

Universal Distribution Connector , Reinforced

1. SCOPE

1.1 Content

This specification contains performance requirements and qualification tests procedures for U.D.C. Reinforced . This connector consists of an "C" member and a Wedge , both stamped and formed of copper alloy (ASTM B36) with an adjustable design configuration to act as a spring . They are intended to provide a reliable electrical connection for solid and stranded conductors (aluminum or copper) used on street light and consumer's enter connections .

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein . In the event of conflict between 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 .

2.1.1 AMP Documents

- 109-13009 Thermal Shock , Test Procedure for
- 109-13010 Salt Spray and Elevated Temperature , Test Procedure for
- 501-289 Test Report

2.1.2 Military Documents

- MIL-C-45662 Calibration of Standards

2.1.3 Commercial Documents

- ANSI C119.4-1991 American National Standard for Connectors for Use Between Aluminum-to-Aluminum or Aluminum-to-Copper Conductors.
- NEMA CC3 - 1973 (R 1978)

3. REQUIREMENTS

3.1 Design and Construction

Connectors shall be of the design , construction and physical dimensions specified on the applicable AMP Product Drawing .

3.2 Materials

The materials used on the construction of these connectors shall be as specified on the applicable AMP Product Drawing.

Prepared by : Cláudio C.Cassali

Checked by : Walter Bellini Jr.

Approved by : José A. La Salvia

3.3 Functional Characteristics

3.3.1 Wire Range

Connectors are designed to accommodate various sizes according to Table I .

U.D. Connector Wire Diameter Limits

Part Number	UL Listed (Y/N)	Sum		Top Groove		Bottom Groove	
		Max.	Min.	Max.	Min.	Max.	Min.
Type I (PN 881781-1)	Y	.552 (14,01)	.417 (10,60)	.320 (8,12)	.125 (3,17)	.292 (7,42)	.125 (3,17)
Type II (PN 881783-1)	Y	.440 (11,18)	.347 (8,82)	.320 (8,12)	.125 (3,17)	.209 (5,30)	.125 (3,17)
Type III (PN 881785-1)	Y	.374 (9,50)	.291 (7,40)	.258 (6,55)	.100 (2,54)	.183 (4,65)	.050 (1,27)
Type IV (PN 881787-1)	Y	.302 (7,67)	.236 (5,99)	.258 (6,55)	.100 (2,54)	.183 (4,65)	.050 (1,27)
Type V (PN 881789-1)	Y	.244 (6,20)	.180 (4,58)	.194 (4,93)	.100 (2,54)	.183 (4,65)	.050 (1,27)
Type VI (PN 444031-1)	Y	.737 (18,72)	.661 (16,79)	.417 (10,61)	.315 (8,01)	.368 (9,36)	.257 (6,54)
Type VI (PN 444031-2)	N	.737 (18,72)	.661 (16,79)	.417 (10,61)	3.15 (8,01)	.368 (9,36)	.257 (6,54)
Type VII (PN 444033-1)	Y	.660 (16,78)	.552 (14,02)	.398 (10,11)	.183 (4,66)	.327 (8,30)	.183 (4,66)
Type VII (PN 444033-2)	N	.660 (16,78)	.552 (14,02)	.398 (10,11)	.183 (4,66)	.327 (8,30)	.183 (4,66)
Type VIII (PN 444385-1)	Y	.796 (20,22)	.738 (18,73)	.398 (10,11)	.315 (8,01)	.398 (10,11)	.315 (8,01)
Type VIII (PN 444385-2)	N	.796 (20,22)	.738 (18,73)	.398 (10,11)	.315 (8,01)	.398 (10,11)	.315 (8,01)
Type A (PN 688652-1)	Y	.431 (10,95)	.358 (9,10)	.368 (9,36)	.220 (5,60)	.201 (5,10)	.068 (1,74)
Type B (PN 688653-1)	Y	.516 (13,11)	.431 (10,95)	.369 (9,36)	.244 (6,20)	.201 (5,10)	.068 (1,74)
Type C (PN 688654-1)	Y	.581 (14,75)	.516 (13,11)	.501 (12,74)	.323 (8,20)	.201 (5,10)	.068 (1,74)
Type D (PN 688655-1)	Y	.669 (17,00)	.581 (14,75)	.502 (12,74)	.374 (9,50)	.201 (5,10)	.068 (1,74)
Type F (PN 688656-1)	Y	.358 (9,10)	.283 (7,20)	.328 (8,33)	.220 (5,60)	.201 (5,10)	.068 (1,74)
Type G (PN 688657-1)	Y	.358 (9,10)	.283 (7,20)	.328 (8,33)	.220 (5,60)	.068 (1,73)	.054 (1,36)

Table I

3.3.2 Classification

U.D. Connectors Reinforced are classified electrically as class "A" and mechanically as class 3 , minimum tension , as described in ANSI Specification C.119.4 - 1991 and NEMA CC3-1973 (R 1978) .

