Product Change Notification

TE Connectivity

Product Change Notification: P-22-022588 **PCN Date:** 29-APR-22

TE would like to inform you of the following change(s) to the listed TE Connectivity Product. In case of any further questions about this change(s), please contact your TE Connectivity Sales Engineer. Affected part, drawing and/or specification numbers are listed on the attached sheet(s).

General Product Description:
DMC-M modules gluing process change

Description of Changes
Use of one glue to assemble hard thermoplastics and elastomeric components on the DMC-M modules and EN4165 version, instead of two presently (one for the thermoplastic to thermoplastic assembly, one for the elastomer to thermoplastic assembly). Change analyzed through the DDP 732-412, and validated by QTR (PVE732-198VA) For EN4165, the change has been submitted to the qualifying authority (ASD-CERT). The change has been approved by the authority. **Other attachments:** DMC-M gluing process change DMC-M gluing process change - Test report

Reason for Changes:	
Product improvement.TE Evreux has highlighted an opportunity to improve its DMC-M module assembly process (gluing) by replacing the two elastomeric glues presently used by a single epoxy glue. This change reduces the numbers of steps in the process and will help to reduce the lead time.	
Estimated Dates:	
Last Order Date (Obsolete Parts Only):	**First Date To Ship** (Changed Parts Only):
	30-JUN-2022
Last Ship Date (Obsolete Parts Only):	**Last Date for Mixed Shipments:** (Changed Parts Only):
	30-APR-2023

Part Number(s) being Modified:

Part Number	Part Discontinued per PCN	Customer Drawing	Customer Part Number	Alias Part Number(s)	Substitute Part Number	Substitute Alias Part Number(s)	Description Of Difference
ZPF0000000000015275	NO			"DMC-M 12-20 SN"			
ZPF0000000000015291	NO			"DMC-M 20-22 AN", "BACI10BC2022PNB"			
ZPF0000000000015318	NO			"DMC-M 20-22 SN"			
ZPF0000000000099564	NO			"732-8254-99"			
ZPF0000000000099565	NO			"732-8256-99"			
ZPF0000000000100306	NO			"732-8256-22"			
ZPF0000000000110281	NO			"732-8255-22"			
ZPF0000000000110283	NO			"732-8255-12"			
ZPF0000000000202708	NO			"DMC-MR 30-23 PN"			

Part Number(s) being Modified:

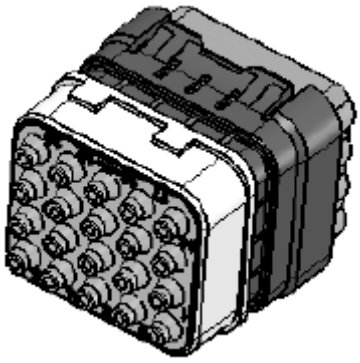
Part Number	Part Discontinued per PCN	Customer Drawing	Customer Part Number	Alias Part Number(s)	Substitute Part Number	Substitute Alias Part Number(s)	Description Of Difference
ZPF0000000000015275	NO			"DMC-M 12-20 SN"			
ZPF0000000000015291	NO			"DMC-M 20-22 AN", "BACI10BC2022PNB"			
ZPF0000000000015318	NO			"DMC-M 20-22 SN"			
ZPF0000000000099564	NO			"732-8254-99"			
ZPF0000000000099565	NO			"732-8256-99"			
ZPF0000000000100306	NO			"732-8256-22"			

Part Number	Part Discontinued per PCN	Customer Drawing	Customer Part Number	Alias Part Number(s)	Substitute Part Number	Substitute Alias Part Number(s)	Description Of Difference
ZPF0000000000110281	NO			"732-8255-22"			
ZPF0000000000110283	NO			"732-8255-12"			
ZPF0000000000202708	NO			"DMC-MR 30-23 PN"			

DECLARATION DESIGN PERFORMANCES

DDP 732-412

EN 4165 modules
Gluing process change



ENGINEERING DEPARTMENT	DECLARATION OF DESIGN AND PERFORMANCES	DDP 732-412
		Indice/*Issue* : a Date : 10/03/21 Page: 2/13

Objet / *Subject* :

modules EN 4165
Gluing process change

Auteur / *Author* : A. TRUQUIN — Date de création / *Date of creation* : 10/03/21

Approbations / *Approvals* (Dernier indice / *Last issue*)

Fonction / *Position*	Nom / *Name*	Date	Visa / *Signature*
Mgr Product Engineering	V. PELLEGRINI	26/04/2021	
Sr Qlty & Reliability Engineer	C. LOBERT	11/03/2021	

Evolutions / *Revisions*

Indice/ *Issue*	Nature des évolutions / *Description of evolution*	Page	Date	Auteur / *Author*
Ø	Creation of document	all	10/03/21	A.TRUQUIN

CONTENTS

1 GENERAL INFORMATION

1.1 Manufacturer :

Name : Connecteurs Electriques DEUTSCH
Address : 17, rue Lavoisier – Zone Industrielle n° 2
27000 Evreux

1.2 Equipment :

Connector Electrical, rectangular modular

1.3 Standard :

European Standard EN 4165-001 (Sep. 2007)
EN 4165-002 (Sep. 2007)
EN 4165-003 (Jul. 2006)
EN 2591

2 COMPLIANCE MATRIX

2.1 Introduction

TE Evreux has highlighted an opportunity to improve its EN 4165 module assembly process (gluing) , replacing the two elastomeric glues presently used by a single epoxy glue , and reducing the numbers of steps in the process as described below. Evolution will help to reduce the lead time .

2.2 Present and proposed configurations

Present		**Proposed**
contact latching control	→	contact latching control
thightness test		thightness test
curing		curing
elastomer gluing		hard to hard insert and elastomer gluing
curing		plasma
hard to hard insert gluing		
plasma		
degreasing		

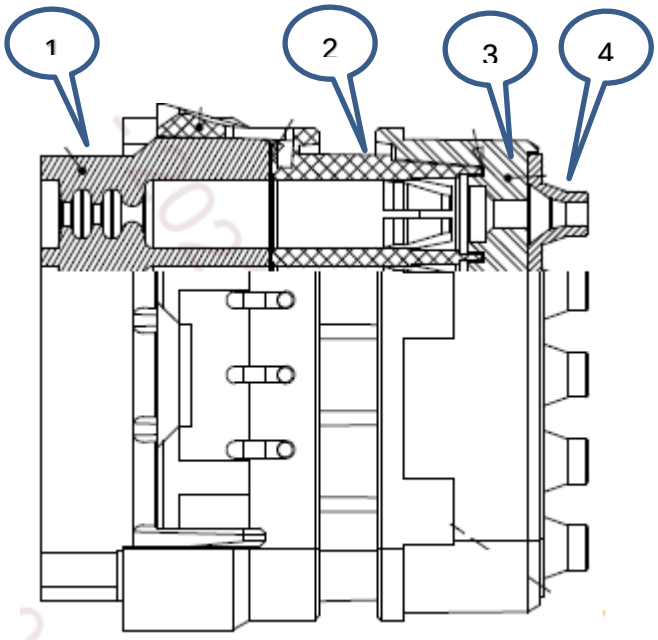
Materials (glues)

	present	proposed
Thermoplastic to thermoplastic gluing	Sylgard 567	Structalit 8801
Thermoplastic to elastomer gluing	Sylgard 577	Structalit 8801

Structalit ® 8801 is a universal one-component epoxy adhesive which can also be used as a potting compound.

Note: SYLGARD 567 and 577 are silicone rubber compound

Description (here for a male insert S/A)



	designation
4	Elastomer Interfacial seal
3	Thermoplastic central male insert
2	Thermoplastic retaining insert
1	elastomer grommet

2.3 Requirements according to EN 4165-001

EN 2591-	DESIGNATION	DETAILS	Impact (YN)	Comment
101	Visual examination	Initial examination: examination of connectors, housing, module loose parts (contacts, etc.) Details to be examined: -identification; -appearance; -marking; -surface finish. Final examination: no loosening of parts, crack, excessive wear or detached part shall be observed.	Y	External appearance , markings , surface finish are unchanged . Focus will be made on the fact that parts don't get loose.
102	Examination of dimensions and mass	According to product specification.	N	Dimensions and mass are unchanged (glue layers thickness is unchanged)
206	Measurement of insulation resistance	Method A – Minimum insulation resistance: - at ambient temperature: 5000MΩ (unmated connectors) - at maximum operating temperature: 1000 MΩ (unmated connectors) - after tests EN 2591-314 : 1000 MΩ (mated connectors) - during tests EN 2591-206 and 305: 1000 MΩ (mated connectors)	Y	

<table>
<tr><th>EN 2591-</th><th>DESIGNATION</th><th>DETAILS</th><th>Impact (YN)</th><th>Comment</th></tr>
<tr><td>207</td><td>Voltage proof test</td><td>Method A, connectors mated and unmated except after test EN2591-314, where they shall be mated. For tests at low pressure, voltage is applied after 30 min at the pressure indicated. Voltage value: If connectors are not mated, follow EN3197
<table>
<tr><td>Max. Leakage current</td><td>Pressure</td><td>Mated (V r.m.s)</td><td>Unmated (V r.m.s)</td></tr>
<tr><td rowspan="4">2mA</td><td>Sea level</td><td>(size 22) 1300
(other) 1500</td><td>(size 22) 1300
(other) 1500</td></tr>
<tr><td>12,1 kPa</td><td>1000</td><td>600</td></tr>
<tr><td>4,7 kPa</td><td>1000</td><td>400</td></tr>
<tr><td>1,1 kPa</td><td>1000</td><td>200</td></tr>
</table></td><td>Y</td><td></td></tr>
<tr><td>301</td><td>Endurance at temperature</td><td>Method B,(no current) / Temperature: 175°C
Duration: 1000 h</td><td>N</td><td>Only pertinent final measures is insulation resistance at high T°. Done during test as per EN 2591-302</td></tr>
<tr><td>302</td><td>Climatic sequence</td><td>Applicable. Connectors mated
Minimum temperature: (-55 ± 2)°C
Maximum temperature: (175 ± 2)°C</td><td>Y</td><td></td></tr>
<tr><td>303</td><td>Cold/low pressure and damp heat</td><td>Connectors mated
Five cycles. Minimum temperature: (-55 ± 2)°C</td><td>Y</td><td></td></tr>
<tr><td>305</td><td>Rapid change of temperature</td><td>Connectors mated
TA = (175 +50)°C / TB = (-65 0-5)°C</td><td>Y</td><td></td></tr>
</table>

