Specification RW-2500/1

TE 108-121004

HIGH TEMPERATURE HEAT SHRINK IDENTIFICATION MARKER SLEEVES - HTMS (HTTMS)

Approved Signatories:

This document is electronically reviewed and approved by TE Connectivity.

1. REVISION HISTORY

Revision Number	Description of change	Date	Incorporated By
1	AFC 256	14/04/04	Alan Kean
2	AFC 403	13/02/06	John Swift
3	AFC 421	17/07/06	Gordon White and Steve Rowland
4	Refer to PCN	24/09/14	Lee Smith

2. SCOPE

This specification sheet, when used with RW-2500, defines the product characteristics and performance of TE Connectivity High Temperature Heat Shrink Identification Marker Sleeves.

The IBM daisy wheel printer and ink cartridge developed for HTMS is now obsolete. TE can only guarantee the performance properties covered in this standard, and not any marking applied using non-recommended printing systems. Where non-standard systems are used, customers are required to carry out their own validation testing.

This system is not recommended where strain relief properties are required. Product is available in 2:1 shrink ratio.

Unless specified, the tube size for qualification testing is 6.4mm (1/4 inch).

3. REQUIREMENTS

3.1. MATERIAL

The sleeving shall be fabricated from irradiated, thermally stabilized, modified polyvinylidene fluoride compound. It shall be homogeneous and essentially free from flaws, defects, pinholes, bubbles, seams, cracks or inclusions.

3.2. COLOR

The sleeves shall be supplied in white, unless otherwise specified.

3.3. PROPERTIES

The sleeves shall meet the requirements of Table 3.

3.4. FORM

The sleeves shall be cut lengths in accordance with Table 1.

