

Special Characteristics Communication and Agreement

Lead / Support roles and timing for each stage

1. DFMEA and potential special characteristics	Type ONLY in Yellow Boxes	1A. PFMEA & Special Characteristics Agreement	Type ONLY in Green Boxes
Ford PD engineer / Supplier		Supplier/ Ford PD	

Special Characteristics for:

2021 2.7L Nano Eaton / Kearney NE JT4E-6507-BA

Special Characteristics Approvals required at UNV2 / UPV2 / PA as per FAP 03-111

Program: 2021 2.7L Nano Part Number: JT4E-6507-BA Ford D & R Engineer Approval/Date:

Supplier Name/Plant: Eaton / Kearney NE Engineering Release Number: NE01-E-14249175-000 Ford STA Engineer Approval/Date:

Supplier SIM Code: E304C Design Lead Brand: Ford Ford Craftsmanship/Sys Engr'g Approval/Date:

Part / System Name: INT VALVE Ford Customer Plant: Lima Engine Plant Supplier Plant Quality Manager Approval/Date:

Signature /s/ Benjamin Rhude	Name Benjamin Rhude	e-mail brhude2@ford.com	Date 9/7/2021
Signature	Name Horia Tugulan	e-mail htugulan@ford.com	Date
Signature	Name Cressel Smith	e-mail csmit840@ford.com	Date
Signature	Name Don Russell	e-mail drusse25@ford.com	Date

Note: approvals may be electronic: complete the approval block above to identify the approvers, and include "/s/" ahead of the name typed into the "signature" box to indicate electronic approval and approve in e-mail with this file as an attachment.

Key:
For Special Characteristic definitions refer to Ford FMEA Handbook.

From DFMEA:

YC	Sev 9,10. Potential CC.
YS	Sev 5-8 and may require special control to maintain process capability. Potential SC.

From PFMEA:

CC	Sev 9,10 (Part). Critical Characteristic.	SC	Sev 5-8 AND Occ 4-10. Significant Characteristic.
OS	Sev 9,10 (Process). Operator Safety.	HI	Sev 5-8 AND Occ 4-10. High Impact Characteristic.

Special Characteristic Totals:

Note 1: Automatic calculation of totals (for guidance only).
Note 2: Count of SCs may be less than count of YSs

YC	YS	CC	OS	SC	HI
0	34	0	0	9	0

Special Characteristics Communication and Agreement for all UN content required to support UN design and development is required by UNV2. The remaining UN content not required to support UN design and development is required by <PA>.
Special Characteristics Communication and Agreement for all UP content is required by UPV2.

Stage 1. DFMEA

Stage 1A. PFMEA

No.	Characteristic Description	Specification & Tolerance	DFMEA Class	PFMEA Class	Process Control Method
1	cup runout	1mm to A	YS	Other	Operator checks at set-up and in process
2	keeper groove, stem thickness at bottom of groove	4.1 - 4.3 mm	YS	Other	Gage 1 per hour and record in data log at operation and check xbar and R on 10 pieces per pallet at pre audit
3	keeper groove chamfer	0.05 - 0.25 mm x 43 - 47 deg	YS	Other	Tool controlled with keeper groove depth, checked at change over by quality with automated optical comparator
4	Keeper Groove Spacing	3.975 - 4.025 mm	YS	Other	Checked by quality lab at change over with an automated optical comparator, tooling controlled
5	Keeper Groove Spacing	1.975 - 2.025 mm	YS	Other	Checked by quality lab at change over with an automated optical comparator program, tooling controlled
6	Back Angle1 Gage Height	3.22 - 3.62 mm	YS	Other	Evidence log, record gage reading every two hours
7	Back Angle2 Gage Height	4.0 - 4.5 mm	YS	Other	Evidence log, record gage reading every two hours
8	Tip Chamfer, Upper Angle	58 - 62 deg	YS	Other	Tool controlled, checked at change over by quality with automated optical comparator
9	Tip Chamfer, Lower Angle	13 - 17 deg	YS	Other	Tool controlled, checked at change over by quality with automated optical comparator
10	Tip Chamfer, Length	0.13 - 0.63 mm	YS	Other	Tool controlled, checked at change over by quality with automated optical comparator
11	Tip Flat Dia	5.09 mm min	YS	Other	Tool controlled, checked at change over by quality with automated optical comparator

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Program:	2021 2.7L Nano	Part Number:	JT4E-6507-BA	Ford D & R Engineer	Signature	Name	e-mail	Date
Supplier Name/Plant:	Eaton / Kearney NE	Engineering Release Number:	NE01-E-14249175-000	Ford STA Engineer	/s/ Benjamin Rhude	Benjamin Rhude	brhude2@ford.com	9/7/2021
Supplier SIM Code:	E304C	Design Lead Brand:	Ford	Ford Craftsmanship/Sys Engr'g	Signature	Name	e-mail	Date
Part / System Name:	INT VALVE	Ford Customer Plant:	Lima Engine Plant	Approval/Date:	Horia Tugulan	Horia Tugulan	htugulan@ford.com	
				Approval/Date:	Signature	Name	e-mail	Date
				Supplier Plant Quality Manager	Cressel Smith	Cressel Smith	csmit840@ford.com	
				Approval/Date:	signature	Name	e-mail	Date
					Don Russell	Don Russell	druuse25@ford.com	