EN 2591-	DESIGNATION	DETAILS	Impact (YN)	Comment
306	Mould growth	Method A Duration: 28 d Growth 0 No prior washing No surface etching	N	Materials are unchanged Glued surface are not accessible to moisture
308	Sand and dust	The mated connectors shall be arranged so that their longitudinal axis is parallel to the wind direction, with the rear of the plug facing into the wind. Wind velocity in the duct: (3.5 ± 0.5) m/s. Number of cycle: one.	N	Materials unchanged
312	Air leakage	Applicable – only peripheral sealing module	N	peripheral sealing done by an O 'ring on the retaining insert (not changed)
314	Immersion at low air pressure	Applicable - 1,1 kPa (30000 m)	Y	
315	Fluid resistance	For types of fluids, number of cycles, temperature and duration of immersion and temperature for the third phase: see table 18 of EN 4165-001.	Y	Materials unchanged . Purpose here is to check if glue dissolves in the fluid , compromising the links between all insert components .
317	Flammability	Test applicable. Connectors mated. Method A	Y	Elastomeric and thermoplastics of the modules are unchanged. Purpose here is to check if the glue layers do not affect the characteristics.
324	Interfacial sealing	Applicable – Pressure 1,1 kPa	N	Profiles of interfacial seals (male and female) unchanged

EN 2591-	DESIGNATION	DETAILS	Impact (YN)	Comment
402	Shock	Method A Receptacle is front mounted on panel with screw (coupling torque: 0.15/0.20 daN). For rack and panel version the spring compression value shall be 1 mm. Severity 100 Number of shocks: one each way for each of the three directions (i.e. six shocks in total) final measurements: EN2591-101, EN2591-408.	N	Inserts mounted in the shell , connectors couples. The glue layers bear no elongation stress
403	Sinusoidal and random vibration	Same mounting configuration as EN2591-402 Connectors mated Method A Frequency range: 5 Hz to 3000 Hz. Acceleration: 20g 1 octave per minute; Duration: 4 h/axe Final measurements: EN2591-101 (ambient temperature), EN2591-205, EN2591-408. Method B Figure 2 and table 1 (see EN4165-001), level E. Duration: 1 h/axe Final measurement : EN2591-101 (ambient T°), EN2591-205, EN2591-408.	N	Inserts mounted in the shell , connectors coupled. The glue layers bear no elongation stress
407	Durability of contact retention system and seals	Applicable	N	Only matters here the contact retaining clip in the retainer insert , and the profile of the cavity of the grommet , unchanged .

<table>
<tr><th>EN 2591-</th><th>DESIGNATION</th><th>DETAILS</th><th>Impact (YN)</th><th>Comment</th></tr>
<tr><td>409</td><td>Contact retention in insert</td><td>Preload: 1daN
<table><tr><th>Contact size</th><th>Axial load daN</th><th>Tested contact</th></tr><tr><td>22</td><td>4,5</td><td>50%</td></tr><tr><td>20</td><td>9</td><td>50%</td></tr><tr><td>16</td><td>11</td><td>50%</td></tr><tr><td>12</td><td>13</td><td>100%</td></tr><tr><td>8</td><td>15,6</td><td>100%</td></tr></table>Displacement < 0,3mm during and after application of the load</td><td>N</td><td>Design of retaining insert unchanged</td></tr>
<tr><td>410</td><td>Insert retention in housing (axial)</td><td>Connector not fitted with contacts.
Mechanical pressure applied: 25,4daN on the front face of the module
Displacement < 0,2mm during and after application of the load</td><td>N</td><td>Design of retaining insert unchanged</td></tr>
<tr><td>412</td><td>Contact insertion and extraction forces</td><td><table><tr><th rowspan="2">Contact size</th><th colspan="2">Maximum force N</th><th rowspan="2">Number of tested contacts</th></tr><tr><th>Insertion</th><th>Extraction</th></tr><tr><td>22</td><td>44</td><td>44</td><td>50%</td></tr><tr><td>20</td><td>89</td><td>89</td><td>50%</td></tr><tr><td>16</td><td>89</td><td>89</td><td>50%</td></tr><tr><td>12</td><td>133</td><td>133</td><td>100%</td></tr><tr><td>8</td><td>156</td><td>156</td><td>100%</td></tr></table></td><td>N</td><td>Only matters here the contact retaining clip in the retainer insert , and the profile of the cavity of the grommet , unchanged here</td></tr>
</table>

ENGINEERING DEPARTMENT	DECLARATION OF DESIGN AND PERFORMANCES	DDP 732-412 Indice/*Issue* : a Date : 08/03/21 Page: 11/13

EN 2591-	DESIGNATION	DETAILS	Impact (YN)	Comment
419	Stability of male contacts in insert	Gauges for test : see figure 26 and table16 (see EN4165-001) Contact size / Permitted deflection / Force daN 22 / 0,76 / 1,2 20 / 1,37 / 2,4 16 / 1,91 / 4,9 12 / 1,91 / 4,9 8 / 2,54 / 9,7	N	Design of front male insert not changed
506	Use of tools	Force to be applied on tool: 1,3daN	N	Glue layers have no impact . on the testing conditions

2.4 Conclusion

The following tests have to be performed in order to assess compliance of the proposed evolution with the EN 4165 requirements .

<table>
<tr><th>EN 2591-</th><th>DESIGNATION</th><th>DETAILS</th></tr>
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<tr><td>206</td><td>Measurement of insulation resistance</td><td>Method A – Minimum insulation resistance:
- at ambient temperature: 5000MΩ (unmated connectors)
- at maximum operating temperature: 1000 MΩ (unmated connectors)
- after tests EN 2591-314 : 1000 MΩ (mated connectors)
- during tests EN 2591- 305: 1000 MΩ (mated connectors)</td></tr>
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<tr><th>Max. Leakage current</th><th>Pressure</th><th>Mated (V r.m.s)</th><th>Unmated (V r.m.s)</th></tr>
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</table></td></tr>
</table>

EN 2591-	DESIGNATION	DETAILS
302	Climatic sequence	Applicable. Connectors mated Minimum temperature: (-55 ± 2)°C Maximum temperature: (175 ± 2)°C
303	Cold/low pressure and damp heat	Connectors mated Five cycles. Minimum temperature: (-55 ± 2)°C
305	Rapid change of temperature	Connectors mated TA = (175 +50)°C / TB = (-65 0-5)°C
314	Immersion at low air pressure	Applicable - 1,1 kPa (30000 m)
315	Fluid resistance	For types of fluids, number of cycles, temperature and duration of immersion and temperature for the third phase: see table 18 of EN 4165-001.
317	Flammability	Test applicable. Connectors mated. Method A

QUALIFICATION TEST REPORT

PVE 732-198 VA

NEW BONDING PROCESS FOR DMC-M

Objet /*Subject* :

NEW BONDING PROCESS FOR DMC-M

QUALIFICATION

Auteur/*Author* : C. PIRIOU — Date création/Date of creation : 05/05/2021

Approbations / *Approvals* (dernier indice)

Fonction	Nom	Date	Visa
Supv R&D/Product Dvl Engineering	J. ROMANILLOS	18/05/2021	JR
Mgr Product Engineering	V. PELLEGRINI	18/05/2021	T. CESAR
Mgr Manufacturing Engineering	C. LAMY	18/05/2021	
Sr Qlty & Reliability Engineer	C. LOBERT	18/05/2021	A.TOUZAIN

Evolutions / *Revisions*

Indice/ *Issue*	Nature des évolutions / *Description of evolution*	Page	Date	Auteur / *Author*
a	Creation du document		05/05/2021	C.PIRIOU

SUMMARY

1. SCOPE OF THE TEST

This document defines, directs and reports the results of the tests performed for the qualification of the new bonding process for DMC-M products, according to TR4633:09-2007 Table 3 and DDP 732-412.

The **current bonding process** is divided into two parts : the thermoplastic to thermoplastic and the thermoplastic to elastomer bondings.

- Thermoplastic to thermoplastic bonding process : components (both thermoplastics parts) are first submitted to a cleaning and exposed to a plasma in order to prepare the surfaces. Then, the standard adhesive is dispensed by a time/pressure system with a syringe put in a robot. The thermoplastic to thermoplastic assembly is carried out manually, a pressure is applied to spread the adhesive and the subset is finally put in an oven for adhesive curing.

- Thermoplastic to elastomer bonding process : components are first submitted to a cleaning (elastomers only) and exposed to a plasma (elastomers and the thermoplastic/thermoplastic subset) in order to prepare the surfaces. Then, the standard adhesive (different from the adhesive used for the thermoplastic to thermoplastic bonding) is spread in a glass plate and elastomers are placed onto in order to dispense adhesive on the glued surfaces. The thermoplastic to elastomer assembly is carried out manually, a pressure is applied to spread the adhesive and the subset is finally put in an oven for adhesive curing.

All the steps of the **new bonding process** is carried consecutively.

- All components (elastomers and thermoplastics) are first exposed to a plasma in order to prepare the surfaces. Then, the new adhesive is dispensed on the receiving surfaces of both thermoplastics and elastomers with a jetting valve system put in a robot. All components are then assembled and a quick pressure is applied to spread the adhesive. Finally, the assembled parts are put in an oven for adhesive curing.

  It has to be noted that, contrary to the standard process which uses two different adhesives for thermoplastic/thermoplastic and thermoplastic/elastomer bondings, the new process uses a single new adhesive of both bonding types.

The qualification is only focused on the new bonding process.

