

***MEC A/S***

Soldering Heat Resistance Test

of

Unimec Switches for Through Hole mount

**Title**                                      **Soldering Heat Resistance Test of Unimec Switches for  
Through Hole mount**

**Project No.**                                0515a Soldering Heat Resistance Test

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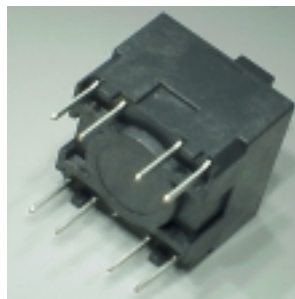
## Report Concerning Project No.

### 0515a Solderability Test of Unimec TH Switch

#### 1. Definition

The scope of this report is to verify the resistance to soldering heat of Lead-Free and RoHS compatible Unimec switches, low and high temperature version.

The test parameters have been chosen according to IEC 60068-2-20 Test Tb Method 1A.



#### 2. Applicable Documents

- EN/IEC 60068-2-20

#### 3. Test parameters

Solder bath Temperature: 260°C.

Solder Alloy: SnCu (Lead Free)

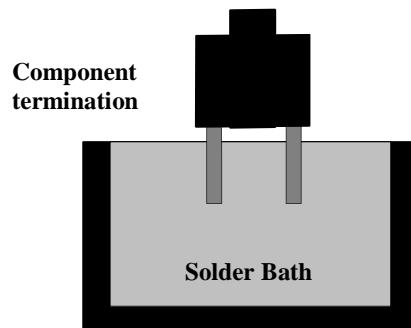
Flux type: Pure Rosin SM/NA

Immersion Time: 10 sec.

Clearance between component body and solder: 1.6 mm

Dipping depth: 2.4 mm

#### 4. Definition of Soldering Heat Resistance Test



A Through Hole test object is dipped vertically into a solder Bath (See Section 3, Test Parameters).

Before and after testing for resistance to soldering heat, the electrical parameters of the switches was measured and the components visually examined.

## 5. Work Description

For Verification of the Solderability the following has been carried out in section 6:

- 6.1 Soldering heat Resistance Test according to EN/IEC 60068-2-20 Test Tb of Components with Lead-free plated Terminations on Unimec High temperature material switch.

*5 Components have been tested at 260°C with Lead-free Solder in Bath (Sn99.3Cu0.7Ni).*

- 6.2 Soldering heat Resistance Test according to EN/IEC 60068-2-20 Test Tb of Components with Lead-free plated Terminations on Unimec Low temperature material switch.

*5 Components have been tested at 260°C with Lead-free Solder in Bath (Sn99.3Cu0.7Ni).*

- 6.3 Summary Conclusion

**6. Test results**

**6.1 Contact Resistance and visual inspection.  
High Temperature version**

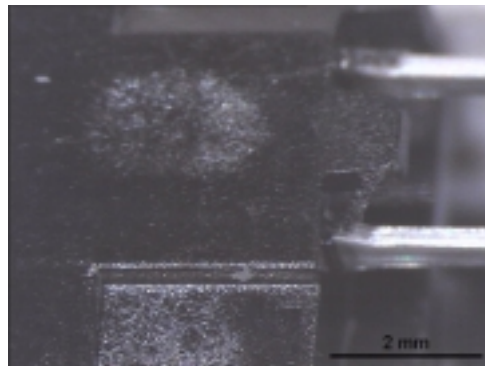
**Before Heat Resistance Test**

	Visual inspection	Contact Resistance termination 1 - 2	Contact Resistance termination 3 - 4	Contact Resistance termination 5 - 6	Contact Resistance termination 7 - 8
H-1	Pass	42.9mΩ	37.7mΩ	36.8mΩ	45.5mΩ
H-2	Pass	45.8mΩ	38.8mΩ	33.6mΩ	43.2mΩ
H-3	Pass	45.5mΩ	35.9mΩ	30.2mΩ	47.1mΩ
H-4	Pass	44.3mΩ	38.3mΩ	39.8mΩ	48.8mΩ
H-5	Pass	48.7mΩ	37.1mΩ	38.5mΩ	38.2mΩ