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Stage 1. DFMEA					Stage 1A. PFMEA	
No.	Characteristic Description	Specification & Tolerance	DFMEA Class	PFMEA Class	Process Control Method	
12	Seat Face - Angle	45.50 - 46.00 deg	YS	Other	Inspect each chuck at 1st hour of shift, at wheel change and change over and track in data log CHECK LAST PIECE PRIOR TO TOOL CHANGE AND CHANGE OVER	
13	Seat Face - Runout	0.050 mm to A	YS	SC	Inspect 3 consecutive pieces at the operation and xbar and R, once per shift	
14	Seat Face - Roundness	0.008 mm	YS	Other	Inspect one piece on each chuck every 2 hours and at wheel changes and change overs collected in metrology data log	
15	Head Dia	32.38 - 32.62 mm	YS	Other	Audit 10 pieces per pallet xbar and R, measuring devices at operation for operators to monitor the process, form is checked on comparator at change over and is recorded in changeover log	
16	Underhead Runout	0.28 mm to A	YS	Other	Gage evidence log, record 1 every two hours	
17	Underhead Thickness- gage line to face	1.57 - 1.83 mm	YS	SC	Inspect 3 consecutive pieces at the operation and xbar and R, once per shift	
18	Head Fillet Radius	5.35 - 7.35 mm	YS	Other	Tooling controlled, inspected at set up	
19	Head Back Angle 1	23 - 27 deg	YS	Other	Tooling controlled, inspected at set up	
20	Head Back Angle 2	10 -14 deg	YS	Other	Tooling controlled, inspected at set up	
21	Stem Dia	5.430 - 5.448 mm	YS	SC	Inspect 3 consecutive pieces at the operation and xbar and R, once per shift and ring gaged 100%	

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Supplier Name/Plant:	Eaton / Kearney NE	Engineering Release Number:	NE01-E-14249175-000	Approval/Date:	/s/ Benjamin Rhude	Benjamin Rhude	brhude2@ford.com	9/7/2021
Supplier SIM Code:	E304C	Design Lead Brand:	Ford	Ford STA Engineer	Signature	Name	e-mail	Date
Part / System Name:	INT VALVE	Ford Customer Plant:	Lima Engine Plant	Approval/Date:	Horia Tugulan	Horia Tugulan	htugulan@ford.com	
				Ford Craftsmanship/Sys Engr'g	Signature	Name	e-mail	Date
				Approval/Date:	Cressel Smith	Cressel Smith	csmit840@ford.com	
				Supplier Plant Quality Manager	Signature	Name	e-mail	Date
				Approval/Date:	Don Russell	Don Russell	drusse25@ford.com	

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No.	Characteristic Description	Specification & Tolerance	DFMEA Class	PFMEA Class	Process Control Method
22	Stem Straightness	0.01 mm	YS	Other	Audit 15 pieces recorded in audit log
23	Keeper Groove Location- gage line to undercut	93.79 - 94.09 mm	YS	SC	Overall length, tip to keeper groove, face to gageline will be measured at the process and recorded on xbar and R, once per shift (3 consecutive pieces). The variation of these three operations will contribute to the capability of the gage line to keeper groove. Gage line to keeper groove dimension will be measured at audit (10 pieces per pallet) and recorded on xbar and R
24	Surface Finish	Ra 0.3 max	YS	SC	Inspect at audit 10 pieces per hour and record data
25	Surface Finish	Rpm 1.0 max	YS	SC	Inspect at audit 10 pieces per hour and record data
26	Tip Surface Finish	Ra 0.8 max, 0.25 cutoff	YS	Other	1 piece at 1st hour of shift record in data log
27	Tip Runout	0.018 mm to A	YS	Other	X bar and r 10 pieces done at pre audit, record pass/fail 1 piece every hour, 5 piece set-up inspection approval
28	Material	SAE J775-UNS S65007	YS	Other	Material verification stem material at eddy current before tip harden op
29	Tip Hardness	50-57 HRC past keeper grooves, 17.3-21.3mm from tip	YS	Other	Hardness checked after first coil IMR 1 piece per machine at start of shift, IMR 1 piece per machine after 2nd coil CHECK LAST PIECE PRIOR TO TOOL CHANGE AND CHANGE OVER Safe launch (ERA in response to valve tip fractures): micro indentation checks every hour, core microhardness checks 3 times per shift. Batch and hold parts

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2021 2.7L Nano	Eaton / Kearney NE	JT4E-6507-BA
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Part Number:	JT4E-6507-BA
Engineering Release Number:	NE01-E-14249175-000
Design Lead Brand:	Ford
Ford Customer Plant:	Lima Engine Plant

Ford D & R Engineer
Approval/Date:
Ford STA Engineer
Approval/Date:
Craftsmanship/Sys Engr'g
Approval/Date:
er Plant Quality Manager
Approval/Date:

Signature /s/ Benjamin Rhude	Name Benjamin Rhude	e-mail brhude2@ford.com	Date 9/7/2021
Signature	Name Horia Tugulan	e-mail htugulan@ford.com	Date
Signature	Name Cressel Smith	e-mail csmi840@ford.com	Date
signature	Name Don Russell	e-mail drusse25@ford.com	Date

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Stage 1A. PFMEA

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