

Competitive Testing of AMP* Power Series 350 Connectors

1. INTRODUCTION

1.1. Purpose

Competitive testing was performed on Anderson connectors and AMP* Power Series 350 connectors used with Anderson™ and SMH™ components to verify performance of product subjected to temperature rise vs current and temperature testing per UL 1977 Section 16, and mating and unmating forces.

1.2. Scope

This report covers connectors tested under test reports CTL B035595-001, B035595-002 and B035595-005. Testing was performed by the Engineering Assurance Product Test Laboratory.

2. TEMPERATURE TEST (CTLB035595-001)

2.1. Test Specimens

The 6 mated assemblies used for testing were representative of normal production lots. Specimens identified with the following part numbers were used for testing:

Part Number	Revision	Description
1604050-2	1	350 AMP orange double pole housings
1604052-1	3	4/0 contacts crimped onto 4/0 wire using PICO tool (see Note)

NOTE Wire is E-93681 (UL) MTW 600 volt VW-1 4/0 AWG/1284/1232 CSA LL39697 TYPE TEW 105°C FT-1 AWM I A/B.

Figure 1

2.2. Test Procedure

Type 'J', 30 AWG thermocouples were attached to the underside of the interface area of the contacts by peening them into drilled holes. The specimens were double pole connectors with one contact of each mated pair of contacts (two per connector) monitored. The specimens were placed on a flat surface in a draft free room that had an ambient temperature of 25 ± 5°C. The specimens were connected in a series circuit and lead in wires to the power supply were connected. Ambient temperatures were monitored by connecting the thermocouples to a Doric 235 data logger. The ambient temperatures were monitored by placing a 'type J' thermocouple in the center of a 2 inch long plastic tube with a 0.5 inch diameter standing upright in the center of the specimens on the same horizontal plane. A test current of 230 amperes AC was applied to 100% of the contacts for a period of 4 hours. Measurements were recorded at the end of the test, just prior to de-energizing the circuit.

2.3. Test Results

The maximum temperature of the current carrying contacts did not exceed 30°C temperature rise or the Relative Thermal Index (RTI) of 125°C specified in UL 1977, Section 16, issued December 2000 and CSA C22.2 NO 182.3-M1987, Section 6.5, issued December 1987 (see Figures 2, 3 and 4).

Specimen ID	Contact Position	Temperature (°C)		
		Ambient	Actual	Rise
101	1	27.1	50.8	23.7
101	2		50.3	23.2
102	1		51.1	24.0
102	2		50.2	23.1
103	1		54.7	27.6
103	2		48.5	21.4
104	1		50.1	23.0
104	2		48.6	21.5
105	1		49.8	22.7
105	2		50.2	23.1
106	1		50.1	23.0
106	2		49.4	22.3
Minimum			48.5	21.4
Maximum			54.7	27.6
Mean			50.317	23.217
Standard Deviation			1.582	1.582

Figure 2

Tyco Electronics 350 Ampere Double Pole Connector With 4/O AWG Wire							
Amperage	0	70	140	210	263.87	280	350
Minimum	0	1.9	7.8	16.5		29.6	46.8
Maximum	0	3.1	11	23		41.2	63.9
Average	0	2.442	9.042	18.767	30	33.325	52.808

Anderson 350 Ampere Double Pole Connector With 4/O AWG Wire							
Amperage	0	70	140	210	257.25	280	350
Minimum	0	1.3	8.3	18.4		33.7	54
Maximum	0	2.6	10	21.2		37.1	59.1
Average	0	2.225	9.25	19.725	30	35.075	55.725

Figure 3

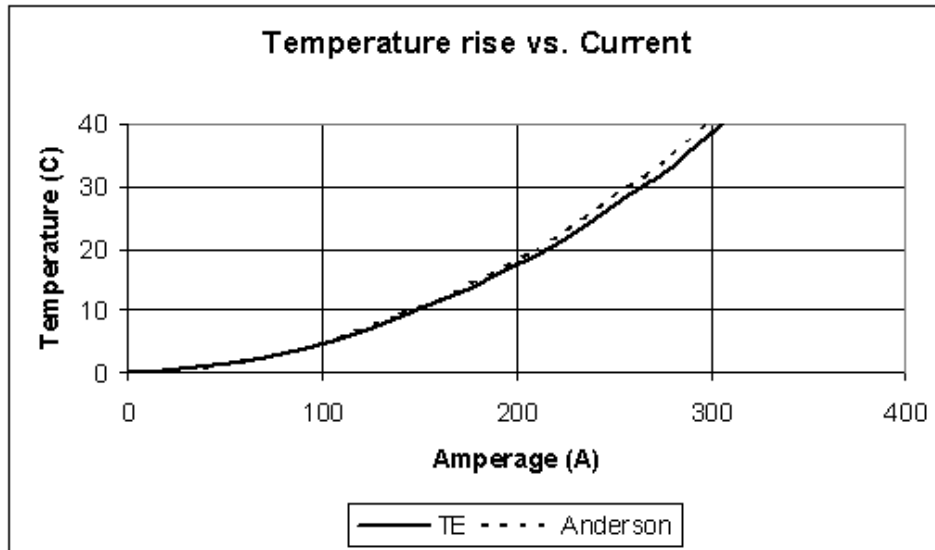


Figure 4

3. MATING AND UNMATING TEST (CTLB035595-002)

3.1. Test Specimens

Specimens used for testing were representative of normal production lots. Specimens identified in Figure 5 were used for testing:

Test Group	Specimen Type	Quantity	Description
1	Double Pole	3 pair	Anderson to Anderson (yellow 1/0 without wire)
2		3 pair	Tyco to Tyco (orange 1/0 without wire)
3		3 pair	Tyco to Anderson (orange 1/0 without wire)
7		1 pair	Tyco to SMH (gray 1/0 without wire)
8		1 pair	Tyco to SMH (orange 1/0 without wire)

Figure 5

3.2. Test Procedure

The force required to mate and unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of .5 inch per minute.

3.3. Test Results

Test Group	Specimen ID	Mating Force (lb)		Unmating Force (lb)	
		Maximum	Average	Maximum	Average
1	1	27.50	30.19	22.88	28.53
	2	28.28		24.05	
	3	34.78		38.65	
2	1	20.18	19.96	19.39	19.64
	2	19.49		20.54	
	3	20.20		18.98	
3	1	21.75	20.40	15.95	15.01
	2	21.21		14.76	
	3	18.24		14.32	
7	1	18.80	NA	22.22	NA
8	1	19.59		18.74	

Figure 6

4. MATING AND UNMATING TEST (CTLB035595-005)

4.1. Test Specimens

Specimens used for testing were representative of normal production lots. Specimens identified in Figure 7 were used for testing:

Test Group	Specimen Type	Description
1	Double Pole	Tyco housing, Tyco contact, Tyco spring
3		Tyco housing, Anderson contact, Tyco spring
5		Anderson housing, Anderson contact, Anderson spring
7		Anderson housing, Tyco contact, Anderson spring

Figure 7

4.2. Test Procedure

The force required to mate and unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of .5 inch per minute.

4.3. Test Results

Specimen ID	Maximum Mating Force (lb)	Maximum Unmating Force (lb)
1	17.08	18.79
3	15.87	14.90
5	31.24	19.70
7	32.13	24.85

Figure 8