1	5/1/2021	3	0	0	300	0	0	0	2021
1	5/1/2021	4	0	0	298	0	0	0	2021
1	5/1/2021	5	0	0	292	0	0	0	2021
1	5/1/2021	6	0	0	283	0	0	0	2021
1	5/1/2021	7	0	0	268	0	0	0	2021
1	5/1/2021	8	0	0	238	0	0	0	2021
1	5/1/2021	9	0	0	191	0	0	0	2021
1	6/1/2021	0	0	0	171	0	0	0	2021
1	6/1/2021	1	0	0	171	0	0	0	2021
1	6/1/2021	2	5.88	1	170	9870.86	58.06	9870.86	2021
1	6/1/2021	3	5.88	1	169	9870.86	58.06	9870.86	2021
1	6/1/2021	4	11.87	2	167	22316.25	132.59	11158.13	2021
1	6/1/2021	5	18.12	3	160	30995.4	186.83	10331.8	2021
1	6/1/2021	6	18.12	3	147	30995.4	186.83	10331.8	2021
1	6/1/2021	7	18.12	3	118	30995.4	186.83	10331.8	2021
1	7/1/2021	0	0	0	906	0	0	0	2021
1	7/1/2021	1	1.11	1	902	11703.63	12.98	11703.63	2021
1	7/1/2021	2	1.11	1	897	11703.63	12.98	11703.63	2021
1	7/1/2021	3	1.11	1	891	11703.63	12.98	11703.63	2021
1	7/1/2021	4	3.38	3	879	34646.22	39.08	11548.74	2021
1	7/1/2021	5	4.55	4	855	46328.74	52.74	11582.19	2021
1	7/1/2021	6	4.55	4	793	46328.74	52.74	11582.19	2021
1	7/1/2021	7	4.55	4	636	46328.74	52.74	11582.19	2021
1	8/1/2021	0	0	0	672	0	0	0	2021
1	8/1/2021	1	0	0	671	0	0	0	2021
1	8/1/2021	2	0	0	664	0	0	0	2021
1	8/1/2021	3	0	0	658	0	0	0	2021
1	8/1/2021	4	0	0	644	0	0	0	2021
1	8/1/2021	5	0	0	611	0	0	0	2021
1	8/1/2021	6	0	0	511	0	0	0	2021
1	9/1/2021	0	0	0	690	0	0	0	2021
1	9/1/2021	1	0	0	684	0	0	0	2021
1	9/1/2021	2	0	0	660	0	0	0	2021
1	9/1/2021	3	12.52	8	639	102768	160.83	12846	2021
1	9/1/2021	4	12.52	8	599	102768	160.83	12846	2021
1	9/1/2021	5	12.52	8	496	102768	160.83	12846	2021

1	10/1/2021	0	0	0	503	0	0	0	2021
1	10/1/2021	1	0	0	492	0	0	0	2021
1	10/1/2021	2	0	0	469	0	0	0	2021
1	10/1/2021	3	0	0	410	0	0	0	2021
1	10/1/2021	4	0	0	338	0	0	0	2021
2		0	0	0	2607	0	0	0	2021
2		1	1.95	5	2568	53742.13	20.93	10748.43	2021
2		2	5.15	13	2501	121450.3	48	9342.33	2021
2		3	6.39	16	2408	150362.3	60.01	9397.64	2021
2		4	7.76	19	2190	181763.1	74.34	9566.48	2021
2		5	8.87	21	1802	200218.5	84.59	9534.21	2021
2		6	8.87	21	1315	200218.5	84.59	9534.21	2021
2		7	10.15	22	781	212014.6	99.69	9637.03	2021
2		8	10.15	22	545	212014.6	99.69	9637.03	2021
2		9	10.15	22	341	212014.6	99.69	9637.03	2021
2	5/1/2021	0	0	0	675	0	0	0	2021
2	5/1/2021	1	2.97	2	673	26069.87	38.74	13034.94	2021
2	5/1/2021	2	2.97	2	671	26069.87	38.74	13034.94	2021
2	5/1/2021	3	5.96	4	669	44097.55	65.68	11024.39	2021
2	5/1/2021	4	7.48	5	660	54424.55	81.33	10884.91	2021
2	5/1/2021	5	9.05	6	637	61462.1	92.38	10243.68	2021
2	5/1/2021	6	9.05	6	616	61462.1	92.38	10243.68	2021
2	5/1/2021	7	9.05	6	563	61462.1	92.38	10243.68	2021
2	5/1/2021	8	9.05	6	484	61462.1	92.38	10243.68	2021
2	5/1/2021	9	9.05	6	341	61462.1	92.38	10243.68	2021
2	6/1/2021	0	0	0	150	0	0	0	2021
2	6/1/2021	1	6.67	1	150	11477.68	76.52	11477.68	2021
2	6/1/2021	2	26.94	4	148	32588.64	219.16	8147.16	2021
2	6/1/2021	3	33.69	5	148	43472.97	292.7	8694.59	2021
2	6/1/2021	4	33.69	5	147	43472.97	292.7	8694.59	2021
2	6/1/2021	5	40.84	6	140	54890.76	374.26	9148.46	2021
2	6/1/2021	6	40.84	6	132	54890.76	374.26	9148.46	2021
2	6/1/2021	7	49.61	7	114	66686.88	477.73	9526.7	2021
2	7/1/2021	0	0	0	140	0	0	0	2021
2	7/1/2021	1	0	0	137	0	0	0	2021
2	7/1/2021	2	7.35	1	136	7469.36	54.92	7469.36	2021
2	7/1/2021	3	7.35	1	133	7469.36	54.92	7469.36	2021
2	7/1/2021	4	7.35	1	127	7469.36	54.92	7469.36	2021
2	7/1/2021	5	7.35	1	122	7469.36	54.92	7469.36	2021
2	7/1/2021	6	7.35	1	117	7469.36	54.92	7469.36	2021
2	7/1/2021	7	7.35	1	104	7469.36	54.92	7469.36	2021
2	8/1/2021	0	0	0	671	0	0	0	2021
2	8/1/2021	1	3	2	666	16194.58	24.32	8097.29	2021
2	8/1/2021	2	6.04	4	659	34649.13	52.32	8662.28	2021
2	8/1/2021	3	6.04	4	640	34649.13	52.32	8662.28	2021
2	8/1/2021	4	7.73	5	592	47292.31	73.68	9458.46	2021
2	8/1/2021	5	7.73	5	543	47292.31	73.68	9458.46	2021
2	8/1/2021	6	7.73	5	450	47292.31	73.68	9458.46	2021
2	9/1/2021	0	0	0	573	0	0	0	2021
2	9/1/2021	1	0	0	563	0	0	0	2021
2	9/1/2021	2	3.65	2	548	20673.27	37.72	10336.64	2021
2	9/1/2021	3	3.65	2	521	20673.27	37.72	10336.64	2021
2	9/1/2021	4	5.85	3	455	29103.93	56.25	9701.31	2021
2	9/1/2021	5	5.85	3	360	29103.93	56.25	9701.31	2021

2	10/1/2021	0	0	0	398	0	0	0	2021
2	10/1/2021	1	0	0	379	0	0	0	2021
2	10/1/2021	2	0	0	339	0	0	0	2021
2	10/1/2021	3	0	0	297	0	0	0	2021
2	10/1/2021	4	0	0	209	0	0	0	2021
3		0	0	0	1257	0	0	0	2021
3		1	0	0	1256	0	0	0	2021
3		2	0	0	1255	0	0	0	2021
3		3	0	0	1252	0	0	0	2021
3		4	0	0	1251	0	0	0	2021
3		5	0	0	1249	0	0	0	2021
3		6	0	0	1244	0	0	0	2021
3		7	0	0	1226	0	0	0	2021
3		8	0	0	1185	0	0	0	2021
3		9	0	0	485	0	0	0	2021
3	5/1/2021	0	0	0	491	0	0	0	2021
3	5/1/2021	1	0	0	490	0	0	0	2021
3	5/1/2021	2	0	0	490	0	0	0	2021
3	5/1/2021	3	0	0	490	0	0	0	2021
3	5/1/2021	4	0	0	490	0	0	0	2021
3	5/1/2021	5	0	0	490	0	0	0	2021
3	5/1/2021	6	0	0	490	0	0	0	2021
3	5/1/2021	7	0	0	490	0	0	0	2021
3	5/1/2021	8	0	0	490	0	0	0	2021
3	5/1/2021	9	0	0	485	0	0	0	2021
3	6/1/2021	0	0	0	766	0	0	0	2021
3	6/1/2021	1	0	0	766	0	0	0	2021
3	6/1/2021	2	0	0	765	0	0	0	2021
3	6/1/2021	3	0	0	762	0	0	0	2021
3	6/1/2021	4	0	0	761	0	0	0	2021
3	6/1/2021	5	0	0	759	0	0	0	2021
3	6/1/2021	6	0	0	754	0	0	0	2021
3	6/1/2021	7	0	0	736	0	0	0	2021
3	6/1/2021	8	0	0	695	0	0	0	2021
4		0	0	0	1933	0	0	0	2021
4		1	0	0	1924	0	0	0	2021
4		2	0	0	1921	0	0	0	2021
4		3	0	0	1899	0	0	0	2021
4		4	0	0	1882	0	0	0	2021
4		5	0	0	1838	0	0	0	2021
4		6	0	0	1780	0	0	0	2021
4		7	0	0	1690	0	0	0	2021
4		8	0	0	1553	0	0	0	2021
4		9	0	0	883	0	0	0	2021
4	5/1/2021	0	0	0	1249	0	0	0	2021
4	5/1/2021	1	0	0	1247	0	0	0	2021
4	5/1/2021	2	0	0	1247	0	0	0	2021
4	5/1/2021	3	0	0	1236	0	0	0	2021
4	5/1/2021	4	0	0	1225	0	0	0	2021
4	5/1/2021	5	0	0	1208	0	0	0	2021
4	5/1/2021	6	0	0	1182	0	0	0	2021
4	5/1/2021	7	0	0	1152	0	0	0	2021
4	5/1/2021	8	0	0	1090	0	0	0	2021
4	5/1/2021	9	0	0	883	0	0	0	2021

4	6/1/2021	0	0	0	684	0	0	0	2021
4	6/1/2021	1	0	0	677	0	0	0	2021
4	6/1/2021	2	0	0	674	0	0	0	2021
4	6/1/2021	3	0	0	663	0	0	0	2021
4	6/1/2021	4	0	0	657	0	0	0	2021
4	6/1/2021	5	0	0	630	0	0	0	2021
4	6/1/2021	6	0	0	598	0	0	0	2021
4	6/1/2021	7	0	0	538	0	0	0	2021
4	6/1/2021	8	0	0	463	0	0	0	2021
5		0	0.24	1	4127	10357.63	2.51	10357.63	2021
5		1	5.1	21	4120	190852.5	46.32	9088.21	2021
5		2	8.75	36	4105	333342.4	81.03	9259.51	2021
5		3	10.95	45	4088	437318.5	106.46	9718.19	2021
5		4	11.2	46	4014	448353.5	109.21	9746.81	2021
5		5	12.51	51	3825	500729.7	122.91	9818.23	2021
5		6	13.13	53	3225	521986.8	129.5	9848.81	2021
5		7	13.13	53	1615	521986.8	129.5	9848.81	2021
5		8	14.18	54	950	529753	137.67	9810.24	2021
5	6/1/2021	0	0.56	1	1783	10357.63	5.81	10357.63	2021
5	6/1/2021	1	4.49	8	1780	67970.91	38.18	8496.36	2021
5	6/1/2021	2	7.31	13	1773	107031.8	60.21	8233.22	2021
5	6/1/2021	3	8.44	15	1770	127368.7	71.7	8491.25	2021
5	6/1/2021	4	8.44	15	1752	127368.7	71.7	8491.25	2021
5	6/1/2021	5	9.03	16	1715	135194.1	76.26	8449.63	2021
5	6/1/2021	6	9.64	17	1636	146865.2	83.39	8639.13	2021
5	6/1/2021	7	9.64	17	1477	146865.2	83.39	8639.13	2021
5	6/1/2021	8	10.69	18	950	154631.4	91.57	8590.63	2021
5	7/1/2021	0	0	0	200	0	0	0	2021
5	7/1/2021	1	0	0	200	0	0	0	2021
5	7/1/2021	2	0	0	200	0	0	0	2021
5	7/1/2021	3	5.03	1	199	13773.83	69.22	13773.83	2021
5	7/1/2021	4	5.03	1	198	13773.83	69.22	13773.83	2021
5	7/1/2021	5	10.1	2	197	25637.96	129.44	12818.98	2021
5	7/1/2021	6	10.1	2	178	25637.96	129.44	12818.98	2021
5	7/1/2021	7	10.1	2	138	25637.96	129.44	12818.98	2021
5	8/1/2021	0	0	0	2096	0	0	0	2021
5	8/1/2021	1	6.21	13	2092	122881.5	58.74	9452.43	2021
5	8/1/2021	2	11.01	23	2085	226310.5	108.35	9839.59	2021
5	8/1/2021	3	13.42	28	2072	285885	137.1	10210.18	2021
5	8/1/2021	4	13.92	29	2018	296919.9	142.57	10238.62	2021
5	8/1/2021	5	15.52	32	1868	329606.6	160.06	10300.21	2021
5	8/1/2021	6	16.23	33	1411	339192.7	166.86	10278.57	2021
6		0	0.18	3	16527	34953.04	2.11	11651.01	2021
6		1	2.74	45	16411	465020	28.32	10333.78	2021
6		2	4.73	77	16126	785868.5	48.22	10206.08	2021
6		3	5.99	97	15783	997430	61.62	10282.78	2021
6		4	7.34	116	14047	1197199	75.84	10320.68	2021
6		5	8.22	126	11417	1301603	84.99	10330.18	2021
6		6	9.01	132	7558	1363750	93.21	10331.44	2021
6		7	9.55	134	3759	1380463	97.66	10301.97	2021
6		8	9.55	134	2476	1380463	97.66	10301.97	2021
6	6/1/2021	0	0.5	2	4003	23697.95	5.92	11848.98	2021
6	6/1/2021	1	4.76	19	3989	185418	46.46	9758.84	2021
6	6/1/2021	2	6.27	25	3976	241352.5	60.53	9654.1	2021

6	6/1/2021	3	7.79	31	3951	301398.4	75.73	9722.53	2021
6	6/1/2021	4	10.36	41	3889	406598.6	102.78	9917.04	2021
6	6/1/2021	5	10.62	42	3795	416902.4	105.49	9926.25	2021
6	6/1/2021	6	11.72	46	3641	457228	116.57	9939.74	2021
6	6/1/2021	7	12.34	48	3232	473941.8	121.74	9873.79	2021
6	6/1/2021	8	12.34	48	2476	473941.8	121.74	9873.79	2021
6	7/1/2021	0	0	0	648	0	0	0	2021
6	7/1/2021	1	4.64	3	647	23439.68	36.23	7813.23	2021
6	7/1/2021	2	9.3	6	644	50622.88	78.44	8437.15	2021
6	7/1/2021	3	9.3	6	642	50622.88	78.44	8437.15	2021
6	7/1/2021	4	10.88	7	629	59593.11	92.7	8513.3	2021
6	7/1/2021	5	10.88	7	612	59593.11	92.7	8513.3	2021
6	7/1/2021	6	10.88	7	587	59593.11	92.7	8513.3	2021
6	7/1/2021	7	10.88	7	527	59593.11	92.7	8513.3	2021
6	8/1/2021	0	0.2	1	4884	11255.09	2.3	11255.09	2021
6	8/1/2021	1	3.49	17	4863	191008.2	39.27	11235.77	2021
6	8/1/2021	2	8.3	40	4791	428739	88.89	10718.47	2021
6	8/1/2021	3	11.25	54	4743	580254.5	120.83	10745.45	2021
6	8/1/2021	4	12.59	60	4477	644639.1	135.21	10743.99	2021
6	8/1/2021	5	14.82	69	4027	738739.3	158.58	10706.37	2021
6	8/1/2021	6	15.42	71	3330	760560.5	165.13	10712.12	2021
6	9/1/2021	0	0	0	4778	0	0	0	2021
6	9/1/2021	1	1.06	5	4735	52732.55	11.14	10546.51	2021
6	9/1/2021	2	1.06	5	4621	52732.55	11.14	10546.51	2021
6	9/1/2021	3	1.06	5	4446	52732.55	11.14	10546.51	2021
6	9/1/2021	4	1.6	7	3646	73946.32	16.96	10563.76	2021
6	9/1/2021	5	1.6	7	2983	73946.32	16.96	10563.76	2021
6	10/1/2021	0	0	0	2214	0	0	0	2021
6	10/1/2021	1	0.46	1	2177	12421.61	5.71	12421.61	2021
6	10/1/2021	2	0.46	1	2094	12421.61	5.71	12421.61	2021
6	10/1/2021	3	0.46	1	2001	12421.61	5.71	12421.61	2021
6	10/1/2021	4	0.46	1	1406	12421.61	5.71	12421.61	2021
7		0	0.09	4	46800	39105.56	0.84	9776.39	2021
7		1	1.1	51	46487	562447.9	12.09	11028.39	2021
7		2	2.56	118	45728	1334735	28.98	11311.31	2021
7		3	3.46	158	44686	1794441	39.27	11357.22	2021
7		4	4.17	188	42362	2139312	47.41	11379.32	2021
7		5	4.63	204	34511	2344473	53.36	11492.52	2021
7		6	4.81	209	27358	2408651	55.7	11524.65	2021
7		7	5	212	16257	2442049	57.76	11519.1	2021
7		8	5.22	214	9027	2461226	59.88	11501.06	2021
7		9	5.22	214	4199	2461226	59.88	11501.06	2021
7	5/1/2021	0	0.18	1	5506	8406.36	1.53	8406.36	2021
7	5/1/2021	1	1.27	7	5497	75058.31	13.65	10722.62	2021
7	5/1/2021	2	2.18	12	5489	123791	22.53	10315.91	2021
7	5/1/2021	3	2.55	14	5475	145622.5	26.52	10401.61	2021
7	5/1/2021	4	2.92	16	5455	169567	30.91	10597.93	2021
7	5/1/2021	5	3.47	19	5411	201120.2	36.74	10585.27	2021
7	5/1/2021	6	3.47	19	5289	201120.2	36.74	10585.27	2021
7	5/1/2021	7	3.47	19	5129	201120.2	36.74	10585.27	2021
7	5/1/2021	8	3.88	21	4872	220297.2	40.67	10490.34	2021
7	5/1/2021	9	3.88	21	4199	220297.2	40.67	10490.34	2021
7	6/1/2021	0	0.15	1	6527	8636.27	1.32	8636.27	2021
7	6/1/2021	1	1.38	9	6519	103445.8	15.87	11493.97	2021

7	6/1/2021	2	3.53	23	6500	256443.6	39.4	11149.72	2021
7	6/1/2021	3	4.46	29	6480	320886	49.35	11065.03	2021
7	6/1/2021	4	5.24	34	6412	372869.3	57.46	10966.74	2021
7	6/1/2021	5	5.56	36	6340	396280.4	61.15	11007.79	2021
7	6/1/2021	6	5.56	36	6109	396280.4	61.15	11007.79	2021
7	6/1/2021	7	5.73	37	5645	409054.7	63.41	11055.53	2021
7	6/1/2021	8	5.73	37	4155	409054.7	63.41	11055.53	2021
7	7/1/2021	0	0.13	1	7826	13844.6	1.77	13844.6	2021
7	7/1/2021	1	1.54	12	7801	121705	15.6	10142.08	2021
7	7/1/2021	2	3.22	25	7749	258144.2	33.2	10325.77	2021
7	7/1/2021	3	4.91	38	7690	401954.3	51.9	10577.74	2021
7	7/1/2021	4	6.36	49	7578	519838.9	67.46	10608.96	2021
7	7/1/2021	5	6.9	53	7371	582109.8	75.91	10983.2	2021
7	7/1/2021	6	7.48	57	6844	632333	83.25	11093.56	2021
7	7/1/2021	7	7.85	59	5483	652956.4	87.01	11067.06	2021
7	8/1/2021	0	0	0	14017	0	0	0	2021
7	8/1/2021	1	1.37	19	13903	212228.7	15.26	11169.93	2021
7	8/1/2021	2	3.21	44	13574	517475.5	37.75	11760.81	2021
7	8/1/2021	3	4.43	60	13110	710677.6	52.49	11844.63	2021
7	8/1/2021	4	5.08	68	12266	809936.8	60.58	11910.84	2021
7	8/1/2021	5	5.61	74	11392	885610.5	67.22	11967.71	2021
7	8/1/2021	6	5.72	75	9116	899565.1	68.76	11994.2	2021
7	9/1/2021	0	0	0	5980	0	0	0	2021
7	9/1/2021	1	0.51	3	5924	41791.8	7.05	13930.6	2021
7	9/1/2021	2	1.72	10	5783	129596.1	22.24	12959.61	2021
7	9/1/2021	3	2.25	13	5602	166016	28.74	12770.46	2021
7	9/1/2021	4	3.03	17	5137	217815.6	38.82	12812.68	2021
7	9/1/2021	5	3.28	18	3997	230068	41.89	12781.56	2021
7	10/1/2021	0	0.14	1	6944	8218.33	1.18	8218.33	2021
7	10/1/2021	1	0.14	1	6843	8218.33	1.18	8218.33	2021
7	10/1/2021	2	0.6	4	6633	49284.47	7.37	12321.12	2021
7	10/1/2021	3	0.6	4	6329	49284.47	7.37	12321.12	2021
7	10/1/2021	4	0.6	4	5514	49284.47	7.37	12321.12	2021
8		0	0.13	2	14914	20618.66	1.38	10309.33	2021
8		1	0.82	12	14674	125054.7	8.5	10421.22	2021
8		2	2.16	31	14125	356141.1	24.86	11488.42	2021
8		3	3.72	52	13495	618791.9	44.32	11899.84	2021
8		4	4.84	66	12509	768628.9	56.3	11645.89	2021
8		5	5.4	71	8889	825801.4	62.73	11631.01	2021
8		6	5.86	73	4319	846974.7	67.64	11602.39	2021
8		7	5.86	73	3173	846974.7	67.64	11602.39	2021
8		8	5.86	73	1849	846974.7	67.64	11602.39	2021
8	5/1/2021	0	0	0	522	0	0	0	2021
8	5/1/2021	1	0	0	516	0	0	0	2021
8	5/1/2021	2	0	0	496	0	0	0	2021
8	5/1/2021	3	0	0	483	0	0	0	2021
8	5/1/2021	4	2.16	1	463	11530.45	24.9	11530.45	2021
8	5/1/2021	5	2.16	1	403	11530.45	24.9	11530.45	2021
8	5/1/2021	6	2.16	1	302	11530.45	24.9	11530.45	2021
8	5/1/2021	7	2.16	1	276	11530.45	24.9	11530.45	2021
8	5/1/2021	8	2.16	1	193	11530.45	24.9	11530.45	2021
8	6/1/2021	0	0.75	2	2676	20618.66	7.71	10309.33	2021
8	6/1/2021	1	2.63	7	2655	69390.73	26.07	9912.96	2021
8	6/1/2021	2	4.56	12	2596	121562.8	46.17	10130.23	2021

8	6/1/2021	3	5.73	15	2558	162517.1	62.18	10834.47	2021
8	6/1/2021	4	6.53	17	2505	179809.5	69.09	10577.03	2021
8	6/1/2021	5	7.79	20	2380	216145.5	84.35	10807.28	2021
8	6/1/2021	6	8.79	22	1991	237318.8	94.99	10787.22	2021
8	6/1/2021	7	8.79	22	1908	237318.8	94.99	10787.22	2021
8	6/1/2021	8	8.79	22	1656	237318.8	94.99	10787.22	2021
8	7/1/2021	0	0	0	3706	0	0	0	2021
8	7/1/2021	1	0	0	3620	0	0	0	2021
8	7/1/2021	2	1.17	4	3415	50151.38	14.69	12537.85	2021
8	7/1/2021	3	2.71	9	3239	106545.1	32.1	11838.34	2021
8	7/1/2021	4	5.05	16	2996	182576.1	57.47	11411.01	2021
8	7/1/2021	5	5.05	16	2360	182576.1	57.47	11411.01	2021
8	7/1/2021	6	5.05	16	1093	182576.1	57.47	11411.01	2021
8	7/1/2021	7	5.05	16	989	182576.1	57.47	11411.01	2021
8	8/1/2021	0	0	0	3261	0	0	0	2021
8	8/1/2021	1	0.32	1	3166	12302.18	3.89	12302.18	2021
8	8/1/2021	2	0.65	2	2965	27092.88	8.87	13546.44	2021
8	8/1/2021	3	2.16	6	2662	75658.42	27.12	12609.74	2021
8	8/1/2021	4	3.51	9	2209	108978.4	42.2	12108.71	2021
8	8/1/2021	5	3.51	9	1321	108978.4	42.2	12108.71	2021
8	8/1/2021	6	3.51	9	933	108978.4	42.2	12108.71	2021
8	9/1/2021	0	0	0	2912	0	0	0	2021
8	9/1/2021	1	1.04	3	2892	31258.84	10.81	10419.61	2021
8	9/1/2021	2	2.44	7	2850	74703.98	26.05	10672	2021
8	9/1/2021	3	4.24	12	2785	137482	48.59	11456.83	2021
8	9/1/2021	4	4.24	12	2638	137482	48.59	11456.83	2021
8	9/1/2021	5	5.06	14	2425	158318.5	57.19	11308.46	2021
8	10/1/2021	0	0	0	1837	0	0	0	2021
8	10/1/2021	1	0.55	1	1825	12102.92	6.63	12102.92	2021
8	10/1/2021	2	3.32	6	1803	82630.1	45.75	13771.68	2021
8	10/1/2021	3	5.58	10	1768	136589.4	76.27	13658.94	2021
8	10/1/2021	4	6.17	11	1698	148252.5	83.14	13477.5	2021
9		0	0.11	10	91410	105034.9	1.15	10503.49	2021
9		1	1.49	135	90663	1408821	15.53	10435.71	2021
9		2	3.09	277	88922	2953111	32.9	10661.05	2021
9		3	4.25	378	86678	4122686	46.39	10906.58	2021
9		4	5.11	448	81180	4894987	55.9	10926.31	2021
9		5	5.72	488	65945	5352918	62.85	10969.09	2021
9		6	6.03	503	48533	5521673	66.32	10977.48	2021
9		7	6.23	509	29523	5583580	68.42	10969.71	2021
9		8	6.4	512	17895	5610524	69.93	10958.05	2021
9		9	6.4	512	6125	5610524	69.93	10958.05	2021
9	5/1/2021	0	0.11	1	8746	8406.36	0.96	8406.36	2021
9	5/1/2021	1	1.03	9	8726	101128.2	11.59	11236.46	2021
9	5/1/2021	2	1.61	14	8694	149860.8	17.19	10704.35	2021
9	5/1/2021	3	2.07	18	8653	189720.1	21.8	10540	2021
9	5/1/2021	4	2.53	22	8591	235521.9	27.13	10705.54	2021
9	5/1/2021	5	3.01	26	8441	274112.7	31.7	10542.8	2021
9	5/1/2021	6	3.01	26	8162	274112.7	31.7	10542.8	2021
9	5/1/2021	7	3.01	26	7878	274112.7	31.7	10542.8	2021
9	5/1/2021	8	3.28	28	7367	293289.8	34.31	10474.63	2021
9	5/1/2021	9	3.28	28	6125	293289.8	34.31	10474.63	2021
9	6/1/2021	0	0.36	6	16760	63310.5	3.78	10551.75	2021
9	6/1/2021	1	2.63	44	16707	437703.1	26.19	9947.8	2021

9	6/1/2021	2	4.68	78	16602	768850.2	46.13	9857.05	2021
9	6/1/2021	3	5.77	96	16501	965514.1	58.05	10057.44	2021
9	6/1/2021	4	6.88	114	16290	1152435	69.53	10109.08	2021
9	6/1/2021	5	7.44	123	15919	1250409	75.68	10165.92	2021
9	6/1/2021	6	7.91	130	15008	1323579	80.56	10181.37	2021
9	6/1/2021	7	8.2	134	13768	1364863	83.55	10185.54	2021
9	6/1/2021	8	8.29	135	10528	1372629	84.29	10167.62	2021
9	7/1/2021	0	0.07	1	13426	13844.6	1.03	13844.6	2021
9	7/1/2021	1	1.2	16	13307	156848.3	11.78	9803.02	2021
9	7/1/2021	2	2.81	37	13041	378091.4	28.74	10218.69	2021
9	7/1/2021	3	4.3	56	12794	592069.1	45.47	10572.66	2021
9	7/1/2021	4	5.99	77	12407	817897.6	63.67	10622.05	2021
9	7/1/2021	5	6.51	83	11517	903715.1	71.12	10888.13	2021
9	7/1/2021	6	6.93	87	9612	953938.3	76.35	10964.81	2021
9	7/1/2021	7	7.18	89	7877	974561.7	78.96	10950.13	2021
9	8/1/2021	0	0.04	1	25601	11255.09	0.44	11255.09	2021
9	8/1/2021	1	2.05	52	25361	554615.2	21.86	10665.68	2021
9	8/1/2021	2	4.52	113	24738	1234267	49.34	10922.72	2021
9	8/1/2021	3	6.15	152	23885	1687125	68.3	11099.5	2021
9	8/1/2021	4	7	171	22206	1907767	78.23	11156.53	2021
9	8/1/2021	5	7.92	189	19762	2110227	88.48	11165.22	2021
9	8/1/2021	6	8.17	193	15751	2155589	91.36	11168.85	2021
9	9/1/2021	0	0	0	14981	0	0	0	2021
9	9/1/2021	1	0.74	11	14846	125783.2	8.47	11434.84	2021
9	9/1/2021	2	1.64	24	14509	277705.9	18.94	11571.08	2021
9	9/1/2021	3	2.85	41	14040	489962.8	34.06	11950.31	2021
9	9/1/2021	4	3.41	48	12521	571406.8	40.57	11904.31	2021
9	9/1/2021	5	3.7	51	10306	604495.7	43.78	11852.86	2021
9	10/1/2021	0	0.08	1	11896	8218.33	0.69	8218.33	2021
9	10/1/2021	1	0.25	3	11716	32742.86	2.78	10914.29	2021
9	10/1/2021	2	0.96	11	11338	144336.2	12.63	13121.47	2021
9	10/1/2021	3	1.33	15	10805	198295.5	17.62	13219.7	2021
9	10/1/2021	4	1.44	16	9165	209958.6	18.89	13122.41	2021

Load Date= Currency E Generated By=TKNOTT
21],[15-Oct-2021],
Cost Type Use Group Currency = Distance = Descriptions = Yes

Vehicle Lin	LOGIC
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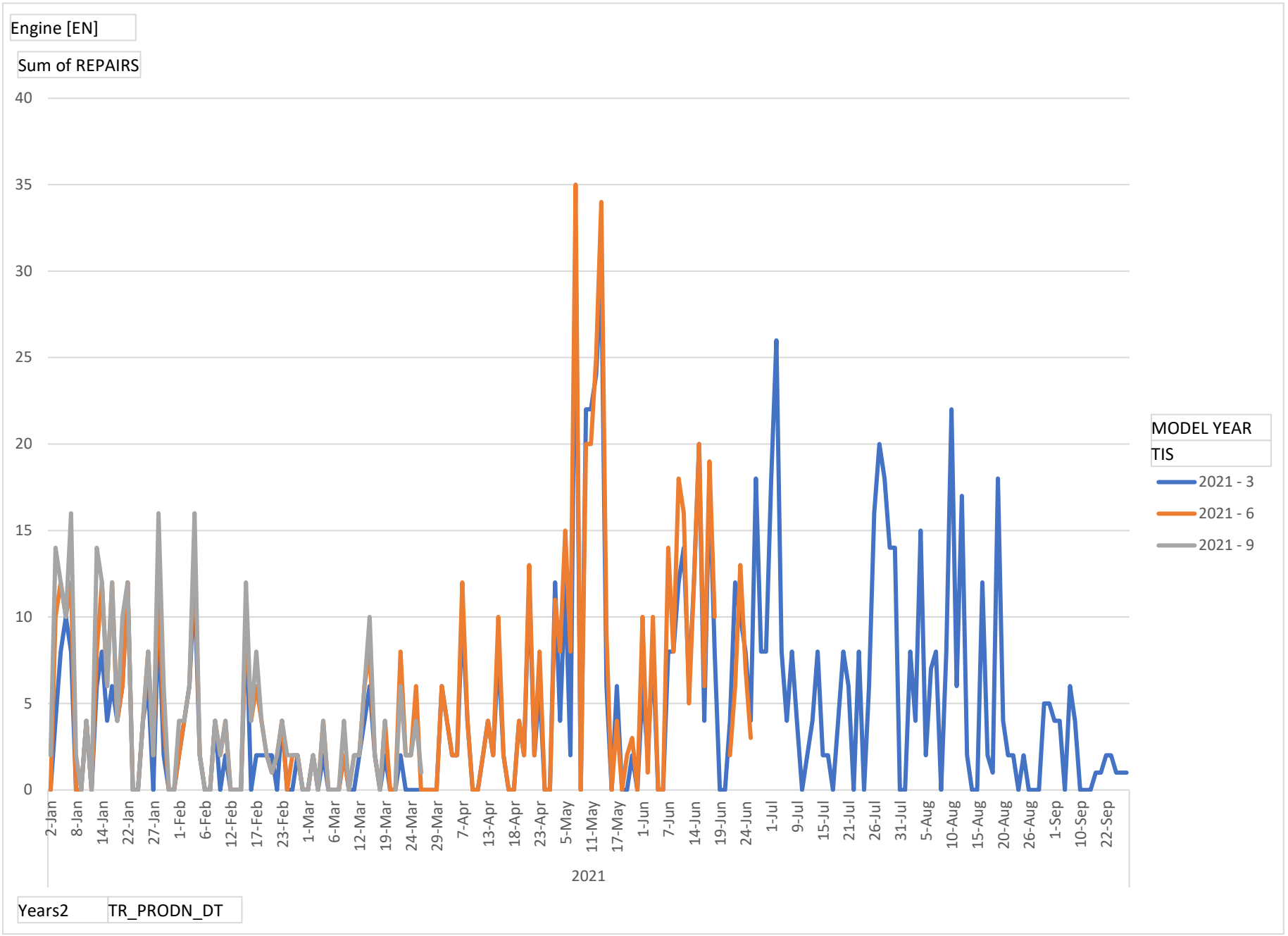
T/G1 - U72	Corporate

TOTAL	Corporate
TOTAL	Corporate
TOTAL	Corporate


Engine [EN]
Sum of REPAIRS
40
35
30
25
20
15
10
5
0
2-Jan
8-Jan
14-Jan
22-Jan
27-Jan
1-Feb
6-Feb
12-Feb
17-Feb
23-Feb
1-Mar
6-Mar
12-Mar
19-Mar
24-Mar
29-Mar
7-Apr
13-Apr
18-Apr
23-Apr
5-May
11-May
17-May
1-Jun
7-Jun
14-Jun
19-Jun
24-Jun
1-Jul
9-Jul
15-Jul
21-Jul
26-Jul
31-Jul
5-Aug
10-Aug
15-Aug
20-Aug
26-Aug
1-Sep
10-Sep
22-Sep
2021
MODEL YEAR
TIS
2021 - 3
2021 - 6
2021 - 9
Years2
TR_PRODN_DT

Engine [EN]	T/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV

Sum of REPAIRS	Column Labels				
	2021			2021 Total	Grand Total
Row Labels	3	6	9		
2021	1005	716	302	2023	2023
2-Jan	0	0	2	2	2
4-Jan	4	10	14	28	28
5-Jan	8	12	12	32	32
6-Jan	10	10	10	30	30
7-Jan	8	12	16	36	36
8-Jan	0	0	2	2	2
10-Jan	0	0	0	0	0
11-Jan	4	4	4	12	12
12-Jan	0	0	0	0	0
13-Jan	6	8	14	28	28
14-Jan	8	12	12	32	32
15-Jan	4	6	6	16	16
19-Jan	6	12	12	30	30
20-Jan	4	4	4	12	12
21-Jan	6	6	10	22	22
22-Jan	12	12	12	36	36
23-Jan	0	0	0	0	0
24-Jan	0	0	0	0	0
25-Jan	4	4	4	12	12
26-Jan	6	8	8	22	22
27-Jan	0	2	2	4	4
28-Jan	10	12	16	38	38
29-Jan	2	4	6	12	12
30-Jan	0	0	0	0	0
31-Jan	0	0	0	0	0
1-Feb	2	2	4	8	8
2-Feb	4	4	4	12	12
3-Feb	6	6	6	18	18
4-Feb	12	14	16	42	42
5-Feb	2	2	2	6	6
6-Feb	0	0	0	0	0
8-Feb	0	0	0	0	0
9-Feb	4	4	4	12	12
10-Feb	0	2	2	4	4
11-Feb	2	4	4	10	10
12-Feb	0	0	0	0	0
13-Feb	0	0	0	0	0
14-Feb	0	0	0	0	0
15-Feb	10	10	12	32	32
16-Feb	0	4	4	8	8
17-Feb	2	6	8	16	16
18-Feb	2	4	4	10	10
19-Feb	2	2	2	6	6
20-Feb	2	1	1	4	4
22-Feb	0	2	2	4	4
23-Feb	4	4	4	12	12
24-Feb	0	0	2	2	2
25-Feb	0	2	2	4	4
26-Feb	2	2	2	6	6

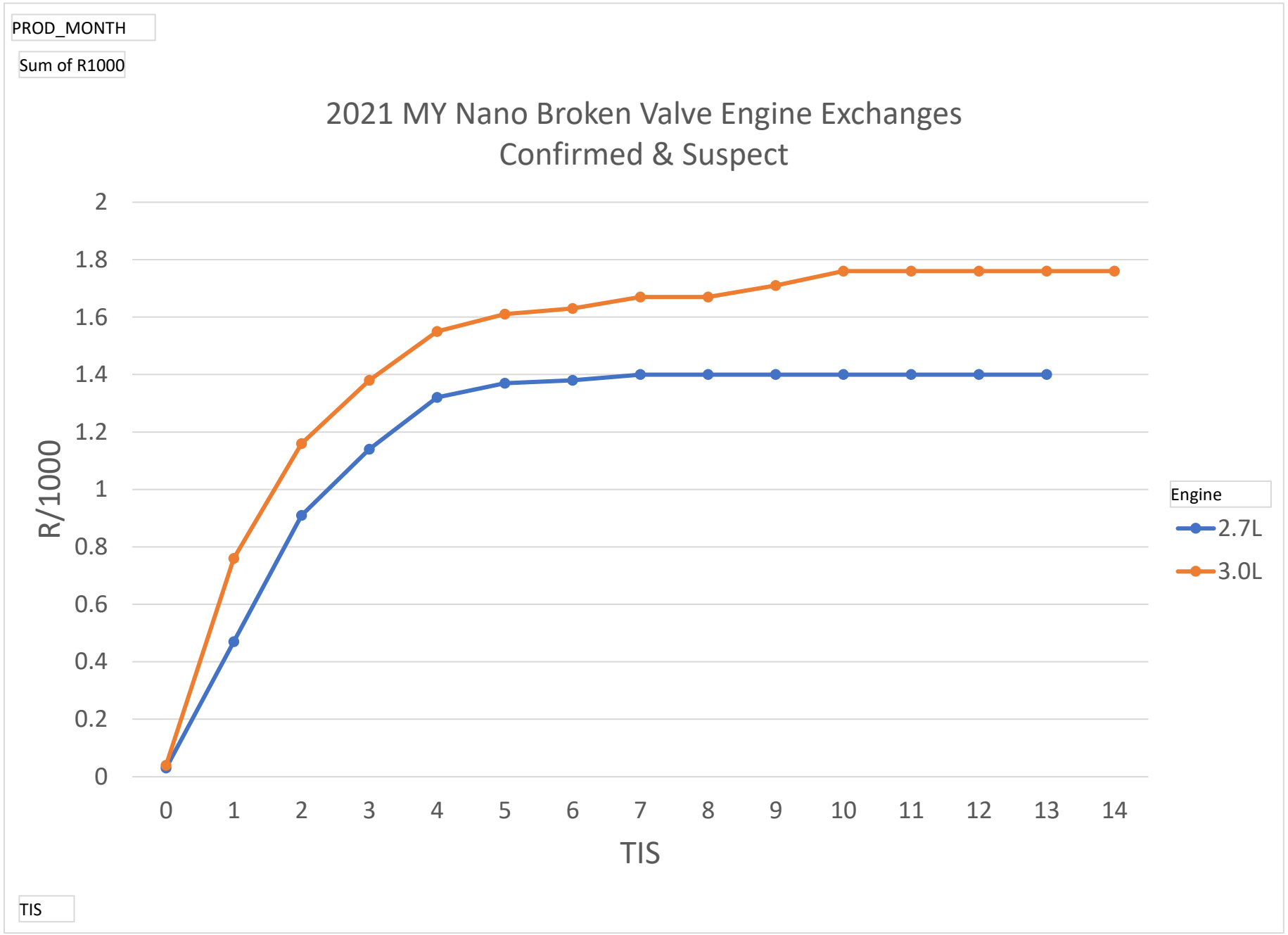
27-Feb	0	0	0	0	0
1-Mar	0	0	0	0	0
2-Mar	2	2	2	6	6
3-Mar	0	0	0	0	0
4-Mar	2	4	4	10	10
5-Mar	0	0	0	0	0
6-Mar	0	0	0	0	0
8-Mar	0	0	0	0	0
9-Mar	2	2	4	8	8
10-Mar	0	0	0	0	0
11-Mar	0	2	2	4	4
12-Mar	2	2	2	6	6
15-Mar	4	6	6	16	16
16-Mar	6	8	10	24	24
17-Mar	2	2	2	6	6
18-Mar	0	0	0	0	0
19-Mar	2	4	4	10	10
20-Mar	0	0		0	0
21-Mar	0	0	0	0	0
22-Mar	2	8	6	16	16
23-Mar	0	2	2	4	4
24-Mar	0	2	2	4	4
25-Mar	0	6	4	10	10
26-Mar	0	0	1	1	1
27-Mar	0	0		0	0
28-Mar	0	0		0	0
29-Mar	0	0		0	0
30-Mar	6	6		12	12
31-Mar	4	4		8	8
1-Apr	2	2		4	4
6-Apr	2	2		4	4
7-Apr	10	12		22	22
8-Apr	4	4		8	8
9-Apr	0	0		0	0
11-Apr	0	0		0	0
12-Apr	2	2		4	4
13-Apr	4	4		8	8
14-Apr	2	2		4	4
15-Apr	8	10		18	18
16-Apr	2	2		4	4
17-Apr	0	0		0	0
18-Apr	0	0		0	0
19-Apr	4	4		8	8
20-Apr	2	2		4	4
21-Apr	12	13		25	25
22-Apr	2	2		4	4
23-Apr	6	8		14	14
24-Apr	0	0		0	0
26-Apr	0	0		0	0
3-May	12	11		23	23
4-May	4	8		12	12
5-May	12	15		27	27
6-May	2	8		10	10
7-May	32	35		67	67
8-May	0	0		0	0

10-May	22	20	42	42
11-May	22	20	42	42
12-May	24	25	49	49
13-May	30	34	64	64
14-May	6	9	15	15
15-May	0	0	0	0
17-May	6	4	10	10
18-May	0	0	0	0
19-May	0	2	2	2
20-May	2	3	5	5
21-May	0	0	0	0
1-Jun	6	10	16	16
2-Jun	2	1	3	3
3-Jun	8	10	18	18
4-Jun	0	0	0	0
6-Jun	0	0	0	0
7-Jun	8	14	22	22
8-Jun	8	8	16	16
9-Jun	12	18	30	30
10-Jun	14	16	30	30
11-Jun	6	5	11	11
14-Jun	12	12	24	24
15-Jun	20	20	40	40
16-Jun	4	6	10	10
17-Jun	18	19	37	37
18-Jun	8	10	18	18
19-Jun	0		0	0
20-Jun	0		0	0
21-Jun	4	2	6	6
22-Jun	12	6	18	18
23-Jun	10	13	23	23
24-Jun	8	7	15	15
25-Jun	4	3	7	7
28-Jun	18		18	18
29-Jun	8		8	8
30-Jun	8		8	8
1-Jul	18		18	18
2-Jul	26		26	26
6-Jul	8		8	8
7-Jul	4		4	4
8-Jul	8		8	8
9-Jul	4		4	4
11-Jul	0		0	0
12-Jul	2		2	2
13-Jul	4		4	4
14-Jul	8		8	8
15-Jul	2		2	2
16-Jul	2		2	2
18-Jul	0		0	0
19-Jul	4		4	4
20-Jul	8		8	8
21-Jul	6		6	6
22-Jul	0		0	0
23-Jul	8		8	8
24-Jul	0		0	0

25-Jul	6			6	6
26-Jul	16			16	16
27-Jul	20			20	20
28-Jul	18			18	18
29-Jul	14			14	14
30-Jul	14			14	14
31-Jul	0			0	0
1-Aug	0			0	0
2-Aug	8			8	8
3-Aug	4			4	4
4-Aug	15			15	15
5-Aug	2			2	2
6-Aug	7			7	7
7-Aug	8			8	8
8-Aug	0			0	0
9-Aug	8			8	8
10-Aug	22			22	22
11-Aug	6			6	6
12-Aug	17			17	17
13-Aug	2			2	2
14-Aug	0			0	0
15-Aug	0			0	0
16-Aug	12			12	12
17-Aug	2			2	2
18-Aug	1			1	1
19-Aug	18			18	18
20-Aug	4			4	4
22-Aug	2			2	2
23-Aug	2			2	2
24-Aug	0			0	0
25-Aug	2			2	2
26-Aug	0			0	0
27-Aug	0			0	0
29-Aug	0			0	0
30-Aug	5			5	5
31-Aug	5			5	5
1-Sep	4			4	4
2-Sep	4			4	4
3-Sep	0			0	0
8-Sep	6			6	6
9-Sep	4			4	4
10-Sep	0			0	0
14-Sep	0			0	0
16-Sep	0			0	0
20-Sep	1			1	1
21-Sep	1			1	1
22-Sep	2			2	2
23-Sep	2			2	2
24-Sep	1			1	1
27-Sep	1			1	1
28-Sep	1			1	1
Grand Total	**1005**	**716**	**302**	**2023**	**2023**

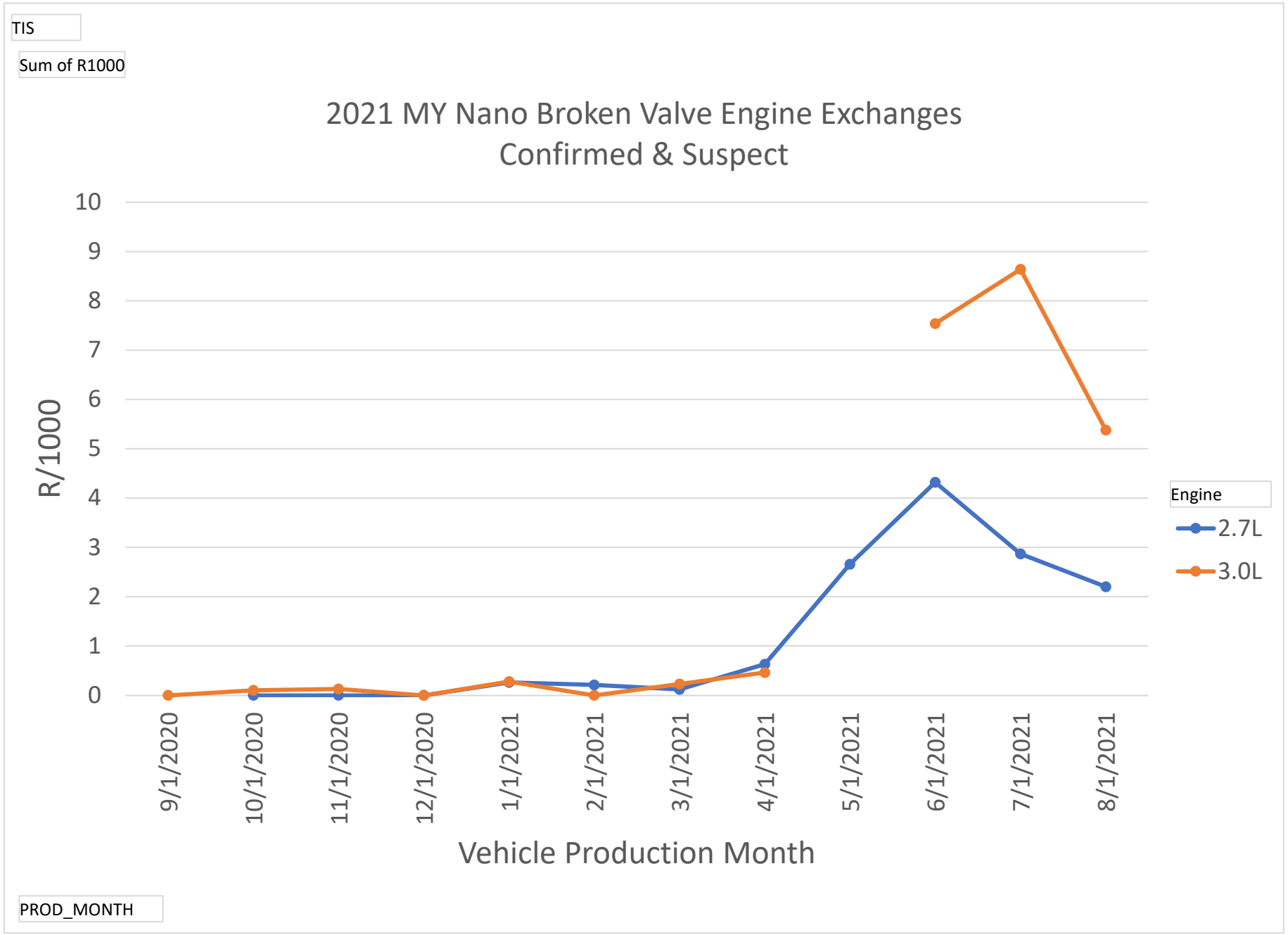
MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE	Engine [EN]	TR_PRODN_DT	LOGIC
120		0	11.9	1	84	4400.03	52.38	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120		1	11.9	1	80	4400.03	52.38	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120		2	11.9	1	61	4400.03	52.38	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120		3	11.9	1	37	4400.03	52.38	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120		4	11.9	1	23	4400.03	52.38	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Aug-21	0	12.2	1	82	4400.03	53.66	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Aug-21	1	12.2	1	79	4400.03	53.66	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Aug-21	2	12.2	1	61	4400.03	53.66	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Aug-21	3	12.2	1	37	4400.03	53.66	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Aug-21	4	12.2	1	23	4400.03	53.66	4400.03	2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Sep-21	0	0		2		0		2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
120	1-Sep-21	1	0		1		0		2021	C/RBQ - 3.0L NANO-D	5-Aug-21	Corporate
314		0	0	0	84	0	0	0	2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314		1	0	0	82	0	0	0	2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314		2	0	0	81	0	0	0	2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314		3	0	0	64	0	0	0	2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314		4	0	0	57	0	0	0	2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Aug-21	0	0		67		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Aug-21	1	0		66		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Aug-21	2	0		65		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Aug-21	3	0		64		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Aug-21	4	0		57		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Oct-21	0	0		17		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Oct-21	1	0		16		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
314	1-Oct-21	2	0		16		0		2021	C/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
688		0	0	0	742	0	0	0	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688		1	2.72	2	734	18968.86	25.84	9484.43	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688		2	4.13	3	714	28158.65	38.71	9386.22	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688		3	8.58	6	673	53014.53	75.65	8835.75	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688		4	10.54	7	512	55728.12	80.95	7961.16	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Aug-21	0	0	0	638	0	0	0	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Aug-21	1	3.15	2	635	18968.86	29.87	9484.43	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Aug-21	2	4.75	3	624	28158.65	44.6	9386.22	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Aug-21	3	9.79	6	596	53014.53	86.3	8835.75	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Aug-21	4	11.74	7	512	55728.12	91.6	7961.16	2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Sep-21	0	0		104		0		2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Sep-21	1	0		99		0		2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Sep-21	2	0		90		0		2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate
688	1-Sep-21	3	0		77		0		2021	C/YX - 3.0L GTDI TC \	5-Aug-21	Corporate

1031		0	0	0	1382	0	0	0	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031		1	0	0	1353	0	0	0	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031		2	0.78	1	1278	12527.24	9.8	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031		3	0.78	1	968	12527.24	9.8	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031		4	0.78	1	680	12527.24	9.8	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Aug-21	0	0	0	963	0	0	0	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Aug-21	1	0	0	951	0	0	0	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Aug-21	2	1.09	1	919	12527.24	13.63	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Aug-21	3	1.09	1	859	12527.24	13.63	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Aug-21	4	1.09	1	680	12527.24	13.63	12527.24	2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Sep-21	0	0		155		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Sep-21	1	0		149		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Sep-21	2	0		142		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Sep-21	3	0		109		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Oct-21	0	0		264		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Oct-21	1	0		253		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate
1031	1-Oct-21	2	0		217		0		2021 T/WQ - 2.7L DOHC 4\	5-Aug-21	Corporate


PROD_MONTH
Sum of R1000
2021 MY Nano Broken Valve Engine Exchanges
Confirmed & Suspect
R/1000
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
TIS
Engine
2.7L
3.0L
TIS

PROD_MONTH (blank)

Sum of R1000	Column Labels		
Row Labels	**2.7L**	**3.0L**	**Grand Total**
0	0.03	0.04	0.07
1	0.47	0.76	1.23
2	0.91	1.16	2.07
3	1.14	1.38	2.52
4	1.32	1.55	2.87
5	1.37	1.61	2.98
6	1.38	1.63	3.01
7	1.4	1.67	3.07
8	1.4	1.67	3.07
9	1.4	1.71	3.11
10	1.4	1.76	3.16
11	1.4	1.76	3.16
12	1.4	1.76	3.16
13	1.4	1.76	3.16
14		1.76	1.76
Grand Total	**16.42**	**21.98**	**38.4**


TIS
Sum of R1000
2021 MY Nano Broken Valve Engine Exchanges
Confirmed & Suspect
R/1000
10
9
8
7
6
5
4
3
2
1
0
9/1/2020
10/1/2020
11/1/2020
12/1/2020
1/1/2021
2/1/2021
3/1/2021
4/1/2021
5/1/2021
6/1/2021
7/1/2021
8/1/2021
Vehicle Production Month
Engine
2.7L
3.0L
PROD_MONTH

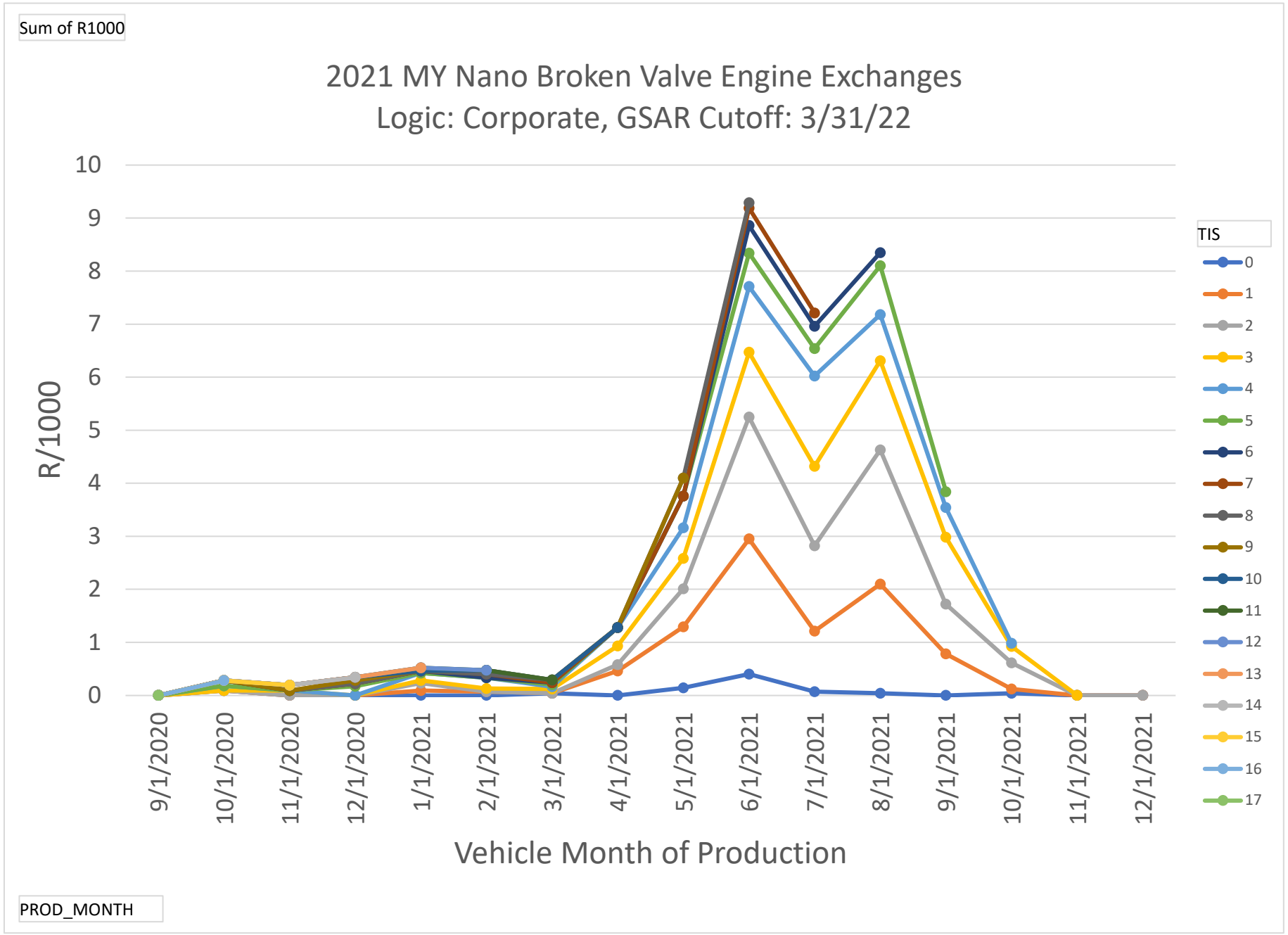
TIS	3

Sum of R1000	Column Labels		
Row Labels	**2.7L**	**3.0L**	**Grand Total**
9/1/2020		0	0
10/1/2020	0	0.1	0.1
11/1/2020	0	0.13	0.13
12/1/2020	0	0	0
1/1/2021	0.26	0.28	0.54
2/1/2021	0.21	0	0.21
3/1/2021	0.12	0.23	0.35
4/1/2021	0.63	0.46	1.09
5/1/2021	2.66		2.66
6/1/2021	4.32	7.54	11.86
7/1/2021	2.87	8.64	11.51
8/1/2021	2.2	5.38	7.58
Grand Total	**13.27**	**22.76**	**36.03**

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE	LOGIC	Engine
1		0	0.03	5	152231	50018.34	0.33	10003.67	2021	Corporate	2.7L
1		1	0.47	63	133947	684076	5.06	10858.35	2021	Corporate	2.7L
1		2	0.91	113	113006	1231736	9.91	10900.31	2021	Corporate	2.7L
1		3	1.14	136	98444	1495831	12.59	10998.76	2021	Corporate	2.7L
1		4	1.32	151	82731	1649658	14.45	10924.89	2021	Corporate	2.7L
1		5	1.37	154	70810	1681619	14.9	10919.6	2021	Corporate	2.7L
1		6	1.38	155	61127	1690429	15.05	10905.99	2021	Corporate	2.7L
1		7	1.4	156	52806	1700440	15.24	10900.25	2021	Corporate	2.7L
1		8	1.4	156	44182	1700440	15.24	10900.25	2021	Corporate	2.7L
1		9	1.4	156	29200	1700440	15.24	10900.25	2021	Corporate	2.7L
1		10	1.4	156	17037	1700440	15.24	10900.25	2021	Corporate	2.7L
1		11	1.4	156	7343	1700440	15.24	10900.25	2021	Corporate	2.7L
1		12	1.4	156	1308	1700440	15.24	10900.25	2021	Corporate	2.7L
1		13	1.4	156	159	1700440	15.24	10900.25	2021	Corporate	2.7L
1	10/1/2020	0	0	0	2659	0	0	0	2021	Corporate	2.7L
1	10/1/2020	1	0	0	2659	0	0	0	2021	Corporate	2.7L
1	10/1/2020	2	0	0	2655	0	0	0	2021	Corporate	2.7L
1	10/1/2020	3	0	0	2652	0	0	0	2021	Corporate	2.7L
1	10/1/2020	4	0	0	2646	0	0	0	2021	Corporate	2.7L
1	10/1/2020	5	0	0	2633	0	0	0	2021	Corporate	2.7L
1	10/1/2020	6	0	0	2612	0	0	0	2021	Corporate	2.7L
1	10/1/2020	7	0	0	2563	0	0	0	2021	Corporate	2.7L
1	10/1/2020	8	0	0	2442	0	0	0	2021	Corporate	2.7L
1	10/1/2020	9	0	0	2221	0	0	0	2021	Corporate	2.7L
1	10/1/2020	10	0	0	1849	0	0	0	2021	Corporate	2.7L
1	10/1/2020	11	0	0	1364	0	0	0	2021	Corporate	2.7L
1	10/1/2020	12	0	0	610	0	0	0	2021	Corporate	2.7L
1	11/1/2020	0	0	0	3937	0	0	0	2021	Corporate	2.7L
1	11/1/2020	1	0	0	3934	0	0	0	2021	Corporate	2.7L
1	11/1/2020	2	0	0	3928	0	0	0	2021	Corporate	2.7L
1	11/1/2020	3	0	0	3920	0	0	0	2021	Corporate	2.7L
1	11/1/2020	4	0	0	3895	0	0	0	2021	Corporate	2.7L
1	11/1/2020	5	0	0	3855	0	0	0	2021	Corporate	2.7L
1	11/1/2020	6	0	0	3790	0	0	0	2021	Corporate	2.7L
1	11/1/2020	7	0	0	3677	0	0	0	2021	Corporate	2.7L
1	11/1/2020	8	0	0	3441	0	0	0	2021	Corporate	2.7L
1	11/1/2020	9	0	0	3083	0	0	0	2021	Corporate	2.7L
1	11/1/2020	10	0	0	2485	0	0	0	2021	Corporate	2.7L
1	11/1/2020	11	0	0	1717	0	0	0	2021	Corporate	2.7L
1	11/1/2020	12	0	0	611	0	0	0	2021	Corporate	2.7L
1	12/1/2020	0	0	0	11341	0	0	0	2021	Corporate	2.7L
1	12/1/2020	1	0	0	11335	0	0	0	2021	Corporate	2.7L
1	12/1/2020	2	0	0	11319	0	0	0	2021	Corporate	2.7L
1	12/1/2020	3	0	0	11285	0	0	0	2021	Corporate	2.7L
1	12/1/2020	4	0	0	11206	0	0	0	2021	Corporate	2.7L
1	12/1/2020	5	0	0	11105	0	0	0	2021	Corporate	2.7L
1	12/1/2020	6	0.09	1	10928	8810.14	0.81	8810.14	2021	Corporate	2.7L
1	12/1/2020	7	0.19	2	10553	18820.79	1.75	9410.4	2021	Corporate	2.7L
1	12/1/2020	8	0.19	2	9766	18820.79	1.75	9410.4	2021	Corporate	2.7L
1	12/1/2020	9	0.19	2	8566	18820.79	1.75	9410.4	2021	Corporate	2.7L
1	12/1/2020	10	0.19	2	6462	18820.79	1.75	9410.4	2021	Corporate	2.7L
1	12/1/2020	11	0.19	2	4174	18820.79	1.75	9410.4	2021	Corporate	2.7L
1	1/1/2021	0	0	0	15227	0	0	0	2021	Corporate	2.7L
1	1/1/2021	1	0.07	1	15208	12273	0.81	12273	2021	Corporate	2.7L
1	1/1/2021	2	0.2	3	15179	35486.1	2.34	11828.7	2021	Corporate	2.7L
1	1/1/2021	3	0.26	4	15134	49258.05	3.25	12314.51	2021	Corporate	2.7L
1	1/1/2021	4	0.33	5	15034	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	5	0.33	5	14886	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	6	0.33	5	14558	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	7	0.33	5	13877	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	8	0.33	5	12470	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	9	0.33	5	10016	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	1/1/2021	10	0.33	5	6153	63112.14	4.17	12622.43	2021	Corporate	2.7L
1	2/1/2021	0	0	0	9801	0	0	0	2021	Corporate	2.7L
1	2/1/2021	1	0.1	1	9791	7523.47	0.77	7523.47	2021	Corporate	2.7L
1	2/1/2021	2	0.1	1	9752	7523.47	0.77	7523.47	2021	Corporate	2.7L
1	2/1/2021	3	0.21	2	9709	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	4	0.21	2	9630	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	5	0.21	2	9489	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	6	0.21	2	9256	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	7	0.21	2	8750	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	8	0.21	2	7622	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	2/1/2021	9	0.21	2	5226	21909.6	2.25	10954.8	2021	Corporate	2.7L
1	3/1/2021	0	0.06	1	16767	15077.62	0.9	15077.62	2021	Corporate	2.7L
1	3/1/2021	1	0.06	1	16563	15077.62	0.9	15077.62	2021	Corporate	2.7L
1	3/1/2021	2	0.12	2	16244	28012.02	1.7	14006.01	2021	Corporate	2.7L
1	3/1/2021	3	0.12	2	15605	28012.02	1.7	14006.01	2021	Corporate	2.7L
1	3/1/2021	4	0.19	3	14548	41268.31	2.61	13756.1	2021	Corporate	2.7L
1	3/1/2021	5	0.19	3	13645	41268.31	2.61	13756.1	2021	Corporate	2.7L
1	3/1/2021	6	0.19	3	12591	41268.31	2.61	13756.1	2021	Corporate	2.7L
1	3/1/2021	7	0.19	3	11271	41268.31	2.61	13756.1	2021	Corporate	2.7L
1	3/1/2021	8	0.19	3	8353	41268.31	2.61	13756.1	2021	Corporate	2.7L
1	4/1/2021	0	0	0	6532	0	0	0	2021	Corporate	2.7L
1	4/1/2021	1	0.63	4	6372	45960.24	7.21	11490.06	2021	Corporate	2.7L
1	4/1/2021	2	0.63	4	6092	45960.24	7.21	11490.06	2021	Corporate	2.7L
1	4/1/2021	3	0.63	4	5241	45960.24	7.21	11490.06	2021	Corporate	2.7L
1	4/1/2021	4	1.08	6	4387	65652.28	11.7	10942.05	2021	Corporate	2.7L
1	4/1/2021	5	1.08	6	3335	65652.28	11.7	10942.05	2021	Corporate	2.7L
1	4/1/2021	6	1.08	6	2544	65652.28	11.7	10942.05	2021	Corporate	2.7L
1	4/1/2021	7	1.08	6	2027	65652.28	11.7	10942.05	2021	Corporate	2.7L
1	5/1/2021	0	0.14	1	6938	8406.36	1.21	8406.36	2021	Corporate	2.7L
1	5/1/2021	1	1.3	9	6894	99979.38	14.49	11108.82	2021	Corporate	2.7L
1	5/1/2021	2	2.04	14	6762	148340.1	21.65	10595.72	2021	Corporate	2.7L

1	5/1/2021	3	2.66	18	6507	192279	28.4	10682.17	2021	Corporate	2.7L
1	5/1/2021	4	3.14	21	6250	226550.4	33.88	10788.11	2021	Corporate	2.7L
1	5/1/2021	5	3.48	23	5799	244011.5	36.89	10609.2	2021	Corporate	2.7L
1	5/1/2021	6	3.48	23	4760	244011.5	36.89	10609.2	2021	Corporate	2.7L
1	6/1/2021	0	0.21	2	9379	18316.03	1.95	9158.02	2021	Corporate	2.7L
1	6/1/2021	1	1.62	15	9272	163848.4	17.65	10923.23	2021	Corporate	2.7L
1	6/1/2021	2	3.49	32	9059	349360.8	38.13	10917.52	2021	Corporate	2.7L
1	6/1/2021	3	4.32	39	8413	428592.1	47.54	10989.54	2021	Corporate	2.7L
1	6/1/2021	4	4.71	42	7817	454766.1	50.89	10827.76	2021	Corporate	2.7L
1	6/1/2021	5	4.88	43	5975	469265.5	53.32	10913.15	2021	Corporate	2.7L
1	7/1/2021	0	0	0	11930	0	0	0	2021	Corporate	2.7L
1	7/1/2021	1	0.78	9	11595	90394.99	7.8	10043.89	2021	Corporate	2.7L
1	7/1/2021	2	2.08	23	10725	239496.2	21.7	10412.88	2021	Corporate	2.7L
1	7/1/2021	3	2.87	30	8863	311923.4	29.87	10397.45	2021	Corporate	2.7L
1	7/1/2021	4	3.56	35	7230	358503.3	36.31	10242.95	2021	Corporate	2.7L
1	8/1/2021	0	0	0	16896	0	0	0	2021	Corporate	2.7L
1	8/1/2021	1	1.21	19	15727	209897	13.35	11047.21	2021	Corporate	2.7L
1	8/1/2021	2	1.93	29	13887	325983	21.71	11240.79	2021	Corporate	2.7L
1	8/1/2021	3	2.2	32	11027	366322.6	25.36	11447.58	2021	Corporate	2.7L
1	9/1/2021	0	0	0	9526	0	0	0	2021	Corporate	2.7L
1	9/1/2021	1	0.34	3	8877	30903.54	3.48	10301.18	2021	Corporate	2.7L
1	9/1/2021	2	0.47	4	7316	43355.37	5.18	10838.84	2021	Corporate	2.7L
1	10/1/2021	0	0.05	1	18565	8218.33	0.44	8218.33	2021	Corporate	2.7L
1	10/1/2021	1	0.05	1	15632	8218.33	0.44	8218.33	2021	Corporate	2.7L
1	11/1/2021	0	0	0	12645	0	0	0	2021	Corporate	2.7L
1		0	0.04	3	72892	26512.03	0.36	8837.34	2021	Corporate	3.0L
1		1	0.76	53	69370	499108.3	7.18	9417.14	2021	Corporate	3.0L
1		2	1.16	79	64746	738044	10.87	9342.33	2021	Corporate	3.0L
1		3	1.38	92	59945	876287.2	13.17	9524.86	2021	Corporate	3.0L
1		4	1.55	101	54010	971730.5	14.94	9621.09	2021	Corporate	3.0L
1		5	1.61	104	51212	1000398	15.5	9619.21	2021	Corporate	3.0L
1		6	1.63	105	46268	1011412	15.74	9632.49	2021	Corporate	3.0L
1		7	1.67	107	43196	1034209	16.27	9665.5	2021	Corporate	3.0L
1		8	1.67	107	36351	1034209	16.27	9665.5	2021	Corporate	3.0L
1		9	1.71	108	26834	1043577	16.61	9662.75	2021	Corporate	3.0L
1		10	1.76	109	19877	1056098	17.24	9688.97	2021	Corporate	3.0L
1		11	1.76	109	13903	1056098	17.24	9688.97	2021	Corporate	3.0L
1		12	1.76	109	8186	1056098	17.24	9688.97	2021	Corporate	3.0L
1		13	1.76	109	3410	1056098	17.24	9688.97	2021	Corporate	3.0L
1		14	1.76	109	280	1056098	17.24	9688.97	2021	Corporate	3.0L
1	9/1/2020	0	0	0	779	0	0	0	2021	Corporate	3.0L
1	9/1/2020	1	0	0	778	0	0	0	2021	Corporate	3.0L
1	9/1/2020	2	0	0	775	0	0	0	2021	Corporate	3.0L
1	9/1/2020	3	0	0	775	0	0	0	2021	Corporate	3.0L
1	9/1/2020	4	0	0	772	0	0	0	2021	Corporate	3.0L
1	9/1/2020	5	0	0	768	0	0	0	2021	Corporate	3.0L
1	9/1/2020	6	0	0	760	0	0	0	2021	Corporate	3.0L
1	9/1/2020	7	0	0	743	0	0	0	2021	Corporate	3.0L
1	9/1/2020	8	0	0	718	0	0	0	2021	Corporate	3.0L
1	9/1/2020	9	0	0	682	0	0	0	2021	Corporate	3.0L
1	9/1/2020	10	0	0	638	0	0	0	2021	Corporate	3.0L
1	9/1/2020	11	0	0	579	0	0	0	2021	Corporate	3.0L
1	9/1/2020	12	0	0	517	0	0	0	2021	Corporate	3.0L
1	9/1/2020	13	0	0	396	0	0	0	2021	Corporate	3.0L
1	9/1/2020	14	0	0	243	0	0	0	2021	Corporate	3.0L
1	10/1/2020	0	0	0	9542	0	0	0	2021	Corporate	3.0L
1	10/1/2020	1	0.1	1	9526	9456.19	0.99	9456.19	2021	Corporate	3.0L
1	10/1/2020	2	0.1	1	9504	9456.19	0.99	9456.19	2021	Corporate	3.0L
1	10/1/2020	3	0.1	1	9464	9456.19	0.99	9456.19	2021	Corporate	3.0L
1	10/1/2020	4	0.21	2	9431	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	5	0.21	2	9355	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	6	0.21	2	9240	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	7	0.21	2	9015	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	8	0.21	2	8575	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	9	0.21	2	8021	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	10	0.21	2	7211	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	11	0.21	2	6121	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	12	0.21	2	4808	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	10/1/2020	13	0.21	2	2976	21724.34	2.29	10862.17	2021	Corporate	3.0L
1	11/1/2020	0	0	0	7730	0	0	0	2021	Corporate	3.0L
1	11/1/2020	1	0	0	7706	0	0	0	2021	Corporate	3.0L
1	11/1/2020	2	0	0	7679	0	0	0	2021	Corporate	3.0L
1	11/1/2020	3	0.13	1	7643	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	4	0.13	1	7587	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	5	0.13	1	7517	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	6	0.13	1	7385	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	7	0.13	1	7164	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	8	0.13	1	6761	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	9	0.13	1	6165	13838.27	1.81	13838.27	2021	Corporate	3.0L
1	11/1/2020	10	0.32	2	5328	26359.36	4.16	13179.68	2021	Corporate	3.0L
1	11/1/2020	11	0.32	2	4246	26359.36	4.16	13179.68	2021	Corporate	3.0L
1	11/1/2020	12	0.32	2	2823	26359.36	4.16	13179.68	2021	Corporate	3.0L
1	12/1/2020	0	0	0	7432	0	0	0	2021	Corporate	3.0L
1	12/1/2020	1	0	0	7415	0	0	0	2021	Corporate	3.0L
1	12/1/2020	2	0	0	7392	0	0	0	2021	Corporate	3.0L
1	12/1/2020	3	0	0	7353	0	0	0	2021	Corporate	3.0L
1	12/1/2020	4	0	0	7299	0	0	0	2021	Corporate	3.0L
1	12/1/2020	5	0.28	2	7233	21423.1	2.96	10711.55	2021	Corporate	3.0L
1	12/1/2020	6	0.28	2	7120	21423.1	2.96	10711.55	2021	Corporate	3.0L
1	12/1/2020	7	0.28	2	6819	21423.1	2.96	10711.55	2021	Corporate	3.0L
1	12/1/2020	8	0.28	2	6237	21423.1	2.96	10711.55	2021	Corporate	3.0L
1	12/1/2020	9	0.46	3	5465	30791.31	4.68	10263.77	2021	Corporate	3.0L
1	12/1/2020	10	0.46	3	4334	30791.31	4.68	10263.77	2021	Corporate	3.0L
1	12/1/2020	11	0.46	3	2919	30791.31	4.68	10263.77	2021	Corporate	3.0L

1	1/1/2021	0	0	0	7145	0	0	0	2021	Corporate	3.0L
1	1/1/2021	1	0.14	1	7111	12820.02	1.8	12820.02	2021	Corporate	3.0L
1	1/1/2021	2	0.28	2	7064	25687.43	3.62	12843.72	2021	Corporate	3.0L
1	1/1/2021	3	0.28	2	7012	25687.43	3.62	12843.72	2021	Corporate	3.0L
1	1/1/2021	4	0.57	4	6922	48249.85	6.88	12062.46	2021	Corporate	3.0L
1	1/1/2021	5	0.57	4	6803	48249.85	6.88	12062.46	2021	Corporate	3.0L
1	1/1/2021	6	0.57	4	6576	48249.85	6.88	12062.46	2021	Corporate	3.0L
1	1/1/2021	7	0.74	5	6057	63863.33	9.46	12772.67	2021	Corporate	3.0L
1	1/1/2021	8	0.74	5	5266	63863.33	9.46	12772.67	2021	Corporate	3.0L
1	1/1/2021	9	0.74	5	4051	63863.33	9.46	12772.67	2021	Corporate	3.0L
1	1/1/2021	10	0.74	5	2328	63863.33	9.46	12772.67	2021	Corporate	3.0L
1	2/1/2021	0	0	0	6034	0	0	0	2021	Corporate	3.0L
1	2/1/2021	1	0	0	6005	0	0	0	2021	Corporate	3.0L
1	2/1/2021	2	0	0	5959	0	0	0	2021	Corporate	3.0L
1	2/1/2021	3	0	0	5901	0	0	0	2021	Corporate	3.0L
1	2/1/2021	4	0.34	2	5799	19107.83	3.3	9553.92	2021	Corporate	3.0L
1	2/1/2021	5	0.34	2	5646	19107.83	3.3	9553.92	2021	Corporate	3.0L
1	2/1/2021	6	0.34	2	5369	19107.83	3.3	9553.92	2021	Corporate	3.0L
1	2/1/2021	7	0.55	3	4762	26291.38	4.8	8763.79	2021	Corporate	3.0L
1	2/1/2021	8	0.55	3	3811	26291.38	4.8	8763.79	2021	Corporate	3.0L
1	2/1/2021	9	0.55	3	2412	26291.38	4.8	8763.79	2021	Corporate	3.0L
1	3/1/2021	0	0	0	9055	0	0	0	2021	Corporate	3.0L
1	3/1/2021	1	0	0	8992	0	0	0	2021	Corporate	3.0L
1	3/1/2021	2	0	0	8915	0	0	0	2021	Corporate	3.0L
1	3/1/2021	3	0.23	2	8813	24736.54	2.81	12368.27	2021	Corporate	3.0L
1	3/1/2021	4	0.23	2	8653	24736.54	2.81	12368.27	2021	Corporate	3.0L
1	3/1/2021	5	0.35	3	8363	31980.74	3.67	10660.25	2021	Corporate	3.0L
1	3/1/2021	6	0.47	4	7855	42994.54	5.08	10748.64	2021	Corporate	3.0L
1	3/1/2021	7	0.47	4	6971	42994.54	5.08	10748.64	2021	Corporate	3.0L
1	3/1/2021	8	0.47	4	4945	42994.54	5.08	10748.64	2021	Corporate	3.0L
1	4/1/2021	0	0	0	2206	0	0	0	2021	Corporate	3.0L
1	4/1/2021	1	0	0	2198	0	0	0	2021	Corporate	3.0L
1	4/1/2021	2	0	0	2178	0	0	0	2021	Corporate	3.0L
1	4/1/2021	3	0.46	1	2159	12484.87	5.78	12484.87	2021	Corporate	3.0L
1	4/1/2021	4	0.46	1	2126	12484.87	5.78	12484.87	2021	Corporate	3.0L
1	4/1/2021	5	0.46	1	2055	12484.87	5.78	12484.87	2021	Corporate	3.0L
1	4/1/2021	6	0.46	1	1925	12484.87	5.78	12484.87	2021	Corporate	3.0L
1	4/1/2021	7	0.46	1	1627	12484.87	5.78	12484.87	2021	Corporate	3.0L
1	6/1/2021	0	0.35	2	5726	18760.61	3.28	9380.31	2021	Corporate	3.0L
1	6/1/2021	1	4.6	26	5650	241530.7	42.7	9289.64	2021	Corporate	3.0L
1	6/1/2021	2	6.41	36	5520	319291.8	56.79	8869.22	2021	Corporate	3.0L
1	6/1/2021	3	7.54	42	5287	375442.6	67.41	8939.11	2021	Corporate	3.0L
1	6/1/2021	4	8.39	46	4718	416947.5	76.21	9064.08	2021	Corporate	3.0L
1	6/1/2021	5	8.39	46	3434	416947.5	76.21	9064.08	2021	Corporate	3.0L
1	7/1/2021	0	0	0	839	0	0	0	2021	Corporate	3.0L
1	7/1/2021	1	3.63	3	827	23439.68	28.34	7813.23	2021	Corporate	3.0L
1	7/1/2021	2	7.34	6	809	50622.88	61.94	8437.15	2021	Corporate	3.0L
1	7/1/2021	3	8.64	7	765	64396.71	79.95	9199.53	2021	Corporate	3.0L
1	7/1/2021	4	8.64	7	665	64396.71	79.95	9199.53	2021	Corporate	3.0L
1	8/1/2021	0	0.15	1	6780	7751.42	1.14	7751.42	2021	Corporate	3.0L
1	8/1/2021	1	2.92	19	6486	183030.7	28.17	9633.19	2021	Corporate	3.0L
1	8/1/2021	2	4.96	31	5883	304154.7	48.76	9811.44	2021	Corporate	3.0L
1	8/1/2021	3	5.38	33	4735	321413.6	52.4	9739.81	2021	Corporate	3.0L
1	9/1/2021	0	0	0	4443	0	0	0	2021	Corporate	3.0L
1	9/1/2021	1	0.81	3	3687	28831	7.82	9610.33	2021	Corporate	3.0L
1	9/1/2021	2	0.81	3	3030	28831	7.82	9610.33	2021	Corporate	3.0L
1	10/1/2021	0	0	0	4147	0	0	0	2021	Corporate	3.0L
1	10/1/2021	1	0	0	2951	0	0	0	2021	Corporate	3.0L
1	11/1/2021	0	0	0	996	0	0	0	2021	Corporate	3.0L


Sum of R1000
2021 MY Nano Broken Valve Engine Exchanges
Logic: Corporate, GSAR Cutoff: 3/31/22
R/1000
10
9
8
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0
9/1/2020
10/1/2020
11/1/2020
12/1/2020
1/1/2021
2/1/2021
3/1/2021
4/1/2021
5/1/2021
6/1/2021
7/1/2021
8/1/2021
9/1/2021
10/1/2021
11/1/2021
12/1/2021
Vehicle Month of Production
TIS
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PROD_MONTH

Sum of R1000	Column Labels																		
Row Labels	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**Grand Total**
9/1/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/1/2020	0.09	0.09	0.09	0.09	0.18	0.18	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28		3.8
11/1/2020	0	0	0	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.19	0.19	0.19	0.19	0.19	0.19			1.77
12/1/2020	0	0	0	0	0	0.17	0.22	0.22	0.22	0.28	0.34	0.34	0.34	0.34	0.34				2.81
1/1/2021	0	0.09	0.23	0.28	0.42	0.42	0.46	0.46	0.46	0.46	0.46	0.52	0.52	0.52					5.3
2/1/2021	0	0.07	0.07	0.13	0.33	0.33	0.33	0.4	0.4	0.47	0.47	0.47	0.47						3.94
3/1/2021	0.04	0.04	0.04	0.12	0.16	0.2	0.24	0.24	0.29	0.29	0.29	0.29							2.24
4/1/2021	0	0.46	0.58	0.93	1.28	1.28	1.28	1.28	1.28	1.28	1.28								10.93
5/1/2021	0.14	1.29	2.01	2.58	3.16	3.76	3.76	3.76	4.1	4.1									28.66
6/1/2021	0.4	2.95	5.25	6.47	7.71	8.34	8.86	9.19	9.29										58.46
7/1/2021	0.07	1.21	2.82	4.32	6.02	6.54	6.96	7.21											35.15
8/1/2021	0.04	2.1	4.63	6.31	7.18	8.1	8.35												36.71
9/1/2021	0	0.78	1.72	2.98	3.54	3.84													12.86
10/1/2021	0.04	0.12	0.61	0.92	0.98														2.67
11/1/2021	0	0	0	0															0
12/1/2021	0	0	0																0
Grand Total	**0.82**	**9.2**	**18.05**	**25.22**	**31.05**	**33.25**	**30.83**	**23.13**	**16.41**	**7.25**	**3.31**	**2.09**	**1.8**	**1.33**	**0.81**	**0.47**	**0.28**	**0**	**205.3**

Report Info Status=Fin Request N Description Run Date / Completion Job Size=2 Execution Precalc Pr Cut Off Da Load Date= Currency E Generated
Data Selec Model Yea Cost Categ Region Bui Engine [EN Claim Key[Typed] = [768741],[557424],[440544],[453300],[496232],[680062],[585217],[132
Report Sel Report Nar Destination CSV Name Model Yea Order By = TIS Rows S YTD Colum Minimum D Logic = Co Cost Type Use Group Currency =
Minimum Divisor Selected:100

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE	LOGIC
1		0	0.05	12	239042	130356.1	0.55	10863.01	2021	Corporate
1		1	0.61	144	236905	1513599	6.38	10511.1	2021	Corporate
1		2	1.26	294	230878	3150624	13.47	10716.41	2021	Corporate
1		3	1.77	406	218580	4459112	19.46	10983.03	2021	Corporate
1		4	2.18	487	196578	5352569	24.01	10990.9	2021	Corporate
1		5	2.44	531	171528	5846642	26.89	11010.63	2021	Corporate
1		6	2.56	550	152586	6057253	28.27	11013.19	2021	Corporate
1		7	2.62	557	131421	6126344	28.79	10998.82	2021	Corporate
1		8	2.65	561	117165	6167004	29.14	10992.88	2021	Corporate
1		9	2.67	563	103224	6192150	29.38	10998.49	2021	Corporate
1		10	2.69	565	92573	6218606	29.67	11006.38	2021	Corporate
1		11	2.7	566	77894	6226567	29.77	11001	2021	Corporate
1		12	2.7	566	54162	6226567	29.77	11001	2021	Corporate
1		13	2.7	566	35672	6226567	29.77	11001	2021	Corporate
1		14	2.7	566	20523	6226567	29.77	11001	2021	Corporate
1		15	2.7	566	9098	6226567	29.77	11001	2021	Corporate
1		16	2.7	566	3392	6226567	29.77	11001	2021	Corporate
1		17	2.7	566	313	6226567	29.77	11001	2021	Corporate
1	9/1/2020	0	0	0	671	0	0	0	2021	Corporate
1	9/1/2020	1	0	0	671	0	0	0	2021	Corporate
1	9/1/2020	2	0	0	671	0	0	0	2021	Corporate
1	9/1/2020	3	0	0	670	0	0	0	2021	Corporate
1	9/1/2020	4	0	0	669	0	0	0	2021	Corporate
1	9/1/2020	5	0	0	667	0	0	0	2021	Corporate
1	9/1/2020	6	0	0	667	0	0	0	2021	Corporate
1	9/1/2020	7	0	0	665	0	0	0	2021	Corporate
1	9/1/2020	8	0	0	661	0	0	0	2021	Corporate
1	9/1/2020	9	0	0	655	0	0	0	2021	Corporate
1	9/1/2020	10	0	0	643	0	0	0	2021	Corporate
1	9/1/2020	11	0	0	626	0	0	0	2021	Corporate
1	9/1/2020	12	0	0	603	0	0	0	2021	Corporate
1	9/1/2020	13	0	0	572	0	0	0	2021	Corporate
1	9/1/2020	14	0	0	524	0	0	0	2021	Corporate
1	9/1/2020	15	0	0	472	0	0	0	2021	Corporate
1	9/1/2020	16	0	0	371	0	0	0	2021	Corporate
1	9/1/2020	17	0	0	232	0	0	0	2021	Corporate
1	10/1/2020	0	0.09	1	10858	10243.61	0.94	10243.61	2021	Corporate
1	10/1/2020	1	0.09	1	10855	10243.61	0.94	10243.61	2021	Corporate
1	10/1/2020	2	0.09	1	10852	10243.61	0.94	10243.61	2021	Corporate
1	10/1/2020	3	0.09	1	10848	10243.61	0.94	10243.61	2021	Corporate
1	10/1/2020	4	0.18	2	10841	22511.76	2.08	11255.88	2021	Corporate
1	10/1/2020	5	0.18	2	10828	22511.76	2.08	11255.88	2021	Corporate
1	10/1/2020	6	0.28	3	10807	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	7	0.28	3	10787	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	8	0.28	3	10731	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	9	0.28	3	10622	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	10	0.28	3	10417	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	11	0.28	3	9956	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	12	0.28	3	9308	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	13	0.28	3	8349	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	14	0.28	3	7056	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	15	0.28	3	5199	30734.75	2.84	10244.92	2021	Corporate
1	10/1/2020	16	0.28	3	2938	30734.75	2.84	10244.92	2021	Corporate
1	11/1/2020	0	0	0	10598	0	0	0	2021	Corporate
1	11/1/2020	1	0	0	10596	0	0	0	2021	Corporate
1	11/1/2020	2	0	0	10590	0	0	0	2021	Corporate
1	11/1/2020	3	0.09	1	10579	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	4	0.09	1	10569	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	5	0.09	1	10554	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	6	0.09	1	10533	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	7	0.09	1	10486	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	8	0.09	1	10420	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	9	0.09	1	10287	13838.27	1.31	13838.27	2021	Corporate
1	11/1/2020	10	0.19	2	10047	26359.36	2.55	13179.68	2021	Corporate
1	11/1/2020	11	0.19	2	9548	26359.36	2.55	13179.68	2021	Corporate
1	11/1/2020	12	0.19	2	8791	26359.36	2.55	13179.68	2021	Corporate
1	11/1/2020	13	0.19	2	7537	26359.36	2.55	13179.68	2021	Corporate
1	11/1/2020	14	0.19	2	5810	26359.36	2.55	13179.68	2021	Corporate
1	11/1/2020	15	0.19	2	3344	26359.36	2.55	13179.68	2021	Corporate
1	12/1/2020	0	0	0	18040	0	0	0	2021	Corporate
1	12/1/2020	1	0	0	18038	0	0	0	2021	Corporate
1	12/1/2020	2	0	0	18031	0	0	0	2021	Corporate
1	12/1/2020	3	0	0	18022	0	0	0	2021	Corporate
1	12/1/2020	4	0	0	18012	0	0	0	2021	Corporate
1	12/1/2020	5	0.17	3	17986	28897.57	1.61	9632.52	2021	Corporate
1	12/1/2020	6	0.22	4	17940	37707.71	2.1	9426.93	2021	Corporate
1	12/1/2020	7	0.22	4	17838	37707.71	2.1	9426.93	2021	Corporate
1	12/1/2020	8	0.22	4	17704	37707.71	2.1	9426.93	2021	Corporate
1	12/1/2020	9	0.28	5	17465	47075.92	2.63	9415.18	2021	Corporate
1	12/1/2020	10	0.34	6	16889	61011.71	3.46	10168.62	2021	Corporate
1	12/1/2020	11	0.34	6	15695	61011.71	3.46	10168.62	2021	Corporate
1	12/1/2020	12	0.34	6	13890	61011.71	3.46	10168.62	2021	Corporate
1	12/1/2020	13	0.34	6	10714	61011.71	3.46	10168.62	2021	Corporate
1	12/1/2020	14	0.34	6	7050	61011.71	3.46	10168.62	2021	Corporate
1	1/1/2021	0	0	0	21640	0	0	0	2021	Corporate
1	1/1/2021	1	0.09	2	21637	25093.02	1.16	12546.51	2021	Corporate
1	1/1/2021	2	0.23	5	21618	61173.53	2.83	12234.71	2021	Corporate
1	1/1/2021	3	0.28	6	21609	74945.48	3.47	12490.91	2021	Corporate
1	1/1/2021	4	0.42	9	21573	111362	5.15	12373.55	2021	Corporate

1	1/1/2021	5	0.42	9	21510	111362	5.15	12373.55	2021	Corporate
1	1/1/2021	6	0.46	10	21431	125171.1	5.8	12517.11	2021	Corporate
1	1/1/2021	7	0.46	10	21279	125171.1	5.8	12517.11	2021	Corporate
1	1/1/2021	8	0.46	10	21053	125171.1	5.8	12517.11	2021	Corporate
1	1/1/2021	9	0.46	10	20570	125171.1	5.8	12517.11	2021	Corporate
1	1/1/2021	10	0.46	10	19552	125171.1	5.8	12517.11	2021	Corporate
1	1/1/2021	11	0.52	11	17501	133131.5	6.25	12102.87	2021	Corporate
1	1/1/2021	12	0.52	11	13917	133131.5	6.25	12102.87	2021	Corporate
1	1/1/2021	13	0.52	11	8417	133131.5	6.25	12102.87	2021	Corporate
1	2/1/2021	0	0	0	15265	0	0	0	2021	Corporate
1	2/1/2021	1	0.07	1	15261	7523.47	0.49	7523.47	2021	Corporate
1	2/1/2021	2	0.07	1	15243	7523.47	0.49	7523.47	2021	Corporate
1	2/1/2021	3	0.13	2	15228	21909.6	1.44	10954.8	2021	Corporate
1	2/1/2021	4	0.33	5	15205	52173.72	3.43	10434.74	2021	Corporate
1	2/1/2021	5	0.33	5	15140	52173.72	3.43	10434.74	2021	Corporate
1	2/1/2021	6	0.33	5	15065	52173.72	3.43	10434.74	2021	Corporate
1	2/1/2021	7	0.4	6	14921	59357.27	3.91	9892.88	2021	Corporate
1	2/1/2021	8	0.4	6	14674	59357.27	3.91	9892.88	2021	Corporate
1	2/1/2021	9	0.47	7	14268	75134.76	5.02	10733.54	2021	Corporate
1	2/1/2021	10	0.47	7	13319	75134.76	5.02	10733.54	2021	Corporate
1	2/1/2021	11	0.47	7	11318	75134.76	5.02	10733.54	2021	Corporate
1	2/1/2021	12	0.47	7	7570	75134.76	5.02	10733.54	2021	Corporate
1	3/1/2021	0	0.04	1	25101	15077.62	0.6	15077.62	2021	Corporate
1	3/1/2021	1	0.04	1	25070	15077.62	0.6	15077.62	2021	Corporate
1	3/1/2021	2	0.04	1	24995	15077.62	0.6	15077.62	2021	Corporate
1	3/1/2021	3	0.12	3	24906	39814.16	1.59	13271.39	2021	Corporate
1	3/1/2021	4	0.16	4	24653	53070.45	2.13	13267.61	2021	Corporate
1	3/1/2021	5	0.2	5	24309	60314.65	2.43	12062.93	2021	Corporate
1	3/1/2021	6	0.24	6	23631	71328.45	2.9	11888.08	2021	Corporate
1	3/1/2021	7	0.24	6	22515	71328.45	2.9	11888.08	2021	Corporate
1	3/1/2021	8	0.29	7	21468	85044.88	3.53	12149.27	2021	Corporate
1	3/1/2021	9	0.29	7	20119	85044.88	3.53	12149.27	2021	Corporate
1	3/1/2021	10	0.29	7	18024	85044.88	3.53	12149.27	2021	Corporate
1	3/1/2021	11	0.29	7	13167	85044.88	3.53	12149.27	2021	Corporate
1	4/1/2021	0	0	0	8716	0	0	0	2021	Corporate
1	4/1/2021	1	0.46	4	8682	46839.97	5.4	11709.99	2021	Corporate
1	4/1/2021	2	0.58	5	8639	58797.88	6.78	11759.58	2021	Corporate
1	4/1/2021	3	0.93	8	8570	98864.49	11.45	12358.06	2021	Corporate
1	4/1/2021	4	1.28	11	8395	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	5	1.28	11	8100	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	6	1.28	11	7235	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	7	1.28	11	6363	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	8	1.28	11	5274	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	9	1.28	11	4396	127816.2	14.9	11619.65	2021	Corporate
1	4/1/2021	10	1.28	11	3599	127816.2	14.9	11619.65	2021	Corporate
1	5/1/2021	0	0.14	1	7008	8406.36	1.2	8406.36	2021	Corporate
1	5/1/2021	1	1.29	9	6991	101128.2	14.46	11236.46	2021	Corporate
1	5/1/2021	2	2.01	14	6959	149860.8	21.47	10704.35	2021	Corporate
1	5/1/2021	3	2.58	18	6929	189720.1	27.22	10540	2021	Corporate
1	5/1/2021	4	3.16	22	6878	235521.9	33.88	10705.54	2021	Corporate
1	5/1/2021	5	3.76	26	6745	274112.7	39.6	10542.8	2021	Corporate
1	5/1/2021	6	3.76	26	6492	274112.7	39.6	10542.8	2021	Corporate
1	5/1/2021	7	3.76	26	6238	274112.7	39.6	10542.8	2021	Corporate
1	5/1/2021	8	4.1	28	5789	293289.8	42.91	10474.63	2021	Corporate
1	5/1/2021	9	4.1	28	4759	293289.8	42.91	10474.63	2021	Corporate
1	6/1/2021	0	0.4	6	14936	63310.5	4.24	10551.75	2021	Corporate
1	6/1/2021	1	2.95	44	14895	437703.1	29.37	9947.8	2021	Corporate
1	6/1/2021	2	5.25	78	14797	768850.2	51.75	9857.05	2021	Corporate
1	6/1/2021	3	6.47	96	14717	965514.1	65.12	10057.44	2021	Corporate
1	6/1/2021	4	7.71	114	14558	1152435	77.96	10109.08	2021	Corporate
1	6/1/2021	5	8.34	123	14256	1250409	84.83	10165.92	2021	Corporate
1	6/1/2021	6	8.86	130	13449	1323579	90.27	10181.37	2021	Corporate
1	6/1/2021	7	9.19	134	12377	1364863	93.6	10185.54	2021	Corporate
1	6/1/2021	8	9.29	135	9308	1372629	94.44	10167.62	2021	Corporate
1	7/1/2021	0	0.07	1	13365	13844.6	1.04	13844.6	2021	Corporate
1	7/1/2021	1	1.21	16	13247	156848.3	11.83	9803.02	2021	Corporate
1	7/1/2021	2	2.82	37	12983	378091.4	28.87	10218.69	2021	Corporate
1	7/1/2021	3	4.32	56	12737	592069.1	45.67	10572.66	2021	Corporate
1	7/1/2021	4	6.02	77	12358	817897.6	63.95	10622.05	2021	Corporate
1	7/1/2021	5	6.54	83	11481	903715.1	71.42	10888.13	2021	Corporate
1	7/1/2021	6	6.96	87	9590	953938.3	76.66	10964.81	2021	Corporate
1	7/1/2021	7	7.21	89	7869	974561.7	79.28	10950.13	2021	Corporate
1	8/1/2021	0	0.04	1	24948	11255.09	0.45	11255.09	2021	Corporate
1	8/1/2021	1	2.1	52	24723	554615.2	22.43	10665.68	2021	Corporate
1	8/1/2021	2	4.63	113	24123	1234267	50.6	10922.72	2021	Corporate
1	8/1/2021	3	6.31	152	23285	1687125	70.05	11099.5	2021	Corporate
1	8/1/2021	4	7.18	171	21783	1907767	80.18	11156.53	2021	Corporate
1	8/1/2021	5	8.1	189	19557	2110227	90.53	11165.22	2021	Corporate
1	8/1/2021	6	8.35	193	15663	2155589	93.43	11168.85	2021	Corporate
1	9/1/2021	0	0	0	14241	0	0	0	2021	Corporate
1	9/1/2021	1	0.78	11	14124	125783.2	8.91	11434.84	2021	Corporate
1	9/1/2021	2	1.72	24	13825	277705.9	19.89	11571.08	2021	Corporate
1	9/1/2021	3	2.98	41	13446	489962.8	35.68	11950.31	2021	Corporate
1	9/1/2021	4	3.54	48	12466	571406.8	42.21	11904.31	2021	Corporate
1	9/1/2021	5	3.84	51	10312	604495.7	45.42	11852.86	2021	Corporate
1	10/1/2021	0	0.04	1	25527	8218.33	0.32	8218.33	2021	Corporate
1	10/1/2021	1	0.12	3	25145	32742.86	1.3	10914.29	2021	Corporate
1	10/1/2021	2	0.61	15	24210	189033	7.75	12602.2	2021	Corporate
1	10/1/2021	3	0.92	22	22722	275105.6	11.54	12504.8	2021	Corporate
1	10/1/2021	4	0.98	23	18535	286768.7	12.17	12468.2	2021	Corporate
1	11/1/2021	0	0	0	20465	0	0	0	2021	Corporate
1	11/1/2021	1	0	0	19841	0	0	0	2021	Corporate
1	11/1/2021	2	0	0	17882	0	0	0	2021	Corporate
1	11/1/2021	3	0	0	14229	0	0	0	2021	Corporate

1	12/1/2021	0	0	0	7580	0	0	0	2021 Corporate
1	12/1/2021	1	0	0	7046	0	0	0	2021 Corporate
1	12/1/2021	2	0	0	5377	0	0	0	2021 Corporate

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3196],[1057831],[1352752],[891972],[1056328],[1094409],[1123234],[1618342],[1148095],[1093139],[1093043],[1010570],[1737150],[1438958],[155
Distance = Descriptions = Yes

5773],[1047577],[1059091],[1082410],[1084197],[1102130],[1114874],[1155773],[1157235],[1343067],[1370268],[1277934],[1607272],[1294382],[202

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19706],[1535645],[1685730],[1278268],[1484345],[1631168],[1816507],[1287257],[1875302],[1631460],[1981871],[1647410],[1714550],[1843363],[1

726459],[1864874],[1675302],[1315517],[1418606],[1316981],[1316466],[1343288],[1345994],[1856730],[1557579],[1684736],[1822782],[2201308],[

664603],[1703669],[1356332],[1810172],[1375491],[1384379],[1673023],[2075327],[2819242],[1630863],[1992712],[1596363],[1659986],[1396943],[

[1413099],[1726433],[1818467],[2018523],[1419915],[1418574],[1415902],[1417796],[1442348],[1460634],[15

Concern	VIN	Mileage	Engine Build Date	Model Yea	Repair Date
Broken Valve	1FTMF1EP7JKE12398	933	3/20/2018	2018	5/24/2018
Broken Valve	1FM5K8GC8LGA05517	5488	6/4/2019	2020	5/19/2020
Broken Valve	1FM5K8GC9LGA17742	1577	6/18/2019	2020	5/4/2020
Broken Valve	1FM5K8HC8LGA10067	10479	6/18/2019	2020	6/18/2020
Broken Valve	1FM5K8GCXLGA22464	1282	6/21/2019	2020	5/13/2020
Broken Valve	1FM5K8GC8LGA28943	6898	6/21/2019	2020	9/16/2020
Broken Valve	1FM5K8GC0LGA17953	7026	6/24/2019	2020	4/27/2020
Broken Valve	1FM5K8GC0LGA28774	743	6/27/2019	2020	2/6/2020
Broken Valve	1FM5K8HC9LGA30487	9517	7/15/2019	2020	9/8/2020
Broken Valve	1FM5K8HC6LGA44332	2100	7/25/2019	2020	12/26/2019
Broken Valve	5LM5J7XC5LGL09916	956	8/27/2019	2020	2/10/2020
Broken Valve	5LM5J9XC0LGL11214	1140	8/28/2019	2020	11/27/2019
Broken Valve	5LM5J9XC8LGL11204	766	8/28/2019	2020	12/16/2019
Broken Valve	5LM5J8WC5LGL08188	4153	8/29/2019	2020	5/22/2020
Broken Valve	5LM5J8WC0LGL08096	471	8/30/2019	2020	6/22/2020
Broken Valve	1FM5K8GC5LGA52049	1056	9/5/2019	2020	7/14/2020
Broken Valve	1FM5K8GC9LGA81277	2426	9/18/2019	2020	1/21/2020
Broken Valve	1FM5K8GC9LGA46089	2407	9/18/2019	2020	6/15/2020
Broken Valve	1FM5K8HC3LGA66577	933	9/19/2019	2020	9/4/2020
Broken Valve	1FM5K8GC9LGB24354	203	10/29/2019	2020	6/24/2020
Broken Valve	1FM5K8GC5LGB92716	1842	2/14/2020	2020	4/29/2020
Broken Valve	1FTEX1EP0LKE23523	1021	3/17/2020	2020	8/31/2020
Broken Valve	1FTEX1CP9LFC00151	3200	3/19/2020	2020	9/9/2020
Broken Valve	LVSHNCAZ2LH498715	869	6/5/2020	2020	10/19/2020
Broken Valve	1FTEW1EP2LFB96282	2008	6/16/2020	2020	10/5/2020
Broken Valve	1FTEW1EP3LFC66789	903	8/17/2020	2020	10/15/2020
Broken Valve	1FM5K8GC8MGA11206	5302	11/4/2020	2021	2/25/2021
Broken Valve	1FM5K8GC0MGA65891	4842	11/16/2020	2021	8/23/2021
Broken Valve	1FM5K8GC3MGA67098	6599	11/16/2020	2021	9/4/2021
Broken Valve	5LM5J6WCXMGL07981	9400	11/17/2020	2021	4/27/2021
Broken Valve	1FTEX1CP3MKD22805	1203	12/14/2020	2021	2/13/2021
Broken Valve	1FTEW1CP0MKD26135	2178	12/16/2020	2021	3/14/2021
Broken Valve	2FMPK4AP3MBA12221	857	12/17/2020	2021	3/31/2021
Broken Valve	1FTEX1EP0MKD14822	1956	12/17/2020	2021	10/7/2021
Broken Valve	1FTEX1EP5MFA36962	2080	1/7/2021	2021	3/17/2021
Broken Valve	1FM5K8GC8MGA90652	513	1/8/2021	2021	3/5/2021
Broken Valve	1FM5K8HC2MGA95506	1245	1/8/2021	2021	6/23/2021
Broken Valve	1FM5K8GCXMGA95254	4614	1/14/2021	2021	6/30/2021
Broken Valve	1FTEX1CP6MKD47049	1500	1/14/2021	2021	6/11/2021
Broken Valve	1FTEW1EP8MFA79081	2919	1/15/2021	2021	6/28/2021
Broken Valve	1FM5K8GC7MGB08543	3582	2/2/2021	2021	10/8/2021
Broken Valve	1FM5K8GC2MGB00950	4348	2/3/2021	2021	7/7/2021
Broken Valve	1FTEW1EP6MKD53692	1020	2/4/2021	2021	7/12/2021
Broken Valve	5LM5J7WC4MGL11532	1757	3/3/2021	2021	7/12/2021
Broken Valve	1FM5K8GC0MGB38144	2853	3/16/2021	2021	6/30/2021
Broken Valve	5LM5J7XC3MGL14159	7350	3/18/2021	2021	10/11/2021

Broken Valve	2LMPJ9JP7MBL01638	2062	3/23/2021	2021	8/11/2021
Broken Valve	2LMPJ8KP1MBL01689	2275	3/25/2021	2021	8/24/2021
Broken Valve	1FTEW1CP8MFB51917	2083	3/30/2021	2021	9/2/2021
Broken Valve	1FTEW1EP6MFB44607	1456	3/31/2021	2021	11/19/2021
Broken Valve	1FTEW1EP4MFB56870	3439	4/1/2021	2021	9/4/2021
Broken Valve	1FTEW1EP9MFB47663	359	4/7/2021	2021	6/4/2021
Broken Valve	1FTEW1EPXMFB72426	1471	4/7/2021	2021	7/12/2021
Broken Valve	1FTEW1EP2MFB68726	1865	4/7/2021	2021	8/28/2021
Broken Valve	1FTEW1CP9MFB67897	862	4/7/2021	2021	11/4/2021
Broken Valve	2FMPK4AP9MBA27225	1589	5/3/2021	2021	9/27/2021
Broken Valve	1FTEW1EP2MFB77653	2781	5/3/2021	2021	7/12/2021
Broken Valve	1FTEW1EP4MFB79064	1722	5/3/2021	2021	7/6/2021
Broken Valve	1FMEE5BP0MLA63520	3474	5/4/2021	2021	11/16/2021
Broken Valve	1FMEE5BP6MLA61450	1880	5/5/2021	2021	9/13/2021
Lower End Damage	2FMPK4APXMBA29078	861	5/6/2021	2021	10/19/2021
Broken Valve	2FMPK4APXMBA38363	4218	5/6/2021	2021	10/22/2021
Broken Valve	1FTEW1EP0MFB47261	2285	5/6/2021	2021	8/10/2021
Broken Valve	1FTEW1EP9MFB77651	1428	5/7/2021	2021	7/1/2021
Broken Valve	1FTEW1EP9MFB73342	1497	5/7/2021	2021	8/2/2021
Lower End Damage	1FTEW1EP8MFB72134	1890	5/7/2021	2021	8/4/2021
Broken Valve	1FTEW1EP7MFB90379	1041	5/7/2021	2021	8/9/2021
Broken Valve	1FTEW1CP7MKE18035	462	5/7/2021	2021	8/19/2021
Broken Valve	1FTEW1CP1MFB90283	1188	5/7/2021	2021	10/29/2021
Broken Valve	1FTEW1CP3MFB90897	3691	5/7/2021	2021	8/23/2021
Broken Valve	1FTEW1EPXMFB82924	2607	5/7/2021	2021	9/29/2021
Broken Valve	1FTEX1EP1MKE09745	2381	5/7/2021	2021	9/9/2021
Lower End Damage	1FTEW1EPXMKE18737	1005	5/7/2021	2021	11/18/2021
Lower End Damage	1FTEX1EPXMFB84430	1461	5/7/2021	2021	9/30/2021
Broken Valve	1FTEW1EP3MFB93649	2485	5/7/2021	2021	9/13/2021
Broken Valve	1FTEW1CP3MFC06922	3199	5/7/2021	2021	10/11/2021
Broken Valve	1FTEW1CP7MFC04087	3722	5/10/2021	2021	8/27/2021
Broken Valve	1FTEW1CP4MKD98665	2094	5/10/2021	2021	8/3/2021
Broken Valve	1FTEW1EP4MKE01867	1832	5/10/2021	2021	9/10/2021
Broken Valve	1FTEW1EP9MFC02791	2417	5/10/2021	2021	8/23/2021
Lower End Damage	1FTEW1EP1MKE02605	3548	5/10/2021	2021	9/27/2021
Broken Valve	1FTEW1EP2MKE14231	1816	5/10/2021	2021	10/4/2021
Lower End Damage	1FTEW1EP7MFC06886	1038	5/10/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP2MKE14763	1212	5/10/2021	2021	8/13/2021
Broken Valve	1FTEX1EP2MKE03050	410	5/10/2021	2021	10/8/2021
Broken Valve	1FTEW1EP6MFB84184	1178	5/10/2021	2021	9/3/2021
Broken Valve	1FTEW1EP8MFB92934	2110	5/10/2021	2021	11/15/2021
Lower End Damage	1FTEW1EP5MFC02965	2169	5/10/2021	2021	10/18/2021
Broken Valve	2FMPK4AP5MBA25536	388	5/11/2021	2021	7/12/2021
Broken Valve	1FMEE5DP8MLA63603	1372	5/11/2021	2021	8/23/2021
Lower End Damage	1FTEW1EP0MFC03392	668	5/11/2021	2021	8/18/2021
Broken Valve	1FTEW1CP4MFB75809	1230	5/11/2021	2021	7/17/2021
Broken Valve	1FTEW1CP5MFB78203	1960	5/11/2021	2021	7/30/2021

Lower End Damage	1FTEW1EP0MFB80213	8885	5/11/2021	2021	9/28/2021
Broken Valve	1FTEW1CPXMFB84868	4214	5/11/2021	2021	10/12/2021
Lower End Damage	1FTEW1EP7MKD88726	2100	5/11/2021	2021	9/20/2021
Lower End Damage	1FTEW1CP1MKE32061	771	5/11/2021	2021	9/1/2021
Broken Valve	1FTEW1CP7MKE47471	3421	5/11/2021	2021	10/18/2021
Broken Valve	1FTEW1EP0MFB86870	2367	5/11/2021	2021	10/4/2021
Broken Valve	1FTEW1CP0MFB93434	8327	5/11/2021	2021	11/12/2021
Broken Valve	5LM5J6XC7MGL18127	237	5/12/2021	2021	10/17/2021
Lower End Damage	1FM5K8LC3MGB87019	623	5/12/2021	2021	8/17/2021
Broken Valve	1FM5K8GC9MGB77542	2800	5/12/2021	2021	9/13/2021
Lower End Damage	2FMPK4AP0MBA32846	1339	5/12/2021	2021	7/28/2021
Lower End Damage	1FMEE5DP0MLA62803	2545	5/12/2021	2021	9/11/2021
Broken Valve	1FTEW1EP3MFB82960	861	5/12/2021	2021	6/26/2021
Broken Valve	1FTEW1EP7MKE41442	990	5/12/2021	2021	11/9/2021
Lower End Damage	1FTEW1EP9MFB84163	3112	5/12/2021	2021	9/27/2021
Lower End Damage	1FTEW1EP9MKE44407	2406	5/12/2021	2021	9/28/2021
Lower End Damage	5LM5J7XC4MGL18558	378	5/13/2021	2021	8/6/2021
Broken Valve	1FM5K8GC0MGB90891	642	5/13/2021	2021	8/9/2021
Broken Valve	1FM5K8GC0MGB57938	1717	5/13/2021	2021	8/16/2021
Broken Valve	1FM5K7LC4MGB88397	1144	5/13/2021	2021	10/6/2021
Broken Valve	1FMEE5DP4MLA64764	1444	5/13/2021	2021	9/7/2021
Broken Valve	1FTEW1EP6MFB62833	1688	5/13/2021	2021	7/30/2021
Broken Valve	1FTEW1EP8MFB73557	1070	5/13/2021	2021	8/5/2021
Broken Valve	1FTEW1EP9MKE11486	1457	5/13/2021	2021	9/7/2021
Broken Valve	1FTEW1EP7MFB81679	1152	5/13/2021	2021	7/16/2021
Broken Valve	1FTEW1EP2MFB95814	5914	5/13/2021	2021	9/11/2021
Broken Valve	1FTEW1EPXMFB76993	3006	5/13/2021	2021	9/29/2021
Broken Valve	1FTEW1EP1MKE13653	947	5/13/2021	2021	8/18/2021
Broken Valve	1FTEW1EP1MKE01700	505	5/13/2021	2021	8/3/2021
Broken Valve	1FTEW1EP1MFB82570	4888	5/14/2021	2021	9/7/2021
Broken Valve	1FTEW1CP4MFC04418	3404	5/14/2021	2021	10/26/2021
Broken Valve	1FTEW1EP3MKE00807	8086	6/7/2021	2021	12/2/2021
Lower End Damage	1FMEE5DP8MLA74682	272	6/8/2021	2021	11/2/2021
Lower End Damage	2LMPJ8KP8MBL08994	1168	6/9/2021	2021	9/14/2021
Lower End Damage	2FMPK4APXMBA28206	240	6/9/2021	2021	9/7/2021
Broken Valve	2FMPK4AP0MBA30580	1856	6/9/2021	2021	11/6/2021
Broken Valve	2FMPK4AP7MBA36280	2762	6/9/2021	2021	9/4/2021
Broken Valve	1FMEE5DP5MLA69696	2394	6/9/2021	2021	9/10/2021
Lower End Damage	1FMDE5CP7MLA70538	900	6/9/2021	2021	11/2/2021
Lower End Damage	1FTEW1EP8MKE14346	4357	6/9/2021	2021	11/22/2021
Broken Valve	1FMEE5DP3MLA66408	1146	6/10/2021	2021	7/27/2021
Broken Valve	1FMEE5EP3MLA40194	601	6/10/2021	2021	8/23/2021
Broken Valve	1FMEE5EP8MLA40112	3592	6/10/2021	2021	9/25/2021
Broken Valve	5LM5J7XC8MGL16067	3402	6/11/2021	2021	8/30/2021
Broken Valve	5LM5J7XC5MGL17239	984	6/11/2021	2021	10/1/2021
Broken Valve	5LM5J6WC3MGL17431	1393	6/11/2021	2021	10/6/2021
Broken Valve	1FM5K8GC8MGB60084	710	6/11/2021	2021	7/19/2021

Lower End Damage	1FM5K8GC3MGB73972	6	6/11/2021	2021	7/21/2021
Broken Valve	1FM5K8GC5MGB65503	2911	6/11/2021	2021	9/22/2021
Broken Valve	1FM5K8GCXMGB73807	934	6/11/2021	2021	8/9/2021
Lower End Damage	1FM5K7LCXMGB90767	267	6/11/2021	2021	7/31/2021
Broken Valve	1FM5K8GC3MGB64298	1509	6/11/2021	2021	8/3/2021
Broken Valve	1FM5K8GC4MGB73821	3025	6/11/2021	2021	9/20/2021
Broken Valve	1FM5K8HC4MGB84929	1528	6/11/2021	2021	9/14/2021
Broken Valve	1FM5K8GC8MGB62319	4760	6/11/2021	2021	11/2/2021
Lower End Damage	1FM5K8HC2MGB76828	4622	6/11/2021	2021	11/17/2021
Lower End Damage	1FM5K8GC5MGB85671	933	6/11/2021	2021	9/29/2021
Lower End Damage	1FTEW1EP1MFC05829	1953	6/11/2021	2021	10/14/2021
Lower End Damage	1FTEW1EP8MFB85109	4913	6/11/2021	2021	10/5/2021
Broken Valve	1FTEW1EPXMFB86035	1165	6/11/2021	2021	10/15/2021
Broken Valve	1FTEW1EPXMFB85872	1960	6/11/2021	2021	9/29/2021
Broken Valve	5LM5J7XC4MGL18012	383	6/14/2021	2021	9/27/2021
Broken Valve	5LM5J7XC3MGL18793	791	6/14/2021	2021	8/4/2021
Broken Valve	5LM5J7XC6MGL15306	1614	6/14/2021	2021	10/5/2021
Broken Valve	5LM5J9XC1MGL18366	667	6/14/2021	2021	9/7/2021
Broken Valve	1FM5K8GC5MGB77764	1346	6/14/2021	2021	7/29/2021
Lower End Damage	1FM5K8GC5MGB73617	577	6/14/2021	2021	8/16/2021
Broken Valve	1FM5K8GC7MGB62327	1464	6/14/2021	2021	9/14/2021
Lower End Damage	1FM5K8GC3MGB65189	450	6/14/2021	2021	9/21/2021
Broken Valve	1FM5K8GC3MGB73499	1909	6/14/2021	2021	8/31/2021
Broken Valve	1FM5K8GC0MGB37415	1160	6/14/2021	2021	7/30/2021
Broken Valve	1FM5K7LC6MGB86327	1571	6/14/2021	2021	9/25/2021
Broken Valve	1FMEE5BP1MLA71500	743	6/14/2021	2021	7/26/2021
Broken Valve	1FMEE5DP8MLA69224	2167	6/14/2021	2021	7/22/2021
Broken Valve	1FMEE5BP5MLA68728	950	6/14/2021	2021	9/7/2021
Broken Valve	1FMEE5BP5MLA67059	937	6/14/2021	2021	11/30/2021
Broken Valve	1FMEE5DP0MLA74160	2907	6/15/2021	2021	10/25/2021
Broken Valve	1FTEW1CP2MFB95301	1027	6/15/2021	2021	9/28/2021
Lower End Damage	1FM5K8GC3MGB62518	870	6/17/2021	2021	9/15/2021
Lower End Damage	1FM5K8GC5MGB73777	3551	6/17/2021	2021	10/18/2021
Broken Valve	1FM5K8HC5MGB48392	412	6/17/2021	2021	10/19/2021
Broken Valve	1FM5K8HC1MGB65559	1183	6/17/2021	2021	10/2/2021
Broken Valve	1FM5K8GC2MGB49470	1790	6/17/2021	2021	9/20/2021
Broken Valve	1FMEE5BP6MLA73937	1578	6/17/2021	2021	9/22/2021
Lower End Damage	5LM5J7XC0MGL18881	1160	6/18/2021	2021	11/1/2021
Lower End Damage	5LM5J7WC7MGL14392	918	6/18/2021	2021	9/8/2021
Lower End Damage	1FM5K8HC9MGB87115	1423	6/18/2021	2021	9/4/2021
Broken Valve	1FM5K8GC6MGB68474	4627	6/18/2021	2021	10/6/2021
Lower End Damage	1FM5K8GC8MGB74177	7255	6/18/2021	2021	11/9/2021
Broken Valve	1FMEE5DP0MLA72960	985	6/18/2021	2021	8/23/2021
Broken Valve	1FMDE5CP3MLA69290	2731	6/18/2021	2021	12/13/2021
Lower End Damage	1FTEW1EP9MFC00295	3550	6/18/2021	2021	8/4/2021
Lower End Damage	1FTEW1EPXMFB97097	2017	6/18/2021	2021	10/25/2021
Broken Valve	5LM5J9XC4MGL18135	502	6/21/2021	2021	11/10/2021

Broken Valve	1FM5K8GC3MGB75916	443	6/21/2021	2021	8/17/2021
Lower End Damage	1FM5K8GC9MGB62118	858	6/21/2021	2021	9/18/2021
Broken Valve	1FM5K7LCXMGB76917	1316	6/21/2021	2021	8/14/2021
Broken Valve	1FM5K8GC4MGB74595	1246	6/21/2021	2021	10/26/2021
Broken Valve	5LM5J7XC9MGL18331	3014	6/22/2021	2021	10/12/2021
Broken Valve	1FM5K8GC5MGB43114	3598	6/22/2021	2021	9/7/2021
Broken Valve	1FM5K8HC9MGA98516	787	6/22/2021	2021	9/29/2021
Lower End Damage	1FM5K8GC4MGA82600	19	6/22/2021	2021	8/20/2021
Broken Valve	1FM5K8GC7MGB73991	984	6/22/2021	2021	8/9/2021
Broken Valve	1FM5K8GC5MGB73956	2094	6/22/2021	2021	8/16/2021
Broken Valve	1FM5K8GC3MGB78413	3959	6/23/2021	2021	8/26/2021
Broken Valve	1FMDE5FP3MLA20070	4736	6/23/2021	2021	11/16/2021
Broken Valve	1FMEE5DP1MLA72501	2646	6/23/2021	2021	11/23/2021
Broken Valve	1FMEE5DP9MLA68339	5272	6/23/2021	2021	11/2/2021
Broken Valve	1FTEW1EP9MFC05626	3026	6/24/2021	2021	9/16/2021
Broken Valve	1FTEW1EP4MKE48123	1800	6/24/2021	2021	9/8/2021
Broken Valve	1FMEE5DP5MLA86269	1294	6/28/2021	2021	10/13/2021
Lower End Damage	1FMEE5BP2MLA77225	1581	6/28/2021	2021	10/11/2021
Broken Valve	1FTEW1EP2MFB98695	588	6/28/2021	2021	8/2/2021
Lower End Damage	1FTEW1EP6MFB84797	2305	6/28/2021	2021	10/5/2021
Broken Valve	1FTEW1CP1MKE54139	5084	6/28/2021	2021	12/13/2021
Broken Valve	1FTEW1EP6MFC10928	984	6/29/2021	2021	8/20/2021
Broken Valve	1FMEE5BP6MLA71427	6245	6/30/2021	2021	10/15/2021
Broken Valve	5LM5J7XC6MGL17279	768	7/1/2021	2021	9/21/2021
Lower End Damage	5LM5J7XC9MGL12769	553	7/1/2021	2021	10/2/2021
Broken Valve	5LM5J7XC8MGL19308	790	7/1/2021	2021	10/12/2021
Lower End Damage	5LM5J7XC2MGL16646	730	7/1/2021	2021	10/13/2021
Broken Valve	2LMPJ8KP7MBL10168	875	7/2/2021	2021	8/16/2021
Lower End Damage	1FTEW1CP5MFB94644	1241	7/2/2021	2021	9/20/2021
Broken Valve	1FTEW1CP8MFB84559	1061	7/2/2021	2021	9/17/2021
Broken Valve	1FTEX1EP3MKE31259	1770	7/2/2021	2021	10/4/2021
Lower End Damage	1FTEW1EP6MKE27080	1481	7/2/2021	2021	10/25/2021
Broken Valve	1FTEW1EP3MFB84563	1215	7/2/2021	2021	10/18/2021
Broken Valve	1FTEW1EP7MFC32789	1900	7/13/2021	2021	9/17/2021
Lower End Damage	1FTEW1EP9MFC28355	586	7/13/2021	2021	11/10/2021
Broken Valve	1FTEW1CP4MFB93453	892	7/14/2021	2021	8/19/2021
Broken Valve	2FMPK4AP8MBA44310	904	7/15/2021	2021	9/13/2021
Broken Valve	1FTEW1CP5MFC28808	1646	7/27/2021	2021	10/15/2021
Broken Valve	1FMEE5DP5MLA87194	1466	7/28/2021	2021	10/22/2021
Broken Valve	1FTEW1EP6MFC22531	2089	7/29/2021	2021	10/18/2021
Broken Valve	1FTEW1EP6MFC15756	3321	7/29/2021	2021	11/30/2021
Broken Valve	1FMEE5BP7MLA94974	2844	8/2/2021	2021	11/22/2021
Lower End Damage	1FMDE5AP2MLA77576	2012	8/2/2021	2021	12/10/2021
Broken Valve	1FTMF1CP8MKE43246	987	8/2/2021	2021	11/16/2021
Lower End Damage	1FTEW1CP3MKE29873	3541	8/2/2021	2021	11/22/2021
Broken Valve	1FTEW1EP8MKE53647	3011	8/2/2021	2021	9/27/2021
Broken Valve	5LM5J7WC8MGL16359	744	8/3/2021	2021	10/25/2021

Broken Valve	1FM5K8GC0MGB49614	2061	8/3/2021	2021	9/14/2021
Lower End Damage	1FM5K8LC0MGB76396	525	8/3/2021	2021	9/16/2021
Lower End Damage	1FM5K8LC3MGB76358	2292	8/3/2021	2021	11/9/2021
Lower End Damage	1FM5K8GC8MGB39655	1477	8/3/2021	2021	11/12/2021
Broken Valve	1FM5K8LC4MGB75915	913	8/3/2021	2021	9/30/2021
Lower End Damage	1FM5K8LC1MGB77184	1825	8/3/2021	2021	11/23/2021
Broken Valve	1FM5K8GC8MGB62837	3869	8/3/2021	2021	11/1/2021
Broken Valve	2FMPK4AP0MBA48366	821	8/3/2021	2021	9/24/2021
Broken Valve	2FMPK4AP3MBA41332	1303	8/3/2021	2021	12/10/2021
Broken Valve	1FTEW1EP0MFC15493	2482	8/3/2021	2021	10/11/2021
Lower End Damage	1FTEW1CPXMFC47239	1520	8/3/2021	2021	11/22/2021
Broken Valve	5LM5J7WC4MGL17203	880	8/4/2021	2021	10/11/2021
Broken Valve	5LM5J7XC0MGL17214	1367	8/4/2021	2021	10/29/2021
Broken Valve	1FM5K8GCXMGB63214	1263	8/4/2021	2021	9/27/2021
Broken Valve	1FM5K8GC4MGB57408	3334	8/4/2021	2021	10/25/2021
Broken Valve	1FM5K8LCXMGB77412	561	8/4/2021	2021	9/7/2021
Lower End Damage	1FM5K8GC9MGB71790	1182	8/4/2021	2021	10/5/2021
Broken Valve	1FMEE5DP7MLA71742	1524	8/4/2021	2021	11/10/2021
Broken Valve	1FMEE5DP6MLA68444	4321	8/4/2021	2021	11/10/2021
Broken Valve	1FTEX1CP9MKE22357	1469	8/5/2021	2021	11/4/2021
Broken Valve	1FTEW1EP4MFC32670	793	8/6/2021	2021	9/16/2021
Broken Valve	1FTEW1EPXMKE16762	4009	8/6/2021	2021	10/20/2021
Broken Valve	1FTEW1EP0MFC25702	2391	8/6/2021	2021	10/25/2021
Lower End Damage	5LM5J7XC1MGL17772	891	8/7/2021	2021	10/30/2021
Broken Valve	1FTEW1CP1MFC51017	1421	8/7/2021	2021	9/17/2021
Lower End Damage	1FTEW1EP5MFC51244	2678	8/7/2021	2021	9/30/2021
Broken Valve	1FTEW1CPXMFC28190	1748	8/7/2021	2021	12/10/2021
Lower End Damage	1FTEW1CP3MFC33845	446	8/7/2021	2021	9/23/2021
Broken Valve	5LM5J7WC9MGL19285	1145	8/9/2021	2021	10/1/2021
Lower End Damage	1FM5K8GC4MGB49079	2079	8/9/2021	2021	11/23/2021
Broken Valve	2FMPK4AP7MBA48140	2460	8/10/2021	2021	12/3/2021
Broken Valve	1FTEW1EPXMFC26047	779	8/10/2021	2021	9/22/2021
Lower End Damage	1FTEX1EP1MFC15774	1178	8/10/2021	2021	10/2/2021
Broken Valve	1FTEW1EP5MFC24805	1316	8/10/2021	2021	10/12/2021
Lower End Damage	1FTEW1EP6MFC26904	1672	8/10/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP0MFC52477	6223	8/10/2021	2021	11/22/2021
Lower End Damage	1FTEW1CP5MFC42711	582	8/10/2021	2021	10/5/2021
Lower End Damage	1FTEW1EP7MFC16592	711	8/10/2021	2021	10/18/2021
Lower End Damage	1FTEW1EP7MFC26734	1227	8/11/2021	2021	11/2/2021
Lower End Damage	5LM5J7XC7MGL15461	1276	8/12/2021	2021	10/28/2021
Lower End Damage	5LM5J7XC0MGL19061	739	8/16/2021	2021	11/11/2021
Lower End Damage	1FM5K8GC3MGB63801	1895	8/16/2021	2021	10/20/2021
Lower End Damage	1FM5K8HC8MGB88756	974	8/16/2021	2021	10/23/2021
Lower End Damage	1FM5K8HC7MGB66179	454	8/16/2021	2021	11/9/2021
Broken Valve	1FM5K8HCXMGB86605	2331	8/16/2021	2021	11/19/2021
Broken Valve	1FM5K8GC4MGB76315	1097	8/16/2021	2021	10/11/2021
Lower End Damage	1FMEE5DP3MLA87968	2678	8/16/2021	2021	12/4/2021

Broken Valve	5LM5J7XC3MGL18907	1304	8/17/2021	2021	11/23/2021
Lower End Damage	1FM5K8HC5MGB60638	1461	8/17/2021	2021	11/15/2021
Broken Valve	1FTEW1EP3MFC26049	608	8/17/2021	2021	10/4/2021
Lower End Damage	1FTEW1EP1MKE32932	173	8/18/2021	2021	10/29/2021
Lower End Damage	5LM5J7XC1MGL12667	2530	8/19/2021	2021	10/21/2021
Broken Valve	5LM5J7WC7MGL18796	739	8/19/2021	2021	10/5/2021
Lower End Damage	1FM5K8HC1MGB68705	511	8/19/2021	2021	10/5/2021
Broken Valve	1FM5K8GC7MGB62537	2762	8/19/2021	2021	11/15/2021
Lower End Damage	1FM5K8HC7MGB64190	639	8/19/2021	2021	9/29/2021
Lower End Damage	1FM5K8GC8MGB64359	2317	8/19/2021	2021	12/10/2021
Broken Valve	1FTEW1CP0MFC47461	2298	8/19/2021	2021	10/18/2021
Lower End Damage	1FTEW1EPXMFC48906	2200	8/19/2021	2021	11/10/2021
Lower End Damage	1FTEW1EP1MFC62063	2775	8/19/2021	2021	11/11/2021
Broken Valve	1FTEW1EP2MFC38600	4375	8/19/2021	2021	10/22/2021
Lower End Damage	1FTEW1EP7MKE34541	2975	8/19/2021	2021	12/2/2021
Broken Valve	1FTEW1EP8MFC25429	1799	8/19/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP5MFC47730	3736	8/19/2021	2021	12/11/2021
Lower End Damage	5LM5J7XC6MGL19176	1281	8/20/2021	2021	11/23/2021
Lower End Damage	5LM5J7XC1MGL17870	1458	8/20/2021	2021	10/13/2021
Broken Valve	5LM5J7XC3MGL18681	656	8/20/2021	2021	10/25/2021
Lower End Damage	1FM5K8GC4MGB70210	132	8/20/2021	2021	9/14/2021
Broken Valve	1FM5K8GC9MGB71711	803	8/20/2021	2021	9/28/2021
Lower End Damage	1FM5K8HC1MGB67487	1997	8/20/2021	2021	11/4/2021
Broken Valve	1FM5K8GC6MGB10042	823	8/20/2021	2021	10/4/2021
Broken Valve	1FM5K8GC5MGB77196	2321	8/20/2021	2021	10/18/2021
Lower End Damage	1FM5K8GC8MGB30132	776	8/20/2021	2021	10/12/2021
Lower End Damage	5LM5J7XC1NGL01427	786	8/30/2021	2022	12/1/2021
Broken Valve	1FM5K8GC0MGC11433	2915	8/30/2021	2021	10/6/2021
Broken Valve	1FM5K8GC1MGC08959	913	8/30/2021	2021	10/19/2021
Lower End Damage	1FTEW1EP9MFC92492	1220	8/30/2021	2021	11/22/2021
Broken Valve	1FTEW1EP0MFC56240	1388	8/30/2021	2021	12/10/2021
Broken Valve	2FMPK4AP0MBA47430	1294	9/1/2021	2021	12/1/2021
Lower End Damage	5LM5J7XC9NGL02227	1732	10/12/2021	2022	11/8/2021

Concern	VIN	Mileage	Engine Build Date	Model Yea	Repair Date
Broken Valve	1FTMF1EP7JKE12398	933	3/20/2018	2018	5/24/2018
Broken Valve	1FM5K8GC8LGA05517	5488	6/4/2019	2020	5/19/2020
Broken Valve	1FM5K8GC9LGA17742	1577	6/18/2019	2020	5/4/2020
Broken Valve	1FM5K8HC8LGA10067	10479	6/18/2019	2020	6/18/2020
Broken Valve	1FM5K8GCXLGA22464	1282	6/21/2019	2020	5/13/2020
Broken Valve	1FM5K8GC8LGA28943	6898	6/21/2019	2020	9/16/2020
Broken Valve	1FM5K8GC0LGA17953	7026	6/24/2019	2020	4/27/2020
Broken Valve	1FM5K8GC0LGA28774	743	6/27/2019	2020	2/6/2020
Broken Valve	1FM5K8HC9LGA30487	9517	7/15/2019	2020	9/8/2020
Broken Valve	1FM5K8HC6LGA44332	2100	7/25/2019	2020	12/26/2019
Broken Valve	5LM5J7XC5LGL09916	956	8/27/2019	2020	2/10/2020
Broken Valve	5LM5J9XC0LGL11214	1140	8/28/2019	2020	11/27/2019
Broken Valve	5LM5J9XC8LGL11204	766	8/28/2019	2020	12/16/2019
Broken Valve	5LM5J8WC5LGL08188	4153	8/29/2019	2020	5/22/2020
Broken Valve	5LM5J8WC0LGL08096	471	8/30/2019	2020	6/22/2020
Broken Valve	1FM5K8GC5LGA52049	1056	9/5/2019	2020	7/14/2020
Broken Valve	1FM5K8GC9LGA81277	2426	9/18/2019	2020	1/21/2020
Broken Valve	1FM5K8GC9LGA46089	2407	9/18/2019	2020	6/15/2020
Broken Valve	1FM5K8HC3LGA66577	933	9/19/2019	2020	9/4/2020
Broken Valve	1FM5K8GC9LGB24354	203	10/29/2019	2020	6/24/2020
Broken Valve	1FM5K8GC5LGB92716	1842	2/14/2020	2020	4/29/2020
Broken Valve	1FTEX1EP0LKE23523	1021	3/17/2020	2020	8/31/2020
Broken Valve	1FTEX1CP9LFC00151	3200	3/19/2020	2020	9/9/2020
Broken Valve	LVSHNCAZ2LH498715	869	6/5/2020	2020	10/19/2020
Broken Valve	1FTEW1EP2LFB96282	2008	6/16/2020	2020	10/5/2020
Broken Valve	1FTEW1EP3LFC66789	903	8/17/2020	2020	10/15/2020
Broken Valve	1FM5K8GC8MGA11206	5302	11/4/2020	2021	2/25/2021
Broken Valve	1FM5K8GC0MGA65891	4842	11/16/2020	2021	8/23/2021
Broken Valve	1FM5K8GC3MGA67098	6599	11/16/2020	2021	9/4/2021
Broken Valve	5LM5J6WCXMGL07981	9400	11/17/2020	2021	4/27/2021
Broken Valve	1FTEX1CP3MKD22805	1203	12/14/2020	2021	2/13/2021
Broken Valve	1FTEW1CP0MKD26135	2178	12/16/2020	2021	3/14/2021
Broken Valve	2FMPK4AP3MBA12221	857	12/17/2020	2021	3/31/2021
Broken Valve	1FTEX1EP0MKD14822	1956	12/17/2020	2021	10/7/2021
Broken Valve	1FTEX1EP5MFA36962	2080	1/7/2021	2021	3/17/2021
Broken Valve	1FM5K8GC8MGA90652	513	1/8/2021	2021	3/5/2021
Broken Valve	1FM5K8HC2MGA95506	1245	1/8/2021	2021	6/23/2021
Broken Valve	1FM5K8GCXMGA95254	4614	1/14/2021	2021	6/30/2021
Broken Valve	1FTEX1CP6MKD47049	1500	1/14/2021	2021	6/11/2021
Broken Valve	1FM5K8GC7MGB08543	3582	2/2/2021	2021	10/11/2021
Broken Valve	1FM5K8GC2MGB00950	4348	2/3/2021	2021	7/7/2021
Broken Valve	1FTEW1EP6MKD53692	1020	2/4/2021	2021	7/12/2021
Broken Valve	5LM5J7WC4MGL11532	1757	3/3/2021	2021	7/12/2021
Broken Valve	1FM5K8GC0MGB38144	2853	3/16/2021	2021	6/30/2021
Broken Valve	5LM5J7XC3MGL14159	7350	3/18/2021	2021	11/3/2021
Broken Valve	2LMPJ9JP7MBL01638	2062	3/23/2021	2021	8/11/2021

Broken Valve	2LMPJ8KP1MBL01689	2275	3/25/2021	2021	8/24/2021
Broken Valve	1FTEW1CP8MFB51917	2083	3/30/2021	2021	9/2/2021
Broken Valve	1FTEW1EP4MFB56870	5538	4/1/2021	2021	10/19/2021
Broken Valve	1FTEW1EP9MFB47663	359	4/7/2021	2021	6/4/2021
Broken Valve	1FTEW1EPXMFB72426	1471	4/7/2021	2021	7/12/2021
Broken Valve	1FTEW1EP2MFB68726	1865	4/7/2021	2021	8/28/2021
Broken Valve	1FTEW1EP2MFB77653	2781	5/3/2021	2021	7/12/2021
Broken Valve	1FTEW1EP4MFB79064	1722	5/3/2021	2021	7/6/2021
Broken Valve	1FMEE5BP6MLA61450	1880	5/5/2021	2021	9/17/2021
Lower End Damage	2FMPK4APXMBA29078	861	5/6/2021	2021	10/19/2021
Broken Valve	1FTEW1EP0MFB47261	2285	5/6/2021	2021	8/10/2021
Broken Valve	1FTEW1EP9MFB77651	1428	5/7/2021	2021	7/1/2021
Broken Valve	1FTEW1EP9MFB73342	1497	5/7/2021	2021	8/2/2021
Lower End Damage	1FTEW1EP8MFB72134	1890	5/7/2021	2021	8/4/2021
Broken Valve	1FTEW1EP7MFB90379	1041	5/7/2021	2021	8/9/2021
Broken Valve	1FTEW1CP7MKE18035	462	5/7/2021	2021	8/19/2021
Broken Valve	1FTEW1CP1MFB90283	1188	5/7/2021	2021	10/29/2021
Broken Valve	1FTEW1CP3MFB90897	3691	5/7/2021	2021	8/23/2021
Broken Valve	1FTEW1EPXMFB82924	2607	5/7/2021	2021	9/29/2021
Broken Valve	1FTEW1CP7MFC04087	3722	5/10/2021	2021	8/27/2021
Broken Valve	1FTEW1CP4MKD98665	2094	5/10/2021	2021	8/3/2021
Broken Valve	1FTEW1EP4MKE01867	1832	5/10/2021	2021	9/16/2021
Broken Valve	1FTEW1EP9MFC02791	2417	5/10/2021	2021	8/23/2021
Lower End Damage	1FTEW1EP1MKE02605	3548	5/10/2021	2021	9/27/2021
Lower End Damage	1FTEW1EP2MKE14231	1816	5/10/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP7MFC06886	1038	5/10/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP2MKE14763	1212	5/10/2021	2021	8/13/2021
Broken Valve	1FTEX1EP2MKE03050	410	5/10/2021	2021	10/8/2021
Broken Valve	1FTEW1EP6MFB84184	1178	5/10/2021	2021	9/3/2021
Broken Valve	2FMPK4AP5MBA25536	388	5/11/2021	2021	7/12/2021
Broken Valve	1FMEE5DP8MLA63603	1372	5/11/2021	2021	8/23/2021
Lower End Damage	1FTEW1EP0MFC03392	668	5/11/2021	2021	8/18/2021
Broken Valve	1FTEW1CP4MFB75809	1230	5/11/2021	2021	7/17/2021
Broken Valve	1FTEW1CP5MFB78203	1960	5/11/2021	2021	7/30/2021
Lower End Damage	1FTEW1EP0MFB80213	8885	5/11/2021	2021	9/28/2021
Broken Valve	1FTEW1CPXMFB84868	4214	5/11/2021	2021	10/12/2021
Lower End Damage	1FTEW1EP7MKD88726	2100	5/11/2021	2021	9/20/2021
Lower End Damage	1FTEW1CP1MKE32061	771	5/11/2021	2021	9/1/2021
Broken Valve	5LM5J6XC7MGL18127	237	5/12/2021	2021	10/17/2021
Lower End Damage	1FM5K8LC3MGB87019	623	5/12/2021	2021	8/17/2021
Broken Valve	1FM5K8GC9MGB77542	2886	5/12/2021	2021	10/12/2021
Lower End Damage	2FMPK4AP0MBA32846	1339	5/12/2021	2021	7/30/2021
Lower End Damage	1FMEE5DP0MLA62803	2545	5/12/2021	2021	9/11/2021
Broken Valve	1FTEW1EP3MFB82960	861	5/12/2021	2021	6/26/2021
Broken Valve	1FTEW1EP7MKE41442	990	5/12/2021	2021	10/1/2021
Lower End Damage	1FTEW1EP9MFB84163	3112	5/12/2021	2021	9/27/2021
Lower End Damage	5LM5J7XC4MGL18558	378	5/13/2021	2021	8/6/2021

