Lot Acceptance Tests Document

Document n° 334454

20th December 2019

smiths interconnect

Hypertac SA
31 Rue Isidore Maille
76410 SAINT AUBIN LES ELBEUF

Technical Division
Laboratory Department

- TEST REPORT -

Title : ***Connector Type MHD 100***
(PCB solder contacts)

Document N° : ***334454***

Date : ***20 December 2019***

Lot Acceptance Tests Document **Document n° 334454** **20th December 2019**	smiths interconnect **Hypertac SA** **31 Rue Isidore Maille** **76410 SAINT AUBIN LES ELBEUF** **Technical Division** **Laboratory Department**

LOT ACCEPTANCE TESTS DOCUMENT

Component : Connector Type MHD 100
(PCB solder contacts)

Date : 20th December 2019

Test Laboratory Technician : A. ROUSSELLE

Test Laboratory Manager : S. LEROY

Reviewed by Quality Assurance : L. OUDJOUDI 06.01.2020.

TABLE OF CONTENTS

COVERSHEET FOR DOCUMENTATION

- **Applicable ESCC Detail Specification** ➢ Connectors and Savers, Electrical, Rectangular, Non-Removable PCB Contacts, based on type MHD	n° 3401/065 issue 5
- **Amendment specifications**	Without
- **Applicable ESCC Generic Specification**	n° 3401 issue 5
- **Level**	B
- **Lot Acceptance**	1
- **Component type**	See page 5
- **Marking**	See detail Specification n° 3401/065 & see page 5.
- **Date code/lot identification**	See pages 5 and 6
- **Range of serial numbers**	See page : without

COVERSHEET FOR DOCUMENTATION (CONTINUED)

- **Number of work order :**

  HYPERTAC S.A. interior n°: E15778 of 17/09/2019

- **Orderer's Name and Address :**

CNES
Centre Spatial de Toulouse
18, Avenue Edouard Belin
31055 TOULOUSE CEDEX
FRANCE

- **Manufacturer's Name and Address :**

Smiths Interconnect
31, rue Isidore Maille
76410 SAINT AUBIN LES ELBEUF
FRANCE

- **Location of the Manufacturing Plant :**

Smiths Interconnect
31, rue Isidore Maille
76410 SAINT AUBIN LES ELBEUF
FRANCE

- **Signature on behalf of the Manufacturer:**

Name : L. OUDJOUDI
Quality Assurance 05.01.2020

SUMMARY

LIST OF COMPONENTS SUBJECT TO THE LOT ACCEPTANCE

PART NUMBER	DATE CODE	LOT	SERIAL NUMBER	Qty	SIMILAR TO STYLE
3401 065 01B 100 44 30 121	1939	A	/	10	MHD 100 44 30 121
MHD 100 55 10 110	1939	A	/	5	MHD 100 55 10 110

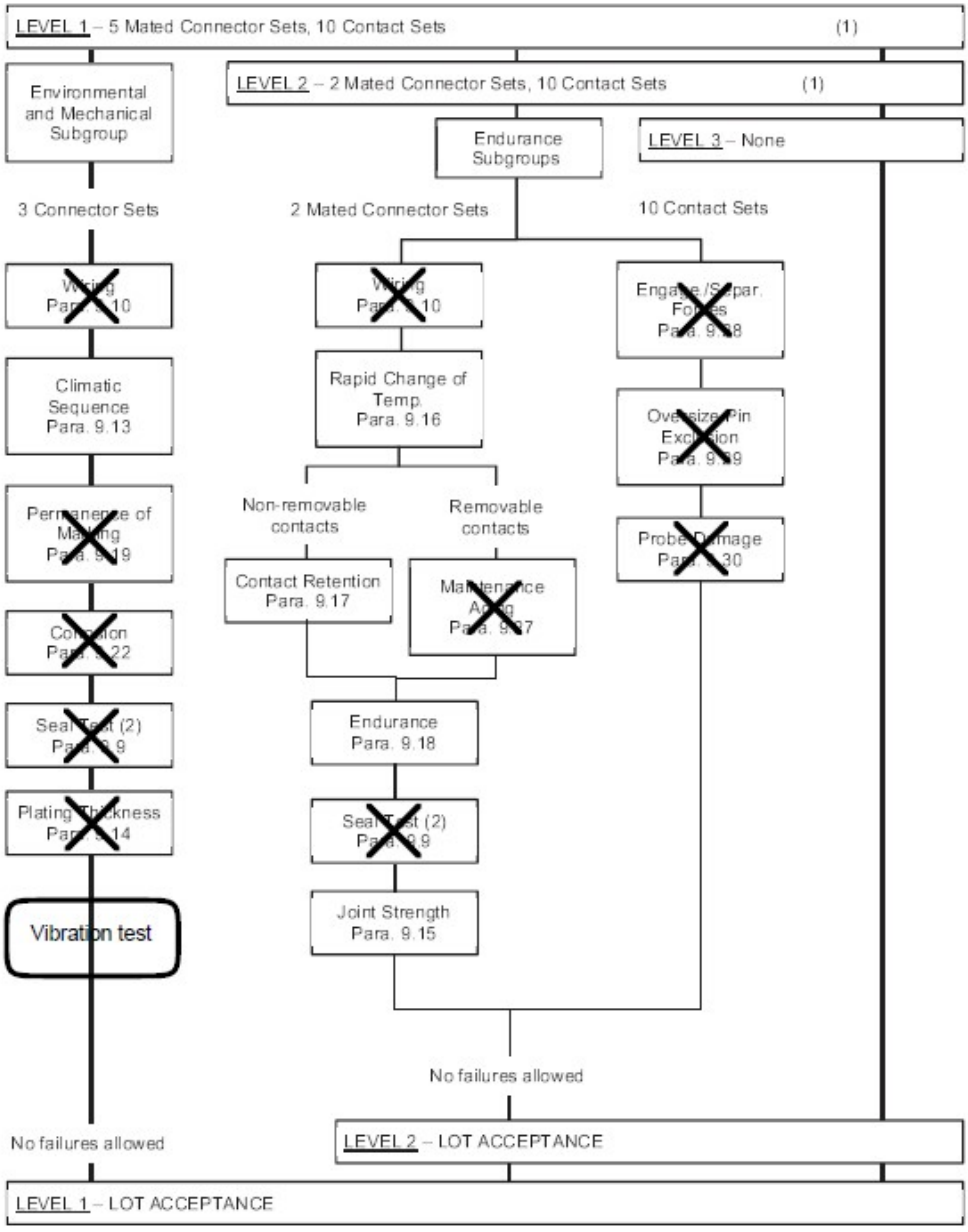
SAMPLING : CONNECTORS

PART NUMBER	DATE CODE	LOT	Qty	SIMILAR TO STYLE	LEVEL	
					I	II
					Env/Mec	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	1	
MHD 100 55 10 110	1939	A	1	MHD 100 55 10 110	1	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	2	
MHD 100 55 10 110	1939	A	1	MHD 100 55 10 110	2	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	3	
MHD 100 55 10 110	1939	A	1	MHD 100 55 10 110	3	End/Rét
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121		4
MHD 100 55 10 110	1939	A	1	MHD 100 55 10 110		4
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121		5
MHD 100 55 10 110	1939	A	1	MHD 100 55 10 110		5
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	6	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	7	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121	8	
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121		9
3401 065 01B 100 44 30 121	1939	A	1	MHD 100 44 30 121		10

This material is conformable to the PID - CDC n° 43 issue S.

PROGRAM OF TESTS
(following CHART V from ESCC n° 3401)

CHART V- LOT ACCEPTANCE TESTS



NOTES
1. For distribution within the sample, see Para. 8.2.2.
2. Hermetic connectors only.

SUMMARY OF RESULTS

Type of test	Details	Specification	PASS or FAIL	Page
Climatic sequence	Dry heat	ESCC Generic Specification n° 3401, ESCC Detail Specification n° 3401/016	PASS	15
	Damp heat accelerated, 1st cycle		PASS	18
	Cold test		PASS	19
	Low air pressure		PASS	20
	Damp heat accelerated, remaining cycles		PASS	23
	Final measurements		PASS	26
Rapid change of temperature	Insulation resistance	Specification n° 3401, Specification n° 3401/016	PASS	38
	Voltage proof		PASS	39
Maintenance ageing	Contact removing from, and reinsertion into the insert	Specification n° 3401, Specification n° 3401/016, Specification n° 3401/017	NA	-
	Contact retention		PASS	42
	Contact insertion and withdrawal forces		NA	-
Endurance	Contact resistance (initial measurement)	ESCC Generic Specification n° 3401, ESCC Detail Specification n° 3401/016, ESCC Detail Specification n° 3401/017	PASS	43
	Mating/unmating forces (initial measurement)		PASS	44
	Mating/unmating forces (final measurement)		PASS	46
	Contact resistance (final measurement)		PASS	47
	Insulation resistance		PASS	48
	Voltage proof		PASS	49
Contact sets	Engagement & separation forces	Specification n° 3401, Specification n° 3401/016, Specification n° 3401/017	NA	-
	Oversize pin exclusion		NA	-
	Probe damage test		NA	-

Conclusion of Lot Acceptance Tests :

Lot Acceptance Tests Level II : Successfull.

Final conclusion :

In compliance with Specifications :

ESCC Generic Specification	n° 3401	issue 5	of March 2018.
ESCC Detail Specification	n° 3401/065	issue 5	of March 2018.

Responsible for Quality Assurance

L. OUDJOUDI 06.01.2020

smiths interconnect

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31, rue Isidore Maille
76410 Saint Aubin Les Elbeuf - France
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www.hyperac.com

Customer : **CNES**

Order number : **E15778 of 17/09/2019**

CERTIFICATE OF CONFORMITY N° 334454

Component type	:	}
		} According to enclosed
Component number	:	}
		} list n° 334454 page 5
Lot identification	:	}
		} of 20/12/2019
Quantity	:	}

This is to certify that the above mentioned components passed the Chart V tests and fulfil the requirements of the following Generic and Detail Specifications of the ESCC Specification System :

- Generic Specification n° 3401	issue 5	of	March 2018.
- Detail Specification n° 3401/065	issue 5	of	March 2018.

The components subject to this certificate of conformity were manufactured at our plant located at :

Smiths Interconnect
31 Rue Isidore Maille
76410 SAINT AUBIN LES ELBEUF (France)

Certified by :

A. ROUSSELLE

Title : Test Laboratory Assistant

Date : 20/12/2019

Approved by :

L. OUDJOUDI

Title : Quality Assurance

Date : 06.01.2020.

smiths

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LOT ACCEPTANCE TEST

LEVEL I

Environmental and Mechanical Subgroup

REPORT SUMMARY SHEET

Test : **EXTERNAL VISUAL INSPECTION (Contacts and Connectors)**	**Lot Acceptance Level I**	**Paragraph 9.7**
Specification and test method : ESCC Basic specifications n° 20500 and 2053400.		
Parameter limit and special requirement : See ESCC Detail Specification 3401/065. Visual inspection X 10 magnification.		
Sample description : For details see pages 4 and 5.		

Measured values or comments

Material and external construction, external surfaces, dimension check and marking are in compliance with ESCC Detail Specification 3401/065.
The visual inspection does not make appear foreign particles and contamination on all external surfaces.

REPORT SUMMARY SHEET

Test : **WIRING**		**Lot Acceptance Level I**	**Paragraph 9.10**
Solder Contacts (PCB)	**Paragraph 9.10.1**		
Specification and test method : ESCC Generic Specification n° 3401, according to ECSS-Q-70-08A.			
Parameter limit and special requirement : Visual inspection X 10 magnification.			
Sample description : For details see pages 4 and 5.			

Measured values or comments

<u>Complementary test</u> :

The PCB Solder Contacts connectors are wired on test printed circuit board.

<u>Results</u> :

The soldered joints are examined in accordance with, and meet the requirements of the visual inspection criteria of ECSS-Q-70-08A.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		Lot Acceptance Level I	Paragraph 9.13
Dry Heat	**Paragraph 9.13.2**		
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 68-2-2, test « Ba ».			
Parameter limit and special requirement : See below.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Procedure :

The mated connectors shall be subjected to Dry Heat test for 2 hours at 125 ±2°C.

