



Superseal 1.0 Terminal Product Specification

Superseal 1.0 端子 产品规范

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1. SCOPE 适用范围

1.1. Content 内容

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) Superseal 1.0 terminal. The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. TE Connectivity makes no representation or warranty, express or implied that the product will comply with these requirements. Further, TE Connectivity reserves the right these requirements based on the results of additional testing and evaluation. Contact TE Connectivity Engineering for further information. If necessary, This document will become the Product Specification at successful completion of testing. 本规范适用于Superseal 1.0 端子的性能，测试和质量要求。

a. 本规范适用但不仅限于以下零件号。

3-1447221-3	Superseal 1.0 Receptacle Contact Assembly
3-1447221-4	Superseal 1.0 Receptacle Contact Assembly

1.2. Qualification 鉴定

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

本测试规范依照下面的规范及标准执行。所有的检验应依照合适的检验计划及产品图纸执行。

2. APPLICABLE DOCUMENTS 适用文件

2.1. Usable document 使用文件

In the event of conflict between the requirements of this specification and the drawing, the drawing shall take precedent.

在本规范的要求与图纸发生冲突时，以产品图纸为准。在本规范的要求与参考文件发生冲突时，以本规范为准。

2.2. TE specifications 泰科电子规范

- 109-1: General Requirements for Testing
- 108-78140_A9 Superseal 1.0 Connector
- 114-78011 Superseal Connector

2.3. Other specifications 其他规范

- SAE J2030: Heavy-Duty Electrical Connector Performance Standard
- USCAR-2 Revision 8
- USCAR-21 Revision 4

3. REQUIREMENT 要求

3.1. Design and Construction 设计和结构

Products must meet the design, construction and physical dimensions specified in the applicable product drawings.

产品必须满足产品图纸上的设计、结构和尺寸要求。

3.2. Material 材料

Description of the material sees the related product drawings.

材料描述见相关产品图纸。

3.3. Test parameters and tolerances 测试参数与公差

Table 1: Test parameters and tolerances

Requirement 要求	Tolerance 公差
Ambient temperature 环境温度	23°C ± 5°C
Relative humidity 相对湿度	45% to 75%
Atmospheric pressure 大气压力	96kPa ± 10kPa

3.4. Ratings 等级

A. Operating Temperature / 工作温度: -55~125°C

B. Rated voltage / 额定工作电压: See connector product specification 见连接器规格书

C. Current (A): See Table 1

Table 1

Part Number	Wire Size / mm ²	Current Carrying Capacity
3-1447221-3	1.25	See Section 3.8
	0.75	
3-1447221-4	0.5	

D. Durability: 30 cycles

3.5. General Performance and Test description 通用性能和试验描述

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para.4. All testes must be performed at the test condition of the TE test specification 109-1 unless otherwise specified.