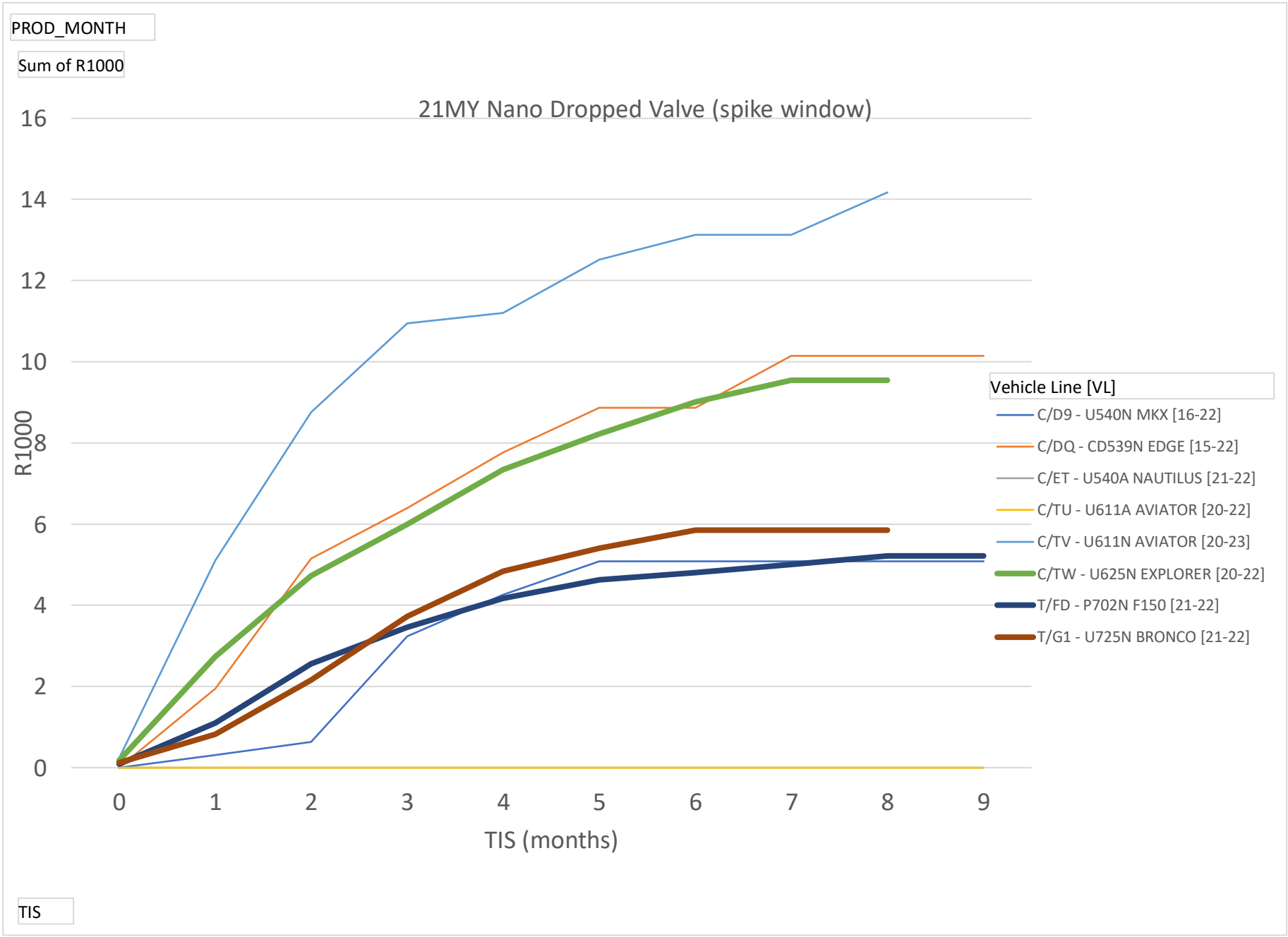
Broken Valve	1FM5K8GC0MGB90891	642	5/13/2021 2021	8/9/2021
Broken Valve	1FM5K8GC0MGB57938	1717	5/13/2021 2021	8/16/2021
Broken Valve	1FMEE5DP4MLA64764	1444	5/13/2021 2021	9/7/2021
Broken Valve	1FTEW1EP6MFB62833	1688	5/13/2021 2021	7/30/2021
Broken Valve	1FTEW1EP8MFB73557	1070	5/13/2021 2021	8/5/2021
Broken Valve	1FTEW1EP9MKE11486	1457	5/13/2021 2021	9/7/2021
Broken Valve	1FTEW1EP7MFB81679	1152	5/13/2021 2021	7/16/2021
Lower End Damage	1FTEW1EP2MFB95814	5914	5/13/2021 2021	9/11/2021
Lower End Damage	1FTEW1EPXMFB76993	3006	5/13/2021 2021	10/19/2021
Broken Valve	1FTEW1EP1MKE13653	947	5/13/2021 2021	10/19/2021
Broken Valve	1FTEW1EP1MFB82570	4888	5/14/2021 2021	9/7/2021
Broken Valve	1FTEW1CP4MFC04418	3404	5/14/2021 2021	10/26/2021
Lower End Damage	1FMEE5DP8MLA74682	272	6/8/2021 2021	11/2/2021
Lower End Damage	2FMPK4APXMBA28206	240	6/9/2021 2021	9/24/2021
Broken Valve	2FMPK4AP0MBA30580	1856	6/9/2021 2021	11/6/2021
Broken Valve	1FMEE5DP5MLA69696	2394	6/9/2021 2021	9/10/2021
Lower End Damage	1FMDE5CP7MLA70538	900	6/9/2021 2021	11/2/2021
Broken Valve	1FMEE5DP3MLA66408	1146	6/10/2021 2021	7/27/2021
Broken Valve	1FMEE5EP3MLA40194	601	6/10/2021 2021	8/23/2021
Lower End Damage	5LM5J7XC8MGL16067	3402	6/11/2021 2021	8/31/2021
Broken Valve	1FM5K8GC8MGB60084	710	6/11/2021 2021	7/19/2021
Lower End Damage	1FM5K8GC3MGB73972	6	6/11/2021 2021	7/21/2021
Lower End Damage	1FM5K8GC5MGB65503	2911	6/11/2021 2021	9/22/2021
Broken Valve	1FM5K8GCXMGB73807	934	6/11/2021 2021	8/9/2021
Lower End Damage	1FM5K7LCXMGB90767	267	6/11/2021 2021	7/31/2021
Broken Valve	1FM5K8GC3MGB64298	1509	6/11/2021 2021	8/3/2021
Broken Valve	1FM5K8GC4MGB73821	3025	6/11/2021 2021	9/20/2021
Broken Valve	1FM5K8HC4MGB84929	1528	6/11/2021 2021	9/14/2021
Lower End Damage	1FTEW1EP1MFC05829	1953	6/11/2021 2021	10/14/2021
Lower End Damage	1FTEW1EP8MFB85109	4913	6/11/2021 2021	10/5/2021
Broken Valve	1FTEW1EPXMFB86035	1165	6/11/2021 2021	10/15/2021
Broken Valve	5LM5J7XC4MGL18012	383	6/14/2021 2021	9/27/2021
Broken Valve	5LM5J7XC3MGL18793	791	6/14/2021 2021	8/4/2021
Broken Valve	5LM5J7XC6MGL15306	1614	6/14/2021 2021	10/11/2021
Broken Valve	5LM5J9XC1MGL18366	667	6/14/2021 2021	9/7/2021
Broken Valve	1FM5K8GC5MGB77764	1346	6/14/2021 2021	7/29/2021
Lower End Damage	1FM5K8GC5MGB73617	577	6/14/2021 2021	8/16/2021
Lower End Damage	1FM5K8GC7MGB62327	1463	6/14/2021 2021	9/14/2021
Lower End Damage	1FM5K8GC3MGB65189	543	6/14/2021 2021	9/27/2021
Broken Valve	1FM5K8GC3MGB73499	1909	6/14/2021 2021	8/31/2021
Lower End Damage	1FM5K8GC0MGB37415	1160	6/14/2021 2021	7/30/2021
Broken Valve	1FM5K7LC6MGB86327	1571	6/14/2021 2021	9/25/2021
Broken Valve	1FMEE5BP1MLA71500	743	6/14/2021 2021	7/26/2021
Broken Valve	1FMEE5DP8MLA69224	2167	6/14/2021 2021	7/22/2021
Broken Valve	1FMEE5BP5MLA68728	950	6/14/2021 2021	9/7/2021
Lower End Damage	1FM5K8GC3MGB62518	870	6/17/2021 2021	9/15/2021
Lower End Damage	1FM5K8GC5MGB73777	3551	6/17/2021 2021	10/19/2021

Broken Valve	1FM5K8HC5MGB48392	411	6/17/2021 2021	11/3/2021
Broken Valve	1FMEE5BP6MLA73937	1578	6/17/2021 2021	9/28/2021
Lower End Damage	5LM5J7XC0MGL18881	1160	6/18/2021 2021	11/1/2021
Lower End Damage	1FM5K8HC9MGB87115	1423	6/18/2021 2021	9/4/2021
Broken Valve	1FM5K8GC6MGB68474	4627	6/18/2021 2021	10/9/2021
Broken Valve	1FMEE5DP0MLA72960	985	6/18/2021 2021	8/23/2021
Lower End Damage	1FTEW1EP9MFC00295	3550	6/18/2021 2021	8/4/2021
Lower End Damage	1FTEW1EPXMFB97097	2016	6/18/2021 2021	11/1/2021
Broken Valve	1FM5K8GC3MGB75916	443	6/21/2021 2021	8/31/2021
Lower End Damage	1FM5K8GC9MGB62118	858	6/21/2021 2021	9/20/2021
Broken Valve	1FM5K7LCXMGB76917	1316	6/21/2021 2021	8/14/2021
Broken Valve	1FM5K8GC4MGB74595	1246	6/21/2021 2021	10/26/2021
Broken Valve	5LM5J7XC9MGL18331	3014	6/22/2021 2021	10/12/2021
Lower End Damage	1FM5K8GC5MGB43114	3598	6/22/2021 2021	9/17/2021
Broken Valve	1FM5K8HC9MGA98516	787	6/22/2021 2021	9/29/2021
Lower End Damage	1FM5K8GC4MGA82600	19	6/22/2021 2021	8/20/2021
Broken Valve	1FM5K8GC7MGB73991	984	6/22/2021 2021	8/9/2021
Lower End Damage	1FM5K8GC5MGB73956	2094	6/22/2021 2021	8/16/2021
Broken Valve	1FM5K8GC3MGB78413	3959	6/23/2021 2021	8/26/2021
Broken Valve	1FTEW1EP9MFC05626	3026	6/24/2021 2021	9/16/2021
Broken Valve	1FTEW1EP4MKE48123	1800	6/24/2021 2021	9/8/2021
Broken Valve	1FMEE5DP5MLA86269	1294	6/28/2021 2021	10/15/2021
Lower End Damage	1FMEE5BP2MLA77225	1581	6/28/2021 2021	10/18/2021
Lower End Damage	1FTEW1EP2MFB98695	588	6/28/2021 2021	8/2/2021
Lower End Damage	1FTEW1EP6MFC10928	984	6/29/2021 2021	8/20/2021
Lower End Damage	1FMEE5BP6MLA71427	6245	6/30/2021 2021	10/15/2021
Broken Valve	5LM5J7XC6MGL17279	768	7/1/2021 2021	9/21/2021
Lower End Damage	5LM5J7XC9MGL12769	553	7/1/2021 2021	10/2/2021
Broken Valve	5LM5J7XC8MGL19308	790	7/1/2021 2021	10/12/2021
Broken Valve	2LMPJ8KP7MBL10168	875	7/2/2021 2021	8/16/2021
Lower End Damage	1FTEW1CP5MFB94644	1241	7/2/2021 2021	9/20/2021
Broken Valve	1FTEW1CP8MFB84559	1061	7/2/2021 2021	9/17/2021
Broken Valve	1FTEX1EP3MKE31259	1770	7/2/2021 2021	10/20/2021
Lower End Damage	1FTEW1EP6MKE27080	1481	7/2/2021 2021	10/28/2021
Broken Valve	1FTEW1EP7MFC32789	1900	7/13/2021 2021	9/17/2021
Broken Valve	1FTEW1CP4MFB93453	892	7/14/2021 2021	8/19/2021
Broken Valve	2FMPK4AP8MBA44310	904	7/15/2021 2021	9/13/2021
Broken Valve	1FTEW1CP5MFC28808	1646	7/27/2021 2021	10/19/2021
Broken Valve	5LM5J7WC8MGL16359	744	8/3/2021 2021	10/25/2021
Broken Valve	1FM5K8GC0MGB49614	2061	8/3/2021 2021	9/14/2021
Lower End Damage	1FM5K8LC0MGB76396	525	8/3/2021 2021	9/16/2021
Broken Valve	2FMPK4AP0MBA48366	821	8/3/2021 2021	9/24/2021
Broken Valve	1FTEW1EP0MFC15493	2482	8/3/2021 2021	10/11/2021
Lower End Damage	5LM5J7WC4MGL17203	880	8/4/2021 2021	10/11/2021
Broken Valve	5LM5J7XC0MGL17214	1367	8/4/2021 2021	10/29/2021
Lower End Damage	1FM5K8GCXMGB63214	1263	8/4/2021 2021	9/27/2021
Lower End Damage	1FM5K8GC4MGB57408	3334	8/4/2021 2021	11/2/2021

Broken Valve	1FTEX1CP9MKE22357	1469	8/5/2021	2021	11/4/2021
Broken Valve	1FTEW1EP4MFC32670	793	8/6/2021	2021	9/16/2021
Broken Valve	1FTEW1CP1MFC51017	1421	8/7/2021	2021	9/21/2021
Lower End Damage	1FTEW1EP5MFC51244	2678	8/7/2021	2021	9/30/2021
Broken Valve	1FTEW1EPXMFC26047	779	8/10/2021	2021	9/22/2021
Lower End Damage	1FTEX1EP1MFC15774	1178	8/10/2021	2021	10/2/2021
Broken Valve	1FTEW1EP5MFC24805	1316	8/10/2021	2021	10/19/2021
Lower End Damage	1FTEW1EP6MFC26904	1672	8/10/2021	2021	10/8/2021
Lower End Damage	1FTEW1EP7MFC26734	1227	8/11/2021	2021	11/2/2021
Lower End Damage	5LM5J7XC7MGL15461	1276	8/12/2021	2021	10/28/2021
Lower End Damage	1FM5K8GC3MGB63801	1895	8/16/2021	2021	10/20/2021
Lower End Damage	1FM5K8HC8MGB88756	957	8/16/2021	2021	11/3/2021
Lower End Damage	5LM5J7XC1MGL12667	2530	8/19/2021	2021	10/21/2021
Lower End Damage	1FM5K8HC1MGB68705	511	8/19/2021	2021	10/5/2021
Lower End Damage	1FTEW1CP0MFC47461	2298	8/19/2021	2021	10/25/2021
Lower End Damage	1FM5K8GC4MGB70210	132	8/20/2021	2021	9/14/2021
Broken Valve	1FM5K8GC9MGB71711	803	8/20/2021	2021	9/28/2021
Broken Valve	1FM5K8GC0MGC11433	2915	8/30/2021	2021	10/18/2021

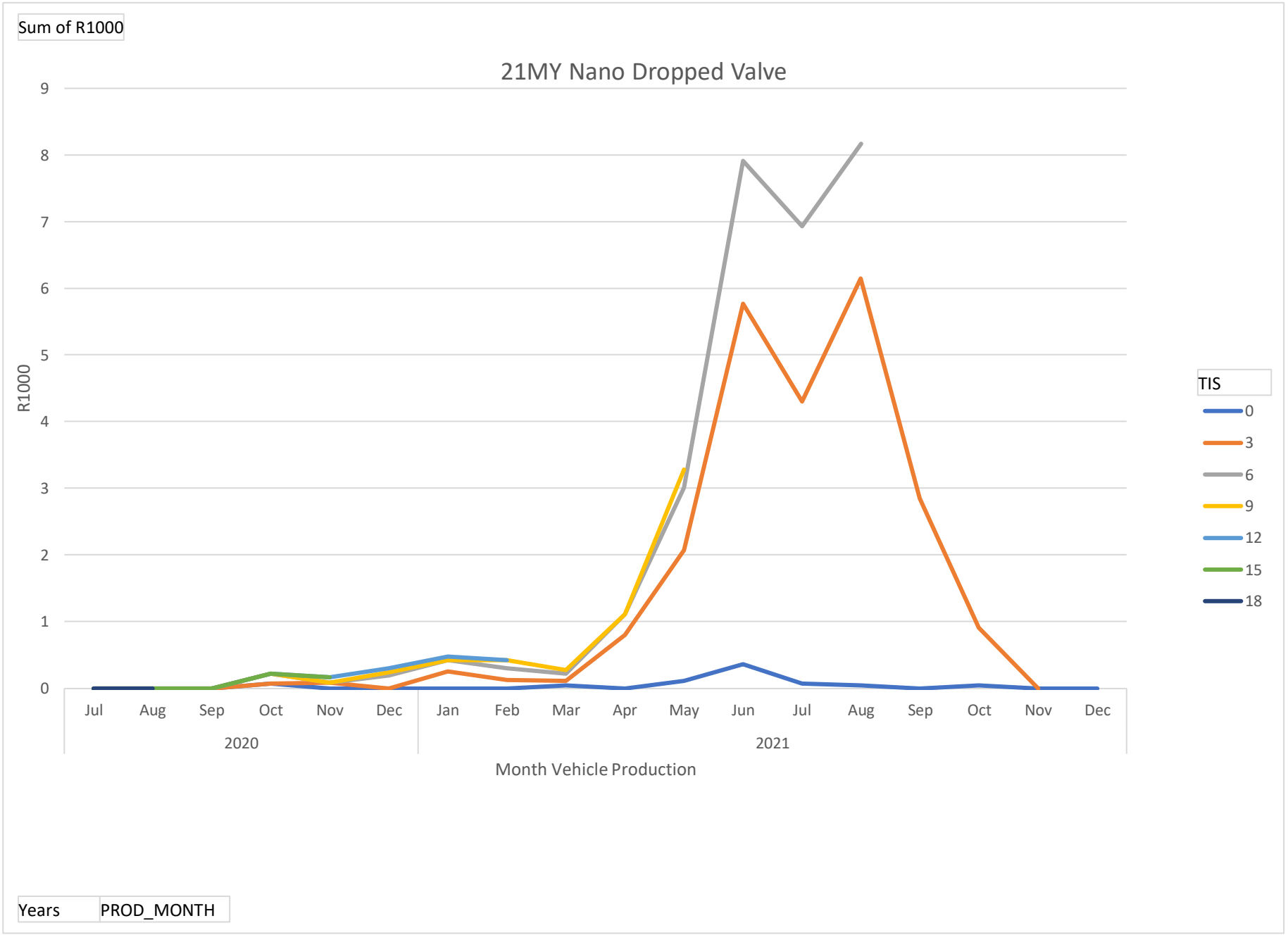
PROD_MONTH	(blank)
TIS	0

Row Labels	Sum of VEHICLES
T/FD - P702N F150 [21-22]	46800
C/TW - U625N EXPLORER [20-22]	16527
T/G1 - U725N BRONCO [21-22]	14914
C/TV - U611N AVIATOR [20-23]	4127
C/D9 - U540N MKX [16-22]	3245
C/DQ - CD539N EDGE [15-22]	2607
C/TU - U611A AVIATOR [20-22]	1933
C/ET - U540A NAUTILUS [21-22]	1257
Grand Total	**91410**


PROD_MONTH
Sum of R1000
21MY Nano Dropped Valve (spike window)
16
14
12
10
8
6
4
2
0
R1000
0
1
2
3
4
5
6
7
8
9
TIS (months)
TIS
Vehicle Line [VL]
C/D9 - U540N MKX [16-22]
C/DQ - CD539N EDGE [15-22]
C/ET - U540A NAUTILUS [21-22]
C/TU - U611A AVIATOR [20-22]
C/TV - U611N AVIATOR [20-23]
C/TW - U625N EXPLORER [20-22]
T/FD - P702N F150 [21-22]
T/G1 - U725N BRONCO [21-22]

PROD_MONTH (blank)

Sum of R1000	Column Labels								
Row Labels	**C/D9 - U540N MKX [16-22]**	**C/DQ - CD539N EDGE [15-22]**	**C/ET - U540A NAUTILUS [21-22]**	**C/TU - U611A AVIATOR [20-22]**	**C/TV - U611N AVIATOR [20-23]**	**C/TW - U625N EXPLORER [20-22]**	**T/FD - P702N F150 [21-22]**	**T/G1 - U725N BRONCO [21-22]**	**Grand Total**
0	0	0	0	0	0.24	0.18	0.09	0.13	0.64
1	0.31	1.95	0	0	5.1	2.74	1.1	0.82	12.02
2	0.63	5.15	0	0	8.75	4.73	2.56	2.16	23.98
3	3.24	6.39	0	0	10.95	5.99	3.46	3.72	33.75
4	4.26	7.76	0	0	11.2	7.34	4.17	4.84	39.57
5	5.09	8.87	0	0	12.51	8.22	4.63	5.4	44.72
6	5.09	8.87	0	0	13.13	9.01	4.81	5.86	46.77
7	5.09	10.15	0	0	13.13	9.55	5	5.86	48.78
8	5.09	10.15	0	0	14.18	9.55	5.22	5.86	50.05
9	5.09	10.15	0	0			5.22		20.46
Grand Total	**33.89**	**69.44**	**0**	**0**	**89.19**	**57.31**	**36.26**	**34.65**	**320.74**


Sum of R1000
21MY Nano Dropped Valve
R1000
9
8
7
6
5
4
3
2
1
0
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
Month Vehicle Production
TIS
0
3
6
9
12
15
18
Years
PROD_MONTH

Sum of R1000	Column Labels							
Row Labels	**0**	**3**	**6**	**9**	**12**	**15**	**18**	**Grand Total**
2020	**0.07**	**0.15**	**0.49**	**0.54**	**0.68**	**0.38**	**0**	**2.31**
Jul	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0		0
Oct	0.07	0.07	0.22	0.22	0.22	0.22		1.02
Nov	0	0.08	0.08	0.08	0.16	0.16		0.56
Dec	0	0	0.19	0.24	0.3			0.73
2021	**0.66**	**23.33**	**28.07**	**5.5**	**0.9**			**58.46**
Jan	0	0.25	0.42	0.42	0.48			1.57
Feb	0	0.12	0.3	0.42	0.42			1.26
Mar	0.04	0.11	0.22	0.27				0.64
Apr	0	0.8	1.11	1.11				3.02
May	0.11	2.07	3.01	3.28				8.47
Jun	0.36	5.77	7.91					14.04
Jul	0.07	4.3	6.93					11.3
Aug	0.04	6.15	8.17					14.36
Sep	0	2.85						2.85
Oct	0.04	0.91						0.95
Nov	0	0						0
Dec	0							0
Grand Total	**0.73**	**23.48**	**28.56**	**6.04**	**1.58**	**0.38**	**0**	**60.77**

Concern	VIN	Mileage	Engine Build Date	Model Year	Repair Date
Broken Valve	1FTMF1EP7JKE12398	933	3/20/2018	2018	5/24/2018
Broken Valve	1FM5K8GC8LGA05517	5488	6/4/2019	2020	5/19/2020
Broken Valve	1FM5K8GC9LGA17742	1577	6/18/2019	2020	5/4/2020
Broken Valve	1FM5K8HC8LGA10067	10479	6/18/2019	2020	6/18/2020
Broken Valve	1FM5K8GCXLGA22464	1282	6/21/2019	2020	5/13/2020
Broken Valve	1FM5K8GC8LGA28943	6898	6/21/2019	2020	9/16/2020
Broken Valve	1FM5K8GC0LGA17953	7026	6/24/2019	2020	4/27/2020
Broken Valve	1FM5K8GC0LGA28774	743	6/27/2019	2020	2/6/2020
Broken Valve	1FM5K8HC9LGA30487	9517	7/15/2019	2020	9/8/2020
Broken Valve	1FM5K8HC6LGA44332	2100	7/25/2019	2020	12/26/2019
Broken Valve	5LM5J7XC5LGL09916	956	8/27/2019	2020	2/10/2020
Broken Valve	5LM5J9XC0LGL11214	1140	8/28/2019	2020	11/27/2019
Broken Valve	5LM5J9XC8LGL11204	766	8/28/2019	2020	12/16/2019
Broken Valve	5LM5J8WC5LGL08188	4153	8/29/2019	2020	5/22/2020
Broken Valve	5LM5J8WC0LGL08096	471	8/30/2019	2020	6/22/2020
Broken Valve	1FM5K8GC5LGA52049	1056	9/5/2019	2020	7/14/2020
Broken Valve	1FM5K8GC9LGA81277	2426	9/18/2019	2020	1/21/2020
Broken Valve	1FM5K8GC9LGA46089	2407	9/18/2019	2020	6/15/2020
Broken Valve	1FM5K8HC3LGA66577	933	9/19/2019	2020	9/4/2020
Broken Valve	1FM5K8GC9LGB24354	203	10/29/2019	2020	6/24/2020
Broken Valve	1FM5K8GC5LGB92716	1842	2/14/2020	2020	4/29/2020
Broken Valve	1FTEX1EP0LKE23523	1021	3/17/2020	2020	8/31/2020
Broken Valve	1FTEX1CP9LFC00151	3200	3/19/2020	2020	9/9/2020
Broken Valve	LVSHNCAZ2LH498715	869	6/5/2020	2020	10/19/2020
Broken Valve	1FTEW1EP2LFB96282	2008	6/16/2020	2020	10/5/2020
Broken Valve	1FTEW1EP3LFC66789	903	8/17/2020	2020	10/15/2020
Broken Valve	1FM5K8GC8MGA11206	5302	11/4/2020	2021	2/25/2021
Broken Valve	1FM5K8GC0MGA65891	4842	11/16/2020	2021	8/23/2021
Broken Valve	1FM5K8GC3MGA67098	6599	11/16/2020	2021	9/4/2021
Broken Valve	5LM5J6WCXMGL07981	9400	11/17/2020	2021	4/27/2021
Broken Valve	1FTEX1CP3MKD22805	1203	12/14/2020	2021	2/13/2021
Broken Valve	1FTEW1CP0MKD26135	2178	12/16/2020	2021	3/14/2021
Broken Valve	2FMPK4AP3MBA12221	857	12/17/2020	2021	3/31/2021
Broken Valve	1FTEX1EP0MKD14822	1956	12/17/2020	2021	10/5/2021
Broken Valve	1FTEX1EP0MKD14822	1956	12/17/2020	2021	10/7/2021
Broken Valve	1FTEX1EP5MFA36962	2080	1/7/2021	2021	3/17/2021
Broken Valve	1FM5K8GC8MGA90652	513	1/8/2021	2021	3/5/2021
Broken Valve	1FM5K8HC2MGA95506	1245	1/8/2021	2021	6/23/2021
Broken Valve	1FM5K8GCXMGA95254	4614	1/14/2021	2021	6/30/2021
Broken Valve	1FTEX1CP6MKD47049	1500	1/14/2021	2021	6/11/2021
Broken Valve	1FTEW1EP8MFA79081	2919	1/15/2021	2021	6/28/2021
Broken Valve	1FM5K8GC7MGB08543	3582	2/2/2021	2021	10/8/2021
Broken Valve	1FM5K8GC2MGB00950	4348	2/3/2021	2021	7/7/2021
Broken Valve	1FTEW1EP6MKD53692	1020	2/4/2021	2021	7/12/2021
Broken Valve	5LM5J7WC4MGL11532	1757	3/3/2021	2021	7/12/2021
Broken Valve	1FM5K8GC0MGB38144	2853	3/16/2021	2021	6/30/2021

Broken Valve	5LM5J7XC3MGL14159	7350	3/18/2021 2021	10/11/2021
Broken Valve	2LMPJ9JP7MBL01638	2062	3/23/2021 2021	8/11/2021
Broken Valve	2LMPJ8KP1MBL01689	2275	3/25/2021 2021	8/24/2021
Broken Valve	1FTEW1CP8MFB51917	2083	3/30/2021 2021	9/2/2021
Broken Valve	1FTEW1EP6MFB44607	1456	3/31/2021 2021	11/15/2021
Broken Valve	1FTEW1EP6MFB44607	1456	3/31/2021 2021	11/19/2021
Broken Valve	1FTEW1EP4MFB56870	3439	4/1/2021 2021	9/4/2021
Broken Valve	1FTEW1CP9MFB67897	862	4/7/2021 2021	11/4/2021
Broken Valve	1FTEW1EP2MFB68726	1865	4/7/2021 2021	8/28/2021
Broken Valve	1FTEW1EP9MFB47663	359	4/7/2021 2021	6/4/2021
Broken Valve	1FTEW1EPXMFB72426	1471	4/7/2021 2021	7/12/2021
Broken Valve	2FMPK4AP9MBA27225	1589	5/3/2021 2021	9/27/2021
Broken Valve	1FTEW1EP2MFB77653	2781	5/3/2021 2021	7/12/2021
Broken Valve	1FTEW1EP4MFB79064	1722	5/3/2021 2021	7/6/2021
Broken Valve	1FMEE5BP0MLA63520	3474	5/4/2021 2021	11/16/2021
Broken Valve	1FMEE5BP6MLA61450	1880	5/5/2021 2021	9/13/2021
Lower End Damage	1FTEW1CP5MFB13089	1669	5/5/2021 2021	11/1/2021
Broken Valve	2FMPK4APXMBA38363	4218	5/6/2021 2021	10/22/2021
Lower End Damage	2FMPK4APXMBA29078	861	5/6/2021 2021	10/18/2021
Broken Valve	1FTEW1EP0MFB47261	2285	5/6/2021 2021	8/10/2021
Broken Valve	1FTEW1CP1MFB90283	1188	5/7/2021 2021	10/4/2021
Broken Valve	1FTEW1CP1MFB90283	1188	5/7/2021 2021	10/29/2021
Broken Valve	1FTEW1CP3MFB90897	3691	5/7/2021 2021	8/23/2021
Broken Valve	1FTEW1CP3MFC06922	3199	5/7/2021 2021	10/11/2021
Broken Valve	1FTEW1CP7MKE18035	462	5/7/2021 2021	8/19/2021
Broken Valve	1FTEW1EP3MFB93649	2485	5/7/2021 2021	9/13/2021
Broken Valve	1FTEW1EP7MFB90379	1041	5/7/2021 2021	8/9/2021
Broken Valve	1FTEW1EP9MFB73342	1497	5/7/2021 2021	8/2/2021
Broken Valve	1FTEW1EP9MFB77651	1428	5/7/2021 2021	7/1/2021
Broken Valve	1FTEW1EPXMFB82924	2607	5/7/2021 2021	9/29/2021
Broken Valve	1FTEX1EP1MKE09745	2381	5/7/2021 2021	9/9/2021
Lower End Damage	1FTEW1EP1MFC00727	1796	5/7/2021 2021	9/8/2021
Lower End Damage	1FTEW1EP8MFB72134	1890	5/7/2021 2021	8/4/2021
Lower End Damage	1FTEW1EPXMKE18737	1005	5/7/2021 2021	11/18/2021
Lower End Damage	1FTEX1EPXMFB84430	1461	5/7/2021 2021	9/30/2021
Broken Valve	1FTEW1CP4MKD98665	2094	5/10/2021 2021	8/3/2021
Broken Valve	1FTEW1CP7MFC04087	3722	5/10/2021 2021	8/27/2021
Broken Valve	1FTEW1EP2MKE14231	1816	5/10/2021 2021	10/4/2021
Broken Valve	1FTEW1EP4MKE01867	1832	5/10/2021 2021	9/10/2021
Broken Valve	1FTEW1EP6MFB84184	1178	5/10/2021 2021	9/3/2021
Broken Valve	1FTEW1EP8MFB92934	2110	5/10/2021 2021	11/15/2021
Broken Valve	1FTEW1EP9MFC02791	2417	5/10/2021 2021	8/23/2021
Broken Valve	1FTEW1EPXMKE04210	944	5/10/2021 2021	11/1/2021
Broken Valve	1FTEX1EP2MKE03050	410	5/10/2021 2021	10/8/2021
Lower End Damage	1FTEW1EP1MKE02605	3548	5/10/2021 2021	9/27/2021
Lower End Damage	1FTEW1EP2MKE14763	1212	5/10/2021 2021	8/13/2021
Lower End Damage	1FTEW1EP5MFC02965	2169	5/10/2021 2021	10/18/2021

Lower End Damage	1FTEW1EP7MFC06886	1038	5/10/2021	2021	10/8/2021
Broken Valve	2FMPK4AP5MBA25536	388	5/11/2021	2021	7/12/2021
Broken Valve	1FMEE5DP8MLA63603	1372	5/11/2021	2021	8/23/2021
Lower End Damage	1FMEE5DP4MLA74713	315	5/11/2021	2021	10/23/2021
Broken Valve	1FTEW1CP0MFB93434	8327	5/11/2021	2021	11/12/2021
Broken Valve	1FTEW1CP4MFB75809	1230	5/11/2021	2021	7/17/2021
Broken Valve	1FTEW1CP5MFB78203	1960	5/11/2021	2021	7/30/2021
Broken Valve	1FTEW1CP7MKE47471	3421	5/11/2021	2021	10/18/2021
Broken Valve	1FTEW1CPXMFB84868	4214	5/11/2021	2021	10/12/2021
Broken Valve	1FTEW1EP0MFB86870	2367	5/11/2021	2021	10/4/2021
Broken Valve	1FTEW1EP0MFC03392	668	5/11/2021	2021	8/18/2021
Broken Valve	1FTEW1EP7MKD88726	2100	5/11/2021	2021	9/20/2021
Broken Valve	1FTEW1EPXMFB98816	4918	5/11/2021	2021	9/25/2021
Lower End Damage	1FTEW1CP1MKE32061	771	5/11/2021	2021	9/1/2021
Lower End Damage	1FTEW1EP0MFB80213	8885	5/11/2021	2021	9/7/2021
Broken Valve	5LM5J6XC7MGL18127	237	5/12/2021	2021	10/17/2021
Broken Valve	1FM5K8GC9MGB77542	2800	5/12/2021	2021	9/13/2021
Broken Valve	1FM5K8LC3MGB87019	623	5/12/2021	2021	7/17/2021
Lower End Damage	2FMPK4AP0MBA32846	1339	5/12/2021	2021	7/28/2021
Broken Valve	1FMEE5DP3MLA64089	2524	5/12/2021	2021	9/15/2021
Lower End Damage	1FMEE5DP0MLA62803	2545	5/12/2021	2021	9/11/2021
Broken Valve	1FTEW1EP2MFB85963	3462	5/12/2021	2021	11/4/2021
Broken Valve	1FTEW1EP3MFB82960	861	5/12/2021	2021	6/26/2021
Broken Valve	1FTEW1EP7MKE41442	990	5/12/2021	2021	11/9/2021
Broken Valve	1FTEW1EPXMFB91221	3105	5/12/2021	2021	11/15/2021
Lower End Damage	1FTEW1EP9MFB84163	3112	5/12/2021	2021	9/27/2021
Lower End Damage	1FTEW1EP9MKE44407	2406	5/12/2021	2021	9/28/2021
Lower End Damage	5LM5J7XC4MGL18558	378	5/13/2021	2021	8/6/2021
Broken Valve	1FM5K7LC4MGB88397	1144	5/13/2021	2021	10/6/2021
Broken Valve	1FM5K8GC0MGB57938	1717	5/13/2021	2021	8/16/2021
Broken Valve	1FM5K8GC0MGB90891	642	5/13/2021	2021	8/9/2021
Broken Valve	1FMDE5CP2MLA63240	2906	5/13/2021	2021	11/12/2021
Broken Valve	1FMEE5DP4MLA64764	1444	5/13/2021	2021	9/7/2021
Broken Valve	1FTEW1EP1MKE01700	505	5/13/2021	2021	8/3/2021
Broken Valve	1FTEW1EP1MKE13653	947	5/13/2021	2021	8/18/2021
Broken Valve	1FTEW1EP2MFB95814	5914	5/13/2021	2021	9/11/2021
Broken Valve	1FTEW1EP6MFB62833	1688	5/13/2021	2021	7/30/2021
Broken Valve	1FTEW1EP7MFB81679	1152	5/13/2021	2021	7/16/2021
Broken Valve	1FTEW1EP8MFB73557	1070	5/13/2021	2021	8/5/2021
Broken Valve	1FTEW1EP9MKE11486	1457	5/13/2021	2021	9/16/2021
Broken Valve	1FTEW1EPXMFB76993	3006	5/13/2021	2021	9/29/2021
Lower End Damage	1FTEW1EP8MFC03124	8544	5/13/2021	2021	12/14/2021
Broken Valve	2FMPK4AP3MBA37023	2398	5/14/2021	2021	9/27/2021
Broken Valve	1FTEW1CP4MFC04418	3404	5/14/2021	2021	10/26/2021
Broken Valve	1FTEW1EP1MFB82570	4888	5/14/2021	2021	9/7/2021
Lower End Damage	1FTEW1EP2MFB72498	7985	5/14/2021	2021	12/13/2021
Broken Valve	1FTEW1EP3MKE00807	8086	6/7/2021	2021	12/2/2021

Lower End Damage	1FMEE5DP8MLA74682	272	6/8/2021	2021	11/2/2021
Broken Valve	2LMPJ8KP8MBL08994	1168	6/9/2021	2021	9/14/2021
Broken Valve	2FMPK4AP0MBA30580	1856	6/9/2021	2021	11/6/2021
Broken Valve	2FMPK4AP7MBA36280	2762	6/9/2021	2021	9/4/2021
Lower End Damage	2FMPK4AP8MBA34389	2170	6/9/2021	2021	11/12/2021
Lower End Damage	2FMPK4APXMBA28206	240	6/9/2021	2021	9/7/2021
Broken Valve	1FMEE5DP5MLA69696	2394	6/9/2021	2021	9/10/2021
Lower End Damage	1FMDE5CP7MLA70538	900	6/9/2021	2021	11/2/2021
Lower End Damage	1FMEE5DPXMLA65451	2199	6/9/2021	2021	11/9/2021
Lower End Damage	1FTEW1EP8MKE14346	4357	6/9/2021	2021	11/22/2021
Broken Valve	1FMEE5BP4MLA68994	2743	6/10/2021	2021	11/15/2021
Broken Valve	1FMEE5DP3MLA66408	1146	6/10/2021	2021	7/22/2021
Broken Valve	1FMEE5DP3MLA66408	1146	6/10/2021	2021	7/27/2021
Broken Valve	1FMEE5EP3MLA40194	601	6/10/2021	2021	8/23/2021
Broken Valve	1FMEE5EP8MLA40112	3592	6/10/2021	2021	9/25/2021
Broken Valve	5LM5J6WC3MGL17431	1393	6/11/2021	2021	10/6/2021
Broken Valve	5LM5J7XC5MGL17239	984	6/11/2021	2021	10/1/2021
Broken Valve	5LM5J7XC8MGL16067	3402	6/11/2021	2021	8/30/2021
Broken Valve	1FM5K8GC3MGB64298	1509	6/11/2021	2021	8/3/2021
Broken Valve	1FM5K8GC4MGB73821	3025	6/11/2021	2021	9/20/2021
Broken Valve	1FM5K8GC5MGB65503	2911	6/11/2021	2021	9/22/2021
Broken Valve	1FM5K8GC8MGB60084	710	6/11/2021	2021	7/19/2021
Broken Valve	1FM5K8GC8MGB62319	4760	6/11/2021	2021	11/2/2021
Broken Valve	1FM5K8GCXMGB73807	934	6/11/2021	2021	8/9/2021
Broken Valve	1FM5K8HC4MGB84929	1528	6/11/2021	2021	9/14/2021
Lower End Damage	1FM5K7LCXMGB90767	267	6/11/2021	2021	7/31/2021
Lower End Damage	1FM5K8GC3MGB73972	6	6/11/2021	2021	7/21/2021
Lower End Damage	1FM5K8GC5MGB85671	933	6/11/2021	2021	9/29/2021
Lower End Damage	1FM5K8HC2MGB76828	4622	6/11/2021	2021	11/17/2021
Broken Valve	1FTEW1EPXMFB85872	1960	6/11/2021	2021	9/29/2021
Broken Valve	1FTEW1EPXMFB86035	1165	6/11/2021	2021	10/15/2021
Lower End Damage	1FTEW1EP1MFB85680	2778	6/11/2021	2021	11/12/2021
Lower End Damage	1FTEW1EP1MFC05829	1953	6/11/2021	2021	10/14/2021
Lower End Damage	1FTEW1EP8MFB85109	4913	6/11/2021	2021	10/5/2021
Broken Valve	5LM5J7XC3MGL18793	791	6/14/2021	2021	8/4/2021
Broken Valve	5LM5J7XC4MGL18012	383	6/14/2021	2021	9/27/2021
Broken Valve	5LM5J7XC6MGL15306	1614	6/14/2021	2021	10/5/2021
Broken Valve	5LM5J9XC1MGL18366	667	6/14/2021	2021	9/7/2021
Broken Valve	1FM5K7LC6MGB86327	1571	6/14/2021	2021	9/25/2021
Broken Valve	1FM5K7LC7MGB88457	3575	6/14/2021	2021	10/18/2021
Broken Valve	1FM5K8GC0MGB37415	1160	6/14/2021	2021	7/30/2021
Broken Valve	1FM5K8GC3MGB73499	1909	6/14/2021	2021	8/31/2021
Broken Valve	1FM5K8GC5MGB73617	577	6/14/2021	2021	8/16/2021
Broken Valve	1FM5K8GC5MGB77764	1346	6/14/2021	2021	7/29/2021
Broken Valve	1FM5K8GC7MGB62327	1464	6/14/2021	2021	9/14/2021
Broken Valve	1FM5K8GCXMGB22730	2318	6/14/2021	2021	11/9/2021
Broken Valve	1FM5K8LCXMGB86501	1485	6/14/2021	2021	9/20/2021

Lower End Damage	1FM5K8GC3MGB65189	450	6/14/2021 2021	9/21/2021
Broken Valve	1FMEE5BP1MLA71500	743	6/14/2021 2021	7/26/2021
Broken Valve	1FMEE5BP5MLA67059	937	6/14/2021 2021	11/30/2021
Broken Valve	1FMEE5BP5MLA68728	950	6/14/2021 2021	9/7/2021
Broken Valve	1FMEE5DP8MLA69224	2167	6/14/2021 2021	7/22/2021
Broken Valve	1FMEE5DP0MLA74160	2907	6/15/2021 2021	10/25/2021
Broken Valve	1FTEW1CP2MFB95301	1027	6/15/2021 2021	9/28/2021
Lower End Damage	1FTEX1EP0MKE06853	2907	6/15/2021 2021	11/11/2021
Lower End Damage	5LM5J7WC3MGL17435	3322	6/17/2021 2021	11/19/2021
Broken Valve	1FM5K8GC2MGB49470	1790	6/17/2021 2021	9/20/2021
Broken Valve	1FM5K8GC4MGB90201	2671	6/17/2021 2021	12/15/2021
Broken Valve	1FM5K8HC1MGB65559	1183	6/17/2021 2021	10/2/2021
Broken Valve	1FM5K8HC5MGB48392	412	6/17/2021 2021	10/19/2021
Lower End Damage	1FM5K8GC3MGB49266	420	6/17/2021 2021	8/21/2021
Lower End Damage	1FM5K8GC3MGB62518	870	6/17/2021 2021	9/15/2021
Lower End Damage	1FM5K8GC5MGB73777	3551	6/17/2021 2021	10/18/2021
Broken Valve	1FMEE5BP6MLA73937	1578	6/17/2021 2021	9/22/2021
Lower End Damage	5LM5J7WC7MGL14392	918	6/18/2021 2021	9/8/2021
Lower End Damage	5LM5J7XC0MGL18881	1160	6/18/2021 2021	11/1/2021
Broken Valve	1FM5K8GC6MGB68474	4627	6/18/2021 2021	10/6/2021
Broken Valve	1FM5K8GC8MGB74177	7255	6/18/2021 2021	11/5/2021
Lower End Damage	1FM5K8GC8MGB74177	7255	6/18/2021 2021	11/9/2021
Lower End Damage	1FM5K8HC9MGB87115	1423	6/18/2021 2021	9/4/2021
Broken Valve	1FMDE5CP3MLA69290	2731	6/18/2021 2021	12/13/2021
Broken Valve	1FMEE5DP0MLA72960	985	6/18/2021 2021	8/23/2021
Lower End Damage	1FTEW1EP9MFC00295	3550	6/18/2021 2021	8/4/2021
Lower End Damage	1FTEW1EPXMFB97097	2017	6/18/2021 2021	10/25/2021
Broken Valve	5LM5J9XC4MGL18135	502	6/21/2021 2021	11/10/2021
Broken Valve	1FM5K7LCXMGB76917	1316	6/21/2021 2021	8/14/2021
Broken Valve	1FM5K8GC3MGB75916	443	6/21/2021 2021	8/17/2021
Broken Valve	1FM5K8GC4MGB74595	1246	6/21/2021 2021	10/23/2021
Lower End Damage	1FM5K8GC9MGB62118	858	6/21/2021 2021	9/18/2021
Broken Valve	5LM5J7XC9MGL18331	3014	6/22/2021 2021	10/4/2021
Broken Valve	5LM5J7XC9MGL18331	3014	6/22/2021 2021	10/12/2021
Broken Valve	5LM5J9XC7MGL18954	2755	6/22/2021 2021	11/30/2021
Broken Valve	1FM5K8GC5MGB43114	3598	6/22/2021 2021	9/7/2021
Broken Valve	1FM5K8GC5MGB73956	2094	6/22/2021 2021	8/16/2021
Broken Valve	1FM5K8GC7MGB73991	984	6/22/2021 2021	8/9/2021
Broken Valve	1FM5K8HC9MGA98516	787	6/22/2021 2021	9/29/2021
Lower End Damage	1FM5K8GC1MGB40856	729	6/22/2021 2021	9/13/2021
Lower End Damage	1FM5K8GC4MGA82600	19	6/22/2021 2021	8/20/2021
Lower End Damage	1FM5K8GCXMGB47238	1228	6/22/2021 2021	11/16/2021
Broken Valve	1FM5K8GC3MGB78413	3959	6/23/2021 2021	8/26/2021
Broken Valve	1FMDE5FP3MLA20070	4736	6/23/2021 2021	11/16/2021
Broken Valve	1FMEE5DP1MLA72501	2646	6/23/2021 2021	11/16/2021
Broken Valve	1FMEE5DP9MLA68339	5272	6/23/2021 2021	11/2/2021
Broken Valve	1FTEW1EP4MFB98262	2682	6/24/2021 2021	9/22/2021

Broken Valve	1FTEW1EP4MKE48123	1800	6/24/2021	2021	9/8/2021
Broken Valve	1FTEW1EP9MFC05626	3026	6/24/2021	2021	9/16/2021
Lower End Damage	1FTEW1EP3MKE21494	2317	6/24/2021	2021	11/1/2021
Broken Valve	1FMEE5DP5MLA86269	1294	6/28/2021	2021	10/13/2021
Lower End Damage	1FMEE5BP2MLA77225	1581	6/28/2021	2021	10/11/2021
Broken Valve	1FTEW1CP1MKE54139	5084	6/28/2021	2021	12/13/2021
Broken Valve	1FTEW1EP2MFB98695	588	6/28/2021	2021	8/2/2021
Broken Valve	1FTEW1EP6MFB84797	2305	6/28/2021	2021	10/5/2021
Broken Valve	1FTEW1EP6MFB90552	1209	6/28/2021	2021	11/20/2021
Lower End Damage	1FTEW1EP9MFC03150	1822	6/28/2021	2021	10/29/2021
Broken Valve	1FTEW1EP6MFC10928	984	6/29/2021	2021	8/20/2021
Broken Valve	1FMEE5BP6MLA71427	6245	6/30/2021	2021	10/15/2021
Broken Valve	1FTEW1EP1MFC08956	2500	6/30/2021	2021	10/11/2021
Broken Valve	5LM5J7XC6MGL17279	768	7/1/2021	2021	9/21/2021
Broken Valve	5LM5J7XC6MGL17279	768	7/1/2021	2021	12/6/2021
Broken Valve	5LM5J7XC8MGL19308	790	7/1/2021	2021	10/12/2021
Lower End Damage	5LM5J7XC2MGL16646	730	7/1/2021	2021	10/13/2021
Lower End Damage	5LM5J7XC9MGL12769	1	7/1/2021	2021	9/28/2021
Broken Valve	2LMPJ8KP7MBL10168	875	7/2/2021	2021	8/16/2021
Broken Valve	1FTEW1CP8MFB84559	1061	7/2/2021	2021	9/17/2021
Broken Valve	1FTEW1EP3MFB84563	1215	7/2/2021	2021	10/18/2021
Broken Valve	1FTEX1CP7MKE47256	945	7/2/2021	2021	10/22/2021
Broken Valve	1FTEX1EP3MKE31259	1770	7/2/2021	2021	10/4/2021
Lower End Damage	1FTEW1CP5MFB94644	1241	7/2/2021	2021	9/20/2021
Lower End Damage	1FTEW1EP6MKE27080	1481	7/2/2021	2021	10/25/2021
Broken Valve	1FTEW1EP7MFC32789	1900	7/13/2021	2021	9/17/2021
Lower End Damage	1FTEW1EP9MFC28355	586	7/13/2021	2021	11/10/2021
Broken Valve	1FTEW1CP4MFB93453	892	7/14/2021	2021	8/19/2021
Broken Valve	2FMPK4AP8MBA44310	904	7/15/2021	2021	9/13/2021
Broken Valve	1FTEW1EP2MKE39405	1862	7/25/2021	2021	10/22/2021
Broken Valve	1FTEX1EP9MKE28768	3038	7/26/2021	2021	12/14/2021
Broken Valve	1FTEW1CP5MFC28808	1646	7/27/2021	2021	10/15/2021
Broken Valve	1FMEE5DP5MLA87194	1466	7/28/2021	2021	10/22/2021
Broken Valve	1FTEW1EP6MFC15756	3321	7/29/2021	2021	11/30/2021
Broken Valve	1FTEW1EP6MFC22531	2089	7/29/2021	2021	10/18/2021
Broken Valve	1FTEW1EP8MFC32655	8090	7/29/2021	2021	11/24/2021
Lower End Damage	1FTEW1EP8MFC24121	2205	7/29/2021	2021	10/19/2021
Broken Valve	1FMDE5CP1MLA81180	1912	7/30/2021	2021	12/15/2021
Lower End Damage	1FTEW1EP5MKE36899	2229	7/30/2021	2021	12/14/2021
Broken Valve	1FMEE5BP7MLA94974	2844	8/2/2021	2021	11/22/2021
Lower End Damage	1FMDE5AP2MLA77576	2012	8/2/2021	2021	12/10/2021
Broken Valve	1FTEW1EP8MKE53647	3011	8/2/2021	2021	9/27/2021
Broken Valve	1FTMF1CP8MKE43246	987	8/2/2021	2021	11/16/2021
Lower End Damage	1FTEW1CP3MKE29873	3541	8/2/2021	2021	11/22/2021
Lower End Damage	1FTEW1EP1MKE38181	1058	8/2/2021	2021	10/25/2021
Broken Valve	5LM5J7WC8MGL16359	744	8/3/2021	2021	10/11/2021
Broken Valve	5LM5J7WC8MGL16359	744	8/3/2021	2021	10/25/2021

Broken Valve	5LM5J7XC8MGL10849	953	8/3/2021 2021	11/8/2021
Broken Valve	1FM5K8GC0MGB49614	2061	8/3/2021 2021	9/14/2021
Broken Valve	1FM5K8GC8MGB62837	3869	8/3/2021 2021	11/1/2021
Broken Valve	1FM5K8LC4MGB75915	913	8/3/2021 2021	9/30/2021
Lower End Damage	1FM5K8GC1MGB49072	4273	8/3/2021 2021	12/1/2021
Lower End Damage	1FM5K8GC8MGB39655	1477	8/3/2021 2021	11/12/2021
Lower End Damage	1FM5K8LC0MGB76396	525	8/3/2021 2021	9/16/2021
Lower End Damage	1FM5K8LC1MGB77184	1825	8/3/2021 2021	11/8/2021
Lower End Damage	1FM5K8LC3MGB76358	2292	8/3/2021 2021	11/9/2021
Broken Valve	2FMPK4AP0MBA48366	821	8/3/2021 2021	9/24/2021
Broken Valve	2FMPK4AP3MBA41332	1303	8/3/2021 2021	12/3/2021
Broken Valve	1FTEW1EP0MFC15493	2482	8/3/2021 2021	10/11/2021
Lower End Damage	1FTEW1CPXMFC47239	1520	8/3/2021 2021	11/22/2021
Broken Valve	5LM5J7WC4MGL17203	880	8/4/2021 2021	10/11/2021
Broken Valve	5LM5J7XC0MGL17214	1367	8/4/2021 2021	10/21/2021
Broken Valve	5LM5J9XC1MGL18125	375	8/4/2021 2021	11/22/2021
Broken Valve	1FM5K8GC4MGB57408	3334	8/4/2021 2021	10/25/2021
Broken Valve	1FM5K8GCXMGB62502	333	8/4/2021 2021	11/3/2021
Broken Valve	1FM5K8GCXMGB63214	1263	8/4/2021 2021	9/27/2021
Broken Valve	1FM5K8LCXMGB77412	561	8/4/2021 2021	9/7/2021
Lower End Damage	1FM5K8GC9MGB71790	1182	8/4/2021 2021	10/5/2021
Broken Valve	1FMEE5BPXMLA84634	3410	8/4/2021 2021	12/7/2021
Broken Valve	1FMEE5DP6MLA68444	4321	8/4/2021 2021	11/10/2021
Broken Valve	1FMEE5DP7MLA71742	1524	8/4/2021 2021	10/14/2021
Broken Valve	1FMEE5DP7MLA71742	1524	8/4/2021 2021	11/10/2021
Broken Valve	1FTEX1CP9MKE22357	1469	8/5/2021 2021	11/4/2021
Broken Valve	1FTEW1EP0MFC25702	2391	8/6/2021 2021	10/25/2021
Broken Valve	1FTEW1EP4MFC32670	793	8/6/2021 2021	9/16/2021
Broken Valve	1FTEW1EPXMKE16762	4009	8/6/2021 2021	10/20/2021
Broken Valve	5LM5J7XC1MGL17772	856	8/7/2021 2021	10/13/2021
Broken Valve	5LM5J7XC1MGL17772	891	8/7/2021 2021	10/30/2021
Broken Valve	1FTEW1CP1MFC51017	1421	8/7/2021 2021	9/17/2021
Broken Valve	1FTEW1CPXMFC28190	1748	8/7/2021 2021	10/8/2021
Lower End Damage	1FTEW1CP3MFC33845	446	8/7/2021 2021	9/23/2021
Lower End Damage	1FTEW1EP5MFC51244	2678	8/7/2021 2021	9/30/2021
Broken Valve	5LM5J7WC9MGL19285	1145	8/9/2021 2021	10/1/2021
Broken Valve	1FM5K8GC4MGB49079	2079	8/9/2021 2021	11/22/2021
Broken Valve	1FM5K8GC6MGB63923	2416	8/9/2021 2021	11/26/2021
Broken Valve	2FMPK4AP7MBA48140	2460	8/10/2021 2021	11/22/2021
Broken Valve	2FMPK4AP7MBA48140	2460	8/10/2021 2021	12/3/2021
Broken Valve	1FTEW1EP5MFC24805	1316	8/10/2021 2021	10/12/2021
Broken Valve	1FTEW1EPXMFC26047	779	8/10/2021 2021	9/22/2021
Lower End Damage	1FTEW1CP5MFC42711	582	8/10/2021 2021	10/5/2021
Lower End Damage	1FTEW1EP0MFC52477	6223	8/10/2021 2021	11/22/2021
Lower End Damage	1FTEW1EP6MFC26904	1672	8/10/2021 2021	10/8/2021
Lower End Damage	1FTEW1EP7MFC16480	3447	8/10/2021 2021	11/30/2021
Lower End Damage	1FTEW1EP7MFC16592	711	8/10/2021 2021	10/18/2021

Lower End Damage	1FTEX1EP1MFC15774	1178	8/10/2021 2021	10/2/2021
Lower End Damage	1FTEW1EP7MFC26734	1227	8/11/2021 2021	11/2/2021
Lower End Damage	5LM5J7XC7MGL15461	1276	8/12/2021 2021	10/28/2021
Broken Valve	1FM5K8HC2MGB76862	5678	8/12/2021 2021	11/29/2021
Lower End Damage	1FMEE5BP2MLA87382	709	8/12/2021 2021	11/29/2021
Lower End Damage	5LM5J7XC0MGL19061	739	8/16/2021 2021	11/11/2021
Broken Valve	1FM5K8GC3MGB63801	1895	8/16/2021 2021	10/18/2021
Broken Valve	1FM5K8GC3MGB63801	1895	8/16/2021 2021	10/20/2021
Broken Valve	1FM5K8GC4MGB76315	1097	8/16/2021 2021	10/11/2021
Broken Valve	1FM5K8HCXMGB86605	2331	8/16/2021 2021	11/19/2021
Lower End Damage	1FM5K8HC7MGB66179	454	8/16/2021 2021	11/9/2021
Lower End Damage	1FM5K8HC8MGB88756	974	8/16/2021 2021	10/23/2021
Broken Valve	1FMEE5EP3MLA41491	1932	8/16/2021 2021	12/3/2021
Lower End Damage	1FMEE5DP3MLA87968	2678	8/16/2021 2021	12/4/2021
Broken Valve	5LM5J7XC3MGL18907	1304	8/17/2021 2021	11/23/2021
Broken Valve	1FM5K8GC3MGB49414	3034	8/17/2021 2021	12/20/2021
Lower End Damage	1FM5K8HC5MGB60638	1461	8/17/2021 2021	11/11/2021
Lower End Damage	1FM5K8HC5MGB60638	1461	8/17/2021 2021	11/15/2021
Broken Valve	1FTEW1EP3MFC26049	608	8/17/2021 2021	10/4/2021
Lower End Damage	1FTEW1EP1MKE32932	173	8/18/2021 2021	10/29/2021
Broken Valve	5LM5J7WC7MGL18796	739	8/19/2021 2021	10/5/2021
Lower End Damage	5LM5J7XC1MGL12667	2530	8/19/2021 2021	10/21/2021
Broken Valve	1FM5K8GC0MGB70835	1316	8/19/2021 2021	10/22/2021
Broken Valve	1FM5K8GC7MGB62537	2762	8/19/2021 2021	11/15/2021
Broken Valve	1FM5K8GC8MGB66581	2610	8/19/2021 2021	11/22/2021
Broken Valve	1FM5K8GCXMGB49135	1284	8/19/2021 2021	10/18/2021
Broken Valve	1FM5K8HC7MGB64190	639	8/19/2021 2021	9/29/2021
Lower End Damage	1FM5K8GC8MGB64359	2317	8/19/2021 2021	12/10/2021
Lower End Damage	1FM5K8HC1MGB68705	511	8/19/2021 2021	10/5/2021
Lower End Damage	1FM5K8HC2MGB90504	1024	8/19/2021 2021	10/8/2021
Broken Valve	1FTEW1CP0MFC47461	2298	8/19/2021 2021	10/18/2021
Broken Valve	1FTEW1CP8MFC69692	1192	8/19/2021 2021	9/30/2021
Broken Valve	1FTEW1EP1MFC62063	2775	8/19/2021 2021	11/10/2021
Broken Valve	1FTEW1EP1MFC62063	2775	8/19/2021 2021	11/11/2021
Broken Valve	1FTEW1EP2MFC38600	4375	8/19/2021 2021	10/22/2021
Broken Valve	1FTEW1EP8MFC25429	1799	8/19/2021 2021	10/8/2021
Lower End Damage	1FTEW1EP5MFC47730	3736	8/19/2021 2021	12/11/2021
Lower End Damage	1FTEW1EP7MKE34541	2975	8/19/2021 2021	12/2/2021
Lower End Damage	1FTEW1EPXMFC25822	1232	8/19/2021 2021	11/22/2021
Lower End Damage	1FTEW1EPXMFC48906	2479	8/19/2021 2021	11/1/2021
Lower End Damage	1FTEW1EPXMFC48906	2200	8/19/2021 2021	11/10/2021
Broken Valve	5LM5J7XC3MGL18681	656	8/20/2021 2021	10/25/2021
Broken Valve	5LM5J7XC6MGL19176	1281	8/20/2021 2021	11/16/2021
Broken Valve	5LM5J9XC9MGL18423	6145	8/20/2021 2021	12/10/2021
Lower End Damage	5LM5J7XC1MGL17870	1458	8/20/2021 2021	10/13/2021
Broken Valve	1FM5K8GC5MGB77196	2321	8/20/2021 2021	10/18/2021
Broken Valve	1FM5K8GC6MGB10042	823	8/20/2021 2021	10/4/2021

Broken Valve	1FM5K8GC9MGB71711	803	8/20/2021	2021	9/28/2021
Broken Valve	1FM5K8HC7MGB66327	1220	8/20/2021	2021	12/7/2021
Lower End Damage	1FM5K8GC4MGB70210	132	8/20/2021	2021	9/14/2021
Lower End Damage	1FM5K8GC5MGC20077	1337	8/20/2021	2021	11/2/2021
Lower End Damage	1FM5K8GC8MGB30132	776	8/20/2021	2021	10/12/2021
Lower End Damage	1FM5K8HC1MGB67487	1997	8/20/2021	2021	11/4/2021
Lower End Damage	5LM5J7XC1NGL01427	786	8/30/2021	2022	12/1/2021
Broken Valve	1FM5K8GC0MGC11433	2915	8/30/2021	2021	10/6/2021
Broken Valve	1FM5K8GC1MGC08959	913	8/30/2021	2021	10/19/2021
Lower End Damage	1FM5K8GCXMGC10239	1035	8/30/2021	2021	10/12/2021
Broken Valve	1FTEW1EP0MFC56240	1388	8/30/2021	2021	11/15/2021
Lower End Damage	1FTEW1EP9MFC92492	1220	8/30/2021	2021	11/22/2021
Lower End Damage	2LMPJ9JPXMBL15999	2836	8/31/2021	2021	12/15/2021
Broken Valve	2FMPK4AP4MBA45020	1663	8/31/2021	2021	12/2/2021
Broken Valve	2LMPJ8KP0MBL16054	2489	9/1/2021	2021	12/15/2021
Broken Valve	2FMPK4AP0MBA47430	1294	9/1/2021	2021	11/30/2021
Broken Valve	2FMPK4AP0MBA47430	1294	9/1/2021	2021	12/1/2021
Lower End Damage	5LM5J7WC1NGL03633	22	9/28/2021	2022	10/27/2021
Lower End Damage	5LM5J7XC9NGL02227	1732	10/12/2021	2022	11/8/2021

From: Simon, David (D.)
Sent: Friday, January 21, 2022 7:11 AM
To: Steslicki, Michael (M.E.)
Subject: RE: 2.7L and 3.0L dropped valve R/1000

Thanks Mike!

Thanks,
Dave

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From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Friday, January 21, 2022 7:02 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: 2.7L and 3.0L dropped valve R/1000

1. 21 MYTD – R/1000 – 2.7L and 3.0L separately – See tab "TIS Chart" – This one should be exactly how you need it
2. R/1000 vs. '21 MOP – 2.7L and 3.0L separately – See tab "Stack Chart" – This one is set at 3 MIS in the upper left corner drop down. You can change this one to 0 MIS, 1 MIS, etc…

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, January 20, 2022 6:47 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: RE: 2.7L and 3.0L dropped valve R/1000

Tomorrow morning is fine.

Thanks,
Dave

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From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Thursday, January 20, 2022 6:47 PM

To: Simon, David (D.) <dsimon1@ford.com>
Subject: Re: 2.7L and 3.0L dropped valve R/1000

I'll run it first thing in the morning. Or tonight depending on when I get home.

Sent from my iPhone

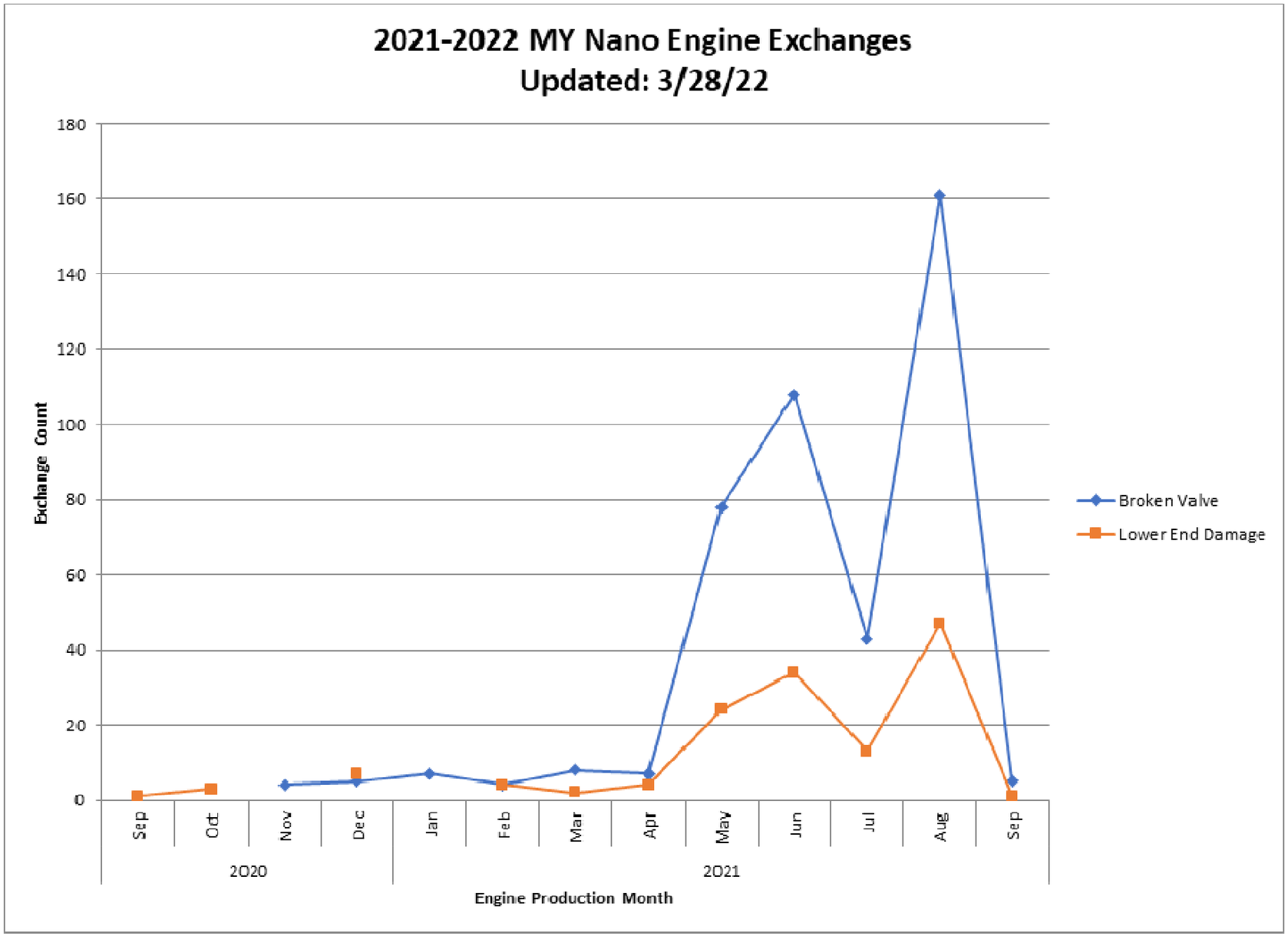
> On Jan 20, 2022, at 6:33 PM, Simon, David (D.) <dsimon1@ford.com> wrote:
>
> Hi Mike,
>
> Mike Felix would like a R/1000 for 2.7L and 3.0L dropped valves (separately). Can you put together the latest data and show:
>
> 1. 21 MYTD – R/1000 – 2.7L and 3.0L separately
> 2. R/1000 vs. '21 MOP – 2.7L and 3.0L separately
>
> We should include the lower end damage engines that we believe will be dropped valves.
>
> Mike would like this in the morning if that's possible.
>
> Thanks,
> Dave
>
> ***David Simon***
> Quality and OPD Manager
> IPTSE North America
> Ford Motor Company
> Mobile: (980) 395-3282

From: Steslicki, Michael (M.E.)
Sent: Monday, March 28, 2022 1:55 PM
To: Simon, David (D.); Corbett, Sandy (S.M.)
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/28/22…

Broken Valve – 433
Lower End Damage – 142

PE22-007 000089 WTY

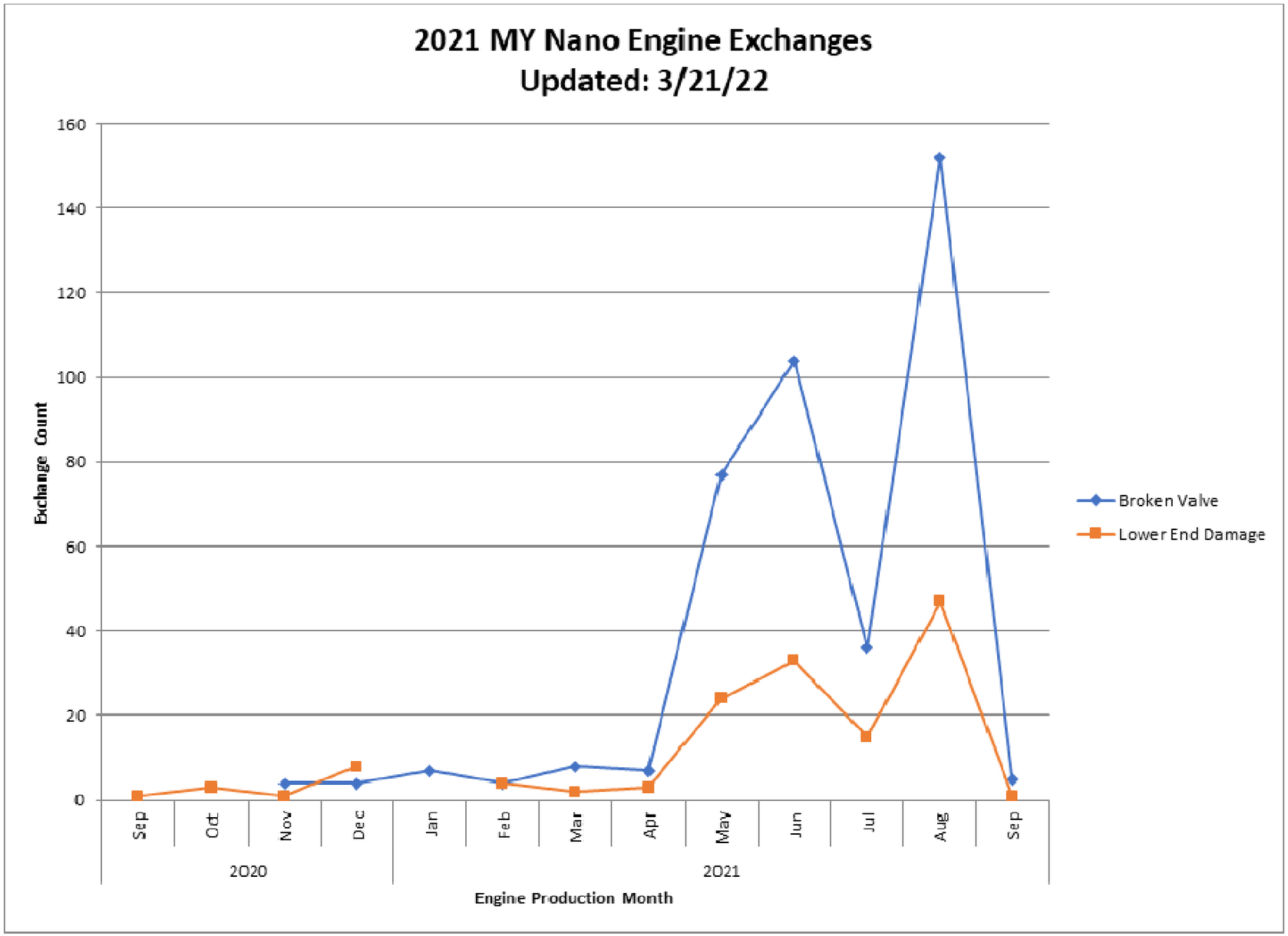

2021-2022 MY Nano Engine Exchanges
Updated: 3/28/22
Exchange Count
180
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 21, 2022 3:05 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/21/22…

Broken Valve – 410
Lower End Damage – 144


2021 MY Nano Engine Exchanges
Updated: 3/21/22
Exchange Count
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

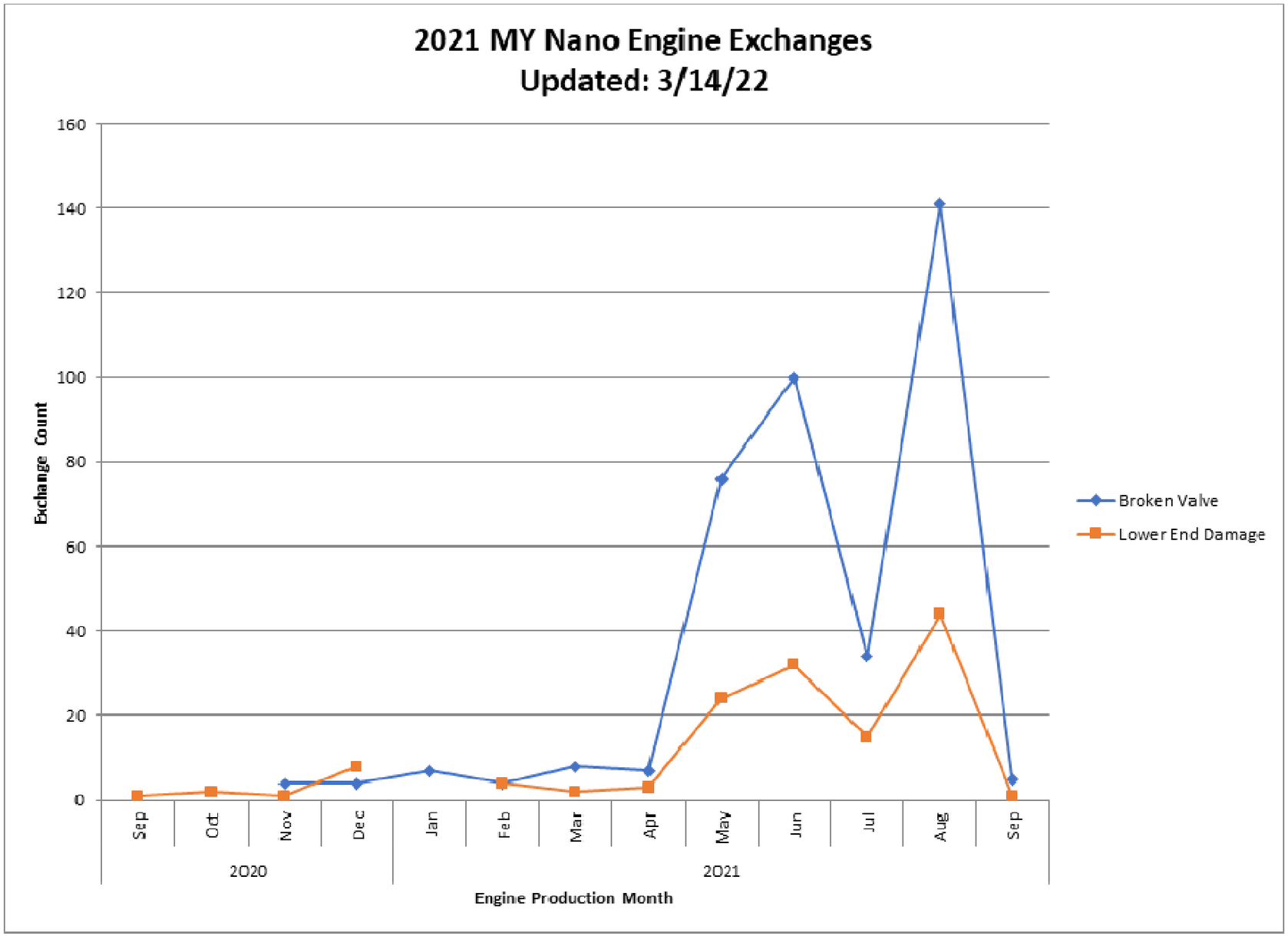
Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 14, 2022 4:43 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

Sandy, FYI, this is a weekly update I give to Dave on the Nano broken valve engine exchanges. The exchanges listed as broken valve are based on dealer and/or teardown comments. The exchanges listed as lower end damage are not back or torn down yet, and don't specifically say broken valve in the dealer write-up, but based on what they do say, we highly suspect that they are broken valves.

As of 3/14/22…

Broken Valve – 391
Lower End Damage – 139

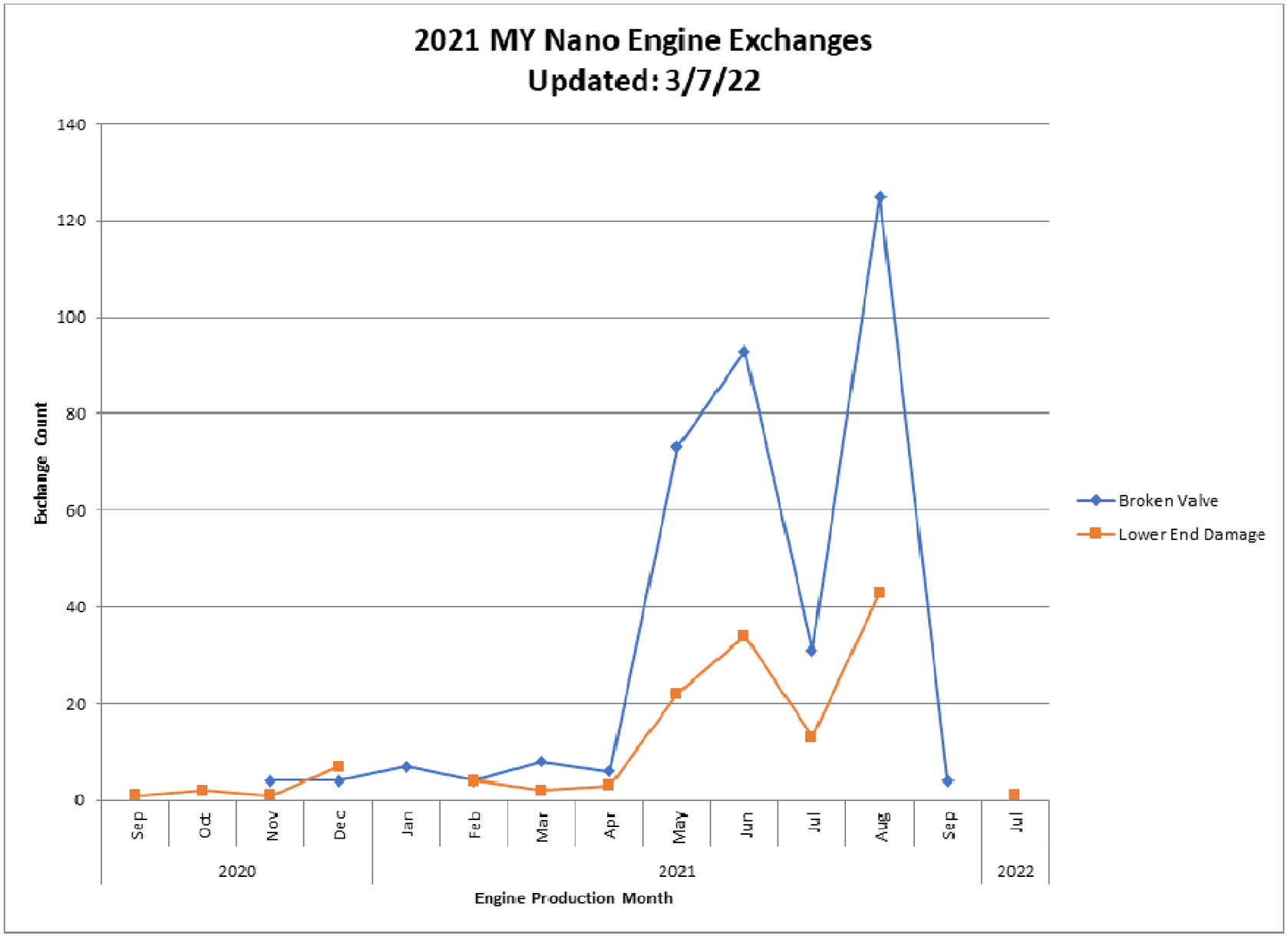

2021 MY Nano Engine Exchanges
Updated: 3/14/22
Exchange Count
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 7, 2022 12:09 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/7/22…

Broken Valve – 360
Lower End Damage – 135

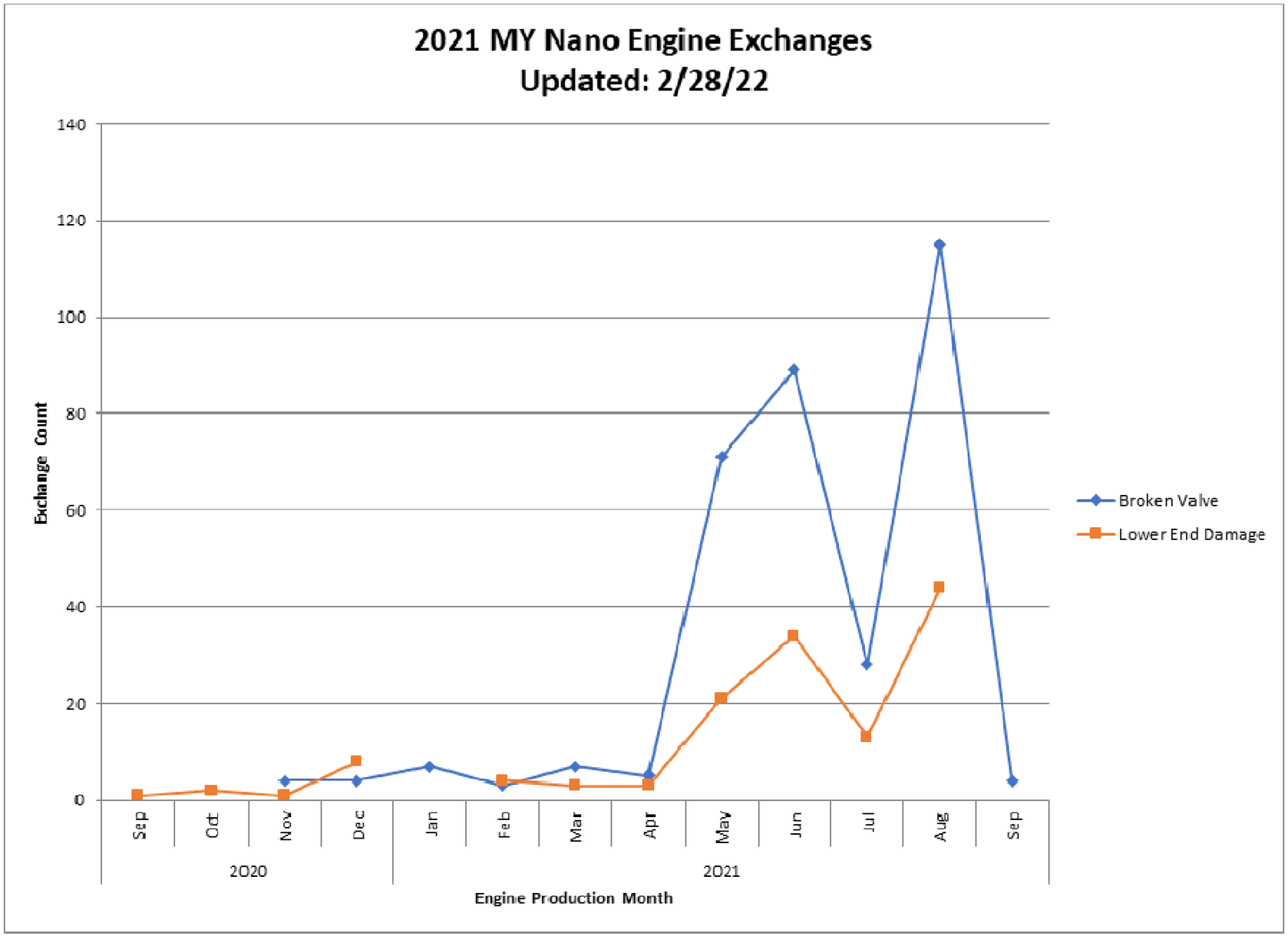

2021 MY Nano Engine Exchanges
Updated: 3/7/22
Exchange Count
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Jul
2020
2021
2022
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 28, 2022 2:20 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/28/22…

Broken Valve – 338
Lower End Damage – 136

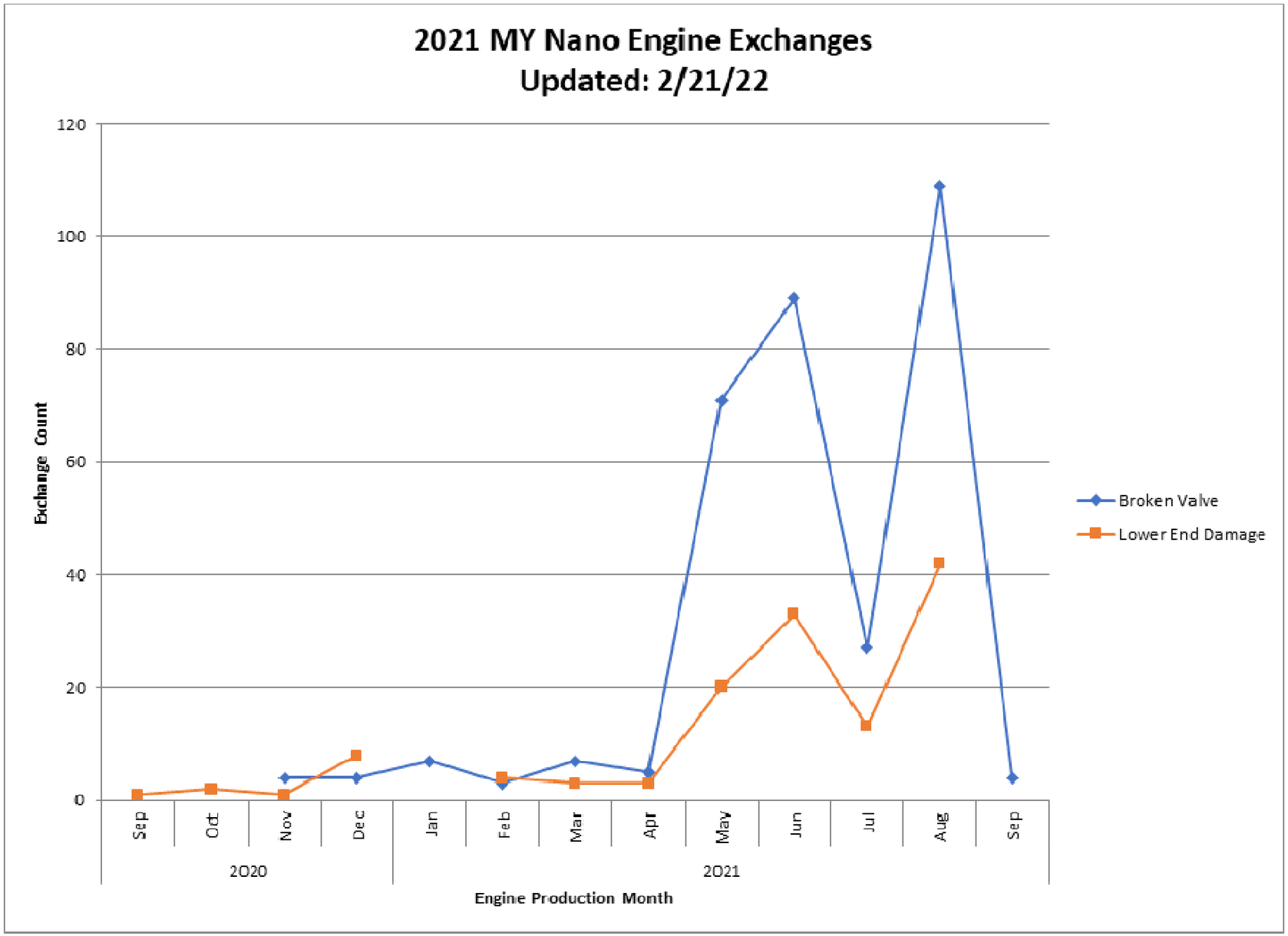

2021 MY Nano Engine Exchanges
Updated: 2/28/22
Exchange Count
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 21, 2022 9:57 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/21/22…

Broken Valve – 331
Lower End Damage – 132

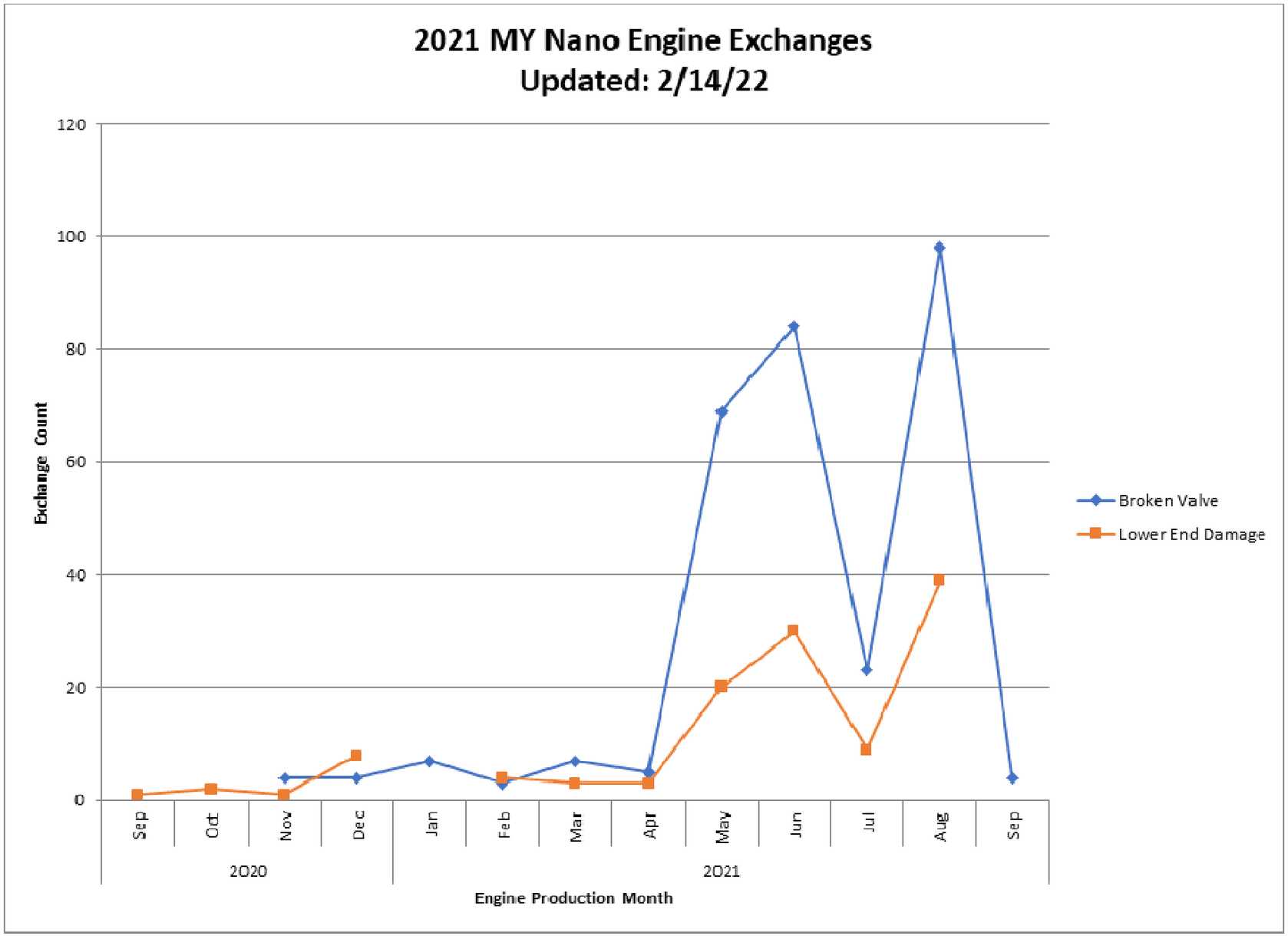

2021 MY Nano Engine Exchanges
Updated: 2/21/22
Exchange Count
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 14, 2022 11:58 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/14/22…

Broken Valve – 309
Lower End Damage – 122

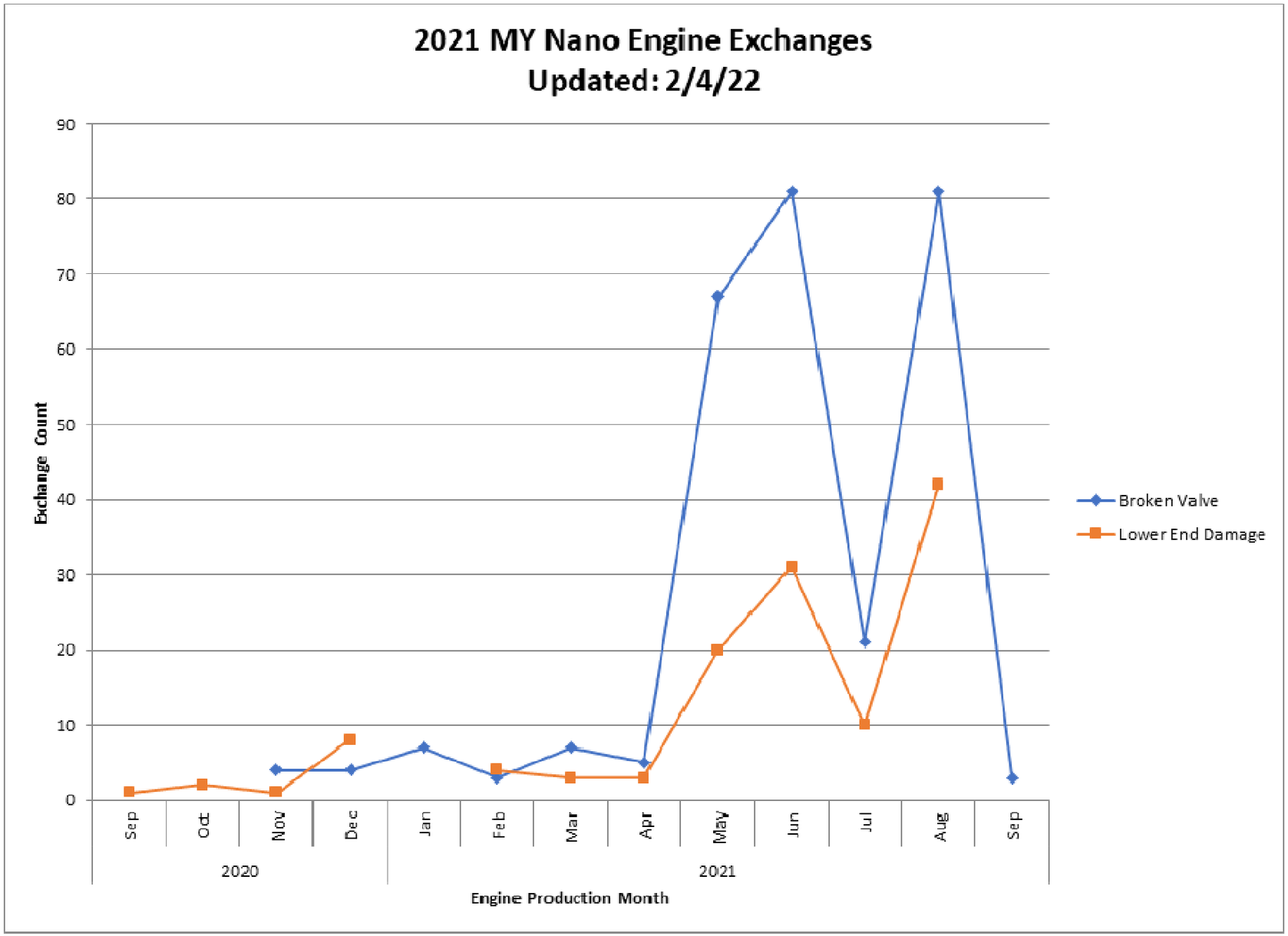

2021 MY Nano Engine Exchanges
Updated: 2/14/22
Exchange Count
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, February 4, 2022 9:30 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/4/22…

Broken Valve – 283
Lower End Damage – 127

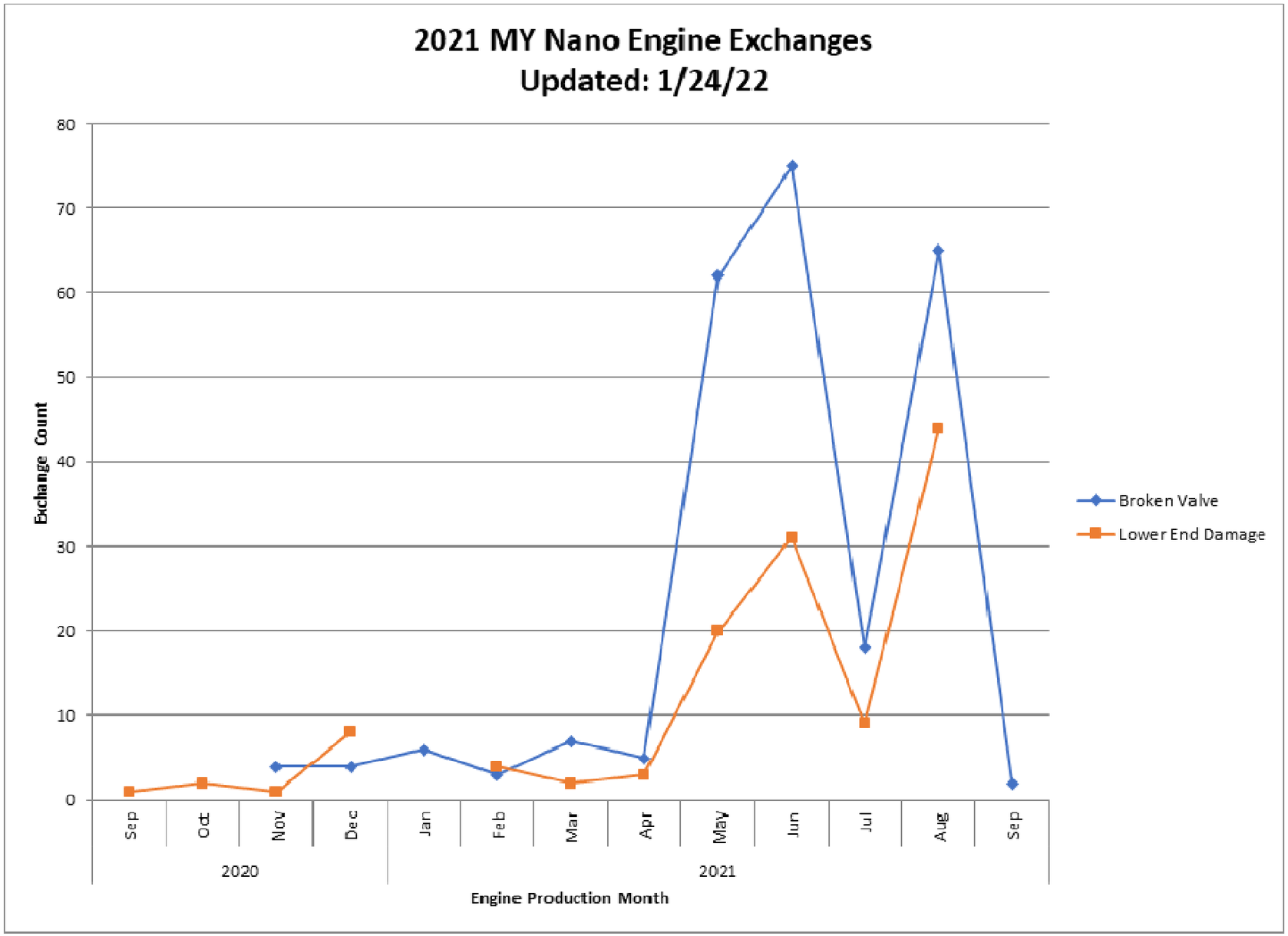

2021 MY Nano Engine Exchanges
Updated: 2/4/22
Exchange Count
90
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, January 24, 2022 1:55 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 1/24/22…

Broken Valve – 251
Lower End Damage – 127

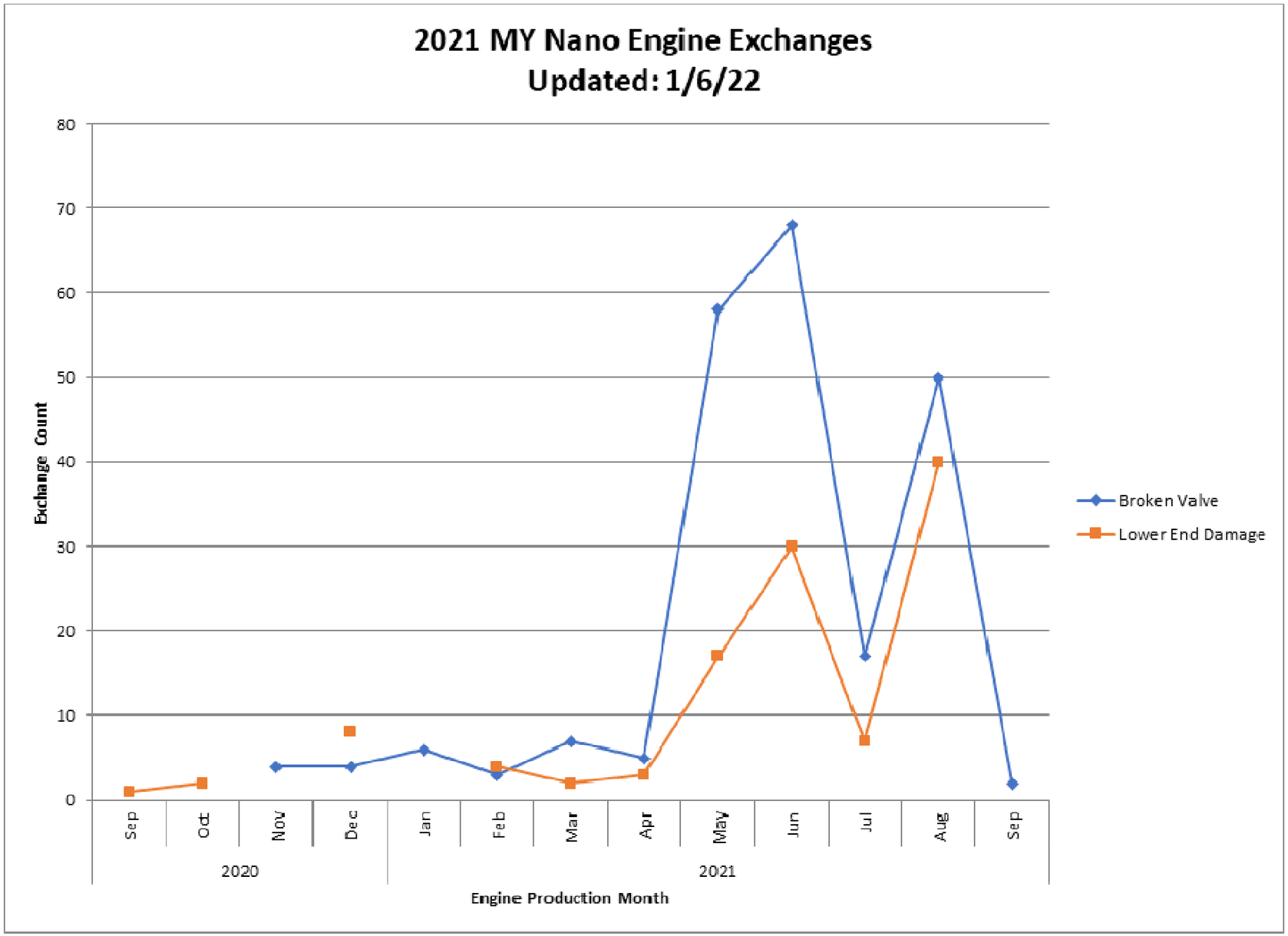

2021 MY Nano Engine Exchanges
Updated: 1/24/22
Exchange Count
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Thursday, January 6, 2022 6:29 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 1/5/22…

Broken Valve – 224
Lower End Damage – 115


2021 MY Nano Engine Exchanges
Updated: 1/6/22
Exchange Count
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, January 5, 2022 7:24 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

Hi Mike – can update with the latest when you have a chance and then also plot them by vehicle or engine production date? I assume we don't have any cases that have broken containment for the valve material change…

Thanks,
Dave

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From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Tuesday, December 21, 2021 1:07 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/21/21…

Broken Valve – 213
Lower End Damage – 115

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, December 13, 2021 2:47 PM

To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/10/21…

Broken Valve – 189
Lower End Damage – 108

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, December 3, 2021 2:44 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/3/21…

Broken Valve – 171
Lower End Damage – 106

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, November 19, 2021 12:44 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 11/19/21…

Broken Valve – 136
Lower End Damage – 95

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, June 6, 2022 10:56 AM
To: Simon, David (D.); Corbett, Sandy (S.M.)
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

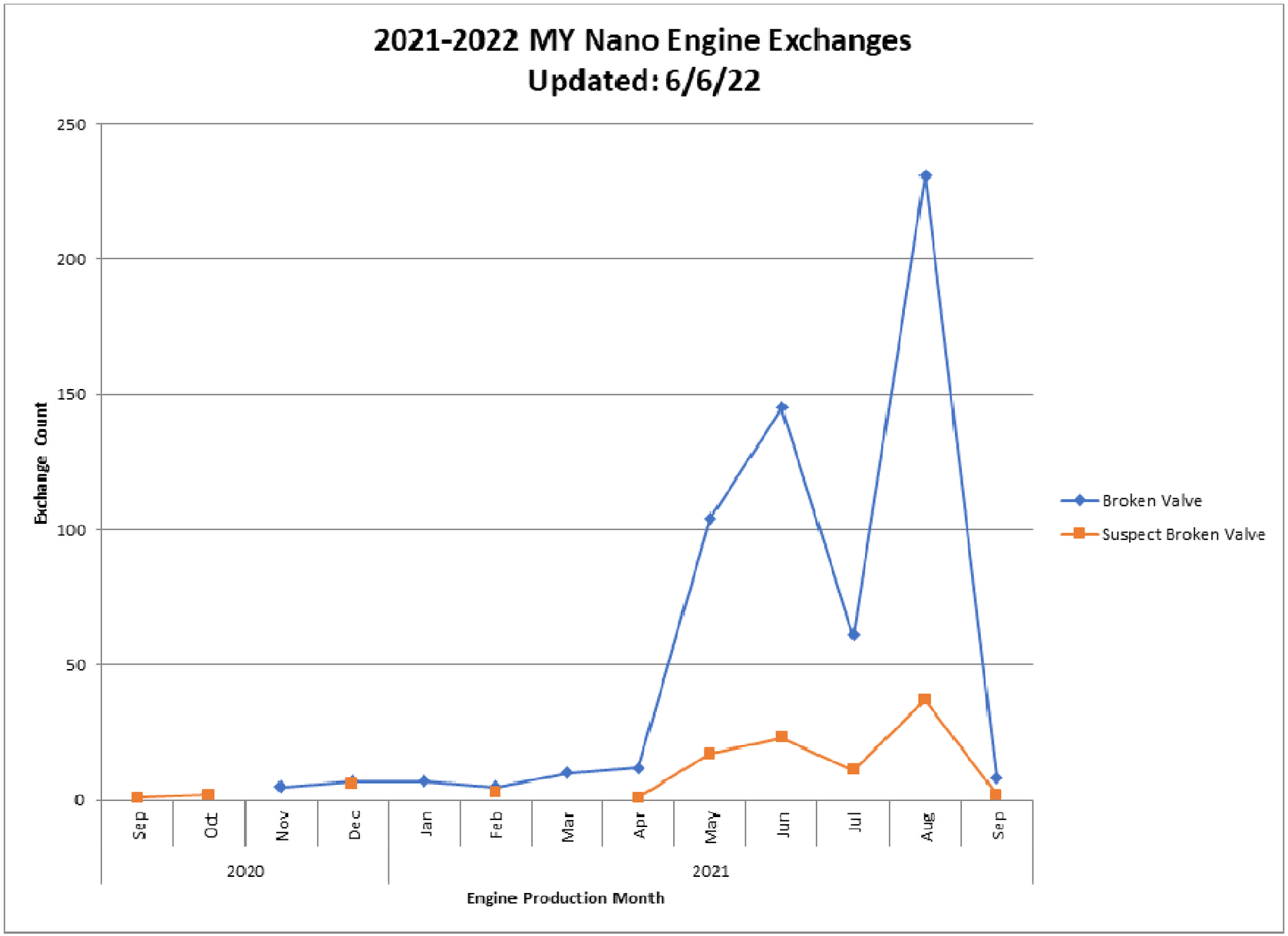
As of 6/6/22…

Broken Valve – 596
Lower End Damage – 109

Continuing to see a very nice trend in terms of claims per load day.

Average Claims Per Load Day
January 2022 – 4.38
February 2022 – 4.95
March 2022 – 5.52
April 2022 – 3.62
May 2022 – 2.05
June 2022 – 1.33

PE22-007 000112 WTY


2021-2022 MY Nano Engine Exchanges
Updated: 6/6/22
Exchange Count
250
200
150
100
50
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Suspect Broken Valve

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

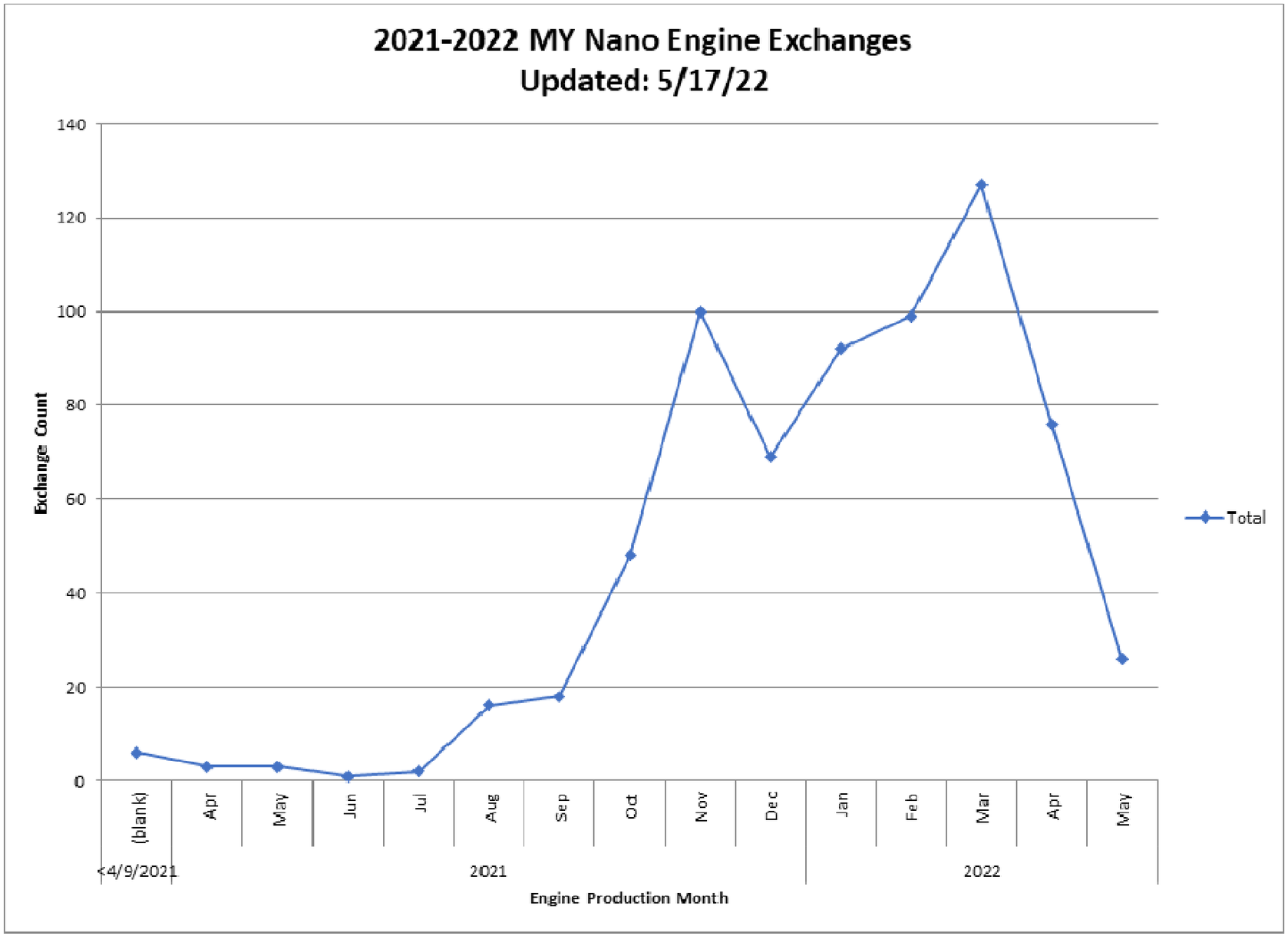
From: Steslicki, Michael (M.E.)
Sent: Tuesday, May 17, 2022 7:44 AM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 5/17/22…

Broken Valve – 566
Lower End Damage – 120

Starting to see a very nice trend in terms of claims per load day.

Average Claims Per Load Day
January 2022 – 4.38
February 2022 – 4.95
March 2022 – 5.52
April 2022 – 3.62
May 2022 – 2.18

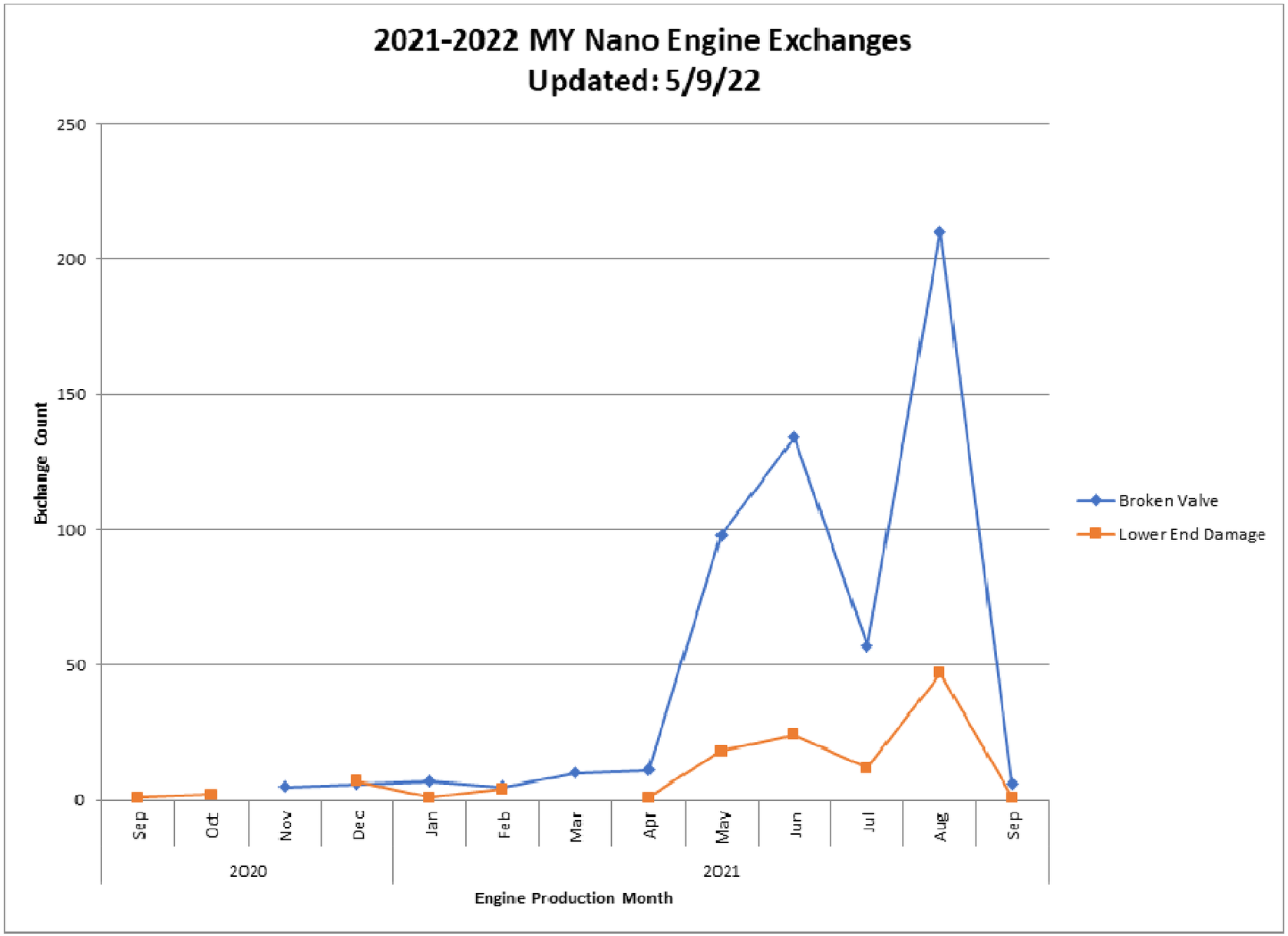

2021-2022 MY Nano Engine Exchanges
Updated: 5/17/22
Exchange Count
140
120
100
80
60
40
20
0
(blank)
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
<4/9/2021
2021
2022
Engine Production Month
Total

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, May 9, 2022 12:48 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 5/9/22…

Broken Valve – 554
Lower End Damage – 123

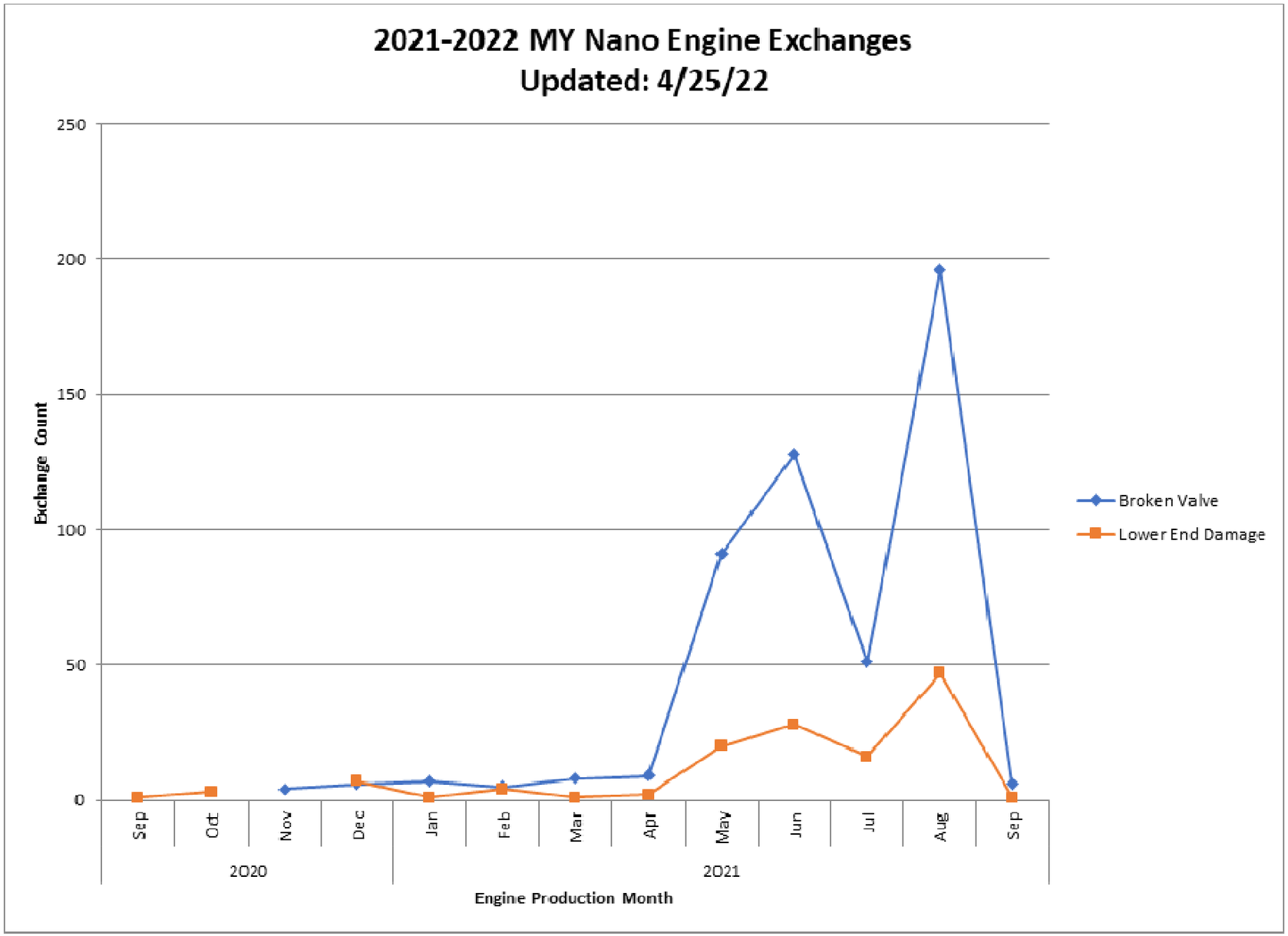

2021-2022 MY Nano Engine Exchanges
Updated: 5/9/22
250
200
150
100
50
0
Exchange Count
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, April 25, 2022 3:09 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 4/25/22…

Broken Valve – 516
Lower End Damage – 135

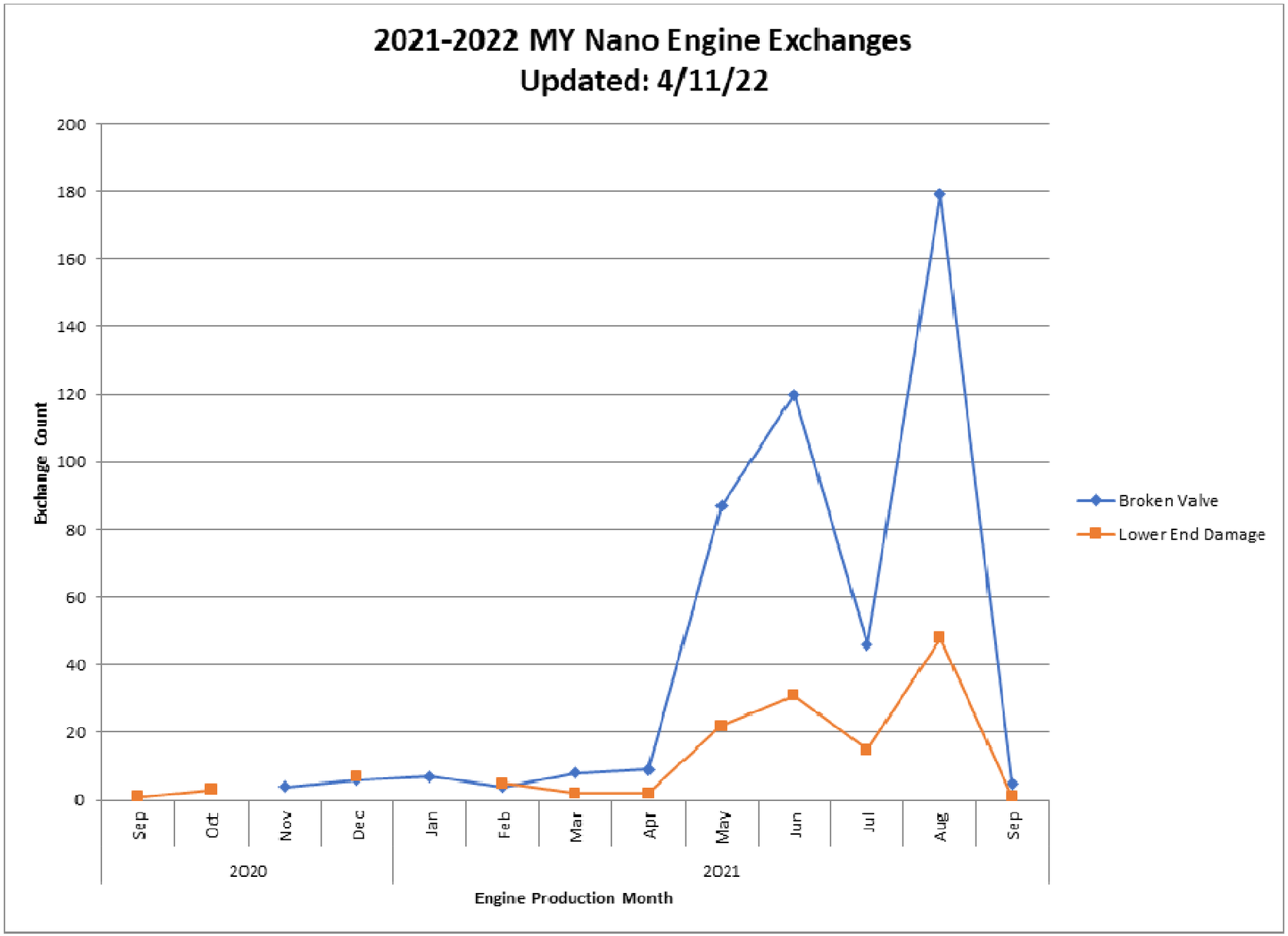

2021-2022 MY Nano Engine Exchanges
Updated: 4/25/22
Exchange Count
250
200
150
100
50
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, April 11, 2022 12:37 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 4/11/22…

Broken Valve – 480
Lower End Damage – 140

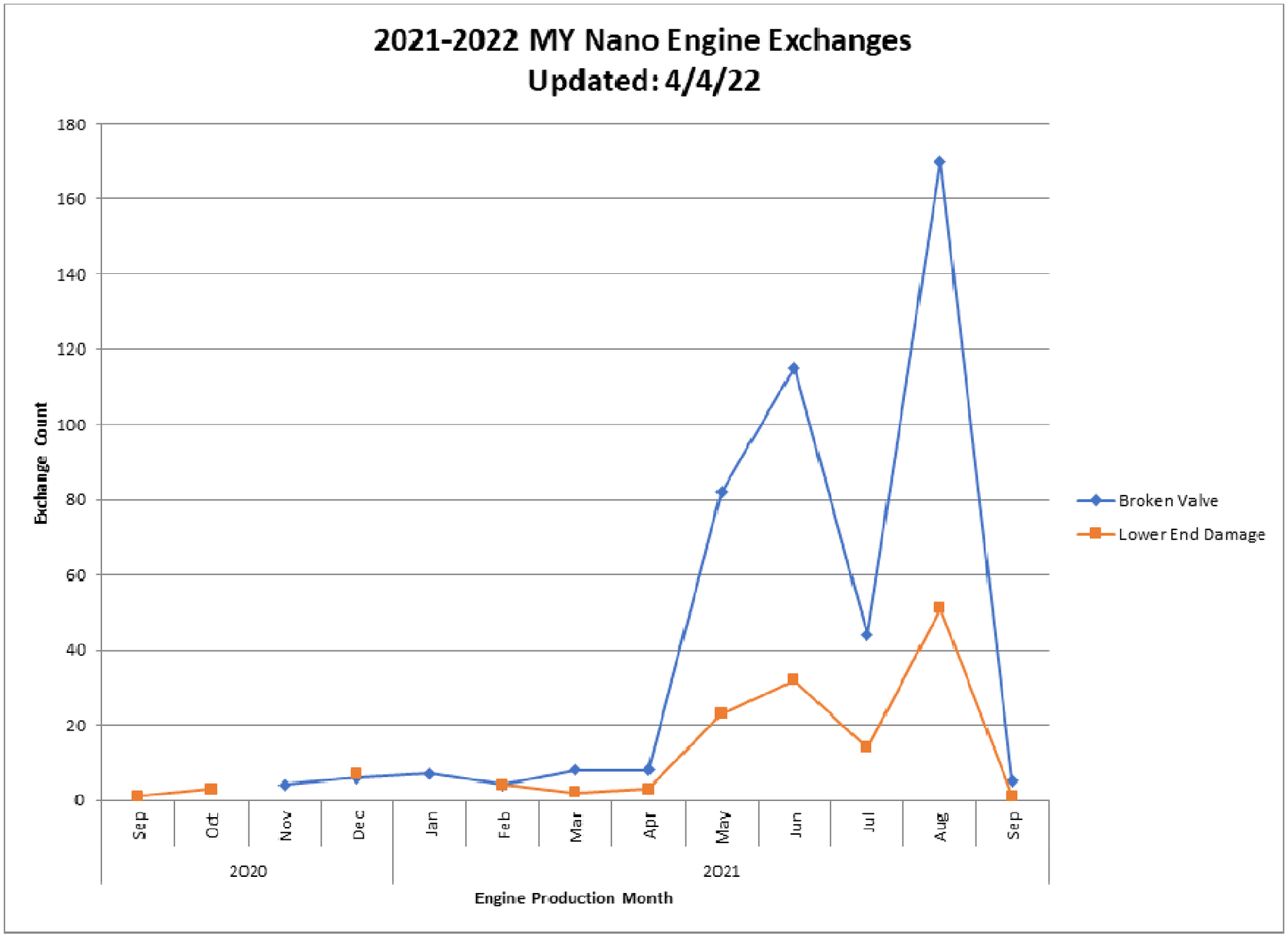

2021-2022 MY Nano Engine Exchanges
Updated: 4/11/22
Exchange Count
200
180
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, April 4, 2022 4:46 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 4/4/22…

Broken Valve – 457
Lower End Damage – 144

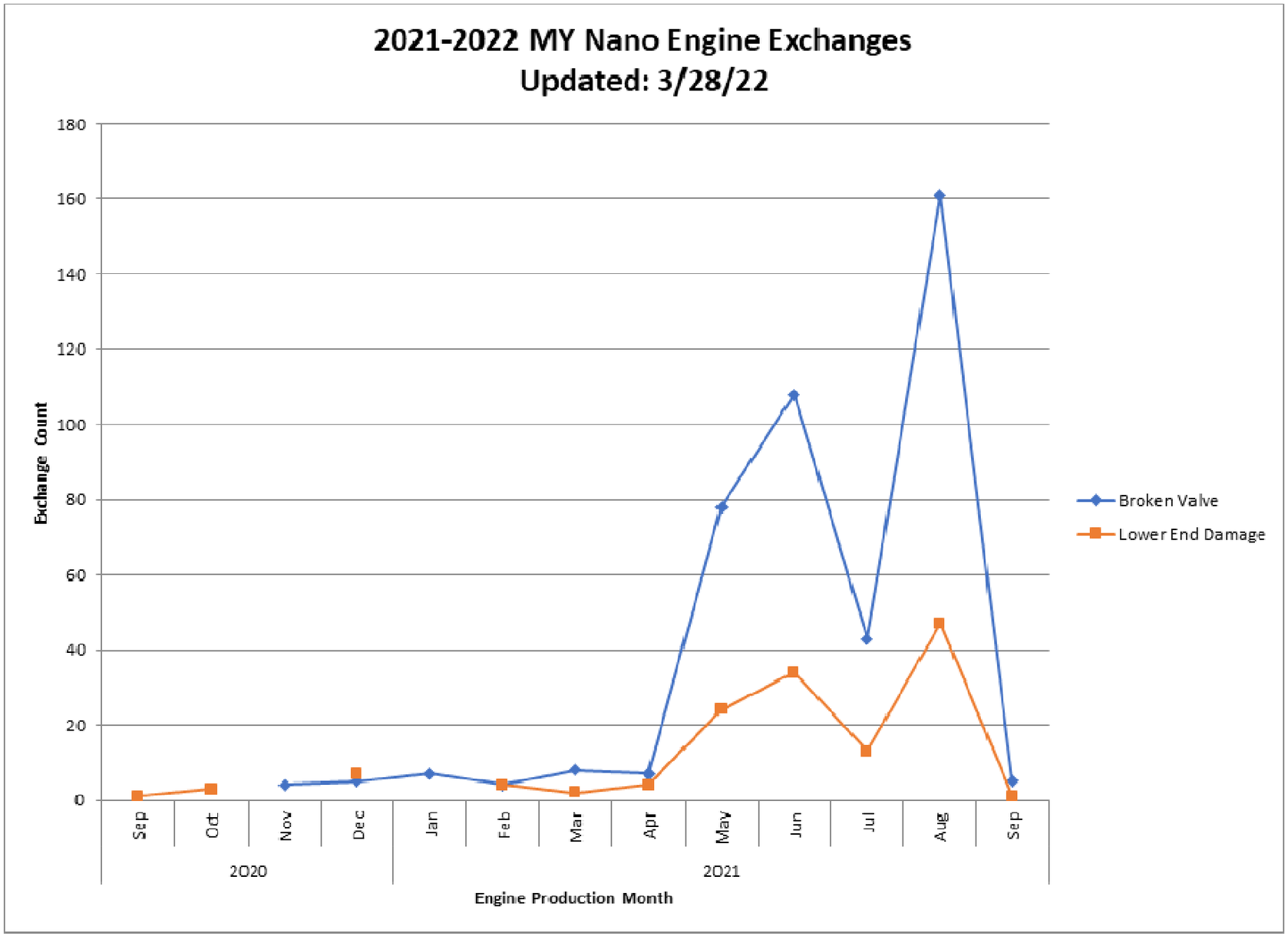

2021-2022 MY Nano Engine Exchanges
Updated: 4/4/22
Exchange Count
180
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 28, 2022 1:55 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/28/22…

Broken Valve – 433
Lower End Damage – 142

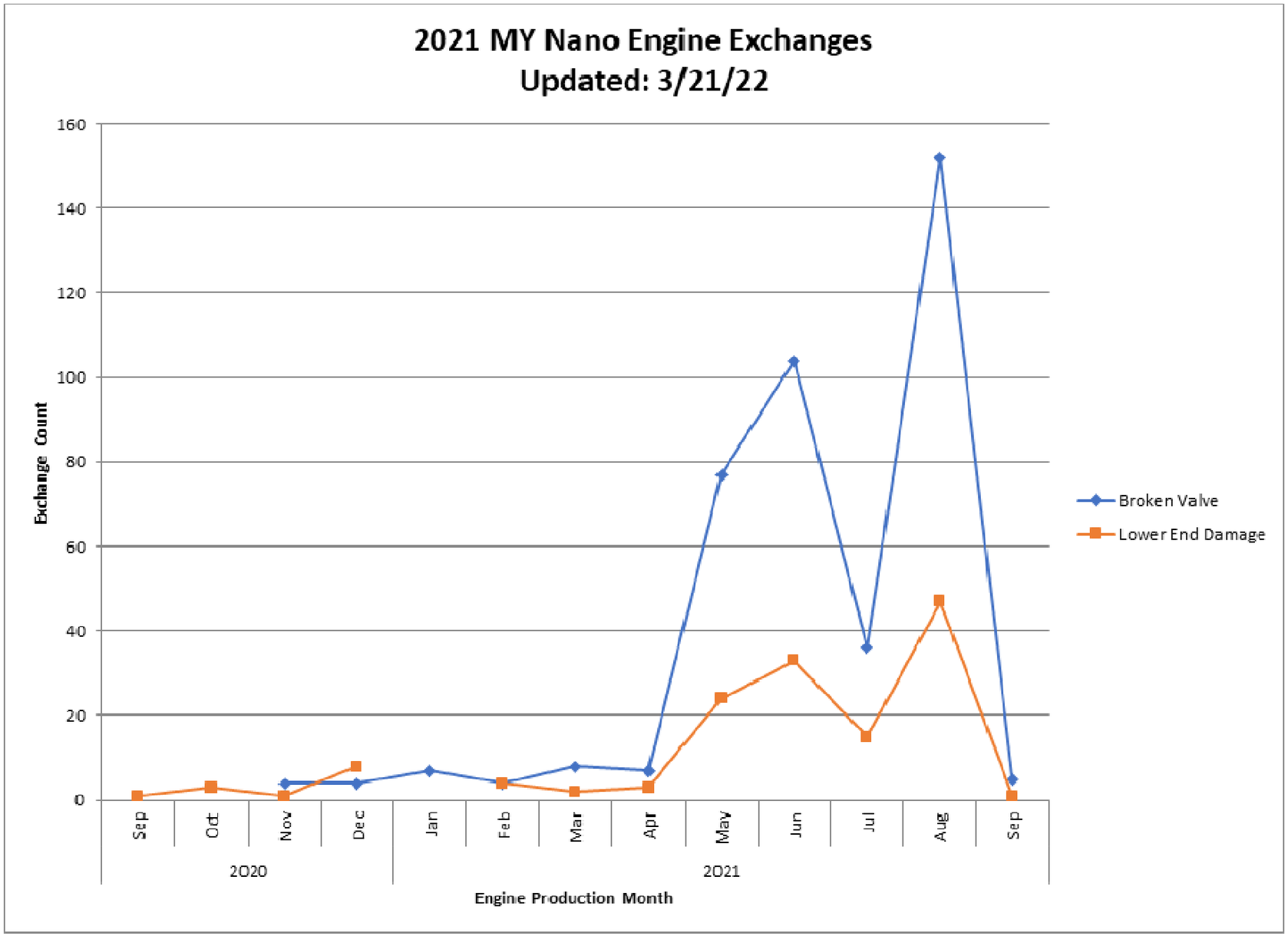

2021-2022 MY Nano Engine Exchanges
Updated: 3/28/22
Exchange Count
180
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 21, 2022 3:05 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/21/22…

Broken Valve – 410
Lower End Damage – 144


2021 MY Nano Engine Exchanges
Updated: 3/21/22
Exchange Count
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

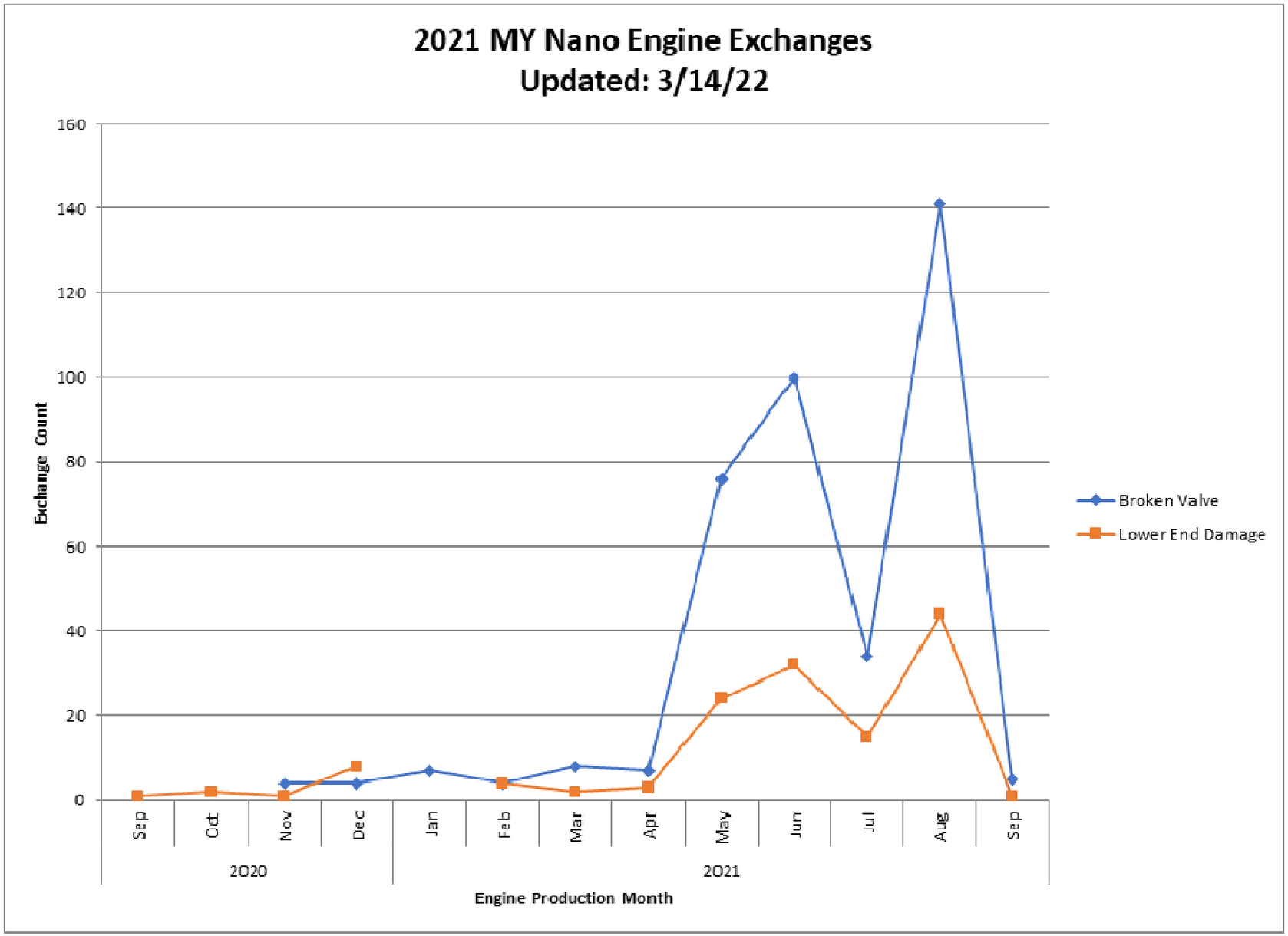
Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 14, 2022 4:43 PM
To: Simon, David (D.) <dsimon1@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

Sandy, FYI, this is a weekly update I give to Dave on the Nano broken valve engine exchanges. The exchanges listed as broken valve are based on dealer and/or teardown comments. The exchanges listed as lower end damage are not back or torn down yet, and don't specifically say broken valve in the dealer write-up, but based on what they do say, we highly suspect that they are broken valves.

