

Document number: TTDS-023

Issue: 5

Date: December 2012

TMS-SCF-2X and TMS-SCF-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<sup>3</sup>

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 5: Standard: White and Yellow

Non Standard: Red, Pink, Orange, Green, Blue, Violet, Grey, Black

SHELF LIFE 6: 5 years from date of manufacture

**AGENCY APPROVALS:** UL recognised Standard 224 (File E35586)7.

CSA certified (File 31929).

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

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<sup>&</sup>lt;sup>1</sup> This standard does not cover TMS-SCE-3X dimensions.

<sup>&</sup>lt;sup>2</sup> TMS-SCE does not fully comply with the colour requirements of MIL STD 104. Pastel colours are used to enhance print contrast.

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

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

TMS-SCE-2X only available in White

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



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#### FIRE SAFETY 8,9

#### RESISTANCE TO FLAME PROPAGATION AND FIRE SUSTAINING

**FLAME SPREAD INDEX** 

(ls)

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 EMMISION 10

(MARHE)

300 kW/m<sup>2</sup>

(50kW/m<sup>2</sup> Irradiance, ASTM E 1354: Heat and Visible Smoke Release Rates or Materials and Products using an Oxygen Consumption (Cone) Calorimeter).

RESISTANCE TO BURNING T

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

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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).
Transport of the Part 200 in the

<sup>&</sup>lt;sup>9</sup> Tested on Heat Shrink sleeving, as supplied.

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



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**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<sup>14</sup> 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 11mm (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.

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**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 Print legible

(Tepol in water, 1% by weight)

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 Print legible

(in water, 5% by weight)

MIL-H-83282 Hydraulic Fluid Print legible

Propylene Glycol de-icing Fluid Print legible

(in water, 50% by volume)

Isopropyl Alcohol Print legible

HIGH PERFORMANCE Skydrol™ 500 hydraulic fluid FLUIDS

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

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Print legible

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многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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