


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 10121 Accredited to ISO/IEC 17025:2017	Millbrook Proving Ground Ltd Issue No: 007 Issue date: 03 July 2020	
	Aston Way Leyland Preston Lancashire PR26 7TZ	Contact: Mr Alan Pennington Tel: +44 (0)1772 425483 Fax: +44 (0)1772 621466 E-Mail: alan.pennington@millbrook.co.uk Website: www.millbrook.co.uk

Testing performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address Aston Way Leyland Preston Lancashire PR26 7TZ Local contact Ms Stephanie Nixon Tel: +44 (0)1772 422911 Fax: +44 (0)1772 621466 Email: stephanie.nixon@millbrook.co.uk	Environmental Materials Vibration Seat Performance Vehicle Systems Durability	P (Permanent Laboratory)

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Vehicle proving grounds, and customer test track facilities	Vehicle Systems	S (Site Facilities)



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DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
AEROSPACE COMPONENTS, EQUIPMENT, MATERIALS AND STRUCTURES	<u>ENVIRONMENTAL TESTS</u> (non-explosive items)		
AGRICULTURAL EQUIPMENT	CLIMATIC Single Parameters		
COMPUTERS & PERIPHERALS	HIGH TEMPERATURE (Constant and cyclic) Max temp: + 120 °C Max chamber size: 3 m x 4 m x 6 m	BS EN 60068-2-2:2007 GM Specification GMW 14651 Clause 4.10 GM Specification GMW 14444 Clause 3.4.1	P
CONSTRUCTION PLANT AND EQUIPMENT	LOW TEMPERATURE (Constant and cyclic)	BS EN 60068-2-1:2007 GM Specification GMW14109 Excluding 4.6.2	P
ELECTRICAL CABLES	TEMPERATURE CHANGE (Thermal Shock) (Manual Transference Only)	BS EN 60068-2-14:2009	P
ELECTRICAL/ELECTRONIC PRODUCTS AND COMPONENTS	Max temp: + 120 °C Min temp: - 40 °C Max chamber size: 3 m x 4 m x 6 m		
ELECTRO-MECHANICAL DEVICES	High Humidity (Steady State)	BS EN 60068-2-78:2002 IEC 60068-2-78:2001	P
HYDRAULIC EQUIPMENT AND FITTINGS	Temp range: + 25 °C to + 55 °C Humidity range: 20 % to 98 % rh Max chamber size: 3 m x 4 m x 6 m		
INSTRUMENTS: INDICATING/RECORDING			
MARINE EQUIPMENT			
MINING PLANT AND EQUIPMENT			
MOTOR VEHICLES			
MOTORS: ELECTRICAL AND HYDRAULIC			
PLASTICS AND PRODUCTS			
PRINTED CIRCUIT BOARDS			
STRUCTURES, COMPONENTS AND FITTINGS			



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Continued from Page 2 TELECOMMUNICATION EQUIPMENT	<p><u>ENVIRONMENTAL TESTS</u> (non-explosive items) (cont'd)</p> <p>HIGH HUMIDITY (Cyclic)</p> <p>Temp range: + 25 °C to + 55 °C Humidity range: 20% to 98% rh Max chamber size: 3 m x 4 m x 6 m</p>	<p>BS EN 60068-2-30:2005 GM Specification GMW 14444 Clause 3.4.1</p> <p>Documented In-House Procedure SEA018</p> <p>BS EN 60529:1992 +A2:2013</p>	P
	<p><u>SAMPLE DEFORMATION</u></p> <p>GOM Tritop Photogrammetric evaluation</p>		P
	<p><u>INGRESS PROTECTION</u></p> <p>WATER</p> <p>IPX3 Protected against spraying water</p> <p>IPX4 Protected against splashing water</p> <p>IPX5 Protected against water jets</p> <p>IPX6 Protected against heavy seas</p> <p>IPX7 Protected against the effects of immersion</p> <p>IPX8 Protected against submersion</p>		P



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As listed on Pages 2 & 3 INTERNAL MATERIALS - AUTOMOTIVE, AEROSPACE, RAIL, MARINE, etc	<u>MATERIALS TESTING</u>		
	FLAMMABILITY <i>Polymeric Interior Materials Horizontal Test Method</i>	Documented In-House Procedure TC 1200 008 based on the following; SAE J 369:May 2003 Rev ISO 3795:1989 BS AU 169a:1992 GM Specification GMW 3232 FMVSS 302:1991 NES M0094:2018 GSO 98/1988 VW TL1010-2008 Chinese GB8410-2006 BMW Group Std GS97038: 2005-07 DIN 75200:1980 Volvo VCS 5031.19 iss 3	P
	CROCKING TESTING <i>Greyscale evaluation against either ISO105-A02 or AATCC scales</i>	Documented In-House Procedure TC1200-006 based on ISO 105 X12:2016	P
	SCRATCH RESISTANCE	Documented In-House Procedure TC1200-005 based on Ford FLTM BN108-13 <i>Visual Examination Only</i>	P
	TABER ABRASION	Documented In-House Procedure TC1200-003 based on Ford FLTM BN 108-02, ASTM D 4060-07 and SAE J948	P
	SCUFFING RESISTANCE	Documented In-House Procedure TC1200 004 based on Ford FLTM BN 108-04 SAE J365:2012	P
	PAINT ADHESION	Documented In-House Procedure TC 1200 007 based on Ford FLTM BI 106-01 <i>Excluding Method A</i>	P