产品应能满足段落4中的电气，机械和环境等性能要求。所有试验均需按照TE规范109-1中的测试条件进行，除非另有说明。

3.6. Test Requirements and Procedures Summary 测试要求及方法

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Table 2

Test Description	Requirement	Procedure
3.6.1 External Appearance	Meets requirements of product drawing. The contacts must be correctly constructed, marked, and show good quality and workmanship.	Visually examine each test sample prior to testing and/or conditioning, and re-examine the samples after testing and/or conditioning, take photographs and/or video recordings of representative samples. To confirm whether there are any defects which can influence function.
ELECTRICAL		
3.6.2 Low Level Contact Resistance (Total=1 crimp resistance + 1 contact resistance)	Initial Maximum resistance: 5 mΩ max. Final Maximum resistance: 10 mΩ max.	Test with applied voltage not exceeding 20 mV open circuit and the test current shall be limited to 100 mA. The resistance of a cable equal in length to that of the two measuring points shall be subtracted from the measured values. The cable used shall be from the same batch of cable as used for the terminal wiring. Measurements shall be taken after thermal equilibrium at current levels.
3.6.3 Crimp Resistance	Initial Maximum resistance: Record the data Final Maximum resistance Record the data	Test with applied voltage not exceeding 20 mV open circuit and the test current shall be limited to 100 mA. The resistance of a cable equal in length to that of the two measuring points shall be subtracted from the measured values.
3.6.4 Maximum Test Current Capability	No pass/fail criteria apply; value is used to establish "Maximum Test Current" for "Current Cycle" test, derating factor is specified as 0.9 for derating curve.	USCAR-2 5.3.3.3 <ol style="list-style-type: none"> 1. Slowly increase the power supply output until it is providing no greater than 50% of the expected Maximum Current Capability of the TUT 2. Wait at least 15 minutes for the circuit temperature to reach Steady State. Then record the ambient temperature, the temperature of each terminal pair interface and the millivolt drop across each terminal pair. Then calculate the resistance of the terminal pair interface. 3. Increase the current by no more than 10% of the expected Maximum Current Capability of the TUT and repeat step 2 4. Repeat steps 2 and 3 until one of the following conditions occurs: <ol style="list-style-type: none"> a. The temperature of any terminal interface exceeds a 55 °C rise over ambient (ROA). b. The total connection resistance of any terminal interface exceeds the Acceptance Criteria. 5. Graph the data with temperature on the Y-axis and current (in amps) on the X-axis for all conductor sizes and insulation types tested.
3.6.5 Current Cycling	<ol style="list-style-type: none"> 1. Verify conformance of CUT/TUT per corresponding measurement section as identified in Test Sequence 2. The temperature of any terminal interface must not exceed a 55 °C ROA at any time during the test. 	USCAR-2 5.3.4.3 <ol style="list-style-type: none"> 1. Assemble the circuit shown in Figure 5.3.3.3-2 of USCAR-2 in a draft free enclosure. Set the power supply to provide 45 minutes on and 15 minutes off at the maximum test current previously determined. 2. Complete 1008 cycles taking readings at least once daily 30 minutes into the on cycle, and at the conclusion

Table 2

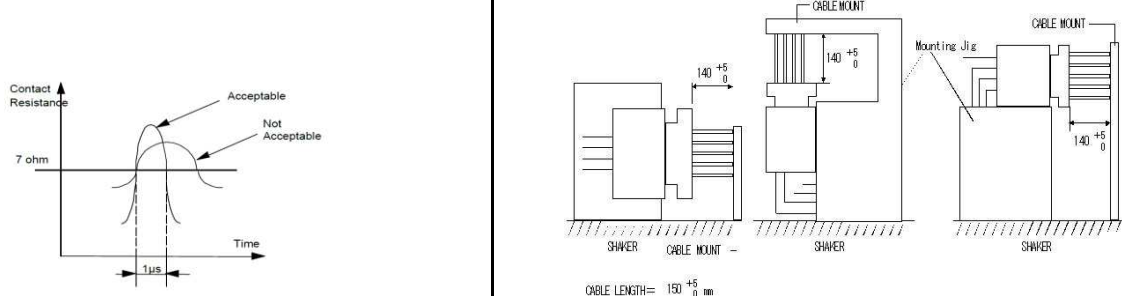
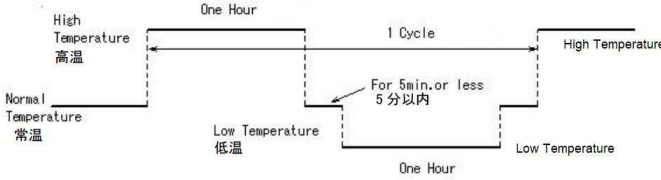
Test Description	Requirement	Procedure
	3. The total connection resistance of any terminal interface reading shall not exceed the Acceptance Criteria	of the test, 30 minutes into the final “on” cycle. Millivolt drop readings should be taken at maximum test current. 3. For each set of data, calculate and record the Total Connection Resistance by subtracting the conductor millivolt drop reading and dividing the result by the test current.
MECHANICAL		
3.6.6 Insertion Force	4.9N(0.5kgf) or less	Pin contact is fastened first, then receptacle contact is mated at a constant mating speed of approx.100mm/min. or less toward the axis.
3.6.7 Withdrawal Force	4.9N(0.5kgf) or less	Pin contact is fastened first, then mated receptacle contact is pulled at a constant speed of approx. 100mm/min. or less toward the axis.
3.6.8 Strength of Crimp Connection	Wire size 0.5 mm ² : 88.2N (9kgf) or more 0.75 mm ² : 127.4N(13kgf) or more 1.25 mm ² : 176.4N(18kgf) or more	After the receptacle contact with wire crimped is fastened and then the load that causes wire breakage or separation of the wire from the crimped barrel with the wire pulled toward the axis at a constant speed of approx. 100mm/min. is measured.
3.6.9 Durability	There shall be no evidence of cracking, distortion or detrimental damage, can meet the following test requirements according to the corresponding test sequence.	Mate and un-mate different specimens for 30 cycles at maximum rate of 600 cycle per hour.
3.6.10 Vibration	<p>1. There shall be no evidence of cracking, distortion or detrimental damage, can meet the following test requirements according to the corresponding test sequence.</p> <p>2. There must be no instance in which the resistance of any terminal pair exceeds 7.0 Ω for more than 1 μs. Following figure illustrates the acceptance criteria graphically.</p>	<p>The sample is fastened to vibration stand as shown in following figure and vibrated on each of the 3 mutually perpendicular axis (X, Y, Z) in 125°C atmosphere. Other condition of the vibration is set by the following table. During the test, intermittent discontinuity is monitored.</p>  <p>The figure contains two parts. On the left is a graph of Contact Resistance (ohms) versus Time (μs). A horizontal line is drawn at 7 ohms. Two curves are shown: one labeled 'Acceptable' which stays below the 7 ohm line, and one labeled 'Not Acceptable' which crosses above the 7 ohm line. A 1 μs interval is marked on the time axis. On the right are three cross-sectional diagrams of a cable mount assembly. The first diagram shows the cable mount on a shaver. The second diagram shows the cable mount on a shaver with a mounting jig. The third diagram shows the cable mount on a shaver with a mounting jig. Dimensions are given as 140 +5/0 mm for the height of the cable mount and 150 +5/0 mm for the cable length.</p>

