Product Validation Plan and Report

MCON 1,2mm Sealed Connector family

PVPNumber		Dept# 21243	Tyco Electronics Prod. Eng. Automotive FORD Department
Plan Date	27-Mar-2007	Plan Originator	Guenther Mumper ++49-6251-133 1754

Component	P/N	UPG Number	Concurrence	Manager Appv'l	Customer Appv'l
MCON 1,2 mm Sealed Connector Family: 2way 3way 4way 5way 6way 8way	X-1670916-X X.1670917-X X-1670918-X X-1670921-X X-1670919-X X-1670920-X			Guenther Mumper	

Model Year	Applications	Controlling Document	Source	Report Date	Reporting Engineer
2008	COMMODITY PART	USCAR-2 Rev. 4 (May2004)	**Tyco Electronics**	31-Aug-07	C. L'Abbate

TEST PLAN											TEST REPORT				NOTES
Item No.	Procedure Or Standard	Test Description	Acceptance Criteria	Target Requirements	Test Responsibility	Test Stage	Sample		Timing		Samples Tested			Actual Results	
							Qty	Type	Start	Compl	Qty	Type	Phase		
USCAR Connector System Mechanical Tests (TEST FLOW 5.9.5)															
1	***USCAR 5.4.1***	***Terminal – Connector Insertion/Extraction Force***	***USCAR Test sequence D***												
1a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D						**o.k.**	
1b	USCAR 5.4.1	Terminal Insertion Force	30 N max.	No failures	Tyco	PV	10	D			32	E		**10,3N max.**	Performed on the 2way Connector
1c	USCAR 5.4.1	Terminal Push Through	50 N min. or cond. column strength	No failures	Tyco	PV	10	D	Nov. 2006						Not tested
1d	USCAR 5.4.1	Terminal Extraction Force (Primary lock only.)	30 N min	No failures	Tyco	PV	10	D	Nov. 2006		20	E		**Min. 61,7N (various pincounts)**	
1e	USCAR 5.4.1	Terminal Extraction Force (Primary lock & TPA before Moisture conditioning.)	75 N min.	No failures	Tyco	PV	64	D			64	E		**Min. 113,4 N**	Tested on the 8way Connector
1f	USCAR 5.4.1	Terminal Extraction Force (Primary lock & TPA before Moisture conditioning.)	75 N min.	No failures	Tyco	PV	64	D			64	E		**Min. 89,4 N**	Tested on the 8 way Connector

TEST PLAN											TEST REPORT				NOTES
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							Qty	Type	Start	Compl	Qty	Type	Phase		
2	***USCAR 5.4.5***	***Misc. Component Engage/Disengage Force***	***USCAR Test sequence E***												
2a	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	10	D	Nov. 2006					**o.k.**	
2b	USCAR 5.4.5	Misc. Component Engage/Disengage Force: TPA Preset to lock (1,5mm contacts)	15 N min. (w/o terminals installed) 60 N max. (w/ terminals installed)	No failures	Tyco	PV	10	D	Feb. 2006		*8*	E		**6,3 – 16,6N (various pincounts)**	Design according to AK Req. in "Working Committee, Guidelines for Automotive Connectors" – **20N max. (PG 7.3)**
2c	USCAR 5.4.5	Misc. Component Engage/Disengage Force: TPA Lock to preset (1,5mm contacts)	60 N max. 18 N min. (after initial repositioning)	No failures	Tyco	PV	10	D	Feb. 2006		*8*	E		**6,2 – 22,2N (various pincounts)**	Design according to AK Req. in "Working Committee, Guidelines for Automotive Connectors" – **20N max. (PG 7.3)**
3	***USCAR 5.4.2***	**Connector-Connector Mating/ Unmating**	***USCAR Test sequence G***												
3a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	Feb. 2006					**o.k.**	
3b	USCAR 5.4.3	Mating force	75 N max.	No failures	Tyco	PV	10	D	Feb. 2006					**3way: 33N 6way: 53,9**	Performed on pilot male inline connectors /// To be repeated with header interfaces
3c	USCAR 5.4.3	Unmating Force (w/ connector lock disabled	75 N max.	No failures	Tyco	PV	10	D	Feb. 2006					**Waiting for samples**	

