



Composite P-Clamps with Chloroprene Cushion

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for TE Connectivity P-Clamps, component number THA-PDKG-XX, where -XX indicates a nominal inside diameter of the cushion measured in 1/16ths inches. This product is designed for use in the Aerospace, Defense and Marine sector, but can be used in various applications where robust P-Clamps are required.

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.

TE Connectivity P-Clamp qualification testing was performed in accordance with TE Connectivity Qualification Test Plan 109-163005 and as reported in TE Connectivity Qualification Test Report 501-163032.

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. TE Connectivity Documents

| | |
|-------------|--|
| THA-PDKG-XX | Composite P-Clamp, Size 03 Thru Size 21, Dual Cushion (Customer Drawing) |
| 109-163005 | Qualification Test Plan for Composite P-Clamps |
| 114-163022 | Application Specification for Composite P-Clamps |
| 501-163032 | Qualification Test Report for Composite P-Clamps |

2.2. Other Documents

U.S. Government Publications

| | |
|-----------------|---|
| MIL-STD-202-101 | Test Method Standard, Salt Atmosphere (Corrosion) |
| MIL-STD-202-107 | Test Method Standard, Thermal Shock |
| MIL-STD-202-214 | Test Method Standard, Random Vibration |

SAE International

| | |
|---------------|--------------------|
| SAE AS23190 | Aerospace Standard |
| SAE AS23190/4 | Aerospace Standard |

Federal Aviation Administration (FAA), Code of Federal Regulations (CFR)

Title 14, Part 25, Subpart C, Chapter 1, Airworthiness Standards: Transport Category Airplanes

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

Temperature: -65°C to +85°C [-85°F to +185°F]

3.4. Performance and Test Description

Product is designed to meet the 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 Visual Inspection | Meets requirements of product drawing and Application Specification 114-163022. | SAE AS23190 Paragraphs 3.4 & 4.7.1; QTP Paragraph 3.3. |
| Fungus Resistance | No fungal growth, rating 0, or traces of fungal growth, rating 1, shall be deemed acceptable. | SAE AS23190 Paragraph 3.3; QTP Paragraph 3.1, RTCA/DO-160, Section 13.5.5 and 13.5.6. |
| Flammability | Specimens shall have a burn rate shall not exceeding 2.5 inches per minute. | SAE AS23190 Paragraph 3.3; QTP Paragraph 3.2, FAA Title 14 CFR Part 25, Appendix F, part I (a)(1)(iv), Horizontal. |
| Maintenance Aging (clamping cycles), 30 cycles | No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | QTP 109-163005, Paragraph 3.4. |
| Moisture Conditioning | 49°C, Relative Humidity 20%, 24 hours. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.1 & 4.7.2; QTP Paragraph 3.5. |
| Tensile Strength, Destructive | Apply force to failure in each of 4 axes. Requirement: 50 lbf, minimum. | SAE AS23190 Paragraphs 3.5.2 & 4.7.3; QTP Paragraph 3.10. |
| Vibration Test | The wire bundle and its contact area with the P-Clamp shall be inspected for signs of chafing. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.3.1 & 4.7.4.1; QTP Paragraph 3.11, Random vibration per MIL-STD-202-214, Test Condition II, Letter G (27.78gRMS), 2 axes, 8 hours per axis. |
| Temperature Cycling | No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.3.2 & 4.7.4.2; QTP Paragraph 3.12. Thermal shock per MIL-STD-202-107, Test Condition B 5 cycles -65° C to +85° C. |
| Tensile Strength, Non-Destructive | Apply 50 lbf in each of 4 axes normal to the central axis. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.2 & 4.7.4.3; QTP Paragraph 3.13. |
| Identification of Product Legibility after Life Cycle | Identification markings shall be legible. | SAE AS23190 Paragraphs 3.5.6 & 4.7.4.4; QTP Paragraph 3.8. |
| Fluid Immersion | 10 Fluids, Temperature 49°C, Duration 4 hours. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.4 & 4.7.5; QTP Paragraph 3.6. |
| Tensile Strength, Non-Destructive | Apply 50 lbf in each of 4 axes normal to the central axis. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.2 & 4.7.4.3; QTP Paragraph 3.13. |
| Corrosion | No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.5 & 4.7.6; QTP Paragraph 3.7. Corrosion per MIL-STD-202-101, Condition A. |
| Tensile Strength, Non-Destructive | Apply 50 lbf in each of 4 axes normal to the central axis. No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190 Paragraphs 3.5.2 & 4.7.3; QTP Paragraph 3.13. |
| Identification of Product Legibility | Identification markings shall be legible. | SAE AS23190 Paragraphs 3.5.6 & 4.7.7; QTP Paragraph 3.8. |
| Diametral Retention Test | No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | SAE AS23190/4 Paragraph 11(b) ; QTP Paragraph 3.14. |
| Maintenance Aging (clamping cycles), 30 cycles | No cracks or wear to any of the retention features, hinge or cushion detrimental to performance. | QTP 109-163005, Paragraph 3.4. |
| Final Visual Inspection | Components shall be free from defects that would adversely affect performance, reliability or durability. | SAE AS23190 Paragraphs 3.4 & 4.7.1; QTP Paragraph 3.9. |

Figure 1

3.6. Product Qualification Test Sequence

| Test Description | Test Groups | | | |
|--|--------------------|-----------------|------------------|------------|
| | I | II | III | IV |
| | Materials / Design | Fluid Immersion | Tensile Strength | Life Cycle |
| Initial Visual Inspection | Perform | Perform | Perform | Perform |
| Fungus Resistance | Perform | - | - | - |
| Flammability | Perform | - | - | - |
| Maintenance Aging (clamping cycles), 30 cycles | - | Perform | Perform | Perform |
| Moisture Conditioning | - | Perform | Perform | Perform |
| Tensile Strength, Destructive | - | - | Perform | - |
| Vibration Test | - | - | - | Perform |
| Temperature Cycling | - | - | - | Perform |
| Tensile Strength, Non-Destructive | - | - | - | Perform |
| Identification of Product Legibility | - | - | - | Perform |
| Diametral Retention Test | - | - | - | Perform |
| Fluid Immersion | - | Perform | - | - |
| Tensile Strength, Non-Destructive | - | Perform | - | - |
| Corrosion | - | - | - | Perform |
| Tensile Strength, Non-Destructive | - | - | - | Perform |
| Identification of Product Legibility | - | Perform | - | Perform |
| Maintenance Aging (clamping cycles), 30 cycles | - | Perform | - | Perform |
| Final Visual Inspection | - | Perform | Perform | Perform |

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. Test group quantities shall be defined in Qualification Test Plan

B. Test Sequence

Qualification test sequence shall be 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.