Insulation resistance shall be measured twice :

- while still at this temperature
- after test and recovery

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		Lot Acceptance Level I	Paragraph 9.13
Dry Heat	Paragraph 9.13.2		
Insulation resistance at temperature			**Paragraph 9.1.1.1**
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Unmated connectors Minimum value of insulation resistance : 1 x 10^3 MΩ.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Test Conditions :

- Temperature : 125 °C
- Barometric pressure : 762 mm of mercury

Summary of results

Insulation resistance at temperature (in MΩ)

Sample Connectors *(Receptacle)*	Dispersion
MHD 100 - n° 1	1,81 x 10^3 to 3,36 x 10^3 MΩ
MHD 100 - n° 2	2,39 x 10^3 to 3,58 x 10^3 MΩ
MHD 100 - n° 3	1,55 x 10^3 to 3,73 x 10^3 MΩ
MHD 100 - n° 6	2,65 x 10^3 to 4,37 x 10^3 MΩ
MHD 100 - n° 7	2,70 x 10^3 to 4,45 x 10^3 MΩ
MHD 100 - n° 8	3,27 x 10^3 to 6,08 x 10^3 MΩ

Results :
Insulation Resistance measurements at Dry Heat Temperature have been performed successfully, all contacts tested withstood specified Minimum value :

- Minimum value measured : 1,55 x 10^3 MΩ.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		Lot Acceptance Level I	Paragraph 9.13
Dry Heat	Paragraph 9.13.2		
Insulation resistance after test and recovery			**Paragraph 9.1.1.1**
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Mated and unmated connectors Minimum value of insulation resistance : 1 x 10^4 MΩ.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Test Conditions :
- Temperature : 22,0 °C
- Relative humidity : 59,6 %
- Barometric pressure : 758 mm of mercury

Summary of results

Insulation resistance after test and recovery (in MΩ)

Sample Connectors *(Receptacle)*	Dispersion
MHD 100 - n° 1	1,03 x 10^6 to 3,88 x 10^7 MΩ
MHD 100 - n° 2	1,55 x 10^6 to 2,95 x 10^7 MΩ
MHD 100 - n° 3	7,30 x 10^6 to 2,99 x 10^8 MΩ
MHD 100 - n° 6	5,88 x 10^6 to 3,31 x 10^7 MΩ
MHD 100 - n° 7	3,20 x 10^5 to 1,24 x 10^8 MΩ
MHD 100 - n° 8	3,91 x 10^7 to 5,78 x 10^8 MΩ

Results :
Insulation Resistance measurements after Dry Heat Test and recovery have been performed successfully, all contacts tested withstood specified Minimum value :
- Minimum value measured : 3,20 x 10^5 MΩ.

REPORT SUMMARY SHEET

<table>
<tr><td colspan="2">Test : CLIMATIC SEQUENCE</td><td rowspan="2">Lot Acceptance Level I</td><td rowspan="2">Paragraph 9.13</td></tr>
<tr><td>Dry Heat</td><td>Paragraph 9.13.2</td></tr>
<tr><td colspan="3">Visual inspection after test</td><td>Paragraph 9.7</td></tr>
<tr><td colspan="4">Specification and test method :
ESCC Basic specifications n° 20500 and n° 2053400.</td></tr>
<tr><td colspan="4">Parameter limit and special requirement :
Without.</td></tr>
<tr><td colspan="4">Sample description : For details see page 4 and 5.</td></tr>
</table>

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Damp Heat Accelerated, First Cycle	**Paragraph 9.13.3**		
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 68-2-30, test "Db", severity b, variant 2, 1 cycle.			
Parameter limit and special requirement : See below.			
Sample description : For details see page 4 and 5.			

Measured values or comments :

Procedure

The mated connectors shall be subjected to Damp Heat Accelerated for 24 hours (1 cycle) :

Step		Temperature	RH	Duration
0	**Stabilized temperature**	**25 ± 3 °C**	**95 % mini**	**1 hour.**
1	**Temperature rising**	**25 to 55 °C**	**95 % mini**	**3 h. ± 30 min.**
2	**Upper temperature**	**55 ± 2 °C**	**93 ± 3 %**	**12 h. ± 30 min.** **the beginning of cycle included (step 1)**
3	**Temperature decreasing**	**55 to 25 °C**	**80 % mini**	**3 to 6 hours.**
4	**Stabilized temperature**	**25 ± 3 °C**	**95 % mini**	**until the end of cycle.**

After this test and recovery, the components shall be subjected immediately to the cold test.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Cold Test	**Paragraph 9.13.4**		
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 68-2-1, test "Aa".			
Parameter limit and special requirement : See below.			
Sample description : For details see page 4 and 5.			

Measured values or comments :

<u>Procedure</u> :

The mated connectors shall be subjected to Cold Test for 2 hours, at the minimum storage temperature : -55 ±3 °C.

After this test and recovery, Low Air Pressure Test shall be performed.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Low Air Pressure	**Paragraph 9.13.5**		
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 68-2-13, test "M".			
Parameter limit and special requirement : Unmated connectors. Dielectric withstanding voltage : 200 Vrms (value to be validated through Low Air Pressure Test). Leakage current (I_L) : 1,0 mA Maxi.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Procedure :

The components shall be subjected to Low Air Pressure Test under the following conditions :

- Half the number of connectors shall be mated, the other half unmated.
- Maximum (simulated) altitude : 33 000 m
- Temperature : T amb. : +15 to +35 °C.

After 10 minutes at the specified (simulated) altitude, the voltage shall be raised from zero to 200 Vrms. Upon reaching this voltage, it shall be maintained for 1 minute. During that time, the connectors shall be monitored for evidence of electrical breakdown, flashover, corona discharge, or current leakage (I_L) in excess of 1,0 mA.

Summary of results

Test conditions :

- Temperature : 21,9 °C
- Relative humidity : 51,5 %
- Barometric pressure of mercury : 7,5 mm Hg (1 KPa)

Points of application :

Between a contact and the other contacts connected together. All contacts tested.

Results :

Low Air Pressure Test has been performed successfully, all contacts tested withstood and validate the specified value (200 Vrms) :

- No breakdown of insulation or flashover : $I_L < 1,0$ mA.

REPORT SUMMARY SHEET

<table>
<tr><td colspan="2">Test : CLIMATIC SEQUENCE</td><td rowspan="2">Lot Acceptance Level I</td><td rowspan="2">Paragraph 9.13</td></tr>
<tr><td>Low Air Pressure</td><td>Paragraph 9.13.5</td></tr>
<tr><td colspan="3">Visual inspection after test</td><td>Paragraph 9.7</td></tr>
<tr><td colspan="4">Specification and test method :
ESCC Basic specifications n° 20500 and n° 2053400.</td></tr>
<tr><td colspan="4">Parameter limit and special requirement :
Without.</td></tr>
<tr><td colspan="4">Sample description : For details see pages 4 and 5.</td></tr>
</table>

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		Lot Acceptance Level I	Paragraph 9.13
Damp Heat Accelerated, Remaining Cycles	**Paragraph 9.13.6**		
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 68-2-30, test "Db", severity b, variant 2, 5 cycles.			
Parameter limit and special requirement : See below.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Procedure :

The mated connectors shall be subjected to Damp Heat Accelerated for 120 hours (5 cycles) :

For description of 1 cycle, see page 18.

Immediately after the test, the Insulation Resistance shall be measured.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		Lot Acceptance Level I	Paragraph 9.13
Damp Heat Accelerated, Remaining Cycles	Paragraph 9.13.6		
Insulation resistance immediately after test			**Paragraph 9.1.1.1**
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Unmated connectors Minimum value of insulation resistance : 1 x 10^2 MΩ.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Test Conditions :
- Temperature : 22,4 °C
- Relative humidity : 55,4 %
- Barometric pressure : 755 mm of mercury

Immediately after Damp Heat Accelerated Test.

Summary of results
Insulation resistance immediately after test (in MΩ)

Sample Connectors *(Receptacle)*	Dispersion
MHD 100 - n° 1	1,02 x 10^7 to 4,23 x 10^7 MΩ
MHD 100 - n° 2	7,93 x 10^6 to 9,53 x 10^6 MΩ
MHD 100 - n° 3	9,90 x 10^5 to 1,22 x 10^8 MΩ
MHD 100 - n° 6	7,24 x 10^6 to 5,36 x 10^7 MΩ
MHD 100 - n° 7	2,54 x 10^7 to 1,59 x 10^8 MΩ
MHD 100 - n° 8	2,31 x 10^7 to 3,64 x 10^7 MΩ

Results :
Insulation Resistance measurements have been performed successfully, all contacts tested withstood specified Minimum value :
- Minimum value measured : 9,90 x 10^5 MΩ.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.7**
Recovery	**Paragraph 9.13.7**		
Specification and test method : ESCC Basic specifications n° 20500 and n° 2053400.			
Parameter limit and special requirement : Recovery period of 1 to 24 hours.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

After the damp Heat Accelerated (5 cycles), a recovery period of one hour minimum is observed.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.7**
Final Inspection	**Paragraph 9.13.7**		
Specification and test method : ESCC Basic specifications n° 20500 and n° 2053400.			
Parameter limit and special requirement : Visual inspection x 10 magnification after a recovery period of 1 to 24 hours.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Final Measurements	**Paragraph 9.13.8**		
Insulation resistance			**Paragraph 9.1.1.1**
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Unmated connectors Minimum value of insulation resistance : 1 x 10^4 MΩ.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Test Conditions :
- Temperature : 22,1 °C
- Relative humidity : 41,5 %
- Barometric pressure : 767 mm of mercury

Summary of results
Insulation resistance after test and recovery (in MΩ)

Sample Connectors *(Receptacle)*	Dispersion
MHD 100 - n° 1	4,70 x 10^6 to 5,79 x 10^8 MΩ
MHD 100 - n° 2	7,84 x 10^7 to 9,77 x 10^8 MΩ
MHD 100 - n° 3	7,35 x 10^6 to 2,94 x 10^8 MΩ
MHD 100 - n° 6	2,05 x 10^7 to 5,08 x 10^8 MΩ
MHD 100 - n° 7	1,78 x 10^6 to 4,05 x 10^8 MΩ
MHD 100 - n° 8	4,18 x 10^6 to 9,99 x 10^8 MΩ

Results :
Insulation Resistance measurements after Climatic Sequence have been performed successfully, all contacts tested withstood specified Minimum value :
- Minimum value measured : 1,78 x 10^6 MΩ.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Final Measurements	**Paragraph 9.13.8**		
Voltage proof (sea level)			**Paragraph 9.1.1.2**
Specification and test method : ESCC Generic Specification n° 3401, Detail Specification 3401/065, according to IEC Publication 512-2, test 4a, method B.			
Parameter limit and special requirement : Unmated connectors Dielectric withstanding voltage : 800 Vrms. Leakage current (I_L) : 1,0 mA Maxi			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

Test Conditions :

- Temperature : 21,9 °C
- Relative humidity : 39,8 %
- Barometric pressure : 739 mm of mercury

Points of application :

Between a contact and the other contacts connected together. All contacts tested.

Results :

Voltage Proof Test after Climatic Sequence has been performed successfully, all contacts tested withstood specified value :

- No breakdown of insulation or flashover : $I_L < 1,0$ mA.

REPORT SUMMARY SHEET

Test : CLIMATIC SEQUENCE		**Lot Acceptance Level I**	**Paragraph 9.13**
Final Measurements	**Paragraph 9.13.8**		
Visual inspection			**Paragraph 9.7**
Specification and test method : ESCC Basic specifications n° 20500 and n° 2053400.			
Parameter limit and special requirement : Without.			
Sample description : For details see pages 4 and 5.			

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : PERMANENCY OF MARKING	Lot Acceptance Level I	Paragraph 9.19
Specification and test method : ESCC Generic specification n° 3401 in accordance with ESCC Basic specification n° 24800.		
Parameter limit and special requirement : Visual inspection.		
Sample description : For details see pages 4 and 5.		

Measured values or comments :

Test not applicable to laser engraved connectors.

REPORT SUMMARY SHEET

Test : CORROSION	Lot Acceptance Level I	Paragraph 9.22
Specification and test method : ESCC Generic specification n° 3401.		
Parameter limit and special requirement : ESCC Generic Specification n° 3401, Detail Specification 3401/065.		
Sample description : For details see pages 4 and 5.		

Measured values or comments :

Test not applicable to PCB connectors :

- ESCC Generic specification n° 3401 para. 9.22.

REPORT SUMMARY SHEET

Test : SEAL TEST	Lot Acceptance Level I	Paragraph 9.9
Specification and test method : ESCC Generic Specification n° 3401, and see deviations in ESCC Detail Specification 3401/065.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 4 and 5.		

Measured values or comments :

Test not applicable :

- ESCC Detail Specification n° 3401/065, deviation (b) para. 4.2.5 page 31.

REPORT SUMMARY SHEET

Test : PLATING THICKNESS	Lot Acceptance Level I	Paragraph 9.14
Specification and test method : ESCC Generic specification n° 3401 – Chart V.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 4 and 5.		

Measured values or comments :

Test not applicable to MHD connectors :
(only applicable to hermetically sealed connectors)

- ESCC Generic Specification n° 3401 – Chart V, Note 2.