As of 3/14/22…

Broken Valve – 391
Lower End Damage – 139

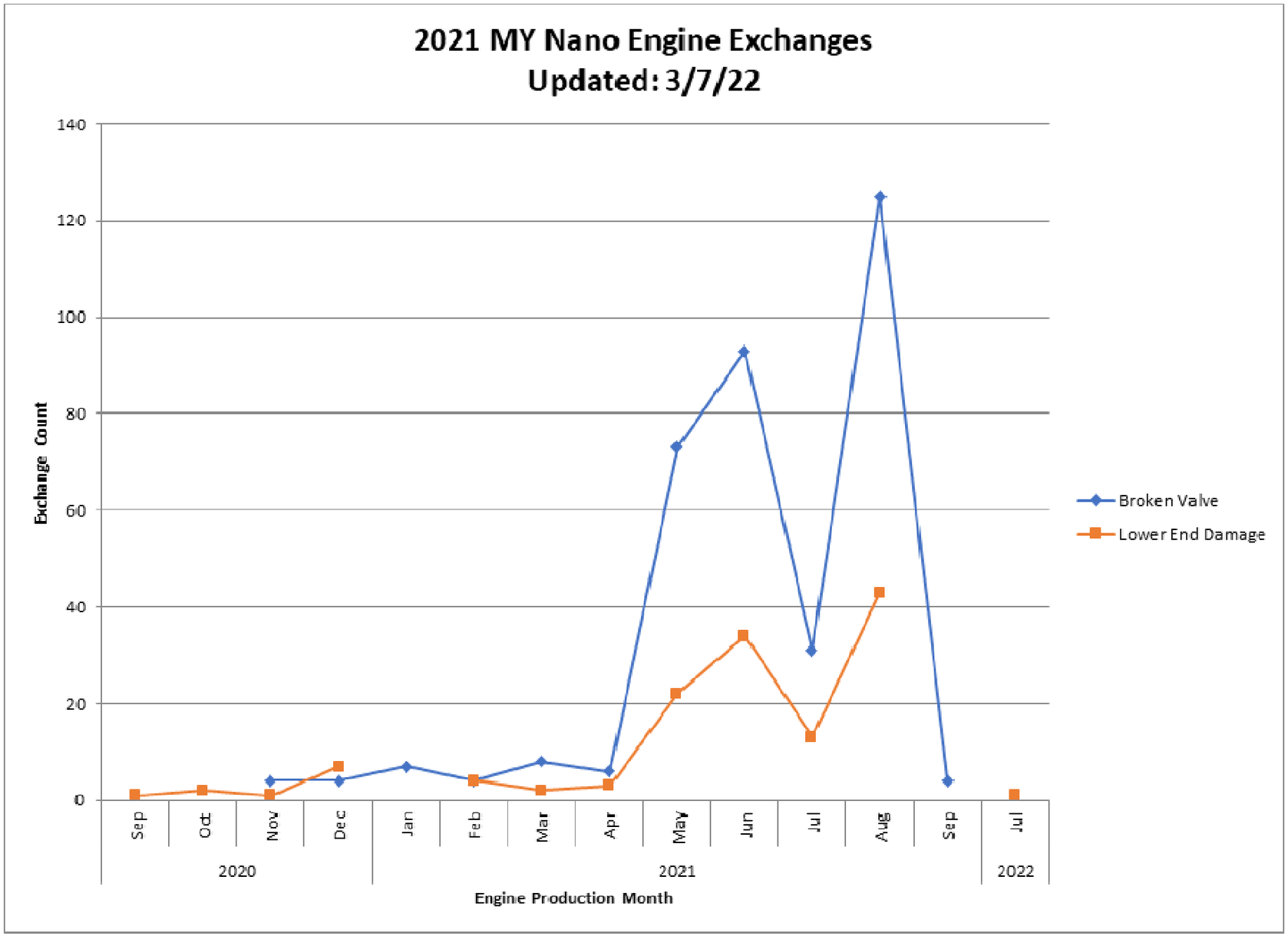

2021 MY Nano Engine Exchanges
Updated: 3/14/22
Exchange Count
160
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, March 7, 2022 12:09 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 3/7/22…

Broken Valve – 360
Lower End Damage – 135

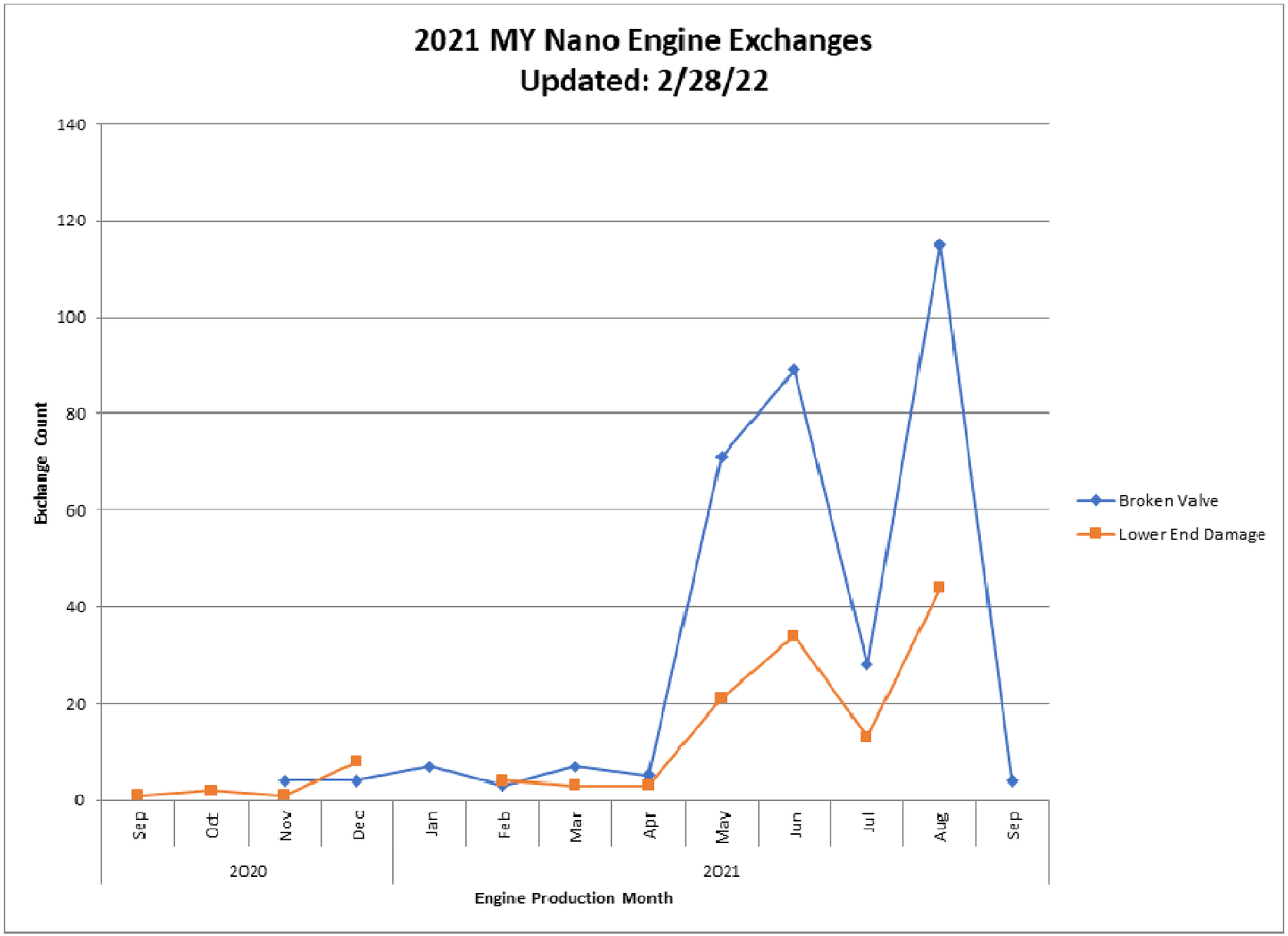

2021 MY Nano Engine Exchanges
Updated: 3/7/22
Exchange Count
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Jul
2020
2021
2022
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 28, 2022 2:20 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/28/22…

Broken Valve – 338
Lower End Damage – 136

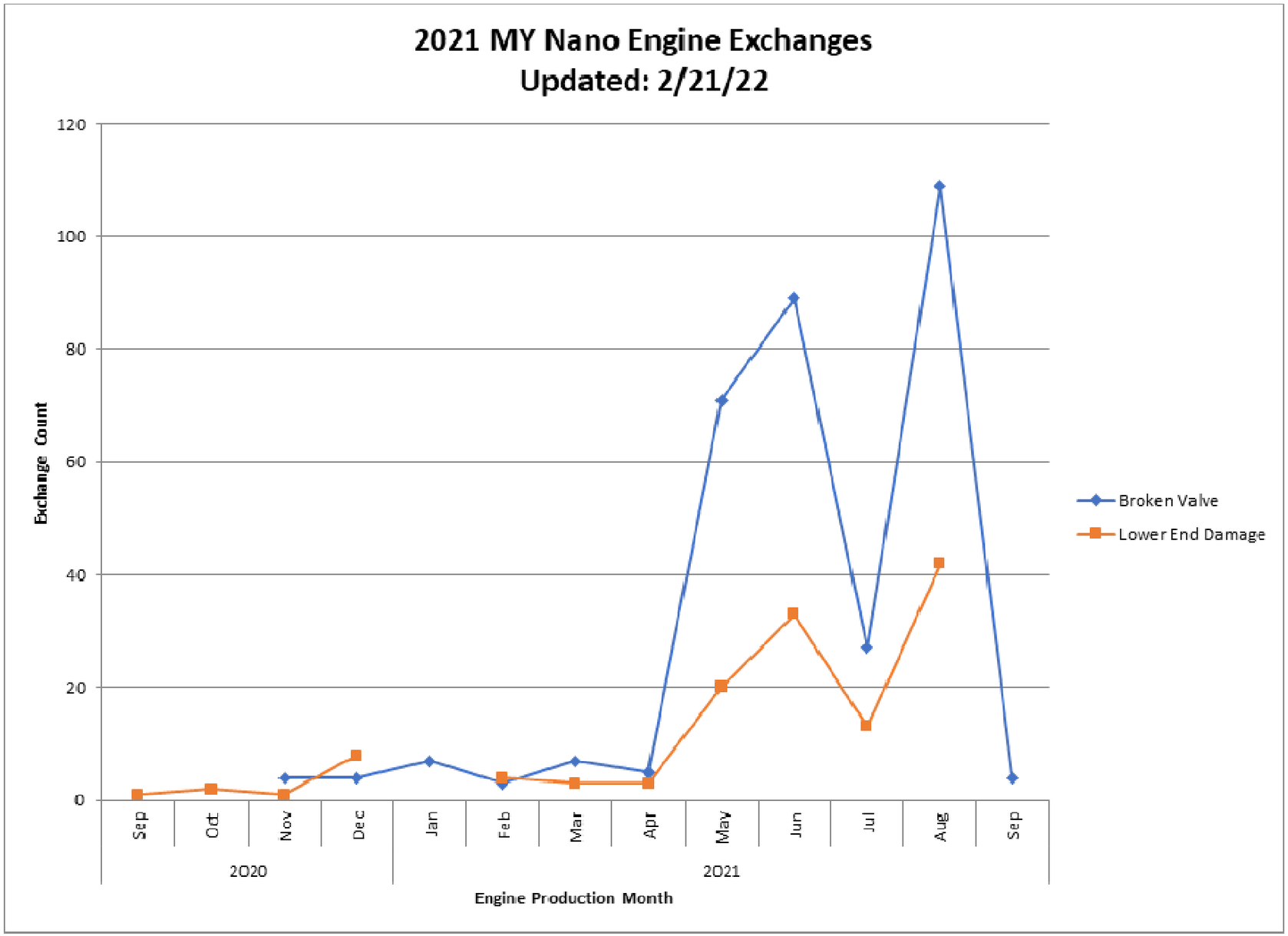

2021 MY Nano Engine Exchanges
Updated: 2/28/22
Exchange Count
140
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 21, 2022 9:57 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/21/22…

Broken Valve – 331
Lower End Damage – 132

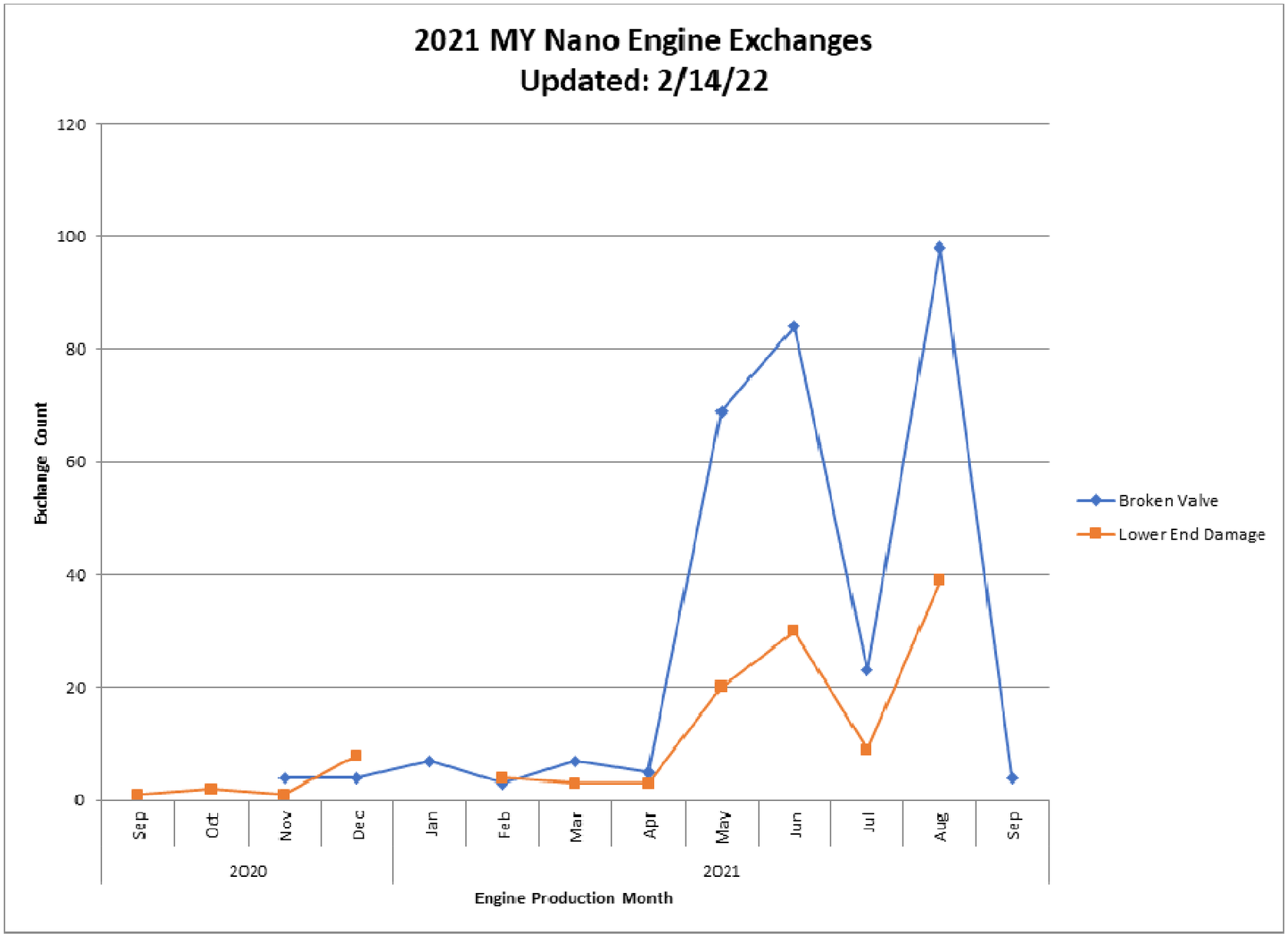

2021 MY Nano Engine Exchanges
Updated: 2/21/22
Exchange Count
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, February 14, 2022 11:58 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/14/22…

Broken Valve – 309
Lower End Damage – 122

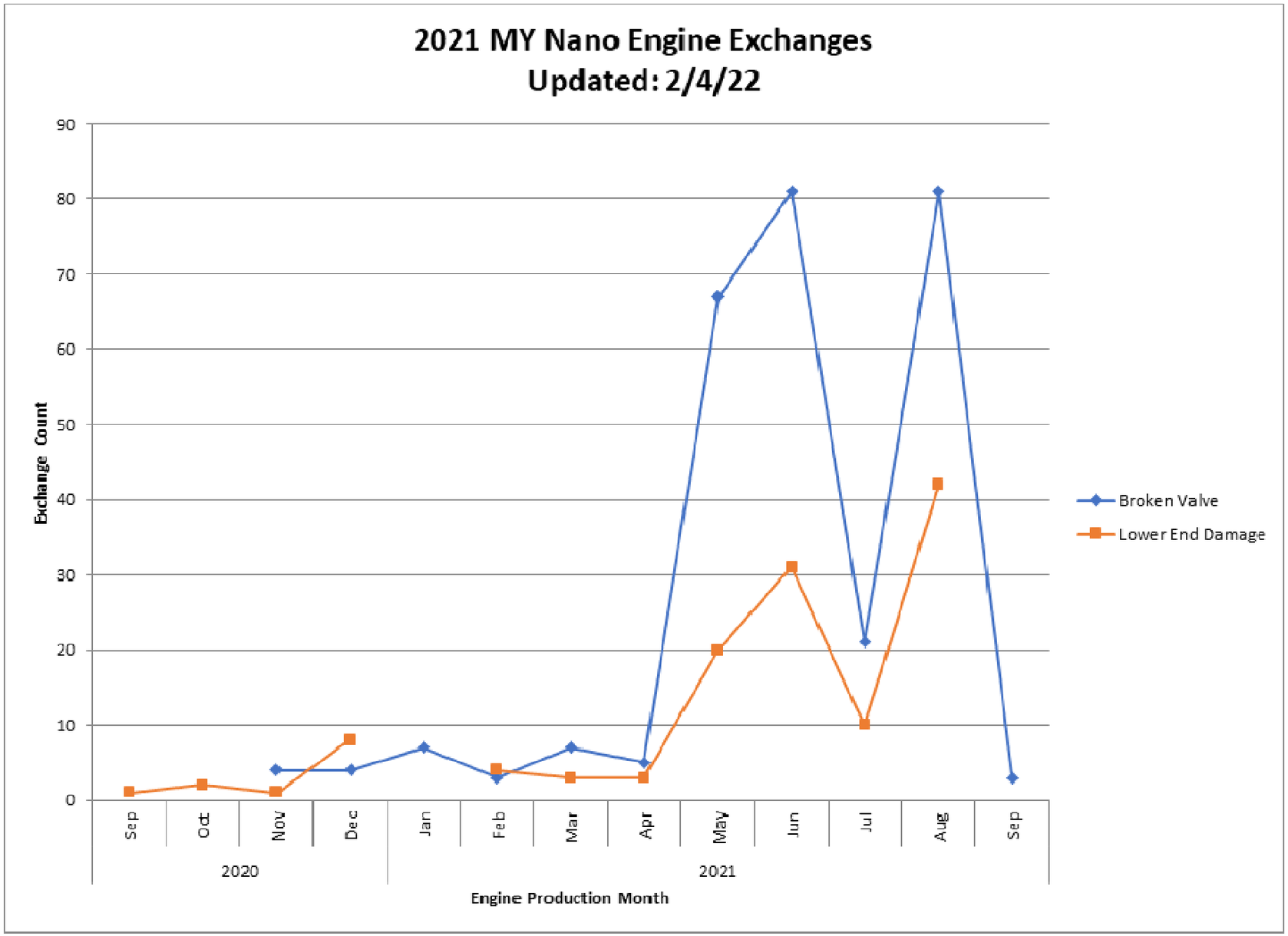

2021 MY Nano Engine Exchanges
Updated: 2/14/22
Exchange Count
120
100
80
60
40
20
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, February 4, 2022 9:30 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 2/4/22…

Broken Valve – 283
Lower End Damage – 127

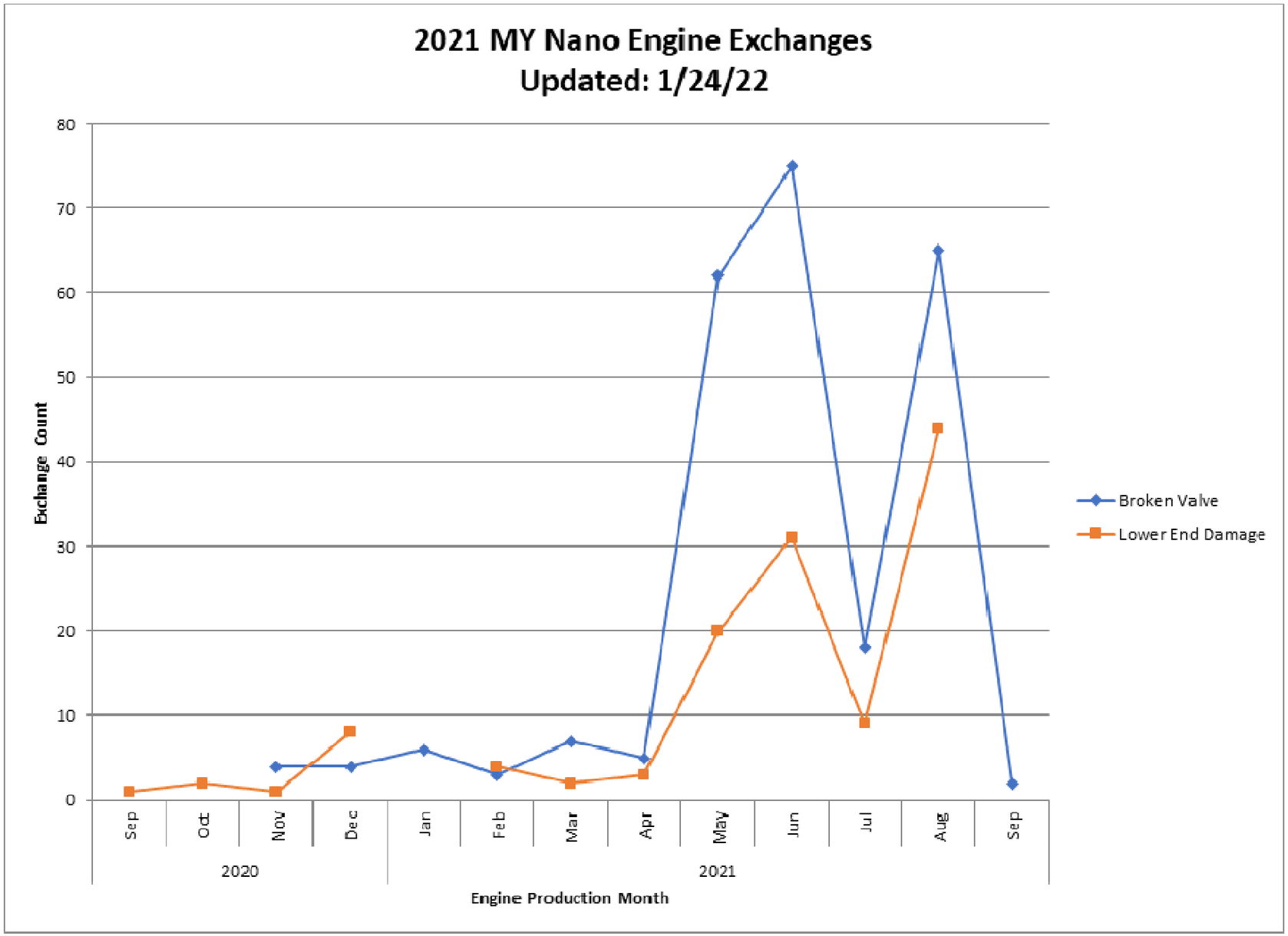

2021 MY Nano Engine Exchanges
Updated: 2/4/22
Exchange Count
90
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, January 24, 2022 1:55 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 1/24/22…

Broken Valve – 251
Lower End Damage – 127

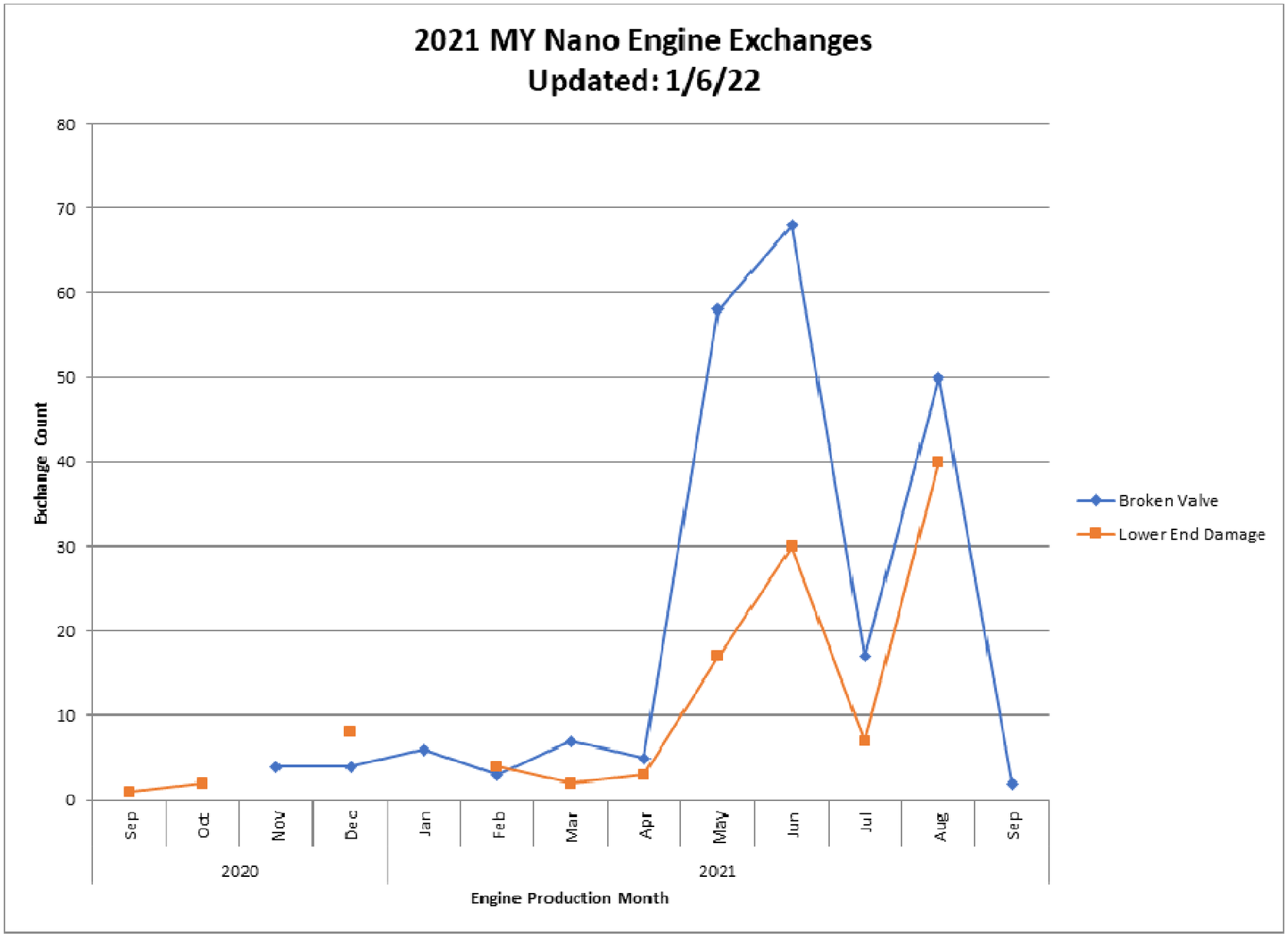

2021 MY Nano Engine Exchanges
Updated: 1/24/22
Exchange Count
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Thursday, January 6, 2022 6:29 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 1/5/22…

Broken Valve – 224
Lower End Damage – 115


2021 MY Nano Engine Exchanges
Updated: 1/6/22
Exchange Count
80
70
60
50
40
30
20
10
0
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
2020
2021
Engine Production Month
Broken Valve
Lower End Damage

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, January 5, 2022 7:24 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

Hi Mike – can update with the latest when you have a chance and then also plot them by vehicle or engine production date? I assume we don't have any cases that have broken containment for the valve material change…

Thanks,
Dave

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From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Tuesday, December 21, 2021 1:07 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/21/21…

Broken Valve – 213
Lower End Damage – 115

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Monday, December 13, 2021 2:47 PM

To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/10/21…

Broken Valve – 189
Lower End Damage – 108

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, December 3, 2021 2:44 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 12/3/21…

Broken Valve – 171
Lower End Damage – 106

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Steslicki, Michael (M.E.)
Sent: Friday, November 19, 2021 12:44 PM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: Nano Broken Valve / Lower End Damage Engine Exchanges

As of 11/19/21…

Broken Valve – 136
Lower End Damage – 95

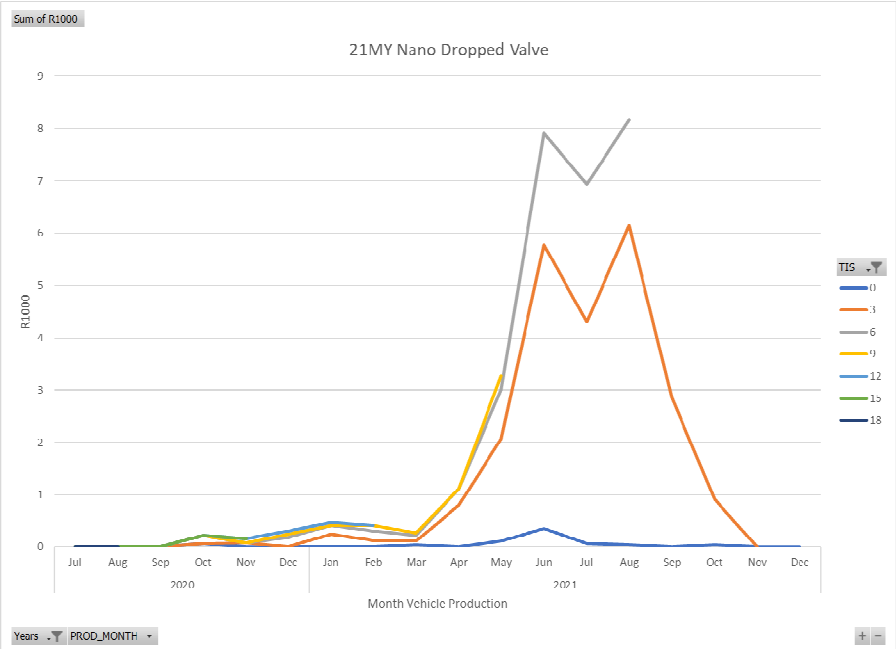
Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

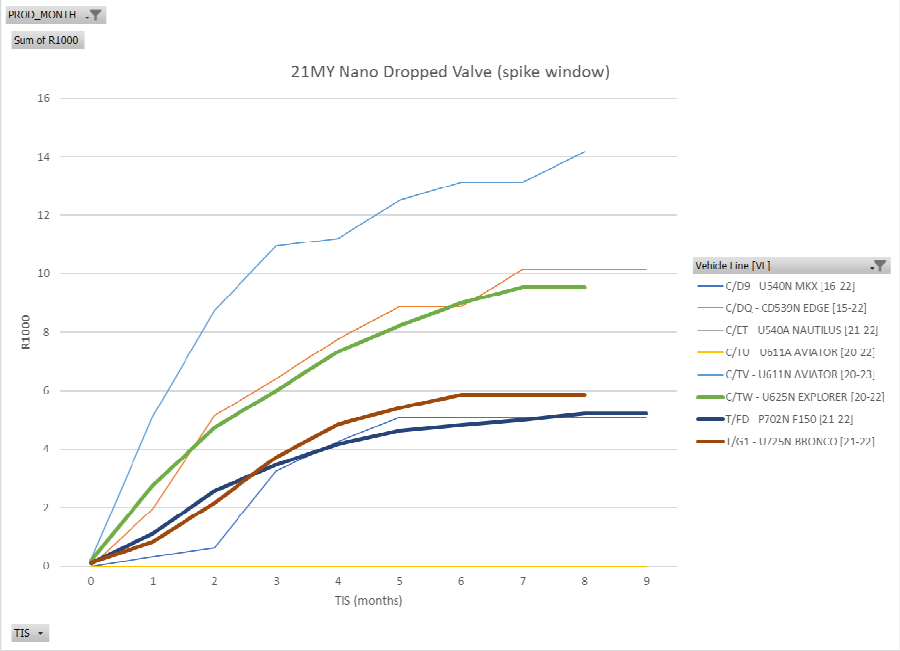
PE22-007 000146 WTY

From: Knott, Tim (.)
Sent: Wednesday, April 27, 2022 2:53 PM
To: Beyer, Laura (L.D.)
Cc: Corbett, Sandy (S.M.); Kolodziejczyk, Jeffrey (J.A.); Steslicki, Michael (M.E.)
Subject: RE: Nano dropped Valve Warranty Analysis
Attachments: 21MY Nano valve .xlsx; 21MY Nano valve spike.xlsx

Laura –

I'll arrange mtg with Vasiliy to kick-off analysis.
Will look to you to establish priority.
A couple preliminary charts to answer questions from this am discussion
Note the thin lines are for low volume vehicles lines.





From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Wednesday, April 27, 2022 2:15 PM
To: Knott, Tim (.) <tknott@ford.com>
Subject: RE: Nano dropped Valve Warranty Analysis

Yes, use lower end.

The Nano file has all the claims for valve exchanges and suspect valve exchanges (lower end).

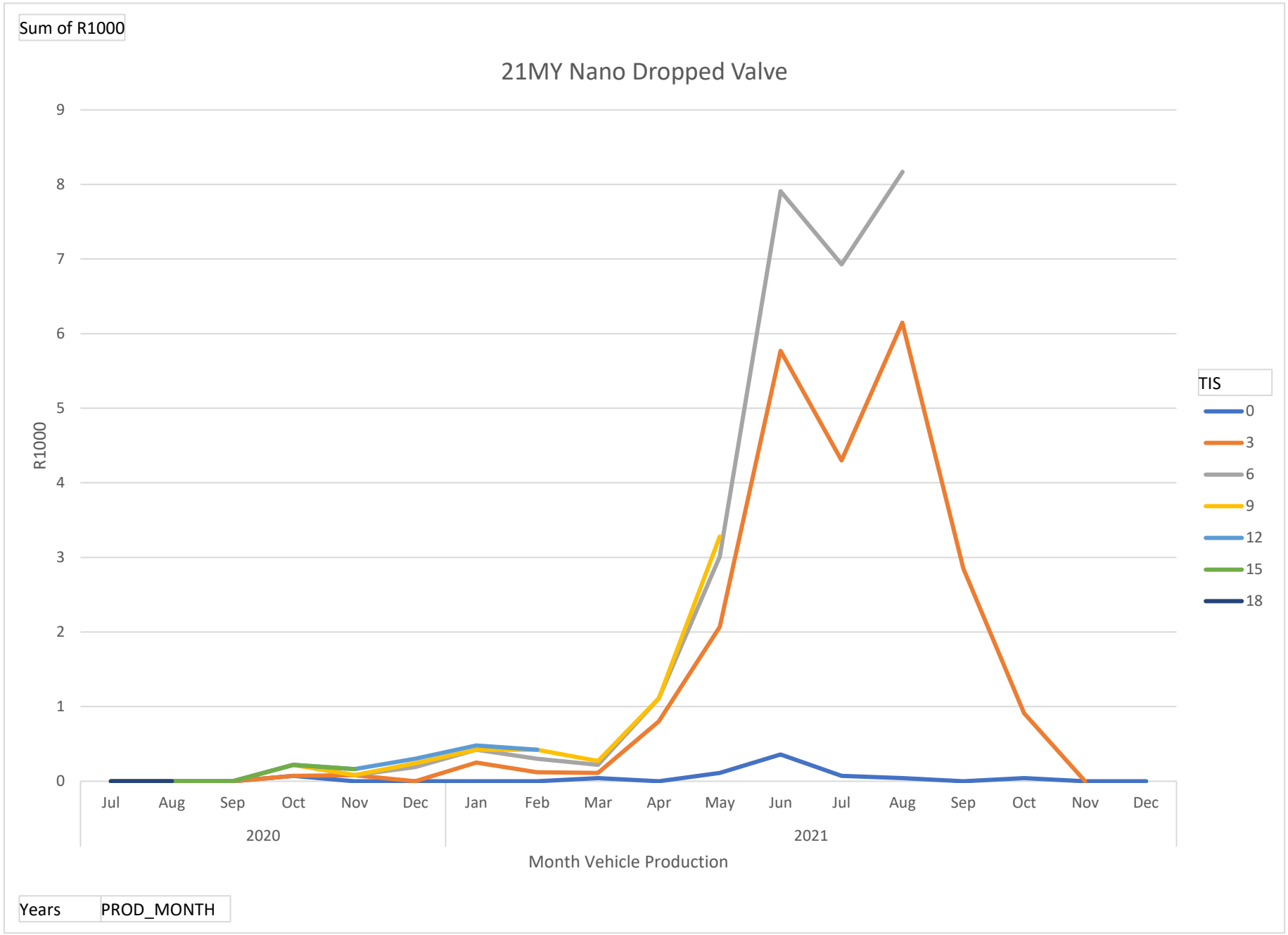
If you're using claim keys from it, take out the 22 MY claim in there as claim keys change each model year.

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Knott, Tim (.) <tknott@ford.com>
Sent: Wednesday, April 27, 2022 1:56 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Nano dropped Valve Warranty Analysis

Mike –

Do you recommend including 'lower end failures' claims for warranty projections?
Are all 21MY claims in the 'nano file' or are there early claims in your 21MY exchange file?


Sum of R1000
21MY Nano Dropped Valve
9
8
7
6
5
4
3
2
1
0
R1000
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
Month Vehicle Production
TIS
0
3
6
9
12
15
18
Years
PROD_MONTH

Sum of R1000	Column Labels							
Row Labels	**0**	**3**	**6**	**9**	**12**	**15**	**18**	**Grand Total**
2020	**0.07**	**0.15**	**0.49**	**0.54**	**0.68**	**0.38**	**0**	**2.31**
Jul	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0		0
Oct	0.07	0.07	0.22	0.22	0.22	0.22		1.02
Nov	0	0.08	0.08	0.08	0.16	0.16		0.56
Dec	0	0	0.19	0.24	0.3			0.73
2021	**0.66**	**23.33**	**28.07**	**5.5**	**0.9**			**58.46**
Jan	0	0.25	0.42	0.42	0.48			1.57
Feb	0	0.12	0.3	0.42	0.42			1.26
Mar	0.04	0.11	0.22	0.27				0.64
Apr	0	0.8	1.11	1.11				3.02
May	0.11	2.07	3.01	3.28				8.47
Jun	0.36	5.77	7.91					14.04
Jul	0.07	4.3	6.93					11.3
Aug	0.04	6.15	8.17					14.36
Sep	0	2.85						2.85
Oct	0.04	0.91						0.95
Nov	0	0						0
Dec	0							0
Grand Total	**0.73**	**23.48**	**28.56**	**6.04**	**1.58**	**0.38**	**0**	**60.77**

Report Info Status=Fin Request N Description Run Date / Completior Job Size=2 Execution ˜ Precalc Pr Cut Off Da Load Date= Currency E Generated By=TKNOTT
Data Selec Model Yea Cost Categ Claim Key[Trace Com Engine Global = NANO GAS V6 (GTDI) - LEP[E2277],
Report Sel Report Nar Destination CSV Name Model Yea Order By = TIS Rows ‹ YTD Colun Minimum D Logic = Co Cost Type Use Group Currency = Distance = Descriptions = Yes
Minimum Divisor Selected:100

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE	LOGIC
1		0	0.05	12	264060	130356.1	0.49	10863.01	2021	Corporate
1		1	0.55	144	261815	1513599	5.78	10511.1	2021	Corporate
1		2	1.14	294	255619	3150624	12.18	10716.41	2021	Corporate
1		3	1.6	406	243145	4459112	17.56	10983.03	2021	Corporate
1		4	1.97	487	219903	5352569	21.63	10990.9	2021	Corporate
1		5	2.19	531	194332	5846642	24.17	11010.63	2021	Corporate
1		6	2.3	550	174929	6057253	25.37	11013.19	2021	Corporate
1		7	2.35	557	153166	6126344	25.82	10998.82	2021	Corporate
1		8	2.38	561	138260	6167004	26.12	10992.88	2021	Corporate
1		9	2.39	563	122238	6192150	26.32	10998.49	2021	Corporate
1		10	2.41	565	109183	6218606	26.57	11006.38	2021	Corporate
1		11	2.42	566	92420	6226567	26.65	11001	2021	Corporate
1		12	2.42	566	66298	6226567	26.65	11001	2021	Corporate
1		13	2.42	566	46085	6226567	26.65	11001	2021	Corporate
1		14	2.42	566	29327	6226567	26.65	11001	2021	Corporate
1		15	2.42	566	15908	6226567	26.65	11001	2021	Corporate
1		16	2.42	566	8394	6226567	26.65	11001	2021	Corporate
1		17	2.42	566	3903	6226567	26.65	11001	2021	Corporate
1		18	2.42	566	2141	6226567	26.65	11001	2021	Corporate
1		19	2.42	566	848	6226567	26.65	11001	2021	Corporate
1	7/1/2020	0	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	1	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	2	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	3	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	4	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	5	0	0	1044	0	0	0	2021	Corporate
1	7/1/2020	6	0	0	1043	0	0	0	2021	Corporate
1	7/1/2020	7	0	0	1042	0	0	0	2021	Corporate
1	7/1/2020	8	0	0	1042	0	0	0	2021	Corporate
1	7/1/2020	9	0	0	1042	0	0	0	2021	Corporate
1	7/1/2020	10	0	0	1041	0	0	0	2021	Corporate
1	7/1/2020	11	0	0	1040	0	0	0	2021	Corporate
1	7/1/2020	12	0	0	1037	0	0	0	2021	Corporate
1	7/1/2020	13	0	0	1035	0	0	0	2021	Corporate
1	7/1/2020	14	0	0	1032	0	0	0	2021	Corporate

1	7/1/2020	15	0	0	1023	0	0	0	2021 Corporate
1	7/1/2020	16	0	0	1005	0	0	0	2021 Corporate
1	7/1/2020	17	0	0	983	0	0	0	2021 Corporate
1	7/1/2020	18	0	0	938	0	0	0	2021 Corporate
1	7/1/2020	19	0	0	809	0	0	0	2021 Corporate
1	8/1/2020	0	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	1	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	2	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	3	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	4	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	5	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	6	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	7	0	0	1577	0	0	0	2021 Corporate
1	8/1/2020	8	0	0	1576	0	0	0	2021 Corporate
1	8/1/2020	9	0	0	1574	0	0	0	2021 Corporate
1	8/1/2020	10	0	0	1573	0	0	0	2021 Corporate
1	8/1/2020	11	0	0	1571	0	0	0	2021 Corporate
1	8/1/2020	12	0	0	1565	0	0	0	2021 Corporate
1	8/1/2020	13	0	0	1563	0	0	0	2021 Corporate
1	8/1/2020	14	0	0	1558	0	0	0	2021 Corporate
1	8/1/2020	15	0	0	1539	0	0	0	2021 Corporate
1	8/1/2020	16	0	0	1481	0	0	0	2021 Corporate
1	8/1/2020	17	0	0	1392	0	0	0	2021 Corporate
1	8/1/2020	18	0	0	1164	0	0	0	2021 Corporate
1	9/1/2020	0	0	0	2476	0	0	0	2021 Corporate
1	9/1/2020	1	0	0	2476	0	0	0	2021 Corporate
1	9/1/2020	2	0	0	2476	0	0	0	2021 Corporate
1	9/1/2020	3	0	0	2474	0	0	0	2021 Corporate
1	9/1/2020	4	0	0	2471	0	0	0	2021 Corporate
1	9/1/2020	5	0	0	2467	0	0	0	2021 Corporate
1	9/1/2020	6	0	0	2466	0	0	0	2021 Corporate
1	9/1/2020	7	0	0	2462	0	0	0	2021 Corporate
1	9/1/2020	8	0	0	2458	0	0	0	2021 Corporate
1	9/1/2020	9	0	0	2449	0	0	0	2021 Corporate
1	9/1/2020	10	0	0	2430	0	0	0	2021 Corporate
1	9/1/2020	11	0	0	2402	0	0	0	2021 Corporate
1	9/1/2020	12	0	0	2362	0	0	0	2021 Corporate
1	9/1/2020	13	0	0	2315	0	0	0	2021 Corporate
1	9/1/2020	14	0	0	2245	0	0	0	2021 Corporate
1	9/1/2020	15	0	0	2151	0	0	0	2021 Corporate

1	9/1/2020	16	0	0	1895	0	0	0	2021 Corporate
1	9/1/2020	17	0	0	1489	0	0	0	2021 Corporate
1	10/1/2020	0	0.07	1	13495	10243.61	0.76	10243.61	2021 Corporate
1	10/1/2020	1	0.07	1	13488	10243.61	0.76	10243.61	2021 Corporate
1	10/1/2020	2	0.07	1	13483	10243.61	0.76	10243.61	2021 Corporate
1	10/1/2020	3	0.07	1	13476	10243.61	0.76	10243.61	2021 Corporate
1	10/1/2020	4	0.15	2	13456	22511.76	1.67	11255.88	2021 Corporate
1	10/1/2020	5	0.15	2	13427	22511.76	1.67	11255.88	2021 Corporate
1	10/1/2020	6	0.22	3	13385	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	7	0.22	3	13346	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	8	0.22	3	13255	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	9	0.22	3	13118	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	10	0.22	3	12837	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	11	0.22	3	12271	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	12	0.22	3	11492	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	13	0.22	3	10293	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	14	0.22	3	8685	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	15	0.22	3	6567	30734.75	2.29	10244.92	2021 Corporate
1	10/1/2020	16	0.22	3	3974	30734.75	2.29	10244.92	2021 Corporate
1	11/1/2020	0	0	0	13120	0	0	0	2021 Corporate
1	11/1/2020	1	0	0	13113	0	0	0	2021 Corporate
1	11/1/2020	2	0	0	13100	0	0	0	2021 Corporate
1	11/1/2020	3	0.08	1	13082	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	4	0.08	1	13053	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	5	0.08	1	13016	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	6	0.08	1	12967	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	7	0.08	1	12884	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	8	0.08	1	12773	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	9	0.08	1	12574	13838.27	1.06	13838.27	2021 Corporate
1	11/1/2020	10	0.16	2	12235	26359.36	2.08	13179.68	2021 Corporate
1	11/1/2020	11	0.16	2	11585	26359.36	2.08	13179.68	2021 Corporate
1	11/1/2020	12	0.16	2	10608	26359.36	2.08	13179.68	2021 Corporate
1	11/1/2020	13	0.16	2	9149	26359.36	2.08	13179.68	2021 Corporate
1	11/1/2020	14	0.16	2	7256	26359.36	2.08	13179.68	2021 Corporate
1	11/1/2020	15	0.16	2	4589	26359.36	2.08	13179.68	2021 Corporate
1	12/1/2020	0	0	0	20673	0	0	0	2021 Corporate
1	12/1/2020	1	0	0	20667	0	0	0	2021 Corporate
1	12/1/2020	2	0	0	20655	0	0	0	2021 Corporate
1	12/1/2020	3	0	0	20644	0	0	0	2021 Corporate
1	12/1/2020	4	0	0	20620	0	0	0	2021 Corporate

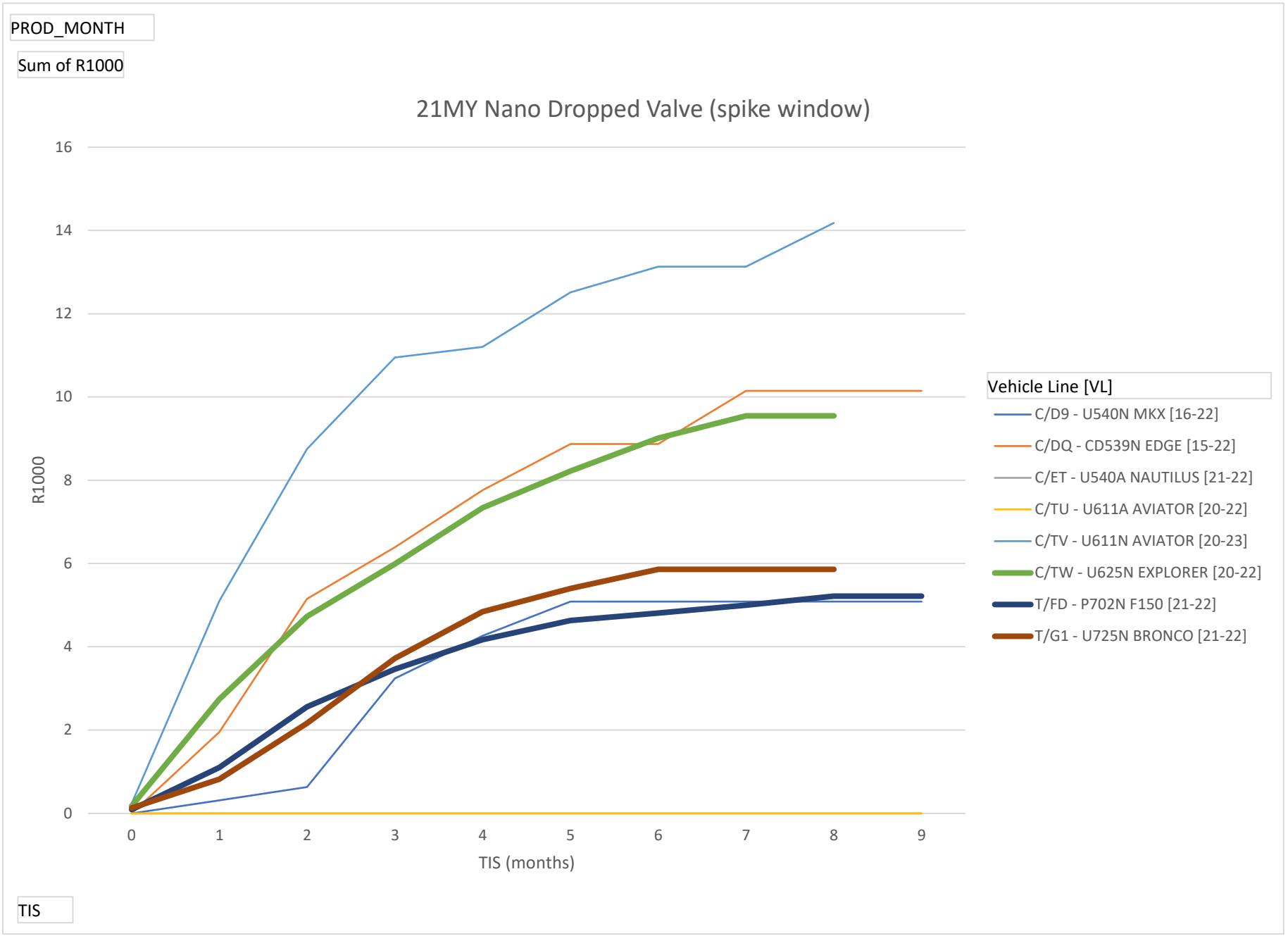
1	12/1/2020	5	0.15	3	20580	28897.57	1.4	9632.52	2021	Corporate
1	12/1/2020	6	0.19	4	20503	37707.71	1.83	9426.93	2021	Corporate
1	12/1/2020	7	0.19	4	20370	37707.71	1.83	9426.93	2021	Corporate
1	12/1/2020	8	0.19	4	20200	37707.71	1.83	9426.93	2021	Corporate
1	12/1/2020	9	0.24	5	19905	47075.92	2.3	9415.18	2021	Corporate
1	12/1/2020	10	0.3	6	19207	61011.71	3.03	10168.62	2021	Corporate
1	12/1/2020	11	0.3	6	17820	61011.71	3.03	10168.62	2021	Corporate
1	12/1/2020	12	0.3	6	15776	61011.71	3.03	10168.62	2021	Corporate
1	12/1/2020	13	0.3	6	12396	61011.71	3.03	10168.62	2021	Corporate
1	12/1/2020	14	0.3	6	8512	61011.71	3.03	10168.62	2021	Corporate
1	1/1/2021	0	0	0	23697	0	0	0	2021	Corporate
1	1/1/2021	1	0.08	2	23692	25093.02	1.06	12546.51	2021	Corporate
1	1/1/2021	2	0.21	5	23673	61173.53	2.58	12234.71	2021	Corporate
1	1/1/2021	3	0.25	6	23656	74945.48	3.17	12490.91	2021	Corporate
1	1/1/2021	4	0.38	9	23587	111362	4.71	12373.55	2021	Corporate
1	1/1/2021	5	0.38	9	23509	111362	4.71	12373.55	2021	Corporate
1	1/1/2021	6	0.42	10	23412	125171.1	5.3	12517.11	2021	Corporate
1	1/1/2021	7	0.42	10	23221	125171.1	5.3	12517.11	2021	Corporate
1	1/1/2021	8	0.42	10	22955	125171.1	5.3	12517.11	2021	Corporate
1	1/1/2021	9	0.42	10	22400	125171.1	5.3	12517.11	2021	Corporate
1	1/1/2021	10	0.42	10	21185	125171.1	5.3	12517.11	2021	Corporate
1	1/1/2021	11	0.48	11	18948	133131.5	5.72	12102.87	2021	Corporate
1	1/1/2021	12	0.48	11	15143	133131.5	5.72	12102.87	2021	Corporate
1	1/1/2021	13	0.48	11	9295	133131.5	5.72	12102.87	2021	Corporate
1	2/1/2021	0	0	0	16819	0	0	0	2021	Corporate
1	2/1/2021	1	0.06	1	16814	7523.47	0.45	7523.47	2021	Corporate
1	2/1/2021	2	0.06	1	16792	7523.47	0.45	7523.47	2021	Corporate
1	2/1/2021	3	0.12	2	16773	21909.6	1.31	10954.8	2021	Corporate
1	2/1/2021	4	0.3	5	16730	52173.72	3.11	10434.74	2021	Corporate
1	2/1/2021	5	0.3	5	16643	52173.72	3.11	10434.74	2021	Corporate
1	2/1/2021	6	0.3	5	16541	52173.72	3.11	10434.74	2021	Corporate
1	2/1/2021	7	0.36	6	16362	59357.27	3.55	9892.88	2021	Corporate
1	2/1/2021	8	0.36	6	16067	59357.27	3.55	9892.88	2021	Corporate
1	2/1/2021	9	0.42	7	15548	75134.76	4.57	10733.54	2021	Corporate
1	2/1/2021	10	0.42	7	14405	75134.76	4.57	10733.54	2021	Corporate
1	2/1/2021	11	0.42	7	12258	75134.76	4.57	10733.54	2021	Corporate
1	2/1/2021	12	0.42	7	8276	75134.76	4.57	10733.54	2021	Corporate
1	3/1/2021	0	0.04	1	27563	15077.62	0.55	15077.62	2021	Corporate
1	3/1/2021	1	0.04	1	27527	15077.62	0.55	15077.62	2021	Corporate
1	3/1/2021	2	0.04	1	27444	15077.62	0.55	15077.62	2021	Corporate

1	3/1/2021	3	0.11	3	27349	39814.16	1.45	13271.39	2021	Corporate
1	3/1/2021	4	0.15	4	27048	53070.45	1.94	13267.61	2021	Corporate
1	3/1/2021	5	0.18	5	26655	60314.65	2.21	12062.93	2021	Corporate
1	3/1/2021	6	0.22	6	25914	71328.45	2.64	11888.08	2021	Corporate
1	3/1/2021	7	0.22	6	24691	71328.45	2.64	11888.08	2021	Corporate
1	3/1/2021	8	0.27	7	23491	85044.88	3.22	12149.27	2021	Corporate
1	3/1/2021	9	0.27	7	21933	85044.88	3.22	12149.27	2021	Corporate
1	3/1/2021	10	0.27	7	19667	85044.88	3.22	12149.27	2021	Corporate
1	3/1/2021	11	0.27	7	14486	85044.88	3.22	12149.27	2021	Corporate
1	4/1/2021	0	0	0	10074	0	0	0	2021	Corporate
1	4/1/2021	1	0.4	4	10038	46839.97	4.67	11709.99	2021	Corporate
1	4/1/2021	2	0.5	5	9994	58797.88	5.86	11759.58	2021	Corporate
1	4/1/2021	3	0.8	8	9923	98864.49	9.9	12358.06	2021	Corporate
1	4/1/2021	4	1.11	11	9737	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	5	1.11	11	9430	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	6	1.11	11	8549	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	7	1.11	11	7649	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	8	1.11	11	6509	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	9	1.11	11	5531	127816.2	12.87	11619.65	2021	Corporate
1	4/1/2021	10	1.11	11	4564	127816.2	12.87	11619.65	2021	Corporate
1	5/1/2021	0	0.11	1	8746	8406.36	0.96	8406.36	2021	Corporate
1	5/1/2021	1	1.03	9	8726	101128.2	11.59	11236.46	2021	Corporate
1	5/1/2021	2	1.61	14	8694	149860.8	17.19	10704.35	2021	Corporate
1	5/1/2021	3	2.07	18	8653	189720.1	21.8	10540	2021	Corporate
1	5/1/2021	4	2.53	22	8591	235521.9	27.13	10705.54	2021	Corporate
1	5/1/2021	5	3.01	26	8441	274112.7	31.7	10542.8	2021	Corporate
1	5/1/2021	6	3.01	26	8162	274112.7	31.7	10542.8	2021	Corporate
1	5/1/2021	7	3.01	26	7878	274112.7	31.7	10542.8	2021	Corporate
1	5/1/2021	8	3.28	28	7367	293289.8	34.31	10474.63	2021	Corporate
1	5/1/2021	9	3.28	28	6125	293289.8	34.31	10474.63	2021	Corporate
1	6/1/2021	0	0.36	6	16760	63310.5	3.78	10551.75	2021	Corporate
1	6/1/2021	1	2.63	44	16707	437703.1	26.19	9947.8	2021	Corporate
1	6/1/2021	2	4.68	78	16602	768850.2	46.13	9857.05	2021	Corporate
1	6/1/2021	3	5.77	96	16501	965514.1	58.05	10057.44	2021	Corporate
1	6/1/2021	4	6.88	114	16290	1152435	69.53	10109.08	2021	Corporate
1	6/1/2021	5	7.44	123	15919	1250409	75.68	10165.92	2021	Corporate
1	6/1/2021	6	7.91	130	15008	1323579	80.56	10181.37	2021	Corporate
1	6/1/2021	7	8.2	134	13768	1364863	83.55	10185.54	2021	Corporate
1	6/1/2021	8	8.29	135	10528	1372629	84.29	10167.62	2021	Corporate
1	7/1/2021	0	0.07	1	13426	13844.6	1.03	13844.6	2021	Corporate

1	7/1/2021	1	1.2	16	13307	156848.3	11.78	9803.02	2021	Corporate
1	7/1/2021	2	2.81	37	13041	378091.4	28.74	10218.69	2021	Corporate
1	7/1/2021	3	4.3	56	12794	592069.1	45.47	10572.66	2021	Corporate
1	7/1/2021	4	5.99	77	12407	817897.6	63.67	10622.05	2021	Corporate
1	7/1/2021	5	6.51	83	11517	903715.1	71.12	10888.13	2021	Corporate
1	7/1/2021	6	6.93	87	9612	953938.3	76.35	10964.81	2021	Corporate
1	7/1/2021	7	7.18	89	7877	974561.7	78.96	10950.13	2021	Corporate
1	8/1/2021	0	0.04	1	25601	11255.09	0.44	11255.09	2021	Corporate
1	8/1/2021	1	2.05	52	25361	554615.2	21.86	10665.68	2021	Corporate
1	8/1/2021	2	4.52	113	24738	1234267	49.34	10922.72	2021	Corporate
1	8/1/2021	3	6.15	152	23885	1687125	68.3	11099.5	2021	Corporate
1	8/1/2021	4	7	171	22206	1907767	78.23	11156.53	2021	Corporate
1	8/1/2021	5	7.92	189	19762	2110227	88.48	11165.22	2021	Corporate
1	8/1/2021	6	8.17	193	15751	2155589	91.36	11168.85	2021	Corporate
1	9/1/2021	0	0	0	14981	0	0	0	2021	Corporate
1	9/1/2021	1	0.74	11	14846	125783.2	8.47	11434.84	2021	Corporate
1	9/1/2021	2	1.64	24	14509	277705.9	18.94	11571.08	2021	Corporate
1	9/1/2021	3	2.85	41	14040	489962.8	34.06	11950.31	2021	Corporate
1	9/1/2021	4	3.41	48	12521	571406.8	40.57	11904.31	2021	Corporate
1	9/1/2021	5	3.7	51	10306	604495.7	43.78	11852.86	2021	Corporate
1	10/1/2021	0	0.04	1	25865	8218.33	0.32	8218.33	2021	Corporate
1	10/1/2021	1	0.12	3	25476	32742.86	1.28	10914.29	2021	Corporate
1	10/1/2021	2	0.61	15	24524	189033	7.65	12602.2	2021	Corporate
1	10/1/2021	3	0.91	22	23017	275105.6	11.39	12504.8	2021	Corporate
1	10/1/2021	4	0.96	23	18526	286768.7	12.02	12468.2	2021	Corporate
1	11/1/2021	0	0	0	20547	0	0	0	2021	Corporate
1	11/1/2021	1	0	0	19890	0	0	0	2021	Corporate
1	11/1/2021	2	0	0	17872	0	0	0	2021	Corporate
1	11/1/2021	3	0	0	14218	0	0	0	2021	Corporate
1	12/1/2021	0	0	0	7557	0	0	0	2021	Corporate
1	12/1/2021	1	0	0	7027	0	0	0	2021	Corporate
1	12/1/2021	2	0	0	5362	0	0	0	2021	Corporate

PROD_MONTH	(blank)
TIS	0

Row Labels	Sum of VEHICLES
T/FD - P702N F150 [21-22]	46800
C/TW - U625N EXPLORER [20-22]	16527
T/G1 - U725N BRONCO [21-22]	14914
C/TV - U611N AVIATOR [20-23]	4127
C/D9 - U540N MKX [16-22]	3245
C/DQ - CD539N EDGE [15-22]	2607
C/TU - U611A AVIATOR [20-22]	1933
C/ET - U540A NAUTILUS [21-22]	1257
Grand Total	**91410**


PROD_MONTH
Sum of R1000
21MY Nano Dropped Valve (spike window)
R1000
TIS (months)
TIS
Vehicle Line [VL]
C/D9 - U540N MKX [16-22]
C/DQ - CD539N EDGE [15-22]
C/ET - U540A NAUTILUS [21-22]
C/TU - U611A AVIATOR [20-22]
C/TV - U611N AVIATOR [20-23]
C/TW - U625N EXPLORER [20-22]
T/FD - P702N F150 [21-22]
T/G1 - U725N BRONCO [21-22]

PROD_MONTH (blank)

Sum of R1000	Column Labels								
Row Labels	C/D9 - U540N MKX [16-22]	C/DQ - CD539N EDGE [15-22]	C/ET - U540A NAUTILUS [21-22]	C/TU - U611A AVIATOR [20-22]	C/TV - U611N AVIATOR [20-23]	C/TW - U625N EXPLORER [20-22]	T/FD - P702N F150 [21-22]	T/G1 - U725N BRONCO [21-22]	Grand Total
0	0	0	0	0	0.24	0.18	0.09	0.13	0.64
1	0.31	1.95	0	0	5.1	2.74	1.1	0.82	12.02
2	0.63	5.15	0	0	8.75	4.73	2.56	2.16	23.98
3	3.24	6.39	0	0	10.95	5.99	3.46	3.72	33.75
4	4.26	7.76	0	0	11.2	7.34	4.17	4.84	39.57
5	5.09	8.87	0	0	12.51	8.22	4.63	5.4	44.72
6	5.09	8.87	0	0	13.13	9.01	4.81	5.86	46.77
7	5.09	10.15	0	0	13.13	9.55	5	5.86	48.78
8	5.09	10.15	0	0	14.18	9.55	5.22	5.86	50.05
9	5.09	10.15	0	0			5.22		20.46
Grand Total	**33.89**	**69.44**	**0**	**0**	**89.19**	**57.31**	**36.26**	**34.65**	**320.74**

Report Info Status=Fin Request N Description Run Date / Completior Job Size=3 Execution ˜ Precalc Pr Cut Off Da Load Date= Currency E Generated By=TKNOTT
Data Selec Model Yea Cost Categ Claim Key[Trace Com Engine Glo Production Date[Typed] Between [01-May-2021],[15-Oct-2021],
Report Sel Report Nar Destination CSV Name Model Yea Order By = TIS Rows S YTD Colum Minimum D Logic = Co Cost Type Use Group Currency = Distance = Descriptions = Yes
Minimum Divisor Selected:100

MATRIX_N	PROD_MC	TIS	R1000	REPAIRS	VEHICLES	COSTS	CPU	CPR	MODEL YE	Vehicle Lin	LOGIC
1		0	0	0	3245	0	0	0	2021	C/D9 - U54	Corporate
1		1	0.31	1	3223	11703.63	3.63	11703.63	2021	C/D9 - U54	Corporate
1		2	0.63	2	3161	21574.49	6.75	10787.25	2021	C/D9 - U54	Corporate
1		3	3.24	10	3067	124342.5	40.26	12434.25	2021	C/D9 - U54	Corporate
1		4	4.26	13	2925	159730.5	52.36	12286.96	2021	C/D9 - U54	Corporate
1		5	5.09	15	2414	180092.1	60.79	12006.14	2021	C/D9 - U54	Corporate
1		6	5.09	15	1734	180092.1	60.79	12006.14	2021	C/D9 - U54	Corporate
1		7	5.09	15	1022	180092.1	60.79	12006.14	2021	C/D9 - U54	Corporate
1		8	5.09	15	310	180092.1	60.79	12006.14	2021	C/D9 - U54	Corporate
1		9	5.09	15	191	180092.1	60.79	12006.14	2021	C/D9 - U54	Corporate
1	5/1/2021	0	0	0	303	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	1	0	0	303	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	2	0	0	301	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	3	0	0	300	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	4	0	0	298	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	5	0	0	292	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	6	0	0	283	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	7	0	0	268	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	8	0	0	238	0	0	0	2021	C/D9 - U54	Corporate
1	5/1/2021	9	0	0	191	0	0	0	2021	C/D9 - U54	Corporate
1	6/1/2021	0	0	0	171	0	0	0	2021	C/D9 - U54	Corporate
1	6/1/2021	1	0	0	171	0	0	0	2021	C/D9 - U54	Corporate
1	6/1/2021	2	5.88	1	170	9870.86	58.06	9870.86	2021	C/D9 - U54	Corporate
1	6/1/2021	3	5.88	1	169	9870.86	58.06	9870.86	2021	C/D9 - U54	Corporate
1	6/1/2021	4	11.87	2	167	22316.25	132.59	11158.13	2021	C/D9 - U54	Corporate
1	6/1/2021	5	18.12	3	160	30995.4	186.83	10331.8	2021	C/D9 - U54	Corporate
1	6/1/2021	6	18.12	3	147	30995.4	186.83	10331.8	2021	C/D9 - U54	Corporate
1	6/1/2021	7	18.12	3	118	30995.4	186.83	10331.8	2021	C/D9 - U54	Corporate
1	7/1/2021	0	0	0	906	0	0	0	2021	C/D9 - U54	Corporate
1	7/1/2021	1	1.11	1	902	11703.63	12.98	11703.63	2021	C/D9 - U54	Corporate
1	7/1/2021	2	1.11	1	897	11703.63	12.98	11703.63	2021	C/D9 - U54	Corporate
1	7/1/2021	3	1.11	1	891	11703.63	12.98	11703.63	2021	C/D9 - U54	Corporate
1	7/1/2021	4	3.38	3	879	34646.22	39.08	11548.74	2021	C/D9 - U54	Corporate
1	7/1/2021	5	4.55	4	855	46328.74	52.74	11582.19	2021	C/D9 - U54	Corporate
1	7/1/2021	6	4.55	4	793	46328.74	52.74	11582.19	2021	C/D9 - U54	Corporate

1	7/1/2021	7	4.55	4	636	46328.74	52.74	11582.19	2021	C/D9 - U54	Corporate
1	8/1/2021	0	0	0	672	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	1	0	0	671	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	2	0	0	664	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	3	0	0	658	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	4	0	0	644	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	5	0	0	611	0	0	0	2021	C/D9 - U54	Corporate
1	8/1/2021	6	0	0	511	0	0	0	2021	C/D9 - U54	Corporate
1	9/1/2021	0	0	0	690	0	0	0	2021	C/D9 - U54	Corporate
1	9/1/2021	1	0	0	684	0	0	0	2021	C/D9 - U54	Corporate
1	9/1/2021	2	0	0	660	0	0	0	2021	C/D9 - U54	Corporate
1	9/1/2021	3	12.52	8	639	102768	160.83	12846	2021	C/D9 - U54	Corporate
1	9/1/2021	4	12.52	8	599	102768	160.83	12846	2021	C/D9 - U54	Corporate
1	9/1/2021	5	12.52	8	496	102768	160.83	12846	2021	C/D9 - U54	Corporate
1	10/1/2021	0	0	0	503	0	0	0	2021	C/D9 - U54	Corporate
1	10/1/2021	1	0	0	492	0	0	0	2021	C/D9 - U54	Corporate
1	10/1/2021	2	0	0	469	0	0	0	2021	C/D9 - U54	Corporate
1	10/1/2021	3	0	0	410	0	0	0	2021	C/D9 - U54	Corporate
1	10/1/2021	4	0	0	338	0	0	0	2021	C/D9 - U54	Corporate
2		0	0	0	2607	0	0	0	2021	C/DQ - CD	Corporate
2		1	1.95	5	2568	53742.13	20.93	10748.43	2021	C/DQ - CD	Corporate
2		2	5.15	13	2501	121450.3	48	9342.33	2021	C/DQ - CD	Corporate
2		3	6.39	16	2408	150362.3	60.01	9397.64	2021	C/DQ - CD	Corporate
2		4	7.76	19	2190	181763.1	74.34	9566.48	2021	C/DQ - CD	Corporate
2		5	8.87	21	1802	200218.5	84.59	9534.21	2021	C/DQ - CD	Corporate
2		6	8.87	21	1315	200218.5	84.59	9534.21	2021	C/DQ - CD	Corporate
2		7	10.15	22	781	212014.6	99.69	9637.03	2021	C/DQ - CD	Corporate
2		8	10.15	22	545	212014.6	99.69	9637.03	2021	C/DQ - CD	Corporate
2		9	10.15	22	341	212014.6	99.69	9637.03	2021	C/DQ - CD	Corporate
2	5/1/2021	0	0	0	675	0	0	0	2021	C/DQ - CD	Corporate
2	5/1/2021	1	2.97	2	673	26069.87	38.74	13034.94	2021	C/DQ - CD	Corporate
2	5/1/2021	2	2.97	2	671	26069.87	38.74	13034.94	2021	C/DQ - CD	Corporate
2	5/1/2021	3	5.96	4	669	44097.55	65.68	11024.39	2021	C/DQ - CD	Corporate
2	5/1/2021	4	7.48	5	660	54424.55	81.33	10884.91	2021	C/DQ - CD	Corporate
2	5/1/2021	5	9.05	6	637	61462.1	92.38	10243.68	2021	C/DQ - CD	Corporate
2	5/1/2021	6	9.05	6	616	61462.1	92.38	10243.68	2021	C/DQ - CD	Corporate
2	5/1/2021	7	9.05	6	563	61462.1	92.38	10243.68	2021	C/DQ - CD	Corporate
2	5/1/2021	8	9.05	6	484	61462.1	92.38	10243.68	2021	C/DQ - CD	Corporate
2	5/1/2021	9	9.05	6	341	61462.1	92.38	10243.68	2021	C/DQ - CD	Corporate
2	6/1/2021	0	0	0	150	0	0	0	2021	C/DQ - CD	Corporate

2	6/1/2021	1	6.67	1	150	11477.68	76.52	11477.68	2021	C/DQ - CD Corporate
2	6/1/2021	2	26.94	4	148	32588.64	219.16	8147.16	2021	C/DQ - CD Corporate
2	6/1/2021	3	33.69	5	148	43472.97	292.7	8694.59	2021	C/DQ - CD Corporate
2	6/1/2021	4	33.69	5	147	43472.97	292.7	8694.59	2021	C/DQ - CD Corporate
2	6/1/2021	5	40.84	6	140	54890.76	374.26	9148.46	2021	C/DQ - CD Corporate
2	6/1/2021	6	40.84	6	132	54890.76	374.26	9148.46	2021	C/DQ - CD Corporate
2	6/1/2021	7	49.61	7	114	66686.88	477.73	9526.7	2021	C/DQ - CD Corporate
2	7/1/2021	0	0	0	140	0	0	0	2021	C/DQ - CD Corporate
2	7/1/2021	1	0	0	137	0	0	0	2021	C/DQ - CD Corporate
2	7/1/2021	2	7.35	1	136	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	7/1/2021	3	7.35	1	133	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	7/1/2021	4	7.35	1	127	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	7/1/2021	5	7.35	1	122	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	7/1/2021	6	7.35	1	117	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	7/1/2021	7	7.35	1	104	7469.36	54.92	7469.36	2021	C/DQ - CD Corporate
2	8/1/2021	0	0	0	671	0	0	0	2021	C/DQ - CD Corporate
2	8/1/2021	1	3	2	666	16194.58	24.32	8097.29	2021	C/DQ - CD Corporate
2	8/1/2021	2	6.04	4	659	34649.13	52.32	8662.28	2021	C/DQ - CD Corporate
2	8/1/2021	3	6.04	4	640	34649.13	52.32	8662.28	2021	C/DQ - CD Corporate
2	8/1/2021	4	7.73	5	592	47292.31	73.68	9458.46	2021	C/DQ - CD Corporate
2	8/1/2021	5	7.73	5	543	47292.31	73.68	9458.46	2021	C/DQ - CD Corporate
2	8/1/2021	6	7.73	5	450	47292.31	73.68	9458.46	2021	C/DQ - CD Corporate
2	9/1/2021	0	0	0	573	0	0	0	2021	C/DQ - CD Corporate
2	9/1/2021	1	0	0	563	0	0	0	2021	C/DQ - CD Corporate
2	9/1/2021	2	3.65	2	548	20673.27	37.72	10336.64	2021	C/DQ - CD Corporate
2	9/1/2021	3	3.65	2	521	20673.27	37.72	10336.64	2021	C/DQ - CD Corporate
2	9/1/2021	4	5.85	3	455	29103.93	56.25	9701.31	2021	C/DQ - CD Corporate
2	9/1/2021	5	5.85	3	360	29103.93	56.25	9701.31	2021	C/DQ - CD Corporate
2	10/1/2021	0	0	0	398	0	0	0	2021	C/DQ - CD Corporate
2	10/1/2021	1	0	0	379	0	0	0	2021	C/DQ - CD Corporate
2	10/1/2021	2	0	0	339	0	0	0	2021	C/DQ - CD Corporate
2	10/1/2021	3	0	0	297	0	0	0	2021	C/DQ - CD Corporate
2	10/1/2021	4	0	0	209	0	0	0	2021	C/DQ - CD Corporate
3		0	0	0	1257	0	0	0	2021	C/ET - U54 Corporate
3		1	0	0	1256	0	0	0	2021	C/ET - U54 Corporate
3		2	0	0	1255	0	0	0	2021	C/ET - U54 Corporate
3		3	0	0	1252	0	0	0	2021	C/ET - U54 Corporate
3		4	0	0	1251	0	0	0	2021	C/ET - U54 Corporate
3		5	0	0	1249	0	0	0	2021	C/ET - U54 Corporate
3		6	0	0	1244	0	0	0	2021	C/ET - U54 Corporate

3		7	0	0	1226	0	0	0	2021	C/ET - U54	Corporate
3		8	0	0	1185	0	0	0	2021	C/ET - U54	Corporate
3		9	0	0	485	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	0	0	0	491	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	1	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	2	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	3	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	4	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	5	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	6	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	7	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	8	0	0	490	0	0	0	2021	C/ET - U54	Corporate
3	5/1/2021	9	0	0	485	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	0	0	0	766	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	1	0	0	766	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	2	0	0	765	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	3	0	0	762	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	4	0	0	761	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	5	0	0	759	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	6	0	0	754	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	7	0	0	736	0	0	0	2021	C/ET - U54	Corporate
3	6/1/2021	8	0	0	695	0	0	0	2021	C/ET - U54	Corporate
4		0	0	0	1933	0	0	0	2021	C/TU - U61	Corporate
4		1	0	0	1924	0	0	0	2021	C/TU - U61	Corporate
4		2	0	0	1921	0	0	0	2021	C/TU - U61	Corporate
4		3	0	0	1899	0	0	0	2021	C/TU - U61	Corporate
4		4	0	0	1882	0	0	0	2021	C/TU - U61	Corporate
4		5	0	0	1838	0	0	0	2021	C/TU - U61	Corporate
4		6	0	0	1780	0	0	0	2021	C/TU - U61	Corporate
4		7	0	0	1690	0	0	0	2021	C/TU - U61	Corporate
4		8	0	0	1553	0	0	0	2021	C/TU - U61	Corporate
4		9	0	0	883	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	0	0	0	1249	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	1	0	0	1247	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	2	0	0	1247	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	3	0	0	1236	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	4	0	0	1225	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	5	0	0	1208	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	6	0	0	1182	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	7	0	0	1152	0	0	0	2021	C/TU - U61	Corporate

4	5/1/2021	8	0	0	1090	0	0	0	2021	C/TU - U61	Corporate
4	5/1/2021	9	0	0	883	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	0	0	0	684	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	1	0	0	677	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	2	0	0	674	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	3	0	0	663	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	4	0	0	657	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	5	0	0	630	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	6	0	0	598	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	7	0	0	538	0	0	0	2021	C/TU - U61	Corporate
4	6/1/2021	8	0	0	463	0	0	0	2021	C/TU - U61	Corporate
5		0	0.24	1	4127	10357.63	2.51	10357.63	2021	C/TV - U61	Corporate
5		1	5.1	21	4120	190852.5	46.32	9088.21	2021	C/TV - U61	Corporate
5		2	8.75	36	4105	333342.4	81.03	9259.51	2021	C/TV - U61	Corporate
5		3	10.95	45	4088	437318.5	106.46	9718.19	2021	C/TV - U61	Corporate
5		4	11.2	46	4014	448353.5	109.21	9746.81	2021	C/TV - U61	Corporate
5		5	12.51	51	3825	500729.7	122.91	9818.23	2021	C/TV - U61	Corporate
5		6	13.13	53	3225	521986.8	129.5	9848.81	2021	C/TV - U61	Corporate
5		7	13.13	53	1615	521986.8	129.5	9848.81	2021	C/TV - U61	Corporate
5		8	14.18	54	950	529753	137.67	9810.24	2021	C/TV - U61	Corporate
5	6/1/2021	0	0.56	1	1783	10357.63	5.81	10357.63	2021	C/TV - U61	Corporate
5	6/1/2021	1	4.49	8	1780	67970.91	38.18	8496.36	2021	C/TV - U61	Corporate
5	6/1/2021	2	7.31	13	1773	107031.8	60.21	8233.22	2021	C/TV - U61	Corporate
5	6/1/2021	3	8.44	15	1770	127368.7	71.7	8491.25	2021	C/TV - U61	Corporate
5	6/1/2021	4	8.44	15	1752	127368.7	71.7	8491.25	2021	C/TV - U61	Corporate
5	6/1/2021	5	9.03	16	1715	135194.1	76.26	8449.63	2021	C/TV - U61	Corporate
5	6/1/2021	6	9.64	17	1636	146865.2	83.39	8639.13	2021	C/TV - U61	Corporate
5	6/1/2021	7	9.64	17	1477	146865.2	83.39	8639.13	2021	C/TV - U61	Corporate
5	6/1/2021	8	10.69	18	950	154631.4	91.57	8590.63	2021	C/TV - U61	Corporate
5	7/1/2021	0	0	0	200	0	0	0	2021	C/TV - U61	Corporate
5	7/1/2021	1	0	0	200	0	0	0	2021	C/TV - U61	Corporate
5	7/1/2021	2	0	0	200	0	0	0	2021	C/TV - U61	Corporate
5	7/1/2021	3	5.03	1	199	13773.83	69.22	13773.83	2021	C/TV - U61	Corporate
5	7/1/2021	4	5.03	1	198	13773.83	69.22	13773.83	2021	C/TV - U61	Corporate
5	7/1/2021	5	10.1	2	197	25637.96	129.44	12818.98	2021	C/TV - U61	Corporate
5	7/1/2021	6	10.1	2	178	25637.96	129.44	12818.98	2021	C/TV - U61	Corporate
5	7/1/2021	7	10.1	2	138	25637.96	129.44	12818.98	2021	C/TV - U61	Corporate
5	8/1/2021	0	0	0	2096	0	0	0	2021	C/TV - U61	Corporate
5	8/1/2021	1	6.21	13	2092	122881.5	58.74	9452.43	2021	C/TV - U61	Corporate
5	8/1/2021	2	11.01	23	2085	226310.5	108.35	9839.59	2021	C/TV - U61	Corporate

5	8/1/2021	3	13.42	28	2072	285885	137.1	10210.18	2021	C/TV - U61	Corporate
5	8/1/2021	4	13.92	29	2018	296919.9	142.57	10238.62	2021	C/TV - U61	Corporate
5	8/1/2021	5	15.52	32	1868	329606.6	160.06	10300.21	2021	C/TV - U61	Corporate
5	8/1/2021	6	16.23	33	1411	339192.7	166.86	10278.57	2021	C/TV - U61	Corporate
6		0	0.18	3	16527	34953.04	2.11	11651.01	2021	C/TW - U6	Corporate
6		1	2.74	45	16411	465020	28.32	10333.78	2021	C/TW - U6	Corporate
6		2	4.73	77	16126	785868.5	48.22	10206.08	2021	C/TW - U6	Corporate
6		3	5.99	97	15783	997430	61.62	10282.78	2021	C/TW - U6	Corporate
6		4	7.34	116	14047	1197199	75.84	10320.68	2021	C/TW - U6	Corporate
6		5	8.22	126	11417	1301603	84.99	10330.18	2021	C/TW - U6	Corporate
6		6	9.01	132	7558	1363750	93.21	10331.44	2021	C/TW - U6	Corporate
6		7	9.55	134	3759	1380463	97.66	10301.97	2021	C/TW - U6	Corporate
6		8	9.55	134	2476	1380463	97.66	10301.97	2021	C/TW - U6	Corporate
6	6/1/2021	0	0.5	2	4003	23697.95	5.92	11848.98	2021	C/TW - U6	Corporate
6	6/1/2021	1	4.76	19	3989	185418	46.46	9758.84	2021	C/TW - U6	Corporate
6	6/1/2021	2	6.27	25	3976	241352.5	60.53	9654.1	2021	C/TW - U6	Corporate
6	6/1/2021	3	7.79	31	3951	301398.4	75.73	9722.53	2021	C/TW - U6	Corporate
6	6/1/2021	4	10.36	41	3889	406598.6	102.78	9917.04	2021	C/TW - U6	Corporate
6	6/1/2021	5	10.62	42	3795	416902.4	105.49	9926.25	2021	C/TW - U6	Corporate
6	6/1/2021	6	11.72	46	3641	457228	116.57	9939.74	2021	C/TW - U6	Corporate
6	6/1/2021	7	12.34	48	3232	473941.8	121.74	9873.79	2021	C/TW - U6	Corporate
6	6/1/2021	8	12.34	48	2476	473941.8	121.74	9873.79	2021	C/TW - U6	Corporate
6	7/1/2021	0	0	0	648	0	0	0	2021	C/TW - U6	Corporate
6	7/1/2021	1	4.64	3	647	23439.68	36.23	7813.23	2021	C/TW - U6	Corporate
6	7/1/2021	2	9.3	6	644	50622.88	78.44	8437.15	2021	C/TW - U6	Corporate
6	7/1/2021	3	9.3	6	642	50622.88	78.44	8437.15	2021	C/TW - U6	Corporate
6	7/1/2021	4	10.88	7	629	59593.11	92.7	8513.3	2021	C/TW - U6	Corporate
6	7/1/2021	5	10.88	7	612	59593.11	92.7	8513.3	2021	C/TW - U6	Corporate
6	7/1/2021	6	10.88	7	587	59593.11	92.7	8513.3	2021	C/TW - U6	Corporate
6	7/1/2021	7	10.88	7	527	59593.11	92.7	8513.3	2021	C/TW - U6	Corporate
6	8/1/2021	0	0.2	1	4884	11255.09	2.3	11255.09	2021	C/TW - U6	Corporate
6	8/1/2021	1	3.49	17	4863	191008.2	39.27	11235.77	2021	C/TW - U6	Corporate
6	8/1/2021	2	8.3	40	4791	428739	88.89	10718.47	2021	C/TW - U6	Corporate
6	8/1/2021	3	11.25	54	4743	580254.5	120.83	10745.45	2021	C/TW - U6	Corporate
6	8/1/2021	4	12.59	60	4477	644639.1	135.21	10743.99	2021	C/TW - U6	Corporate
6	8/1/2021	5	14.82	69	4027	738739.3	158.58	10706.37	2021	C/TW - U6	Corporate
6	8/1/2021	6	15.42	71	3330	760560.5	165.13	10712.12	2021	C/TW - U6	Corporate
6	9/1/2021	0	0	0	4778	0	0	0	2021	C/TW - U6	Corporate
6	9/1/2021	1	1.06	5	4735	52732.55	11.14	10546.51	2021	C/TW - U6	Corporate
6	9/1/2021	2	1.06	5	4621	52732.55	11.14	10546.51	2021	C/TW - U6	Corporate

6	9/1/2021	3	1.06	5	4446	52732.55	11.14	10546.51	2021	C/TW - U6	Corporate
6	9/1/2021	4	1.6	7	3646	73946.32	16.96	10563.76	2021	C/TW - U6	Corporate
6	9/1/2021	5	1.6	7	2983	73946.32	16.96	10563.76	2021	C/TW - U6	Corporate
6	10/1/2021	0	0	0	2214	0	0	0	2021	C/TW - U6	Corporate
6	10/1/2021	1	0.46	1	2177	12421.61	5.71	12421.61	2021	C/TW - U6	Corporate
6	10/1/2021	2	0.46	1	2094	12421.61	5.71	12421.61	2021	C/TW - U6	Corporate
6	10/1/2021	3	0.46	1	2001	12421.61	5.71	12421.61	2021	C/TW - U6	Corporate
6	10/1/2021	4	0.46	1	1406	12421.61	5.71	12421.61	2021	C/TW - U6	Corporate
7		0	0.09	4	46800	39105.56	0.84	9776.39	2021	T/FD - P70	Corporate
7		1	1.1	51	46487	562447.9	12.09	11028.39	2021	T/FD - P70	Corporate
7		2	2.56	118	45728	1334735	28.98	11311.31	2021	T/FD - P70	Corporate
7		3	3.46	158	44686	1794441	39.27	11357.22	2021	T/FD - P70	Corporate
7		4	4.17	188	42362	2139312	47.41	11379.32	2021	T/FD - P70	Corporate
7		5	4.63	204	34511	2344473	53.36	11492.52	2021	T/FD - P70	Corporate
7		6	4.81	209	27358	2408651	55.7	11524.65	2021	T/FD - P70	Corporate
7		7	5	212	16257	2442049	57.76	11519.1	2021	T/FD - P70	Corporate
7		8	5.22	214	9027	2461226	59.88	11501.06	2021	T/FD - P70	Corporate
7		9	5.22	214	4199	2461226	59.88	11501.06	2021	T/FD - P70	Corporate
7	5/1/2021	0	0.18	1	5506	8406.36	1.53	8406.36	2021	T/FD - P70	Corporate
7	5/1/2021	1	1.27	7	5497	75058.31	13.65	10722.62	2021	T/FD - P70	Corporate
7	5/1/2021	2	2.18	12	5489	123791	22.53	10315.91	2021	T/FD - P70	Corporate
7	5/1/2021	3	2.55	14	5475	145622.5	26.52	10401.61	2021	T/FD - P70	Corporate
7	5/1/2021	4	2.92	16	5455	169567	30.91	10597.93	2021	T/FD - P70	Corporate
7	5/1/2021	5	3.47	19	5411	201120.2	36.74	10585.27	2021	T/FD - P70	Corporate
7	5/1/2021	6	3.47	19	5289	201120.2	36.74	10585.27	2021	T/FD - P70	Corporate
7	5/1/2021	7	3.47	19	5129	201120.2	36.74	10585.27	2021	T/FD - P70	Corporate
7	5/1/2021	8	3.88	21	4872	220297.2	40.67	10490.34	2021	T/FD - P70	Corporate
7	5/1/2021	9	3.88	21	4199	220297.2	40.67	10490.34	2021	T/FD - P70	Corporate
7	6/1/2021	0	0.15	1	6527	8636.27	1.32	8636.27	2021	T/FD - P70	Corporate
7	6/1/2021	1	1.38	9	6519	103445.8	15.87	11493.97	2021	T/FD - P70	Corporate
7	6/1/2021	2	3.53	23	6500	256443.6	39.4	11149.72	2021	T/FD - P70	Corporate
7	6/1/2021	3	4.46	29	6480	320886	49.35	11065.03	2021	T/FD - P70	Corporate
7	6/1/2021	4	5.24	34	6412	372869.3	57.46	10966.74	2021	T/FD - P70	Corporate
7	6/1/2021	5	5.56	36	6340	396280.4	61.15	11007.79	2021	T/FD - P70	Corporate
7	6/1/2021	6	5.56	36	6109	396280.4	61.15	11007.79	2021	T/FD - P70	Corporate
7	6/1/2021	7	5.73	37	5645	409054.7	63.41	11055.53	2021	T/FD - P70	Corporate
7	6/1/2021	8	5.73	37	4155	409054.7	63.41	11055.53	2021	T/FD - P70	Corporate
7	7/1/2021	0	0.13	1	7826	13844.6	1.77	13844.6	2021	T/FD - P70	Corporate
7	7/1/2021	1	1.54	12	7801	121705	15.6	10142.08	2021	T/FD - P70	Corporate
7	7/1/2021	2	3.22	25	7749	258144.2	33.2	10325.77	2021	T/FD - P70	Corporate

7	7/1/2021	3	4.91	38	7690	401954.3	51.9	10577.74	2021	T/FD - P70	Corporate
7	7/1/2021	4	6.36	49	7578	519838.9	67.46	10608.96	2021	T/FD - P70	Corporate
7	7/1/2021	5	6.9	53	7371	582109.8	75.91	10983.2	2021	T/FD - P70	Corporate
7	7/1/2021	6	7.48	57	6844	632333	83.25	11093.56	2021	T/FD - P70	Corporate
7	7/1/2021	7	7.85	59	5483	652956.4	87.01	11067.06	2021	T/FD - P70	Corporate
7	8/1/2021	0	0	0	14017	0	0	0	2021	T/FD - P70	Corporate
7	8/1/2021	1	1.37	19	13903	212228.7	15.26	11169.93	2021	T/FD - P70	Corporate
7	8/1/2021	2	3.21	44	13574	517475.5	37.75	11760.81	2021	T/FD - P70	Corporate
7	8/1/2021	3	4.43	60	13110	710677.6	52.49	11844.63	2021	T/FD - P70	Corporate
7	8/1/2021	4	5.08	68	12266	809936.8	60.58	11910.84	2021	T/FD - P70	Corporate
7	8/1/2021	5	5.61	74	11392	885610.5	67.22	11967.71	2021	T/FD - P70	Corporate
7	8/1/2021	6	5.72	75	9116	899565.1	68.76	11994.2	2021	T/FD - P70	Corporate
7	9/1/2021	0	0	0	5980	0	0	0	2021	T/FD - P70	Corporate
7	9/1/2021	1	0.51	3	5924	41791.8	7.05	13930.6	2021	T/FD - P70	Corporate
7	9/1/2021	2	1.72	10	5783	129596.1	22.24	12959.61	2021	T/FD - P70	Corporate
7	9/1/2021	3	2.25	13	5602	166016	28.74	12770.46	2021	T/FD - P70	Corporate
7	9/1/2021	4	3.03	17	5137	217815.6	38.82	12812.68	2021	T/FD - P70	Corporate
7	9/1/2021	5	3.28	18	3997	230068	41.89	12781.56	2021	T/FD - P70	Corporate
7	10/1/2021	0	0.14	1	6944	8218.33	1.18	8218.33	2021	T/FD - P70	Corporate
7	10/1/2021	1	0.14	1	6843	8218.33	1.18	8218.33	2021	T/FD - P70	Corporate
7	10/1/2021	2	0.6	4	6633	49284.47	7.37	12321.12	2021	T/FD - P70	Corporate
7	10/1/2021	3	0.6	4	6329	49284.47	7.37	12321.12	2021	T/FD - P70	Corporate
7	10/1/2021	4	0.6	4	5514	49284.47	7.37	12321.12	2021	T/FD - P70	Corporate
8		0	0.13	2	14914	20618.66	1.38	10309.33	2021	T/G1 - U72	Corporate
8		1	0.82	12	14674	125054.7	8.5	10421.22	2021	T/G1 - U72	Corporate
8		2	2.16	31	14125	356141.1	24.86	11488.42	2021	T/G1 - U72	Corporate
8		3	3.72	52	13495	618791.9	44.32	11899.84	2021	T/G1 - U72	Corporate
8		4	4.84	66	12509	768628.9	56.3	11645.89	2021	T/G1 - U72	Corporate
8		5	5.4	71	8889	825801.4	62.73	11631.01	2021	T/G1 - U72	Corporate
8		6	5.86	73	4319	846974.7	67.64	11602.39	2021	T/G1 - U72	Corporate
8		7	5.86	73	3173	846974.7	67.64	11602.39	2021	T/G1 - U72	Corporate
8		8	5.86	73	1849	846974.7	67.64	11602.39	2021	T/G1 - U72	Corporate
8	5/1/2021	0	0	0	522	0	0	0	2021	T/G1 - U72	Corporate
8	5/1/2021	1	0	0	516	0	0	0	2021	T/G1 - U72	Corporate
8	5/1/2021	2	0	0	496	0	0	0	2021	T/G1 - U72	Corporate
8	5/1/2021	3	0	0	483	0	0	0	2021	T/G1 - U72	Corporate
8	5/1/2021	4	2.16	1	463	11530.45	24.9	11530.45	2021	T/G1 - U72	Corporate
8	5/1/2021	5	2.16	1	403	11530.45	24.9	11530.45	2021	T/G1 - U72	Corporate
8	5/1/2021	6	2.16	1	302	11530.45	24.9	11530.45	2021	T/G1 - U72	Corporate
8	5/1/2021	7	2.16	1	276	11530.45	24.9	11530.45	2021	T/G1 - U72	Corporate

8	5/1/2021	8	2.16	1	193	11530.45	24.9	11530.45	2021	T/G1 - U72	Corporate
8	6/1/2021	0	0.75	2	2676	20618.66	7.71	10309.33	2021	T/G1 - U72	Corporate
8	6/1/2021	1	2.63	7	2655	69390.73	26.07	9912.96	2021	T/G1 - U72	Corporate
8	6/1/2021	2	4.56	12	2596	121562.8	46.17	10130.23	2021	T/G1 - U72	Corporate
8	6/1/2021	3	5.73	15	2558	162517.1	62.18	10834.47	2021	T/G1 - U72	Corporate
8	6/1/2021	4	6.53	17	2505	179809.5	69.09	10577.03	2021	T/G1 - U72	Corporate
8	6/1/2021	5	7.79	20	2380	216145.5	84.35	10807.28	2021	T/G1 - U72	Corporate
8	6/1/2021	6	8.79	22	1991	237318.8	94.99	10787.22	2021	T/G1 - U72	Corporate
8	6/1/2021	7	8.79	22	1908	237318.8	94.99	10787.22	2021	T/G1 - U72	Corporate
8	6/1/2021	8	8.79	22	1656	237318.8	94.99	10787.22	2021	T/G1 - U72	Corporate
8	7/1/2021	0	0	0	3706	0	0	0	2021	T/G1 - U72	Corporate
8	7/1/2021	1	0	0	3620	0	0	0	2021	T/G1 - U72	Corporate
8	7/1/2021	2	1.17	4	3415	50151.38	14.69	12537.85	2021	T/G1 - U72	Corporate
8	7/1/2021	3	2.71	9	3239	106545.1	32.1	11838.34	2021	T/G1 - U72	Corporate
8	7/1/2021	4	5.05	16	2996	182576.1	57.47	11411.01	2021	T/G1 - U72	Corporate
8	7/1/2021	5	5.05	16	2360	182576.1	57.47	11411.01	2021	T/G1 - U72	Corporate
8	7/1/2021	6	5.05	16	1093	182576.1	57.47	11411.01	2021	T/G1 - U72	Corporate
8	7/1/2021	7	5.05	16	989	182576.1	57.47	11411.01	2021	T/G1 - U72	Corporate
8	8/1/2021	0	0	0	3261	0	0	0	2021	T/G1 - U72	Corporate
8	8/1/2021	1	0.32	1	3166	12302.18	3.89	12302.18	2021	T/G1 - U72	Corporate
8	8/1/2021	2	0.65	2	2965	27092.88	8.87	13546.44	2021	T/G1 - U72	Corporate
8	8/1/2021	3	2.16	6	2662	75658.42	27.12	12609.74	2021	T/G1 - U72	Corporate
8	8/1/2021	4	3.51	9	2209	108978.4	42.2	12108.71	2021	T/G1 - U72	Corporate
8	8/1/2021	5	3.51	9	1321	108978.4	42.2	12108.71	2021	T/G1 - U72	Corporate
8	8/1/2021	6	3.51	9	933	108978.4	42.2	12108.71	2021	T/G1 - U72	Corporate
8	9/1/2021	0	0	0	2912	0	0	0	2021	T/G1 - U72	Corporate
8	9/1/2021	1	1.04	3	2892	31258.84	10.81	10419.61	2021	T/G1 - U72	Corporate
8	9/1/2021	2	2.44	7	2850	74703.98	26.05	10672	2021	T/G1 - U72	Corporate
8	9/1/2021	3	4.24	12	2785	137482	48.59	11456.83	2021	T/G1 - U72	Corporate
8	9/1/2021	4	4.24	12	2638	137482	48.59	11456.83	2021	T/G1 - U72	Corporate
8	9/1/2021	5	5.06	14	2425	158318.5	57.19	11308.46	2021	T/G1 - U72	Corporate
8	10/1/2021	0	0	0	1837	0	0	0	2021	T/G1 - U72	Corporate
8	10/1/2021	1	0.55	1	1825	12102.92	6.63	12102.92	2021	T/G1 - U72	Corporate
8	10/1/2021	2	3.32	6	1803	82630.1	45.75	13771.68	2021	T/G1 - U72	Corporate
8	10/1/2021	3	5.58	10	1768	136589.4	76.27	13658.94	2021	T/G1 - U72	Corporate
8	10/1/2021	4	6.17	11	1698	148252.5	83.14	13477.5	2021	T/G1 - U72	Corporate
9		0	0.11	10	91410	105034.9	1.15	10503.49	2021	TOTAL	Corporate
9		1	1.49	135	90663	1408821	15.53	10435.71	2021	TOTAL	Corporate
9		2	3.09	277	88922	2953111	32.9	10661.05	2021	TOTAL	Corporate
9		3	4.25	378	86678	4122686	46.39	10906.58	2021	TOTAL	Corporate

9		4	5.11	448	81180	4894987	55.9	10926.31	2021	TOTAL	Corporate
9		5	5.72	488	65945	5352918	62.85	10969.09	2021	TOTAL	Corporate
9		6	6.03	503	48533	5521673	66.32	10977.48	2021	TOTAL	Corporate
9		7	6.23	509	29523	5583580	68.42	10969.71	2021	TOTAL	Corporate
9		8	6.4	512	17895	5610524	69.93	10958.05	2021	TOTAL	Corporate
9		9	6.4	512	6125	5610524	69.93	10958.05	2021	TOTAL	Corporate
9	5/1/2021	0	0.11	1	8746	8406.36	0.96	8406.36	2021	TOTAL	Corporate
9	5/1/2021	1	1.03	9	8726	101128.2	11.59	11236.46	2021	TOTAL	Corporate
9	5/1/2021	2	1.61	14	8694	149860.8	17.19	10704.35	2021	TOTAL	Corporate
9	5/1/2021	3	2.07	18	8653	189720.1	21.8	10540	2021	TOTAL	Corporate
9	5/1/2021	4	2.53	22	8591	235521.9	27.13	10705.54	2021	TOTAL	Corporate
9	5/1/2021	5	3.01	26	8441	274112.7	31.7	10542.8	2021	TOTAL	Corporate
9	5/1/2021	6	3.01	26	8162	274112.7	31.7	10542.8	2021	TOTAL	Corporate
9	5/1/2021	7	3.01	26	7878	274112.7	31.7	10542.8	2021	TOTAL	Corporate
9	5/1/2021	8	3.28	28	7367	293289.8	34.31	10474.63	2021	TOTAL	Corporate
9	5/1/2021	9	3.28	28	6125	293289.8	34.31	10474.63	2021	TOTAL	Corporate
9	6/1/2021	0	0.36	6	16760	63310.5	3.78	10551.75	2021	TOTAL	Corporate
9	6/1/2021	1	2.63	44	16707	437703.1	26.19	9947.8	2021	TOTAL	Corporate
9	6/1/2021	2	4.68	78	16602	768850.2	46.13	9857.05	2021	TOTAL	Corporate
9	6/1/2021	3	5.77	96	16501	965514.1	58.05	10057.44	2021	TOTAL	Corporate
9	6/1/2021	4	6.88	114	16290	1152435	69.53	10109.08	2021	TOTAL	Corporate
9	6/1/2021	5	7.44	123	15919	1250409	75.68	10165.92	2021	TOTAL	Corporate
9	6/1/2021	6	7.91	130	15008	1323579	80.56	10181.37	2021	TOTAL	Corporate
9	6/1/2021	7	8.2	134	13768	1364863	83.55	10185.54	2021	TOTAL	Corporate
9	6/1/2021	8	8.29	135	10528	1372629	84.29	10167.62	2021	TOTAL	Corporate
9	7/1/2021	0	0.07	1	13426	13844.6	1.03	13844.6	2021	TOTAL	Corporate
9	7/1/2021	1	1.2	16	13307	156848.3	11.78	9803.02	2021	TOTAL	Corporate
9	7/1/2021	2	2.81	37	13041	378091.4	28.74	10218.69	2021	TOTAL	Corporate
9	7/1/2021	3	4.3	56	12794	592069.1	45.47	10572.66	2021	TOTAL	Corporate
9	7/1/2021	4	5.99	77	12407	817897.6	63.67	10622.05	2021	TOTAL	Corporate
9	7/1/2021	5	6.51	83	11517	903715.1	71.12	10888.13	2021	TOTAL	Corporate
9	7/1/2021	6	6.93	87	9612	953938.3	76.35	10964.81	2021	TOTAL	Corporate
9	7/1/2021	7	7.18	89	7877	974561.7	78.96	10950.13	2021	TOTAL	Corporate
9	8/1/2021	0	0.04	1	25601	11255.09	0.44	11255.09	2021	TOTAL	Corporate
9	8/1/2021	1	2.05	52	25361	554615.2	21.86	10665.68	2021	TOTAL	Corporate
9	8/1/2021	2	4.52	113	24738	1234267	49.34	10922.72	2021	TOTAL	Corporate
9	8/1/2021	3	6.15	152	23885	1687125	68.3	11099.5	2021	TOTAL	Corporate
9	8/1/2021	4	7	171	22206	1907767	78.23	11156.53	2021	TOTAL	Corporate
9	8/1/2021	5	7.92	189	19762	2110227	88.48	11165.22	2021	TOTAL	Corporate
9	8/1/2021	6	8.17	193	15751	2155589	91.36	11168.85	2021	TOTAL	Corporate

9	9/1/2021	0	0	0	14981	0	0	0	2021	TOTAL	Corporate
9	9/1/2021	1	0.74	11	14846	125783.2	8.47	11434.84	2021	TOTAL	Corporate
9	9/1/2021	2	1.64	24	14509	277705.9	18.94	11571.08	2021	TOTAL	Corporate
9	9/1/2021	3	2.85	41	14040	489962.8	34.06	11950.31	2021	TOTAL	Corporate
9	9/1/2021	4	3.41	48	12521	571406.8	40.57	11904.31	2021	TOTAL	Corporate
9	9/1/2021	5	3.7	51	10306	604495.7	43.78	11852.86	2021	TOTAL	Corporate
9	10/1/2021	0	0.08	1	11896	8218.33	0.69	8218.33	2021	TOTAL	Corporate
9	10/1/2021	1	0.25	3	11716	32742.86	2.78	10914.29	2021	TOTAL	Corporate
9	10/1/2021	2	0.96	11	11338	144336.2	12.63	13121.47	2021	TOTAL	Corporate
9	10/1/2021	3	1.33	15	10805	198295.5	17.62	13219.7	2021	TOTAL	Corporate
9	10/1/2021	4	1.44	16	9165	209958.6	18.89	13122.41	2021	TOTAL	Corporate

From: Boscheratto, Connie (C.)
Sent: Monday, January 31, 2022 2:15 PM
To: Knott, Tim (.); Parr, Michael (M.); Dixon, Mark (M.R.)
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up
Attachments: nano valve claims v2.xls

Mark,
We will need your support to pull the full alert data for the VINs in the attached list. There is a large quantity (300ish), so file size will be an issue. Could we pull the data for 1 month before/1 month after the repair date? How quickly could we get the data? Dave is trying to get answers for a meeting this coming Thursday. We will do the analysis, just need the data.

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

From: Knott, Tim (.) <tknott@ford.com>
Sent: Monday, January 31, 2022 1:21 PM
To: Boscheratto, Connie (C.) <cbosche2@ford.com>; Parr, Michael (M.) <mparr10@ford.com>; Dixon, Mark (M.R.) <mdixon@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Connie –
Dropped valve claims list.
Don't worry about the China claims.

-----Original Appointment-----
From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, January 27, 2022 7:49 AM
To: Simon, David (D.); Simon, David (D.); Knott, Tim (.); Pearson, Gavin (G J R.); Adam, Paul (P.J.); Boscheratto, Connie (C.); Parr, Michael (M.); Dixon, Mark (M.R.)
Cc: Kolodziejczyk, Jeffrey (J.A.)
Subject: Nano Dropped Valves - Global CCRG Follow Up
When: Monday, January 31, 2022 1:00 PM-1:25 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Web Ex

_~_

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T32MC04

Concern	Vehicle Lin	Engine Co	CQIS .	VIN	Vehicle Bu	Dealer Stat	Mileage	Engine Ser	Engine Build Date	Engine Pla	Initial Inforr	Model Yea	AWS Load Date	Issue	Trans Cod	Assy Plant	Warr Start Date	Part (Base)	Repair Date	TIS
Broken Val	C/TU	C/YX	LQRAH14(	LVSHNCA.	8/10/2020	*	869	EF06A201	6/5/2020	LEP (Nano)		2020		Engine sei	C/ET	DE	9/14/2020		10/19/2020	
Broken Val	C/TV	C/YX	KZBCL039	5LM5J9XC	9/14/2019	IN	1140	EF06A192	8/28/2019	LEP (Nano)		2020	1/14/2020	Engine noi	C/ET	AD	10/19/2019	6507	11/27/2019	2
Broken Val	C/TV	C/YX	KZKIK006	5LM5J9XC	9/8/2019	WI	766	EF06A192	8/28/2019	LEP (Nano)		2020	4/30/2020	Engine lost	C/ET	AD	12/6/2019	6507	12/16/2019	1
Broken Val	C/TV	C/YX	L2KCQ001	5LM5J7XC	9/13/2019	QC	956	EF06A192	8/27/2019	LEP (Nano)		2020	3/11/2020	Engine sei	C/ET	AD	1/28/2020	6006	2/10/2020	1
Broken Val	C/TV	C/YX	L4JGV013	5LM5J8W(	9/9/2019	CN	4153	EF06A192	8/29/2019	LEP (Nano)		2020	6/1/2020	Engine sei	C/ET	AD	1/16/2020	6006	5/22/2020	5
Broken Val	C/TV	C/YX	L6AAL008	5LM5J8W(	9/11/2019	CN	471	EF06A192	8/30/2019	LEP (Nano)		2020	6/26/2020	Engine sei	C/ET	AD	5/20/2020	6006	6/22/2020	2
Broken Val	C/TV	C/YX	N/A	5LM5J6W(	6/22/2021	NC	1393	EF06A211	6/11/2021	LEP (Nano)		2021	12/7/2021	Knock nois	C/ET	AD	7/24/2021	6006	10/6/2021	3
Broken Val	C/TV	C/YX	M5JBH008	5LM5J6W(	12/9/2020	CA	9400	EF06A203	11/17/2020	LEP (Nano)		2021	5/31/2021	Overheat,	C/ET	AD	12/24/2020	6006	4/27/2021	5
Broken Val	C/TV	C/YX	MQXAC00	5LM5J6XC	6/21/2021	*	237	EF06A211	5/12/2021	LEP (Nano)		2021	11/1/2021	Engine sei	C/ET	AD	10/14/2021	6507	10/17/2021	1
Broken Val	C/TV	C/YX	M7PBI004	5LM5J7W(	3/15/2021	FL	1757	EF06A210	3/3/2021	LEP (Nano)		2021	8/9/2021	Engine sei	C/ET	AD	5/1/2021	6006	7/12/2021	3
Broken Val	C/TV	C/YX	MQLBR00	5LM5J7W(	8/11/2021	TX	880	EF06A212	8/4/2021	LEP (Nano)		2021	11/1/2021	Engine sei	C/ET	AD	9/25/2021	6006	10/11/2021	1
Broken Val	C/TV	C/YX	N/A	5LM5J7W(	8/29/2021	TX	739	EF06A212	8/19/2021	LEP (Nano)		2021	11/29/2021	Engine sei	C/ET	AD	9/13/2021	6006	10/5/2021	1
Broken Val	C/TV	C/YX	MQYDH01	5LM5J7W(	8/6/2021	FL	744	EF06A212	8/3/2021	LEP (Nano)		2021	1/10/2022	Engine sei	C/ET	AD	9/10/2021	6006	10/11/2021	2
Broken Val	C/TV	C/YX	MQYDH01	5LM5J7W(	8/6/2021	FL	744	EF06A212	8/3/2021	LEP (Nano)		2021		Engine sei	C/ET	AD	9/10/2021		10/25/2021	
Broken Val	C/TV	C/YX	N/A	5LM5J7W(	8/16/2021	TX	1145	EF06A212	8/9/2021	LEP (Nano)		2021	11/30/2021	Engine sei	C/ET	AD	9/14/2021	6006	10/1/2021	1
Broken Val	C/TV	C/YX	MQ3CL00(	5LM5J7XC	8/10/2021	TX	1367	EF06A212	8/4/2021	LEP (Nano)		2021	12/28/2021	Engine sei	C/ET	AD	8/26/2021	6007	10/21/2021	2
Broken Val	C/TV	C/YX	MQ4B100	5LM5J7XC	8/13/2021	OK	856	EF06A212	8/7/2021	LEP (Nano)		2021	1/4/2022	Engine noi	C/ET	AD	9/23/2021	6006	10/13/2021	1
Broken Val	C/TV	C/YX	MQ4B100	5LM5J7XC	8/13/2021	OK	891	EF06A212	8/7/2021	LEP (Nano)		2021		Engine noi	C/ET	AD	9/23/2021		10/30/2021	
Broken Val	C/TV	C/YX	MXCD200	5LM5J7XC	3/26/2021	PA	7350	EF06A210	3/18/2021	LEP (Nano)		2021	11/15/2021	Engine sei	C/ET	AD	6/4/2021	6507	10/11/2021	-1
Broken Val	C/TV	C/YX	N/A	5LM5J7XC	8/26/2021	MO	656	EF06A212	8/20/2021	LEP (Nano)		2021	12/8/2021	Engine sei	C/ET	AD	9/22/2021	6006	10/25/2021	2
Broken Val	C/TV	C/YX	N/A	5LM5J7XC	6/28/2021	TX	791	EF06A211	6/14/2021	LEP (Nano)		2021	10/4/2021	Engine sei	C/ET	AD	7/9/2021	6006	8/4/2021	1
Broken Val	C/TV	C/YX	MXWCL00	5LM5J7XC	8/23/2021	ON	1304	EF06A212	8/17/2021	LEP (Nano)		2021		Engine sei	C/ET	AD	9/17/2021		11/23/2021	
Broken Val	C/TV	C/YX	M93FO094	5LM5J7XC	6/25/2021	*	383	EF06A211	6/14/2021	LEP (Nano)		2021	10/25/2021	Engine sei	C/ET	AD	9/1/2021	6507	9/27/2021	1
Broken Val	C/TV	C/YX	N/A	5LM5J7XC	6/26/2021	QC	984	EF06A211	6/11/2021	LEP (Nano)		2021	11/12/2021	Engine sei	C/ET	AD	9/8/2021	6507	10/1/2021	1
Broken Val	C/TV	C/YX	MQKEE01	5LM5J7XC	6/24/2021	*	1614	EF06A211	6/14/2021	LEP (Nano)		2021	11/18/2021	Engine noi	C/ET	AD	8/27/2021	6006	10/5/2021	2
Broken Val	C/TV	C/YX	M9UCL027	5LM5J7XC	8/6/2021	NJ	768	EF06A211	7/1/2021	LEP (Nano)		2021		Engine sei	C/ET	AD	8/27/2021		9/21/2021	
Broken Val	C/TV	C/YX	M9UCL027	5LM5J7XC	8/6/2021	MD	768	EF06A211	7/1/2021	LEP (Nano)		2021	1/4/2022	Engine sei	C/ET	AD	8/27/2021	6006	12/6/2021	4
Broken Val	C/TV	C/YX	MXWBX0(	5LM5J7XC	8/25/2021	OH	1281	EF06A212	8/20/2021	LEP (Nano)		2021	12/29/2021	Engine ma	C/ET	AD	10/9/2021	6006	11/16/2021	2
Broken Val	C/TV	C/YX	N/A	5LM5J7XC	8/9/2021	GA	953	EF06A212	8/3/2021	LEP (Nano)		2021	1/4/2022	Engine sei	C/ET	AD	9/21/2021	6006	11/8/2021	2
Broken Val	C/TV	C/YX	M85BG00(	5LM5J7XC	6/22/2021	ON	3402	EF06A211	6/11/2021	LEP (Nano)		2021	11/19/2021	Engine sei	C/ET	AD	7/14/2021	6762	8/30/2021	2
Broken Val	C/TV	C/YX	N/A	5LM5J7XC	8/6/2021	TX	790	EF06A211	7/1/2021	LEP (Nano)		2021	11/3/2021	Engine sei	C/ET	AD	9/22/2021	6006	10/12/2021	1
Broken Val	C/TV	C/YX	MQLDF00(	5LM5J7XC	6/29/2021	FL	3014	EF06A211	6/22/2021	LEP (Nano)		2021	1/12/2022	Engine sei	C/ET	AD	7/30/2021	6006	10/4/2021	3
Broken Val	C/TV	C/YX	MQLDF00(	5LM5J7XC	6/29/2021	FL	3014	EF06A211	6/22/2021	LEP (Nano)		2021		Engine sei	C/ET	AD	7/30/2021		10/12/2021	
Broken Val	C/TV	C/YX	N/A	5LM5J9XC	8/16/2021	*	375	EF06A212	8/4/2021	LEP (Nano)		2021	12/17/2021	Engine sei	C/ET	AD	11/12/2021	6006	11/22/2021	1
Broken Val	C/TV	C/YX	M9HEF004	5LM5J9XC	6/25/2021	FL	667	EF06A211	6/14/2021	LEP (Nano)		2021	10/25/2021	Engine sei	C/ET	AD	7/15/2021	6006	9/7/2021	2
Broken Val	C/TV	C/YX	MXPBZ00	5LM5J9XC	6/29/2021	*	502	EF06A211	6/21/2021	LEP (Nano)		2021	11/25/2021	Lower end	C/ET	AD	10/30/2021	6009	11/10/2021	1
Broken Val	C/TV	C/YX	N/A	5LM5J9XC	6/30/2021	*	2755	EF06A211	6/22/2021	LEP (Nano)		2021	12/28/2021	Engine sei	C/ET	AD	10/14/2021	6006	11/30/2021	2
Broken Val	C/TV	C/YX	N/A	5LM5J9XC	9/1/2021	LA	6145	EF06A212	8/20/2021	LEP (Nano)		2021	1/10/2022	Engine sei	C/ET	AD	10/11/2021	6049	12/10/2021	3
Broken Val	C/TW	C/YX	L1VEK002	1FM5K8G(	9/26/2019	CO	2426	EF06A192	9/18/2019	LEP (Nano)		2020	2/20/2020	Engine sei	C/ET	AD	11/22/2019	6006	1/21/2020	3
Broken Val	C/TW	C/YX	L2RCM004	1FM5K8G(	7/15/2019	NV	743	EF06A191	6/27/2019	LEP (Nano)		2020	7/3/2020	Engine noi	C/ET	AD	12/31/2019	6505	2/6/2020	2
Broken Val	C/TW	C/YX	L43CX001	1FM5K8G(	2/24/2020	TX	1842	EF06A200	2/14/2020	LEP (Nano)		2020	7/27/2020	Engine sei	C/ET	AD	4/11/2020	6009	4/29/2020	1
Broken Val	C/TW	C/YX	L5GDL001	1FM5K8G(	7/11/2019	WA	1577	EF06A191	6/18/2019	LEP (Nano)		2020	6/25/2020	Engine sei	C/ET	AD	3/14/2020	6006	5/4/2020	2
Broken Val	C/TW	C/YX	L5NFM004	1FM5K8G(	7/9/2019	NJ	1282	EF06A191	6/21/2019	LEP (Nano)		2020	7/9/2020	Engine sei	C/ET	AD	3/11/2020	6006	5/13/2020	3
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	7/9/2019	MT	7026	EF06A191	6/24/2019	LEP (Nano)		2020	6/4/2020	Engine sei	C/ET	AD	9/17/2019	6505	4/27/2020	8
Broken Val	C/TW	C/YX	L6RCY001	1FM5K8H(	6/24/2019	NC	10479	EF06A191	6/18/2019	LEP (Nano)		2020	7/23/2020	Engine sei	C/ET	AD	9/14/2019	6507	6/18/2020	10
Broken Val	C/TW	C/YX	L7BDT002	1FM5K8G(	11/4/2019	BC	203	EF06A193	10/29/2019	LEP (Nano)		2020	10/1/2020	Engine sta	C/ET	AD	6/16/2020	6049	6/24/2020	1
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	8/14/2019	TX	2100	EF06A192	7/25/2019	LEP (Nano)		2020	7/13/2020	Engine sei	C/ET	AD	11/25/2019	6507	12/26/2019	2
Broken Val	C/TW	C/YX	L5TGI004	1FM5K8G(	6/14/2019	IN	5488	EF06A191	6/4/2019	LEP (Nano)		2020	7/15/2020	Engine sei	C/ET	AD	7/2/2020	6006	5/19/2020	0

Broken Val	C/TW	C/YX	L6PCU014	1FM5K8G(	9/23/2019	NH	2407	EF06A192	9/18/2019	LEP (Nano)	2020	8/14/2020	Engine sei:	C/ET	AD	2/27/2020	6B288	6/15/2020	4
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	9/24/2019	MI	1056	EF06A192	9/5/2019	LEP (Nano)	2020	8/31/2020	Engine sei:	C/ET	AD	6/20/2020	6006	7/14/2020	1
Broken Val	C/TW	C/YX	LQGBG00	1FM5K8H(	9/28/2019	NY	933	EF06A192	9/19/2019	LEP (Nano)	2020	12/17/2020	Engine sei:	C/ET	AD	8/13/2020	6200	9/4/2020	1
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	8/1/2019	IN	9517	EF06A191	7/15/2019	LEP (Nano)	2020	10/20/2020	Engine sei:	C/ET	AD	9/30/2019	6507	9/8/2020	12
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	7/10/2019	AZ	6898	EF06A191	6/21/2019	LEP (Nano)	2020	11/9/2020	Runs rougl	C/ET	AD	12/5/2019	6507	9/16/2020	10
Broken Val	C/TW	C/YX	N/A	1FM5K7LC	6/21/2021	TX	1144	EF06A211	5/13/2021	LEP (Nano)	2021	12/6/2021	Engine sei:	C/ET	AD	7/6/2021	6006	10/6/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K7LC	6/24/2021	SC	1571	EF06A211	6/14/2021	LEP (Nano)	2021	11/1/2021	Engine sei:	C/ET	AD	8/27/2021	6006	9/25/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K7LC	6/25/2021	TX	3575	EF06A211	6/14/2021	LEP (Nano)	2021	1/6/2022	Engine sei:	C/ET	AD	7/18/2021	6006	10/18/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K7LC	6/30/2021	FL	1316	EF06A211	6/21/2021	LEP (Nano)	2021	10/14/2021	Engine sei:	C/ET	AD	7/16/2021	6006	8/14/2021	1
Broken Val	C/TW	C/YX	M8WC500	1FM5K8G(	12/6/2020	ON	4842	EF06A203	11/16/2020	LEP (Nano)	2021		Engine sei:	C/ET	AD	4/7/2021		8/23/2021	
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/19/2021	KS	1160	EF06A211	6/14/2021	LEP (Nano)	2021	10/20/2021	Engine sei:	C/ET	AD	7/6/2021	6006	7/30/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	3/20/2021	MA	2853	EF06A210	3/16/2021	LEP (Nano)	2021	8/6/2021	Engine ma	C/ET	AD	4/20/2021	6006	6/30/2021	3
Broken Val	C/TW	C/YX	M9VEX00	1FM5K8G(	8/6/2021	MI	2061	EF06A212	8/3/2021	LEP (Nano)	2021	11/1/2021	Engine sei:	C/ET	AD	8/23/2021	6507	9/14/2021	1
Broken Val	C/TW	C/YX	MQZEF00	1FM5K8G(	6/21/2021	VA	1717	EF06A211	5/13/2021	LEP (Nano)	2021	11/9/2021	Engine sei:	C/ET	AD	7/2/2021	6507	8/16/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/25/2021	ND	1316	EF06A212	8/19/2021	LEP (Nano)	2021	1/19/2022	Engine sei:	C/ET	AD	9/7/2021	6006	10/22/2021	2
Broken Val	C/TW	C/YX	M8PD3005	1FM5K8G(	6/21/2021	VA	642	EF06A211	5/13/2021	LEP (Nano)	2021	9/29/2021	Engine sei:	C/ET	AD	7/13/2021	6006	8/9/2021	1
Broken Val	C/TW	C/YX	MQRCD00	1FM5K8G(	9/2/2021	MI	2915	EF06A212	8/30/2021	LEP (Nano)	2021	11/30/2021	Engine sei:	C/ET	AD	9/16/2021	6006	10/6/2021	1
Broken Val	C/TW	C/YX	MQVBY01	1FM5K8G(	9/2/2021	NY	913	EF06A212	8/30/2021	LEP (Nano)	2021	12/7/2021	Runs rougl	C/ET	AD	10/5/2021	6006	10/19/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	2/11/2021	MI	4348	EF06A210	2/3/2021	LEP (Nano)	2021	8/17/2021	Exhaust let	C/ET	AD	4/5/2021	6006	7/7/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/23/2021	MI	1790	EF06A211	6/17/2021	LEP (Nano)	2021	12/9/2021	Engine sei:	C/ET	AD	7/6/2021	6006	9/20/2021	3
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	12/8/2020	CT	6599	EF06A203	11/16/2020	LEP (Nano)	2021	11/1/2021	Engine sei:	C/ET	AD	1/2/2021	6006	9/4/2021	9
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/27/2021	TN	3034	EF06A212	8/17/2021	LEP (Nano)	2021	1/19/2022	Engine sei:	C/ET	AD	9/28/2021	6006	12/20/2021	3
Broken Val	C/TW	C/YX	MQTE500	1FM5K8G(	8/24/2021	TX	1895	EF06A212	8/16/2021	LEP (Nano)	2021	1/6/2022	Engine sei:	C/ET	AD	9/15/2021	6006	10/18/2021	2
Broken Val	C/TW	C/YX	MQTE500	1FM5K8G(	8/24/2021	TX	1895	EF06A212	8/16/2021	LEP (Nano)	2021		Engine sei:	C/ET	AD	9/15/2021		10/20/2021	
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/23/2021	SD	1509	EF06A211	6/11/2021	LEP (Nano)	2021	10/11/2021	Engine sei:	C/ET	AD	7/22/2021	6006	8/3/2021	0
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/25/2021	ON	1909	EF06A211	6/14/2021	LEP (Nano)	2021	10/1/2021	Engine sei:	C/ET	AD	7/24/2021	6006	8/31/2021	2
Broken Val	C/TW	C/YX	M85CD053	1FM5K8G(	6/28/2021	PA	443	EF06A211	6/21/2021	LEP (Nano)	2021	11/15/2021	Engine sei:	C/ET	AD	7/28/2021	6006	8/17/2021	-1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/30/2021	IN	3959	EF06A211	6/23/2021	LEP (Nano)	2021	9/21/2021	Engine sei:	C/ET	AD	7/9/2021	6006	8/26/2021	2
Broken Val	C/TW	C/YX	MXWCM0(	1FM5K8G(	8/15/2021	LA	2079	EF06A212	8/9/2021	LEP (Nano)	2021	12/27/2021	Engine sei:	C/ET	AD	9/10/2021	6006	11/22/2021	3
Broken Val	C/TW	C/YX	MXBDV00	1FM5K8G(	8/13/2021	NC	3334	EF06A212	8/4/2021	LEP (Nano)	2021	12/8/2021	Engine sei:	C/ET	AD	8/30/2021	6006	10/25/2021	2
Broken Val	C/TW	C/YX	MQEBG02	1FM5K8G(	6/23/2021	QC	3025	EF06A211	6/11/2021	LEP (Nano)	2021	11/5/2021	Engine sei:	C/ET	AD	7/14/2021	6006	9/20/2021	3
Broken Val	C/TW	C/YX	MQZAR08	1FM5K8G(	7/2/2021	*	1246	EF06A211	6/21/2021	LEP (Nano)	2021	12/20/2021	Engine sei:	C/ET	AD	9/26/2021	6250	10/23/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/24/2021	NC	1097	EF06A212	8/16/2021	LEP (Nano)	2021	12/9/2021	Engine sei:	C/ET	AD	9/11/2021	6006	10/11/2021	2
Broken Val	C/TW	C/YX	MZOFD00	1FM5K8G(	6/23/2021	AB	2671	EF06A211	6/17/2021	LEP (Nano)	2021		Engine sei:	C/ET	AD	8/9/2021		12/15/2021	
Broken Val	C/TW	C/YX	M9QE200	1FM5K8G(	7/4/2021	TX	3598	EF06A211	6/22/2021	LEP (Nano)	2021	11/25/2021	Lower end	C/ET	AD	7/13/2021	6507	9/7/2021	2
Broken Val	C/TW	C/YX	M9WEX00	1FM5K8G(	6/22/2021	ON	2911	EF06A211	6/11/2021	LEP (Nano)	2021	11/5/2021	Lower end	C/ET	AD	7/30/2021	6006	9/22/2021	2
Broken Val	C/TW	C/YX	M8QFM00	1FM5K8G(	6/26/2021	ON	577	EF06A211	6/14/2021	LEP (Nano)	2021	10/21/2021	Engine sei:	C/ET	AD	7/29/2021	6006	8/16/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/30/2021	AB	2094	EF06A211	6/22/2021	LEP (Nano)	2021	10/28/2021	Engine sei:	C/ET	AD	7/24/2021	6006	8/16/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/30/2021	MD	2321	EF06A212	8/20/2021	LEP (Nano)	2021	12/6/2021	Engine sei:	C/ET	AD	9/6/2021	6507	10/18/2021	2
Broken Val	C/TW	C/YX	M8BCX01	1FM5K8G(	6/23/2021	WV	1346	EF06A211	6/14/2021	LEP (Nano)	2021	10/20/2021	Engine sei:	C/ET	AD	7/6/2021	6507	7/29/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/30/2021	NJ	823	EF06A212	8/20/2021	LEP (Nano)	2021	11/22/2021	Engine sei:	C/ET	AD	9/20/2021	6006	10/4/2021	1
Broken Val	C/TW	C/YX	MZQB202	1FM5K8G(	8/17/2021	TX	2416	EF06A212	8/9/2021	LEP (Nano)	2021	1/6/2022	Engine noi:	C/ET	AD	9/13/2021	6006	11/26/2021	3
Broken Val	C/TW	C/YX	MQICQ001	1FM5K8G(	6/28/2021	OH	4627	EF06A211	6/18/2021	LEP (Nano)	2021	11/22/2021	Engine sei:	C/ET	AD	6/30/2021	6006	10/6/2021	4
Broken Val	C/TW	C/YX	MQKCC00	1FM5K8G(	2/21/2021	ON	3582	EF06A210	2/2/2021	LEP (Nano)	2021	11/18/2021	Engine noi:	C/ET	AD	6/23/2021	6006	10/8/2021	4
Broken Val	C/TW	C/YX	M9NCA00	1FM5K8G(	6/25/2021	ON	1464	EF06A211	6/14/2021	LEP (Nano)	2021	11/19/2021	Engine sei:	C/ET	AD	8/19/2021	6762	9/14/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/26/2021	NJ	2762	EF06A212	8/19/2021	LEP (Nano)	2021	11/25/2021	Misfire, coc	C/ET	AD	10/4/2021	6006	11/15/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/30/2021	AB	984	EF06A211	6/22/2021	LEP (Nano)	2021	10/26/2021	Hard start,	C/ET	AD	7/26/2021	6108	8/9/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	########	NC	5302	EF06A203	11/4/2020	LEP (Nano)	2021	4/9/2021	Engine noi:	C/ET	AD	12/4/2020	6006	2/25/2021	3
Broken Val	C/TW	C/YX	M3HE200	1FM5K8G(	1/24/2021	CT	513	EF06A210	1/8/2021	LEP (Nano)	2021	6/18/2021	Vehicle los	C/ET	AD	2/26/2021	6006	3/5/2021	1

Broken Val	C/TW	C/YX	M7VFM01	1FM5K8G(	6/17/2021	UT	710	EF06A211	6/11/2021	LEP (Nano)	2021	8/25/2021	Engine sei:	C/ET	AD	6/30/2021	6006	7/19/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/22/2021	ON	4760	EF06A211	6/11/2021	LEP (Nano)	2021	11/11/2021	Engine ma	C/ET	AD	7/22/2021	6006	11/2/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/9/2021	GA	3869	EF06A212	8/3/2021	LEP (Nano)	2021	12/8/2021	Engine sei:	C/ET	AD	9/10/2021	6006	11/1/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/25/2021	NJ	2610	EF06A212	8/19/2021	LEP (Nano)	2021	1/19/2022	Engine sei:	C/ET	AD	9/17/2021	6006	11/22/2021	3
Broken Val	C/TW	C/YX	MXIB2014	1FM5K8G(	6/28/2021	ON	7255	EF06A211	6/18/2021	LEP (Nano)	2021	1/7/2022	Engine ma	C/ET	AD	7/23/2021	6006	11/5/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/25/2021	OR	803	EF06A212	8/20/2021	LEP (Nano)	2021	11/9/2021	Engine sei:	C/ET	AD	9/8/2021	6006	9/28/2021	1
Broken Val	C/TW	C/YX	MQLB200	1FM5K8G(	6/21/2021	WI	2800	EF06A211	5/12/2021	LEP (Nano)	2021	11/10/2021	Engine noi:	C/ET	AD	6/30/2021	6006	9/13/2021	3
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	1/30/2021	UT	4614	EF06A210	1/14/2021	LEP (Nano)	2021	8/19/2021	Engine sei:	C/ET	AD	3/12/2021	6006	6/30/2021	4
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/26/2021	GA	2318	EF06A211	6/14/2021	LEP (Nano)	2021	12/16/2021	Engine noi:	C/ET	AD	7/30/2021	6006	11/9/2021	4
Broken Val	C/TW	C/YX	MQTBH00	1FM5K8G(	8/30/2021	GA	1284	EF06A212	8/19/2021	LEP (Nano)	2021	1/19/2022	Engine sei:	C/ET	AD	9/20/2021	6006	10/18/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	8/10/2021	NY	333	EF06A212	8/4/2021	LEP (Nano)	2021	1/10/2022	Engine sei:	C/ET	AD	8/27/2021	6006	11/3/2021	3
Broken Val	C/TW	C/YX	M91B2017	1FM5K8G(	8/10/2021	VA	1263	EF06A212	8/4/2021	LEP (Nano)	2021	10/28/2021	Engine sta	C/ET	AD	9/14/2021	6006	9/27/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8G(	6/22/2021	QC	934	EF06A211	6/11/2021	LEP (Nano)	2021	9/28/2021	Engine sei:	C/ET	AD	7/16/2021	6507	8/9/2021	1
Broken Val	C/TW	C/YX	MQDE500	1FM5K8H(	6/23/2021	ON	1183	EF06A211	6/17/2021	LEP (Nano)	2021	11/23/2021	Overheat,	C/ET	AD	9/8/2021	6211	10/2/2021	1
Broken Val	C/TW	C/YX	M64BY016	1FM5K8H(	1/22/2021	CA	1245	EF06A210	1/8/2021	LEP (Nano)	2021	8/9/2021	Engine sei:	C/ET	AD	5/14/2021	6007	6/23/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	8/21/2021	IA	5678	EF06A212	8/12/2021	LEP (Nano)	2021	1/20/2022	Engine sei:	C/ET	AD	10/14/2021	6108	11/29/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	6/25/2021	NB	1528	EF06A211	6/11/2021	LEP (Nano)	2021	10/18/2021	Lower end	C/ET	AD	8/27/2021	6006	9/14/2021	1
Broken Val	C/TW	C/YX	MXCE902	1FM5K8H(	6/22/2021	*	412	EF06A211	6/17/2021	LEP (Nano)	2021	11/30/2021	Engine sei:	C/ET	AD	8/26/2021	6006	10/19/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	8/26/2021	CA	639	EF06A212	8/19/2021	LEP (Nano)	2021	11/25/2021	Engine sei:	C/ET	AD	9/21/2021	6006	9/29/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8H(	8/25/2021	NJ	1220	EF06A212	8/20/2021	LEP (Nano)	2021	1/20/2022	Engine sei:	C/ET	AD	11/3/2021	6006	12/7/2021	2
Broken Val	C/TW	C/YX	M93FO087	1FM5K8H(	7/3/2021	*	787	EF06A211	6/22/2021	LEP (Nano)	2021	11/1/2021	Engine sei:	C/ET	AD	9/3/2021	6507	9/29/2021	1
Broken Val	C/TW	C/YX	MXSB900	1FM5K8H(	8/23/2021	TN	2331	EF06A212	8/16/2021	LEP (Nano)	2021		Runs rougl	C/ET	AD	8/30/2021		11/19/2021	
Broken Val	C/TW	C/YX	M8QCT02	1FM5K8LC	6/20/2021	MD	623	EF06A211	5/12/2021	LEP (Nano)	2021	12/14/2021	Knock nois	C/ET	AD	7/5/2021	6006	7/17/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8LC	8/9/2021	PA	913	EF06A212	8/3/2021	LEP (Nano)	2021	11/22/2021	Engine sei:	C/ET	AD	8/21/2021	6006	9/30/2021	2
Broken Val	C/TW	C/YX	N/A	1FM5K8LC	8/15/2021	WI	561	EF06A212	8/4/2021	LEP (Nano)	2021	11/10/2021	Engine noi:	C/ET	AD	8/19/2021	6507	9/7/2021	1
Broken Val	C/TW	C/YX	N/A	1FM5K8LC	6/26/2021	NC	1485	EF06A211	6/14/2021	LEP (Nano)	2021	1/20/2022	Misfire, coc	C/ET	AD	7/29/2021	6007	9/20/2021	2
Broken Val	C/D9	C/WQ	MZOCO01	2LMPJ8KF	9/9/2021	OH	2489	EF06A212	9/1/2021	LEP (Nano)	2021		Engine sei:	C/FY	AS	9/17/2021		12/15/2021	
Broken Val	C/D9	C/WQ	N/A	2LMPJ8KF	4/7/2021	PA	2275	EF06A210	3/25/2021	LEP (Nano)	2021	10/25/2021	Engine sei:	C/FY	AS	4/30/2021	6518	8/24/2021	4
Broken Val	C/D9	C/WQ	M8QCL01	2LMPJ8KF	7/16/2021	OH	875	EF06A211	7/2/2021	LEP (Nano)	2021	9/21/2021	Engine sei:	C/FY	AS	7/30/2021	6006	8/16/2021	1
Broken Val	C/D9	C/WQ	N/A	2LMPJ8KF	6/30/2021	KY	1168	EF06A211	6/9/2021	LEP (Nano)	2021	11/23/2021	Engine noi:	C/FY	AS	8/9/2021	6006	9/14/2021	2
Broken Val	C/D9	C/WQ	N/A	2LMPJ9JP	4/1/2021	CA	2062	EF06A210	3/23/2021	LEP (Nano)	2021	10/15/2021	Runs rougl	C/FY	AS	5/11/2021	92	8/11/2021	4
Broken Val	C/DQ	C/WQ	MXFBD00	2FMPK4AI	7/1/2021	*	1856	EF06A211	6/9/2021	LEP (Nano)	2021		Engine sei:	C/FY	AS	8/30/2021		11/6/2021	
Broken Val	C/DQ	C/WQ	MZAD300	2FMPK4AI	9/13/2021	TX	1294	EF06A212	9/1/2021	LEP (Nano)	2021	1/18/2022	Engine noi:	C/FY	AS	10/23/2021	6006	11/30/2021	2
Broken Val	C/DQ	C/WQ	MZAD300	2FMPK4AI	9/13/2021	TX	1294	EF06A212	9/1/2021	LEP (Nano)	2021		Engine noi:	C/FY	AS	10/23/2021		12/1/2021	
Broken Val	C/DQ	C/WQ	N/A	2FMPK4AI	8/11/2021	NJ	821	EF06A212	8/3/2021	LEP (Nano)	2021	10/25/2021	Engine sei:	C/FY	AS	8/24/2021	6006	9/24/2021	2
Broken Val	C/DQ	C/WQ	M4MDU00	2FMPK4AI	2/11/2021	MD	857	EF06A203	12/17/2020	LEP (Nano)	2021	4/22/2021	Engine lost	C/FY	AS	3/5/2021	6006	3/31/2021	1
Broken Val	C/DQ	C/WQ	N/A	2FMPK4AI	5/27/2021	VA	2398	EF06A211	5/14/2021	LEP (Nano)	2021	1/5/2022	Engine sei:	C/FY	AS	7/2/2021	6507	9/27/2021	3
Broken Val	C/DQ	C/WQ	MZHFO21	2FMPK4AI	8/10/2021	QC	1303	EF06A212	8/3/2021	LEP (Nano)	2021	12/20/2021	Engine sei:	C/FY	AS	11/11/2021	6505	12/3/2021	1
Broken Val	C/DQ	C/WQ	N/A	2FMPK4AI	9/9/2021	IA	1663	EF06A212	8/31/2021	LEP (Nano)	2021	1/19/2022	Engine sei:	C/FY	AS	11/1/2021	6006	12/2/2021	2
Broken Val	C/DQ	C/WQ	M7NCQ01	2FMPK4AI	5/25/2021	NC	388	EF06A211	5/11/2021	LEP (Nano)	2021	8/9/2021	Engine sei:	C/FY	AS	6/25/2021	6007	7/12/2021	1
Broken Val	C/DQ	C/WQ	N/A	2FMPK4AI	6/29/2021	TX	2762	EF06A211	6/9/2021	LEP (Nano)	2021	11/10/2021	Engine sei:	C/FY	AS	8/2/2021	6009	9/4/2021	2
Broken Val	C/DQ	C/WQ	MZCBX00	2FMPK4AI	8/23/2021	SK	2460	EF06A212	8/10/2021	LEP (Nano)	2021	1/17/2022	Engine sei:	C/FY	AS	10/22/2021	6006	11/22/2021	2
Broken Val	C/DQ	C/WQ	MZCBX00	2FMPK4AI	8/23/2021	SK	2460	EF06A212	8/10/2021	LEP (Nano)	2021		Engine sei:	C/FY	AS	10/22/2021		12/3/2021	
Broken Val	C/DQ	C/WQ	M9NEY00	2FMPK4AI	8/10/2021	MO	904	EF06A211	7/15/2021	LEP (Nano)	2021	10/12/2021	Engine sei:	C/FY	AS	9/1/2021	6006	9/13/2021	1
Broken Val	C/DQ	C/WQ	M92DM00	2FMPK4AI	5/17/2021	MA	1589	EF06A211	5/3/2021	LEP (Nano)	2021	11/11/2021	Engine sei:	C/FY	AS	6/1/2021	6505	9/27/2021	4
Broken Val	C/DQ	C/WQ	N/A	2FMPK4AI	5/19/2021	NJ	4218	EF06A211	5/6/2021	LEP (Nano)	2021	11/17/2021	Engine sei:	C/FY	AS	5/26/2021	6006	10/22/2021	5
Broken Val	T/G1	T/WQ	MZOB403	1FMDE5CI	9/22/2021	MI	1912	EF06A212	7/30/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	10/6/2021		12/15/2021	
Broken Val	T/G1	T/WQ	N/A	1FMDE5CI	6/12/2021	TN	2906	EF06A211	5/13/2021	LEP (Nano)	2021	1/3/2022	Engine sei:	T/ET	AP	7/6/2021	6006	11/12/2021	5
Broken Val	T/G1	T/WQ	MZMD200	1FMDE5CI	7/13/2021	MO	2731	EF06A211	6/18/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	10/12/2021		12/13/2021	

Broken Val	T/G1	T/WQ	MXPB201	1FMDE5FI	7/1/2021	TN	4736	EF06A211	6/23/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	7/27/2021		11/16/2021	
Broken Val	T/G1	T/WQ	MXPCP00	1FMEE5BI	5/13/2021	WV	3474	EF06A211	5/4/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	7/30/2021		11/16/2021	
Broken Val	T/G1	T/WQ	M7ZCV005	1FMEE5BI	6/19/2021	MO	743	EF06A211	6/14/2021	LEP (Nano)	2021	8/16/2021	Engine sei:	T/ET	AP	7/13/2021	6505	7/26/2021	1
Broken Val	T/G1	T/WQ	N/A	1FMEE5BI	6/29/2021	VA	2743	EF06A211	6/10/2021	LEP (Nano)	2021	1/7/2022	Engine sei:	T/ET	AP	7/20/2021	6006	11/15/2021	4
Broken Val	T/G1	T/WQ	MX4D2002	1FMEE5BI	6/26/2021	FL	937	EF06A211	6/14/2021	LEP (Nano)	2021		Engine noi:	T/ET	AP	7/30/2021		11/30/2021	
Broken Val	T/G1	T/WQ	N/A	1FMEE5BI	6/26/2021	CA	950	EF06A211	6/14/2021	LEP (Nano)	2021	10/19/2021	Engine sei:	T/ET	AP	7/23/2021	6006	9/7/2021	2
Broken Val	T/G1	T/WQ	M9QD7011	1FMEE5BI	6/3/2021	BC	1880	EF06A211	5/5/2021	LEP (Nano)	2021	11/26/2021	Knock nois	T/ET	AP	8/3/2021	6108	9/13/2021	2
Broken Val	T/G1	T/WQ	MQOBQ00	1FMEE5BI	7/22/2021	TN	6245	EF06A211	6/30/2021	LEP (Nano)	2021	11/17/2021	Engine sei:	T/ET	AP	7/29/2021	6505	10/15/2021	3
Broken Val	T/G1	T/WQ	M92FD017	1FMEE5BI	7/12/2021	CA	1578	EF06A211	6/17/2021	LEP (Nano)	2021	11/18/2021	Engine sei:	T/ET	AP	8/5/2021	6006	9/22/2021	2
Broken Val	T/G1	T/WQ	MXVBX01	1FMEE5BI	10/5/2021	TN	2844	EF06A212	8/2/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	10/13/2021		11/22/2021	
Broken Val	T/G1	T/WQ	N/A	1FMEE5BI	8/19/2021	QC	3410	EF06A212	8/4/2021	LEP (Nano)	2021	1/7/2022	Engine sei:	T/ET	AP	9/29/2021	6505	12/7/2021	3
Broken Val	T/G1	T/WQ	M8XEB004	1FMEE5DI	6/30/2021	TX	985	EF06A211	6/18/2021	LEP (Nano)	2021	9/24/2021	Engine sei:	T/ET	AP	7/27/2021	6006	8/23/2021	1
Broken Val	T/G1	T/WQ	MQYE2345	1FMEE5DI	7/19/2021	KY	2907	EF06A211	6/15/2021	LEP (Nano)	2021	11/25/2021	Engine sei:	T/ET	AP	8/4/2021	6006	10/25/2021	3
Broken Val	T/G1	T/WQ	MXWD300	1FMEE5DI	7/19/2021	CA	2646	EF06A211	6/23/2021	LEP (Nano)	2021	12/29/2021	Engine sei:	T/ET	AP	8/10/2021	6006	11/16/2021	4
Broken Val	T/G1	T/WQ	MZBB2001	1FMEE5DI	6/11/2021	MO	2524	EF06A211	5/12/2021	LEP (Nano)	2021	12/16/2021	Engine sta	T/ET	AP	7/7/2021	6006	9/15/2021	3
Broken Val	T/G1	T/WQ	M71B4008	1FMEE5DI	6/25/2021	MI	1146	EF06A211	6/10/2021	LEP (Nano)	2021	8/16/2021	Engine sei:	T/ET	AP	6/30/2021	6000	7/22/2021	1
Broken Val	T/G1	T/WQ	M71B4008	1FMEE5DI	6/25/2021	MI	1146	EF06A211	6/10/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	6/30/2021		7/27/2021	
Broken Val	T/G1	T/WQ	M9HDF003	1FMEE5DI	6/9/2021	AB	1444	EF06A211	5/13/2021	LEP (Nano)	2021	11/9/2021	Engine sei:	T/ET	AP	7/28/2021	6108	9/7/2021	2
Broken Val	T/G1	T/WQ	MQKA703	1FMEE5DI	7/16/2021	MI	2394	EF06A211	6/9/2021	LEP (Nano)	2021	11/2/2021	Engine sei:	T/ET	AP	7/26/2021	6505	9/10/2021	2
Broken Val	T/G1	T/WQ	MQODM00	1FMEE5DI	9/1/2021	BC	1294	EF06A211	6/28/2021	LEP (Nano)	2021	12/7/2021	Misfire, coo	T/ET	AP	9/20/2021	6507	10/13/2021	1
Broken Val	T/G1	T/WQ	N/A	1FMEE5DI	9/16/2021	SC	1466	EF06A212	7/28/2021	LEP (Nano)	2021	11/25/2021	Engine sei:	T/ET	AP	10/5/2021	6006	10/22/2021	1
Broken Val	T/G1	T/WQ	MX4E9057	1FMEE5DI	8/11/2021	ID	4321	EF06A212	8/4/2021	LEP (Nano)	2021	12/7/2021	Mil light ca	T/ET	AP	9/10/2021	6006	11/10/2021	3
Broken Val	T/G1	T/WQ	MXIE4328	1FMEE5DI	8/11/2021	MI	1524	EF06A212	8/4/2021	LEP (Nano)	2021	1/6/2022	Engine sei:	T/ET	AP	8/25/2021	6006	10/14/2021	2
Broken Val	T/G1	T/WQ	MXIE4328	1FMEE5DI	8/11/2021	MI	1524	EF06A212	8/4/2021	LEP (Nano)	2021		Engine sei:	T/ET	AP	8/25/2021		11/10/2021	
Broken Val	T/G1	T/WQ	M84EU002	1FMEE5DI	6/12/2021	TX	1372	EF06A211	5/11/2021	LEP (Nano)	2021	9/28/2021	Engine sei:	T/ET	AP	7/31/2021	6006	8/23/2021	1
Broken Val	T/G1	T/WQ	M9ME5001	1FMEE5DI	6/29/2021	TX	2167	EF06A211	6/14/2021	LEP (Nano)	2021	10/18/2021	Lower end	T/ET	AP	7/24/2021	6006	7/22/2021	0
Broken Val	T/G1	T/WQ	MXBDA00	1FMEE5DI	7/1/2021	TX	5272	EF06A211	6/23/2021	LEP (Nano)	2021	12/3/2021	Engine sei:	T/ET	AP	8/3/2021	6505	11/2/2021	4
Broken Val	T/G1	T/WQ	M9ID2003	1FMEE5EI	6/24/2021	CA	601	EF06A211	6/10/2021	LEP (Nano)	2021	10/27/2021	Engine sei:	T/ET	AP	7/28/2021	6006	8/23/2021	1
Broken Val	T/G1	T/WQ	N/A	1FMEE5EI	9/24/2021	NE	1932	EF06A212	8/16/2021	LEP (Nano)	2021	12/15/2021	Engine sei:	T/ET	AP	11/5/2021	6006	12/3/2021	1
Broken Val	T/G1	T/WQ	MQREO00	1FMEE5EI	6/24/2021	TX	3592	EF06A211	6/10/2021	LEP (Nano)	2021	12/1/2021	Engine sei:	T/ET	AP	7/20/2021	6006	9/25/2021	3
Broken Val	T/FC	T/WQ	J53FJ013	1FTMF1EF	3/28/2018	FL	933	EF06A180	3/20/2018	LEP (Nano)	2018	7/2/2018	Rattle nois	T/EU	AJ	4/24/2018	6049	5/24/2018	2
Broken Val	T/FC	T/WQ	N/A	1FTEX1EF	5/26/2020	OH	1021	EF06A200	3/17/2020	LEP (Nano)	2020	10/30/2020	Engine sei:	T/EU	AJ	7/31/2020	6507	8/31/2020	2
Broken Val	T/FC	T/WQ	N/A	1FTEX1CF	5/28/2020	FL	3200	EF06A200	3/19/2020	LEP (Nano)	2020	11/2/2020	Engine sei:	T/EU	AF	8/3/2020	6006	9/9/2020	2
Broken Val	T/FC	T/WQ	N/A	1FTEW1E	6/22/2020	NY	2008	EF06A201	6/16/2020	LEP (Nano)	2020	11/4/2020	Engine sei:	T/EU	AF	9/2/2020	6009	10/5/2020	2
Broken Val	T/FC	T/WQ	N/A	1FTEW1E	8/23/2020	WI	903	EF06A202	8/17/2020	LEP (Nano)	2020	11/5/2020	No start, co	T/EU	AF	9/2/2020	6006	10/15/2020	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	7/21/2021	TX	8327	EF06A211	5/11/2021	LEP (Nano)	2021	12/2/2021	Knock nois	T/EU	AF	8/31/2021	6006	11/12/2021	3
Broken Val	T/FD	T/WQ	MQYDA00	1FTEW1C	8/27/2021	TX	2298	EF06A212	8/19/2021	LEP (Nano)	2021	12/8/2021	Engine noi:	T/EU	AF	9/21/2021	6006	10/18/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	1/8/2021	CA	2178	EF06A203	12/16/2020	LEP (Nano)	2021	5/11/2021	Knock nois	T/EU	AJ	2/6/2021	6006	3/14/2021	2
Broken Val	T/FD	T/WQ	MQ3EW00	1FTEW1C	6/27/2021	PR	1188	EF06A211	5/7/2021	LEP (Nano)	2021	1/4/2022	Engine sei:	T/EU	AF	8/9/2021	6006	10/4/2021	2
Broken Val	T/FD	T/WQ	MQ3EW00	1FTEW1C	6/27/2021	PR	1188	EF06A211	5/7/2021	LEP (Nano)	2021		Engine sei:	T/EU	AF	8/9/2021		10/29/2021	
Broken Val	T/FD	T/WQ	M9UEJ002	1FTEW1C	8/11/2021	CA	1421	EF06A212	8/7/2021	LEP (Nano)	2021	11/24/2021	Engine sei:	T/EU	AF	9/6/2021	6006	9/17/2021	1
Broken Val	T/FD	T/WQ	MZMFM01	1FTEW1C	8/2/2021	CA	5084	EF06A211	6/28/2021	LEP (Nano)	2021		Runs rougl	T/EU	AJ	8/30/2021		12/13/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	6/22/2021	CA	1027	EF06A211	6/15/2021	LEP (Nano)	2021	11/23/2021	Engine sei:	T/EU	AF	8/9/2021	6006	9/28/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	6/17/2021	GA	3691	EF06A211	5/7/2021	LEP (Nano)	2021	11/2/2021	Engine sei:	T/EU	AF	7/7/2021	6505	8/23/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	6/29/2021	CA	3199	EF06A211	5/7/2021	LEP (Nano)	2021	12/3/2021	Engine sei:	T/EU	AF	7/15/2021	6006	10/11/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	5/22/2021	TX	1230	EF06A211	5/11/2021	LEP (Nano)	2021	9/24/2021	Runs rougl	T/EU	AF	7/13/2021	9F593	7/17/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	7/21/2021	TX	892	EF06A211	7/14/2021	LEP (Nano)	2021	9/21/2021	Vehicle sta	T/EU	AF	8/4/2021	6006	8/19/2021	1
Broken Val	T/FD	T/WQ	MQZEX00	1FTEW1C	6/25/2021	TX	3404	EF06A211	5/14/2021	LEP (Nano)	2021		Engine sei:	T/EU	AF	8/28/2021		10/26/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	6/21/2021	TX	2094	EF06A211	5/10/2021	LEP (Nano)	2021	9/3/2021	Engine sei:	T/EU	AJ	7/24/2021	6007	8/3/2021	1

