

 WILLIAMS CONTROLS		PROCEDURE NAME:		DEPT:		031	
		Laboratory Endurance Formal Report					
DOCUMENT NUMBER:	WQF-031-018	REVISION LEVEL:	B	DATE EFFECTIVE:	2/14/13	DAF#	803
QEMS Representative	Tuan Nguyen	Process Owner	Harry Sutton		Department Manager	Richard Monday	

INFORMATION REDACTED PURSUANT TO THE FREEDOM
OF INFORMATION ACT (FOIA), 5 U.S.C. 552(B)(6)

TEST #A-5860

WM-542 ESPA / 400483 / Endurance Product Validation



Product: **Thirty (30) ESFPA Units Under Test (UUT)**



Figure 1—WM-542 400483 pedal



Figure 2—WM-542 400483 pedal

Analysis Type: **Endurance—Product Validation**

Reference: **WM-542**

Purpose of Test

The purpose of this test is validate the current production using new deadband containment programming.

Test Summary (Test period: 06/20/13 through 08/13/13)

Received thirty (30) ESPA UUT pedal sensor electrical and force measurements were collected at the beginning and at the end of the test, with electrical and force data collected at designated intervals.

Testing details are provided on the following pages.

REMARKS:

The force specification used for this testing was an internal requirement applied to products at the start of life. The customer has no force requirements for this assembly. A small decrease in actuation force over life is normal for this product.

Baird Chrisman, Design Engineer
August 14, 2015

Results Summary Test of UUT pedal units with specific results as follows:

Initial measurements----- See Table 2 for specified details.

After 250.0K cycles: ----- See Table 3 for specified details.

After 750.0K cycles: ----- See Table 4 for specified details.

After 1000.0K cycles: ----- See Table 5 for specified details.

After 1500.0K cycles: ----- See Table 6 for specified details.

After 2000.0K cycles: ----- See Table 7 for specified details.

After 2500.0K cycles: ----- See Table 8 for specified details.

After 3000.0K cycles: ----- See Table 9 for specified details.

See Lab Remarks section for more details of UUT testing.

PROCEDURE:

Test Matrix:

● ESPA UUT 01 through 30 testing:

1. Conduct initial sensor electrical and pedal force measurements.
 2. Cycle pedals at cycle rate of approximately 1 Hz through full stroke with no snap back visible.
 3. Record sensor electrical and pedal force outputs at designated intervals.
 4. Record sensor electrical and pedal force measurements at the end of test. Conduct visual inspection of UUT.
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Test Data Measurement Device:



Figure 3—Data acquisition station

Test Sensor Load Circuit Diagram:

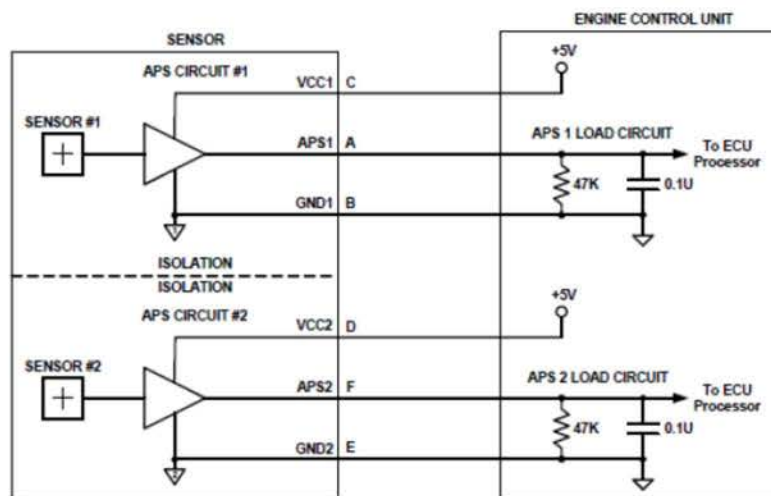


Figure 4—Cummins 07 ECU (400483) load circuit diagram for testing

Test Data Electrical and Force Limits:

Table 1—400483 pedal limits

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N

Test Data of UUT:**Initial data measurements****Table 2—Initial electrical and force measurements**

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.92%	84.02%	10.84%	41.96%	22.50 N	35.50 N
2	21.86%	84.01%	10.88%	41.80%	21.00 N	35.10 N
3	21.86%	84.14%	10.81%	41.90%	21.00 N	34.60 N
4	21.86%	83.97%	10.70%	41.71%	21.80 N	33.50 N
5	21.89%	84.00%	10.89%	41.92%	21.50 N	34.40 N
6	21.80%	83.99%	10.83%	41.90%	20.50 N	35.10 N
7	21.94%	83.99%	10.84%	41.93%	21.00 N	34.70 N
8	21.92%	83.99%	10.87%	41.86%	20.70 N	35.40 N
9	21.79%	84.09%	10.86%	41.89%	19.50 N	34.10 N
10	21.78%	84.06%	10.84%	41.88%	21.30 N	34.80 N
11	21.86%	83.95%	10.88%	41.93%	19.90 N	35.00 N
12	21.86%	84.02%	10.87%	41.86%	19.60 N	35.70 N
13	21.75%	83.96%	10.80%	41.84%	20.20 N	34.80 N
14	21.87%	83.99%	10.88%	41.97%	20.90 N	35.80 N
15	21.90%	84.06%	10.88%	41.90%	20.50 N	34.50 N
16	21.90%	83.92%	10.84%	41.94%	21.70 N	35.80 N
17	21.86%	83.91%	10.89%	41.89%	19.80 N	34.70 N
18	21.90%	84.02%	10.86%	41.90%	20.00 N	35.10 N
19	21.93%	84.04%	10.80%	41.90%	20.00 N	35.40 N
20	21.87%	83.93%	10.81%	41.95%	20.60 N	34.20 N
21	21.87%	84.09%	10.84%	41.93%	19.10 N	34.90 N
22	21.92%	83.95%	10.89%	41.90%	19.10 N	34.50 N
23	21.83%	83.98%	10.91%	41.99%	19.70 N	35.00 N
24	21.87%	84.04%	10.83%	41.84%	20.80 N	34.30 N
25	21.87%	83.98%	10.86%	41.88%	21.00 N	34.30 N
26	21.89%	84.05%	10.78%	41.94%	20.00 N	34.10 N
27	21.86%	83.98%	10.89%	42.00%	19.50 N	33.30 N
28	21.83%	83.93%	10.83%	41.87%	19.50 N	33.80 N
29	21.96%	84.05%	10.97%	41.89%	20.30 N	34.90 N
30	21.90%	84.06%	10.81%	41.87%	19.70 N	32.50 N
Avg	21.87%	84.01%	10.85%	41.90%	20.42 N	34.66 N