2. REFERENCE DOCUMENTS

- EN 4165-001 (Oct. 2015) : Connectors, electrical, rectangular, modular, operating temperatures 175°C continuous – Part 001 : Technical specification.
- EN 2591-101 (Aug. 1994) : Visual examination
- EN 2591-314 (Oct. 1997) : Immersion at low air pressure
- EN 2591-206 (Feb. 1996) : Measurement of insulation resistance
- EN 2591-207 (Feb. 1996) : Voltage proof test
- EN 2591-305 (Oct. 1997) : Rapid change of temperature
- EN 2591-302 (Oct. 1997) : Climatic sequence
- EN 2591-303 (Oct. 1997) : Cold/low pressure and damp heat
- EN 2591-315 (Jun. 1998) : Fluid resistance
- DDP 732-412 (April 2021) : Declaration of design performances
- TR 4633:09-2007 (Table 3) : ASD Technical Report

3. GENERAL CONDITIONS

Unless otherwise specified, tests shall be conducted in laboratory under the following ambient conditions :

- temperature : 23°C ± 5°C
- relative humidity : 45 to 75%
- air pressure : 860 to 1,060 mbar

4. SAMPLES UNDER TEST

4.1. Distribution of samples

Modules shall be distributed in groups:

Description		TE Reference	Code date	Groups			
				1	2	3	4
RECEPTACLE		DMC-M 24N	21-07	2	2	11	1
PLUG		DMC- 20 N	20-31	2	2	11	1
MODULE	Socket	DMC-M 20-22	N/A (Prototype)	2	2	11	1
	Pin	DMC-M 20-22	N/A (Prototype)	2	2	11	1
CONTACT	Socket	38946-22L	02/21	40	40	220	20
	Pin	38941-22L	12/20	40	40	220	20

4.2. Wiring of module

	Group 1			
Insert	DMC-M 20-22 Socket		DMC-M 20-22 Pin	
Cavity N°	1 to 20 (50% of each)		1 to 20 (50% of each)	
Contact Reference	38946-22L		38941-22L	
Wire reference	KZ 05-06	KZ 04-04	KZ 05-06	KZ 04-04
Wire length (mm)	300	300	500	500
Crimping tool	M22520/2-01			
Pilot stop	M22520/2-06		M22520/2-09	
Selector	4	2	4	2
Insertion/extraction tool	M81969/14-01			
	Group 2			
Insert	DMC-M 20-22 Socket		DMC-M 20-22 Pin	
Cavity N°	1 to 20		1 to 20	
Contact Reference	38946-22L		38941-22L	
Wire reference	KZ 05-06		KZ 05-06	
Wire length (mm)	500		500	
Crimping tool	M22520/2-01			
Pilot stop	M22520/2-06		M22520/2-09	
Selector	4		4	
Insertion/extraction tool	M81969/14-01			
	Group 3			
Insert	DMC-M 20-22 Socket		DMC-M 20-22 Pin	
Cavity N°	1 to 20		1 to 20	
Contact Reference	38946-22L		38941-22L	
Wire reference	KZ 05-06		KZ 05-06	
Wire length (mm)	200		200	
Crimping tool	M22520/2-01			
Pilot stop	M22520/2-06		M22520/2-09	
Selector	4		4	
Insertion/extraction tool	M81969/14-01			
	Group 4			
Insert	DMC-M 20-22 Socket		DMC-M 20-22 Pin	
Cavity N°	1 to 20		1 to 20	
Contact Reference	38946-22L		38941-22L	
Wire reference	KZ 05-06		KZ 05-06	
Wire length (mm)	300		300	
Crimping tool	M22520/2-01			
Pilot stop	M22520/2-06		M22520/2-06	
Selector	4		4	
Insertion/extraction tool	M81969/14-01			

5. TESTS SEQUENCE

The test sequence is issued from TR4633:09-2007 (Table 3) and DDP 732-412.

GROUP 1

EN 2591	Test description	Data sheet	Page	Appendix
101	Visual examination	1	9	1
314	Immersion at low air pressure	2	10-11	2
206	Measurement of insulation resistance	3	12	3
207	Voltage proof test	4	13	4
101	Visual examination	5	14	5

GROUP 2

EN 2591	Test description	Data sheet	Page	Appendix
101	Visual examination	6	15	6
305	Rapid change of temperature	7	16	N/A
302	Climatic sequence	8	17-18	N/A
303	Cold/low pressure and damp heat	9	19-20	N/A
206	Measurement of insulation resistance	10	21	7
207	Voltage proof test	11	22	8
101	Visual examination	12	23	9

GROUP 3

EN 2591	Test description	Data sheet	Page	Appendix
101	Visual examination	13	24	N/A
315	Fluid resistance	14	25-26	N/A
206	Measurement of insulation resistance	15	27	10
207	Voltage proof test	16	28	11
101	Visual examination	17	29	12

GROUP 4

EN 2591	Test description	Data sheet	Page	Appendix
317	Flammability	18	31	13

6. RESULTS

All results are noted in data sheets nr 1 to 18 and in appendices 1 to 13.

7. CONCLUSION

DMC-M 20-22 modules did pass successfully all tests defined in paragraph 5 – Tests sequence and do meet the requirements of EN4165-001 standard.

8. APPENDICES

- Appendix 1 : Visual examination EN2591-101 (Group 1, Data sheet nr 1)
- Appendix 2 : Immersion at low air pressure EN2591-314 (Group 1, Data sheet nr 2)
- Appendix 3 : Insulation resistance EN2591-206 (Group 1, Data sheet nr 3)
- Appendix 4 : Voltage proof test EN2591-207 (Group 1, Data sheet nr 4)
- Appendix 5 : Visual examination EN2591-101 (Group 1, Data sheet nr 5)
- Appendix 6 : Visual examination EN2591-101 (Group 2, Data sheet nr 6)
- Appendix 7 : Insulation resistance EN2591-206 (Group 2, Data sheet nr 10)
- Appendix 8 : Voltage proof test EN2591-207 (Group 2, Data sheet nr 11)
- Appendix 9 : Visual examination EN2591-101 (Group 2, Data sheet nr 12)
- Appendix 10 : Insulation resistance EN2591-206 (Group 3, Data sheet nr 15)
- Appendix 11 : Voltage proof test EN2591-207 (Group 3, Data sheet nr 16)
- Appendix 12 : Visual examination EN2591-101 (Group 3, Data sheet nr 17)
- Appendix 13 : Flammability EN2591-317 (Group 4, Data sheet nr 18)

DATA SHEET NR 1

VISUAL EXAMINATION	Group 1

Date : 17/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-101

Test equipment : **Last (next) cal dates :**

Binocular OLYMPUS SZ61 N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

At the end of the test, results are conformable.

Appendix 1 presents pictures of samples.

DATA SHEET NR 2

IMMERSION AT LOW AIR PRESSURE — Group 1

Date : 22/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-314

Test equipment : **Last (next) cal dates :**

Vacuum pump ALCATEL	N/A
Chamber nr 9003 0000 00 001	N/A
Vacuum sensor LEYBOLD nr 7250 0003 00 001	(production licence n°018-21 : 10/21)
Clock nr 7540 0001 04 009	11/20 (11/21)

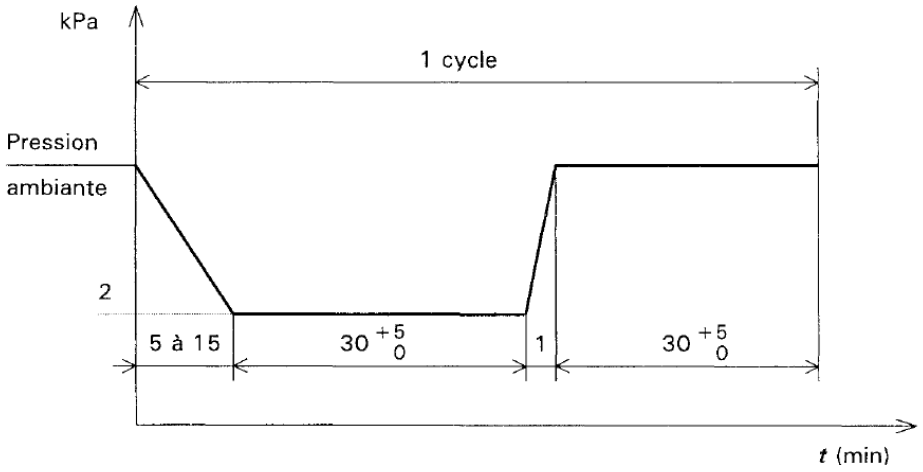
Procedure :

Mated connectors are immersed in the salt solution. The chamber pressure is reduced from ambient to 11 mbars (30,000 meters) in 15 min and maintained for 30 min.

The chamber pressure is then increased to room ambient in 1 min and is maintained at room pressure for 30 min. The foregoing constitutes one cycle.

The specimen is submitted to three cycles in total.

After the third cycle, the insulation resistance and dielectric withstanding voltage tests are performed while the specimen remains in the salt solution.



Requirements :

Requirements are those of insulation resistance test and dielectric withstanding voltage test.
See data sheets hereafter.

A visual examination is performed after insulation resistance test and dielectric withstanding voltage test to see salt water ingress.

Results :

Pictures of the test are shown in Appendix 2.

DATA SHEET NR 3

MEASUREMENT OF INSULATION RESISTANCE — Group 1

Date : 22/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-206

Test equipment : **Last (next) cal dates :**

Megohmmeter SEFELEC DXS56 nr 7301 0016 01 002	11/20 (11/21)
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are mated in water at ambient temperature and pressure.
A 500 V_{dc} voltage is applied between each contact in turn and all others connected together and to the shell for 1 minute maximum.

Requirements :

Insulation resistance shall not be lower than 1,000 MΩ.

Results :

The two non-compliant cavities have been analysed and root causes have been explained.

The new bonding process is not questioned in this test.

At the end of the test, results are conformable.

Results are presented in Appendix 3.

DATA SHEET NR 4

VOLTAGE PROOF TEST	Group 1

Date : 22/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-207

Test equipment : **Last (next) cal dates :**

Dielectrimeter SEFELEC DXS56 nr 7301 0016 01 002	11/20 (11/21)
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are mated under water at ambiant temperature and pressure.
A 1,300 V_{ac} voltage is applied between each contact in turn and all others connected together and to the shell for 5 seconds minimum.
Leakage current is monitored.

Requirements :

There shall be no flashover nor electrical breakdown.

Leakage current shall be lower than 2 mA.

Results :

The two non-compliant cavities have been analysed and root causes have been explained.

The new bonding process is not questioned in this test.

At the end of the test, results are conformable.

Results are presented in Appendix 4.

DATA SHEET NR 5

VISUAL EXAMINATION	Group 1

Date : 23/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-101

Test equipment : **Last (next) cal dates :**

Binocular OLYMPUS SZ61 N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

The two non-compliant cavities have been analysed and root causes have been explained.

The new bonding process is not questioned in this test.

At the end of the test, results are conformable.

Appendix 5 shows pictures of samples after the immersion at low air pressure test.

DATA SHEET NR 6

VISUAL EXAMINATION	Group 2

Date : 10/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-101

Test equipment : **Last (next) cal dates :**

Binocular OLYMPUS SZ61 N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

At the end of the test, results are conformable.

Pictures of samples are presented in Appendix 6.