Broken Val	T/FD	T/WQ	N/A	1FTEW1C	5/22/2021	TX	1960	EF06A211	5/11/2021	LEP (Nano)	2021	9/24/2021	Engine sei	T/EU	AF	6/29/2021	6006	7/30/2021	2
Broken Val	T/FD	T/WQ	MQSEO00	1FTEW1C	8/3/2021	TX	1646	EF06A212	7/27/2021	LEP (Nano)	2021	11/25/2021	Engine sei	T/EU	AF	9/24/2021	6006	10/15/2021	1
Broken Val	T/FD	T/WQ	M9BFK004	1FTEW1C	6/30/2021	TX	3722	EF06A211	5/10/2021	LEP (Nano)	2021	10/20/2021	Engine ma	T/EU	AF	7/15/2021	6006	8/27/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	6/29/2021	HI	462	EF06A211	5/7/2021	LEP (Nano)	2021	10/28/2021	Engine sei	T/EU	AJ	8/8/2021	6006	8/19/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	7/28/2021	TX	3421	EF06A211	5/11/2021	LEP (Nano)	2021	11/18/2021	Engine sei	T/EU	AJ	9/11/2021	6006	10/18/2021	2
Broken Val	T/FD	T/WQ	M9QB9012	1FTEW1C	5/5/2021	FL	2083	EF06A210	3/30/2021	LEP (Nano)	2021	11/2/2021	Knock nois	T/EU	AF	8/6/2021	6006	9/2/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	7/8/2021	GA	1061	EF06A211	7/2/2021	LEP (Nano)	2021	10/19/2021	Engine noi	T/EU	AF	8/16/2021	6006	9/17/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1C	8/26/2021	FL	1192	EF06A212	8/19/2021	LEP (Nano)	2021	1/19/2022	Engine sei	T/EU	AF	9/11/2021	6006	9/30/2021	1
Broken Val	T/FD	T/WQ	MXIDC016	1FTEW1C	4/24/2021	FL	862	EF06A210	4/7/2021	LEP (Nano)	2021	12/8/2021	Engine sei	T/EU	AF	10/16/2021	6006	11/4/2021	1
Broken Val	T/FD	T/WQ	MQLBQ01	1FTEW1C	7/20/2021	LA	4214	EF06A211	5/11/2021	LEP (Nano)	2021		Engine sei	T/EU	AF	8/11/2021		10/12/2021	
Broken Val	T/FD	T/WQ	MZJER016	1FTEW1C	8/11/2021	TX	1748	EF06A212	8/7/2021	LEP (Nano)	2021	12/20/2021	Engine sei	T/EU	AF	9/25/2021	6006	10/8/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/19/2021	IL	2285	EF06A211	5/6/2021	LEP (Nano)	2021	11/5/2021	Engine sei	T/EU	AF	6/5/2021	6505	8/10/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/22/2021	CO	2367	EF06A211	5/11/2021	LEP (Nano)	2021	11/22/2021	Engine sei	T/EU	AF	8/23/2021	6006	10/4/2021	2
Broken Val	T/FD	T/WQ	M8TE2002	1FTEW1E	7/21/2021	MI	668	EF06A211	5/11/2021	LEP (Nano)	2021	10/8/2021	Engine sei	T/EU	AF	8/6/2021	6006	8/18/2021	1
Broken Val	T/FD	T/WQ	MQKBZ01	1FTEW1E	8/9/2021	NH	2482	EF06A212	8/3/2021	LEP (Nano)	2021	11/2/2021	Engine noi	T/EU	AF	9/8/2021	6006	10/11/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/10/2021	MI	2391	EF06A212	8/6/2021	LEP (Nano)	2021	11/23/2021	Engine sei	T/EU	AF	9/23/2021	6006	10/25/2021	2
Broken Val	T/FD	T/WQ	MZJER022	1FTEW1E	9/23/2021	ON	1388	EF06A212	8/30/2021	LEP (Nano)	2021	12/17/2021	Engine sei	T/EU	AF	10/6/2021	6007	11/15/2021	2
Broken Val	T/FD	T/WQ	M9HDT013	1FTEW1E	5/25/2021	MB	4888	EF06A211	5/14/2021	LEP (Nano)	2021	10/22/2021	Engine sei	T/EU	AF	7/20/2021	6009	9/7/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/6/2021	CA	2500	EF06A211	6/30/2021	LEP (Nano)	2021	1/10/2022	Engine sei	T/EU	AF	8/5/2021	6006	10/11/2021	3
Broken Val	T/FD	T/WQ	MXKE500	1FTEW1E	8/25/2021	TX	2775	EF06A212	8/19/2021	LEP (Nano)	2021	1/6/2022	Engine sei	T/EU	AF	9/24/2021	6006	11/10/2021	2
Broken Val	T/FD	T/WQ	MXKE500	1FTEW1E	8/25/2021	TX	2775	EF06A212	8/19/2021	LEP (Nano)	2021		Engine sei	T/EU	AF	9/24/2021		11/11/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/24/2021	MB	505	EF06A211	5/13/2021	LEP (Nano)	2021	11/17/2021	Engine sei	T/EU	AJ	7/28/2021	6006	8/3/2021	1
Broken Val	T/FD	T/WQ	MQSCV02	1FTEW1E	6/25/2021	ON	947	EF06A211	5/13/2021	LEP (Nano)	2021	11/25/2021	Engine sei	T/EU	AJ	7/31/2021	6256	8/18/2021	1
Broken Val	T/FD	T/WQ	M9VE2003	1FTEW1E	4/25/2021	FL	1865	EF06A210	4/7/2021	LEP (Nano)	2021	10/20/2021	Engine sei	T/EU	AF	8/13/2021	6006	8/28/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/18/2021	TX	2781	EF06A211	5/3/2021	LEP (Nano)	2021	8/13/2021	Engine sei	T/EU	AF	5/21/2021	6006	7/12/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/24/2021	MI	3462	EF06A211	5/12/2021	LEP (Nano)	2021	12/17/2021	Engine sei	T/EU	AF	6/30/2021	6006	11/4/2021	5
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/21/2021	KS	5914	EF06A211	5/13/2021	LEP (Nano)	2021	10/13/2021	Engine sei	T/EU	AF	8/2/2021	6006	9/11/2021	2
Broken Val	T/FD	T/WQ	M8KE5002	1FTEW1E	7/3/2021	AL	588	EF06A211	6/28/2021	LEP (Nano)	2021	10/4/2021	Engine die	T/EU	AF	7/22/2021	6006	8/2/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/28/2021	ME	4375	EF06A212	8/19/2021	LEP (Nano)	2021	12/1/2021	Engine sei	T/EU	AF	9/13/2021	6006	10/22/2021	2
Broken Val	T/FD	T/WQ	MQHCS00	1FTEW1E	7/3/2021	NS	1816	EF06A211	5/10/2021	LEP (Nano)	2021	11/26/2021	Engine sei	T/EU	AJ	7/26/2021	6006	10/4/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/4/2021	TX	1862	EF06A212	7/25/2021	LEP (Nano)	2021	12/16/2021	Crank, no	T/EU	AJ	9/24/2021	6006	10/22/2021	1
Broken Val	T/FD	T/WQ	M7EA9001	1FTEW1E	5/26/2021	BC	861	EF06A211	5/12/2021	LEP (Nano)	2021	7/30/2021	Engine sei	T/EU	AF	6/14/2021	6006	6/26/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/9/2021	GA	1215	EF06A211	7/2/2021	LEP (Nano)	2021	11/22/2021	Engine sei	T/EU	AF	9/30/2021	6007	10/18/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/18/2021	TX	2485	EF06A211	5/7/2021	LEP (Nano)	2021	11/25/2021	Engine sei	T/EU	AF	7/10/2021	6007	9/13/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/23/2021	MI	608	EF06A212	8/17/2021	LEP (Nano)	2021	12/6/2021	Engine sei	T/EU	AF	9/13/2021	6006	10/4/2021	1
Broken Val	T/FD	T/WQ	MZBB202	1FTEW1E	6/21/2021	AB	8086	EF06A211	6/7/2021	LEP (Nano)	2021	12/17/2021	Engine sei	T/EU	AJ	8/9/2021	6006	12/2/2021	4
Broken Val	T/FD	T/WQ	MQSCV02	1FTEW1E	4/28/2021	ON	3439	EF06A210	4/1/2021	LEP (Nano)	2021	11/17/2021	Engine sei	T/EU	AF	8/10/2021	6006	9/4/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/18/2021	SD	1722	EF06A211	5/3/2021	LEP (Nano)	2021	9/3/2021	Engine sei	T/EU	AF	5/29/2021	6006	7/6/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/2/2021	NY	2682	EF06A211	6/24/2021	LEP (Nano)	2021	12/30/2021	Engine sei	T/EU	AF	7/27/2021	6006	9/22/2021	2
Broken Val	T/FD	T/WQ	M9QDE00	1FTEW1E	8/10/2021	MN	793	EF06A212	8/6/2021	LEP (Nano)	2021	11/8/2021	Engine sei	T/EU	AF	9/1/2021	6009	9/16/2021	1
Broken Val	T/FD	T/WQ	M9PA1013	1FTEW1E	6/24/2021	AB	1832	EF06A211	5/10/2021	LEP (Nano)	2021	12/9/2021	Engine sei	T/EU	AJ	8/4/2021	6108	9/10/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/27/2021	MI	1800	EF06A211	6/24/2021	LEP (Nano)	2021	10/13/2021	Engine sei	T/EU	AJ	8/11/2021	6006	9/8/2021	1
Broken Val	T/FD	T/WQ	MQSBN01	1FTEW1E	8/13/2021	OH	1316	EF06A212	8/10/2021	LEP (Nano)	2021	11/30/2021	Engine sei	T/EU	AF	8/30/2021	6006	10/12/2021	2
Broken Val	T/FD	T/WQ	MXSDN00	1FTEW1E	4/22/2021	QC	1456	EF06A210	3/31/2021	LEP (Nano)	2021	1/6/2022	Engine noi	T/EU	AF	9/29/2021	6006	11/15/2021	2
Broken Val	T/FD	T/WQ	MXSDN00	1FTEW1E	4/22/2021	QC	1456	EF06A210	3/31/2021	LEP (Nano)	2021		Engine noi	T/EU	AF	9/29/2021		11/19/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/20/2021	MO	1688	EF06A211	5/13/2021	LEP (Nano)	2021	8/26/2021	Engine noi	T/EU	AF	7/26/2021	6006	7/30/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/1/2021	NY	1178	EF06A211	5/10/2021	LEP (Nano)	2021	11/8/2021	Engine noi	T/EU	AF	8/16/2021	6006	9/3/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/11/2021	AL	2305	EF06A211	6/28/2021	LEP (Nano)	2021	11/23/2021	Lower end	T/EU	AF	8/20/2021	6006	10/5/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/2/2021	NY	1209	EF06A211	6/28/2021	LEP (Nano)	2021	1/19/2022	Engine sei	T/EU	AF	8/31/2021	6007	11/20/2021	3

Broken Val	T/FD	T/WQ	M8TD3004	1FTEW1E	7/16/2021	ON	984	EF06A211	6/29/2021	LEP (Nano)	2021	11/17/2021	Engine sei:	T/EU	AF	7/29/2021	6007	8/20/2021	1
Broken Val	T/FD	T/WQ	MX4GI002	1FTEW1E	8/4/2021	NY	3321	EF06A212	7/29/2021	LEP (Nano)	2021		Engine sei:	T/EU	AF	8/27/2021		11/30/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/5/2021	SD	2089	EF06A212	7/29/2021	LEP (Nano)	2021	11/22/2021	Runs roug	T/EU	AF	9/16/2021	6006	10/18/2021	2
Broken Val	T/FD	T/WQ	M8LD4001	1FTEW1E	2/26/2021	AR	1020	EF06A210	2/4/2021	LEP (Nano)	2021	10/4/2021	Engine sei:	T/EU	AJ	4/17/2021	6007	7/12/2021	3
Broken Val	T/FD	T/WQ	M73B2005	1FTEW1E	5/21/2021	AB	1152	EF06A211	5/13/2021	LEP (Nano)	2021	9/15/2021	Runs roug	T/EU	AF	6/22/2021	6006	7/16/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/25/2021	ME	1041	EF06A211	5/7/2021	LEP (Nano)	2021	10/4/2021	Engine sei:	T/EU	AF	7/23/2021	6006	8/9/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/29/2021	MN	1900	EF06A211	7/13/2021	LEP (Nano)	2021	10/29/2021	Engine sei:	T/EU	AF	8/13/2021	6006	9/17/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/21/2021	NJ	2100	EF06A211	5/11/2021	LEP (Nano)	2021	11/1/2021	Engine noi:	T/EU	AJ	7/29/2021	6006	9/20/2021	2
Broken Val	T/FD	T/WQ	MQABJ045	1FTEW1E	7/28/2021	ID	990	EF06A211	5/12/2021	LEP (Nano)	2021	11/19/2021	Engine sei:	T/EU	AJ	8/20/2021	6006	11/9/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	1/23/2021	CA	2919	EF06A210	1/15/2021	LEP (Nano)	2021	10/4/2021	Engine sei:	T/EU	AF	4/15/2021	6006	6/28/2021	3
Broken Val	T/FD	T/WQ	M8KDQ00	1FTEW1E	6/21/2021	AB	1070	EF06A211	5/13/2021	LEP (Nano)	2021	10/26/2021	Engine sei:	T/EU	AF	7/12/2021	6006	8/5/2021	1
Broken Val	T/FD	T/WQ	MXPE500	1FTEW1E	6/30/2021	MI	2110	EF06A211	5/10/2021	LEP (Nano)	2021	12/9/2021	Engine sei:	T/EU	AF	9/9/2021	6006	11/15/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/28/2021	MI	1799	EF06A212	8/19/2021	LEP (Nano)	2021	12/6/2021	Engine sei:	T/EU	AF	9/7/2021	6505	10/8/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/6/2021	MN	8090	EF06A212	7/29/2021	LEP (Nano)	2021	1/10/2022	Engine sei:	T/EU	AF	9/8/2021	6006	11/24/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/10/2021	IL	3011	EF06A212	8/2/2021	LEP (Nano)	2021	11/23/2021	Engine sei:	T/EU	AJ	8/27/2021	6006	9/27/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/6/2021	MI	359	EF06A210	4/7/2021	LEP (Nano)	2021	7/9/2021	Engine sei:	T/EU	AF	5/28/2021	6006	6/4/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/18/2021	PE	1497	EF06A211	5/7/2021	LEP (Nano)	2021	9/16/2021	Engine sei:	T/EU	AF	7/9/2021	6006	8/2/2021	1
Broken Val	T/FD	T/WQ	M7BBY02	1FTEW1E	5/19/2021	TX	1428	EF06A211	5/7/2021	LEP (Nano)	2021	9/27/2021	Engine sei:	T/EU	AF	6/1/2021	6006	7/1/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/1/2021	MI	2417	EF06A211	5/10/2021	LEP (Nano)	2021	10/6/2021	Engine sei:	T/EU	AF	7/12/2021	6006	8/23/2021	2
Broken Val	T/FD	T/WQ	M9PEX008	1FTEW1E	7/2/2021	GA	3026	EF06A211	6/24/2021	LEP (Nano)	2021	10/29/2021	Engine sei:	T/EU	AF	8/20/2021	6006	9/16/2021	1
Broken Val	T/FD	T/WQ	M9GE500	1FTEW1E	6/24/2021	MO	1457	EF06A211	5/13/2021	LEP (Nano)	2021	12/29/2021	Engine noi:	T/EU	AJ	8/2/2021	6006	9/16/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	5/10/2021	BC	1471	EF06A210	4/7/2021	LEP (Nano)	2021	8/13/2021	Engine sei:	T/EU	AF	6/24/2021	6006	7/12/2021	1
Broken Val	T/FD	T/WQ	MQSBP00	1FTEW1E	5/21/2021	MI	3006	EF06A211	5/13/2021	LEP (Nano)	2021	11/30/2021	Engine sei:	T/EU	AF	6/17/2021	6507	9/29/2021	4
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	6/25/2021	BC	2607	EF06A211	5/7/2021	LEP (Nano)	2021	11/8/2021	Misfire, coc	T/EU	AF	8/6/2021	6007	9/29/2021	2
Broken Val	T/FD	T/WQ	M93EE001	1FTEW1E	7/7/2021	MI	1960	EF06A211	6/11/2021	LEP (Nano)	2021		Engine sei:	T/EU	AF	7/28/2021		9/29/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/7/2021	OH	1165	EF06A211	6/11/2021	LEP (Nano)	2021	11/1/2021	Engine sei:	T/EU	AF	7/17/2021	6505	10/15/2021	4
Broken Val	T/FD	T/WQ	MXRB202	1FTEW1E	7/22/2021	NC	3105	EF06A211	5/12/2021	LEP (Nano)	2021	1/13/2022	Engine sei:	T/EU	AF	9/6/2021	6006	11/15/2021	3
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	7/20/2021	GA	4918	EF06A211	5/11/2021	LEP (Nano)	2021	12/17/2021	Engine sei:	T/EU	AF	8/4/2021	6006	9/25/2021	2
Broken Val	T/FD	T/WQ	M9WEX00	1FTEW1E	8/18/2021	MI	779	EF06A212	8/10/2021	LEP (Nano)	2021	11/3/2021	Engine sei:	T/EU	AF	8/30/2021	6006	9/22/2021	1
Broken Val	T/FD	T/WQ	MZ3CF015	1FTEW1E	7/2/2021	MI	944	EF06A211	5/10/2021	LEP (Nano)	2021	1/6/2022	Engine sei:	T/EU	AJ	7/26/2021	6006	11/1/2021	4
Broken Val	T/FD	T/WQ	N/A	1FTEW1E	8/17/2021	MI	4009	EF06A212	8/6/2021	LEP (Nano)	2021	11/12/2021	Engine sei:	T/EU	AJ	8/30/2021	6507	10/20/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEX1CF	1/4/2021	CA	1203	EF06A203	12/14/2020	LEP (Nano)	2021	4/13/2021	Knock nois	T/EU	AJ	1/27/2021	6200	2/13/2021	1
Broken Val	T/FD	T/WQ	N/A	1FTEX1CF	1/22/2021	WA	1500	EF06A210	1/14/2021	LEP (Nano)	2021	8/26/2021	Runs roug	T/EU	AJ	2/23/2021	6006	6/11/2021	4
Broken Val	T/FD	T/WQ	N/A	1FTEX1CF	8/2/2021	FL	945	EF06A211	7/2/2021	LEP (Nano)	2021	1/4/2022	Knock nois	T/EU	AJ	9/20/2021	6006	10/22/2021	2
Broken Val	T/FD	T/WQ	MXDDE00	1FTEX1CF	8/16/2021	IL	1469	EF06A212	8/5/2021	LEP (Nano)	2021		Engine sei:	T/EU	AJ	10/16/2021		11/4/2021	
Broken Val	T/FD	T/WQ	MQGE500	1FTEX1EF	########	MI	1956	EF06A203	12/17/2020	LEP (Nano)	2021	1/18/2022	Misfire, coc	T/EU	AJ	5/14/2021	6006	10/5/2021	5
Broken Val	T/FD	T/WQ	MQGE500	1FTEX1EF	########	MI	1956	EF06A203	12/17/2020	LEP (Nano)	2021		Misfire, coc	T/EU	AJ	5/14/2021		10/7/2021	
Broken Val	T/FD	T/WQ	N/A	1FTEX1EF	6/16/2021	AB	2381	EF06A211	5/7/2021	LEP (Nano)	2021	11/17/2021	Engine sei:	T/EU	AJ	7/30/2021	6006	9/9/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEX1EF	6/24/2021	NH	410	EF06A211	5/10/2021	LEP (Nano)	2021	11/1/2021	Engine sei:	T/EU	AJ	9/27/2021	6006	10/8/2021	1
Broken Val	T/FD	T/WQ	MQTB200	1FTEX1EF	8/2/2021	NY	1770	EF06A211	7/2/2021	LEP (Nano)	2021	11/25/2021	Engine sei:	T/EU	AJ	9/21/2021	6006	10/4/2021	1
Broken Val	T/FD	T/WQ	M3SBP001	1FTEX1EF	1/14/2021	IL	2080	EF06A210	1/7/2021	LEP (Nano)	2021	5/5/2021	Engine locl	T/EU	AF	2/1/2021	6006	3/17/2021	2
Broken Val	T/FD	T/WQ	N/A	1FTEX1EF	8/5/2021	BC	3038	EF06A212	7/26/2021	LEP (Nano)	2021	12/30/2021	Engine sei:	T/EU	AJ	9/24/2021	6006	12/14/2021	3
Broken Val	T/FD	T/WQ	MXPE500	1FTMF1CF	8/11/2021	CA	987	EF06A212	8/2/2021	LEP (Nano)	2021		Engine sei:	T/EU	AJ	9/16/2021		11/16/2021	

Claim Key	Region Co	Tech Com	Tech Com	Customer (	Country Sc	FileName2	Vehicle Lin	Vehicle Lin	Engine De	Engine Glc	Engine Glc	Transmissi	Transmissi	Transmission Type
							C/TU	U611A AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
248310	NA	verified vel	catastroph	DRIVABILI	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
591202	NA	EEC TEST	ON ALSO	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
395050	NA	ESSAYER	MAIS BAT	CLIENT MI	CAN		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
725203	CN	1.该车为救	援拖车回店	启动不着	CHN		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
859701	CN	电脑检测有	一些模块电	车辆行驶中	CHN		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1965439	NA	LTIS-verifie	coolant ca	ENGINE M	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
680062	NA	car overhea	stem to 21	ENGINE M	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1660381	IM	Concern ve	ue to crank	Engine not	ARE		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1059091	NA	VERIFIED	CONTROL	D21 CUST	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1663132	NA	VERIFY C	ING PAN A	C/S ENGIN	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1889143	NA	CAUSAL 6	DING UP-	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2244050	NA	VERIFIED	UND NO D	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
							C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1906688	NA	TOWED IN	CTED GO(	C31 CLICK	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2143177	NA	VERIFIED	RELATE W	C/S WILL	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2204718	NA	VEHICLE (	STICS BE(	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
							C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1770424	NA	VERIFIED	ED VALVE	VEHICLE S	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1969812	NA	verify conc	conv nuts	check veh	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1419915	NA	TECH 211	ANK NOIS	TOWED IN	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
							C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1596363	IM	Check the	. C14: NO.	The parkin	KOR		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1761165	NA	SUITE AU	moteur et r	VERIFIER	CAN		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1806924	IM	VERIFIED	TO ROTA	CAN NOT	KOR		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
							C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2201308	NA	NO START	EN CONNI	ENGINE IN	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2156438	NA	VERIFY AI	UT OF TIM	C/S VEHIC	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2202119	NA	VERIFIED	CTION. FC	ELECTRIC	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1816351	NA	PUT VEHI	ENGINE C	CHECK EN	CAN		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1681245	NA	VERIFIED	NT AND S	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2268480	NA	VERIFIED	ICLE IN NE	AUTO TO\	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
							C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2059338	IM	check neec	lly rotating	need to res	KOR		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1595840	NA	VERIFY C	NTACTED	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1864620	IM	Concern ve	Tried to ro	Engine run	ARE		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2145617	IM	VERIFIED	BLE AND I	ENGINE IS	KOR		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2244033	NA	CONFIRMI	SED INSF	CUSTOME	USA		C/TV	U611N AV	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
334055	NA	VERIFIED	L FLUID LE	CUST STA	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
903751	NA	VERIFIED	LE IN PIST	NO START	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1040245	NA	TECH 165	D AND W(	C/S THE V	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
854735	NA	TECH 754	RNATY BA	CUST STA	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
934263	NA	CHECK VE	P0305 P(	CUSTOME	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
748497	NA	verify conc	and new i	C/S ENGIN	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1016264	NA	VERIFIED	OISE CK	VEH DIED	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1642856	NA	(16) Verify	ps. As per	Vehicle tow	CAN		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
953358	NA	PERFORM	RK PLUGS	ADD ON R	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
968031	NA	VERIFIED	WITHIN SI	CUSTOME	USA		C/TW	U625N EX	3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A

1177875	NA	CONFIRM	USED BO	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1330380	NA	13.8 mtime	bad knocki	Electrical -	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2498180	NA	VERIFIED	OUGH THI	c/s that the	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1827462	NA	RAN EEC	EMOVED	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2038431	NA	P0304	P0 D SUB FR	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1946213	NA	Verify Eng	rank still w	D02 CUST	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1663574	NA	VERIFIED	NE CONDI	VEHICLE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2220132	NA	INTERNAL	EAD. SEN	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1505751	NA	VERIFIED	STED THE	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
						C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1556016	NA	Engine will	. Engine st	customer s	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1047577	NA	CAR CRAI	VER AND	GASOLINE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1664603	NA	verfied car	that the er	Electrical -	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1728654	NA	VERIFIED	ASSEMBL	DRIVING A	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2333842	NA	VERIFIED	INTAKE M	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1384379	NA	VERIFIED	PRESSION	TOW IN...	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1909411	NA	VERIFIED	. PERFOR	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1965620	NA	FUEL SAM	CYLINDEF	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1102130	NA	basic 6006	ire engine	ENGINE D	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1983084	NA	M-TIME 16	PE FOUNI	EXPLORE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1663146	NA	CC 42 BAS	E AND BR	E29 "CHE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2335499	NA	CASUAL F	OPED CYI	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2224037	NA	HOLDING	& THEN IT	C/S: WHE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
						C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1476442	NA	AFTER IN	E THE EN	WONT ST	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1413099	NA	VERIFIED	WITH BOI	DRIVEABI	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1774210	NA	NO START	D OIL DRA	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1316981	NA	CUSTOME	LINDER 4	CUST STA	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2132405	NA	Cause: ver	d position r	VEHICLE	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1972937	NA	Engine Dar	e Conditior	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1701594	NA	VERIFIER	T LEVER E	VERIFIER	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2079025	IM	Verify cust	ning (stuck	CHECK EN	SAU	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1980937	NA	REMOVEI	E AND AF	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
						C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1864874	NA	TEST BAT	ING OVER	C/S: AT RI	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1703669	NA	engine kno	parts - refil	OTHER EN	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1565090	NA	Confirmed	fferent. Mai	customer s	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1635873	NA	tested and	low time in	MR DIAG 2	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1945790	NA	TECH CHE	R BY HAN	CUST STA	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1555773	NA	verified eng	and locked	DRIVEABI	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1828626	NA	VERIFY C	MAL. REL/	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
2220595	NA	PPT HD1	SHORT TI	C/S HEAR	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1830304	NA	CHECK OI	RING. CHE	DRIVEABI	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1807098	NA	check caus	hg10 put	CHECK CA	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1816507	NA	UNIT DOW	I 6. REMO	ENGINE M	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1865262	NA	TECH INS	HAVE JUN	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
1607772	NA	VERIFIED	RELATIVE	CHECK EN	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
440544	NA	VERIFIED	MPRESSI	C.S VEHIC	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A
768741	NA	catastrophi	es not cran	DIAG Cust	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU A

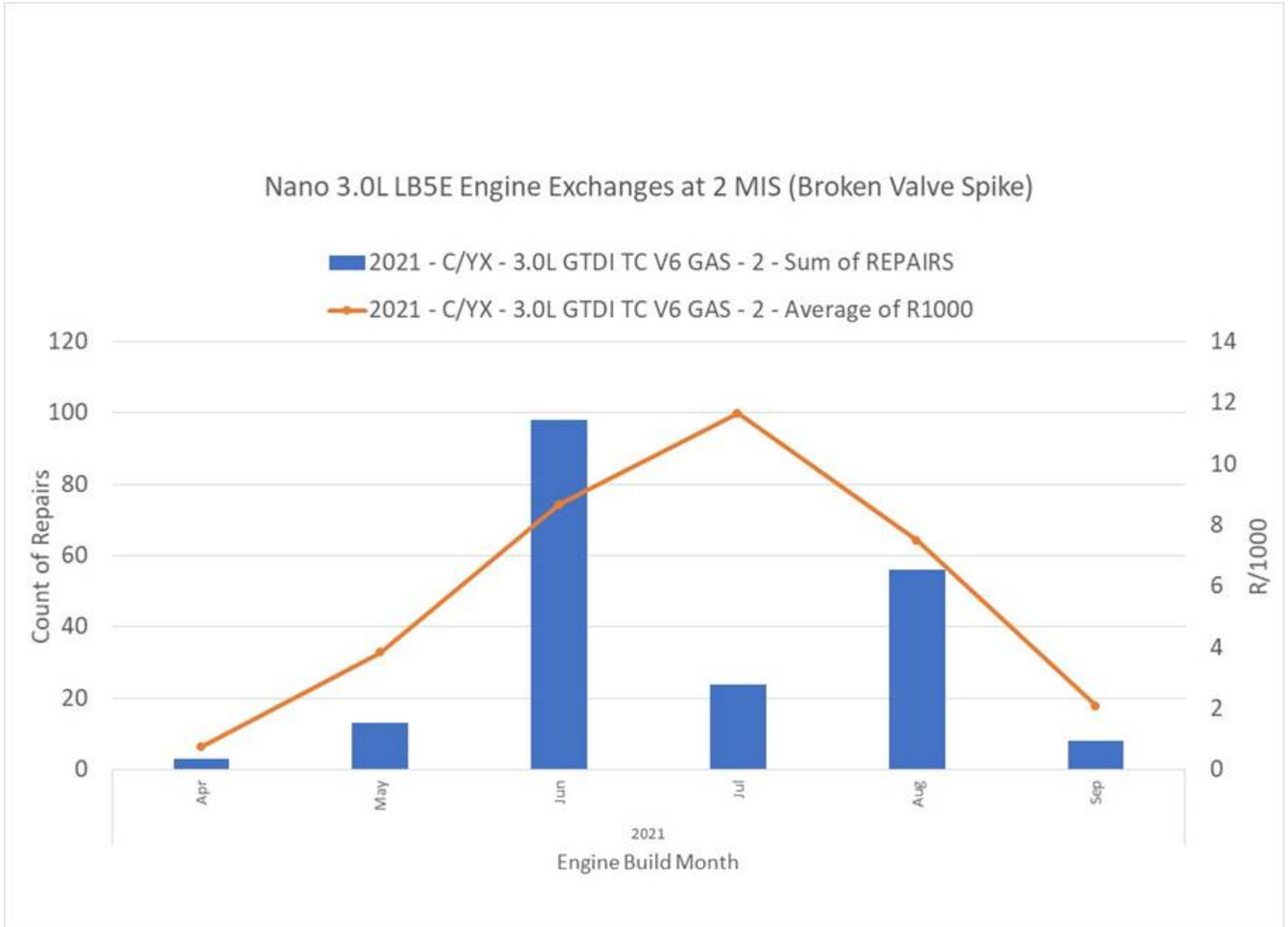
1148095	NA	verified cus	tried turnin	Customer S	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1747716	NA	VEHICLE \	ER. REMC	TOWED T	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1972566	NA	VERIFIED	ON CYLIN	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2334468	NA	VERIFIED	E XX FOU	TOWED IN	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2231788	NA	ENGINE W	not start. E	ENGINE W	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1728734	NA	VERIFY C	LINDER NI	CHECK AN	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1739577	NA	coolant leaking out of t	engine diec		USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1114874	NA	CONFIRMI	AMAGED	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2043306	NA	RAN OASI	OST CAP	C/S WHILI	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2333735	NA	PART#600	SYSTEM	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2245782	NA	Verified cu	as locked.	MAINTEN/	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1630863	NA	VERIFIED	METAL IN	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1375491	NA	CONFIRMI	r nouveau r	VEHICULE	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1845010	NA	VERIFY EI	TO TURN	VEHICLE I	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1057831	NA	NO CRANI	SERVICE	ADVISE T	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2347191	NA	INTAKE V	nd that eng	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1533644	NA	checked fo	tive compr	MIL lamp c	CAN	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1903617	IM	VERIFIED	EN AND D	ENGINE W	KOR	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1865684	NA	Vehicle un	metal in oil	Customer S	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2346882	NA	REMOVEI	D BROKEI	C/S VEHIC	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1659986	IM	Check the	er solenoid	While drivi	KOR	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
						C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2021465	NA	VERIFY-TI	PISTON C	C/S VEHIC	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1827695	NA	VERIFIED	MANUALL	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
1740606	NA	UNABLE T	RMED NO	CUSTOME	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
2343765	NA	AFTER R/I	DER LEAK	WARRAN	USA	C/TW	U625N	EX 3.0L GTDI	E2277	NANO GA	C/ET	10 SPD AU	A
						C/D9	U540N	MK 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1595008	NA	VERIFIED	PER BROI	TOW IN - \	USA	C/D9	U540N	MK 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1315517	NA	INSPECTE	AND INSP	CUSTOME	USA	C/D9	U540N	MK 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1844555	NA	confirmed	it. removed	Customer S	USA	C/D9	U540N	MK 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1516269	NA	TECH INS	2 OVER-F	CUSTOME	USA	C/D9	U540N	MK 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
						C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
2321307	NA	VERIFIED	D FOUND	CUSTOME	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
						C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1593778	NA	TECH DIA	WAPPED	CUSTOME	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
496232	NA	CONFIRMI	NK WAS E	OWNER R	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
2212991	NA	CYLINDEF	ND THAT	VEHICLE ~	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
2076975	NA	JAI VERIF	9 PRESEN	MOTEUR	CAN	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
2331472	NA	attempt to	plug and fo	CUSTOME	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1056328	NA	VERIFY N	CONVERT	C/S VEHIC	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1736875	NA	VERIFY C	. REMOVE	CUSTOME	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
2307911	NA	VERIFIED	TICALLY A	CHECK EN	CAN	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
						C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1484345	NA	VER CUST	OIST AND	CUSTOME	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1750287	NA	CHECKED	ER PASS	NO START	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
1794918	NA	VERIFY EI	EST FOR I	TOWED IN	USA	C/DQ	CD539N	E 2.7L DOH	E2277	NANO GA	C/FY	8 SPD AU	A
						T/G1	U725N	BR 2.7L DOH	E2277	NANO GA	T/ET	10 SPD AUTO TRANSMISSION-10R60	
2194014	NA	engine cra	damaged	ELECTRIC	USA	T/G1	U725N	BR 2.7L DOH	E2277	NANO GA	T/ET	10 SPD AUTO TRANSMISSION-10R60	
						T/G1	U725N	BR 2.7L DOH	E2277	NANO GA	T/ET	10 SPD AUTO TRANSMISSION-10R60	

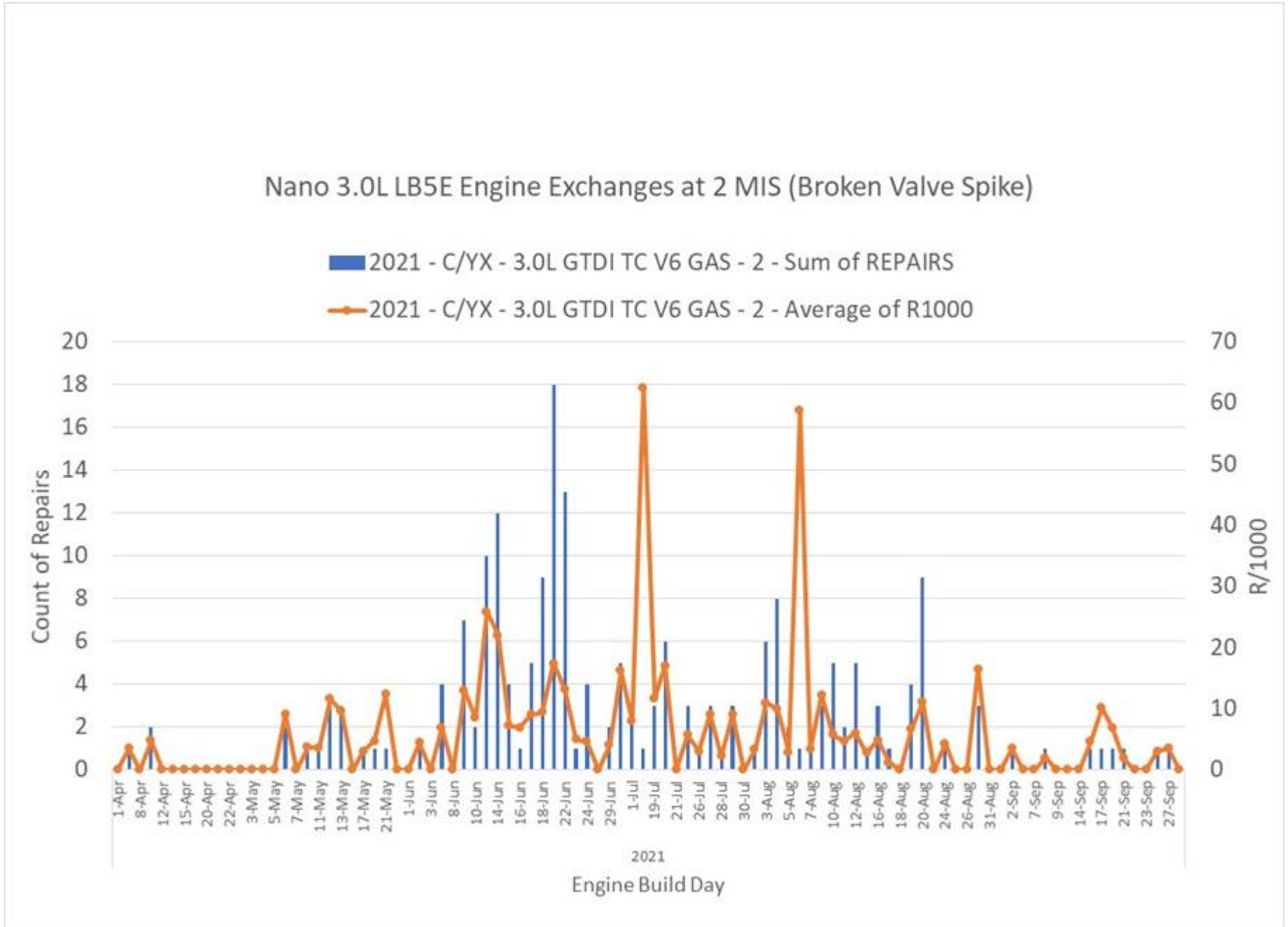
				T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
				T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1093139	NA	INSPECT .. FOUND S	TOWED IN	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2232223	NA	REMOVE : AND PART	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
					T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1545948	NA	VEHICLE ` CABLE N(	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1875302	NA	CHECK C(ELSE OK.	VEHICLE \	CAN	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1797850	NA	VERIFIED S WITH B(	CHECK P(	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1810172	NA	1578 CYLI CLICK RA	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
					T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2235167	NA	4411 MT F CYL 5 VAL	VERIFIER	CAN	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1343067	NA	SCANNED SHED OU`	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1865058	NA	VERIFIED #3 MISSIN	C/S THAT	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2158256	NA	VERIFIED NG BORO	DRIVEABI	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2049249	NA	CAME IN \ TURN. RE	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1093043	NA	eec test p0 causing c	c/s that wh	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
					T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1726948	NA	***2292***(L FULL OF	PLEASE IN	CAN	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1674114	NA	VERIFED (CED ENGI	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1963746	NA	CHECK F(ARE 0% L(	TOW IN-E	CAN	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1865702	NA	VERIFIED HAS EXTI	CUST STA	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1958052	NA	Verified co(compressi	DIAG CUS	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2224056	NA	VERIFIED NECESS.	customer s	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
					T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1370268	NA	VERIFIED S ENGINE	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1535645	NA	VERIFIED LL CHECK	ADDED LII	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1934013	NA	VERIFIED FOUND N(	TOWED IN	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1619706	NA	VERIFIED WED SYM	CUST STS	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
2031450	NA	Verified cu: GAS bottle	CUSTOME	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1920356	NA	CUSTOME NO RELAT	ENGINE H	USA	T/G1	U725N BR	2.7L DOH(	E2277	NANO GA:	T/ET 10 SPD AUTO TRANSMISSION-10R60
1429452	NA	LOW CON OUGH EXI	C/S ENGIN	USA	09 to 19M\	T/FC	P552N F-1	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1953506	NA	VERIFIED ROSS WR	CUSTOME	USA		T/FC	P552N F-1	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1979793	NA	VERIFY C(KAM RES	CUSTOME	USA		T/FC	P552N F-1	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
2003621	NA	VERIFY C(ITION REN	DIAGNOSI	USA		T/FC	P552N F-1	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
2016010	NA	PERFORM VED CAB (	customer s	USA		T/FC	P552N F-1	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1928556	NA	6513 CC 4 VED SPAF	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1971040	NA	D4/6108 V RANKING.	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
585217	NA	VERIFIED N THE CR.	ENGINE C	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
2204203	WD	VERIFIED L PSI TES	C/I NO ST,	PRI		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
						T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1856730	NA	9725 - VEF ITH FUEL	: Vehicle tc	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
						T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1845381	NA	IDS SYST ED ENGIN	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1673823	NA	REPLACE had 150ps	PERFORM	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1933388	NA	INSPECT `. REMOVE	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1343288	NA	VERIFY C(8-YES 12. `	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1316466	NA	CP-6006 (MEDIATEL	CUSTOME	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
						T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A
1213096	NA	ENGINE F ried to turn	ENGINE ((	USA		T/FD	P702N F15	2.7L DOH(	E2277	NANO GA: T/EU 10 SPD AU A

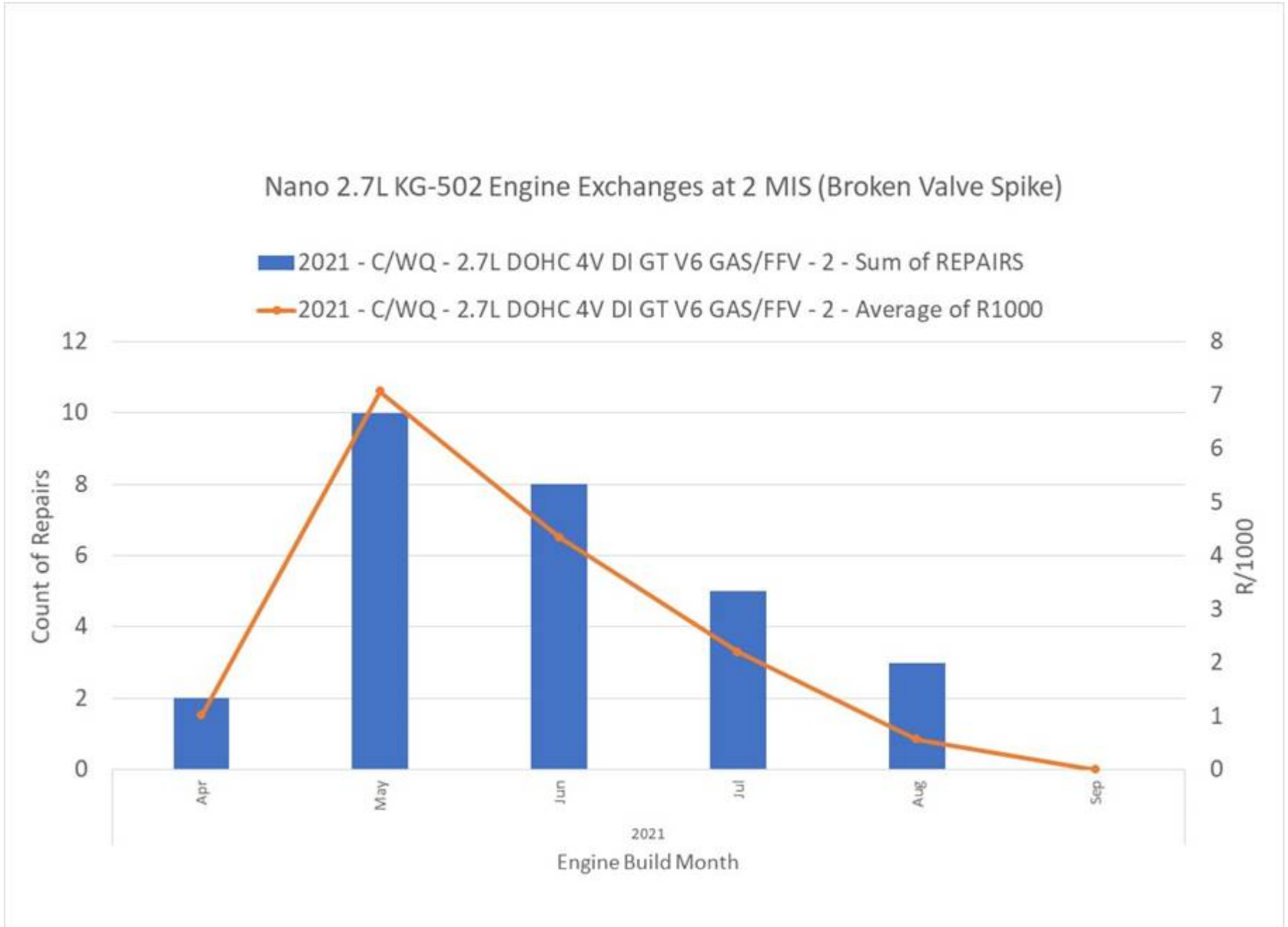
1345994	NA	42 6507 \ AND STAI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1865657	NA	INSPECT . PARK PLL	GAS ENGI	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1559282	NA	NOTED TH VEHICLE	CS WHILE	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1630157	NA	WF94 FAC ND HAS W	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1809131	NA	VERIFIED N FOR INS	crank no st	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1675302	NA	VERIFY C O REMOV	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1546278	NA	EEC TEST HE CYLINI	C/S CHEC	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2333823	NA	VERIFY C FOUND V	C/S VEH S	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1970496	NA	ENG ASY A CRANK	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
					T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2078017	NA	LOW TIME AND A NE	CS TRUCK	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1702727	NA	REMOVE S ILE ENGIN	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1827972	NA	RAN EEC IDE CYLIN	TRUCK TC	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1458989	NA	PERFORM REFILL FL	DIAGNOSI	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1674648	NA	CK CONCI TEST ANI	C-S HAVIN	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1846107	NA	Tech 27 W charged a	WEAK OR	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2065163	NA	VERIFIED VEHICLE (	CHECK FC	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1578721	NA	SUBMIT F CK HEATE	AS PER D	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2248995	NA	upon vehic and was le	Customer S	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2222813	NA	ATTEMPT ED SINCE	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
					T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1794248	NA	verified che ed P06E9	CHECK EN	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1866724	NA	EEC TEST S A4-YES ;	CHECK N	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1557579	NA	VERIFIED CUSTOMI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1082410	NA	CHECKED FOUND PI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2059941	NA	VEHICLE I 304 P030(	CUST JUS	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1498211	NA	INTERNAL IVE BELT C/S WAS I		USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1418606	NA	TECH VEF Y B8-Y. FI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1919850	NA	verified cus e will not tu	CUSTYON	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1873433	NA	Customer s med gsm r	Customer s	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2044625	NA	VERIFIED NSPECT T	D02 C/S T	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1010570	NA	Vehicle wil Vehicle wi	C STATES	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1827068	NA	CHECK OI THE CYLI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1867156	NA	INTAKE V, OVE ENGI	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1946388	NA	VERIFIED INTAKE M	VEHICLE (	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2061521	NA	VERIFIED MOVED BI	17-DRIVE/	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1794578	NA	CHECK AI PONENTS	EXTREME	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1213905	NA	CHARGEL OUND ME	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2168875	NA	VERIFIED P0607 -00	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1714550	NA	VERIFEID OT. REMC	OWNER S	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1981871	NA	(TECH 68E TEMPT TC	CHECK FC	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1495633	NA	OIL IN EN(TO CYLINI	TRUCK ST	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1905537	NA	CONFIRMI MED REL/	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2220567	NA	FAIS TES" rieur. essay	DIAGNOS"	CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
					T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1155773	NA	CONFIRMI HAT MATC	C/S: ENGI	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1718373	NA	VERIFIED MISFIRE. (	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
1842431	NA	VERIFED (WITH BOF	CUSTOME	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A
2335457	NA	COMPLAIN ENGINE F	C/S VEHIC	USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU 10 SPD AU A

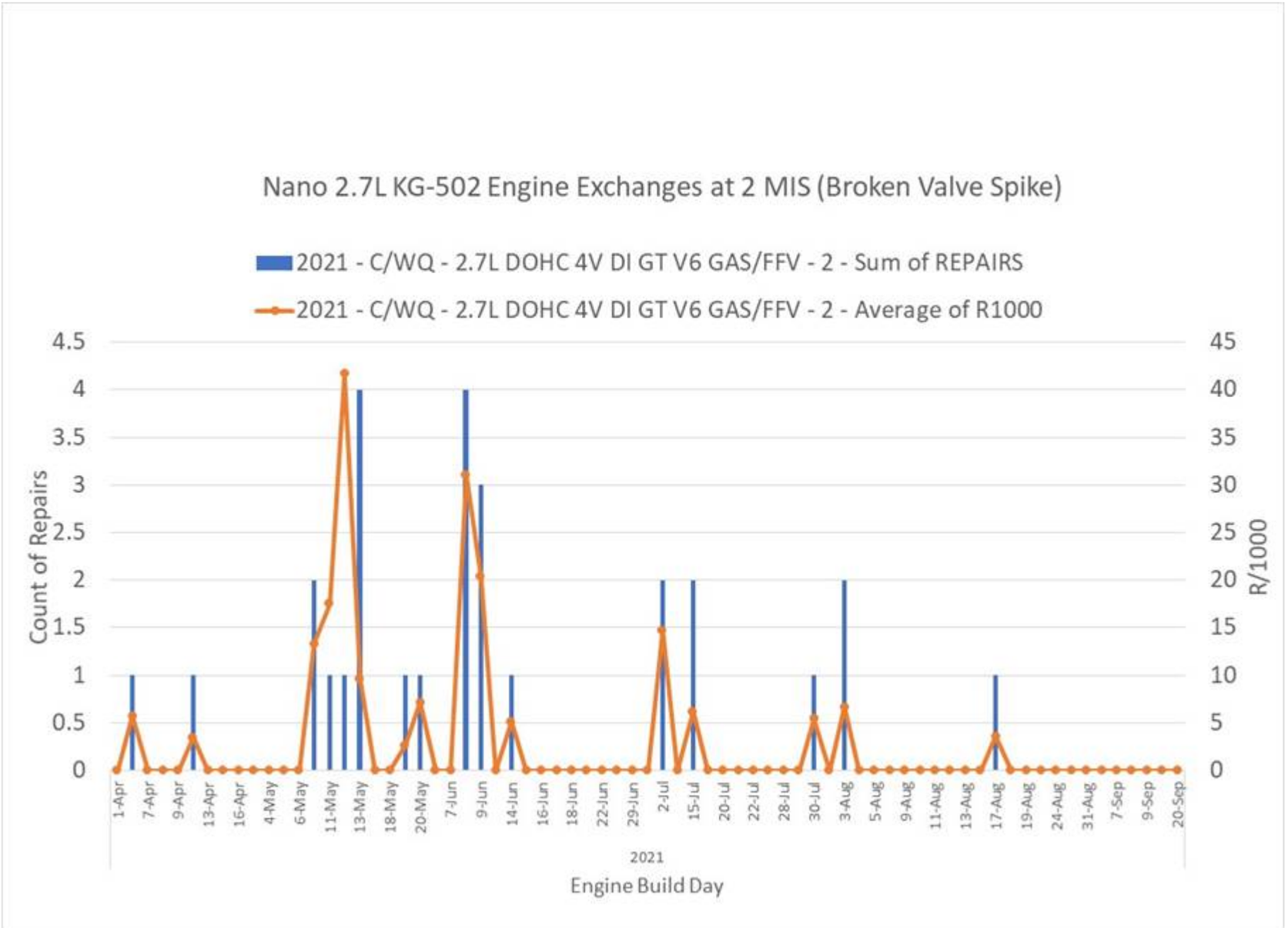
1797098	NA	went to cra wn found 3 ENGINE N CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
			T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1827732	NA	VERIFY C FOUND C CK ENGIN USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1418574	NA	eec test co er now clic CUST STA USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1278268	NA	DW ON FC CAM SET VERIFIED CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1415902	NA	TECH 411 FOUND LE Customer S USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1644407	NA	VEHICLE \ ENGINE H can smell c USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1665993	NA	MAY BE M EXHAUST CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1818467	NA	verify custc no di2 no c MINOR EN USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1417796	NA	3298 VERI EO TEST. CUSTMOE USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1607272	NA	(TECH 68E FAULT) + CHECK FC CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1986353	NA	ROAD TES P0303. P0: VEHICLE S USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1945587	NA	VERIFY N VER BY H. VEHICLE \ USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2246083	NA	VERIFIED USED A B CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1845191	NA	VERIFIED TO FSAC , CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
891972	NA	VERIFIED NTACT W FOUND AF USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1287257	NA	TOWED IN RK PLUGS TOWED IN CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1352752	NA	VERIFY. F 0 PSI. PEF WHITE SM USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1442348	NA	Inspected. re scope. L Customer S USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1647410	NA	PERFORM 6 0PSI PLI CUST STA USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2153889	NA	CAME IN \ QUARTEF CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1084197	NA	Diag for a l er perform ELECTRIC CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1910189	NA	2.7L GTDI Y. REMOV AFTER ST USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1720572	NA	VERIFIED ALVE. REI CHECK AN CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
			T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1662463	NA	verified. ch ab. remove WHEN TR USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2279846	NA	VERIFIED RELATIVE C/S WHILE USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2062320	NA	#6 intake v ttery dead j DIAGNOSI USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1684736	NA	MIL ON PC SP #4 INT, CHECK EN USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2224852	NA	see note br ter then thi ADVISE O USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1759943	NA	VERIFIED CYLS. (US CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
453300	NA	TIME TO C NOSE BY CUSTOME USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1157235	NA	Checked e e oil is over CONTINUE USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2204010	NA	VERIFIED ING ROD ¯ LOW OIL I USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
			T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2322776	NA	engine is r removal se SES LIGH USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
			T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1794247	NA	CAUSAUL 7E1 1.4 PF FORD RO CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1663453	NA	CK CONCI REPLACE OWNER S USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
1864240	NA	NO START ON. INSPE TRUCK DI USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
557424	NA	CHECK CC RANKS FL VEHICLE I USA	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
2166832	NA	Diag for tru vehicle int DRIVEABI CAN	T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A
			T/FD	P702N F15	2.7L DOHC	E2277	NANO GA	T/EU	10 SPD AU	A

From: Hewlett, Matt (M.S.)
Sent: Wednesday, February 23, 2022 10:00 AM
To: Lyons, Marcus (M.I.)
Subject: Valve Warranty
Attachments: Broken Valve r1000 cpu 21MY (Jan 18 2022 data pull).xlsx

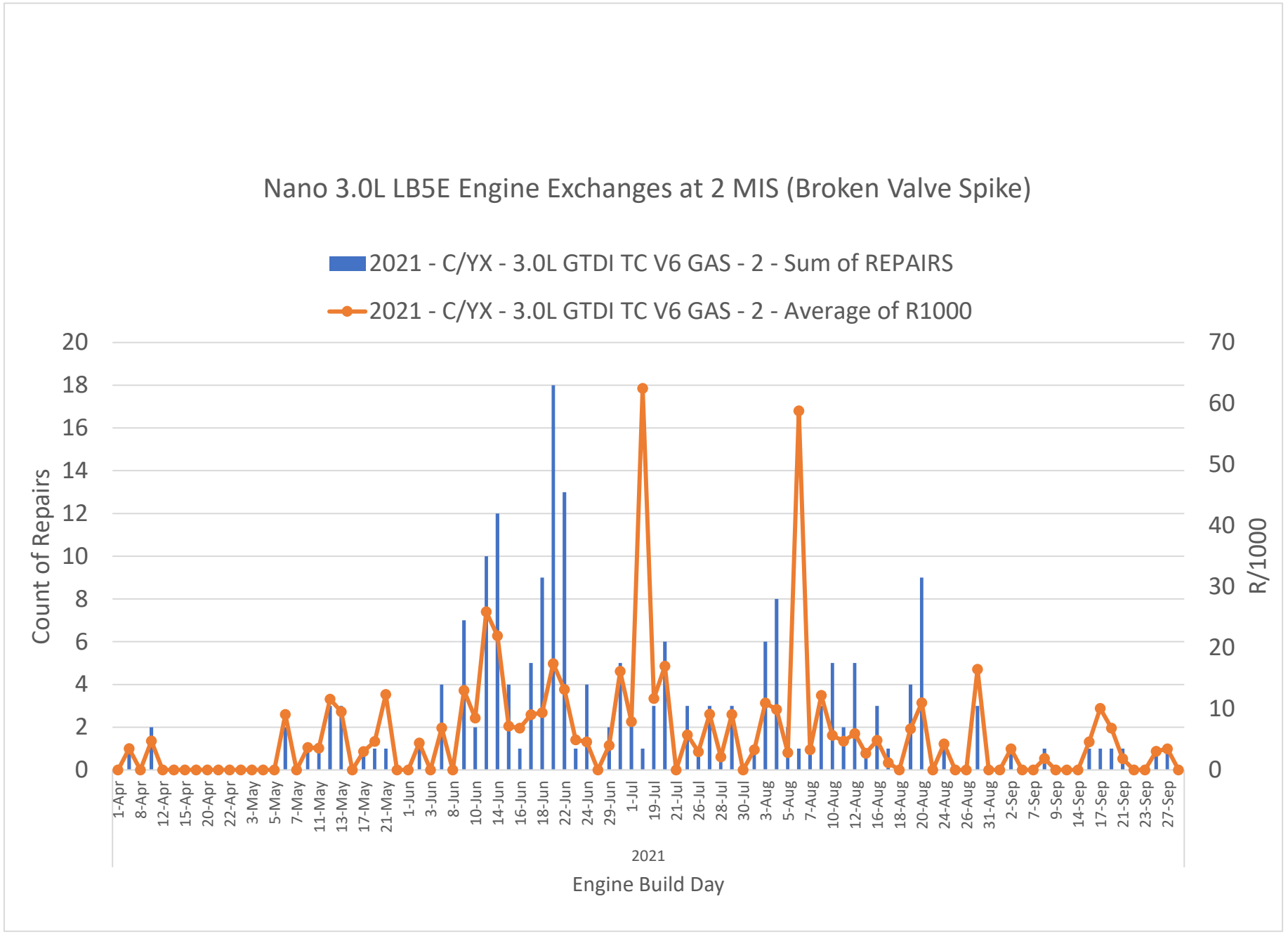

Nano 3.0L LB5E Engine Exchanges at 2 MIS (Broken Valve Spike)
2021 - C/YX - 3.0L GTDI TC V6 GAS - 2 - Sum of REPAIRS
2021 - C/YX - 3.0L GTDI TC V6 GAS - 2 - Average of R1000
Count of Repairs
R/1000
120
100
80
60
40
20
0
14
12
10
8
6
4
2
0
Apr
May
Jun
Jul
Aug
Sep
2021
Engine Build Month


Nano 3.0L LB5E Engine Exchanges at 2 MIS (Broken Valve Spike)
2021 - C/YX - 3.0L GTDI TC V6 GAS - 2 - Sum of REPAIRS
2021 - C/YX - 3.0L GTDI TC V6 GAS - 2 - Average of R1000
Count of Repairs
R/1000
Engine Build Day
2021


Nano 2.7L KG-502 Engine Exchanges at 2 MIS (Broken Valve Spike)
2021 - C/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV - 2 - Sum of REPAIRS
2021 - C/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV - 2 - Average of R1000
Count of Repairs
R/1000
0
2
4
6
8
10
12
0
1
2
3
4
5
6
7
8
Apr
May
Jun
Jul
Aug
Sep
2021
Engine Build Month


Nano 2.7L KG-502 Engine Exchanges at 2 MIS (Broken Valve Spike)
2021 - C/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV - 2 - Sum of REPAIRS
2021 - C/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV - 2 - Average of R1000
Count of Repairs
R/1000
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
45
40
35
30
25
20
15
10
5
0
1-Apr
7-Apr
9-Apr
13-Apr
16-Apr
4-May
6-May
11-May
13-May
18-May
20-May
7-Jun
9-Jun
14-Jun
16-Jun
18-Jun
22-Jun
29-Jun
2-Jul
15-Jul
20-Jul
22-Jul
28-Jul
30-Jul
3-Aug
5-Aug
9-Aug
11-Aug
13-Aug
17-Aug
19-Aug
24-Aug
31-Aug
7-Sep
9-Sep
20-Sep
2021
Engine Build Day

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069



PE22-007 000191 WTY

PROD_MONTH (blank)

Column Labels								
	2021							
	C/YX - 3.0L GTDI TC V6 GAS		C/YX - 3.0L GTDI TC V6 GAS Sum of REPAIRS	C/YX - 3.0L GTDI TC V6 GAS Average of R1000	2021 Sum of REPAIRS	2021 Average of R1000	Total Sum of REPAIRS	Total Average of R1000
Row Labels	Sum of REPAIRS	Average of R1000						
2021	202	5.912395833	202	5.912395833	202	5.912395833	202	5.912395833
1-Apr	0	0	0	0	0	0	0	0
6-Apr	1	3.51	1	3.51	1	3.51	1	3.51
8-Apr	0	0	0	0	0	0	0	0
9-Apr	2	4.73	2	4.73	2	4.73	2	4.73
12-Apr	0	0	0	0	0	0	0	0
13-Apr	0	0	0	0	0	0	0	0
15-Apr	0	0	0	0	0	0	0	0
19-Apr	0	0	0	0	0	0	0	0
20-Apr	0	0	0	0	0	0	0	0
21-Apr	0	0	0	0	0	0	0	0
22-Apr	0	0	0	0	0	0	0	0
2-May	0	0	0	0	0	0	0	0
3-May	0	0	0	0	0	0	0	0
4-May	0	0	0	0	0	0	0	0
5-May	0	0	0	0	0	0	0	0
6-May	2	9.09	2	9.09	2	9.09	2	9.09
7-May	0	0	0	0	0	0	0	0
10-May	1	3.68	1	3.68	1	3.68	1	3.68
11-May	1	3.56	1	3.56	1	3.56	1	3.56
12-May	3	11.58	3	11.58	3	11.58	3	11.58
13-May	3	9.54	3	9.54	3	9.54	3	9.54
14-May	0	0	0	0	0	0	0	0
17-May	1	3.02	1	3.02	1	3.02	1	3.02
20-May	1	4.67	1	4.67	1	4.67	1	4.67
21-May	1	12.35	1	12.35	1	12.35	1	12.35
22-May	0	0	0	0	0	0	0	0
1-Jun	0	0	0	0	0	0	0	0
2-Jun	1	4.41	1	4.41	1	4.41	1	4.41
3-Jun	0	0	0	0	0	0	0	0
7-Jun	4	6.87	4	6.87	4	6.87	4	6.87
8-Jun	0	0	0	0	0	0	0	0
9-Jun	7	13.01	7	13.01	7	13.01	7	13.01
10-Jun	2	8.49	2	8.49	2	8.49	2	8.49
11-Jun	10	25.9	10	25.9	10	25.9	10	25.9
14-Jun	12	21.98	12	21.98	12	21.98	12	21.98
15-Jun	4	7.18	4	7.18	4	7.18	4	7.18
16-Jun	1	6.85	1	6.85	1	6.85	1	6.85
17-Jun	5	9.04	5	9.04	5	9.04	5	9.04
18-Jun	9	9.38	9	9.38	9	9.38	9	9.38
21-Jun	18	17.39	18	17.39	18	17.39	18	17.39
22-Jun	13	13.19	13	13.19	13	13.19	13	13.19
23-Jun	1	4.95	1	4.95	1	4.95	1	4.95
24-Jun	4	4.6	4	4.6	4	4.6	4	4.6
28-Jun	0	0	0	0	0	0	0	0
29-Jun	2	4.03	2	4.03	2	4.03	2	4.03
30-Jun	5	16.15	5	16.15	5	16.15	5	16.15
1-Jul	3	7.93	3	7.93	3	7.93	3	7.93
2-Jul	1	62.5	1	62.5	1	62.5	1	62.5
19-Jul	3	11.7	3	11.7	3	11.7	3	11.7
20-Jul	6	16.99	6	16.99	6	16.99	6	16.99
21-Jul	0	0	0	0	0	0	0	0
22-Jul	3	5.73	3	5.73	3	5.73	3	5.73
26-Jul	1	3	1	3	1	3	1	3
27-Jul	3	9.13	3	9.13	3	9.13	3	9.13
28-Jul	1	2.15	1	2.15	1	2.15	1	2.15
29-Jul	3	9.09	3	9.09	3	9.09	3	9.09
30-Jul	0	0	0	0	0	0	0	0
2-Aug	1	3.33	1	3.33	1	3.33	1	3.33
3-Aug	6	10.97	6	10.97	6	10.97	6	10.97
4-Aug	8	9.9	8	9.9	8	9.9	8	9.9
5-Aug	2	2.82	2	2.82	2	2.82	2	2.82
6-Aug	1	58.82	1	58.82	1	58.82	1	58.82
7-Aug	1	3.33	1	3.33	1	3.33	1	3.33
9-Aug	3	12.22	3	12.22	3	12.22	3	12.22
10-Aug	5	5.65	5	5.65	5	5.65	5	5.65
11-Aug	2	4.71	2	4.71	2	4.71	2	4.71
12-Aug	5	5.96	5	5.96	5	5.96	5	5.96
13-Aug	1	2.72	1	2.72	1	2.72	1	2.72
16-Aug	3	4.86	3	4.86	3	4.86	3	4.86
17-Aug	1	1.18	1	1.18	1	1.18	1	1.18
18-Aug	0	0	0	0	0	0	0	0
19-Aug	4	6.73	4	6.73	4	6.73	4	6.73
20-Aug	9	11.01	9	11.01	9	11.01	9	11.01
23-Aug	0	0	0	0	0	0	0	0
24-Aug	1	4.27	1	4.27	1	4.27	1	4.27
25-Aug	0	0	0	0	0	0	0	0
26-Aug	0	0	0	0	0	0	0	0
30-Aug	3	16.48	3	16.48	3	16.48	3	16.48
31-Aug	0	0	0	0	0	0	0	0
1-Sep	0	0	0	0	0	0	0	0
2-Sep	1	3.47	1	3.47	1	3.47	1	3.47
3-Sep	0	0	0	0	0	0	0	0
7-Sep	0	0	0	0	0	0	0	0
8-Sep	1	1.88	1	1.88	1	1.88	1	1.88
9-Sep	0	0	0	0	0	0	0	0
10-Sep	0	0	0	0	0	0	0	0
14-Sep	0	0	0	0	0	0	0	0
15-Sep	1	4.61	1	4.61	1	4.61	1	4.61
17-Sep	1	10.1	1	10.1	1	10.1	1	10.1
20-Sep	1	6.85	1	6.85	1	6.85	1	6.85
21-Sep	1	1.83	1	1.83	1	1.83	1	1.83
22-Sep	0	0	0	0	0	0	0	0
23-Sep	0	0	0	0	0	0	0	0
24-Sep	1	3.06	1	3.06	1	3.06	1	3.06
27-Sep	1	3.46	1	3.46	1	3.46	1	3.46
29-Sep	0	0	0	0	0	0	0	0
Grand Total	202	5.912395833	202	5.912395833	202	5.912395833	202	5.912395833

Search Criteria	
UserID	LBEYER4
Report Date Time	2022-05-25 11:17:52
Total Result Count	7540
Manufacturer	FORD MOTOR COMPANY
Model	BRONCO;EXPLORER;AVIATOR;F-150;F-150 HERITAGE;MKX;NAUTILUS;EDGE
Component	SYSTEM;ENGINE AND ENGINE COOLING:COOLING SYSTEM:FAN;ENGINE AND ENGINE COOLING:COOLING SYSTEM:HOSE;ENGINE AND ENGINE COOLING:COOLING SYSTEM:HOSES/LINES/PIPING/FITTINGS;ENGINE AND ENGINE COOLING:COOLING SYSTEM:PUMP;ENGINE AND ENGINE COOLING:COOLING SYSTEM:RADIATOR ASSEMBLY;ENGINE AND ENGINE COOLING:CRITICAL FASTENERS;ENGINE AND ENGINE COOLING:ENGINE;ENGINE AND ENGINE COOLING:ENGINE:CRANK/CAMSHAFT POSITION SENSOR;ENGINE AND ENGINE COOLING:ENGINE:DIESEL;ENGINE AND ENGINE COOLING:ENGINE:ENGINE CONTROL MODULE (ECU/ECM);ENGINE AND ENGINE COOLING:ENGINE:ENGINE CONTROL MODULE (ECU/ECM):SOFTWARE;ENGINE AND ENGINE COOLING:ENGINE:GASOLINE;ENGINE AND ENGINE COOLING:ENGINE:GASOLINE:BELTS AND ASSOCIATED PULLEYS;ENGINE AND ENGINE COOLING:ENGINE:GASOLINE:TURBO-CHARGER;ENGINE AND ENGINE COOLING:ENGINE:GASOLINE:TURBO/SUPERCHARGER;ENGINE AND ENGINE COOLING:ENGINE:GASOLINE:TURBO/SUPERCHARGER:INTERCOOLER;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION: OIL COOLER;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION:FILTER/SCREEN;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION:PRESSURE/TEMPERATURE SENSOR;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION:SEALS/GASKETS;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION:SUMP/TANK;ENGINE AND ENGINE COOLING:ENGINE:OIL/LUBRICATION:SUMP/TANK:DRAIN PLUG;ENGINE AND ENGINE COOLING:ENGINE:OTHER FUEL TYPES:TURBO-CHARGER;ENGINE AND ENGINE COOLING:ENGINE:OTHER FUEL TYPES:TURBO/SUPERCHARGER;ENGINE AND ENGINE COOLING:ENGINE:SOLENOID/ACTUATOR;ENGINE AND ENGINE COOLING:EXHAUST SYSTEM;ENGINE AND ENGINE COOLING:EXHAUST SYSTEM:EMISSION CONTROL;ENGINE AND ENGINE COOLING:EXHAUST

S.No	Source	ODI/Source ID #	CMPL ID	Incident Date	Load/Received Date	Date Added to Source	VIN	Manufacturer	Make	Model	Model Year	Significant Event	Fatality #	Injury #	Country	State/Province	City	Odometer	Occurences
176	NHTSA	11448171	1788994	01-12-2022	02-11-2022	01-20-2022	1FMEE5DP5MLA71030	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	GA	Lawrenceville	0	0
321	NHTSA	11448461	1789394	09-10-2021	02-11-2022	01-22-2022	1FMEE5DP5ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	MI	Holly	0	0
159	NHTSA	11450659	1792661	01-28-2022	02-13-2022	02-06-2022	1FMEE5DP5MLA71271	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	TX	Spring	0	0
169	NHTSA	11450702	1792723	01-19-2022	02-13-2022	02-06-2022	1FMEE5DP6ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	FL	Middleburg	0	0

215	NHTSA	11450737	1792770	12-16-2021	02-13-2022	02-07-2022	1FMEE5BP0MLA93701	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	DE	Lewes	0	0
204	NHTSA	11450788	1792830	12-23-2021	02-13-2022	02-07-2022	1FMDE5FP3MLA20375	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	CA	Hollister	2322	0

250	NHTSA	11450871	1792947	11-14-2021	02-13-2022	02-07-2022	1FMEE5BP4MLA68994	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	VA	Vinton	0	0
232	NHTSA	11450879	1792955	12-08-2021	02-13-2022	02-07-2022	1FMDE5AP2MLA77576	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	IN	Whitelan d	0	0

168	NHTSA	11451158	1793353	01-22-2022	02-13-2022	02-09-2022	1FMEE5DP5MLA93495	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	NC	Wadesboro	0	0
135	NHTSA	11451503	1793800	02-06-2022	02-20-2022	02-11-2022	1FMEE5DP3ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	TN	Knoxville	0	0

226	NHTSA	11451957	1794449	12-11-2021	02-20-2022	02-14-2022	1FMEE5DPXMLA90155	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	NM	Albuquerque	0	0
193	NHTSA	11452074	1794611	12-31-2021	02-20-2022	02-15-2022	1FMEE5DP7MLA93627	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	CA	Redondo Beach	0	0
123	NHTSA	11452692	1795523	02-17-2022	02-27-2022	02-18-2022	1FMEE5BP0MLA78146	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	FL	Windermere	0	0

110	NHTSA	11453669	1797014	02-22-2022	02-27-2022	02-23-2022	1FMEE5DP8MLA92941	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	CA	Oceanside	0	0
128	NHTSA	11453933	1797407	02-14-2022	02-27-2022	02-24-2022	1FMEE5EP6ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	UT	Park City	0	0
105	NHTSA	11454098	1797696	02-24-2022	03-07-2022	02-25-2022	1FMEE5DP9MLA88378	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	OK	Tulsa	0	0

95	NHTSA	11455294	1799341	02-28-2022	03-21-2022	03-05-2022	1FMDE5AP4ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	IN	FORT WAYNE	0	0
203	NHTSA	11456219	1800462	12-24-2021	03-13-2022	03-10-2022	1FMDE5CP4ML	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	WA	Kirkland	0	0

75	NHTSA	11456713	1801142	03-13-2022	03-21-2022	03-14-2022	1FMDE5CP2MLA61925	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	NY	Rochester	0	0
73	NHTSA	11459262	1804838	03-14-2022	04-10-2022	04-01-2022	1FMEE5DP4MLA77160	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	MI	Farmington Hills	0	0

38	NHTSA	11460124	1805996	04-08-2022	04-18-2022	04-08-2022	99999999999	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	CA	SAN DIEGO	0	0
39	NHTSA	11460125	1805997	04-08-2022	04-18-2022	04-08-2022	99999999999	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	KY	CRESTWOOD	0	0
28	NHTSA	11461178	1807462	04-18-2022	04-26-2022	04-18-2022	99999999999	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	NV	INCLINE VILLAGE	0	0
234	NHTSA	11463199	1810324	12-08-2021	05-09-2022	05-03-2022	1FMDE5AP2MLA77576	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	IN	Whiteland	0	0

86	NHTSA	11463296	1810457	03-07-2022	05-09-2022	05-03-2022	1FMDE5FPXMLA20387	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	AK	North Pole	0	0

9	NHTSA	11464516	1812151	05-05-2022	05-22-2022	05-13-2022	1FMEE5DP6MLA72459	FORD MOTOR COMPANY	FORD	BRONCO	2021		0	0	UNITED STATES	CA	granite bay	0	0

Component	Consumer Comments	ASO Bin	NHTSA Provided	On Engine Exchange List?	Comment	On DP Opening Resume?	On PE Opening Resume?	Vehicle Speed	Vehicle speed unit
ENGINE	The 2.7 L engine failed going down the interstate in the middle lane. Complete loss of power. Was fortunate to be able to coast to the shoulder. Dealer says the engine failed and needs to be replaced.	A1	Y			Y	Y	0	
ENGINE	Without any warning lamps, messages or any other symptoms, lost acceleration power going roughly 45mph. I was traveling on a rural road, but this could have caused a serious accident if this would've happened in traffic or a highway. Dealer diagnosed a dropped valve in 2.7L engine, almost 2400 miles.	A1	Y			Y	Y	45	
ENGINE	pulled up to stop light. car shuddred coughed and conked out. Got it started, coughing and sputtering. Made is 2 miles to get home. Had it towed to dealer. Dealer first said I got water in engine. There is no way that happend. Then they said ford will be paying for it to be repaired. 4,400 miles on her.	A1		Y		Y	Y	0	
ENGINE	broke down with 2058 miles. Flashing engine light, strong fumes smell and vigorously shaking. Ford customer care said there's nothing they could do. Not even a loaner for a $63k vehicle.	A1				Y	Y	50	

ENGINE	One of the engine valve rods failed and punched a 3 hole in the engine block. I was traveling about 70 MPH when the engine light came on and the vehicle started to loose power. At the time I was on a major highway and barely had enough time to get off on the shoulder before the engine quit entirely. Fortunately, I had enough time to get off the highway, but what if this had happened somewhere on a highway where I could not safely pull off on the shoulder???	A1	Y			Y	Y	70	
ENGINE	The contact owns a 2021 Ford Bronco. The contact stated that while at a stop sign, the vehicle experienced a catastrophic engine failure. There were no warning lights illuminated. The vehicle was towed to the local dealer where it was diagnosed that the engine needed to be replaced. The vehicle was repaired after several weeks. The manufacturer was notified of the failure however, no further assistance was provided. The approximate failure mileage was 2,322.	A1	Y			Y	Y	0	

ENGINE	the 2.7 ecoboost engine on my 2021 Bronco, with 2744 miles, shut off without warning. I was traveling on the interstate, going approximately 75 mph, with my girlfriend and elderly mother as passengers. The Bronco lost all acceleration and the service engine light came on. Fortunately, I was able to coast to the nearest exit ramp. After bringing the vehicle to a stop, I attempted to restart the Bronco to no avail. The starter would engage, but the engine would not fire back up. I unhooked the battery cable in an attempt to reset the electronics, but this did not work either. I then checked to make sure all of the fuses were tight, but the vehicle still wouldn't start. The vehicle was transported to the nearest	A1	Y	Y		Y	Y	75	
ENGINE	While driving on interstate engine shut off. Was able to get to side of the road easily because it was late at night. Was not able to restart once coming to a complete stop. Had towed to dealer. Dealer could not get engine to start. Dealer found what looked to be a dropped valve. No indicators on the dash as to what was happening.	A1	Y	Y		Y	Y	70	

ENGINE	Driving in town at a speed of 30 mph (speed limit 35). Engine dropped a valve. Engine was destroyed internally and locked up. I quickly put the transmission in neutral and pulled off to the side of the street. This could have been a bad accident if it had happened on a highway at speeds. Ford has an issue with these engines. They know that there is an issue and they are waiting on them to fail and then fix them. I am a member of a forum (www.bronco6g.com) with a few bronco owners and there are at least 35 engines that have failed. Someone is going to get hurt or worse.	A1	Y			Y	Y	30	
ENGINE	I experienced complete motor failure while traveling on the highway near my home. I was able to move across traffic to the shoulder of the highway. The vehicle would not re-start, and a tow service was required to take it to the dealership. They have informed the the motor is blown, and will require complete replacement. The vehicle has 6,600 miles and is fully covered under warranty. There were no prior warning or alarm indications, smoke, noise, etc to indicate and issue. The pertinent engine information is included in a picture as attachment.	A1	Y			Y	Y	55	

ENGINE	On 12/11/2021 at 1,166 miles and after 35 days of owning the new vehicle I was traveling on interstate 40 about 400 miles from home. I was doing approximately 80 mph on the highway when the vehicle shuddered. Luckily right in front of an off-ramp. So I quickly pulled on the off-ramp. The engine light and several alarms went off and the vehicle died while traveling on the road. I was able to pull close to the side, but still in traffic. The engine was dead. It melted. It died on the highway, at high speed, with other cars around, with 1,166 miles on it. Brand new. It is still in the shop two months later.	A1	Y			Y	Y	80	
ENGINE	Engine seized when coming to a full stop at a light. Shut off abruptly and shook the vehicle. Would not crank the engine over at all. Towed directly to the dealer 12/31/2021.	A1	Y			Y	Y	1	
ENGINE	Engine stopped in parking lot. Would no re-start. Towed to dealership.	A1		Y		Y	Y	5	

ENGINE	Engine cut out in the middle of road driving in heavy traffic and would not restart. Vehicle was stranded and had to be towed to dealership. Driver and passengers had to exit vehicle into traffic to avoid dangerously sitting in disabled vehicle on road with significant traffic. Passenger and driver waiting in rain for tow truck to take vehicle to dealership. Dealership has stated engine has seized and can not turn over with starter or manual crank.	A1	Y			Y	Y	35	
ENGINE	Was driving my son to school, maybe 30 mph when all of a sudden I heard some clicking noises from the engine. The power dropped and I was barely able to pull over to the side of the busy road out of harms way. Engine dead. Only warning lights I got were a forward sensor failure and then a message telling me to pull over put it in park and restart. I tried but I was not able to restart, the starter fired but didn't seem to engage with anything. Got towed to the dealer. Dealer confirmed a dropped valve and engine failure. Awaiting a replacement engine.	A1	Y			Y	Y	29	
ENGINE	The engine blew at 6,976 miles.	A1	Y			Y	Y	20	

ENGINE	My vehicle started showing power loss, and within 1 mile of driving completely died and refused to restart. The dealership diagnosed the engine as having dropped a piston and will require a full replacement.	A1	Y			Y	Y	0	
ENGINE	My 2.7L V6 engine dropped a valve, it was inspected and determined by the dealer. This happened after a 1 hour freeway trip on Christmas Eve. Luckily, the incident was in my driveway after shutting off the engine. If it would have happened minutes before we would have had complete power failure at 65mph. The problem was determined to be a defect and was replaced under warranty by the dealer. Unknown whether Ford has done a post mortem inspection. No warning whatsoever prior to failure. It happened on shut down so no indication of an issue until attempting to restart 2 days later.	A1	Y			Y	Y	0	

ENGINE	I was on cruise control going about 70 yesterday when I lost all power at the gas pedal. I made it to the side of the highway and waited 90 minutes for a tow truck to come get me. I had my dogs with me and it was 25 degrees out. We were three hours from home. The service department reported today that I had a catastrophic engine failure. A valve came loose and was crushed by the pistons or some such.	A1		Y		Y	Y	70	
ENGINE	I was driving to work on the morning of March 14, 2022, on the highway approx. 70 mph. I felt a falter or engine buck, I began to lose power to the engine. The engine light began to flash and I was only able to drive 55mph. I was in a very unsafe area on a highway with a very narrow shoulder and so I proceeded to manage my speed to reach work safely. I was able to make the additional 10 miles to my workplace. When I stopped at the gate for security, the engine died and I was unable to restart it.	A1	Y			Y	Y	70	

ENGINE	2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO A KNOWN VALVE DEFECT WHICH CAUSES ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHERS SHARE THE DEFECT.	DP				Y	Y	0	
ENGINE	2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO KNOWN DEFECT WITH VALVES THAT CAUSES CATASTROPHIC ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHER VEHICLES SHARE SAME THE DEFECT.	DP				Y	Y	0	
ENGINE	CONSTITUENT WRITES IN REGARD TO THEIR 2021 FORD BRONCO. CONSTITUENT STATED THAT THE ENGINE HAS A KNOWN DEFECT IN THE VALVES CAUSING CATASTROPHIC ENGINE FAILURE.	DP				Y	Y	0	
ENGINE	at 2,000 miles the engine dropped a valve. Vehicle has already received a new engine. Vehicle shut off running down the interstate. safety was had to coast to shoulder and wait on tow truck.	Dupe		Y		N	Y	70	

ENGINE	my Ford Bronco First Edition with the 2.7 engine experienced catastrophic engine failure. I was driving near my home when my vehicle stopped running. I did feel a strange pull in my steering and tires; but I was also driving on ice and assumed it was the traction control system at play. I was wrong. It was my engine losing compression and my engine failing. My dash lit up with a series of errors (all in quick succession and could not catch them all) and my vehicle lost all power and control. As mentioned above, I was driving on ice covered roads and had difficulty steering. I attempted to pull off the road and into a parking lot; however, the drive sloped up and I could not get clear	A1				N	Y	40	

ENGINE	driving the vehicle and was enveloped in smoke and the engine stopped and she was stuck in the middle lane of a busy road in rush hour. A dangerous section of road a few miles from our house. I drove down and gave her my SUV and then called AAA who towed it to the dealership. The motor was dead. The vehicle was towed to Future Ford of Sacramento. They then diagnosed it a few days later and informed us that it is a complete engine failure and that it will take several months to get the vehicle back to us. There were no warning lights or any warning prior to the engine stopping and a large amount of smoke to the point that my wife thought the whole vehicle was on fire. Four people stopped to help her	A1				N	Y	40	

A1
A2 - Verify

B - Unknown
C - Not Related

5lm5j7wc8mg
5LM5J7XC8MGL17641
1FMEE5DP6MLA72459
1FMEE5DP4MLA77160
1FMDE5CP2MLA61925
1FMDE5FPXMLA20387
1FMDE5AP4ML
1FMEE5DP9MLA88378
1FMEE5DP8MLA92941
1FMEE5BP0MLA78146
1FMEE5EP6ML
1FMEE5DP3ML
1FMEE5DP5MLA71271
1FMEE5DP5MLA93495
1FMEE5DP6ML
1FMEE5DP5MLA71030
1FMEE5DP7MLA93627
1FMDE5CP4ML
1FMDE5FP3MLA20375
1FMEE5BP0MLA93701
1FMEE5DPXMLA90155
1FMDE5AP2MLA77576
1FMDE5AP2MLA77576
1FMEE5BP4MLA68994
1FMEE5DP5ML
1FTEW1EP9MF
1FTEW1EP5MFC69887

ngine failure. The ODI complaints cited above can be reviewed at NHTSA.gov under the following ODI numbers: 11459262, 11457360, 11456713, 11456219, 11455294, 11454100, 11454098, 11453933, 11453669, 11452692, 11452595, 11452074, 11451957, 11451503, 11451158, 11450879, 11450871, 11450788, 11450737, 11450702, 11450659, 11448737, 11448461, 11448393, 11448171, 11441831, 11414378, 11414295, 11406545.

11459262
11457360

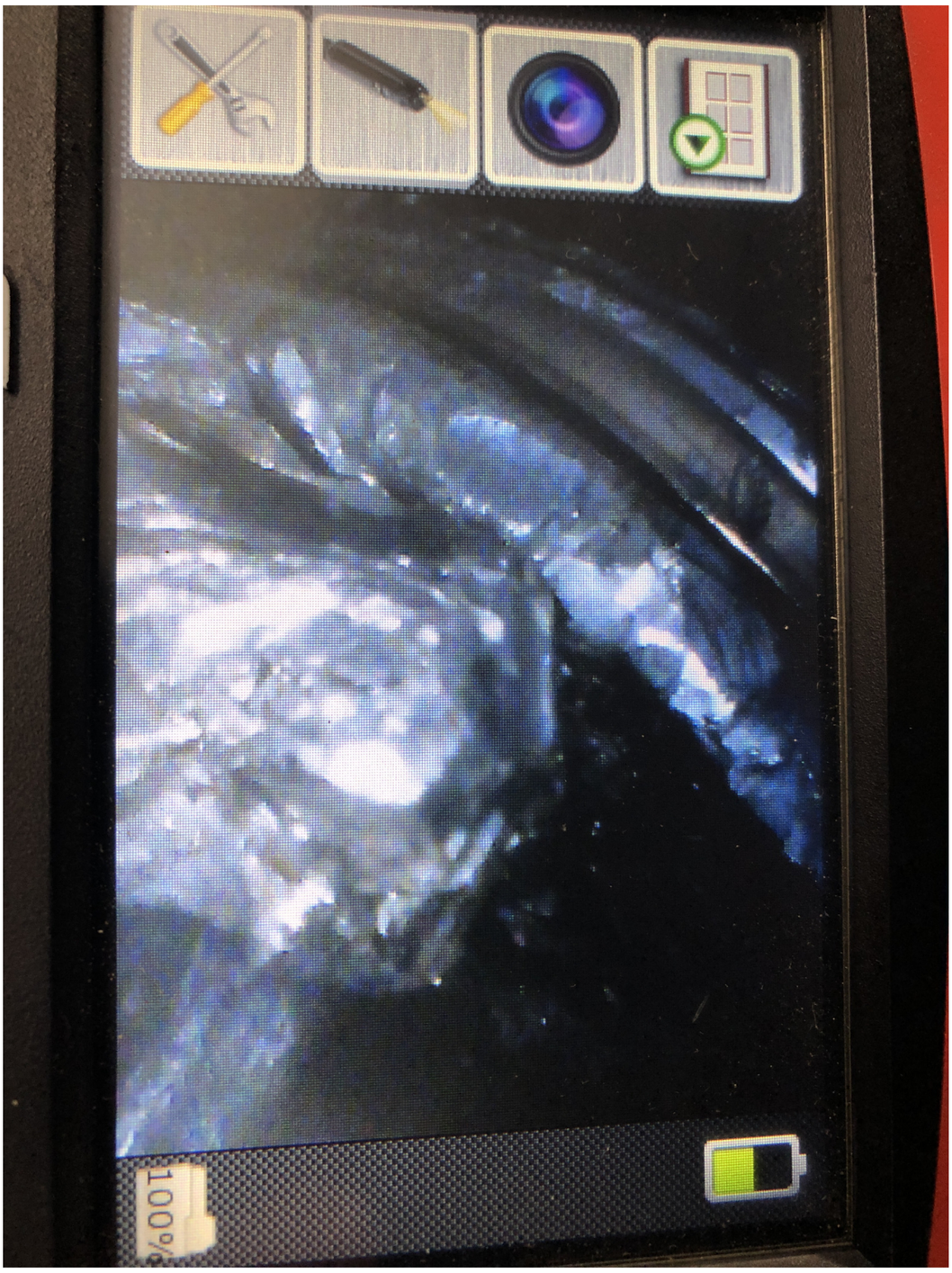
Report Number:M72CQ018

Print Close

PE22-807 000026 ER

Report Number:M72CQ018

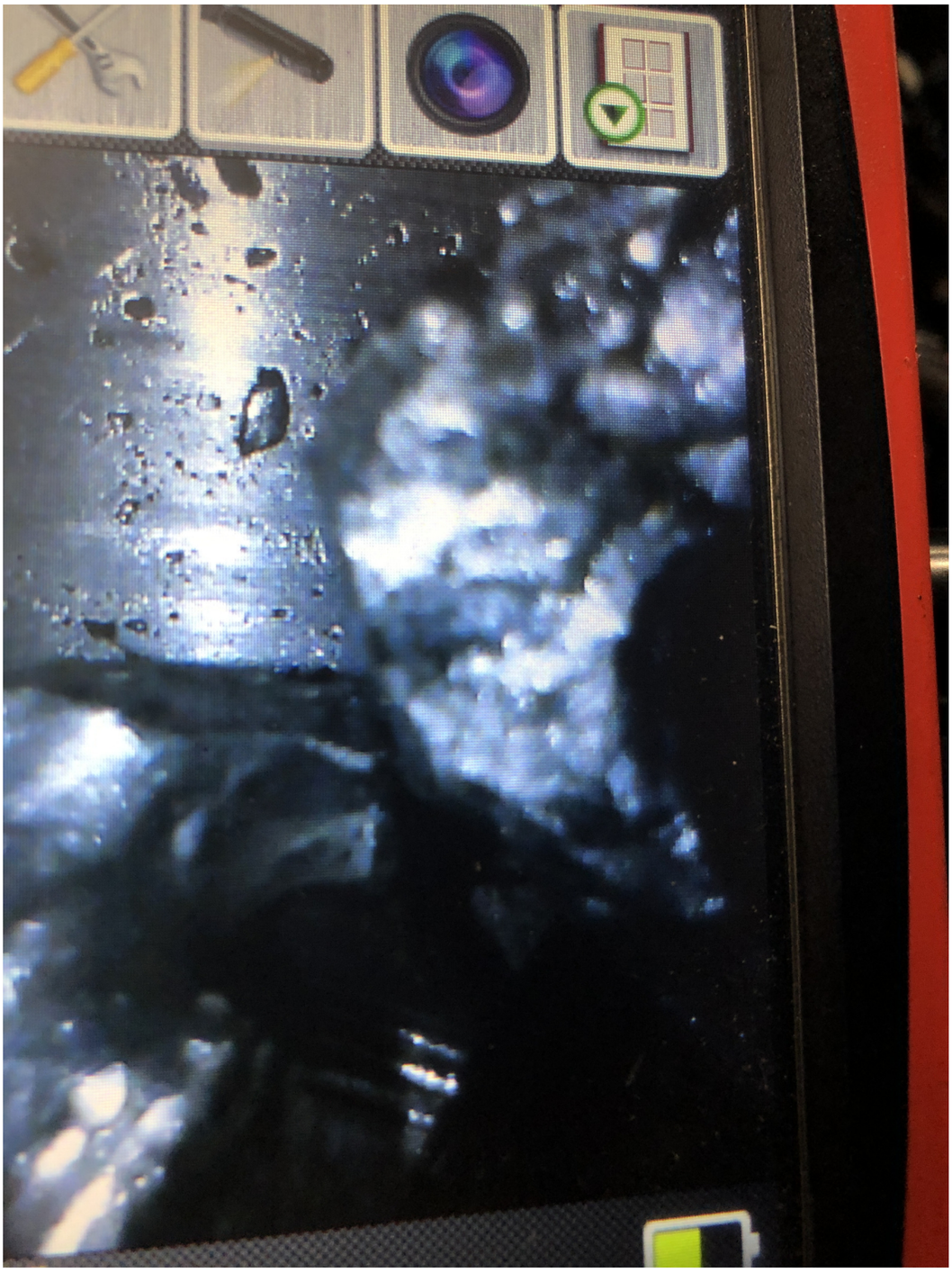
Print Close



PE22-007 000027 ER

Report Number:M72CQ018

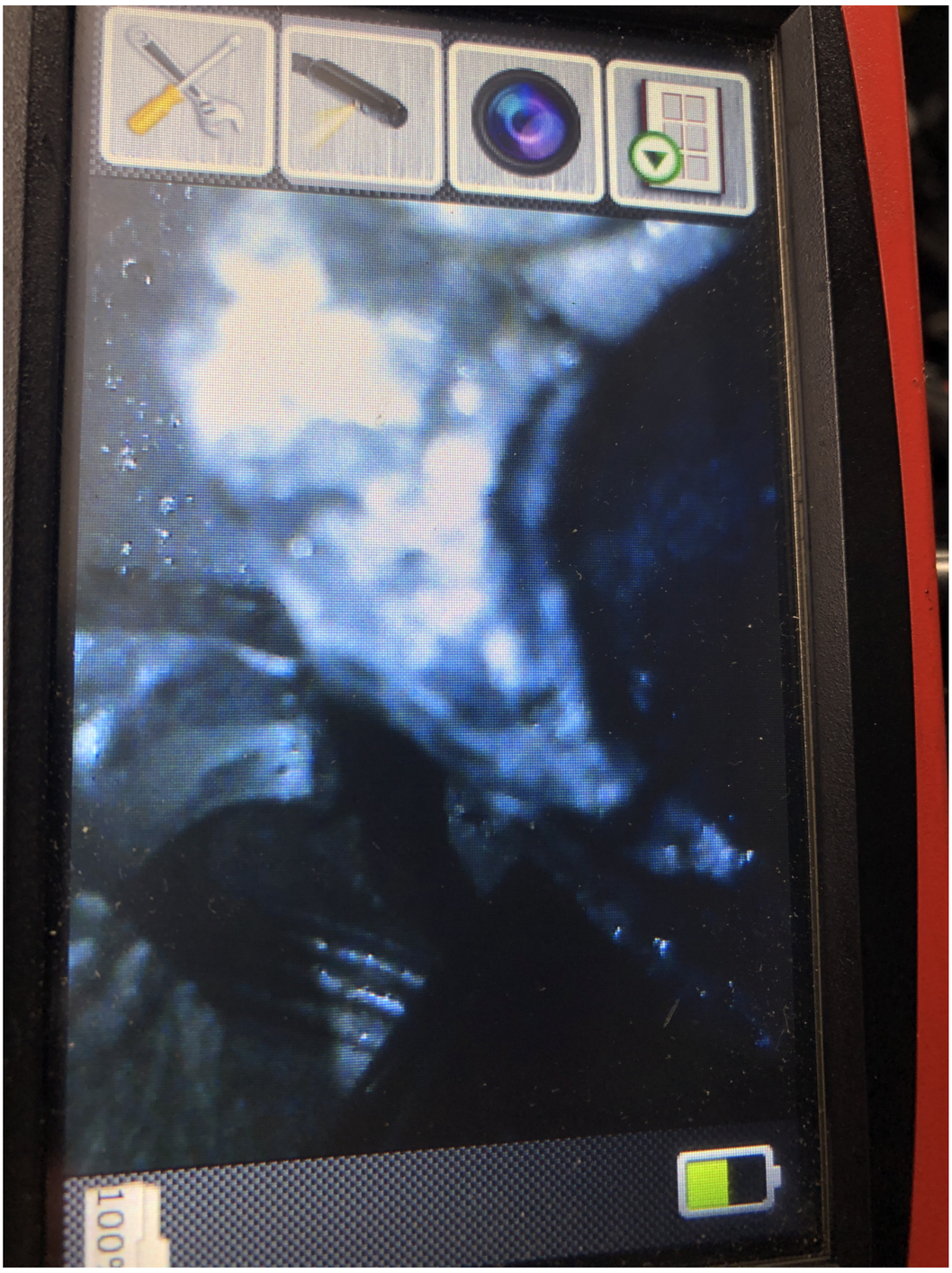
Print Close



PE22-807 000028 ER

Report Number:M72CQ018

Print Close



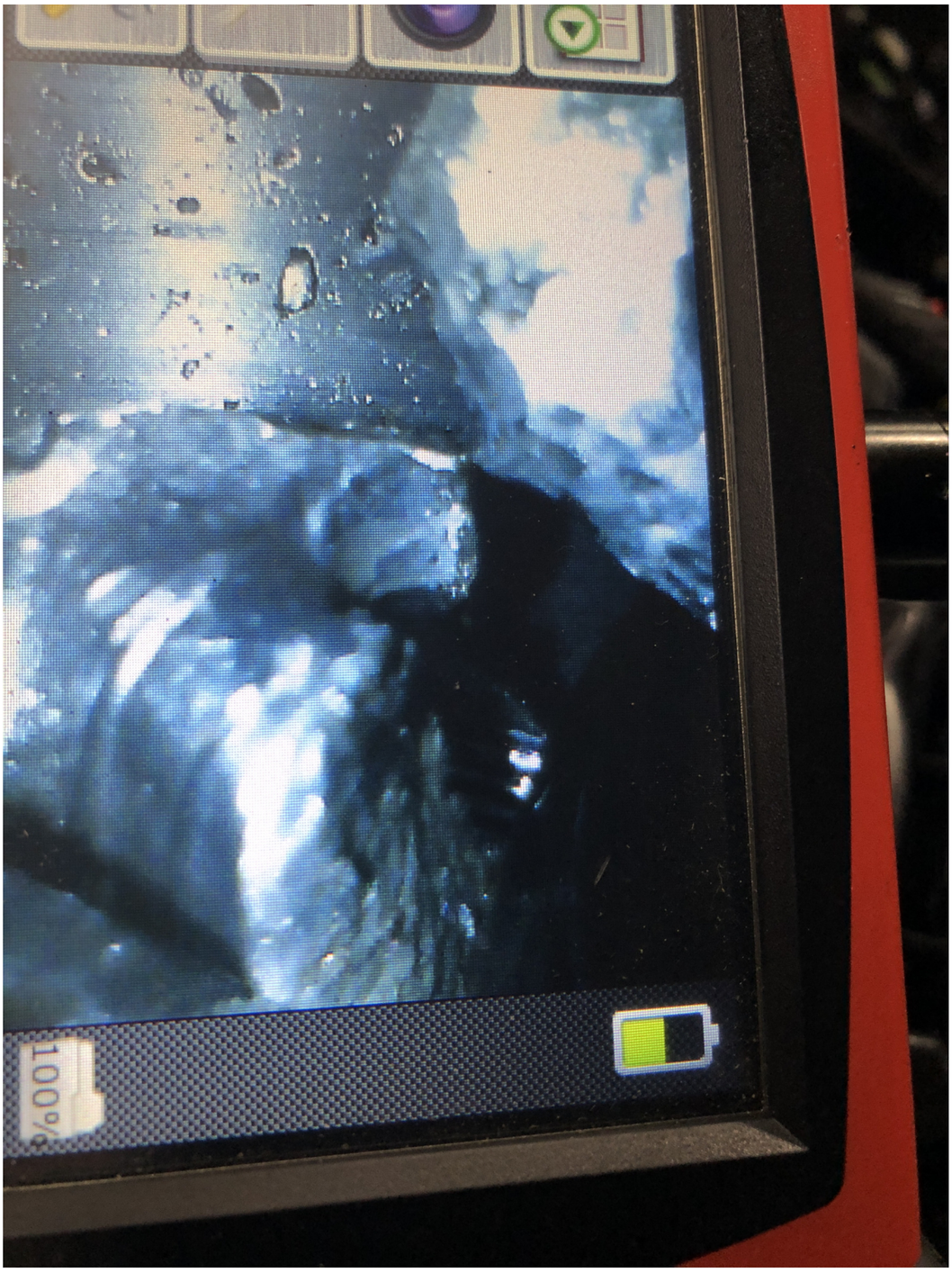
PE22-007 000029 ER

Report Number:M72CQ018

Print Close

Report Number:M72CQ018

Print Close



PE22-807 000031 ER

Report Number:M72CQ018

Print Close

PE22-007 000032 ER

Report Number:M72CQ018

Print Close

From: Steslicki, Michael (M.E.)
Sent: Sunday, September 19, 2021 8:06 PM
To: Pearson, Gavin (G J R.); Ward, Zachary (Z.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Strand, Tim (T.A.); Simon, David (D.); Katinas, Dana (D.J.); Vylasek, Stephan (S.); Melki, Imad (I.E.)
Subject: Bronco 2.7L Potential #8 dropped valve

New hotline report filed Friday for a potential broken valve engine exchange on 2.7L Bronco.

ESN: EF06A21125120020 MB3E 6007 AA

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: CQIS@ford.com <CQIS@ford.com>
Sent: Sunday, September 19, 2021 8:02 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Report Summary for the CQIS Report#M9QD7011, from MSTESLIC

Attachments : 0

Report# :	M9QD7011 CREDSR--or-- Q 202193802653			**Received:**	09/17/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP6MLA61450			**Build Date:**	06/03/2021
Odometer :	1,880 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B7002 Lake City Ford Sales Inc.			**Phone#:**	250-392-4455
City:	Williams Lake	**Province**	British Colu	**Country :**	CAN
Originator:	WILLY DEVUYST	**Originator e-mail:**	wdevuyst@lakecityford.ca		
Symptom:	4 41 Z 00 ST/RN/MV,RUNNING,NOT LISTED,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				
Additional Symptom:					
Fix:	**Causal Component :**		ENGINE ASSY/BARE -- RPL		
Condition Code:					

Region Code: 07 Region Name: 07 Pacific District

Comments :

CONCER 09/17/2021 01:58PM

DIAG FOR DASH SAID PULL OVER SAFELY TURN VEHICLE OFF - NOW IT WONT START

TECH/C 09/17/2021 01:58PM

CHECK CODES FIND ONLY LONG CRANK TIME CODE. ATTEMPT TO START AND ENGINE RUNS BARELY AND KNOCKS. SHUT OFF, CHECK OIL LEVEL OK, REMOVE FILTER AND INSPECT OK. CHECK RELATIVE COMPRESSION #6 3% LOW BUT ALL ELSE OK. START ENGINE AGAIN BUT ENGINE SIEZES AND WILL NOT CRANK ANYMORE. REQUIRES TEARDOWN. VEHICLE IS VERY NEW, CONTACT ENGINEERING TO SEE IF THEY WANT TO INSPECT THE COMPLETE ENGINE WITHOUT TEARDOWN FIRST. REMOVED OIL PAN TO INSPECT AS PER BULLENTIN WTY-2020-31N. FOUND LARGE CHUNKS OFF DEBRIS IN OIL PAN. REQUEST REPLACEMENT ENGINE AS PER BULLETIN "LOW TIME IN SERVICE (LTIS) ASSEMBLY REPLACEMENT"

Click here to View Report Summary

	PN	ID / Dealer	ESN	Miles	Date	Model (Bronco?)
1	Marshal Lab Analysis	Tomball Ford				
2		Zeigler Ford				
3		Darling Bangor Ford				
4		Autonation Ford - Frisco				
5		D. Alex MacDonald Ford				
6		Nick Mayer Ford				
7		Dow… Ford				
8		W… Ford				
9		Ace Ford				
10		Chenoweth Ford				
11		Portsmouth Ford				
12		North Park Ford				
13		Performance Ford				
14		Putnam Ford				
15		Big M Ford				
16		Ken Knapp Ford				
17		Richardson Ford				
18		Dan Hattan Ford				
19		Szott Ford				
20		Ford of Kendall				
21		Bozard Ford				
22		McKie Ford				
23		Watkin Ford				
24		JK0L0021				
25		McCombs Ford				
26		Stuart Powell Ford				
27		Mohawk Ford				
28		White's Canyon Ford				
29		Galpin Ford				
30		Spitzer Ford				
31		Randall Reed Ford				
32		Casco Bay Ford				
33		North Star Ford				
34		Boundary Ford				
35		Serra Ford				
36		Akins Ford				
37		Phil Brannen Ford				
38		Iron City Ford				
39		Rusty Eck Ford				
40		West Point Ford				
41		Hansel Ford				
42	Kearney Lab	Bomorroto				
43		Scott Petersen				
44		Captitol Ford				
45		Tommy Vaughn				
46		Dewey Moore				
47		Auto Nation				
48		Pat Milliken				
49		Keller Ford				
50		Gillespie Ford				
51		Shaffer Ford				
52		Capitol Ford				
53		El Cajon Ford				
54		Sante Monica Ford				

71	71	65	29	4	2		
Last 8	Bank	Cylinder	No Valve Tip Found in Cylinder (Oil Pan Removal)	No Damage Found	Missing Cylinder Heads	Dealer	Comments
MGB74069	LH	4				Nisku Ford, Nisku, AB Canada	
MFC83565	LH	1				Townsend Sales, Townsend, MA	
MGL18279	LH	4				Gray-Daniels Ford, Brandon, MS	
MLA68339	LH	5				Gullo Ford, Conroe, TX	
MLA87887	LH	4				Parks Ford, Hendersonville, NC	
MGB74069	LH	5				Fullerton Ford, Somerville, NJ	MGB66327
MBA06896	LH	5				Hayes Ford, Newport, VT	
MBA48140	LH	4				Cypress Motors, Swift Current, SK Canada	
MGL10156	LH	6				Butch Oustalet, Gulfport, MS	
MFB98262	LH	4				Don's Ford, Utica, NY	
MLA94974	LH	5				Ford Lincoln of Cookeville, Cookeville, TN	
MKE09415	LH	4				Humber Motors Ford, Corner Brook, NL Canada	2nd exchange
MGB08543	LH	6				Victory Ford, Chatham, ON Canada	
MGC08959	LH	5				Healey Ford, Goshen, NY	
MLA74498	LH	6				All American Ford, Old Bridge, NJ	
MFB72454	LH	4				Courtesy Ford, London, ON Canada	2 engines on this list, 1st engine
MKE14231	RH	N/A				Steele Ford, Halifax, NS Canada	
MGB69433	LH	4 & 5				Tom Holzer Ford, Farmington Hills, MI	
MGB76917	LH	4				No Dealer Address	
MGB76862	LH	6				Clinton Auto Group, Clinton, IA	
MGA67098	LH	6				Bob Thomas Ford, Hamden, CT	
MBL16825	RH	3				No Dealer Address	
MGL18317	LH	4				Pines Ford, Pembroke, FL	
MGB75915	RH	N/A				Koch 33 Ford, Easton, PA	
MFB86870	LH	N/A				Sill-Terhar Motors, Broomfield, CO	
MGB75916	LH	5				Ray Price Ford, Mount Pocono, PA	
MGB10042	LH	5				All American Ford, Old Bridge, NJ	
MFC32670	LH	4				AutoNation Ford, White Bear, MN	
MFB90897	LH	4				Fairway Ford, Evans, GA	
MFC02791	LH	6				Bill Marsh Ford, Gaylord, MI	
MLA64089	LH	5				Gary Crossley Ford, Kansas City, MO	
MBA44310	LH	5				Chuck Anderson Ford, Excelsior Springs, MO	
MGL19285	LH	6				West Point Lincoln, Houston, TX	
MLA68444	LH	5				Goode Motor Ford, Burley, ID	
MFB85963	LH	4				Bill Brown Ford, Livonia, MI	
MGB77196	LH	4				Century Ford, Mt Airy, MD	
MGL17214	LH	6	x			No Dealer Address	
MFC48349	N/A	N/A	x			No Dealer Address	
MGB76917	LH	4	x			No Dealer Address	On this list twice, but only one exchange
MGL18527	LH	5 & 6	x			No Dealer Address	
MFB73557	LH	6	x			Metro Ford, Calgary, AB Canada	
MLA41900	LH	5	x			Ford of Clermont, Clermont, FL	
MKE41442	LH	6	x			Woody Smith Ford, Rexburg, ID	
MGB71711	LH	5	x			Courtesy Ford, Portland, OR	
MFB82924	LH	5	x			Bannister Ford, Dawson Creek, BC Canada	
MGB62327	LH	6	x			Kennedy Ford, Oakville, ON Canada	
MLA67059	LH	6	x			Gary Yeomans Ford, Daytona Beach, FL	
MLA89526	LH	4	x			Sawgrass Ford, Sunrise, FL	
MFC23499	LH	4	x			Shults Ford South, Pittsburgh, PA	
MBL09907	LH	5	x			Herb Chambers Lincoln, Norwood, MA	
MFC44298	LH	5	x			Interstate Ford, Miamisburg, OH	

MBA37547	LH	4	x			Sanders Ford, Jacksonville, NC	
MBL16054	LH	4	x			Bob-Boyd Lincoln, Columbus, OH	
MFC15756	RH	1	x			Bailey Ford, Plattsburgh, NY	
MBL16857	LH	6	x			Shults Ford Lincoln, Wexford, PA	
MKE28101	LH	6	x			Bennett-Dunlop Ford, Regina, SK Canada	
MFC51017	LH	6	x			The Ford Store Morgan Hill, Morgan Hill, CA	
MGB48828	LH	6	x			Fred Beans Ford, Exton, PA	
MGB79374	LH	6	x			No Dealer Address	
MGL18210	LH	6	x			Ray Price Stroud Ford, Stroudsburg, PA	
MGB49614	LH	6	x			Fox Ford, Grand Rapids, MI	
MFB76993	LH	6	x			Royal Oak Ford, Royal Oak, MI	
MBA27225	LH	6	x			Stoneham Motor Co, Stoneham, MA	
MGB59315	LH	6	x			Mac Haik Ford, Houston, TX	
MKE33760	LH	4	x			Plantation Ford, Plantation, FL	
MLA66237	N/A			x		Nisku Ford, Nisku, AB Canada	Overheat engine, needs to go back to LEP
MFB72454	N/A			x		Courtesy Ford, London, ON Canada	2 engines on this list, 2nd engine, needs to go back to LEP
MFC04418	N/A			x		Gullo Ford, Conroe, TX	2nd exchange for this VIN, cracked block, needs to go back to LEP
MKD99802	N/A			x		Towne Ford, Orchard Park, NY	Suspected to be a broken valve, needs to go back to LEP
MFC31223	N/A				x	Don Vance Ford, Marshfield, MO	Head is at LEP
MFC27126	N/A				x	No Dealer Address	Head is at LEP

odi_id	vin
11459262	1FMEE5DP4MLA77160
11456219	1FMDE5CP4MLA79147
11455294	
11454098	1FMEE5DP9MLA88378
11453933	
11453669	1FMEE5DP8MLA92941
11452074	1FMEE5DP7MLA93627
11451957	1fmee5dpxmla90155
11451503	
11451158	1FMEE5DP5MLA93495
11450879	1FMDE5AP2MLA77576
11450871	1FMEE5BP4MLA68994
11450788	1FMDE5FP3MLA20375
11450737	1FMEE5BP0MLA93701
11448461	
11448171	1fmee5dp5mla71030

Field Report Name	VIN
000002L213001FC-SFYBR(	1FMEE5DP3MLA66408
000002L213001FC-SFNBR	1FMEE5BP1MLA71500

From: Ott, David (D.J.)
To: Beyer, Laura (L.D.)
Subject: FW: 2.7lL
Date: Monday, June 20, 2022 8:38:58 AM

Info

-----Original Message-----
From: Ott, David (D.J.)
Sent: Monday, June 20, 2022 8:38 AM
To: Deep, Said (.) <sdeep@ford.com>
Cc: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: RE: 2.7lL

I'm good with that.

-----Original Message-----
From: Deep, Said (.) <sdeep@ford.com>
Sent: Monday, June 20, 2022 8:03 AM
To: Ott, David (D.J.) <dott@ford.com>
Cc: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: Re: 2.7lL

Can i just say: the NHTSA investigation is on the bronco 2.7 only.

Q: what about Ford? We're monitoring all vehicle lines as we would do as a normal course of business.

> On Jun 20, 2022, at 6:44 AM, Ott, David (D.J.) <dott@ford.com> wrote:
>
> While our focus is on all applications, we can't say what NHTSA's PE will include.
>
> They are aware that the 2.7 is used in other applications, but their DP only addressed Bronco based specifically on the number of complaints they had received on that vehicle line.
>
> Dave
>
> -----Original Message-----
> From: Deep, Said (.) <sdeep@ford.com>
> Sent: Friday, June 17, 2022 11:31 PM
> To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
> Cc: Ott, David (D.J.) <dott@ford.com>
> Subject: Re: 2.7lL
>
> Media asking whether this investigation covers all engine applications in our other vehicles.
> Can we say focus is on Bronco for now, per NHTSA investigation?
>
>
>
>> On Jun 16, 2022, at 8:40 AM, Diaz, Adrian (A.D.) <adiaz41@ford.com> wrote:
>>
>> Hi Said,
>>
>> I don't think we have filed anything public with NHTSA (Dave, please confirm). All is public at this point is the Defect Petition that NHTSA has published and in a week or so we are expecting to get the Preliminary Evaluation from the agency with their inquiries.

>>
>> Adrian
>>
>> -----Original Message-----
>> From: Deep, Said (.) <sdeep@ford.com>
>> Sent: Wednesday, June 15, 2022 5:48 PM
>> To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
>> Subject: 2.7lL
>>
>> Hi. Have we filed any information around the 2.7 liter with NHTSA that is in public view/access?
>> Marketing has a live chat it does on Bronco Nation coming up and we will get this question.
>> Was hoping we could say more than we are aware and investigating. We could stick to whatever it is we've provided NHTSA that might be public.
>> Please let me know.
>> Thank you!

From: Matthews, Matt (.)
Sent: Monday, September 20, 2021 7:54 AM
To: Simon, David (D.)
Subject: FW: 2.7L Dealer return
Attachments: 100_0310.JPG; 100_0311.JPG; 100_0314.JPG; 100_0316.JPG; 100_0317.JPG; 100_0318.JPG; 100_0319.JPG

FYI V6 Bronco

Matt Matthews
IPTSE Engine Engineering Quality Supervisor
I3-I4 GTDI Gas Engines
Ford Motor Company
mmatthe1@ford.com
313-805-8802

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 7:29 AM
To: Matthews, Matt (.) <mmatthe1@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: 2.7L Dealer return

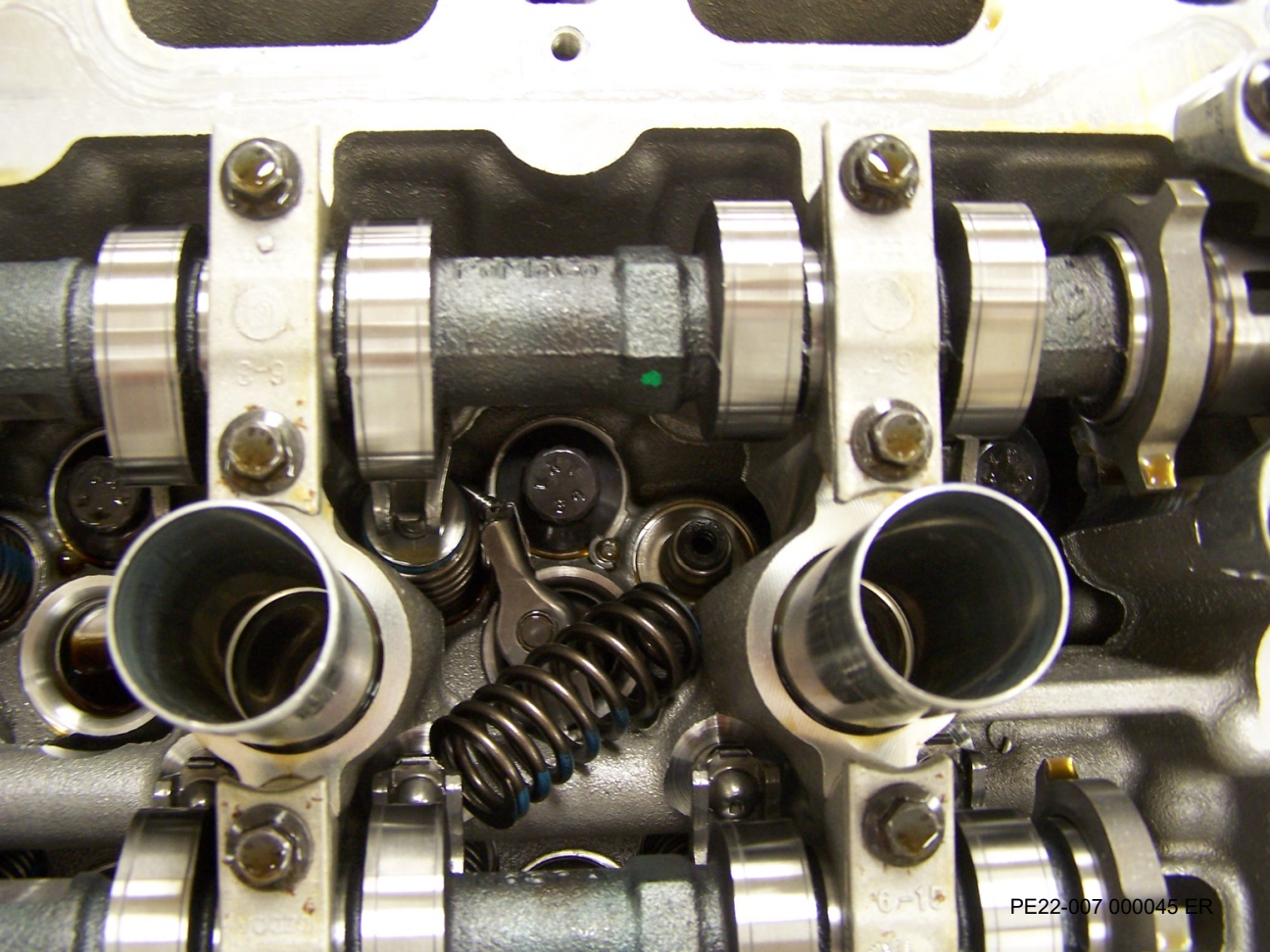
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP0MLA72960			**Build Date:**	06/30/2021
Odometer :	1,072 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02441 AutoNation Ford Frisco			**Phone#:**	972-335-5000
City:	Frisco	**State:**	Texas	**Country :**	USA
Originator:					
Originator e-mail:					
Symptom:	4 41 4 00 ST/RN/MV,RUNNING,NO SHUT OFF,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				

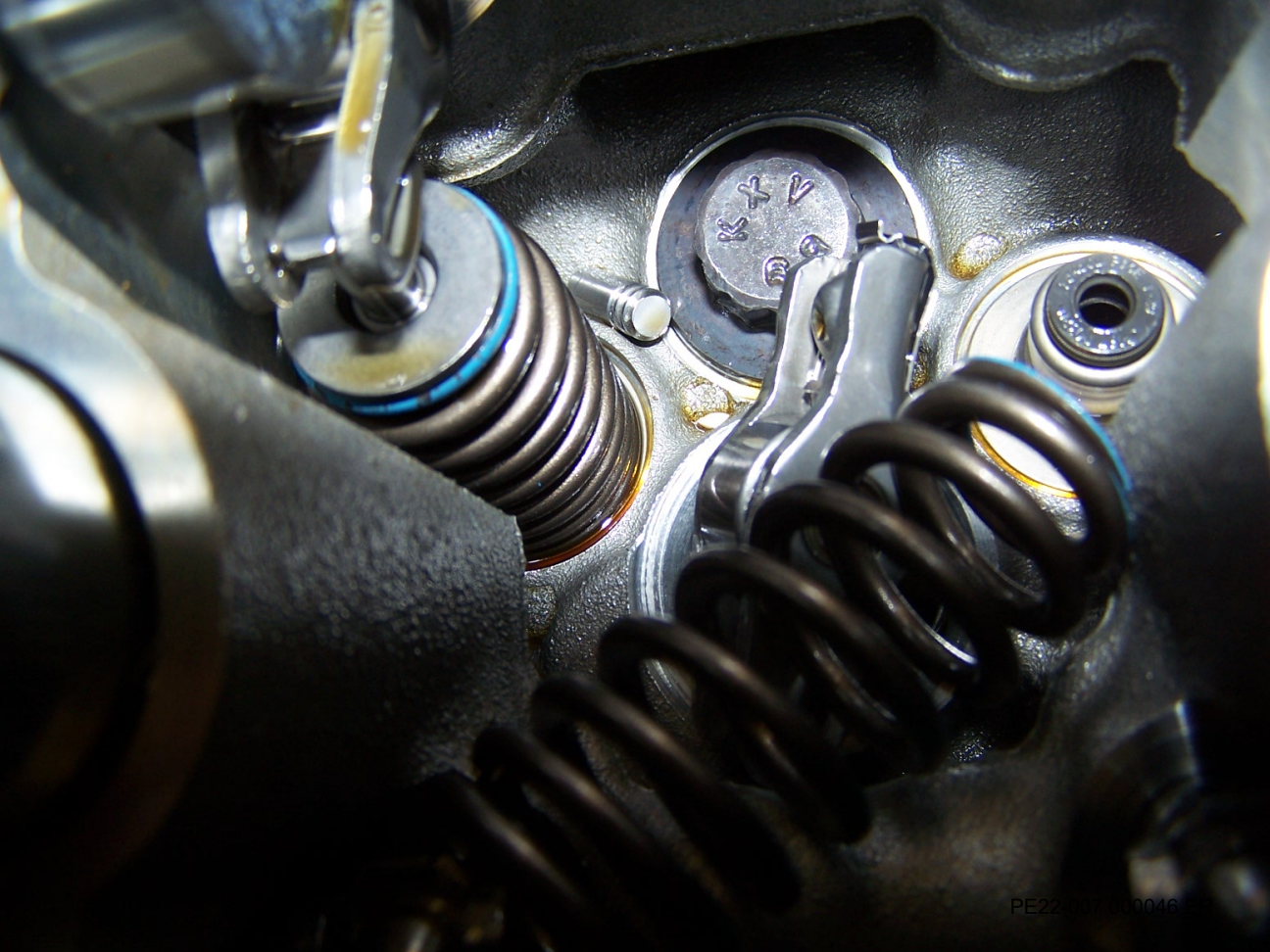
#6 cylinder.
Primary intake valve broken tip @ the bottom keeper grove.

At this point I will treat this engine like the other 2.7L Dealer return valve failures.
Valve train in boards, engine on a table for inspection.

atom

Lima Engine Plant
27L RWD U725
MB3E 6007 AA
121
EF06A21169120323

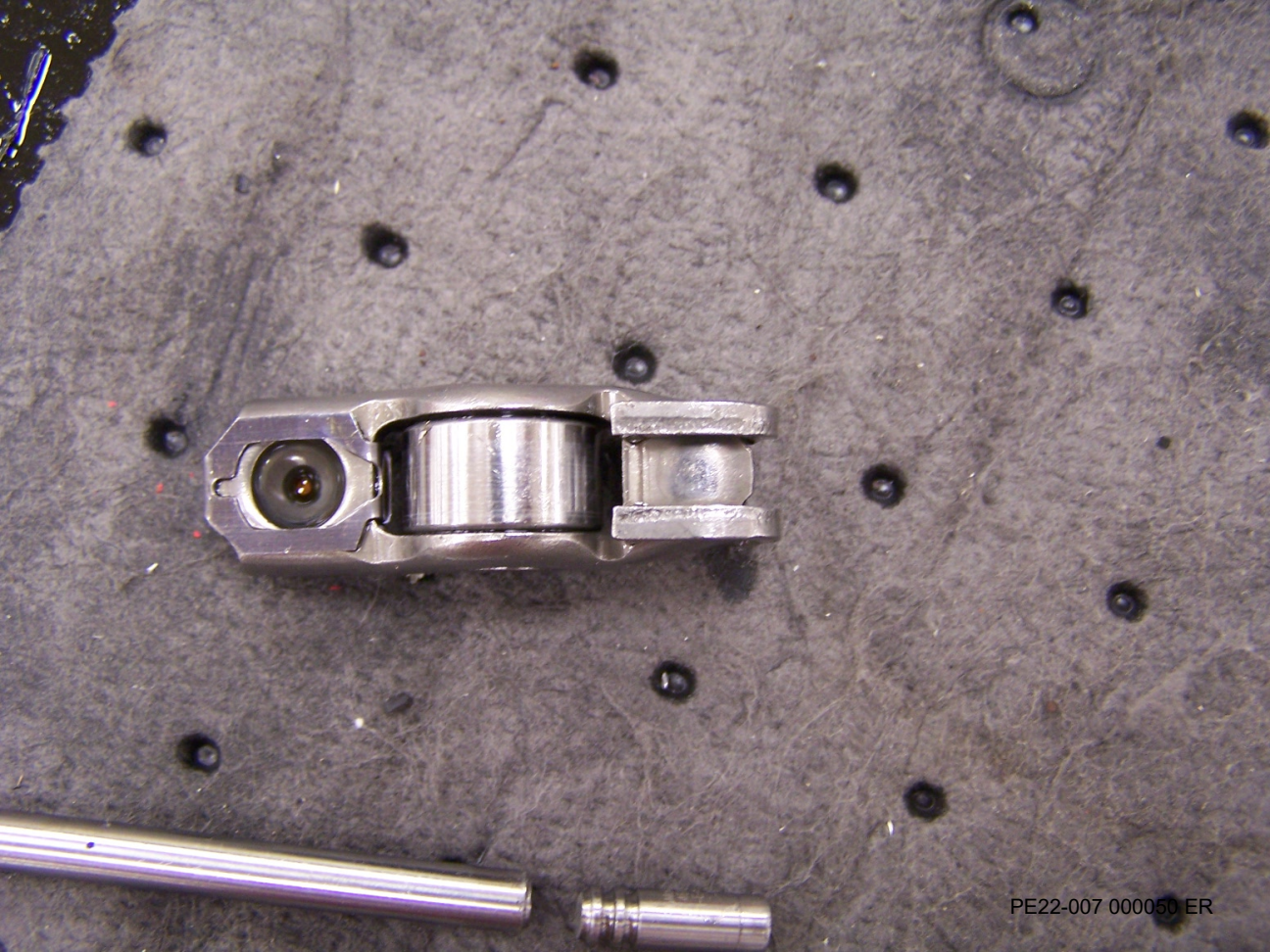

PE22-007 000045 ER



E22-007 000047-ER

PE22-007 000048 ER

PE22-007 000049 ER


PE22-007 000050 ER

From: Ott, David (D.J.)
Sent: Tuesday, April 19, 2022 1:34 PM
To: Beyer, Laura (L.D.)
Subject: FW: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

Some background per our discussion.

I'll find time with you tomorrow morning.

Dave

From: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Sent: Tuesday, April 19, 2022 12:26 PM
To: Kivett, Peter (NHTSA) <Peter.Kivett@dot.gov>; Afety, S (S.) <safety24@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Ott, David (D.J.) <dott@ford.com>; Ong, Nathan (NHTSA) <nathan.ong@dot.gov>
Subject: RE: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

Hi Peter,

I spoke with Dave and brought me up to speed in the topic. We will be conducting our internal investigation and collaborate with you and your team on any information you may need from us.

Adrian Diaz (狄安君) | Assistant Director - Automotive Safety Office |
| Int'l Phone: +1-313-337-6777 | Mobile: +1-313-804-3744 |
| Tie Line: 337-6777 |
| E-mail: adiaz41@ford.com |

From: Kivett, Peter (NHTSA) <Peter.Kivett@dot.gov>
Sent: Monday, April 18, 2022 12:48 PM
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>; Afety, S (S.) <safety24@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Ott, David (D.J.) <dott@ford.com>; Ong, Nathan (NHTSA) <nathan.ong@dot.gov>
Subject: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

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Guys –

I sent this email off to David earlier this morning but I was made aware by my staff that in addition to David I need to send it to safety24@ford.com Please see below.

Thankx, Pete

David –

I know this is a quick request but at your earliest convenience can you please reach out to me? 443.306.3583

We are in the process in granting a Defect Petition on 2021 Bronco's with 2.7L Ecoboost Engine failures causing a loss in motor power. We are interested in learning a few things, such as other model vehicles this engine is used in and if this issue is on Fords radar? I can forward you the petition letter(s) and VOQ's once we had a conversation related to this issue.

Thank you,

NHTSA

,

Peter Kivett
VDD-C Division Chief (Acting)
Office of Defects Investigations
Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE., Washington, DC 20590
Office: 202-366-6178
Cell: 443-306-3583

From: Ott, David (D.J.)
Sent: Thursday, April 21, 2022 3:20 PM
To: Beyer, Laura (L.D.)
Cc: Gaduski, Michael (M.)
Subject: FW: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

FYI

From: Gaduski, Michael (M.) <mgaduski@ford.com>
Sent: Tuesday, April 19, 2022 8:47 AM
To: Ott, David (D.J.) <dott@ford.com>
Subject: RE: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

Dave, it appears that NHTSA is getting a lot of copy and paste VOQs on the 2.7L valve stems, probably from an enthusist forum. I recall some GCCRG discussions on this concern for the 3.0L nano engine for the china consumers day talks.

April 8, 2022 NHTSA ID NUMBER: 11460118

Components: ENGINE, UNKNOWN OR OTHER

NHTSA ID Number: 11460118

Incident Date April 8, 2022

Consumer Location Unknown

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE 2.7 LITRE ECO BOOST ENGINE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHERS SHARE THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

April 8, 2022 NHTSA ID NUMBER: 11460124

Components: ENGINE

NHTSA ID Number: 11460124

Incident Date April 8, 2022

Consumer Location SAN DIEGO, CA

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO A KNOWN VALVE DEFECT WHICH CAUSES ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHERS SHARE THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

April 8, 2022 NHTSA ID NUMBER: 11460125

Components: ENGINE, UNKNOWN OR OTHER

NHTSA ID Number: 11460125

Incident Date April 8, 2022

Consumer Location CRESTWOOD, KY

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO KNOWN DEFECT WITH VALVES THAT CAUSES CATASTROPHIC ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHER VEHICLES SHARE SAME THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

Mike Gaduski
Safety Investigations Engineer
FPS| Suite 500

O: 313-845-8445
mgaduski@ford.com
SUSTAINABILITY ENVIRONMENT & SAFETY ENGINEERING

From: Afety, S (S.) <safety24@ford.com>
Sent: Monday, April 18, 2022 12:49 PM
To: Gaduski, Michael (M.) <mgaduski@ford.com>; Ott, David (D.J.) <dott@ford.com>; Henney, Travis (J.) <thenney@ford.com>
Subject: FW: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

From: Kivett, Peter (NHTSA) <Peter.Kivett@dot.gov>
Sent: Monday, April 18, 2022 4:48:13 PM (UTC) Coordinated Universal Time
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>; Afety, S (S.) <safety24@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Ott, David (D.J.) <dott@ford.com>; Ong, Nathan (NHTSA) <nathan.ong@dot.gov>
Subject: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

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Guys –

I sent this email off to David earlier this morning but I was made aware by my staff that in addition to David I need to send it to safety24@ford.com Please see below.

Thankx, Pete

David –

I know this is a quick request but at your earliest convenience can you please reach out to me? 443.306.3583

We are in the process in granting a Defect Petition on 2021 Bronco's with 2.7L Ecoboost Engine failures causing a loss in motor power. We are interested in learning a few things, such as other model vehicles this engine is used in and if this issue is on Fords radar? I can forward you the petition letter(s) and VOQ's once we had a conversation related to this issue.

Thank you,

NHTSA
,
Peter Kivett
VDD-C Division Chief (Acting)
Office of Defects Investigations
Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE., Washington, DC 20590
Office: 202-366-6178
Cell: 443-306-3583

From: Melki, Imad (I.E.)
Sent: Friday, September 10, 2021 2:06 PM
To: Pearson, Gavin (G J R.); Kilby, John (J.G.); Moore, Brian (B.M.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.)
Cc: Mazzella, Brian (B.R.)
Subject: FW: BRONCO - Report Summary(s) from a GCQIS Query Disposition

Importance: High

Please see this call to hot line for noise on 2.7L V6 from Turbo waste gate.
Is this related to the issue we had before Bronco OKTB?

Report# :	M9IB2004 NHL			**Received:**	09/09/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP1MLA67542			**Build Date:**	06/25/2021
Odometer :	2,919 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 08511 Sound Ford, Inc.			**Phone#:**	425-277-1345
City:	Renton	**State:**	Washington	**Country :**	USA
Originator:	KENNY BURNSIDE	**Originator e-mail:**	TRAVIS@SOUNDFORD.COM		
Symptom:	4 48 1 02 ST/RN/MV,NOISE,RUN/STAND,ALWAYS				
Status:					
VFG:	V49 POWERTRAIN GOOD SOUND AND NVH				
Additional Symptom:	Noise				
Fix:	**Causal Component :**		--		
Condition Code:					

Hotliner: ATOVAR8 **Phone:** **Regn Cd:** W5 Seattle

Engineering: **Phone:** **TAR:**

Dlr Contact: KENNY BURNSIDE **Phone:** **Title Cde:** SF

DTCs:

Comments :

CONCER 09/09/202102:24PM ANDREW TOVAR MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118384806) Description of Vehicle Concern: There is a loud ticking noise from the engine bay that comes and goes. Please list any diagnostics already performed:

Performed NVH diagnosis and performed noise fault tracing with chassis ears and also stethoscope. Found ticking to be coming from the wastegate control solenoids on both sides. the noise comes and goes at this time while idling but once moving the noise is present almost at all times. The ticking noise is heard more once you are traveling close to a wall or in a tunnel. Compared vehicle to another like vehicle and the wastegate solenoids on the other vehicle are quiet compared to these. Parts Replaced: None Your Question: Is this a normal condition or have you heard of this before. What is the next step in fault tracing or repair

RECOMM 09/09/202102:24PM ANDREW TOVAR MSS - FCSD - TECH ASSIT CENTER

Kenny, Thank you for the update on your diagnosis. Since the Nosie is coming from both turbo charger wastegates suspecting the noise can be a normal characteristic of the vehicle. However, it is recommended with comparing the vehicle with multiple like unit to ensure this is an abnormal driving characteristic. If needed please reference GSB TSB 20-7092 . If sure the noise is an abnormalcharacteristic continue with isolating the noise. Ensure the noise is coming from the wastegate control solenoid. If able to command the solenoid and detrmine if the noise appears to change when the concern is present. Perform steps HN 30 and 38 ensuring no faults can be seen with the actuator. If no faults are found with the actuator but sure the noise is originating from the actuator proceed with replacing and reevaluating the concern. If the concern does not change recommended with checking the rest of the turbo charge system. Ensure the bypass is operating correctly and inspect the turbocharger for any concerns. Ford technical Assistance Center- Andrew T.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Ott, David (D.J.)
Sent: Monday, May 16, 2022 8:48 AM
To: Beyer, Laura (L.D.)
Subject: FW: Bronco Article

From: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Sent: Monday, May 16, 2022 7:27 AM
To: Hansen, Thayne (T.) <thansen1@ford.com>; Ott, David (D.J.) <dott@ford.com>
Subject: RE: Bronco Article

Thanks for sharing it.

From: Hansen, Thayne (T.) <thansen1@ford.com>
Sent: Sunday, May 15, 2022 9:31 PM
To: Ott, David (D.J.) <dott@ford.com>; Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: Bronco Article

Just as an FYI, and I am guessing that you are already aware.

https://www.carscoops.com/2022/05/ford-bronco-owners-with-the-2-7l-v6-engine-might-be-riding-a-ticking-timebomb/

Take a look at the 4th paragraph.

From: Beyer, Laura (L.D.)
Sent: Monday, June 6, 2022 7:29 AM
To: Piña Ocampo, Enrique (EPO.)
Cc: Corbett, Sandy (S.M.); Bautz, Jeffrey (J.E.); Knott, Tim (.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: FW: Bronco Nano engine

Enrique,
Please invite the team cc'd on this email to tomorrow's (7-Jun) Global CCRG meeting to support the GRID 22-306 2.7/3.0 Nano Engine topic.

Thank you.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Sent: Monday, June 6, 2022 7:23 AM
To: Gu, Tao (T.) <tgu4@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>; Ott, David (D.J.) <dott@ford.com>; Piña Ocampo, Enrique (EPO.) <epinaoca@ford.com>; Beyer, Laura (L.D.) <lbeyer4@ford.com>
Cc: Bourne, Aaron (A.) <abourne5@ford.com>; Britton, Eric (E.J.) <ebritton@ford.com>; Wu, Jiushan (J.) <JWU137@ford.com>
Subject: RE: Bronco Nano engine

Yes, Tao. We can add it into the GCCRG tomorrow.

Enrique… can you help?

From: Gu, Tao (T.) <tgu4@ford.com>
Sent: Monday, June 6, 2022 3:32 AM
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Bourne, Aaron (A.) <abourne5@ford.com>; Britton, Eric (E.J.) <ebritton@ford.com>; Wu, Jiushan (J.) <jwu137@ford.com>
Subject: Bronco Nano engine

Adrian and Mike,

I notice there's a report on Bronco 2.7L nano engine investigation in NHTSA. Internal GRID # is 22-306 which affects 2.7/3.0L Nano EcoBoost Engine. Could you take several minutes to quickly brief the latest status in tomorrow GCCRG for transparency? Many thanks.

2021 Ford Bronco engine failure complaints lead to NHTSA investigation (freep.com)

Tao GU/ 顾涛

PE22-007 000059 ER

Veh Concern Investigation Supervisor,
China Sustainability, Environment & Safety Engineering (SE&SE)

Click it IM with me

Ford China
34F, Shanghai Information Tower,
211 Century Blvd, Pudong New District,
Shanghai 200120, China
FordNet: (8) 314-2029
Tel: +86-21-20322029

From: Strand, Tim (T.A.)
Sent: Thursday, July 29, 2021 3:44 PM
To: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: FW: BRONCO VALVE PICTURES

FYI

Tim Strand
Nano Engine Systems Supervisor
Cell: (313) 805-9701
tstrand2@ford.com

From: Joe Wood (Hazelwood Ford Service Tech) <jwood@bommarito.net>
Sent: Thursday, July 29, 2021 3:42 PM
To: Strand, Tim (T.A.) <tstrand2@ford.com>
Subject: BRONCO VALVE PICTURES

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Hey Tim, hopefully these are bit more revealing. Having some trouble getting over to the one side due to the orientation of the spark plug hole in the cylinder, which looks like it might be the keeper end of things. Let me know if there is anything else I can do to help or if more pictures would be helpful.

Joe Wood

Jwood@bommarito.net

(314) 712-2128

Sent from my iPhone

From: Ellerbrock, Renee (R.)
Sent: Wednesday, October 20, 2021 1:04 PM
To: Grigsby, Penny (P.L.); Hale, Bryan (B.)
Cc: Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Mooney, David (D.C.)
Subject: FW: Eaton Valve Sample
Attachments: Eaton Valve Sample Lineside 102021.pptx

These are 4 valves I have here, that I pulled out of dunnage. I am going to have Brad measure the imperfections on these so that we have some reference data for the next meeting.

Renee Ellerbrock

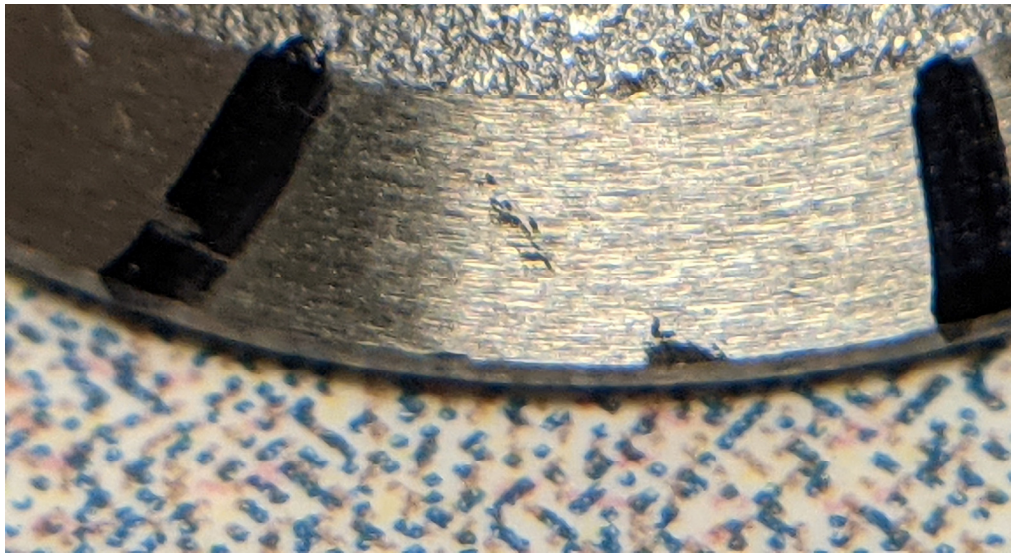
Quality Operating Systems Coordinator (QOSC)
Ford Motor Company
Lima Engine Plant
419-226-7218
rhitchc2@ford.com

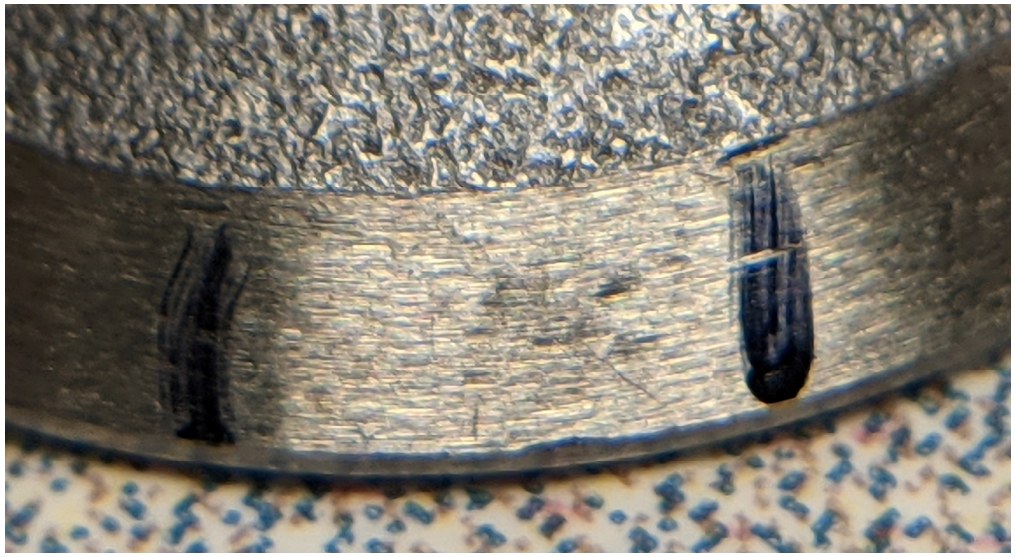
From: Hale, Bryan (B.) <bhale26@ford.com>
Sent: Wednesday, October 20, 2021 12:53 PM
To: Ellerbrock, Renee (R.) <rhitchc2@ford.com>
Cc: Grigsby, Penny (P.L.) <pgrigsby@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: Eaton Valve Sample

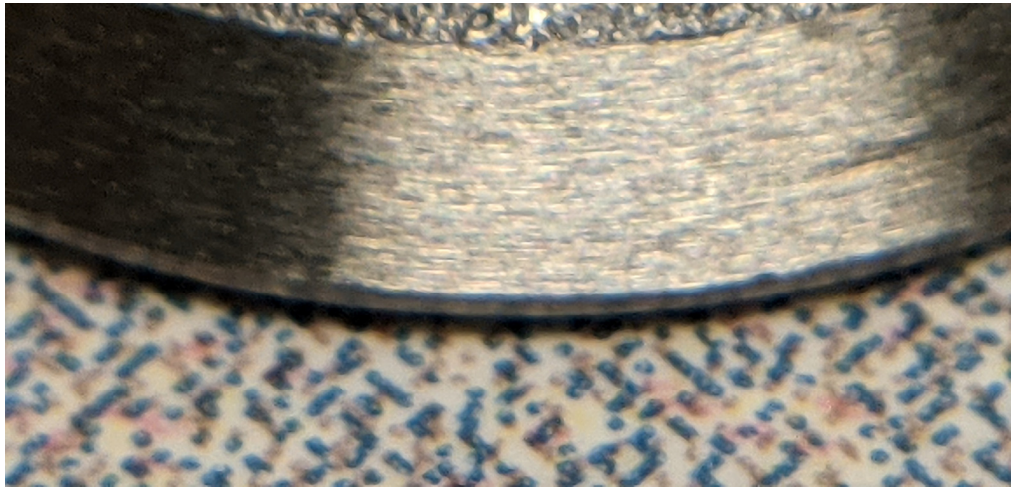
Renee – PowerPoint attached of the valves you gave me. Each slide correlates with the number written on the valve. Each slide contains 4 different views/sides of each valve.

