NICOMATIC R&D LABORATORY	QUALIFICATION TEST REPORT	QTR18036a
EMM SERIE ACCORDING TO MIL-DTL-83513G STANDARD		Page : 1 /17
		Qualification status : PASSED

RESISTANCE TO SOLDERING HEAT

According to MIL-DTL-83513G §3.5.10 & 4.5.12 and MIL-STD-202, method 210F

ISSUE	MODIFICATION	VISA	DATE
a	Original Issue	AJ	21/05/18
b			
c			

	Name	Duty	Date	Visa
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1 Conclusion

The EMM connectors are **qualified** regarding RESISTANCE TO SOLDERING HEAT according to MIL-DTL-83513G standard.

2 Technical Features Proposal

EMM connectors:
Soldering Heat severities:
- Solder Iron: 350°C±10°C / 5s ±1s
- Solder Dip: 260°C ±5°C / 20s ±1s

3 Connate Reports

4 Information about the tests

4.1 Object

This test is performed to determine if EMM connectors can withstand the effects of the heat to which they will be subjected during the soldering process (solder iron and solder dip).

4.2 Reference documents/Qualification Plan

- MDC.P16020.a
- MIL-DTL-83513G
- MIL-STD-202

4.3 Tested Products

Designation	Article Reference*	Drawing issue*	Batch / DI*	Quantity
C18892-30 (Female, Straight on PCB, E60 guiding)	C18892-30	na	DI7576	20
C18900-30 (Female Straight on PCB, E50)	C18900-30	na	DI7577	20
C18891-30 (Male, Straight on PCB, E10)	C18891-30	na	DI7579	20
C18904-30 (Male, 90° on PCB, E11 guiding)	C18904-30	na	DI7578	20
C18893-30 (Female, 90° on PCB, E61 guiding)	C18893-30	na	DI7580	20
C18901-30 (Female, 90° on PCB, E51 jackscrew)	C18901-30	na	DI7581	20
C18981-30-0250 (Male, on cable AWG30, E01 jackscrew)	C18981-30-0250	na	DI7592	20
C18980-30-0250 (Male, on cable AWG28, E01 jackscrew)	C18980-30-025	na	DI7591	20
C18902-30-0250 (Male, on cable AWG26, E01 jackscrew)	C18902-30-0250	na	DI7588	20
C18979-30-0250 (Male, on cable AWG24, E01 jackscrew)	C18979-30-0250	na	DI7589	20
C18902-30-0250-BP (Male, on cable AWG26, E01 jackscrew BP)	C18902-30-0250-BP	na	DI7586	20
18224-AWG24	18224-AWG24	na	DI7594	25
18224-AWG26	18224-AWG26	na	DI7596	25
18240-AWG28	18240-AWG28	na	DI7597	25
18240-AWG30	18240-AWG30	na	DI7598	25

4.4 Persons present during the tests

Name	Duty
A.JAGHMIM	Test & Measurement Manager

4.5 Date and place of the tests

ADETESTS Lab. from 26/02/18 to 09/03/18

4.6 Environmental conditions

Ambient temperature: See Test Set up
Pressure: 972 mbar
Humidity: 47%

4.7 Incidents during the test

None

4.8 Test Equipments

4.9 Test Tooling

Designation	Tooling reference
Tin Batch	
Binocular	

5 Requirements according to MIL-DTL-83513G standard

Connectors shall be visually inspected and show no evidence of distortion or physical damage and shall meet the dimensional requirements.

6 Test Procedure

6.1 Test Procedure according to MIL-DTL-83513G standard

All solder cup termination type connectors shall be tested as follows:

a. Unless otherwise specified, the applicable copper wire size 2 to 4 inches in length, properly prepared for the applicable solder cup size shall be inserted into the contact termination. Seven contacts or 20 percent of the contacts, whichever is greater, shall be tested.

b. The test specimens shall be fluxed accordingly with liquid or other techniques.

c. Unless otherwise specified, a pencil type solder iron rated for 25 watts shall be used.

d. The solder iron shall be heated to a temperature of 360°C ±10°C and shall be applied along with SN-63 solder to the termination for a time duration allowing the solder to become liquid and remain in the liquid state for 4 to 5 seconds.

e. After application, the soldering iron shall be removed and a visual and mechanical inspection performed. The visual inspection shall be at 10X.

f. The connector shall show no evidence of distortion or damage to any area of the connector housing or evidence of contact misalignment.