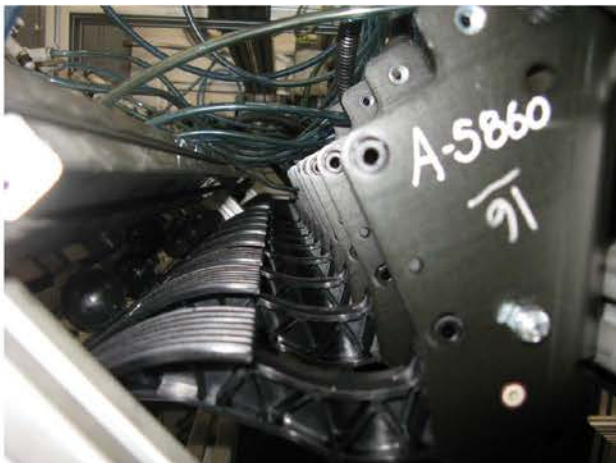
Test Data UUT 01-30: ~**Endurance Testing****Figure 5—400483 UUT 01-16 on high speed cycle test fixture****Figure 6—400483 UUT 17-30 on high speed cycle test fixture****Figure 7—Close-up view of UUT on test fixture showing actuation alignment****Figure 8—PLC control box**

Table 3—Post 250.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.95%	84.03%	10.87%	41.80%	20.31 N	34.66 N
2	21.88%	84.01%	10.91%	41.78%	19.50 N	36.36 N
3	21.87%	84.15%	10.84%	41.92%	18.10 N	35.69 N
4	21.86%	83.99%	10.78%	41.85%	17.66 N	33.78 N
5	21.93%	84.00%	10.91%	41.94%	18.68 N	34.89 N
6	21.87%	84.01%	10.85%	41.83%	20.88 N	34.85 N
7	21.73%	84.01%	10.64%	42.01%	22.28 N	34.56 N
8	21.92%	83.99%	10.89%	41.89%	20.07 N	34.34 N
9	21.83%	84.14%	10.89%	41.91%	20.44 N	35.29 N
10	21.80%	84.04%	10.86%	41.94%	19.93 N	36.25 N
11	21.88%	83.96%	10.89%	41.97%	19.78 N	34.49 N
12	21.88%	84.04%	10.90%	41.88%	18.90 N	36.03 N
13	21.74%	84.04%	10.82%	41.86%	19.12 N	34.41 N
14	21.88%	84.01%	10.92%	42.02%	20.66 N	35.96 N
15	21.91%	84.08%	10.91%	41.92%	19.78 N	33.31 N
16	21.92%	83.93%	10.87%	41.97%	19.49 N	35.88 N
17	21.87%	83.93%	10.93%	41.97%	18.46 N	33.09 N
18	21.90%	84.03%	10.90%	41.96%	19.26 N	35.88 N
19	21.96%	84.02%	10.82%	41.85%	20.59 N	35.29 N
20	21.90%	83.95%	10.83%	41.97%	19.19 N	36.03 N
21	21.88%	84.14%	10.88%	41.95%	18.46 N	34.12 N
22	21.95%	83.97%	10.92%	41.94%	19.63 N	35.88 N
23	21.88%	84.00%	10.93%	41.99%	18.38 N	34.34 N
24	21.89%	84.09%	10.86%	41.98%	18.82 N	33.60 N
25	21.88%	84.00%	10.89%	41.91%	18.09 N	35.96 N
26	21.92%	84.07%	10.82%	41.95%	17.94 N	34.63 N
27	21.90%	84.03%	10.92%	41.95%	18.82 N	35.96 N
28	21.88%	83.94%	10.87%	41.90%	16.32 N	33.38 N
29	21.97%	84.06%	10.84%	41.91%	16.91 N	32.50 N
30	21.92%	84.09%	10.86%	41.90%	20.15 N	38.31 N
Avg	21.88%	84.02%	10.87%	41.92%	19.22 N	34.99 N
Change	0.01%	0.02%	0.02%	0.02%	-1.20 N	0.33 N

