STRATO-THERM* Un-Insulated, No-Insulation Support, Heat Resistant Terminals

1. INTRODUCTION

1.1. Purpose

Testing was performed on STRATO-THERM* un-insulated, no-insulation support, heat resistant terminals to determine their conformance to the requirements of Product Specification 108-2193 | Revision B.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of STRATO-THERM un-insulated, no-insulation support, heat resistant terminals. Testing was performed at the Engineering | Assurance Product Testing Laboratory between Dec04 and Jan05. Additional testing was performed | between 13Jul06 and 24Aug06. The test file numbers for this testing are CTL3010-002 and CTL3066-| 002. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The STRATO-THERM un-insulated, no-insulation support, heat resistant terminals listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product | Specification 108-2193 Revision B.

1.4. Product Description

STRATO-THERM un-insulated, no-insulation support, heat resistant terminals are intended for the termination of stranded, nickel plated wire conforming to Mil-W-22759.

1.5. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Request Group ID	Part Number & Revision Level	Wire Size (AWG)	Stud Size (Inch)
1,2,3,4	323167 Rev F	8	5/16
4	323169 Rev N	6	#10
1,2,3	323170 Rev N	6	1/4
1,2,3,4	323174 Rev K	4	5/16
1,2,3,4	323177 Rev K	2	3/8
1,2,3,4	323180 Rev L	1/0	3/8

Figure 1

* Trademark
| Indicates change

1.6. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35˚C
- Relative Humidity: 25 to 75%

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Initial examination of product	1	1	1	1
Voltage drop	3	3	3	
Vibration, sinusoidal		2		
Termination tensile strength		5	5	2
Thermal shock	2			
Salt spray			2	
Final examination of product	4	4	4	

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Voltage Drop - Test Groups 1, 2 and 3

All test specimens complied with voltage drop requirements shown in Figure 3.

Wire Size	Test Current	Terminal Millivolt Drop (maximum)	Tensile Strength (pounds minimum)
8	73	5.0	225
6	101	5.0	300
4	135	5.0	400
2	181	5.0	550
1/0	245	5.0	700

Figure 3
Millivolt Drop & Tensile Strength Requirements

2.3. Sinusoidal Vibration - Test Group 2

There was no apparent physical damage or discontinuities of 1 microsecond or greater during vibration testing.

2.4. Termination Tensile Strength - Test Groups 2, 3 and 4

All tensile values were greater than specified minimum shown in Figure 3.

2.5. Thermal Shock - Test Group 1

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.6. Salt Spray - Test Group 3

No evidence of physical damage was visible as a result of exposure to a salt spray atmosphere.

2.7. Final Examination of Product - All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product

A Certificate of Conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. Voltage Drop

Voltage drop was measured at rated current after specified tests. Double-ended assemblies were arranged in a series chain, and assembled horizontally in a draft free room a minimum of 24 inches from the walls, ceiling, and floor on “Y” shaped insulated stands. Specimens were tested using the same bolt size as the terminal stud size. Size 5/16-18 bolts were tightened to 130 in-lbs torque. Size 1/4 -20 bolts were tightened to 75 in-lbs torque. Size 3/8-24 bolts were tightened to 240 in-lbs torque. Lead-in wires of the same gage as test specimens were used to connect the test series circuit to power supply bus bars. The series chain was then energized at the test current indicated in Figure 3 until thermal stability was achieved. Thermal stability was defined as a minimum of 3 readings of test wire taken at 5 minute intervals that did not vary by more than 1˚C. Ambient temperature was monitored via a thermocouple mounted in a 2 inch square, ¼ inch thick copper block positioned in the same horizontal plane as the series chain. When thermal stability was achieved voltage drop was hand probed using needle probes from the intersection of the wire barrel and the tongue to the wire at 1/16 inch back from the wire receiving end of the terminal. Also, 4 equal wire length (EWL) voltage drop measurements were taken near the middle of 4 different test wires of each terminal size.

3.3. Sinusoidal Vibration

Specimens were subjected to a simple harmonic motion having an amplitude of 0.06 inch double amplitude (maximum total excursion). The vibration frequency was varied uniformly between the approximate limits of 10 to 55 Hz. The entire frequency range of 10 to 55 Hz and return to 10 Hz was traversed in approximately 1 minute. The motion was applied for a period of 18 hours in each of the 2 mutually perpendicular axes, so the motion was applied for a total period of approximately 36 hours. The test specimens were not run in the axis that would force them back upon themselves. Specimens were rigidly mounted to the vibrating surface while the wire ends were secured to a non-vibrating support 12 inches from the test terminal with all slack removed from the wire. Specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.4. Termination Tensile Strength

An axial load was applied to double ended specimens at a rate of 1 inch per minute until failure. Two slotted plate fixtures were used to attach each specimen in a vertical position to the mounting plates of the tensile machine. The maximum tensile strength was recorded.

3.5. Thermal Shock

Specimens were subjected to 50 cycles of 30 minutes at -75°C; 30 minutes at room temperature; 30 minutes at 150°C; and 30 minutes at room temperature.

3.6. Salt Spray

Mated specimens were subjected to a 5% salt spray environment for 48 hours. The temperature of the box was maintained at 95 +2/-3°C, while the pH of the salt solution was between 6.5 and 7.2.

3.7. Final Examination of Product

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.