

**Competitive Testing of AMP\* Power Series 120 Connectors**

**1. INTRODUCTION**

1.1. Purpose

Competitive testing was performed on Anderson SB® 120 2-Pole connectors and AMP\* Power Series 120 connectors used with Anderson components and kits to verify performance of product subjected to a variety of electrical, mechanical and environmental tests including: durability, contact retention, mating and unmating forces, temperature rise vs current and temperature testing per UL 1977 Section 16.

1.2. Scope

This report covers connectors tested under test reports CTL B034992-002, B034992-004 and B034992-005. Testing was performed by the Engineering Assurance Product Test Laboratory.

**2. DOUBLE POLE TESTING**

2.1. Test Samples

Test samples were representative of normal production lots. Samples identified with the following part numbers were used for test.

Sample Group	Quantity	Part Number	Description
CTL B034992-002			
Durability, Contact Retention, Mating/Unmating Force, Temperature Rise vs Current, Temperature Test			
1	6	6800G1	Anderson assembly with 2, 2 AWG contacts with wire
2	20	6800G1	Anderson assembly with 2, 2 AWG contacts with wire
4	4	6800G1	Anderson assembly with 2, 2 AWG contacts with wire
CTL B034992-004			
Durability, Temperature Rise vs Current			
2	4	1445998-2	Housing mated to Anderson assembly with 2, 2 AWG contacts

Figure 1

2.2. Test Results

A. CTL B034992-002 - Durability, Contact Retention, Mating/Unmating Forces, Temperature Rise vs Current and Temperature Test (Anderson with Anderson).

1. Sample Group 1 - Durability with Temperature Rise at Rated Current
2. Test Sequence:
  - a. Initial temperature rise at rated current
  - b. Durability, 10,000 mating cycles at maximum rate of 500 cycles per hour
  - c. Final temperature rise at rated current

- Sample Group 1 was subjected to a temperature rise at rated current test for 4 hours with 100% of the contacts energized with a current of 120 amperes per UL 1977, Section 16. Temperature rise for Sample Group 1 was measured initially at the rated current, and after 10,000 cycles of durability testing was performed. Thermocouples were soldered to the underside of the contact as close to the interface area as possible. Ambient temperature was 24.3°C. See Figure 2.

Sample Group 1	Δ°C	
	Initial	Final
Minimum	27.800	27.800
Maximum	33.300	31.200
Average	30.887	29.938

Figure 2  
Temperature Rise At Rated Current With Durability

- Sample Group 2 was subjected to 5 mating/unmating cycles. The force required to mate and unmate the samples at a maximum rate of 1 inch per minute was measured and recorded. See Figure 3.

Sample Group 2 Mating Force (lbs)		Sample Group 2 Unmating Force (lbs)	
Sample ID 200		Sample ID 200	
Minimum	20.770	Minimum	16.490
Maximum	25.800	Maximum	25.590
Average	23.216	Average	20.776
Sample ID 201		Sample ID 201	
Minimum	29.190	Minimum	26.700
Maximum	29.910	Maximum	26.940
Average	29.585	Average	26.837

Figure 3  
Mating/Unmating Force

- Contact retention was performed at a maximum rate of 1 inch per minute on crimped samples of Sample Group 2. The force required to pull the contact from the housing was measured and recorded. See Figure 4.

Sample Group 2 Contact Retention (lbs)	
Minimum	235.500
Maximum	281.300
Average	264.920

Figure 4  
Contact Retention

6. Temperature rise versus current was measured on Sample Group 4 in accordance with EIA 364-70a. Thermocouples were soldered to the underside of the contact as close to the interface area as possible. See Figure 5.

Sample Group 4	Δ°C 30 Amperes		Δ°C 60 Amperes		Δ°C 90 Amperes		Δ°C 120 Amperes	
	Minimum	2.400	8.100	16.600	28.200			
Maximum	3.900	10.900	20.500	32.700				
Average	3.025	9.062	18.325	30.750				

Figure 5  
Temperature Rise vs Current

- B. CTL B034992-004 - Durability and Temperature Rise vs Current (Tyco to Anderson).

1. Sample Group 2 - Durability with Temperature Rise vs Current

- a. Test Sequence:

- (1) Initial temperature rise
- (2) Durability, 10,000 mating cycles at maximum rate of 500 cycles per hour
- (3) Final temperature rise

- b. Temperature rise for Sample Group 2 was measured initially, and after 10,000 cycles of durability testing was performed in accordance with EIA 364-70. Thermocouples were soldered to the underside of the contact as close to the interface area as possible.

Sample ID's 201, 202	°C 30 Amperes		°C 60 Amperes		°C 90 Amperes		°C 120 Amperes		°C 140 Amperes	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
	Minimum	2.100	1.400	6.900	6.400	14.700	14.300	26.200	23.600	38.900
Maximum	3.300	3.400	10.000	10.300	18.400	19.600	31.800	30.400	44.500	46.300
Average	2.450	2.537	7.975	8.138	16.562	16.588	28.500	26.513	42.025	40.725

Figure 6  
Temperature Rise vs Current, Tyco Mated to Anderson

### 3. SINGLE POLE TESTING

- 3.1. Test Samples

Sample Group	Quantity	Part Number	Description
CTL B034992-005 Durability, Temperature Rise vs Current			
2	4	1604002-2	Tyco assembly mated to Anderson assembly with 2, 2 AWG contacts

Figure 7

3.2. CTL B034992-005 - Durability and Temperature Rise vs Current (Tyco to Anderson)

A. Sample Group 2 - Durability with Temperature Rise vs Current

1. Test Sequence:

- a. Initial temperature rise vs current
- b. Durability, 10,000 mating cycles at maximum rate of 500 cycles per hour
- c. Final temperature rise vs current

B. Temperature rise vs current was measured on Sample Group 2 in accordance with EIA 364-70a. Thermocouples were soldered to the underside of the contact as close to the interface area as possible. See Figure 8.

Sample Group 2	°C 40 Amperes		°C 70 Amperes		°C 100 Amperes		°C 130 Amperes		°C 140 Amperes	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Minimum	2.100	1.100	7.400	6.400	14.900	14.200	27.400	24.900	30.900	33.700
Maximum	3.300	2.400	8.800	7.400	16.000	15.100	27.600	25.700	31.700	34.600
Average	2.800	1.875	8.200	7.000	15.500	14.675	27.550	25.325	31.300	34.175

Figure 8  
Temperature Rise vs Current, Tyco Mated to Anderson