FASTON* Standard Products (with lower mating insertion forces)

1. SCOPE

1.1. Content

This specification covers performance, tests, and quality requirements for FASTON* Standard products, including 2D crimp, F-crimp, and Tab-Lok crimp terminals.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the full subject product line is in-process. The Qualification Test Report numbers are issued upon successful qualification testing of each part number and put on file.

1.4. Revision Summary

Revisions to this specification include:

- Corrected test sequence in Figure 3. Derating curve information added as Note C.
- Correction of test procedure specification and operation speed for Insertion and Withdrawal Force.

2. APPLICABLE DOCUMENTS AND FORMS

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. TE Connectivity Specifications

114-2036	Application Specification – FASTON* Standard Straight Receptacles with F-crimp Feature
114-2078	Application Specification – FASTON* Standard Flag Receptacles with Tab-Lok Feature
114-2079	FASTON* Flag Receptacles with “F-” Crimp Feature Application Specification
114-143088	Application Specification – FASTON* Standard Straight Receptacle Terminals with 2D Crimp Feature
114-143089	Application Specification – FASTON* Standard Flag Receptacle Terminals with 2D Crimp Feature
501-106369	Qualification Test Report
501-134154	Qualification Test Report

2.2. Commercial Standards and Specifications

UL310	UL Safety Standard for Electrical Quick-Connect Terminals
IEC 60512	International Standard – Connectors for Electronic Equipment – Tests and Measurements
EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials 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 TE drawing.

3.3. Ratings

A. Voltage Rating: 600 VAC

B. Temperature Rating: 125°C (maximum) Tin-Plated Brass
250°C (maximum) Nickel-Plated Steel

C. Current Rating: See Figure 1.

Wire Size [AWG]	Current [A]
12	20
14	15
16	10
18	7
20	4
22	3

Figure 1

3.4. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 2. All tests shall be performed at ambient environmental conditions otherwise specified.

3.5. Test Requirements and Procedure Summary

<table>
<tr><th>Test Description</th><th colspan="3">Requirement</th><th>Procedure</th></tr>
<tr><td>Examination of Product</td><td colspan="3">Meets requirements of product drawing and TE application specification.
Parts show no signs of damage or physical change.</td><td>EIA-364-18, Method B
Visual, dimensional and functional as per applicable inspection plan.</td></tr>
<tr><td colspan="5">Electrical</td></tr>
<tr><td>Contact Resistance, Rated Current</td><td>Wire Size [AWG]</td><td>Test Current [A]</td><td>Max. Resistance (mΩ) Brass|Steel</td><td>IEC 60512-2-2, Test 2B
Measure potential drop of mated contacts.</td></tr>
<tr><td></td><td>22</td><td>3</td><td>6 10</td><td></td></tr>
<tr><td></td><td>20</td><td>4</td><td>6 10</td><td></td></tr>
<tr><td></td><td>18</td><td>7</td><td>6 10</td><td></td></tr>
<tr><td></td><td>16</td><td>10</td><td>6 10</td><td></td></tr>
<tr><td></td><td>14</td><td>15</td><td>6 12</td><td></td></tr>
<tr><td></td><td>12</td><td>20</td><td>6 12</td><td></td></tr>
</table>

Figure 2 (continued)

<table>
<tr><th>Test Description</th><th>Requirement</th><th>Procedure</th></tr>
<tr><td>Temperature Rise</td><td>Brass:
Temperature rise of any individual termination shall not exceed 30°C when subjected to the specified current indicated in Figure 1.
Steel:
Temperature rise of any individual termination shall not exceed 60°C when subjected to the specified current indicated in Figure 1.</td><td>UL310
Measure temperature rise above ambient created by the energizing current. Measurement must be taken in a place where there is no influence from air convection.
Temperature rise = Temperature of contact – Ambient temperature</td></tr>
<tr><td>Current Cycling</td><td>Brass:
Temperature rise between T1 and T2 shall not exceed 15°C. Neither T1 nor T2 shall exceed 85°C.
Steel:
Temperature rise between T1 and T2 shall not exceed 15°C. Neither T1 nor T2 shall exceed 200°C.</td><td>UL310
Subject terminals to 500 cycles. T1 shall be measured after the 24th cycle and T2 shall be measured after the 500th cycle. Terminals terminated overload test current to be 200% of the nominal test current. One cycle include 45 minutes on and 15 minutes off.</td></tr>
<tr><td colspan="3">Mechanical</td></tr>
<tr><td>Crimp Tensile Strength</td><td><table><tr><th>Wire Size [AWG]</th><th>Min. Tensile Force [lbs (N)]</th></tr><tr><td>24</td><td>5 (22)</td></tr><tr><td>22</td><td>8 (36)</td></tr><tr><td>20</td><td>13 (58)</td></tr><tr><td>18</td><td>20 (89)</td></tr><tr><td>16</td><td>30 (133)</td></tr><tr><td>14</td><td>50 (222)</td></tr><tr><td>12</td><td>70 (311)</td></tr></table></td><td>UL310
Operation Speed: 25.4 mm/min
Measure the force required to break or pull-out wire from wire barrel crimp. Insulation barrel crimp shall not be fully closed.
This is verification of crimp to wire integrity. This may require terminal support fixturing and will likely destroy the terminal in some cases, but is considered a pass if the wire barrel remains connected to the wire.</td></tr>
<tr><td>Insertion Force</td><td>1st Insertion: Tin-Plated Brass Version
36N[8#]max. (individual)
27N[6#]max. (average)

Nickel-Plated Steel Version
.250 series: 53N[12#]max.(individual)
.187 series: 36N[8#]max. (individual)
No average insertion spec. on steel versions.</td><td>IEC 60512-13-2, Test 13B
Operation Speed: 25.4 mm/min
Measure the force required to push terminal onto test tab.</td></tr>
<tr><td>Withdrawal Force</td><td>For ALL FASTON Standard Versions:
1st Withdrawal: 3 lbs (13 N) min. (individual)
5 lbs (22 N) min. (average)
6th Withdrawal: 3 lbs (13 N) min. (individual)
(.250 Srs.) 4 lbs (18 N) min. (average)
6th Withdrawal: 2 lbs (9 N) min. (individual)
(.187 Srs.) 3 lbs (13 N) min. (average)</td><td>IEC 60512-13-2, Test 13B
Operation Speed: 25.4 mm/min
Measure the force required to pull terminal from test tab.
Retention forces based upon UL310 Para 6.4 Tin-plated.</td></tr>
</table>

Figure 2 (end)

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 3.

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)		
	1	2	3
	TEST SEQUENCE (b)		
Examination of Product	1, 4	1, 3	1, 7
Insertion Force	2		
Withdrawal Force	3		
Contact Resistance			2, 4, 6
Crimp Tensile Strength		2	
Current Cycling			5
Temperature Rise (c)			3

Figure 3

NOTE
(a) See paragraph 4.2.
(b) Numbers indicate sequence in which tests are performed.
(c) Derating curve to be created and included in test report using Temperature Rise data.

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 4.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 4

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

4.3. 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.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in Figure 2. 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.

4.5. 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.