



RK-6161 Revision 4

Raychem brand T-DR-25

SCOPE

This Quality Assurance Specification establishes the quality standard for two types of cross-linked, flame-retarded, heat and oil resistant elastomeric harness tape of low and high shrink ratios.

Approved Signatories*

Tyco Electronics :

Approved electronically via DMTec

*** This document is electronically reviewed and approved - therefore no signatures will appear.**

1. REVISION HISTORY

Revision Number	Change Request	Date	Incorporated By
1	Initial		
2	TO203	08/03/93	H Curtis
3	CR98-DM-0199	24 September 1998	L. Abrams
	CR02-DM-0281	14 November 2002	L. Abrams
4	CR10-DM-009	3 August 2010	Paul Dixon

2. REQUIREMENTS**2.1 Composition, Appearance and Colour**

The sleeving shall be homogeneous and free from pinholes, bubbles, cracks and inclusions. The colour shall be black

2.2 Dimensions

Tape Number	Supplied Thickness (mm)	Supplied Width (mm)
1	0.60 ± 0.15	25 ± 2
2	0.45 ± 0.15	20 ± 2

2.3 Test Requirements

The test requirements shall be as specified in Table 1.

3. TEST METHODS

3.1 Preparation of Test Specimens

Unless otherwise specified, tests shall be carried out on specimens of tape stress relieved by conditioning in a fan assisted air circulating oven at $200 \pm 5^{\circ}\text{C}$ for 6 ± 1 minutes and allowed to cool in air to ambient temperature. No pre-conditioning period is required prior to testing. Unless otherwise specified, all tests shall be made under standard ambient conditions according to IEC Publication 212. In cases of dispute the tests shall be carried out at a temperature of $23 \pm 2^{\circ}\text{C}$ and at $50 \pm 5\%$ relative humidity.

3.2 Dimensions and Longitudinal Change

The test method shall be as specified in ASTM D2671.
The width and thickness shall be measured. The longitudinal change shall be expressed as a percentage of the original length after conditioning.

3.3 Tensile Strength and Ultimate Elongation

The test method shall be as specified in ISO 37.
Five Type 2 dumb-bell specimens shall be tested. Rate of grip separation shall be $100 \pm 10\text{mm}$ per minute. The test shall be carried out at a temperature of $23 \pm 2^{\circ}\text{C}$.

3.4 Secant Modulus

The test method shall be as specified in Method A of ASTM D882.
Five strip specimens 150mm long shall be tested. Initial grip separation shall be 100mm and rate of grip separation $10 \pm 1\text{mm}$ per minute. The test shall be carried out at a temperature of $23 \pm 2^{\circ}\text{C}$.

3.5 Specific Gravity

The test method shall be as specified in Method A of ISO 1183.

3.6 Heat Shock

The test method shall be as specified in ASTM D2671.
The specimens shall be conditioned in a fan assisted air circulating oven as specified in Table 1

3.7 Heat Ageing

The test method shall be as specified in ISO 188.
Five tensile test specimens prepared as in Clause 3.3 shall be conditioned in a fan assisted air circulating oven as specified in Table 1. After conditioning the specimens shall be removed from the oven, allowed to cool naturally to room temperature and tested for Tensile Strength and Ultimate Elongation according to Clause 3.3.

TEST METHODS (Cont'd)**3.8 Low Temperature Flexibility**

The test method shall be as specified in Procedure C of ASTM D2671.
Mandrel diameter shall be 20 x specimen thickness $\pm$ 10%.
The specimens and mandrel shall be conditioned as specified in Table 1.

3.9 Burning Rate

The test method shall be as specified in MWSS 302

3.10 Electric Strength

The test method shall be as specified in IEC 60243 (Short time test).

3.11 Copper Mirror Corrosion

The test method shall be as specified in ASTM D2671.
The specimens shall be conditioned as specified in Table 1.

3.12 Water Absorption

The test method shall be as specified in Method 1 of ISO 62.
Three disc specimens of diameter 25 $\pm$ 1mm shall be cut from the tape

3.13 Fluid Resistance

The test method shall be as specified in ISO 1817.
Five tensile test specimens prepared as in Clause 3.3. shall be completely immersed in each of the fluids for the times and temperatures specified in Table 1. The volume of the fluid shall not be less than 20 times that of the specimen. After immersion, lightly wipe the specimens and allow to air dry at 23 $\pm$ 2°C for 1h $\pm$ 15m. The Tensile Strength and Ultimate Elongation of each specimen shall be tested according to Clause 3.3. The test shall be repeated on the remaining specified fluids.