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COATED PARTS, FASTENERS, BODY & WHITE SECTIONS	<u>MATERIALS TESTING</u> (cont'd) SALT SPRAY TESTING <i>Max chamber size: 1.0m x 1.0m x 2.0m</i> Temp Range : 25 °C to 45 °C	ASTM B117-16 DIN 50 021-S5:1988 ISO 9227:2012 TP JLR.52.252 Issue 01	P
TRIM SECTIONS	TENSILE TESTING 180° Peel Adhesion Strength Test <i>Tension loads up to 5kN</i>	Documented In-House Procedure TC 1200 002 based on Ford FLTM BN 151-05	P
BODYSHELLS CENTRE CONSOLES COMPUTERS & PERIPHERALS ELECTRICAL CABLES ELECTRICAL EQUIPMENT GEAR ASSEMBLIES PAS EQUIPMENT PLASTICS AND PRODUCTS PRINTED CIRCUIT BOARDS RESONATORS/EXPANSION TANKS ROOF CONSOLES ROOF LINERS SIGNALLING EQUIPMENT	<u>VIBRATION TESTS</u> (non-explosive items) DYNAMIC VIBRATION (electromagnetic) Sine, random, broadband random, swept sine, fixed sine dwell, sine-on-random, random-on-random - with slip table facility (a) Ambient Temperature Freq range: 3 to 3150 Hz Max peak thrust: 40 kN Max payload (vertical): 454 kg Max displacement: 38 mm pk-pk (b) High/Low Temperature (Standard Enclosure) Ranges as above,	DEF STAN 00-35, Chapter 2-01:1997 BS EN 60068-2-6:2008 BS EN 60068-2-64:2008 IEC 60068-2-64:1993 IEC 68-2-6:1995 RTCA DO 160E:8.0:2004 DEF STAN 08-123:2000 Data Sheet 25 (externally generated) DEF STAN 07-55:1983 Test A1 Test A2 MIL-STD 810F:2001 Method 514.5 Method 519.5	P



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<p>As listed on Page 6 +</p> <p>STEERING ASSEMBLIES</p> <p>SUB-SEA CONNECTORS</p> <p>TELECOMMUNICATION EQUIPMENT</p> <p>TURBOCHARGERS</p>	<p><u>VIBRATION TESTS</u> (non-explosive items) (cont'd)</p> <p>Max temp: + 120 °C Min temp: - 40 °C Chamber size: 0.8 m x 0.8 m x 0.8 m</p> <p>SHOCK</p> <p>Classical shock with half sine, initial and terminal peak sawtooth, trapezoidal, and rectangular pulse shape</p> <p>- Horizontal & Vertical half sine, sawtooth Max item mass: 454 kg</p> <p>Severity: 1 g to 40 g Duration: 1 ms to 70 ms (severity dependent)</p> <p>- ambient & with temperature (prefabricated enclosure) Max temp: + 120 °C Min temp: - 40 °C</p> <p>BUMP</p> <p>- ambient & with temperature (prefabricated enclosure)</p> <p>Max item mass: 454 kg Max temp: + 120 °C Min temp: - 40 °C</p>	<p>DEF STAN 00-35 Chapters 2-03, 2-06 and 2-07:1997 RTCA DO 160E:7.0:2004 BS EN 60068-2-27:2009 IEC 68-2-27:1987 DEF STAN 07-55:1983 Test A3 MIL-STD 810F:2001 Method 516.4 DEF STAN 08-123:2000 Data Sheet 28</p> <p>DEF STAN 00-35, Chapter 2-12:1997 BS EN 60068-2-29:2007 IEC 68-2-29:1987 DEF STAN 07-55:1983 Test A5</p>	<p>P</p> <p>P</p>



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SEATS AND THEIR COMPONENTS	<u>SEAT PERFORMANCE TESTS</u>		
	OCCUPANT INGRESS/EGRESS		
	Automated using purpose built robots	Ford SDS ST-0035	P
	PRESSURE MAPPING	Documented In-House Procedure TC 1000 002	P
	AIRBAG DEPLOYMENT		
	Temperature range: - 40 °C to + 125 °C	Ford AA-0001, 0002, 0013, 0015, and 0034	P
	PERFORMANCE CHECKS		
a) Manual Seats - Force (Operating Efforts) - Displacement - Free Play - Co-ordinates (H-Point) using FARO arm	Ford SDS Specs Nissan NDS Specs TP JLR Specs GM Specification GMW14109 Excluding 4.6.2	P	
b) Powered Seats - Current - Operating noise - Co-ordinates (H-Point) using FARO arm	Ford SDS ST-0010v6	P	
DURABILITY			
Manual & Powered Seats - Track - Height - Recline - Lumbar - Head-rest - Tilt	Ford SDS Specs	P	



