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**Occupant Classification Module**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Occupant Classification Module.

## 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed in Jan03. The Qualification Test Report number for this testing is 501-550. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

## 2.1. Tyco Electronics Documents

- 114-13006: Application Specification
- 501-550: Qualification Test Report

## 2.2. Industry Standards

- SAE/USCAR-2: Performance Standard For Automotive Electrical Connection Systems - April 2001
- Chrysler PF-9590: Automotive Electrical Device Connection Systems
- Chrysler PF-9600: Standard for Automotive Electrical Connection Systems
- Chrysler PF-9688: Electrical/Electronic Device Environmental and Durability Testing Specifications
- TRW 204654: Cleanliness Specification

**3. REQUIREMENTS**

## 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

## 3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 12.8 volts AC
- Temperature: -40 to 85°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
SAE/USCAR-2, Section 5.1.6. Visual inspection.	SAE/USCAR-2, Section 5.1.6.4. All specimens shall be free of defects that could affect the electrical or mechanical performance of the part or degrade the long term performance of the part.	SAE/USCAR-2, Section 5.1.6.3. Visually examine each specimen prior to testing and/or conditioning, noting in detail any manufacturing or material defects such as cracks, tarnishing, flash, etc.
SAE/USCAR-2, 5.3.1. Dry circuit resistance.	SAE/USCAR-2, Section 5.3.1.4. 20 milliohms maximum.	SAE/USCAR-2, Section 5.3.1.3. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
SAE/USCAR-2, Section 5.3.2. Voltage drop.	SAE/USCAR-2, Section 5.3.2.4. 10 millivolt/ampere.	SAE/USCAR-2, Section 5.3.2.3. Subject specimens to a current of 5 amperes per square millimeter of conductor cross section. Measure millivolt drop across $150 \pm 1$ mm of conductor and use these values to calculate voltage drop across the entire connection.
SAE/USCAR-2, Section 5.4.1. Terminal-connector insertion/extraction force.	SAE/USCAR-2, Section 5.4.1.4. 15 N maximum insertion force. Primary lock withstands 30 N.	SAE/USCAR-2, Section 5.4.1.3. Measure force required to insert and extract a terminal into and from a connector at a uniform maximum rate of 50 mm per minute.
SAE/USCAR-2, Section 5.4.2. Connector-connector mating/unmating force.	SAE/USCAR-2, Section 5.4.2.4. Mating force: $\leq 75$ N. Unmating force: $\leq 75$ N with primary connector lock completely disengaged. $\geq 110$ N with primary connector lock fully engaged.	SAE/USCAR-2, Section 5.4.2.3. Measure force required to mate and unmate specimens at a uniform maximum rate of 50 mm per minute.

Figure 1 (cont)

Test Description	Requirement	Procedure
SAE/USCAR-2, Section 5.4.5. Vibration/mechanical shock.	SAE/USCAR-2, Section 5.4.5.4. No discontinuities of 1 microsecond or longer duration. See Note.	SAE/USCAR-2, Section 5.4.5.3. Mechanical shock: Subject specimens to 35 G's half-sine shock pulses of 10 milliseconds duration. 10 shocks in each direction applied along 3 mutually perpendicular planes. Vibration: See Figure 3, 8 hours in each of 3 mutually perpendicular planes.
SAE/USCAR-2, Section 5.6.1. Thermal shock.	SAE/USCAR-2, Section 5.6.1.4. See Note.	SAE/USCAR-2, Section 5.6.1.3. Subject specimens to Class 1 temperature range.
SAE/USCAR-2, Section 5.6.2. Temperature/humidity cycling.	SAE/USCAR-2, Section 5.6.2.4. See Note.	SAE/USCAR-2, Section 5.6.2.3. Subject specimens to Class 1 temperature range and schedule.
SAE/USCAR-2, Section 5.6.3. High temperature exposure.	SAE/USCAR-2, Section 5.6.3.4. See Note.	SAE/USCAR-2, Section 5.6.3.3. Subject specimens to 1008 hours at Class 1 temperature.
SAE/USCAR-2, Section 5.6.6. Pressure/vacuum leak.	SAE/USCAR-2, Section 5.6.6.4. No loss of pressure or visible bubbles exiting the specimens. See Note.	SAE/USCAR-2, Section 5.6.6.3. Submerge specimens in salt water solution and apply a pressure of 48 kPa to each specimen for 15 seconds, then, decrease pressure until a vacuum of 48 kPa is obtained and hold for 15 seconds.
Chrysler PF-9600, Section 6.3.4. 1008 hour current cycling.	Voltage drop not to exceed 10 millivolt/ampere.	Subject specimens to 1008 hours of current cycling.
Chrysler PF-9688, Section 2.3.3. High/low temperature soak.	See Note.	Subject specimens to 1 cycle (24 hours at each temperature extreme) between -40 and 85°C
Chrysler PF-9688, Section 2.5. Drop test.	See Note.	Subject specimens to 1 m drop onto concrete surface.
Chrysler PF-9590, Section 2.5.3. Contact retention, push-in.	24 N minimum.	Measure force required to insert contact into connector.
PF-9688, Section 2.5.3. Contact retention, pull-out.	24 N minimum.	Measure force required to remove contact from connector.
Chrysler PF-9688, Section 2.8.5. Salt water immersion.	No evidence of leakage into the connector. See Note.	Submerge specimens heated to 110°C in 0°C 5% salt solution for 1 hour.
Chrysler PF-9688, Section 2.9.4. Fluid resistance.	No evidence of leakage into the connector. See Note.	Submerge 1 specimen in each specified fluid.
Chrysler PF-9688, Section 2.17. Buzz, squeak, rattle.	No objectionable noises.	Subject specimens to frequency sweeps and monitor for internal noises.

