

Test Data

Sure-Seal® Circular Connectors

Typical: Power Sure-Seal®, Flange Sure-Seal®, and Mini Sure-Seal® are essentially the same except for mechanical and amperage capacity differences. Sure-Seal® products are designed to meet specification CS-155. Items of most general interest to users and designers are listed below. With its current capability and large size, Power Sure-Seal® contacts and currents are covered in CS-169.

Test Description	Reference Paragraph	Requirements																																				
Environmental Sealing	3.5.1	Sure-Seal® connectors when mated shall form an environmental seal against water, moisture, aqueous solutions, oils and certain chemicals as well as dust and dirt. Tests include immersion in 3 feet depth in water solution containing 5% salt.																																				
Contact Tensile Strength-Crimp	3.6.12	The minimum tensile load required to separate the wire from the contact, either by pulling the wire out of the crimp joint or breaking the wire within the crimp joint, shall not be less than the applicable limits as specified. Wire breakage, or contact damage not due to crimping, at less than tensile loads shall not constitute failure.																																				
		Crimp Tensile Strength, Pounds Minimum																																				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Wire Size AWG</th> <th>Without Insulation Support Contacts</th> <th>With Insulation Support Contacts</th> <th>Wire Size AWG</th> <th>Without Insulation Support Contacts</th> <th>With Insulation Support Contacts</th> <th>Wire Size AWG</th> <th>Without Insulation Support Contacts</th> <th>With Insulation Support Contacts</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>140</td> <td>—</td> <td>10</td> <td>80</td> <td>—</td> <td>18</td> <td>25</td> <td>25</td> </tr> <tr> <td>6</td> <td>100</td> <td>—</td> <td>14</td> <td>35</td> <td>35</td> <td>20</td> <td>—</td> <td>20</td> </tr> <tr> <td>8</td> <td>90</td> <td>—</td> <td>16</td> <td>35</td> <td>35</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts	Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts	Wire Size AWG	Without Insulation Support Contacts	With Insulation Support Contacts	4	140	—	10	80	—	18	25	25	6	100	—	14	35	35	20	—	20	8	90	—	16	35	35			
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Insulation Resistance	4.4.1	Properly assembled and mated connectors shall be tested in accordance with MIL-STD-202, Method 302, except a potential of 500 ± 15 volt DC shall be used. The resistance shall be measured between adjacent parts of contacts (or contacts to ground for SS-1) and shall not be less than 100 MΩ. If the specimen has been immersed in fluid in the preceding test, it shall be placed wet on a conducting surface and insulation resistance measured within 5 minutes between each contact and also between each contact and the conducting surface (except for SS-1 to be measured contact to ground while immersed).																																				
Dielectric Withstanding Voltage	4.4.2	Assembled and mated connectors shall show no evidence of breakdown between adjacent contacts (or contact to ground for SS-1) when tested in accordance with MIL-STD-202, Method 301, and a test voltage of 1200 ± 15 volts A.C.																																				
Contact Resistance	4.4.3	The contact resistance of mated contacts shall be such that the resistance measured across the contacts and 5/8" behind the crimp junction shall not exceed 10 mΩ. Test current to be 1 amp, and MIL-STD-202, Method 307.																																				
Shock	4.4.4	Mated connectors properly mounted shall be subjected to the shock test in accordance with MIL-STD-202, Method 213B, CONDITION B. The shock test shall be repeated three (3) times in each of X, Y & Z axis. Suitable means shall be employed to monitor the current flow. Current discontinuity of 1 microsecond or more, disengagement of the mated connectors, evidence of cracking, breaking or loosening of parts shall be cause for rejection.																																				
Vibration	4.4.5	Properly assembled and mated connectors shall be mounted to the vibration table, with the wire leads strapped to a vibrating member approximately 3 inches from each end of the connector body and vibrated with a peak-to-peak amplitude of .25 inch across a frequency range of 5 to 39Hz, and a ±20g acceleration across 39 to 55 Hz, swept up in one minute and down in another minute. The vibration shall be swept up and down for a total of 36 hours under the following conditions: Six (6) hours at 180°F (82°C) along the longitudinal axis Six (6) hours at 180°F (82°C) along a perpendicular axis Six (6) hours at room temperature along the longitudinal axis Six (6) hours at room temperature along a perpendicular axis Six (6) hours at -40°F (-40°C) along the longitudinal axis Six (6) hours at -40°F (-40°C) along a perpendicular axis The connectors shall be connected in a series circuit with a minimum of 0.1 ampere flowing through the contacts. Electrical continuity shall be continually monitored. Breaks in continuity longer than one microsecond shall be cause for rejection.																																				
