CERTI-SEAL* Aerial Service Wire Splice Closure

1. INTRODUCTION

1.1. Purpose

Testing was performed on the CERTI-SEAL* Aerial Service Wire Splice Closure to determine its conformance to the requirements of Product Specification 108-1995 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the CERTI-SEAL Aerial Service Wire Splice Closure. Testing was performed at the Engineering Assurance Product Test Laboratory between 11Jun01 and 11Jan02. The test file number for this testing is CTL B019133-005. This documentation is on file at and available from the Engineering Assurance Product Test Laboratory.

1.3. Conclusion

The CERTI-SEAL Aerial Service Wire Splice Closure listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-1995 Revision A.

1.4. Product Description

The CERTI-SEAL Aerial Service Wire Splice Closure system provides a fast, simple way to seal and encapsulate telephone cable splices in non-pressurized aerial service wire applications. The closure consists of a high impact plastic body that encompasses a gel sealant which seals out the environment and will not leak. One piece, snap together latching system and the pre-installed gel sealant eliminate special handling, making the closure simple and easy to install.

1.5. Test Specimens

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

Test Group	Quantity	Part Number	Description
1,2,3	8	1217204-1	2 or 6 pair closure with 2 pair service wire cable
	8	1217204-1	2 or 6 pair closure with 6 pair service wire cable
4	2	1217204-1	2 or 6 pair closure, unterminated, packaged
5,6,7,8	6	1217204-1	2 or 6 pair closure with 2 pair service wire cable
	6	1217204-1	2 or 6 pair closure with 6 pair service wire cable

Figure 1

1.6. Environmental Conditions

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

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

* Trademark
I Indicates change

LOC B

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)							
	1	2	3	4	5	6	7	8
	Test Sequence (b)							
Initial examination of product	1	1	1	1	1	1	1	1
Insulation resistance	2,4,6,8	2,4,6,8	2,4,6		3,5	2,4	2,4	2,4
Cable pullout	3							
Torsion resistance		3						
Bending resistance		5						
Impact resistance			3					
Drop test				2				
Humidity-temperature cycling		7				3		
Low temperature handling					2			
Thermal shock	7		5		4			
Water intrusion							3	
Water immersion	5							
Salt fog spray								3
Sealant consistency				3				
Final examination of product	9	9	7	4	6	5	5	5

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. Insulation Resistance - Test Groups 1, 2, 3, 5, 6, 7 and 8

All insulation resistance measurements were greater than 100 megohms.

2.3. Cable Pullout - Test Group 1

Service wire cables did not pull out of the closure when an axial load of 35 pounds [15.88 kg] was applied. All insulation resistance measurements were greater than 100 megohms.

2.4. Torsion Resistance - Test Group 2

No evidence of physical damage was visible as a result of alternately rotating the service wire cables 90 degrees to each side. A total of 10 cycles were performed. All insulation resistance measurements were greater than 100 megohms.

2.5. Bending Resistance - Test Group 2

No evidence of physical damage was visible as a result of alternately bending the service wire cables 45 degrees from the axis of the cable, and then into a plane perpendicular to the cable. A total of 10 cycles were performed in each of the 2 planes. All insulation resistance measurements were greater than 100 megohms.

2.6. Impact Resistance - Test Group 3

No physical damage occurred as a result of a 5 foot-pound [6.78 J] impact force by a 2 inch [50.8 mm] spherical diameter impact head. All insulation resistance measurements were greater than 100 megohms.

2.7. Drop Test - Test Group 4

No physical damage occurred as a result of dropping packaged enclosures from a height of 6 feet [1.83 m] onto a concrete surface.

2.8. Humidity-temperature Cycling - Test Groups 2 and 6

No evidence of physical damage was visible as a result of humidity-temperature cycling. All insulation resistance measurements were greater than 100 megohms.

2.9. Low Temperature Handling - Test Group 5

Specimens were capable of being installed after conditioning for 2 hours at 15 to 20°F [-9.5 to -6.5°C]. All insulation resistance measurements were greater than 100 megohms.

2.10. Thermal Shock - Test Groups 1, 3 and 5

No evidence of physical damage was visible as a result of thermal shock testing. All insulation resistance measurements were greater than 100 megohms.

2.11. Water Intrusion - Test Group 7

No evidence of physical damage was visible as a result of water intrusion testing. All insulation resistance measurements were greater than 100 megohms.

2.12. Water Immersion - Test Group 1

No evidence of physical damage was visible as a result of water immersion testing. All insulation resistance measurements were greater than 100 megohms.

