



TECHNICAL DATA SHEET

Document number: TTDS-023
Issue: 6
Date: October 2015

TMS-SCE-2X and TMS-SCE-3X Heat shrinkable sleeves

PRODUCT OVERVIEW

MATERIAL DESCRIPTION:	Thin wall flame retarded radiation cross-linked modified polyolefin heat-shrinkable tubing, assembled as organized cut sleeves in a "ladder" configuration. 3:1 and 2:1 shrink ratio products available.
USE:	Identification of wires and cables by computer-based printing onto sleeves. Sleeves can also provide terminal insulation and strain relief. Suitable for a wide variety of applications, including aerospace, military and general rail applications.
STANDARDS:	TMS-SCE is designed to TE standard RW-2511. TMS-SCE-3X Sleeves meet the material and performance requirements of SAE AMS-DTL-23053/5 for Class 1 ^{1,2} TMS-SCE-2X Sleeves meet the material and performance requirements of SAE AMS-DTL-23053/5 for Classes 1 and 3. SAE AS5942 Marking of Electrical Materials, 4.1 Adherence ³ MIL-STD-202G Method 215 Resistance to Solvents
PRINTING SYSTEM:	See document 411-121005 'IDENTIFICATION PRINTER PRODUCT RIBBON MATRIX' for the recommended printer/product/ribbon combination.
SERVICE TEMPERATURE ⁴ :	-55°C to +135°C (-67°F to +275°F).
MAXIMUM STORAGE TEMPERATURE:	40°C (104°F).
COLORS:	Standard: White and Yellow Non Standard: Red, Pink, Orange, Green, Blue, Violet, Grey, Black.
SHELF LIFE ⁵ :	5 years from date of manufacture.
AGENCY APPROVALS:	UL recognised Standard 224 (File E35586) ⁶ . CSA certified (File 31929).

¹ This standard does not cover TMS-SCE-3X dimensions.

² TMS-SCE does not fully comply with the colour requirements of MIL STD 104. Pastel colours are used to enhance print contrast.

³ SAE AS5942 replaces obsolete standard SAE AS81531; the performance of the product has not changed.

⁴ As installed. Defined in document SAE-AMS-DTL-23053 for 'continuous operating temperature range'; classes 1 and 3.

⁵ Product must be stored in original packaging, maintained between 10°C to 40°C and 45±5% relative humidity.

⁶ UL224 standard approval, meets flammability rating for 'flame test - all tubing'.

If the document is printed it becomes uncontrolled
Check with TE Connectivity (TE) for latest version

Author: A Kean
Issue date: Oct 2015
Page: 1 of 4

While TE Connectivity Ltd. has made every reasonable effort to ensure the accuracy of the information in this document, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.



TECHNICAL DATA SHEET

Document number: TTDS-023
Issue: 6
Date: October 2015

TMS-SCE-2X and TMS-SCE-3X Heat shrinkable sleeves

FIRE SAFETY ^{7,8}

RESISTANCE TO FLAME PROPAGATION AND FIRE SUSTAINING

FLAME SPREAD INDEX (Is)	35 maximum – No flame spread or flame dripping. (ASTM E162 Surface Flammability of Materials, Using a Radiant Heat Energy Source).
SPECIFIC OPTICAL DENSITY: (flaming/non flaming)	100 maximum (1.5 minutes), 200 maximum (4 minutes). (ASTM E662 Specific Optical Density of Smoke, Generated by Solid Materials).
MAXIMUM AVERAGE RATE OF HEAT EMISSION ⁹ (MARHE)	300 kW/m ² (50kW/m ² Irradiance, ASTM E 1354: Heat and Visible Smoke Release Rates or Materials and Products using an Oxygen Consumption (Cone) Calorimeter).
RESISTANCE TO BURNING:	TMS-SCE Burn time 60 seconds maximum (ASTM D2671 Procedure B). TMS-SCE-2X No flag burn; no burning of cotton or dripping (ASTM D2671 Procedure C).

TOXIC FUMES:

TOXIC GAS GENERATION FROM MATERIAL COMBUSTION	Toxic gas generation from material combustion (Boeing BSS 7239, SMP 800-C), parts per million (ppm), maxima:
	Carbon monoxide 3500
	Nitrogen oxides 100
	Sulphur dioxide 100
	Hydrogen chloride 500
	Hydrogen fluoride 200
	Hydrogen bromide 100
	Hydrogen cyanide 150

⁷ Specifically required by US Department of Transport - Federal Rail Administration (FRA 49 CFR Appendix B to Part 238), and also National Fire Protection Association (NFPA 130) (Excluding resistance to burning).