Table 2

Test Description	Requirement	Procedure						
		<table border="1" data-bbox="943 275 1507 428"> <thead> <tr> <th>Acceleration 加速度 (m/s²)</th> <th>Vibration Duration 加振時間 (h)</th> <th>Vibration Frequency 加振周波数 (Hz)</th> </tr> </thead> <tbody> <tr> <td>98~245 (10~25G)</td> <td>3 hours per direction, Total of 9 hours 各3時間 計9時間</td> <td>50~100 ... 98m/s²(10G)constant 一定 100~250* ... Half vibration stroke of 0.2mm constant ~245m/s²(25G)constant 片振巾 0.2mm一定~245m/s²(25G)一定 Sweep Time 3min.(Log Sweep) 掃引時間 3分(Log Sweep)</td> </tr> </tbody> </table> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div data-bbox="984 480 1149 533" style="text-align: center;"> <p>Half vibration stroke constant 振巾一定 (0.2mm)</p> </div> <div data-bbox="1170 449 1451 533" style="text-align: center;"> <p>*100~176~250Hz Acceleration constant 加速度一定 (25G)</p> </div> </div>	Acceleration 加速度 (m/s ²)	Vibration Duration 加振時間 (h)	Vibration Frequency 加振周波数 (Hz)	98~245 (10~25G)	3 hours per direction, Total of 9 hours 各3時間 計9時間	50~100 ... 98m/s ² (10G)constant 一定 100~250* ... Half vibration stroke of 0.2mm constant ~245m/s ² (25G)constant 片振巾 0.2mm一定~245m/s ² (25G)一定 Sweep Time 3min.(Log Sweep) 掃引時間 3分(Log Sweep)
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3.6.11 Retention Force in Connector	58.8N(6kgf) or more	About 100mm long wire is crimped with the plug housing connector and the receptacle contact is fastened and then the load that causes separation of contact from the housing with the wire pulled toward the axis at a constant speed of approx.100mm/min. is measured.						