CONCLUSION OF LOT ACCEPTANCE TESTS LEVEL I :

The Connectors and Contacts type MHD 100 have passed the Lot Acceptance Tests Level I Successfully :

- Environmental and Mechanical Subgroup.

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LOT ACCEPTANCE TEST

LEVEL II

Endurance Subgroup

REPORT SUMMARY SHEET

Test : **EXTERNAL VISUAL INSPECTION**	**Lot Acceptance Level II**	**Paragraph 9.7**
Specification and test method : ESCC Basic specifications n° 20500 and n° 2053400.		
Parameter limit and special requirement : See ESCC Detail Specification 3401/065.		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

Material and external construction, external surfaces, dimension check and marking are in compliance with ESCC Detail Specification 3401/065 issue 5.

REPORT SUMMARY SHEET

Test : **WIRING**		**Lot Acceptance Level II**	**Paragraph 9.10**
Solder Contacts (PCB)	**Paragraph 9.10.1**		
Specification and test method : ESCC Generic Specification n° 3401, according to ECSS-Q-70-08A.			
Parameter limit and special requirement : Visual inspection X 10 magnification.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

<u>Complementary test</u> :

The solder PCB contacts connectors are wired on test printed circuit board, in Flight conditions.

<u>Results</u> :

The soldered joints are examined in accordance with, and meet the requirements of the visual inspection criteria of ECSS-Q-70-08A.

REPORT SUMMARY SHEET

Test : **RAPID CHANGE OF TEMPERATURE**	**Lot Acceptance Level II**	**Paragraph 9.16**
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065, according to IEC Publication 512-6, test 11d.		
Parameter limit and special requirement : Visual inspection X 10 magnification.		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

Test conditions B :

On wired mated connectors sets.

- Number of cycles : 5

- Per cycle :	**Temperature**
step - 1	**-55°C** $^{+\ 0}_{-\ 5}$
step - 2	**+25°C** $^{+\ 10}_{-\ 5}$
step - 3	**+125°C** $^{+\ 3}_{-\ 0}$
step - 4	**+25°C** $^{+\ 10}_{-\ 5}$

Exposure time at temperatures extremes for steps 1 and 3 : half an hour.

Maximum exposure time at ambient temperature for steps 2 and 4: 5 minutes.

Variant applied by Hypertac S.A. :
The transition from a temperature chamber to the other one is executed in a few seconds without return to the ambient temperature (automatic apparatus).
These conditions are more severe.

Results :

After stability at room ambient, temperature following the final cycle, connectors show :

- No evidence of cracking or breaking or mechanical defects.

REPORT SUMMARY SHEET

Test : **RAPID CHANGE OF TEMPERATURE**		**Lot Acceptance Level II**	**Paragraph 9.16**
Insulation Resistance After Test	**Paragraph 9.1.1.1**		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Unmated connectors Minimum value of insulation resistance : 1 x 10^4 MΩ.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

Test conditions :

- Temperature : 21,9 ° C
- Relative humidity : 46,6 %
- Barometric pressure : 761 mm of mercury

Insulation resistance measured : between a contact and the other contacts closed to the metallic parts around external dimensions of insulator.

Summary of results
Insulation resistance (in MΩ)

Sample Connectors		Dispersion
MHD 100 - n° 4	Receptacle	2,39 x 10^7 to 4,07 x 10^8 MΩ
MHD 100 - n° 5		1,36 x 10^6 to 3,47 x 10^8 MΩ
MHD 100 - n° 9		1,44 x 10^8 to 4,73 x 10^8 MΩ
MHD 100 - n° 10		5,21 x 10^7 to 9,90 x 10^8 MΩ

Results :

Insulation Resistance measurements after Rapid Change of Temperature have been performed successfully, all contacts tested withstood specified Minimum value:

- minimum value measured : 1,36 x 10^6 MΩ.

REPORT SUMMARY SHEET

Test : **RAPID CHANGE OF TEMPERATURE**		**Lot Acceptance Level II**	**Paragraph 9.16**
Voltage Proof After Test (sea level)	**Paragraph 9.1.1.2**		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065, according to IEC Publication 512-2, test 4a, method B.			
Parameter limit and special requirement : Unmated connectors Dielectric withstanding voltage : 800 Vrms Leakage current (I_L): 1,0 mA Maxi.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

Test conditions :

- Temperature : 22,4 ° C
- Relative humidity : 55,1 %
- Barometric pressure : 758 mm of mercury

Point of application :

Between a contact and the all other contacts closed to the metallic parts around external dimensions of insulator.

Results :

Voltage Proof Test after Rapid Change of Temperature has been performed successfully, all contacts tested withstood specified value:

- No breakdown of insulation or flashover: $I_L < 1,0$ mA.

REPORT SUMMARY SHEET

Test : **RAPID CHANGE OF TEMPERATURE**		**Lot Acceptance Level II**	**Paragraph 9.16**
Visual Inspection After Tests	**Paragraph 9.7**		
Specification and test method : ESCC Basic Specifications n° 20500 and 2053400.			
Parameter limit and special requirement : Without.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : MAINTENANCE AGING	Lot Acceptance Level II	Paragraph 9.27
Specification and test method : ESCC Generic Specification n° 3401, and see deviations in ESCC Detail Specification 3401/065.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

Test not applicable :

- ESCC Detail Specification n° 3401/065, deviation (d), para. 4.2.5, page 31.

REPORT SUMMARY SHEET

Test : **CONTACT RETENTION (IN INSERT)**	**Lot Acceptance Level II**	**Paragraph 9.17**
Specification and test method : ESCC Generic Specification n° 3401, and Detail Specification n° 3401/065.		
Parameter limit and special requirement : See Detail Specification ESCC 3401/065 Compression force : 40 N } mini Contact displacement : ≤ 0,3 mm		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

A minimum of 20 %, but not less than five of the contacts in each connector, shall be tested.

Results :

Contact Retention Test has been performed successfully, all contacts tested withstood specified retention forces and contact displacement :

– Maxi contact displacement measured : 0,149 mm.

For details, see annex III.

REPORT SUMMARY SHEET

Test : ENDURANCE			
a) Initial Measurements : Low Level Contact Resistance	Paragraph 9.1.1.3	Lot Acceptance Level II	Paragraph 9.18
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.			
Parameter limit and special requirement : Contact resistance does not exceed 12 mΩ (Rcl).			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

On mated connectors sets

a) <u>Initial Measurements</u>

Sample Connector	Low Level Contact Resistance (mΩ) (paragraph 9.1.1.3)											
	MHD 100 n° 4			MHD 100 n° 5			MHD 100 n° 9			MHD 100 n° 10		
	Dir	Inv	Avg	Dir	Inv	Avg	Dir	Inv	Avg	Dir	Inv	Avg
Min	7,59	7,76	7,68	7,59	7,65	7,62	8,92	8,93	8,99	8,33	8,29	8,31
Max	10,60	10,88	10,65	10,87	10,69	10,74	10,70	10,67	10,63	10,78	11,01	10,90
Average	9,18	9,26	9,22	8,97	9,10	9,04	9,75	9,72	9,73	9,50	9,52	9,51

<u>Results</u> :

Low level Contact Resistance measurements have been performed successfully, all contacts tested withstood specified values :

- Maximum Low Level Contact Resistance value measured : 11,01 mΩ.

Low Level Contact Resistance : for details see Annex IV.

REPORT SUMMARY SHEET

Test : ENDURANCE		Lot Acceptance Level II	Paragraph 9.18
a) Initial Measurements : Mating and unmating forces	Paragraph 9.20		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.			
Parameter limit and special requirement : Mating and unmating forces per contact do not exceed 0,70 N.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

a) Initial Measurements

Sample Connector		Mating and unmating forces per contact (in N) (paragraph 9.20)			
		Mating		Unmating	
		Connector	Per contact	Connector	Per contact
MHD 100 n° 4	1. 4.	25,64 27,02	0,26 0,27	22,30 23,56	0,22 0,24
MHD 100 n° 5	1. 4.	28,34 29,95	0,28 0,30	24,23 25,42	0,24 0,25
MHD 100 n° 9	1. 4.	29,44 30,06	0,29 0,30	26,23 26,62	0,26 0,27
MHD 100 n° 10	1. 4.	31,55 31,83	0,32 0,32	28,14 28,26	0,28 0,28

Note : ***1.*** *= First cycle measure.*
4. *= Fourth cycle measure.*

Results :

Mating and unmating forces have been performed successfully, and withstood specified values:

- Maximum value recorded : 0,32 N/contact.

REPORT SUMMARY SHEET

Test : ENDURANCE b) Procedure c) Final Inspection	Lot Acceptance Level II	Paragraph 9.18
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.		
Parameter limit and special requirement : Visual inspection X 10 magnification : No mechanical defect.		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

b) Procedure

Mated wired connectors sets shall be mated and unmated 100 times.
The axis of the pin contacts and mating receptacle contacts shall coïncide during mating and unmating. The mating/unmating speed shall be 5mm/second maximum and the cycling rate shall be 8 cycles/minute maximum.

Summary of results

c) Final Inspection

Endurance Test has been performed successfully.

We do not make appear cracking, breaking or mechanical defect. The connectors show no evidence of physical damage.

REPORT SUMMARY SHEET

Test : ENDURANCE		Lot Acceptance Level II	Paragraph 9.18
d) Final Measurements : **Mating and unmating forces**	**Paragraph 9.20**		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.			
Parameter limit and special requirement : Mating and unmating forces per contact do not exceed 0,70 N.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

d) <u>Final Measurements</u>:

Sample Connector		Mating and unmating forces per contact (in N) (paragraph 9.20)			
		Mating		Unmating	
		Connector	Per contact	Connector	Per contact
MHD 100 n° 4	1.	39,26	0,39	33,20	0,33
	4.	38,27	0,38	32,89	0,33
MHD 100 n° 5	1.	44,99	0,45	38,60	0,39
	4.	43,87	0,44	37,93	0,38
MHD 100 n° 9	1.	42,15	0,42	36,29	0,36
	4.	40,72	0,41	35,65	0,36
MHD 100 n° 10	1.	43,89	0,44	37,93	0,38
	4.	41,81	0,42	36,49	0,36

<u>Note</u> : ***1.*** *= First cycle measure.*
4. *= Fourth cycle measure.*

<u>Results :</u>

Mating and Unmating Forces have been performed successfully, and withstood specified values :
- Maximum value recorded : 0,45 N / contact.

REPORT SUMMARY SHEET

Test : ENDURANCE			
a) Final Measurements : Low Level Contact Resistance	Paragraph 9.1.1.3	Lot Acceptance Level II	Paragraph 9.18
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.			
Parameter limit and special requirement : Low level contact resistance does not exceed 12 mΩ (Rcl). Low level contact resistance drift does not exceed 6,0 mΩ (ΔRcl).			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

On mated connectors sets

d) <u>Final Measurements</u>

Sample Connector	Low Level Contact Resistance (mΩ) (paragraph 9.1.1.3)											
	MHD 100 n° 4			MHD 100 n° 5			MHD 100 n° 9			MHD 100 n° 10		
	Dir	Inv	Avg	Dir	Inv	Avg	Dir	Inv	Avg	Dir	Inv	Avg
Min	8,35	8,45	8,40	7,90	7,96	7,93	8,05	8,00	8,03	8,14	8,30	8,22
Max	11,12	11,24	11,18	10,96	11,01	10,99	10,99	10,96	10,92	11,05	11,05	11,00
Average	9,96	9,97	9,97	9,87	9,85	9,86	9,83	9,79	9,81	9,71	9,74	9,73

<u>Results</u> :

Low Level and Drift of Low Level Contact Resistance measurements have been performed successfully, all contacts tested withstood specified values:

- Maximum Low Level Contact Resistance value measured : 11,24 mΩ.
- Maximum Drift of Low Level Contact Resistance value measured : 2,12 mΩ.

Low Level Contact Resistance and Drift : for details see Annex IV.

REPORT SUMMARY SHEET

Test : ENDURANCE		Lot Acceptance Level II	Paragraph 9.18
d) Final measurements Insulation Resistance	**Paragraph 9.1.1.1**		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065, according to IEC Publication 512-2, test 3a, method B.			
Parameter limit and special requirement : Unmated connectors. Minimum value of insulation resistance : 1 x 10^4 MΩ.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

Test conditions :

- Temperature : 21,5 ° C
- Relative humidity : 40,2 %
- Barometric pressure : 752 mm of mercury

Insulation resistance measured : between a contact and the other contacts closed to the metallic parts around external dimensions of insulator.