2.13. Salt Fog Spray - Test Group 8

No evidence of physical damage was visible as a result of salt fog spray testing. All insulation resistance measurements were greater than 100 megohms.

2.14. Sealant Consistency - Test Group 4

No evidence of sealant creep or run-out was visible as a result of exposure to 140°F [60°C] for 336 hours.

2.15. 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. Insulation Resistance

Insulation resistance was measured between all tip and ring circuits of each terminated specimen. A test voltage of 100 volts DC was applied for 2 minutes before the resistance was measured.

3.3. Cable Pullout

Each terminated specimen was individually secured in a slotted fixture so as to let the service wire cable hang vertically beneath the specimen. A 35 pound [15.88 kg] weight was suspended on each service wire in each specimen for a period of 1 minute.

3.4. Torsion Resistance

The service wire cables of each terminated specimen were clamped 4 inches [101.6 mm] from the end of the specimen. The service wire cables were then alternately rotated 90 degrees to each side. A total of 10 cycles were performed.

3.5. Bending Resistance

The service wire cables of each terminated specimen were bent 45 degrees from the axis of the cable, in a plane of the cables and in a plane perpendicular to the cables. A total of 10 cycles were performed in each of the 2 planes.

3.6. Impact Resistance

Each terminated specimen was preconditioned at 15°F [-9.5°C] for 2 hours prior to impact testing. Immediately following the preconditioning, each assembled specimen was placed on a bed of gravel, and subjected to a 5 foot-pound [6.78 J] impact force by a 2 inch [50.8 mm] spherical diameter impact head.

3.7. Drop Test

Each unterminated, packaged specimen was preconditioned at 15°F [-9.5°C] for 8 hours prior to drop testing. Immediately following the preconditioning, each unterminated, packaged specimen was dropped from a height of 6 feet [1.83 m] onto a concrete surface.

3.8. Humidity-temperature Cycling

Terminated specimens were exposed to 30 days of humidity-temperature cycling. Each cycle consisted of 4 hour dwells at temperature extremes of 40 and 140°F [4.44 and 60°C]. The average rate of temperature change from 1 extreme to the other was 25°F [13.9°C] per hour. The relative humidity at the upper temperature extreme was maintained between 92 and 100%. During the exposure, the specimens were biased by the application of 48 volts DC between the tip and ring circuits. Insulation resistance measurements were recorded initially, and weekly thereafter, at each dwell temperature.

3.9. Low Temperature Handling

Unterminated, packaged specimens and service wire cables were preconditioned at 15 to 20°F [-9.5 to -6.5°C] for 2 hours. Upon completion of the preconditioning period, each specimen was terminated while still in the cold chamber.

3.10. Thermal Shock

Terminated specimens were subjected to 15 cycles of thermal shock. Each cycle consisted of 4 hour dwells at temperature extremes of -40 and 140°F [-40 and 60°C], with a transition time of 4 hours between temperature extremes.

3.11. Water Intrusion

Terminated specimens were mounted in their typical mounting position, and subjected to a stream of water striking the specimens at a downward angle of 45 degrees. The flow of water was 15 gallons [56.8 l] per minute with a head pressure of 10 psi [68.9 kPa], adjusted so that the water impinged uniformly over the surface of each specimen. The temperature of the water was adjusted to be equal to or greater than the temperature of the specimen to avoid condensation. The duration of the test was 5 minutes per side for each specimen.

3.12. Water Immersion

Terminated specimens were exposed to 14 days of immersion in water. Each specimen was immersed in tap water at a temperature of 65 to 80°F [18.5 to 26.7°C] to a depth of 24 inches [0.61 m]. During the exposure, the specimens were biased by the application of 48 volts DC between the tip and ring circuits. Insulation resistance measurements were recorded after 1 hour, and daily thereafter.

3.13. Salt Fog Spray

Terminated specimens were subjected to a 5% salt spray environment for 30 days. The temperature of the box was maintained at 95 +2/-3°C, the pH of the salt solution was between 6.5 and 7.2. During the exposure, the specimens were biased by the application of 48 volts DC between the tip and ring circuits. Insulation resistance measurements were recorded initially, and daily thereafter.

3.14. Sealant Consistency

Unterminated, opened specimens were placed in an air circulating oven, and subjected to a temperature of 140°F [60°C] for a period of 336 hours. The specimens were placed in an upside down position so as to facilitate sealant creep or run out of the closure. Upon completion of the exposure period, the closure specimens were visually examined.

3.15. Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.