6.2 Test Procedure according to MIL-STD-202, method 210F

6.2.1 Special preparation of specimens

Any special preparation of specimens prior to testing shall be as specified in the individual specification. This could include specific instructions such as bending or any other relocation of terminations, cleaning, application of flux, pretinning, or attachment of heat sinks or protective shielding (see 2.2), prior to the solder immersion.

6.2.2 Preparation of solder bath

The molten solder shall be agitated to assure that the temperature is uniform. The surface of the solder shall be kept clean and bright.

6.2.3 Application of flux

When flux is used, the terminations to be tested shall be immersed in the flux (see 3.2), which is at room ambient temperature, to the depth specified for the solder dip. The duration of the immersion shall be from 5 seconds to 10 seconds.

6.2.4 Test conditions

Unless otherwise specified in the individual specification, the test shall be performed on all solder terminations attached to the component part. There are six types of soldering techniques covered by these test conditions. The test conditions are outlined below and in table I.

- Test condition A: Solder iron - Hand soldering of solder cups, through hole components, tab and post terminations, solder eyelet terminations.
- Test condition B: Solder dip - Simulates hot solder dipping (tinning) of leaded components.
- Test condition C: Wave solder - Simulates wave solder of topside board mount product.
- Test condition D: Wave solder - Simulates wave solder of bottomside board mount product.
- Test condition H: VPR - VPR environment without preheat.
- Test conditions I, J, K: Infrared/Convection reflow - Simulates IRR, natural convection, and forced air convection reflow environments.

6.2.4.1 Test condition A: Solder iron.

a. When testing a solder cup, tab and post termination, or solder eyelet termination, the applicable wire size, properly prepared for the solder termination, shall be attached in the appropriate manner.
   When testing a board mount component, the component shall be placed on a mounting board (see 2.4).
b. When specified, the components shall be fluxed (see 4.3).

c. Unless otherwise specified, a solder iron in accordance with 2.5 shall be used.
d. The solder iron shall be heated to 350°C ±10°C and applied to the termination for duration of 4 seconds to 5 seconds as specified in table I. The solder and iron shall be applied to the area of the assembly closest to the component body that the product is likely to experience. For surface mount components, the iron shall be placed on the pad only.
e. Remove the iron and allow the component to cool and stabilize at room ambient conditions. If flux was used, the component shall be cleaned using an appropriate cleaning solution.
f. The component shall be visually examined under 10X magnification.