Figure 1 (cont)

Test Description	Requirement	Procedure
TRW 204654. Cleanliness.	Does not exceed limits.	Clean specimens in solvent solution and analyze solution using chromatography.

**NOTE** *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)										
	1	2	3	4	5	6	7	8	9	10	11
	Test Sequence (b)										
Visual inspection	1	1,7	1,7	1,7	1,7	1,5	1,3	1,4	1,5	1,4	1,3
Dry circuit resistance	3,6	2,5	2,5	2,5	2,5						
Voltage drop (c)	4,7	3,6	3,6	3,6	3,6						
Temperature rise vs current	2(c)										
Terminal-connector insertion/extraction force									2		
Connector-connector mating/unmating force								2,3			
Vibration/mechanical shock		4									
Thermal shock (c)			4								
Temperature/humidity cycling (c)				4							
High temperature exposure (c)					4						
Pressure/vacuum leak						4					
1008 hour current cycling	5										
High/low temperature soak						2					
Drop test										3	
Contact retention, push-in									3		
Contact retention, pull-out									4		
Salt water immersion						3					
Fluid resistance							2				
Buzz, squeak, rattle										2	
Cleanliness											2

**NOTE** (a) *See paragraph 4.1.A.*  
 (b) *Numbers indicate sequence in which tests are performed.*  
 (c) *Precondition specimens with 10 mating/unmating cycles.*

Figure 2

**4. QUALITY ASSURANCE PROVISIONS**

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. All test groups shall each consist of a minimum of 5 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

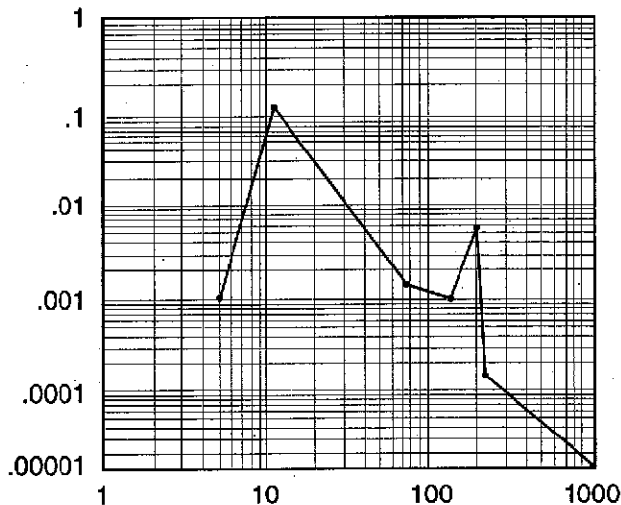
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.



Frequency (Hz)	Power Spectral Density (g <sup>2</sup> /Hz)
5.0	0.00200
12.5	0.24800
77.5	0.00320
145.0	0.00200
200.0	0.01180
230.0	0.00032
1000.0	0.00002
Grms = 1.81	

Figure 3  
Vibration Requirements