Summary of results

Insulation resistance (in MΩ)

Sample Connectors		Dispersion
MHD 100 - n° 4	Receptacle	4,06 x 10^7 to 7,16 x 10^8 MΩ
MHD 100 - n° 5		4,02 x 10^7 to 3,82 x 10^8 MΩ
MHD 100 - n° 9		1,33 x 10^7 to 6,29 x 10^8 MΩ
MHD 100 - n° 10		1,21 x 10^7 to 8,11 x 10^8 MΩ

Results :

Insulation Resistance measurements after Endurance test have been performed successfully, all contacts tested withstood specified Minimum values :

- Minimum value measured : 1,21 x 10^7 MΩ.

REPORT SUMMARY SHEET

Test : ENDURANCE		Lot Acceptance Level II	Paragraph 9.18
d) Final measurements Voltage Proof (sea level)	**Paragraph 9.1.1.2**		
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065, according to IEC Publication 512-2, test 4a, method B.			
Parameter limit and special requirement : Unmated connectors Dielectric withstanding voltage : 800 Vrms Leakage current (I_L): 1,0 mA Maxi.			
Sample description : For details see pages 5 and 6.			

Measured values or comments :

Test conditions :

- Temperature : 22,1 ° C
- Relative humidity : 42,4 %
- Barometric pressure : 751 mm of mercury

Point of application :

Between a contact and the all other contacts closed to the metallic parts around external dimensions of insulator.

Results :

Voltage Proof Test after Endurance has been performed successfully, all contacts tested withstood specified value :

- No breakdown of insulation or flashover : I_L < 1,0 mA.

REPORT SUMMARY SHEET

<table>
<tr><td colspan="2">Test : ENDURANCE</td><td rowspan="2">Lot Acceptance Level II</td><td rowspan="2">Paragraph 9.18</td></tr>
<tr><td>Visual Inspection After Tests</td><td>Paragraph 9.7</td></tr>
<tr><td colspan="4">Specification and test method :
ESCC Basic Specifications n° 20500 and 2053400.</td></tr>
<tr><td colspan="4">Parameter limit and special requirement :
Without.</td></tr>
<tr><td colspan="4">Sample description : For details see pages 5 and 6.</td></tr>
</table>

Measured values or comments :

The visual inspection does not make appear :

- Foreign particles and contamination on all external surfaces.
- Corrosion, peeling, cracks of plating.
- Colouring change of plating, insulator and marking.

REPORT SUMMARY SHEET

Test : SEAL TEST	Lot Acceptance Level II	Paragraph 9.9
Specification and test method : ESCC Generic Specification n° 3401 and see deviation in Detail Specification n° 3401/065.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 5 and 6		

Measured values or comments

Test not applicable (this test is only applicable to hermetically sealed connectors).

REPORT SUMMARY SHEET

Test : JOINT STRENGTH	Lot Acceptance Level II	Paragraph 9.15
Specification and test method : ESCC Generic Specification n° 3401.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 5 and 6.		

Measured values or comments

Test not applicable to Solder Contacts :

- ESCC Generic Specification n° 3401, para. 9.15.1 page 31.

REPORT SUMMARY SHEET

Test : ENGAGEMENT AND SEPARATION FORCES (10 Contacts sets)	Lot Acceptance Level II	Paragraph 9.28
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.		
Parameter limit and special requirement : See below.		
Sample description : For details see pages 5 and 6.		

Measurement values or comments :

Test not applicable to male contact.

REPORT SUMMARY SHEET

Test : OVERSIZE PIN EXCLUSION (10 Contacts sets)	Lot Acceptance Level II	Paragraph 9.29
Specification and test method : ESCC Generic Specification n° 3401 and Detail Specification n° 3401/065.		
Parameter limit and special requirement : See Below.		
Sample description : For details see pages 5 and 6.		

Measurement values or comments :

Test not applicable to male contact.

REPORT SUMMARY SHEET

Test : PROBE DAMAGE TEST (Contacts sets)	Lot Acceptance Level II	Paragraph 9.30
Specification and test method : ESCC Generic Specification n° 3401 and see deviation in Detail Specification n° 3401/065.		
Parameter limit and special requirement : Without.		
Sample description : For details see pages 5 and 6.		

Measured values or comments :

Test not applicable :

- ESCC Detail Specification n° 3401/065.

CONCLUSION OF LOT ACCEPTANCE TESTS LEVEL II :

The Connectors and Contacts type MHD 100 have passed the Lot Acceptance Tests Level II Successfully.

Lot Acceptance Tests Document

Document n° 334454

20th December 2019

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Laboratory Department

Pages 0 to 3

ANNEX I

Connector type MHD 100

(PCB Contacts)

List of Test and Measuring Equipment Used

Test	Specification and paragraph	Equipment
Visual inspection	**Chart V Level II 9.7**	- Binoculars Nachet magnification X 10.
Wiring (PCB Solder Contacts)	**Chart V Level II 9.10.1**	- Soldering iron ERSA, type Digital 2000 A, 80 W. - Tinlead alloy solder RADIEL Fondam 60/40 with a core of non-activated rosin. - Temperature calibrated with data acquisition system National Instruments, with LABVIEW software (E.01/T), and thermocouples « type K » -70 °C to 1000 °C, accuracy ± 1 °C. - Binoculars Nachet magnification X 10.
Rapid Change of Temperature	**Chart V Level II 9.16**	**<u>Rapid change of temperature</u> : 9.16** - Automatic transition temperature chambers VÖTSCH, type VT 7012 S2 (T.15/AE) : - Cold chamber : -80 to +70 °C. - Hot chamber : +50 to +220 °C. - Temperature calibrated with data acquisition system National Instruments, with LABVIEW software, and thermocouples « type K » -70 °C to 1000 °C, accuracy ± 1 °C. **<u>Final Measurements</u> : 9.16** **Insulation Resistance After Test : 9.1.1.1** - Megohmeter SEFELEC, type M 1500 P, 100 Ω to 2 X 10^9 MΩ Voltage test 500 V d.c. (36/E) - Standard resistance 10^2, 10^3, 10^6 and 10^8 MΩ - Thermometer hygrometer recorder, type SKL200THII, 10 to 40 °C and 0 to 100 % Rh (57/T). - Barometer with mercury scale. **Voltage Proof After Test (sea level) : 9.1.1.2** - Dielectrometer SEFELEC RMG15AC, 0 to 15 kV (14/E). - Voltage divider SEFELEC type DHT 10 N, 0 to 15 kV. Calibrated by A+ Metrologie Company. - Thermometer hygrometer recorder, type SKL200THII, 10 to 40 °C and 0 to 100 % Rh (57/T). - Barometer with mercury scale. **Visual Inspection After Tests : 9.7** - See Level II (Visual Inspection).

Test	Specification and paragraph	Equipment
Maintenance Aging	**Chart V Level II 9.27**	- Test not applicable : ESCC Detail Specification n° 3401/065, deviation (d), para. 4.2.5, page 31.
Contact Retention (in insert)	**Chart V Level II 9.17**	- Digital dynamometer leakage CHATILLON, type DFGS 50, full scale 0 to 250 N, Calibrated by A+ Metrologie Company (431/F). - Digital dial gauge ROCH-Etalon, type 4639, full scale 0 to 30 mm, Calibrated by A+ Metrologie Company (E.019/D/2).
Endurance	**Chart V Level II 9.18**	**a) Initial Measurements :** **Low Level Contact Resistance : 9.1.1.3.** - Standard resistance of 1 mΩ AOIP, accuracy 0,05%. - Standard resistance of 10 mΩ CROPICO LTD, accuracy 0,02%. - Milliohmeter SEFELEC MGR10, accuracy 1/100 mΩ (15/E). **Mating and unmating forces : 9.20.** - Mating and unmating test mounting. - Force cell SYNTAX 3R (061/F/1), full scale 0 to 5000 N, Calibrated by CERIB. **Endurance : 9.18.** - Mating and unmating test mounting. - Force cell SYNTAX 3R (061/F/1), full scale 0 to 5000 N, Calibrated by CERIB. **c) Final Inspection :** - See Level II (Visual Inspection). **d) Final measurements :** **Mating and unmating forces : 9.20.** - See Level II (Endurance, Initial Measurements). **Low Level Contact Resistance : 9.1.1.3.** - See Level II (Initial Measurements).

Test	Specification and paragraph	Equipment
Endurance *(continued)*	**Chart V Level II 9.18**	**Mated shell Conductivity : 9.1.1.4** - Test not applicable : See Level II (Endurance, Initial measurements). **Insulation Resistance : 9.1.1.1.** - See Level II (Rapid Change of Temperature). **Voltage Proof (sea level) : 9.1.1.2.** - See Level II (Rapid Change of Temperature). **Visual Inspection (after tests) : 9.7.** - See Level II (Visual Inspection).

Visual Inspection	**Chart V Level II 9.7**	- See Level II (Visual Inspection).
Engagement and Separation Forces	**Chart V Level II 9.28** *(Contacts Sets)*	- Pins gauges : ϕ 0,48 } + 0 mm. } – 0,005 mm. ϕ 0,50 } + 0,005 mm. } – 0 mm. - Digital dynamometer CHATILLON, type DFGS, full scale 0 to 10,0 N, Calibrated by A+ Metrologie (063/F).
Oversize Pin Exclusion	**Chart V Level II 9.29** *(Contacts Sets)*	- Pin gauge ϕ 0,60 ± 0,002 mm. - Digital dynamometer CHATILLON, type DGGS, full scale 0 to 10,0 N, Calibrated by A+ Metrologie.
Probe Damage Test	**Chart V Level II 9.30** *(Contacts Sets)*	- Test not applicable : ESCC Detail Specification n° 3401/065, deviation (e), para. 4.2.5, page 31.

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Pages 0 to 4

ANNEX II

Connector type MHD 100

(PCB Contacts)

CONTACT RETENTION (in insert)

LAT 2 : CONTACT RETENTION (in insert) (9.17)

Contact displacement : ≤ 0,30 mm

Values in mm

MHD 100 receptacle n° 4							
Compression Force (40 N)							
Ct n°	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**
A1	0,105	**A6**	0,102	**F9**	0,125	**F4**	0,076
A11	0,106	**A16**	0,124	**F19**	0,139	**F14**	0,096
A21	0,149	**A26**	0,146	**F29**	0,138	**F24**	0,117
A31	0,139	**A36**	0,112	**F39**	0,103	**F34**	0,111
A41	0,113	**A46**	0,079	**F49**	0,090	**F44**	0,073
mini	0,073						
Maxi	0,149						

Maximum value recorded : 0,149 mm.

LAT 2 : CONTACT RETENTION (in insert) (9.17)

Contact displacement : ≤ 0,30 mm

Values in mm

MHD 100 receptacle n° 5							
Compression Force (40 N)							
Ct n°	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**
A1	0,026	**A6**	0,080	**F9**	0,088	**F4**	0,055
A11	0,099	**A16**	0,085	**F19**	0,118	**F14**	0,077
A21	0,116	**A26**	0,123	**F29**	0,081	**F24**	0,104
A31	0,100	**A36**	0,107	**F39**	0,065	**F34**	0,063
A41	0,064	**A46**	0,042	**F49**	0,070	**F44**	0,055
mini	0,026						
Maxi	0,123						

Maximum value recorded : 0,123 mm.

LAT 2 : CONTACT RETENTION (in insert) (9.17)

Contact displacement : ≤ 0,30 mm

Values in mm

MHD 100 receptacle n° 9							
Compression Force (40 N)							
Ct n°	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**
A1	0,095	**A6**	0,087	**F9**	0,088	**F4**	0,071
A11	0,052	**A16**	0,116	**F19**	0,123	**F14**	0,081
A21	0,115	**A26**	0,122	**F29**	0,076	**F24**	0,068
A31	0,054	**A36**	0,108	**F39**	0,041	**F34**	0,068
A41	0,102	**A46**	0,075	**F49**	0,085	**F44**	0,057
mini	0,041						
Maxi	0,123						

Maximum value recorded : 0,123 mm.

LAT 2 : CONTACT RETENTION (in insert) (9.17)

Contact displacement : ≤ 0,30 mm

Values in mm

MHD 100 receptacle n° 10							
Compression Force (40 N)							
Ct n°	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**	**Ct n°**	**Displacement (in mm)**
A1	0,080	**A6**	0,035	**F9**	0,093	**F4**	0,036
A11	0,102	**A16**	0,094	**F19**	0,078	**F14**	0,090
A21	0,120	**A26**	0,099	**F29**	0,132	**F24**	0,092
A31	0,003	**A36**	0,129	**F39**	0,084	**F34**	0,091
A41	0,082	**A46**	0,048	**F49**	0,084	**F44**	0,042
mini	0,003						
Maxi	0,132						

Maximum value recorded : 0,132 mm.