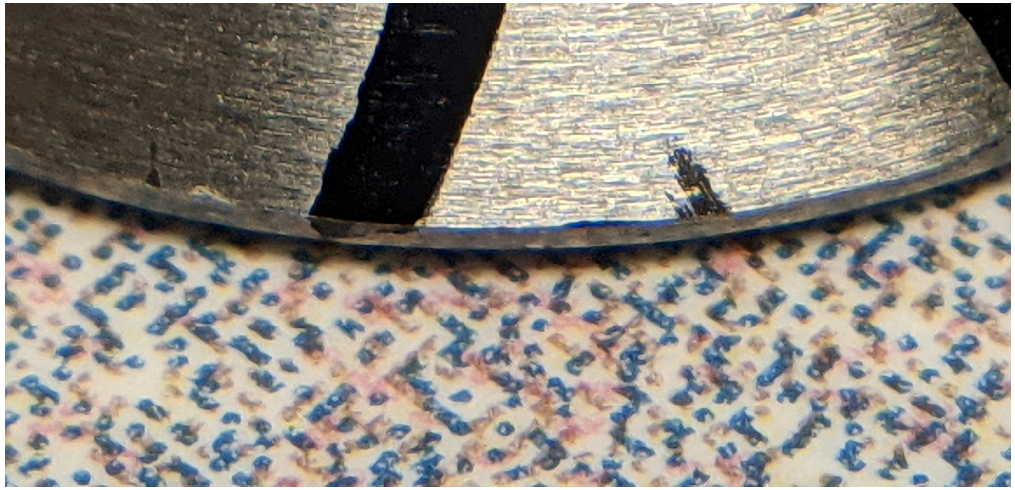
Thanks,

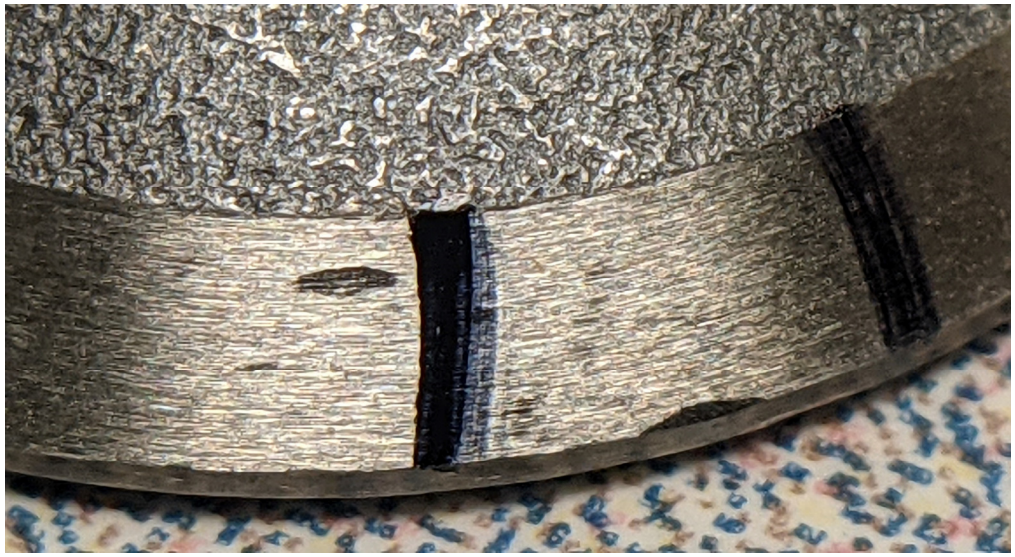
Bryan Hale
Process Coach Incoming Quality PV6
Lima Ford Engine Plant
419-226-7104

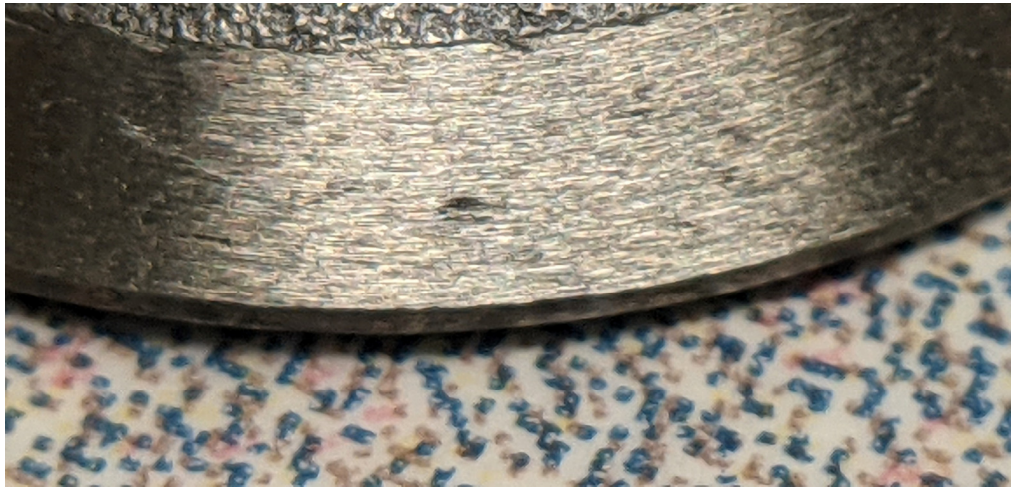


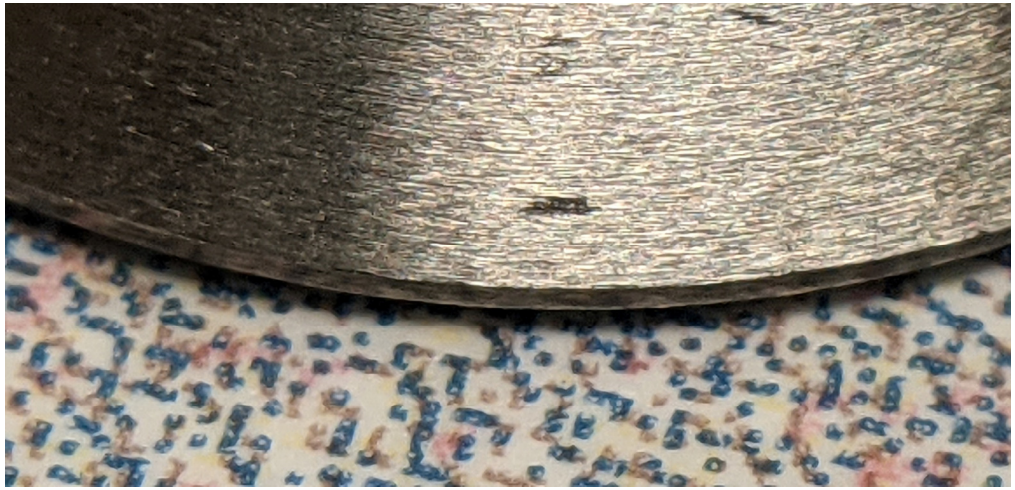


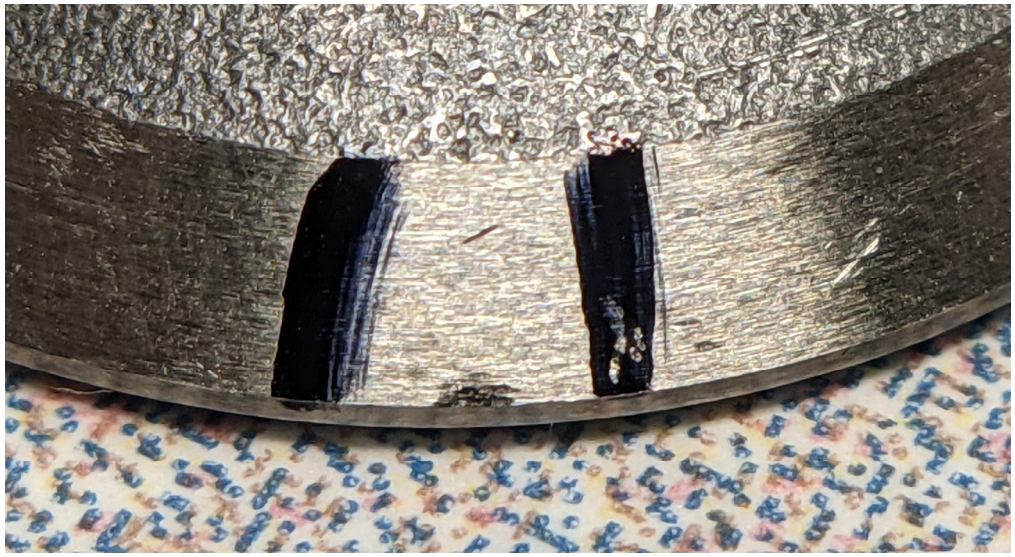


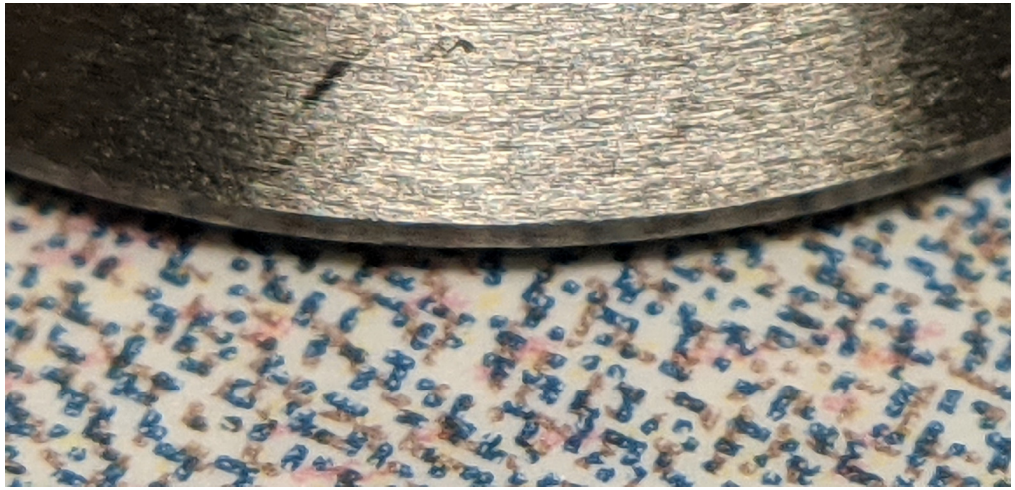


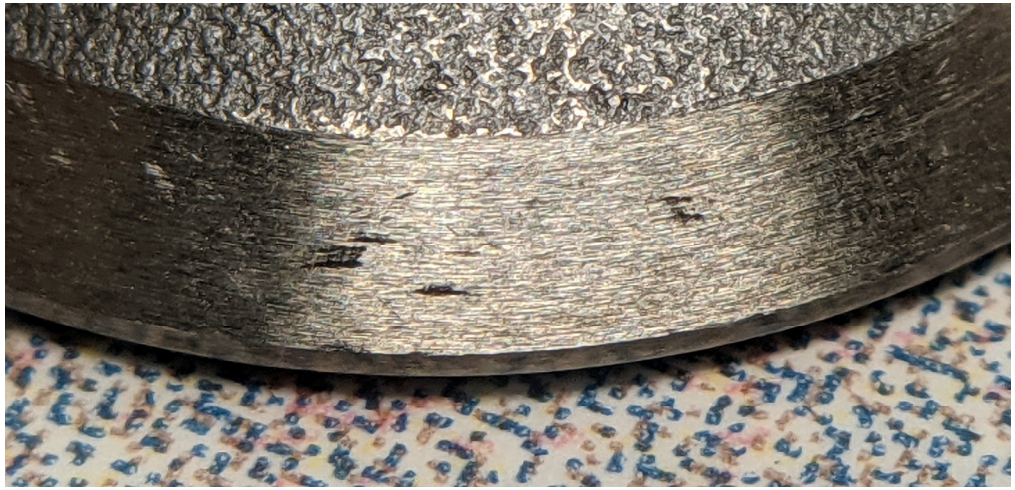


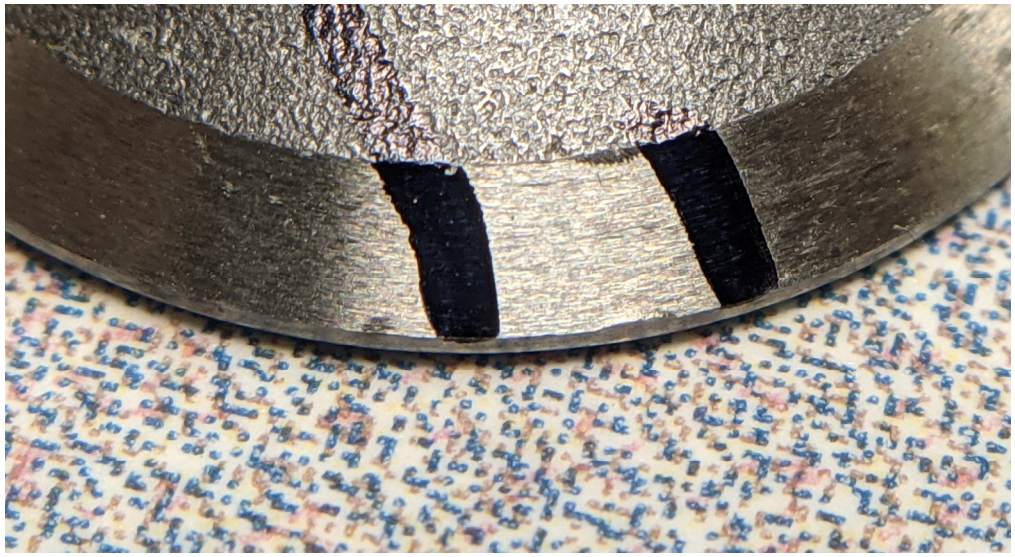


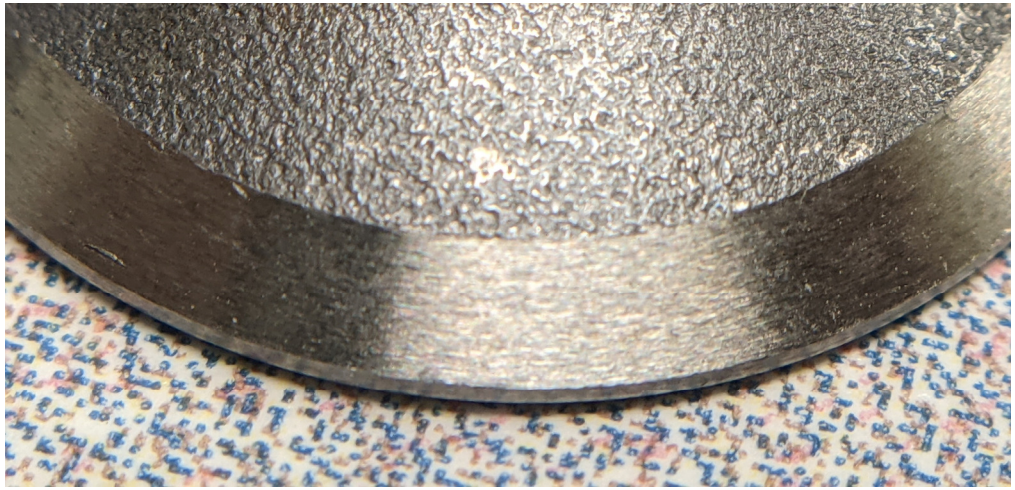


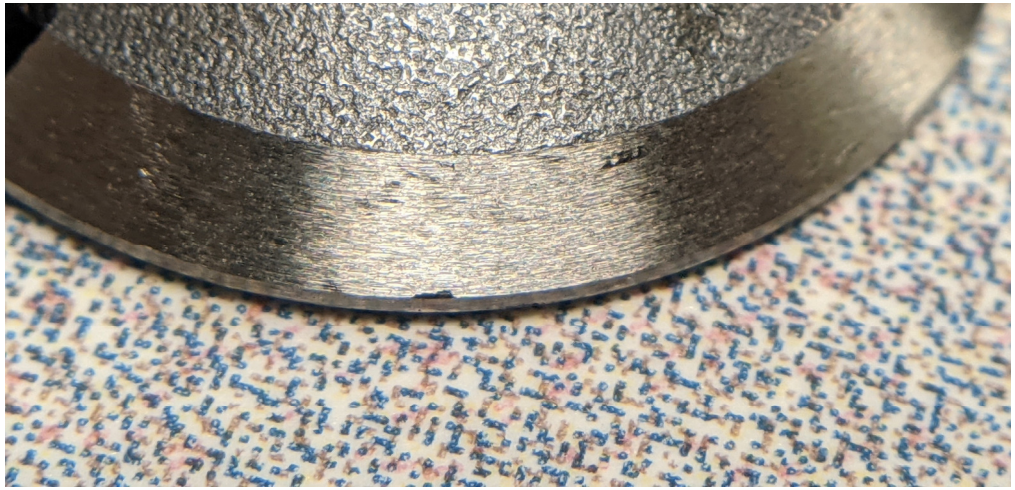












From: Hewlett, Matt (M.S.)
Sent: Thursday, July 29, 2021 7:30 AM
To: Stechschulte, Craig (C.T.); Schuh, Rudy (R.) (rschuh1@ford.com); Hashbarger, Jacob (J.E.) (jhashbar@ford.com); Moore, Roger (R.D.) (rmoore36@ford.com); Sheidler, Tom (T.L.) (tsheidl1@ford.com)
Cc: Lyons, Marcus (M.I.); Birr, Jodi (J.) (jbirr@ford.com)
Subject: FW: Failed 2.7L - Bronco
Attachments: Report Summary for the CQIS Report#M7ZCV005, from SVYLASEK; Report Summary for the CQIS Report#M71B4008, from SVYLASEK

1FMEE5BP1MLA71500 - EF06A21165120177 MB3E 6007 AA
743 miles

CONCER 07/26/2021 11:45AM

CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.

TECH/C 07/26/2021 11:45AM

VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

1FMEE5DP3MLA66408 - EF06A21161120082 MB3E 6007 AA
1146 miles

CONCER 07/27/2021 09:24AM

customer was driving had loss of power , trailer default message, dash went black and vehicle shut down. will not turn over. engine seems to locked up.

TECH/C 07/27/2021 09:24AM

tried turning over manually and engine is locked

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Lyons, Marcus (M.I.) <mlyons3@ford.com>
Sent: Wednesday, July 28, 2021 6:26 PM
To: Melki, Imad (I.E.) <imelki@ford.com>; Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Mancini, JonCarlo (J.) <jmancin6@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Schuh, Rudy (R.) <rschuh1@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: Fwd: Failed 2.7L - Bronco

+ Rudy Schuh, LEP Quality Engineer

+ Jodi Birr, LEP Quality Analyst
+ Matt Hewlett, PD Resident at LEP

Marcus Lyons
Quality Manager
Lima Engine Plant
w: 419.226.7268
c: 419.673.7551

Outlook for iOS

From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Wednesday, July 28, 2021 5:21 PM
To: Mazzella, Brian (B.R.); Kilby, John (J.G.); Mancini, JonCarlo (J.); Lyons, Marcus (M.I.)
Cc: Moore, Brian (B.M.)
Subject: FW: Failed 2.7L - Bronco

2,7L V6 Team,
Please see two engine failure claims.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Vylasek, Stephan (S.) <svylasek@ford.com>
Sent: Wednesday, July 28, 2021 5:17 PM
To: Melki, Imad (I.E.) <imelki@ford.com>
Cc: Shah, Kiran (K.H.) <kshah12@ford.com>
Subject: FW: Failed 2.7L - Bronco

Wrong person! :) This one is for you Imad.

Kiran,

Here are the two failed 2.7L engine reports. The comments are brief, but straight forward. I plan to call them in the morning to see if the engines are indeed complete replacements. If they are, this will open into an emerging QSF. One more and we are QSF reporting in the FQRs.

I'll let you know how the calls to these dealers go.

Steve Vylasek
Concern ID & Resolution – Program Manager
Mustang / Continental / Bronco / Ranger / EcoSport
Ford Motor Company – FCSD
(313)-323-7817 / SVylasek@Ford.com

From: CQIS, Help (.)
Sent: Wednesday, July 28, 2021 5:00 PM
To: Vylasek, Stephan (S.)
Subject: Report Summary for the CQIS Report#M7ZCV005, from SVYLASEK

Attachments : 0

Report# :	M7ZCV005 CREDSR--or-- Q 202193761282			**Received:**	07/26/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP1MLA71500			**Build Date:**	06/19/2021
Odometer :	743 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 08189 Bommarito Ford			**Phone#:**	314-895-0600
City:	Hazelwood	**State:**	Missouri	**Country :**	USA
Originator:	JOE WOOD	**Originator e-mail:**	JWOOD@BOMMARITO.NET		
Symptom:	4 40 3 02 ST/RN/MV,STARTING,CRANK NO START ,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:					
Fix:	**Causal Component :**		ENGINE ASSY/BARE -- RPL		
Condition Code:					

Region Code: C4 Region Name: Kansas City

DTC:

PCM:P0305:00-65

Comments :

CONCER 07/26/2021 11:45AM

CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.

TECH/C 07/26/2021 11:45AM

VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

Click here to View Report Summary

From: CQIS, Help (.)
Sent: Wednesday, July 28, 2021 5:00 PM
To: Vylasek, Stephan (S.)
Subject: Report Summary for the CQIS Report#M71B4008, from SVYLASEK

Attachments : 0

Report# :	M71B4008 CREDSR--or-- Q 202193762322			**Received:**	07/27/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP3MLA66408			**Build Date:**	06/25/2021
Odometer :	1,146 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 09696 Keller Ford, Inc.			**Phone#:**	616-784-6600
City:	Grand Rapids	**State:**	Michigan	**Country :**	USA
Originator:	Dustin Wiegerink	**Originator e-mail:**	dwiegerink@kellerfordauto.com		
Symptom:	4 41 0 00 ST/RN/MV,RUNNING,UNKNOWN,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				
Additional Symptom:					
Fix:	**Causal Component :**		TRANSMISSION ASY-AUT -- RPR		
Condition Code:					

Region Code: G2 Region Name: Detroit

Comments :

CONCER 07/27/2021 09:24AM

customer was driving had loss of power , trailer default message, dash went black and vehicle shut down. will not turn over. engine seems to locked up.

TECH/C 07/27/2021 09:24AM

tried turning over manually and engine is locked

Click here to View Report Summary

From: Simon, David (D.)
Sent: Thursday, July 29, 2021 8:02 AM
To: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Bautz, Jeffrey (J.E.)
Cc: Sorab, Jagadish (J.); Pearson, Gavin (G J R.)
Subject: FW: Failed 2.7L - Bronco
Attachments: Report Summary for the CQIS Report#M7ZCV005, from SVYLASEK; Report Summary for the CQIS Report#M71B4008, from SVYLASEK

Guys,

We are working to get more info and the engines back asap. At least one of them is a potential dropped valve based on the verbatim.

Already huge amounts of attention on this internally and externally. Social media posts, etc…

Just a head up for now…will have more info later this morning.

Thanks,
Dave

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From: Katinas, Dana (D.J.) <dkatinas@ford.com>
Sent: Wednesday, July 28, 2021 7:39 PM
To: Simon, David (D.) <dsimon1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Subject: Fwd: Failed 2.7L - Bronco

Awareness. Pair of failed 2.7 engines emerging issue.

Dana Katinas
Ford Motor Company
IPTSE Nano V6 / Coyote V8 Engine Systems Mgr
313-805-2303
dkatinas@ford.com

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Wednesday, July 28, 2021 5:22 PM
To: Strand, Tim (T.A.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.)
Subject: FW: Failed 2.7L - Bronco

Info

Brian R. Mazzella
Global Engine Engineering
21MY-beyond Nano Engine Programs Supervisor (Vehicle Interface)

From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Wednesday, July 28, 2021 5:21 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Mancini, JonCarlo (J.) <jmancin6@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>
Cc: Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: FW: Failed 2.7L - Bronco
Importance: High

2,7L V6 Team,
Please see two engine failure claims.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Vylasek, Stephan (S.) <svylasek@ford.com>
Sent: Wednesday, July 28, 2021 5:17 PM
To: Melki, Imad (I.E.) <imelki@ford.com>
Cc: Shah, Kiran (K.H.) <kshah12@ford.com>
Subject: FW: Failed 2.7L - Bronco

Wrong person! :) This one is for you Imad.

Kiran,

Here are the two failed 2.7L engine reports. The comments are brief, but straight forward. I plan to call them in the morning to see if the engines are indeed complete replacements. If they are, this will open into an emerging QSF. One more and we are QSF reporting in the FQRs.

I'll let you know how the calls to these dealers go.

Steve Vylasek
Concern ID & Resolution – Program Manager
Mustang / Continental / Bronco / Ranger / EcoSport
Ford Motor Company – FCSD
(313)-323-7817 / SVylasek@Ford.com

From: CQIS, Help (.)
Sent: Wednesday, July 28, 2021 5:00 PM
To: Vylasek, Stephan (S.)
Subject: Report Summary for the CQIS Report#M7ZCV005, from SVYLASEK

Attachments : 0

Report# :	M7ZCV005 CREDSR--or-- Q 202193761282			**Received:**	07/26/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP1MLA71500			**Build Date:**	06/19/2021
Odometer :	743 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 08189 Bommarito Ford			**Phone#:**	314-895-0600
City:	Hazelwood	**State:**	Missouri	**Country :**	USA
Originator:	JOE WOOD	**Originator e-mail:**	JWOOD@BOMMARITO.NET		
Symptom:	4 40 3 02 ST/RN/MV,STARTING,CRANK NO START ,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:					
Fix:	**Causal Component :**		ENGINE ASSY/BARE -- RPL		
Condition Code:					

Region Code: C4 Region Name: Kansas City

DTC:

PCM:P0305:00-65

Comments :

CONCER 07/26/2021 11:45AM

CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.

TECH/C 07/26/2021 11:45AM

VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

Click here to View Report Summary

From: CQIS, Help (.)
Sent: Wednesday, July 28, 2021 5:00 PM
To: Vylasek, Stephan (S.)
Subject: Report Summary for the CQIS Report#M71B4008, from SVYLASEK

Attachments : 0

Report# :	M71B4008 CREDSR--or-- Q 202193762322			**Received:**	07/27/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP3MLA66408			**Build Date:**	06/25/2021
Odometer :	1,146 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 09696 Keller Ford, Inc.			**Phone#:**	616-784-6600
City:	Grand Rapids	**State:**	Michigan	**Country :**	USA
Originator:	Dustin Wiegerink	**Originator e-mail:**	dwiegerink@kellerfordauto.com		
Symptom:	4 41 0 00 ST/RN/MV,RUNNING,UNKNOWN,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				
Additional Symptom:					
Fix:	**Causal Component :**		TRANSMISSION ASY-AUT -- RPR		
Condition Code:					

Region Code: G2 Region Name: Detroit

Comments :

CONCER 07/27/2021 09:24AM

customer was driving had loss of power , trailer default message, dash went black and vehicle shut down. will not turn over. engine seems to locked up.

TECH/C 07/27/2021 09:24AM

tried turning over manually and engine is locked

Click here to View Report Summary

From: Beyer, Laura (L.D.)
Sent: Thursday, April 21, 2022 4:13 PM
To: Stanley, Daniel (D.J.)
Subject: FW: Ford Bronco Engine Failures

This will be discussed in an EMM for 22-306 next week. I will put in the request this afternoon.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Sent: Wednesday, April 20, 2022 9:09 AM
To: Ott, David (D.J.) <dott@ford.com>; Beyer, Laura (L.D.) <lbeyer4@ford.com>
Subject: FW: Ford Bronco Engine Failures

Laura / Dave… let's plan to bring this topic to an EMM some time next week to see what is it that we know at this point.

From: Deep, Said (.) <sdeep@ford.com>
Sent: Wednesday, April 20, 2022 7:10 AM
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: Fwd: Ford Bronco Engine Failures

Per our discussion.

From: Rob Stumpf <Rob@thedrive.com>
Sent: Tuesday, April 19, 2022 10:33 AM
To: Cadiz, Jiyan (J.K.) <jcadiz@ford.com>
Cc: Caleb Jacobs <caleb@thedrive.com>
Subject: Ford Bronco Engine Failures

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Hey Jiyan,

Long time no talk! Hope you are doing well.

Over the past few months, we've received several tips regarding failures of the 2.7-liter engine found in the Bronco. It appears that there have been a number of valvetrain-related issues reported by owners with very low miles. I can see this echoed over on the Bronco6g forums, Facebook, and on the NHTSA's site:

- https://www.bronco6g.com/forum/threads/2-7l-blown-engine-fail-list-45-so-far-april-16-update.31951/
- https://www.bronco6g.com/forum/threads/bronco-2-7-blown-engine.31613/
- https://www.bronco6g.com/forum/threads/final-update-complete-engine-failure-sas-big-bend-3wk-old-1000mi-2-7l-ecoboost.26787/
- https://www.nhtsa.gov/vehicle/2021/FORD/BRONCO/SUV/4WD
- https://www.reddit.com/r/FordBronco/comments/s7bu2s/bronco_badlands_27_broken_with_2000miles/

Can you confirm if Ford is aware of an increased number of failures? If so, has Ford had any discussion on next steps and if a recall or TSB is necessary? I would be interested in a technical explainer if Ford has one to share.

One forum member claims to have worked at Lima and says there was a bad batch of valves. Can you confirm if there is any validity to that claim?

- https://www.bronco6g.com/forum/threads/2-7l-issue.23375/post-906150

Kind regards,

Rob Stumpf

Writer, The Drive
The Drive is part of Recurrent

Harrisburg, PA

m. 717.903.1641

@RobDrivesCars

From: Hewlett, Matt (M.S.)
Sent: Friday, August 6, 2021 7:47 AM
To: Adam, Paul (P.J.); Bradshaw, Michael (M.W.)
Subject: FW: Missouri Nano
Attachments: IMG_4105.jpg; IMG_4106.jpg

Mike, do these marks look similar to marks from PCL sorting alerted cams?

Thanks,
Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

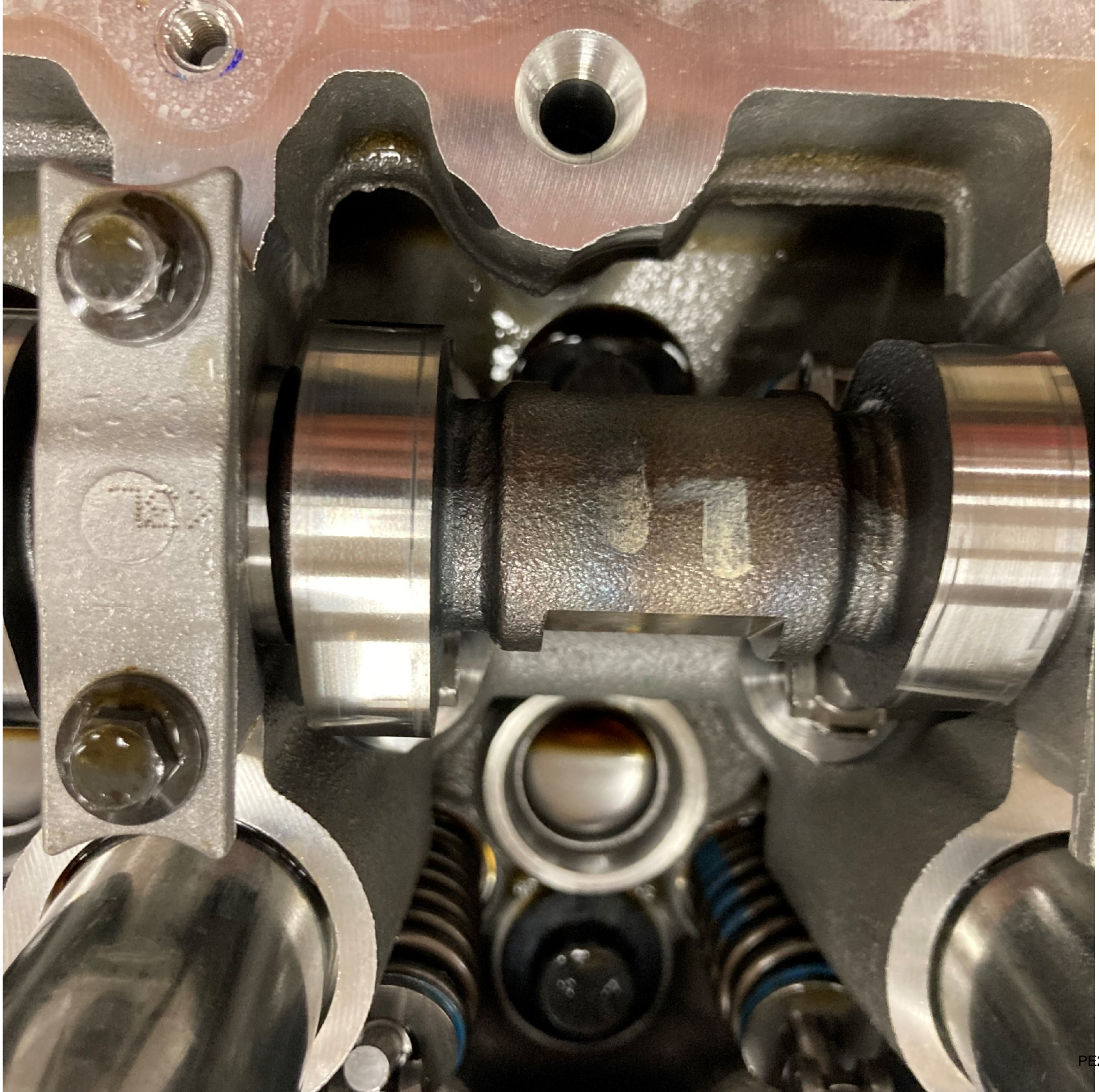
From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Friday, August 06, 2021 7:29 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: Missouri Nano

Morning Matt.

Any idea why these cams from the Missouri engine are marked with paint pen?

FYI - one of the unfailed valves on this engine has a broken RFF finger…

Paul
313-580-3971



PE22-007 000086 ER

PE22-007 000087 ER

From: Ott, David (D.J.)
Sent: Tuesday, July 19, 2022 2:30 PM
To: Frascaroli, Emily (E.E.)
Cc: Beyer, Laura (L.D.)
Subject: FW: Nano Dropped Valve
Attachments: GDIA_2.7L and 3.0L Nano Engine Failures 25-May-2022.pdf

Emily, looks like there are an additional 53 2.7L reports to date.

From: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Sent: Tuesday, July 19, 2022 2:10 PM
To: Ott, David (D.J.) <dott@ford.com>
Subject: RE: Nano Dropped Valve

Dave,
Please see Tim Knott's chart below showing GSAR load date for dropped valve claims for Nano engines (all vehicle lines). There have been 53 incremental dropped valves subsequent to the GDIA analysis (which used a 09-May-2022 data file).

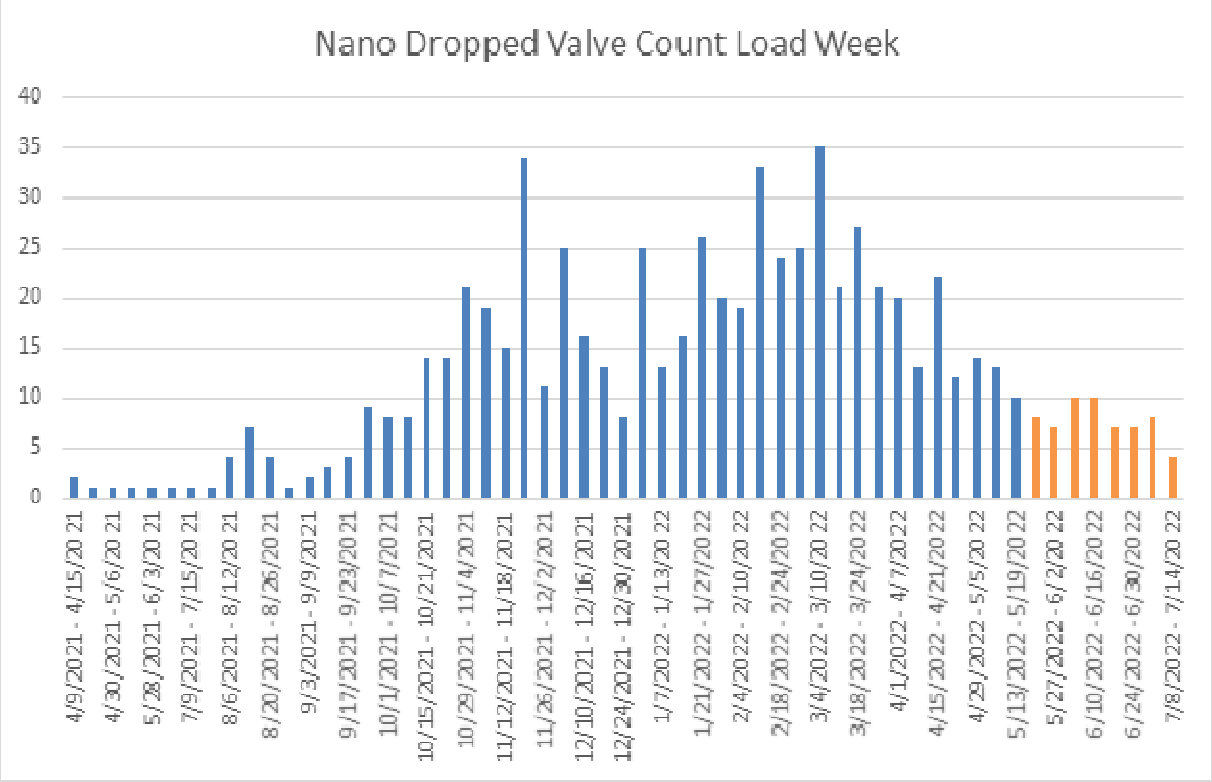
The May 2022 GDIA analysis is attached.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Knott, Tim (.) <tknott@ford.com>
Sent: Tuesday, July 19, 2022 12:47 PM
To: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Cc: Corbett, Sandy (S.M.) <scorbett@ford.com>
Subject: Nano Dropped Valve

Laura -

There have been 53 additional dropped valve after the GDIA analysis.
Highlighted in orange.


Nano Dropped Valve Count Load Week
40
35
30
25
20
15
10
5
0
4/9/2021 - 4/15/2021
4/30/2021 - 5/6/2021
5/28/2021 - 6/3/2021
7/9/2021 - 7/15/2021
8/6/2021 - 8/12/2021
8/20/2021 - 8/26/2021
9/3/2021 - 9/9/2021
9/17/2021 - 9/23/2021
10/1/2021 - 10/7/2021
10/15/2021 - 10/21/2021
10/29/2021 - 11/4/2021
11/12/2021 - 11/18/2021
11/26/2021 - 12/2/2021
12/10/2021 - 12/16/2021
12/24/2021 - 12/30/2021
1/7/2022 - 1/13/2022
1/21/2022 - 1/27/2022
2/4/2022 - 2/10/2022
2/18/2022 - 2/24/2022
3/4/2022 - 3/10/2022
3/18/2022 - 3/24/2022
4/1/2022 - 4/7/2022
4/15/2022 - 4/21/2022
4/29/2022 - 5/5/2022
5/13/2022 - 5/19/2022
5/27/2022 - 6/2/2022
6/10/2022 - 6/16/2022
6/24/2022 - 6/30/2022
7/8/2022 - 7/14/2022

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Thursday, December 2, 2021 6:27 AM
To: Parks, Tracy
Cc: Adam, Paul (P.J.); Vempati, Abhijyoth (A.R.)
Subject: FW: Nano Intake valve JT4E-6507-BA - Purchase Order

Tracy,

You should have revised RFQ for BA level. Please respond with Quote so that PO can get issued.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Norton, Julie (J.) <jnorto45@ford.com>
Sent: Wednesday, December 01, 2021 5:48 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Cc: Donnelly, Claire (C. M.) <CGEMBROW@ford.com>; Vempati, Abhijyoth (A.R.) <avempati@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: RE: Nano Intake valve JT4E-6507-BA - Purchase Order

Hello Jeffrey,

This was (re)-sent today. I had 4 parts (2 GTT that Debbie inquired on earlier today), 1 Schaeffler (P2GE-6G093-AB adding a new plant), and this part below that I received over the holiday weekend. I sent them out on Monday, but after Debbie inquired on the GTT parts today I noticed a problem with all of the parts I sent out for quote on Monday.

So, short answer is that Eaton should have JT4E-6507-BA in their queue as of later today.

Thank-you,

Julie Norton
Valvetrain Buyer
ICE Propulsion and Thermal Systems
Ford Motor Company
☎: 1.248.752.5450
✉: jnorto45@ford.com

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Wednesday, December 1, 2021 4:21 PM
To: Norton, Julie (J.) <jnorto45@ford.com>
Cc: Donnelly, Claire (C. M.) <CGEMBROW@ford.com>; Vempati, Abhijyoth (A.R.) <avempati@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: Nano Intake valve JT4E-6507-BA - Purchase Order

Hi Julie,

PE22-007 000090 ER

Tracy Parks from Eaton mentioned in meeting today that he responded to your RFQ but it was for old part number JT4E-6507-AA.

The new release for Sil1 mtrl change that should be in WIPS is JT4E-6507-BA: Notice NE01 E 14249175 000.

Can you please check and confirm if this is accurate.

We need Eaton quote for BA level and PO issued so that PSW parts can be shipped.

Thanks.
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Zschering lll, Kurt H (K.)
Sent: Monday, July 19, 2021 10:24 AM
To: Copp, Anthony (A. R.); Danger, Gerald (G.); Figurella, Neil (N.); Jolley, Clifford (C.); Kakareka, Tom (T.); Yamada, Shuya Shark (S.Y.); Adam, Paul (P.J.); Affes, Habib (H.); Alex, Thomas (T.); Bagozzi, Andrew (A.J.); Battistini, Claudio (C.R.); Baumhardt Neto, Victor (V. F.); Blaha, Ron (R.); Bollman, Wes (W.); Bolyard, Jay (John.); Booth, Charles (C.); Breida, Mary (M.T.); Brewer, Todd (T.J.); Brodbeck, Luke (L.); Carlisle, Shawn (S.K.); Chen, Yung-Ming (Y.); Chisholm, Peter (P.M.); Cockerill, Al (C.A.); Collareno, Michael (M.D.); Collings, Travis (T.); Cote, Anthony (A.); Crowe, Jonathan (J.D.); Dame, Andrew (A.C.); Davidson, Alexander (A.H.); Deegan, Michael (M.D.); Delproposto, Michael (M.D.); Dey, Tapash (T.); Diepenhorst, Timothy (T.); Dummer, Eric (E.); Dupuis, Craig (C.P.); Ejakov, Misha (M.); Evenson, Karl (K.); Farahat, Zyad (Z.); Feldmeier, Laural (L.S.); Fratzke, Jacob (J.W.); Gasior, David (D.M.); Giunta, Michael (M.J.); Gore, Alexander (A.H.); Gray, Ryan (R.S.); Grywacheski, Scott (S.M.); Hale, Tony (A. S.); Hansen, Nathaniel (N.D.); Hanshaw, Jamie (J.C.); Hart, Lori (L.A.); Hendrickson, Joe (J.); Henne, Joseph (J.); Herr, Mike (M.S.); Hewlett, Matt (M.S.); Jacobs, Jeremy (J.); Janda, Jon (J.M.); Jeng, Dan (D.L.); Jeyasingh, Rashiker (R.J.); Johns, Tameka (T.); Johnson, Ryan (L.); Jung, Howard (H.H.); Jung, Terry (H.); Kamat, Prasad (P.K.); Kapusta, Joshua (J.); Karim, Ahsanul (A.); Katinas, Dana (D.J.); Kawai, Sarah (S.K.); Kilby, John (J.G.); Kiss, Victor (V. K.); Klomp, Karl (K.R.); Knott, Tim (.); Kolodziejczyk, Jeffrey (J.A.); Kozar, John (J.S.); Kramer, Michael (M.T.); Kunert, Nicholas (N.); Langley, Scott (C.S.); Lanzesira, Joseph (J.M.); Liimatta, Gary (G.D.); Lisowsky, Timothy (T.J.); Lohr, John (J.C.); Lu, Zikun (Z.); Luginbill, Michael (M.); Lyle, Randy (R.V.); Ma, Weidong (W.); Madinsky, Patrick (P.J.); Mancini, JonCarlo (J.); Mariucci, Vincent (V.E.); Mazzella, Brian (B.R.); Mazzella, Gary (G.R.); Mcdonald, Aaron (A.); McNary, Todd (T.P.); Moore, Patrick (P.M.); Morabito, Ryan (R.); Moran, Jonathan (J.); Morelli, Anthony (A.J.); Morrow, Bill (N.W.); New, Kenneth Jarrett (K.J.); Ni, Ben (B.X.); O'Brien, Sean (S.R.); Ogden, Chris (C.W.); Palazzolo, Chris (C.K.); Parkinson, Tim (T.M.); Parr, Michael (M.); Patel, Bhavesh (B.R.); Pearson, Gavin (G J R.); Peters, Ed (E.W.); Pyzoha, Matthew (M.J.); Rakowicz, Timothy (T.J.); Randall, Katherine (K.); Rauch, Jim (J.R.); Reinhart, Paul (T.); Riggs, Gregory (G.L.); Russ, Stephen (S.G.); Sanders, Thomas (T.); Schildcrout, Doug (D.L.); Schneider, Jim (J.M.); Schook, Rodney (R.W.); Scott, Logan (L.T.); Selthofer, Sara (S.); Shapardanis, Steven (S.); Sheeran, William (W.M.); Shelley, David (D.R.); Shen, Huihua (Harry.); Simon, David (D.); Sipila, Darren (.); Sliwka, Peter (P.A.); Smith, Cressel (C.); Sobecki, Chris (C.); Soper, Todd (R.); Spannbauer, Shawn (S.M.); Suchecki, Tom (.); Tajmahal, Hussain (H.); Tiernan, Chris (C.D.); Truman, Darin (D.R.); Wild, David (D.J.); Willis, Scott (S.A.); Wingert, Dean (D.); Wong, Benny (.); Xie, Chunlei (C.); Yeager, Jeffrey (J.A.); Younis, Athir (A.); Zitny, Dennis (D.R.); Zschering lll, Kurt H (K.)
Subject: FW: PLS-Teardown Report for Serial-ML3E_6007_AA-25120030AA Test-LIGHT TRUCK POWERTRAIN DURABILITY TEST PROCEDURE (00.00-R-316)

Good morning. This engine was reviewed in the 6/29/2021 teardown meeting.

From: pptpls@ford.com <pptpls@ford.com>
Sent: Monday, July 19, 2021 10:22 AM
To: Zschering lll, Kurt H (K.) <kzscheri@ford.com>
Subject: PLS-Teardown Report for Serial-ML3E_6007_AA-25120030AA Test-LIGHT TRUCK POWERTRAIN DURABILITY TEST PROCEDURE (00.00-R-316)

TEARDOWN INFO

Engine No:	ML3E_6007_AA-25120030AA		
Program Name:	2021 MY 2.7L V6 Nano GTDI UPG 4V Gas U725 -- Study NA Only		
Test Name:	LIGHT TRUCK POWERTRAIN DURABILITY TEST PROCEDURE (00.00-R-316)		
Requested By:	Jacobs, Jeremy (J.)		
Reported By:	Zschering, Kurt (K.)		
Dyno Contact:	0		
Display Date:	06/25/2021 - 07/09/2021	**Display Location:**	6A
Reasons for Teardown:	Completed Test		

ENGINE INFO

Test Site/Cell:		**Test Type:**	VEHICLE
Test Hours:		**Total Engine Hours:**	
Fuel Type/Spec:		**Oil Type/Spec:**	
Oil Change Interval:		**Coolant Type:**	
Oil Economy Overall:		**Oil Economy EOT:**	
Block Material:	0	**Cylinder Bore Material:**	0
Requestor's Notes:	Please perform full durability teardown. Engine completed Baja 1000 race. no reported issues but would like to look for any extra wear on anything		
Teardown Technician's Notes:	CONTACT ME WHEN ENGINE IS ON A STAND FOR PHOTOS		

Message:

Please click on the link to review the Teardown Report.

Link to Teardown Report.

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Wednesday, July 28, 2021 6:42 AM
To: Adam, Paul (P.J.)
Subject: FW: Request for Nano Intake Valves
Attachments: 0448CS tags.pdf

Paul,

FYI - Shipping info for the other 10 current AB valves for impact testing.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Steinke, Cody (C.) <csteink2@ford.com>
Sent: Wednesday, July 28, 2021 6:07 AM
To: Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>; Tolbert, Keith (K.) <ktolber6@ford.com>; Abner, ERIC (E.S.) <eabner@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; McAdams, Matthew (M.) <MMCADAM6@ford.com>; Guthrie, Kelley (K. S.) <kguthri4@ford.com>
Subject: RE: Request for Nano Intake Valves

RFS # 815240 has been created to ship out (10) intake valves, part # JT4E-6507-AB to building 1/FD20T via FedEx. Parts scrapped to tag 0448CS tags. A copy of the shipper was sent to the back to pick the parts for shipping.

Thank you,

Cody Steinke
Production Control Coordinator
Lima Engine Plant
Ford Motor Company
419-226-7253

From: Lyons, Marcus (M.I.) <mlyons3@ford.com>
Sent: Tuesday, July 27, 2021 3:24 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Request for Nano Intake Valves

Concur.

:: Marcus ::

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Tuesday, July 27, 2021 12:25 PM
To: Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>

Cc: Lyons, Marcus (M.I.) <mlyons3@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: FW: Request for Nano Intake Valves
Importance: High

Marcus, can we scrap (10) JT4E-6507-AB Nano intake valves to TST?

Cody or Aaron, please ship them to building 1 (FD20T) attention Ben Rhude if Marcus approves. Please ensure they are wrapped individually for shipping.

Ben, sorry I missed your earlier email.

Thanks,
Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Sent: Tuesday, July 27, 2021 12:02 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: RE: Request for Nano Intake Valves
Importance: High

Hey Matt

I haven't heard anything on this. Is it a possibility to get these parts in Dearborn before Tuesday next week?

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Rhude, Benjamin (B.)
Sent: Thursday, July 15, 2021 11:55 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: Request for Nano Intake Valves

Hello Matt,

In light of the 3rd keeper groove failures, I would like to request 10 intake valves (JT4E-6507-AB). I am planning on getting some impact testing on them. Could you please send them to my attention at building 1?

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

SCRAP

0448CS

Plant	EF06A	LIMA ENGINE PLANT		**ID Created:**	ABUTLE67
Reject Date:	07/28/21	**Reject Code:**	IP:In Plant	**Reject Status:**	Pending
Responsibility:	Plant	**Code:**	5051F		
		Name:	NANO HEAD ASSY SELL		
Reject Remarks:	PV6 INTAKE VALVES BEING SCRAPPED TO TST FOR IMPACT TESTING AT BUILDING 1: ATTN BEN RHUDE				
Part No.:	**JT4E- 6507-AB**			INTAKE VALVE PV 6	
Part Reject Status:	Pending	**CMMS Part Status:**	C:Current	**ID Created:**	ABUTLE67
Reject Qty:	10	**Original Qty:**	10	**ID Closed:**	ABUTLE67
Reject Reason:	NO:NO REASON TO CODE				
Supplier Reject Cd:					
Lift Tag:					
Reject Part Remarks:					
Scrap Work Center:	5051F:NANO HEAD ASSY SELL			**Department:**	5051:NANO HEAD ASSEMBLY
Shift:	2	**Scrap Date:**	07/28/21	**Work Order:**	
Scrap Tag:	**0448CS**			**Scrap Qty:**	10
Scrap Reason Code:	TST:DESTRUCTIVE TEST SCRAP (QUALITY CONTROL ONLY)				
Scrap Lift Tag:		**Count:**	Y	**Recovery:**	

From: Adam, Paul (P.J.)
Sent: Friday, July 23, 2021 4:05 PM
To: Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.)
Subject: FW: valve material
Attachments: J775_201801 - Valve Materials.pdf

Paul
313-580-3971

From: Adam, Paul (P.J.)
Sent: Friday, July 23, 2021 1:11 PM
To: Knott, Tim (.) <tknott@ford.com>
Subject: valve material

Paul Adam
Global Valve Train Technical Expert
Ford Motor Company
313-580-3971

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SURFACE VEHICLE INFORMATION REPORT

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Engine Poppet Valve Information Report

RATIONALE

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Foreword—Poppet valves control combustion chamber induction and exhaust gas flow in reciprocating combustion engines. Poppet valves are manufactured from iron, nickel, titanium, and cobalt-base metallic alloys that are often welded together in various combinations.

Martensitic and austenitic steels are used for intake valves. Specially designed high temperature martensitic alloys, austenitic alloys, and superalloys are used for exhaust valves.

Titanium alloys have been used for both intake and exhaust valves in some limited production, high performance applications. Special iron, nickel, and cobalt-base alloys are welded to many of the valve head alloys to improve seat face wear and corrosion resistance.

1. Scope—This specification supplies engineers and designers with:

a. Poppet valve nomenclature
b. Poppet valve alloy designations
c. Chemical compositions of poppet valve alloys
d. A guide to valve alloy metallurgy and heat treatments
e. General information on properties of valve alloys
f. A guide to the application of valve alloys
g. A description of valve design and construction, and their relation to valve alloy selection
h. Valve gear design considerations that affect valves

2. Reference

2.1 Applicable Publication—The following publication forms a part of this specification to the extent specified herein.

2.1.1 ISO PUBLICATION—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 683-15—Heat-treatable steels, alloy steels and free-cutting steels—Part 15: Valve steels for internal combustion engines

3. Valve Nomenclature—Valve nomenclature and constructions are illustrated in Figures 1 to 5.

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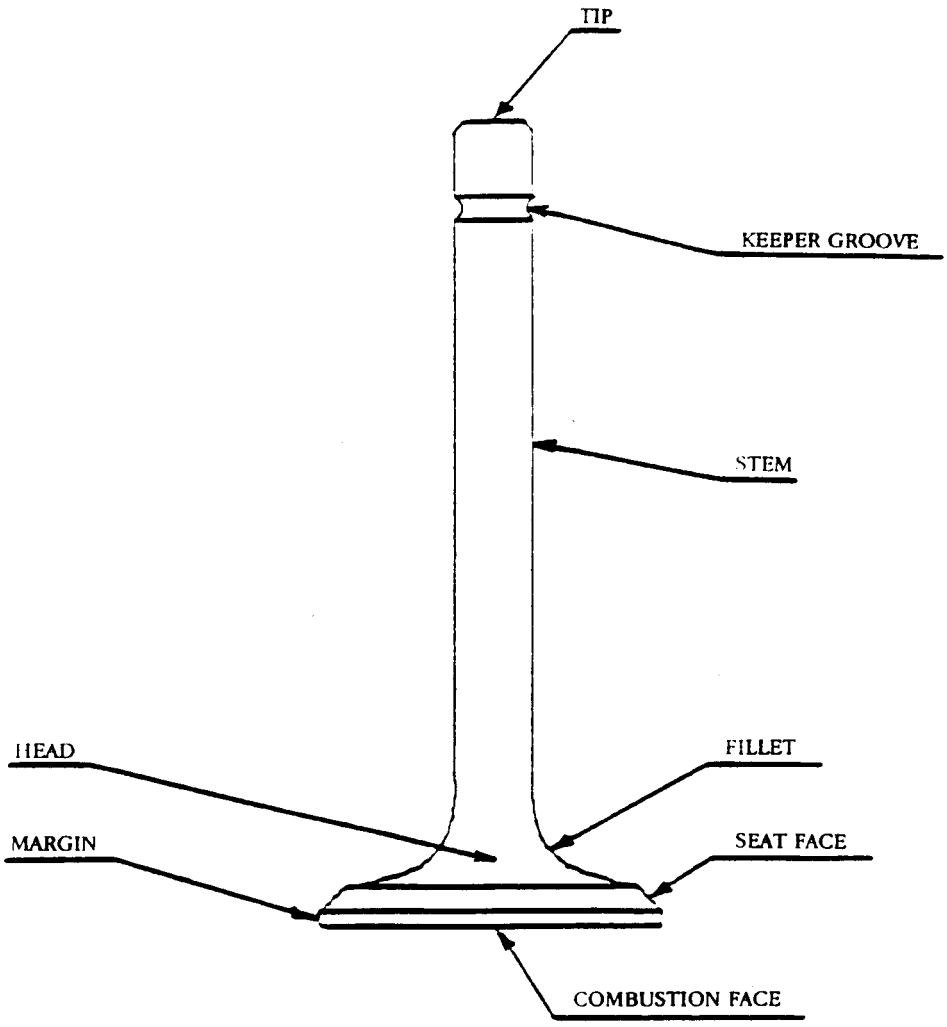

The majority of intake valves for all applications are one-piece construction that also has significant usage in spark ignition engine exhaust valves.

FIGURE 1—ONE-PIECE CONSTRUCTION

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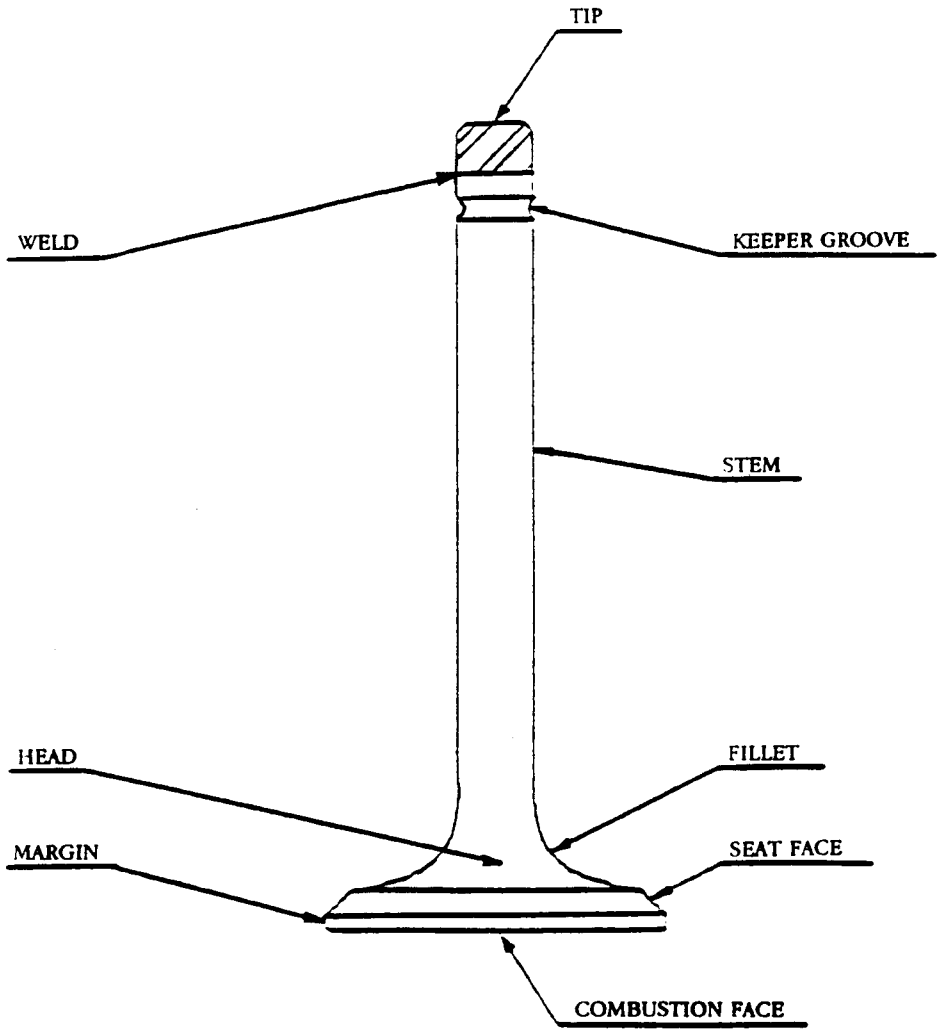

Welded tip construction has significant usage in spark and compression ignition engine valves.

FIGURE 2—WELDED TIP CONSTRUCTION

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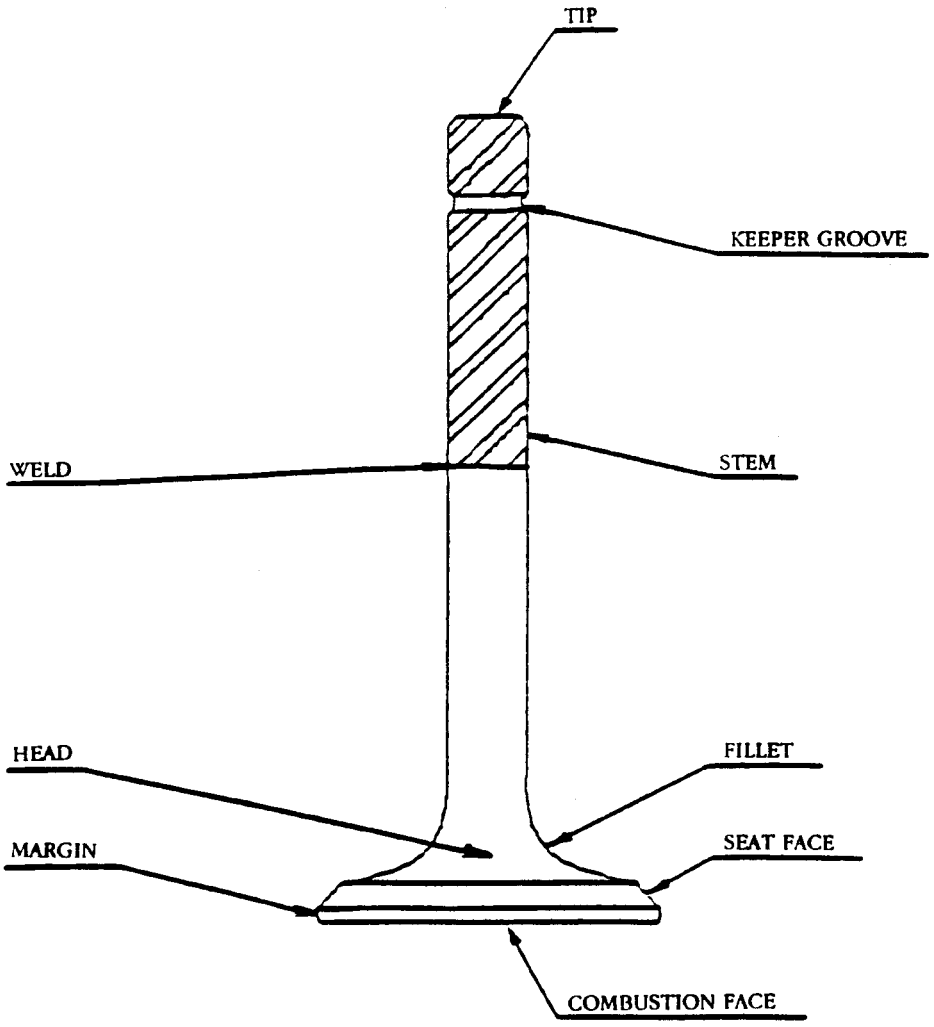

Two-piece construction has significant usage in spark and compression ignition engine exhaust valves.

FIGURE 3—TWO-PIECE CONSTRUCTION

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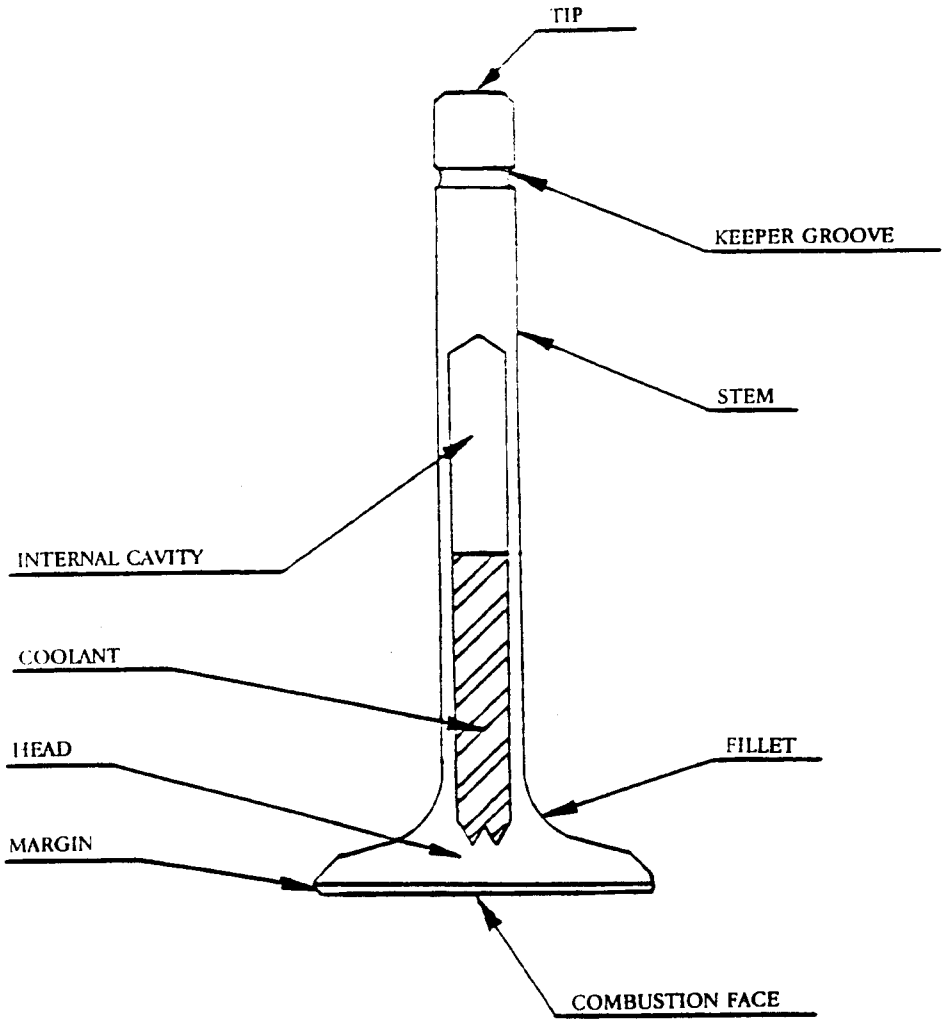

Internally cooled construction used in extreme duty truck, high performance, and aircraft spark ignition engine exhaust valves.

FIGURE 4—INTERNALLY-COOLED CONSTRUCTION

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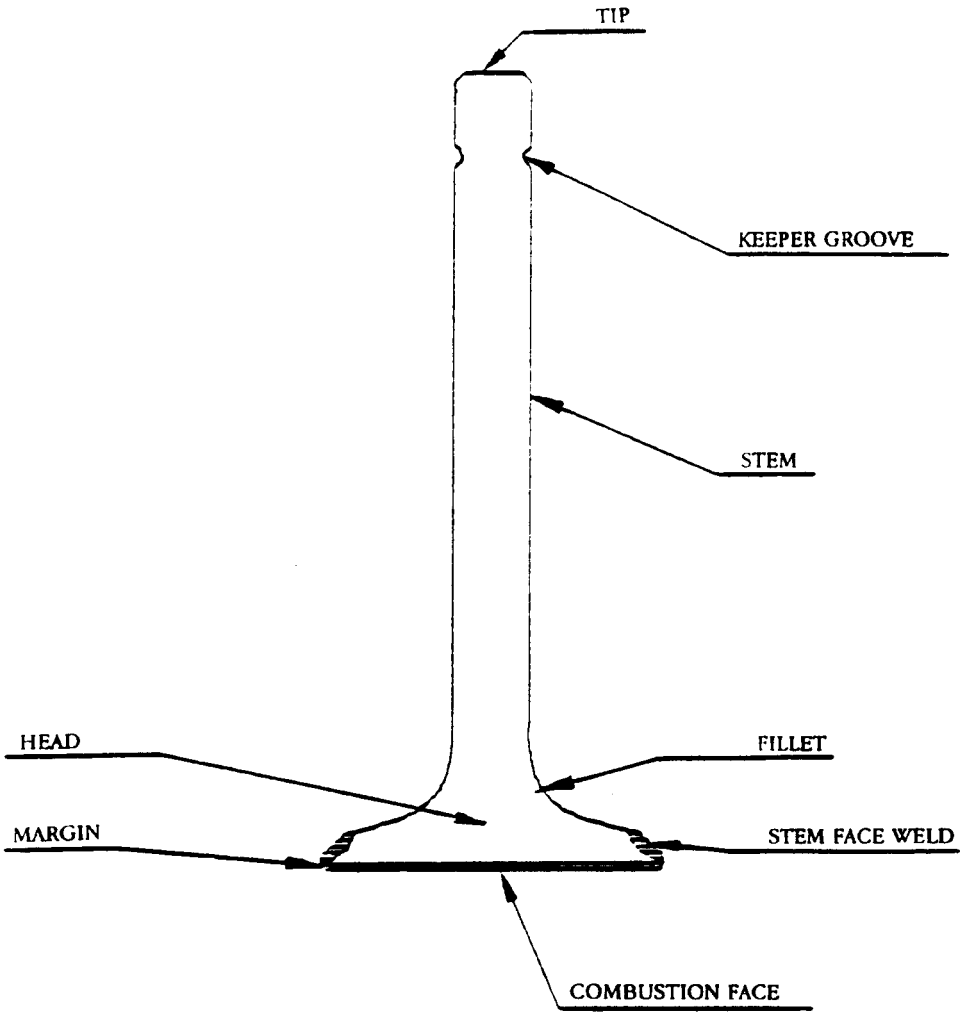

Welded seat face construction predominates in compression ignition engine exhaust valves and has some usage in other valve applications. It supplements other types of valve construction.

FIGURE 5—WELDED SEAT FACE CONSTRUCTION

4. Valve Alloy Designation

4.1 UNS Designations—SAE, in conjunction with American Society for Testing and Materials (ASTM), has adopted the Unified Numbering System (UNS) for the identification of all metallic alloys. Tables 1A to 4B use the UNS identification codes for valve alloys. These UNS numbers supersede the previous SAE functional numbering system.

TABLE 1A—CURRENT NORTH AMERICAN VALVE ALLOYS (MARTENSITIC STEELS)(1)

UNS/ISO 683/15	COMMERCIAL	C	Mn	P (max)	S (max)	SI	Cr	Ni	W	Mo	Fe	Other
H15410	1541H	0.35/0.45	1.25/1.75	0.040	0.050	0.15/0.35	—	—	—	—	Base	
G15470	1547	0.43/0.51	1.35/1.65	0.040	0.050	—	—	—	—	—	Base	
G86450	8645	0.43/0.48	0.75/1.00	0.035	0.040	0.15/0.35	0.40/0.60	0.40/0.70	—	0.15/0.25	Base	
H41400	4140H	0.37/0.44	0.65/1.10	0.035	0.040	0.15/0.35	0.75/1.20	—	—	0.15/0.25	Base	
K14072	ASTM–A193\B16	0.36/0.44	0.45/0.70	0.040	0.040	0.15/0.35	0.80/1.15	—	—	0.50/0.65	Base	V 0.25/0.35
S65007/ X 45 CrSi 9 3	Sil 1	0.40/0.50	0.80 max	0.040	0.030	2.70/3.30	8.00/10.00	0.60 max	—	—	Base	
S65006	Sil XB	0.75/0.90	0.80 max	0.040	0.040	1.75/2.60	19.00/ 21.00	1.00/1.70	—	—	Base	
S42200	422 SS	0.20/0.25	1.00 max	0.040	0.030	0.75 max	11.00/ 12.50	0.50/1.00	0.75/1.25	0.75/1.25	Base	V 0.15/0.30 Cu 0.50 max
S64004/ X50CrSi 8 2	SUH 11/ SUH 11M	0.45/0.55 0.47/0.55	0.60 max 0.60 max	0.030 0.030	0.030 0.030	1.00/2.00 1.00/2.00	7.50/9.50 7.50/9.50	0.60 max 0.60 max	—	— —	Base	
—	FMS-235	0.47/0.53	0.60 max	0.030	0.030	1.05/2.00	4.80/5.50	0.60 max	—	—	Base	
	SUH-3	0.35/0.45	0.60	0.030	0.030	1.80/2.50	10.0/12.0	0.60 max	—	0.70/1.30	Base	Cu 0.30 max

1. All chemical contents are expressed in weight percent.

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TABLE 1B—(OTHER) VALVE ALLOYS (MARTENSITIC STEELS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	W	Mo	Fe	Other	SIMILAR TO	WHERE USED
X 50 CrSi 8 2	0.45/0.55	0.60 max	0.030	0.030	1.0/2.0	7.5/9.5	0.60 max	—	—	—	Base			Europe
Chromo 193/ X 85 CrMoV 18 2	0.80/0.90	1.5 max	0.040	0.030	1.0 max	16.5/18.5	—	—	—	2.0/2.5	Base	V 0.30/0.60		Europe
SMnC443	0.40/0.46	1.35/1.65	0.030	0.030	0.15/0.35	0.35/0.70	—	—	—	—	Base		G15470	Asia
SNCM 240	0.38/0.43	0.70/1.00	0.030	0.030	0.15/0.35	0.40/0.65	0.40/0.70	—	—	0.15/0.30	Base			Asia
SUH 1	0.40/0.50	0.60 max	0.030	0.030	3.00/3.50	7.50/9.5	0.60 max	—	—	—	Base		S65007	Asia
SUH 616	0.20/0.25	0.50/1.00	0.040	0.030	0.50 max	11.00/13.00	0.50/1.00	—	0.75/1.25	0.75/1.25	Base	V 0.20/0.30	S42200	Asia
40 Cr	0.38/0.43	0.60/0.85	0.030	0.030	0.15/0.35	0.90/1.20	0.25	—			Base	Cu 0.30 max		Eru/Asia
GM-8440	0.35/0.45	0.20/0.40	0.030	0.040	3.60/4.20	1.85/2.50	0.25 max	—	—	0.10 max	Base	Cu 0.25 max		USA

TABLE 2A—CURRENT NORTH AMERICAN VALVE ALLOYS (AUSTENITIC STEELS)

UNS/ISO 683/15	COMMERCIAL	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	Fe	Other
S63008/ X 53 CrMnNiN 21 9	21-4N	0.48/0.58	8.00/10.00	0.050	0.030	0.25 max	20.00/22.00	3.25/4.50	0.35/0.50	Base	
S63012	21-2N	0.50/0.60	7.00/10.00	0.050	0.030	0.25 max	19.50/21.50	1.50/2.75	0.20/0.40	Base	
S63018/ X 33 CrMnNiN 23 8	23-8N	0.28/0.38	1.50/3.50	0.050	0.030	0.50/1.00	22.00/24.00	7.00/9.00	0.25/0.35	Base	Mo 0.50 max W 0.50 max
S30430	302 HQ	0.10 max	2.00 max	0.045	0.030	1.00 max	17.00/19.00	8.00/10.00		Base	Cu 3.00/4.00
S63019/ X 50 CrMnNiNbN 21 9	21-4N + Nb + W	0.45/0.55	8.00/10.00	0.050	0.030	0.45 max	20.00/22.00	3.50/5.50	0.40/0.60	Base	W 0.80/1.50 Nb + Ta 1.80/2.50
S31630	316 MOD	0.08/0.12	2.0/3.0	0.020	0.015	0.025 max	0.16/0.17	9.0/10.0	0.12/0.19	Base	Mo2.5 – 3.0 Cu2.5 – 3.5
S30500	305SS	0.12 max	2.00 max	0.045	0.030	1.0 max	17.0/19.0	10.0/13.0		Base	

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TABLE 2B—OTHER VALVE ALLOYS (AUSTENITIC STEELS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	Fe	OTHER	SIMILAR TO	WHERE USED
18-12N	0.40/0.50	11/13	0.05	0.005	1 max	17/19	0.50 max	0.25/0.35	Base			Service
21-12N	0.15/0.25	1.00/1.50	0.045	0.030	0.70/1.25	20.00/22.00	10.50/ 12.50	0.15/0.25	Base		S63017	Europe
Gaman H	0.47/0.57	11.00/13.00	0.030	0.050	2.00/3.00	20.00/22.00	—	0.40/0.50	Base		S63013	Service
X 55 CrMnNiN 20 8	0.50/0.60	7.0/10.0	0.050	0.030	0.25 max	19.5/21.5	1.50/2.75	0.20/0.40	Base		S63012	Europe
X 53 CrMnNiNbN 21 9	0.48/0.58	8.0/10.0	0.050	0.030	0.45 max	20.0/22.0	3.25/4.50	0.38/0.50	Base	C + N > 0.90 Nb + Ta 2.–3	S63019	Europe
SUH 4	0.75/0.85	0.20/0.60	0.030	0.030	1.75/2.25	19.00/20.50	1.15/1.65		Base		S65006	Asia
SUH 35	0.48/0.58	8.00/10.00	0.040	0.030	0.35 max	20.00/22.00	3.25/4.50	0.35/0.50	Base		S63008	Asia
SUH 37	0.15/0.25	1.00/1.60	0.040	0.030	1.00 max	20.50/22.50	10.0/12.0	0.15/0.30	Base		S63017	Asia

TABLE 3A—CURRENT VALVE ALLOYS (SUPERALLOYS)

UNS/ISO 683/15	COMMERCIAL	C	Mn (max)	P (max)	S (max)	SI (max)	Cr	Ni	Co	Mo	Fe	Other
N07751/ NiCr 15 Fe 7 TiAl	I n conel 751	0.03/0.10	0.50	0.015	0.015	0.50	14.0/17.0	Base	1.00 max	0.50 max	5.00/9.00	Ti 2.00/2.60 Al 1.10/1.35 Nb + Ta 0.70/1.20 B 0.0015/0.009 Cu 0.50 max
N07080/ NiCr 20 TiAl	Nimonic 80-A	0.04/0.10	1.00	0.020	0.015	1.00	18.0/21.0	Base	2.00 max	—	3.00 max	B 0.008 max Ti 1.80/2.70 Al 1.00/1.80 Cu 0.20 max
N07031	Pyromet 31	0.03/0.06	0.20	0.015	0.015	0.20	22.3/22.9	55.0/58.0		1.70/2.30	—	Ti 2.10/2.60 Al 1.0/1.70 Nb 0.60/1.20 B 0.008 max

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TABLE 3A—CURRENT VALVE ALLOYS (SUPERALLOYS)

UNS/ISO 683/15	COMMERCIAL	C	Mn (max)	P (max)	S (max)	Sl (max)	Cr	Ni	Co	Mo	Fe	Other
N07032	Pyromet 31V	0.20	0.20	0.015	0.015	0.20	22.3/22.9	55.0/58.0	1.00 max	1.70/2.30	Balance	Ti 2.10/2.40 Al 1.10/1.40 Nb 0.70/1.00 B 0.008 max Cu 0.50 max
S66315/ Ni30	NCF 3015	0.08	0.50	0.015	0.015	0.50	13.5/15.5	29.5/33.5	—	0.4/1.0	Balance	Ti 2.30/2.90 Al 1.60/2.20 B 0.010 Max Nb 0.4/0.9

TABLE 3B—OTHER VALVE ALLOYS (SUPERALLOYS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	X (max)	Si	Cr	Ni	Co	Mo	Fe	OTHER	SIMILAR
NiFe 25 Cr 20 NbTi	0.10 max	1.0 max	0.030	0.015	1.0 max	18.0/21.0	Base	—	—	23.0/28.0	Al 0.30/1.00 Nb + Ta 1.0/2.0 B 0.008 max	
Waspaloy	0.03/0.10	1.00	0.030	0.030	0.75	18.00/21.00	Base	12.00/15.00	3.50/5.00	2.00 max	Ti 2.75/3.25 Al 1.20/1.60 Zr 0.02/0.12 B 0.003/0.010 Cu 0.50 max	N07001
Nimonic 90	0.13 max	1.00 max			1.50 max	18.0/21.0	Balance	15.0/21.0	—	3.00 max	Ti 1.80/3.00	

TABLE 3C—OTHER VALVE ALLOYS (TITANIUM)

UNS	GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C (max)	Al	V	Zr	Mo	Sn	O (max)	Fe (max)	H (max)	Y (max)	Ti	OTHER
R56401	Ti 6-4	0.10	5.25/6.75	3.35/4.65	—	—	—	0.40	0.80	0.020	0.005	Base	N 0.10
R54620	Ti 6-2-4-2	0.05	5.50/6.50	—	3.60/4.40	1.80/2.20	1.80/2.20	0.20	0.25	0.015	0.005	Base	Si 0.20 N 0.07

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TABLE 4A—CURRENT VALVE ALLOYS (FACING ALLOYS)

UNS	COMMERCIAL	C	Mn (max)	P (max)	S (max)	Si	Cr	Ni	Co	W	Mo	Fe	Other
R30006	Stellite 6	0.90/1.40	1.00	0.030	0.030	1.50 max	26.0/32.0	5.00 max	Base	3.50/5.50	1.50 max	6.00 max	
R30002	Stellite F	1.50/2.00	1.00	0.030	0.030	0.80/1.50	23.0/27.0	20.5/23.5	Base	10.5/13.5	1.00 max	6.00 max	
R30001	Stellite 1	2.00/3.00	1.00	0.030	0.030	0.40/2.00	26.0/33.0	3.00 max	Base	11.0/14.0	1.00 max	6.00 max	
R30012	Stellite 12	1.10/1.70	1.00	0.030	0.030	0.40/2.00	26.0/33.0	3.00 max	Base	7.00/9.50	1.00 max	3.00 max	
R30400	Tribaloy T-400	0.08 max	—	0.030	0.030	2.20/3.00	7.50/10.00	3.00 max	61.0/63.0	—	26.5/30.0	3.00 max	
S63021	VMS 637	2.00/2.30	—	—	—	1.00/1.30	23.5/26.0	11.0/12.0	—	—	5.00/5.60	Base	
S68000	Eatonite 6	1.50/2.00	1.00	0.025	0.020	1.10/1.50	26.0/30.0	15.0/18.0	—	—	4.00/5.00	Base	
S63020	VMS-646	1.70/1.85	11.0/13.0			0.500 max	19.0/20.5	19.0/21.0			9.00/10.5	Balance	

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TABLE 4B—CURRENT OTHER VALVE ALLOYS (FACING ALLOYS)

COMMERCIAL	C	Mn (max)	P (max)	S (max)	Si	Cr	Ni	Co	W	Mo	Fe	Other	SIMILAR TO	WHERE USED
X-782	1.75/2.25	1.00	0.030	0.030	0.50 max	25.0/27.0	Base	0.50 max	8.00/9.50	—	4.00 max		N06782	US/Eur
Eatonite 3	1.80/2.20	1.00	0.030	0.030	0.80/1.20	28.0/30.0	Base	—	—	4.00/6.00	1.00/8.00		N06013	US/Eur
Eatonite 5	1.80/2.20	1.00	0.030	0.030	0.80/1.20	28.0/30.0	Base	—	—	7.00/9.00	1.00/8.00		N06015	US/Eur
Tribaloy T-800	0.08 max	—	0.030	0.030	3.00/3.80	16.5/18.5	1.50 max	Base	—	27.0/30.0	1.50 max			
Co Cr 1	2.00/3.00	1.00	—	—	0.40/2.00	26.0/33.0	3.00 max	Base	11.00/14.00	1.00 max	3.00 max	0.50 max	R30001	Asia
Co Cr 6	0.90/1.40	1.00	—	—	0.40/2.00	26.0/32.0	3.00 max	Base	3.00/6.00	1.00 max	3.00 max	0.50 max	R30006	Asia
Co Cr 12	1.20/1.70	1.00	—	—	0.40/2.00	26.0/33.0	3.00 max	Base	7.00/9.50	1.00 max	3.00 max	0.50 max	R30012	Asia

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Each UNS designation is a five-digit identification number preceded by a type identification prefix letter.

Valve alloys have six identification prefixes:

G - General purpose carbon and low alloy structural steels
H - Controlled hardenability carbon and low alloy steels
K - Special purpose iron-base alloys
N - Nickel-base alloys
R - Cobalt, titanium, and other refractory alloys
S - Stainless steels, heat-resistant steels, corrosion-resistant steels, and iron-base superalloys

The five-digit identification number often incorporates the most popular previous designation for the alloy. Individual SAE and ASTM committees that work in concert control the UNS designations.

4.2 Primary Tables—All the materials currently used in North America organized in Tables 1A through 4A.

4.3 Secondary Tables—All the materials currently not used in North American and used elsewhere are included in Tables 1B through 4B. Table 3C contains titanium alloys information.

5. Valve Alloy Chemical Compositions

5.1 General—Where applicable, a reference to ISO 683-15 was made in the first column of each table.

Where no ISO 683-15 identification was available, the UNS designation and/or alloy commercial names were used.

5.2 Secondary Tables—Alloys covered in Tables 1B through 4B contain references to primary alloys in Tables 1A through 4A as well as markets where they are used.

6. Valve Alloy Metallurgy and Heat Treatment

6.1 General—The performance characteristics of a valve alloy are a cross product of composition and heat treatment. Alloy selection depends upon stresses, corrosive agents, and temperatures encountered in service, as well as the economic and durability objectives. Heat treatments used to improve the mechanical properties of valves depend upon the specific alloy, economics, and the level of properties desired. They can be general or selective, and it is not uncommon for a single valve to be subjected to two or more heat treatments in different locations.

6.2 Martensitic Alloys—Plain carbon, low alloy, and high alloy martensitic steels are primarily used for intake valves. Extreme duty martensitic steels generally have the highest carbon and alloy contents to resist wear, to resist seat face indention by deposits, and to provide increased strength. Elements such as chromium and silicon are added when increased oxidation or corrosion resistance is needed. Manganese and nickel are added as strengthening agents. Occasionally, refractory elements, such as molybdenum, tungsten, and vanadium are used to enhance certain elevated temperature properties.

Martensitic valves are most often quench hardened and tempered to hardness readings in the 25 to 45 Rockwell “C” scale range. This is a compromise among good strength, adequate ductility, impact performance, and wear resistance along the stem. In some less demanding applications, martensitic valves can be used in the annealed condition.

Tips and seats are often selectively hardened to create high hardness and wear resistant surfaces. These surfaces are selectively hardened, generally to the greatest hardness practical for the alloy. Tip hardening may extend beyond the keeper groove to improve the fatigue strength and the wear resistance of this region.

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6.3 Austenitic Alloys—Austenitic alloys have a face-centered cubic crystal structure, which is termed austenite. The elements that stabilize the austenitic structure are carbon, manganese, nickel, copper, and nitrogen. Chromium, silicon, and sometimes, aluminum are added for oxidation or corrosion resistance. Refractory elements such as molybdenum, niobium, tantalum, tungsten, and vanadium may be added for high temperature strength. These alloys are termed steels when the base element is iron. The cobalt and nickel-base austenitic materials are termed superalloys. Iron-base austenitic steels are hardened by carbonitride precipitation. Nickel-base superalloys are hardened by precipitation of aluminum, nickel, niobium, tantalum, and titanium in the form of intermetallic compounds. They may be used in either wrought or cast form, although cast valves are diminishing in commercial importance.

Austenitic valve alloys may be as simple in composition as 18-8 stainless steels, or as complicated as gas turbine alloys. The selection is strongly influenced by economic considerations, as well as the mechanical, physical, and chemical attributes required to satisfy specific engine requirements.

Mechanical properties are improved in austenitic valve alloys by precipitation hardening or strain hardening, rather than the martensitic transformation hardening of low alloy steels. The most common austenitic alloy hardening processes are:

a. High temperature forging followed by aging heat treatment(s)
b. High temperature forging followed by a solution treatment and then aging heat treatment(s)
c. Cold forming

In lower temperature applications, austenitic engine valves are frequently used in the forged and aged condition. More severe and higher temperature service generally requires solution treatment followed by one or more aging treatments. These operations produce hardness readings in the 20 to 40 Rockwell “C” scale range. The hardness developed depends upon the capability of the individual alloy. These alloys develop fatigue, creep, wear, and seat face indentation resistance from the heat treatments.

The cold-formed austenitic alloys (302HQ) are often used in small light-duty engines.

6.4 Titanium Alloys—Titanium alloys can be divided into three categories: alpha, alpha-beta, and beta alloys. Alpha alloys have a close-packed hexagonal structure, beta alloys have a body-centered cubic structure, and alpha-beta alloys have mixtures of the two different structures. The alloying elements that stabilize the alpha structure include oxygen, nitrogen, aluminum, and carbon.

Alloying elements that stabilize the beta structure include vanadium and molybdenum.

Zirconium and tin have minor effects upon phase stability, but are widely used as solid-solution strengtheners in both alpha and beta alloys.

Most titanium intake valves are made from alpha-beta alloys that have superior low temperature strength. Exhaust valves are generally manufactured from alpha or near alpha alloys because they have better high temperature creep properties. Beta alloys have not been used in any engine valve applications of consequence.

Titanium alloy heat treatments for engine valve applications are less established than the heat treatments for high volume production alloys. Most titanium alloys used in engine valves are precipitation hardenable and receive some type of solution treatment and aging after forming.

It is important to note that the development of titanium alloy engine valves has been primarily for high performance applications where extended durability is not a primary concern. Heat treatment procedures and precision are believed to be critical parameters in long-term titanium valve durability.

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Titanium aluminides are being investigated on an experimental basis for passenger car exhaust valve applications.

6.5 Ceramic Materials—Although not yet used in any commercial applications, ceramic materials are being investigated for high temperature valve service. The primary material being investigated for this application is Si3N4. Much experimentation has been done to develop plasma sprayed cermets, but these are being used only on a limited basis.

6.6 Seat Facing Alloys—Seat facing alloys are composed of hard precipitates in cobalt, nickel, or iron-base austenitic matrices. The hard precipitates are generally chromium, molybdenum, tungsten, or vanadium carbides. Some compositions use intermetallic compounds, such as Laves phase, as the hard precipitates. Chromium is added to the matrix to increase corrosion resistance. Silicon additions provide the fluidity necessary for welding the facing to the valve seat and can improve wear resistance.

Seat facing alloys derive their wear resistance from the volume fraction of precipitates that possess great hot hardness and compressive strength. A significant portion of the adhesive wear resistance in these seat facing alloys, as well as other high chromium alloys, is derived from the tenacious chromium oxide layer formed on the wear surface by oxidation during service. When extremely severe conditions of corrosion are encountered, such as those that occur when sulfur-containing fuels are used, cobalt or iron-base hard-facing alloys may be required to assure valve seat durability.

Selection of a particular seat-facing alloy usually depends upon temperatures, stresses, and corrodents encountered in service. Manufacturing considerations may preclude some seat facing alloy/valve head alloy combinations.

7. Valve Alloy Physical and Mechanical Properties

7.1 General—No single property can define the varying conditions encountered in different internal combustion engines. Spark and compression ignition engines place different demands on engine valves, so the properties of interest vary.

Common causes of valve failures include:

a. Adhesive or Abrasive Wear

1. Of the stem surface
2. Of the seat surface
3. Of the tip surface

b. General or Localized Corrosion

1. Primarily at elevated temperatures
2. Often combined with fatigue

c. Fatigue

1. Head radial cracking by thermal fatigue
2. Head chordal cracking by mechanical fatigue
3. Fillet transverse cracking by mechanical fatigue
4. Keeper groove transverse cracking by mechanical fatigue
5. Often assisted by corrosion

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7.2 Wear Properties—The wear resistance of valve materials cannot be adequately assessed by a single type of wear or mechanical property test because of the different modes of wear encountered at different locations on the valve. Often a secondary mode of wear can be initiated by the wear particles generated by the primary wear mode. Valve wear service must be considered individually at each of these locations: valve tip, stem, and seat.

a. Valve Tip—Against rocker arm type valve gear, valve tips are subjected to combined sliding and rolling contact with the rocker arm surface, potentially causing adhesive wear.
b. Valve Stem—Valve stems are subjected to a normal amount of sliding wear, which is not severe unless aggravated by inadequate lubrication or applied transverse loads.
   Excessive transverse loads are often due to improper rocker arm geometry or thermal distortion of the cylinder seat.
c. Valve Seat—The valve seat/cylinder head seat contact is characterized by high normal stresses and severe sliding conditions, generally at high temperatures and in a corrosive environment. The high combustion pressures in heavy-duty compression ignition engines impose high shear stresses across the contact interface, which damage the seat face surfaces by sliding. Valve seat wear is often accelerated because of dimensional misalignment as a result of manufacturing variability or thermal distortion.

Valve wear performance is most often determined by evaluating valves that are run in durability test engines, but some laboratory tests are also used to rate the relative performance of alloys.

These laboratory tests include:

a. Pin on disc tests
b. Crossed cylinder wear tests
c. Thrust washer tests
d. Cylinder - vee block tests
e. Functional tests of components in fixtures or actual engines

At the present time, there is little experience to suggest that the data generated by these tests can be used to design an engine valve from the first principles, but test data are invaluable in improving the wear performance of existing valve designs.

7.3 Corrosion Properties—Because of the variety of corrosive environments, there is no industry standard laboratory corrosion test. Some of the tests used to rate the corrosion resistance of valve alloys are:

a. Crucible immersion tests with various corrodents
b. Engine tests with a hole drilled through the head of the valve
c. Air oxidation tests run at high temperatures for a given time
d. Sulfidation tests using gas atmospheres

The corrosion of valves is accelerated by their temperature and environment. Corrosion occurs through four mechanisms:

a. Oxidation
b. Attack by various liquid metal oxides and salts
c. Attack by combustion products
d. Attack by fuel and lubricant additives or contaminants

Valve manufacturers and valve steel suppliers can generally supply representative corrosion resistance data.

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7.4 Fatigue Properties—Fatigue data and corrosion-accelerated fatigue data are limited because of the lengthy testing programs required to generate meaningful data. The situation is improving, and more data are being gathered by valve and steel manufacturers. In lieu of these data, estimates of fatigue resistance are usually established on the basis of elevated temperature tensile, creep, and stress rupture performances.

7.5 Tensile Properties—The tensile properties of finished valves are dependent upon processing and heat treatment during manufacture. Typical tensile data for individual alloys are provided in Tables 5, 6 and 7. ISO 683-15 table format was applied to data from the previous edition and data from ISO 683-15 was incorporated within. These tables contain data from unknown origin, therefore, its accuracy cannot be presumed. The data should be used only as a guideline. Valve manufacturers can generally supply expected mechanical properties in different regions of a valve, once a design envelope is established.

7.6 Creep Properties—Table 8 lists creep properties of selected alloys and was adopted from ISO683-15.

7.7 Forming and Heat Treatment—General guidelines for hot forming and heat treatments are incorporated for reference in Table 9. The ranges shown are wide and represent a variety of design and application requirements. Valve manufacturers can select appropriate forming and heat treatment conditions to fit the application requirements.

7.8 Physical Properties—The physical properties of various valve steels and alloys are listed in Table 10. These data are of unknown origin and their accuracy cannot be presumed. The data should be used only as a guideline.

8. Valve Alloy Application

8.1 General—Alloys are selected for the body of the valve after considering the required mechanical and physical properties. Final selection and validation are usually decided, based on the outcome of engine tests. It is well worth noting that there are many thermodynamic adjustments that can be made to an engine system, which dramatically change the operating environment of the valves. The cost penalties of the more sophisticated valve alloys that may be required must be considered when analyzing the benefits of thermodynamic cycle improvements.

The severity of valve duty is determined by the operating environment in which the valve functions. The preeminent environmental factors are temperature, imposed stress, and chemical activity. Poppet valve operating temperature is generally a function of combustion process efficiency and engine cooling system effectiveness. Peak engine firing pressures and the valve seating velocities determine the stresses of most concern in a valve. The combustion gases that flow past the exhaust valve can be quite active chemically and generally dictate the use of corrosion resistant alloys.

8.2 Intake Valves—Intake valves require wear resistance and fatigue strength. Intake valves for light-duty service are generally manufactured from carbon or low alloy steels. Heavy-duty service intake valves are typically made from high alloy martensitic or austenitic steels. Titanium alloys are used in selected high-speed spark ignition engine valves where valve train mass reduction is a prime design criterion.

Maximum intake valve temperatures are typically less than 425 °C (800 °F) in light-duty spark ignition engines and 500 °C (930 °F) in heavy-duty compression ignition engines. Plain carbon steels are used for the lowest temperature intake valve applications. Low alloy martensitic steels, high alloy martensitic steels, and austenitic steels are used progressively as intake valve temperatures and peak firing pressures increase.

Spark ignition engine intake valve seats that operate at moderate temperatures achieve adequate adhesive wear durability by using low alloy martensitic steels hardened to 35 Rockwell “C” scale or harder. Higher temperature spark ignition engine valves generally use hardened high carbon, high chromium alloys. In the most demanding application, intake valve seats are hard-faced with a seatfacing alloy.

TABLE 5—REFERENCE VALUES FOR THE MECHANICAL PROPERTIES AT ROOM TEMPERATURE (FOR DIAMETERS UP TO 40 MM) (APPLICABLE TO THE REFERENCE HEAT-TREATMENT CONDITION IN ACCORDANCE WITH TABLE 9)

Material Designation UNS/ISO	Material Designation Commercial	Reference Heat treatment condition[1]	Hardness HB	Hardness HRC[2]	0.2% - proof stress[2] N/mm²[3]	Tensile strength N/mm²[3]	Elongation after fracture (L0 = 5D0)[2] %[4]	Reduction in area after fracture[2] %[4]
Martensitic Steels								
H15410	1541H	TQ + T[5]		35	960	1050	18	60
G15470	1547	TQ + T[5]		40	1140	1240	15	40
G86450	8645	TQ + T[5]		35	1140	1240		40
H41400	4140H	TQ + T[5]		35	1000	1100	18	58
K14072	ASTM-A193/B16	TQ + T[5]		35	1000	1100	18	60
X 45 CrSi 9 3	Sil 1	TQ + T[5]	266 to 325		750	1100-1350	14-22	40-50
S65006	Sil XB	TQ + T[5]	293		840-844	940-941	8-15.5	9-10
S42200	422 SS	TQ + T[5]		35	860	1030	8-10	52
S64004	SUH 11/11M	TQ + T[5]		35	780	975	35	15
	FMS235	TQ + T[5]		35	1050	1200	20	40
	SUH 3	TQ + T[5]		35	785	1050	15	35
X 50 CrSI 8 2		TQ + T[5]	266 to 325		685	900-1100	14	40
X 85 CrMoV 18 2		TQ + T[5]	296 to 355		800	1000-1200	7	12
Austenitic Materials								
X 53 CrMnNiN 21 9	21-4N	ST + P		30[6]	580-895	880-1200	8-25	9-10
S63012	21-2N	ST + P			553-700	862-1155	7-24	4-20
X 33 CrNiMnN 23 8	23 8N	ST + P		25[6]	550-634	850-1100	20	30-33
S30430	302HQ	ST+CW		24-30	900-1000	1000-1150	17	
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P		30[6]	580-880	950-1190	10-25	6-25
S63017	21-12N	ST + P		23-25[6]	415-763	795-865	35-45	45-55
X 55 CrMnNiN 20 8		ST + P		28[6]	520-550	900-1150	8	5-10
X 53 CrMnNiNbN 21 9		ST + P		30[6]	580-740	950-1150	8	9-10
305SS		ANN	107 to 125		205	515	40	
S63013	Gaman H	ST + P		35	520	1080	57	5
S31630	316 MOD	ST+CW		32-35	1000-1130	1100-1380	15	
Nickel-based Alloys								
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P		32-40[6]	630-850	1100-1300	12-33	20-32
NiCr 20 TiAl	Nimonic 80A	ST + P		32-38[6]	620-969	1050-1400	15-40	20-38
N07032	Pyromet 31/31V	ST + P		32-37[6]	692-830	1103-1300	25-35	5-45
NiFe 25 Cr 20 NbTi		ST + P		28[6]	500	900-1100	25	30
N07001	Waspaloy	ST + P		32-45	1030	1280	--	15
	Nimonic 90	ST + P		32-42	690-750	1014-1175	30-36	35
Ni30	NCF 3015	ST + P		31-39[6]	655-670	1124-1128	34-35	54-55

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened, CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm^2 = 1 MPa
4. Variation in reported values relatexs to the choice of heat treat temperatures.
5. Also possible as delivery condition, in which case the values shall apply as true requirements.
6. Austenitic grades may show hardness values which cannot be converted into tensile strength values according to the standard tables commonly used in laboratories. Therefore, in cases of dispute only the tensile strength value shall be considered as valid.

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TABLE 6—REFERENCE VALUES FOR THE TENSILE STRENGTH AT ELEVATED TEMPERATURES

Material Designation UNS/ISO	Material Designation Commercial	Reference Heat treatment condition[1]	Tensile strength N/mm²[2] 500 °C N/mm²[3]	Tensile strength N/mm² 540 °C N/mm²[3]	Tensile strength N/mm² 550 °C N/mm²[3]	Tensile strength N/mm² 600 °C N/mm²[3]	Tensile strength N/mm² 650 °C N/mm²[3]	Tensile strength N/mm² 700 °C N/mm²[3]	Tensile strength N/mm² 750 °C N/mm²[3]	Tensile strength N/mm² 760 °C N/mm²[3]	Tensile strength N/mm² 800 °C N/mm²[3]	Tensile strength N/mm² 815+ °C N/mm²[3]
Martensitic Steels												
H15410	1541H	TQ + T		420			150	NA	NA	NA	NA	NA
G15470	1547	TQ + T						NA	NA	NA	NA	NA
G86450	8645	TQ + T						NA	NA	NA	NA	NA
H41400	4140H	TQ + T		500			180	NA	NA	NA	NA	NA
K14072	ASTM-A193/B16	TQ + T						NA	NA	NA	NA	NA
X 45 CrSi 9 3	Sil 1	TQ + T	500		360	250	170-210	110		69	NA	NA
S65006	Sil XB	TQ + T					200			100	NA	NA
S42200	422 SS	TQ + T					360				NA	NA
S64004	SUH 11/11M	TQ + T									NA	NA
	FMS235	TQ + T				420					NA	NA
	SUH 3	TQ + T									NA	NA
X 50 CrSI 8 2		TQ + T	500		360	230	160	105			NA	NA
X 85 CrMoV 18 2		TQ + T	550		400	300	230	180	140		NA	NA
Austenitic Materials												
X 53 CrMnNiN 21 9	21-4N	ST + P	650-705		600	550-600	500-590	450-480	370	390	300-330	235
S63012	21-2N	ST + P			590		535			360-390		275
X 33 CrNiMnN 23 8	23 8N	ST + P	600		570	530	470-580	400	340	470	280	
S30430	302HQ	ST+CW				600						
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P	680		650	610	550-720	480	410	340	340	
S63017	21-12N	ST + P					420			300		
X 55 CrMnNiN 20 8		ST + P	640		590	540	490	440	360		290	
X 53 CrMnNiNbN 21 9		ST + P	680		650	600	510	450	380		320	
305SS		ST + P										
S63013	Gaman H	ST + P					940			760		
S31630	316 MOD	ST+CW				690						
Nickel-based Alloys												
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P	1000	1136	980	930	825-1033	770	650	550-792	510	
NiCr 20 TiAl	Nimonic 80A	ST + P	1050	876	1030	834-1000	790-930	724-820	680	590-600	496-500	234-310
N07032	Pyromet 31/31V	ST + P		1083			1055-1150			758-850		593
NiFe 25 Cr 20 NbTi		ST + P	800		800	790	640	640	340		340	
N07001	Waspaloy	ST + P					1000					
	Nimonic 90	ST + P										
Ni30	NCF 3015	ST + P										

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened; CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm² = 1 Mpa

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TABLE 7—REFERENCE VALUES FOR THE 0.2% - PROOF STRESS AT ELEVATED TEMPERATURES

Material Designation UNS/ISO	Material Designation Commercial	Reference heat treatment condition[1]	0.2% - Proof stress[2], at 500 °C N/mm²[3]	0.2% - Proof stress[2], at 540 °C N/mm²[3]	0.2%- Proof stress[2], at 550 °C N/mm²[3]	0.2% - Proof stress[2], at 600 °C N/mm²[3]	0.2% - Proof stress[2], at 650 °C N/mm²[3]	0.2% - Proof stress[2], at 700 °C N/mm²[3]	0.2% - Proof stress[2], at 750 °C N/mm²[3]	0.2% - Proof stress[2], at 760 °C N/mm²[3]	0.2% - Proof stress[2], at 800 °C N/mm²[3]	0.2% - Proof stress[2], at 815 °C N/mm²[3]
Martensitic Steels												
H15410	1541H	TQ + T		330		190	110	NA	NA	NA	NA	NA
G15470	1547	TQ + T	370	220				NA	NA	NA	NA	NA
G86450	8645	TQ + T						NA	NA	NA	NA	NA
H41400	4140H	TQ + T		500			110	NA	NA	NA	NA	NA
K14072	ASTM-A193/B16	TQ + T		560		430	330	NA	NA	NA	NA	NA
X 45 CrSi 9 3	Sil 1	TQ + T	400		300	240	120-160	80	NA	62-75	NA	NA
S65006	Sil XB	TQ + T						NA	NA	NA	NA	NA
S42200	422 SS	TQ + T					310	NA	NA	NA	NA	NA
S64004	SUH 11/11M	TQ + T						NA	NA	NA	NA	NA
	FMS235	TQ + T				320		NA	NA	NA	NA	NA
	NA SUH 3	TQ + T						NA	NA	NA	NA	NA
X 50 CrSI 8 2		TQ + T	400		300	220	110	75	NA	NA	NA	NA
X 85 CrMoV 18 2		TQ + T	500		370	280	170	120	80	NA	NA	NA
Austenitic Materials												
X 53 CrMnNiN 21 9	21-4N	ST + P	350-355		330	300-310	270-330	250-275	230	260	200-220	180
S63012	21-2N	ST + P					240-340			207-280		185
X 33 CrNiMnN 23 8	23 8N	ST + P	270		250	220	210-270	190	180	260	170	
S30430	302HQ	ST+CW				500						
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P	350		330	310	285-570	260	240	280	220	
S63017	21-12N	ST + P								220		
X 55 CrMnNiN 20 8		ST + P	300		280	250	2230	220	200		170	
X 53 CrMnNiNbN 21 9		ST+CW	340		320	310	230	260	235		220	
305SS												
S63013	Gaman H	ST + P					340-350			280-330		
S31630	316 MOD	ST+CW										
Nickel-based Alloys												
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P	725	785	710	690	565-758	650	560	450-620	425	
NiCr 20 TiAl	Nimonic 80A	ST + P	700	531	650	650	550-660	600	500	500-503	450	262
N07032	Pyromet 31/31V	ST + P		655			648-750			655-730		579
NiFe 25 Cr 20 NbTi		ST + P	450		450	450	450	430	380		250	
N07001	Waspaloy	ST + P					860					
	Nimonic 90	ST + P										
Ni30	NCF 3015	ST + P										

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened; CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm² - 1 Mpa

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TABLE 8—REFERENCE VALUES FOR THE CREEP STRENGTH AFTER 1000 H (APPLICABLE TO THE REFERENCE CONDITION IN ACCORDANCE WITH TABLE 9

Material Designation UNS/ISO	Material Designation Commercial	Creep Strength[1] after 1000 h, at 500 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 650 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 725 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 800 °C N/mm²[2]
Martensitic Steels					
H15410	1541H				
G15470	1547				
G86450	8645				
H41400	4140H				
K14072	ASTM-A193/B16				
X 45 CrSi 9 3	Sil 1	190	40	—	—
S65006	Sil XB				
S42200	422 SS				
S64004	SUH 11/11M				
	FMS235				
	SUH 3				
X 50 CrSI 8 2		190	—	—	—
X 85 CrMoV 18 2		260	52	18	—
Austenitic Materials					
X 53 CrMnNiN 21 9	21-4N	—	200	110	50
S63012	21-2N				
X 33 CrNiMnN 23 8	23 8N	—	235	130	60
S30430	302HQ				
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	—	220	120	55
S63017	21-12N				
X 55 CrMnNiN 20 8		—	160	85	45
X 53 CrMnNiNbN 21 9		—	215	115	50
305SS					
S63013	Gaman H				
S31630	316 MOD				
Nickel-based Alloys					
NiCr 15 Fe 7 TiAl	Inconel 751	—	475	260	125
NiCr 20 TiAl	Nimonic 80A	—	500	290	150
N07032	Pyromet 31/31V				
NiFe 25 Cr 20 NbTi		—	400	180	60
N07001	Waspaloy				
	Nimonic 90				
Ni30	NCF 3015				

1. Mean values of scatter range determined until now.
2. 1 N/mm² = 1 Mpa

* All values are reported by ISO

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TABLE 9—REFERENCE DATA FOR HOT FORMING AND HEAT TREATING[1]

Material Designation UNS/ISO	Material Designation Commercial	Cold Forming Yes/No	Hot Forming °C	Soft Annealing °C	Quenching or Solution Heat Treatment °C	Quenching Agent	Tempering or Artificial Aging °C
Martensitic Steels							
H15410	1541H	Yes	1245 to 870		815 to 845	Oil	400 to 525 / Air
G15470	1547	Yes	1245 to 870		815 to 845	Oil	400 to 525 / Air
G86450	8645	Yes	1230 to 925				
H41400	4140H	Yes	1230 to 870		829 to 857	Oil	557 to 585 / Air
K14072	ASTM-A193/B16	Yes	1230 to 925		857 to 885	Oil	663 to 691 / Air
X 45 CrSi 9 3	Sil 1	No	1100 to 900	780 to 820 / Air or water	1000 to 1050	Oil	720 to 820 / Air or water
S65006	Sil XB	No	1163 to 1135		1024 to 1052	Air / Furnace	527 to 704 / Air
S42200	422 SS	No	1150 to 955		1024 to 1052	Oil	607 to 635 / Air
S64004	SUH 11/11M	No	1138 to 1104		950 to 1100	Oil / Air	663 to 691 / Air
	FMS235	Yes	1082 to 1049		950 to 1100	Air	677 to 704
	SUH 3	No	1138 to 1104		1010 to 1038	Oil	727 to 754
X 50 CrSi 8 2		No	1100 to 900	780 to 820 / Air or water	1000 to 1050	Oil	720 to 820 / Air or water
X 85 CrMoV 18 2		No	1100 to 900	820 to 869 / Retarded cooling	1050 to 1080	Oil	720 to 820 / Air
Austenitic Materials							
X 53 CrMnNiN 21 9	21-4N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
S63012	21-2N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
X 33 CrNiMnN 23 8	23 8N	No	1150 to 980		1150 to 1170	Water	800 to 830 / 8 h Air
S30430	302HQ	Yes					
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	No	1150 to 950		1160 to 1200	Water	760 to 815 / 4 h to 8 h Air
S63017	21-12N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
X 55 CrMnNiN 20 8		No	1100 to 950		1140 to 1180	Water	760 to 815 / 4 h to 8 h Air
X 53 CrMnNiNbN 21 9		No	1150 to 980		1160 to 1200	Water	760 to 850 / 6 h Air
305SS		Yes					
S63013	Gaman H	No					
S31630	316 MOD	Yes					
Nickel-based Alloys							
NiCr 15 Fe 7 TiAl	Inconel 751	No	1150 to 940		1100 to 1150	Air	840 / 24 h + 700 / 2 h Air
NiCr 20 TiAl	Nimonic 80A	No	1150 to 1050		1000 to 1080	Air to Water	690 to 710 / 16 h Air
N07032	Pyromet 31/31V	No	1150 to 1050		1079 to 1107	Oil	677 to 732 / 2 to 16 h Air
NiFe 25 Cr 20 NbTi		No	1150 to 1050		1000 to 1080	Air or Water	690 to 710 / 16 h Air
N07001	Waspaloy	No					
	Nimonic 90	No					
Ni30	NCF 3015	No					

1. The heat treat conditions reported here apply to property ranges reported in Tables 5 through 8.

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TABLE 10—REFERENCE DATA RELATING TO PHYSICAL PROPERTIES (APPLICABLE TO THE REFERENCE CONDITION IN ACCORDANCE WITH TABLE 9)

Material Designation UNS/ISO	Material Designation Commercial	Density at 20 °C kg/dm^3	Modulus of elasticity at 20 °C kN/mm$^{2(1)}$	Thermal Expansion coefficient between 20 °C and 100 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 200 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 300 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 500 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 600 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 700 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 1000 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 1300 °C 10^{-6} K	Thermal Conductivity at 20 °C W/(m K)	Specific heat at 20 °C J/kg K	Magnetiz-ability
Martensitic Steels														
H15410	1541H	7.81	210		11.6	12.1	13.1	13.6				42		Existent
G15470	1547	7.81	210				13.5					42		Existent
G86450	8645	7.81	210				13.5					42		Existent
H41400	4140H	7.81	210		11.0	11.7	12.3	12.6				42.6	473	Existent
K14072	ASTM-A193/ B16	7.81	210											Existent
X 45 CrSi 9 3	Sil 1	7.7	194-210	10.9	11.3	11.2	11.5	12.4	11.8	13.2	13.5	21*	500	Existent
S65006	Sil XB	7.4-7.5	194		9.8			11.5		12.4	13.1			Existent
S42200	422 SS	7.6												Existent
S64004	SUH 11/11M							13.4						Existent
	FMS235													Existent
	SUH 3								12.2					Existent
X 50 CrSi 8 2		7.4-7.7	210	10.9		11.2	11.5		11.8			21*	500	Existent
X 85 CrMoV 18 2		7.7	210	10.9		11.2	11.5		11.8			21*	500	Existent
Austenitic Materials														
X 53 CrMnNiN 21 9	21-4N	7.6-7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent$^{(2)}$
S63012	21-2N	7.6-7.8			14.4			17.5		18.5				Non-existent$^{(2)}$
X 33 CrNiMnN 23 8	23 8N	7.8	205	16.5		17.1	17.3		17.4			14.5	500	Non-existent$^{(2)}$
S30430	302HQ	7.9	194		17.3			17.8				16.3	500	
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	7.8-7.9	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent$^{(2)}$
S63017	21-12N	7.7-7.8	201		14.8			15.8		17.3	18.5			
X 55 CrMnNiN 20 8		7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent$^{(2)}$
X 53 CrMnNiNbN 21 9		7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent$^{(2)}$
305SS														
S63013	Gaman H													
S31630	316 MOD													
Nickel-based Alloys														
NiCr 15 Fe 7 TiAl	Inconel 751	8.0-8.3	215	13.0	13.0	14.0	14.5	14.0	15.5	14.9		13	460	Non-existent
NiCr 20 TiAl	Nimonic 80A	8.0-8.3	208-215	11.9	12.6	13.1	13.7	13.3	14.5	13.9		13	460	Non-existent
N07032	Pyromet 31/31V	7.9-8.0	208	14.1				14.0		14.8	15.3	13	460	
NiFe 25 Cr 20 NbTi		8.1	215			15.5	15.9		16.8					
No7001	Waspaloy													
	Nimonic 90													
Ni30	NCF 3015	7.9	201		14.9			16.0		16.6	16.7	13		

1. 1 N/mm^2 = 1 Mpa and other conversions
2. Austenitic steels may be slightly magnetizable in the aged condition. Their magnetizability may increase with extended cold forming.

* Data transferred from ISO

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8.3 Exhaust Valves—Principal exhaust valve requirements are resistance to seat face burning (commonly referred to as guttering), resistance to wear, fatigue strength resistance to bending loads, and creep strength sufficient to prevent head doming (commonly referred to as tuliping). Exhaust valves are typically made from austenitic steels or superalloys. Titanium alloys are also used in spark ignition engine exhaust valves when mass reduction is a paramount consideration.

Austenitic exhaust valve operating temperatures are typically 700 to 760 °C (1300 to 1400 °F), but transient temperatures as hot as 815 to 850 °C (1500 to 1560 °F) are encountered in service. UNS S3XXXX series for austenitic stainless steels are used for the lowest temperature exhaust valve applications. Low nickel content nitrogen-strengthened austenitic steels, high nickel content nitrogen-strengthened austenitic steels, and superalloys are used progressively as exhaust valve temperatures increase. The maximum service temperature for superalloys can be as high as 870 to 900 °C (1600 to 1650 °F) depending upon imposed stresses. Seat face burning resistance is achieved by alloy composition rather than valve design such as valve face angle. The precipitation strengthened austenitic stainless steels used in light-duty spark ignition exhaust valves possess adequate hot hardness and oxidation/corrosion resistance to prevent undue seat wear. In demanding applications, the seats are hard-faced with a high hot hardness and corrosion resistant alloy.

Many exhaust valves have martensitic steel wafers welded to their stem tips or martensitic steel stems welded to their austenitic heads. These martensitic steel tips, when hardened, generally provide sufficient wear resistance. When a martensitic stem extends into the valve guide, the valve is referred to as a two-piece construction. This construction minimizes stem wear, provides superior fatigue strength in the keeper groove, and conserves alloying elements.

9. Valve Design Relationship to Materials

9.1 General—The design of a valve and its application to the engine are as important as the selection of the valve's alloy(s). As many as six different materials are used in the valve construction for some applications. Valve durability is limited by the operating temperature and stress imposed on it. It is sometimes possible to select a stronger or a more temperature resistant material to overcome limitations in valve design and application.

Optimizing stresses, temperature, and cooling for valve durability may impede overall engine efficiency, particularly when advanced thermodynamic concepts are employed.

Fortunately, many of the valve design enhancements can compensate for excessive temperatures; delivering satisfactory valve durability under otherwise difficult circumstances.

9.2 Design Enhancements—When valve alloys with the properties necessary to obtain the desired durability are not available (or cannot be used economically); various valve design enhancements are employed. The most important of these are:

a. Seat Face Welding—When wear, corrosion, or duty service conditions are extreme, the valve face of an otherwise satisfactory head alloy may be inadequate. In these cases, he valve seat may be welded with a hard overlay alloy to better withstand wear and corrosion at the valve-seating surface. Special cobalt, nickel, or iron-base alloys have been developed for this purpose.
b. Seat Face Strain Hardening—When seat wear conditions are moderately beyond the endurance of an otherwise satisfactory head alloy, the valve seat may be strain hardened to better withstand wear. This is accomplished by mechanically cold working the seat face region after high temperature heat treating operations.
c. Stem Surface Treatments—Chromium plating, nitriding, moly spray coating, and other surface treatments are applied to valve stems to reduce friction, wear, or both, in service. A light film of engine oil (commonly referred to as a pre-lube), generally prevents stem/guide wear, but adhesive wear can still occur under some circumstances. Valve stem surface treatments have effectively prevented adhesive wear in these instances.

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d. Internal Cooling—Hollow valves, partially filled with metallic sodium or sodiumpotassium mixtures, transfer heat by convection from the hot head end of the valve to the stem. Internal cooling reduces peak valve temperatures, which may reduce engine octane sensitivity or permit a reduction in valve alloy content. Hollow intake valves and internally cooled exhaust valves are being increasingly considered to decrease valve mass.
e. Tip Caps—Occasionally a hardened martensitic steel cap is mechanically fitted on the end of the valve stem to improve tip wear resistance. These tip caps are sometimes used on valves where dissimilar metal welding is a problem.
f. f. Seat Face Angle—Changing to a seat face that is more perpendicular to the longitudinal axis of the valve stem can greatly reduce seat wear although valve seat burning and deposit build-up may be accentuated if a flex head valve design is not utilized.

10. Valve Gear Design Considerations

10.1 General—The design of a poppet valve is generally dictated by a preestablished operating environment. Since overall engine cost effectiveness is paramount, valve gear design parameters that intensify valve stresses must be carefully considered. Actuating geometry and valve gear dynamic performance are the most significant parameters.

10.2 Actuating Geometry—Valve actuating mechanisms often have a resolved force vector at the valve tip that is not coaxial with the valve stem. The greater the divergence, the greater the concentration of stem to guide contact forces at the ends of the guide. This concentrates the contact forces at the guide ends that may cause severe adhesion of the guide material to the valve stem, often referred to as valve stem scuffing.

Valve rotators are mechanical devices that rotate the valve during the opening portion of the operating cycle. Valve rotation dissipates hot spots and reduces deposits on the seat face so that heat transfer to the seat is improved. Valve rotators can be used to reduce stem and guide wear as well as stem scuffing.

10.3 Dynamic Performance—Valve stresses arise primarily from the dynamics of the valve gear and from the manner in which the valve closes against its seat. Compression ignition engines generate peak combustion pressures several times higher than spark ignition engines. Careful analysis of the valve gear kinematics and pressure induced stress is essential in assuring adequate valve durability. Hydraulic valve lifters compensate for wear and thermal expansion/contraction in the valve gear. Automatic lash adjustment eliminates the undue stresses caused by excessive lash, extreme valve temperatures, and valve burning/guttering that develop from inadequate lash. Optimizing actuating geometry and dynamic performance for valve durability may impede overall engine efficiency, particularly when advanced concepts are employed. Fortunately, many of the valve design enhancements compensate for sub-optimal geometry and dynamics, permitting adequate valve durability under difficult circumstances.

11. Notes

11.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. A (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE ELEVATED TEMPERATURE PROPERTIES OF FERROUS METALS COMMITTEE

From: Ott, David (D.J.)
Sent: Tuesday, June 7, 2022 10:27 AM
To: Landry, Mike (M.P.); Freeman, Scott (S.T.)
Cc: Beyer, Laura (L.D.)
Subject: FW: VOQs Cited in DP 22-001 Opening Resume
Attachments: Bronco Sport VOQ ref DP22-001.xlsx; Bronco VOQ ref DP22-001.xlsx

Importance: High

Mike and Scott, NHTSA recently opened an DP for Bronco 2.7L engine failure allegations.

That DP resume made reference to 32 VOQs, however eight of those pertained to Bronco Sport. Laura has attached those in a spreadsheet above.

NHTSA had a prior PIR relating to Bronco Sport that it looks like they just closed. Not sure if these are related but I believe Laura has already given Scott a head's up as he handled the prior PIR.

Passing these along for your awareness only, not sure what NHTSA might do with these once they peel them off of the DP.

David J. Ott
Defect Investigations Manager – Truck Programs (CCRG Chair)
Automotive Safety Office
Ford Motor Company
313-402-2502 (work cell)
313-407-3194 (cell)

From: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Sent: Tuesday, May 31, 2022 1:50 PM
To: Ott, David (D.J.) <dott@ford.com>
Subject: VOQs Cited in DP 22-001 Opening Resume
Importance: High

Dave,
Eight of the 29 VOQs on the DP 22-001 Opening Resume are for Bronco Sport (CX430) with the 1.5L engine shown in the table below.

I have attached the lists of Bronco and Bronco Sport VOQs listed in the opening resume. Consumer Comments are in column V.

DP22-001:
The petitioners identified a number of complaints received by NHTSA alleging complete engine failure. The ODI complaints cited above can be reviewed at NHTSA.gov under the following ODI numbers: 11459262, 11457360, 11456713, 11456219, 11455294, 11454100, 11454098, 11453933, 11453669, 11452692, 11452595, 11452074, 11451957, 11451503, 11451158, 11450879, 11450871, 11450788, 11450737, 11450702, 11450659, 11448737, 11448461, 11448393, 11448171, 11441831, 11414378, 11414295, 11406545.

Vehicle	Engine	ODI VOQ Count	Comment

BRONCO	T/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV	20	Subject Vehicle Line/Subject Engine
BRONCO	T/N3 - 2.3L 4V TIVCT DI TC 270 HP GAS	1	Subject Vehicle Line/ NOT Subject Engine
BRONCO SPORT	C/Y1 - 1.5L DRAGON I3 DI TC GAS B	8	NOT Subject Vehicle Line/ NOT Subject Engine

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

Search Criteria	
UserID	LBEYER4
Report Date Time	2022-05-31 12:47:23
Total Result Count	88
Manufacturer	FORD MOTOR COMPANY
Model	BRONCO SPORT

S.No	Source	ODI/Sour	CMPL ID	Incident I	Load/Rec	Date Add	VIN	Manufact	Make	Model	Model Ye	Significa	Fatality #	Injury #	Country	State/Pro	City	Odomete	Occurenc	Compone	Consume	ASO Flag	Vehicle S	Vehicle speed unit
84	NHTSA	11406545	1738706	03-25-202	02-11-202	04-05-202	3FMCRNA6	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	NY	ALBANY	1449	0	FUEL SYST	THE VEHIC	Y	25	
77	NHTSA	11414295	1743961	04-27-202	02-11-202	04-28-202	3FMCR9B6	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	NJ	BAYONNE	2294	0	POWER TR	TL* THE C	Y	25	
78	NHTSA	11414378	1744074	04-26-202	02-11-202	04-28-202	3FMCR9D9	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	NY	PORT WAS	198	0	POWER TR	NOT EVEN	Y	20	
48	NHTSA	11441831	1780202	11-27-202	02-11-202	11-27-202	3FMCR9B6	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	AK	Anchorage	100	0	UNKNOWN	The car sta	Y	60	
50	NHTSA	11448393	1789295	11-22-202	02-11-202	01-21-202	3FMCR9A6	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	NJ	Springfield	50000	0	ENGINE	The contac	Y	0	
79	NHTSA	11448737	1789800	04-22-202	02-11-202	01-24-202	3FMCR9C6	FORD MOT	FORD	BRONCO S	2021		0	0	UNITED ST	PA	Milton	0	0	ENGINE	First time t	Y	35	
17	NHTSA	11452595	1795355	02-17-202	02-27-202	02-17-202	3FMCR9B6	FORD MOT	FORD	BRONCO S	2022		0	0	UNITED ST	AK	Anchorage	0	0	ENGINE	Engine mal	Y	25	
19	NHTSA	11454100	1797699	02-15-202	03-07-202	02-25-202	3FMCR9B6	FORD MOT	FORD	BRONCO S	2021	FIRE	0	0	UNITED ST	MI	Ferndale	0	0	ENGINE	I started m	Y	2	

Search Criteria	
UserID	LBEYER4
Report Date Time	2022-05-25 11:17:52
Total Result Count	7540
Manufacturer	FORD MOTOR COMPANY
Model	BRONCO;EXPLORER;AVIATOR;F-150;F-150 HERITAGE;MKX;NAUTILUS;EDGE
Component	COOLING;ENGINE AND ENGINE COOLING:COOLING SYSTEM;ENGINE AND ENGINE COOLING:COOLING SYSTEM:FAN;ENGINE AND ENGINE COOLING:COOLING SYSTEM:HOSE;ENGINE AND ENGINE COOLING:COOLING SYSTEM:HOSES/LINES/PIPING/FITTINGS;ENGINE AND ENGINE COOLING:COOLING SYSTEM:PUMP;ENGINE AND ENGINE COOLING:COOLING SYSTEM:RADIATOR ASSEMBLY;ENGINE AND ENGINE COOLING:CRITICAL FASTENERS;ENGINE AND ENGINE COOLING:ENGINE;ENGINE AND ENGINE COOLING:ENGINE:CRANK/CAMSHAFT POSITION SENSOR;ENGINE AND ENGINE COOLING:ENGINE:DIESEL;ENGINE AND ENGINE COOLING:ENGINE:ENGINE CONTROL MODULE (ECU/ECM);ENGINE AND ENGINE

S.No	Source	ODI/Source ID #	CMPL ID	Incident Date	Load/Received Date	Date Added to Source	VIN	Manufacturer	Make	Model	Model Year	Significant Event	Fatality #	Injury #	Country	State/Province	City	Odometer	Occurences	Component	Consumer Comments	ASO Bin	Prelim NHTSA Provided	Comment	On Opening Resume?	Vehicle Speed	Vehicle speed unit
176	NHTSA	11448171	1788994	01-12-2022	02-11-2022	01-20-2022	1FMEE5DP5MLA71030	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	GA	Lawrencev	0	0	ENGINE	The 2.7 L engine failed going	A	Y		Y	0	
321	NHTSA	11448461	1789394	09-10-2021	02-11-2022	01-22-2022	1FMEE5DP5ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	MI	Holly	0	0	ENGINE	Without any warning lamps,	A	Y		Y	45	
159	NHTSA	11450659	1792661	01-28-2022	02-13-2022	02-06-2022	1FMEE5DP5MLA71271	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	TX	Spring	0	0	ENGINE	pulled up to stop light. car sh	A			Y	0	
169	NHTSA	11450702	1792723	01-19-2022	02-13-2022	02-06-2022	1FMEE5DP6ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	FL	Middlebur	0	0	ENGINE	broke down with 2058 miles.	A			Y	50	
215	NHTSA	11450737	1792770	12-16-2021	02-13-2022	02-07-2022	1FMEE5BP0MLA93701	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	DE	Lewes	0	0	ENGINE	One of the engine valve rods	A	Y		Y	70	
204	NHTSA	11450788	1792830	12-23-2021	02-13-2022	02-07-2022	1FMDE5FP3MLA20375	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	CA	Hollister	2322	0	ENGINE	The contact owns a 2021 For	A	Y		Y	0	
250	NHTSA	11450871	1792947	11-14-2021	02-13-2022	02-07-2022	1FMEE5BP4MLA68994	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	VA	Vinton	0	0	ENGINE	On November 14th, 2021,	A	Y		Y	75	
232	NHTSA	11450879	1792955	12-08-2021	02-13-2022	02-07-2022	1FMDE5AP2MLA77576	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	IN	Whiteland	0	0	ENGINE	While driving on interstate e	A	Y		Y	70	
168	NHTSA	11451158	1793353	01-22-2022	02-13-2022	02-09-2022	1FMEE5DP5MLA93495	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	NC	Wadesbor	0	0	ENGINE	Driving in town at a speed of	A	Y		Y	30	
135	NHTSA	11451503	1793800	02-06-2022	02-20-2022	02-11-2022	1FMEE5DP3ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	TN	Knoxville	0	0	ENGINE	I experienced complete moto	A	Y		Y	55	
226	NHTSA	11451957	1794449	12-11-2021	02-20-2022	02-14-2022	1FMEE5DPXMLA90155	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	NM	Albuquerq	0	0	ENGINE	On 12/11/2021 at 1,166 mile	A	Y		Y	80	
193	NHTSA	11452074	1794611	12-31-2021	02-20-2022	02-15-2022	1FMEE5DP7MLA93627	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	CA	Redondo B	0	0	ENGINE	Engine seized when coming t	A	Y		Y	1	
123	NHTSA	11452692	1795523	02-17-2022	02-27-2022	02-18-2022	1FMEE5BP0MLA78146	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	FL	Winderme	0	0	ENGINE	Engine stopped in parking lot	A			Y	5	
110	NHTSA	11453669	1797014	02-22-2022	02-27-2022	02-23-2022	1FMEE5DP8MLA92941	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	CA	Oceanside	0	0	ENGINE	Engine cut out in the middle	A	Y		Y	35	
128	NHTSA	11453933	1797407	02-14-2022	02-27-2022	02-24-2022	1FMEE5EP6ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	UT	Park City	0	0	ENGINE	Was driving my son to schoo	A	Y		Y	29	
105	NHTSA	11454098	1797696	02-24-2022	03-07-2022	02-25-2022	1FMEE5DP9MLA88378	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	OK	Tulsa	0	0	ENGINE	The engine blew at 6,976 mil	A	Y		Y	20	
95	NHTSA	11455294	1799341	02-28-2022	03-21-2022	03-05-2022	1FMDE5AP4ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	IN	FORT WAY	0	0	ENGINE	My vehicle started showing p	A	Y		Y	0	
203	NHTSA	11456219	1800462	12-24-2021	03-13-2022	03-10-2022	1FMDE5CP4ML	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	WA	Kirkland	0	0	ENGINE	My 2.7L V6 engine dropped a	A	Y		Y	0	
75	NHTSA	11456713	1801142	03-13-2022	03-21-2022	03-14-2022	1FMDE5CP2MLA61925	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	NY	Rochester	0	0	ENGINE	I was on cruise control going	A			Y	70	
180	NHTSA	11457360	1802087	01-11-2022	03-27-2022	03-18-2022	1FMDE5DH7MLA99772	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	OH	Galena	0	0	ENGINE	After 625 miles the low engin	B		T/N3 - 2.3L 4	Y	0	
73	NHTSA	11459262	1804838	03-14-2022	04-10-2022	04-01-2022	1FMEE5DP4MLA77160	FORD MOTOR COM	FORD	BRONCO	2021		0	0	UNITED STAT	MI	Farmingto	0	0	ENGINE	I was driving to work on the	A	Y		Y	70	

5lm5j7wc8mg
5LM5J7XC8MGL17641
1FMEE5DP6MLA72459
1FMEE5DP4MLA77160
1FMDE5CP2MLA61925
1FMDE5FPXMLA20387
1FMDE5AP4ML
1FMEE5DP9MLA88378
1FMEE5DP8MLA92941
1FMEE5BP0MLA78146
1FMEE5EP6ML
1FMEE5DP3ML
1FMEE5DP5MLA71271
1FMEE5DP5MLA93495
1FMEE5DP6ML
1FMEE5DP5MLA71030
1FMEE5DP7MLA93627
1FMDE5CP4ML
1FMDE5FP3MLA20375
1FMEE5BP0MLA93701
1FMEE5DPXMLA90155
1FMDE5AP2MLA77576
1FMDE5AP2MLA77576
1FMEE5BP4MLA68994
1FMEE5DP5ML
1FTEW1EP9MF
1FTEW1EP5MFC69887

From: Katinas, Dana (D.J.)
Sent: Thursday, July 29, 2021 8:45 AM
To: Abkenar, Frank (F.K.); Harrison, Michael (M.J.)
Cc: Simon, David (D.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.)
Subject: Fwd: Failed 2.7L - Bronco

Awareness. 2 failed 2.7 in new Broncos. In case comes up in Dave's VPQR later.

Dana Katinas
Ford Motor Company
IPTSE Nano V6 / Coyote V8 Engine Systems Mgr
313-805-2303
dkatinas@ford.com

From: Lyons, Marcus (M.I.) <mlyons3@ford.com>
Sent: Thursday, July 29, 2021 8:42 AM
To: Hewlett, Matt (M.S.); Pearson, Gavin (G J R.)
Cc: Katinas, Dana (D.J.); Simon, David (D.); Liddle, Preston (P.); Suetterlin, Terry (T.D.); Strand, Tim (T.A.); Kilby, John (J.G.); Ward, Zachary (Z.); Schuh, Rudy (R.); Birr, Jodi (J.); Steslicki, Michael (M.E.); Hashbarger, Jacob (J.E.); Moore, Roger (R.D.); Sheidler, Tom (T.L.)
Subject: RE: Failed 2.7L - Bronco

My note below was about the other engine in the original email – being from Keller Ford in Grand Rapids.

To tack onto Matt's question about a "man in a van", isn't there also supposed to be limited teardown requests at launch in order to get the vehicle back on the road quicker and have an expedited return of the complete engine for teardown within Ford?

GCQIS:

Report# :	M72CQ018 NHL			**Received:**	07/28/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP3MLA66408			**Build Date:**	06/25/2021
Odometer :	1,146 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 09696 Keller Ford, Inc.			**Phone#:**	616-784-6600
City:	Grand Rapids	**State:**	Michigan	**Country :**	USA
Originator:	DUSTIN WIEGERINK				
Originator e-mail:	DWIEGERINK@KELLERFORDAUTO.COM				
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	Loss power, shut off, no crank				
Fix:	**Causal Component :**				
Condition Code:					

Hotliner: CSOREN11 **Phone:** **Regn Cd:** G2 Detroit

Engineering: **Phone:** **TAR:**

Dlr Contact: DUSTIN WIEGERINK **Phone:** **Title Cde:** SM

Comments:

CONCER **07/28/2021 07:28PM CHEYENNE SORENSEN MSS - FCSD - TECH ASSIT CENTER**

Web Form Data(118293132) Description of Vehicle Concern: customer was driving vehicle starting to lose power, trailer default message came on and dash went black. vehicle then quite running and would not turn over. Please list any diagnostics already performed: self tested vehicle, had pages full of lack of power to module codes. charged vehicle, vehicle still wont turn over. we removed belt and attempted to turn engine over by hand and it would not move. we suspect a locked up motor. vehicle has plenty of coolant and oil is full and clean. please advise next step considering this is new model and low mileage. Parts Replaced: no Your Question: given the circumstances of the events we are baffled on how engine could have locked up. do you think something else could be causing this.

RECOMM **07/28/2021 07:28PM CHEYENNE SORENSEN MSS - FCSD - TECH ASSIT CENTER**

Dustin, With the vehicle not able to be rotated by hand, it does seem like the engine is locked up. If not done yet, remove the spark plugs and attempt to rotate the engine by hand again. If you are still unable to rotate the engine by hand, the oil pan should be removed to verify if there is damage to the lower end bearings. If you do find damage to the lower end, use GSB 20-7062 to help determine the root cause. Once the root cause has been determined, a Smart Cost Cap should be completed. Based off the time in service and mileage of the vehicle this would fall under the Low Time In Service (LITS) policy and the long block should be replaced. LTIS is applicable to vehicles that are within 12 months/12,000 miles from the warranty start date and there has been confirmed damage to the lower end. More information about the LTIS policy can be found in the Warranty and Policy Manual or in EFC EFC08094. *** Technical Assistance Center Team Member Cheyenne

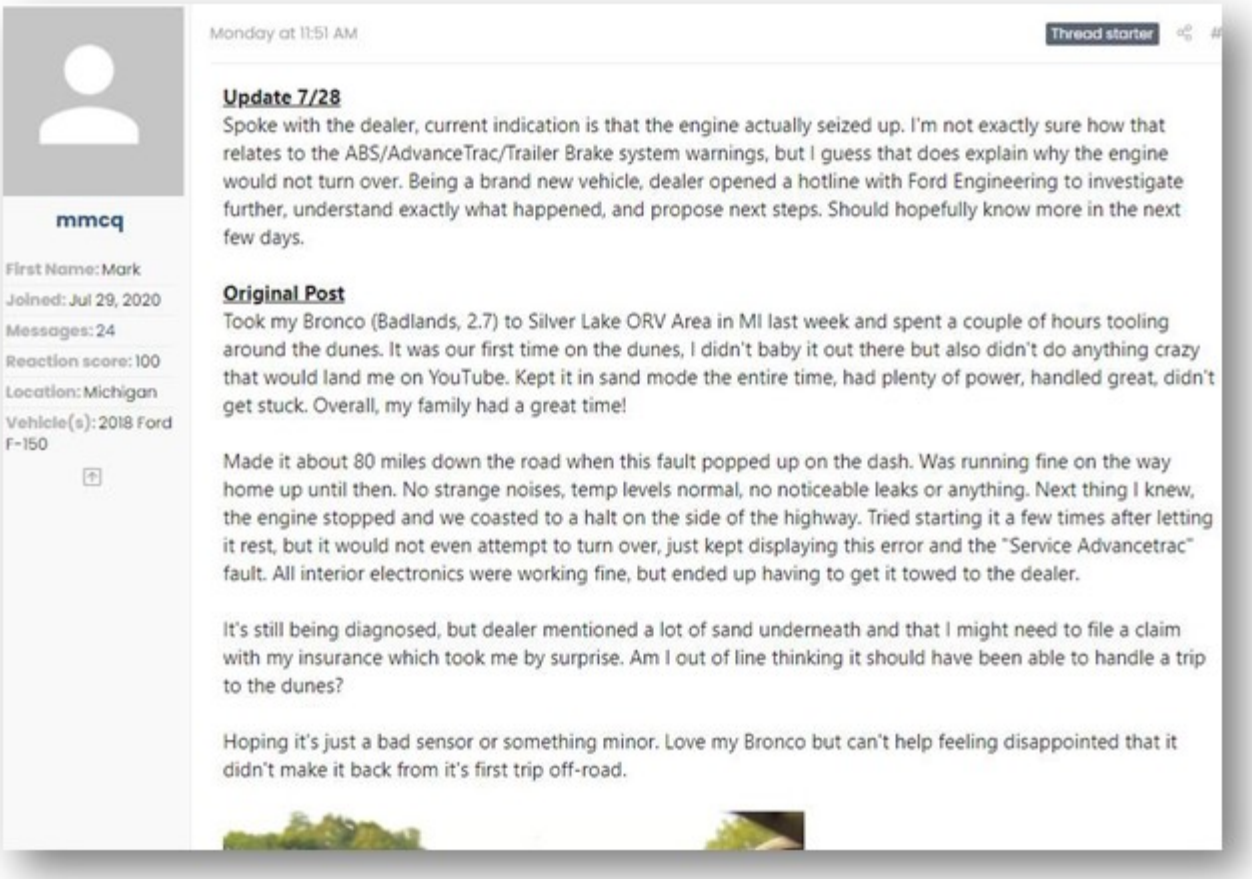
ADD-ON **07/28/2021 07:28PM CHEYENNE SORENSEN MSS - FCSD - TECH ASSIT CENTER**

Was reached out to by FSE Adam Hopper about this contact. Advised a quick response would be best because this vehicle is getting a lot of notice on the discussion boards. Discussed and agreed to verify the root cause and provide the LTIS information. Advised that the oil pan can be removed to verify the lower end is at fault.

:: Marcus ::

From: Lyons, Marcus (M.I.)
Sent: Thursday, July 29, 2021 7:44 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Schuh, Rudy (R.) <rschuh1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Hashbarger, Jacob (J.E.) <JHASHBAR@ford.com>; Moore, Roger (R.D.) <rmoore36@ford.com>; Sheidler, Tom (T.L.) <tsheidl1@ford.com>
Subject: RE: Failed 2.7L - Bronco

FYI….Social Media Post. I haven't read all of the comments, but there's a lot of attention out there on this one.



mmcq

First Name: Mark
Joined: Jul 29, 2020
Messages: 24
Reaction score: 100
Location: Michigan
Vehicle(s): 2018 Ford F-150

Monday at 11:51 AM — Thread starter

Update 7/28
Spoke with the dealer, current indication is that the engine actually seized up. I'm not exactly sure how that relates to the ABS/AdvanceTrac/Trailer Brake system warnings, but I guess that does explain why the engine would not turn over. Being a brand new vehicle, dealer opened a hotline with Ford Engineering to investigate further, understand exactly what happened, and propose next steps. Should hopefully know more in the next few days.

Original Post
Took my Bronco (Badlands, 2.7) to Silver Lake ORV Area in MI last week and spent a couple of hours tooling around the dunes. It was our first time on the dunes, I didn't baby it out there but also didn't do anything crazy that would land me on YouTube. Kept it in sand mode the entire time, had plenty of power, handled great, didn't get stuck. Overall, my family had a great time!

Made it about 80 miles down the road when this fault popped up on the dash. Was running fine on the way home up until then. No strange noises, temp levels normal, no noticeable leaks or anything. Next thing I knew, the engine stopped and we coasted to a halt on the side of the highway. Tried starting it a few times after letting it rest, but it would not even attempt to turn over, just kept displaying this error and the "Service Advancetrac" fault. All interior electronics were working fine, but ended up having to get it towed to the dealer.

It's still being diagnosed, but dealer mentioned a lot of sand underneath and that I might need to file a claim with my insurance which took me by surprise. Am I out of line thinking it should have been able to handle a trip to the dunes?

Hoping it's just a bad sensor or something minor. Love my Bronco but can't help feeling disappointed that it didn't make it back from it's first trip off-road.

:: Marcus ::

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Thursday, July 29, 2021 7:40 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Schuh, Rudy (R.) <rschuh1@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Hashbarger, Jacob (J.E.) <jhashbar@ford.com>; Moore, Roger (R.D.) <rmoore36@ford.com>; Sheidler, Tom (T.L.) <tsheidl1@ford.com>
Subject: RE: Failed 2.7L - Bronco

MB3E-6007-AA – engine as shipped
MB3E-6006-AA – long block

Gavin, Dave, is there still a man-in-a-van program for 21 Bronco rapid diagnosis?

1FMEE5BP1MLA71500 (VBD Jun 19) - EF06A21165120177 MB3E 6007 AA (EBD June 14)
743 miles
CONCER 07/26/2021 11:45AM
CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.
TECH/C 07/26/2021 11:45AM

VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

1FMEE5DP3MLA66408 (VBD Jun 25) - EF06A21161120082 MB3E 6007 AA (EBD June 10)
1146 miles
CONCER 07/27/2021 09:24AM
customer was driving had loss of power , trailer default message, dash went black and vehicle shut down. will not turn over. engine seems to locked up.
TECH/C 07/27/2021 09:24AM
tried turning over manually and engine is locked

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, July 28, 2021 8:49 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Failed 2.7L - Bronco

Matt – what is the 6007 part number for Bronco 2.7 engine complete as produced today by LEP. I would like to check that it is catalogued by Terry and available for shipment by Preston. Thanks.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Katinas, Dana (D.J.) <dkatinas@ford.com>
Sent: Wednesday, July 28, 2021 7:39 PM
To: Simon, David (D.) <dsimon1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Subject: Fwd: Failed 2.7L - Bronco

Awareness. Pair of failed 2.7 engines emerging issue.

Dana Katinas
Ford Motor Company
IPTSE Nano V6 / Coyote V8 Engine Systems Mgr
313-805-2303
dkatinas@ford.com

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Wednesday, July 28, 2021 5:22 PM
To: Strand, Tim (T.A.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.)
Subject: FW: Failed 2.7L - Bronco

Info

Brian R. Mazzella
Global Engine Engineering
21MY-beyond Nano Engine Programs Supervisor (Vehicle Interface)

From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Wednesday, July 28, 2021 5:21 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Mancini, JonCarlo (J.) <jmancin6@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>
Cc: Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: FW: Failed 2.7L - Bronco
Importance: High

2,7L V6 Team,
Please see two engine failure claims.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Vylasek, Stephan (S.) <svylasek@ford.com>
Sent: Wednesday, July 28, 2021 5:17 PM
To: Melki, Imad (I.E.) <imelki@ford.com>
Cc: Shah, Kiran (K.H.) <kshah12@ford.com>
Subject: FW: Failed 2.7L - Bronco

Wrong person! :) This one is for you Imad.

Kiran,

Here are the two failed 2.7L engine reports. The comments are brief, but straight forward. I plan to call them in the morning to see if the engines are indeed complete replacements. If they are, this will open into an emerging QSF. One more and we are QSF reporting in the FQRs.

I'll let you know how the calls to these dealers go.

Steve Vylasek
Concern ID & Resolution – Program Manager
Mustang / Continental / Bronco / Ranger / EcoSport
Ford Motor Company – FCSD

(313)-323-7817 / SVylasek@Ford.com

From: Adam, Paul (P.J.)
Sent: Wednesday, September 22, 2021 1:55 PM
To: Rhude, Benjamin (B.); Kolodziejczyk, Jeffrey (J.A.)
Subject: Fwd: Hughes Springs Tx, 2.7L Bronco just came in.

FYI - valve 21C17

Paul

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, September 22, 2021 1:42:12 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Matthews, Matt (.) <mmatthe1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Thank you Adam.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Wednesday, September 22, 2021 1:03 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Matthews, Matt (.) <mmatthe1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

#5 primary intake valve.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, September 22, 2021 12:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Thanks for letting us know Adam.

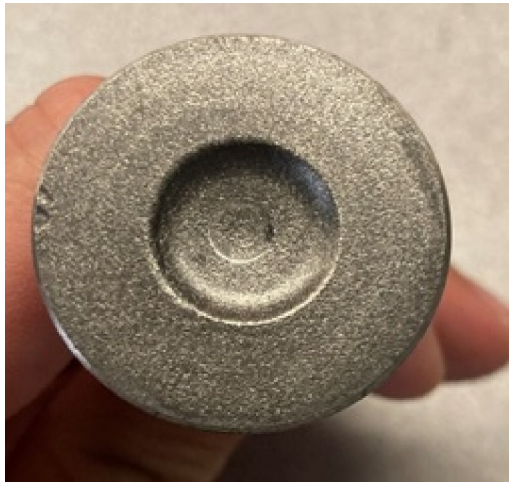
From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Wednesday, September 22, 2021 12:37 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: Hughes Springs Tx, 2.7L Bronco just came in.

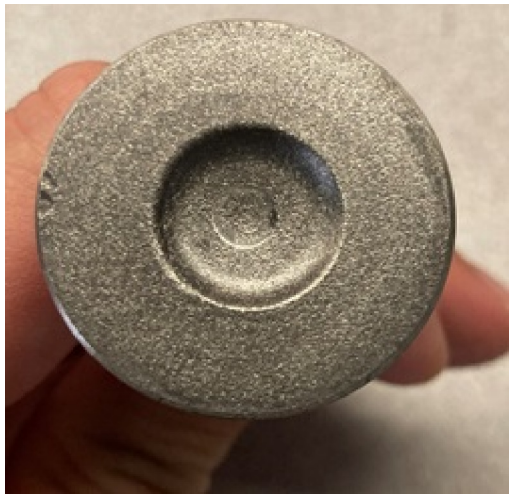
Report# :	M84EU002 NHL	**Received:**	08/30/2021
CCRG/EPRC:	**Reviewed Status:**	**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA63603	**Build Date:**	06/12/2021

Odometer :	1,372 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02508 Dewey Moore Ford			**Phone#:**	903-639-2516
City:	Hughes Springs	**State:**	Texas	**Country :**	USA
Originator:	WILLIAM DEAN				
Originator e-mail:	SCOTT.DEAN24@YAHOO.COM				
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	smoke from exhaust/stalled				
Fix:	**Causal Component :**				
Condition Code:					

Hotliner:	TMASCARI	**Phone:**		**Regn Cd:**	C1 Dallas
Engineering:		**Phone:**		**TAR:**	
Dlr Contact:	WILLIAM DEAN	**Phone:**		**Title Cde:**	SM

PE22-007 000139 ER





From: Pearson, Gavin (G J R.)
Sent: Thursday, July 29, 2021 2:38 PM
To: Simon, David (D.); Katinas, Dana (D.J.); Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Hewlett, Matt (M.S.); Adam, Paul (P.J.); Strand, Tim (T.A.); Vylasek, Stephan (S.); Lyons, Marcus (M.I.); Boarts, Jonathan (J.)
Subject: Keller Ford Bronco 2.7 - valve failure
Attachments: IMG_3457.jpg; IMG_3458.jpg

Pictures of #6 piston. 2 dropped valves, one intake and one exhaust.