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3d	USCAR 5.4.3	Unmating force (w/ connector lock engaged)	110N min.	No failures	Tyco	PV	10	D	Feb. 2006		5	E		**Min. 148,3N (8way Female Connector on 8way Male Prototype Connector)** **Min. 135,8N (various pincounts on headers made from aluminium)**	To be repeated with molded interfaces / male connectors as soon this are available
4	***USCAR 5.4.4***	***Polarization Feature Effectiveness***	***USCAR Test sequence H***												**Not tested**
4a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	2	D	Feb. 2006					**TBD**	See row below
4b	USCAR 5.4.4	Connector Mated Turned 180°	No mating >220 N	No failures	Tyco	PV	2	D	Feb. 2006					**TBD**	To be repeated with molded interfaces / male connectors as soon this are available
4c	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	2	D	Feb. 2006					**TBD**	To be repeated with molded interfaces / male connectors as soon this are available
5	***USCAR 5.4.9***	***Cavity Damage Susceptibility***	***USCAR Test sequence J***												
5a	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	5	D	Feb. 2006					**o.k.**	
5b	USCAR 5.4.9	Cavity Damage susceptability	TPA must withstand 40 N higher than maximum seating force or 80 N min. when trying to seat with partially inserted contact.	No failures	Tyco	PV	5	D	Feb. 2006		*5/ pinc ount*	E		**Test passed**	For half inserted terminals it is not possible to push the TPA on the connector in the final position at a force of 80N

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							Qty	Type	Start	Compl	Qty	Type	Phase		
5c	USCAR 5.1.8	Visual Inspection	Inspect for defects	No defects	Tyco	PV	5	D	Feb. 2006					**Test Passed**	After applying 80N on the TPA small marks of effort are visible on the TPA, but full functionality is given on terminals and plastic parts (conn. & TPA)
USCAR CONNECTOR SYSTEM ELECTRICAL TESTS (test flow 5.9.6)															
6	***USCAR 5.4.6***	***Vibration/Mechanical Shock Engine Coupled Component profile***	***USCAR Test sequence M***												Performed on the 3way Connector mated to the parking Aid Sensor Valeo
6a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6b	USCAR 5.1.7	Connector Cycling	10 connector matings		Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6c	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6d	USCAR 5.4.6	Mechanical Shock	Per USCAR 5.1.9.4	No discontinuities	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6e	USCAR 5.4.6	Vibration Engine Coupled Component Profile	Per USCAR 5.1.9.4	No discontinuities	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6f	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6g	USCAR 5.3.2	Nominal Current Resistance (Voltage drop)	$R_T \leq 20m\Omega$	No failures	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	
6h	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	6	D	April / May 2007			6	E	**Test passed**	

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							Qty	Type	Start	Compl	Qty	Type	Phase		
USCAR CONNECTOR SYSTEM ELECTRICAL TESTS (SEVERE VIBRATION)															
7	***USCAR 5.8.2***	***Severe Vibration***												**NOT TESTED YET**	
7a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7b	USCAR 5.1.7	Connector Cycling	10 connector matings		Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7c	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7d	USCAR 5.8.2	Vibration sine & random profile with temperature cycling	Per USCAR 5.2.8.3	No discontinuities	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7e	USCAR 5.8.2	Condition samples for 48 hours @ ambient temperature	Per USCAR 5.2.8.3	No discontinuities	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7f	USCAR 5.3.1	Dry Circuit Resistance	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7g	USCAR 5.3.2	Nominal Current Resistance (Voltage drop)	$R_T \leq 20m\Omega$	No failures	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	
7h	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	15Aug07	7Sept07				**TBD**	