Table 4—Post 750.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.91%	84.03%	10.84%	41.94%	20.75 N	35.69 N
2	21.83%	84.02%	10.90%	41.70%	20.68 N	34.08 N
3	21.81%	84.11%	10.82%	41.90%	19.06 N	37.09 N
4	21.86%	83.95%	10.67%	41.78%	19.50 N	34.30 N
5	21.89%	84.01%	10.87%	41.93%	18.77 N	34.89 N
6	21.85%	84.01%	10.82%	41.90%	18.40 N	32.24 N
7	21.90%	84.02%	10.82%	41.97%	19.87 N	35.84 N
8	21.88%	84.01%	10.84%	41.86%	19.43 N	36.28 N
9	21.78%	84.15%	10.83%	41.88%	19.72 N	35.11 N
10	21.80%	84.08%	10.80%	41.88%	18.18 N	31.87 N
11	21.82%	83.96%	10.86%	41.93%	17.30 N	34.66 N
12	21.85%	84.04%	10.86%	41.85%	17.66 N	31.87 N
13	21.70%	84.05%	10.79%	41.82%	21.90 N	37.68 N
14	21.83%	84.01%	10.86%	42.00%	20.50 N	36.80 N
15	21.86%	84.08%	10.88%	41.90%	17.90 N	35.10 N
16	21.88%	83.93%	10.83%	41.71%	20.30 N	35.00 N
17	21.83%	83.93%	10.89%	41.93%	17.50 N	35.60 N
18	21.86%	84.03%	10.85%	41.94%	17.20 N	33.40 N
19	21.92%	84.03%	10.78%	41.91%	18.20 N	35.10 N
20	21.86%	83.95%	10.78%	41.95%	17.10 N	35.40 N
21	21.85%	84.08%	10.83%	41.94%	16.70 N	34.60 N
22	21.91%	83.98%	10.88%	41.91%	18.20 N	34.30 N
23	21.82%	84.02%	10.88%	41.75%	17.00 N	33.60 N
24	21.86%	84.09%	10.81%	41.84%	17.50 N	30.90 N
25	21.82%	84.01%	10.85%	41.91%	17.50 N	32.10 N
26	21.88%	84.06%	10.77%	41.97%	16.40 N	32.90 N
27	21.85%	84.00%	10.84%	41.94%	17.90 N	32.20 N
28	21.84%	83.94%	10.81%	41.87%	17.50 N	35.10 N
29	21.94%	84.06%	10.79%	41.89%	20.80 N	34.90 N
30	21.88%	84.09%	10.80%	41.88%	18.20 N	34.30 N
Avg	21.85%	84.02%	10.83%	41.89%	18.59 N	34.43 N
Change	-0.02%	0.02%	-0.02%	-0.01%	-1.84 N	-0.23 N

Table 5—Post 1000.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.88%	84.02%	10.83%	41.96%	20.87 N	36.21 N
2	21.83%	84.02%	10.87%	41.81%	20.11 N	35.36 N
3	21.84%	84.14%	10.81%	41.90%	18.57 N	34.08 N
4	21.82%	83.99%	10.66%	41.77%	19.42 N	33.99 N
5	21.91%	84.01%	10.87%	41.92%	19.00 N	33.91 N
6	21.84%	84.00%	10.82%	41.89%	20.62 N	36.04 N
7	21.92%	84.03%	10.82%	41.95%	19.51 N	34.85 N
8	21.91%	84.00%	10.85%	41.87%	19.34 N	35.53 N
9	21.76%	84.10%	10.85%	41.89%	17.98 N	31.27 N
10	21.80%	84.07%	10.82%	41.89%	20.28 N	33.91 N
11	21.99%	83.97%	10.87%	41.94%	17.81 N	31.52 N
12	21.85%	84.07%	10.86%	41.84%	20.02 N	32.29 N
13	21.67%	84.03%	10.79%	41.87%	18.83 N	34.93 N
14	21.84%	84.01%	10.88%	42.00%	19.42 N	33.65 N
15	21.86%	84.07%	10.87%	41.90%	18.23 N	32.46 N
16	21.89%	83.93%	10.83%	41.81%	20.28 N	35.78 N
17	21.85%	83.94%	10.90%	41.93%	19.17 N	32.63 N
18	21.86%	84.03%	10.85%	41.90%	17.98 N	31.10 N
19	21.91%	84.04%	10.79%	41.89%	18.15 N	34.59 N
20	21.86%	83.96%	10.79%	41.94%	19.25 N	31.52 N
21	21.85%	84.11%	10.84%	41.95%	18.66 N	35.61 N
22	21.90%	83.98%	10.88%	41.94%	18.57 N	32.20 N
23	21.82%	84.01%	10.89%	41.97%	19.08 N	33.99 N
24	21.86%	84.09%	10.81%	41.97%	18.91 N	35.02 N
25	21.86%	84.01%	10.85%	41.89%	18.06 N	31.01 N
26	21.86%	84.06%	10.78%	41.97%	18.32 N	32.80 N
27	21.87%	84.00%	10.86%	41.94%	20.11 N	33.82 N
28	21.85%	83.94%	10.81%	41.87%	18.32 N	31.86 N
29	21.91%	84.06%	10.81%	41.89%	19.85 N	37.15 N
30	21.86%	84.04%	10.83%	41.88%	19.94 N	33.57 N
Avg	21.86%	84.02%	10.83%	41.90%	19.16 N	33.76 N
Change	-0.01%	0.02%	-0.02%	0.01%	-1.27 N	-0.90 N

Table 6—Post 1500.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.90%	84.02%	10.84%	41.96%	19.15 N	33.95 N
2	21.85%	84.02%	10.88%	41.83%	19.15 N	35.37 N
3	21.84%	84.18%	10.81%	41.90%	18.75 N	34.34 N
4	21.81%	83.99%	10.60%	41.80%	19.23 N	33.08 N
5	21.92%	84.00%	10.86%	41.92%	18.67 N	34.58 N
6	21.82%	84.00%	10.82%	41.90%	18.91 N	35.61 N
7	21.93%	84.02%	10.86%	41.98%	19.15 N	33.79 N
8	21.88%	83.99%	10.84%	41.88%	19.31 N	34.74 N
9	21.79%	84.17%	10.84%	41.89%	19.23 N	31.18 N
10	21.82%	84.08%	10.82%	41.89%	19.70 N	32.36 N
11	21.83%	83.96%	10.86%	41.94%	16.62 N	31.26 N
12	21.86%	84.04%	10.87%	41.86%	17.96 N	32.05 N
13	21.69%	84.03%	10.78%	41.85%	19.07 N	31.49 N
14	21.85%	84.02%	10.89%	42.03%	19.94 N	35.29 N
15	21.87%	84.03%	10.89%	41.91%	18.99 N	30.31 N
16	21.90%	83.93%	10.83%	41.95%	19.23 N	34.34 N
17	21.86%	83.94%	10.89%	41.92%	18.36 N	29.67 N
18	21.87%	84.03%	10.86%	41.91%	17.33 N	27.38 N
19	21.93%	84.04%	10.79%	41.93%	19.70 N	32.44 N
20	21.87%	83.96%	10.79%	41.95%	19.94 N	31.57 N
21	21.86%	84.12%	10.84%	41.92%	17.96 N	31.81 N
22	21.85%	83.97%	10.82%	41.94%	17.25 N	32.60 N
23	21.85%	83.99%	10.89%	41.98%	19.15 N	34.98 N
24	21.85%	84.09%	10.80%	41.97%	18.75 N	33.16 N
25	21.87%	84.00%	10.85%	41.88%	17.49 N	31.02 N
26	21.89%	84.07%	10.78%	41.96%	17.73 N	31.73 N
27	21.89%	84.00%	10.86%	41.98%	18.99 N	32.68 N
28	21.86%	83.94%	10.83%	41.87%	17.65 N	31.34 N
29	21.94%	84.09%	10.84%	41.90%	18.20 N	32.60 N
30	21.89%	84.08%	10.81%	41.88%	18.91 N	32.36 N
Avg	21.86%	84.03%	10.83%	41.92%	18.68 N	32.64 N
Change	-0.01%	0.02%	-0.02%	0.02%	-1.74 N	-2.02 N

