
Electrical Distribution Busbar (140 or 200A)

1. SCOPE**1.1 Content**

This specification contains performance requirements and qualification tests procedures for Electrical Distribution Busbar (140 or 200A). These products are assembled from a set of stainless steel helical spring plus a set of stainless steel plate, all of them protected by a PA 6.6 injected housing, where is included two cooper bars, which represent the main conductors of the busbars.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 Commercial Documents

- UL-1059 Terminal Blocks
- ANSI C119.4-1991 American National Standard for Connectors for use between Aluminum or Aluminum-Copper
- ASTM B-117 Standard practice for Operating Salt Spray (Fog) Testing Apparatus

2.2 Tyco Documents

- 109-13010 Salt Spray and Elevated Temperature, Test Procedure for
- 411-37026 Instruction Sheet

2.3 Military Documents

- MIL-C-45662 Calibration of Standards.

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

The materials used on the construction of these connectors (including plating) shall be as specified on the applicable Tyco Product Drawing.

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3.3 Ratings

- a) **Voltage:**
The products were developed to undergo voltage level until 750V (Low Voltage Class). Otherwise voltage application request specific analysis.
- b) **Current:**
The products were developed to undergo the maximum current of 140 or 200A (depending of the model), considering rated working conditions.
- c) **Temperature:**
Maximum working temperature permissible at the copper busbar for the product is 100°C.

3.4 Functional Characteristics

The products accept solid, stranded and compacted copper or aluminum conductors within ranges defined as 2,5mm² to 35mm² for **140A Busbar** and 2,5mm² to 50mm² for **200A Busbar**. The Connectors were designed to meet the electrical, mechanical and environmental performance requirements specified in Table 1.

Note: On the 200A Busbar, the cables from 35mm² to 50mm², must be applied with a Helical Termination connector, according Instruction Sheet 411-37026.

3.5 Classification

Both, 140A and 200A, Electrical Distribution Busbar are classified electrically as class "A", as described in ANSI C119.4-1991.

4. QUALITY ASSURANCE PROVISIONS

4.1 General Provisions

The quality provisions specified herein shall be employed in the qualification or requalification of this product to insure that the design units continue to meet the performance requirements of this specification.

The inspection procedures are synthesized by Qualification Inspection and Quality Conformance Inspection.

5. QUALIFICATION INSPECTION

5.1 Test Procedure

To perform the Qualification Inspection, the busbar must be selected from the normal production and they must represent the current design.

The busbar shall be prepared for the test sequence as follow:

Qualification Inspection					
Test or Examination	Paragraph	Test Group and Sequence			Results Evaluation and Procedures Ref.
		I	II	III	
Examination of Product	5.1.1	1 – 5	1	1	-
Termination Resistance	5.1.2	4	2 – 4		ANSI C119.4
Heat Cycle	5.1.3	2			ANSI C119.4
Short Time Current	5.1.6	3			UL 1059
Corrosion	5.1.4		3		ASTM B-117 Tyco 109-13010
Tensile Strength	5.1.5			2	UL 1059

Table 1

5.1.1 Examination of Product

All samples shall be free from any damage or physical defects which would affect the electrical or mechanical performance of the busbar.

5.1.1.1 Test Method

Test samples shall be visually examined before and after assembling to assure proper manufacturing and assembly in accordance with the manufacture's drawings and instructions.

5.1.2 Termination Resistance

5.1.2.1 Heat Cycle Test

When measured as specified, each connection shall indicate electrical stability throughout the test from the 25th to the 500th cycle, by a variation of not more than +/- 5% from the average of the measured values in this interval.

5.1.2.2 Short Time Current

When measured as specified, each connection shall indicate a 10% maximum resistance variation after three applications of a short time current (one second per application).

5.1.2.3 Corrosion

When measured as specified, the voltage drop across connection terminations shall not indicate a variation bigger than 250% from the initial measurements.