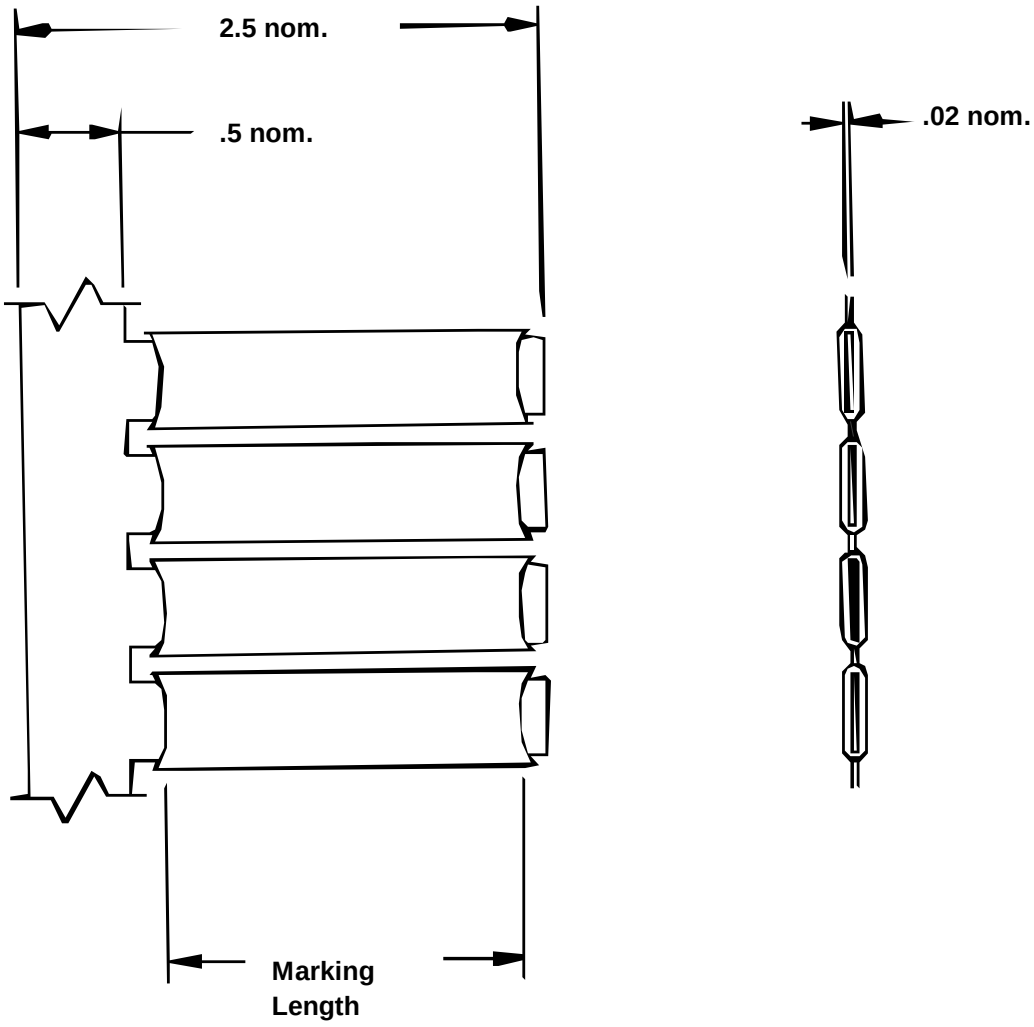

Figure 1: HTMS System 90 Assembly

TABLE 1
Dimensions

USA DESCRIPTIONS

Product Description	As Supplied				Recovered			
	Inside Diameter Minimum		Marking Length Minimum		Inside Diameter Maximum		Wall Thickness	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.
HTTMS-3/32-1.50	0.093	2.36	1.50	39.41	0.031	0.79	0.016 + 0.003	0.41+0.08
HTTMS-1/8-1.50	0.125	3.17	1.50	39.41	0.062	1.57	0.013 + 0.003	0.33+0.08
HTTMS-3/16-1.50	0.187	4.74	1.50	39.41	0.093	2.36	0.015 + 0.003	0.38+0.08
HTTMS-1/4-1.50	0.250	6.35	1.50	39.41	0.125	3.17	0.015 + 0.003	0.38+0.08
HTTMS-3/8-1.50	0.375	9.50	1.50	39.41	0.187	4.74	0.015 + 0.003	0.38+0.08
HTTMS-1/2-1.50	0.475	12.07	1.50	39.41	0.250	6.35	0.015 + 0.003	0.38+0.08
HTTMS-3/4-1.50	N/A	N/A	1.50	39.41	0.375	9.53	0.017 + 0.003	0.43+0.08
HTTMS-3/32-1.75	0.093	2.36	1.75	44.45	0.031	0.79	0.016 + 0.003	0.41+0.08
HTTMS-1/8-1.75	0.125	3.17	1.75	44.45	0.062	1.57	0.013 + 0.003	0.33+0.08
HTTMS-3/16-1.75	0.187	4.74	1.75	44.45	0.093	2.36	0.015 + 0.003	0.38+0.08
HTTMS-1/4-1.75	0.250	6.35	1.75	44.45	0.125	3.17	0.015 + 0.003	0.38+0.08
HTTMS-3/8-1.75	0.375	9.50	1.75	44.45	0.187	4.74	0.015 + 0.003	0.38+0.08
HTTMS-3/4-1.75	N/A	N/A	1.75	44.45	0.375	9.53	0.017 + 0.003	0.43+0.08

EUROPEAN DESCRIPTIONS

Product Description	As Supplied				Recovered			
	Inside Diameter Minimum		Marking Length Minimum		Inside Diameter Maximum		Wall Thickness	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.
HTMS-3/32	0.093	2.36	1.89	48	0.031	0.79	0.016 + 0.003	0.41+0.08
HTMS-1/8	0.125	3.17	1.89	48	0.062	1.57	0.013 + 0.003	0.33+0.08
HTMS-3/16	0.187	4.74	1.89	48	0.093	2.36	0.015 + 0.003	0.38+0.08
HTMS-1/4	0.250	6.35	1.89	48	0.125	3.17	0.015 + 0.003	0.38+0.08
HTMS (HTTMS)-3/8	0.375	9.50	1.85	47	0.187	4.74	0.015 + 0.003	0.38+0.08
HTMS (HTTMS)-1/2	0.475	12.07	1.81	46	0.250	6.35	0.015 + 0.003	0.38+0.08
HTMS (HTTMS)-3/4	N/A	N/A	1.65	42	0.375	9.53	0.017 + 0.003	0.43+0.08