Table 7—Post 2000.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.88%	84.02%	10.83%	41.96%	20.26 N	32.41 N
2	21.85%	84.02%	10.85%	41.89%	18.64 N	31.31 N
3	21.83%	84.14%	10.81%	41.89%	19.15 N	31.68 N
4	21.79%	83.98%	10.71%	41.95%	19.82 N	31.90 N
5	21.91%	84.00%	10.86%	41.91%	19.01 N	32.12 N
6	21.80%	84.00%	10.81%	41.90%	19.52 N	29.83 N
7	21.92%	84.02%	10.83%	41.99%	20.63 N	33.37 N
8	21.87%	83.98%	10.85%	41.87%	19.30 N	28.88 N
9	21.78%	84.16%	10.83%	41.88%	18.78 N	32.04 N
10	21.79%	84.07%	10.84%	41.88%	19.30 N	30.13 N
11	22.23%	83.96%	11.06%	41.92%	18.78 N	29.24 N
12	21.85%	84.03%	10.87%	41.86%	18.05 N	28.80 N
13	21.70%	84.03%	10.77%	41.84%	18.34 N	29.98 N
14	21.84%	84.00%	10.87%	41.98%	19.52 N	32.34 N
15	21.86%	84.08%	10.87%	41.90%	17.83 N	28.51 N
16	21.89%	83.93%	10.84%	41.97%	18.91 N	31.53 N
17	21.85%	83.93%	10.88%	41.93%	18.77 N	29.66 N
18	21.86%	84.04%	10.85%	41.90%	18.18 N	28.70 N
19	21.89%	84.01%	10.79%	41.90%	18.99 N	32.24 N
20	21.84%	83.96%	10.80%	41.78%	19.43 N	28.85 N
21	21.84%	84.07%	10.85%	41.92%	18.84 N	30.84 N
22	21.90%	83.97%	10.88%	41.95%	19.50 N	30.47 N
23	21.84%	84.01%	10.88%	41.77%	18.99 N	30.62 N
24	21.86%	84.07%	10.82%	41.98%	19.72 N	32.53 N
25	21.86%	84.01%	10.84%	41.80%	18.62 N	30.54 N
26	21.87%	84.06%	10.77%	41.95%	18.40 N	30.76 N
27	21.81%	84.00%	10.85%	41.94%	19.50 N	32.00 N
28	21.85%	83.94%	10.79%	41.87%	18.25 N	30.32 N
29	21.93%	84.06%	10.82%	41.89%	20.02 N	32.68 N
30	21.88%	84.08%	10.80%	41.88%	18.77 N	30.40 N
Avg	21.86%	84.02%	10.84%	41.90%	19.06 N	30.82 N
Change	-0.01%	0.02%	-0.01%	0.00%	-1.36 N	-3.84 N

Table 8—Post 2500.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.90%	84.00%	10.86%	41.97%	19.88 N	34.06 N
2	21.86%	83.98%	10.89%	41.94%	21.94 N	30.42 N
3	21.84%	84.11%	10.82%	41.89%	21.39 N	31.92 N
4	21.82%	83.96%	10.65%	41.85%	20.75 N	29.78 N
5	21.89%	83.98%	10.87%	41.92%	20.51 N	31.29 N
6	21.80%	83.97%	10.83%	41.90%	22.26 N	31.21 N
7	21.92%	84.00%	10.83%	41.97%	20.44 N	32.24 N
8	21.88%	83.97%	10.87%	41.87%	20.04 N	30.50 N
9	21.81%	84.14%	10.86%	41.89%	19.64 N	31.60 N
10	21.83%	84.06%	10.83%	41.92%	20.04 N	30.50 N
11	22.33%	83.95%	11.08%	41.94%	20.83 N	32.79 N
12	21.86%	84.02%	10.88%	41.86%	22.02 N	30.57 N
13	21.71%	84.01%	10.80%	41.85%	22.02 N	30.73 N
14	21.85%	83.99%	10.89%	42.02%	20.28 N	32.95 N
15	21.88%	84.06%	10.88%	41.90%	21.54 N	31.92 N
16	21.90%	83.91%	10.84%	41.97%	19.56 N	30.73 N
17	21.84%	83.92%	10.89%	41.93%	20.12 N	29.07 N
18	21.87%	84.01%	10.86%	41.91%	20.04 N	31.60 N
19	21.92%	84.02%	10.80%	41.90%	18.93 N	30.73 N
20	21.86%	83.94%	10.80%	41.95%	17.58 N	28.99 N
21	21.84%	84.08%	10.84%	41.89%	19.09 N	31.05 N
22	21.90%	83.97%	10.90%	41.95%	18.85 N	32.63 N
23	21.84%	84.00%	10.91%	41.97%	17.90 N	29.15 N
24	21.86%	84.08%	10.82%	41.95%	17.27 N	28.75 N
25	21.86%	83.99%	10.86%	41.90%	18.53 N	28.91 N
26	21.88%	84.04%	10.79%	42.00%	17.43 N	28.83 N
27	21.88%	84.00%	10.88%	41.90%	19.56 N	32.63 N
28	21.84%	83.92%	10.82%	41.83%	18.06 N	29.94 N
29	21.95%	84.05%	10.82%	41.90%	19.88 N	32.16 N
30	21.88%	84.06%	10.83%	41.87%	17.90 N	29.70 N
Avg	21.88%	84.01%	10.85%	41.92%	19.81 N	30.91 N
Change	0.00%	0.00%	0.00%	0.02%	-0.61 N	-3.75 N