Tim Strand reviewed engine as best we could manage via FaceTime.

We are going to reassemble the engine and send to EMDO for review.

Get Outlook for iOS

Snap-on

Snap-on
PE22-007 000146 ER

From: Pearson, Gavin (G J R.)
Sent: Thursday, July 29, 2021 2:10 PM
To: Simon, David (D.); Katinas, Dana (D.J.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Vylasek, Stephan (S.); Boarts, Jonathan (J.); Lyons, Marcus (M.I.); Ni, Ben (B.X.)
Subject: Keller Ford Bronco 2.7
Attachments: IMG_3446.jpg; IMG_3449.jpg; IMG_3450.jpg; IMG_3453.jpg; IMG_3454.jpg; IMG_3455.jpg

Categories: Green Category

Oil level on dipstick looks good and clean.

Oil filter looks in great condition.

Codes were pulled- sheet attached.

Customer said that while driving from Silver Lake they had a loss of power, trailer default message, dash went black, vehicle shut off and would not restart.

Get Outlook for iOS

PE22-007 000148 ER

Lima Engine Plant
27L RWD U725
MB3E 6007 AA
121
EF06A21161120082

PE22-007 000150 ER

PE22-007 000152 ER

D1	C0031	01	28	+ Left Front Wheel Speed Sensor	CMDTC	03 days, 03:31:00
D1	C0034	01	28	+ Right Front Wheel Speed Sensor	CMDTC	03 days, 03:31:00
D1	C0037	01	28	+ Left Rear Wheel Speed Sensor	CMDTC	03 days, 03:31:00
D1	C003A	01	28	+ Right Rear Wheel Speed Sensor	CMDTC	03 days, 03:31:00
3	Pass				CMDTC	
3	Pass				CMDTC	
2	Pass				CMDTC	
1	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	U3003	16	08	+ Battery Voltage	CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	U0418	86	28	+ Invalid Data Received from Brake System Control Module "A"	CMDTC	03 days, 03:31:00
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	U3003	16	08	+ Battery Voltage	CMDTC	
	U3003	68	28	+ Battery Voltage	CMDTC	03 days, 03:30:00
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Fail			Module not Responding	CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	
	Pass				CMDTC	

Cleared DTCs for the following modules cannot be determined because the most recent test failed:SODR

From: Pearson, Gavin (G J R.)
Sent: Thursday, July 29, 2021 2:16 PM
To: Simon, David (D.); Katinas, Dana (D.J.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Vylasek, Stephan (S.); Boarts, Jonathan (J.); Lyons, Marcus (M.I.)
Subject: Keller Ford Bronco 2.7
Attachments: IMG_3456.jpg

Spark plugs 4, 5 and 6.
#6 has the issue

Get Outlook for iOS

PE22-007 000155 ER

VIN	Dealer	700 Tag
1FTEW1EP8MFB73557	METRO FORD SALES LIMITED	
1FTEW1EP6MFC10928	ERIC CAMPBELL FORD LINCOLN LTD	
1FM5K8GC3MGB75916	RAY PRICE FORD	
1FTEW1EP9MKE11486	GARY CROSSLEY FORD INC.	
1FTEW1EP1MFB82570	MID-TOWN FORD SALES LIMITED	
2FMPK4AP8MBA44310	CHUCK ANDERSON FORD INC.	
1FM5K8GC7MGB62327	KENNEDY FORD SALES LIMITED	
1FTEW1EP4MKE01867	METRO FORD SALES LIMITED	
1FTEW1EP4MFC32670	AUTONATION FORD WHITE BEAR LAK	
1FTEW1CP1MFC51017	THE FORD STORE MORGAN HILL	
1FTEW1EP6MKD53692	SUPERIOR FORD INC.	
1FTEW1EP9MFC02791	BILL MARSH FORD OF GAYLORD	
1FTEW1EP2MKE14231	STEELE FORD LINCOLN	
2LMPJ9JP7MBL01638	GALPIN LINCOLN	
1FM5K8GC0MGC11433	MISSION FORD OF DEARBORN INC.	
1FTEW1CP5MFC28808	KEN STOEPEL FORD	
1FTEW1EPXMFB76993	ROYAL OAK FORD	
2LMPJ8KP1MBL01689	SOUTH HILLS LINCOLN INC.	
1FTEW1CP3MFB90897	FAIRWAY FORD OF AUGUSTA INC	
1FTEW1EPXMFB82924	BANNISTER FORD	
1FM5K8GC1MGC08959	HEALEY FORD	
5LM5J7XC5MGL17239	MORAND FORD LINCOLN LTEE	
1FTEW1EP1MKE01700	FORMO MOTORS LTD.	
1FTEX1EP1MKE09745	UNIVERSAL FORD LINCOLN SALES	
1FM5K8GC6MGB10042	ALL AMERICAN FORD OF OLD BRIDG	
1FM5K8LC4MGB75915	KOCH 33 FORD	
1FTEW1EP0MFB86870	SILL-TERHAR MOTORS INC.	
1FMEE5DP5MLA87194	CONWAY FORD INC.	
1FTEW1EP3MFB93649	COVERT FORD LINCOLN	
5LM5J7WC9MGL19285	WEST POINT LINCOLN OF SUGAR LA	
1FMEE5DP6MLA68444	GOODE MOTOR FORD LLC	
1FMEE5EP8MLA40112	SAM PACK'S FIVE STAR FORD	
1FMEE5DP9MLA68339	GULLO FORD OF CONROE	
1FTEW1CP3MFC06922	SUNRISE FORD	
1FM5K8GC5MGB77196	CENTURY FORD OF MT AIRY INC	
1FTEW1EP3MFC26049	SERRA FORD ROCHESTER HILLS	
1FTEW1EP8MFC25429	MIKE DORIAN FORD INC.	
5LM5J6WC3MGL17431	ASHEVILLE FORD	
1FMEE5EP3MLA41491	ZOELLNER FORD OF BEATRICE	
1FMEE5DP3MLA64089	GARY CROSSLEY FORD INC.	
1FTEW1EP2MFB85963	BILL BROWN FORD INC.	
1FM5K8GC9MGB71711	COURTESY FORD	
1FM5K8LC3MGB87019	HAGERSTOWN FORD	
5LM5J7XC8MGL16067	KENNEDY FORD SALES LIMITED	
1FTEW1CP7MFC04087	AUTONATION FORD KATY	
1FTEW1CP8MFB51917	FORD OF KENDALL LLC	
1FTEW1CP5MFB78203	CHASTANG FORD	
1FM5K8GC0MGB49614	FOX FORD	
1FM5K8GCXMGB73807	PRESTIGE FORD	
1FM5K8GC0MGB90891	BATTLEFIELD FORD CULPEPER	
5LM5J7XC3MGL18793	NORTH PARK LINCOLN	
1FTEW1EP4MKE48123	RUSS MILNE FORD INC.	
1FM5K7LCXMGB76917	GRIECO FORD OF DELRAY BEACH	
1FMEE5BP6MLA71427	MIRACLE FORD INC.	

1FTEW1CP8MFB84559	AKINS FORD
1FTEW1EP4MFB56870	YONGE-STEELES FORD LINCOLN SAL
1FTEX1EP3MKE31259	MAGUIRE FORD
1FTEW1EP7MFC32789	MUSCATELL BURNS FORD
1FM5K8GC3MGA67098	BOB THOMAS FORD INC.
1FM5K7LC6MGB86327	O. C. WELCH FORD
1FTEW1EPXMFB86035	YARK FORD
1FM5K8GC4MGB57408	RANDY MARION FORD LINCOLN LLC
5LM5J7XC3MGL14159	SOUTH HILLS LINCOLN INC.
1FTEW1EP0MFB47261	CURRIE MOTORS FRANKFORT INC
1FTEW1EP6MFB84184	SAYVILLE FORD
1FMEE5DP0MLA74160	CROSSROADS FORD
1FM5K8LCXMGB77412	GORDIE BOUCHER FORD OF JANESVI
2FMPK4AP9MBA27225	STONEHAM MOTOR COMPANY INC.
1FTEW1EPXMKE16762	PAT MILLIKEN FORD INC.
1FTEW1EP8MKE53647	ROBERTS MOTORS INC.
1FM5K8GC7MGB62537	FREEHOLD FORD INC.
1FM5K7LC4MGB88397	JORDAN FORD LTD.
1FM5K8GC8MGB62837	MALL OF GEORGIA FORD
5LM5J7XC3MGL18681	SAKELARIS FORD OF CAMDENTON
1FM5K8GC2MGB49470	SUBURBAN FORD OF FERNDALE
2FMPK4AP3MBA41332	DRUMMONDVILLE FORD
1FM5K8GCXMGB22730	WADE FORD INC.

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Wednesday, May 25, 2022 11:40 AM
To: Steslicki, Michael (M.E.)
Subject: Nano Dropped Valve Engine Exchanges

Hi Mike,

How many Nano dropped valve engine exchanges are we at currently?

Can you tell me how many torn down confirmed?

Updating a 1-pager for management review tomorrow.

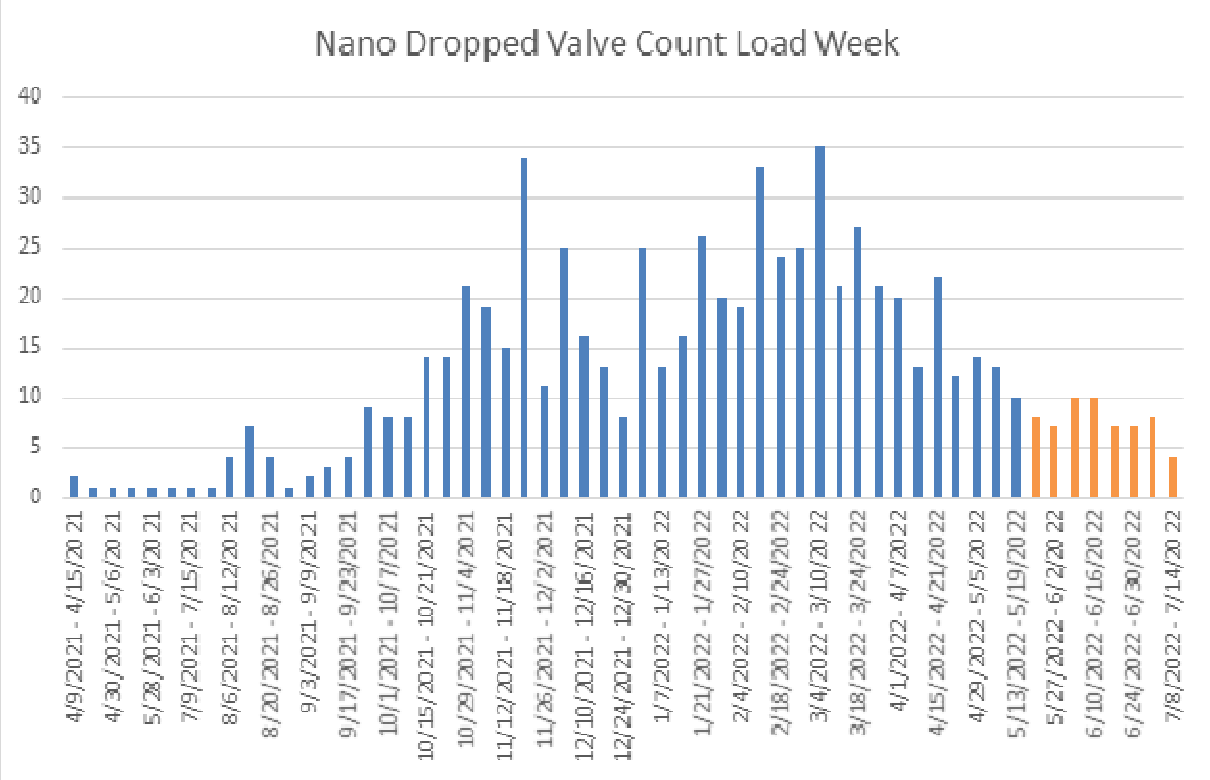
Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Knott, Tim (.)
Sent: Tuesday, July 19, 2022 12:47 PM
To: Beyer, Laura (L.D.)
Cc: Corbett, Sandy (S.M.)
Subject: Nano Dropped Valve

Laura -

There have been 53 additional dropped valve after the GDIA analysis.
Highlighted in orange.



From: Pearson, Gavin (G J R.)
Sent: Thursday, August 12, 2021 3:47 PM
To: Strand, Tim (T.A.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.); Simon, David (D.); Bautz, Jeffrey (J.E.); Smith, Cressel (C.); Knott, Tim (.); Rhude, Benjamin (B.)
Cc: Zschering lll, Kurt H (K.); Sanaski, Adam (A.); Jacobs, Jeremy (J.)
Subject: Nano engines for valvetrain review at EMDO

Importance: High

Team – a number of engines have been brought back to EMDO and laid out in the teardown area for valvetrain review. Please take the opportunity to review these engines tomorrow. Please note that EMDO opens at 6am and techs generally leave by 2.30 pm.

Thank you.

Regards,
Gavin J.R. Pearson
IPTSE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Pearson, Gavin (G J R.)
Sent: Friday, July 30, 2021 2:28 PM
To: Zschering lll, Kurt H (K.) <kzscheri@ford.com>; Sanaski, Adam (A.) <asanaski@ford.com>; Jacobs, Jeremy (J.) <jjacob93@ford.com>
Cc: Strand, Tim (T.A.) <tstrand2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: 2 x Nano engines for teardown at EMDO

Gentlemen – we have 2 x Nano engines that have failed valves at dealers which we are trying to get to EMDO with the utmost urgency to tear down and enable analysis of the valvetrain components and some head features.

Recognizing that this is vacation season are you all in next week and can you all please work together to get these engines into the teardown area, get the parts laid out and help us understand when we can get people in to review parts?

Many thanks.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

PE22-007 000160 ER

From: Rhude, Benjamin (B.)
Sent: Wednesday, July 21, 2021 2:12 PM
To: Grundemann, Wesley
Cc: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: Nano JT4E-6507-AA/AB Valves

Hey Wes,

Have you sent the valves yet for impact testing? I know we have talked about it but I haven't seen any information regarding their status. Please let me know.

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Strand, Tyson <TysonStrand@Eaton.com>
Sent: Friday, August 27, 2021 9:56 AM
To: Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.); Adam, Paul (P.J.)
Cc: Grundemann, Wesley
Subject: Nano valve tip FEA

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Jeff,

I met with our FEA team in Pune this morning. They are able to perform the FEA. Once they receive all required inputs, estimate 4-5 days for the first model, then about 2 days to run each subsequent iteration for static FEA. They are also going to run dynamic FEA, but are still working on timing to complete this (I will let you know when I hear back from them).

We can discuss more this afternoon, I just wanted to get you approximate timing.

Thanks,

Tyson

on Left valve lover
21131 – 21281 are Bad ours
Lima Engine Plant
27L RWD U725
MB3E 6007 AA
121
EF06A21308131028

From: Ott, David (D.J.)
Sent: Monday, June 6, 2022 8:04 AM
To: Abkenar, Frank (F.K.)
Cc: Beyer, Laura (L.D.)
Subject: NHTSA Investigation DP22-001 - Bronco 2.7L
Attachments: DP22-001 Resume.PDF

Frank, this is the document that is on NHTSA's public-facing website.

The typical next step is that they will send us a formal list of questions which we will have 45 days to respond.

Let me know if you have any questions.

David J. Ott
Defect Investigations Manager – Truck Programs (CCRG Chair)
Automotive Safety Office
Ford Motor Company
313-402-2502 (work cell)
313-407-3194 (cell)

U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION
NHTSA

Investigation:	DP 22-001		
Prompted by:	Defect Petition		
Date Opened:	05/27/2022		
Investigator:	Donte Kirksey	**Reviewer:**	Peter Kivett
Approver:	Stephen Ridella		
Subject:	Loss of Motive Power		

MANUFACTURER & PRODUCT INFORMATION

Manufacturer:	Ford Motor Company
Products:	2021 Ford Bronco
Population:	25,538
Problem Description:	Under normal driving conditions without warning the vehicle may experience a loss of motive power without restart due to catastrophic engine failure related to a faulty valve within 2.7 L Eco-Boost Engines

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	32	0	32
Crashes/Fires:	0	0	0
Injury Incidents:	0	0	0
Fatality Incidents:	0	0	0

ACTION / SUMMARY INFORMATION

Action: Further evaluation of Defect Petition for a grant or deny decision

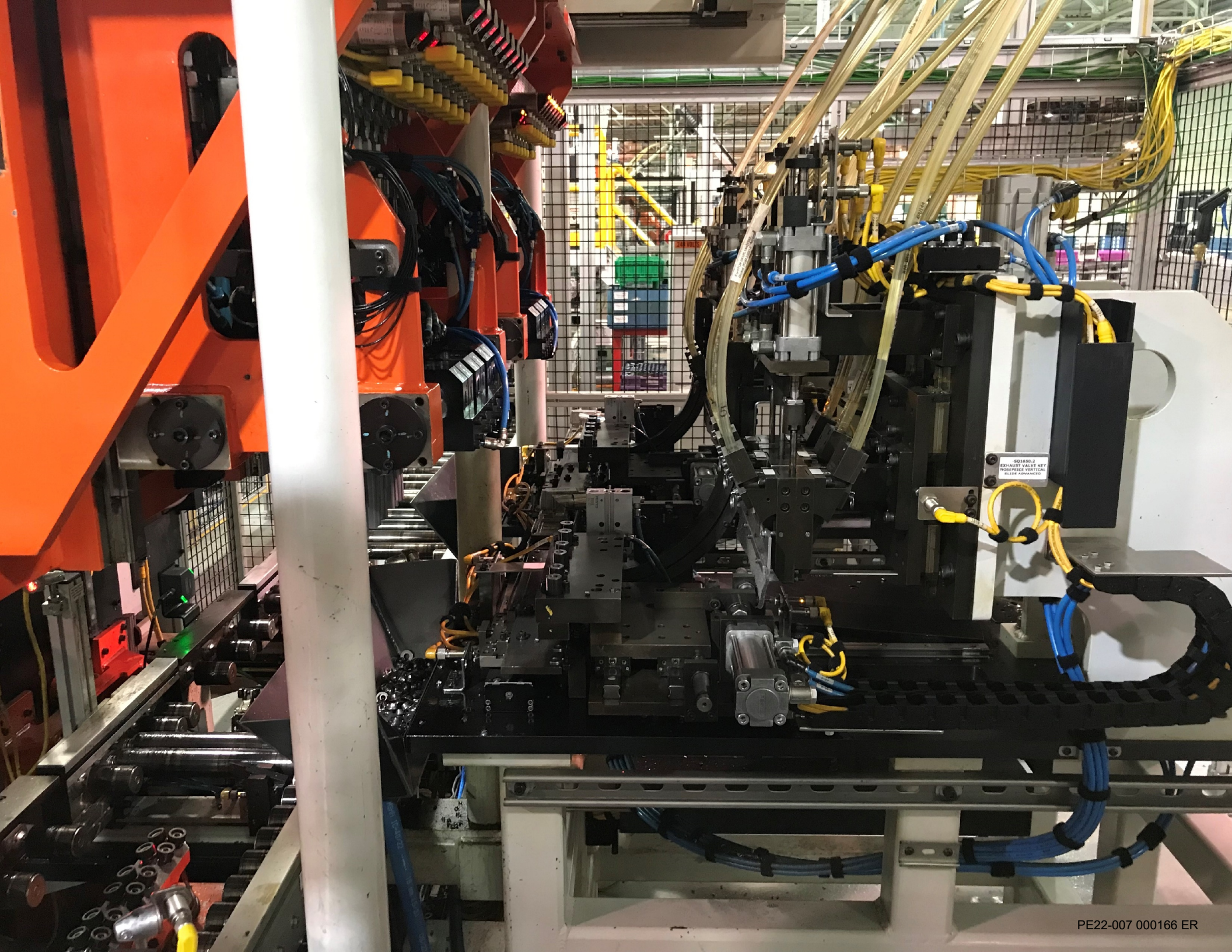
Summary:

The Office of Defects Investigation (ODI) received three petitions on March 17, 2022, March 18, 2022, and March 29, 2022, requesting a defect investigation into an alleged defect of the "valves" on 2021 MY Ford Bronco vehicles equipped with the 2.7L Eco-boost engine. The petitions can be reviewed at NHTSA.gov under ODI numbers 11461178, 11460125, and 11460124.

The petitioners alleged that 2021 MY Ford Broncos vehicles are experiencing loss of motive power at highway speeds with no-restart due to catastrophic engine failures.

This defect petition has been opened to evaluate the issue and determine whether to grant or deny the petitions.

The petitioners identified a number of complaints received by NHTSA alleging complete engine failure. The ODI complaints cited above can be reviewed at NHTSA.gov under the following ODI numbers: 11459262, 11457360, 11456713, 11456219, 11455294, 11454100, 11454098, 11453933, 11453669, 11452692, 11452595, 11452074, 11451957, 11451503, 11451158, 11450879, 11450871, 11450788, 11450737, 11450702, 11450659, 11448737, 11448461, 11448393, 11448171, 11441831, 11414378, 11414295, 11406545.



PE22-007 000166 ER

From: Russell, Don (D.R.)
Sent: Tuesday, September 14, 2021 8:41 AM
To: Jones, Amy (A.); Buetner, Bradley (B.)
Cc: Mosley, Scott (J.S.); Steinke, Cody (C.); Clement, Chris (C.M.); Contris, Brad (B.); Hewlett, Matt (M.S.)
Subject: RE: VALVES

Categories: Red Category

Amy

The PV 6 Valves in the market area have a "FIFO" tag on them which needs to be left on the skid when taken to head assembly.
This will assist in traceability and establishing a clean point.

Also we need to locate the DR1 machined heads from WEP and let Chris Clements know the location.
Chris is planning on running them this week through head assembly.

Don Russell

From: Grundemann, Wesley J <WesleyJGrundemann@Eaton.com>
Sent: Thursday, July 22, 2021 2:49 PM
To: Rhude, Benjamin (B.)
Cc: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: RE: [EXTERNAL] Nano JT4E-6507-AA/AB Valves

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Found the valves and they went out today via FedEx.

Tracking #: 774330965931

10 pieces PN FT4E-6507-CA (Silchrome 1)
10 pieces PN JT4E-6507-AB (Silite)

Wesley Grundemann
Eaton – Engine Air Management
Machine Shop Supervisor
tel: +1 269 781-0597 mobile: +1 269 601-2973
WesleyJGrundemann@Eaton.com

From: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Sent: Wednesday, July 21, 2021 2:12 PM
To: Grundemann, Wesley J <WesleyJGrundemann@Eaton.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: [EXTERNAL] Nano JT4E-6507-AA/AB Valves

Hey Wes,

Have you sent the valves yet for impact testing? I know we have talked about it but I haven't seen any information regarding their status. Please let me know.

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Strand, Tyson <TysonStrand@Eaton.com>
Sent: Thursday, July 29, 2021 10:21 PM
To: Kolodziejczyk, Jeffrey (J.A.); Parks, Tracy; Grundemann, Wesley; Zarek, Paul
Cc: Rhude, Benjamin (B.); Adam, Paul (P.J.)
Subject: RE: [EXTERNAL] RE: 2.7L Bronco Stop Ship

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Jeff,

I've communicated below to the Kearney team for tomorrow.

Thanks,

Tyson

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, July 29, 2021 9:01 PM
To: Parks, Tracy <SheltonSParks@Eaton.com>; Strand, Tyson <TysonStrand@Eaton.com>; Grundemann, Wesley J <WesleyJGrundemann@Eaton.com>; Zarek, Paul <PaulZarek@Eaton.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: [EXTERNAL] RE: 2.7L Bronco Stop Ship

Tyson,

Engine build dates at LEP for the 2 failed engines are June 10 and June 14 2021. We will not have the valves back from dealer until the weekend. Please reach out to Kearney quality team and have them pull control plan quality documents to review tomorrow at 11 am meeting.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Thursday, July 29, 2021 4:20 PM
To: Parks, Tracy <SheltonSParks@Eaton.com>; Strand, Tyson <TysonStrand@Eaton.com>; Grundemann, Wesley <WesleyJGrundemann@eaton.com>; Zarek, Paul <PaulZarek@Eaton.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: 2.7L Bronco Stop Ship
Importance: High

Eaton team,

Bronco launch is heading towards a stop ship due to the 2 vehicle claims with dropped valves. In process of getting the parts back from dealers.

Ben Rhude set up a recurring meeting. Agenda tomorrow 11 am is to review process quality documentation and discuss Silchrome 1 material change over.

I know you mentioned we will not have info on timing until Monday but need to accelerate a response on this.

Please forward to anyone else on Eaton team that can support the quality discussion

I will forward more info on build date etc when I get the claims.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Strand, Tyson <TysonStrand@Eaton.com>
Sent: Friday, November 19, 2021 3:04 PM
To: Kolodziejczyk, Jeffrey (J.A.)
Cc: Vempati, Abhijyoth (A.R.); Adam, Paul (P.J.)
Subject: RE: [EXTERNAL] Return part analysis - Nano 3rd keeper failures

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Thanks Jeff, I will keep you updated.

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Friday, November 19, 2021 3:02 PM
To: Strand, Tyson <TysonStrand@Eaton.com>
Cc: Vempati, Abhijyoth (A.R.) <avempati@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: [EXTERNAL] Return part analysis - Nano 3rd keeper failures

Hi Tyson,

I shipped 8 dealer return 3rd keeper valve failures to your attention at Marshal for hardness and grinder burn checks.

Each return is labelled with dealer name.

Please let us know when received.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sorab, Jagadish (J.)
Sent: Tuesday, August 3, 2021 5:36 AM
To: Pearson, Gavin (G J R.); Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Brewer, Todd (T.J.); Simon, David (D.); Knott, Tim (.); Katinas, Dana (D.J.); Strand, Tim (T.A.)
Subject: RE: 2.7L Bronco Dropped Valves ERA Working Level Review - drive cycle of customer in St Louis, MO

Gavin – thanks.

Jagadish Sorab
Chief Engineer
Components & Subsystems Engineering
ICE Propulsion and Thermal Systems Engineering, Ford Motor Co.
Mobile: 313-348-9344 jsorab@ford.com

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, August 2, 2021 5:50 PM
To: Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Brewer, Todd (T.J.) <tbrewer1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Knott, Tim (.) <tknott@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Sorab, Jagadish (J.) <jsorab@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>
Subject: RE: 2.7L Bronco Dropped Valves ERA Working Level Review - drive cycle of customer in St Louis, MO

I was asked to speak to the Service Manager at Bommarito Ford, Hazelwood Missouri and find what drive cycle the customer was using while they owned the vehicle.

The Service Manager called the customer and then returned my call. I understand that 90% of the drive cycle was on the highway commuting with the balance running errands in town. There was no off-road activity.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

-----Original Appointment-----
From: Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Sent: Friday, July 30, 2021 8:46 AM
To: Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Brewer, Todd (T.J.); Simon, David (D.) (dsimon1@ford.com); Knott, Tim (.); Pearson, Gavin (G J R.)
Cc: Katinas, Dana (D.J.); Sorab, Jagadish (J.); Strand, Tim (T.A.)
Subject: 2.7L Bronco Dropped Valves ERA Working Level Review

PE22-007 000172 ER

When: Tuesday, August 3, 2021 4:00 PM-4:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Webex

Join Meeting

Meeting number (access code): 179 756 9658 Meeting password: Y3ZcKKUfe55
Tap to join from a mobile device (attendees only)
+1-313-248-3668,,1797569658## FordNet 248-3668 / Toll
+1-888-628-3668,,1797569658## US Toll Free Number

Join by phone
+1-313-248-3668 FordNet 248-3668 / Toll
+1-888-628-3668 US Toll Free Number
Global call-in numbers | Toll-free calling restrictions

Join from a video system or application
Dial 1797569658@ford.webex.com
You can also dial 173.243.2.68 and enter your meeting number.

If you are a host, click here to view host information.

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T32MC04

From: Katinas, Dana (D.J.)
Sent: Wednesday, August 11, 2021 10:20 PM
To: Kolodziejczyk, Jeffrey (J.A.)
Cc: Bautz, Jeffrey (J.E.); Simon, David (D.)
Subject: Re: 2.7L Bronco Dropped Valves ERA Working Level Review

As OPD and components team have been lead and systems support I recommend Simon and Bautz should be listed for champions before me on the top… given the impact to U725, U6xx, P702…

Dana Katinas
Ford Motor Company
IPTSE Nano V6 / Coyote V8 Engine Systems Mgr
313-805-2303
dkatinas@ford.com

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Wednesday, August 11, 2021 6:55 PM
To: Adam, Paul (P.J.); Simon, David (D.); Pearson, Gavin (G J R.)
Cc: Katinas, Dana (D.J.); Strand, Tim (T.A.); Bautz, Jeffrey (J.E.); Brewer, Todd (T.J.); Knott, Tim (.)
Subject: RE: 2.7L Bronco Dropped Valves ERA Working Level Review

Updated 5D presentation for VQR & PCT.

Dave, Paul, Gavin

Please feel free to update for level of presentation detail. I left in the other investigations in process beyond ERA 1, 2, 3 but not to cover in detail.

Included all workplan to reflect Gantt chart timing.

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

-----Original Appointment-----
From: Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Sent: Monday, August 02, 2021 5:16 PM
To: Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Brewer, Todd (T.J.); Simon, David (D.) (dsimon1@ford.com); Knott, Tim (.); Pearson, Gavin (G J R.)
Cc: Katinas, Dana (D.J.); Sorab, Jagadish (J.); Strand, Tim (T.A.)
Subject: 2.7L Bronco Dropped Valves ERA Working Level Review
When: Wednesday, August 11, 2021 11:35 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Webex

PE22-007 000174 ER

Join Meeting

Meeting number (access code): 179 756 9658 Meeting password: Y3ZcKKUfe55

Tap to join from a mobile device (attendees only)

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Join by phone

+1-313-248-3668 FordNet 248-3668 / Toll
+1-888-628-3668 US Toll Free Number
Global call-in numbers | Toll-free calling restrictions

Join from a video system or application

Dial 1797569658@ford.webex.com
You can also dial 173.243.2.68 and enter your meeting number.

If you are a host, click here to view host information.

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For additional help with WebEx, Ford users can click on the Digital Worker link: WebEx Support

Can't join the meeting? Contact support.

T32MC04

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Thursday, July 29, 2021 9:01 PM
To: Parks, Tracy; Strand, Tyson; Grundemann, Wesley; Zarek, Paul
Cc: Rhude, Benjamin (B.); Adam, Paul (P.J.)
Subject: RE: 2.7L Bronco Stop Ship

Tyson,

Engine build dates at LEP for the 2 failed engines are June 10 and June 14 2021. We will not have the valves back from dealer until the weekend. Please reach out to Kearney quality team and have them pull control plan quality documents to review tomorrow at 11 am meeting.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Thursday, July 29, 2021 4:20 PM
To: Parks, Tracy <SheltonSParks@Eaton.com>; Strand, Tyson <TysonStrand@Eaton.com>; Grundemann, Wesley <WesleyJGrundemann@eaton.com>; Zarek, Paul <PaulZarek@Eaton.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: 2.7L Bronco Stop Ship
Importance: High

Eaton team,

Bronco launch is heading towards a stop ship due to the 2 vehicle claims with dropped valves. In process of getting the parts back from dealers.

Ben Rhude set up a recurring meeting. Agenda tomorrow 11 am is to review process quality documentation and discuss Silchrome 1 material change over.

I know you mentioned we will not have info on timing until Monday but need to accelerate a response on this.

Please forward to anyone else on Eaton team that can support the quality discussion

I will forward more info on build date etc when I get the claims.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

PE22-007 000176 ER

From: Sanaski, Adam (A.)
Sent: Monday, September 20, 2021 10:57 AM
To: Adam, Paul (P.J.); Pearson, Gavin (G J R.); Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Birr, Jodi (J.); Ward, Zachary (Z.); Knott, Tim (.)
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Table 5A

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Monday, September 20, 2021 10:51 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Thanks, Adam.

Ben and I will visit tomorrow morning to review / take any required parts for analysis.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 10:41 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Please display the top end of the engine until the valvetrain team have reviewed it & taken parts for analysis, after which It can be boxed up and sent to River Raisin.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 10:30 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Team the engine is down.?

What is the plan with it?

Display on a table?
Box up send to river?
Anyone want parts?

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 8:09 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: FW: 2.7L Dealer return - AutoNation Ford Frisco

Thanks Adam.

Team - #6 3rd keeper groove failure.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 7:29 AM
To: Matthews, Matt (.) <mmatthe1@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: 2.7L Dealer return

Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP0MLA72960			**Build Date:**	06/30/2021
Odometer :	1,072 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02441 AutoNation Ford Frisco			**Phone#:**	972-335-5000
City:	Frisco	**State:**	Texas	**Country :**	USA
Originator:					
Originator e-mail:					
Symptom:	4 41 4 00 ST/RN/MV,RUNNING,NO SHUT OFF,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				

#6 cylinder.
Primary intake valve broken tip @ the bottom keeper grove.

At this point I will treat this engine like the other 2.7L Dealer return valve failures.
Valve train in boards, engine on a table for inspection.

atom

From: Adam, Paul (P.J.)
Sent: Monday, September 20, 2021 10:51 AM
To: Pearson, Gavin (G J R.); Sanaski, Adam (A.); Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Birr, Jodi (J.); Ward, Zachary (Z.); Knott, Tim (.)
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Thanks, Adam.

Ben and I will visit tomorrow morning to review / take any required parts for analysis.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 10:41 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Please display the top end of the engine until the valvetrain team have reviewed it & taken parts for analysis, after which It can be boxed up and sent to River Raisin.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 10:30 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Team the engine is down.?

What is the plan with it?

Display on a table?
Box up send to river?
Anyone want parts?

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 8:09 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: FW: 2.7L Dealer return - AutoNation Ford Frisco

Thanks Adam.

Team - #6 3rd keeper groove failure.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 7:29 AM
To: Matthews, Matt (.) <mmatthe1@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: 2.7L Dealer return

Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP0MLA72960			**Build Date:**	06/30/2021
Odometer :	1,072 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02441 AutoNation Ford Frisco			**Phone#:**	972-335-5000
City:	Frisco	**State:**	Texas	**Country :**	USA
Originator:					
Originator e-mail:					
Symptom:	4 41 4 00 ST/RN/MV,RUNNING,NO SHUT OFF,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				

#6 cylinder.
Primary intake valve broken tip @ the bottom keeper grove.

At this point I will treat this engine like the other 2.7L Dealer return valve failures.
Valve train in boards, engine on a table for inspection.

atom

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Monday, September 20, 2021 2:27 PM
To: Sanaski, Adam (A.); Pearson, Gavin (G J R.); Adam, Paul (P.J.); Rhude, Benjamin (B.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Birr, Jodi (J.); Ward, Zachary (Z.); Knott, Tim (.)
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Adam,

I inspected today and got the date code from the valve.

Paul and Ben will be there tomorrow to inspect and retrieve valvetrain parts for supplier analysis.

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 10:30 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Team the engine is down.?

What is the plan with it?

Display on a table?
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Anyone want parts?

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 8:09 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: FW: 2.7L Dealer return - AutoNation Ford Frisco

Thanks Adam.

Team - #6 3rd keeper groove failure.

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Sent: Monday, September 20, 2021 7:29 AM

To: Matthews, Matt (.) <mmatthe1@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: 2.7L Dealer return

Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP0MLA72960			**Build Date:**	06/30/2021
Odometer :	1,072 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02441 AutoNation Ford Frisco			**Phone#:**	972-335-5000
City:	Frisco	**State:**	Texas	**Country :**	USA
Originator:					
Originator e-mail:					
Symptom:	4 41 4 00 ST/RN/MV,RUNNING,NO SHUT OFF,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				

#6 cylinder.
Primary intake valve broken tip @ the bottom keeper grove.

At this point I will treat this engine like the other 2.7L Dealer return valve failures.
Valve train in boards, engine on a table for inspection.

atom

From: Adam, Paul (P.J.)
Sent: Monday, September 20, 2021 1:39 PM
To: Birr, Jodi (J.); Pearson, Gavin (G J R.); Sanaski, Adam (A.); Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.); Strand, Tim (T.A.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Ward, Zachary (Z.); Knott, Tim (.)
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

The valve from this engine was 21 E 08. Jeff K snapped the pic below this morning.

From: Birr, Jodi (J.) <jbirr@ford.com>
Sent: Monday, September 20, 2021 1:27 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: RE: 2.7L Dealer return - AutoNation Ford Frisco

Can someone please get the number off of the valve tip and report back to the team?

It will be in this format:

21-E-24 (May 24, 2021)

Thank you,

Jodi Birr
313.938.9385

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Monday, September 20, 2021 8:09 AM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>
Subject: FW: 2.7L Dealer return - AutoNation Ford Frisco

Thanks Adam.

Team - #6 3rd keeper groove failure.

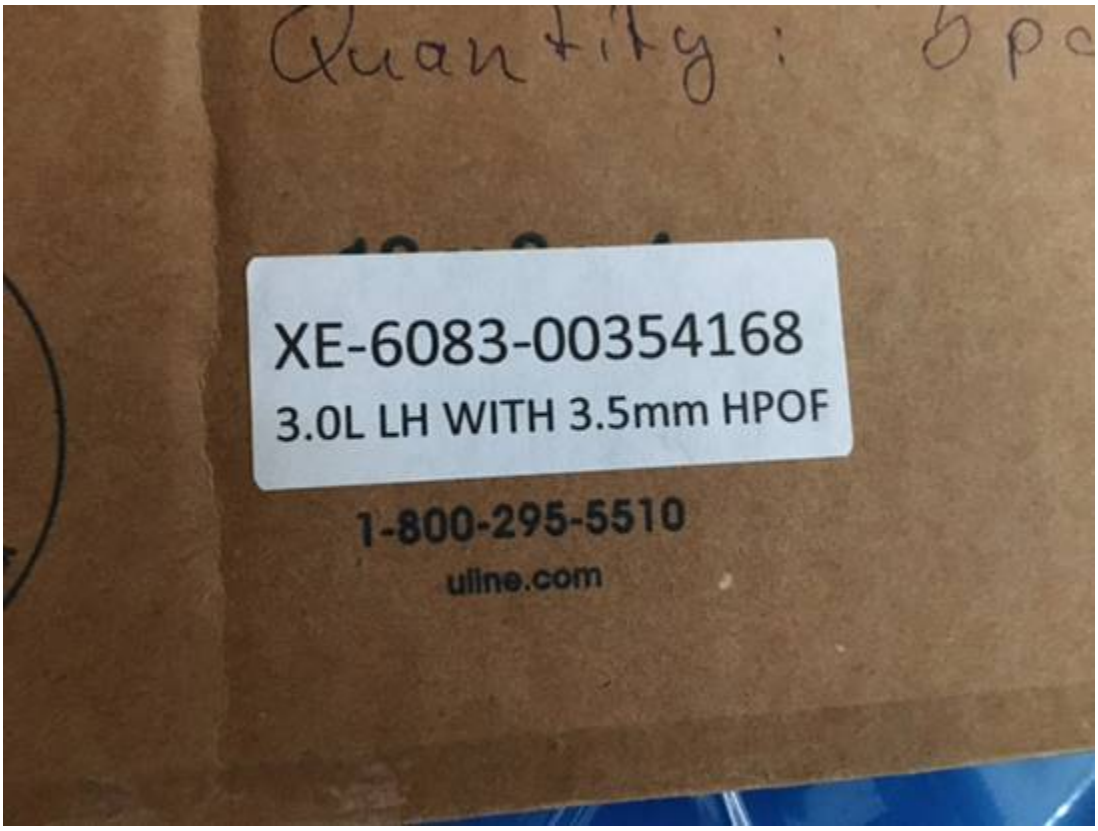
From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Monday, September 20, 2021 7:29 AM
To: Matthews, Matt (.) <mmatthe1@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: 2.7L Dealer return

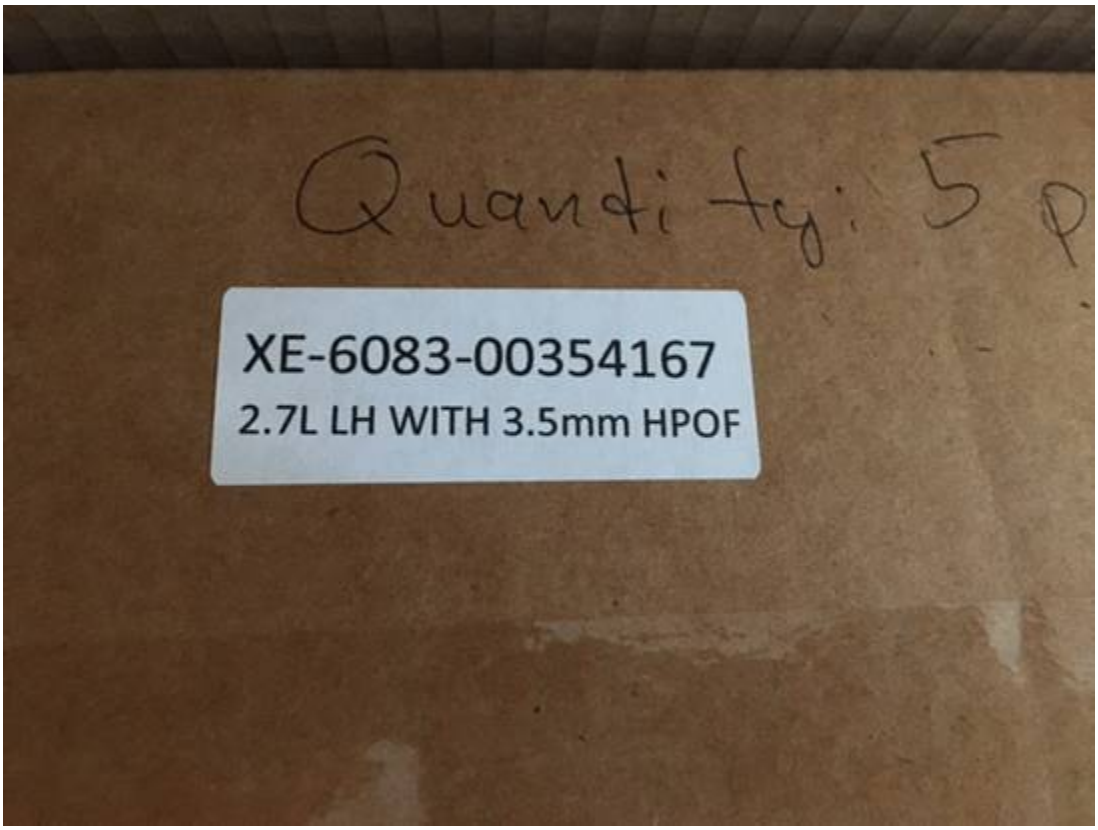
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP0MLA72960			**Build Date:**	06/30/2021
Odometer :	1,072 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02441 AutoNation Ford Frisco			**Phone#:**	972-335-5000
City:	Frisco	**State:**	Texas	**Country :**	USA
Originator:					
Originator e-mail:					
Symptom:	4 41 4 00 ST/RN/MV,RUNNING,NO SHUT OFF,UNKNOWN				
Status:					
VFG:	V44 POWERTRAIN MALFUNCTION				

#6 cylinder.
Primary intake valve broken tip @ the bottom keeper grove.

At this point I will treat this engine like the other 2.7L Dealer return valve failures.
Valve train in boards, engine on a table for inspection.

atom





Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Henne, Joseph (J.) <jhenne@ford.com>
Sent: Tuesday, August 31, 2021 5:56 PM
To: Strand, Tim (T.A.) <tstrand2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Cc: Reinhart, Paul (T.) <preinhar@ford.com>; Keough, Shane (S.T.) <skeough@ford.com>
Subject: 2.7L head gasket with 3.5mm oil feed hole

The original order was for five 2.7L and five 3.0L gaskets.

Jeff: Is this what was received? I have not looked in the box. Did you confirm that you got the correct displacement gasket for the testing you were doing? Any idea whats left in the box?

Regards,

Joseph Henne
Technical Expert – Cylinder Head Gaskets
Global Engine Engineering
Ford Motor Company
jhenne@ford.com
(313)402-1306

There must be a better way….

From: Oliver, Byron (B.D.)
Sent: Thursday, October 14, 2021 1:49 PM
To: Simon, David (D.); Tugulan, Horia (H.); Adam, Paul (P.J.); Kolodziejczyk, Jeffrey (J.A.); Bautz, Jeffrey (J.E.)
Subject: Re: 2.7L/3.0L Nano Valve Quality Issues

Hello Dave,

Not sure if I have a meeting notice for the meeting you are referring too but if you send it to me we can support.

Regards,

Byron D. Oliver
STA Site Manager
Ford Motor Company
Cell (W): 313-806-1599 * Cell (P): 937-248-9472
bolive44@ford.com

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, October 14, 2021 12:52:32 PM
To: Tugulan, Horia (H.) <htugulan@ford.com>; Oliver, Byron (B.D.) <bolive44@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: 2.7L/3.0L Nano Valve Quality Issues

Hi Byron and Horia,

I know you guys are engaged with Eaton on the recent valve issues (third keeper groove failures). This is getting a lot of attention and is likely to grow into a significant warranty issue before the new valves roll through the system.
We need to discuss a plan to keep Eaton producing clean – the request to STA is take all necessary measures to ensure they don't get out of control.

Paul – can we discuss in the next dropped valve task force meeting (tomorrow)…if Horia and Byron can support?

Thanks,
Dave

David Simon
Quality and OPD Manager
IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282

From: Rhude, Benjamin (B.)
Sent: Friday, October 15, 2021 7:48 AM
To: Kolodziejczyk, Jeffrey (J.A.)
Subject: RE: 2.7L/3.0L Nano Valve Quality Issues

Hey Jeff,

Horia is invited to the meeting cadence, I will let him know that his attendance is requested.

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Rhude, Scott (.) <srhude@ford.com>
Sent: Friday, October 15, 2021 7:46 AM
To: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Subject: FW: 2.7L/3.0L Nano Valve Quality Issues

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Friday, October 15, 2021 6:25 AM
To: Rhude, Scott (.) <srhude@ford.com>
Subject: FW: 2.7L/3.0L Nano Valve Quality Issues

Info – We also talked about inviting Horia to Friday Eaton meeting. This will be a good kick off discussion.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, October 14, 2021 12:53 PM
To: Tugulan, Horia (H.) <htugulan@ford.com>; Oliver, Byron (B.D.) <bolive44@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: 2.7L/3.0L Nano Valve Quality Issues

Hi Byron and Horia,

I know you guys are engaged with Eaton on the recent valve issues (third keeper groove failures). This is getting a lot of attention and is likely to grow into a significant warranty issue before the new valves roll through the system.
We need to discuss a plan to keep Eaton producing clean – the request to STA is take all necessary measures to ensure they don't get out of control.

Paul – can we discuss in the next dropped valve task force meeting (tomorrow)…if Horia and Byron can support?

Thanks,
Dave

David Simon
Quality and OPD Manager
IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282

From: Ott, David (D.J.)
Sent: Monday, June 20, 2022 8:38 AM
To: Deep, Said (.)
Cc: Diaz, Adrian (A.D.)
Subject: RE: 2.7lL

I'm good with that.

-----Original Message-----
From: Deep, Said (.) <sdeep@ford.com>
Sent: Monday, June 20, 2022 8:03 AM
To: Ott, David (D.J.) <dott@ford.com>
Cc: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: Re: 2.7lL

Can i just say: the NHTSA investigation is on the bronco 2.7 only.

Q: what about Ford? We're monitoring all vehicle lines as we would do as a normal course of business.

> On Jun 20, 2022, at 6:44 AM, Ott, David (D.J.) <dott@ford.com> wrote:
>
> While our focus is on all applications, we can't say what NHTSA's PE will include.
>
> They are aware that the 2.7 is used in other applications, but their DP only addressed Bronco based specifically on the number of complaints they had received on that vehicle line.
>
> Dave
>
> -----Original Message-----
> From: Deep, Said (.) <sdeep@ford.com>
> Sent: Friday, June 17, 2022 11:31 PM
> To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
> Cc: Ott, David (D.J.) <dott@ford.com>
> Subject: Re: 2.7lL
>
> Media asking whether this investigation covers all engine applications in our other vehicles.
> Can we say focus is on Bronco for now, per NHTSA investigation?
>
>
>
>> On Jun 16, 2022, at 8:40 AM, Diaz, Adrian (A.D.) <adiaz41@ford.com> wrote:
>>
>> Hi Said,
>>
>> I don't think we have filed anything public with NHTSA (Dave, please confirm). All is public at this point is the Defect Petition that NHTSA has published and in a week or so we are expecting to get the Preliminary Evaluation from the agency with their inquiries.
>>
>> Adrian

>>
>> -----Original Message-----
>> From: Deep, Said (.) <sdeep@ford.com>
>> Sent: Wednesday, June 15, 2022 5:48 PM
>> To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
>> Subject: 2.7lL
>>
>> Hi. Have we filed any information around the 2.7 liter with NHTSA that is in public view/access?
>> Marketing has a live chat it does on Bronco Nation coming up and we will get this question.
>> Was hoping we could say more than we are aware and investigating. We could stick to whatever it is we've provided NHTSA that might be public.
>> Please let me know.
>> Thank you!

From: Gaduski, Michael (M.)
Sent: Tuesday, April 19, 2022 8:47 AM
To: Ott, David (D.J.)
Subject: RE: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

Dave, it appears that NHTSA is getting a lot of copy and paste VOQs on the 2.7L valve stems, probably from an enthusist forum. I recall some GCCRG discussions on this concern for the 3.0L nano engine for the china consumers day talks.

April 8, 2022 NHTSA ID NUMBER: 11460118

Components: ENGINE, UNKNOWN OR OTHER

NHTSA ID Number: 11460118

Incident Date April 8, 2022

Consumer Location Unknown

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE 2.7 LITRE ECO BOOST ENGINE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHERS SHARE THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

April 8, 2022 NHTSA ID NUMBER: 11460124

Components: ENGINE

NHTSA ID Number: 11460124

Incident Date April 8, 2022

Consumer Location SAN DIEGO, CA

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO A KNOWN VALVE DEFECT WHICH CAUSES ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHERS SHARE THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

April 8, 2022 NHTSA ID NUMBER: 11460125

Components: ENGINE, UNKNOWN OR OTHER

NHTSA ID Number: 11460125

Incident Date April 8, 2022

Consumer Location CRESTWOOD, KY

Vehicle Identification Number 99999999999*****

Summary of Complaint

CRASH	No
FIRE	No
INJURIES	0
DEATHS	0

2021 FORD BRONCO. CONSUMER WRITES IN REGARDS TO KNOWN DEFECT WITH VALVES THAT CAUSES CATASTROPHIC ENGINE FAILURE. THE CONSUMER STATED THE MANUFAUCTURER HAD NOT MADE ANY EFFORT TO ACKNOWLEDGE THE FAILURE. THE CONSUMER BELIEVED THE ENGINE SHOULD BE RECALLED AS MANY OTHER VEHICLES SHARE SAME THE DEFECT.

1 Affected Product

1 Associated Document

☐ Request Research (Services fees apply)

Mike Gaduski
Safety Investigations Engineer
FPS| Suite 500

O: 313-845-8445
mgaduski@ford.com
SUSTAINABILITY ENVIRONMENT & SAFETY ENGINEERING

From: Afety, S (S.) <safety24@ford.com>
Sent: Monday, April 18, 2022 12:49 PM
To: Gaduski, Michael (M.) <mgaduski@ford.com>; Ott, David (D.J.) <dott@ford.com>; Henney, Travis (J.) <thenney@ford.com>
Subject: FW: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

From: Kivett, Peter (NHTSA) <Peter.Kivett@dot.gov>
Sent: Monday, April 18, 2022 4:48:13 PM (UTC) Coordinated Universal Time
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>; Afety, S (S.) <safety24@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Ott, David (D.J.) <dott@ford.com>; Ong, Nathan (NHTSA) <nathan.ong@dot.gov>
Subject: 2021 Ford Bronco with 2.7L Ecoboost Engine failures (Defect Petition)

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Guys –

I sent this email off to David earlier this morning but I was made aware by my staff that in addition to David I need to send it to safety24@ford.com Please see below.

Thankx, Pete

David –

I know this is a quick request but at your earliest convenience can you please reach out to me? 443.306.3583

We are in the process in granting a Defect Petition on 2021 Bronco's with 2.7L Ecoboost Engine failures causing a loss in motor power. We are interested in learning a few things, such as other model vehicles this engine is used in and if this issue is on Fords radar? I can forward you the petition letter(s) and VOQ's once we had a conversation related to this issue.

Thank you,

NHTSA
,
Peter Kivett
VDD-C Division Chief (Acting)
Office of Defects Investigations
Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE., Washington, DC 20590
Office: 202-366-6178
Cell: 443-306-3583

From: Beyer, Laura (L.D.)
Sent: Monday, April 25, 2022 9:09 AM
To: Pearson, Gavin (G J R.); Corbett, Sandy (S.M.); Bautz, Jeffrey (J.E.); Adam, Paul (P.J.); Kolodziejczyk, Jeffrey (J.A.)
Subject: RE: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
Attachments: FW: Ford Bronco Engine Failures

Sensitivity: Private

Good Morning,
The 2.7L Nano topic will be the subject of this afternoon's ASO EMM. Today's EMM has limited attendance and the typical :cc EMM distribution list is not included. If I missed anyone that should be included, please let me know.

In addition to the information received from NHTSA about a potential investigation, we would also like to discuss the attached email this afternoon. Additionally, please have info available about other potentially affected vehicle lines, including model years and front door/back door if known.

Our standard presentation format is the CCRG Investigation Template. I have added it to the working level shared drive here: 22-306 2.7L EcoBoost Engine Failures (Loss of Motive Power). I will populate the basic information and look to the team to add the specifics. For today's EMM, please use materials you have on hand as the CCRG template won't yet be complete.

This topic has been assigned GRID ID (Global Recall Implementation Database) **22-306**. Official notes and documentation are tracked/stored in GRID.

Thank you.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

-----Original Appointment-----
From: Piña Ocampo, Enrique (EPO.) <epinaoca@ford.com>
Sent: Friday, April 22, 2022 3:03 PM
To: Piña Ocampo, Enrique (EPO.); Diaz, Adrian (A.D.); Ott, David (D.J.); Beyer, Laura (L.D.); Frascaroli, Emily (E.E.); Pearson, Gavin (G J R.); Corbett, Sandy (S.M.); Bautz, Jeffrey (J.E.); Adam, Paul (P.J.); Kolodziejczyk, Jeffrey (J.A.); Stanley, Daniel (D.J.); Dunlap, Zachary (Z.)
Cc: Boehk, Karen (K.S.); Abkenar, Frank (F.K.)
Subject: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
When: Monday, April 25, 2022 2:00 PM-2:30 PM (UTC-06:00) Guadalajara, Mexico City, Monterrey.
Where: WebEx

Requester: Adrian Diaz
Alternate Hosts: Laura Beyer and Dave Ott

Deep-dive CCRG investigations or any business-related topics that need support from the ASO Assistant Director, Adrian Diaz.

Please direct any questions to ASO Lead of each agenda topic. Topics and attendees are based on agenda (managed by Enrique Pina).
Distributed to the broader ASO team for awareness. You may connect at your discretion if not directly involved in the items discussed.

Agenda

Lead Region	NA
GRID #	22-306
Title	Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
ASO Lead	L. Beyer
CCRG Chair	dott@ford.com
Objective / Desired Outcome	Discuss investigation status and next steps.

-~-

-- Do not delete or change any of the following text. --

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T32MC04

From: Diaz, Adrian (A.D.)
Sent: Wednesday, April 20, 2022 9:09 AM
To: Ott, David (D.J.); Beyer, Laura (L.D.)
Subject: FW: Ford Bronco Engine Failures

Laura / Dave… let's plan to bring this topic to an EMM some time next week to see what is it that we know at this point.

From: Deep, Said (.) <sdeep@ford.com>
Sent: Wednesday, April 20, 2022 7:10 AM
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>
Subject: Fwd: Ford Bronco Engine Failures

Per our discussion.

From: Rob Stumpf <Rob@thedrive.com>
Sent: Tuesday, April 19, 2022 10:33 AM
To: Cadiz, Jiyan (J.K.) <jcadiz@ford.com>
Cc: Caleb Jacobs <caleb@thedrive.com>
Subject: Ford Bronco Engine Failures

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Hey Jiyan,

Long time no talk! Hope you are doing well.

Over the past few months, we've received several tips regarding failures of the 2.7-liter engine found in the Bronco. It appears that there have been a number of valvetrain-related issues reported by owners with very low miles. I can see this echoed over on the Bronco6g forums, Facebook, and on the NHTSA's site:

- https://www.bronco6g.com/forum/threads/2-7l-blown-engine-fail-list-45-so-far-april-16-update.31951/
- https://www.bronco6g.com/forum/threads/bronco-2-7-blown-engine.31613/
- https://www.bronco6g.com/forum/threads/final-update-complete-engine-failure-sas-big-bend-3wk-old-1000mi-2-7l-ecoboost.26787/
- https://www.nhtsa.gov/vehicle/2021/FORD/BRONCO/SUV/4WD

- https://www.reddit.com/r/FordBronco/comments/s7bu2s/bronco_badlands_27_broken_with_2000miles/

Can you confirm if Ford is aware of an increased number of failures? If so, has Ford had any discussion on next steps and if a recall or TSB is necessary? I would be interested in a technical explainer if Ford has one to share.

One forum member claims to have worked at Lima and says there was a bad batch of valves. Can you confirm if there is any validity to that claim?

- https://www.bronco6g.com/forum/threads/2-7l-issue.23375/post-906150

Kind regards,

Rob Stumpf

Writer, The Drive
The Drive is part of Recurrent

Harrisburg, PA

m. 717.903.1641

@RobDrivesCars

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Monday, April 25, 2022 10:02 AM
To: Adam, Paul (P.J.)
Subject: RE: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)

Sensitivity: Private

Sounds good Paul.

I have to drop my computer off for hard drive update at 2:30. Will have to call in over my phone

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Monday, April 25, 2022 9:43 AM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
Sensitivity: Private

Agree Jeff – I am reviewing the presentation template as well as all the documents Laura has uploaded. I will try to make sure we have the relevant information from the template handy to walk the team through.

Do you think we should have a 15 min discussion (me, you, Gavin) beforehand? I can set up.

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Monday, April 25, 2022 9:14 AM
To: Adam, Paul (P.J.) <padam6@ford.com>
Subject: RE: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
Sensitivity: Private

Paul,

That deck you started to pull together for the spike recovery may be useful in this discussion. I don't think there is anything else to bring in at this time.

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Sent: Monday, April 25, 2022 9:09 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>

Subject: RE: ASO EMM; 22-306 Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)
Sensitivity: Private

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Thank you.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

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To: Piña Ocampo, Enrique (EPO.); Diaz, Adrian (A.D.); Ott, David (D.J.); Beyer, Laura (L.D.); Frascaroli, Emily (E.E.); Pearson, Gavin (G J R.); Corbett, Sandy (S.M.); Bautz, Jeffrey (J.E.); Adam, Paul (P.J.); Kolodziejczyk, Jeffrey (J.A.); Stanley, Daniel (D.J.); Dunlap, Zachary (Z.)
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Requester: Adrian Diaz
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Please direct any questions to ASO Lead of each agenda topic. Topics and attendees are based on agenda (managed by Enrique Pina).
Distributed to the broader ASO team for awareness. You may connect at your discretion if not directly involved in the items discussed.

Agenda

Lead Region	NA
GRID #	22-306
Title	Bronco 2.7L EcoBoost Engine Failures (Loss of Motive Power)

ASO Lead	L. Beyer
CCRG Chair	dott@ford.com
Objective / Desired Outcome	Discuss investigation status and next steps.

-~-

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T32MC04

From: Adam, Paul (P.J.)
Sent: Wednesday, August 11, 2021 2:54 PM
To: Knott, Tim (.); Kolodziejczyk, Jeffrey (J.A.)
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Hey Tim – thanks. Yes. We decided to change over the entire valvetrain team and management in the last year. It's been a fun experiment. 😊

Paul
313-580-3971

From: Knott, Tim (.) <tknott@ford.com>
Sent: Wednesday, August 11, 2021 2:44 PM
To: Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Paul –

I notice you have a new crew of valvetrain engineers.

I'll update 6-panel before Friday.

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Wednesday, August 11, 2021 2:36 PM
To: Simon, David (D.) <dsimon1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Hey Dave, Jeff.

I would recommend we start this bi-weekly cadence the following week to give the team some time to develop meaningful workstreams around this.

We are just now transitioning from the ERA to Root Cause investigation. I have the first task force meeting Friday to get organized on the workstreams to prioritize. I am on vacation next week. I am not sure we are at a point where we can have a valuable discussion w/ the larger team after just kicking this off.

Obviously, if you disagree, that's fine. We'll do our best and I'm sure Jeff K will put his dancing shoe on.

Paul
313-580-3971

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, August 11, 2021 10:56 AM
To: Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Great – thank you.

Thanks,
Dave

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Sent: Wednesday, August 11, 2021 10:54 AM
To: Simon, David (D.) <dsimon1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Dave,

Thanks for the heads-up . Paul has kicked off a dropped valve task force and we understand the urgency.

Thanks,

Jeff Bautz
Engine Interfacing Systems Manager
ASQ Certified Black Belt
Ford Global Engine Engineering
Dearborn, MI
Mobile: 313 820 0886

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, August 11, 2021 10:53 AM
To: Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: Bi-Weekly Dropped Valve Update in DQR

All – Frank requested a dropped valve update every two weeks in the DQR. We'd like to have the first review next week. Note that this isn't just a Bronco discussion….it's the systemic (low ambient) level of dropped valves and our plan to fix.

Tracy – please add this to DQR list for next week and every other week after that.

(BTW – there is going to be a shift in the DQR content as we focus more our top systemic issues on a weekly basis)

Thanks,
Dave

David Simon
Quality and OPD Manager
IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282

From: Simon, David (D.)
Sent: Thursday, August 12, 2021 8:10 PM
To: Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Knott, Tim (.); Marshall, Tracy (T.)
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Hi All,

I understand the reasoning for wanting to delay however, given the attention on it right now, let's maintain next week. It can be an update, team formed, planned work paths, etc. We can do a 15min preliminary meeting and then in two weeks a more down-town deep dive.

Thanks,
Dave

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From: Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Sent: Thursday, August 12, 2021 5:17 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Jeff/Paul,

I am aligned to delay one week.

Thanks,

Jeff Bautz
Engine Interfacing Systems Manager
ASQ Certified Black Belt
Ford Global Engine Engineering
Dearborn, MI
Mobile: 313 820 0886

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, August 12, 2021 5:15 PM
To: Adam, Paul (P.J.) <padam6@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Bautz, Jeffrey (J.E.)

<jbautz@ford.com>; Knott, Tim (.) <tknott@ford.com>; Marshall, Tracy (T.) <tmarsha8@ford.com>
Subject: RE: Bi-Weekly Dropped Valve Update in DQR

Dave, Jeff,

Any thoughts on this? Paul has a good point. With only one meeting may be more productive to have another week. I will be here all week so either way is fine with me.

Could always use first DQR to refresh everyone on the 6 panel Tim Knott has in progress.

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Wednesday, August 11, 2021 2:36 PM
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Great – thank you.

Thanks,
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(BTW – there is going to be a shift in the DQR content as we focus more our top systemic issues on a weekly basis)

Thanks,
Dave

David Simon
Quality and OPD Manager
IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282

From: Adam, Paul (P.J.)
Sent: Thursday, September 9, 2021 9:28 AM
To: Knott, Tim (.)
Subject: RE: BRONCO - Report Summary(s) from a GCQIS Query Disposition

Do you have any hypothesis at all as to why we seem to have a Bronco concentration? Interested to review the R/1000 numbers from Gavin tomorrow, but I have to imagine Bronco volume isn't an order of magnitude higher than F150. Perhaps we're scaling back on 2.7L F150 to focus on higher trim models w/ the chip scenario?

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, September 9, 2021 8:49 AM
To: Melki, Imad (I.E.) <imelki@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Mazzella, Brian (B.R.) <bmazzell@ford.com>; Moore, Brian (B.M.) <bmoore1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: RE: BRONCO - Report Summary(s) from a GCQIS Query Disposition

Imad – thanks for the info

Gavin/Zach – can we please assess if the failure rate for Bronco is now higher than our other 2.7L applications. Please have this prepared for the task force meeting tomorrow afternoon.

Jeff K/Paul/LEP team – can we also review the timing of when LEP will start building with the various ICA level valves and when we expect them to flow through to VO (especially MAP).

Thanks,
Dave

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From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Thursday, September 09, 2021 7:34 AM
To: Simon, David (D.) <dsimon1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Mazzella, Brian (B.R.) <bmazzell@ford.com>; Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: FW: BRONCO - Report Summary(s) from a GCQIS Query Disposition
Importance: High

Engine team,
Looks like we have a 5th 2.7L V6 engine failure on Bronco.
This one is in Alberta Canada.

Respectfully submitted,
Imad E. Melki

Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: cqis@ford.com <cqis@ford.com>
Sent: Thursday, September 9, 2021 4:10 AM
To: Melki, Imad (I.E.) <imelki@ford.com>
Subject: BRONCO - Report Summary(s) from a GCQIS Query Disposition

---

Attachments : 0

Report# :	M9HDF003 NHL			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP4MLA64764			**Build Date:**	06/09/2021
Odometer :	1,444 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B6292 North Star Ford Sales (Calgary			**Phone#:**	403-239-1115
City:	Calgary	**Province**	Alberta	**Country :**	CAN
Originator:	JOHN FLEMING	**Originator e-mail:**	JOHNLESLIEZOEY@GMAIL.COM		
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	engine failure				
Fix:	**Causal Component :**		--		
Condition Code:					

Hotliner: EREILLY9 **Phone:** **Regn Cd:** 06 06 Western District

Engineering: **Phone:** **TAR:**

Dlr Contact: JOHN FLEMING **Phone:** **Title Cde:** T

DTCs:

PCM P0304,P0305

Comments :

CONCER 09/08/202110:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER

	Web Form Data(118382233) Description of Vehicle Concern: CONFIRM NO START. Please list any diagnostics already performed: WILL NO CRANK P0304 P0305 P0316 TRY TO TURN TRUCK OVER BY HAND WILL NO MOVE. FOUND OIL FULL OFF COOLANT AT LEAST 5L OVER FULL ON DIP-STICK. REMOVED SPARKPLUGS FOUND CYL 4 AND 5 SPARK PLUGS DAMAGED. USED SCOPE TO INSPECT CYLAND FOUND CYL 4 PISTON IS CRACKED AND MISSING PIECES. CYL 5 PISTON HASMULTIPLE HOLES IN PISTON. APPEARS TO HAVE DROPPED A VALVE AND DAMAGED BLOCK AND HEADS. OIL HAS METAL IN IT. WILL REQUIRE LONG BLOCK, INTAKE,TURBOS AND ALL OIL FEED LINES. Parts Replaced: NONE Your Question: I JUST WANT TO MAKE SURE ITS RECOMENDED TO REPLACE TURBOS AND INTAKE WITH SUCH A LARGE ENG FAILURE. ALSO IF WE CAN DUE TO NO WARRANTY STARTDATE AS THIS TRUCK IS A STOCK UNIT
RECOMM	09/08/202110:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER
	Hello John, Regarding the turbo replacement, carefully inspect the oilsupply lines, turbocharger oil inlet as well as the turbo oil drain for any signs of metallic debris. The presence of metal passing through the turbochargers lubrication circuit supports internal contamination and damage. This in turn will compromise the performanceand longevity of the turbochargers and they should be replaced. Turbocharger oil supply lines and filters should be replaced since they have the potential to trap debris and could cause repeat turbocharger failure. If there is no metal at the turbochargers and itpasses the Component Check for Free Rotation as outlined in step C6 inPPT C in the WSM section 303-04D, reuse the turbochargers. Regarding the intake, refer to GSB 20-7062 to determine if the intake has caused other damage. Include it in the cost cap if damage is noticed. Thank you, Eric R. Ford Technical Assistance Center

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Attachments : 7

Report# :	M9HCG003 HLIEPA			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP4MLA73187			**Build Date:**	08/06/2021
Odometer :	273 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 20630 Smith Motor Company, Inc.			**Phone#:**	908-689-3737
City:	Washington	**State:**	New Jersey	**Country :**	USA
Originator:	GRANT STASYSHYN	**Originator e-mail:**			
Symptom:	3 30 4 73 FT/FN/BD,PAINT/FINISH,HORIZON SURF,THIN COVER				
Status:					
VFG:	V33 PAINT APPEARANCE				
Additional Symptom:	Hood dirt in paint				
Fix:	**Causal Component :**		--		
Condition Code:					

Region Code: N1 **Region Name:** New York

DTCs:

Comments :

CONCER	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER RO: 072497 RO Date: 2021/09/04 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. customers concernthere is a large defect in the paint on the hood, passenger side What is the intended repair, list all components needed for repair? intended repair is to refinish hood There are indications of (Optional) Provide any additional details necessary. Please include any available technical information that you believe will helpprocess your prior approval request. there is no signs of impact or neglect. where paint surface is affected on passenger side is under the clear coat when sprayed at factory. clear coat is not compromised.
RECOMM	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER Grant, The close up image P9070031.JPG of the hood shows the finish isbubbled with a warped reflection, indicating debris contamination occurred during the factory finish application. Figure 1 of the GSB 20-7081 Paint and Bumper Concern Analysis shows an example of this concern. As presented, refinishing of the Hood Assembly (16612) is warrantable under the New Vehicle Warranty. The General Service Bulletin (GSB) can be found via the PTS website, by running an OASIS report entering a specific VIN and symptom code, or providing the year, make & model of a specific vehicle, then by clicking on the TSB/GSB/SSM tab located on the PTS home page. You may also access the GSB directly on the PTS home page by Entering the Article Number in the Search box. For future paint requests, please know we no longerrequire the paint peel tape test. THIE225498 DIPA Approved THIE225498
ADD-ON	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER QLS report shows dirt in paint for the Hood

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 6

Report# :	M9HC6001 HLIEPA			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP4MLA72558			**Build Date:**	06/29/2021
Odometer :	1,264 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 04701 Pearson Ford, Inc.			**Phone#:**	855-385-8310
City:	Zionsville	**State:**	Indiana	**Country :**	USA
Originator:	ANDRE BARNES	**Originator e-mail:**	ABARNES@MYINDYFORD.COM		
Symptom:	3 30 1 10 FT/FN/BD,PAINT/FINISH,ALL SURFACES,CHIP/SCRATCH				

Status:

VFG: V33 PAINT APPEARANCE

Additional Symptom: scratched A pillar

Fix: **Causal Component :** --

Condition Code:

Region Code: G3 **Region Name:** Cincinnati

DTCs:

Comments :

CONCER 09/08/202108:34AM ADAM MILLER MSS - FCSD - TECH ASSIT CENTER

RO: 363902 RO Date: 2021/09/07 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. CUSTOMER STATES REAR COVER IS MAKING CONTACT WITH ON FRAME RAIL OF VEHICLE What is theintended repair, list all components needed for repair? THE INTENDED REPAIR IS TO CORRECT PAINT There are indications of (Optional) Provideany additional details necessary.
Please include any available technical information that you believe will help process your prior approval request. ONCE PAINT IS REPAIRED CHECK AND ADVISE SO IT DOES NOT HAPPEN AGAIN.

RECOMM 09/08/202108:34AM ADAM MILLER MSS - FCSD - TECH ASSIT CENTER

Andre, Image thumbnail_IMG_3376.jpg shows the Right A Pillar is scratched. Although no images were provided showing the contact between the Convertible Top and A Pillar were provided, the A Pillar (02500), does not currently require Interior / Exterior Prior Approval. Prior Approval is only required for replacement of the listed components (not including alignment or adjustment even if that includes removal and installation) or refinishing of the panels listedon the current Interior / Exterior Warranty Prior Approval Component List. This is found at FMCDealer - Parts and Service tab - Warranty Administration & Warranty Parts Return sub-tab - My Dealerships Prior Approval Programs. You can also verify Interior/Exterior Prior Approval requirements by entering the base part number into the Part Coverage Tool found under the OASIS tab on the PTS website. The Part Coverage Tool provides you with a results page indicating which component(s) require Prior Approval for replacement or paint repairs. DIPA Prior Approval Not Necessary

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 3

Report# :	M9HCJ004 HLIEPA	**Received:**	09/08/2021
CCRG/EPRC:	**Reviewed Status:**	**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,2DR ,MPV ,1FMDE5CP5MLA66553	**Build Date:**	07/15/2021

Odometer :	661 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B6251 Vegreville Ford Sales & Servic			**Phone#:**	780-632-2060
City:	Vegreville	**Province**	Alberta	**Country :**	CAN
Originator:	GRANT MOROZ	**Originator e-mail:**			
Symptom:	3 30 2 09 FT/FN/BD,PAINT/FINISH,LEFT SIDE,BUBBLE/PEEL				
Status:					
VFG:	V33 PAINT APPEARANCE				
Additional Symptom:	l quarter panel peel				
Fix:	**Causal Component :**		--		
Condition Code:					

Region Code: 06 **Region Name:** 06 Western District

DTCs:

Comments :

CONCER 09/08/202110:11AM ANTHONY SANTIAGO MSS - FCSD - TECH ASSIT CENTER

RO: 165352 RO Date: 2021/09/08 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. Paint peeling in the LH rear fender only. What is the intended repair, list all components needed for repair? Refinish LH rear fender. There are indications of (Optional) Provide any additional details necessary.
Please include any available technical information that you believe will help process your prior approval request. Closely inspected all fenders and verified customer concern of paint peeling only on the LH rear fender. No signs of outside source damage such as rock chips or other.

RECOMM 09/08/202110:11AM ANTHONY SANTIAGO MSS - FCSD - TECH ASSIT CENTER

Grant, The image labeled IMG_3193.JPG shows peeling finish on the leftquarter panel. Figure 5 of the Paint and Bumper Concern Analysis GSB (GSB 20-7081) illustrates a similar example of peeling finish on a body panel assembly. The General Service Bulletin (GSB) can be found via the PTS website, by running an OASIS report entering a specific VIN and symptom code, or providing the year, make & model of a specific vehicle, then by clicking on the TSB/GSB/SSM tab located on the PTS home page. You may also access the GSB directly on the PTS home page by Entering the Article Number in the Search box. As the appearance of peeling finish is the result of a finish adhesion defect, repair of the left quarter panel (27841) is warrantable under the New Vehicle Warranty. THIE223808 DIPA Approved THIE223808

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9H0

Attachments : 3

Report# :	M9HCW011 CREDSR--or-- Q 202193795982			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP3MLA72824			**Build Date:**	07/14/2021
Odometer :	1,375 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 05437 Mark Ficken Ford Lincoln			**Phone#:**	704-552-2760
City:	Charlotte	**State:**	North Caroli	**Country :**	USA
Originator:	JOSEPH HOLLAND	**Originator e-mail:**	jholland@flcharlotte.com		
Symptom:	3 32 D 03 FT/FN/BD,INTERIOR TRIM ,INSTRU PANEL,APPEARANCE				
Status:					
VFG:	V71 I.P. & COUNSOL FUNCTION				
Additional Symptom:					
Fix:	**Causal Component :**		PANEL ASY-INSTRUMENT -- GSA		
Condition Code:					

Region Code: S2 **Region Name:** Charlotte

DTCs:

Comments :

CONCER	09/08/202109:50AM
	client states uneven coloring on top center of instrument panel. refinish or replace?
TECH/C	09/08/202109:50AM
	appropriate repair please

Please click on the link below to view the attachments associated with this report
https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 1

Report# :	M9HBS007 NHL			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DPXMLA65532			**Build Date:**	06/26/2021
Odometer :	3,821 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 09400 Cornerstone Ford			**Phone#:**	763-274-3338

City:	Elk River	**State:**	Minnesota	**Country :**	USA
Originator:	COLTON HANSEN	**Originator e-mail:**	CSHANSEN0418@GMAIL.COM		
Symptom:	3 38 8 02 FT/FN/BD,NOISE,WIND,ALWAYS				
Status:					
VFG:	V11 WIND NOISE				
Additional Symptom:	wind noise				
Fix:	**Causal Component :**		--		
Condition Code:					

Hotliner: CMCCAU10 **Phone:** **Regn Cd:** G5 Twin Cities

Engineering: **Phone:** **TAR:**

Dlr Contact: COLTON HANSEN **Phone:** **Title Cde:** T

DTCs:

Comments :

CONCER 09/08/202102:58PM COLLIN MCCAULEY MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118382299) Description of Vehicle Concern: Customer states that they can hear a whistling noise coming from front of vehicle while driving 65MPH and above. Please list any diagnostics already performed: Verified the concern. Sounds like the whistle is coming from outside the vehicle. Tapped off sections in front that could have air blowing through it and causing it to whistle. Finally tapped enough to where the whistle went away. Pulled over on road and removed one piece of tape at a time to see when the whistle would go away. Pinpointed to whistle coming from cowl panel with all the littleholes in it right in front of the windshield in the center. Parts Replaced: None Your Question: What do you recommend on me doing. The section of the cowl has a bunch of little holes in it that are supposed to be there. Nothing looks to be out of place or broken. I attached an image of the cowl.

RECOMM 09/08/202102:58PM COLLIN MCCAULEY MSS - FCSD - TECH ASSIT CENTER

Hey Colton, Since this vehicle is basically brand new and has a whistling noise coming from the cowl panel above 65 MPH, we suggest comparing with multiple like vehicles to see if this is a normal characteristic. If other like vehicles have the same whistling noise above 65 MPH, this would be a normal characteristic and the customer should be informed. If this is not normal and the concern is specific to this vehicle, we should refer to the online workshop manual (WSM) 501-02 front end body panels>removal and installation>cowl panel grille. Follow this procedure to remove the cowl panel. After removal,re-install ensuring that all locking tabs are secured and making sure there is no gap between the cowl panel grille and the windshield. Itspossible that this component was installed incorrectly, or a tab was broke when the vehicle was built. Again, make sure that this is not a normal characteristic then try to remove and re-install the cowl panelgrille. Also make sure youre checking all locking tabs, and clips fordamage and making sure theyre secure when it goes back together. Collin M. Ford Technical Assistance Center

Please click on the link below to view the attachments associated with this report

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Thursday, September 9, 2021 8:59 AM
To: Simon, David (D.); Melki, Imad (I.E.); Pearson, Gavin (G J R.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.); Ward, Zachary (Z.); Knott, Tim (.); Adam, Paul (P.J.)
Cc: Katinas, Dana (D.J.); Mazzella, Brian (B.R.); Moore, Brian (B.M.); Bautz, Jeffrey (J.E.)
Subject: RE: BRONCO - Report Summary(s) from a GCQIS Query Disposition

Dave, working with Eaton and LEP to pin point the dates which ERA's start production.

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, September 09, 2021 8:49 AM
To: Melki, Imad (I.E.) <imelki@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Knott, Tim (.) <tknott@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Mazzella, Brian (B.R.) <bmazzell@ford.com>; Moore, Brian (B.M.) <bmoore1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: RE: BRONCO - Report Summary(s) from a GCQIS Query Disposition

Imad – thanks for the info

Gavin/Zach – can we please assess if the failure rate for Bronco is now higher than our other 2.7L applications. Please have this prepared for the task force meeting tomorrow afternoon.

Jeff K/Paul/LEP team – can we also review the timing of when LEP will start building with the various ICA level valves and when we expect them to flow through to VO (especially MAP).

Thanks,
Dave

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From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Thursday, September 09, 2021 7:34 AM
To: Simon, David (D.) <dsimon1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Mazzella, Brian (B.R.) <bmazzell@ford.com>; Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: FW: BRONCO - Report Summary(s) from a GCQIS Query Disposition
Importance: High

Engine team,
Looks like we have a 5th 2.7L V6 engine failure on Bronco.

This one is in Alberta Canada.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: cqis@ford.com <cqis@ford.com>
Sent: Thursday, September 9, 2021 4:10 AM
To: Melki, Imad (I.E.) <imelki@ford.com>
Subject: BRONCO - Report Summary(s) from a GCQIS Query Disposition

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Attachments : 0

Report# :	M9HDF003 NHL			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP4MLA64764			**Build Date:**	06/09/2021
Odometer :	1,444 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B6292 North Star Ford Sales (Calgary			**Phone#:**	403-239-1115
City:	Calgary	**Province**	Alberta	**Country :**	CAN
Originator:	JOHN FLEMING	**Originator e-mail:**	JOHNLESLIEZOEY@GMAIL.COM		
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	engine failure				
Fix:	**Causal Component :**		--		
Condition Code:					

Hotliner: EREILLY9 **Phone:** **Regn Cd:** 06 06 Western District

Engineering: **Phone:** **TAR:**

Dlr Contact: JOHN FLEMING **Phone:** **Title Cde:** T

DTCs:

PCM P0304,P0305

Comments :

CONCER 09/08/202110:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118382233) Description of Vehicle Concern: CONFIRM NO START. Please list any diagnostics already performed: WILL NO CRANK P0304 P0305 P0316 TRY TO TURN TRUCK OVER BY HAND WILL NO MOVE. FOUND OIL FULL OFF COOLANT AT LEAST 5L OVER FULL ON DIP-STICK. REMOVED SPARKPLUGS FOUND CYL 4 AND 5 SPARK PLUGS DAMAGED. USED SCOPE TO INSPECT CYLAND FOUND CYL 4 PISTON IS CRACKED AND MISSING PIECES. CYL 5 PISTON HASMULTIPLE HOLES IN PISTON. APPEARS TO HAVE DROPPED A VALVE AND DAMAGED BLOCK AND HEADS. OIL HAS METAL IN IT. WILL REQUIRE LONG BLOCK, INTAKE,TURBOS AND ALL OIL FEED LINES. Parts Replaced: NONE Your Question: I JUST WANT TO MAKE SURE ITS RECOMENDED TO REPLACE TURBOS AND INTAKE WITH SUCH A LARGE ENG FAILURE. ALSO IF WE CAN DUE TO NO WARRANTY STARTDATE AS THIS TRUCK IS A STOCK UNIT

RECOMM 09/08/202110:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER

Hello John, Regarding the turbo replacement, carefully inspect the oilsupply lines, turbocharger oil inlet as well as the turbo oil drain for any signs of metallic debris. The presence of metal passing through the turbochargers lubrication circuit supports internal contamination and damage. This in turn will compromise the performanceand longevity of the turbochargers and they should be replaced. Turbocharger oil supply lines and filters should be replaced since they have the potential to trap debris and could cause repeat turbocharger failure. If there is no metal at the turbochargers and itpasses the Component Check for Free Rotation as outlined in step C6 inPPT C in the WSM section 303-04D, reuse the turbochargers. Regarding the intake, refer to GSB 20-7062 to determine if the intake has caused other damage. Include it in the cost cap if damage is noticed. Thank you, Eric R. Ford Technical Assistance Center

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Attachments : 7

Report# :	M9HCG003 HLIEPA			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP4MLA73187			**Build Date:**	08/06/2021
Odometer :	273 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 20630 Smith Motor Company, Inc.			**Phone#:**	908-689-3737
City:	Washington	**State:**	New Jersey	**Country :**	USA
Originator:	GRANT STASYSHYN	**Originator e-mail:**			
Symptom:	3 30 4 73 FT/FN/BD,PAINT/FINISH,HORIZON SURF,THIN COVER				
Status:					
VFG:	V33 PAINT APPEARANCE				
Additional Symptom:	Hood dirt in paint				
Fix:	**Causal Component :**		--		

Condition Code:

Region Code: N1 **Region Name:** New York

DTCs:

Comments :

CONCER	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER RO: 072497 RO Date: 2021/09/04 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. customers concernthere is a large defect in the paint on the hood, passenger side What is the intended repair, list all components needed for repair? intended repair is to refinish hood There are indications of (Optional) Provide any additional details necessary. Please include any available technical information that you believe will helpprocess your prior approval request. there is no signs of impact or neglect. where paint surface is affected on passenger side is under the clear coat when sprayed at factory. clear coat is not compromised.
RECOMM	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER Grant, The close up image P9070031.JPG of the hood shows the finish isbubbled with a warped reflection, indicating debris contamination occurred during the factory finish application. Figure 1 of the GSB 20-7081 Paint and Bumper Concern Analysis shows an example of this concern. As presented, refinishing of the Hood Assembly (16612) is warrantable under the New Vehicle Warranty. The General Service Bulletin (GSB) can be found via the PTS website, by running an OASIS report entering a specific VIN and symptom code, or providing the year, make & model of a specific vehicle, then by clicking on the TSB/GSB/SSM tab located on the PTS home page. You may also access the GSB directly on the PTS home page by Entering the Article Number in the Search box. For future paint requests, please know we no longerrequire the paint peel tape test. THIE225498 DIPA Approved THIE225498
ADD-ON	09/08/202110:39AM WAFAA RAMLAWI MSS - FCSD - TECH ASSIT CENTER QLS report shows dirt in paint for the Hood

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 6

Report# :	M9HC6001 HLIEPA			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP4MLA72558			**Build Date:**	06/29/2021
Odometer :	1,264 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 04701 Pearson Ford, Inc.			**Phone#:**	855-385-8310

City:	Zionsville	**State:**	Indiana	**Country :**	USA
Originator:	ANDRE BARNES	**Originator e-mail:**	ABARNES@MYINDYFORD.COM		
Symptom:	3 30 1 10 FT/FN/BD,PAINT/FINISH,ALL SURFACES,CHIP/SCRATCH				
Status:					
VFG:	V33 PAINT APPEARANCE				
Additional Symptom:	scratched A pillar				
Fix:	**Causal Component :**		--		
Condition Code:					

Region Code: G3 **Region Name:** Cincinnati

DTCs:

Comments :

CONCER 09/08/202108:34AM ADAM MILLER MSS - FCSD - TECH ASSIT CENTER

RO: 363902 RO Date: 2021/09/07 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. CUSTOMER STATES REAR COVER IS MAKING CONTACT WITH ON FRAME RAIL OF VEHICLE What is theintended repair, list all components needed for repair? THE INTENDED REPAIR IS TO CORRECT PAINT There are indications of (Optional) Provideany additional details necessary.
Please include any available technical information that you believe will help process your prior approval request. ONCE PAINT IS REPAIRED CHECK AND ADVISE SO IT DOES NOT HAPPEN AGAIN.

RECOMM 09/08/202108:34AM ADAM MILLER MSS - FCSD - TECH ASSIT CENTER

Andre, Image thumbnail_IMG_3376.jpg shows the Right A Pillar is scratched. Although no images were provided showing the contact between the Convertible Top and A Pillar were provided, the A Pillar (02500), does not currently require Interior / Exterior Prior Approval. Prior Approval is only required for replacement of the listed components (not including alignment or adjustment even if that includes removal and installation) or refinishing of the panels listedon the current Interior / Exterior Warranty Prior Approval Component List. This is found at FMCDealer - Parts and Service tab - Warranty Administration & Warranty Parts Return sub-tab - My Dealerships Prior Approval Programs. You can also verify Interior/Exterior Prior Approval requirements by entering the base part number into the Part Coverage Tool found under the OASIS tab on the PTS website. The Part Coverage Tool provides you with a results page indicating which component(s) require Prior Approval for replacement or paint repairs. DIPA Prior Approval Not Necessary

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9H0

Attachments : 3

Report# :	M9HCJ004 HLIEPA			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,2DR ,MPV ,1FMDE5CP5MLA66553			**Build Date:**	07/15/2021
Odometer :	661 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B6251 Vegreville Ford Sales & Servic			**Phone#:**	780-632-2060
City:	Vegreville	**Province**	Alberta	**Country :**	CAN
Originator:	GRANT MOROZ	**Originator e-mail:**			
Symptom:	3 30 2 09 FT/FN/BD,PAINT/FINISH,LEFT SIDE,BUBBLE/PEEL				
Status:					
VFG:	V33 PAINT APPEARANCE				
Additional Symptom:	l quarter panel peel				
Fix:	**Causal Component :**		--		
Condition Code:					

Region Code: 06 **Region Name:** 06 Western District

DTCs:

Comments :

CONCER 09/08/202110:11AM ANTHONY SANTIAGO MSS - FCSD - TECH ASSIT CENTER

RO: 165352 RO Date: 2021/09/08 Warranty Type: NVW SPW Install Mileage:SPW Install Date: Please describe customers concern. Paint peeling in the LH rear fender only. What is the intended repair, list all components needed for repair? Refinish LH rear fender. There are indications of (Optional) Provide any additional details necessary.
Please include any available technical information that you believe will help process your prior approval request. Closely inspected all fenders and verified customer concern of paint peeling only on the LH rear fender. No signs of outside source damage such as rock chips or other.

RECOMM 09/08/202110:11AM ANTHONY SANTIAGO MSS - FCSD - TECH ASSIT CENTER

Grant, The image labeled IMG_3193.JPG shows peeling finish on the leftquarter panel. Figure 5 of the Paint and Bumper Concern Analysis GSB (GSB 20-7081) illustrates a similar example of peeling finish on a body panel assembly. The General Service Bulletin (GSB) can be found via the PTS website, by running an OASIS report entering a specific VIN and symptom code, or providing the year, make & model of a specific vehicle, then by clicking on the TSB/GSB/SSM tab located on the PTS home page. You may also access the GSB directly on the PTS home page by Entering the Article Number in the Search box. As the appearance of peeling finish is the result of a finish adhesion defect, repair of the left quarter panel (27841) is warrantable under the New Vehicle Warranty. THIE223808 DIPA Approved THIE223808

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 3

Report# :	M9HCW011 CREDSR--or-- Q 202193795982			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP3MLA72824			**Build Date:**	07/14/2021
Odometer :	1,375 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 05437 Mark Ficken Ford Lincoln			**Phone#:**	704-552-2760
City:	Charlotte	**State:**	North Caroli	**Country :**	USA
Originator:	JOSEPH HOLLAND	**Originator e-mail:**	jholland@flcharlotte.com		
Symptom:	3 32 D 03 FT/FN/BD,INTERIOR TRIM ,INSTRU PANEL,APPEARANCE				
Status:					
VFG:	V71 I.P. & COUNSOL FUNCTION				
Additional Symptom:					
Fix:	**Causal Component :**		PANEL ASY-INSTRUMENT -- GSA		
Condition Code:					

Region Code: S2 **Region Name:** Charlotte

DTCs:

Comments :

CONCER	09/08/202109:50AM
	client states uneven coloring on top center of instrument panel. refinish or replace?
TECH/C	09/08/202109:50AM
	appropriate repair please

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HC

Attachments : 1

Report# :	M9HBS007 NHL			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DPXMLA65532			**Build Date:**	06/26/2021

Odometer :	3,821 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 09400 Cornerstone Ford			**Phone#:**	763-274-3338
City:	Elk River	**State:**	Minnesota	**Country :**	USA
Originator:	COLTON HANSEN	**Originator e-mail:**	CSHANSEN0418@GMAIL.COM		
Symptom:	3 38 8 02 FT/FN/BD,NOISE,WIND,ALWAYS				
Status:					
VFG:	V11 WIND NOISE				
Additional Symptom:	wind noise				
Fix:	**Causal Component :**		--		
Condition Code:					

Hotliner: CMCCAU10 **Phone:** **Regn Cd:** G5 Twin Cities

Engineering: **Phone:** **TAR:**

Dlr Contact: COLTON HANSEN **Phone:** **Title Cde:** T

DTCs:

Comments :

CONCER 09/08/202102:58PM COLLIN MCCAULEY MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118382299) Description of Vehicle Concern: Customer states that they can hear a whistling noise coming from front of vehicle while driving 65MPH and above. Please list any diagnostics already performed: Verified the concern. Sounds like the whistle is coming from outside the vehicle. Tapped off sections in front that could have air blowing through it and causing it to whistle. Finally tapped enough to where the whistle went away. Pulled over on road and removed one piece of tape at a time to see when the whistle would go away. Pinpointed to whistle coming from cowl panel with all the littleholes in it right in front of the windshield in the center. Parts Replaced: None Your Question: What do you recommend on me doing. The section of the cowl has a bunch of little holes in it that are supposed to be there. Nothing looks to be out of place or broken. I attached an image of the cowl.

RECOMM 09/08/202102:58PM COLLIN MCCAULEY MSS - FCSD - TECH ASSIT CENTER

Hey Colton, Since this vehicle is basically brand new and has a whistling noise coming from the cowl panel above 65 MPH, we suggest comparing with multiple like vehicles to see if this is a normal characteristic. If other like vehicles have the same whistling noise above 65 MPH, this would be a normal characteristic and the customer should be informed. If this is not normal and the concern is specific to this vehicle, we should refer to the online workshop manual (WSM) 501-02 front end body panels>removal and installation>cowl panel grille. Follow this procedure to remove the cowl panel. After removal,re-install ensuring that all locking tabs are secured and making sure there is no gap between the cowl panel grille and the windshield. Itspossible that this component was installed incorrectly, or a tab was broke when the vehicle was built. Again, make sure that this is not

a normal characteristic then try to remove and re-install the cowl panelgrille. Also make sure youre checking all locking tabs, and clips fordamage and making sure theyre secure when it goes back together. Collin M. Ford Technical Assistance Center

Please click on the link below to view the attachments associated with this report

https://web.gcqis.dealerconnection.com/GCQISWeb/gcqisReportAttachment.do?method=dispalyDefault&reportNumber=M9HE

From: Steslicki, Michael (M.E.)
Sent: Monday, September 13, 2021 4:40 PM
To: Melki, Imad (I.E.); Pearson, Gavin (G J R.); Ward, Zachary (Z.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Strand, Tim (T.A.); Simon, David (D.); Katinas, Dana (D.J.); Vylasek, Stephan (S.)
Subject: RE: Bronco 2.7L #7 dropped valve

These are the seven VIN's. These are all in GCQIS.

1FMEE5BP1MLA71500
1FMEE5DP3MLA66408
1FMEE5DP0MLA72960
1FMEE5DP8MLA63603
1FMEE5DP4MLA64764
1FMEE5EP3MLA40194
1FMEE5DP8MLA69224

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Monday, September 13, 2021 4:11 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>
Subject: RE: Bronco 2.7L #7 dropped valve

Team,
We need to keep track of all these failures to be able to answer the R/1000 question and how Bronco compares to other vehicle lines experiencing same failures.
I have been monitoring every email/source and I only know of 6 (could be 5) because I am assuming that the one in Texas vis email is same as what later came in CQIS. See attached excel file.
If you have better/more complete data please let me know.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Monday, September 13, 2021 3:20 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>; Melki, Imad (I.E.) <imelki@ford.com>
Subject: Bronco 2.7L #7 dropped valve

New hotline report filed today for a broken valve engine exchange on 2.7L Bronco.

ESN: EF06A21165120471 MB3E 6007 AA

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: CQIS@ford.com <CQIS@ford.com>
Sent: Monday, September 13, 2021 3:13 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Report Summary for the CQIS Report#M9ME5001, from MSTESLIC

Attachments : 3

Report# :	M9ME5001 NHL			**Received:**	09/13/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA69224			**Build Date:**	06/29/2021
Odometer :	2,167 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 04474 Tommie Vaughn Motors, Inc.			**Phone#:**	713-869-4661
City:	Houston	**State:**	Texas	**Country :**	USA
Originator:	HUMBERTO RAMOS	**Originator e-mail:**			
Symptom:	5 50 A 02 DRV PERF,RUNS ROUGH,ALL RUNNING,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	short block damage				
Fix:	**Causal Component :**				
Condition Code:					

Hotliner: RDEWIT17 Phone: Regn Cd: C2 Houston

Engineering: Phone: TAR:

Dlr Contact: HUMBERTO RAMOS Phone: Title Cde: T

DTC:

PCM:P0300,P0303,P0306

Comments :

CONCER 09/13/2021 11:19AM RHETT DEWITT MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118392097) Description of Vehicle Concern: CUSTOMER STATES VEHICLE IS MAKING KNOCKING NOISE AND WILL NOT STAY RUNNING Please list any diagnostics already performed: REMOVED AND CUT OPEN OIL FILTER, PCM SELF TEST, RELATIVE COMPRESSION TEST, BORE SCOPE TEST Parts Replaced: NONE Your Question: VEHICLE CAME IN AND WOULD NOT STAY RUNNING FINALLY GOT IT TO RUN AND HEARD LOWER END KNOCKING NOISE LIMPED VEHICLE IN TO STALL AND PROCEEDED TO CHECK FLUIDS AND FOUND ALL FULL CHECKED OIL AND FOUND TO HAVE METALLIC FLAKES IN OIL REMOVED OIL FILTER AND FOUND SOME METAL IN OIL FILTER PROCEDED TO CHECK FOR ANY TSBS AND FOUND NONE RELATED TO CONCERN SELF TESTED PCM AND FOUND P0300, P0303, P0306, PROCEEDED TO RUN RELATIVE COMPRESSION TEST AND FOUND CYL NO. 6 5% DOWN PROCEEDED TO REMOVE SPARK PLUGS AND INSPECTED WITH BORE SCOPE AND FOUND TOP OF THE PISTONS TO HAVE DAMAGE LOOKED LIKE SOMETHING WAS HITTING TOP OF PISTON FOUND HEAVY SCORING ON CYLINDER WALLS. INSPECTED VALVES AND FOUND ONE OF THE VALVES TO HAVE A 2 CM PIECE MISSING FROM THE VALVE SEAT AREA , ALSO FOUND DAMAGE TO THE FACE OF THE CYLINDER HEAD INBETWEEN THE VALVES. WITH THE EXTENT OF THE DAMAGE TO PISTON, CYLINDER WALL AND CYLINDER HEAD AND METAL IN OIL WHAT WOULD BE THE NEXT STEP? WILL THE TURBOS NEED TO BE REPLACED DUE TO OIL IN METAL? PHOTOS ATTACHED BELLOW

RECOMM 09/13/2021 11:19AM RHETT DEWITT MSS - FCSD - TECH ASSIT CENTER

Humberto, With this vehicle being under 12 months from the warranty start date and under 12,000 miles along with confirmed short block damage as the piston has physical damage then this vehicle would qualify for Low Time in service and no further tear down is required. Follow the new Technicians step-by-step Guide for LTIS. This will explain the procedure that needs to be followed. The long block will need to be replaced in this vehicle. Along with this guide the Low Time in Service Job Aid should also be reviewed to confirm that proper procedures are being followed. Thank you, Rhett D. Ford Technical Assistance Center

Click here to View Attachments

Click here to View Report Summary

From: Melki, Imad (I.E.)
Sent: Monday, September 13, 2021 4:11 PM
To: Steslicki, Michael (M.E.); Pearson, Gavin (G J R.); Ward, Zachary (Z.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Strand, Tim (T.A.); Simon, David (D.); Katinas, Dana (D.J.); Vylasek, Stephan (S.)
Subject: RE: Bronco 2.7L #7 dropped valve
Attachments: List of affected VINs - 13SEP21.xlsx

Team,
We need to keep track of all these failures to be able to answer the R/1000 question and how Bronco compares to other vehicle lines experiencing same failures.
I have been monitoring every email/source and I only know of 6 (could be 5) because I am assuming that the one in Texas vis email is same as what later came in CQIS. See attached excel file.
If you have better/more complete data please let me know.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Monday, September 13, 2021 3:20 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>; Melki, Imad (I.E.) <imelki@ford.com>
Subject: Bronco 2.7L #7 dropped valve

New hotline report filed today for a broken valve engine exchange on 2.7L Bronco.

ESN: EF06A21165120471 MB3E 6007 AA

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: CQIS@ford.com <CQIS@ford.com>
Sent: Monday, September 13, 2021 3:13 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Report Summary for the CQIS Report#M9ME5001, from MSTESLIC

Attachments : 3

Report# :	M9ME5001 NHL			**Received:**	09/13/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA69224			**Build Date:**	06/29/2021
Odometer :	2,167 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 04474 Tommie Vaughn Motors, Inc.			**Phone#:**	713-869-4661
City:	Houston	**State:**	Texas	**Country :**	USA
Originator:	HUMBERTO RAMOS	**Originator e-mail:**			
Symptom:	5 50 A 02 DRV PERF,RUNS ROUGH,ALL RUNNING,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	short block damage				
Fix:	**Causal Component :**				

Condition Code:

Hotliner: RDEWIT17 Phone: Regn Cd: C2 Houston

Engineering: Phone: TAR:

Dlr Contact: HUMBERTO RAMOS Phone: Title Cde: T

DTC:

PCM:P0300,P0303,P0306

Comments :

CONCER 09/13/2021 11:19AM RHETT DEWITT MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118392097) Description of Vehicle Concern: CUSTOMER STATES VEHICLE IS MAKING KNOCKING NOISE AND WILL NOT STAY RUNNING Please list any diagnostics already performed: REMOVED AND CUT OPEN OIL FILTER, PCM SELF TEST, RELATIVE COMPRESSION TEST, BORE SCOPE TEST Parts Replaced: NONE Your Question: VEHICLE CAME IN AND WOULD NOT STAY RUNNING FINALLY GOT IT TO RUN AND HEARD LOWER END KNOCKING NOISE LIMPED VEHICLE IN TO STALL AND PROCEEDED TO CHECK FLUIDS AND FOUND ALL FULL CHECKED OIL AND FOUND TO HAVE METALLIC FLAKES IN OIL REMOVED OIL FILTER AND FOUND SOME METAL IN OIL FILTER PROCEDED TO CHECK FOR ANY TSBS AND FOUND NONE RELATED TO CONCERN SELF TESTED PCM AND FOUND P0300, P0303, P0306, PROCEEDED TO RUN RELATIVE COMPRESSION TEST AND FOUND CYL NO. 6 5% DOWN PROCEEDED TO REMOVE SPARK PLUGS AND INSPECTED WITH BORE SCOPE AND FOUND TOP OF THE PISTONS TO HAVE DAMAGE LOOKED LIKE SOMETHING WAS HITTING TOP OF PISTON FOUND HEAVY SCORING ON CYLINDER WALLS. INSPECTED VALVES AND FOUND ONE OF THE VALVES TO HAVE A 2 CM PIECE MISSING FROM THE VALVE SEAT AREA , ALSO FOUND DAMAGE TO THE FACE OF THE CYLINDER HEAD INBETWEEN THE VALVES. WITH THE EXTENT OF THE DAMAGE TO PISTON, CYLINDER WALL AND CYLINDER HEAD AND METAL IN OIL WHAT WOULD BE THE NEXT STEP? WILL THE TURBOS NEED TO BE REPLACED DUE TO OIL IN METAL? PHOTOS ATTACHED BELLOW

RECOMM 09/13/2021 11:19AM RHETT DEWITT MSS - FCSD - TECH ASSIT CENTER

Humberto, With this vehicle being under 12 months from the warranty start date and under 12,000 miles along with confirmed short block damage as the piston has physical damage then this vehicle would qualify

for Low Time in service and no further tear down is required. Follow the new Technicians step-by-step Guide for LTIS. This will explain the procedure that needs to be followed. The long block will need to be replaced in this vehicle. Along with this guide the Low Time in Service Job Aid should also be reviewed to confirm that proper procedures are being followed. Thank you, Rhett D. Ford Technical Assistance Center

Click here to View Attachments

Click here to View Report Summary

VIN	Source	Reported Date	Mileage	Build Date	Reported in ECB	Other Comments
1FMEE5BP1MLA71500	CQIS	7/26/2021	743	6/19/2021	8/17/2021	V52 DRIVEABILITY. From Missoury
1FMEE5DP3MLA66408	CQIS	7/27/2021	1,146	6/25/2021	8/17/2021	V44 POWERTRAIN MALFUNCTION . Grand Rapids
mannequin engine	e-mail	8/26/2021				Texas Dealer - 2.7L FCTP unit
1FMEE5DP8MLA63603	CQIS	8/30/2021	1,372	6/12/2021		V52 DRIVEABILITY. Texas. Believed to be same as Texas FCTP Unit as it is same dealer (at Dewey Moore Ford)
1FMEE5EP3MLA40194	CAC	9/8/2021	700	6/24/2021		V49 POWERTRAIN GOOD SOUND AND NVH. From Customer Assistance Center
1FMEE5DP8MLA69224	CQIS	9/13/2021	2,167	6/29/2021		V52 DRIVEABILITY

From: Beyer, Laura (L.D.)
Sent: Thursday, June 30, 2022 6:05 PM
To: Knott, Tim (.)
Subject: RE: Bronco 2.7L Nano CARB Inquiry

Thank you.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Knott, Tim (.) <tknott@ford.com>
Sent: Thursday, June 30, 2022 1:13 PM
To: Beyer, Laura (L.D.) <lbeyer4@ford.com>; Russ, Stephen (S.G.) <sruss@ford.com>; Devries, Jason (J.E.) <jdevrie4@ford.com>
Cc: Selthofer, Sara (S.) <sselthof@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Bronco 2.7L Nano CARB Inquiry

Laura –
For emission compliance related to dropped valve…
I would consult Steve Russ and Jason Devries.

From: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Sent: Thursday, June 30, 2022 11:57 AM
To: Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Knott, Tim (.) <tknott@ford.com>; Corbett, Sandy (S.M.) <scorbett@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Cc: Selthofer, Sara (S.) <sselthof@ford.com>
Subject: Bronco 2.7L Nano CARB Inquiry
Importance: High

Team-
CARB has reached out to our Ford Emissions Compliance colleagues with questions related to the 2.7L Nano engine failure resulting in loss of motive power topic. In their outreach, CARB cited the article linked here: *NHTSA investigates Ford Bronco 'catastrophic engine failure' reports (yahoo.com)*

We will work with our Ford colleagues in Emissions Compliance to formulate a response. An internal meeting is scheduled for tomorrow (01-July) at 9:30am. Can you please suggest the best contacts to assist me during the internal meeting? I will forward the meeting notice accordingly.

CARB's questions include:

- Is EWIR reporting required?
- Additional information about the issue including: *What is the cause of the failure? What components are failing? How and why are the components failing? etc)*

Thank you.

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Hewlett, Matt (M.S.)
Sent: Thursday, August 26, 2021 9:06 AM
To: Strand, Tim (T.A.)
Subject: RE: Bronco cylinder 6 - AutoNation, Frisco TX

I can't play the attachment, what does it show?

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Strand, Tim (T.A.) <tstrand2@ford.com>
Sent: Thursday, August 26, 2021 8:21 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: FW: Bronco cylinder 6 - AutoNation, Frisco TX

Tim Strand
Nano Engine Systems Supervisor
Cell: (313) 805-9701
tstrand2@ford.com

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, August 25, 2021 5:21 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Smith, Cressel (C.) <csmit840@ford.com>
Subject: FW: Bronco cylinder 6 - AutoNation, Frisco TX

From: JASON SMITH <jsmith81573@yahoo.com>
Sent: Wednesday, August 25, 2021 4:09 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Subject: Bronco cylinder 6

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Sent from my iPhone

From: Diaz, Adrian (A.D.)
Sent: Monday, June 6, 2022 7:23 AM
To: Gu, Tao (T.); Landry, Mike (M.P.); Ott, David (D.J.); Piña Ocampo, Enrique (EPO.); Beyer, Laura (L.D.)
Cc: Bourne, Aaron (A.); Britton, Eric (E.J.); Wu, Jiushan (J.)
Subject: RE: Bronco Nano engine

Yes, Tao. We can add it into the GCCRG tomorrow.

Enrique… can you help?

From: Gu, Tao (T.) <tgu4@ford.com>
Sent: Monday, June 6, 2022 3:32 AM
To: Diaz, Adrian (A.D.) <adiaz41@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Bourne, Aaron (A.) <abourne5@ford.com>; Britton, Eric (E.J.) <ebritton@ford.com>; Wu, Jiushan (J.) <jwu137@ford.com>
Subject: Bronco Nano engine

Adrian and Mike,

I notice there's a report on Bronco 2.7L nano engine investigation in NHTSA. Internal GRID # is 22-306 which affects 2.7/3.0L Nano EcoBoost Engine. Could you take several minutes to quickly brief the latest status in tomorrow GCCRG for transparency? Many thanks.

2021 Ford Bronco engine failure complaints lead to NHTSA investigation (freep.com)

Tao GU/ 顾涛

Veh Concern Investigation Supervisor,
China Sustainability, Environment & Safety Engineering (SE&SE)

Click it IM with me

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From: Jadhav, Nitesh (N.C.)
Sent: Thursday, April 21, 2022 4:28 PM
To: Donovan, Kevin (K.M.)
Cc: Beyer, Laura (L.D.)
Subject: RE: CCRG GRID 22-028
Attachments: 52_22-028_Bronco_2.7L_engine_March_21_2022.xlsx

Hello Kevin,

There is a separate NHTSA investigation being opened on the Bronco Engines which Laura Beyer will be leading from Dave's team.

After talking to Dave, he mentioned- we do not need to monitor this topic going forward. It will be covered by Laura as part of her investigation.

Hence please cancel the monitoring of this topic. For reference, sending the file from period-1.

Thank you,
Best Regards,
Nitesh
(313-805-3467)

From: Donovan, Kevin (K.M.) <kdonov11@ford.com>
Sent: Sunday, February 27, 2022 5:42 PM
To: Jadhav, Nitesh (N.C.) <njadhav@ford.com>
Subject: RE: CCRG GRID 22-028

Hello, Nitesh.

Thanks, I'll add to the list.

Thanks,
Kevin

From: Jadhav, Nitesh (N.C.) <njadhav@ford.com>
Sent: Friday, February 25, 2022 4:01 PM
To: Donovan, Kevin (K.M.) <kdonov11@ford.com>
Subject: CCRG GRID 22-028

Hello Kevin,

Dave asked me to setup the automated monitoring with you for the following - 2.7L Engine Broken valve on 2021-22 Bronco. Attaching the automated monitor template for this issue.

There is a concern that came into CCRG 22-028 which was put on monitor status earlier in Jan 2022. It was led by China team, but they focused mainly on China programs with 2.7L engines.

I am seeking to monitor Bronco Program with 2.7L engine on a monthly basis for 2022CY.

I appreciate your support.

Thank you,
Best Regards,
Nitesh C. Jadhav
(Automotive Safety Office)
Ph. #: 313-805-3467
Email id: njadhav@ford.com

Monitoring Request

Issue	**Issue Title**	2021MY U725 Bronco 2.7L Engine Broken Valve	
	Isuse Decription	Loss of power while driving	
	Sample Responsive Record(s)	Broken valve in the 2.7L engine	(Please provide sample records indicative of issue)
Monitor Populatio	**Model**	U725 Bronco	
	Model Year(s)	2021-22MY	
	Population Details	2.7L engine	(e.g, all; 3.5L GTDI powertrain, etc.)
	Records to monitor	All	(e.g. all CDR; VOQ, sig events; allegations of accidents or injury)
	CDR Search Criteria	**Selection Summary** **make**: Ford LM; **model year**: 2022; 2021; **vehicle line**: BRONCO; **commodity category**: powertrain; **commodity level1**: engine; **source system key**: AP; AW; CQ; CT; CU; DU; FM; GQ; LM; LW; QF; ST; VO; VP; WL; **Selections**: powertrain - engine -> Total **Selections**: powertrain - engine -> Total **Selections**: powertrain - engine -> Total **Selections**: powertrain - engine -> Total	(Alternatively, provide screenshot of CDR search from most recent data refresh)
Timing	**Request Date**	25-Feb-22	
	Most Recent Data Refresh Date	14-Feb-22	
	Requested Monitoring Cadence	Monthly	(e.g., monthly; weekly)
Trigger Criteria	**What would you like to be notified of?**	Broken valve in 2.7L engine	(e.g, any responsive records; > 3 VOQs; R/1000 > 5)
Closure Criteria	**When should this item be removed from the monitor list?**	Dec-22	(e.g. after 6 months w/ CCRG approval; after action approved in FRC)

Time Frame	**Monitor Period**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Monitoring Totals To Date**
	Monitor Period Start Date	2/15/2022												
	Monitor Period End Date	3/20/2022												
Responsive Record Counts	**VOQ**	0												0
	LMMS	0												0
	GSAR	16												16
	GCQIS	4												4
	FMC360	3												3
	Total	23												23
Occurrence Rate	**Monitor Population Volume At Time of Monitor Period**													
	Monitor Period R/1000													

PLOT Reports versus period to quickly visulaize trend

Selection Summary
make Ford LM;
model year 2022; 2021;
vehicle line BRONCO;
commodity powertrain;
commodity engine;
engine code 2.7L DOHC 4V DI GT V6 GAS/FFV; 2.7L OHC TC I4 DSL-IBERIA; 2.7L V6 24V DOHC EFI T/C DSL;
date 2022-02-14; 2022-03-20;
source syst AP; AW; CQ; CT; CU; DU; FM; GQ; LM; LW; QF; ST; VO; VP; WL;
Selections powertrain - engine -> Total
Selections powertrain - engine -> Total
Selections powertrain - engine -> Total

ECI Record	Source Coc	Commodit	Symptoms	Significant	Alleged Fire	Alleged Fire	Alleged Fire	Verified	Source Clai	VOQ	ODI N	Warranty (	Corporate	Time In Se	Customer (	V Function	Version Se	Source Sys	Repair/Re	Load Date	Maintenan	Causal Par	Causal Par	Causal Par	Causal Par	Non Causal	Labor Ope	Dealer Cod	Dealer Nar	Dealer City	Dealer Stat	Dealer Cou	Dealer Pho	Tread Cate
758860799	GCQIS	Ford	powertrain	damage;da	None of the	Unknown	Unknown	N	N3HDX013								Q		03/08/202	03/09/222	03/09/222	Unknown	Unknown	-	-		"04651 "	BOB THOM	FORT WAY	IN	USA	260436367	
758862510	GCQIS	Ford	powertrain	damage;da	None of the	Unknown	Unknown	N	N3IB9027								H		03/09/202	03/10/222	03/10/222	Unknown	Unknown	-	-		"08598 "	ZOELLNER I	BEATRICE	NE	USA	402223354	
758878257	GCQIS	Ford	powertrain	contaminat	None of the	Unknown	Unknown	N	N3PD4005								Q		03/16/202	03/17/222	03/17/222	Unknown	Unknown	-	-		"03919 "	BYERS FOR	DELAWARE	OH	USA	740363367	

758883300 GCQIS Ford powertrain function-m	None of the	Unknown	Unknown	N	N3RCB005			H	03/18/202	03/19/2214	03/19/2214	Unknown	Unknown	- -	"05613 "	LANCE CUN	KNOXVILLE	TN	USA	865687210
903857109 GCCT\FMC powertrain contaminat	None of the	Unknown	Unknown	N	731B5A56-I				02/23/202	02/24/222	03/19/2214		NOT PROVI	- -	"05512 "	KEN GROD\	CARLSBAD	CA	USA	760438917 "06"
903860982 GCCT\FMC powertrain circuit-poo	None of the	Unknown	Unknown	N	616AAF18-(				02/17/202	03/05/2214	03/19/2214		NOT PROVI	- -	"01172 "	SUN STATE	ORLANDO	FL	USA	407299590
903865302 GCCT\FMC powertrain administrat	None of the	Unknown	Unknown	N	E855A84D-I				03/11/202	03/14/222	03/19/2214		NOT PROVI	- -	"08621 "	SEEKINS FO	FAIRBANKS	AK	USA	907459400

112921566	GSAR\AWS powertrain appearance	None of the	Unknown	Unknown	N	02569420	"1A03"	"07"	4	D50	V44		02/14/2021	02/15/2221	02/15/2221		6006		ENGINE ASS	- -	"08741 "	ALL AMERI	OLD BRIDG	NJ	USA	732591111	"06"
112930657	GSAR\AWS powertrain damage;da	None of the	Unknown	Unknown	N	02586676	"1A03"		2	D50	V44		02/15/2021	02/16/2221	02/16/2221	MB3Z	6006	A	ENGINE ASS	- -	"06022 "	WOODHOL	PLATTSMO	NE	USA	402296900	"06"
112930699	GSAR\AWS powertrain damage-cra	None of the	Unknown	Unknown	N	02587099	"1A03"		2	D50	V44		02/15/2021	02/16/2221	02/16/2221	MB3Z	6006	A	ENGINE ASS	- -	"00008 "	LEN STOLE	OWINGS M	MD	USA	410356700	"06"
112945053	GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02612011	"1A03"		3	D50	V44		02/17/2021	02/19/2214	02/19/2214	MB3Z	6006	A	ENGINE ASS	- -	"00266 "	EVERGREE	ISSAQUAH	WA	USA	425392690	"06"

112952696 GSAR\AWS powertrain engine pow	None of the	Unknown	Unknown	N	02631083	"1A03"	"07"	3	D50	V44		02/18/202	02/21/222	02/21/222		6006		ENGINE AS	- -	"B8144 "	CAVALCADI BRACEBRID ON	CAN	705645873	
112969955 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02665683	"1A03"		4	D50	V44		02/22/202	02/23/222	02/23/222	MB3Z	6006	A	ENGINE AS	- -	"00228 "	MOSS MOT SOUTH PITTN	USA	423837711	"06"
112976663 GSAR\AWS powertrain compressio	None of the	Unknown	Unknown	N	02676359	"1A03"		1	D50	V44		02/23/202	02/24/222	02/24/222	MB3Z	6006	A	ENGINE AS	- -	"07851 "	TOWNE FO REDWOOD CA	USA	650366574	"06"
113000013 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02727625	"1A03"		2	D50	V44		02/26/202	03/01/222	03/01/222	MB3Z	6006	A	ENGINE AS	- -	"05508 "	THEODORE COSTA MESCA	USA	949642001	"06"

113000832 GSAR\AWS powertrain compressio	None of the	Unknown	Unknown	N	02735820	"1A03"		3	D50	V44	02/28/2021	03/01/2221	03/01/2221	MB3Z	6006	L	ENGINE ASS	- -	"05659 "	OXMOOR F	LOUISVILLE	KY	USA	502426250 "06"
113024672 GSAR\AWS powertrain damage;en	None of the	Unknown	Unknown	N	02773358	"1A03"		3	D50	V44	03/03/2021	03/05/2214	03/05/2214	MB3Z	6006	L	ENGINE ASS	- -	"09648 "	LASCO FOR	FENTON	MI	USA	810629225
113024730 GSAR\AWS powertrain compressio	None of the	Unknown	Unknown	N	02773932	"1A03"		3	D50	V44	03/03/2021	03/05/2214	03/05/2214	MB3Z	6006	A	ENGINE ASS	- -	"05246 "	BILL KNIGH	TULSA	OK	USA	918526240
113024747 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02774102	"1C03"	"05"	3	D50	V44	03/03/2021	03/05/2214	03/05/2214		6507		INTAKE VAL	- -	"05126 "	GARY CROS	KANSAS CIT	MO	USA	816781484

113037850 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02804568	"1A03"	3	D50	V44		03/07/2021	03/08/2221	03/08/2221	MB3Z	6006	A	ENGINE AS	- -	"08927 "	IRWIN FOR	LACONIA	NH	USA	603524492
113060797 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02850842	"1A03"	4	D50	V44		03/10/2021	03/12/2214	03/12/2214	MB3Z	6006	L	ENGINE AS	- -	"00413 "	VALLEY FOI	HURON	OH	USA	419433440
113067823 GSAR\AWS powertrain contaminat	None of the	Unknown	Unknown	N	02862956	"1A03"	3	D50	V44		03/11/2021	03/14/2221	03/14/2221	MB3Z	6006	L	ENGINE AS	- -	"04695 "	TOM WOOI	INDIANAPC	IN	USA	317846424
113090183 GSAR\AWS powertrain compressio	fire;	Smoke	Unknown	Unknown	Y	02906335	"1A03"	3	D50	V44		03/16/2021	03/17/2221	03/17/2221	MB3Z	6006	L	ENGINE AS	- -	"04437 "	COVERT FO	AUSTIN	TX	USA	512345434

Disclaimer:
This data is for use as one of several potential awareness indicators for the
Ford Motor Co. Enhanced Concern Identification System.It is unverified, draft,
summary data generated from a computer word search of customer and technician
symptom comments.Supplier data, technician and customer comments are unverified
and actual root cause of any potential issue is not established by this summary

Tread Cate	Reported i	Attachmen	Communic	VOQ Comp	GCQIS Safe	Tire Manuf	Tire Size	Tire Brand	Wheel	VIN	Production	Model Yea	Vehicle De	Engine Seri	Engine Des	Transmissi	Body Cab S	Drive Line	Transmissi	Vehicle Axl	Vehicle Re	Retail Sale	Reacquirec	Plant Desci	Build Regic	Build Coun	Warranty S	Mileage
	Y					Unknown	255/70R18			1FMDE5AP	08/03/2021	2021	BRONCO	"A2117212	2.7L DOHC	10 SPD AUT	3 DOOR	4 WHL L/H	"A2121122					MICHIGAN		11/08/2021	1680
	Y					Unknown	Unknown			1FMEE5EP	09/24/2021	2021	BRONCO	"A2122812	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2124422					MICHIGAN		11/05/2021	5368
	Y					Unknown	255/70R18			1FMEE5BP	10/18/2021	2021	BRONCO	"A2121413	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2127122					MICHIGAN		10/27/2021	2000

	N		Unknown	Unknown	1FMEE5DP:	09/08/2021	2021	BRONCO	"A2120913	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2122323		MICHIGAN	09/14/2021	6618
engine and Q1 2022	N	PH	Unknown	Unknown	1FMEE5DP:	10/19/2021	2021	BRONCO	"A2121413	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2128522		MICHIGAN	11/17/2021	3200
	N	PH	Unknown	255/70R18	1FMEE5BP(	07/15/2021	2021	BRONCO	"A2118212	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2118722		MICHIGAN	10/04/2021	5949
	N	PH	Unknown	Unknown	1FMDE5FP:	09/13/2021	2021	BRONCO	"A2120913	2.7L DOHC	10 SPD AUT	3 DOOR	4 WHL L/H	"A2124422		MICHIGAN	11/07/2021	4478

engine and Q1 2022	Unknown	Unknown	1FMEE5DP	07/23/2021	2021	BRONCO	"A2117912	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2120122	R	MICHIGAN	08/19/2021	3122
engine and Q1 2022	Unknown	255/70R18	1FMEE5BP	10/18/2021	2021	BRONCO	"A2122412	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2128022	R	MICHIGAN	11/10/2021	698
engine and Q1 2022	Unknown	Unknown	1FMEE5DP	09/02/2021	2021	BRONCO	"A2119513	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2123722	R	MICHIGAN	09/13/2021	3360
engine and Q1 2022	Unknown	LT 265/70R	1FMDE5CP	07/13/2021	2021	BRONCO	"A2117513	2.7L DOHC	10 SPD AUT	3 DOOR	4 WHL L/H	"A2118922	R	MICHIGAN	10/08/2021	1795

	Unknown	Unknown	1FMEE5DP(	08/26/2021	2021	BRONCO	"A2120712	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2120822	R	MICHIGAN	10/14/2021	2863
engine and Q1 2022	Unknown	Unknown	1FMDE5FP:	07/01/2021	2021	BRONCO	"A2117413	2.7L DOHC	10 SPD AUT	3 DOOR	4 WHL L/H	"A2116722	R	MICHIGAN	07/27/2021	4736
engine and Q1 2022	Unknown	Unknown	1FMEE5DP:	10/05/2021	2021	BRONCO	"A2122412	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2126523	R	MICHIGAN	10/29/2021	927
engine and Q1 2022	Unknown	Unknown	1FMEE5DP:	10/05/2021	2021	BRONCO	"A2122412	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2125222	R	MICHIGAN	10/22/2021	3560

engine and Q1 2022	Unknown	Unknown	1FMEE5DP:	10/20/2021	2021	BRONCO	"A2121413	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2128422	R	MICHIGAN	11/01/2021	2014
	Unknown	Unknown	1FMEE5DP!	10/19/2021	2021	BRONCO	"A2121413	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2128422	R	MICHIGAN	11/15/2021	1260
	Unknown	Unknown	1FMEE5EP!	04/29/2021	2021	BRONCO	"A2109812	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2105122	R	MICHIGAN	10/29/2021	2306
	Unknown	LT 265/70R	1FMDE5CP:	07/13/2021	2021	BRONCO	"A2116912	2.7L DOHC	10 SPD AUT	3 DOOR	4 WHL L/H	"A2118122	R	MICHIGAN	10/12/2021	2731

Unknown	LT285/70R1	1FMEE5DP1	06/18/2021	2021	BRONCO	"A2115912	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2116022	F	MICHIGAN	08/06/2021	272
Unknown	255/75R 17	1FMEE5BP1	10/15/2021	2021	BRONCO	"A2122412	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2127922	R	MICHIGAN	10/28/2021	2291
Unknown	Unknown	1FMEE5EP5	09/20/2021	2021	BRONCO	"A2122113	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2124222	R	MICHIGAN	09/28/2021	2352
Unknown	255/70R18	1FMEE5BP2	07/22/2021	2021	BRONCO	"A2118112	2.7L DOHC	10 SPD AUT	5 DOOR	4 WHL L/H	"A2118822	R	MICHIGAN	11/03/2021	4172

Customer Comments	Technician Comments	CQIS Recommendations	Potentially Responsive
CHECK ENGINE LIGHT IS ON. RUNS ROUGH AND STALLS - TOWED IN	CYLINDER #4 HARD MISSFIRE. RELATIVE COMPRESSION SHOWED CYL #4 DOWN 4.5%. MANUAL COMPRESSION SHOW 0% ON CYL #4. BORE SCOPE REVEALED BENT VALVE HAD MADE CONTACT ON PISTON. PISTON IS DAMAGED.		x
WEB FORM DATA(118725290) DESCRIPTION OF VEHICLE CONCERN: CUSTOMER STATES THE CEL STARTED FLASHING AND THERE WAS A LOUD REPETITIVE KNOCKING NOISE FROM THE ENGINE. PLEASE LIST ANY DIAGNOSTICS ALREADY PERFORMED: VERIFIED CUSTOMER CONCERN. SINCE P0306 WAS PRESENT REMOVED CYLINDER 6 SPARK PLUG TO INSPECTED AND SPARK PLUG LOOKED NORMAL. USED BORESCOPE AND DETERMINED THAT ENGINE HAS CATASTROPHIC FAILURE. IT IS HARD TO IDENTIFY WHAT IS IN CYLINDER 6 BUT APPEARS TO BE A CHUNK OF SMASHED METAL. POSSIBLE PIECE OF VALVE. PARTS REPLACED: WE INSTALLED AN ENGINE LAST VISIT FOR THIS CONCERN, AND ALSO REPLACED INTAKE MANIFOLD DUE TO EMBEDDED SHAVINGS OF METAL, AND CLEANED CAC TUBES AND CHARGE AIR COOLER. LAST VISIT CYLINDER 5 INTAKE VALVE MADE CONTACT WITH THE PISTON AND LTIS WAS USED FOR LONG BLOCK REPLACEMENT. YOUR QUESTION: THIS APPEARS TO BE THE SAME FAILURE ON THIS ENGINE AS WELL BUT WITH A DIFFERENT CYLINDER. WE ARE GOING TO NEED TO REPLACE THE		GOOD AFTERNOON PRESLEY, INSPECT THE TURBOS FOR DAMAGE AND MISSING COMPONENTS, AND REPLACE AS NEEDED. WHEN AN ENGINE IS REPLACED, THE TURBO OIL FEED LINE FILTERS SHOULD BE REPLACED AS WELL. INSPECT THE CAC PIPES AND CLEAN THEM. THE CAC SHOULD BE REPLACED SINCE IT IS THE ONLY COMPONENT THAT WAS FROM THE ORIGINAL ENGINE, AND THIS WILL ELIMINATE THE POSSIBILITY OF ANY DEBRIS INSIDE THE CAC TO REACH THE ENGINE. INSPECT THE INTAKE CAREFULLY AND REPLACE IT IF ANY DEBRIS IS FOUND. IT IS NOT CLEAR IF ANY CHANGES HAVE BEEN MADE TO THE ENGINE OR PARTS, BUT A NEW LONG BLOCK WITH ALL NEW ONE TIME USE PARTS AND CAC SHOULD NOT FAIL. IF THE CUSTOMER IS NOT SATISFIED, THEY CAN CONTACT THE CRC. FORD TECHNICAL ASSISTANCE TEAM MEMBER ? DAVID H. <DIV STYLE ><FONT FACE ARIAL, VERDANA><SPAN STYLE FONT-SIZE: 13.3333PX>IF FURTHER ASSISTANCE IS NEEDED ON THIS CONTACT, PLEASE CALL THE TAC BY PHONE. THIS WILL ALLOW THE TAC TEAM TO WORK CLOSELY WITH YOU TO ENSURE THE VEHICLE ISSUE IS RESOLVED AS QUICKLY AND EFFICIENTLY AS POSSIBLE.</SPAN></FONT></DIV><DIV STYLE ><FONT FACE ARIAL, VERDANA><SPAN STYLE FONT-SIZE: 13.3333PX> </SPAN></FONT></DIV><DIV STYLE	x
CS WHILE DRIVING A MESSAGE POPPED UP AND SSAID PULL OVER RESTART ENGINE. ENGINE WON T RESTART, ENGINE LOCKED UP. TESTED FOUND CODE P0305,P0304.P2282. VERIFIED ENGINE LOCKED UP, REMOVED OIL PAN FOUND CHUNKS OF METAL IN OIL PAN.,LTIS NEEDS ENGINE ASSEMBLY REPALCED	P0304,P0305,P2282 ENGINE DROPPED VALVE AND DAMAGED ENGINE BLOCK		x

WEB FORM DATA(118741418) DESCRIPTION OF VEHICLE CONCERN: VEHICLE DROPPED VALVE IN CYL 5, FOUND DEBRES IN INTAKE AND TURBO. NO TURBOS ARE AVAILABLE TO REPLACE. PLEASE LIST ANY DIAGNOSTICS ALREADY PERFORMED: REPLACING LONG BLOCK PARTS REPLACED: LONG BLOCK YOUR QUESTION: NO TURBOS AVAILABLE, FOUND DEBRES INSIDE EXHAUST SIDE OF TURBO. WHAT STEPS SHOULD BE TAKEN FROM HERE?		HI NICK, <P>IN THE EVENT THAT THE PART NEEDED TO REPAIR THIS VEHICLE IS NOT AVAILABLE, THE PARTS ESCALATION PROCESS (EFC08937) SHOULD BE FOLLOWED. IN ORDER TO COMPLETE THE PARTS ESCALATION PROCESS, THE ORDER SHOULD BE FLAGGED AS VOR (VEHICLE OFF ROAD) IN COPIS.</P><P> </P><P>THE PARTS ESCALATION WILL ALLOW THE INVOLVEMENT OF OTHER FORD DEPARTMENTS TO ENSURE CUSTOMER SATISFACTION WITH THE REPAIR PROCESS. FOR MORE INFORMATION, REFER TO <A TARGET _BLANK HREF HTTPS://WWW.FMCDEALER.DEALERCONNECTION.COM/CONTENT/DAM/FMCDEALER/DOCUMENTS/PARTS_SERVICE/PTOR/PTAV/PAGES/BACKORDER_ESCALATION.PDF>PARTS ESCALATION PROCESS</A> (VEHICLE OFF ROAD) FOUND IN FMCDEALER.</P> <DIV STYLE ><FONT FACE ARIAL, VERDANA><SPAN STYLE FONT-SIZE: 13.3333PX>IF FURTHER ASSISTANCE IS NEEDED ON THIS CONTACT, PLEASE CALL THE TAC BY PHONE. THIS WILL ALLOW THE TAC TEAM TO WORK CLOSELY WITH YOU TO ENSURE THE VEHICLE ISSUE IS RESOLVED AS QUICKLY AND EFFICIENTLY AS POSSIBLE.</SPAN></FONT></DIV><DIV STYLE ><FONT FACE ARIAL, VERDANA><SPAN STYLE FONT-SIZE: 13.3333PX> </SPAN></FONT></DIV><DIV STYLE	x
2022-03-17-19.34.16.000000 EMAIL FROM SM HECTO DELAFUENTEWE ARE REMOVING ENGINE AS WE SPEAK, WE SHOULD BE DONE EARLY NEXT WEEK	2022-03-17-19.34.16.000000 RE:PARENT CAS-35552873-M8M1B0RO 353056 2/22/22 3184 MIPLEASE PROVIDE AN UPDATE ON THE REPAIR STATUS. IS THE VEHICLE IN THE BAY? ETA FOR ENGINE REPAIR COMPLETION?I AM AWARE THETRAILER FAULT ERROR TO BE DIAGNOSED AFTER YOU COMPLETEENGINE REPAIR SO YOU CAN START VEHICLE.REGARDS,CHERRIEFORD MOTOR COMPANYCUSTOMER RELATIONSHIP CENTER CONCERN (CXSC) CHERRIE DORSEYCDORSE21@FORD.COM WWW.FORD.COMOFFICE: 866-631-3788 EXT. 79124EFAX: 8883258533MON-FRI 7:30 AM TO 4 PM CST		x
2022-03-16.54.14.000000 2 PARTS FOR ENGINE ARRIVED3/17/22 THUR BY 7PM CSTPLAN OF ACTION CALL DLR SA STEPHEN LINARES 7604389171 FOR REPAIR STATUS RO 353056 , IS VEHICLE IN THE BAY? ETA FOR ENGINE COMPLETION?(NOTE TRAILER FAULT ERROR TO BE DIAGNOSED AFTER DLR COMPLETES ENGINE SO THEY CAN START VEHICLE)OBC DLR KEN GRODY FORD - CARLSBAD 7604389171SM HECTOR DELAFUENTA -VM----------PLAN OF ACTION UPDATE CUST ON REPAIROBC CUST ANDREW DEALY-BATSON 8052154774 CELLCXSLEFT VM FOR BOTH SM AND SA FOR AN UPDATE ON VEHICLE. DID DLR CALL YOU WITH AN UPDATE?CUSTETA END OF NEXT WEEK 3/25/22CXS WILL FU 3/23/22 WED BY 7PM TO SEE IF DLR IS ON TRACK WITH REPAIR ETANEXT STEPS: 3/23/22 WED BY 7PM CHECK EMAIL REPLY FROM SM HECTOR DELAFUENTA OR SA STEPHEN LINARES WITH UPDATE ON ETA FOR ENGINE REPAIR.PLAN OF ACTION CALL DLR SM HECTOR DELAFUENTA OR SA STEPHEN LINARES WITH UPDATE ON ETA FOR ENGINE REPAIR RO 353056 2/22/22 3184 MI. (NOTE TRAILER FAULT ERROR	2022-03-16.54.14.000000 RE:PARENT CAS-35552873-M8M1B0RO 353056 2/22/22 3184 MIPLEASE PROVIDE AN UPDATE ON THE REPAIR STATUS. IS THE VEHICLE IN THE BAY? ETA FOR ENGINE REPAIR COMPLETION?I AM AWARE THETRAILER FAULT ERROR TO BE DIAGNOSED AFTER YOU COMPLETEENGINE REPAIR SO YOU CAN START VEHICLE.REGARDS,CHERRIEFORD MOTOR COMPANYCUSTOMER RELATIONSHIP CENTER CONCERN (CXSC) CHERRIE DORSEYCDORSE21@FORD.COM WWW.FORD.COMOFFICE: 866-631-3788 EXT. 79124EFAX: 8883258533MON-FRI 7:30 AM TO 4 PM CST		
2022-03-15-22.13.11.000000 OBC TO PART NO ANSWER	2022-03-15-22.13.11.000000 DEARALLAN BRADLEY,IN REFERENCE TO CASE NO.CAS-35463509-R3K7J4THANK YOU FOR CONTACTING FORD MOTOR COMPANY TODAY. AS PROMISED, I WILL WORK WITH YOU TO BRING THE EARLIEST POSSIBLE RESOLUTION TO YOUR CASE, PROVIDING YOU WITH REGULAR UPDATES IN THE INTERIM.SHOULD YOU NEED TO CONTACT ME, YOU MAY REACH ME DIRECTLY AT THIS EMAIL ADDRESS OR AT 866-631-3788 ON MY EXTENSION.IF IM UNAVAILABLE, PLEASE LEAVE ME A DETAILED VOICE MESSAGE AND I WILL RETURN YOUR CALL AS SOON AS POSSIBLE.NOTE: IF YOU DO CALL BACK, PLEASE BE PREPARED TO PROVIDE YOUR CASE NUMBER TO ENABLE QUICKER SERVICE.ONCE YOUR CONCERN IS ADDRESSED YOU MAY RECEIVE AN EMAIL SURVEY FROM FORD MOTOR CO. WE ASK THAT YOU TAKE A FEW MINUTES TO RESPOND TO THE SURVEY AND PROVIDE US WITH YOUR FEEDBACK REGARDING OUR HANDLING OF YOUR CONCERN.THANK YOU AGAIN FOR CONTACTING FORD, WE APPRECIATE YOUR LOYALTY AND ARE COMMITTED TO RESOLVING YOUR CASE AS SOON AS POSSIBLE.REGARDS,DEANDREA DAVIS1-866-631-3788EXTENSION #:FORD MOTOR COMPANY		x
2022-03-14-23.12.48.000000 FROM: FIECHTNER, ZACHARY (Z.) SENT: MONDAY, MARCH 14, 2022 6:13 PMTO: ALLAN.JAMES.BRADLEY@GMAIL.COM SUBJECT: CAS-35463509THANK YOU FOR CONTACTING FORD MOTOR COMPANY AND ALLOWING US THE OPPORTUNITY TO ASSIST YOU WITH YOUR VEHICLE CONCERN. UNFORTUNATELY, YOUR AGENT WAS OUT OF THE OFFICE TODAY, SO I HAVE RESET YOUR FOLLOW-UP APPOINTMENT TO (03/15).I WILL BE REVIEWING YOUR CASE TO SEE WHAT PROGRAMS YOU MAY QUALIFY FOR. I WILL GO OVER THE STEPS WITH YOUR CUSTOMER EXPERIENCE SPECIALIST TO BRING YOU THE EARLIEST POSSIBLE RESOLUTION TO YOUR CONCERN. IF YOU HAVE ANY ADDITIONAL QUESTIONS OR CONCERNS REGARDING THIS MATTER, PLEASE REPLY VIA EMAIL FOR THE FASTEST RESPONSE. THANKS AGAIN FOR BEING A LOYAL PART OF THE FORD FAMILY.REGARDSZACHARY FIECHTNERFORD MOTOR COMPANY CUSTOMER EXPERIENCE SPECIALIST, FORD PASSENGER VEHICLE TEAMZFIECHTN@FORD.COM WWW.FORD.COMMONDAY-FRIDAY 10:30 AM-7:00 PM CSTOFFICE: 866-631-3788 EXT. 79336	2022-03-14-23.12.48.000000 DEARALLAN BRADLEY,IN REFERENCE TO CASE NO.CAS-35463509-		
2022-03-09-18.09.32.000000 LESLIE EVANS/EXT.79352/LEVAN117@FORD.COM :IBC FROM 2022-03-17-22.57.20.000000 VALERIE GRAY/VGRAY17@FORD.COM/ EX. 79473OBC: SPOKE TO THE CUSTOMERTOLD HER WE ARE STILL WAITING ON THE ENGINE AND SOME OTHER PIECES TO ARRIVE.NEXT STEPS: REACH OUT TO THE CUSTOMER AND DEALERSHIP TOMORROWVALERIE GRAYFORD MOTOR COMPANY CUSTOMER RELATIONSHIPCUSTOMER EXPERIENCE SPECIALISTVGRAY17@FORD.COM WWW CENTER - SUV/CAREMAIL: VGRAY17@FORD.COMOFFICE: 8666313788 EXT 79473	2022-03-17-22.57.20.000000 DEARKIM MINTON,IN REFERENCE TO CASE NO.CAS-35812615-H4B1T4THANK YOU FOR CONTACTING FORD MOTOR COMPANY TODAY. AS PROMISED, I WILL WORK WITH YOU TO BRING THE EARLIEST POSSIBLE RESOLUTION TO YOUR CASE, PROVIDING YOU WITH REGULAR UPDATES IN THE INTERIM.SHOULD YOU NEED TO CONTACT ME, YOU MAY REACH ME DIRECTLY AT THIS EMAIL ADDRESS OR AT 866-631-3788 ON MY EXTENSION.IF IM UNAVAILABLE, PLEASE LEAVE ME A DETAILED VOICE MESSAGE AND I WILL RETURN YOUR CALL AS SOON AS POSSIBLE.NOTE: IF YOU DO CALL BACK, PLEASE BE PREPARED TO PROVIDE YOUR CASE NUMBER TO ENABLE QUICKER SERVICE.ONCE YOUR CONCERN IS ADDRESSED YOU MAY RECEIVE AN EMAIL SURVEY FROM FORD MOTOR CO. WE ASK THAT YOU TAKE A FEW MINUTES TO RESPOND TO THE SURVEY AND PROVIDE US WITH YOUR FEEDBACK REGARDING OUR HANDLING OF YOUR CONCERN.THANK YOU AGAIN FOR CONTACTING FORD, WE APPRECIATE YOUR LOYALTY AND ARE COMMITTED TO RESOLVING YOUR CASE AS SOON AS POSSIBLE.REGARDS,VALERIE GRAY1-866-631-3788EXTENSION #:FORD MOTOR COMPANY		x
2022-03-17-22.53.45.000000 VALERIE GRAY/VGRAY17@FORD.COM/ EX. 79473OBC: CALLED THE SERVICE DEPARTMENTSA RALPHMISSING THE ENGINE, AND 3 DIFFERENT PIECES OF HARDWARE, 8 BOLTS, 4 STUDS, 4 MORE BOLTS, THATS ALL THE INFORMATION HE HAS AVAILABLE FOR ME. MASON IS THE SA.CALLED BACK TO THE PARTS DEPARTMENT. NO ONE ANSWERED.VALERIE GRAYFORD MOTOR COMPANY CUSTOMER RELATIONSHIPCUSTOMER EXPERIENCE SPECIALISTVGRAY17@FORD.COM WWW CENTER - SUV/CAREMAIL: VGRAY17@FORD.COMOFFICE: 8666313788 EXT 79473			
2022-03-17-22.42.11.000000 VALERIE GRAY/VGRAY17@FORD.COM/ EX. 79473OBC: CALLED	2022-03-17-22.53.45.000000 DEARKIM MINTON,IN REFERENCE TO CASE NO.CAS-35812615-		

THE CUSTOMER STATES CHECK ENGINE LIGHT ON, CAR STARTED TO SHAKE AND MISFIRE. VEHICLE DIDNT WANT TO RUN. CAR WAS JUST IN FOR SEEMINGLY UNRELATED BODY REPAIRS. CHECK AND ADVISE. VALET VERIFIED VEHICLE WILL NOT GO ABOVE 10 MPH & CHECK ENGINE LIGHT WAS FLASHING WHEN WE MOVED VE HICLE.	VERIFIED CUSTOMER CONCERN. FOUND VEHICLE MIL LIGHT FLASHING. SCANNED VEHICLE FOR CODES AND OBTAINED CODE P0306 AND P2282. PERFORMED RELATIVE COMPRESSION TEST AND CYLINDER 6 FAILED. REMOVED SPARK PLUG AND INSPECTED SPARK PLUG. FOUND SPARK PLUG TO BE FOULED AND WET. INSPECTED CYLINDER WITH BORE SCOPE AND FOUND VALVE MARKS ON PISTON. PERFORMED MANUAL COMPRESSION TEST AND FAILED AT 0PSI. PERFORMED CYLINDER LEAK DOWN TEST AND FAILED. REMOVED MOTOR FOLLOWING 303-01B ENGINE - 2.7L ECOBOOST. SWAPPED NECESSARY COMPONENTS ONTO NEW MOTOR AND RE-ASSEMBLED USING NEW HARDWARE. TOPPED OFF ALL FLUIDS AND START AND CHECK THE EXHAUST SYSTEM FOR LEAKS. NO LEAKS WERE FOUND. USE THE POWERTRAIN CONTROL MODULE (PCM) MISFIRE MONITOR PROFILE CORRECTION ROUTINE IN THE DIAGNOSTIC SCAN TOOL. TEST DROVE VEHICLE AND NO ISSUES FOUND POST ROAD TEST	x
C/S VEHICLE WILL NOT START. CRANKS BUT NO START	VERIFIED CUSTOMER CONCERN. FOUND VEHICLE TO CRANK AND NOT START. CAN HEAR AUIDBLE CHANGE IN SOUND WHEN CRANKING. FOUND P0305 IN PCM. REMOVED CYL 5 SPARK PLUG AND FOUND PLUG VERY DAMAGED. BORESCOPPED CYLINDER AND FOUND INTAKE VALVE DROPPED AND DAMAGED PISTON/WALLS/CLYINDER HEAD. VALVE JAMMED SIDEWAYS IN HEAD CAUSING NO START. FOLLOWING WSM REMOVED AND REPLACED LONGBLOCK AND INTAKE UNDER LTIS. REPLACE INTAKE DUE TO METAL IN INTAKE. WHEN REMOVING DRIVER SIDE TURBO FOUND DAMAGE TO TURBINE FROM PISTON MATERIAL. REPLACED DRIVER SIDE TURBO ALSO. VACUUM FILLED AND FILLED WITH 7 QRTS OF 5W30. RETESTED, CONCERN NO LONGER PRESENT. RETURN VEHICLE TO CUSTOMER.	x
C/S THAT WHILE DRIVING THERE WAS A LOUDSCREECHING SOUND AND VEHICLE LOST POWER. AFTERLOSING POWER VEHICLE WOULD NOT RESTART. PLEASECHECK AND ADVISE	TECH CONFIRMED CUSTOMER CONCERN. DETERMINED THAT #4 VALVE BROKE CAUSING ENGINE FAILURE. TECH REPLACED ENGINE AND TEST DROVE NO ISSUE AT THIS TIME	x
VEHICLE BEING TOWED IN AND WILL NOT HAS LIGHTS TRIED TO JUMP BUT WILL NOT START. CHECK AND ADVISE. VEHICLE BEING TOWED IN AND WILL NOT HAS LIGHTS TRIED TO JUMP BUT WILL NOT START. CHECK AND ADVISE. VE	SD1 VERIFIED CONCERN, NO CRANK, NO START. RAN OASIS, NO TSB OR SSM. THUD NOISE NOTICED WHEN ATTEMPTING TO START. TRIED TO TURN ENGINE OVER BY HAND, LOCKED UP. REMOVED ACCESSORY DRIVE BELT, NO CHANGE. REMOVED SPARK PLUGS, NO OBVIOUS SIGN OF FAULT. USED BORESCOPE TO LOOK INTO CYLINDERS, FOUND DAMAGE TO CYL 5, APPEARS VALVE BROKE. CONTACT HOTLINE (118604148), RECOMMEND ENGINE DUE TO LOW TIME IN SERVICE. EXTRA DIAG FOR ENGINE INSPECTION (MT6007E1). JB1, FOUND ENGINE SEIZED. NEED TO REMOVE LEFT CYLINDER HEAD TO TURN MOTOR TO REMOVE LEFT CYLINDER HEAD TO TURN MOTOR TO REMOVE TORQUE CONVERTER NUTS. NO ROOM TO REMOVE WITH ENGINE (VERY TIGHT). REMOVED LEFT CYLINDER HEAD, REMOVED ENGINE, REPLACED LONG BLOCK, TRANSFERRED ALL PARTS REMOVED TO NEW LONG BLOCK AS OUTLINED IN WORKSHOP MANUAL. ROAD TESTED. ASSEMBLED ORINGINAL LONG BLOCK TO SEND BACK TO FORD. EXTRA TIME FOR REMOVING HEADS IN VEHICLE. REASSEMBLED FOR CORE. M-TIME FOR PART REPLACMENT AND CYLINDER HEAD REMOVAL, NO LABOR OPS AVAILABLE. NECESSARY TO REPLACE INTAKE MANIFOLD DUE METAL SHAVING CONTAMINATION (CATASTOPHIC ENGINE	x