DATA SHEET NR 7

RAPID CHANGE OF TEMPERATURE	**Group 2**

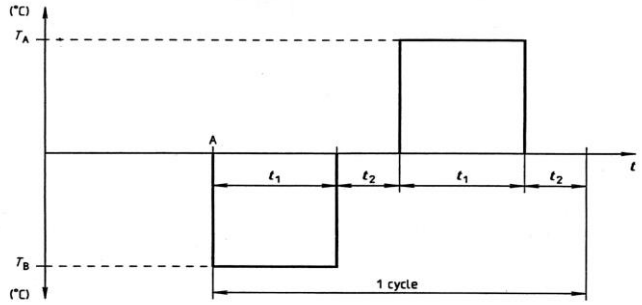
Date : 15/03/2021	**Tested by : J. LEMERCIER C.PIRIOU**	**Reference : EN2591-305**

Test equipment : **Last (next) cal dates :**

Climatic chamber CLIMATS nr 7601 0021 00 003 09/20 (09/21)

Procedure :

Mated connectors shall perform 10 times the following cycle :



T_A = +175 °C
T_B = -55 °C
t_1 = 30 min

Transfer of connectors between the chambers is performed within 1 minute (t_2).

Requirements :

After test completion, connectors shall be subjected to the following tests :

- Climatic sequence
- Cold/low pressure and damp heat
- Insulation resistance
- Voltage proof test
- Visual examination

Results :

At the end of the test, results are conformable.

DATA SHEET NR 8

CLIMATIC SEQUENCE	**Group 2**

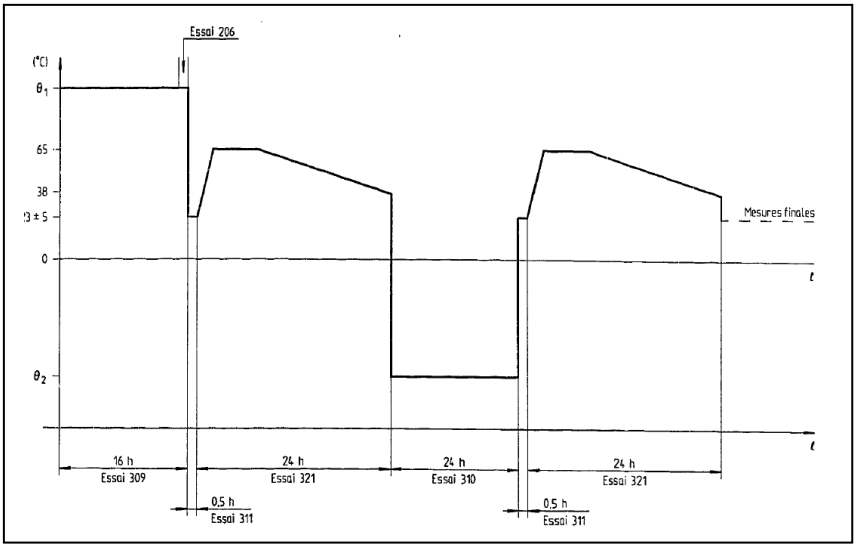
Date : From 29/03 to 03/04/2021	**Tested by : J. LEMERCIER C.PIRIOU**	**Reference : EN2591-302**

Test equipment : **Last (next) cal dates :**

Hot chamber CLIMATS nr 7601 0023 00 001	01/21 (01/22)
Dielectrimeter SEFELEC DXS56 nr 7301 0016 01 002	11/20 (11/21)
Climatic chamber CLIMATS nr 7601 0021 00 001	10/20 (10/21)
Vacuum pump ALCATEL	N/A
Chamber nr 9000 0000 00 002	N/A
Vacuum sensor LEYBOLD nr 7250 0003 00 001	(production licence n°018-21 : 10/21)
Clock nr 7540 0001 04 006	11/20 (11/21)

Procedure :

Step 1 : First, samples are exposed to a dry heat of 175 °C for 16 h, according to EN2591-309. During the last hour, insulation resistance is measured according to EN2591-206. Samples are then brought back to ambient conditions.
Step 2 : Samples are submitted to a 11 mbars pressure for 30 minutes.
Step 3 : Samples are submitted to 1 cycle of damp heat, according to EN2591-321, then immediately they are exposed to a -55 °C temperature for 24 h. Samples are then brought back to ambient conditions.
Step 4 : Samples are submitted to a 11 mbars pressure for 30 minutes again.
Step 5 : Samples are submitted to 1 cycle of damp heat, according to EN2591-321.
Step 6 : Samples are then brought back to ambient conditions.



Requirements :

Insulation resistance shall be greater than 1,000 MΩ.

Results :

At the end of the test, results are conformable.

DATA SHEET NR 9

COLD/LOW PRESSURE AND DAMP HEAT — Group 2

Date : From 07/04 to 28/04/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-303

Test equipment : **Last (next) cal dates :**

Climatic chamber CLIMATS nr 7601 0021 00 001	10/20 (10/21)
Dielectrimeter SEFELEC nr 7301 0016 01 001	02/21 (02/22)

Procedure :

Samples are submitted to the following graph (method A) :

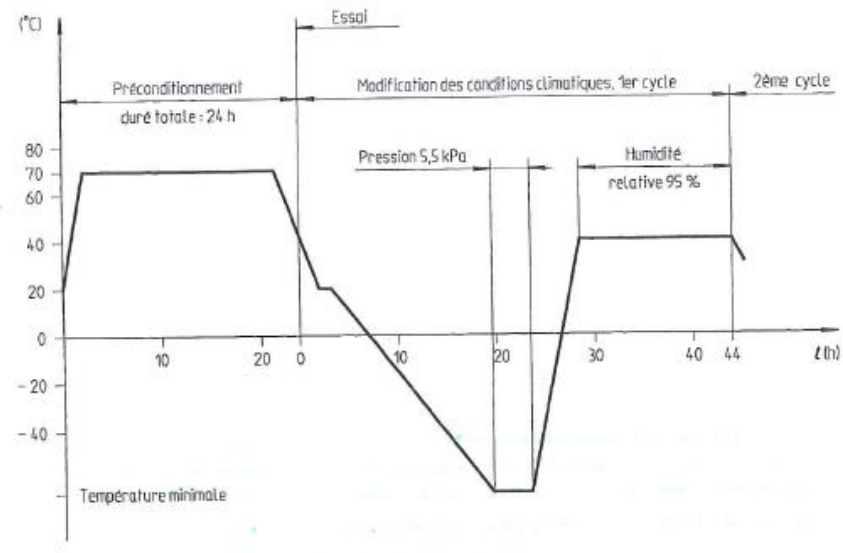


Figure 1 - Séquence d'essais

5 cycles are performed with minimum temperature equal to -55 °C.

For this test and for each sample, wiring is done as the way that there are 2 groups of shunts and during the test, a 300 V_{dc} voltage is applied between the two circuits and the leakage current is monitored.

Requirements :

There shall be no leakage current in excess of 2 mA between the two circuits.

During the last hour of the last cycle, insulation resistance shall me measured and shall be greater than 100 MΩ.

Results :

At the end of the test, results are conformable.

Minimum insulation resistance measured is greater than 1,000 MΩ.

DATA SHEET NR 10

MEASUREMENT OF INSULATION RESISTANCE — Group 2

Date : 03/05/2021	**Tested by : J. LEMERCIER A-C. BOUCHAIN**	**Reference : EN2591-206**

Test equipment : **Last (next) cal dates :**

Megohmmeter SEFELEC DXS56 nr 7301 0016 01 002	11/21
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are mated at ambient temperature and pressure.
A 500 V_{dc} voltage is applied between each contact in turn and all others connected together and to the shell for 1 minute maximum.

Requirements :

Insulation resistance shall not be lower than 1,000 MΩ.

Results :

At the end of the test, results are conformable.

Minimum insulation resistance measured is greater than 300 GΩ.

Results are exposed in Appendix 7.

DATA SHEET NR 11

VOLTAGE PROOF TEST — Group 2

Date : 03/05/21 – 04/05/21	Tested by : J. LEMERCIER A-C. BOUCHAIN	Reference : EN2591-207

Test equipment : **Last (next) cal dates :**

Dielectrimeter SEFELEC DXS56 nr 7301 0016 01 002	11/21
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are unmated and mated at ambient temperature and pressure.
A 1,300 V_{ac} voltage is applied between each contact in turn and all others connected together and to the shell for 1 minute maximum. Leakage current is monitored.

Requirements :

There shall be no flashover nor electrical breakdown.
Leakage current shall be lower than 2 mA.

Results :

At the end of the test, results are conformable.
There was not any flashover nor electrical breakdown.
Leakage current was lower than 2 mA.
Appendix 8 shown the results.

DATA SHEET NR 12

VISUAL EXAMINATION	**Group 2**

Date : 04/05/21	**Tested by : J. LEMERCIER A-C. BOUCHAIN**	**Reference : EN2591-101**

Test equipment : **Last (next) cal dates :**

Binocular NIKON SMZ-2B	N/A
Dino-Lite Digital Microscope	N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

At the end of the test, results are conformable.

Pictures of samples after the tests are presented in Appendix 9.

The non-detachable slight brown marks on the periphery observed on one of the 2 samples correspond to an overflow of glue linked to the manual process of setting up the mat, which will be solved by the installation of a tooling.
The glue being adherent on the mat (see traction test), it does not represent any risk of FOD.

DATA SHEET NR 13		
VISUAL EXAMINATION		**Group 3**
Date : 18/12/2019 and 10/03/2021	**Tested by : J. LEMERCIER / C.PIRIOU**	**Reference : EN2591-101**

Test equipment : **Last (next) cal dates :**

Binocular OLYMPUS SZ61 N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

At the end of the test, results are conformable.

DATA SHEET NR 14

FLUID RESISTANCE — Group 3

Date : From 06/01 to 16/01/2020 And From 19/03 to 26/03/2021	**Tested by : J. LEMERCIER / C.PIRIOU / L. HUDEBINE**	**Reference : EN2591-315**

Test equipment : **Last (next) cal dates :**

Hot chamber FRANCE ETUVE nr 7601 0018 01 001	10/20 (20/21)
Hot chamber FRANCE ETUVE nr 7601 0018 01 002	06/20 (06/21)

Procedure :

Each pair of unmated modules is submitted to an immersion in the following fluids (1 pairs of modules per fluid) :

Fluid nr	Fluid			Immersion (min / °C)		Storage (°C)	Cycles nr
3	Synthetic hydraulic fluid	Skydrol 5		15	85	100	5
3	Synthetic hydraulic fluid	Skydrol 500 B4		15	85	100	5
7	Mineral lubricant	O-142		15	120	125	5
9	Synthetic lubricant	O-160		15	150	125	5
5	Mineral hydraulic fluid	H515		15	85	100	5
2	Fuel for modules type 1 and 2	OTAN F44 JP5		5	25	85	7
13	Cleaning product	MIL-PRF-87937	Type IV	5	25	25	2
12	Cleaning product	M.E.K		15	25	25	5
11	Cleaning product	Mix 25% isopropylic alcohol + 75% white spirit		15	25	25	5
15	De-icing product	OTAN-S742		15	50	100	5
19	Cooling fluid	S-1748		15	50	25	5

Samples are then removed from fluids and placed in ambient conditions for 7 hours.
Finally, each pair of modules is mated and placed in storage conditions as defined in table above for 16 hours.
This constitutes one cycle. Several cycles are performed as defined in the table above.