⁸ Tested on Heat Shrink sleeving, as supplied.

⁹ No national maximum limit currently applies. Results supplied for fire hazard risk assessment purposes only.

If the document is printed it becomes uncontrolled
Check with TE Connectivity (TE) for latest version

Author: A Kean
Issue date: Oct 2015
Page: 2 of 4

While TE Connectivity Ltd. has made every reasonable effort to ensure the accuracy of the information in this document, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.



TECHNICAL DATA SHEET

Document number: TTDS-023
Issue: 6
Date: October 2015

TMS-SCE-2X and TMS-SCE-3X Heat shrinkable sleeves

PHYSICAL:

TENSILE STRENGTH:	10.3 MPa minimum.
ULTIMATE ELONGATION:	200% minimum.
2% SECANT MODULUS:	172.4 MPa maximum.
LONGITUDINAL CHANGE:	-20% maximum for TMS-SCE-3X. -5% maximum for TMS-SCE-2X.

ELECTRICAL:

DIELECTRIC STRENGTH:	19.7 MV/m minimum.
VOLUME RESISTIVITY:	10^{14} Ohm-cm minimum.

ENVIRONMENTAL:

HEAT AGEING:	100% ultimate elongation retained and print legible after 168 hours at 175°C (347°F).
HEAT SHOCK:	No cracking, dripping or flowing and print legible after 4 hours at 250°C (482°F).
LOW TEMPERATURE FLEXIBILITY:	Print legible. No cracking after 11 mm (7/16 inch) mandrel bend after 4 hours at -55°C (-67°F).
WATER ABSORPTION:	0.5% maximum.
COPPER MIRROR CORROSION:	Non-corrosive; no pitting or blackening of mirror after 16 hours at 175°C (347°F).
COPPER CONTACT:	No pitting or blackening of copper after 16 hours 175°C (347°F).
MOLD GROWTH:	Print legible after 56 day incubation (ISO 846, method B) - tensile strength and ultimate elongation maintained after testing.

If the document is printed it becomes uncontrolled
Check with TE Connectivity (TE) for latest version

Author: A Kean
Issue date: Oct 2015
Page: 3 of 4

While TE Connectivity Ltd. has made every reasonable effort to ensure the accuracy of the information in this document, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.



TECHNICAL DATA SHEET

Document number: TTDS-023
Issue: 6
Date: October 2015

TMS-SCE-2X and TMS-SCE-3X Heat shrinkable sleeves

PRINT ENDURANCE:

PRINT ADHERENCE: Print legible after 50 rubs (AMS AS5942).
Print legible after 30 strokes (MIL-STD-202G, Method 215).

FLUID RESISTANCE Fluid immersion for 24 hours at 21°C (70°F) followed by 20 rubs.

INDUSTRIAL GRADE FLUIDS

Test Fluid	Result
Water	Print legible
Detergent (Tepol in water, 1% by weight)	Print legible
MIL-L-7808 Lubricating oil	Print legible
MIL-L-23699 Lubricating oil	Print legible
MIL-T-83133 Aircraft Fuel (JP-8)	Print legible
Sodium Chloride (in water, 5% by weight)	Print legible
MIL-H-83282 Hydraulic Fluid	Print legible
Propylene Glycol de-icing Fluid (in water, 50% by volume)	Print legible
Isopropyl Alcohol	Print legible
HIGH PERFORMANCE FLUIDS	
Skydrol™ 500 hydraulic fluid	Print legible
Aviation Gasoline (100/130)	Print legible

Refer to TE specification RW-2511 for full TMS-SCE performance & dimensional details.

Some types of neoprene insulation used in jackets contain additives that can migrate to the surface and discolor the polyolefin TMS-SCE sleeves. Any discoloration is dependent on the composition of the neoprene, combined with application conditions. Users should independently evaluate the suitability of TMS-SCE sleeves for applications involving neoprene-jacketed cables

If the document is printed it becomes uncontrolled
Check with TE Connectivity (TE) for latest version

Author: A Kean
Issue date: Oct 2015
Page: 4 of 4

While TE Connectivity Ltd. has made every reasonable effort to ensure the accuracy of the information in this document, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.