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ANNEX III

Connector type MHD 100

(PCB Contacts)

ENDURANCE TEST

A) Initial measurements
D) Final measurements

LAT 2 : ENDURANCE (9.18)

a) Initial measurements

Low Level Contact Resistance (Rcl), before Endurance (in mΩ).

MHD 100 n° 4							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	8,40	8,61	8,51	**A2**	9,11	9,34	9,23
A3	9,22	9,34	9,28	**A4**	9,42	9,61	9,52
A5	8,81	8,99	8,90	**A6**	8,64	8,70	8,67
A7	8,47	8,59	8,53	**A8**	8,83	8,93	8,88
A9	8,31	8,46	8,39	**A10**	8,55	8,65	8,60
A11	8,27	8,39	8,33	**A12**	9,16	9,28	9,22
A13	8,30	8,39	8,35	**A14**	8,57	8,63	8,60
A15	8,31	8,39	8,35	**A16**	9,59	9,68	9,64
A17	7,96	8,10	8,03	**A18**	8,91	9,03	8,97
A19	8,01	8,15	8,08	**A20**	9,23	9,32	9,28
A21	8,05	8,22	8,14	**A22**	8,60	8,70	8,65
A23	8,07	8,19	8,13	**A24**	9,18	9,23	9,21
A25	8,09	8,24	8,17	**A26**	9,01	9,05	9,03
A27	7,59	7,76	7,68	**A28**	9,28	9,37	9,33
A29	8,16	8,29	8,23	**A30**	8,96	9,02	8,99
A31	7,89	7,99	7,94	**A32**	8,92	9,05	8,99
A33	8,09	8,27	8,18	**A34**	8,97	9,03	9,00
A35	7,78	7,91	7,85	**A36**	9,02	9,10	9,06
A37	8,09	8,26	8,18	**A38**	8,65	8,70	8,68
A39	7,99	8,13	8,06	**A40**	8,57	8,66	8,62
A41	8,05	8,15	8,10	**A42**	8,31	8,43	8,37
A43	8,18	8,29	8,24	**A44**	8,65	8,73	8,69
A45	8,35	8,46	8,41	**A46**	8,88	8,96	8,92
A47	8,44	8,55	8,50	**A48**	8,84	8,89	8,87
A49	8,27	8,37	8,32	**A50**	9,00	9,13	9,07

MHD 100 n° 4							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	9,73	9,97	9,85	**F2**	10,40	10,88	10,64
F3	10,49	10,36	10,43	**F4**	9,58	9,35	9,47
F5	9,88	9,81	9,85	**F6**	10,04	9,89	9,97
F7	9,67	10,03	9,85	**F8**	9,70	9,60	9,65
F9	10,45	10,75	10,60	**F10**	9,92	9,94	9,93
F11	9,59	9,98	9,79	**F12**	10,42	10,20	10,31
F13	9,04	9,38	9,21	**F14**	9,90	9,98	9,94
F15	9,02	8,88	8,95	**F16**	9,51	9,82	9,67
F17	9,88	9,66	9,77	**F18**	9,24	9,42	9,33
F19	9,67	9,47	9,57	**F20**	9,84	9,93	9,89
F21	9,48	9,25	9,37	**F22**	10,02	10,09	10,06
F23	9,33	9,14	9,24	**F24**	9,59	9,61	9,60
F25	9,51	9,98	9,75	**F26**	10,60	10,70	10,65
F27	9,83	10,13	9,98	**F28**	10,14	10,10	10,12
F29	10,23	10,48	10,36	**F30**	9,49	9,56	9,53
F31	9,04	9,16	9,10	**F32**	10,12	10,17	10,15
F33	9,22	9,38	9,30	**F34**	10,37	10,41	10,39
F35	9,85	10,01	9,93	**F36**	10,16	10,19	10,18
F37	9,54	9,65	9,60	**F38**	10,11	10,26	10,19
F39	9,56	9,72	9,64	**F40**	9,80	9,94	9,87
F41	9,43	9,47	9,45	**F42**	10,17	10,13	10,15
F43	9,92	9,88	9,90	**F44**	9,34	9,29	9,32
F45	9,66	9,50	9,58	**F46**	10,44	10,28	10,36
F47	9,86	9,67	9,77	**F48**	9,67	9,34	9,51
F49	9,77	9,55	9,66	**F50**	10,05	9,71	9,88
				Mini	7,59	7,76	7,68
				Maxi	10,60	10,88	10,65
				Avg.	9,18	9,26	9,22

MHD 100 n° 5							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	8,74	8,80	8,77	**A2**	9,32	9,27	9,30
A3	8,22	8,60	8,41	**A4**	9,81	9,93	9,87
A5	8,23	8,42	8,33	**A6**	8,64	8,69	8,67
A7	8,36	8,48	8,42	**A8**	8,91	9,06	8,99
A9	8,23	8,55	8,39	**A10**	8,94	8,89	8,92
A11	7,85	8,05	7,95	**A12**	8,99	9,11	9,05
A13	7,96	8,10	8,03	**A14**	8,76	8,87	8,82
A15	9,14	9,24	9,19	**A16**	8,42	8,49	8,46
A17	8,12	8,24	8,18	**A18**	8,49	8,60	8,55
A19	7,95	8,09	8,02	**A20**	8,58	8,65	8,62
A21	8,09	8,26	8,18	**A22**	8,95	9,05	9,00
A23	8,35	8,52	8,44	**A24**	8,66	8,85	8,76
A25	7,80	7,98	7,89	**A26**	8,45	8,75	8,60
A27	8,37	8,48	8,43	**A28**	8,33	8,57	8,45
A29	7,78	7,95	7,87	**A30**	8,21	8,41	8,31
A31	8,11	8,09	8,10	**A32**	8,33	8,69	8,51
A33	7,59	7,65	7,62	**A34**	8,73	9,00	8,87
A35	7,64	7,71	7,68	**A36**	8,93	9,07	9,00
A37	8,35	8,29	8,32	**A38**	8,72	8,80	8,76
A39	8,19	8,25	8,22	**A40**	8,74	8,95	8,85
A41	8,60	8,49	8,55	**A42**	9,00	9,14	9,07
A43	8,05	8,02	8,04	**A44**	8,77	8,91	8,84
A45	8,23	8,31	8,27	**A46**	8,45	8,60	8,53
A47	8,83	8,81	8,82	**A48**	8,96	9,11	9,04
A49	8,52	8,63	8,58	**A50**	9,10	9,21	9,16

MHD 100 n° 5							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	10,87	10,61	10,74	**F2**	9,07	9,47	9,27
F3	9,91	9,61	9,76	**F4**	9,24	9,42	9,33
F5	9,53	9,32	9,43	**F6**	8,79	8,95	8,87
F7	9,80	9,75	9,78	**F8**	9,20	9,01	9,11
F9	9,39	9,60	9,50	**F10**	8,94	9,30	9,12
F11	8,82	8,97	8,90	**F12**	8,22	8,57	8,40
F13	9,93	10,10	10,02	**F14**	9,40	9,65	9,53
F15	9,21	9,61	9,41	**F16**	9,55	9,73	9,64
F17	10,02	10,21	10,12	**F18**	9,21	9,40	9,31
F19	9,64	9,40	9,52	**F20**	8,78	9,04	8,91
F21	9,61	9,75	9,68	**F22**	9,22	9,52	9,37
F23	9,64	9,83	9,74	**F24**	8,69	9,02	8,86
F25	9,64	9,82	9,73	**F26**	9,18	9,22	9,20
F27	9,37	9,48	9,43	**F28**	9,26	9,54	9,40
F29	9,94	9,93	9,94	**F30**	8,45	8,75	8,60
F31	9,49	9,52	9,51	**F32**	8,92	9,18	9,05
F33	9,27	9,30	9,29	**F34**	9,03	9,41	9,22
F35	9,72	9,70	9,71	**F36**	9,71	9,95	9,83
F37	10,02	10,02	10,02	**F38**	9,24	9,53	9,39
F39	9,97	10,04	10,01	**F40**	9,02	9,23	9,13
F41	10,21	10,10	10,16	**F42**	9,49	9,54	9,52
F43	10,32	10,12	10,22	**F44**	9,58	9,40	9,49
F45	10,18	10,39	10,29	**F46**	9,48	9,98	9,73
F47	10,51	10,69	10,60	**F48**	9,06	9,39	9,23
F49	9,95	10,15	10,05	**F50**	9,15	9,50	9,33
				Mini	7,59	7,65	7,62
				Maxi	10,87	10,69	10,74
				Avg.	8,97	9,10	9,04

MHD 100 n° 9							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	10,69	10,56	10,63	**A2**	9,95	10,30	10,13
A3	9,76	9,87	9,82	**A4**	9,08	9,05	9,07
A5	9,57	9,50	9,54	**A6**	10,52	10,41	10,47
A7	9,83	9,80	9,82	**A8**	9,42	9,47	9,45
A9	10,35	10,25	10,30	**A10**	9,30	9,15	9,23
A11	10,55	10,27	10,41	**A12**	9,69	9,47	9,58
A13	9,77	9,53	9,65	**A14**	10,11	10,05	10,08
A15	10,06	9,87	9,97	**A16**	9,05	8,93	8,99
A17	9,79	9,54	9,67	**A18**	9,19	9,05	9,12
A19	9,86	9,67	9,77	**A20**	9,49	9,32	9,41
A21	9,93	9,82	9,88	**A22**	9,54	9,46	9,50
A23	10,33	10,21	10,27	**A24**	9,49	9,29	9,39
A25	10,52	10,45	10,49	**A26**	9,26	9,13	9,20
A27	9,98	9,73	9,86	**A28**	9,56	9,41	9,49
A29	9,92	9,87	9,90	**A30**	9,14	9,12	9,13
A31	9,26	9,08	9,17	**A32**	9,29	9,19	9,24
A33	9,99	9,81	9,90	**A34**	9,27	9,22	9,25
A35	9,90	9,86	9,88	**A36**	9,09	9,03	9,06
A37	9,94	9,89	9,92	**A38**	9,14	9,01	9,08
A39	9,58	9,53	9,56	**A40**	9,58	9,46	9,52
A41	9,99	9,91	9,95	**A42**	9,42	9,38	9,40
A43	9,32	9,12	9,22	**A44**	9,18	9,32	9,25
A45	10,05	9,95	10,00	**A46**	10,30	10,07	10,19
A47	10,19	10,23	10,21	**A48**	10,27	10,00	10,14
A49	9,73	9,55	9,64	**A50**	10,70	10,49	10,60

MHD 100 n° 9							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	9,51	9,23	9,37	**F2**	9,60	9,47	9,54
F3	10,09	9,85	9,97	**F4**	10,38	10,30	10,34
F5	10,37	10,44	10,41	**F6**	9,45	9,50	9,48
F7	9,81	9,56	9,69	**F8**	9,48	9,52	9,50
F9	10,27	10,29	10,28	**F10**	9,83	9,89	9,86
F11	9,83	9,97	9,90	**F12**	9,99	10,05	10,02
F13	10,27	10,67	10,47	**F14**	9,19	9,32	9,26
F15	9,35	9,70	9,53	**F16**	9,25	9,51	9,38
F17	10,51	10,47	10,49	**F18**	9,81	10,07	9,94
F19	10,29	10,33	10,31	**F20**	8,92	9,19	9,06
F21	10,21	10,52	10,37	**F22**	9,09	9,34	9,22
F23	10,29	10,40	10,35	**F24**	8,95	9,14	9,05
F25	10,11	10,21	10,16	**F26**	9,44	9,76	9,60
F27	10,09	10,00	10,05	**F28**	9,29	9,56	9,43
F29	9,72	9,83	9,78	**F30**	9,22	9,04	9,13
F31	10,21	10,39	10,30	**F32**	9,71	9,44	9,58
F33	9,44	9,52	9,48	**F34**	9,78	9,33	9,56
F35	9,52	9,88	9,70	**F36**	9,23	9,47	9,35
F37	9,77	9,95	9,86	**F38**	9,73	9,80	9,77
F39	9,95	10,15	10,05	**F40**	9,98	9,93	9,96
F41	9,74	9,63	9,69	**F42**	9,95	10,17	10,06
F43	9,74	9,99	9,87	**F44**	9,13	9,20	9,17
F45	10,45	10,31	10,38	**F46**	9,38	9,35	9,37
F47	9,47	9,26	9,37	**F48**	9,64	9,62	9,63
F49	9,68	9,33	9,51	**F50**	9,55	9,32	9,44
				Mini	8,92	8,93	8,99
				Maxi	10,70	10,67	10,63
				Avg.	9,75	9,72	9,73