Requirements : **S**amples shall be submitted to the following tests :

- Measurement of insulation resistance
- Voltage proof test
- Visual examination

See data sheets hereafter.

Results : At the end of the test, results are conformable.

DATA SHEET NR 15

MEASUREMENT OF INSULATION RESISTANCE — Group 3

Date : 29/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-206

Test equipment : **Last (next) cal dates :**

Megohmmeter SEFELEC DXS56 nr 7301 0016 01 002	11/20 (11/21)
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are tested unmated at ambient temperature and pressure.
A 500 V_{dc} voltage is applied between each contact in turn and all others connected together and to the shell for 1 minute maximum.

Requirements :

Insulation resistance shall not be lower than 1,000 MΩ.

Results :

At the end of the test, results are conformable.

Appendix 10 shows results of insulation resistance.

DATA SHEET NR 16

VOLTAGE PROOF TEST	Group 3

Date : 29/03/2021	Tested by : J. LEMERCIER C.PIRIOU	Reference : EN2591-207

Test equipment : **Last (next) cal dates :**

Megohmmeter SEFELEC DXS56 nr 7301 0016 01 002	11/20 (11/21)
Switching box nr 7300 0140 00 001	N/A

Procedure :

Connectors are tested unmated then mated at ambient temperature and pressure.
A 1,300 V_{rms} voltage is applied between each contact in turn and all others connected together and to the shell for 5 seconds minimum.
Leakage current is monitored.

Requirements :

There shall be no flashover nor electrical breakdown.

Leakage current shall be lower than 2 mA.

Results :

At the end of the test, results are conformable.

There was not any flashover nor electrical breakdown.

Leakage current was lower than 2 mA.

Appendix 11 presents the results of voltage proof tests.

DATA SHEET NR 17		
VISUAL EXAMINATION		**Group 3**
Date : 29/03/2021	**Tested by : J. LEMERCIER C.PIRIOU**	**Reference : EN2591-101**

Test equipment : **Last (next) cal dates :**

Binocular OLYMPUS SZ61 N/A

Procedure :

Samples are examined with naked eyes under a suitable lightning and under a 10 times magnification.

Requirements :

Samples shall be free from defects which could affect life, serviceability or appearance.

Results :

At the end of the test, results are conformable.

Pictures of samples after the fluid tests are exposed in Appendix 12.

DATA SHEET NR 18		
FLAMMABILITY		**Group 4**
Date : 04/05/2021	**Tested by : L HUDEBINE**	**Reference : EN2591-317**

Test equipment : **Last cal date :**

Data acquisition AGILENT 34970A n°7341 0008 00 001	07/19 – 07/21
Mass flowmeter n°7693 0002 00 001	10/20 – 10/22
Clock n°7540 0001 04 009	11/20 – 11/21

Procedure :

Modules and shells are mated and exposed to a flame with a 955 ± 30 °C temperature for 30 seconds with the following installation (see Appendix 13).

An easily flammable paper is positioned under the sample.

Requirements :

During the 30 seconds of test, none part of samples shall be removed from them and fire the paper. 30 seconds after the end of the test, there shall be nor flame nor incandescence on the sample.

Results :

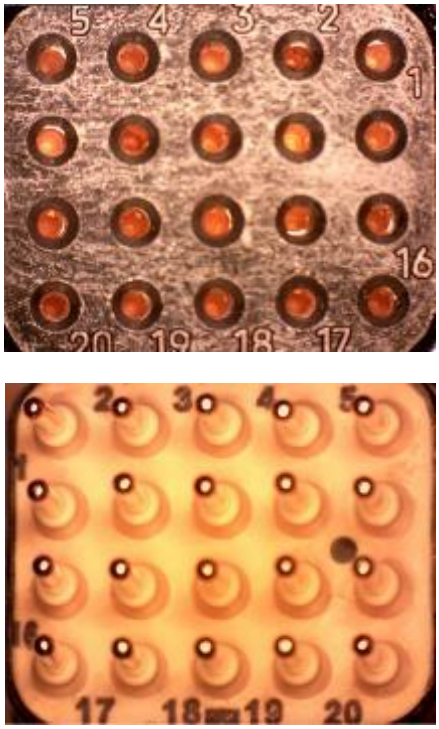
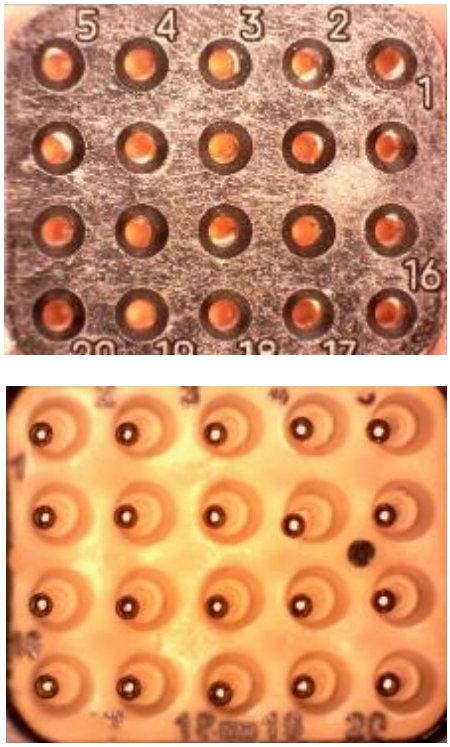
At the end of the test, results are conformable.

Pictures are in Appendix 13.

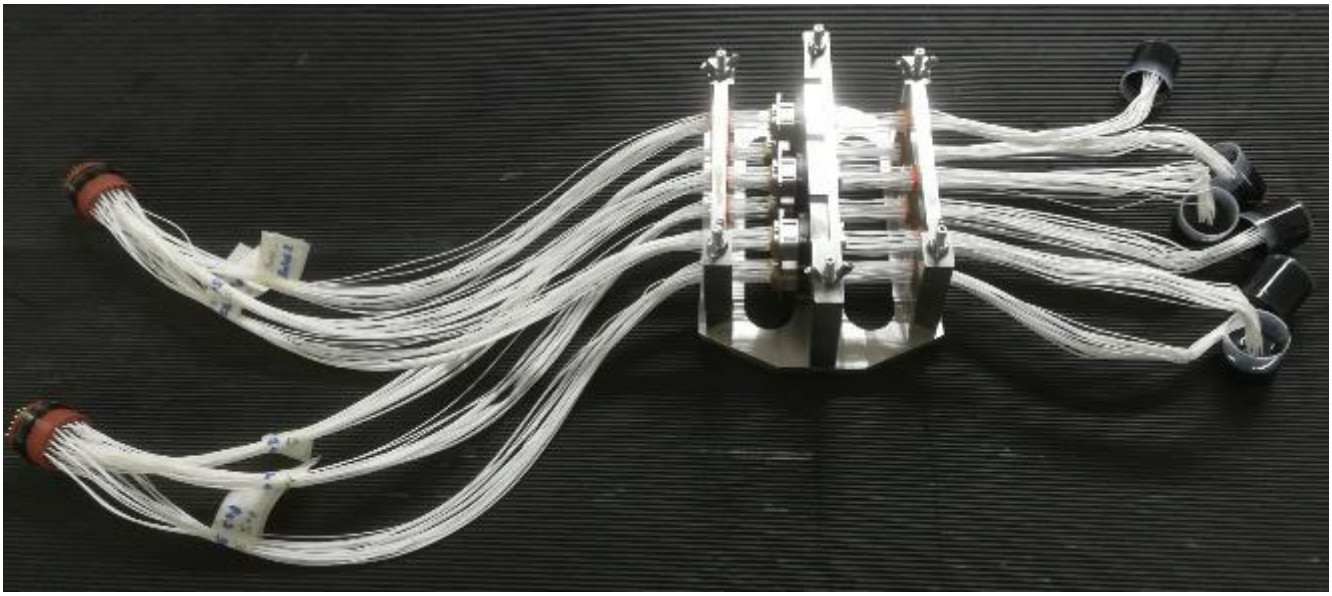
APPENDICES

- Appendix 1 : Visual examination EN2591-101 (Group 1, Data sheet nr 1)
- Appendix 2 : Immersion at low air pressure EN2591-314 (Group 1, data sheet nr 2)
- Appendix 3 : Insulation resistance EN2591-206 (Group 1, Data sheet nr 3)
- Appendix 4 : Voltage proof test EN2591-207 (Group 1, Data sheet nr 4)
- Appendix 5 : Visual examination EN2591-101 (Group 1, Data sheet nr 5)
- Appendix 6 : Visual examination EN2591-101 (Group 2, Data sheet nr 6)
- Appendix 7 : Insulation resistance EN2591-206 (Group 2, Data sheet nr 10)
- Appendix 8 : Voltage proof test EN2591-207 (Group 2, Data sheet nr 11)
- Appendix 9 : Visual examination EN2591-101 (Group 2, Data sheet nr 12)
- Appendix 10 : Insulation resistance EN2591-206 (Group 3, Data sheet nr 15)
- Appendix 11 : Voltage proof test EN2591-207 (Group 3, Data sheet nr 16)
- Appendix 12 : Visual examination EN2591-101 (Group 3, Data sheet nr 17)
- Appendix 13 : Flammability EN2591-317 (Group 4, Data sheet nr 18)

Appendix 1 : Visual examination (Data sheet nr 1 – Group 1)

Sample N° 1	Sample N° 2
	

Appendix 2 : Immersion at low air pressure (Data sheet nr 2 – Group 1)



Appendix 3 : Insulation resistance
(Data sheet nr 3 – Group 1)

Sample 1	
Cavity nr	Result
1	ok
2	nok (0 MΩ)
3	ok
4	ok
5	ok
6	ok
7	ok
8	ok
9	ok
10	ok
11	ok
12	ok
13	ok
14	ok
15	ok
16	ok
17	ok
18	ok
19	ok
20	nok (800 MΩ)

Sample 2	
Cavity nr	Result
1	ok
2	ok
3	ok
4	ok
5	ok
6	ok
7	ok
8	ok
9	ok
10	ok
11	ok
12	ok
13	ok
14	ok
15	ok
16	ok
17	ok
18	ok
19	ok
20	ok