Table 9—Post 3000.0K cycles electrical and force measurements

	CT 1	WOT 1	CT 2	WOT 2	IPF	FPTF
Max	24.00%	86.00%	13.00%	44.00%	32.00 N	46.00 N
Min	20.00%	82.00%	9.00%	40.00%	16.00 N	26.00 N
1	21.90%	84.01%	10.85%	41.97%	19.23 N	29.44 N
2	21.85%	84.02%	10.88%	41.87%	19.94 N	27.93 N
3	21.82%	84.10%	10.84%	41.90%	18.44 N	30.31 N
4	21.83%	83.94%	10.74%	41.85%	19.07 N	30.78 N
5	21.92%	83.98%	10.87%	41.91%	16.06 N	27.54 N
6	21.80%	83.98%	10.83%	41.90%	16.93 N	26.98 N
7	21.93%	84.01%	10.85%	41.99%	18.52 N	29.12 N
8	21.89%	83.98%	10.87%	41.87%	17.73 N	28.17 N
9	21.78%	84.15%	10.86%	41.89%	16.93 N	27.46 N
10	21.83%	84.06%	10.83%	41.93%	17.57 N	26.90 N
11	22.08%	83.94%	10.90%	41.98%	15.75 N	26.82 N
12	21.86%	84.01%	10.89%	41.86%	16.54 N	27.54 N
13	21.74%	84.01%	10.79%	41.84%	17.96 N	28.09 N
14	21.86%	83.99%	10.88%	41.98%	17.80 N	30.54 N
15	21.88%	84.06%	10.89%	41.90%	16.14 N	27.38 N
16	21.90%	83.91%	10.85%	41.97%	17.17 N	26.75 N
17	21.86%	83.92%	10.91%	41.93%	17.17 N	27.93 N
18	21.88%	84.01%	10.87%	41.90%	16.62 N	28.33 N
19	21.93%	84.02%	10.80%	41.90%	17.57 N	28.57 N
20	21.87%	83.94%	10.81%	41.96%	17.65 N	29.52 N
21	21.85%	84.08%	10.85%	41.94%	16.85 N	28.96 N
22	21.91%	83.96%	10.90%	41.83%	17.96 N	29.36 N
23	21.83%	83.98%	10.91%	41.98%	17.65 N	27.62 N
24	21.86%	84.07%	10.85%	41.99%	18.83 N	28.72 N
25	21.86%	83.98%	10.86%	41.88%	17.80 N	27.70 N
26	21.88%	84.05%	10.80%	41.92%	18.52 N	29.59 N
27	21.88%	83.98%	10.89%	41.94%	18.36 N	29.83 N
28	21.86%	83.92%	10.84%	41.88%	18.12 N	26.90 N
29	21.95%	84.04%	10.81%	41.89%	18.67 N	33.71 N
30	21.90%	84.06%	10.84%	41.88%	17.01 N	28.17 N
Avg	21.87%	84.01%	10.85%	41.91%	17.69 N	28.56 N
Change	0.00%	0.00%	0.00%	0.01%	-2.74 N	-6.10 N

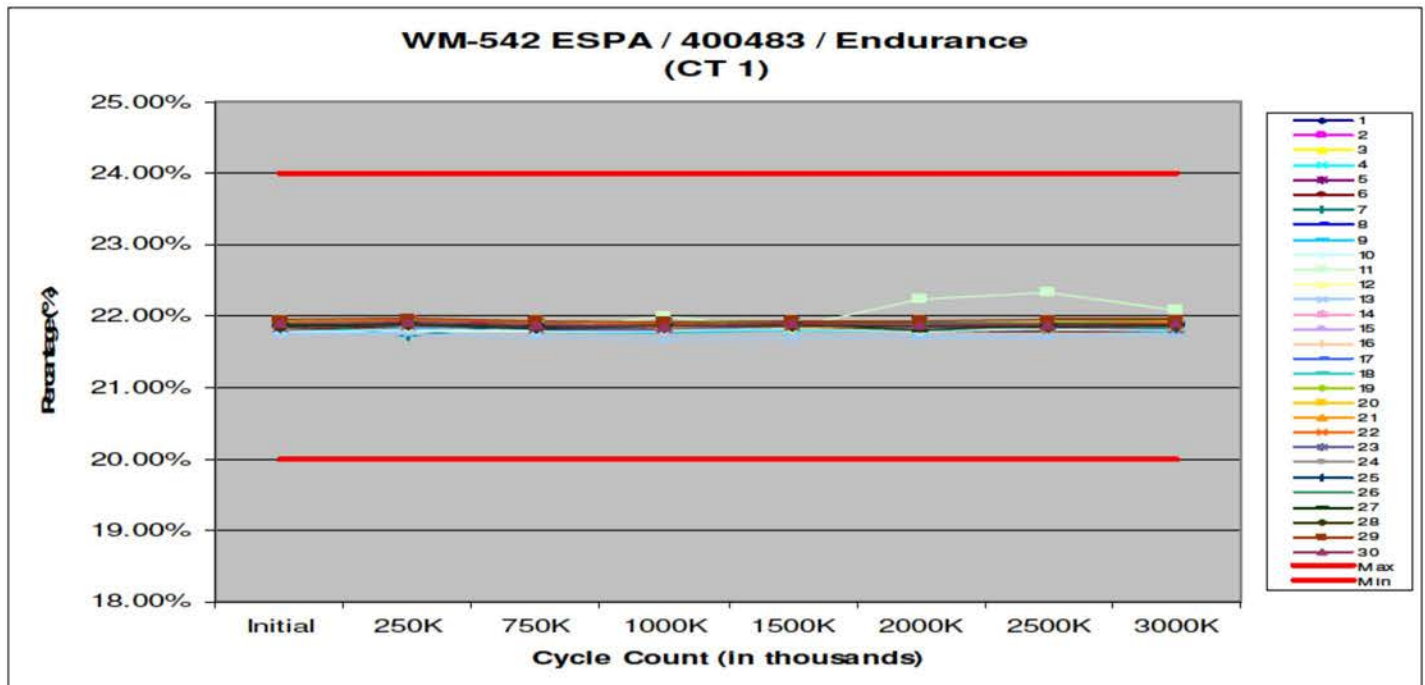


Figure 9—CT-1 sensor electrical measurement for UUT.