MHD 100 n° 10							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	8,33	8,29	8,31	**A2**	10,01	9,80	9,91
A3	9,44	9,34	9,39	**A4**	9,83	9,90	9,87
A5	8,88	8,80	8,84	**A6**	9,39	9,82	9,61
A7	9,49	9,43	9,46	**A8**	8,81	9,10	8,96
A9	9,28	9,17	9,23	**A10**	9,49	9,82	9,66
A11	9,02	8,94	8,98	**A12**	9,05	9,39	9,22
A13	9,19	9,05	9,12	**A14**	9,40	9,82	9,61
A15	9,05	8,93	8,99	**A16**	9,18	9,01	9,10
A17	9,13	8,95	9,04	**A18**	10,22	10,11	10,17
A19	9,28	9,36	9,32	**A20**	10,34	10,25	10,30
A21	9,66	9,75	9,71	**A22**	10,57	10,62	10,60
A23	9,32	9,42	9,37	**A24**	10,13	10,05	10,09
A25	9,24	9,32	9,28	**A26**	10,66	10,50	10,58
A27	9,32	9,42	9,37	**A28**	10,34	10,21	10,28
A29	9,47	9,61	9,54	**A30**	10,04	9,97	10,01
A31	9,25	9,44	9,35	**A32**	10,04	9,98	10,01
A33	9,16	9,37	9,27	**A34**	9,39	9,12	9,26
A35	9,20	9,39	9,30	**A36**	9,39	9,08	9,24
A37	9,09	9,24	9,17	**A38**	9,43	9,11	9,27
A39	8,84	9,02	8,93	**A40**	9,43	9,12	9,28
A41	9,48	9,66	9,57	**A42**	8,69	8,33	8,51
A43	9,27	9,47	9,37	**A44**	9,09	8,89	8,99
A45	9,41	9,61	9,51	**A46**	9,84	9,64	9,74
A47	9,17	9,38	9,28	**A48**	9,90	9,72	9,81
A49	9,02	9,20	9,11	**A50**	9,46	9,23	9,35

MHD 100 n° 10							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	10,55	10,67	10,61	**F2**	9,59	9,56	9,58
F3	10,05	10,25	10,15	**F4**	9,08	8,75	8,92
F5	9,62	9,92	9,77	**F6**	9,45	9,51	9,48
F7	9,64	9,80	9,72	**F8**	9,61	9,28	9,45
F9	9,87	10,06	9,97	**F10**	9,41	9,55	9,48
F11	9,59	9,76	9,68	**F12**	9,40	9,64	9,52
F13	9,77	9,97	9,87	**F14**	8,77	8,96	8,87
F15	9,70	9,93	9,82	**F16**	9,02	9,21	9,12
F17	9,40	9,09	9,25	**F18**	9,59	9,34	9,47
F19	9,37	9,23	9,30	**F20**	9,76	9,36	9,56
F21	9,76	9,74	9,75	**F22**	8,99	8,73	8,86
F23	9,05	9,24	9,15	**F24**	9,27	9,63	9,45
F25	9,15	9,22	9,19	**F26**	9,13	9,51	9,32
F27	9,16	9,67	9,42	**F28**	9,09	9,48	9,29
F29	9,11	9,51	9,31	**F30**	9,41	9,43	9,42
F31	10,64	10,32	10,48	**F32**	8,90	8,97	8,94
F33	9,58	9,78	9,68	**F34**	9,12	9,18	9,15
F35	9,25	9,28	9,27	**F36**	9,96	9,51	9,74
F37	9,87	10,10	9,99	**F38**	9,99	9,92	9,96
F39	10,78	11,01	10,90	**F40**	9,02	9,27	9,15
F41	9,70	9,86	9,78	**F42**	9,23	9,69	9,46
F43	9,88	10,00	9,94	**F44**	9,31	9,22	9,27
F45	10,33	10,30	10,32	**F46**	9,29	9,13	9,21
F47	9,81	9,64	9,73	**F48**	9,81	9,61	9,71
F49	10,62	10,35	10,49	**F50**	9,14	9,19	9,17
				Mini	8,33	8,29	8,31
				Maxi	10,78	11,01	10,90
				Avg.	9,50	9,52	9,51

LAT 2 : ENDURANCE (9.18)

d) Final measurements

Low Level Contact Resistance (Rcl), before Endurance (in mΩ).

MHD 100 n°4							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	9,80	9,60	9,70	**A2**	9,49	9,29	9,39
A3	9,70	9,67	9,69	**A4**	10,44	10,35	10,40
A5	9,61	9,52	9,57	**A6**	9,92	9,86	9,89
A7	9,31	9,47	9,39	**A8**	9,97	9,96	9,97
A9	9,52	9,86	9,69	**A10**	9,64	9,68	9,66
A11	9,17	9,49	9,33	**A12**	10,17	10,22	10,20
A13	9,79	9,72	9,76	**A14**	9,70	9,78	9,74
A15	9,53	9,40	9,47	**A16**	10,00	10,20	10,10
A17	9,32	9,22	9,27	**A18**	9,94	10,18	10,06
A19	9,23	9,14	9,19	**A20**	10,04	10,26	10,15
A21	9,48	9,34	9,41	**A22**	9,70	9,96	9,83
A23	9,50	9,53	9,52	**A24**	10,25	10,18	10,22
A25	9,45	9,47	9,46	**A26**	10,17	10,15	10,16
A27	8,58	8,62	8,60	**A28**	10,53	10,49	10,51
A29	9,15	9,23	9,19	**A30**	9,82	9,91	9,87
A31	8,81	8,94	8,88	**A32**	10,29	10,34	10,32
A33	8,96	9,05	9,01	**A34**	10,33	10,43	10,38
A35	8,94	9,07	9,01	**A36**	10,20	10,43	10,32
A37	8,60	8,67	8,64	**A38**	9,91	10,10	10,01
A39	8,96	9,09	9,03	**A40**	9,66	9,84	9,75
A41	8,87	9,02	8,95	**A42**	9,67	9,79	9,73
A43	9,23	9,37	9,30	**A44**	10,32	10,41	10,37
A45	8,35	8,45	8,40	**A46**	10,09	10,12	10,11
A47	8,74	8,79	8,77	**A48**	10,40	10,38	10,39
A49	8,66	8,69	8,68	**A50**	10,31	10,26	10,29

MHD 100 n° 4							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	9,80	10,02	9,91	**F2**	9,49	9,83	9,66
F3	10,73	10,48	10,61	**F4**	9,70	9,76	9,73
F5	10,60	10,25	10,43	**F6**	9,20	9,27	9,24
F7	10,77	10,33	10,55	**F8**	8,81	8,99	8,90
F9	11,12	11,24	11,18	**F10**	10,01	10,07	10,04
F11	10,59	10,60	10,60	**F12**	10,19	10,42	10,31
F13	10,72	10,68	10,70	**F14**	10,88	10,61	10,75
F15	10,39	10,47	10,43	**F16**	10,33	10,21	10,27
F17	10,56	10,48	10,52	**F18**	10,87	10,60	10,74
F19	10,59	10,55	10,57	**F20**	10,97	10,75	10,86
F21	10,27	10,43	10,35	**F22**	10,59	10,44	10,52
F23	10,62	10,68	10,65	**F24**	10,20	10,00	10,10
F25	10,93	10,85	10,89	**F26**	10,80	10,60	10,70
F27	11,09	11,13	11,11	**F28**	10,57	10,48	10,53
F29	10,66	10,76	10,71	**F30**	10,09	9,91	10,00
F31	10,06	10,21	10,14	**F32**	10,56	10,33	10,45
F33	10,62	10,55	10,59	**F34**	10,69	10,50	10,60
F35	11,05	10,95	11,00	**F36**	10,76	10,51	10,64
F37	10,91	10,70	10,81	**F38**	10,80	10,58	10,69
F39	10,47	10,29	10,38	**F40**	9,84	9,54	9,69
F41	9,72	9,30	9,51	**F42**	9,67	9,64	9,66
F43	10,89	10,50	10,70	**F44**	9,32	9,73	9,53
F45	10,41	10,78	10,60	**F46**	9,38	9,66	9,52
F47	10,19	10,51	10,35	**F48**	9,25	9,68	9,47
F49	9,44	9,69	9,57	**F50**	9,57	9,80	9,69
				Mini	8,35	8,45	8,40
				Maxi	11,12	11,24	11,18
				Avg.	9,96	9,97	9,97

MHD 100 n° 5							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	9,00	8,88	8,94	**A2**	10,24	10,02	10,13
A3	9,63	9,57	9,60	**A4**	10,59	10,37	10,48
A5	9,33	9,30	9,32	**A6**	9,94	9,78	9,86
A7	9,23	9,14	9,19	**A8**	10,23	10,14	10,19
A9	9,44	9,38	9,41	**A10**	9,95	9,90	9,93
A11	9,06	9,00	9,03	**A12**	10,12	10,02	10,07
A13	9,08	9,00	9,04	**A14**	9,66	9,64	9,65
A15	9,25	9,21	9,23	**A16**	9,47	9,52	9,50
A17	9,21	9,04	9,13	**A18**	10,61	10,57	10,59
A19	8,77	8,63	8,70	**A20**	9,69	9,77	9,73
A21	9,20	9,03	9,12	**A22**	10,20	10,32	10,26
A23	9,00	8,83	8,92	**A24**	9,71	9,88	9,80
A25	8,70	8,62	8,66	**A26**	9,66	9,78	9,72
A27	9,87	9,77	9,82	**A28**	9,79	9,90	9,85
A29	9,90	9,71	9,81	**A30**	10,00	10,14	10,07
A31	9,06	8,92	8,99	**A32**	10,36	10,49	10,43
A33	8,99	8,77	8,88	**A34**	9,83	9,95	9,89
A35	7,90	7,96	7,93	**A36**	9,93	10,08	10,01
A37	8,43	8,54	8,49	**A38**	9,70	9,95	9,83
A39	8,75	8,85	8,80	**A40**	9,61	9,89	9,75
A41	8,90	8,95	8,93	**A42**	10,03	10,25	10,14
A43	9,75	9,78	9,77	**A44**	10,03	10,27	10,15
A45	8,73	8,84	8,79	**A46**	9,69	9,99	9,84
A47	9,31	9,38	9,35	**A48**	10,72	10,92	10,82
A49	8,81	8,79	8,80	**A50**	9,94	10,17	10,06

MHD 100 n° 5							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	10,84	10,78	10,81	**F2**	10,65	10,75	10,70
F3	10,56	10,14	10,35	**F4**	9,49	9,45	9,47
F5	10,21	10,30	10,26	**F6**	10,32	10,24	10,28
F7	10,61	10,31	10,46	**F8**	10,17	10,01	10,09
F9	10,56	10,18	10,37	**F10**	9,80	9,65	9,73
F11	10,68	10,37	10,53	**F12**	9,79	9,60	9,70
F13	10,60	10,56	10,58	**F14**	9,82	9,70	9,76
F15	10,21	10,34	10,28	**F16**	9,96	9,85	9,91
F17	10,32	10,37	10,35	**F18**	10,35	10,25	10,30
F19	10,66	10,78	10,72	**F20**	9,94	9,97	9,96
F21	10,35	10,49	10,42	**F22**	10,05	10,11	10,08
F23	10,96	11,01	10,99	**F24**	10,06	9,92	9,99
F25	10,67	10,80	10,74	**F26**	9,91	9,83	9,87
F27	10,21	10,40	10,31	**F28**	10,19	10,04	10,12
F29	10,32	10,47	10,40	**F30**	10,11	10,05	10,08
F31	10,67	10,91	10,79	**F32**	10,14	10,00	10,07
F33	10,36	10,70	10,53	**F34**	9,40	9,34	9,37
F35	10,54	10,48	10,51	**F36**	10,65	10,48	10,57
F37	10,45	10,71	10,58	**F38**	10,31	10,19	10,25
F39	9,37	9,20	9,29	**F40**	10,40	10,19	10,30
F41	9,79	9,39	9,59	**F42**	10,23	10,03	10,13
F43	9,58	9,47	9,53	**F44**	10,23	9,99	10,11
F45	9,74	9,69	9,72	**F46**	10,01	9,87	9,94
F47	9,93	9,90	9,92	**F48**	10,52	10,20	10,36
F49	9,47	9,78	9,63	**F50**	10,31	9,96	10,14
				Mini	7,90	7,96	7,93
				Maxi	10,96	11,01	10,99
				Avg.	9,87	9,85	9,86