Appendix 4 : Voltage proof test
(Data sheet nr 4 – Group 1)

Sample 1	
Cavity nt	Result
1	ok
2	nok
3	ok
4	ok
5	ok
6	ok
7	ok
8	ok
9	ok
10	ok
11	ok
12	ok
13	ok
14	ok
15	ok
16	ok
17	ok
18	ok
19	ok
20	ok

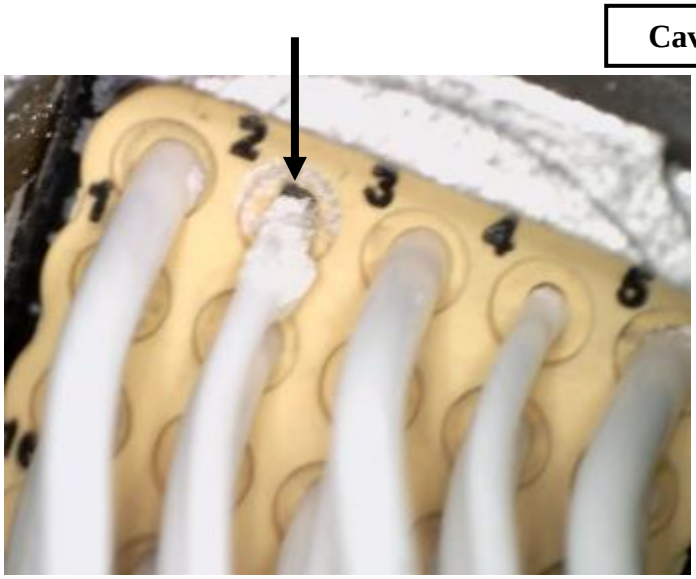
Sample 2	
Cavity nt	Result
1	ok
2	ok
3	ok
4	ok
5	ok
6	ok
7	ok
8	ok
9	ok
10	ok
11	ok
12	ok
13	ok
14	ok
15	ok
16	ok
17	ok
18	ok
19	ok
20	ok

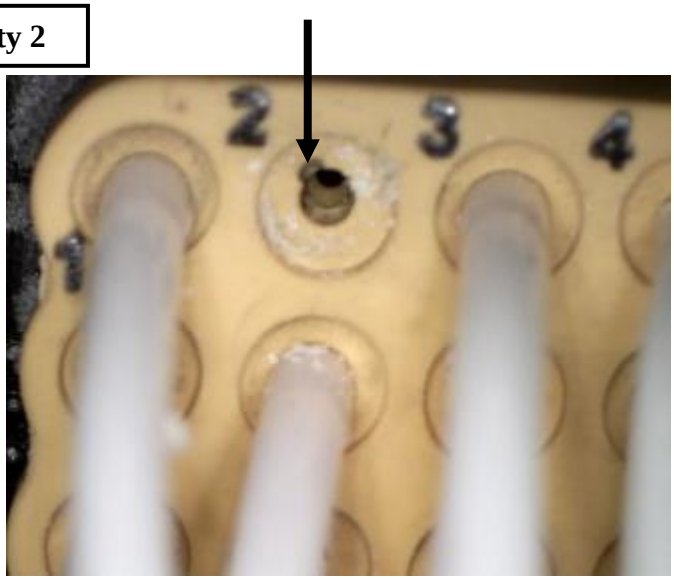
Appendix 5 : Visual examination
(Data sheet nr 5 – Group 1)

SAMPLE 1

Tearing of the back elastomer is observed in cavity 2 and due to the use of plastic tool during the wire and contact insertion. It highlights the water infiltration at the back of the connector and thus the bad result in insulation resistance and voltage breakdown.

Cavity 2

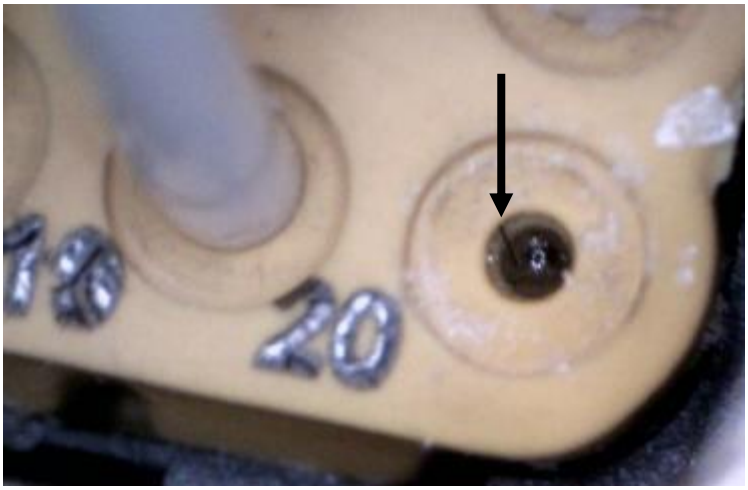




Black mark on the wire of cavity 2 due to the voltage breakdown.

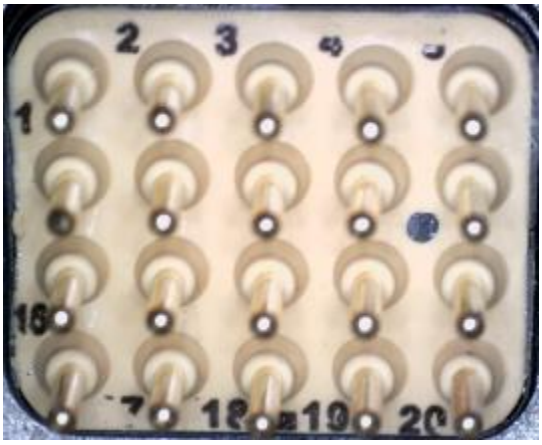
Cavity 20

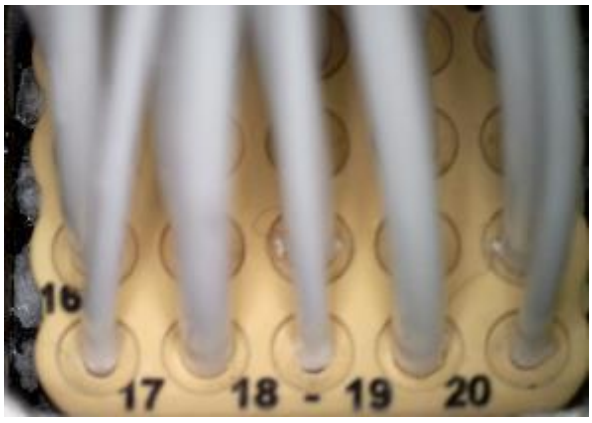
Presence of an impurity in cavity 20 that can explain the good result in voltage proof test but the failure in insulation resistance.

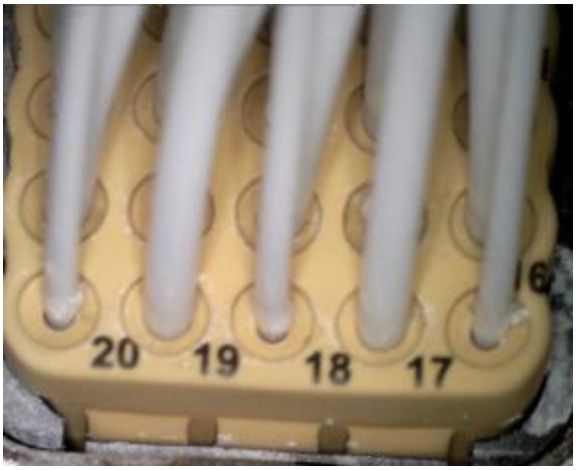


SAMPLE 2

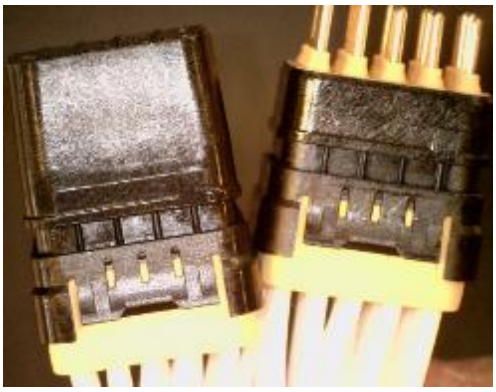
Sample 2 is free from defects.

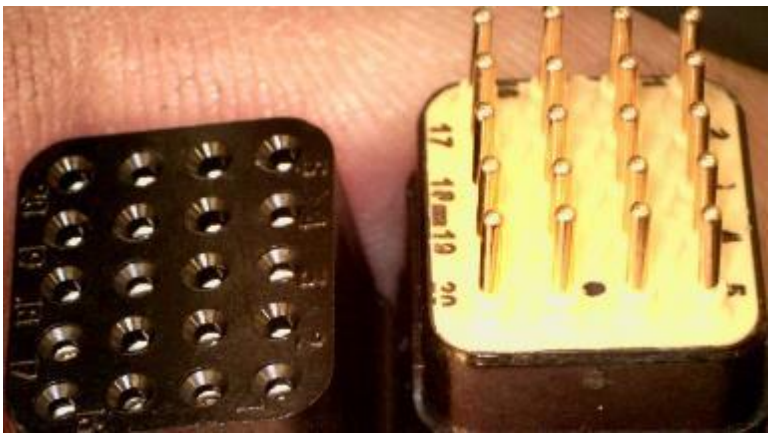






Appendix 6 : Visual examination
(Data sheet nr 6 – Group 2)





Appendix 7 : Insulation resistance
(Data sheet nr 10 – Group 2)

Sample 1	
Cavity nr	**Result**
1	**Ok**
2	**Ok**
3	**Ok**
4	**Ok**
5	**Ok**
6	**Ok**
7	**Ok**
8	**Ok**
9	**Ok**
10	**Ok**
11	**Ok**
12	**Ok**
13	**Ok**
14	**Ok**
15	**Ok**
16	**Ok**
17	**Ok**
18	**Ok**
19	**Ok**
20	**Ok**

Sample 2	
Cavity nr	**Result**
1	**Ok**
2	**Ok**
3	**Ok**
4	**Ok**
5	**Ok**
6	**Ok**
7	**Ok**
8	**Ok**
9	**Ok**
10	**Ok**
11	**Ok**
12	**Ok**
13	**Ok**
14	**Ok**
15	**Ok**
16	**Ok**
17	**Ok**
18	**Ok**
19	**Ok**
20	**Ok**