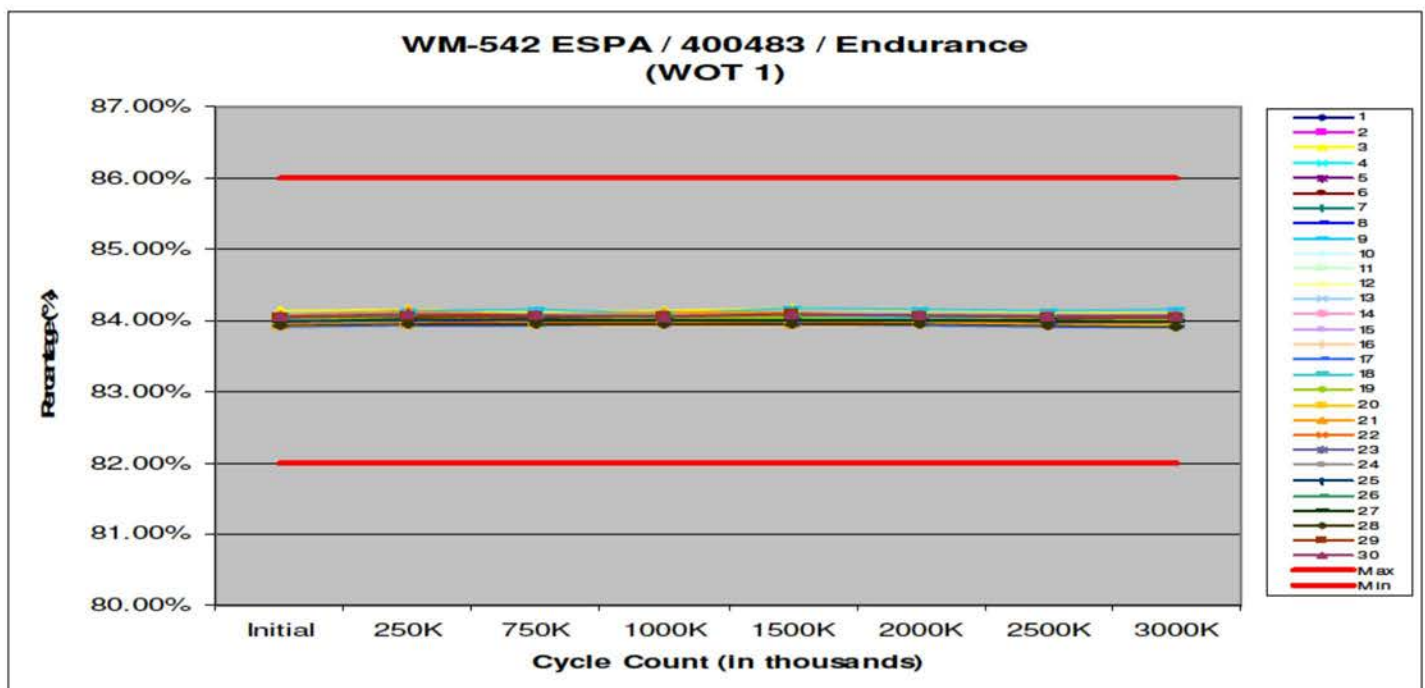


Figure 10—WOT-1 sensor electrical measurement for UUT.