MHD 100 n° 9							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	9,90	9,92	9,91	**A2**	9,20	9,11	9,16
A3	9,33	9,41	9,37	**A4**	9,43	9,47	9,45
A5	9,34	9,32	9,33	**A6**	10,20	10,23	10,22
A7	9,14	9,09	9,12	**A8**	9,67	9,81	9,74
A9	9,06	9,12	9,09	**A10**	10,01	10,08	10,05
A11	9,67	9,73	9,70	**A12**	10,20	10,26	10,23
A13	8,48	8,55	8,52	**A14**	10,32	10,35	10,34
A15	8,39	8,45	8,42	**A16**	9,82	9,79	9,81
A17	8,67	8,74	8,71	**A18**	9,64	9,72	9,68
A19	8,56	8,63	8,60	**A20**	9,76	9,84	9,80
A21	8,76	8,74	8,75	**A22**	10,03	10,09	10,06
A23	9,41	9,31	9,36	**A24**	9,49	9,56	9,53
A25	9,45	9,51	9,48	**A26**	9,54	9,52	9,53
A27	8,17	8,25	8,21	**A28**	9,87	9,91	9,89
A29	8,53	8,50	8,52	**A30**	10,23	10,14	10,19
A31	8,33	8,29	8,31	**A32**	10,28	10,21	10,25
A33	8,79	8,74	8,77	**A34**	10,05	10,11	10,08
A35	9,08	9,14	9,11	**A36**	10,45	10,50	10,48
A37	9,46	9,50	9,48	**A38**	8,68	8,76	8,72
A39	8,48	8,43	8,46	**A40**	9,22	9,25	9,24
A41	8,05	8,00	8,03	**A42**	9,05	9,13	9,09
A43	8,34	8,22	8,28	**A44**	9,68	9,62	9,65
A45	8,76	8,67	8,72	**A46**	9,94	9,90	9,92
A47	8,59	8,57	8,58	**A48**	10,19	10,14	10,17
A49	8,67	8,69	8,68	**A50**	10,38	10,36	10,37

MHD 100 n° 9							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	10,78	10,53	10,66	**F2**	10,59	10,26	10,43
F3	10,34	10,40	10,37	**F4**	10,80	10,78	10,79
F5	10,45	10,20	10,33	**F6**	10,28	10,07	10,18
F7	10,10	10,07	10,09	**F8**	10,20	9,98	10,09
F9	10,95	10,84	10,90	**F10**	10,35	10,68	10,52
F11	10,99	10,73	10,86	**F12**	10,65	10,49	10,57
F13	10,73	10,68	10,71	**F14**	10,99	10,77	10,88
F15	10,05	9,83	9,94	**F16**	9,45	9,68	9,57
F17	10,94	10,61	10,78	**F18**	9,39	9,68	9,54
F19	10,73	10,59	10,66	**F20**	9,53	9,49	9,51
F21	10,95	10,76	10,86	**F22**	9,25	9,07	9,16
F23	10,60	10,65	10,63	**F24**	9,62	9,47	9,55
F25	10,69	10,82	10,76	**F26**	9,58	9,50	9,54
F27	10,87	10,66	10,77	**F28**	10,60	10,58	10,59
F29	10,74	10,66	10,70	**F30**	9,16	9,02	9,09
F31	9,98	10,01	10,00	**F32**	9,62	9,33	9,48
F33	10,41	10,45	10,43	**F34**	10,65	10,42	10,54
F35	10,43	10,50	10,47	**F36**	10,80	10,44	10,62
F37	10,47	10,43	10,45	**F38**	10,33	10,15	10,24
F39	10,91	10,65	10,78	**F40**	10,39	10,20	10,30
F41	10,50	10,42	10,46	**F42**	9,87	9,56	9,72
F43	10,40	10,15	10,28	**F44**	10,02	9,88	9,95
F45	10,88	10,96	10,92	**F46**	9,39	9,29	9,34
F47	10,67	10,63	10,65	**F48**	10,47	10,42	10,45
F49	10,58	10,65	10,62	**F50**	9,48	9,20	9,34
				Mini	8,05	8,00	8,03
				Maxi	10,99	10,96	10,92
				Avg.	9,83	9,79	9,81

MHD 100 n° 10							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
A1	8,74	8,55	8,65	**A2**	9,80	9,91	9,86
A3	9,62	9,47	9,55	**A4**	9,17	9,33	9,25
A5	9,22	9,28	9,25	**A6**	9,77	9,84	9,81
A7	9,10	9,15	9,13	**A8**	8,55	8,81	8,68
A9	8,81	8,87	8,84	**A10**	8,80	9,02	8,91
A11	8,56	8,59	8,58	**A12**	8,74	8,93	8,84
A13	8,32	8,44	8,38	**A14**	9,77	9,88	9,83
A15	8,69	8,83	8,76	**A16**	8,73	8,89	8,81
A17	8,82	8,79	8,81	**A18**	9,13	9,23	9,18
A19	8,63	8,60	8,62	**A20**	9,04	9,09	9,07
A21	8,53	8,67	8,60	**A22**	9,63	9,60	9,62
A23	8,38	8,56	8,47	**A24**	8,97	9,08	9,03
A25	8,44	8,59	8,52	**A26**	9,08	9,12	9,10
A27	8,52	8,66	8,59	**A28**	9,29	9,23	9,26
A29	8,14	8,30	8,22	**A30**	8,72	8,84	8,78
A31	8,56	8,76	8,66	**A32**	9,35	9,41	9,38
A33	8,25	8,50	8,38	**A34**	9,33	9,29	9,31
A35	8,41	8,59	8,50	**A36**	9,10	9,12	9,11
A37	8,76	8,91	8,84	**A38**	9,91	9,85	9,88
A39	8,24	8,43	8,34	**A40**	9,73	9,77	9,75
A41	8,97	9,12	9,05	**A42**	9,75	9,59	9,67
A43	8,66	8,82	8,74	**A44**	10,23	10,07	10,15
A45	8,77	8,98	8,88	**A46**	10,20	10,14	10,17
A47	8,34	8,47	8,41	**A48**	10,00	9,95	9,98
A49	8,73	8,89	8,81	**A50**	10,30	10,14	10,22

MHD 100 n° 10							
Ct n°	**Direct**	**Inverse**	**Avrge**	**Ct n°**	**Direct**	**Inverse**	**Avrge**
F1	10,48	10,33	10,41	**F2**	10,72	10,37	10,55
F3	10,83	10,39	10,61	**F4**	10,67	10,40	10,54
F5	9,64	9,42	9,53	**F6**	10,86	10,88	10,87
F7	10,11	10,17	10,14	**F8**	9,73	9,91	9,82
F9	10,68	10,33	10,51	**F10**	9,94	10,04	9,99
F11	10,23	10,47	10,35	**F12**	10,34	10,47	10,41
F13	10,94	11,03	10,99	**F14**	10,30	10,45	10,38
F15	10,93	11,05	10,99	**F16**	10,26	10,40	10,33
F17	9,59	9,45	9,52	**F18**	10,30	10,34	10,32
F19	9,82	9,81	9,82	**F20**	10,84	10,95	10,90
F21	10,66	10,55	10,61	**F22**	10,13	10,21	10,17
F23	10,48	10,33	10,41	**F24**	10,28	10,42	10,35
F25	10,69	10,43	10,56	**F26**	10,01	10,21	10,11
F27	10,10	9,97	10,04	**F28**	10,49	10,64	10,57
F29	10,71	10,51	10,61	**F30**	10,70	10,89	10,80
F31	11,05	10,95	11,00	**F32**	10,38	10,49	10,44
F33	10,29	10,10	10,20	**F34**	10,16	10,30	10,23
F35	10,87	10,71	10,79	**F36**	10,40	10,56	10,48
F37	10,49	10,21	10,35	**F38**	10,26	10,28	10,27
F39	10,68	10,63	10,66	**F40**	10,60	10,61	10,61
F41	10,87	10,74	10,81	**F42**	10,29	10,40	10,35
F43	10,21	10,30	10,26	**F44**	9,69	9,76	9,73
F45	10,78	10,47	10,63	**F46**	10,28	10,40	10,34
F47	10,49	10,28	10,39	**F48**	10,26	10,48	10,37
F49	10,13	9,97	10,05	**F50**	10,45	10,51	10,48
				Mini	8,14	8,30	8,22
				Maxi	11,05	11,05	11,00
				Avg.	9,71	9,74	9,73

LAT 2 : ENDURANCE (9.18)

d) Final measurements

Drift of Low Level Contact Resistance (ΔRcl), after Endurance(in mΩ).

MHD 100 n° 4							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
A1	1,40	0,99	1,20	**A2**	0,38	-0,05	0,17
A3	0,48	0,33	0,40	**A4**	1,02	0,74	0,88
A5	0,80	0,53	0,66	**A6**	1,28	1,16	1,22
A7	0,84	0,88	0,86	**A8**	1,14	1,03	1,09
A9	1,21	1,40	1,31	**A10**	1,09	1,03	1,06
A11	0,90	1,10	1,00	**A12**	1,01	0,94	0,98
A13	1,49	1,33	1,41	**A14**	1,13	1,15	1,14
A15	1,22	1,01	1,12	**A16**	0,41	0,52	0,47
A17	1,36	1,12	1,24	**A18**	1,03	1,15	1,09
A19	1,22	0,99	1,11	**A20**	0,81	0,94	0,87
A21	1,43	1,12	1,28	**A22**	1,10	1,26	1,18
A23	1,43	1,34	1,39	**A24**	1,07	0,95	1,01
A25	1,36	1,23	1,30	**A26**	1,16	1,10	1,13
A27	0,99	0,86	0,93	**A28**	1,25	1,12	1,19
A29	0,99	0,94	0,97	**A30**	0,86	0,89	0,88
A31	0,92	0,95	0,94	**A32**	1,37	1,29	1,33
A33	0,87	0,78	0,83	**A34**	1,36	1,40	1,38
A35	1,16	1,16	1,16	**A36**	1,18	1,33	1,26
A37	0,51	0,41	0,46	**A38**	1,26	1,40	1,33
A39	0,97	0,96	0,97	**A40**	1,09	1,18	1,14
A41	0,82	0,87	0,84	**A42**	1,36	1,36	1,36
A43	1,05	1,08	1,07	**A44**	1,67	1,68	1,68
A45	0,00	-0,01	-0,01	**A46**	1,21	1,16	1,19
A47	0,30	0,24	0,27	**A48**	1,56	1,49	1,53
A49	0,39	0,32	0,36	**A50**	1,31	1,13	1,22

MHD 100 n° 4							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
F1	0,07	0,05	0,06	**F2**	-0,91	-1,05	-0,98
F3	0,24	0,12	0,18	**F4**	0,12	0,41	0,27
F5	0,72	0,44	0,58	**F6**	-0,84	-0,62	-0,73
F7	1,10	0,30	0,70	**F8**	-0,89	-0,61	-0,75
F9	0,67	0,49	0,58	**F10**	0,09	0,13	0,11
F11	1,00	0,62	0,81	**F12**	-0,23	0,22	0,00
F13	1,68	1,30	1,49	**F14**	0,98	0,63	0,81
F15	1,37	1,59	1,48	**F16**	0,82	0,39	0,61
F17	0,68	0,82	0,75	**F18**	1,63	1,18	1,41
F19	0,92	1,08	1,00	**F20**	1,13	0,82	0,98
F21	0,79	1,18	0,98	**F22**	0,57	0,35	0,46
F23	1,29	1,54	1,42	**F24**	0,61	0,39	0,50
F25	1,42	0,87	1,15	**F26**	0,20	-0,10	0,05
F27	1,26	1,00	1,13	**F28**	0,43	0,38	0,40
F29	0,43	0,28	0,36	**F30**	0,60	0,35	0,48
F31	1,02	1,05	1,04	**F32**	0,44	0,16	0,30
F33	1,40	1,17	1,29	**F34**	0,32	0,09	0,20
F35	1,20	0,94	1,07	**F36**	0,60	0,32	0,46
F37	1,37	1,05	1,21	**F38**	0,69	0,32	0,51
F39	0,91	0,57	0,74	**F40**	0,04	-0,40	-0,18
F41	0,29	-0,17	0,06	**F42**	-0,50	-0,49	-0,49
F43	0,97	0,62	0,80	**F44**	-0,02	0,44	0,21
F45	0,75	1,28	1,02	**F46**	-1,06	-0,62	-0,84
F47	0,33	0,84	0,58	**F48**	-0,42	0,34	-0,04
F49	-0,33	0,14	-0,10	**F50**	-0,48	0,09	-0,20
				Mini	0,00	-0,01	0,00
				Maxi	1,68	1,68	1,68

ΔRcl Maxi recorded : 1,68 mΩ.