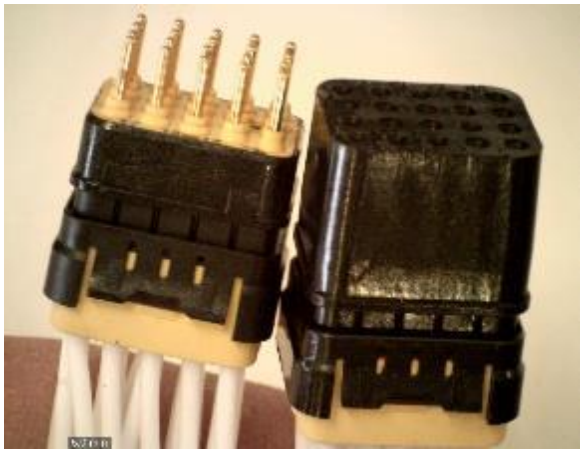
Appendix 8 (page 1) : Voltage proof test
(Data sheet nr 11 – Group 2)

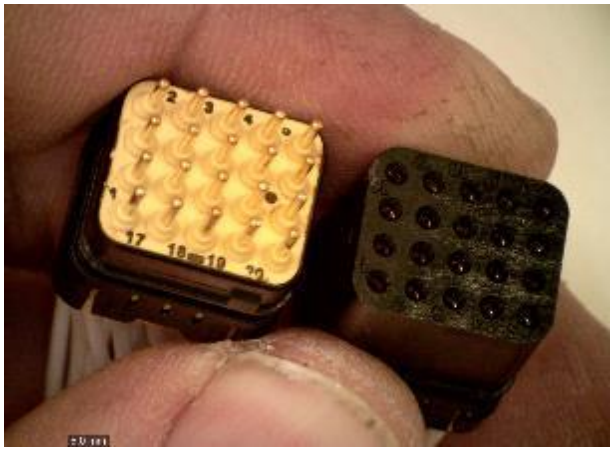
	Sample 1 (mated)	Sample 1 (Unmated Pin)	Sample 1 (Unmated - Socket)
Cavity nr	**Result**	**Result**	**Result**
1	**Ok**	**Ok**	**Ok**
2	**Ok**	**Ok**	**Ok**
3	**Ok**	**Ok**	**Ok**
4	**Ok**	**Ok**	**Ok**
5	**Ok**	**Ok**	**Ok**
6	**Ok**	**Ok**	**Ok**
7	**Ok**	**Ok**	**Ok**
8	**Ok**	**Ok**	**Ok**
9	**Ok**	**Ok**	**Ok**
10	**Ok**	**Ok**	**Ok**
11	**Ok**	**Ok**	**Ok**
12	**Ok**	**Ok**	**Ok**
13	**Ok**	**Ok**	**Ok**
14	**Ok**	**Ok**	**Ok**
15	**Ok**	**Ok**	**Ok**
16	**Ok**	**Ok**	**Ok**
17	**Ok**	**Ok**	**Ok**
18	**Ok**	**Ok**	**Ok**
19	**Ok**	**Ok**	**Ok**
20	**Ok**	**Ok**	**Ok**

Appendix 8 (page 2) : Voltage proof test
(Data sheet nr 11 – Group 2)

	Sample 2 (mated)	Sample 2 (Unmated - Pin)	Sample 2 (Unmated - Socket)
Cavity nr	**Result**	**Result**	**Result**
1	**Ok**	**Ok**	**Ok**
2	**Ok**	**Ok**	**Ok**
3	**Ok**	**Ok**	**Ok**
4	**Ok**	**Ok**	**Ok**
5	**Ok**	**Ok**	**Ok**
6	**Ok**	**Ok**	**Ok**
7	**Ok**	**Ok**	**Ok**
8	**Ok**	**Ok**	**Ok**
9	**Ok**	**Ok**	**Ok**
10	**Ok**	**Ok**	**Ok**
11	**Ok**	**Ok**	**Ok**
12	**Ok**	**Ok**	**Ok**
13	**Ok**	**Ok**	**Ok**
14	**Ok**	**Ok**	**Ok**
15	**Ok**	**Ok**	**Ok**
16	**Ok**	**Ok**	**Ok**
17	**Ok**	**Ok**	**Ok**
18	**Ok**	**Ok**	**Ok**
19	**Ok**	**Ok**	**Ok**
20	**Ok**	**Ok**	**Ok**

Appendix 9 : Visual examination
(Data sheet nr 12 – Group 2)





Appendix 10 : Insulation resistance
(Data sheet nr 15 – Group 3)

	FLUIDS – Unmated connectors					
Cavity nr	Skydrol 5	Skydrol 500 B4	O-142	O-160	H515	OTAN F44 JP5
1	Not tested - Conductive fluid	Not tested - Conductive fluid	**ok**	**ok**	**ok**	**ok**
2			**ok**	**ok**	**ok**	**ok**
3			**ok**	**ok**	**ok**	**ok**
4			**ok**	**ok**	**ok**	**ok**
5			**ok**	**ok**	**ok**	**ok**
6			**ok**	**ok**	**ok**	**ok**
7			**ok**	**ok**	**ok**	**ok**
8			**ok**	**ok**	**ok**	**ok**
9			**ok**	**ok**	**ok**	**ok**
10			**ok**	**ok**	**ok**	**ok**
11			**ok**	**ok**	**ok**	**ok**
12			**ok**	**ok**	**ok**	**ok**
13			**ok**	**ok**	**ok**	**ok**
14			**ok**	**ok**	**ok**	**ok**
15			**ok**	**ok**	**ok**	**ok**
16			**ok**	**ok**	**ok**	**ok**
17			**ok**	**ok**	**ok**	**ok**
18			**ok**	**ok**	**ok**	**ok**
19			**ok**	**ok**	**ok**	**ok**
20			**ok**	**ok**	**ok**	**ok**

	FLUIDS – Unmated connectors				
Cavity nr	MIL-PRF-87937 Type IV	M.E.K.	Mix 25% iso. alc. + 75% white spirit	OTAN-S742	S-1748
1	Not tested – Conductive fluid	**ok**	Not tested -Conductive fluid	**ok**	**ok**
2		**ok**		**ok**	**ok**
3		**ok**		**ok**	**ok**
4		**ok**		**ok**	**ok**
5		**ok**		**ok**	**ok**
6		**ok**		**ok**	**ok**
7		**ok**		**ok**	**ok**
8		**ok**		**ok**	**ok**
9		**ok**		**ok**	**ok**
10		**ok**		**ok**	**ok**
11		**ok**		**ok**	**ok**
12		**ok**		**ok**	**ok**
13		**ok**		**ok**	**ok**
14		**ok**		**ok**	**ok**
15		**ok**		**ok**	**ok**
16		**ok**		**ok**	**ok**
17		**ok**		**ok**	**ok**
18		**ok**		**ok**	**ok**
19		**ok**		**ok**	**ok**
20		**ok**		**ok**	**ok**

Appendix 11 : Voltage proof test
(Data sheet nr 16 – Group 3)

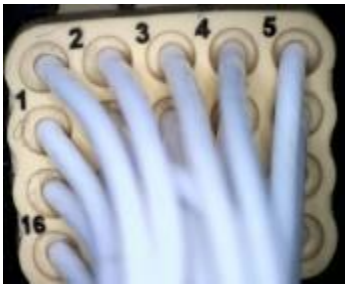
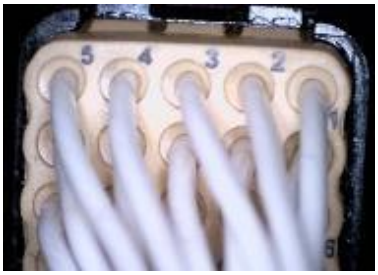
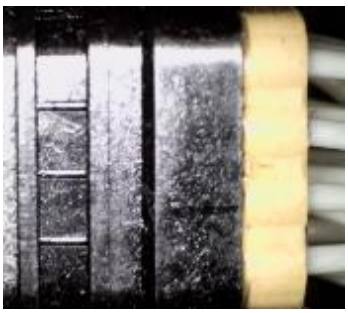
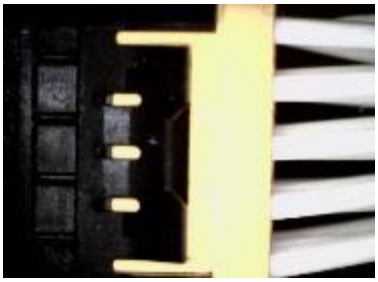
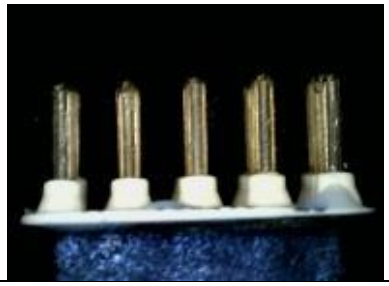
	FLUIDS – Unmated connectors					
Cavity nr	Skydrol 5	Skydrol 500 B4	O-142	O-160	H515	OTAN F44 JP5
1	Not tested - Conductive fluid	Not tested - Conductive fluid	**ok**	**ok**	**ok**	**ok**
2			**ok**	**ok**	**ok**	**ok**
3			**ok**	**ok**	**ok**	**ok**
4			**ok**	**ok**	**ok**	**ok**
5			**ok**	**ok**	**ok**	**ok**
6			**ok**	**ok**	**ok**	**ok**
7			**ok**	**ok**	**ok**	**ok**
8			**ok**	**ok**	**ok**	**ok**
9			**ok**	**ok**	**ok**	**ok**
10			**ok**	**ok**	**ok**	**ok**
11			**ok**	**ok**	**ok**	**ok**
12			**ok**	**ok**	**ok**	**ok**
13			**ok**	**ok**	**ok**	**ok**
14			**ok**	**ok**	**ok**	**ok**
15			**ok**	**ok**	**ok**	**ok**
16			**ok**	**ok**	**ok**	**ok**
17			**ok**	**ok**	**ok**	**ok**
18			**ok**	**ok**	**ok**	**ok**
19			**ok**	**ok**	**ok**	**ok**
20			**ok**	**ok**	**ok**	**ok**