TABLE 2
Mandrel Dimensions for Heat Shock, Heat Aging and Low Temperature Flexibility

Tubing Size	Mandrel Diameter	
	in	mm
3/32 through 3/16	5/16	7.9
1/4 through 3/4	3/4	19.0

TABLE 3 Requirements

PROPERTY	UNIT	REQUIREMENT	RW-2500 TEST METHOD
PHYSICAL Dimensions	mm (inches)	In accordance with Table 1	RW-2500 Section 4.3.1.1 ASTM D 2671
Dimensional Recovery 3 minutes at 200°C (392°F)	mm (inches)	In accordance with Table 1	
Longitudinal Change 3 minutes at 200°C (392°F)	Percent	10 maximum	
Tensile Strength	MPa (psi)	34.5 (5000) minimum	RW-2500 Section 4.3.2.1 ASTM D 2671 2 inches/minute
Ultimate Elongation	Percent	200 minimum	
Specific Gravity	---	1.8 maximum	RW-2500 Section 4.3.3 ASTM D 2671
Low Temperature Flexibility 4 hours at -55°C (-67°F)	---	No cracking	RW-2500 Section 4.3.5.1
Heat Shock 4 hours at 275°C (527°F)	---	No dripping, flowing, or cracking	RW-2500 Section 4.3.6.1
Heat Aging 168 hours at 225°C (437°F)	---	No cracking	RW-2500 Section 4.3.7.1
Copper Contact Corrosion 16 hours at 150° C (302°F)	---	No pitting or blackening of core	RW-2500 Section 4.3.14.1
Pull-Off Force Size: 3/32 through 1/8 Size: 3/16 through 1/4 Size: 3/8 through 3/4	 N (Pounds) N (Pounds) N (Pounds)	 22 (5.0) maximum 31 (7.0) maximum 44 (10.0) maximum	RW-2500 Section 4.3.8
Vacuum Outgassing TML (Total Mass Loss) VCM (Volatile Condensable Material)	 Percent Percent	 1.0 maximum 0.1 maximum	RW-2500 Section 4.3.18 ASTM E 595
Temperature Cycling 6 cycles of: 0.5 hr/-196°C (-321° F) 0.5 hr/200°C (392° F)		 No cracking	RW-2500 Section 4.3.23
ELECTRICAL Dielectric Strength Size: 3/32 through 3/16 1/4 through 1/2	 kV/mm (V/mil)	 31.5 (800) minimum 23.6 (600) minimum	RW-2500 Section 4.3.11.1 ASTM D 2671
Volume Resistivity	ohm-cm	10^{12} minimum	RW-2500 Section 4.3.12.1 ASTM D 2671
CHEMICAL Corrosive Effect 16 hours at 150°C (302°F)	---	Non Corrosive	RW-2500 Section 4.3.13.1 ASTM D 2671
Flammability UL 224 ASTM D 876 Average time of burning	 Seconds	 Pass VW-1 15 maximum	RW-2500 Section 4.3.15.1 and Section 4.3.15.2
Fungus Resistance	---	Rating of 1 or less	ASTM G 21

Additional notes for Low Temperature Flexibility

For sizes smaller than 1/4 inch, recover three 6-inch long specimens and cool to room temperature.

For sizes 1/4 inch and larger, prepare test strips as follows: Recover three 6-inch long sections of tubing, and while they are still hot, slit longitudinally, and flatten between metal plates. Cool to room temperature, remove metal plates, and cut into 1/4-inch wide strips.

Place the specimens in a cold chamber with the mandrel specified in Table 2 at -55°C (-67°F) for 4 hours. While still in the cold chamber, and at this same temperature, wrap the specimens around the mandrel not less than 360° in approximately 2 seconds.

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