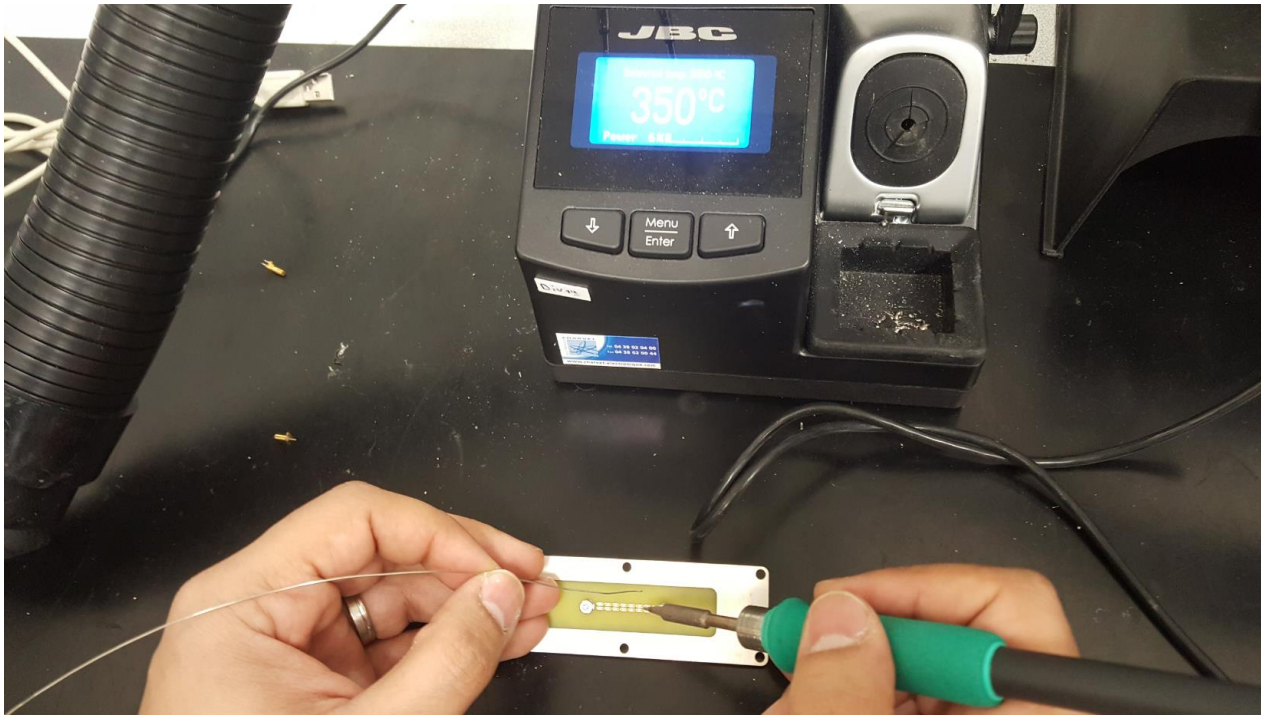
6.2.4.2 Test condition B: Solder dip.

a. Place the component in an appropriate fixture (see 2.3).
b. When specified, the leads shall be fluxed (see 4.3).
c. The specific combination of temperature, immersion and emersion rate, immersion duration, and number of heats shall be as specified in table I. Unless otherwise specified, terminations shall be immersed to within .050 inch (1.27 mm) of the component body. Terminations shall be immersed simultaneously, if the geometry of the component permits.
d. After the solder dip, the component shall be allowed to cool and stabilize at room ambient conditions. If flux was used, the component shall be cleaned using an appropriate cleaning solution.
e. The component shall be visually examined under 10X magnification.

Solder technique simulation	Test condition	Temperature (°C)	Time (s)	Temperature ramp/ immersion and emersion rate	Number of heat cycles
Solder iron	A	350 ±10 (solder iron temp)	4 - 5		1
Dip	B	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1
Wave: Topside board-mount product	C	260 ±5 (solder temp)	20 ±1		1
Wave: Bottomside board-mount product	D	260 ±5 (solder temp)	10 ±1	Preheat 1°C/s-4°C/s to within 100°C of solder temp. 25 mm/s ± 6 mm/s	1
	E	CANCELLED			
	F	CANCELLED			
	G	CANCELLED			
Vapor phase reflow	H	215 ±5 (vapor temp)	60 ±5		1
IR/convection reflow	I	215 ±5 (component temp)	30 ±5	1°C/s-4°C/s; time above 183°C, 90 s - 120 s	3
	J	235 ±5 (component temp)	30 ±5	1°C/s-4°C/s; time above 183°C, 90 s - 120 s	3
	K	250 ±5 (component temp)	30 ±5	1°C/s-4°C/s; time above 183°C, 90 s - 120 s	3

Solder Dip Time is change for 20s ±1s

7 Test setup


JBC
350°C
Menu
Enter


HAKKO FX-301B
SOLDERING POT
Dirty
260
ON
OFF
UP
DOWN
HAKKO
http://www.hakko.com


GROUP 6
RESISTANCE TO SOLDERING HEAT
CONTACT RETENTION
MARKING PERFORMANCE
C18891-30

8 Measurements results

No visual damage after tests.
Connectors show no evidence of distortion or physical damage except EMM Connectors 90° on PCB that show some distortion on the housing part between PCB face and contact. But this not affects the result because of the functionality of this part (backpotting shape). See Visual Inspection