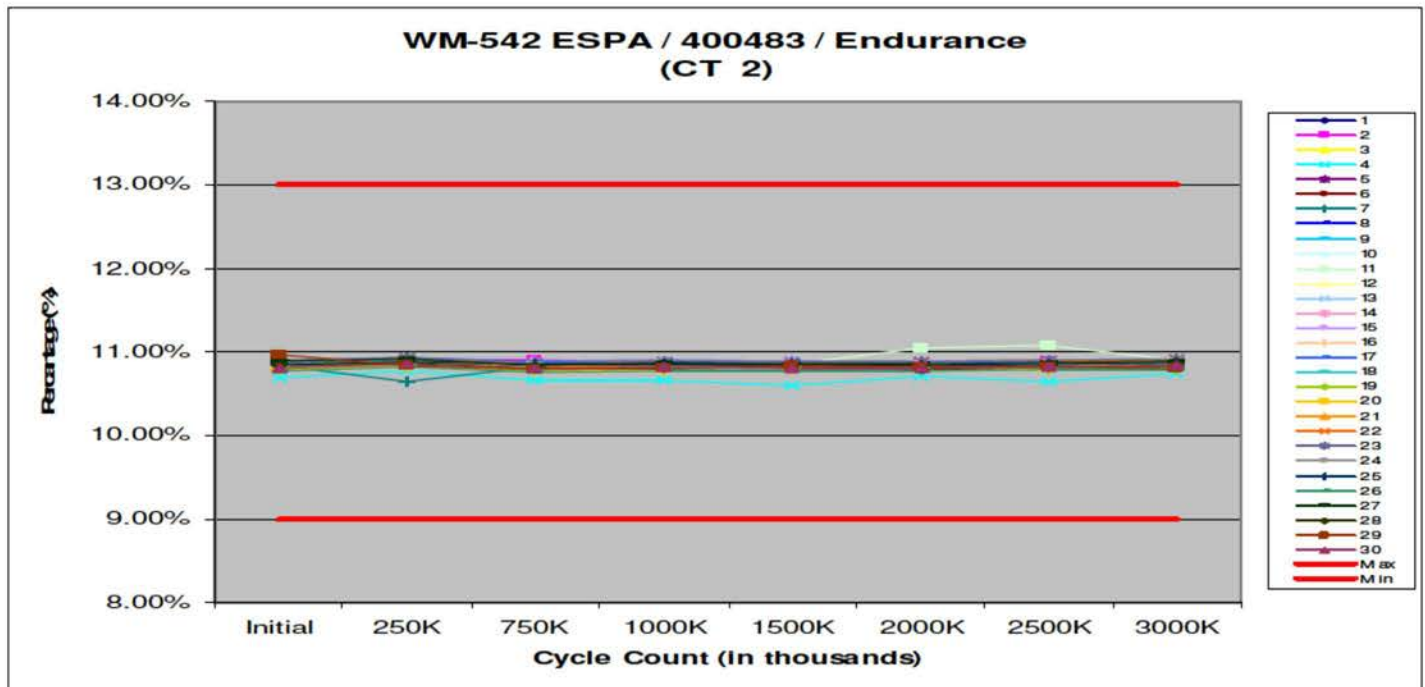


Figure 11—CT-2 APS sensor electrical measurement for UUT.

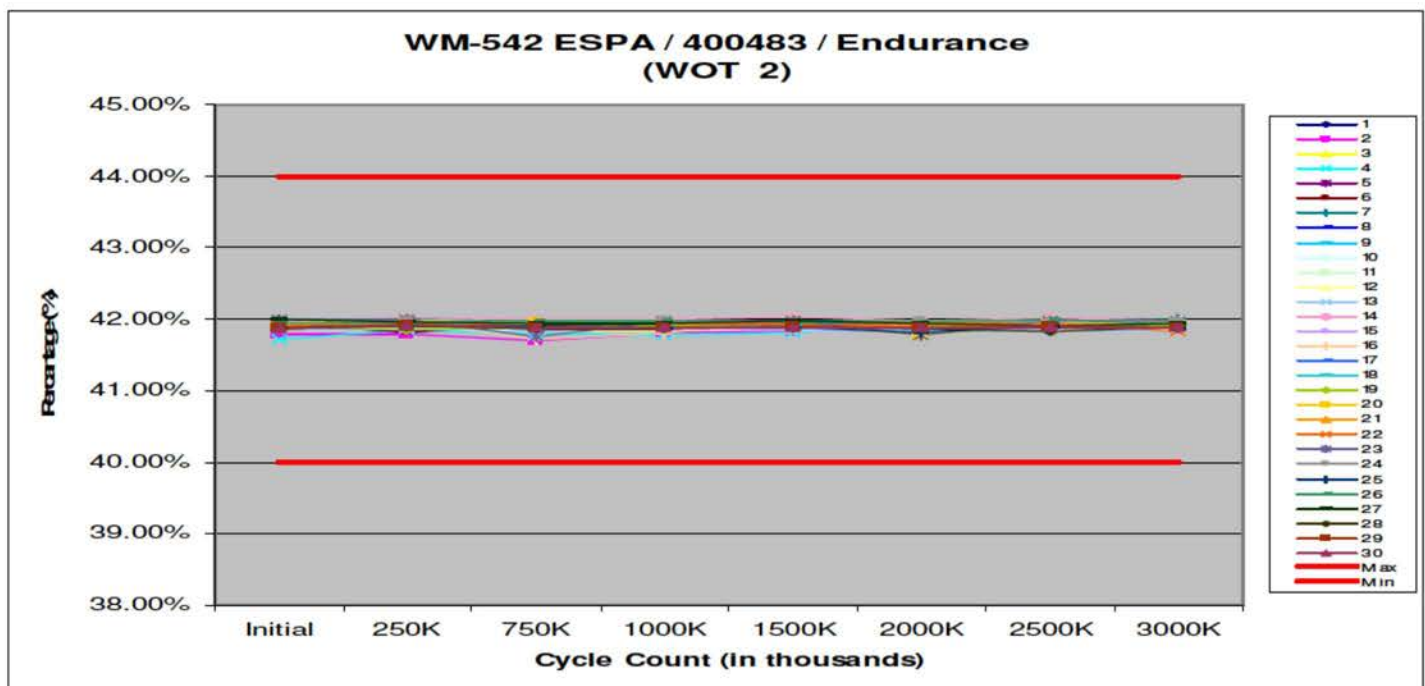


Figure 12—WOT-2 APS sensor electrical measurement for UUT.