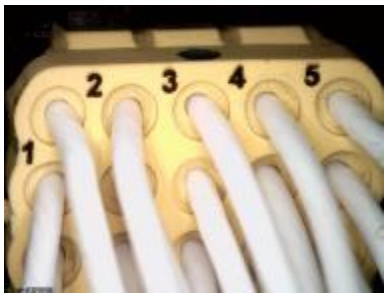
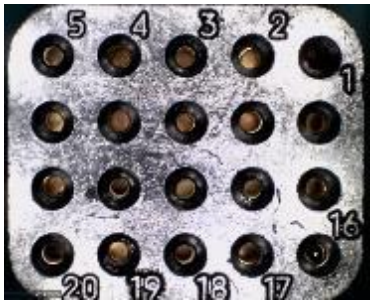
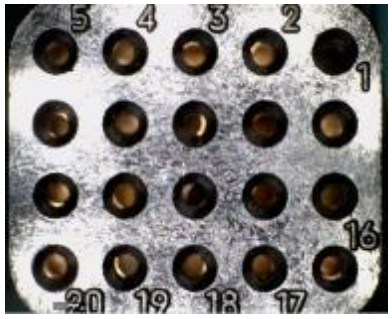
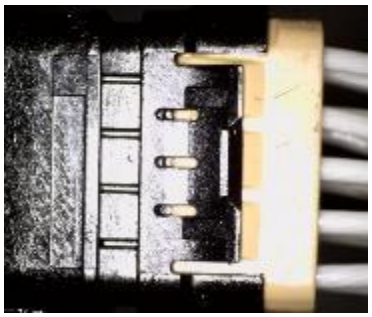
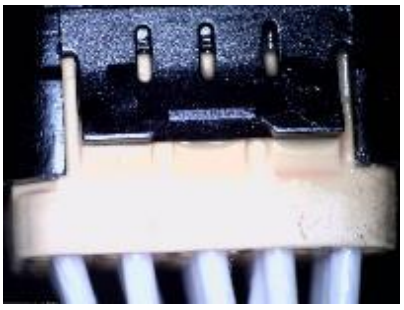
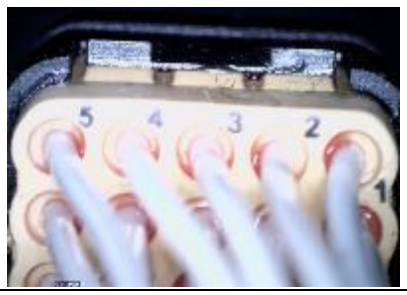
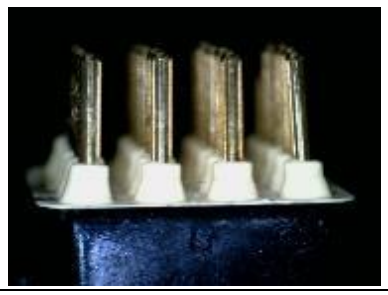
	FLUIDS – Unmated connectors				
Cavity nr	MIL-PRF-87937 Type IV	M.E.K.	Mix 25% iso. alc. + 75% white spirit	OTAN-S742	S-1748
1	Not tested – Conductive fluid	**ok**	Not tested - Conductive fluid	**ok**	**ok**
2		**ok**		**ok**	**ok**
3		**ok**		**ok**	**ok**
4		**ok**		**ok**	**ok**
5		**ok**		**ok**	**ok**
6		**ok**		**ok**	**ok**
7		**ok**		**ok**	**ok**
8		**ok**		**ok**	**ok**
9		**ok**		**ok**	**ok**
10		**ok**		**ok**	**ok**
11		**ok**		**ok**	**ok**
12		**ok**		**ok**	**ok**
13		**ok**		**ok**	**ok**
14		**ok**		**ok**	**ok**
15		**ok**		**ok**	**ok**
16		**ok**		**ok**	**ok**
17		**ok**		**ok**	**ok**
18		**ok**		**ok**	**ok**
19		**ok**		**ok**	**ok**
20		**ok**		**ok**	**ok**

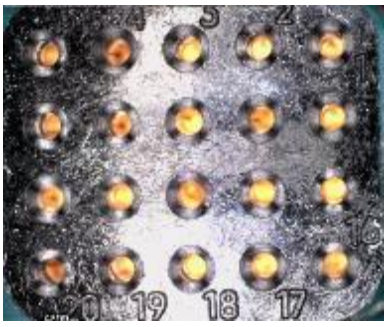
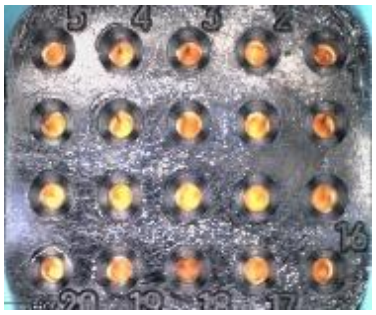
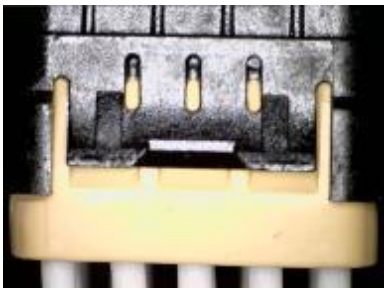
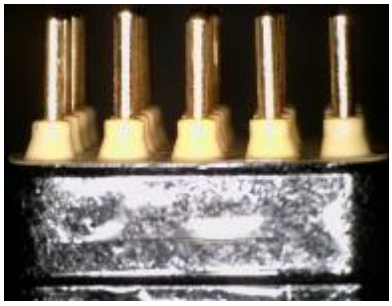
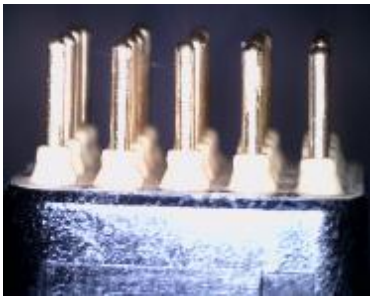
	FLUIDS – Mated connectors					
Cavity nr	Skydrol 5	Skydrol 500 B4	O-142	O-160	H515	OTAN F44 JP5
1	Not tested - Conductive fluid	Not tested - Conductive fluid	**ok**	**ok**	**ok**	**ok**
2			**ok**	**ok**	**ok**	**ok**
3			**ok**	**ok**	**ok**	**ok**
4			**ok**	**ok**	**ok**	**ok**
5			**ok**	**ok**	**ok**	**ok**
6			**ok**	**ok**	**ok**	**ok**
7			**ok**	**ok**	**ok**	**ok**
8			**ok**	**ok**	**ok**	**ok**
9			**ok**	**ok**	**ok**	**ok**
10			**ok**	**ok**	**ok**	**ok**
11			**ok**	**ok**	**ok**	**ok**
12			**ok**	**ok**	**ok**	**ok**
13			**ok**	**ok**	**ok**	**ok**
14			**ok**	**ok**	**ok**	**ok**
15			**ok**	**ok**	**ok**	**ok**
16			**ok**	**ok**	**ok**	**ok**
17			**ok**	**ok**	**ok**	**ok**
18			**ok**	**ok**	**ok**	**ok**
19			**ok**	**ok**	**ok**	**ok**
20			**ok**	**ok**	**ok**	**ok**

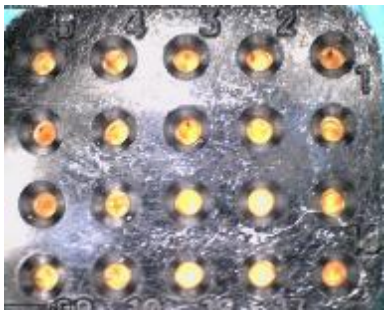
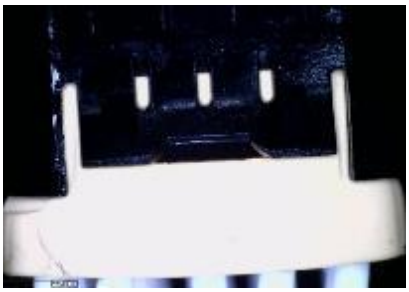
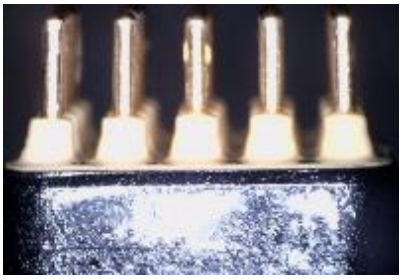
	FLUIDS – Mated connectors				
Cavity nr	MIL-PRF-87937 Type IV	M.E.K.	Mix 25% iso. alc. + 75% white spirit	OTAN-S742	S-1748
1	Not tested – Conductive fluid	**ok**	Not tested - Conductive fluid	**ok**	**ok**
2		**ok**		**ok**	**ok**
3		**ok**		**ok**	**ok**
4		**ok**		**ok**	**ok**
5		**ok**		**ok**	**ok**
6		**ok**		**ok**	**ok**
7		**ok**		**ok**	**ok**
8		**ok**		**ok**	**ok**
9		**ok**		**ok**	**ok**
10		**ok**		**ok**	**ok**
11		**ok**		**ok**	**ok**
12		**ok**		**ok**	**ok**
13		**ok**		**ok**	**ok**
14		**ok**		**ok**	**ok**
15		**ok**		**ok**	**ok**
16		**ok**		**ok**	**ok**
17		**ok**		**ok**	**ok**
18		**ok**		**ok**	**ok**
19		**ok**		**ok**	**ok**
20		**ok**		**ok**	**ok**

Appendix 12 : Visual examination
(Data sheet nr 17 – Group 3)

Skydrol 5	Skydrol 500 B4	O-142
		
		
		
		
		

O-160	H515	OTAN F44 JP5
		
		
		
		
		

MIL-PRF-87937 Type IV	M.E.K.	25% iso. alc. + 75% white spirit
		
		
		
		
		

OTAN-S742	S-1748	
		
		
		
		
		

Appendix 13 : Flammability
(Data sheet nr 18 – Group 4)

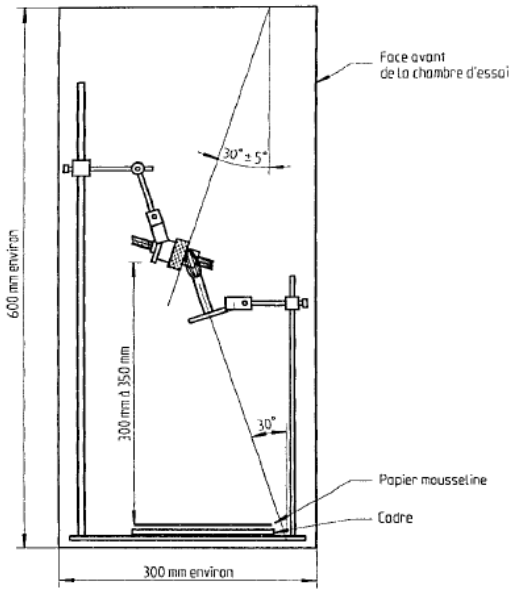


Figure 1

During the test, none part of samples was removed from them and fire the paper.
30 seconds after the end of the test, there was no flame nor incandescence on the sample.