MCX Series Coaxial Connectors – Maximum Current Handling

1.0 Introduction

1.1 Purpose

Testing was performed on the Tyco/Greenpar MCX series coaxial connectors to determine the maximum current handling capability.

1.2 Scope

This report defines the maximum current rating of the Tyco/Greenpar MCX series coaxial connectors with a de-rated operating temperature range. Connectors are manufactured in accordance with CECC 22 220 for use in ground based aerospace, industrial and commercial applications. Testing was performed at the Tyco Electronics AMP Italia Laboratory between 2 August 2004 and 21 September 2004. The test file number for this testing is 04/MCX. This documentation is on file at and available from the AMP Italia EMEA Region Laboratory.

1.3 Conclusion

The Tyco/Greenpar MCX series coaxial cable connectors when terminated to the Tyco Raychem coax cable, as specified below and mated with the MCX SMD printed circuit board socket, showed that this combination of connectors met a continuous operation of 3 Amperes at 85 Deg C conforming to Tyco Product Specification 108-3640 as specified.

1.4 Product Description

Connector (1): Tyco Greenpar MCX Straight Cable Plug Solder Centre Contact Hex Crimp for RG174 and similarly dimensioned coax cables.
Cable: Tyco Raychem Cheminax Single Braid Coax Cable with Thermorad Jacket
Connector (2): Tyco Greenpar MCX Straight Surface Mount PCB Socket Receptacle

1.5 Test Samples

The test samples (see table 1) were selected from normal production lots and the following part numbers were used for test. The connectors were terminated to 500mm of cable in accordance with Tyco Assembly Spec No. 411-3247, using Crimp Hand Tool 9-1478240-0 and Die Set 9-1478248-0. The centre conductor was soldered. MCX Straight Surface Mount PCB Socket Receptacle was soldered to a suitable standard prototype PCB.

Table 1

Test Group	Qty	Part Number	Description
1	1	6-1337580-0	MCX Straight Plug Crimp Brass/Gold RG174
2	1	6-1337580-0	MCX Straight Plug Crimp Brass/Gold RG174
3	1	6-1337580-0	MCX Straight Plug Crimp Brass/Gold RG174
4	1	6-1337580-0	MCX Straight Plug Crimp Brass/Gold RG174
5	1	6-1337580-0	MCX Straight Plug Crimp Brass/Gold RG174
1-5	5x0.5M	5024A1311-0	Cheminax Single Braid Coax Cable with Theromrad Jacket
1-5	5	6-1337582-0	MCX Straight Surface Mount PCB Socket Receptacle

1.6 Qualification Test Sequence

Table 2					
Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Examination of product	1	1	1	1	1
Contact resistance, centre contact	2, 6	2, 6	2, 6	2, 6	2, 6
Contact resistance, braid to housing	3, 7	3, 7	3, 7	3, 7	3, 7
Temperature Rise	5	5	5	5	5
Post test examination of product	4, 8	4, 8	4, 8	4, 8	4, 8

Note
(a) See paragraph 3.0
(b) Numbers indicate sequence in which tests were performed

2.0 Summary of testing

2.1 Examination of Product – All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the product assurance department.

2.2 Resistance Test

The following tests were carried-out in accordance with the test sequence noted in Table 2.

Braid: A current of 50 milliamps maximum and 20 millivolts maximum was applied to the braid and a reading of less than 1.5 milliohms was determined. This test was repeated after cable retention tests were performed and a variance of less than 5 milliohms was recorded.

Centre Contact: A current of 50 milliamps maximum and 20 millivolts maximum was applied to the centre contact and a reading of less than 5.0 milliohms was determined. This test was repeated after cable retention tests were performed and a variance of less than 5 milliohms was recorded.

2.3 Temperature Rise

At Ambient 27 Deg C : The test sample was subjected to 3 Amperes. Temperature readings were then taken. This test was then repeated at 4 Amperes and 5 Amperes, also at ambient. Test results were recorded and showed that a rise of 5.8 Deg C occurred at 3 Amperes.

2.4 Post Test Examination of Product

Contact Resistance: All samples were examined for visual changes to the crimp termination and contact location in the dielectric. No changes were apparent.

Temperature Rise: All samples were examined for visual changes to the crimp termination and contact location in the dielectric. No changes were apparent. Under magnification no damage, discolouring, arcing/carbon build-up was noted at either the braid or centre contact areas. (See Table 2 for the correct sequence).