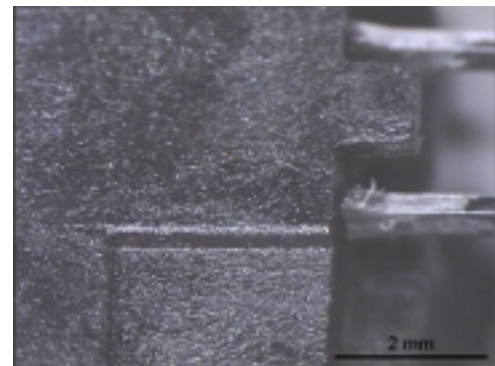
**After Heat Resistance Test (Test Temperature 260°C)**

	Visual inspection	Contact Resistance termination 1 - 2	Contact Resistance termination 3 - 4	Contact Resistance termination 5 - 6	Contact Resistance termination 7 - 8
H-1	Pass	48.8mΩ	35.8mΩ	36.0mΩ	44.4mΩ
H-2	Pass	40.0mΩ	31.9mΩ	30.8mΩ	34.8mΩ
H-3	Pass	39.8mΩ	34.2mΩ	30.2mΩ	40.9mΩ
H-4	Pass	39.8mΩ	30.6mΩ	34.4mΩ	39.9mΩ
H-5	Pass	39.0mΩ	31.6mΩ	31.3mΩ	40.5mΩ

Before Test



After Test



Pass electrical test for contact resistance before and after soldering.  
No visual degradation observed.

**6.2 Contact Resistance and visual inspection.  
Low Temperature version**

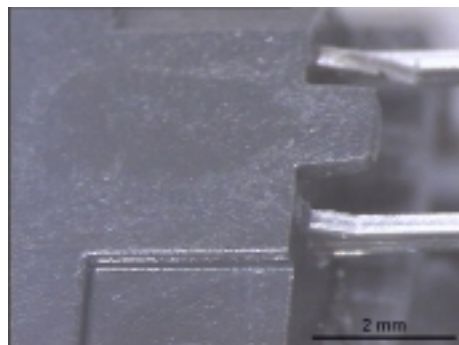
**Before Heat Resistance Test**

	Visual inspection	Contact Resistance termination 1 - 2	Contact Resistance termination 3 - 4	Contact Resistance termination 5 - 6	Contact Resistance termination 7 - 8
L-1	Pass	39.3mΩ	37.8mΩ	34.4mΩ	36.8mΩ
L-2	Pass	43.7mΩ	43.2mΩ	42.2mΩ	39.0mΩ
L-3	Pass	47.2mΩ	37.6mΩ	36.1mΩ	41.7mΩ
L-4	Pass	45.8mΩ	37.8mΩ	33.8mΩ	49.4mΩ
L-5	Pass	47.2mΩ	42.5mΩ	46.4mΩ	48.7mΩ

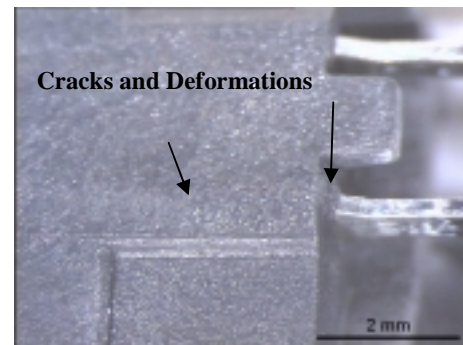
**After Heat Resistance Test (Test Temperature 260°C)**

	Visual inspection	Contact Resistance termination 1 - 2	Contact Resistance termination 3 - 4	Contact Resistance termination 5 - 6	Contact Resistance termination 7 - 8
L-1	Fail	47.4mΩ	37.8mΩ	37.1mΩ	44.4mΩ
L-2	Fail	46.9mΩ	48.5mΩ	38.2mΩ	43.9mΩ
L-3	Fail	43.9mΩ	40.6mΩ	36.0mΩ	39.3mΩ
L-4	Fail	47.6mΩ	40.0mΩ	37.7mΩ	40.4mΩ
L-5	Fail	53.4mΩ	52.2mΩ	40.2mΩ	52.3mΩ

Before Test



After Test



Pass electrical test for contact resistance before and after soldering.  
After the test there are visible signs that the low temperature plastic has degraded due to heat exposure, however, not to an extent that it affects the electrical performance.



### 6.3 Summary Conclusion

The test has been carried out according to EN/IEC 60068-2-20 with Lead Free Solder at 260°C and all the tested High Temperature components show acceptable results.

The Low Temperature components indicated cracks and deformation after test, but no dramatic changes in contact resistance.

(See Section 6.2).

For lead free solder processes that involves heat exposure equal to a 200°/10s dip, the high temperature version is recommended.