ENVIRONMENTAL

3.6.12 High Temperature Exposure (Temperature Life)	There shall be no evidence of cracking, distortion or detrimental damage, can meet the following test requirements according to the corresponding test sequence.	The samples are kept in a thermostatic chamber for 1000 hours and then taken out to be exposed to the normal temperature until it cools off to the temperature. The chamber temperature is set at 125°C.
3.6.13 Thermal Shock	There shall be no evidence of cracking, distortion or detrimental damage, can meet the following test requirements according to the corresponding test sequence.	<p>The samples are placed in a thermostatic chamber and given with 200cycles of heating/cooling process in the heating/cooling pattern shown in following figure and then is taken out of the chamber to be left in the normal temperature for more than 2hours.</p> 

3.7. Product Qualification and Requalification Test Sequence 试验顺序

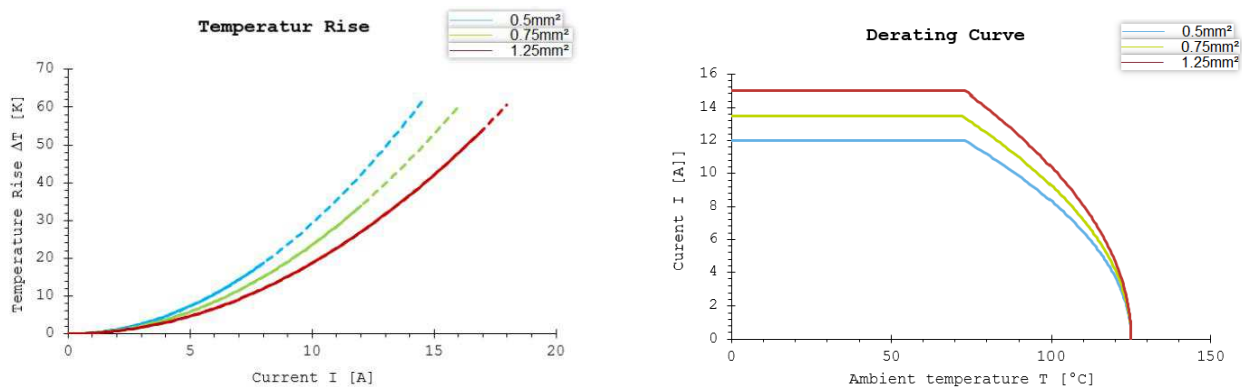
Test samples were subjected to the following tests in the order given.

Test or Examination		Test Group (a)					
		1	2	3	4	5	6
		Test Sequence (b)					
3.6.1	External Appearance	1	1	1	1	1	1
3.6.2	Low Level Contact Resistance		2, 4	2,4,7	3,6	3,6	
3.6.3	Crimp Resistance				3,6	3,6	
3.6.4	Maximum Test Current Capability			5			
3.6.5	Current Cycling			6			
3.6.7	Insertion Force	2, 5			2,8	2,8	
3.6.8	Withdrawal Force	3, 6			4,7	4,7	
3.6.9	Strength of Crimp Connection	7					
3.6.10	Durability	4		3			
3.6.11	Vibration		3				
3.6.12	Retention Force in Connector						2
3.6.13	High Temperature Exposure				5		
3.6.14	Thermal Shock					5	

3.8. Temperature rise / derating free in air 温升 / 降额 (裸露在空气中)

The temperature rise curve and derating free in air are shown as below.

温升曲线和降额曲线如下图所示。



NOTE: The limit temperature as well as the maximum current carrying capacity of the used wires have to be considered.

注意：参考该曲线时，所选择电缆的应用最高温度及载流能力需要考虑能否满足应用。

4. QUALITY 质量

4.1. Qualification test 鉴定

Samples must be in accordance with drawings and be taken in a random way in the production in progress.

样件必须与产品图纸一致，并且是生产过程中随机选取的。

4.2. Requalification test 重新鉴定

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by product engineering.

如果产品或者制造过程中有显著影响外观，装配和功能的设变，质保需要协调按照原先工程定义的测试顺序，重新验证全部或者部分测试项目。

4.3. Acceptance 验收

Acceptance is based on verification that the product meets the requirements of section 3.6. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

归咎于测试设备，样件安装或者操作员的失误的失效不应判定产品不合格。当产品失效发生时，需要有纠正措施以及重新提交样件进行验证。在重新验证前，需确认已有纠正措施。

4.4. Quality conformance inspection 质量合格检验

The applicable TE Connectivity quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification

TE Connectivity 的质量检验计划将指定适用的质量标准。尺寸和功能要求，应按照适用的产品图纸和本规范。