THERE WAS GRINDING IN THE ENGINE LIMPED AND QUIT RESTARTED BUT AS SOON AS YOU TOUCHED GAS QUIT NOW NOT STARTING	START, ENGINE KNOCKING, FDRS, RETRIEVE DTC P0300, P0316, P2198, PERFORM POWER BALANCE, CYL 5 IS DEAD MISS, REMOVE PLUG AND INSPECT WITH BORO-SCOPE , FOUND VALVE HIT PISTON, NEEDS ENGINE IT IS NOW SEIZED,REMOVE ENGINE, EXTRA TIME REQUIRED TO REMOVE WITH TORQUE CONVERTER STILL ATTACHED, ORDER CONVERTER SEAL... REMOVE ENGINE WITH CONVERTER, TRANSFER PARTS TO NEW ENGINE, AND INSTALL NEW INTAKE TURBO`S AND SEALS, REPLACE CONVERTER HUB SEAL AND REINSTALL CONVERTER, INSTALL NEW ENGINE AND REINSTALL COOLANT PIPES AND AIR PIPES, FILL ENGINE AND TRANY WITH OIL, START AND RUN TILL AT OPERATING TEMP, PERFORM ENGINE MISFIRE RELEARN, PERFORM KOER SELF TEST ALL PASS, ROAD TEST HOME FOR NIGHT AND BACK IN AM, RECHECK AND ADJUST FLUID LEVELS, OK AFTER REPAIR	x
TOWED IN, CUSTOMER STATES VEHICLE DIED WHILE DRIVING AND WILL NOT START BACK, WILL NOT TURN OVER	VERIFIED CONCERN PERFORM VISUAL INSPECTION. OIL LEVEL OVERFILLED AND MILKY MIXTURE PRESENT, ARTTEMPT TO START, TURNED OVER SLIGHTLY METALLIC NOISE ENGINE SEIZED, CONTACTED FORD - FORD APPROVED REMOVED AND DISASSEMBLE OF ENGINE. UPON DISASSEMBLY #3 CYLINDER INTAKE VALVE BROKE AND DAMAGED #3 PISTON, CYLINDER WALL, BROKE CONNECTING ROD, DAMAGED CYL HEAD. CONNECTED FORD APPROVED REPLACING ENGINE, INSTALLED LONG BLOCK AND ALL NECEESSARY ONE TIME USE PARTS. PERFORM TEST DRIVE - INSPECT NO LEAKS. VERIFIED REPAIR COMPLETE.	x
CUSTOMER STATES SERVICE ENGINE SOON LIGHT IS ON-CHECK AND ADVISE.	VERIFIED CONCERN VERY HARD TO START AND WHEN IT DID RAN REALLY BAD. CHECKED CODES P0304 AND P0305. RAN POWER BALANCE AND FOUND MISIFRE CYLINDER 4 AND RAN RELITIVE COMPRESSION AND LOW CYLINDER 4. REMOVED PLUG AND IT WAS FUEL FUALED USED BORE SCOPE TO INSPECT AND FOUND VALVES MADE CONTACT WITH PISTON. WITH LOW MILEAGE AND LOW TIME IN SERVICE WILL GET NEW MOTOR TECH 132 TOOK OVER THE ENGINE REMOVED AND INSTALLETION, RELEASED FUEL PRESSURE, REMOVED BATTERY AND BATTERY TRAY, REMOVED THE UNDER BODY SKIT PLATES UNDER THE ENGINE, THEN DRAINED THE OIL AND COOLANT, REMOVED THE HOOD, REMOVED THE PCM CONECTOR AND PCM, REMOVED LH AND RH TURBO OUTLET AND INLET PIPES, REMOVED CAC TUBE, REMOVED THE SERPENTINE AND ALTERNATOR BELT, REMOVED GENERATOR, REMOVED THE EVAP LIN AND ALL THE COOLANT HOSES IN THE ENGINE, REMOVED FRONT SWAY BAR AND REMOVED MOTOR MOUNT BOLTS, REMOVED STARTER AND THE EXHAUST MANIFOLS, REMOVED THE FRONT AXLE TO ACCESS TO MOTOR MOUNTS, REMOVED TORQUE CONVERTER NUTS AND THE BELL HOUSING BOLTS, INSTALLED SPECIAL TOOL TO RAISED THE ENGINE AND RAISED THE ENGINE TO REMOVED	x
CUST STATES VEH STOPPED IN MIDDLE OF HWY, NOT DRIVABLE. SPILLED FLUIDS FROM ENGINE AREA. ADVISE. TOWED IN.	verified concern vehicle will not crank. visual inspection showed cracKin oil and coolant leaking from crack. attempted to manually turn engine would not move. locked up. Removed spark plug from cylinder 6 and found plug was crushed. used borescope to inspect inside cylinder and found piston was completely missing from the cylinder. Catastrophic damage to inside engine and pan full of large chunks of metal from failed pistons, spark plug pieces and valves broken and laying in pan. smart cost cap started, meets LTIS guidelines. Replaced longblock, manifold full of metal and could not be cleaned. Turbo was seized and would not turn. transfer any reuseable parts to new engine, cleaned all intake components of metal debris thoroughly cleaned and prepped all sealing surfaces. reassembled using new OTUP as directed, MTIME claimed to clean intake system of metal to prevent recontamination. replace cat converter due to excessive metal contamination. cleared codes and road tested 20 miles to confirm repair.	x

CUSTOMER STATES VEHICLE SHUT DOWN ON THE HIGHWAYAND WILL NOT START. VEHICLE ELECTRONICS ALLWORKING. LONG CRANK WITH VEHICLE FEELING LIKEITS TRYING TO START. PLEASE CHECK ANDADVI SE.	6007E .70 6007A 10.60 6007A34 3.70 DIAGNOSED CUSTOMER CONCERN ENGINE SHUT DOWN ON THE HIGHWAY AND IT WILL NOT START. VERIFIED CUSTOMER CONCERN FOUND LOW COMPRESSION ON LH BANK. REMOVED VALVE COVERS AND PLUGS FOR INSPECTION. FOUND ONE CYL 6 VALVE HAS DROPPED, CRACKING THE PISTON AND DAMAGING THE CYLINDER HEAD. REMOVED AND REPLACED LONG BLOCK.	x
CUSTOMER STATES HE WAS DRIVING THE TRUCK AND WAS APPROACHING A STOP LIGHT AND THE TRUCK SHUTOFF, WENT TO TRY AND START IT AND IT WAS A NO CRANK, TRIED AGAIN AND IT TRIED TURNING OVER FOR A SPLIT SECOND AND WOULDN`T DO ANYTHING. THE LIGHTS ON THE DASH AND 4 WAYS WORK, NO GRINDING OR NOISE OR DRAGGING . ACCESSORY POWER OR AUXILIARY POWER FAULT CAME ON. PLEASE CHECK AND ADVISE	VERIFIED CUSTOMER CONCERN OF NO CRANK NO START. PUSHED VEHICLE INTO THE SHOP AND HOISTED. TRIED MANUALLY CRANKING MOTOR, AND VERIFIED IT WAS SEIZED. REMOVED SPARK PLUGS AND INSPECTED CYLINDERS USING A BOROSCOPE. FOUND VALVE LAYING ON PISTON IN CYLINDER 5. NECC TO REPLACE LONG BLOCK ASSEMBLY. DRAINED OIL AND COOLING SYSTEM, EVAC AC, REMOVED LONG BLOCK ASSEMBLY AND TRANSFERRED COMPONENTS. REINSTALLED LONG BLOCK ASSEMBLY. TOPPED OFF ALL FLUIDS AND RECHARGED AC. AFTER ENGINE WAS INSTALLED VEHICLE HAD SLOW CRANK. FOUND DUE TO HIGH AMP DRAW IN STARTER. STARTER WAS DAMAGED DUE TO MANY STARTING ATTEMPTS ON A SEIZED MOTOR. REPLACED STARTER, AND PERFORMED CAM/CRANK MISSFIRE CORRECTION AND CLEARED ANY DTCS THAT WERE PRESENT. PERFORMED ROAD TEST AND RE HOISTED VEHICLE. PERFORMED POST REPAIR INSPECTION. AT THIS TIME THE VEHICLE IS OPERATING AS DESIGNED.	x
GAS ENGINE CONCERNS truck died while driving, cranks wont start	vehicle came in after dying on highway attempted to start vehicle and vehcile cranks but had no compression pulled codes and found a p0306 fro cylinder 6 misfire removed spark plug and found half of it beaten off borescoped cylinder and found a valve dropped and was beat through the engine filled out cost cap and vehicle qualified for ltis request number LTIS202202600461 removed the engine and turbos found metal in the cat converters and turbos and in the charge air cooler installed new engine and turbos installed in vehicle removed the cac and the cats and replaced them due to metal contamination flushed out all air intake tubes and replaced the intake due to metal contamination reassembled vehicle vacuum filled cooling system and performed post repair road test labor ops found were 6007a 10.6 6007abd .2 6007axq .2 6007a34 3.7 6775a .6 5212bt 3.5 18.8 total A copy of the RO with clock time and test results attached, also have attached smart cost cap page	x
CUSTOMER STATED THAT THE VEHICLE WAS TOWED IN AND NOW VEHICLE WON`T START AND JUST MAKES A CLUNKING NOISE WHEN TRYING TO START. CUSTOMER WAS DRIVING WHEN IT STOPPED RUNNING	6507 CC 01 POPPET VALVE BROKEN, FELL INTO COMBUSTION CHAMBER CAUSING INTERNAL ENGINE COLLISION. VERIFIED CONCERN, VEHICLE PRESENTED ENGINE LOCKED UP WILL NOT TURN WITH STARTER OR MANUALLY. IDS SELF TEST NO RELATED CODES. REMOVED SPARK PLUGS BORESCOPE CYLS FOUND MASS DAMAGE IN CYL 3 AND 4 PISTONS,CYL WALLS DAMAGED. SHORT BLOCK DAMAGE VERIFIED, LTIS APPLIES, REPLACED LONG BLOCK, REPLACED INTAKE, BOTH TURBOS, CAT CONVERTERS, CHARGE AIR COOLER FOR DEBRIS. SMALL KNICKS IN TURBO FINS. REPLACED PCV TUBE FOR DESIGN FLAW CAUSING IT TO BE A ONE TIME USE COMPONENT, REPLACED ENGINE OIL DRAIN PLUG ON NEW ENGINE WAS DAMAGED IN SHIPPING. RESET MISFIRE MONITOR , POST RD TEST OK RETEST PASS PASS MILES OUT 2754 MT IS FOR SEPARATING ENGINE AND TRANS WITH ENGINE LOCKED UP WITH OUT DAMAGING TORQUE CONVERTER, NO OPERATION FOR MISFIRE MONITOR RESET, NO OPERATION FOR BORESCOPE INSPECTION,	x

PER CUST, VEHICLE WILL NOT START,ACTS LIKE ADEAD BATT ERY	VERIFIED CONCERN- TESTED BATTERY AND OK. TRACED TO MOTOR LOCKED UP. WILL NEED FURTHER DIAG. WROTE HOTLINE # 118490655. REMOVED SPARK PLUGS, FOUND #4 PLUG CRUSHED & VALVES DROPPED. ORDERED LONG BLOCK FOR REPLACEMENT. DUE TO THE ENGINE BEING LOCKED UP I COULDN`T ROTATE THE ENGINE TO GET THE TORQUE CONVERTER BOLTS REMOVED. HAD TO REMOVE HOOD, FRONT GRILL & REMOVED MOTOR/TRANS AS A UNIT. SEPARATED TRANS FROM ENGINE WITH CONVERTER STILL CONNECTED TO ENGINE AND THEN WAS ABLE TO GET THE CONVERTER OFF. INSTALLED NEW MOTOR & HAD TO REPLACE THE INTAKE MANIFOLD DUE TO DEBRIS FROM ENGINE GETTING UP INTO IT. PERFORMED MISFIRE MONITOR LEARN. CLEARED ALL CODES & ROAD TEST.	x
ENGINE ISSUE DIED ON ROAD - VEHICLE BEING TOWED IN	VEHICLE WAS TOWED IN. REMOVED THE BELTS. ENGINE WOULD NOT TURN OVER. WILL TURN OVER COUNTER CLOCKWISE BUT WILL LOCK UP CLOCKWISE. DRAINED OIL-HAS METAL SHAVINGS IN FLUID. INSPECTED THE OIL FILTER- HAS CHUNKS OF METAL INSIDE. INSPECTED INSIDE OIL PAN WITH BOROSCOPE AND FOUND LARGE PIECES OF ENGINE DEBRIS ON BOTTOM OF PAN. BOROSCOPE DOWN THE INTAKE MANIFOLD- FOUND CYLNDER #5 INTAKE VALVE STEM NOT PRESENT. ALL OTHERS ARE INTACT. CONTACTED TECH SUPPORT REQUEST #118686325. THEY ADVISED THERE WERE NO SERVICE BULLETINS USE LTIS FOR THIS REPAIR TO REPLACE THE LONG BLOCK ASSY. PER THE SHOP MANUAL SECTION 303-01B REMOVED ALL COMPONENTS FOR ACCESS TO REMOVE ENGINE ASSY. SWAP ALL NECESARY PARTS TO NEW ENGINE. REPLACED ALL THE NONREUSABLE HARDWAER PER SHOP MANUAL PROCEDURES. FILLED ALL FLUIDS TO LEVEL. RUN ENGINE TO TEMPERATURE. CHECK OVER. ROAD TEST. FILLED OUT COST CAP TOOL ATTESTATION FORM #LTIS202203600193. SERVICE MANAGEMENT VERIFIED LOWER END DAMAGE TO ENGINE. (PART DELAYED PARTS ORDER #R93647- COMPLETED COPIS CASE #CAS-35463714-L6C0L8 TO GET ENGINE SHIPPED SOONER.) DUE TO THE ENGINE DIED ON THE ROAD	x
MISCASR CUSTOMER STATES WHILE DRIVING, FELT VEHICLE RUMBLE FOR A FEW SECONDS, THEN VEHICLE LOST ACCELERATION AND NOW HAS CRANK NO START	VEH CRANKS WONT START FRDS QT P2282 P0300 P0304P0305P0306 DRAIN OIL COOLANT IN OIL METAL IN OIL REMOVE OIL FILTER METAL IN FILTER PERFORM REL COMPRESSION TEST 5% #5 CYL 4% #4 CYL REMOVE SPARK PLUG BORESCOPE #5 CYL FOUND DAMAGED CYL HEAD PISTON AND CYL WALLS DROPPED VALVE FILL OUT COST CAP FOR LONG BLOCK REMOVE INSTALL ENGINE R AND I STABILIZER BAR R AND I BUMPER BAR REPLACED LONG BLOCK found metal and debris in intake manifold extra time to remove t body and all sensors clean out intake manifold FOUND METAL IN BOTH TURBOS EXTRA TIME TO CLEAN OUT OIL FEED TUBE REPLACED THE SCREENS CLEAN OUT OIL DRAN BACK TUBES CLEAN ALL CHARGE AIR HOSES, REMOVE AND INSTALL CHARGE AIR COOLER AFTER CLEAN OUT REPLACED EGR FOUND METAL DEBRIS IN EGR REPLACED EGR COOLER FULL OF LIQUID AND METAL EXTRA TIME FOR LONG ROAD TEST TO CLEAR OUT COOLANT FROM EXHAUST EXTRA TIME TO RECRATE OLD ENGINE FOR RETURN TECH 243	x
CUSTOMER STATES THERE WAS A WHITE CLOUD OF SMOKE THEN THE ENGINE STALLED, THE DASH BOARD HAD ERROR MESSAGE COME ON TO PARK AND RESTART. VEHICLE WOULD NOT RESTART ONLY CRANKS CHECK AND ADVISE	VALVE CONCERN, VALVE DROPPED ON CYLINDER #5 CAUSING DAMAGE TO ENGINE BLOCK/PISTON AND CYLINDER HEAD. NO COST CAP OR PRIOR APPROVAL NEEDED PER FMC GUIDELINES. DIAG VERIFIED CUSTOMERS CONCERN. ECC TEST PO306 P0307. PERFORMED RELATIVE COMPRESSION. #5 LOW. REMOVED SPARK PLUG FOUND DAMAGE TO SPARK PLU. PERFORMED MANUAL COMPRESSION. 0 PSI. DURING MANUAL COMPRESSION TEST ENGINE LOCKED UP. USED BORESCOPE FOUND DAMAGE TO CYLINDER 5 AND WATER INTRUSION. TEAR DOWN AND INSPECTED REMOVED VALVE COVER FOUND DROPPED VALVE. R&I ENGINE INSPECTED TURBOS REPLACED INTAKE MANIFOLD. REPLACED LONG BLOCK, NECESSARY TO REPLACE INTAKE MANIFOLD FOR METAL INTRUSION AND DAMAGE TO INTAKE PORT DUE TO VALVE DROPPING. CLEARED CODES TEST DROVE ALL OK AT THIS TIME.	x

From: Smith, Cressel (C.)
Sent: Wednesday, August 18, 2021 11:13 AM
To: Mazzella, Brian (B.R.); Moore, Brian (B.M.)
Cc: Strand, Tim (T.A.); Hewlett, Matt (M.S.)
Subject: RE: Concern Number:SAQ2021620161 Concern Title: U725 2.7L Engine - Loss of Power

C14249175

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Wednesday, August 18, 2021 11:09 AM
To: Moore, Brian (B.M.) <bmoore1@ford.com>
Cc: Strand, Tim (T.A.) <tstrand2@ford.com>; Smith, Cressel (C.) <csmit840@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: Re: Concern Number:SAQ2021620161 Concern Title: U725 2.7L Engine - Loss of Power

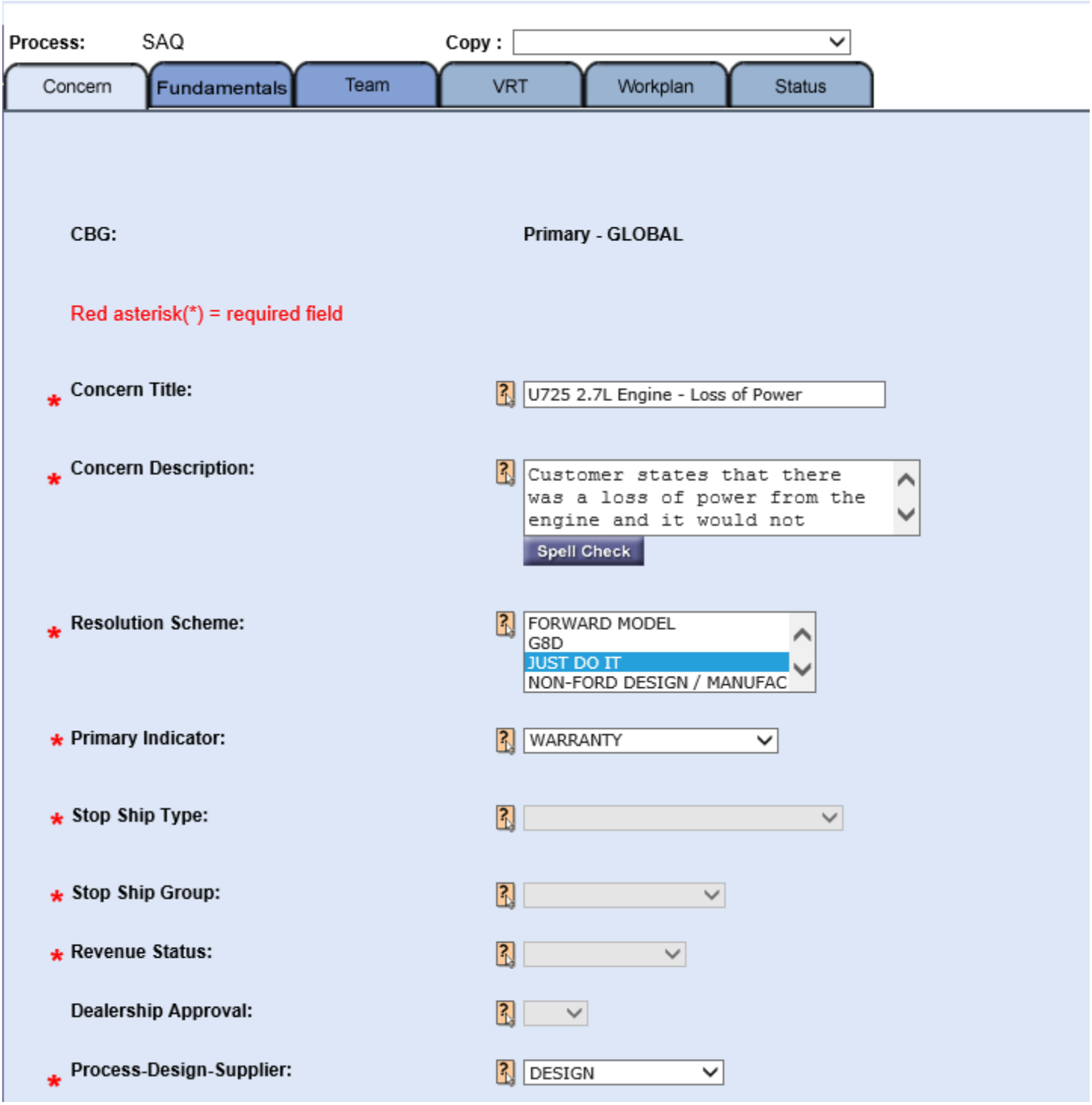
Ok for the broken intake valves.
Yes we have a CR in the system.

Brian R Mazzella
Global Engine Engineering
21MY- beyond Nano Engine Program Supervisor Vehicle Interface

---

From: Moore, Brian (B.M.) <bmoore1@ford.com>
Sent: Wednesday, August 18, 2021 10:43 AM
To: Mazzella, Brian (B.R.)
Subject: RE: Concern Number:SAQ2021620161 Concern Title: U725 2.7L Engine - Loss of Power

Brian,
These are the (2) recent 2.7L Engine Failures on the Bronco program in the field (replacement engines were supplied by LEP directly to the Dealers).
The warranty claims just came into the GSAR system yesterday.
There was a presentation reviewed last week at the Ranger/Bronco VQR on this issue and once
I have the ICA/PCA, I can update the BSAQ Concern.



Regards,
Brian M. Moore

MAP – PT PVT
bmoore1@ford.com
(313) 805-3902

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Wednesday, August 18, 2021 10:02 AM
To: Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: RE: Concern Number:SAQ2021620161 Concern Title: U725 2.7L Engine - Loss of Power

Brian -- my access denied.. Can you send me a copy of the issue for this one? One engine or multiple etc?

Brian R. Mazzella
Global Engine Engineering
22MY-beyond Nano Engine Programs Supervisor (Vehicle Interface)

From: GSARHELP@ford.com <GSARHELP@ford.com>
Sent: Wednesday, August 18, 2021 9:30 AM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Subject: Concern Number:SAQ2021620161 Concern Title: U725 2.7L Engine - Loss of Power

You have been added by BMOORE1, as Concern Champion to SAQ2021620161-U725 2.7L Engine - Loss of Power in the BSAQ System.

You have Read access to the concern information.

Team members with Ford Intranet access can view the concern at:
https://www.bsaq.ford.com/bsaq/bsaqNavigator.do?targetScreen=ConcernxtConcernVO.concernId=SAQ2021620161

From: Birr, Jodi (J.)
Sent: Tuesday, January 19, 2021 3:30 PM
To: Knott, Tim (.)
Subject: RE: Engine Teardowns

Hi Tim,

Any updates for these (3) engines that were sent to EMDO?

Thanks,

Jodi Birr
313.938.9385

From: Knott, Tim (.) <tknott@ford.com>
Sent: Thursday, December 10, 2020 10:03 AM
To: Birr, Jodi (J.) <jbirr@ford.com>
Subject: RE: Engine Teardowns

Engines arrived and are in queue for teardown.
I don't have a scheduled date yet.

From: Birr, Jodi (J.) <jbirr@ford.com>
Sent: Wednesday, December 9, 2020 12:50 PM
To: Knott, Tim (.) <tknott@ford.com>
Subject: Engine Teardowns

Tim:

Any information on the (3) engines we sent you for teardown?

Thanks,

Jodi Birr
Quality Analyst

Ford Lima Engine Plant
1155 Bible Road
Lima, Ohio 45801
(D) 419.226.7302 | (M) 313.938.9385
jbirr@ford.com

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Wednesday, June 15, 2022 6:49 AM
To: Hewlett, Matt (M.S.); Verhoff, Darrin (D.J.); Steinke, Cody (C.); Butler, Aaron (A.)
Cc: Adam, Paul (P.J.); Joiner, Dionte (D.); Birr, Jodi (J.)
Subject: RE: ETA for Nano Valves from Teardown

Matt,

Sorry there were a couple deliveries. I was referring only to 3 broken valve samples. Do not need good valves.

Just 3 warranty returns will all pieces of the valve bagged by engine number and vehicle miles.

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Tuesday, June 14, 2022 10:51 PM
To: Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Hi Darrin,

The lab made a mistake with the last sets of valves we sent for analysis.

Can you please package up three engine sets of intake valves and send them to Building 1?
3 bags of valves:

- wrapped and protected
- labeled with the engine serial number
- 11 good intake valves
- one broken intake valve with both pieces.

Send to:
Attn: Jeff Kolodziejczyk (313-805-9213)
Ford Motor Company Building 1 (FD20T)
20000 Rotunda Drive
Dearborn, MI 48124

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Hewlett, Matt (M.S.)
Sent: Tuesday, May 17, 2022 10:43 AM
To: Birr, Jodi (J.) <JBIRR@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Steinke, Cody (C.) (csteink2@ford.com) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Attn: Jeff Kolodziejczyk (313-805-9213)
Ford Motor Company Building 1 (FD20T)
20000 Rotunda Drive
Dearborn, MI 48124

That's still correct, right?

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Birr, Jodi (J.) <jbirr@ford.com>
Sent: Tuesday, May 17, 2022 10:38 AM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

I was over in Dyno this morning. The box is still on the Dyno table.

Darren, can you get this sent to Jeff Kolodziejczyk?

Jodi Birr
313.938.9385

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Tuesday, May 17, 2022 9:46 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Can anyone supply a shipper or tracking number for this package?

Hi Dionte, Expecting a package addressed to me from Lima Engine Plant. Please let me know if you see it.

Thanks,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Monday, May 16, 2022 9:51 AM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

They were boxed on Friday. They should be on the way

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Monday, May 16, 2022 8:30 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>
Subject: ETA for Nano Valves from Teardown

Hi Matt,

Do you have an ETA for the 3 engine sets of valves from dropped valve exchanges?

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Wednesday, June 22, 2022 6:25 AM
To: Steinke, Cody (C.); Verhoff, Darrin (D.J.); Hewlett, Matt (M.S.); Butler, Aaron (A.)
Cc: Adam, Paul (P.J.); Joiner, Dionte (D.); Birr, Jodi (J.)
Subject: RE: ETA for Nano Valves from Teardown

Thanks Cody. They arrived in building 1 yesterday. Appreciate the help on this!

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Steinke, Cody (C.) <csteink2@ford.com>
Sent: Wednesday, June 22, 2022 6:23 AM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Jeff: This valves show delivered. Please confirm receipt on your end.

Thank you,

PE22-007 000265 ER

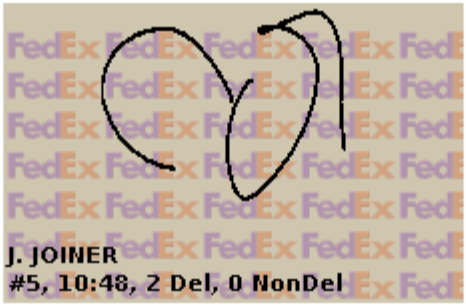
777165840061

ADD NICKNAME

Delivered
Tuesday, 6/21/2022 at 10:48 am

DELIVERED

Signed for by: JJOINER



GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM

Scott Mosley
Scott Mosley

1155 Bible Rd
Lima, OH US 45801
419-226-7183

TO

JEFF KOLODZIEJCZ
FORD RESEARCH & ENGIN

20000 ROTUNDA/REC 1/BLI
Dearborn, MI US 48124
419-226-7000

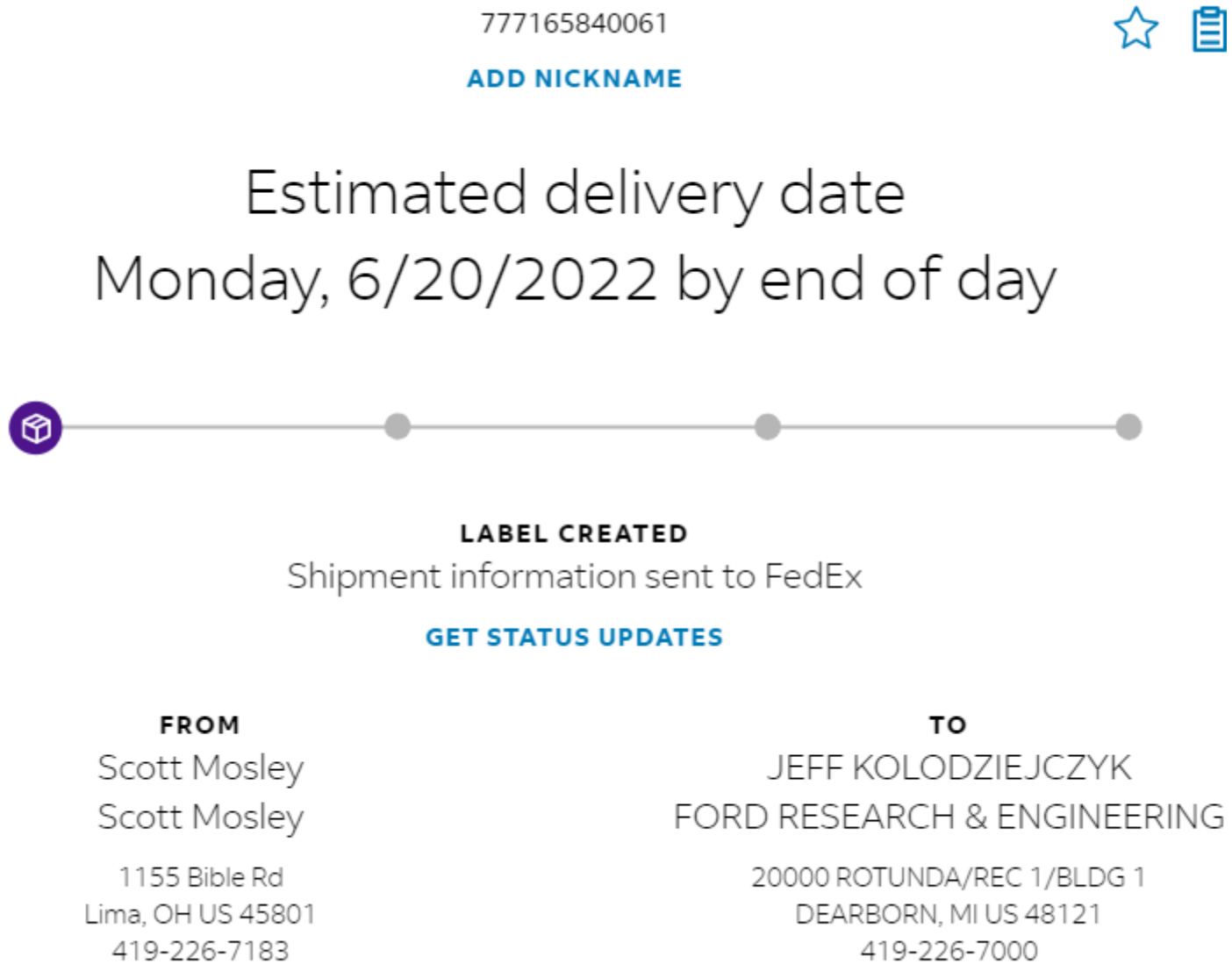
Cody Steinke
Production Control
Lima Engine Plant
Ford Motor Company
419-226-7253

From: Steinke, Cody (C.)
Sent: Saturday, June 18, 2022 6:17 AM

To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

The FedEx tracking # is 7771 6584 0061.

Thanks,



Cody Steinke
Production Control
Lima Engine Plant
Ford Motor Company
419-226-7253

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Wednesday, June 15, 2022 8:34 AM
To: Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Thanks!

We only need 3 of the 3rd keeper groove failure warranty returns for analysis. No other good valves needed.

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Sent: Wednesday, June 15, 2022 6:48 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Yes, we will get them together and sent out.

Thanks,
Darrin Verhoff
DYNO/LAYOUT
LIMA ENGINE PLANT
419 226 7668

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Tuesday, June 14, 2022 10:51 PM
To: Verhoff, Darrin (D.J.) <dverhoff@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Hi Darrin,

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3 bags of valves:

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Attn: Jeff Kolodziejczyk (313-805-9213)
Ford Motor Company Building 1 (FD20T)
20000 Rotunda Drive
Dearborn, MI 48124

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Hewlett, Matt (M.S.)
Sent: Tuesday, May 17, 2022 10:43 AM
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Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Attn: Jeff Kolodziejczyk (313-805-9213)
Ford Motor Company Building 1 (FD20T)
20000 Rotunda Drive
Dearborn, MI 48124

That's still correct, right?

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

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Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

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Jodi Birr
313.938.9385

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Tuesday, May 17, 2022 9:46 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Birr, Jodi (J.) <JBIRR@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Joiner, Dionte (D.) <djoiner1@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

Can anyone supply a shipper or tracking number for this package?

Hi Dionte, Expecting a package addressed to me from Lima Engine Plant. Please let me know if you see it.

Thanks,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Monday, May 16, 2022 9:51 AM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Verhoff, Darrin (D.J.) <dverhoff@ford.com>
Subject: RE: ETA for Nano Valves from Teardown

They were boxed on Friday. They should be on the way

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Monday, May 16, 2022 8:30 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>
Subject: ETA for Nano Valves from Teardown

Hi Matt,

Do you have an ETA for the 3 engine sets of valves from dropped valve exchanges?

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Pearson, Gavin (G J R.)
Sent: Thursday, July 29, 2021 9:25 AM
To: Strand, Tim (T.A.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.); Simon, David (D.); Lyons, Marcus (M.I.); Liddle, Preston (P.); Suetterlin, Terry (T.D.); Kilby, John (J.G.); Ward, Zachary (Z.); Schuh, Rudy (R.); Birr, Jodi (J.); Steslicki, Michael (M.E.); Hashbarger, Jacob (J.E.); Moore, Roger (R.D.); Sheidler, Tom (T.L.); McDonagh, Scot (S.M.); Bautz, Jeffrey (J.E.); Adam, Paul (P.J.); Kolodziejczyk, Jeffrey (J.A.); Rhude, Benjamin (B.)
Subject: RE: Failed 2.7L - Bronco - 1FMEE5BP1MLA71500 - valve failure cyl 5
Attachments: BRONCO ENGINE FAILURE IMAGES

Pictures attached. They're ordering a new long block and I asked them to look at the LH turbo & order a new one if there is any debris in the turbine.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Strand, Tim (T.A.) <tstrand2@ford.com>
Sent: Thursday, July 29, 2021 8:52 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Schuh, Rudy (R.) <rschuh1@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Hashbarger, Jacob (J.E.) <jhashbar@ford.com>; Moore, Roger (R.D.) <rmoore36@ford.com>; Sheidler, Tom (T.L.) <tsheidl1@ford.com>
Subject: RE: Failed 2.7L - Bronco

If anyone talks to the dealer, can we get a picture of the valve/screen of borescope? Thanks,

Tim Strand
Nano Engine Systems Supervisor
Cell: (313) 805-9701
tstrand2@ford.com

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Thursday, July 29, 2021 7:40 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Schuh, Rudy (R.) <rschuh1@ford.com>; Birr, Jodi (J.) <jbirr@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Hashbarger, Jacob (J.E.) <jhashbar@ford.com>; Moore, Roger (R.D.) <rmoore36@ford.com>; Sheidler, Tom (T.L.) <tsheidl1@ford.com>
Subject: RE: Failed 2.7L - Bronco

MB3E-6007-AA – engine as shipped
MB3E-6006-AA – long block

Gavin, Dave, is there still a man-in-a-van program for 21 Bronco rapid diagnosis?

1FMEE5BP1MLA71500 (VBD Jun 19) - EF06A21165120177 MB3E 6007 AA (EBD June 14)
743 miles
CONCER 07/26/2021 11:45AM
CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.
TECH/C 07/26/2021 11:45AM
VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

1FMEE5DP3MLA66408 (VBD Jun 25) - EF06A21161120082 MB3E 6007 AA (EBD June 10)
1146 miles
CONCER 07/27/2021 09:24AM
customer was driving had loss of power , trailer default message, dash went black and vehicle shut down. will not turn over. engine seems to locked up.
TECH/C 07/27/2021 09:24AM
tried turning over manually and engine is locked

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, July 28, 2021 8:49 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Failed 2.7L - Bronco

Matt – what is the 6007 part number for Bronco 2.7 engine complete as produced today by LEP. I would like to check that it is catalogued by Terry and available for shipment by Preston. Thanks.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Katinas, Dana (D.J.) <dkatinas@ford.com>
Sent: Wednesday, July 28, 2021 7:39 PM

To: Simon, David (D.) <dsimon1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Subject: Fwd: Failed 2.7L - Bronco

Awareness. Pair of failed 2.7 engines emerging issue.

Dana Katinas
Ford Motor Company
IPTSE Nano V6 / Coyote V8 Engine Systems Mgr
313-805-2303
dkatinas@ford.com

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Wednesday, July 28, 2021 5:22 PM
To: Strand, Tim (T.A.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.)
Subject: FW: Failed 2.7L - Bronco

Info

Brian R. Mazzella
Global Engine Engineering
21MY-beyond Nano Engine Programs Supervisor (Vehicle Interface)

From: Melki, Imad (I.E.) <imelki@ford.com>
Sent: Wednesday, July 28, 2021 5:21 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kilby, John (J.G.) <jkilby1@ford.com>; Mancini, JonCarlo (J.) <jmancin6@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>
Cc: Moore, Brian (B.M.) <bmoore1@ford.com>
Subject: FW: Failed 2.7L - Bronco
Importance: High

2,7L V6 Team,
Please see two engine failure claims.

Respectfully submitted,
Imad E. Melki
Powertrain PVT Supervisor - MAP
MAP – PVT, Q12
Wayne, MI 48184
USA
Telephone +1 313-8053707

From: Vylasek, Stephan (S.) <svylasek@ford.com>
Sent: Wednesday, July 28, 2021 5:17 PM
To: Melki, Imad (I.E.) <imelki@ford.com>
Cc: Shah, Kiran (K.H.) <kshah12@ford.com>
Subject: FW: Failed 2.7L - Bronco

Wrong person! :) This one is for you Imad.

Kiran,

Here are the two failed 2.7L engine reports. The comments are brief, but straight forward. I plan to call them in the morning to see if the engines are indeed complete replacements. If they are, this will open into an emerging QSF. One more and we are QSF reporting in the FQRs.

I'll let you know how the calls to these dealers go.

Steve Vylasek
Concern ID & Resolution – Program Manager
Mustang / Continental / Bronco / Ranger / EcoSport
Ford Motor Company – FCSD
(313)-323-7817 / SVylasek@Ford.com

From: WOOD, JOSEPH
Sent: Thursday, July 29, 2021 9:09 AM
To: Pearson, Gavin (G J R.)
Subject: BRONCO ENGINE FAILURE IMAGES

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Hi Gavin, sending you the pictures we just spoke about, let me know if you need any further pictures or information. Thanks, Joe Wood

JWOOD@BOMMARITO.NET

(314)712-2128

BRONCO
THE FORD STORE
Bommarito
Ford

From: Rhude, Benjamin (B.)
Sent: Friday, August 6, 2021 3:11 PM
To: Adam, Paul (P.J.); Trpcevski, Larry NM/TRY-VSA; Kolodziejczyk, Jeffrey (J.A.)
Subject: RE: FedEx Shipment 282285281000 Notification

Hey Larry,

Here is some of the information below, let me know if you need anything else.

Vin: 1FMEE5BP1MLA71500
Odometer: 743 Mi
Build date: 06/19/2021

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Friday, August 6, 2021 2:33 PM
To: Trpcevski, Larry NM/TRY-VSA <ljupco.trpcevski@schaeffler.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: Fwd: FedEx Shipment 282285281000 Notification

Larry, as discussed - tracking attached.

Ben, please provide the Missouri vehicle details to Larry if you haven't already. Thanks

Paul
313-580-3971

From: TrackingUpdates@fedex.com <TrackingUpdates@fedex.com>
Sent: Friday, August 6, 2021 2:06:29 PM
To: Adam, Paul (P.J.) <padam6@ford.com>
Subject: FedEx Shipment 282285281000 Notification

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

This tracking update has been requested by:

Company Name: FORD MOTOR CO
Name: Paul Adam
E-mail: padam6@ford.com

Paul Adam of FORD MOTOR CO sent Larry Trpcevski 1 FedEx Priority Overnight® package(s). This shipment is scheduled to be sent on 08/06/2021.

Reference information includes:

Ship date:	Aug 6, 2021
Estimated delivery date:	Mon, 8/9/2021 by 10:30 am
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Medium Box
Number of pieces:	1
Weight:	3.00 lb.
Special handling/Services	Deliver Weekday
Standard transit:	8/9/2021 by 10:30 am
Status:	Picked up

Tracking number: 282285281000

Shipper Information	Recipient Information
DEARBORN	TROY
MI	MI
US	US

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 1:06 PM CDT on 08/06/2021.

The shipment is scheduled for delivery on or before the scheduled delivery displayed above. FedEx does not determine money-back guarantee or delay claim requests based on the scheduled delivery. Please see the FedEx Service Guide for terms and conditions of service, including the FedEx Money-Back Guarantee, or contact your FedEx customer support representative.

To track the status of this shipment online, please use the following: https://clicktime.symantec.com/3XBK42bPnBYTEMRDcWceoKW7Vc?u=https%3A%2F%2Fwww.fedex.com%2Fapps%2Ffedextrack%2F%3Faction%3Dtrack%26tracknumbers%3D282285281000%26language%3Den%26opco%3DFX%26clientype%3Divother

Standard transit is the date and time the package is scheduled to be delivered by, based on the selected service, destination and ship date. Limitations and exceptions may apply. Please see the FedEx Service Guide for terms and conditions of service, including the FedEx Money-Back Guarantee, or contact your FedEx Customer Support representative.

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From: Mark Reader (Hazelwood Ford Parts Manager) <mreader@bommarito.net>
Sent: Friday, July 30, 2021 9:17 AM
To: Sean Johnson; Pearson, Gavin (G J R.); Johnson-Roy, Taylor; 'WOOD, JOSEPH'
Cc: Strand, Tim (T.A.); Simon, David (D.); Katinas, Dana (D.J.); Hewlett, Matt (M.S.); Lyons, Marcus (M.I.); Vylasek, Stephan (S.); Ward, Zachary (Z.); Steslicki, Michael (M.E.)
Subject: Re: Ford Bronco engine - Bommarito Ford

I received a call from Ford this morning the Engine is supposed to arrive this evening. The driver will have my contact info for me to meet him if needed after hours.

Mark T Reader
Bommarito Ford Parts Mananger
314-895-0600 ext 19733
mreader@bommarito.net

---- Original Message ----
From: "Sean Johnson" <seanjohnson@bommarito.net>
Sent: 7/30/2021 8:14:39 AM
To: "'Pearson, Gavin \(G J R.\)'" <gpearso3@ford.com>, "'Johnson-Roy, Taylor'" <tjohnsonroy@bommarito.net>, "'Reader, Mark'" <mreader@bommarito.net>, "'WOOD, JOSEPH'" <JWOOD@BOMMARITO.NET>
Cc: "'Strand, Tim \(T.A.\)'" <tstrand2@ford.com>, "'Simon, David \(D.\)'" <dsimon1@ford.com>, "'Katinas, Dana \(D.J.\)'" <dkatinas@ford.com>, "'Hewlett, Matt \(M.S.\)'" <mhewlet1@ford.com>, "'Lyons, Marcus \(M.I.\)'" <mlyons3@ford.com>, "'Vylasek, Stephan \(S.\)'" <svylasek@ford.com>, "'Ward, Zachary \(Z.\)'" <zward1@ford.com>, "'Steslicki, Michael \(M.E.\)'" <msteslic@ford.com>
Subject: RE: Ford Bronco engine - Bommarito Ford

Good morning all,

Joe will get to the Bronco later today to start removal of the engine. Joe has a few jobs to get finished today for the end of the month and needs to get the Bronco onto his hoist to start disassembly. I would say that we can confidently plan to have the engine out by Tuesday morning. If we can get it done quicker, we certainly will.

Once we receive the new engine, we will secure the old engine onto the shipping crate for return.

Do we have a tracking number for the engine that is in route to us so that we can have a better idea of how to plan for the swap?

Regards,

Sean Johnson
Fixed Operations Director
Bommarito of Hazelwood
Ford, Volkswagen, Nissan, Toyota, Honda, Nissan Ballwin
seanjohnson@bommarito.net
Cell: 6362199675
Office: 3147374120

Please consider the environment before printing this email

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From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Friday, July 30, 2021 4:21 AM
To: Sean Johnson <seanjohnson@bommarito.net>; Johnson-Roy, Taylor <tjohnsonroy@bommarito.net>; Reader, Mark <mreader@bommarito.net>; WOOD, JOSEPH <JWOOD@BOMMARITO.NET>
Cc: Strand, Tim (T.A.) <tstrand2@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: RE: Ford Bronco engine - Bommarito Ford

Sean / Taylor / Mark / Joe,

Thank you for the assistance you have given us with respect to investigating the 2.7L Bronco engine in vehicle 1FMEE5BP1MLA71500.

We have made arrangements to ship you a complete engine direct from the engine factory in Lima, Ohio and also key components necessary to fit the engine in the vehicle direct from the vehicle assembly plant in Wayne, Michigan.

As you can tell by the speed at which everything has moved we would like to get the engine back for analysis at the earliest opportunity and would be highly appreciative if you were to make appropriate arrangements to remove the engine so it can be shipped out on Monday.

To facilitate this please can you email us (please copy the cc list):

1) Confirmation of receipt of the engine.
2) Anticipated time that engine will be out of vehicle – e.g. Sunday 2pm.
3) Confirmation that engine is in shipping crate and when a shipping company can collect engine – e.g. Monday 8am CST.

Thank you.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Sean Johnson <seanjohnson@bommarito.net>
Sent: Thursday, July 29, 2021 5:29 PM
To: WOOD, JOSEPH <JWOOD@BOMMARITO.NET>; GPEARS03@FORD.COM; Strand, Tim (T.A.) <tstrand2@ford.com>
Cc: Johnson-Roy, Taylor <tjohnsonroy@bommarito.net>; Reader, Mark <mreader@bommarito.net>; GPEARS03@FORD.COM; Pearson, Gavin (G J R.) <gpearso3@ford.com>
Subject: RE: Ford Bronco engine

WARNING: This message originated outside of Ford Motor Company. Use caution when opening attachments, clicking links, or responding.

Let us know what we can do to help and who we need to talk to about getting an authorization to return the engine that we have p[previously ordered.

Regards,

Sean Johnson
Fixed Operations Director
Bommarito of Hazelwood
Ford, Volkswagen, Nissan, Toyota, Honda, Nissan Ballwin
seanjohnson@bommarito.net
Cell: 6362199675
Office: 3147374120

From: Joe Wood (Hazelwood Ford Service Tech) <jwood@bommarito.net>
Sent: Thursday, July 29, 2021 4:18 PM
To: GPEARS03@FORD.COM; TSTRAND2 <TSTRAND2@FORD.COM>
Cc: Sean Johnson <seanjohnson@bommarito.net>; Johnson-Roy, Taylor <tjohnsonroy@bommarito.net>; MREADER@BOMMARITO.NET
Subject: Ford Bronco engine

Good afternoon Gavin and Tim, below is the requested information for our parts and service managers.

Sean Johnson, Fixed Operations Director

seanjohnson@bommarito.net

Direct line - (314)737-4120

Cell - (636)219-9675

Taylor Johnson-Roy, Service Manager

(314)737-4101

Cell - (618)980-5017

Mark Reader, Parts Department Manager

(314)731-1222 ext. 19733

Cell (314)704-4396

Attachments : 0

Report# :	M7ZCV005 CREDSR--or-- Q 202193761282			**Received:**	07/26/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,4X4 ,4DR ,MPV ,1FMEE5BP1MLA71500			**Build Date:**	06/19/2021
Odometer :	743 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 08189 Bommarito Ford			**Phone#:**	314-895-0600
City:	Hazelwood	**State:**	Missouri	**Country :**	USA
Originator:	JOE WOOD	**Originator e-mail:**	JWOOD@BOMMARITO.NET		
Symptom:	4 40 3 02 ST/RN/MV,STARTING,CRANK NO START ,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:					
Fix:	**Causal Component :**		ENGINE ASSY/BARE -- RPL		
Condition Code:					

Region Code: C4 Region Name: Kansas City

DTC:

PCM:P0305:00-65

Comments :

CONCER 07/26/2021 11:45AM

CUSTOMER STATES ENGINE STALLED AT HIGHWAY SPEEDS AND WOULD NOT RESTART.

TECH/C 07/26/2021 11:45AM

VERIFIED CRANK/NO START CONCERN. SELFTESTED MODULES, P0305 PRESENT. PERFORMED RELATIVE COMPRESSION TEST. FOUND ONLY 1% LOSS ON #5 CYLINDER. REMOVED SPARK PLUG AND FOUND SEVERE DAMAGE TO SPARK PLUG, USED BORE SCOPE TO INSPECT CYLINDER AND FOUND VALVE LAYING ON TOP OF PISTON. SEVERE DAMAGE TO PISTON PRESENT. NO FURTHER TEAR DOWN HAS BEEN PERFORMED AT THIS TIME.

Click here to View Report Summary

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Monday, May 23, 2022 4:26 PM
To: Jacobs, Jeremy (J.); Mazzella, Brian (B.R.)
Subject: Re: Help locating Nano parts in the crib

We wouldn't want to use these anyway. They were superseded by the BA.
Thanks Jeremy! I will grab them tomorrow.

Get Outlook for iOS

From: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Sent: Monday, May 23, 2022 3:21:12 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: Re: Help locating Nano parts in the crib

Nope

Jeremy Jacobs
IPTSE Nano Engine Systems
313-498-8537

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Monday, May 23, 2022 3:12:23 PM
To: Jacobs, Jeremy (J.) <jjacob93@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Help locating Nano parts in the crib

We don't need for any of the DCV builds right?

Brian R. Mazzella
Global Engine Engineering
22MY-beyond Nano Engine Programs Supervisor (Vehicle Interface)

From: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Sent: Monday, May 23, 2022 2:01 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Help locating Nano parts in the crib

We have 27 in the crib. I'll pull them to Jeff's name. they can be picked up tomorrow.

Jeremy Jacobs
Nano Engine Systems Technologist
313-498-8537

From: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Sent: Monday, May 23, 2022 1:54 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: Re: Help locating Nano parts in the crib

Thomas Alex is trying to cover only the key CPMTS and then Salah will do the overage when he gets back from vacation Jeremy pls check

Brian R Mazzella
Future Nano Engine Programs

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Monday, May 23, 2022 12:39:28 PM
To: Mazzella, Brian (B.R.) <bmazzell@ford.com>
Subject: Help locating Nano parts in the crib

Hi Brian, I forgot who was backfilling Cressel.

Can someone help look in the crib for availability of JT4E-6507-AB (intake valves)?

I need 20-30 to support failure replication testing for Nano dropped valve failures.

Thanks.

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.)
Sent: Friday, September 24, 2021 6:59 AM
To: Kolodziejczyk, Jeffrey (J.A.); Pearson, Gavin (G J R.); Reinhart, Paul (T.)
Cc: Adam, Paul (P.J.); Williams, Brian (B.E.); Ward, Zachary (Z.)
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Work Order Number: 2313346

CCMM on Both LH cyl head valve guides.

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, September 23, 2021 5:06 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Adam,

Yes, I didn't include since I thought it was already shipped to RR..but if you can include it please do.

A couple sample of 3 level guide measurements is sufficient.

Thanks.
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Thursday, September 23, 2021 2:03 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Does the team want both engines (L/H heads sent in)?
Frisco Texas
Hughes Springs Texas

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, September 23, 2021 1:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.)

<zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Adam,

Team is requesting CMM 3 level valve guide inspection on LH head intake guides.

Can you submit request?

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Thursday, September 23, 2021 10:00 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Engine is tore down,

Parts on display Table 5-D

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, September 22, 2021 12:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Thanks for letting us know Adam.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Wednesday, September 22, 2021 12:37 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: Hughes Springs Tx, 2.7L Bronco just came in.

Report# :	M84EU002 NHL			**Received:**	08/30/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA63603			**Build Date:**	06/12/2021
Odometer :	1,372 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02508 Dewey Moore Ford			**Phone#:**	903-639-2516
City:	Hughes Springs	**State:**	Texas	**Country :**	USA
Originator:	WILLIAM DEAN				

Originator e-mail:	SCOTT.DEAN24@YAHOO.COM
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS
Status:	
VFG:	V52 DRIVEABILITY
Additional Symptom:	smoke from exhaust/stalled
Fix:	**Causal Component :**
Condition Code:	

Hotliner: TMASCARI **Phone:** **Regn Cd:** C1 Dallas

Engineering: **Phone:** **TAR:**

Dlr Contact: WILLIAM DEAN **Phone:** **Title Cde:** SM

From: Sanaski, Adam (A.)
Sent: Wednesday, September 22, 2021 1:03 PM
To: Pearson, Gavin (G J R.); Matthews, Matt (.)
Cc: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Williams, Brian (B.E.); Ward, Zachary (Z.)
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.
Attachments: 100_0360.JPG; 100_0361.JPG; 100_0362.JPG; 100_0363.JPG; 100_0364.JPG; 100_0365.JPG; 100_0366.JPG; 100_0367.JPG

#5 primary intake valve.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, September 22, 2021 12:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Thanks for letting us know Adam.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Wednesday, September 22, 2021 12:37 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: Hughes Springs Tx, 2.7L Bronco just came in.

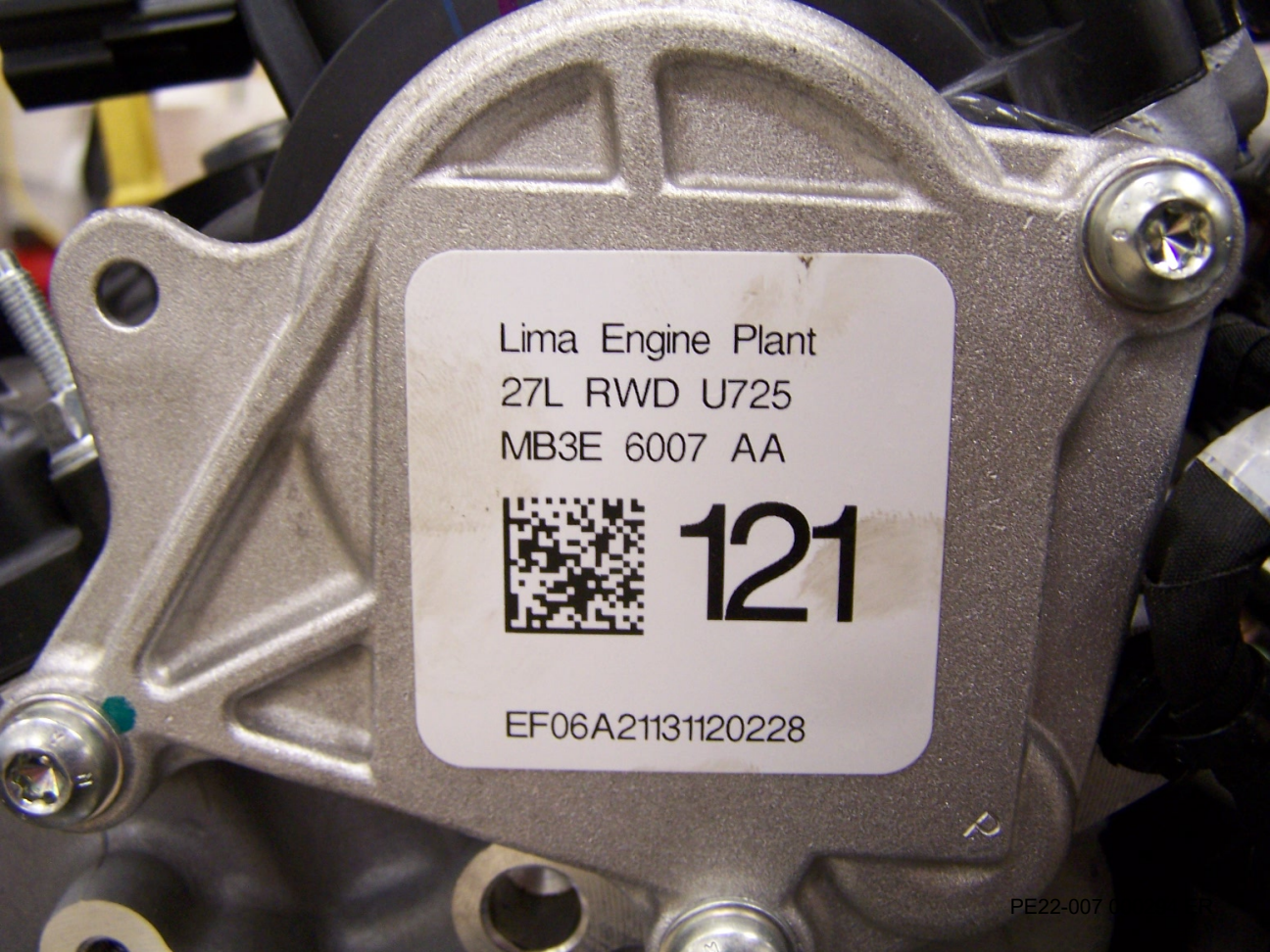
Report# :	M84EU002 NHL			**Received:**	08/30/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA63603			**Build Date:**	06/12/2021
Odometer :	1,372 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02508 Dewey Moore Ford			**Phone#:**	903-639-2516
City:	Hughes Springs	**State:**	Texas	**Country :**	USA
Originator:	WILLIAM DEAN				
Originator e-mail:	SCOTT.DEAN24@YAHOO.COM				
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	smoke from exhaust/stalled				
Fix:	**Causal Component :**				
Condition Code:					

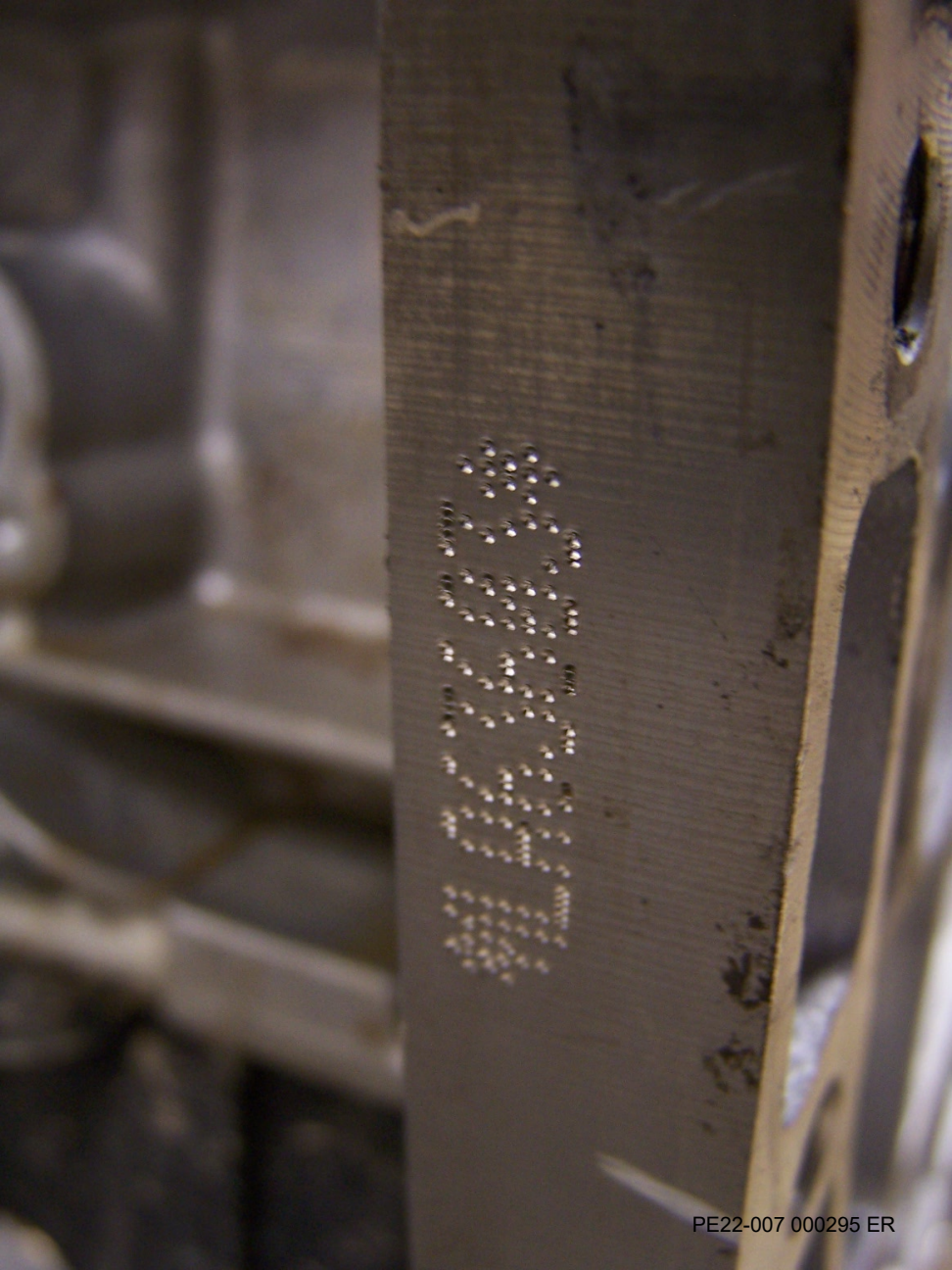
Hotliner: TMASCARI **Phone:** **Regn Cd:** C1 Dallas

Engineering: **Phone:** **TAR:**

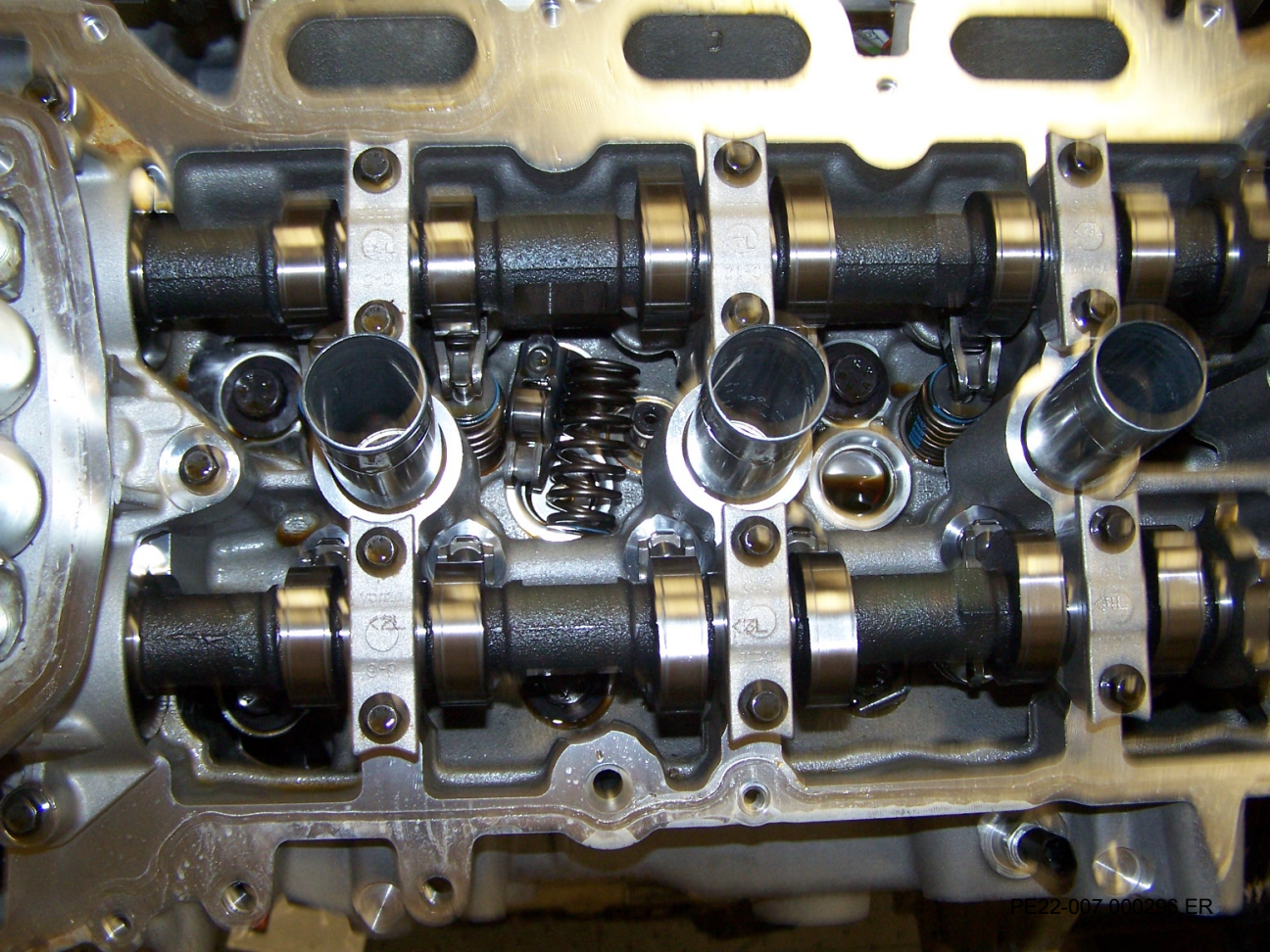
Dlr Contact: WILLIAM DEAN **Phone:** **Title Cde:** SM

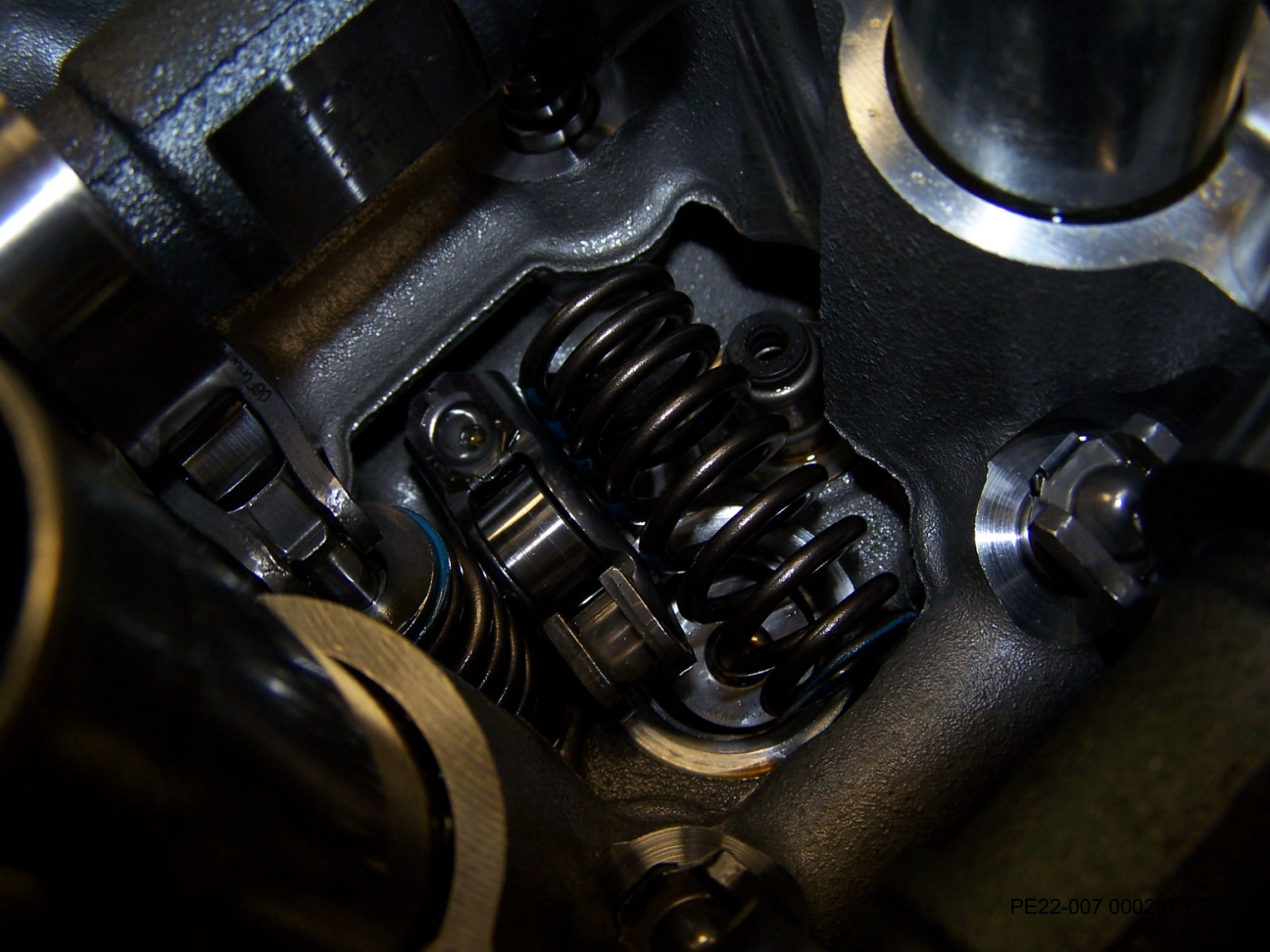
Lima Engine Plant
27L RWD U725
MB3E 6007 AA
121
EF06A21131120228

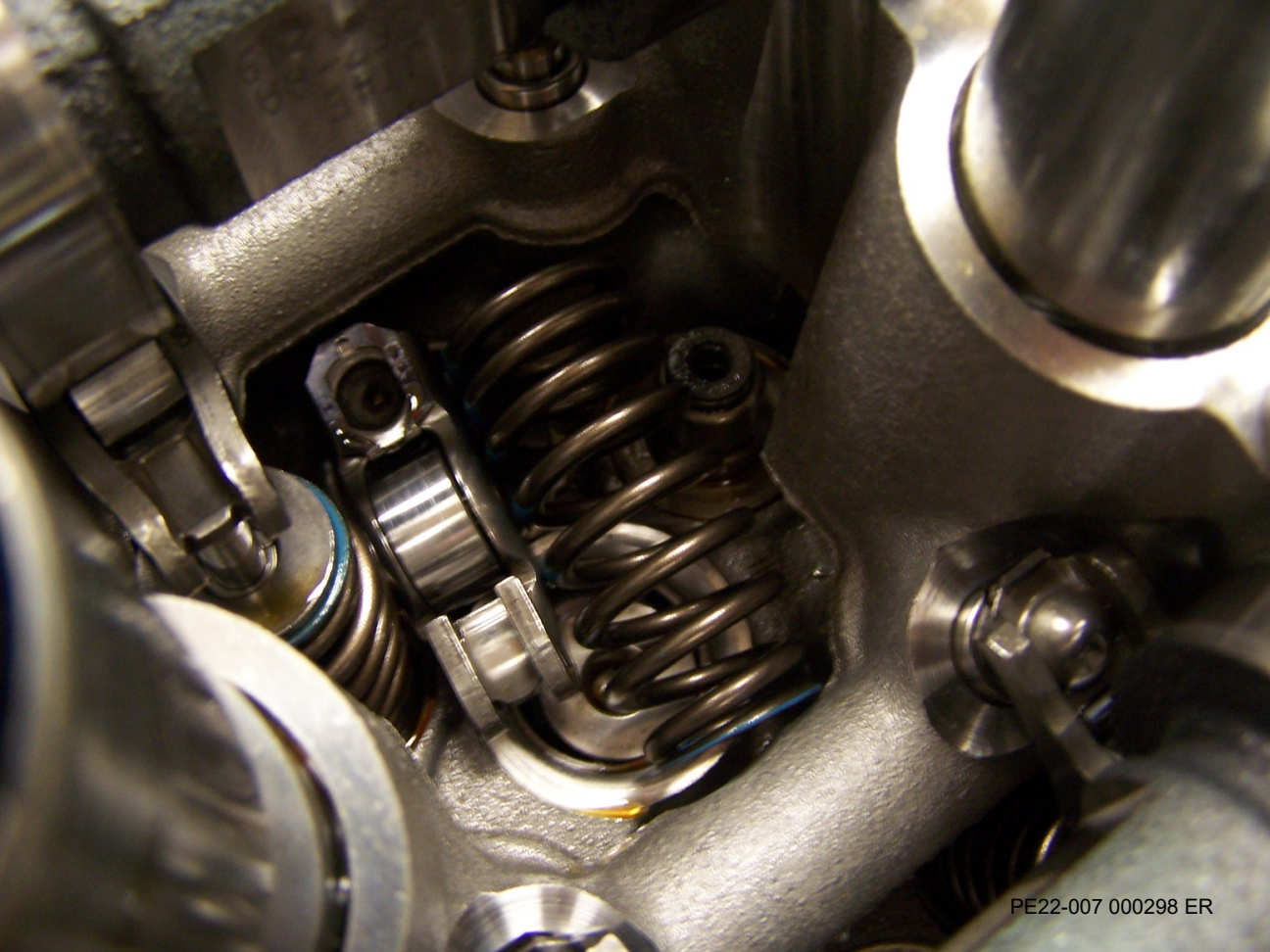

Lima Engine Plant
27L RWD U725
MB3E 6007 AA
121
EF06A21131120228

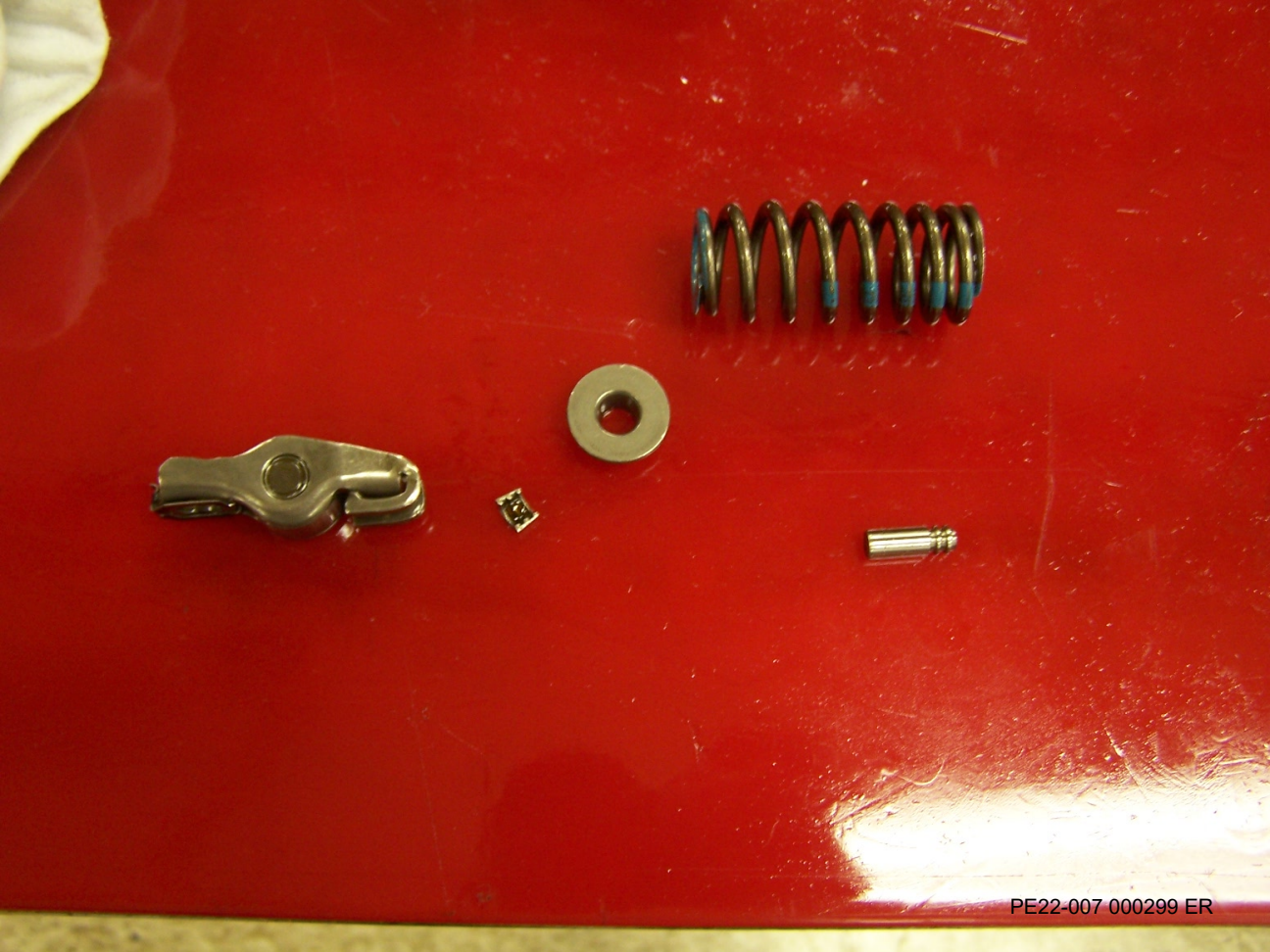


PE22-007 000295 ER


PE22-007-000296 ER


PE22-007 0002


PE22-007 000298 ER



PE22-007 000299 ER

PE22-007 000300 ER

From: Sanaski, Adam (A.)
Sent: Monday, September 27, 2021 9:20 AM
To: Kolodziejczyk, Jeffrey (J.A.); Pearson, Gavin (G J R.); Reinhart, Paul (T.)
Cc: Adam, Paul (P.J.); Williams, Brian (B.E.); Ward, Zachary (Z.); Matthews, Matt (.)
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Jeff.

The inspection crew printed out the results. I will attach those results to their assigned cyl head for anyone that comes to EMDO can take a look.

Other wise as you know I had already forwarded you the results.

aTOm.

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, September 23, 2021 5:06 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Adam,

Yes, I didn't include since I thought it was already shipped to RR..but if you can include it please do.

A couple sample of 3 level guide measurements is sufficient.

Thanks.
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Thursday, September 23, 2021 2:03 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Does the team want both engines (L/H heads sent in)?
Frisco Texas
Hughes Springs Texas

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, September 23, 2021 1:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>; Pearson, Gavin (G J R.) <gpearso3@ford.com>; Reinhart, Paul (T.) <preinhar@ford.com>
Cc: Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Adam,

Team is requesting CMM 3 level valve guide inspection on LH head intake guides.

Can you submit request?

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Thursday, September 23, 2021 10:00 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Engine is tore down,

Parts on display Table 5-D

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Wednesday, September 22, 2021 12:58 PM
To: Sanaski, Adam (A.) <asanaski@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: RE: Hughes Springs Tx, 2.7L Bronco just came in.

Thanks for letting us know Adam.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Wednesday, September 22, 2021 12:37 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Williams, Brian (B.E.) <bwilli16@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: Hughes Springs Tx, 2.7L Bronco just came in.

Report# :	M84EU002 NHL			**Received:**	08/30/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP8MLA63603			**Build Date:**	06/12/2021
Odometer :	1,372 M	**Engine:**	2.7L 4V	**Calibration:**	MTG1WQNA

Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 02508 Dewey Moore Ford			**Phone#:**	903-639-2516
City:	Hughes Springs	**State:**	Texas	**Country :**	USA
Originator:	WILLIAM DEAN				
Originator e-mail:	SCOTT.DEAN24@YAHOO.COM				
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					
VFG:	V52 DRIVEABILITY				
Additional Symptom:	smoke from exhaust/stalled				
Fix:	**Causal Component :**				
Condition Code:					

Hotliner:	TMASCARI	**Phone:**		**Regn Cd:**	C1 Dallas
Engineering:		**Phone:**		**TAR:**	
Dlr Contact:	WILLIAM DEAN	**Phone:**		**Title Cde:**	SM

From: Russell, Don (D.R.)
Sent: Thursday, September 30, 2021 12:42 PM
To: Hewlett, Matt (M.S.); Smith, Cressel (C.)
Cc: Rhude, Benjamin (B.)
Subject: RE: Intake Valves

YES, true statement.

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Thursday, September 30, 2021 12:34 PM
To: Russell, Don (D.R.) <drusse25@ford.com>; Smith, Cressel (C.) <csmit840@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Subject: RE: Intake Valves

We're building with JT4E-6507-BA shipped under alert A14259652 as JT4E-6507-AB.

C14249175 releases the JT4E-6507-BA With more robust sil-1 stem material.

Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Russell, Don (D.R.) <drusse25@ford.com>
Sent: Thursday, September 30, 2021 12:28 PM
To: Smith, Cressel (C.) <csmit840@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Subject: RE: Intake Valves

YES, if we have FIFO correctly

From: Smith, Cressel (C.) <csmit840@ford.com>
Sent: Thursday, September 30, 2021 12:17 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Russell, Don (D.R.) <drusse25@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Subject: Intake Valves

Hey guys,
Are we building with JT4E- 6507 – AB valves?

Cressel Smith
Engine Systems Engineering
Cell: 313-400-9962
Desk Loc: 13D045
20000 Rotunda Dr.
Dearborn, MI 48124

From: Adam, Paul (P.J.)
Sent: Friday, August 6, 2021 8:42 AM
To: Bradshaw, Michael (M.W.); Hewlett, Matt (M.S.)
Subject: RE: Missouri Nano

Thanks guys.

Paul
313-580-3971

From: Bradshaw, Michael (M.W.) <mbradsh4@ford.com>
Sent: Friday, August 06, 2021 8:39 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: RE: Missouri Nano

Yes, the marks are from PCL.

Mike Bradshaw
Ford - Lima Engine Plant
Quality Operating Systems Coordinator
419-226-7346
mbradsh4@ford.com

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Friday, August 06, 2021 7:47 AM
To: Adam, Paul (P.J.) <padam6@ford.com>; Bradshaw, Michael (M.W.) <mbradsh4@ford.com>
Subject: FW: Missouri Nano

Mike, do these marks look similar to marks from PCL sorting alerted cams?

Thanks,
Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Adam, Paul (P.J.) <padam6@ford.com>
Sent: Friday, August 06, 2021 7:29 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: Missouri Nano

Morning Matt.

Any idea why these cams from the Missouri engine are marked with paint pen?

FYI - one of the unfailed valves on this engine has a broken RFF finger…

Paul
313-580-3971

From: Adam, Paul (P.J.)
Sent: Thursday, October 29, 2020 3:13 PM
To: Knott, Tim (.)
Cc: Schwartzers, Elisabeth (E.M.)
Subject: RE: Nano 3rd Keeper Groove Failures - Analysis of Engine Test Data

Hi Tim,
I still haven't been able to get with Mark on chuggers. Both my timeslots w/ him were cancelled…. Not sure if that is critical to tomorrow's discussion…

-----Original Appointment-----
From: Adam, Paul (P.J.)
Sent: Wednesday, October 28, 2020 3:41 PM
To: Knott, Tim (.)
Subject: Accepted: Nano 3rd Keeper Groove Failures - Analysis of Engine Test Data
When: Friday, October 30, 2020 7:00 AM-7:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx

Hey Tim – I still haven't been able to sit with Mark on this. We've been living a couple other issues, and Mark had a half day today. Going to try again tomorrow – I will let you know if I get him in the morning tomorrow.

From: Schwartzers, Elisabeth (E.M.)
Sent: Tuesday, October 6, 2020 2:56 PM
To: Birr, Jodi (J.); Hewlett, Matt (M.S.)
Cc: Knott, Tim (.); Strand, Tim (T.A.); Nowak, Mark (M.E.)
Subject: RE: Nano 3rd Keeper Groove Failures - Cylinder Head Machining Locations

Categories: Red Category

Jodi,

Just wanted to confirm – past conversations have indicated there are times when there is minor overlap of machining at WEPA/LEP.

Thank you!

All the best,

Elisabeth

Elisabeth Schwartzers
2.7L/3.0L Nano | 1.5L Dragon PFI Valvetrain Engineer
Ford Motor Company – Global Engine Engineering
eschwa19@ford.com | (313) 920-4518

From: Birr, Jodi (J.) <jbirr@ford.com>
Sent: Tuesday, October 06, 2020 1:59 PM
To: Schwartzers, Elisabeth (E.M.) <eschwa19@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Knott, Tim (.) <tknott@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Nowak, Mark (M.E.) <mnowak@ford.com>
Subject: RE: Nano 3rd Keeper Groove Failures - Cylinder Head Machining Locations

LEP machines all 2.7L heads, FWD and RWD.

Jodi Birr
313.938.9385

From: Schwartzers, Elisabeth (E.M.) <eschwa19@ford.com>
Sent: Tuesday, October 6, 2020 11:30 AM
To: Birr, Jodi (J.) <jbirr@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Knott, Tim (.) <tknott@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Nowak, Mark (M.E.) <mnowak@ford.com>
Subject: Nano 3rd Keeper Groove Failures - Cylinder Head Machining Locations

Jodi,

Can you tell me which engine plant machined the heads associated with the following 3rd Keeper Groove Failures on Nano?

PE22-007 000307 ER

- EF06A19158120533KG 502 BA
- EF06A19080110016KG 502 BA
- EF06A19269131196KG 502 BA

All the best,

Elisabeth

Elisabeth Schwartzers
2.7L/3.0L Nano | 1.5L Dragon PFI Valvetrain Engineer
Ford Motor Company – Global Engine Engineering
eschwa19@ford.com | (313) 920-4518

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Wednesday, May 25, 2022 2:43 PM
To: Steslicki, Michael (M.E.)
Subject: RE: Nano Dropped Valve Engine Exchanges

Thanks Mike!

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Wednesday, May 25, 2022 12:31 PM
To: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Nano Dropped Valve Engine Exchanges

Total: 691 (688 from 2021 MY, 3 from 2022 MY)
Teardown Confirmed: 321 (318 from 2021 MY, 3 from 2022 MY)

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Wednesday, May 25, 2022 11:40 AM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Nano Dropped Valve Engine Exchanges

Hi Mike,

How many Nano dropped valve engine exchanges are we at currently?

Can you tell me how many torn down confirmed?

Updating a 1-pager for management review tomorrow.

Regards,

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Boscheratto, Connie (C.)
Sent: Monday, January 31, 2022 3:51 PM
To: Dixon, Mark (M.R.); Knott, Tim (.); Parr, Michael (M.); Becerril, Fernando (F.)
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Sounds good. Could we break up the file also to reduce size? After it is processed, it is really slow in excel when it is too large.

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

From: Dixon, Mark (M.R.) <mdixon@ford.com>
Sent: Monday, January 31, 2022 3:44 PM
To: Boscheratto, Connie (C.) <cbosche2@ford.com>; Knott, Tim (.) <tknott@ford.com>; Parr, Michael (M.) <mparr10@ford.com>; Becerril, Fernando (F.) <fbecerri@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Connie, how about pulling the data on say 100 VINs with the most recent repair date.

Not sure what will be learned with 300 VINs – this is a lot of data to go through, and will slow down file manipulation.

Not sure of a good way to selectively pull +/- one month of data (from repair date) when this window is unique for every VIN.

From: Boscheratto, Connie (C.) <cbosche2@ford.com>
Sent: Monday, January 31, 2022 3:33 PM
To: Knott, Tim (.) <tknott@ford.com>; Parr, Michael (M.) <mparr10@ford.com>; Dixon, Mark (M.R.) <mdixon@ford.com>; Becerril, Fernando (F.) <fbecerri@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

+ Fernando

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

From: Boscheratto, Connie (C.)
Sent: Monday, January 31, 2022 2:15 PM
To: Knott, Tim (.) <tknott@ford.com>; Parr, Michael (M.) <mparr10@ford.com>; Dixon, Mark (M.R.) <mdixon@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Mark,

We will need your support to pull the full alert data for the VINs in the attached list. There is a large quantity (300ish), so file size will be an issue. Could we pull the data for 1 month before/1 month after the repair date? How quickly could we get the data? Dave is trying to get answers for a meeting this coming Thursday. We will do the analysis, just need the data.

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

From: Knott, Tim (.) <tknott@ford.com>
Sent: Monday, January 31, 2022 1:21 PM
To: Boscheratto, Connie (C.) <cbosche2@ford.com>; Parr, Michael (M.) <mparr10@ford.com>; Dixon, Mark (M.R.) <mdixon@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Connie –
Dropped valve claims list.
Don't worry about the China claims.

-----Original Appointment-----
From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, January 27, 2022 7:49 AM
To: Simon, David (D.); Simon, David (D.); Knott, Tim (.); Pearson, Gavin (G J R.); Adam, Paul (P.J.); Boscheratto, Connie (C.); Parr, Michael (M.); Dixon, Mark (M.R.)
Cc: Kolodziejczyk, Jeffrey (J.A.)
Subject: Nano Dropped Valves - Global CCRG Follow Up
When: Monday, January 31, 2022 1:00 PM-1:25 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Web Ex

-~-~-~

Join from a video system or application
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For additional help with WebEx, Ford users can click on the Digital Worker link: WebEx Support

Can't join the meeting? Contact support.

T32MC04

From: Boscheratto, Connie (C.)
Sent: Wednesday, February 2, 2022 11:01 AM
To: Simon, David (D.)
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

That will work. I will plan on attending.

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, February 02, 2022 10:59 AM
To: Boscheratto, Connie (C.) <cbosche2@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Hi Connie – we're going to use the last half of the VPQR review meeting (12:30-1pm) – I'll send you the invite. If that doesn't work for you, we can set up a separate review later today.

Thanks,
Dave

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From: Boscheratto, Connie (C.) <cbosche2@ford.com>
Sent: Wednesday, February 02, 2022 10:36 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano Dropped Valves - Global CCRG Follow Up

Dave,
I have an assessment from the CV data. Is there a meeting to discuss it before the CCRG review?

Connie Boscheratto
Ford Motor Company
IPTSE Core Process Engineering Supr.
Connected Vehicle/Data Analytics/To4 Support
Phone 313-806-4254

-----Original Appointment-----
From: Simon, David (D.) <dsimon1@ford.com>
Sent: Thursday, January 27, 2022 7:49 AM
To: Simon, David (D.); Knott, Tim (.); Pearson, Gavin (G J R.); Adam, Paul (P.J.); Boscheratto, Connie (C.); Parr, Michael (M.); Dixon, Mark (M.R.)
Cc: Kolodziejczyk, Jeffrey (J.A.)

Subject: Nano Dropped Valves - Global CCRG Follow Up
When: Monday, January 31, 2022 1:00 PM-1:25 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Web Ex

-~-~-~

From: Simon, David (D.)
Sent: Wednesday, November 17, 2021 7:24 AM
To: Steslicki, Michael (M.E.)
Subject: RE: Nano dropped valves - weekly update request

Let's include lower end damage as well.

Thanks,
Dave

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From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Wednesday, November 17, 2021 7:23 AM
To: Simon, David (D.) <dsimon1@ford.com>
Subject: RE: Nano dropped valves - weekly update request

Just the ones binned to broken valve? Or lower end damage too, as I believe a majority of these will be found to be valves when they get back and are torn down?

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Wednesday, November 17, 2021 6:49 AM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Nano dropped valves - weekly update request

Hi Mike,

Can you give me a weekly update on the number of Nano engine exchanges for dropped valves. I want to keep tabs on the numbers and I get asked multiple time per week by various people.

Thanks,
Dave

David Simon
Quality and OPD Manager

IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282

From: Pearson, Gavin (G J R.)
Sent: Tuesday, May 18, 2021 3:48 PM
To: Birr, Jodi (J.)
Cc: Hewlett, Matt (M.S.); Steslicki, Michael (M.E.); Lyons, Marcus (M.I.)
Subject: RE: Nano Engine Exchange - Additional Investigation

Great presentations.

Please send the valves for analysis and let Jeff Kolodziejczyk and his team know that you're doing it.

Glad the block does not have a casting defect.

Thank you.

Gavin

From: Birr, Jodi (J.) <jbirr@ford.com>
Sent: Tuesday, May 18, 2021 2:08 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Cc: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Steslicki, Michael (M.E.) <msteslic@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>
Subject: Nano Engine Exchange - Additional Investigation

Please see the attached ppt presentation. Let me know if you have any questions.

Thanks!

Jodi Birr
Quality Analyst

Ford Lima Engine Plant
1155 Bible Road
Lima, Ohio 45801
(D) 419.226.7302 | (M) 313.938.9385
jbirr@ford.com

From: Smith, Cressel (C.)
Sent: Tuesday, August 24, 2021 11:06 AM
To: Sanaski, Adam (A.); Pearson, Gavin (G J R.); Strand, Tim (T.A.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Hewlett, Matt (M.S.); Katinas, Dana (D.J.); Bautz, Jeffrey (J.E.); Knott, Tim (.); Rhude, Benjamin (B.)
Cc: Jacobs, Jeremy (J.)
Subject: RE: Nano engines for valvetrain review at EMDO

Jeremy needs to grab parts before it gets boxed and stored. Please allow today to do this activity.

From: Sanaski, Adam (A.) <asanaski@ford.com>
Sent: Tuesday, August 24, 2021 10:30 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Smith, Cressel (C.) <csmit840@ford.com>; Knott, Tim (.) <tknott@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Cc: Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: RE: Nano engines for valvetrain review at EMDO

Team.

Just inquiring about the two Dealer return 2.7L Nano's with valve failures.

Can I pull them off display?
What would we like to do with them? Scrap or storage?

aTom.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Thursday, August 12, 2021 3:47 PM
To: Strand, Tim (T.A.) <tstrand2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>; Smith, Cressel (C.) <csmit840@ford.com>; Knott, Tim (.) <tknott@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Cc: Zschering lll, Kurt H (K.) <kzscheri@ford.com>; Sanaski, Adam (A.) <asanaski@ford.com>; Jacobs, Jeremy (J.) <jjacob93@ford.com>
Subject: Nano engines for valvetrain review at EMDO
Importance: High

Team – a number of engines have been brought back to EMDO and laid out in the teardown area for valvetrain review. Please take the opportunity to review these engines tomorrow. Please note that EMDO opens at 6am and techs generally leave by 2.30 pm.

Thank you.

Regards,
Gavin J.R. Pearson

IPTSE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Pearson, Gavin (G J R.)
Sent: Friday, July 30, 2021 2:28 PM
To: Zschering lll, Kurt H (K.) <kzscheri@ford.com>; Sanaski, Adam (A.) <asanaski@ford.com>; Jacobs, Jeremy (J.) <jjacob93@ford.com>
Cc: Strand, Tim (T.A.) <tstrand2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: 2 x Nano engines for teardown at EMDO

Gentlemen – we have 2 x Nano engines that have failed valves at dealers which we are trying to get to EMDO with the utmost urgency to tear down and enable analysis of the valvetrain components and some head features.

Recognizing that this is vacation season are you all in next week and can you all please work together to get these engines into the teardown area, get the parts laid out and help us understand when we can get people in to review parts?

Many thanks.

Regards,
Gavin J.R. Pearson
GEE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Pearson, Gavin (G J R.)
Sent: Thursday, September 9, 2021 4:29 PM
To: Steslicki, Michael (M.E.); Ward, Zachary (Z.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Strand, Tim (T.A.); Simon, David (D.); Katinas, Dana (D.J.); Vylasek, Stephan (S.); Melki, Imad (I.E.)
Subject: RE: Report Summary for the CQIS Report#M9CD2664, from MSTESLIC - Nano, Bronco, dropped valve engine #6

I've just spoken to the dealer service advisor Frankie Lopez at their Auto Mall store (661) 835-6109; the engine has a dropped valve in #5. They are waiting for an engine to come from Memphis.

Regards,
Gavin J.R. Pearson
IPTSE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: Steslicki, Michael (M.E.) <msteslic@ford.com>
Sent: Thursday, September 9, 2021 2:00 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Ward, Zachary (Z.) <zward1@ford.com>
Subject: FW: Report Summary for the CQIS Report#M9CD2664, from MSTESLIC

This is a CAC (Customer Assistance Center) report. Looks like this customer is going to get an engine exchange. There is no hotline report for this VIN.

The engine is this vehicle was built 6/10/21, the same day as the Keller Ford broken valve.

Mike Steslicki
MI&Q Engine Quality
Ford Motor Company
(313) 805-9888

From: CQIS@ford.com <CQIS@ford.com>
Sent: Thursday, September 9, 2021 1:57 PM
To: Steslicki, Michael (M.E.) <msteslic@ford.com>
Subject: Report Summary for the CQIS Report#M9CD2664, from MSTESLIC

Attachments : 0

Report# :	M9CD2664 CACVOC--or-- C1 0061400657MS			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,PREFERD,2DR ,MPV ,1FMEE5EP3MLA40194			**Build Date:**	06/24/2021
Odometer :	700 M	**Engine:**	2.7L 4V	**Calibration:**	

Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	USA 05471 Jim Burke Ford			**Phone#:**	661-328-3711
City:	Bakersfield	**State:**	California	**Country :**	USA
Originator:		**Originator e-mail:**			
Symptom:	4 48 2 12 ST/RN/MV,NOISE,MOVE/DRIVE,COLD				
Status:					
VFG:	V49 POWERTRAIN GOOD SOUND AND NVH				
Additional Symptom:					
Fix:	**Causal Component :**				
Condition Code:					

Cust: Home Phone: ( )

Work Phone: ( ) Region: W1 Los Angeles

Case Status: Date: 00 / 00 / 0000 Vehicle Paint: BLUE LIGHTNING

Comments :

OWNREL 09/03/2021 05:42PM

CONTACT VIA:6612298310EMAIL:chupacabraind@yahoo.comCUST SAYSwe have this first edition of bronco. there was a noise coming out from it and it shut off. it was taken at the dealer and its been there for three weeks. they told me they would change the alternator and that is fine but they told me that they need a new motor for this and it only has literally 700 miles on it. i dont feel like its still a brand new vehicle for me. im wondering if you can just give me anew car. we have been with ford and all of our cars are ford. PER CUST, DLR SAYSN/ACRC ADVISEDI will escalate your case/request to our Ford Regional Customer Service Manager who works daily with your dealership's management team. The Ford Regional Customer Service Manager has access to all Ford resources and will use these resources to assist you and your dealership regarding your situation. You can expect a phone call from your Customer Service Manager within 1 business day. The case number that I have established for you today is CAS-33101598-F0T0K5Ford's commitment is to honor the new vehicle limited warranty this does not guarantee that Ford will buyback your vehicle.

OWNREL 09/03/2021 05:42PM

??????Type of purchase Ýnew - used from the dealer - Certified Pre-Owned (CPO) - private sale or gift¨: BRAND NEWPurchase state: CAPurchase date: JULY 28 2021Mileage at the time of purchase: 13 milesName of selling dealer, business, or seller: JIM BURKE FORDRegistered owner(s) name(s) for the vehicle: ANDRES GARCIAState/province where the vehicle is currently registered: CAIs the vehicle primarily used for personal or business reasons? PERSONALIf a business, the total number of vehicles the business has registered in California: N/AWas the vehicle purchased or leased by a full-time active duty member of the Armed Forces who was stationed or residing in California at the time of purchase/lease or at the time the buyback request was filed? NOPrimary mechanical concern for buyback request:noise coming out and it wont startIs the vehicle currently at the dealer? yesIf the vehicle is currently at the dealer:Name of dealer jim burke ford (if applicable) and Service Advisor (SA): frank lopezDate vehicle arrived at the dealer: august 13Does the customer require a rental? provided a rental carUNABLE TO LINK AAF: California Buyback Request

OWNREL 09/04/2021 02:26AM

CXS: Martin EkandemEXT: 79306Email: oekandem@ford.comOBC - CUST - 916612298310Initial BB Request - CA - No answer - Left a message - with my contactNEXT STEP:Initial BB request - CA Ford Motor CompanyCustomer Relationship Center-SUV Martin Ekandemoekandem@ford.com | www.ford.com ext. 79306

OWNREL 09/04/2021 02:49AM

The Buyback TemplateCustomer InformationName(s) on the Title: ANDRES GARCIAAddress: 1830 TERRACE PL. DELANO, CA. 93215Email Address: chupacabraind@yahoo.comCustomer is Select Purchasing or Leasing

Vehicle InformationVIN: 1FMEE5EP3MLA40194Current Mileage: Ownership Status: Select New, Used, or CPOPurpose of vehicle: Select Personal or Business# vehicles registered to the business. (If yes to business)Purchase Date: Exact Mileage at Purchase: State InformationState Where Purchased: State Where Registered: Dealer InformationPurchased from Dealer? Dealership (if yes): Primary Reason for Repurchase: Enter primary reason the customer wants the vehicle repurchased.

OWNREL 09/07/2021 10:22PM

CXS: Martin EkandemEXT: 79306Email: oekandem@ford.comOBC - CUST - 916612298310 IS VEH @ the DLRDLR said the Motor needs to be replacedNEXT STEP:DLR/Repair info - BB - CAMonitor BB - CA RequestFord Motor CompanyCustomer Relationship Center-SUV Martin Ekandemoekandem@ford.com | www.ford.comext. 79306

OWNREL 09/07/2021 10:45PM

CXS: Martin EkandemEXT: 79306Email: oekandem@ford.comOBC-DLR - 916618379400SM Franky Lopez - SA - 916618376487 -fopez@burkeauto.com PM----------9/7/21 - SA is not Available -Symptoms - Motor needs to be replaced - Engine Assembly? ----------RO# - 210661 - Battery lightRO date - 8/23/21RO Mileage - 601Repair Line # - AFail Causal Part Number –ETA of Repair -SME -Hotline -Part # -E B/O -B/O Date -COPIS - Rental/Loaner ~ YesDlr P$A Code - 05471NEXT STEPS:Ford Motor CompanyCustomer Relationship Center-SUV Martin Ekandemoekandem@ford.com

OWNREL 09/07/2021 10:57PM

Case Number : CAS-33101598-F0T0K5Customer : ANDRES GARCIABusiness Phone : 6612298310Home Phone : 6612298310Mobile Phone : 6612298310LTV Score : 97Vehicle Purchase Status : Original OwnerFord Credit Contract Number : UnknownPart Number : UnknownDealer Name : Jim Burke FordDealer P&A : 05471Dealer phone : 6613283600VIN : 1FMEE5EP3MLA40194Year : 2021Make : FORDModel : BRONCOMileage : 700Engine Specification : 2.7L DOHC 4V DI GT V6 GAS/FFVTransmission Specification : 10 SPD AUTO TRANSMISSION-10R60Warranty Start Date : 2021-07-28Open Recall/FSA: : N/AESP : 0968 - USA 2021 NEW 36/36,000 PREMIUMCARE W/WEAR ITEMS0968 - USA 2021 LIMITED MAINT 36/36K-7.5K INTERVALHotline Contact : UnknownWarranty History : N/A

OWNREL 09/07/2021 11:11PM

The Buyback TemplateCustomer InformationName(s) on the Title: ANDRES GARCIAAddress: 1830 TERRACE PL. DELANO, CA. 93215Email Address: chupacabraind@yahoo.comCustomer is Select Purchasing or Leasing Vehicle InformationVIN: 1FMEE5EP3MLA40194Current Mileage: 709Ownership Status: NewPurpose of vehicle: PersonalPurchase Date: 7-28-21Exact Mileage at Purchase: 23State InformationState Where Purchased: CaliforniaState Where Registered: CaliforniaDealer InformationPurchased from Dealer? YesDealership (if yes): Jim Burke Ford Bakersfield Primary Reason for Repurchase: Enter primary reason the customer wants the vehicle repurchased.The Customer Stated:she has been with Ford a long time, has only had Fords. She was very excited to get the First Edition Bronco. Got the vehicle in July and there was a noise we have this first edition of bronco. there was a noise coming out from it and it shut off. it was taken at the dealer and its been there for three weeks. they told me they would change the alternator and that is fine but they told me that they need a new motor for this and it only has literally 700 miles on it. I don't feel like its still a brand new vehicle for me. im wondering if you can just give me anew car. we have been with ford and all of our cars are ford.

Click here to View Report Summary

From: Suetterlin, Terry (T.D.)
Sent: Friday, September 10, 2021 7:40 AM
To: Pearson, Gavin (G J R.); Vylasek, Stephan (S.); Liddle, Preston (P.)
Cc: Ward, Zachary (Z.); Simon, David (D.); Katinas, Dana (D.J.); Strand, Tim (T.A.); Lyons, Marcus (M.I.); Hewlett, Matt (M.S.)
Subject: RE: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

Nothing.
The 6007 is in the catalog to basically tell the dealers that the service solution is to replace the long block.
We do not service 6007 due to the fact that the plant can only build them for the production model year.

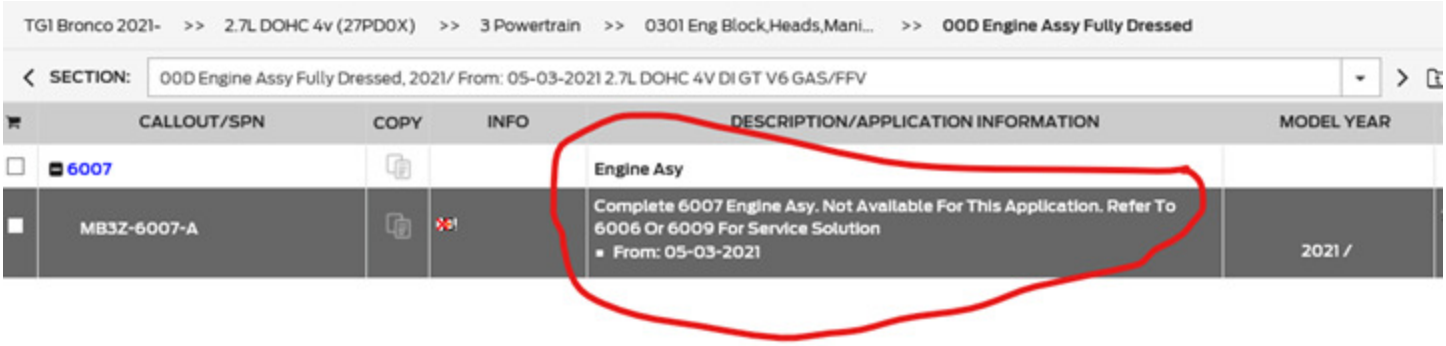
From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Thursday, September 9, 2021 4:39 PM
To: Vylasek, Stephan (S.) <svylasek@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>
Cc: Ward, Zachary (Z.) <zward1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: RE: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

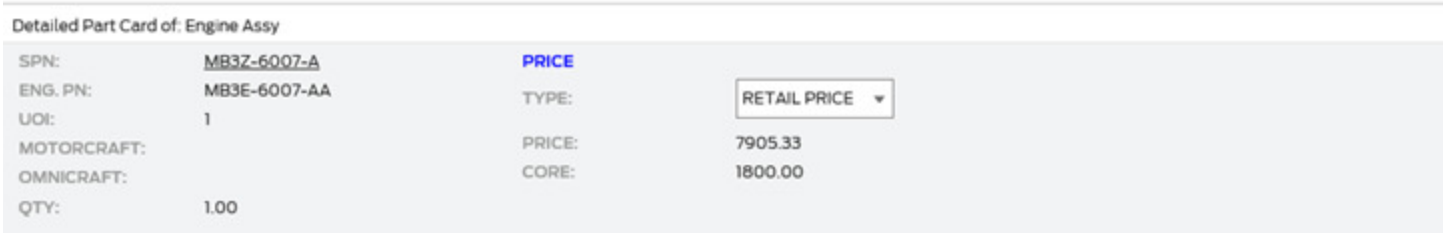
Is there a difference between what you see Steve and what you see Terry?

From: Vylasek, Stephan (S.) <svylasek@ford.com>
Sent: Thursday, September 9, 2021 3:46 PM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>
Cc: Ward, Zachary (Z.) <zward1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: RE: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

Gavin,

6007 Complete assembly is not available to order for service. See below.





Steve Vylasek
Concern ID & Resolution – Program Manager
Mustang / Continental / Bronco / Ranger / EcoSport
Ford Motor Company – FCSD
(313)-323-7817 / SVylasek@Ford.com

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Thursday, September 09, 2021 11:12 AM
To: Suetterlin, Terry (T.D.) <tsuetter@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>
Cc: Ward, Zachary (Z.) <zward1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: RE: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

Terry – thanks for clarifying.

Steve – please can you ask the dealer (via CQIS) to fit a 6007 for this instance.

Thank you.

From: Suetterlin, Terry (T.D.) <tsuetter@ford.com>
Sent: Thursday, September 9, 2021 11:05 AM
To: Pearson, Gavin (G J R.) <gpearso3@ford.com>; Vylasek, Stephan (S.) <svylasek@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>

Cc: Ward, Zachary (Z.) <zward1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: RE: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

The 6007 is in the catalog.
Historically, we do not service complete engines. The plant can only build them for the current production model year.

From: Pearson, Gavin (G J R.) <gpearso3@ford.com>
Sent: Thursday, September 9, 2021 10:50 AM
To: Vylasek, Stephan (S.) <svylasek@ford.com>; Liddle, Preston (P.) <pliddle@ford.com>; Suetterlin, Terry (T.D.) <tsuetter@ford.com>
Cc: Ward, Zachary (Z.) <zward1@ford.com>; Simon, David (D.) <dsimon1@ford.com>; Katinas, Dana (D.J.) <dkatinas@ford.com>; Strand, Tim (T.A.) <tstrand2@ford.com>; Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Subject: FW: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK - Bronco #5

Is there any way to put the 6007 engine in the catalogue? This would streamline the process of repairing these engines at the dealer level where the damage extends beyond that of the 6006 level assembly which is what we get when we fail valves and pistons.

Regards,
Gavin J.R. Pearson
IPTSE Ongoing Product Development Supervisor
Duratec I4 NA & Hybrid / Nano / Cyclone / Voodoo / Predator / Boss programs
(313) 805-6498

From: CQIS, Help (.) <cqis@ford.com>
Sent: Thursday, September 9, 2021 10:17 AM
To: Vylasek, Stephan (S.) <svylasek@ford.com>
Subject: Report Summary for the CQIS Report#M9HDF003, from SVYLASEK

Attachments : 0

Report# :	M9HDF003 NHL			**Received:**	09/08/2021
CCRG/EPRC:		**Reviewed Status:**		**Date:**	
Vehicle:	2021,BRONCO 4X4 ,ADVANCE,4DR ,MPV ,1FMEE5DP4MLA64764			**Build Date:**	06/09/2021
Odometer :	1,444 M	**Engine:**	2.7L 4V	**Calibration:**	
Transmission:	10R60	**Axle:**		**A/C:**	YES
Dealer:	CAN B6292 North Star Ford Sales (Calgary			**Phone#:**	403-239-1115
City:	Calgary	**Province**	Alberta	**Country :**	CAN
Originator:	JOHN FLEMING	**Originator e-mail:**	JOHNLESLIEZOEY@GMAIL.COM		
Symptom:	4 40 1 02 ST/RN/MV,STARTING,NO CRANK,ALWAYS				
Status:					

VFG: V52 DRIVEABILITY

Additional Symptom: engine failure

Fix: **Causal Component :**

Condition Code:

Hotliner: EREILLY9 Phone: Regn Cd: 06 06 Western District

Engineering: Phone: TAR:

Dlr Contact: JOHN FLEMING Phone: Title Cde: T

DTC:

PCM:P0304,P0305

Comments :

CONCER 09/08/2021 10:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER

Web Form Data(118382233) Description of Vehicle Concern: CONFIRM NO START. Please list any diagnostics already performed: WILL NO CRANK P0304 P0305 P0316 TRY TO TURN TRUCK OVER BY HAND WILL NO MOVE. FOUND OIL FULL OFF COOLANT AT LEAST 5L OVER FULL ON DIP-STICK. REMOVED SPARK PLUGS FOUND CYL 4 AND 5 SPARK PLUGS DAMAGED. USED SCOPE TO INSPECT CYL AND FOUND CYL 4 PISTON IS CRACKED AND MISSING PIECES. CYL 5 PISTON HAS MULTIPLE HOLES IN PISTON. APPEARS TO HAVE DROPPED A VALVE AND DAMAGED BLOCK AND HEADS. OIL HAS METAL IN IT. WILL REQUIRE LONG BLOCK, INTAKE, TURBOS AND ALL OIL FEED LINES. Parts Replaced: NONE Your Question: I JUST WANT TO MAKE SURE ITS RECOMENDED TO REPLACE TURBOS AND INTAKE WITH SUCH A LARGE ENG FAILURE. ALSO IF WE CAN DUE TO NO WARRANTY START DATE AS THIS TRUCK IS A STOCK UNIT

RECOMM 09/08/2021 10:48AM ERIC REILLY MSS - FCSD - TECH ASSIT CENTER

Hello John, Regarding the turbo replacement, carefully inspect the oil supply lines, turbocharger oil inlet as well as the turbo oil drain for any signs of metallic debris. The presence of metal passing through the turbochargers lubrication circuit supports internal contamination and damage. This in turn will compromise the performance and longevity of the turbochargers and they should be replaced. Turbocharger oil supply lines and filters should be replaced since they have the potential to trap debris and could cause repeat turbocharger failure. If there is no metal at the turbochargers and it passes the Component Check for Free Rotation as outlined in step C6 in PPT C in the WSM section 303-04D, reuse the turbochargers. Regarding the intake, refer to GSB 20-7062 to determine if the intake has caused other damage. Include it in the cost cap if damage is noticed. Thank you, Eric R. Ford Technical Assistance Center

Click here to View Report Summary

From: Rhude, Benjamin (B.)
Sent: Thursday, July 29, 2021 7:46 AM
To: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: RE: Request for Nano Intake Valves

Hi Jeff,

I was instructed to leave the valves at central labs with Joshua Hamilton's name on the samples.

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Sent: Thursday, July 29, 2021 7:43 AM
To: Adam, Paul (P.J.) <padam6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Subject: FW: Request for Nano Intake Valves

Paul, Ben,

I should be able to get these valves plus other 2 sets to Central lab today.

Ben, Any special instructions or just drop them off in the lobby with TR?

Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

From: Steinke, Cody (C.) <csteink2@ford.com>
Sent: Thursday, July 29, 2021 7:38 AM
To: Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Request for Nano Intake Valves

Ben: These valves delivered already this morning. FedEx tracking # is 7743 7773 2005. Please confirm receipt when you get the parts.

Thanks,

774377732005

ADD NICKNAME

Delivered

Thursday, July 29, 2021 at 7:03 am

DELIVERED

Signed for by: J.JOINER

GET STATUS UPDATES

OBTAIN PROOF OF DELIVERY

FROM	TO
Ford Lima Engine Plant	BEN RHUDE
Scott Mosley	FORD RESEARCH & ENGIN
1155 Bible Rd	20000 ROTUNDRA/ REC 1 BL
Lima, OH US 45801	DEARBORN, MI US 48121
419-226-7183	419-226-7000

Travel History

Cody Steinke
Production Control Coordinator
Lima Engine Plant
Ford Motor Company
419-226-7253

From: Steinke, Cody (C.)
Sent: Wednesday, July 28, 2021 6:07 AM
To: Lyons, Marcus (M.I.) <mlyons3@ford.com>; Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Butler, Aaron (A.)

<abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>; Tolbert, Keith (K.) <ktolber6@ford.com>; Abner, ERIC (E.S.) <EABNER@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; McAdams, Matthew (M.) <MMCADAM6@ford.com>; Guthrie, Kelley (K. S.) <KGUTHRI4@ford.com>
Subject: RE: Request for Nano Intake Valves

RFS # 815240 has been created to ship out (10) intake valves, part # JT4E-6507-AB to building 1/FD20T via FedEx. Parts scrapped to tag 0448CS tags. A copy of the shipper was sent to the back to pick the parts for shipping.

Thank you,

Cody Steinke
Production Control Coordinator
Lima Engine Plant
Ford Motor Company
419-226-7253

From: Lyons, Marcus (M.I.) <mlyons3@ford.com>
Sent: Tuesday, July 27, 2021 3:24 PM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>; Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>
Cc: Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: RE: Request for Nano Intake Valves

Concur.

:: Marcus ::

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Tuesday, July 27, 2021 12:25 PM
To: Steinke, Cody (C.) <csteink2@ford.com>; Butler, Aaron (A.) <abutle67@ford.com>; Mosley, Scott (J.S.) <jmosley6@ford.com>
Cc: Lyons, Marcus (M.I.) <mlyons3@ford.com>; Rhude, Benjamin (B.) <BRHUDE2@ford.com>; Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: FW: Request for Nano Intake Valves
Importance: High

Marcus, can we scrap (10) JT4E-6507-AB Nano intake valves to TST?

Cody or Aaron, please ship them to building 1 (FD20T) attention Ben Rhude if Marcus approves. Please ensure they are wrapped individually for shipping.

Ben, sorry I missed your earlier email.

Thanks,
Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

From: Rhude, Benjamin (B.) <BRHUDE2@ford.com>
Sent: Tuesday, July 27, 2021 12:02 PM

To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>; Adam, Paul (P.J.) <padam6@ford.com>
Subject: RE: Request for Nano Intake Valves
Importance: High

Hey Matt

I haven't heard anything on this. Is it a possibility to get these parts in Dearborn before Tuesday next week?

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Rhude, Benjamin (B.)
Sent: Thursday, July 15, 2021 11:55 AM
To: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Cc: Kolodziejczyk, Jeffrey (J.A.) <jkolodz1@ford.com>
Subject: Request for Nano Intake Valves

Hello Matt,

In light of the 3rd keeper groove failures, I would like to request 10 intake valves (JT4E-6507-AB). I am planning on getting some impact testing on them. Could you please send them to my attention at building 1?

Regards,
Benjamin Rhude
Nano Valvetrain Component Engineering
Ford Motor Company
313-949-7899

From: Kolodziejczyk, Jeffrey (J.A.)
Sent: Monday, May 16, 2022 6:20 PM
To: Bautz, Jeffrey (J.E.); Adam, Paul (P.J.); Knott, Tim (.)
Cc: Corbett, Sandy (S.M.)
Subject: RE: Safety TRG: (22-306) 2.7/3.0L Nano EcoBoost Engine Failures (Loss of Motive Power)

Sensitivity: Private

Jeff, Paul, Tim,

Since this looks like another awareness presentation the last deck with updated charts from Tim seems appropriate. Any thoughts?

Should we get this in front of Jagadish and Frank tomorrow afternoon? Looks like Frank has 2:00 & 4:00 open.

Regards,
Jeff Kolodziejczyk
Valvetrain Supervisor Ford Motor Co.
(313) 805-9213 Bldg #1 13D074, jkolodz1@ford.com

-----Original Appointment-----
From: Lambert, Lauralee (L.A.) <llambe27@ford.com> **On Behalf Of** Frascaroli, Emily (E.E.)
Sent: Monday, May 16, 2022 5:29 PM
To: Schop, Christopher (C.D.); Stanley, Daniel (D.J.); Beyer, Laura (L.D.); Ott, David (D.J.); Diaz, Adrian (A.D.); Hotrum, Erin (E.M.); Boehk, Karen (K.S.); Brezee, Shane (S.B.); Parrish, Will (W.F.); Carene, Daniel (D.J.); Hultman, Paula (R.); Bhavsar, Daven (D.); Hansen, Thayne (T.); Leifson, Kirk (K.V.); Liddle, Preston (P.); Parker, Valencia (V.L.); Owens, Minerva (M.I.); Soucie, Tanya (T.); Dunlap, Zachary (Z.); Luikart, Tim (T.E.); Barber, Todd (T.A.); Schneider, Jeffrey (J.); Slankard, Andy (J.A.); Docimo, Tony (A.F.); Carroll, Justin (J.); Simon, David (D.); Gryglak, Adam (A.J.); Coffey, Jolanta (K.); Zhang, Linda (L.N.); Green, Ann (A.D.); Ahmadi, Shadan (S.); Owens, Karen (K.E.); Abkenar, Frank (F.K.); Bautz, Jeffrey (J.E.); Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.); Knott, Tim (.); Oliver, Byron (B.D.); Sciortino, Giuseppe (G.S.); Tugulan, Horia (H.); Sorab, Jagadish (J.); Corbett, Sandy (S.M.); Rozario, Dennis (V.)
Subject: Safety TRG: (22-306) 2.7/3.0L Nano EcoBoost Engine Failures (Loss of Motive Power)
When: Wednesday, May 18, 2022 4:15 PM-5:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx
Sensitivity: Private

05/16/2022: Updated the Responsible Director.

Requester: Emily Frascaroli (Lauralee A. Lambert #84-54321 / LLAMBE27)
NA - Meeting Participation Only -- Awareness
Ford Confidential - Do not forward or distribute - Contact [Dan Stanley (dstanle1)] to be added to the meeting.

Purpose: Awareness
DRI: TBD
Responsible Director: **Frank Abkenar - If Director is not available, feel free to include an empowered delegate.**
Supplier Responsibility: Yes (Supplier Manufacturing)

Regions Affected: NA
Alternate Host(s): Dan Stanley

-~-

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T32MC04

From: Hale, Bryan (B.)
Sent: Tuesday, September 21, 2021 9:13 AM
To: Hewlett, Matt (M.S.)
Cc: CRUZ RIVERA, JOSE ISRAEL; Tugulan, Horia (H.); Grigsby, Penny (P.L.)
Subject: RE: Scrap Eaton valves

Matt – I am having these brought to the IQ area where I will get a count and place them on reject status.

Israel – These have been rejected for use through direction of our Resident Engineer Matt Hewlett. There have been field issues with this particular date of valves. Do you want these scrapped at LEP, or do you prefer to arrange pick up of these?

Thanks,

Bryan Hale
Process Coach Incoming Quality PV6
Lima Ford Engine Plant
419-226-7104

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Tuesday, September 21, 2021 8:31 AM
To: Hale, Bryan (B.) <bhale26@ford.com>
Subject: Scrap Eaton valves

3B2
15

From: Knott, Tim (.)
Sent: Monday, November 9, 2020 9:30 AM
To: Schwartzers, Elisabeth (E.M.); Krummrey, Jake (J.E.); Strand, Tim (T.A.); Nowak, Mark (M.E.) (mnowak@ford.com)
Subject: RE: Third Keeper Groove Dropped Valve - PFSL Testing Touchpoint

Looks like we are on with Renwick tomorrow at 1:00

Let's use todays 1:00 to review what we will present.

I will summarize the LEP findings.

Jake can you summarize the clamped design you plan to test.

If you send me the baseline testing I will run the weibull .

-----Original Appointment-----
From: Schwartzers, Elisabeth (E.M.) <eschwa19@ford.com>
Sent: Monday, October 12, 2020 9:29 AM
To: Schwartzers, Elisabeth (E.M.); Krummrey, Jake (J.E.); Hoskins, Ty (T.R.); Rayman, Bradley (B.); Nowak, Mark (M.E.); Strand, Tim (T.A.); Crowe, Jonathan (J.D.); Oravetz, Peter (P.M.); Knott, Tim (.); Woodiwiss, Vanessa (V.)
Subject: Third Keeper Groove Dropped Valve - PFSL Testing Touchpoint
When: Monday, November 9, 2020 1:00 PM-1:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx

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T32MC04

From: Landry, Mike (M.P.)
Sent: Tuesday, June 7, 2022 1:04 PM
To: Freeman, Scott (S.T.); Ott, David (D.J.)
Cc: Beyer, Laura (L.D.)
Subject: RE: VOQs Cited in DP 22-001 Opening Resume

Great! Thank you Scott.

Regards,
Mike Landry
Manager, Car & Small Utility Vehicle Investigations
Automotive Safety Office
CELL: (313) 269-4747
E-MAIL: mlandry@ford.com

From: Freeman, Scott (S.T.) <sfreema1@ford.com>
Sent: Tuesday, June 7, 2022 11:09 AM
To: Ott, David (D.J.) <dott@ford.com>; Landry, Mike (M.P.) <mlandry@ford.com>
Cc: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Subject: RE: VOQs Cited in DP 22-001 Opening Resume

Thank you for the heads up.

Mike,

- 4 of these 8 Bronco Sport reports were part of the PIR recently closed.
- I will take a look at the remaining unique reports, to see if this changes our view.

Scott T. Freeman
Automotive Safety Office
Fairlane Plaza South, Suite 500
330 Town Center Drive
Dearborn, Mi 48126
Phone: 313.805.7410

From: Ott, David (D.J.) <dott@ford.com>
Sent: Tuesday, June 7, 2022 10:27 AM
To: Landry, Mike (M.P.) <mlandry@ford.com>; Freeman, Scott (S.T.) <sfreema1@ford.com>
Cc: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Subject: FW: VOQs Cited in DP 22-001 Opening Resume
Importance: High

Mike and Scott, NHTSA recently opened an DP for Bronco 2.7L engine failure allegations.

That DP resume made reference to 32 VOQs, however eight of those pertained to Bronco Sport. Laura has attached those in a spreadsheet above.

NHTSA had a prior PIR relating to Bronco Sport that it looks like they just closed. Not sure if these are related but I believe Laura has already given Scott a head's up as he handled the prior PIR.

Passing these along for your awareness only, not sure what NHTSA might do with these once they peel them off of the DP.

David J. Ott
Defect Investigations Manager – Truck Programs (CCRG Chair)
Automotive Safety Office
Ford Motor Company
313-402-2502 (work cell)
313-407-3194 (cell)

From: Beyer, Laura (L.D.) <lbeyer4@ford.com>
Sent: Tuesday, May 31, 2022 1:50 PM
To: Ott, David (D.J.) <dott@ford.com>
Subject: VOQs Cited in DP 22-001 Opening Resume
Importance: High

Dave,
Eight of the 29 VOQs on the DP 22-001 Opening Resume are for Bronco Sport (CX430) with the 1.5L engine shown in the table below.

I have attached the lists of Bronco and Bronco Sport VOQs listed in the opening resume. Consumer Comments are in column V.

DP22-001:
The petitioners identified a number of complaints received by NHTSA alleging complete engine failure. The ODI complaints cited above can be reviewed at NHTSA.gov under the following ODI numbers: 11459262, 11457360, 11456713, 11456219, 11455294, 11454100, 11454098, 11453933, 11453669, 11452692, 11452595, 11452074, 11451957, 11451503, 11451158, 11450879, 11450871, 11450788, 11450737, 11450702, 11450659, 11448737, 11448461, 11448393, 11448171, 11441831, 11414378, 11414295, 11406545.

Vehicle	Engine	ODI VOQ Count	Comment
BRONCO	T/WQ - 2.7L DOHC 4V DI GT V6 GAS/FFV	20	Subject Vehicle Line/Subject Engine
BRONCO	T/N3 - 2.3L 4V TIVCT DI TC 270 HP GAS	1	Subject Vehicle Line/ NOT Subject Engine
BRONCO SPORT	C/Y1 - 1.5L DRAGON I3 DI TC GAS B	8	NOT Subject Vehicle Line/ NOT Subject Engine

Laura Beyer
Safety Investigations/CCRG - Truck Programs
Automotive Safety Office
Ford Motor Company
(313) 316-7026 (mobile)

From: Clement, Chris (C.M.)
Sent: Thursday, October 21, 2021 9:21 AM
To: Hewlett, Matt (M.S.)
Subject: RE: when did 21194N570A001419 go through head assembly?

August 9th

Chris Clement
Ford Motor Company
Lima Engine Plant
Desk: 419.226.7336
Cell: 937.470.7653

From: Hewlett, Matt (M.S.) <mhewlet1@ford.com>
Sent: Thursday, October 21, 2021 8:53 AM
To: Clement, Chris (C.M.) <CCLEME53@ford.com>
Subject: when did 21194N570A001419 go through head assembly?

Checking for my boss's new bronco.
Thanks.
Matt Hewlett
LEP Resident Engineer
Desk: 419-226-7349
Cell: 313-805-1069

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saeeng.saejournals.org

Effect of Valvetrain Components Misalignment on Valve and Guide Interactions in Automotive Engines

Mohammed Yusuf Ali, Thomas Sanders, Mikhail A. Ejakov, and Reda Adimi
Ford Motor Company

Alexander Boucke, Jochen Lang, and Gunter Knoll
IST Engineering Company

ABSTRACT

Strict requirements for fuel economy and emissions are the main drivers for recent automotive engine downsizing and an increase of boosting technologies. For high power density engines, among other design challenges, valve and guide interactions are very important. Undesirable contact interactions may lead to poor fuel economy, engine noise, valve stem to valve guide seizure, and in a severe case, engine failure. In this paper, the valve stem and valve guide contact behavior is investigated using computational models for the camshaft drive in push and pull directions under several misalignment conditions for an engine with roller finger follower (RFF) valvetrain and overhead cam configuration. An engine assembly analysis with the appropriate assembly and thermal boundary conditions are first carried out using the finite element solver ABAQUS. Hot assembly displacements results for the exhaust valves, the guides, the valve seats and the cylinder head from the static analysis are then used as the boundary conditions for subsequent dynamic simulations of the valvetrain motion. A single RFF valvetrain is modeled using the elasto-hydrodynamically coupled multibody systems program FIRST by IST. A tolerance study is conducted to identify few key valvetrain misalignment conditions used in the simulations. The computational results show that at the given scale the influences on wear initiation at the bottom of the guide are very similar for the push and pull directions for the case with no misalignments, although the affected regions in the circumference of the guide differ. The results also show that the horizontal RFF misalignment with respect to the plane of RFF motion and with the drive in push direction has the most significant effect on wear initiation at the bottom of the guide. These results can be further processed for wear simulation for the valve guide. Simulation results for misalignments indicate that the wear pattern may vary significantly under various misalignment conditions.

CITATION: Ali, M., Sanders, T., Ejakov, M., Adimi, R. et al., "Effect of Valvetrain Components Misalignment on Valve and Guide Interactions in Automotive Engines," *SAE Int. J. Engines* 10(2):2017, doi:10.4271/2017-01-1082.

1. INTRODUCTION

Modern automotive engines face new design challenges to meet competing demands such as increased power, better fuel economy, tighter emissions control and reduced engine noise. These requirements are often addressed by downsizing the engine and employing boosting technology. The valvetrain system in a high power density engine needs to tackle several issues of which the valve and guide interaction is very important. The valve, the seat insert**,** and the guide wear due to undesirable contact interactions between the mating components can be a serious problem and thus needs proper assessment during the development of new engines.

Researchers attempted modelling of friction and valvetrain dynamics to improve the valvetrain design process. Calabretta et al. [1] used advanced mathematical models to quantify power loss at cam/tappet contact, tappet/bore contact and camshaft bearings for direct acting valvetrains. They have compared calculated and measured friction data for the valvetrain of a high speed passenger car engine as tested on a motored cylinder head test rig. Their results indicated that friction losses in a direct acting valvetrain are dominated by losses at the cam/tappet contact particularly at low engine speed. Tappet/bore interactions were less important but still worthy of consideration.

Lewis and Dwyer-Joyce [2] developed a semi-empirical wear model to account for wear mechanisms occurring at the valve/seat interface for predicting valve/seat recession based on the data gathered from laboratory simulation experiments. They have used an iterative software program RECESS to run the model. Blau [3] presented a mathematical model that portrays variations in the time-dependent removal and displacement of material from a diesel engine exhaust valve and seat combination. The model is based on the observation that the valves experience a combination of repetitive impact with slip. Blau [3] has used a high-temperature repetitive impact test system for basic tribology studies of the combined processes of mechanical wear plus oxidation at elevated temperatures. Boggupalli [4] investigated valve recession of a commercial vehicle engine inlet valve using the software tools IDEAS and TYCON for different valve seat angles. It should also be noted that misalignment of the valve causes the valve head/seat wear widths to increase at the point of contact that subsequently leads to a greater valve/seat wear at that location [2,4].

The above-mentioned researches are related to valve/seat recession issues and development of wear models for this contact pair. These works were mainly focused on the tribological aspects without

incorporating thermal distortions of the cylinder head or misalignment effects of the valvetrain system. Various misalignments that may arise due to tolerances in the valvetrain system in addition to thermal distortion of the cylinder head need to be studied thoroughly with appropriate modeling during an engine design phase, since investigating the valve or guide wear problems through multiple dynamometer tests would be costly.

In this paper, the valve stem and valve guide contact behavior is investigated for an engine with RFF valvetrain and overhead cam configuration. An advanced engine assembly analysis is conducted to simulate the assembly and thermal loads under a specified engine operating condition. The finite element solver ABAQUS is used for the static analysis. The hot assembly nodal displacements results for the exhaust valves, the guides, the seats and the cylinder head from this static analysis are then used as the boundary conditions for the dynamics simulations of valvetrain motion. A single RFF valvetrain is modeled for the dynamics simulation using the elasto-hydrodynamically (EHD) coupled multibody systems approach. The multibody systems simulations are conducted using the software program FIRST by IST. A tolerance study is conducted to identify few key valvetrain misalignment conditions. The computational models for the camshaft drive in push and pull directions under several misalignment conditions are analyzed. Results for selected misalignments are then presented and compared with that of the case with no misalignments to identify the major influence. Finally, some conclusions based on the results of these investigations are made.

2. MODELING

Computational models consist of two parts to investigate the valve and guide interactions – a static engine assembly simulation and a single valvetrain based multibody system dynamics simulation. A schematic of the simulation steps is shown in Figure 1. Brief descriptions of the models are as follows.

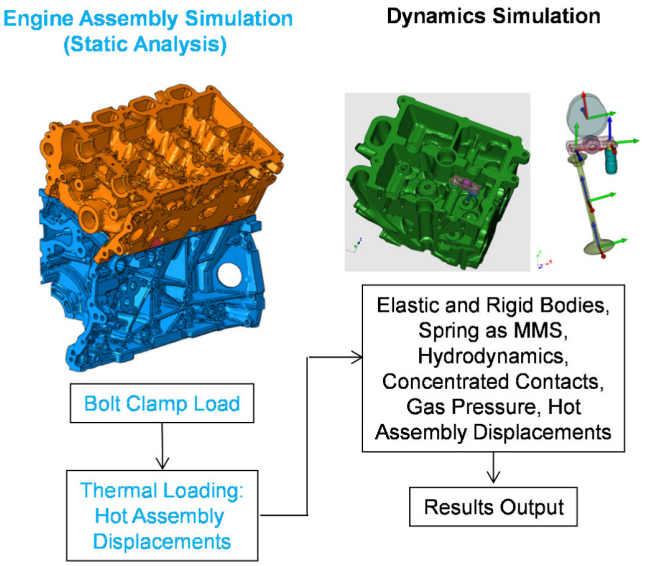


Figure 1. A schematic of the simulation steps.

2.1 Engine Assembly Simulation

An advanced engine assembly analysis of a V6 engine is conducted using the finite element solver ABAQUS. The valves, guides, and seats are meshed with linear hexahedral elements with a fine mesh size that is acceptable for direct use in dynamic simulations as discussed later. The rest of the other components in the engine assembly are meshed with quadratic tetrahedral elements. In this static structural analysis, the press fit of the valve seats and the valve guides is simulated. The cylinder head, cylinder block and cylinder head gasket are assembled with the specified bolt load to simulate the cylinder head deformation under assembly load at room temperature.

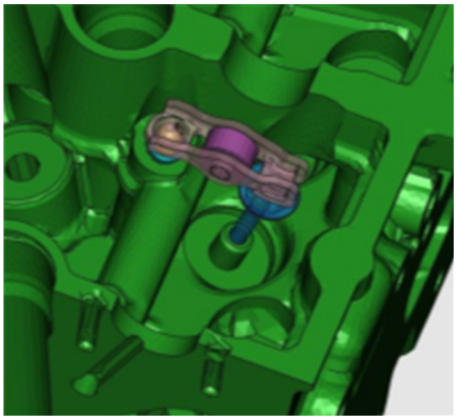
An appropriate thermal loading corresponding to a particular engine operating condition is applied after the engine assembly simulation [5]. The hot assembly condition is important as it impacts the global deformation of the port wall, valve guide, and seat and the local deformation of the press-fitted guide and the seat due to thermal expansion mismatch of dissimilar metals. In this study the hot thermal distortion is corresponding to peak power engine speed and is considered as a given condition under the operating thermal load.

2.2 Dynamics Simulation

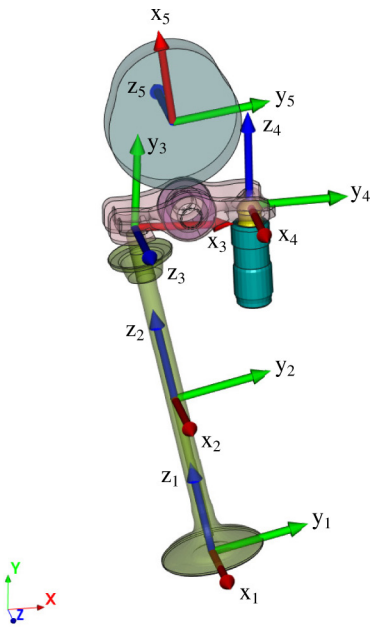
The exhaust valves and the guides at the bottom of the valve guide location tend to be about four to five times hotter than that of the intake sides and hence the exhaust valve of the V6 engine is selected for this study [6]. A single valvetrain based submodeling approach is adopted in this paper for computational efficiency. The analysis scheme presented here can be applied to any valve. The single valvetrain based multibody system dynamics model consists of an overhead cam configuration using a rolling contact cam follower, a hydraulic lash adjuster (HLA), and a valve with a single spring. The cam is assumed to be rigid. The lever and the roller of the RFF are assumed to be elastic and rigid, respectively. The plunger and the housing of the HLA are modeled as rigid bodies. A suitable section of the cylinder head, the valve, the seat and the guide are modelled as elastic bodies. The valve spring is modeled using a multi-mass-spring (MMS) model. The needle roller bearing of the RFF is solved using characteristic data and the roller bearing module by the manufacturer, Schaeffler Technologies. The elastic cylinder head section is fixed on the mating surface to create realistic elastic deformations of the areas affecting the single valvetrain included in the model. Cylinder pressure corresponding to the operating condition is applied at the combustion chamber surface. Pressures at the combustion chamber and exhaust port channel are applied on the exhaust valve head surfaces with opposite sign. Since the other valves were not modeled the resulting force due to cylinder and port pressure on each individual valve head is directly applied to the corresponding seating surface.

The simulation solves Newton's equations of motion in the time domain, with all bearings and other kinematic restrictions being modeled as force couplings. All rigid bodies are described through center of gravity, complete tensor of inertia and mass. For elastic bodies a reduction of order is performed. The reduction step combines static and modal analysis to reduce the dimension of the model by several orders of magnitude without compromising the static and the dynamic responses of the model in the areas of interest, e.g. the valve guide, the valve seat. For these areas of interest the main degrees of freedom (main-DOF) are defined as unit deflections of nodes or groups of nodes. The result of a static analysis for each unit deflection of a main-DOF represents a static Ritz-vector that belongs to the deflected main-DOF. In addition a set of modal

Ritz- vectors is determined by an eigenvalue analysis of the model for the fixed main-DOFs and the boundaries. The static and modal Ritz- Vectors are combined into a transformation matrix to reduce the order of the original FEM-model for the elastic structure.



a.



b.

Figure 2. (a) Section of the cylinder head and (b) a single exhaust valvetrain model.

The calculation of the hydrodynamic pressure distribution for the journal sliding bearings is realized by solving the Reynolds equation at every time step. In the mixed lubrication regime, the hydrodynamic pressure is superposed by the contact pressure based on surface roughness. Crowning, local contours or shapes and the elastic deformations of the bearing surfaces for the valve, the valve seat and the guide are considered for the calculation of hydrodynamic gap functions. For the consideration of the surface roughness effects, the stochastic model by Greenwood and Tripp is applied using the standard deviation of the surface roughness. Thermal distortion and rigid translation and rotation of the exhaust valve stem and guide due to hot assembly condition of the cylinder head are included in the model. Rigid-body translations and rotations of the valve seat due to thermal distortion of the cylinder head are also included. The averaged rigid body translations of the valve, the guide and the seat due to hot assembly displacements have been subtracted to prevent any artificial misalignments between the RFF, the valve, the guide and the seat. This also ensures that the relative positions of the valve stem to the guide, and the valve head to the seat are intact.

Figures 2(a) and 2(b) shows a portion of the cylinder head and the single exhaust valvetrain model, respectively. There are multiple local coordinate systems marked in Figure 2(b) and these are major coordinates for force couplings in the model. Usually local z-axis is defined as axis of rotation for the cam and roller, and axial movement for the valve and HLA. All results output presented in this paper are based on these local coordinates and will be indicated appropriately. The global z-axis is parallel to the longitudinal axis of the engine. Note that the local axes color representations are similar to that of the global axes color.

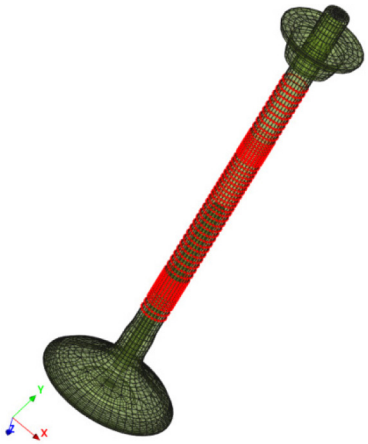


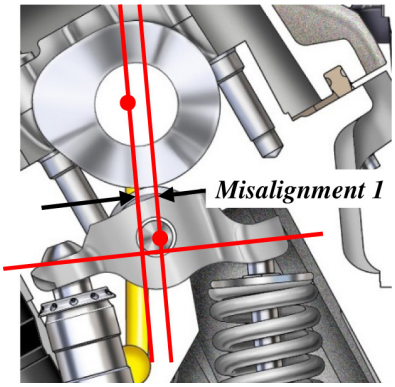
Figure 3. Contact zone for EHD simulation between the valve and guide shown with red nodes.

Figure 3 shows the contact zone marked by red nodes for EHD simulation between the valve and guide. EHD models are used for the valve, the guide, and the seat. Standard roughness values are used for the valve guide, the valve stem, the guide inner, the valve head, and the valve seat surfaces. A nominal clearance between the exhaust valve stem and the exhaust guide is used. The variation of clearance between the exhaust valve stem and the exhaust guide can further be studied at hot assembly condition to identify other worse conditions and is excluded in this misalignment study. For example, there are variations of other parameters such as valve guide pressfit, thermal expansion coefficients of the valve stem, the guide and the cylinder head materials, etc. might influence the worse condition. This study is mainly focused on the misalignment effect of the cam and RFF interactions. Only the upper half of the valve guide is considered to be filled with oil. Oil film thickness in the lower half of the valve guide is reduced to 0.5 microns. A fully filled bearing with the viscosity of air is used for the valve seat simulation, since only contact pressures and friction are of interest, although a thin film thickness could alternatively be used. Appropriate friction coefficients are used for all contacts in this investigation for the comparative study. However, it should be noted that the coefficient of friction depends on several other factors and any such dependency is not considered in this study due to insufficient data.

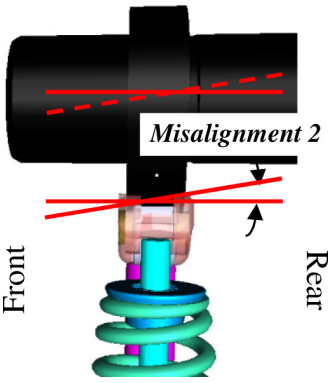
2.3 Definition of Misalignment

Valve/seat misalignment, valve/guide or guide/seat concentricity issues may arise from thermal distortion of the cylinder head, the valve seat and the guide, tolerances of components or dynamics loadings. These can impact the smooth operation of the valvetrain system. Investigating all these misalignments in detail at the same time could be computationally quite challenging. This study is focused on investigating the effect of tolerances of components especially between the RFF roller axis to the cam base circle axis. This is particularly important since the RFF is driven by the cam and so any misalignment between these two components needs to be studied for robustness purposes.

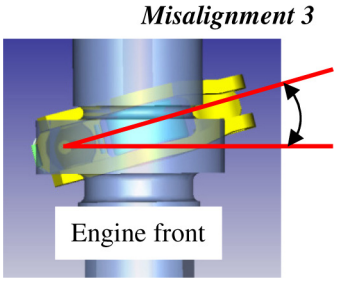
A tolerance study is carried out to predict angular variability of the exhaust RFF roller axis to the camshaft axis. The details of the tolerance study are out of scope of this paper. Based on the tolerance study three key misalignment conditions, identified as Misalignment 1, Misalignment 2 and Misalignment 3, are used for simulations. These misalignments are analyzed separately to understand the extent of effect of each of the misalignments on the valve and guide interactions. Misalignment 1 is the distance between the roller and cam centers as shown in Figure 4(a). In the simulation the cam center is moved towards to the HLA by a distance of Misalignment 1. Figure 4(b) shows Misalignment 2 is an angle between the cam and the roller axes. In the simulation the camshaft axis is rotated as shown by the dotted line in Figure 4(b) so that the included angle between the cam lobe and the RFF roller is Misalignment 2. Figure 4(c) shows Misalignment 3 is an angle between the RFF plane and the cam lobe plane. Misalignment 3 is modeled as a dislocation of HLA with respect to the valve center line, such that the RFF sitting with pad centered on the valve shows an angle towards the rear of the engine relative to the cam as shown in Figure 4(c). Note that the actual misalignment values used in the simulations are the maximum values obtained from the tolerance study.



a.



b.



c.

Figure 4. Based on a tolerance study three key misalignment conditions are identified as Misalignment 1, Misalignment 2 and Misalignment 3. (a) Misalignment 1 is the distance between the roller and cam centers. (b) Misalignment 2 is an angle between the cam and the roller axes. (c) Misalignment 3 is an angle between the RFF plane and the cam lobe plane.

