AUTOMOTIVE TESTING GUIDE

Samtec's automotive products undergo testing that is comparable to USCAR2-6 specifications for performance reliability: Design Qualification, Extended Life Product™, and Severe Environment Testing. Proven processes are also used that meet Samtec's IATF 16949 certification. These products are designated with an A-Series part number and supplied to customers with a Level 3 Product Part Approval Process (PPAP) package.

Contact **AutoSalesGroup@samtec.com** for more information or to discuss your specific automotive application.

DESIGN QUALIFICATION TESTING

All Samtec series undergo Design Qualification Testing (DQT). This includes Gas Tight, Normal Force, Thermal Aging, Mating/Unmating/Durability, IR/DWV, Current Carrying Capacity (CCC), and Intense Shock and Vibration (LLCR & Event Detection).

EXTENDED LIFE PRODUCT™

E.L.P.™ certified products are tested to additional, rigorous standards that evaluate contact resistance in simulated storage and field conditions.

Products are exposed to 10-year Mixed Flowing Gas, where sulfur dioxide, chlorine, hydrogen sulfide and nitrogen dioxide flow around parts for 14 days, and achieve high mating cycles (250 to 2,500). Certain plating and/or contact options apply.

For additional details, including a list of qualifying products and test results, visit **samtec.com/ELP** or contact the Customer Engineering Support Group at **ASG@samtec.com**.

SEVERE ENVIRONMENT TESTING

Severe Environment Testing (SET) is a new Samtec initiative to test products beyond typical industry standards and specifications, many set forth by common requirements for rugged / harsh environment industries.

These products undergo additional testing to ensure they are more than suitable for industrial, military, automotive, space and other extreme applications. Visit **samtec.com/SET** or contact **set@samtec.com** for additional information and current available test results.

Additional Testing Includes:

- Higher Mating Cycles with 100% Humidity
- Intense Shock and Vibration: LLCR & Event Detection
- Temperature Cycling (500 Cycles)
- Non-Operating Class Temperature
- DWV at Altitude
- Electrostatic Discharge (ESD)

All series undergo Design Qualification Testing (DQT). Extended Life Product™ testing and Severe Environment Testing are performed in addition to DQT. Please visit **samtec.com** for details.

AUTOMOTIVE TESTING QUICK REFERENCE GUIDE

USCAR2-6 APPLICABLE SPECIFICATIONS	SAMTEC COMPERABLE SPECIFICATIONS - MEETS OR EXCEEDS VITA 47 STANDARD
5.1.4.1 Temperature Classification	T1, T2, T3 Available
5.1.4.2 Sealing Classification	S1 Available
5.1.4.3 Vibration Classification	V1 Available
5.1.7 Connector and/or Terminal Cycling	Initial Mating/Unmating (25 Cycles)
5.1.9 Circuit Continuity Monitoring	Continuity Event Detection (Min. 50 ns)
5.2.1 Terminal to Terminal Engage/Disengage Force	Mating/Unmating 100 Cycles (Up to 1000+ Cycles on E.L.P.™)
5.3.1 Dry Circuit Resistance	Contact Resistance (10.1 to 15.0 mΩ)
5.3.2 Voltage Drop	Voltage Drop (Reported at Rated Current)
5.3.3 Maximum Test Current Capability	Current Rating per Contact (30 °C Rise, 20% De-Rated at 105 °C)
5.3.4 Current Cycling	500 cycles (125% of Rated Current)
5.4.2 Connector-Connector Mating/Unmating/Retention/Lock Deflection Forces (non-assist)	Forces Reported for 25, 50, 75 and 100 Cycles
5.4.6 Vibration/Mechanical Shock	Shock/Vibe (100 G, 6 ms, Sawtooth Wave, 11.3 fps, 3 shocks/direction, 3 axis)
5.5.1 Insulation Resistance	IR (1,000 MΩ minimum at 500 VDC)
5.6.1 Thermal Shock	100 Cycles, 30 min Dwell, 85 °C to -55 °C, Immediate Transition
5.6.2 Temperature/Humidity Cycling	Test Temp 25 °C to 65 °C, 90-95% R.H. for 240 hrs (SET Available)

Gas Tight*
Measures LLCR change after mated product is exposed in nitric acid for 1 hour. This test verifies there is enough normal force between contacts that a gas tight seal is created at the interface.

Normal Force*
Measures the contact gap compared to the print before taking normal force measurements; contact gaps are measured after thermal aging.

Thermal Aging*
Measures the change in LLCR and mating/unmating force after products have been thermally exposed.

Mating / Unmating / Durability*
Measures the change in LLCR and mating/unmating after products have been cycled and exposed to various environmental conditions.

Insulation Resistance / Dielectric Withstanding Voltage (IR/DWV)*
Determines the testing voltage and then ensures environmental exposure will not cause the product to fail at the test voltage.

Current Carrying Capacity (CCC)*
Establishes the maximum CCC versus ambient temperature.

Mechanical Shock / Random Vibration / LLCR*
Measures the product's ability to withstand a series of mechanical shocks and random vibration. LLCR is a before and after check for damage.

Mechanical Shock / Random Vibration / Nanosecond Event Detection*
Measures the product's ability to withstand a series of mechanical shocks and vibrations. Event detection monitors continuity during testing.

10-Year Mixed Flowing Gas (MFG)**
Measures the change in LLCR after the product has been cycled and exposed to various environmental conditions.

Mating Cycles**
Measures the maximum number of mating/unmating cycles the product can withstand while maintaining the maximum resistance & pull force.

Temperature Cycling***
Evaluates the product's reliability through thermal fatigue by cycling through two temperature extremes (-65˚ C to 125˚ C, 30 minute dwell time at each extreme).

Non-Operating Class Temperature***
Determines the temperature range at which the product operates at peak level (-55˚ C to 125˚ C at 100 cycles, and -65˚ C to 125˚ C at 100 cycles; 200 total cycles).

** Completed as part of initial Design Qualification Testing (All series undergo DQT). ** Additional Extended Life Product™ testing. *** Additional Severe Environment Testing applicable to automotive.*
Please visit samtec.com for details.