4. QUALITY ASSURANCE PROVISIONS

4.1. General Provisions

The quality provisions specified herein shall be employed in the manufacturing and testing of this product to insure that normal production units continue to meet the performance requirements of this specification .

4.2 Classification of Test

- a) Qualification Inspection (see 5)
- b) Quality Conformance Inspection (see 6)

4.3 Test Conditions

4.3.1 Measurements

Measurements shall be made with instruments that have been calibrated and are certified in accordance with specification MIL-C-45662.

4.3.2 Laboratory Conditions

Unless otherwise specified herein , normal laboratory temperature , humidity and atmospheric pressure shall be considered acceptable for test purposes .

5. QUALIFICATION INSPECTION

5.1. Sample Selection

Connectors selected for test shall be representative of current design and construction . Preparation of test samples shall be conducted in accordance with AMP Instruction Sheets governing assembly techniques .

5.2 Test Procedure

Qualification Inspection shall be conducted in accordance with Table II in sequence specified .

5.3 Sample Preparation

Three or four connectors shall be prepared for each test group in the following manner , as applicable for their respective tests .

5.3.1 Test Group I (Heat Cycle Test)

The exposed length of conductor in the heat cycle loop between the connectors and equalizers , shall be twelve (12) inches between the connectors and equalizers . For solid round conductors , the exposed length between connectors shall be twenty-four (24) inches , as no equalizers are required .

The loop shall be connected to the power source using additional lengths (twelve (12) minimum inches for stranded conductors and twenty-four (24) minimum inches for solid round conductors) .

Equalizers are installed on stranded conductors to provide equipotential planes for resistance measurements and to prevent the influence of one connector on the other in the heat cycle loop . These equalizers may be of any form that assure permanent contact with all the strands of the conductor between connectors for the duration of the heat cycle test ; e.g. , a welded equalizer or a short compression sleeve in the center between two connectors , if a continuous conductor is used .

In addition , for obtaining conductor temperature , a control conductor shall be installed in the heat cycle loop between two equalizers . It shall be the same size and type as the test conductor that would run at the higher temperature , and shall be at least twice the length specified for the test conductor . For temperature measurements at least one thermocouple shall be permanently attached to each connector , as close as possible to the midpoint between the two conductors , and one thermocouple attached at the midpoint of the control conductor .

5.3.2 Test Group II (Thermal Shock/Corrosion)

Connectors shall be assembled to lengths of conductor as specified in AMP Specifications 109-13009 and 109-13010 .

Current equalizers shall be installed on stranded conductors twelve inches from the edges of the connectors .

5.4 Acceptance

All samples shall meet the requirements specified in the performance section of this specification , paragraph 5.5 .

5.5 Performance Requirements and Test Methods

U.D. Connector Reinforced shall be designed to meet the performance requirements specified herein . To verify compliance to this specification , production items shall be tested and shall meet the requirements of this specification .
 Tests shall be conducted in order specified on Table II .

Qualification Inspection				
Test or examination	Paragraph	Test Group and Sequence		
		I	II	III
Examination of Product	5.5.1.	1	1	1
Termination Resistance (a)	5.5.2.	2 - 4	2 - 4 - 6	
EET Heat Cycle	5.5.3.	3		
Thermal Shock	5.5.4.		3	
Corrosion	5.5.5.		5	
Tensile Strength	5.5.6.			2

Table II

(a) Test Group I , sequence 4 , measurements taken throughout the test as specified .

5.5.1 Examination of Product

When examined as specified , all samples shall be free from any damage or physical defects that would affect the electrical or mechanical performance of the connectors . After connectors applications , mainly when using solid conductors , they could rotate over the conductor without any restriction for termination resistance and tensile strength requirements .

5.5.1.1 Test Method

Test specimens shall be visually examined before and after assembling to assure proper manufacturing and assembly in accordance with the manufacturer’s drawings and instructions .

5.5.2 Termination Resistance

a) Heat Cycle Test

When measured as specified, each connector shall indicate electrical stability throughout the test from the 25th to the 500th cycle , by a variation of not more than 5% from the average of the measured values in this interval .

b) Thermal Shock and Corrosion

When measured as specified , the voltage drop across connector termination shall not deviate more than 250% from the initial measurements (Step 2 , Table II) to measurements made after either Thermal Shock or Corrosion .

5.5.2.1 Test Method

Measurements shall be taken across each connector , with the probe points located on the equalizers 1/8 inch back from the edge adjacent to the connector , or at a similar distance on a solid conductor .
 A nonheating magnitude of direct current shall be used for measurements .