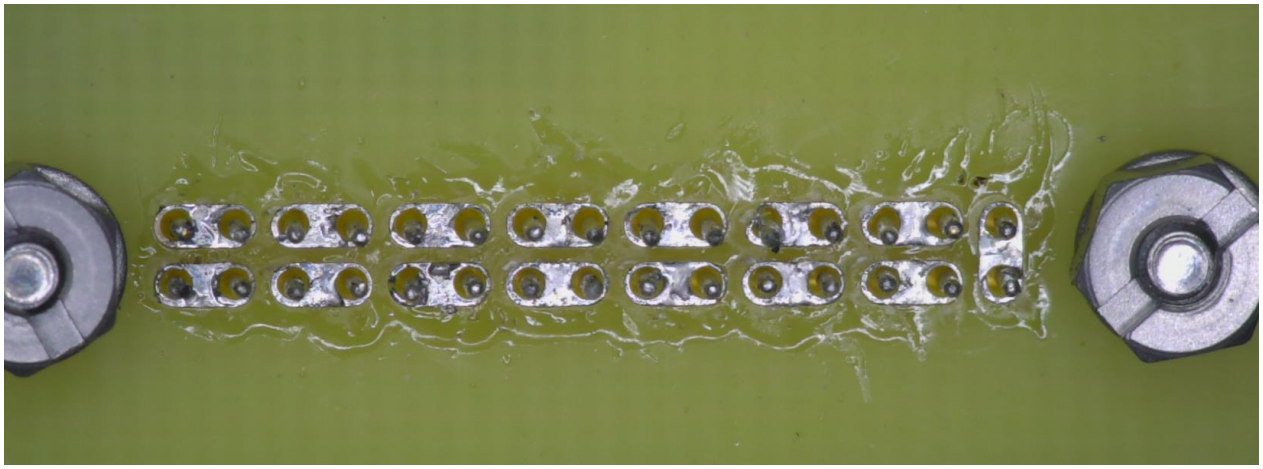
See QTR18036 - EMM Connectors - Contact Retention (after Resistance to Soldering Heat)