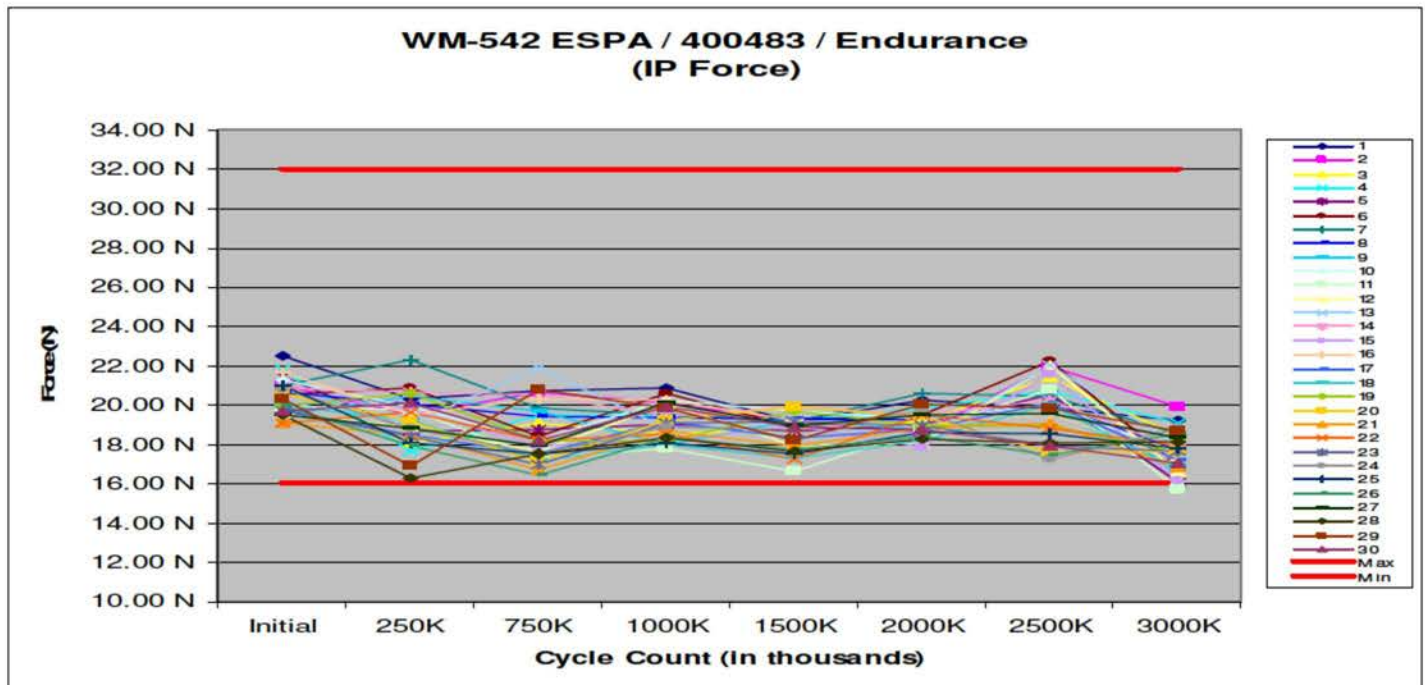


Figure 13—Initial Pedal Force measurement for UUT.

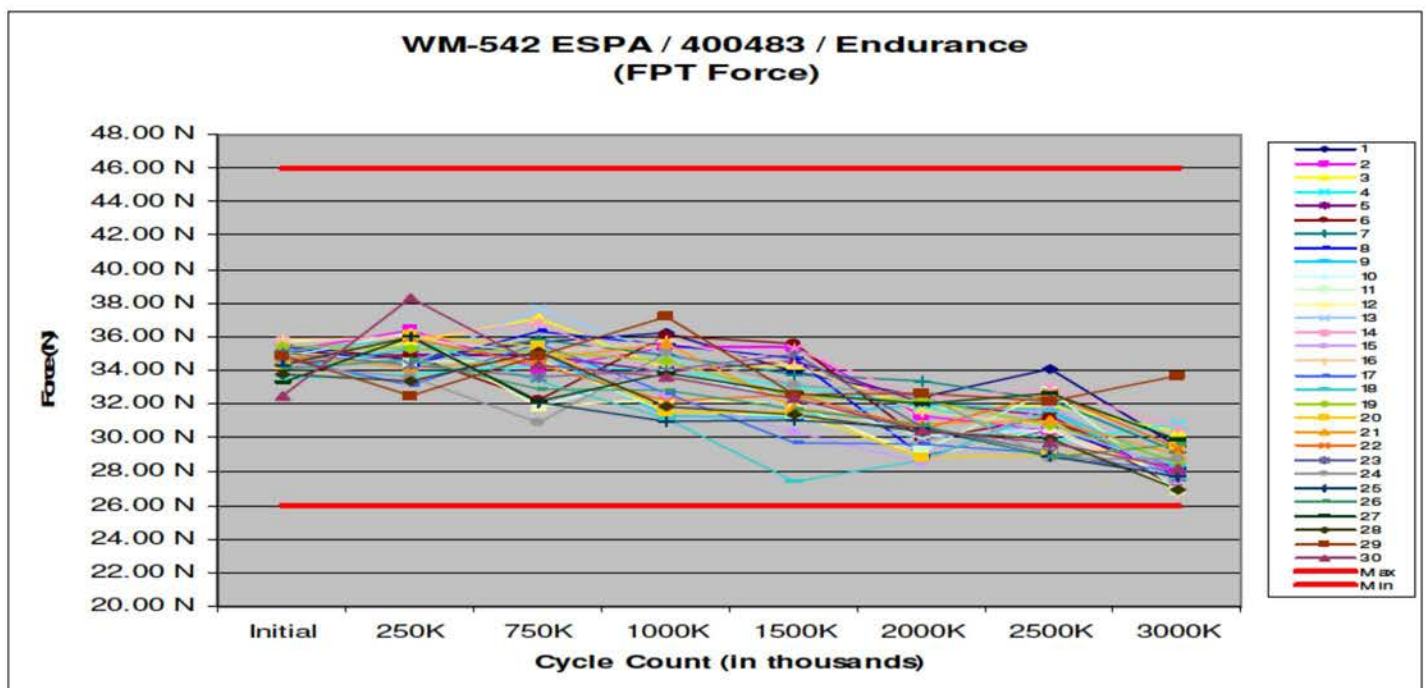


Figure 14—Full Pedal Travel Force measurement for UUT.

REMARKS (Lab):

- Received UUT, uniquely labeled 30 400483 UUT assemblies for Endurance test. Recorded initial sensor electrical values and pedal forces; sensor electrical and pedal force measurements were within specified limits.
- During testing, 500K measurements were not taken, while inputting the amount of cycles to reach 500K technician input 750K cycles, engineer was notified and requested to resume testing.
- No other errors encountered on the assemblies or the Endurance test fixture.

APPENDIX: A. Equipment List:

Description	Purpose	WCL	Cal Due Date
▶ Personal DAQ 3005 ----- pedal sensor and force measurements		0706	06/26/14
▶ Chatillon DFS-050----- Bench top pedal force measurements		1007	08/10/14

- ATTACHMENTS:**
1. Log sheets
 2. Electrical and force plots