

**AMPSEAL 16 Vertical and Right Angle Backshells**

**1. INTRODUCTION**

1.1. Purpose

Testing was performed on the AMPSEAL 16\* Vertical and Right Angle Backshells to determine their conformance to the requirements of Product Specification 108-151043 Revision A.

1.2. Scope

This report covers the mechanical, environmental and electrical performance of the AMPSEAL 16 Backshell Family. Testing was performed at the TE Connectivity Product Reliability Center and Laboratory in 2016.

1.3. Conclusion

The AMPSEAL 16 Backshell Family in paragraph 1.4 conformed to the mechanical, environmental and electrical performance requirements of Product Specification 108-151043 Revision A.

1.4. Test Specimens

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

Part Number	Description
2292797-1	Plug Vertical Backshell Kit; 2p; Smooth Exit
2292860-1, -2, -3	Cap Vertical Backshell Kit; 2p; Smooth Exit (-1); NC12 (-2); NC08 (-3)
2292798-1	Plug Vertical Backshell Kit; 3p; Smooth Exit
2292861-1, -2, -3	Cap Vertical Backshell Kit; 3p; Smooth Exit (-1); NC12 (-2); NC08 (-3)
2292799-1	Plug Vertical Backshell Kit; 4p; Smooth Exit
2292862-1, -2, -3	Cap Vertical Backshell Kit; 4p; Smooth Exit (-1); NC16 (-2); NC12 (-3)
2292800-1	Plug Vertical Backshell Kit; 6p; Smooth Exit
2292863-1, -2, -3	Cap Vertical Backshell Kit; 6p; Smooth Exit (-1); NC16 (-2); NC12 (-3)
2292802-1	Plug Vertical Backshell Kit; 12p; Smooth Exit
2292865-1, -2, -3	Cap Vertical Backshell Kit; 12p; Smooth Exit (-1); NC20 (-2); NC16 (-3)
2302488-1	Plug Right Angle Backshell Kit; 2p; Smooth Exit
2302481-1	Cap Right Angle Backshell Kit; 2p; Smooth Exit
2302492-1	Plug Right Angle Backshell Kit; 4p; Smooth Exit
2302483-1	Cap Right Angle Backshell Kit; 4p; Smooth Exit
2302493-1	Plug Right Angle Backshell Kit; 6p; Smooth Exit
2302484-1	Cap Right Angle Backshell Kit; 6p; Smooth Exit
2302495-1	Plug Right Angle Backshell Kit; 12p; Smooth Exit
2302486-1	Cap Right Angle Backshell Kit; 12p; Smooth Exit

**Figure 1**

1.5. Environmental Conditions

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

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

1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)		
	1	2	3
	TEST SEQUENCE (b)		
Initial examination of product	1	1	1
Adapter Side Load (4 Directions)	2		
Adapter Axial Pull	3		
Durability			3
Insulation Resistance		4	
Thermal Shock		2	
Temperature Life			2
Pressure Wash		3	
Fluid Immersion			4
Final examination of product	4	5	5

Figure 2



**NOTE**

- (a) See paragraph 1.4.
- (b) Numbers indicate sequence in which tests are performed.

**2. SUMMARY OF TESTING**

2.1. Visual Examination of Product – All Test Groups

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

2.2. Adapter Side Load (4 Directions) – Test Group 1

All specimens met a minimum of 50 Newton’s [11.2 lbs.] side load force for 5 seconds in all 4 directions without damage or removal.

2.3. Adapter Axial Pull – Test Group 1

All specimens met a minimum of 75 Newton’s [16.8 lbs.] axial pull force for 5 seconds without damage or removal.

2.4. Durability – Test Group 3

No physical damage occurred as a result of manually removing and re-installing the backshells 2 times after Temperature Life testing.

2.5. Insulation Resistance – Test Group 2

All Insulation Resistance measurements were greater than 20 megohms.

2.6. Thermal Shock – Test Group 2

No evidence of physical damage was visible as a result of Thermal Shock testing.

2.7. Temperature Life – Test Group 3

No evidence of physical damage was visible as a result of Temperature Life testing.

2.8. Pressure Washing – Test Group 2

No evidence of physical damage was visible as a result of Pressure Washing.

2.9. Fluid Immersion – Test Group 3

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

### 3. TEST METHODS

3.1. Examination of Product – SAE J2030 6.1. and 6.27.

Specimens were visually inspected before and after testing for conditions such as cracked plastic, deformation, degradation, or anything that affects performance or serviceability of the product deemed by qualified Engineer.

3.2. Adapter Side Load (4 Directions) – No Specification Procedure.

The test was performed by applying a 50 Newton [11.2 lbs.] force on the outer most region of the backshell as shown in Picture 1. The force is to be applied by use of a load cell at a speed of 25 mm/min and held for 5 seconds. Repeated on all 4 sides.



**Picture 1**



**Picture 2**

3.3. Adapter Axial Pull - No Specification Procedure.

The test was performed by applying a 75 Newton [16.8 lbs.] force on the outer most region of the backshell as shown in Picture 2. The force is to be applied by use of a load cell at a speed of 25 mm/min and held for 5 seconds.

3.4. Durability – SAE J2030 6.11.

Specimens were removed from the connectors and reinstalled 2 times after environmental exposure.

3.5. Insulation Resistance – SAE J2030 6.3.

Using a 1000 Vdc insulation resistance test measurement device, the resistance is checked between each contact to each adjacent contact and housing edge. A metal foil is applied to the plastic housing to create a grounding surface. The insulation resistance shall be greater than 20 megohms.

3.6. Thermal Shock – SAE J2030 6.13.

The specimens are subjected to 10 cycles of thermal shock. One cycle consists of a 1 hour soak time at -40°C ambient, then transitioned within 2 minutes to an ambient of 125°C for 1 hour, then transitioned back to -40°C within 2 minutes.

3.7. Temperature Life – EIA-364-17.

The specimens are subjected to the chamber temperature of 125°C (test condition 5) for a duration of 500 hours (test time condition C).

3.8. Pressure Wash – SAE J2030 6.5. and SAE J1455 4.5.

The specimens were mounted in their normal operating position in the test apparatus of design per figure 3 in the SAE J2030 specification. A water pressure of 7000 kPa (1020 lbf/in<sup>2</sup>) was applied with a flow rate of approximately 9460 cm<sup>3</sup>/min (150 gal/hr.) to the specimens for 3 seconds of a 6 second period. This was repeated for 375 cycles with the water temperature at 40°C. No detergent was used due to environmental concerns.

3.9. Fluid Immersion – SAE J2030 6.14.

Specimens were exposed to the chemicals listed in figure 3 after each chemical had stabilized at the specified temperature. No specimen was exposed to more than one chemical. A specimen was submerged in each chemical for 5 minutes, then removed and allowed to air dry for 24 hours. This procedure was repeated for a total of 5 consecutive days.

<b>Fluids</b>	<b>Temperature (°C)</b>
Diesel Fuel	60 ± 3°C
Engine Oil	85 ± 3°C
Brake Fluid	85 ± 3°C
Antifreeze 50/50	85 ± 3°C

*Figure 3*