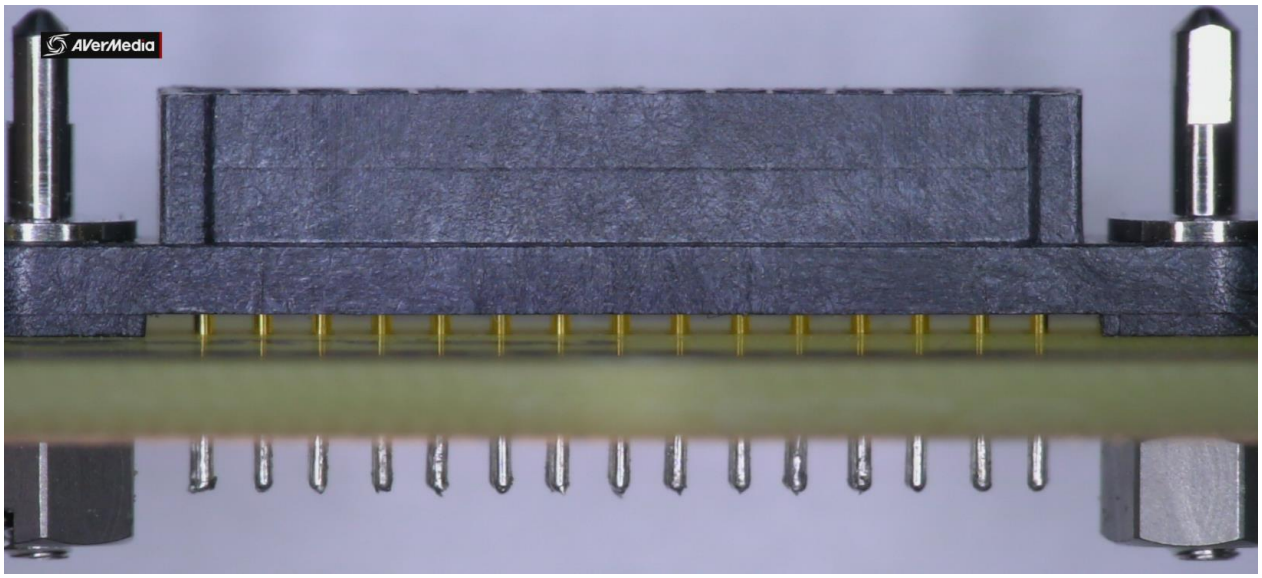
9 Visual Inspection

Required by the applicable standard ?			
YES		NO	☐

9.1 EMM Connectors Straight on PCB

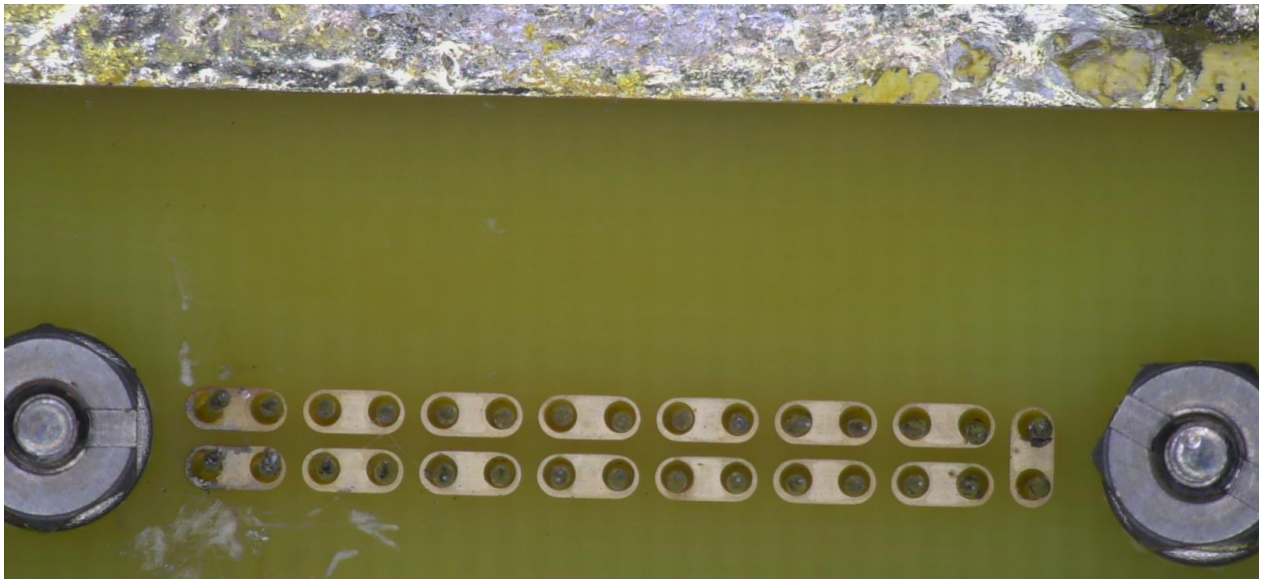
9.1.1 After Solder Iron Process

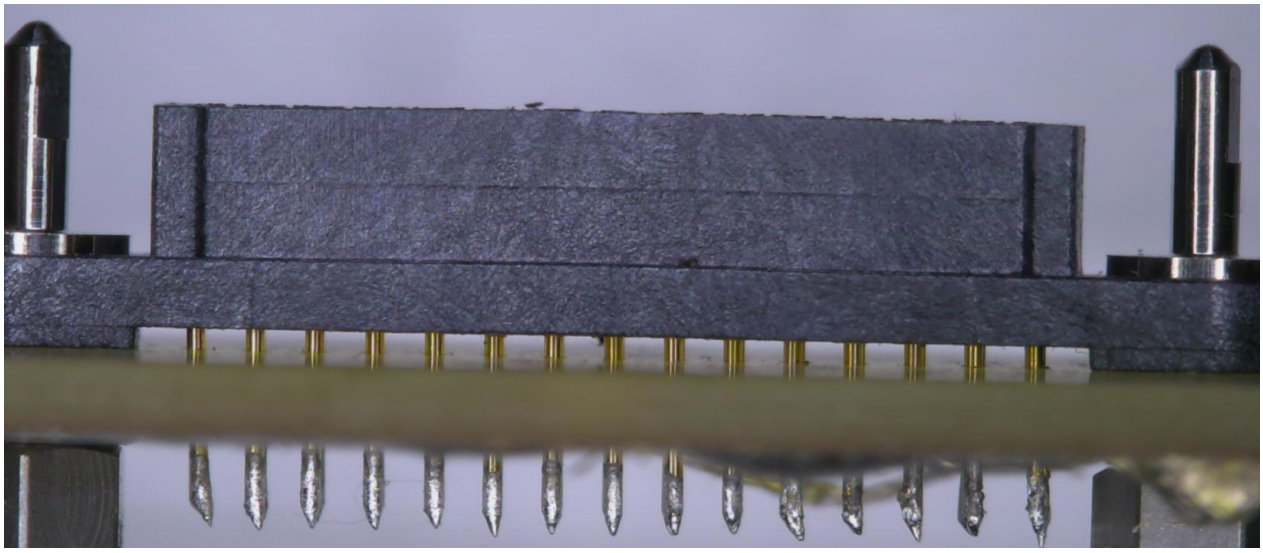






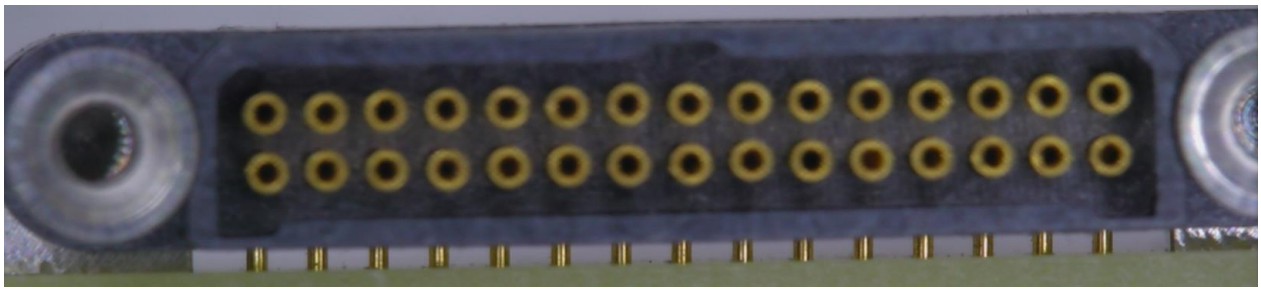
9.1.2 After Solder Dip Process