Durability	4.4.6	The connectors shall be subjected to 25 cycles of mating and unmating at -10°C and another 25 cycles at 50°C. There shall be no evidence of damage to the contacts, the contact plating, the insulators or sealing rings, which would be detrimental to connector function.																																				
Contact Retention	4.4.7	With the connector plug or receptacle held firmly, an axial dead weight of 7.5 lbs. shall be imposed on each wire for one minute without the contacts being dislodged from the connector. Plugs and receptacles to be tested separately.																																				
Maintenance Aging	4.4.8	Each wired receptacle and plug shall be subjected to 5 cycles of contact insertion and extraction in the same cavity using the approved tools. Plug and receptacle are to be tested separately. After the 5 cycles of insertion and extraction, each plug and receptacle in turn will be subjected to the contact retention test of 6 lbs. per paragraph 4.4.7.																																				
Connector Separating Force	4.4.11	Using an assembled and mated connector with the receptacle held firmly by the wires, a load shall be applied to the wires of the plug until the connector is completely separated. The rate of loading shall be one inch per minute. The sample shall fall within the limits specified as follows:																																				
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Solvent Resistance	4.4.13 4.4.14 4.4.15 4.4.16 4.4.17 4.4.18 4.4.19	Wired and mated connectors shall be subjected to the applicable fluids for the length of time specified. Following the test the connectors shall be immersed to a depth of 3 feet in salt water for 24 hours at room temperature. At the completion of the salt water immersion test and while still immersed insulation resistance shall be measured. Failure to meet the insulation resistance requirements shall be cause for rejection.																																				
		Gasoline Splash 1 second dip - 3 minute air dry for 80 cycles at room ambient temperature.																																				
		Diesel Fuel Splash 1 second dip - 3 minute air dry for 80 cycles at room ambient temperature.																																				
		Automotive Lubricating Oil Immersed in S.A.E. 30 weight lubricating oil for 1 hour.																																				
		Antifreeze Immersed at 120°F (49°C) for 48 hours.																																				
		Brake Fluid Immersed at room ambient temperature for 24 hours.																																				
		Automatic Transmission Fluid Immersed at 120°F (49°C) for 48 hours.																																				
Gasoline Vapor Immersed in a gasoline vapor atmosphere at room temperature for 48 hours.																																						
Weather and Ozone Resistance	4.4.20	Wired and properly mated connectors shall be subjected to ozone test per ASTM-D-1149 except that 100 ppm of ozones shall be used. The duration of the test shall be 7 days. Outdoor exposure to be conducted per ASTM D-1171. The connector shall show no cracking or other degradation which would result in loss of sealing integrity.																																				
High Temperature Long-Term	4.4.23	Wired mated connectors shall be tested in accordance with MIL-STD-202 Method 108A, Test Condition D at 105°C for 1000 hours. Following the test, they shall be subjected to 3 feet salt water immersion for 24 hours. While immersed, insulation resistance shall be determined. Failure to meet the insulation resistance requirements shall be cause for rejection.																																				
UV	-	Sure Seal Connections has recently completed testing of the Sure Seal PVC Nitrile material (SM 3400-06) for UV resistance. The material was tested in accordance with ASTM G-26 (Xenon Arc), 720 hours exposure with no loss in tensile strength and greater than 75% retention of elongation.																																				

Caution: "Sure-Seal® connectors are rated for use between temperatures of -40 to + 105 degrees Celsius. However, if a Sure-Seal® connector is exposed for long periods of time to temperatures exceeding 85 degrees Celsius and is unmated, it may lose its environmental sealing integrity upon remating. Thus, we recommend that both the plug and receptacle be replaced if environmental sealing is required after remating."