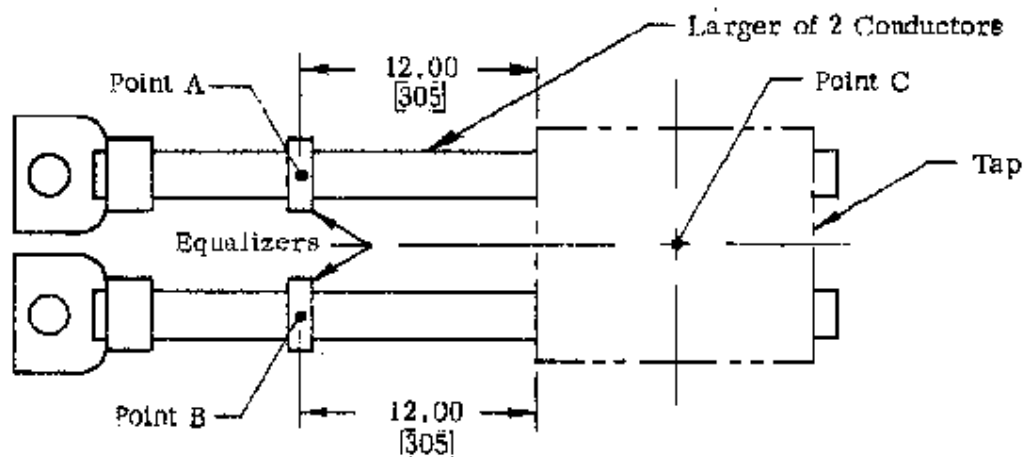
5.1.3 Heat Cycle Test

Throughout the test, as specified, the temperature of connectors shall not exceed that of the control conductor, and the temperature difference between the control conductor and each connector shall show a condition of stability from the 25th to the 500th cycle. Stability is indicated by a decrease of this difference of not more than 10°C from the average of the measured differences in the interval for this connector. In addition, connection shall meet the requirements for Termination Resistance throughout the test as specified in Paragraph 5.1.2.1.

5.1.4 Corrosion

After the 15-day Salt-Spray test as specified, the connections shall be in accordance with the requirements for Termination Resistance, Paragraph 5.1.2.3. The specified standards shall be used as follow:

- Test Methodology: ASTM B-117
- Circuit Lay-Out: Tyco 109-13010



Tap Measurement Points

5.1.5 Tensile Strength

When tested as specified, the connections shall not break or become separated from the cable until attaining a tensile force as table 2.

Cable Range (mm ²)	Tensile Force (N)
2,5 to 16	62
25 to 50	89

Table 2

5.1.5.1 Test Method

It shall be selected 3 samples for tensile test which shall be placed in a tensile testing machine and an axial force applied to the conductors at a rate of ¼ inch per minute minimum per 12 inches of length between jaws until the connector breaks or becomes separated from the conductor. When testing connectors assembled to stranded conductors, a suitable deadening procedure shall be performed on the cable ends to assure simultaneous loading of all strands.

5.1.6 Short Time Current Test

After heat cycle test the connectors shall be tested in short time current test according to UL-1059 Standard, item 47.

6. QUALITY CONFORMANCE INSPECTION

6.1 Sampling and Acceptable

Quality levels shall be as specified in the applicable Tyco Quality Inspection Plan. Dimensional requirements shall be in accordance with the applicable Tyco Product Drawing.

6.2 Test Procedure

Connectors supplied in accordance with this specification shall meet the requirements for Quality Conformance Inspection, Table 3. Examination and test shall be conducted in the sequence specified:

Quality Conformance Inspection	
Test Examination	Test Method
Examination of Product	Quality Inspection Plan
Tensile Strength	Paragraph 5.1.5

Table 3

Revision Record		
Revision	Date	Description
O	25-Nov-1997	Issued
A	20-Feb-1998	LB00-0061-98
B	06-Mar-1998	LB00-0081-98
C	11-Sep-1998	LB00-0304-98
D	12-Mar-1999	LB00-0075-99
E	12-Nov-1999	LB00-0521-99
F	30-Jun-2000	LB00-0212-00
G	19-Feb-2002	LB00-0043-02
H	27-Oct-2003	LB00-0455-03