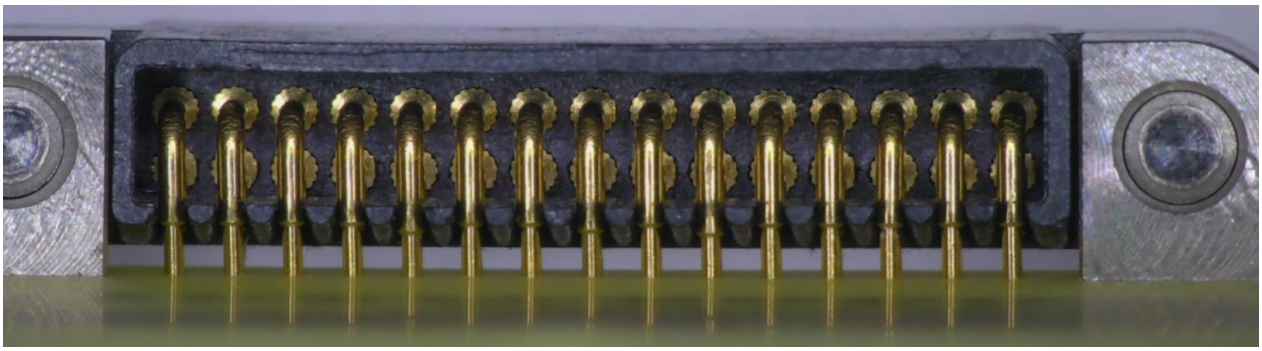




9.2 EMM Connectors 90° on PCB

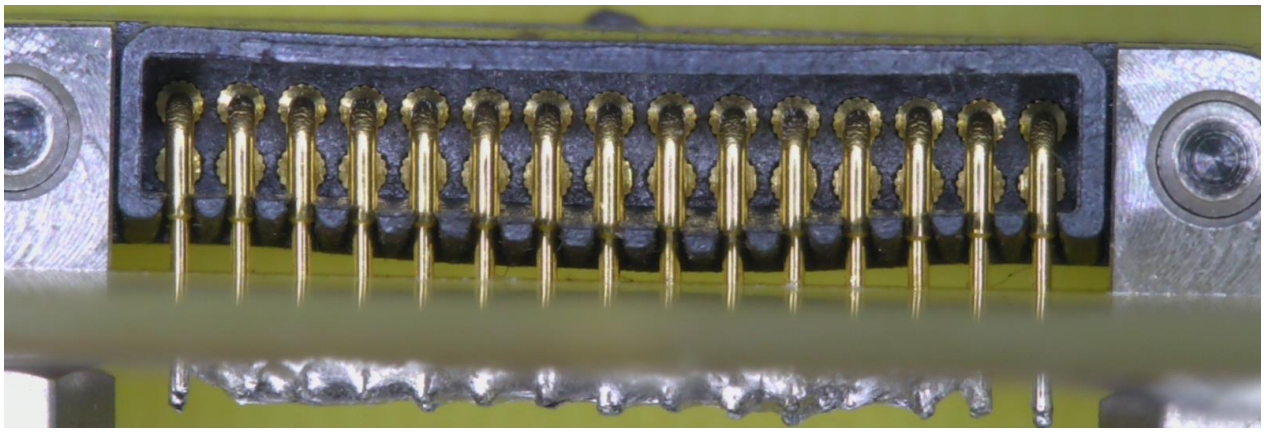
9.2.1 After Solder Iron Process



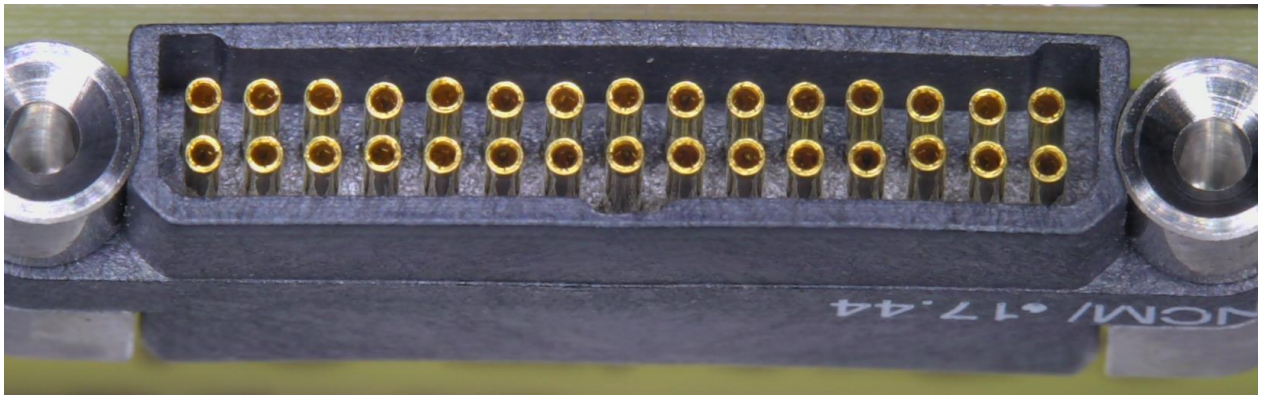




9.2.2 After Solder Dip Process



Here we can see a distortion of the housing. This distortion is due to the weak thickness alone, without backpotting. Backpotted, this part will not be distorted. Even on that case, the performances will not be affected and does not affect the qualification.





No problem to mate and unmate the connectors even with the distortion.

**********END OF REPORT**********

10 APPENDIX

Internal use only ?			
YES	☐	NO	☒

10.1 The Laboratory Advice

10.2 Pictures

**********END OF APPENDIX**********