3.0 Test Methods

3.1 Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance

Termination resistance measurements at low level current were made using a milliohm meter as shown in the graphic / picture. See Figure 3. The test current was maintained at 50 milliamperes DC with an open circuit voltage of 20 millivolts DC.

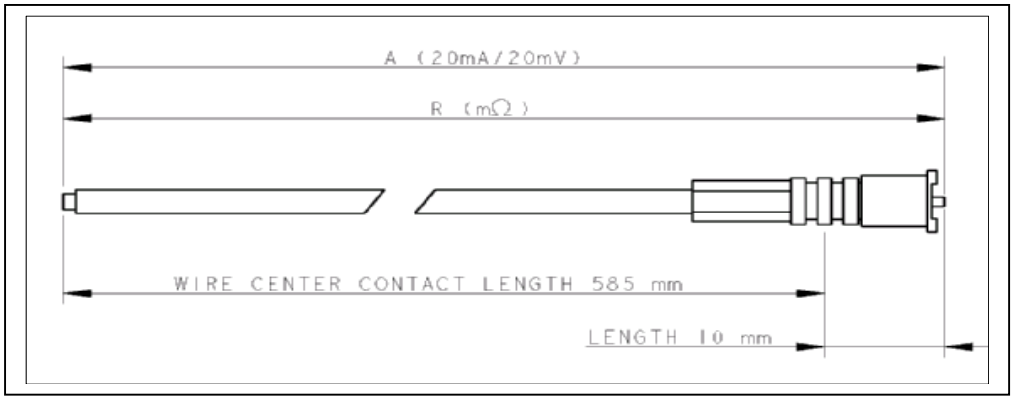

Figure 3

(Typical Termination Resistance Measurement Points)

3.3 Temperature Rise

Temperature Rise tests were carried out by applying a load to the test samples in free air at ambient temperature. The test samples were subjected to three different loads being 3, 4, and 5 Amperes. Test results were recorded to ascertain the temperature rise above ambient and expressed as a graph showing the temperature curve.
See figure 4.

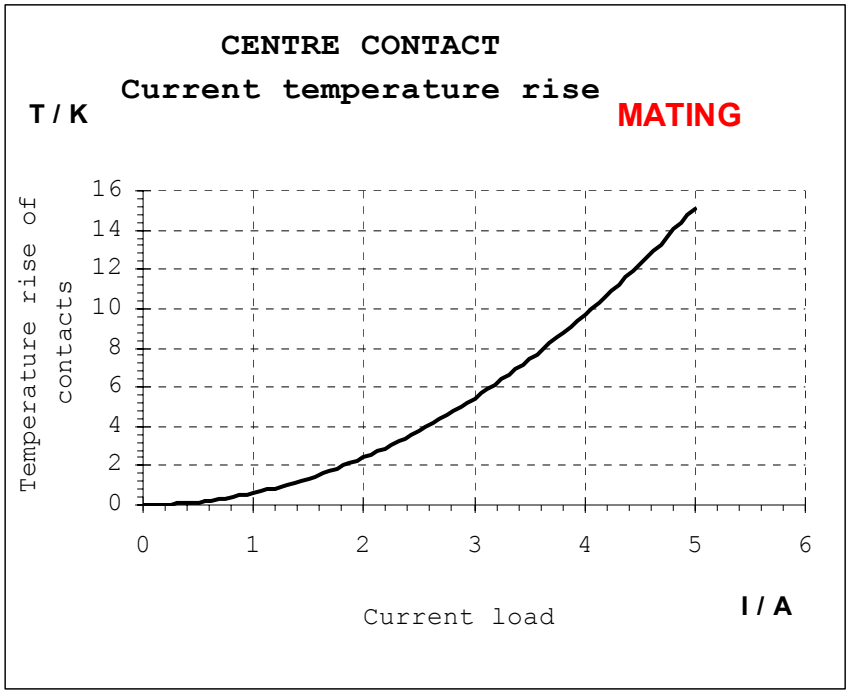

Figure 4
(Typical Temperature Rise)

3.4 Electrical Resistance / Continuity

Suitable test probes were attached to the cable conductor and centre contact to create a circuit ensuring that no cross circuits could occur at the free cable end. The same procedure was repeated for the braid to outer body circuit. These two circuits were then used to determine either resistance or electrical continuity.