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SEATS AND THEIR COMPONENTS (cont'd)	<p><u>SEAT PERFORMANCE TESTS</u> (cont'd)</p> <p>MECHANICAL FATIGUE</p> <p>Using purpose built reaction frames, with sinusoidal, random, synthesised, and road load data control inputs Max force: 200 kN Max frequency: 50 Hz</p> <p>(force/stiffness dependent)</p>	Ford SDS Specs Nissan NDS Specs	P
	<p>TRIM</p> <p>Seat system material wear</p>		
	<p>STRENGTH</p> <p>Static/low frequency (using purpose built reaction frames)</p> <p>Temperature range: - 40 °C to + 125 °C (using standard or prefabricated chambers) Max single force: 250 kN</p> <p>Properties measured: displacement, mechanical strain, acceleration, pressure, force</p>	Ford SDS Specs Nissan NDS Specs	P
	<p>HEATED SEAT DURABILITY AND PERFORMANCE CHECKS</p> <p>Temperature range: - 40 °C to + 125 °C (using standard chambers)</p>		



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SEATS AND THEIR COMPONENTS (cont'd)	<u>SEAT PERFORMANCE TESTS</u> (cont'd)		
	VIBRATION DURABILITY Using 5-axis shaker table Max payload: 500 kg	Ford SDS ST-0009	P
	VIBRATION TRANSMISSIBILITY Using purpose built rig	Ford SDS ST-0784	P
VEHICLES IN EEC & ECE CATEGORIES M1, M2, M3, N1, N2, N3, O1, O2, O3, O4	<u>VEHICLE SYSTEMS TESTS</u>		
	AUTOMOTIVE BRAKE DEVICES AND BRAKING SYSTEMS (Type approval testing) Utilising test track circuit and SAC dynamometer		S
	VEHICLES WITH AIRBRAKE SYSTEMS	FMVSS 121 (USA) (excluding FMVSS 121D) CMVSS 121 (Canada)	S
	LIGHT VEHICLE BRAKING SYSTEMS	FMVSS 135 (USA)	S
	REPLACEMENT BRAKE LINING ASSEMBLIES	ECE REGULATION 90 Annex 3 (M1, M2, N1 vehicles)	S
	STEERING EQUIPMENT PERFORMANCE (Motor Vehicles & Trailers)		S
MASSES AND DIMENSIONS	EEC DIRECTIVE - 97/27/EC as last amended by - 2001/85/EC	P, S	



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AEROSPACE COMPONENTS, EQUIPMENT, MATERIALS AND STRUCTURES AGRICULTURAL EQUIPMENT COATED PARTS, FASTENERS BODY IN WHITE SECTIONS CONSTRUCTION PLANT AND EQUIPMENT ELECTRICAL/ELECTRONIC PRODUCTS AND THEIR COMPONENTS INSTRUMENTS: INDICATING AND RECORDING MARINE EQUIPMENT MINING PLANT & EQUIPMENT MOTOR VEHICLES STRUCTURES, COMPONENTS & FITTINGS TRIM SECTIONS VEHICLES IN EEC & ECE CATEGORIES M1, M2, M3 N1, N2, N3 O1, O2, O3, O4	<p><u>DURABILITY TESTS</u></p> <p>STATIC TESTS</p> <p>Static/Low Frequency (Purpose Built Reaction frames) Ambient or high/low temperatures using either standard or pre-fabricated chambers Max specimen size: 20 m x 5 m x 5 m (L x W x H) Max Single Force: 250 kN (Hydraulic actuators) Max Temp: 120 °C Min Temp: - 40 °C</p> <p>Properties measured: Displacement, Mechanical Strain, Acceleration, Pressure, Force</p> <p>FATIGUE TESTS (MECHANICAL)</p> <p>Sinusoidal, Random, Synthesised and Road Load Data Purpose Built Reaction Frame Max specimen size: 20 m x 5 m x 5 m (L x W x H) Max Force: 200 kN Max Freq: 50 Hz (force/stiffness dependent)</p> <p>ENDURANCE TESTS (MECHANICAL)</p> <p>Purpose Built Rigs Utilising Pneumatic/Hydraulic/Electric Actuators Measurement of: Force (Static and Dynamic), Displacement, Strain, Frequency Cycles Completed, at Failure</p>	<p>Documented In-House Procedures (as agreed with customers)</p> <p>Documented In-House Procedures (as agreed with customers)</p> <p>Documented In-House Procedures (as agreed with customers)</p>	<p>P</p> <p>P</p> <p>P</p>



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As listed on Page 12	<p><u>DURABILITY TESTS</u> <u>(cont'd)</u></p> <p>DYNAMIC TESTS</p> <p>Vibration (Hydraulic) Sinusoidal, Random, Sine on Random, Road Load Data with Slip Table Facilities Using Standard and Pre-Fabricated Temperature Chambers as necessary Frequency Range: 1 to 350 Hz</p> <p>Maximum Peak Thrust: 250 kN Maximum Payload: 3500 kg Maximum Displacement: 250 mm (pk/pk) Temperature Range: - 40 °C to + 120 °C</p>	Documented In-House Procedures (as agreed with customers)	P
END			