MHD 100 n° 5							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
A1	0,26	0,08	0,17	**F2**	0,92	0,75	0,83
A3	1,41	0,97	1,19	**F4**	0,78	0,44	0,61
A5	1,10	0,88	0,99	**F6**	1,30	1,09	1,20
A7	0,87	0,66	0,77	**F8**	1,32	1,08	1,20
A9	1,21	0,83	1,02	**F10**	1,01	1,01	1,01
A11	1,21	0,95	1,08	**F12**	1,13	0,91	1,02
A13	1,12	0,90	1,01	**F14**	0,90	0,77	0,84
A15	0,11	-0,03	0,04	**F16**	1,05	1,03	1,04
A17	1,09	0,80	0,95	**F18**	2,12	1,97	2,05
A19	0,82	0,54	0,68	**F20**	1,11	1,12	1,12
A21	1,11	0,77	0,94	**F22**	1,25	1,27	1,26
A23	0,65	0,31	0,48	**F24**	1,05	1,03	1,04
A25	0,90	0,64	0,77	**F26**	1,21	1,03	1,12
A27	1,50	1,29	1,40	**F28**	1,46	1,33	1,40
A29	2,12	1,76	1,94	**F30**	1,79	1,73	1,76
A31	0,95	0,83	0,89	**F32**	2,03	1,80	1,92
A33	1,40	1,12	1,26	**F34**	1,10	0,95	1,03
A35	0,26	0,25	0,26	**F36**	1,00	1,01	1,01
A37	0,08	0,25	0,16	**F38**	0,98	1,15	1,07
A39	0,56	0,60	0,58	**F40**	0,87	0,94	0,91
A41	0,30	0,46	0,38	**F42**	1,03	1,11	1,07
A43	1,70	1,76	1,73	**F44**	1,26	1,36	1,31
A45	0,50	0,53	0,52	**F46**	1,24	1,39	1,32
A47	0,48	0,57	0,53	**F48**	1,76	1,81	1,79
A49	0,29	0,16	0,23	**F50**	0,84	0,96	0,90

MHD 100 n° 5							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
F1	-0,03	0,17	0,07	**F2**	1,58	1,28	1,43
F3	0,65	0,53	0,59	**F4**	0,25	0,03	0,14
F5	0,68	0,98	0,83	**F6**	1,53	1,29	1,41
F7	0,81	0,56	0,69	**F8**	0,97	1,00	0,98
F9	1,17	0,58	0,88	**F10**	0,86	0,35	0,61
F11	1,86	1,40	1,63	**F12**	1,57	1,03	1,30
F13	0,67	0,46	0,57	**F14**	0,42	0,05	0,23
F15	1,00	0,73	0,87	**F16**	0,41	0,12	0,27
F17	0,30	0,16	0,23	**F18**	1,14	0,85	1,00
F19	1,02	1,38	1,20	**F20**	1,16	0,93	1,05
F21	0,74	0,74	0,74	**F22**	0,83	0,59	0,71
F23	1,32	1,18	1,25	**F24**	1,37	0,90	1,14
F25	1,03	0,98	1,01	**F26**	0,73	0,61	0,67
F27	0,84	0,92	0,88	**F28**	0,93	0,50	0,72
F29	0,38	0,54	0,46	**F30**	1,66	1,30	1,48
F31	1,18	1,39	1,29	**F32**	1,22	0,82	1,02
F33	1,09	1,40	1,25	**F34**	0,37	-0,07	0,15
F35	0,82	0,78	0,80	**F36**	0,94	0,53	0,74
F37	0,43	0,69	0,56	**F38**	1,07	0,66	0,87
F39	-0,60	-0,84	-0,72	**F40**	1,38	0,96	1,17
F41	-0,42	-0,71	-0,57	**F42**	0,74	0,49	0,61
F43	-0,74	-0,65	-0,69	**F44**	0,65	0,59	0,62
F45	-0,44	-0,70	-0,57	**F46**	0,53	-0,11	0,21
F47	-0,58	-0,79	-0,69	**F48**	1,46	0,81	1,14
F49	-0,48	-0,37	-0,43	**F50**	1,16	0,46	0,81
				Mini	-0,03	0,03	0,04
				Maxi	2,12	1,97	2,05

ΔRcl Maxi recorded : 2,12 mΩ.

MHD 100 n° 9							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
A1	-0,79	-0,64	-0,72	**F2**	-0,75	-1,19	-0,97
A3	-0,43	-0,46	-0,44	**F4**	0,35	0,42	0,38
A5	-0,23	-0,18	-0,21	**F6**	-0,32	-0,18	-0,25
A7	-0,69	-0,71	-0,70	**F8**	0,25	0,34	0,30
A9	-1,29	-1,13	-1,21	**F10**	0,71	0,93	0,82
A11	-0,88	-0,54	-0,71	**F12**	0,51	0,79	0,65
A13	-1,29	-0,98	-1,14	**F14**	0,21	0,30	0,26
A15	-1,67	-1,42	-1,55	**F16**	0,77	0,86	0,82
A17	-1,12	-0,80	-0,96	**F18**	0,45	0,67	0,56
A19	-1,30	-1,04	-1,17	**F20**	0,27	0,52	0,40
A21	-1,17	-1,08	-1,13	**F22**	0,49	0,63	0,56
A23	-0,92	-0,90	-0,91	**F24**	0,00	0,27	0,14
A25	-1,07	-0,94	-1,01	**F26**	0,28	0,39	0,33
A27	-1,81	-1,48	-1,65	**F28**	0,31	0,50	0,41
A29	-1,39	-1,37	-1,38	**F30**	1,09	1,02	1,06
A31	-0,93	-0,79	-0,86	**F32**	0,99	1,02	1,01
A33	-1,20	-1,07	-1,14	**F34**	0,78	0,89	0,83
A35	-0,82	-0,72	-0,77	**F36**	1,36	1,47	1,42
A37	-0,48	-0,39	-0,43	**F38**	-0,46	-0,25	-0,36
A39	-1,10	-1,10	-1,10	**F40**	-0,36	-0,21	-0,29
A41	-1,94	-1,91	-1,93	**F42**	-0,37	-0,25	-0,31
A43	-0,98	-0,90	-0,94	**F44**	0,50	0,30	0,40
A45	-1,29	-1,28	-1,29	**F46**	-0,36	-0,17	-0,27
A47	-1,60	-1,66	-1,63	**F48**	-0,08	0,14	0,03
A49	-1,06	-0,86	-0,96	**F50**	-0,32	-0,13	-0,22

MHD 100 n° 9							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
F1	1,27	1,30	1,29	**F2**	0,99	0,79	0,89
F3	0,25	0,55	0,40	**F4**	0,42	0,48	0,45
F5	0,08	-0,24	-0,08	**F6**	0,83	0,57	0,70
F7	0,29	0,51	0,40	**F8**	0,72	0,46	0,59
F9	0,68	0,55	0,62	**F10**	0,52	0,79	0,66
F11	1,16	0,76	0,96	**F12**	0,66	0,44	0,55
F13	0,46	0,01	0,24	**F14**	1,80	1,45	1,63
F15	0,70	0,13	0,42	**F16**	0,20	0,17	0,19
F17	0,43	0,14	0,28	**F18**	-0,42	-0,39	-0,41
F19	0,44	0,26	0,35	**F20**	0,61	0,30	0,46
F21	0,74	0,24	0,49	**F22**	0,16	-0,27	-0,05
F23	0,31	0,25	0,28	**F24**	0,67	0,33	0,50
F25	0,58	0,61	0,59	**F26**	0,14	-0,26	-0,06
F27	0,78	0,66	0,72	**F28**	1,31	1,02	1,17
F29	1,02	0,83	0,92	**F30**	-0,06	-0,02	-0,04
F31	-0,23	-0,38	-0,31	**F32**	-0,09	-0,11	-0,10
F33	0,97	0,93	0,95	**F34**	0,87	1,09	0,98
F35	0,91	0,62	0,77	**F36**	1,57	0,97	1,27
F37	0,70	0,48	0,59	**F38**	0,60	0,35	0,48
F39	0,96	0,50	0,73	**F40**	0,41	0,27	0,34
F41	0,76	0,79	0,78	**F42**	-0,08	-0,61	-0,34
F43	0,66	0,16	0,41	**F44**	0,89	0,68	0,79
F45	0,43	0,65	0,54	**F46**	0,01	-0,06	-0,03
F47	1,20	1,37	1,29	**F48**	0,83	0,80	0,82
F49	0,90	1,32	1,11	**F50**	-0,07	-0,12	-0,10
				Mini	0,00	0,01	0,03
				Maxi	-1,94	-1,91	-1,93

ΔRcl Maxi recorded : -1,94 mΩ.

MHD 100 n° 10							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
A1	0,41	0,26	0,34	**F2**	-0,21	0,11	-0,05
A3	0,18	0,13	0,15	**F4**	-0,66	-0,57	-0,62
A5	0,34	0,48	0,41	**F6**	0,38	0,02	0,20
A7	-0,39	-0,28	-0,34	**F8**	-0,26	-0,29	-0,28
A9	-0,47	-0,30	-0,39	**F10**	-0,69	-0,80	-0,75
A11	-0,46	-0,35	-0,41	**F12**	-0,31	-0,46	-0,39
A13	-0,87	-0,61	-0,74	**F14**	0,37	0,06	0,22
A15	-0,36	-0,10	-0,23	**F16**	-0,45	-0,12	-0,28
A17	-0,31	-0,16	-0,23	**F18**	-1,09	-0,88	-0,98
A19	-0,65	-0,76	-0,71	**F20**	-1,30	-1,16	-1,23
A21	-1,13	-1,08	-1,11	**F22**	-0,94	-1,02	-0,98
A23	-0,94	-0,86	-0,90	**F24**	-1,16	-0,97	-1,07
A25	-0,80	-0,73	-0,77	**F26**	-1,58	-1,38	-1,48
A27	-0,80	-0,76	-0,78	**F28**	-1,05	-0,98	-1,02
A29	-1,33	-1,31	-1,32	**F30**	-1,32	-1,13	-1,23
A31	-0,69	-0,68	-0,68	**F32**	-0,69	-0,57	-0,63
A33	-0,91	-0,87	-0,89	**F34**	-0,06	0,17	0,05
A35	-0,79	-0,80	-0,80	**F36**	-0,29	0,04	-0,13
A37	-0,33	-0,33	-0,33	**F38**	0,48	0,74	0,61
A39	-0,60	-0,59	-0,59	**F40**	0,30	0,65	0,48
A41	-0,51	-0,54	-0,53	**F42**	1,06	1,26	1,16
A43	-0,61	-0,65	-0,63	**F44**	1,14	1,18	1,16
A45	-0,64	-0,63	-0,64	**F46**	0,36	0,50	0,43
A47	-0,83	-0,91	-0,87	**F48**	0,10	0,23	0,16
A49	-0,29	-0,31	-0,30	**F50**	0,84	0,91	0,88

MHD 100 n° 10							
Ct n°	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**	**Ct n°**	**ΔRcl Direct**	**ΔRcl Inverse**	**ΔRcl Avrge**
F1	-0,07	-0,34	-0,20	**F2**	1,13	0,81	0,97
F3	0,78	0,14	0,46	**F4**	1,59	1,65	1,62
F5	0,02	-0,50	-0,24	**F6**	1,41	1,37	1,39
F7	0,47	0,37	0,42	**F8**	0,12	0,63	0,38
F9	0,81	0,27	0,54	**F10**	0,53	0,49	0,51
F11	0,64	0,71	0,68	**F12**	0,94	0,83	0,89
F13	1,17	1,06	1,12	**F14**	1,53	1,49	1,51
F15	1,23	1,12	1,18	**F16**	1,24	1,19	1,22
F17	0,19	0,36	0,27	**F18**	0,71	1,00	0,86
F19	0,45	0,58	0,52	**F20**	1,08	1,59	1,34
F21	0,90	0,81	0,86	**F22**	1,14	1,48	1,31
F23	1,43	1,09	1,26	**F24**	1,01	0,79	0,90
F25	1,54	1,21	1,38	**F26**	0,88	0,70	0,79
F27	0,94	0,30	0,62	**F28**	1,40	1,16	1,28
F29	1,60	1,00	1,30	**F30**	1,29	1,46	1,38
F31	0,41	0,63	0,52	**F32**	1,48	1,52	1,50
F33	0,71	0,32	0,52	**F34**	1,04	1,12	1,08
F35	1,62	1,43	1,53	**F36**	0,44	1,05	0,75
F37	0,62	0,11	0,37	**F38**	0,27	0,36	0,32
F39	-0,10	-0,38	-0,24	**F40**	1,58	1,34	1,46
F41	1,17	0,88	1,03	**F42**	1,06	0,71	0,88
F43	0,33	0,30	0,32	**F44**	0,38	0,54	0,46
F45	0,45	0,17	0,31	**F46**	0,99	1,27	1,13
F47	0,68	0,64	0,66	**F48**	0,45	0,87	0,66
F49	-0,49	-0,38	-0,43	**F50**	1,31	1,32	1,32
				Mini	0,02	0,02	-0,05
				Maxi	1,62	1,65	1,62

ΔRcl Maxi recorded : 1,65 mΩ.