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USCAR CONNECTOR SYSTEM ENVIRONMENTAL TESTS (test flow 5.9.7)															
8	***USCAR 5.6.5 & 5.6.6***	***High Temperature Exposure Submersion and PV Leak***	***USCAR Test sequence T & U***											**Performed on the 3way Connector mated to the parking Aid Sensor Valeo**	**TO BE RETESTED ON THE 8WAY CONNECTOR WITH MOLDED INTERFACES / MALE CONNECTORS AS SOON THIS ARE AVAILABLE FOR THE SURROGATE RELEASE OF THE WHOLE FAMILY**
8a	USCAR 5.1.8	Visual Inspection	Inspect for defects.	No defects	Tyco	PV	10	D	Aug 2007		*6*	E		**Test passed**	
8b	USCAR 5.1.7	Connector Cycling			Tyco	PV	10	D	Aug. 2007		*6*	E		**Test passed**	
8c	USCAR 5.6.6	Pressure / Vacuum Leak	7 psig	No leakage	Tyco	PV	10	D	Aug 2007		*6*	E		**Test passed**	
8d	USCAR 5.6.3	High Temperature Exposure Class 3 (1008 hours @ 125°C)			Tyco	PV	10	D	Aug. 2007		*6*	E		**Test passed**	
8e	USCAR 5.6.6	Pressure / Vacuum Leak	4 psi	No leakage	Tyco	PV	10	D	Aug 2007		*6*	E		**Test passed**	
8f	USCAR 5.6.5	Submersion			Tyco	PV	10	D	Aug. 2007		*6*	E		**Test passed**	
8g	USCAR 5.1.8	Visual Inspection	Inspect for leakage	No leakage	Tyco	PV	10	D	Aug. 2007		*6*	E		**Test passed**	

GENERIC VALIDATION:

Vibration performance of the MCON Sealed Connector Family tested in accordance to the following application specific vibration profiles:

a) Vibration profile – Throttle sensor

Oscillation, sinusoidal

Severity :	s = 0,35mm,	f = 100 – 200Hz
	a = 24g,	f = 200 – 220Hz
	a = 16g	f = 230 – 350Hz
	a = 10g,	f = 400Hz
Duration :	**24 h per spatial axis**	

Wide-band random vibration

Severity :	20Hz,	0,15g²/Hz
	95Hz	0,2g²/Hz
	110Hz	0,0001g²/Hz
	380Hz	0,0001g²/Hz
	410Hz	0,2g²/Hz
	800Hz	0,1g²/Hz
	1600Hz	0,05g²/Hz
	g eff = 11,2 m/s²	
Duration	**24 h per spatial axis**	
Temperature cycling	**-40° /+105°C**	

b) Vibration profile - COMMON RAIL

Oscillation, sinusoidal

Severity :	**s = 0,35mm,**	**f = 70 – 147Hz**
	a = 30g,	**f = 147 – 1000Hz**
	a = 20g	**f = 1000 - 2000Hz**
Duration :	**100 h per spatial axis**	
Sweep rate:	**1 octave /min**	
Temperature cycling	**-40° /+105°C**	

c) Vibration profile – Component mounted on engine (to be started April 2007)

Oscillation, sinusoidal

Severity :	**100Hz**	**10,2 g**
	150Hz	**15,3 g**
	200Hz	**20,4 g**
	240Hz	**20,4 g**
	255Hz	**15,3 g**
	440Hz	**15,3 g**
Duration :	**8 h per spatial axis**	

Wide-band random vibration

Severity :	**10Hz,**	**0,104g²/Hz**
	100Hz	**0,104g²/Hz**
	300Hz	**0,005g²/Hz**
	500Hz	**0,208g²/Hz**
	2000Hz	**0,208g²/Hz**
	g eff = 18,41 m/s²	
Duration	**8h per spatial axis**	
Temperature cycling	**-40° /+105°C**	

Water tightness of the connectors validated in accordance to the "Working Committee – Test Guidelines for Motor Vehicle Connectors" PG 23 on aluminum header

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Generic environmental validation of the MCON 1,2mm Terminals in accordance to the Specification "Working Committee – Test Guidelines for Motor Vehicle Connector"