3.14 Fungus Resistance

The test method shall be as specified ISO 846, Method B .
The specimens shall be conditioned for 56 days, and tested for Tensile Strength and Ultimate Elongation according to Clause 3.3.

4. RELATED STANDARDS & issue

ASTM D2671-09	Standard Test Methods for Heat-Shrinkable Tubing for Electrical Use
ASTM D882-10	Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
IEC 60212: 1971	Standard Conditions for Use Prior to and During Testing of Solid Electrical Insulating Materials
IEC 60243-1: 1998	Electrical Strength Of Insulating Materials - Test Methods - Tests At Power Frequencies
ISO 37: 2005	Rubber, vulcanized or thermoplastic - Determination of Tensile Stress-Strain Properties
ISO 62: 2008	Determination of Water Absorption
ISO 188: 2007	Rubber, vulcanized - Accelerated Ageing or Heat Resistance Tests.
ISO 846: 1997	Plastics - Evaluation of the action of microorganisms.
ISO 1183-1: 2004	Plastics - Methods For Determining The Density Of Non-Cellular Plastics - Part 1: Immersion Method, Liquid Pyknometer Method And Titration Method
ISO 1817: 2005	Rubber, vulcanized - Determination of the effect of liquids

Subsequent amendments to, or revisions of, any of the above publications apply to this standard only when incorporated in it by updating or revision.

5. SAMPLING

Tests shall be carried out on a sample taken at random from each batch of finished tape..
A batch of tape is defined as that quantity of tape extruded at any one time.
Testing frequency shall be Production Routine or Qualification. Production Routine tests consisting of Visual Examination, Dimensions, Longitudinal Change, Tensile Strength, Ultimate Elongation and Specific Gravity shall be carried out on every batch of sleeving.
Qualification tests shall be carried out to the requirements of the Design Authority.

6. PACKAGING

Packaging shall be in accordance with good commercial practice. Each package shall bear an identification label showing material quantity, description, size, colour and batch number.
Additional information shall be supplied as specified in the contract or order.

TABLE 1 Test Requirements

Test	Test Method	Test Requirements
Visual Examination		As per Clause 2.1
Dimensions	ASTM D2671	As per Clause 2.2
Longitudinal Change	ASTM D2671	Tape No. 1 : 0 to -25% Tape No. 2 : -40 to -60%
Tensile Strength	ISO 37	14 MPa minimum
Ultimate Elongation	ISO 37	400% minimum
Secant Modulus at 2% Strain	ASTM D882	50 MPa maximum
Specific Gravity	ISO 1183	1.45 maximum
Heat Shock (4h ± 15m at 215 ± 5°C)	ASTM D2671	No dripping, cracking or flowing
Heat Ageing (168h ± 2h at 160 ± 3°C) - Tensile Strength - Ultimate Elongation	ISO 188 ISO 37	10 MPa minimum 200% minimum
Low Temperature Flexibility (4h ± 15m at -75 ± 2°C)	ASTM D2671	No cracking
Burning Rate	MVSS 302	20 mm/minute maximum
Electric Strength	IEC 60243-1	15 MV/m minimum
Copper Mirror Corrosion (16h ± 15m at 150 ± 3°C)	ASTM D2671	No corrosion of mirrors
Water Absorption (24 ± 2h immersion at 23 ± 2°C)	ISO 62	2 % maximum

TABLE 1 Test Requirements (Cont'd)

Test	Test Method	Test Requirements
Fluid Resistance (24 ± 2h immersion at 40 ± 2°C) - Hydraulic Fluid to H-542 SAE J1703 - Tensile Strength - Ultimate Elongation	ISO 1817 ISO 37	 10 MPa minimum 300 % minimum
Fluid Resistance (24 ± 2h immersion at 70 ± 2°C) - Gasoline Fuel to ISO 1817 Test Liquid B - Diesel Fuel to BS 2869 Class A1 - Hydraulic Fluid to H-515 (Mil-H-5606) - Tensile Strength - Ultimate Elongation	ISO 1817 ISO 37	 10 MPa minimum 300 % minimum
Fluid Resistance (24 ± 2h immersion at 100 ± 2°C) - Lubricating Oil to O-156 (Mil-L-23699) - Tensile Strength - Ultimate Elongation	ISO 1817 ISO 37	 10 MPa minimum 300 % minimum
Fungus Resistance - Tensile Strength - Ultimate Elongation	ISO 846 ISO 37	 14 MPa minimum 350 % minimum

In line with a policy of continual product development, Tyco reserves the right to make changes in construction, materials and dimensions without further notice. You are advised, therefore, to contact Tyco Electronics, should it be necessary to ensure that this document is the latest issue.

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