5.5.3 Heat Cycle Test

Throughout the test , as specified , the temperature of connectors shall not exceed that the control conductor , and the temperature difference between the control conductor and each connector shall show a condition of stability from the 25th to the 500th cycle . Stability is indicated by a decrease of this difference of not more than 10°C from the average of the measured differences in the interval for this connector . In addition , connectors shall meet the requirements for Termination Resistance throughout the test as specified in Paragraph 5.5.2.a .

5.5.3.1 Test Method

Connectors shall be subjected to heat cycle test in accordance with ANSI C119.4 - 1991 , and NEMA CC3-1973 (R 1978) , class "A" , as stated herein . A total of 500 "current on /current off" cycles shall be performed . Testing shall be performed in a draft-free room at an ambient temperature of 15°C per ANSI C119 to 35°C . The test current shall be adjusted to produce a temperature rise above ambient of 100°C on the control conductor , the adjustment to be made during the heating periods of the first 25 cycles . This current shall be used for the remainder of the test , regardless of the deviation of the control conductor temperature . Each heating cycle shall consist of equal "current on" and "current off " periods of one (01) hour of duration (the length of these time periods in which resistance and temperature measurements are made shall be extended for the time required to take the measurements) .

a) Mounting

The heat cycle test chain may be installed in the form of a loop , an "U", or a "zigzag" configuration in which the connectors shall be mounted in a horizontal position with at least eight inches distance between adjacent connectors . The chain shall be a minimum distance of 12 inches from any walls and 24 inches from the floor or ceiling .

b) Measurements

Resistance and temperature measurements shall be made at the beginning of the test and at the following intervals , conforming as close as possible to normal working hours :

- cycles 25 , 50 , 75 , 100 , 125 , 165 , 205 , 250 , 325 , 405 and 500 , plus-or-minus 5 cycles .

Resistance measurements shall be made in accordance with paragraph 5.5.2.1. at the end of the specified "current off" periods . The ambient temperature shall be recorded along with each set of resistance measurements , and the resistance values corrected to 20°C . Temperature measurements shall be taken on connectors and the control conductors at the end of the specified "current on" heating periods .

5.5.4 Thermal Shock

After five cycles of Thermal Shock as specified , connectors shall meet the requirements for Termination Resistance , paragraph 5.5.2.b .

5.5.4.1 Test Method

Connectors shall be subjected to five cycles of Thermal Shock in accordance with AMP Specification 109-13009 , each consisting of :

- 2 ½ hours at 150°C
- 15 minutes at 0°C (melting ice water) , immediately from the previous environment
- 30 minutes at 150°C
- 20 ¾ hours at room temperature.

5.5.5 Corrosion

Upon completion of the 30-day Salt Spray test as specified , connectors shall meet the requirements for Termination Resistance , Paragraph 5.5.2.b .

5.5.5.1 Test Method

Connectors shall be subjected to a 30-day Salt Spray Corrosion Test in accordance with AMP Specification 109-13010 , each daily exposure consisting of :

- 15 hours in a 5% salt spray atmosphere
- 1 hour in a drying oven at 100°C
- 8 hours at room temperature.

5.5.6 Tensile Strength (Test Group III)

When tested as specified , the taps shall not break or become separated from the cable until attaining a tensile force of 200 pounds or 5% of the rated cable strength of the weaker conductor , whichever is larger , for conductors larger than 6 AWG . For conductor sizes 6 AWG and smaller , the force value shall be 100 pounds .

5.5.6.1 Test Method

Test specimens shall be placed in a tensile testing machine and an axial force applied to the conductors at a rate of ¼ inch per minute per 12 inches of length between jaws until the connector breaks or becomes separated from the conductor . When testing connectors assembled to stranded conductors , a suitable deadening procedure shall be performed on the cable ends to assure simultaneous loading of all strands .

6. QUALITY CONFORMANCE INSPECTION

6.1. Sample Selection

Unless otherwise specified , sampling procedures shall be in accordance with MIL-STD-105 . Sampling and Acceptable Quality Levels shall be as specified in the applicable AMP Quality Inspection Plan .

Dimensional requirements shall be in accordance with the applicable AMP Product Drawing .

6.2 Test Procedure

Connectors supplied in accordance with this specification shall meet the requirements for Quality Conformance Inspection , Table III .

Examination and test shall be conducted in the sequence specified .

Quality Conformance Inspection	
Test or Examination	Test Method
Examination of Product	Quality Inspection Plan
Tensile Strength	Paragraph 5.5.6

Table III

Revision Record		
Revision	Date	Description
O	-----	Released
A	06-Jan-1993	3393
B	01-Sep-1993	LB00-0259-93
C	25-Apr-1994	LB00-0186-94
D	13-Jul-1994	LB00-0354-94
E	02-Jun-1995	LB00-0266-95
F	15-Dec-1995	LB00-0587-95
G	27-Aug-1999	LB00-0381-99
H	27-Nov-2001	LB00-0505-01