SHUR-PLUG* and SHUR-PLUG* Receptacles

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for SHUR-PLUG* and SHUR-PLUG* receptacles. The .180 inch diameter SHUR-PLUG is only available as a straight contact while SHUR-PLUG receptacles are available in straight and right angle versions.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Successful qualification testing on the subject product line was completed on 28May08. The Qualification Test Report number for this testing is 501-688. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Documents

- 109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)
- 114-2042: Application Specification (SHUR-PLUG* .156 Diameter Terminals and Receptacle Contacts)
- 501-688: Qualification Test Report (SHUR-PLUG* and SHUR-PLUG* Receptacles)

2.2. Industry Document

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 110 volts DC
- Current: See Figure 3 for applicable current carrying capability
- Temperature: -40 to 105˚C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	4 milliohms maximum initial. ΔR 4 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. Measure from crimp to crimp of mated assembly.
Contact resistance, specified current.	4 milliohms maximum initial. ΔR 4 milliohms maximum.	EIA-364-6. Subject specimens to 1 ampere maximum and 1 volt maximum open circuit voltage. Measure from crimp to crimp of mated assembly.
Temperature rise vs current.	30˚C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1˚C. See Figure 3.
MECHANICAL		
Crimp tensile.	Wire Size (AWG) / Crimp Tensile (Pounds Minimum) 18 / 20 16 / 30 14 / 50 12 / 70 10 / 80 8 / 57	EIA-364-08. Determine axial force necessary to pull wire from crimp or break terminal at a maximum rate of 1 inch per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
Sinusoidal vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10 to 55 to 10 Hz traversed in 1 minute with .06 inch maximum total excursion. Two hours in each of 2 mutually perpendicular planes. One end of the specimen mounted to the vibrating surface with the other end secured to a non-vibrating support with a minimum of 8 inches of unsupported cable in between.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Manually mate and unmate specimens for 6 cycles.
Mating force.	17 pounds maximum.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 1 inch per minute.
Unmating force.	5.7 pounds minimum.	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 1 inch per minute.
ENVIRONMENTAL		
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III, Test Condition B. Subject unmated specimens to 10 cycles (10 days) between 25 and 65˚C at 80 to 100% RH.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition C. Subject mated specimens to 105˚C for 500 hours.

NOTE *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)		
	1	2	3
	Test Sequence (b)		
Initial examination of product	1	1	1
LLCR		2,7	
Contact resistance, specified current	3,7		
Temperature rise vs current		3,8	
Crimp tensile			2
Sinusoidal vibration	5	6(c)	
Mechanical shock	6		
Durability	4		
Mating force	2		
Unmating force	8		
Humidity/temperature cycling		4(d)	
Temperature life		5	
Final examination of product	9	9	

NOTE

(a) See paragraph 4.1.A.

(b) Numbers indicate sequence in which tests are performed.

(c) Discontinuities shall not be measured. Energize at 18˚C level for 100% loadings per Quality Specification 102-950.

(d) Precondition specimens with 6 durability cycles.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Each test group shall consist of a minimum of 5 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

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

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall 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.

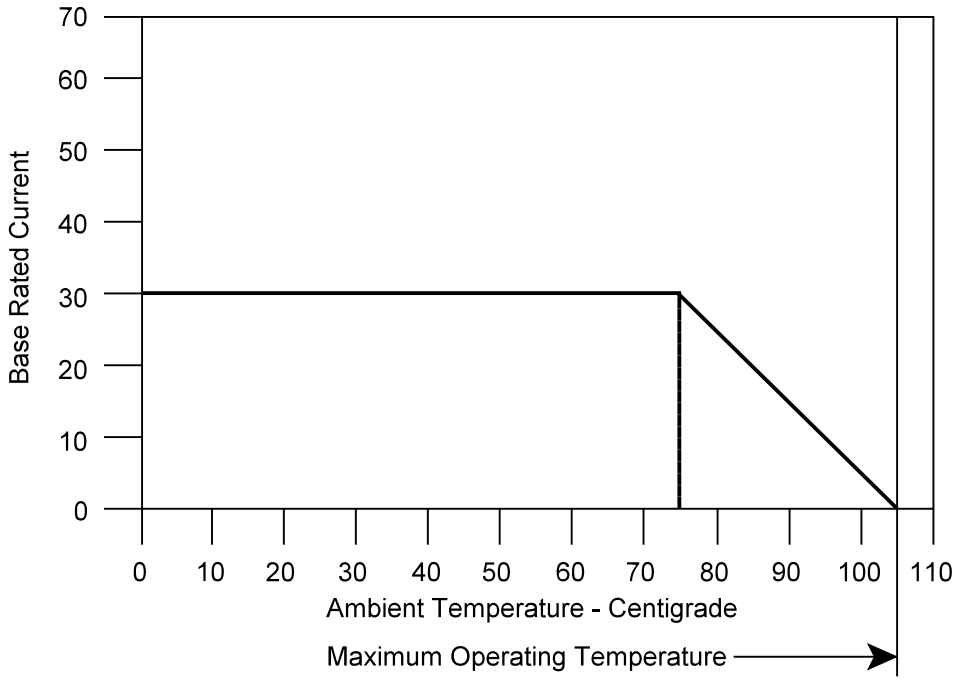

Figure 3A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG			
	16	14	12	10/8
Single Contact	0.3	0.4	0.5	1.0

NOTE

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at the maximum ambient operating temperature shown in Figure 4A.

Figure 3B
Current Rating