2.4 Boundary Conditions and Data

The following data and boundary conditions are obtained to prepare the dynamics simulation model. The three dimensional geometry model based volume definitions of the RFF, the HLA plunger and body, valve with the spring retainer, the appropriate cylinder head section, the valve seat and the guide are used to create rigid and elastic bodies as mentioned before. Geometry and stiffness of the valve spring is obtained for spring modeling. Contour profile for the cam is directly used in the simulation for better accuracy. Appropriate elastic material properties such as Young's Modulus, density and Poisson's ratio are used for the components modelled as elastic bodies. A nominal clearance is used for all lubricated surfaces. Surface roughness information for all manufactured surface contours in contacts and bearings are obtained from manufacturing specifications [6]. In this investigation the thermal distortion corresponds to the peak power engine speed, which is 5750 RPM. Dynamic viscosity of oil at hot condition and gas pressure acting on the valve at peak power engine speed are also used in the simulation.

Table 1. Simulation cases.

Cam rotation w.r.t. the RFF	Case			
Push	Base	Misalignment 1	Misalignment 2	Misalignment 3
Pull	Base	Misalignment 1	Misalignment 2	Misalignment 3

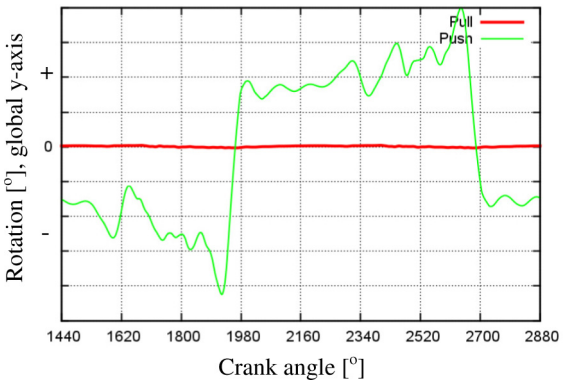
2.5 Considered Factors

Dynamics of the valve train including lash adjuster hydraulics and spring mass effects are considered in the simulation. Local deformation of the valve and the guide are included to accurately model the interaction behavior under a particular engine speed. Elasticity of the valve, the valve guide and the seat are important to obtain representative contact pressure distribution. Contact pressure distribution in valve seat and line contacts with surface contours are considered for both nominal and misalignment cases. Wear indicators

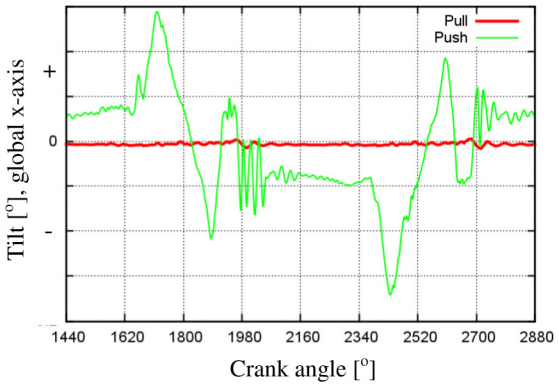
based on mixed/dry friction on valve guide and seat area are also modeled. However, elasticity of RFF roller under cam forces and asymmetry in valve spring are not considered in this investigation.

2.6 Simulation Variants

The valvetrain layout on the left hand bank is a mirror image of the layout on the right hand bank for this engine. On the left bank, this layout causes the exhaust camshaft to push the RFF towards the lash adjuster pivot point. On the right bank, this causes the exhaust camshaft to pull the RFF away from the lash adjuster pivot point. It is perceived that the rotation of the camshaft in the push direction together with any RFF misalignment may aggravate the condition while the rotation of the camshaft in the pull direction may tend to pull the RFF along to counteract the RFF misalignment effect. Therefore, the push and pull direction effects on the valve and guide contact interactions are investigated for the base case and with the misalignment conditions as listed in Table 1. The base simulation is the case of without any tolerance misalignment modeled in the single valvetrain model. Note that an additional phase correction are not introduced between the push and pull direction simulation and only the camshaft is rotated to match the direction of rotation with respect to the RFF. Dynamic simulations are conducted at peak power speed of 5750 RPM.

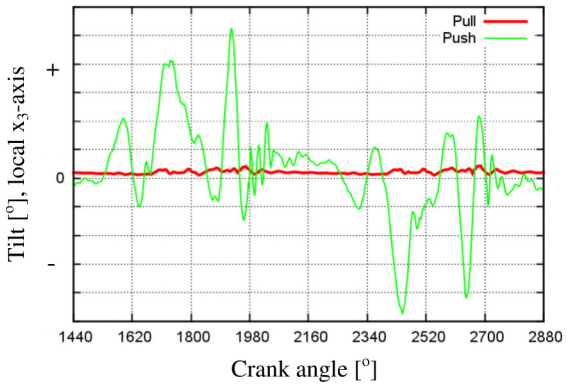


a.

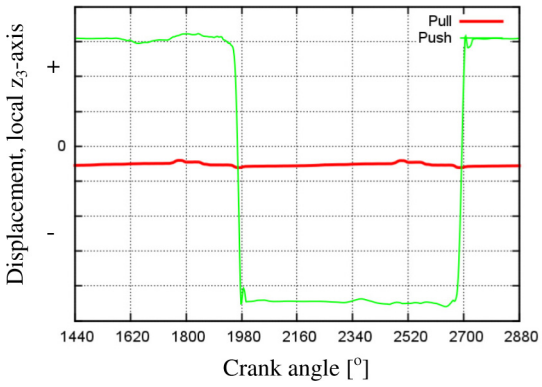


b.

Figure 5. The Push and pull direction movement for the base case. (a) The RFF is being rotated around the HLA and alternates sides when pushed, and (b) the RFF is also tilted under load due to unsymmetry when pushed to a side.



a.



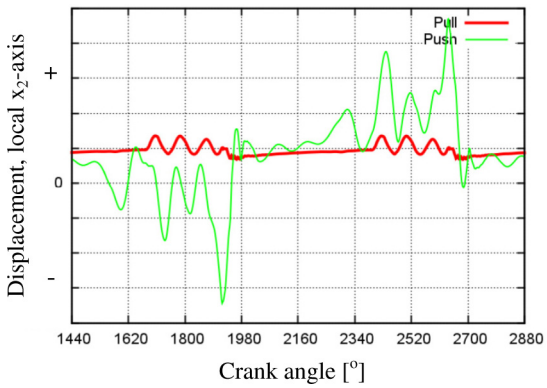
b.

Figure 6. (a) Changes in relative angle between the RFF pad and the valve tip. The Valve movements or deformations interfere with RFF angle. (b) Changes in relative sideways movement between the RFF pad and the valve tip.

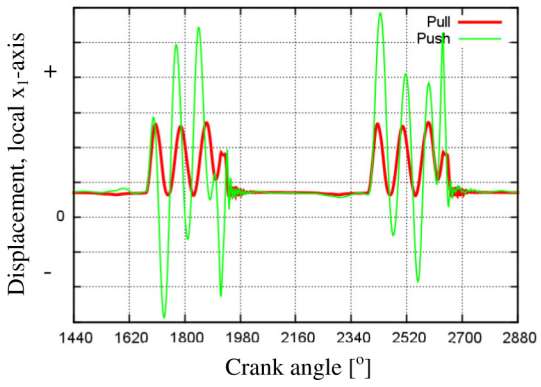
3. COMPUTATIONAL RESULTS

The plots related to the base case for push and pull directions are presented in Figures 5 to 10. The plots for the misalignment cases are excluded here due to space limitations. In Figures 5 to 10 the horizontal axis in each plot is based on two working cycles i.e. the range of the crankshaft angle is 1440°. Based on the simulation results it is observed that the some of the push cases create an inherent misalignment of the RFF during cam rotation that resets itself after every two working cycles. For these cases the results showed a pattern that did not repeat at every working cycle, but did repeat after every second working cycle. The RFF changed sides on the valve stem tip every other cycle in these simulation cases. Basically the RFF is pushed against one side of the valve tip with quite some force, so it springs back when pressure is released after the valve closes. It takes two working cycles for it to be moved back to resting heavily on the same side again due to this characteristic misalignment. This is significantly influenced by the modeling of damping between the valve tip and the RFF pad. In a running engine the amount of oil present on these surfaces will most likely be a major contributor to damping. Further investigation to validate this characteristic with hardware results are necessary and may be a subject of the future research.

Figure 5(a) shows the effect of the push and pull direction movement on the RFF for the base case where the RFF is being rotated around the HLA and alternated sides when pushed compared to almost no rotation when pulled. In Figure 5(a), the RFF rotation is around the vertical y-axis of the global coordinate shown in Figure 2(b). Figure 5(b) shows that the RFF is tilted under load due to unsymmetry when pushed to a side. In Figure 5(b) the RFF tilt is around the horizontal global x-axis shown in Figure 2(b). Figure 6(a) shows changes in relative tilting angle between the RFF pad and the valve tip. This is due to the valve movements/deformations during the movement in the push direction. The movement and tilting of the RFF introduce forces into the valve tip through friction e.g. stick-slip conditions, creating a bending movement of the valve. In Figure 6(a) the RFF tilt is around the horizontal local x_3 -axis shown in Figure 2(b). Figure 6(b) shows changes in the relative sideways movement between the RFF pad and the valve tip parallel to the crankshaft. There is almost no tilting of the RFF and no relative sideways movement between the RFF pad and the valve tip during the pull direction movement as shown in Figures 6(a) and 6(b).

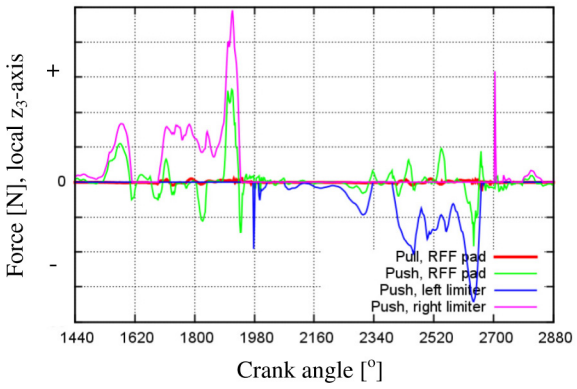


a.

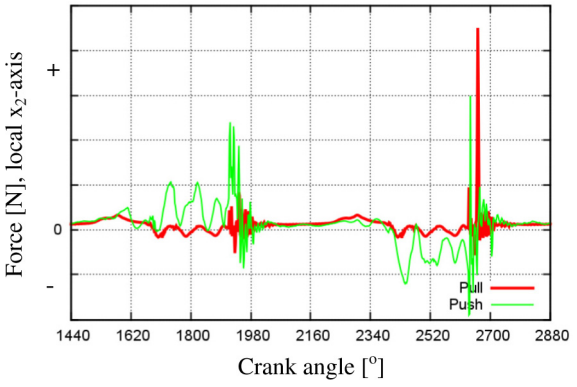


b.

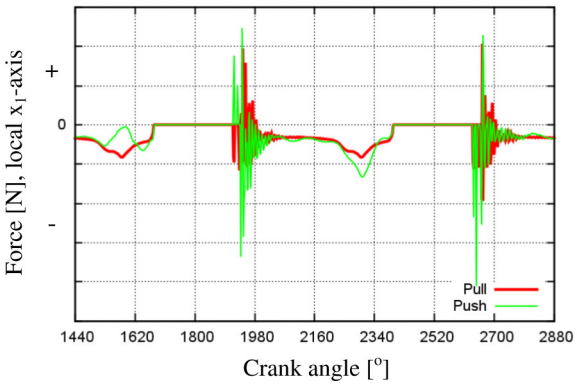
Figure 7. (a) Average sideways displacement of the valve stem inside the guide, and (b) average sideways displacement of the valve head relative to the seat in the direction parallel to the crankshaft.



a.



b.



c.

Figure 8. During the push direction movement (a) the RFF alternates sides as it is being pushed against the valve tip under load. The RFF pressing against the valve tip sideways also changes resulting forces in (b) the guide and (c) the seat during push direction movement. Pull direction side forces on valve guide and seat exist due to hot assembly displacements.

Figure 7(a) shows the effect of the push and pull direction movements on the average sideways displacement of the valve stem inside the guide in the direction parallel to the crankshaft for the base case. The displacement is larger for the push direction than that of the pull direction. This average sideways displacement is based on all the red nodes shown in Figure 3 for the EHD simulation between the valve and guide. Since not all nodes are inside the actual guide at all times, so the rigid body rotation of the valve during open phase and bending motions

can create values greater than the radial play for the push direction. Figure 7(b) shows the average sideways displacement of the valve head relative to the seat in the direction parallel to the crankshaft. A slight offset from 0 in the closed position and unsymmetric movement in the pull direction are due to unsymmetries from the hot assembly displacements. Despite significant differences in movements during the open phase between the push and pull direction, the valve sets on the same, slightly offset position due to a short relaxation of normal forces between the RFF and the valve tip immediately after closing due to combined mass inertia of the RFF and HLA. The RFF alternates sides as being pressed against the valve tip during the push direction movement under the load as shown in Figure 8(a), highlighted by the alternating forces between valve tip and side limiters next to the RFF pad. The RFF pressing against the valve tip sideways also changes the resulting forces in the guide and the seat during the push direction movement as shown in Figures 8(b) and 8(c), respectively. Note that for the pull direction side forces on the valve guide and the seat exist due to hot assembly displacements. In Figure 8(a) the pattern of force on right or left limiter repeats at every two working cycles but there is not much influence of this on the valve seat side force in Figure 8(c). However, there is some influence on the pattern of side force in the guide as shown in Figure 8(b).

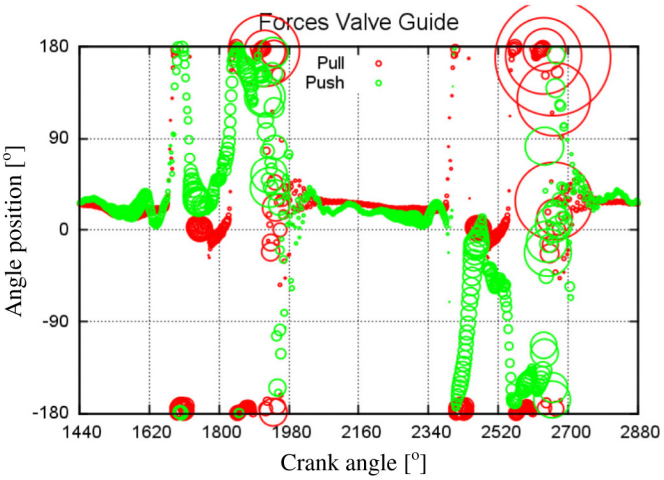


Figure 9. Direction and magnitude of resultant forces in the valve guide during valve motion for both push and pull directions.

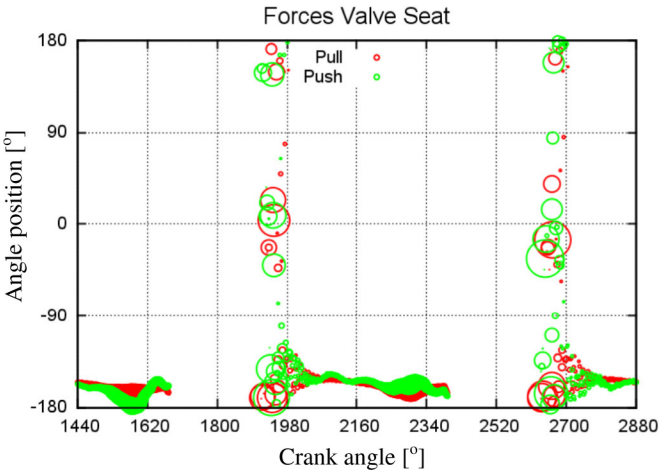
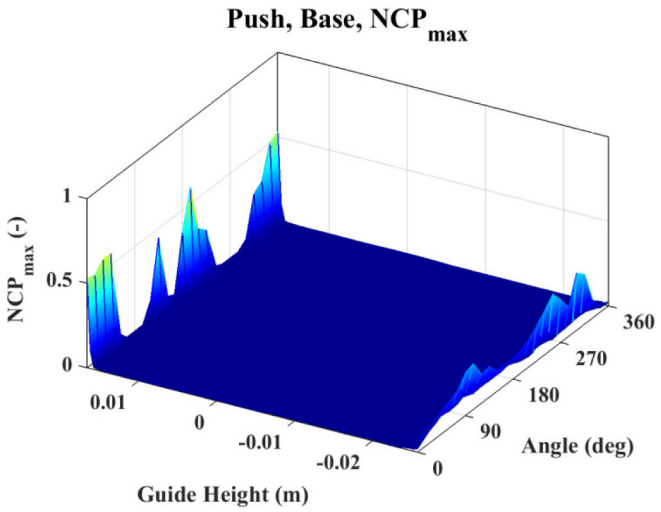


Figure 10. Direction and magnitude of resultant forces in the valve seat during valve motion for both push and pull directions.

Figure 9 shows the change of direction and magnitude of the resultant force in the valve guide during valve motion for both push and pull directions. The y-axis of the graph in Figure 9 shows the direction of the resulting forces in the local coordinate x_2-y_2 plane. This local coordinate is located at the valve stem as shown in Figure 2(b). The convention for vertical axis of the graph in Figure 9 is the 0 degree starts at the local y_2-axis of the valve stem and the 90 degrees is towards to the front of the engine with a counter clockwise rotation. These resultant forces typically are in the opposite direction of the maximum contact pressure position in the guide. Similarly, Figure 10 shows the direction of the resulting force in the valve seat when the valve is seated and is mostly determined by the hot assembly distortion. The vertical axis of the graph in Figure 10 uses the same convention as Figure 9. There are no forces in the seat during the valve open phase. The bubble size in Figures 9 and 10 represents the magnitude of the force and is for relative visual comparison only.



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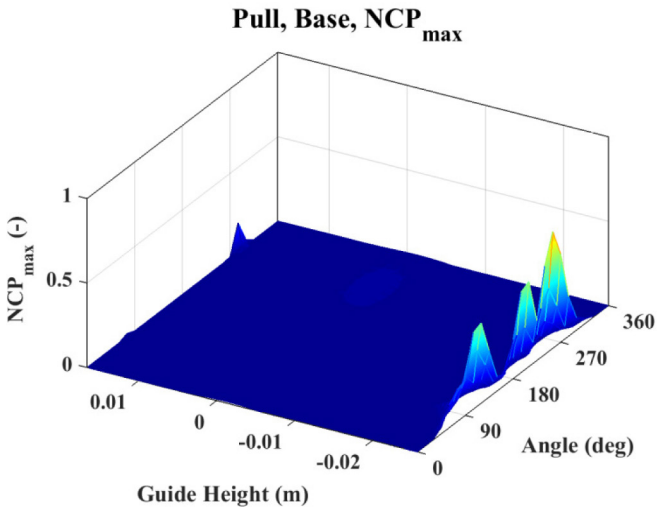
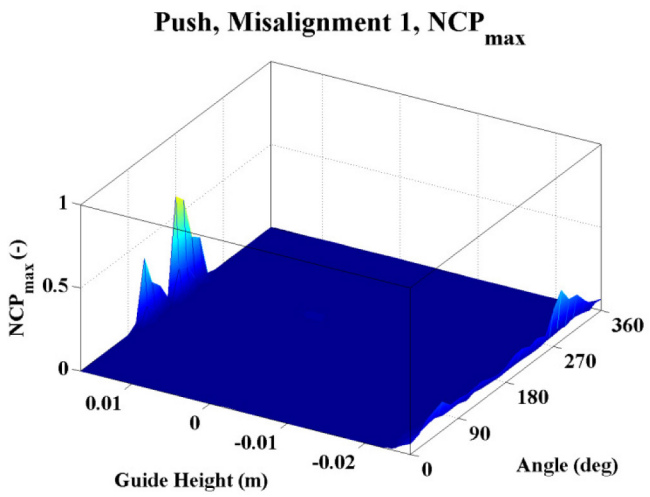


b.

Figure 11. Normalized maximum total pressures, NCP_{max}, for various cases (a) push base, (b) pull base, (c) push Misalignment 1, (d) pull Misalignment 1, (e) push Misalignment 2, (f) pull Misalignment 2, (g) push Misalignment 3 and (h) pull Misalignment 3.



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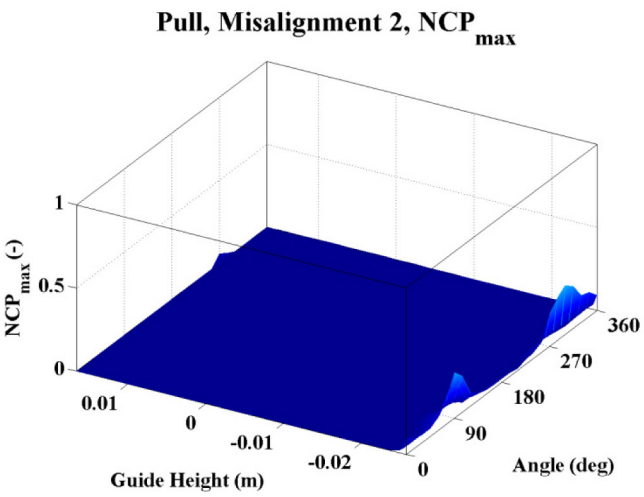

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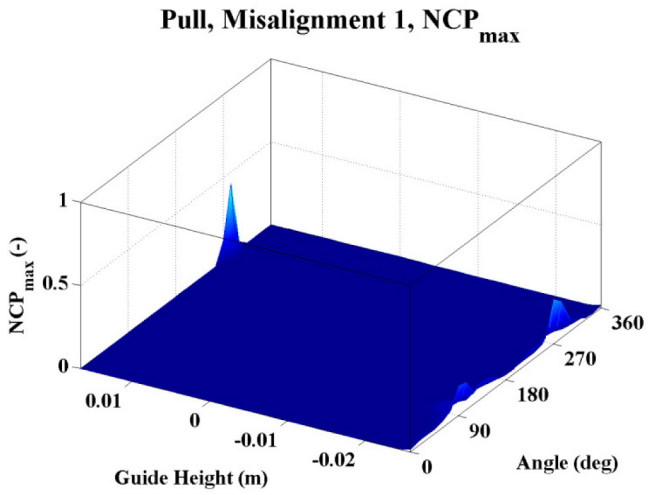

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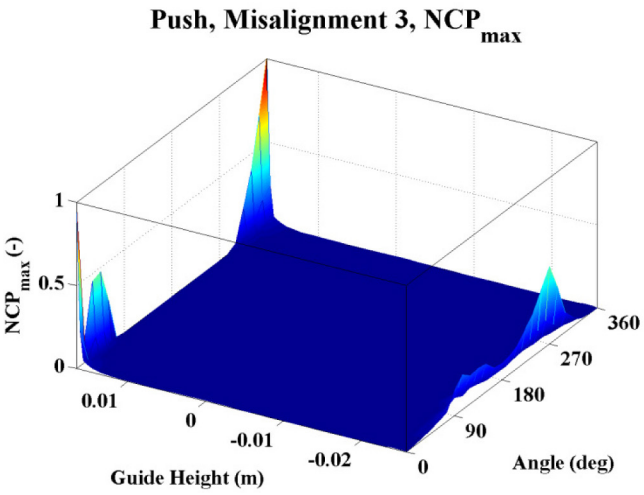

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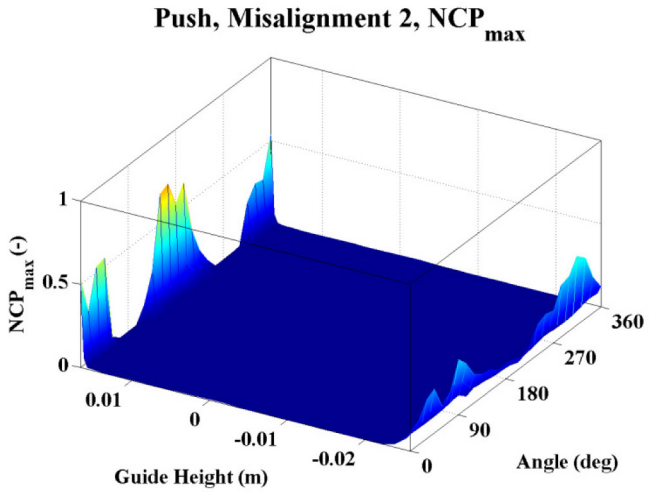

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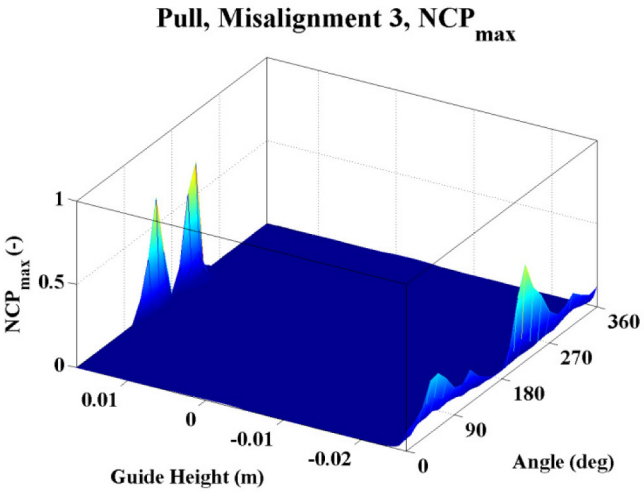


h.

Figure 11. (cont.) Normalized maximum total pressures, NCP_{max}, for various cases (a) push base, (b) pull base, (c) push Misalignment 1, (d) pull Misalignment 1, (e) push Misalignment 2, (f) pull Misalignment 2, (g) push Misalignment 3 and (h) pull Misalignment 3.

One of the key output parameters for the valve and guide contact interaction analysis is the total pressure which is a combination of asperity contact and hydrodynamic pressures. It is essential to identify the location of the maximum contact pressure that may be critical for initiation of surface wear or galling at higher temperature when material yield limit decreases. The peak value of total pressure, CP_{max}, over an engine cycle time for each individual node on the guide surface is obtained first. It is then normalized for comparing the cases. Normalized maximum total pressure is obtained as the ratio of the CP_{max} to the worse or maximum CP_{max} out of all cases. Normalized maximum total pressures, NCP_{max}, for all cases are plotted in Figures 11(a) through 11(h). It should be noted that the magnitude of the hydrodynamic pressure is one order lower than that of the asperity contact pressure and is hardly noticeable in these plots. In the plots the guide height is with respect to the local z_2-coordinate at the valve stem shown in Figure 2(b). The top and bottom of the guide is represented by the positive and negative guide height value, respectively. The convention for "Angle" axis in Figure 11 is the 0 degree starts at the local x_2-axis and the 90 degrees is towards to the HLA or local y_2-axis with a counter clockwise rotation. The bottom part of the exhaust valve guide is usually at higher temperature than the upper part. In this study, emphasis is given to the maximum total pressure value at the bottom of the guide although higher contact pressure is also observed at the top of the guide. It is important to note that the elastic material properties and the surfaces geometries and roughness in an idealized condition before wear are modeled in this investigation. The value of maximum total pressure might be affected if geometries of the mating surfaces after wear are modeled or the elastic-plastic material properties are used. Figures 11(e) and 11(f) show that the dominating direction of NCP_{max} for Misalignment 2 is along the crankshaft axis and towards the rear of the engine whereas for all other cases it is in the transverse direction of the engine. The NCP_{max} at the valve guide bottom for all cases is shown in Figure 12. The NCP_{max} result for base case pull direction is somewhat higher than that of the push case and occurs in the transverse direction of the engine. Differences between NCP_{max} for push and pull directions is not that large for misalignment cases as observed in the base case. Misalignment 3 shows higher NCP_{max} among all misalignment cases.

Average friction power density FPD_{avg} is defined as

$$FPD_{avg} = \frac{\sum_{i=1}^{i=n} CP_i \mu v_i}{n} \quad (1)$$

where n is the number of output from analysis in the cycle, CP_i is the total contact pressure at i - th output, μ is coefficient of friction for the mating surface and v_i is the absolute value of the relative speed between mating surfaces at the matching point at i - th output.

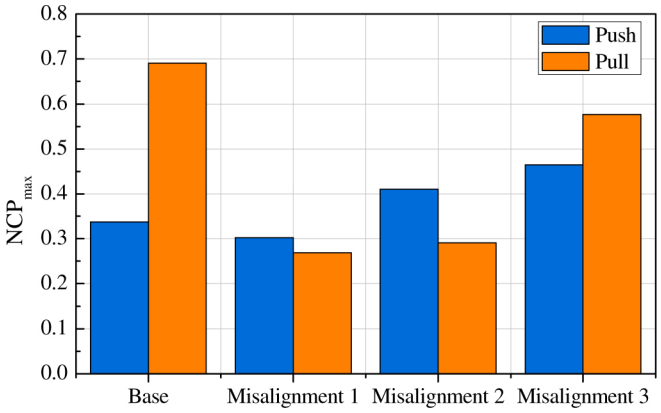
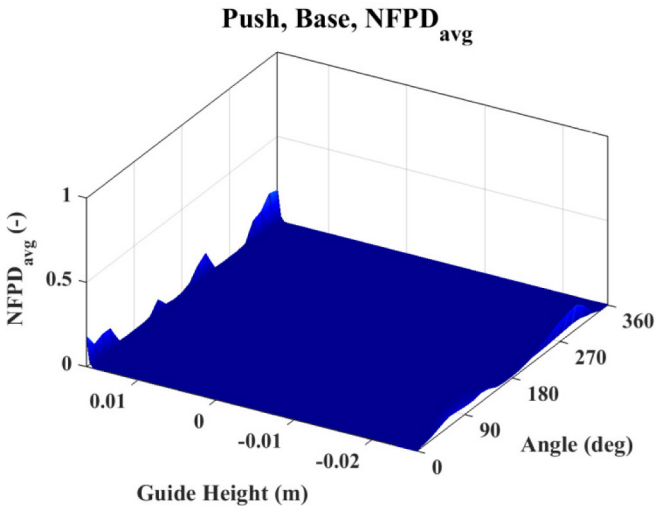


Figure 12. Comparison of NCP_{max} at the valve guide bottom for all cases.



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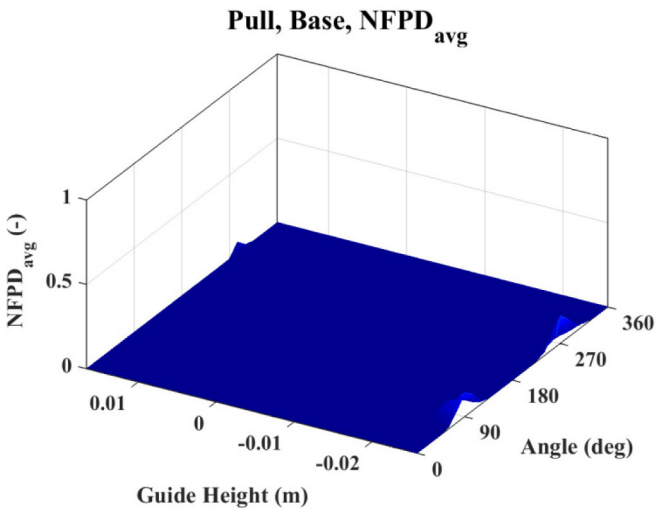
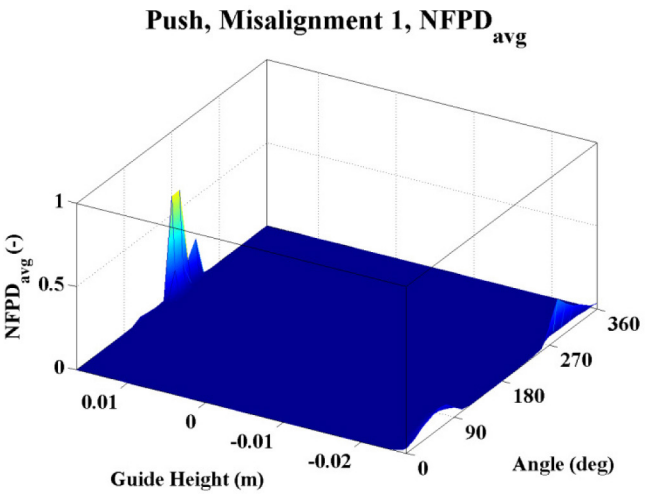


b.

Figure 13. Normalized average friction power density, $NFPD_{avg}$, for various cases (a) push base, (b) pull base, (c) push Misalignment 1, (d) pull Misalignment 1, (e) push Misalignment 2, (f) pull Misalignment 2, (g) push Misalignment 3 and (h) pull Misalignment 3.



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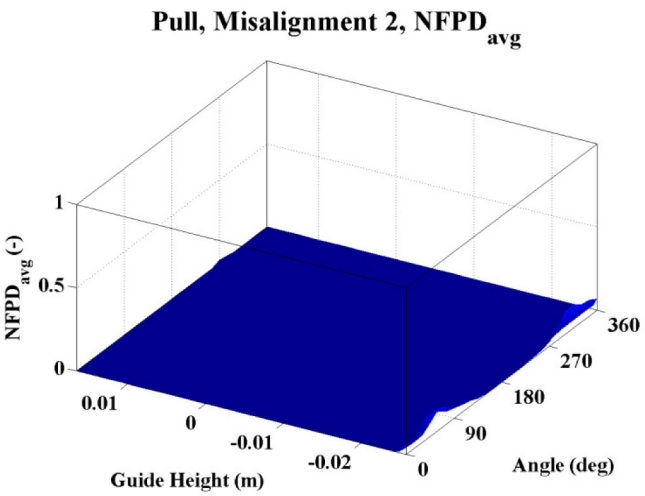

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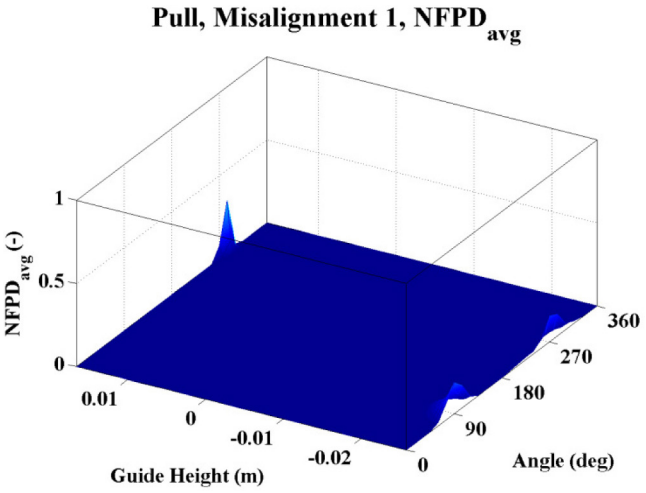

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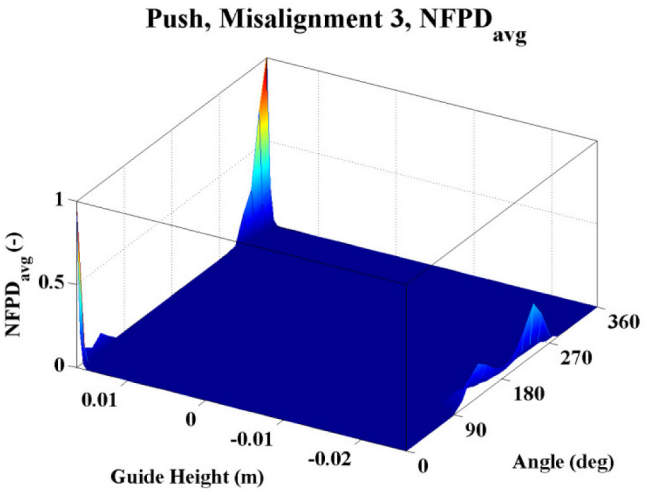

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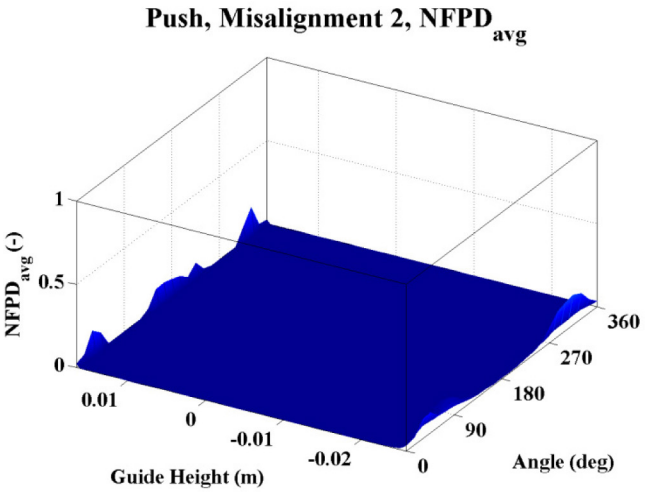

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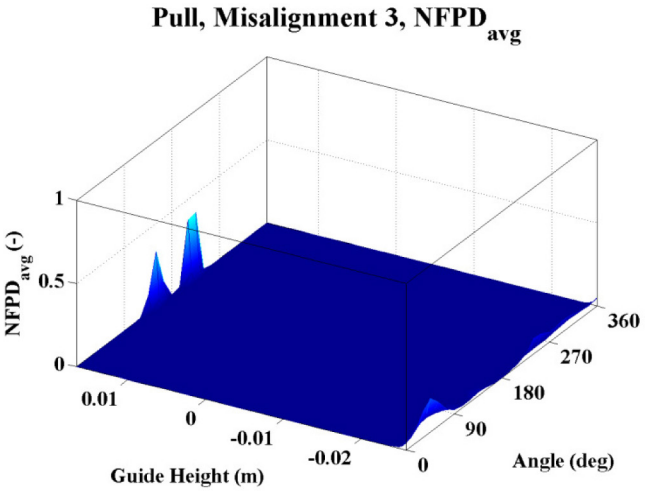

h.

Figure 13. (cont.) Normalized average friction power density, $NFPD_{avg}$, for various cases (a) push base, (b) pull base, (c) push Misalignment 1, (d) pull Misalignment 1, (e) push Misalignment 2, (f) pull Misalignment 2, (g) push Misalignment 3 and (h) pull Misalignment 3.

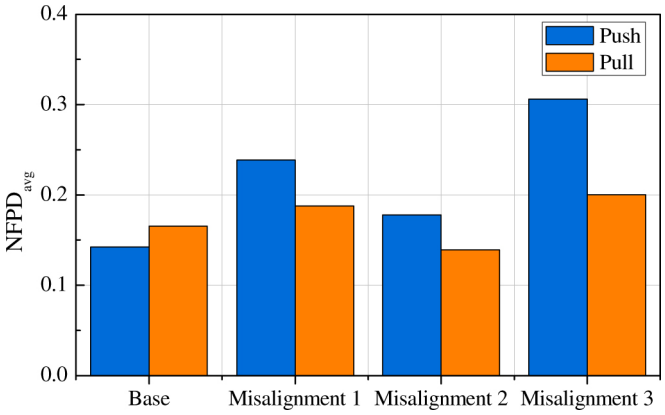

Figure 14. Comparison of $NFPD_{avg}$ at the valve guide bottom for all cases.

Normalized average friction power density, $NFPD_{avg}$, is obtained as the ratio of the FPD_{avg} to the worse or maximum FPD_{avg} out of all cases. Normalized average friction power densities for all cases are plotted in Figures 13(a) through 13(h). Similar convention as Figure 11 is used for Figure 13. Here $NFPD_{avg}$ is considered as a wear initiation indicator for a particular location. The design objective should be to minimize this value or bring it down to an acceptable level. At the top of the guide, temperature is close to the temperature of the oil and relatively cooler than the bottom of the guide. Moreover, the lubricants at the top part of the guide carried-in by valve motion would give better wear characteristics at the guide top than the bottom. Hence, similar to maximum total pressure, emphasis is given to the $NFPD_{avg}$ at the bottom of the guide. Figures 13(e) and 13(f) show that the dominating direction of $NFPD_{avg}$ for Misalignment 2 is along the crankshaft axis and towards the rear of the engine. Figures 13(g) and 13(h) show that the dominating direction of $NFPD_{avg}$ for Misalignment 3 is along the crankshaft axis with direction towards the engine front for the push and rear for the pull drives. For the rest of other cases it is in the transverse direction of the engine. The $NFPD_{avg}$ at the valve guide bottom for all cases is shown in Figure 14. Results show that Misalignment 3 in the push direction is the worse among all cases in terms of wear initiation. Differences between $NFPD_{avg}$ for the push and pull directions is not that large for other cases as observed in the Misalignment 3.

4. DISCUSSIONS

The details of the valve and guide interactions and various influences that affect different aspects of the valvetrain system are discussed using Figures 5 through 10. Figures 5, 6 and 7 showed influence of the camshaft rotation with respect to the RFF on the kinematics of RFF and valve with respect to mating surfaces. Figures 8, 9 and 10 showed influence of the camshaft rotation with respect to the RFF on the resultant forces in the valve tip, the guide and the seat. The results show that at the given scale the influences on wear initiation at the bottom of the guide are very similar for the push and pull directions for the base case.

Results also suggest that the maximum total pressure, a critical output parameter for understanding the valve and guide interaction, has no directional relationship to the average friction power density, another critical output parameter for wear initiation indicator. This is due to the fact that the maximum total pressure represents an instantaneous behavior whereas the average friction power density represents the cycle average occurrence of the product of total pressure and relative sliding velocity. In this investigation the wear initiation indicator is obtained using an appropriate coefficient of friction for a comparative study. However, it should be noted that the coefficient of friction depends on the mating surface temperature [3], materials choice for the mating pair, and various other factors that may need to be accounted for in a wear calculation. This may be a subject of the future research work.

Thermal distortion of the cylinder head used in this study is considered a given condition and can be an iterative process to determine any structural and thermal distortion influence on the valve guide wear. Computational results obtained can be further processed for wear simulation of the valve guide with appropriate adjustment and incorporating temperature dependency to the coefficient of friction and oil viscosity. Different types of misalignments are analyzed separately in this study. It is understood that in reality these misalignments may occur in many combinations. It is quite challenging to pick a representative combination of these misalignments since it may be very specific.

Simulation results for misalignments indicate that the wear pattern may vary significantly under various misalignment conditions. This essentially indicates that the wear pattern obtained from these simulations may only be used for the design direction and may be used in a limited capacity for comparisons to engine dyno test results. For example, the misalignment presented here are typical tolerances in the valvetrain system of an engine and the engine could have any potential combinations of these misalignments during operation. However, if a guide wear issue is detected in an engine, based on direction of the wear in the hardware and using computational results it may be possible to identify which misalignment(s) is/are dominating or if a certain misalignment is aggravated by external loadings.

5. CONCLUSIONS

The valve stem and valve guide contact behavior is investigated using computational models for an engine with roller finger follower (RFF) valvetrain and overhead cam configuration. The camshaft drive in push and pull directions under several misalignment conditions are modeled and analyzed. Different types of misalignments are analyzed individually to understand the extent of effect of each of the misalignments on the valve and guide interactions. The following conclusions were made in this investigation:

- The maximum total pressure, a critical output parameter for understanding the valve and guide interaction, has no directional relationship to the average friction power density, another critical output parameter for wear initiation indicator.
- At the given scale the influences on wear initiation at the bottom of the guide are very similar for the push and pull directions for the case with no misalignments, although the affected regions in the circumference of the guide differ.

- The horizontal RFF misalignment with respect to the plane of RFF motion and with the drive in push direction has the most significant effect on wear initiation at the bottom of the guide.
- Computational results obtained can be further processed for wear simulation for the valve guide. Simulation results for misalignments indicate that the wear pattern may vary significantly under various misalignment conditions.
- The wear pattern obtained from the simulations may only be used for the design direction and may be used in a limited capacity for comparisons to engine dyno test results.6.

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Helpful discussions with the valvetrain team at Ford Motor Co. are greatly appreciated.

DEFINITIONS/ABBREVIATIONS

$\boldsymbol{CP_{max}}$ - peak value of total pressure

$\boldsymbol{NCP_{max}}$ - normalized maximum total pressure

$\boldsymbol{FPD_{avg}}$ - average friction power density

$\boldsymbol{NFPD_{avg}}$ - normalized average friction power density

$\boldsymbol{CP_i}$ - total contact pressure at i - th output

$\boldsymbol{\mu}$ - coefficient of friction

$\boldsymbol{v_i}$ - absolute value of the relative speed at i - th output

$\boldsymbol{n}$ - the number of output from analysis in the cycle

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6-16

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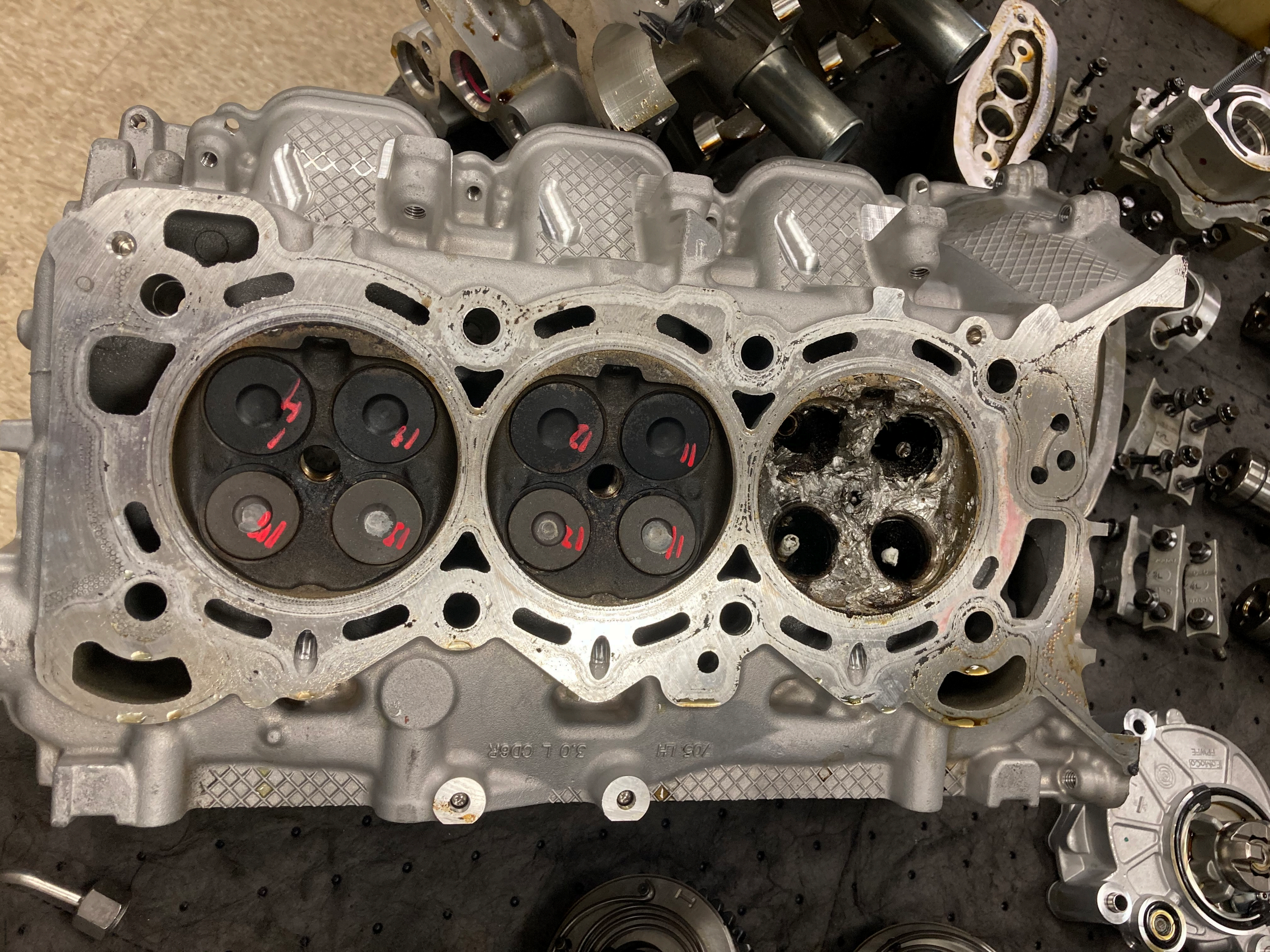
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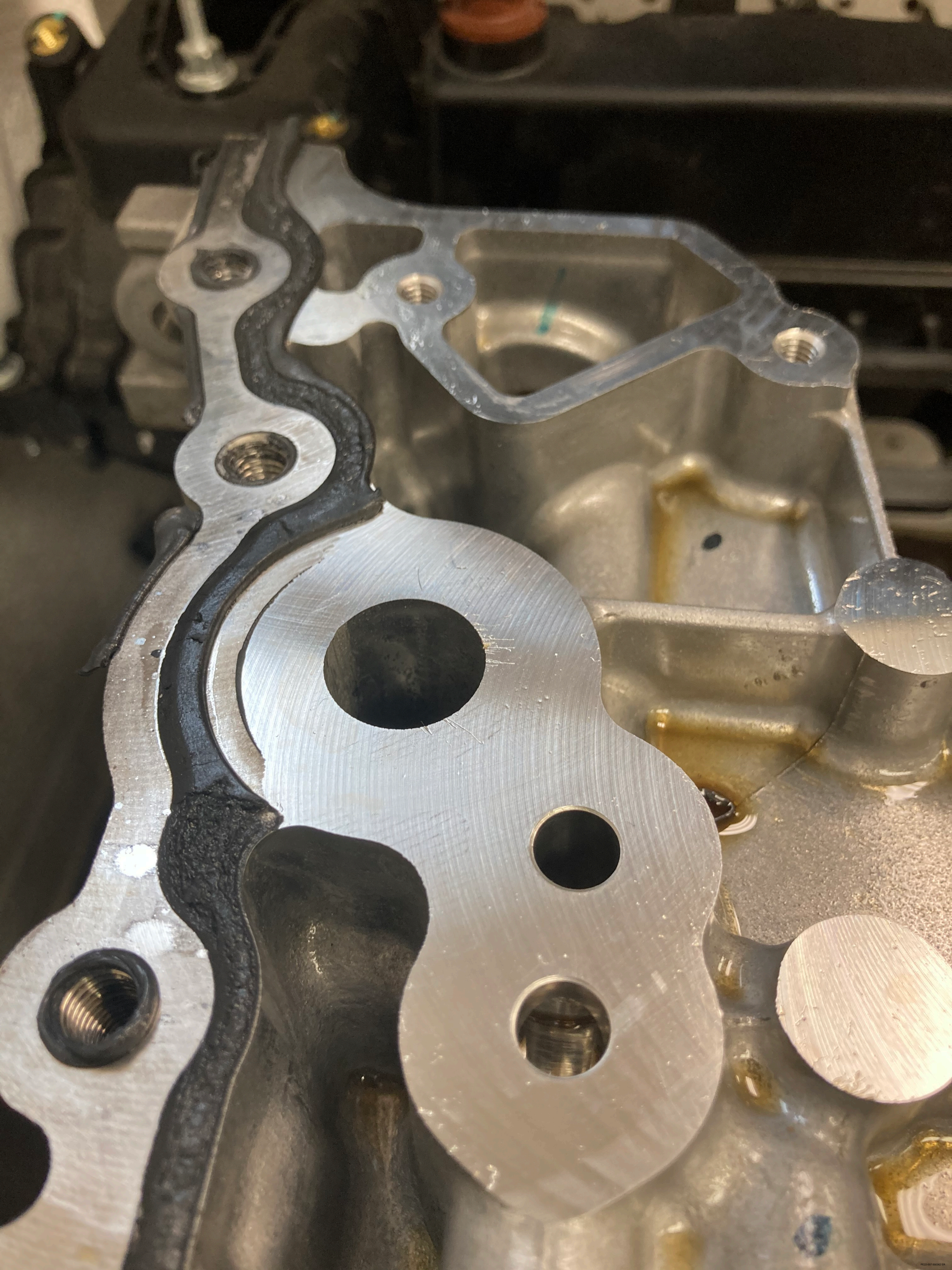

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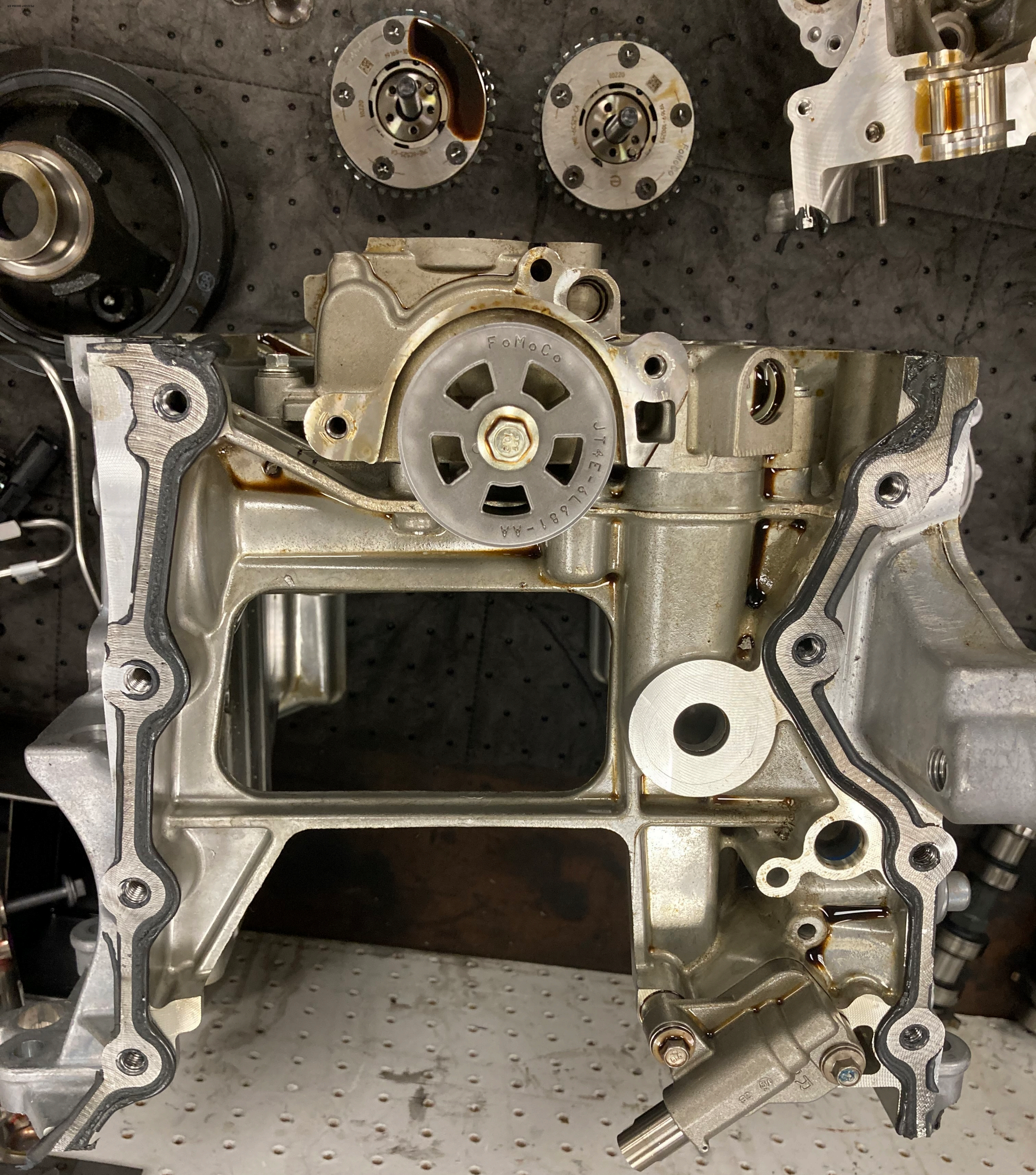

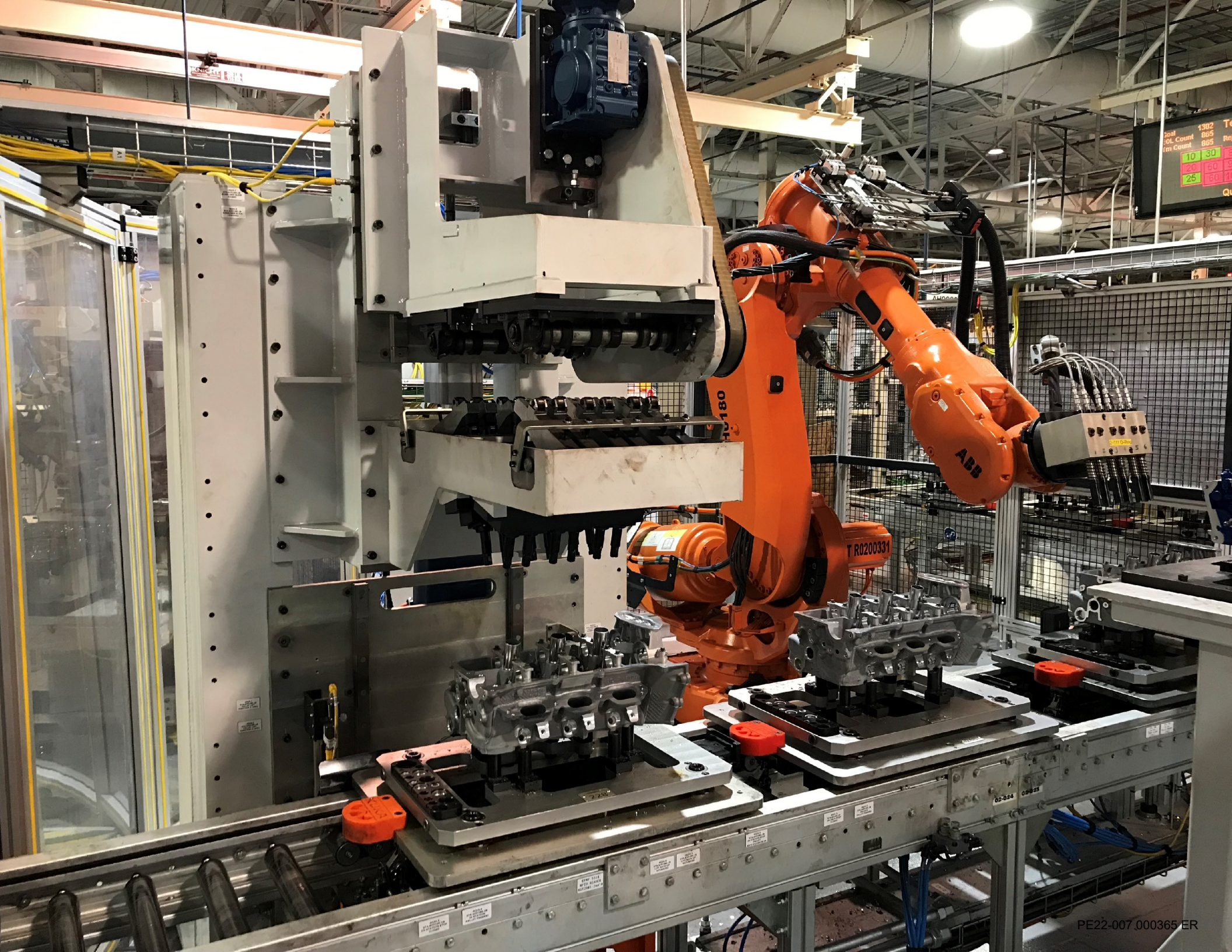

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To: Knott, Tim (.)
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Paul Adam
Global Valve Train Technical Expert
Ford Motor Company
313-580-3971

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SURFACE VEHICLE INFORMATION REPORT

J775™ JAN2018

Issued 1961-06
Revised 2004-11
Stabilized 2018-01

Superseding J775 NOV2004

Engine Poppet Valve Information Report

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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Foreword—Poppet valves control combustion chamber induction and exhaust gas flow in reciprocating combustion engines. Poppet valves are manufactured from iron, nickel, titanium, and cobalt-base metallic alloys that are often welded together in various combinations.

Martensitic and austenitic steels are used for intake valves. Specially designed high temperature martensitic alloys, austenitic alloys, and superalloys are used for exhaust valves.

Titanium alloys have been used for both intake and exhaust valves in some limited production, high performance applications. Special iron, nickel, and cobalt-base alloys are welded to many of the valve head alloys to improve seat face wear and corrosion resistance.

1. Scope—This specification supplies engineers and designers with:

a. Poppet valve nomenclature
b. Poppet valve alloy designations
c. Chemical compositions of poppet valve alloys
d. A guide to valve alloy metallurgy and heat treatments
e. General information on properties of valve alloys
f. A guide to the application of valve alloys
g. A description of valve design and construction, and their relation to valve alloy selection
h. Valve gear design considerations that affect valves

2. Reference

2.1 Applicable Publication—The following publication forms a part of this specification to the extent specified herein.

2.1.1 ISO PUBLICATION—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 683-15—Heat-treatable steels, alloy steels and free-cutting steels—Part 15: Valve steels for internal combustion engines

3. Valve Nomenclature—Valve nomenclature and constructions are illustrated in Figures 1 to 5.

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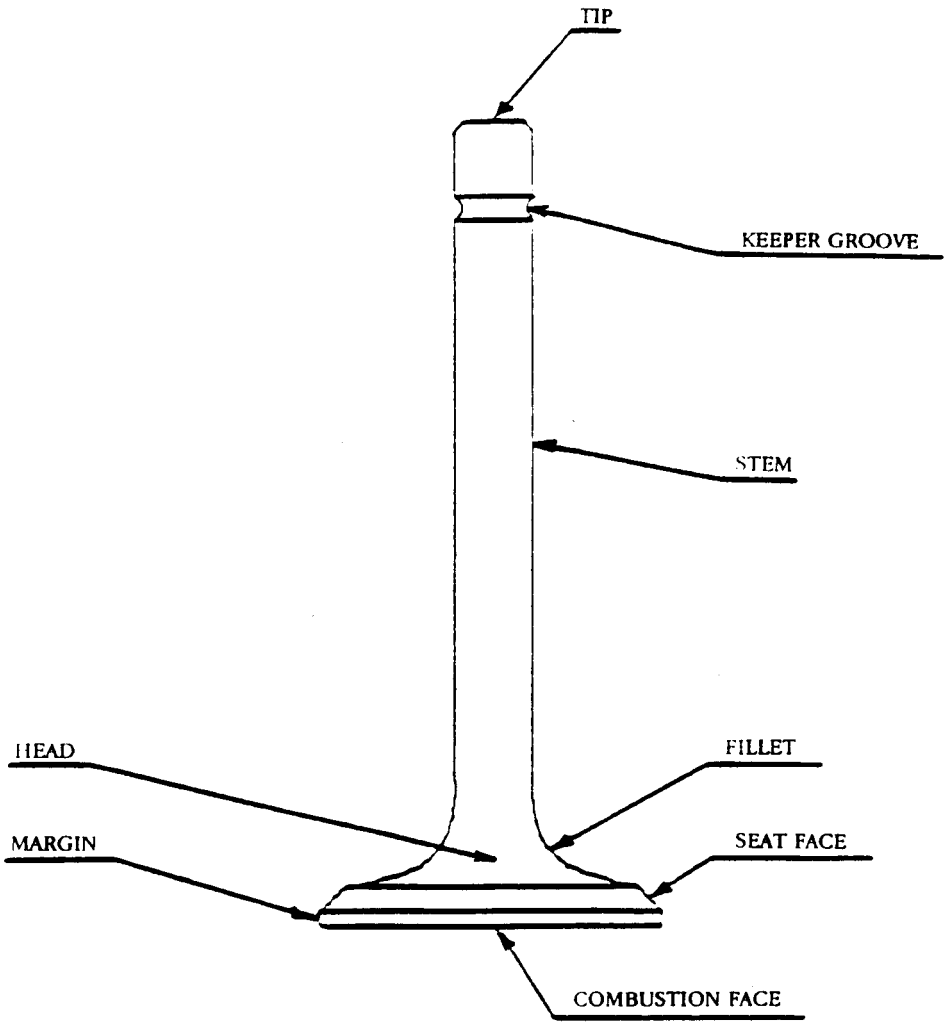

The majority of intake valves for all applications are one-piece construction that also has significant usage in spark ignition engine exhaust valves.

FIGURE 1—ONE-PIECE CONSTRUCTION

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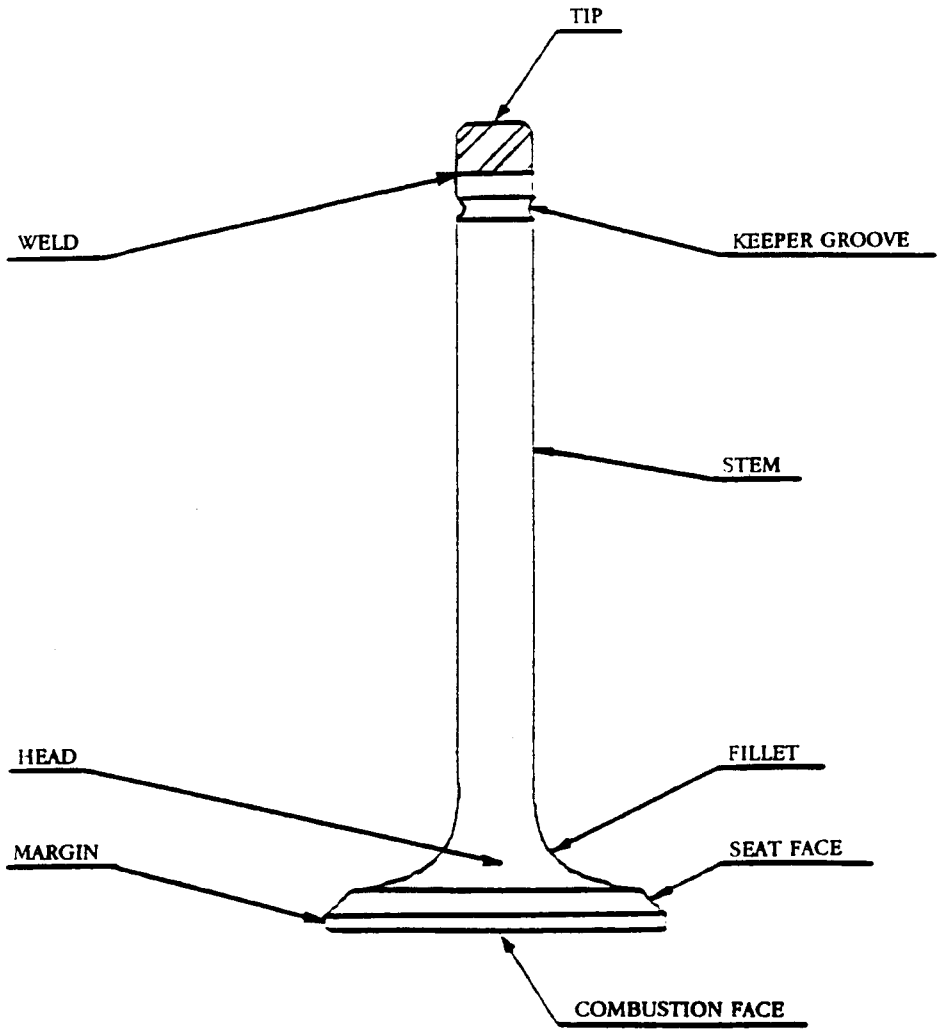

Welded tip construction has significant usage in spark and compression ignition engine valves.

FIGURE 2—WELDED TIP CONSTRUCTION

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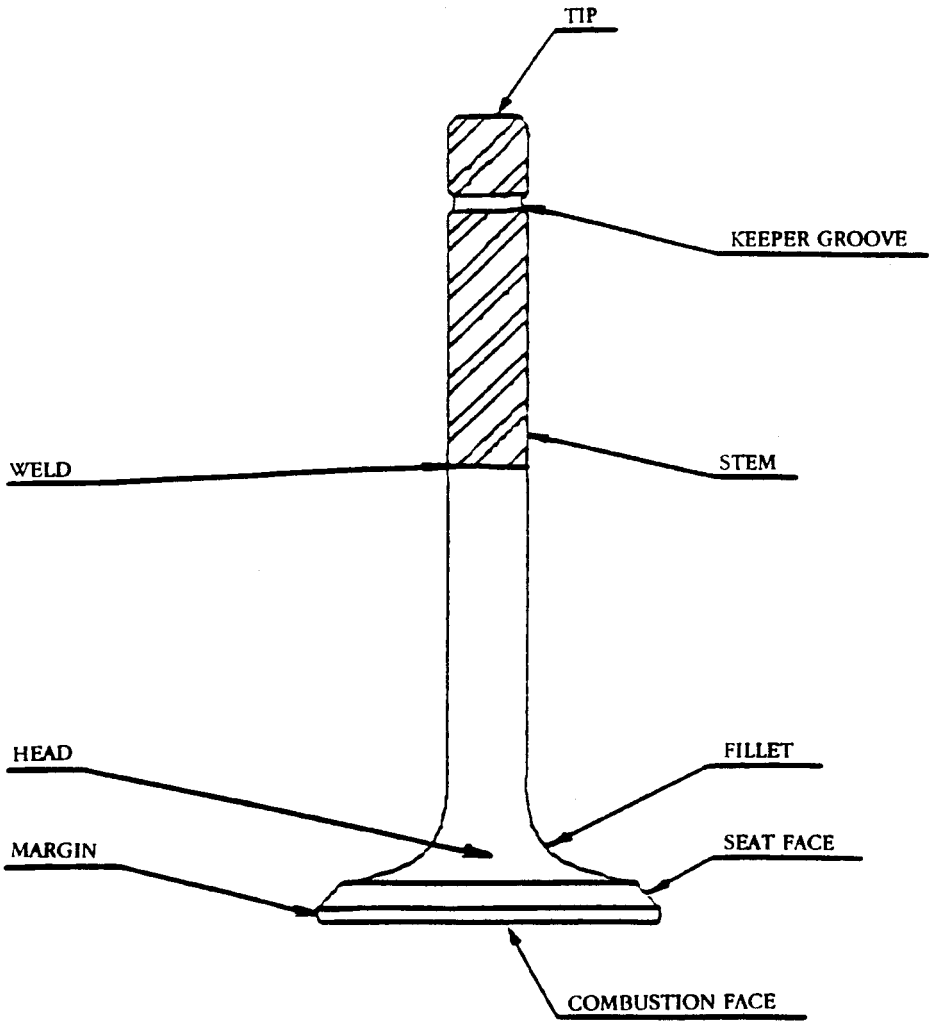

Two-piece construction has significant usage in spark and compression ignition engine exhaust valves.

FIGURE 3—TWO-PIECE CONSTRUCTION

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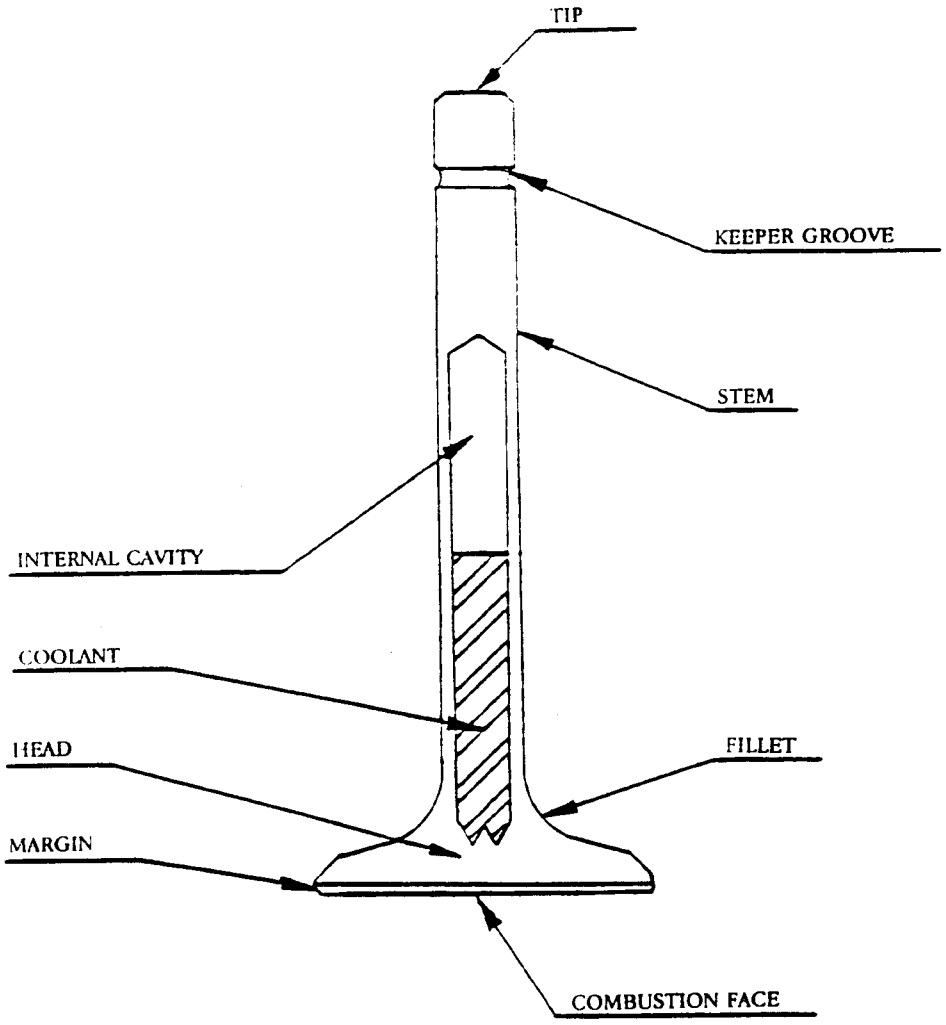

Internally cooled construction used in extreme duty truck, high performance, and aircraft spark ignition engine exhaust valves.

FIGURE 4—INTERNALLY-COOLED CONSTRUCTION

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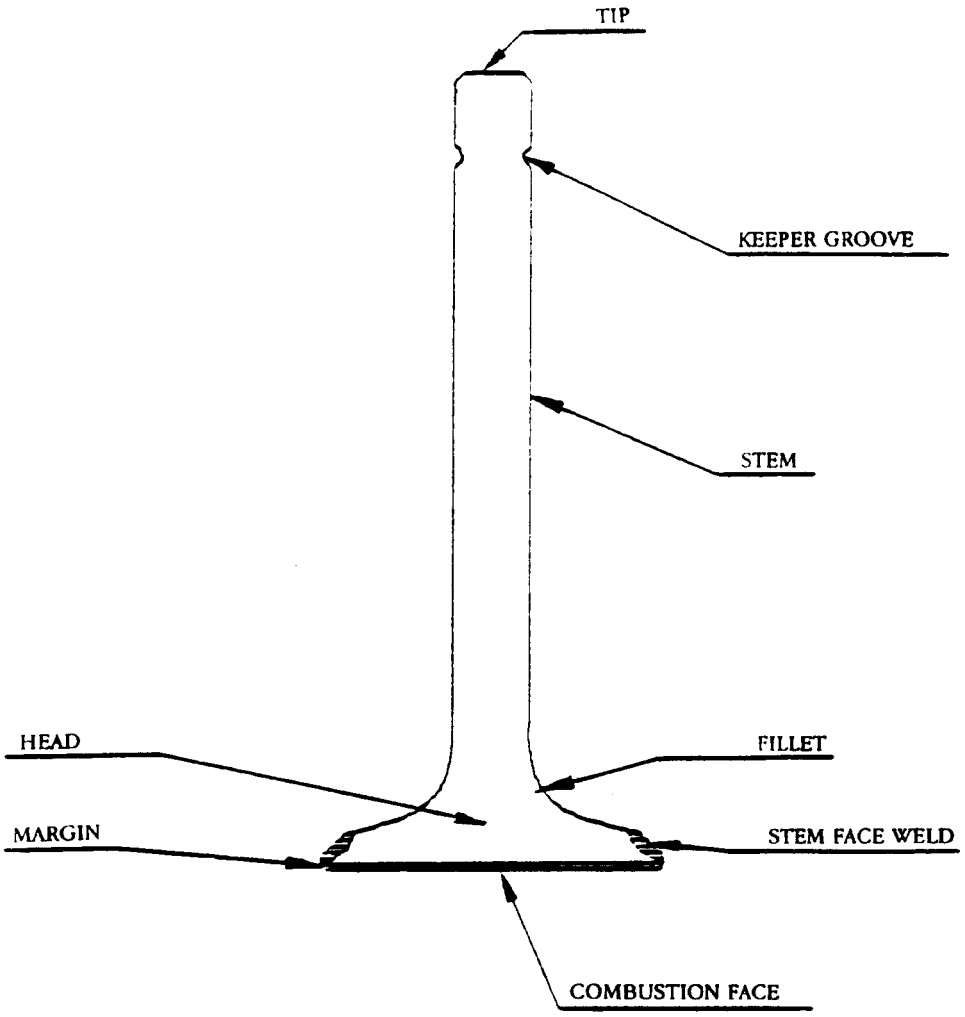

Welded seat face construction predominates in compression ignition engine exhaust valves and has some usage in other valve applications. It supplements other types of valve construction.

FIGURE 5—WELDED SEAT FACE CONSTRUCTION

4. Valve Alloy Designation

4.1 UNS Designations—SAE, in conjunction with American Society for Testing and Materials (ASTM), has adopted the Unified Numbering System (UNS) for the identification of all metallic alloys. Tables 1A to 4B use the UNS identification codes for valve alloys. These UNS numbers supersede the previous SAE functional numbering system.

TABLE 1A—CURRENT NORTH AMERICAN VALVE ALLOYS (MARTENSITIC STEELS)(1)

UNS/ISO 683/15	COMMERCIAL	C	Mn	P (max)	S (max)	SI	Cr	Ni	W	Mo	Fe	Other
H15410	1541H	0.35/0.45	1.25/1.75	0.040	0.050	0.15/0.35	—	—	—	—	Base	
G15470	1547	0.43/0.51	1.35/1.65	0.040	0.050	—	—	—	—	—	Base	
G86450	8645	0.43/0.48	0.75/1.00	0.035	0.040	0.15/0.35	0.40/0.60	0.40/0.70	—	0.15/0.25	Base	
H41400	4140H	0.37/0.44	0.65/1.10	0.035	0.040	0.15/0.35	0.75/1.20	—	—	0.15/0.25	Base	
K14072	ASTM–A193\B16	0.36/0.44	0.45/0.70	0.040	0.040	0.15/0.35	0.80/1.15	—	—	0.50/0.65	Base	V 0.25/0.35
S65007/ X 45 CrSi 9 3	Sil 1	0.40/0.50	0.80 max	0.040	0.030	2.70/3.30	8.00/10.00	0.60 max	—	—	Base	
S65006	Sil XB	0.75/0.90	0.80 max	0.040	0.040	1.75/2.60	19.00/ 21.00	1.00/1.70	—	—	Base	
S42200	422 SS	0.20/0.25	1.00 max	0.040	0.030	0.75 max	11.00/ 12.50	0.50/1.00	0.75/1.25	0.75/1.25	Base	V 0.15/0.30 Cu 0.50 max
S64004/ X50CrSi 8 2	SUH 11/ SUH 11M	0.45/0.55 0.47/0.55	0.60 max 0.60 max	0.030 0.030	0.030 0.030	1.00/2.00 1.00/2.00	7.50/9.50 7.50/9.50	0.60 max 0.60 max	—	— —	Base	
—	FMS-235	0.47/0.53	0.60 max	0.030	0.030	1.05/2.00	4.80/5.50	0.60 max	—	—	Base	
	SUH-3	0.35/0.45	0.60	0.030	0.030	1.80/2.50	10.0/12.0	0.60 max	—	0.70/1.30	Base	Cu 0.30 max

1. All chemical contents are expressed in weight percent.

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TABLE 1B—(OTHER) VALVE ALLOYS (MARTENSITIC STEELS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	W	Mo	Fe	Other	SIMILAR TO	WHERE USED
X 50 CrSi 8 2	0.45/0.55	0.60 max	0.030	0.030	1.0/2.0	7.5/9.5	0.60 max	—	—	—	Base			Europe
Chromo 193/ X 85 CrMoV 18 2	0.80/0.90	1.5 max	0.040	0.030	1.0 max	16.5/18.5	—	—	—	2.0/2.5	Base	V 0.30/0.60		Europe
SMnC443	0.40/0.46	1.35/1.65	0.030	0.030	0.15/0.35	0.35/0.70	—	—	—	—	Base		G15470	Asia
SNCM 240	0.38/0.43	0.70/1.00	0.030	0.030	0.15/0.35	0.40/0.65	0.40/0.70	—	—	0.15/0.30	Base			Asia
SUH 1	0.40/0.50	0.60 max	0.030	0.030	3.00/3.50	7.50/9.5	0.60 max	—	—	—	Base		S65007	Asia
SUH 616	0.20/0.25	0.50/1.00	0.040	0.030	0.50 max	11.00/13.00	0.50/1.00	—	0.75/1.25	0.75/1.25	Base	V 0.20/0.30	S42200	Asia
40 Cr	0.38/0.43	0.60/0.85	0.030	0.030	0.15/0.35	0.90/1.20	0.25	—			Base	Cu 0.30 max		Eru/Asia
GM-8440	0.35/0.45	0.20/0.40	0.030	0.040	3.60/4.20	1.85/2.50	0.25 max	—	—	0.10 max	Base	Cu 0.25 max		USA

TABLE 2A—CURRENT NORTH AMERICAN VALVE ALLOYS (AUSTENITIC STEELS)

UNS/ISO 683/15	COMMERCIAL	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	Fe	Other
S63008/ X 53 CrMnNiN 21 9	21-4N	0.48/0.58	8.00/10.00	0.050	0.030	0.25 max	20.00/22.00	3.25/4.50	0.35/0.50	Base	
S63012	21-2N	0.50/0.60	7.00/10.00	0.050	0.030	0.25 max	19.50/21.50	1.50/2.75	0.20/0.40	Base	
S63018/ X 33 CrMnNiN 23 8	23-8N	0.28/0.38	1.50/3.50	0.050	0.030	0.50/1.00	22.00/24.00	7.00/9.00	0.25/0.35	Base	Mo 0.50 max W 0.50 max
S30430	302 HQ	0.10 max	2.00 max	0.045	0.030	1.00 max	17.00/19.00	8.00/10.00		Base	Cu 3.00/4.00
S63019/ X 50 CrMnNiNbN 21 9	21-4N + Nb + W	0.45/0.55	8.00/10.00	0.050	0.030	0.45 max	20.00/22.00	3.50/5.50	0.40/0.60	Base	W 0.80/1.50 Nb + Ta 1.80/2.50
S31630	316 MOD	0.08/0.12	2.0/3.0	0.020	0.015	0.025 max	0.16/0.17	9.0/10.0	0.12/0.19	Base	Mo2.5 – 3.0 Cu2.5 – 3.5
S30500	305SS	0.12 max	2.00 max	0.045	0.030	1.0 max	17.0/19.0	10.0/13.0		Base	

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TABLE 2B—OTHER VALVE ALLOYS (AUSTENITIC STEELS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	S (max)	Si	Cr	Ni	N	Fe	OTHER	SIMILAR TO	WHERE USED
18-12N	0.40/0.50	11/13	0.05	0.005	1 max	17/19	0.50 max	0.25/0.35	Base			Service
21-12N	0.15/0.25	1.00/1.50	0.045	0.030	0.70/1.25	20.00/22.00	10.50/ 12.50	0.15/0.25	Base		S63017	Europe
Gaman H	0.47/0.57	11.00/13.00	0.030	0.050	2.00/3.00	20.00/22.00	—	0.40/0.50	Base		S63013	Service
X 55 CrMnNiN 20 8	0.50/0.60	7.0/10.0	0.050	0.030	0.25 max	19.5/21.5	1.50/2.75	0.20/0.40	Base		S63012	Europe
X 53 CrMnNiNbN 21 9	0.48/0.58	8.0/10.0	0.050	0.030	0.45 max	20.0/22.0	3.25/4.50	0.38/0.50	Base	C + N > 0.90 Nb + Ta 2.–3	S63019	Europe
SUH 4	0.75/0.85	0.20/0.60	0.030	0.030	1.75/2.25	19.00/20.50	1.15/1.65		Base		S65006	Asia
SUH 35	0.48/0.58	8.00/10.00	0.040	0.030	0.35 max	20.00/22.00	3.25/4.50	0.35/0.50	Base		S63008	Asia
SUH 37	0.15/0.25	1.00/1.60	0.040	0.030	1.00 max	20.50/22.50	10.0/12.0	0.15/0.30	Base		S63017	Asia

TABLE 3A—CURRENT VALVE ALLOYS (SUPERALLOYS)

UNS/ISO 683/15	COMMERCIAL	C	Mn (max)	P (max)	S (max)	SI (max)	Cr	Ni	Co	Mo	Fe	Other
N07751/ NiCr 15 Fe 7 TiAl	I n conel 751	0.03/0.10	0.50	0.015	0.015	0.50	14.0/17.0	Base	1.00 max	0.50 max	5.00/9.00	Ti 2.00/2.60 Al 1.10/1.35 Nb + Ta 0.70/1.20 B 0.0015/0.009 Cu 0.50 max
N07080/ NiCr 20 TiAl	Nimonic 80-A	0.04/0.10	1.00	0.020	0.015	1.00	18.0/21.0	Base	2.00 max	—	3.00 max	B 0.008 max Ti 1.80/2.70 Al 1.00/1.80 Cu 0.20 max
N07031	Pyromet 31	0.03/0.06	0.20	0.015	0.015	0.20	22.3/22.9	55.0/58.0		1.70/2.30	—	Ti 2.10/2.60 Al 1.0/1.70 Nb 0.60/1.20 B 0.008 max

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TABLE 3A—CURRENT VALVE ALLOYS (SUPERALLOYS)

UNS/ISO 683/15	COMMERCIAL	C	Mn (max)	P (max)	S (max)	SI (max)	Cr	Ni	Co	Mo	Fe	Other
N07032	Pyromet 31V	0.20	0.20	0.015	0.015	0.20	22.3/22.9	55.0/58.0	1.00 max	1.70/2.30	Balance	Ti 2.10/2.40 Al 1.10/1.40 Nb 0.70/1.00 B 0.008 max Cu 0.50 max
S66315/ Ni30	NCF 3015	0.08	0.50	0.015	0.015	0.50	13.5/15.5	29.5/33.5	—	0.4/1.0	Balance	Ti 2.30/2.90 Al 1.60/2.20 B 0.010 Max Nb 0.4/0.9

TABLE 3B—OTHER VALVE ALLOYS (SUPERALLOYS)

GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C	Mn	P (max)	X (max)	Si	Cr	Ni	Co	Mo	Fe	OTHER	SIMILAR
NiFe 25 Cr 20 NbTi	0.10 max	1.0 max	0.030	0.015	1.0 max	18.0/21.0	Base	—	—	23.0/28.0	Al 0.30/1.00 Nb + Ta 1.0/2.0 B 0.008 max	
Waspaloy	0.03/0.10	1.00	0.030	0.030	0.75	18.00/21.00	Base	12.00/15.00	3.50/5.00	2.00 max	Ti 2.75/3.25 Al 1.20/1.60 Zr 0.02/0.12 B 0.003/0.010 Cu 0.50 max	N07001
Nimonic 90	0.13 max	1.00 max			1.50 max	18.0/21.0	Balance	15.0/21.0	—	3.00 max	Ti 1.80/3.00	

TABLE 3C—OTHER VALVE ALLOYS (TITANIUM)

UNS	GRADE COMMERCIAL DESIGNATION or ISO GRADE NAME	C (max)	Al	V	Zr	Mo	Sn	O (max)	Fe (max)	H (max)	Y (max)	Ti	OTHER
R56401	Ti 6-4	0.10	5.25/6.75	3.35/4.65	—	—	—	0.40	0.80	0.020	0.005	Base	N 0.10
R54620	Ti 6-2-4-2	0.05	5.50/6.50	—	3.60/4.40	1.80/2.20	1.80/2.20	0.20	0.25	0.015	0.005	Base	Si 0.20 N 0.07

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TABLE 4A—CURRENT VALVE ALLOYS (FACING ALLOYS)

UNS	COMMERCIAL	C	Mn (max)	P (max)	S (max)	Si	Cr	Ni	Co	W	Mo	Fe	Other
R30006	Stellite 6	0.90/1.40	1.00	0.030	0.030	1.50 max	26.0/32.0	5.00 max	Base	3.50/5.50	1.50 max	6.00 max	
R30002	Stellite F	1.50/2.00	1.00	0.030	0.030	0.80/1.50	23.0/27.0	20.5/23.5	Base	10.5/13.5	1.00 max	6.00 max	
R30001	Stellite 1	2.00/3.00	1.00	0.030	0.030	0.40/2.00	26.0/33.0	3.00 max	Base	11.0/14.0	1.00 max	6.00 max	
R30012	Stellite 12	1.10/1.70	1.00	0.030	0.030	0.40/2.00	26.0/33.0	3.00 max	Base	7.00/9.50	1.00 max	3.00 max	
R30400	Tribaloy T-400	0.08 max	—	0.030	0.030	2.20/3.00	7.50/10.00	3.00 max	61.0/63.0	—	26.5/30.0	3.00 max	
S63021	VMS 637	2.00/2.30	—	—	—	1.00/1.30	23.5/26.0	11.0/12.0	—	—	5.00/5.60	Base	
S68000	Eatonite 6	1.50/2.00	1.00	0.025	0.020	1.10/1.50	26.0/30.0	15.0/18.0	—	—	4.00/5.00	Base	
S63020	VMS-646	1.70/1.85	11.0/13.0			0.500 max	19.0/20.5	19.0/21.0			9.00/10.5	Balance	

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TABLE 4B—CURRENT OTHER VALVE ALLOYS (FACING ALLOYS)

COMMERCIAL	C	Mn (max)	P (max)	S (max)	Si	Cr	Ni	Co	W	Mo	Fe	Other	SIMILAR TO	WHERE USED
X-782	1.75/2.25	1.00	0.030	0.030	0.50 max	25.0/27.0	Base	0.50 max	8.00/9.50	—	4.00 max		N06782	US/Eur
Eatonite 3	1.80/2.20	1.00	0.030	0.030	0.80/1.20	28.0/30.0	Base	—	—	4.00/6.00	1.00/8.00		N06013	US/Eur
Eatonite 5	1.80/2.20	1.00	0.030	0.030	0.80/1.20	28.0/30.0	Base	—	—	7.00/9.00	1.00/8.00		N06015	US/Eur
Tribaloy T-800	0.08 max	—	0.030	0.030	3.00/3.80	16.5/18.5	1.50 max	Base	—	27.0/30.0	1.50 max			
Co Cr 1	2.00/3.00	1.00	—	—	0.40/2.00	26.0/33.0	3.00 max	Base	11.00/14.00	1.00 max	3.00 max	0.50 max	R30001	Asia
Co Cr 6	0.90/1.40	1.00	—	—	0.40/2.00	26.0/32.0	3.00 max	Base	3.00/6.00	1.00 max	3.00 max	0.50 max	R30006	Asia
Co Cr 12	1.20/1.70	1.00	—	—	0.40/2.00	26.0/33.0	3.00 max	Base	7.00/9.50	1.00 max	3.00 max	0.50 max	R30012	Asia

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Each UNS designation is a five-digit identification number preceded by a type identification prefix letter.

Valve alloys have six identification prefixes:

G - General purpose carbon and low alloy structural steels
H - Controlled hardenability carbon and low alloy steels
K - Special purpose iron-base alloys
N - Nickel-base alloys
R - Cobalt, titanium, and other refractory alloys
S - Stainless steels, heat-resistant steels, corrosion-resistant steels, and iron-base superalloys

The five-digit identification number often incorporates the most popular previous designation for the alloy. Individual SAE and ASTM committees that work in concert control the UNS designations.

4.2 Primary Tables—All the materials currently used in North America organized in Tables 1A through 4A.

4.3 Secondary Tables—All the materials currently not used in North American and used elsewhere are included in Tables 1B through 4B. Table 3C contains titanium alloys information.

5. Valve Alloy Chemical Compositions

5.1 General—Where applicable, a reference to ISO 683-15 was made in the first column of each table.

Where no ISO 683-15 identification was available, the UNS designation and/or alloy commercial names were used.

5.2 Secondary Tables—Alloys covered in Tables 1B through 4B contain references to primary alloys in Tables 1A through 4A as well as markets where they are used.

6. Valve Alloy Metallurgy and Heat Treatment

6.1 General—The performance characteristics of a valve alloy are a cross product of composition and heat treatment. Alloy selection depends upon stresses, corrosive agents, and temperatures encountered in service, as well as the economic and durability objectives. Heat treatments used to improve the mechanical properties of valves depend upon the specific alloy, economics, and the level of properties desired. They can be general or selective, and it is not uncommon for a single valve to be subjected to two or more heat treatments in different locations.

6.2 Martensitic Alloys—Plain carbon, low alloy, and high alloy martensitic steels are primarily used for intake valves. Extreme duty martensitic steels generally have the highest carbon and alloy contents to resist wear, to resist seat face indention by deposits, and to provide increased strength. Elements such as chromium and silicon are added when increased oxidation or corrosion resistance is needed. Manganese and nickel are added as strengthening agents. Occasionally, refractory elements, such as molybdenum, tungsten, and vanadium are used to enhance certain elevated temperature properties.

Martensitic valves are most often quench hardened and tempered to hardness readings in the 25 to 45 Rockwell “C” scale range. This is a compromise among good strength, adequate ductility, impact performance, and wear resistance along the stem. In some less demanding applications, martensitic valves can be used in the annealed condition.

Tips and seats are often selectively hardened to create high hardness and wear resistant surfaces. These surfaces are selectively hardened, generally to the greatest hardness practical for the alloy. Tip hardening may extend beyond the keeper groove to improve the fatigue strength and the wear resistance of this region.

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6.3 Austenitic Alloys—Austenitic alloys have a face-centered cubic crystal structure, which is termed austenite. The elements that stabilize the austenitic structure are carbon, manganese, nickel, copper, and nitrogen. Chromium, silicon, and sometimes, aluminum are added for oxidation or corrosion resistance. Refractory elements such as molybdenum, niobium, tantalum, tungsten, and vanadium may be added for high temperature strength. These alloys are termed steels when the base element is iron. The cobalt and nickel-base austenitic materials are termed superalloys. Iron-base austenitic steels are hardened by carbonitride precipitation. Nickel-base superalloys are hardened by precipitation of aluminum, nickel, niobium, tantalum, and titanium in the form of intermetallic compounds. They may be used in either wrought or cast form, although cast valves are diminishing in commercial importance.

Austenitic valve alloys may be as simple in composition as 18-8 stainless steels, or as complicated as gas turbine alloys. The selection is strongly influenced by economic considerations, as well as the mechanical, physical, and chemical attributes required to satisfy specific engine requirements.

Mechanical properties are improved in austenitic valve alloys by precipitation hardening or strain hardening, rather than the martensitic transformation hardening of low alloy steels. The most common austenitic alloy hardening processes are:

a. High temperature forging followed by aging heat treatment(s)
b. High temperature forging followed by a solution treatment and then aging heat treatment(s)
c. Cold forming

In lower temperature applications, austenitic engine valves are frequently used in the forged and aged condition. More severe and higher temperature service generally requires solution treatment followed by one or more aging treatments. These operations produce hardness readings in the 20 to 40 Rockwell “C” scale range. The hardness developed depends upon the capability of the individual alloy. These alloys develop fatigue, creep, wear, and seat face indentation resistance from the heat treatments.

The cold-formed austenitic alloys (302HQ) are often used in small light-duty engines.

6.4 Titanium Alloys—Titanium alloys can be divided into three categories: alpha, alpha-beta, and beta alloys. Alpha alloys have a close-packed hexagonal structure, beta alloys have a body-centered cubic structure, and alpha-beta alloys have mixtures of the two different structures. The alloying elements that stabilize the alpha structure include oxygen, nitrogen, aluminum, and carbon.

Alloying elements that stabilize the beta structure include vanadium and molybdenum.

Zirconium and tin have minor effects upon phase stability, but are widely used as solid-solution strengtheners in both alpha and beta alloys.

Most titanium intake valves are made from alpha-beta alloys that have superior low temperature strength. Exhaust valves are generally manufactured from alpha or near alpha alloys because they have better high temperature creep properties. Beta alloys have not been used in any engine valve applications of consequence.

Titanium alloy heat treatments for engine valve applications are less established than the heat treatments for high volume production alloys. Most titanium alloys used in engine valves are precipitation hardenable and receive some type of solution treatment and aging after forming.

It is important to note that the development of titanium alloy engine valves has been primarily for high performance applications where extended durability is not a primary concern. Heat treatment procedures and precision are believed to be critical parameters in long-term titanium valve durability.

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Titanium aluminides are being investigated on an experimental basis for passenger car exhaust valve applications.

6.5 Ceramic Materials—Although not yet used in any commercial applications, ceramic materials are being investigated for high temperature valve service. The primary material being investigated for this application is Si3N4. Much experimentation has been done to develop plasma sprayed cermets, but these are being used only on a limited basis.

6.6 Seat Facing Alloys—Seat facing alloys are composed of hard precipitates in cobalt, nickel, or iron-base austenitic matrices. The hard precipitates are generally chromium, molybdenum, tungsten, or vanadium carbides. Some compositions use intermetallic compounds, such as Laves phase, as the hard precipitates. Chromium is added to the matrix to increase corrosion resistance. Silicon additions provide the fluidity necessary for welding the facing to the valve seat and can improve wear resistance.

Seat facing alloys derive their wear resistance from the volume fraction of precipitates that possess great hot hardness and compressive strength. A significant portion of the adhesive wear resistance in these seat facing alloys, as well as other high chromium alloys, is derived from the tenacious chromium oxide layer formed on the wear surface by oxidation during service. When extremely severe conditions of corrosion are encountered, such as those that occur when sulfur-containing fuels are used, cobalt or iron-base hard-facing alloys may be required to assure valve seat durability.

Selection of a particular seat-facing alloy usually depends upon temperatures, stresses, and corrodents encountered in service. Manufacturing considerations may preclude some seat facing alloy/valve head alloy combinations.

7. Valve Alloy Physical and Mechanical Properties

7.1 General—No single property can define the varying conditions encountered in different internal combustion engines. Spark and compression ignition engines place different demands on engine valves, so the properties of interest vary.

Common causes of valve failures include:

a. Adhesive or Abrasive Wear

1. Of the stem surface
2. Of the seat surface
3. Of the tip surface

b. General or Localized Corrosion

1. Primarily at elevated temperatures
2. Often combined with fatigue

c. Fatigue

1. Head radial cracking by thermal fatigue
2. Head chordal cracking by mechanical fatigue
3. Fillet transverse cracking by mechanical fatigue
4. Keeper groove transverse cracking by mechanical fatigue
5. Often assisted by corrosion

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7.2 Wear Properties—The wear resistance of valve materials cannot be adequately assessed by a single type of wear or mechanical property test because of the different modes of wear encountered at different locations on the valve. Often a secondary mode of wear can be initiated by the wear particles generated by the primary wear mode. Valve wear service must be considered individually at each of these locations: valve tip, stem, and seat.

a. Valve Tip—Against rocker arm type valve gear, valve tips are subjected to combined sliding and rolling contact with the rocker arm surface, potentially causing adhesive wear.
b. Valve Stem—Valve stems are subjected to a normal amount of sliding wear, which is not severe unless aggravated by inadequate lubrication or applied transverse loads.
   Excessive transverse loads are often due to improper rocker arm geometry or thermal distortion of the cylinder seat.
c. Valve Seat—The valve seat/cylinder head seat contact is characterized by high normal stresses and severe sliding conditions, generally at high temperatures and in a corrosive environment. The high combustion pressures in heavy-duty compression ignition engines impose high shear stresses across the contact interface, which damage the seat face surfaces by sliding. Valve seat wear is often accelerated because of dimensional misalignment as a result of manufacturing variability or thermal distortion.

Valve wear performance is most often determined by evaluating valves that are run in durability test engines, but some laboratory tests are also used to rate the relative performance of alloys.

These laboratory tests include:

a. Pin on disc tests
b. Crossed cylinder wear tests
c. Thrust washer tests
d. Cylinder - vee block tests
e. Functional tests of components in fixtures or actual engines

At the present time, there is little experience to suggest that the data generated by these tests can be used to design an engine valve from the first principles, but test data are invaluable in improving the wear performance of existing valve designs.

7.3 Corrosion Properties—Because of the variety of corrosive environments, there is no industry standard laboratory corrosion test. Some of the tests used to rate the corrosion resistance of valve alloys are:

a. Crucible immersion tests with various corrodents
b. Engine tests with a hole drilled through the head of the valve
c. Air oxidation tests run at high temperatures for a given time
d. Sulfidation tests using gas atmospheres

The corrosion of valves is accelerated by their temperature and environment. Corrosion occurs through four mechanisms:

a. Oxidation
b. Attack by various liquid metal oxides and salts
c. Attack by combustion products
d. Attack by fuel and lubricant additives or contaminants

Valve manufacturers and valve steel suppliers can generally supply representative corrosion resistance data.

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7.4 Fatigue Properties—Fatigue data and corrosion-accelerated fatigue data are limited because of the lengthy testing programs required to generate meaningful data. The situation is improving, and more data are being gathered by valve and steel manufacturers. In lieu of these data, estimates of fatigue resistance are usually established on the basis of elevated temperature tensile, creep, and stress rupture performances.

7.5 Tensile Properties—The tensile properties of finished valves are dependent upon processing and heat treatment during manufacture. Typical tensile data for individual alloys are provided in Tables 5, 6 and 7. ISO 683-15 table format was applied to data from the previous edition and data from ISO 683-15 was incorporated within. These tables contain data from unknown origin, therefore, its accuracy cannot be presumed. The data should be used only as a guideline. Valve manufacturers can generally supply expected mechanical properties in different regions of a valve, once a design envelope is established.

7.6 Creep Properties—Table 8 lists creep properties of selected alloys and was adopted from ISO683-15.

7.7 Forming and Heat Treatment—General guidelines for hot forming and heat treatments are incorporated for reference in Table 9. The ranges shown are wide and represent a variety of design and application requirements. Valve manufacturers can select appropriate forming and heat treatment conditions to fit the application requirements.

7.8 Physical Properties—The physical properties of various valve steels and alloys are listed in Table 10. These data are of unknown origin and their accuracy cannot be presumed. The data should be used only as a guideline.

8. Valve Alloy Application

8.1 General—Alloys are selected for the body of the valve after considering the required mechanical and physical properties. Final selection and validation are usually decided, based on the outcome of engine tests. It is well worth noting that there are many thermodynamic adjustments that can be made to an engine system, which dramatically change the operating environment of the valves. The cost penalties of the more sophisticated valve alloys that may be required must be considered when analyzing the benefits of thermodynamic cycle improvements.

The severity of valve duty is determined by the operating environment in which the valve functions. The preeminent environmental factors are temperature, imposed stress, and chemical activity. Poppet valve operating temperature is generally a function of combustion process efficiency and engine cooling system effectiveness. Peak engine firing pressures and the valve seating velocities determine the stresses of most concern in a valve. The combustion gases that flow past the exhaust valve can be quite active chemically and generally dictate the use of corrosion resistant alloys.

8.2 Intake Valves—Intake valves require wear resistance and fatigue strength. Intake valves for light-duty service are generally manufactured from carbon or low alloy steels. Heavy-duty service intake valves are typically made from high alloy martensitic or austenitic steels. Titanium alloys are used in selected high-speed spark ignition engine valves where valve train mass reduction is a prime design criterion.

Maximum intake valve temperatures are typically less than 425 °C (800 °F) in light-duty spark ignition engines and 500 °C (930 °F) in heavy-duty compression ignition engines. Plain carbon steels are used for the lowest temperature intake valve applications. Low alloy martensitic steels, high alloy martensitic steels, and austenitic steels are used progressively as intake valve temperatures and peak firing pressures increase.

Spark ignition engine intake valve seats that operate at moderate temperatures achieve adequate adhesive wear durability by using low alloy martensitic steels hardened to 35 Rockwell “C” scale or harder. Higher temperature spark ignition engine valves generally use hardened high carbon, high chromium alloys. In the most demanding application, intake valve seats are hard-faced with a seatfacing alloy.

TABLE 5—REFERENCE VALUES FOR THE MECHANICAL PROPERTIES AT ROOM TEMPERATURE (FOR DIAMETERS UP TO 40 MM) (APPLICABLE TO THE REFERENCE HEAT-TREATMENT CONDITION IN ACCORDANCE WITH TABLE 9)

Material Designation UNS/ISO	Material Designation Commercial	Reference Heat treatment condition[1]	Hardness HB	Hardness HRC[2]	0.2% - proof stress[2] N/mm²[3]	Tensile strength N/mm²[3]	Elongation after fracture (L0 = 5D0)[2] %[4]	Reduction in area after fracture[2] %[4]
Martensitic Steels								
H15410	1541H	TQ + T[5]		35	960	1050	18	60
G15470	1547	TQ + T[5]		40	1140	1240	15	40
G86450	8645	TQ + T[5]		35	1140	1240		40
H41400	4140H	TQ + T[5]		35	1000	1100	18	58
K14072	ASTM-A193/B16	TQ + T[5]		35	1000	1100	18	60
X 45 CrSi 9 3	Sil 1	TQ + T[5]	266 to 325		750	1100-1350	14-22	40-50
S65006	Sil XB	TQ + T[5]	293		840-844	940-941	8-15.5	9-10
S42200	422 SS	TQ + T[5]		35	860	1030	8-10	52
S64004	SUH 11/11M	TQ + T[5]		35	780	975	35	15
	FMS235	TQ + T[5]		35	1050	1200	20	40
	SUH 3	TQ + T[5]		35	785	1050	15	35
X 50 CrSI 8 2		TQ + T[5]	266 to 325		685	900-1100	14	40
X 85 CrMoV 18 2		TQ + T[5]	296 to 355		800	1000-1200	7	12
Austenitic Materials								
X 53 CrMnNiN 21 9	21-4N	ST + P		30[6]	580-895	880-1200	8-25	9-10
S63012	21-2N	ST + P			553-700	862-1155	7-24	4-20
X 33 CrNiMnN 23 8	23 8N	ST + P		25[6]	550-634	850-1100	20	30-33
S30430	302HQ	ST+CW		24-30	900-1000	1000-1150	17	
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P		30[6]	580-880	950-1190	10-25	6-25
S63017	21-12N	ST + P		23-25[6]	415-763	795-865	35-45	45-55
X 55 CrMnNiN 20 8		ST + P		28[6]	520-550	900-1150	8	5-10
X 53 CrMnNiNbN 21 9		ST + P		30[6]	580-740	950-1150	8	9-10
305SS		ANN	107 to 125		205	515	40	
S63013	Gaman H	ST + P		35	520	1080	57	5
S31630	316 MOD	ST+CW		32-35	1000-1130	1100-1380	15	
Nickel-based Alloys								
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P		32-40[6]	630-850	1100-1300	12-33	20-32
NiCr 20 TiAl	Nimonic 80A	ST + P		32-38[6]	620-969	1050-1400	15-40	20-38
N07032	Pyromet 31/31V	ST + P		32-37[6]	692-830	1103-1300	25-35	5-45
NiFe 25 Cr 20 NbTi		ST + P		28[6]	500	900-1100	25	30
N07001	Waspaloy	ST + P		32-45	1030	1280	--	15
	Nimonic 90	ST + P		32-42	690-750	1014-1175	30-36	35
Ni30	NCF 3015	ST + P		31-39[6]	655-670	1124-1128	34-35	54-55

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened, CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm² = 1 MPa
4. Variation in reported values relatexs to the choice of heat treat temperatures.
5. Also possible as delivery condition, in which case the values shall apply as true requirements.
6. Austenitic grades may show hardness values which cannot be converted into tensile strength values according to the standard tables commonly used in laboratories. Therefore, in cases of dispute only the tensile strength value shall be considered as valid.

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TABLE 6—REFERENCE VALUES FOR THE TENSILE STRENGTH AT ELEVATED TEMPERATURES

Material Designation UNS/ISO	Material Designation Commercial	Reference Heat treatment condition[1]	Tensile strength N/mm²[2] 500 °C N/mm²[3]	Tensile strength N/mm² 540 °C N/mm²[3]	Tensile strength N/mm² 550 °C N/mm²[3]	Tensile strength N/mm² 600 °C N/mm²[3]	Tensile strength N/mm² 650 °C N/mm²[3]	Tensile strength N/mm² 700 °C N/mm²[3]	Tensile strength N/mm² 750 °C N/mm²[3]	Tensile strength N/mm² 760 °C N/mm²[3]	Tensile strength N/mm² 800 °C N/mm²[3]	Tensile strength N/mm² 815+ °C N/mm²[3]
Martensitic Steels												
H15410	1541H	TQ + T		420			150	NA	NA	NA	NA	NA
G15470	1547	TQ + T						NA	NA	NA	NA	NA
G86450	8645	TQ + T						NA	NA	NA	NA	NA
H41400	4140H	TQ + T		500			180	NA	NA	NA	NA	NA
K14072	ASTM-A193/B16	TQ + T						NA	NA	NA	NA	NA
X 45 CrSi 9 3	Sil 1	TQ + T	500		360	250	170-210	110		69	NA	NA
S65006	Sil XB	TQ + T					200			100	NA	NA
S42200	422 SS	TQ + T					360				NA	NA
S64004	SUH 11/11M	TQ + T									NA	NA
	FMS235	TQ + T				420					NA	NA
	SUH 3	TQ + T									NA	NA
X 50 CrSI 8 2		TQ + T	500		360	230	160	105			NA	NA
X 85 CrMoV 18 2		TQ + T	550		400	300	230	180	140		NA	NA
Austenitic Materials												
X 53 CrMnNiN 21 9	21-4N	ST + P	650-705		600	550-600	500-590	450-480	370	390	300-330	235
S63012	21-2N	ST + P			590		535			360-390		275
X 33 CrNiMnN 23 8	23 8N	ST + P	600		570	530	470-580	400	340	470	280	
S30430	302HQ	ST+CW				600						
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P	680		650	610	550-720	480	410	340	340	
S63017	21-12N	ST + P					420			300		
X 55 CrMnNiN 20 8		ST + P	640		590	540	490	440	360		290	
X 53 CrMnNiNbN 21 9		ST + P	680		650	600	510	450	380		320	
305SS		ST + P										
S63013	Gaman H	ST + P					940			760		
S31630	316 MOD	ST+CW				690						
Nickel-based Alloys												
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P	1000	1136	980	930	825-1033	770	650	550-792	510	
NiCr 20 TiAl	Nimonic 80A	ST + P	1050	876	1030	834-1000	790-930	724-820	680	590-600	496-500	234-310
N07032	Pyromet 31/31V	ST + P		1083			1055-1150			758-850		593
NiFe 25 Cr 20 NbTi		ST + P	800		800	790	640	640	340		340	
N07001	Waspaloy	ST + P					1000					
	Nimonic 90	ST + P										
Ni30	NCF 3015	ST + P										

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened; CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm² = 1 Mpa

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TABLE 7—REFERENCE VALUES FOR THE 0.2% - PROOF STRESS AT ELEVATED TEMPERATURES

Material Designation UNS/ISO	Material Designation Commercial	Reference heat treatment condition[1]	0.2% - Proof stress[2], at 500 °C N/mm²[3]	0.2% - Proof stress[2], at 540 °C N/mm²[3]	0.2%- Proof stress[2], at 550 °C N/mm²[3]	0.2% - Proof stress[2], at 600 °C N/mm²[3]	0.2% - Proof stress[2], at 650 °C N/mm²[3]	0.2% - Proof stress[2], at 700 °C N/mm²[3]	0.2% - Proof stress[2], at 750 °C N/mm²[3]	0.2% - Proof stress[2], at 760 °C N/mm²[3]	0.2% - Proof stress[2], at 800 °C N/mm²[3]	0.2% - Proof stress[2], at 815 °C N/mm²[3]
Martensitic Steels												
H15410	1541H	TQ + T		330		190	110	NA	NA	NA	NA	NA
G15470	1547	TQ + T	370	220				NA	NA	NA	NA	NA
G86450	8645	TQ + T						NA	NA	NA	NA	NA
H41400	4140H	TQ + T		500			110	NA	NA	NA	NA	NA
K14072	ASTM-A193/B16	TQ + T		560		430	330	NA	NA	NA	NA	NA
X 45 CrSi 9 3	Sil 1	TQ + T	400		300	240	120-160	80	NA	62-75	NA	NA
S65006	Sil XB	TQ + T						NA	NA	NA	NA	NA
S42200	422 SS	TQ + T					310	NA	NA	NA	NA	NA
S64004	SUH 11/11M	TQ + T						NA	NA	NA	NA	NA
	FMS235	TQ + T				320		NA	NA	NA	NA	NA
	NA SUH 3	TQ + T						NA	NA	NA	NA	NA
X 50 CrSI 8 2		TQ + T	400		300	220	110	75	NA	NA	NA	NA
X 85 CrMoV 18 2		TQ + T	500		370	280	170	120	80	NA	NA	NA
Austenitic Materials												
X 53 CrMnNiN 21 9	21-4N	ST + P	350-355		330	300-310	270-330	250-275	230	260	200-220	180
S63012	21-2N	ST + P					240-340			207-280		185
X 33 CrNiMnN 23 8	23 8N	ST + P	270		250	220	210-270	190	180	260	170	
S30430	302HQ	ST+CW				500						
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	ST + P	350		330	310	285-570	260	240	280	220	
S63017	21-12N	ST + P								220		
X 55 CrMnNiN 20 8		ST + P	300		280	250	2230	220	200		170	
X 53 CrMnNiNbN 21 9		ST+CW	340		320	310	230	260	235		220	
305SS												
S63013	Gaman H	ST + P					340-350			280-330		
S31630	316 MOD	ST+CW										
Nickel-based Alloys												
NiCr 15 Fe 7 TiAl	Inconel 751	ST + P	725	785	710	690	565-758	650	560	450-620	425	
NiCr 20 TiAl	Nimonic 80A	ST + P	700	531	650	650	550-660	600	500	500-503	450	262
N07032	Pyromet 31/31V	ST + P		655			648-750			655-730		579
NiFe 25 Cr 20 NbTi		ST + P	450		450	450	450	430	380		250	
N07001	Waspaloy	ST + P					860					
	Nimonic 90	ST + P										
Ni30	NCF 3015	ST + P										

1. TQ = quenched; T = tempered; ST = solution treated; P = precipitation hardened; CW = cold worked.
2. The single values given here are situated near the lower limit of the scatter range and ranges represent typical values observed.
3. 1 N/mm² - 1 Mpa

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TABLE 8—REFERENCE VALUES FOR THE CREEP STRENGTH AFTER 1000 H (APPLICABLE TO THE REFERENCE CONDITION IN ACCORDANCE WITH TABLE 9

Material Designation UNS/ISO	Material Designation Commercial	Creep Strength[1] after 1000 h, at 500 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 650 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 725 °C N/mm²[2]	Creep Strength[1] after 1000 h, at 800 °C N/mm²[2]
Martensitic Steels					
H15410	1541H				
G15470	1547				
G86450	8645				
H41400	4140H				
K14072	ASTM-A193/B16				
X 45 CrSi 9 3	Sil 1	190	40	—	—
S65006	Sil XB				
S42200	422 SS				
S64004	SUH 11/11M				
	FMS235				
	SUH 3				
X 50 CrSI 8 2		190	—	—	—
X 85 CrMoV 18 2		260	52	18	—
Austenitic Materials					
X 53 CrMnNiN 21 9	21-4N	—	200	110	50
S63012	21-2N				
X 33 CrNiMnN 23 8	23 8N	—	235	130	60
S30430	302HQ				
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	—	220	120	55
S63017	21-12N				
X 55 CrMnNiN 20 8		—	160	85	45
X 53 CrMnNiNbN 21 9		—	215	115	50
305SS					
S63013	Gaman H				
S31630	316 MOD				
Nickel-based Alloys					
NiCr 15 Fe 7 TiAl	Inconel 751	—	475	260	125
NiCr 20 TiAl	Nimonic 80A	—	500	290	150
N07032	Pyromet 31/31V				
NiFe 25 Cr 20 NbTi		—	400	180	60
N07001	Waspaloy				
	Nimonic 90				
Ni30	NCF 3015				

1. Mean values of scatter range determined until now.
2. 1 N/mm² = 1 Mpa

* All values are reported by ISO

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TABLE 9—REFERENCE DATA FOR HOT FORMING AND HEAT TREATING[1]

Material Designation UNS/ISO	Material Designation Commercial	Cold Forming Yes/No	Hot Forming °C	Soft Annealing °C	Quenching or Solution Heat Treatment °C	Quenching Agent	Tempering or Artificial Aging °C
Martensitic Steels							
H15410	1541H	Yes	1245 to 870		815 to 845	Oil	400 to 525 / Air
G15470	1547	Yes	1245 to 870		815 to 845	Oil	400 to 525 / Air
G86450	8645	Yes	1230 to 925				
H41400	4140H	Yes	1230 to 870		829 to 857	Oil	557 to 585 / Air
K14072	ASTM-A193/B16	Yes	1230 to 925		857 to 885	Oil	663 to 691 / Air
X 45 CrSi 9 3	Sil 1	No	1100 to 900	780 to 820 / Air or water	1000 to 1050	Oil	720 to 820 / Air or water
S65006	Sil XB	No	1163 to 1135		1024 to 1052	Air / Furnace	527 to 704 / Air
S42200	422 SS	No	1150 to 955		1024 to 1052	Oil	607 to 635 / Air
S64004	SUH 11/11M	No	1138 to 1104		950 to 1100	Oil / Air	663 to 691 / Air
	FMS235	Yes	1082 to 1049		950 to 1100	Air	677 to 704
	SUH 3	No	1138 to 1104		1010 to 1038	Oil	727 to 754
X 50 CrSi 8 2		No	1100 to 900	780 to 820 / Air or water	1000 to 1050	Oil	720 to 820 / Air or water
X 85 CrMoV 18 2		No	1100 to 900	820 to 869 / Retarded cooling	1050 to 1080	Oil	720 to 820 / Air
Austenitic Materials							
X 53 CrMnNiN 21 9	21-4N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
S63012	21-2N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
X 33 CrNiMnN 23 8	23 8N	No	1150 to 980		1150 to 1170	Water	800 to 830 / 8 h Air
S30430	302HQ	Yes					
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	No	1150 to 950		1160 to 1200	Water	760 to 815 / 4 h to 8 h Air
S63017	21-12N	No	1150 to 950		1168 to 1196	Water	746 to 774 / 4 h to 10 h Air
X 55 CrMnNiN 20 8		No	1100 to 950		1140 to 1180	Water	760 to 815 / 4 h to 8 h Air
X 53 CrMnNiNbN 21 9		No	1150 to 980		1160 to 1200	Water	760 to 850 / 6 h Air
305SS		Yes					
S63013	Gaman H	No					
S31630	316 MOD	Yes					
Nickel-based Alloys							
NiCr 15 Fe 7 TiAl	Inconel 751	No	1150 to 940		1100 to 1150	Air	840 / 24 h + 700 / 2 h Air
NiCr 20 TiAl	Nimonic 80A	No	1150 to 1050		1000 to 1080	Air to Water	690 to 710 / 16 h Air
N07032	Pyromet 31/31V	No	1150 to 1050		1079 to 1107	Oil	677 to 732 / 2 to 16 h Air
NiFe 25 Cr 20 NbTi		No	1150 to 1050		1000 to 1080	Air or Water	690 to 710 / 16 h Air
N07001	Waspaloy	No					
	Nimonic 90	No					
Ni30	NCF 3015	No					

1. The heat treat conditions reported here apply to property ranges reported in Tables 5 through 8.

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TABLE 10—REFERENCE DATA RELATING TO PHYSICAL PROPERTIES (APPLICABLE TO THE REFERENCE CONDITION IN ACCORDANCE WITH TABLE 9)

Material Designation UNS/ISO	Material Designation Commercial	Density at 20 °C kg/dm^3	Modulus of elasticity at 20 °C kN/mm$^{2(1)}$	Thermal Expansion coefficient between 20 °C and 100 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 200 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 300 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 500 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 600 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 700 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 1000 °C 10^{-6} K	Thermal Expansion coefficient between 20 °C and 1300 °C 10^{-6} K	Thermal Conductivity at 20 °C W/(m K)	Specific heat at 20 °C J/kg K	Magnetiz-ability
Martensitic Steels														
H15410	1541H	7.81	210		11.6	12.1	13.1	13.6				42		Existent
G15470	1547	7.81	210				13.5					42		Existent
G86450	8645	7.81	210				13.5					42		Existent
H41400	4140H	7.81	210		11.0	11.7	12.3	12.6				42.6	473	Existent
K14072	ASTM-A193/ B16	7.81	210											Existent
X 45 CrSi 9 3	Sil 1	7.7	194-210	10.9	11.3	11.2	11.5	12.4	11.8	13.2	13.5	21*	500	Existent
S65006	Sil XB	7.4-7.5	194		9.8			11.5		12.4	13.1			Existent
S42200	422 SS	7.6												Existent
S64004	SUH 11/11M							13.4						Existent
	FMS235													Existent
	SUH 3								12.2					Existent
X 50 CrSi 8 2		7.4-7.7	210	10.9		11.2	11.5		11.8			21*	500	Existent
X 85 CrMoV 18 2		7.7	210	10.9		11.2	11.5		11.8			21*	500	Existent
Austenitic Materials														
X 53 CrMnNiN 21 9	21-4N	7.6-7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent(2)
S63012	21-2N	7.6-7.8			14.4			17.5		18.5				Non-existent(2)
X 33 CrNiMnN 23 8	23 8N	7.8	205	16.5		17.1	17.3		17.4			14.5	500	Non-existent(2)
S30430	302HQ	7.9	194		17.3			17.8				16.3	500	
X 50 CrMnNiNbN 21 9	21-4N+Nb+W	7.8-7.9	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent(2)
S63017	21-12N	7.7-7.8	201		14.8			15.8		17.3	18.5			
X 55 CrMnNiN 20 8		7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent(2)
X 53 CrMnNiNbN 21 9		7.8	205	15.5		17.5	18.5		18.8			14.5	500	Non-existent(2)
305SS														
S63013	Gaman H													
S31630	316 MOD													
Nickel-based Alloys														
NiCr 15 Fe 7 TiAl	Inconel 751	8.0-8.3	215	13.0	13.0	14.0	14.5	14.0	15.5	14.9		13	460	Non-existent
NiCr 20 TiAl	Nimonic 80A	8.0-8.3	208-215	11.9	12.6	13.1	13.7	13.3	14.5	13.9		13	460	Non-existent
N07032	Pyromet 31/31V	7.9-8.0	208	14.1				14.0		14.8	15.3	13	460	
NiFe 25 Cr 20 NbTi		8.1	215			15.5	15.9		16.8					
No7001	Waspaloy													
	Nimonic 90													
Ni30	NCF 3015	7.9	201		14.9			16.0		16.6	16.7	13		

1. 1 N/mm^2 = 1 Mpa and other conversions
2. Austenitic steels may be slightly magnetizable in the aged condition. Their magnetizability may increase with extended cold forming.

* Data transferred from ISO

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8.3 Exhaust Valves—Principal exhaust valve requirements are resistance to seat face burning (commonly referred to as guttering), resistance to wear, fatigue strength resistance to bending loads, and creep strength sufficient to prevent head doming (commonly referred to as tuliping). Exhaust valves are typically made from austenitic steels or superalloys. Titanium alloys are also used in spark ignition engine exhaust valves when mass reduction is a paramount consideration.

Austenitic exhaust valve operating temperatures are typically 700 to 760 °C (1300 to 1400 °F), but transient temperatures as hot as 815 to 850 °C (1500 to 1560 °F) are encountered in service. UNS S3XXXX series for austenitic stainless steels are used for the lowest temperature exhaust valve applications. Low nickel content nitrogen-strengthened austenitic steels, high nickel content nitrogen-strengthened austenitic steels, and superalloys are used progressively as exhaust valve temperatures increase. The maximum service temperature for superalloys can be as high as 870 to 900 °C (1600 to 1650 °F) depending upon imposed stresses. Seat face burning resistance is achieved by alloy composition rather than valve design such as valve face angle. The precipitation strengthened austenitic stainless steels used in light-duty spark ignition exhaust valves possess adequate hot hardness and oxidation/corrosion resistance to prevent undue seat wear. In demanding applications, the seats are hard-faced with a high hot hardness and corrosion resistant alloy.

Many exhaust valves have martensitic steel wafers welded to their stem tips or martensitic steel stems welded to their austenitic heads. These martensitic steel tips, when hardened, generally provide sufficient wear resistance. When a martensitic stem extends into the valve guide, the valve is referred to as a two-piece construction. This construction minimizes stem wear, provides superior fatigue strength in the keeper groove, and conserves alloying elements.

9. Valve Design Relationship to Materials

9.1 General—The design of a valve and its application to the engine are as important as the selection of the valve's alloy(s). As many as six different materials are used in the valve construction for some applications. Valve durability is limited by the operating temperature and stress imposed on it. It is sometimes possible to select a stronger or a more temperature resistant material to overcome limitations in valve design and application.

Optimizing stresses, temperature, and cooling for valve durability may impede overall engine efficiency, particularly when advanced thermodynamic concepts are employed.

Fortunately, many of the valve design enhancements can compensate for excessive temperatures; delivering satisfactory valve durability under otherwise difficult circumstances.

9.2 Design Enhancements—When valve alloys with the properties necessary to obtain the desired durability are not available (or cannot be used economically); various valve design enhancements are employed. The most important of these are:

a. Seat Face Welding—When wear, corrosion, or duty service conditions are extreme, the valve face of an otherwise satisfactory head alloy may be inadequate. In these cases, he valve seat may be welded with a hard overlay alloy to better withstand wear and corrosion at the valve-seating surface. Special cobalt, nickel, or iron-base alloys have been developed for this purpose.
b. Seat Face Strain Hardening—When seat wear conditions are moderately beyond the endurance of an otherwise satisfactory head alloy, the valve seat may be strain hardened to better withstand wear. This is accomplished by mechanically cold working the seat face region after high temperature heat treating operations.
c. Stem Surface Treatments—Chromium plating, nitriding, moly spray coating, and other surface treatments are applied to valve stems to reduce friction, wear, or both, in service. A light film of engine oil (commonly referred to as a pre-lube), generally prevents stem/guide wear, but adhesive wear can still occur under some circumstances. Valve stem surface treatments have effectively prevented adhesive wear in these instances.

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d. Internal Cooling—Hollow valves, partially filled with metallic sodium or sodiumpotassium mixtures, transfer heat by convection from the hot head end of the valve to the stem. Internal cooling reduces peak valve temperatures, which may reduce engine octane sensitivity or permit a reduction in valve alloy content. Hollow intake valves and internally cooled exhaust valves are being increasingly considered to decrease valve mass.
e. Tip Caps—Occasionally a hardened martensitic steel cap is mechanically fitted on the end of the valve stem to improve tip wear resistance. These tip caps are sometimes used on valves where dissimilar metal welding is a problem.
f. f. Seat Face Angle—Changing to a seat face that is more perpendicular to the longitudinal axis of the valve stem can greatly reduce seat wear although valve seat burning and deposit build-up may be accentuated if a flex head valve design is not utilized.

10. Valve Gear Design Considerations

10.1 General—The design of a poppet valve is generally dictated by a preestablished operating environment. Since overall engine cost effectiveness is paramount, valve gear design parameters that intensify valve stresses must be carefully considered. Actuating geometry and valve gear dynamic performance are the most significant parameters.

10.2 Actuating Geometry—Valve actuating mechanisms often have a resolved force vector at the valve tip that is not coaxial with the valve stem. The greater the divergence, the greater the concentration of stem to guide contact forces at the ends of the guide. This concentrates the contact forces at the guide ends that may cause severe adhesion of the guide material to the valve stem, often referred to as valve stem scuffing.

Valve rotators are mechanical devices that rotate the valve during the opening portion of the operating cycle. Valve rotation dissipates hot spots and reduces deposits on the seat face so that heat transfer to the seat is improved. Valve rotators can be used to reduce stem and guide wear as well as stem scuffing.

10.3 Dynamic Performance—Valve stresses arise primarily from the dynamics of the valve gear and from the manner in which the valve closes against its seat. Compression ignition engines generate peak combustion pressures several times higher than spark ignition engines. Careful analysis of the valve gear kinematics and pressure induced stress is essential in assuring adequate valve durability. Hydraulic valve lifters compensate for wear and thermal expansion/contraction in the valve gear. Automatic lash adjustment eliminates the undue stresses caused by excessive lash, extreme valve temperatures, and valve burning/guttering that develop from inadequate lash. Optimizing actuating geometry and dynamic performance for valve durability may impede overall engine efficiency, particularly when advanced concepts are employed. Fortunately, many of the valve design enhancements compensate for sub-optimal geometry and dynamics, permitting adequate valve durability under difficult circumstances.

11. Notes

11.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. A (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE ELEVATED TEMPERATURE PROPERTIES OF FERROUS METALS COMMITTEE

From: Birr, Jodi (J.)
Sent: Monday, September 13, 2021 3:09 PM
To: Grundemann, Wesley
Cc: Hewlett, Matt (M.S.)
Subject: Valve Production Dates

The following engine exchanges were due to broken valves. These valves were sent back to you for analysis…can you please advise as to the valve production date for each of these? If a particular valve was not sent back, just indicate N/A (I know some of them we could not locate the valve tip with the information). I am going back through my records here as well, but I know I did not get all of these recorded before they were sent back to you.

2021MY
Pat Milliken Ford
Hoffman Ford
Santa Monica Ford
El Cajon Ford
Ken Grody Ford Redlands
Gillespie Ford
Capital Ford
Shaffer Ford
Hempstead Ford

2020MY
ZEIGLER FORD OF ELKHART
TITUS-WILL FORD SALES INC.
CAPITAL FORD OF WILMINGTON
JONES FORD BUCKEYE
LUCAS MOTOR COMPANY INC.
KALISPELL FORD
FRIENDLY FORD
ZEIGLER FORD OF ELKHART
FIVE STAR FORD
MONTMORENCY FORD LINCOLN
TOM ROUSH LINCOLN
HEISER FORD
FOX FORD GRAND TRAVERSE
UNIQUE FORD INC.
PHIL LONG FORD OF DENVER LLC
HEMPSTEAD FORD
CHILLIWACK FORD
MAC HAIK FORD
AUTONATION FORD WESTLAKE
WAYNE AKERS FORD INC.
RYE FORD INC.
BENNA FORD SUPERIOR

Thank you,

Jodi Birr

PE22-007 000393 ER

Quality Analyst

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1155 Bible Road
Lima, Ohio 45801
(D) 419.226.7302 | (M) 313.938.9385
jbirr@ford.com

From: Knott, Tim (.)
Sent: Tuesday, February 2, 2021 4:03 PM
To: Knott, Tim (.)
Subject: Valve
Attachments: IMG_0012.jpg; IMG_0013.jpg; IMG_0014.jpg; IMG_0015.jpg; IMG_0016.jpg; IMG_0017.jpg

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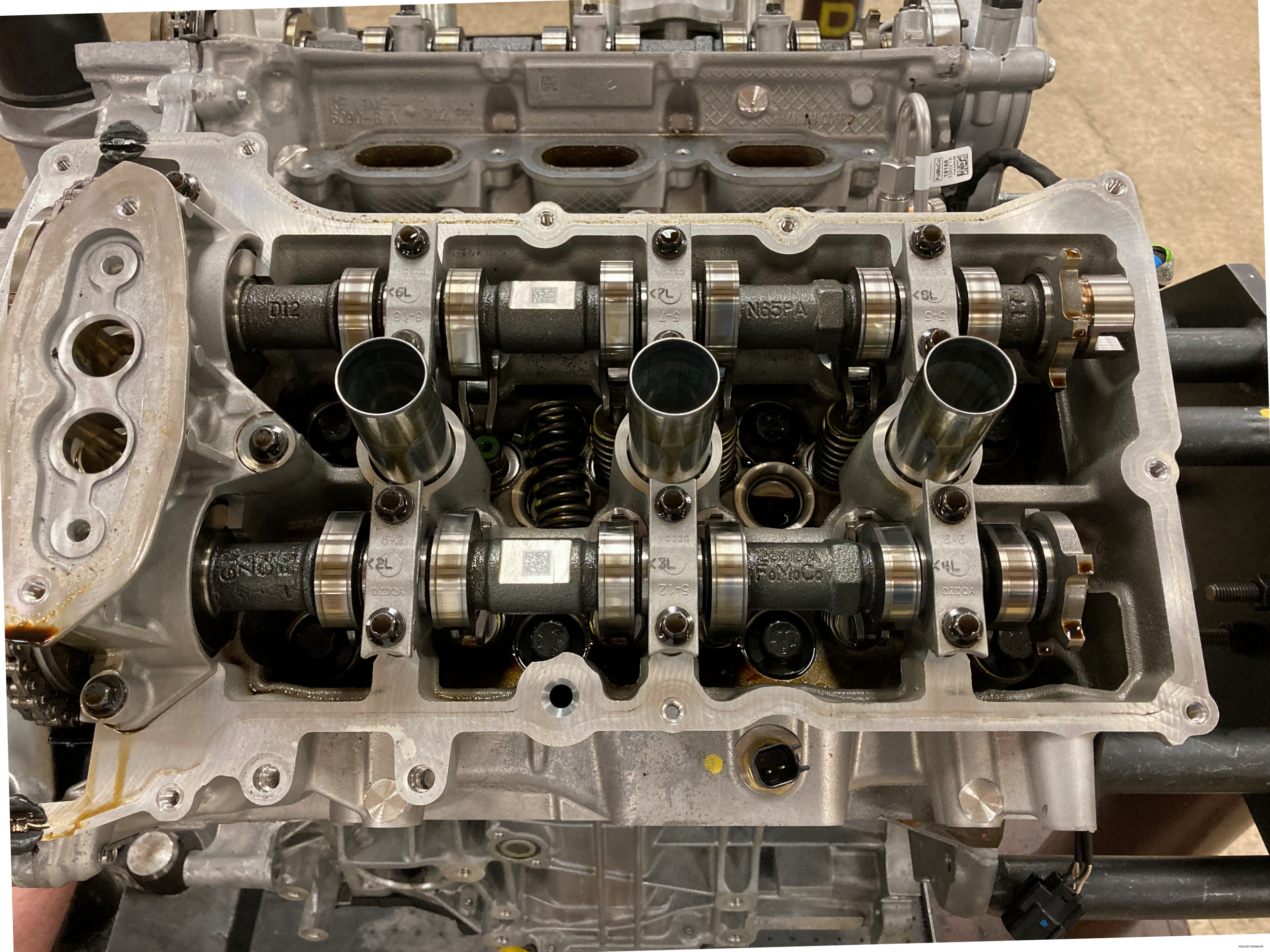
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5-2
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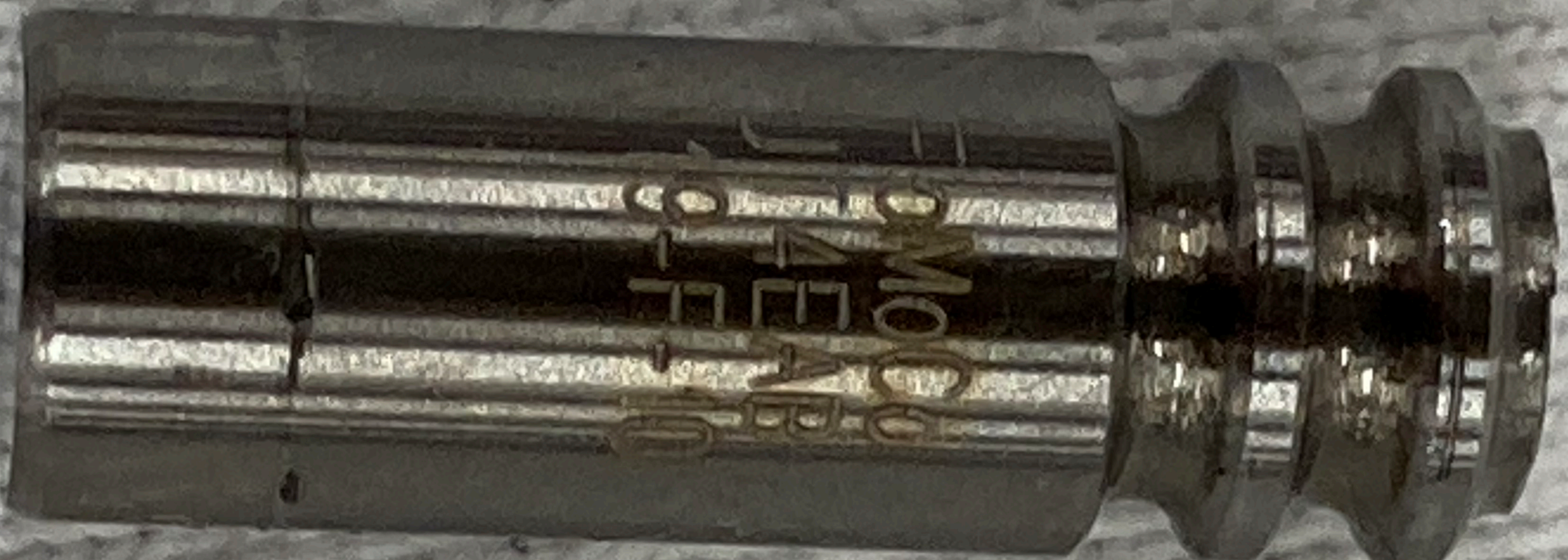
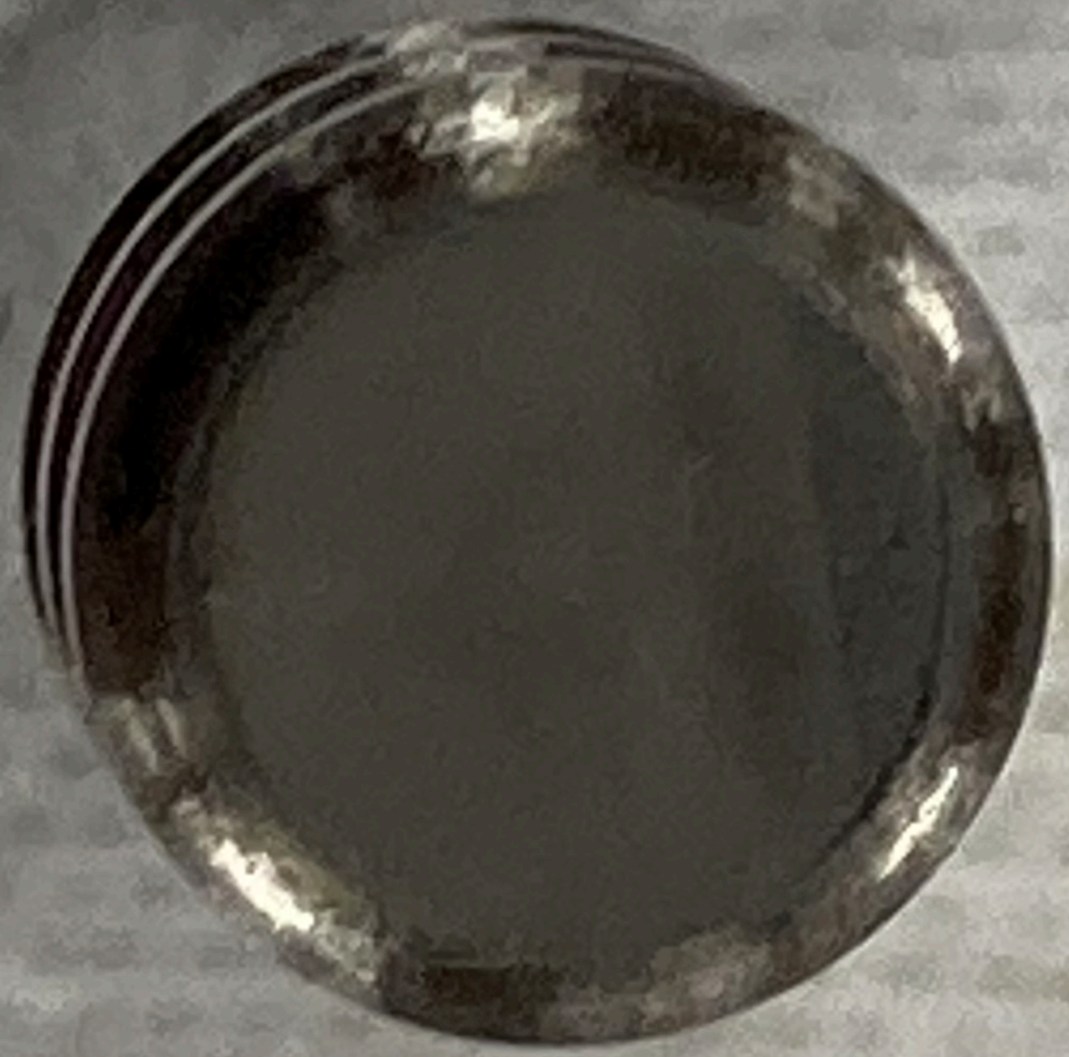
DZDQA
3L
3-12
5-3
4L
DZDQA

PE22-007 000397 ER





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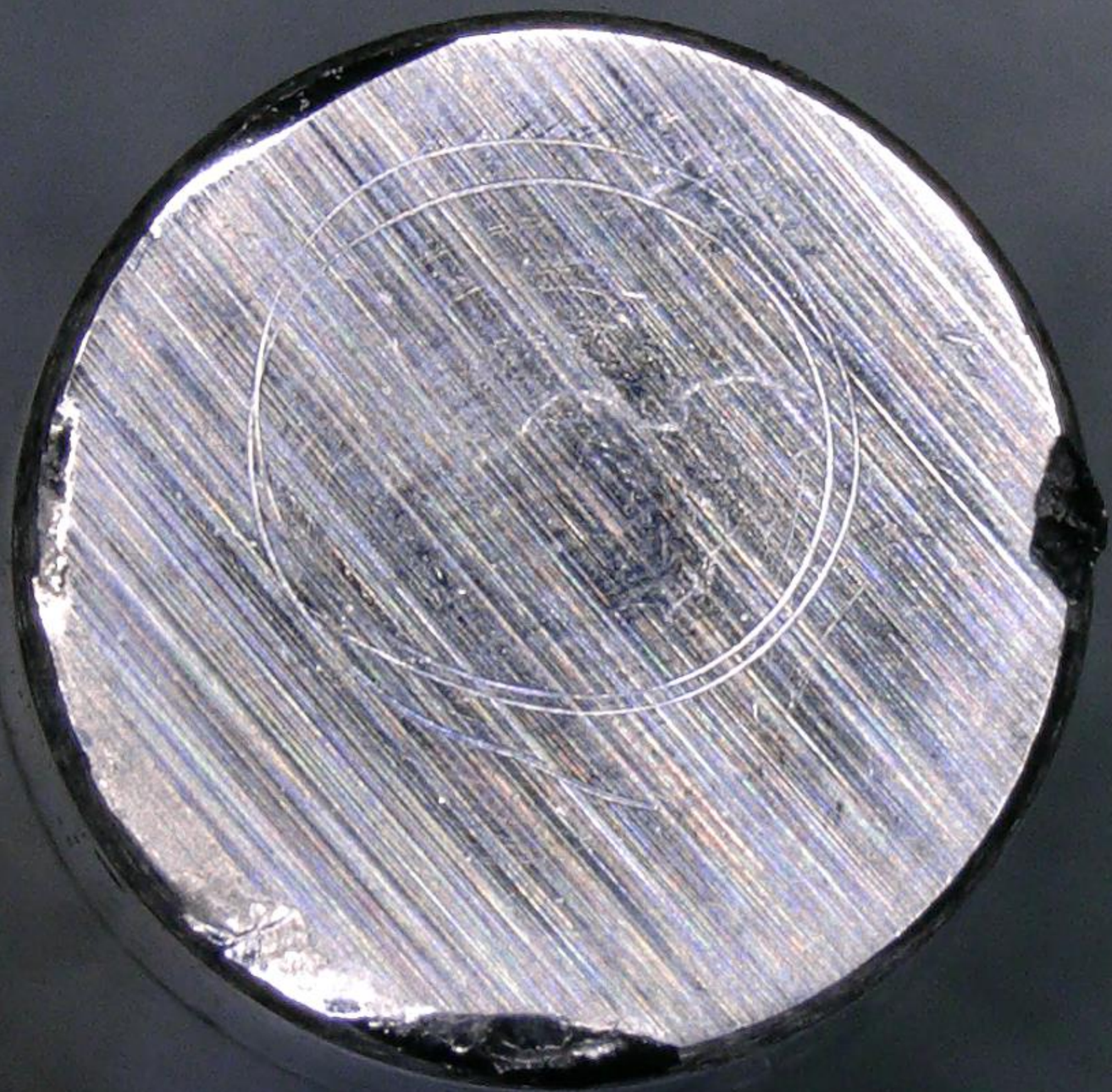
4E-AB
21-E-08

PE22-007 000405 ER



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PE22-007 000409 ER

PE22-007 00041 0 ER

PE22-007 000411 ER

PE22-007 000412 ER

PE22-007 000413 ER

PE22-007 00414 ER

From: Bautz, Jeffrey (J.E.)
Sent: Monday, February 7, 2022 10:19 AM
To: Kolodziejczyk, Jeffrey (J.A.); Adam, Paul (P.J.)
Subject: FW: Motortrend Article - Nano Dropped Valves

Jeff/Paul,

Please read, no follow-up needed. This is for your awareness.

Thanks,

Jeff Bautz
Engine Interfacing Systems Manager
ASQ Certified Black Belt
Ford Global Engine Engineering
Dearborn, MI
Mobile: 313 820 0886

From: Simon, David (D.) <dsimon1@ford.com>
Sent: Monday, February 7, 2022 8:24 AM
To: Bautz, Jeffrey (J.E.) <jbautz@ford.com>
Subject: FW: Motortrend Article - Nano Dropped Valves

Sorry – probably should have had you on this in the first place…

Thanks,
Dave

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From: Simon, David (D.)
Sent: Saturday, February 05, 2022 8:32 AM
To: Filipe, David (D.J.) <dfilipe@ford.com>; Abkenar, Frank (F.K.) <fabkenar@ford.com>; Deep, Said (.) <sdeep@ford.com>; Sorab, Jagadish (J.) <jsorab@ford.com>; Dunahay, John (J.C.) <jdunahay@ford.com>; Harrison, Michael (M.J.) <mharris6@ford.com>
Subject: Motortrend Article - Nano Dropped Valves

Hi All,

I saw this article last night.

https://www.motortrend.com/news/2021-ford-bronco-2-7-liter-engine-valve-troubles/

REDACTED FOR PRIVILEGE

David Simon
Quality and OPD Manager
IPTSE North America
Ford Motor Company
Mobile: (980) 395-3282