



# TECHNICAL DATA SHEET

Document number: TTDS-108

Issue: 5

Date: May 2012

## HX-SCE Heat shrinkable sleeves

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MATERIAL DESCRIPTION:</b>                | Thin wall, zero-halogen, low smoke, low toxicity, radiation cross-linked, UV stabilised polyolefin heat-shrinkable tubing, assembled as cut sleeves organized in a ladder format.                                                                                                                                                                                                                                   |
| <b>USE:</b>                                 | Identification of wires and cables by computer-based printing onto sleeves. Ideal for applications where LFH characteristics are critical. The self extinguishing properties with low smoke and low toxic fume emissions make this product ideal for use in enclosed spaces such as mass transit, marine and industrial installations. This product is not recommended where strain relief properties are required. |
| <b>PRINT METHOD/RIBBON:</b>                 | Refer to TE Identification TT Printer Product Ribbon Matrix Document 411-121005                                                                                                                                                                                                                                                                                                                                     |
| <b>CONTINUOUS OPERATING TEMPERATURE:</b>    | -55°C to +105°C (-40°F to +221°F).                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>MINIMUM RECOVERY TEMPERATURE:</b>        | 120°C (248°F).                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>COLOURS:</b>                             | White or Yellow. Other colors available on request.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>FLAMMABILITY:</b>                        | Self-extinguishing (ASTM D2671 Procedure B)<br>Maximum flame spread index, $Is \leq 35$ (ASTM E 162)                                                                                                                                                                                                                                                                                                                |
| <b>OXYGEN INDEX:</b>                        | 34% minimum (BS EN ISO 4589-2 [1996]).                                                                                                                                                                                                                                                                                                                                                                              |
| <b>SMOKE EMISSION (A<sub>0</sub>)</b>       | 0.017 maximum (BS 6853 [1999] Annex D.8.3).                                                                                                                                                                                                                                                                                                                                                                         |
| <b>SMOKE DENSITY</b>                        | ASTM E 662 Maximum Ds (1.5) $\leq 100$ , Ds(4) $\leq 200$<br>(Flaming and non flaming modes)                                                                                                                                                                                                                                                                                                                        |
| <b>TOXIC FUME (R)</b>                       | $< 1$ (BS 6853 [1999] Annex B – Mass based test method - NF X 70-100)                                                                                                                                                                                                                                                                                                                                               |
| <b>LUL TOXIC FUME (ELEMENTAL ANALYSIS):</b> | No Halogens, P, S, or N sources above trace level<br>(1-085 A3 Fire Safety Performance of Materials).                                                                                                                                                                                                                                                                                                               |

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|                                 |                                                                                                                                                                        |
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| <b>DIELECTRIC STRENGTH:</b>     | 15kV/mm minimum.                                                                                                                                                       |
| <b>WATER ABSORPTION:</b>        | 1% maximum after 24 hours at 23°C (73°F).                                                                                                                              |
| <b>COPPER MIRROR CORROSION:</b> | 8% maximum after 16 hours at 150°C (302°F).                                                                                                                            |
| <b>LONGITUDINAL CHANGE:</b>     | +5% to -10%.                                                                                                                                                           |
| <b>TENSILE STRENGTH:</b>        | 7MPa minimum.                                                                                                                                                          |
| <b>ULTIMATE ELONGATION:</b>     | 80% minimum.                                                                                                                                                           |
| <b>SECANT MODULUS:</b>          | 200MPa maximum at 2% elongation.                                                                                                                                       |
| <b>UV RESISTANCE:</b>           | Tensile Strength > 90% & Ultimate Elongation > 40% of original value after 1000 hours<br>(ASTM G53: UVA [100% dry cycle]; UVB [8 hours dry/4 hours wet cycle]).        |
| <b>PRINT PERMANENCE:</b>        |                                                                                                                                                                        |
| - ADHERENCE                     | SAE AS5942 <sup>i</sup> : 1Kg load 50 rubs: Legible.                                                                                                                   |
| - FLUID RESISTANCE              | MIL-STD-202 Method 215: 3 cycles, 30 brush strokes: Legible.<br>BS EN 50343: 2003: Appendix H: Legible.<br>London Underground specific test fluids to CC3349: Legible. |

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<sup>i</sup> SAE AS81531 cancelled Oct 2011, superseded by SAE AS5942.

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### FLUID RESISTANCE, DETAIL:

| THREAT                                                     | TEST                                       | EFFECT        |
|------------------------------------------------------------|--------------------------------------------|---------------|
| Xylene / butylacetate / cyclohexanone mix (Paint stripper) | 10 Cycles, Crockmeter                      | Print legible |
| Diesel                                                     | 10 Cycles, Crockmeter                      | Print legible |
| Tunnel dust/white spirit                                   | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Water                                                      | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Tunnel Dust and Oil (50%/50%)                              | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Tunnel Dust and Water (50%/50%)                            | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| White Spirits                                              | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Diesel                                                     | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Grease                                                     | LUL C3349 (72hours, 20 strokes dry tissue) | Print legible |
| Wash cycle test                                            | 25 cycles at 75°C (167°F), 25 wipes        | Print legible |

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### FLUID RESISTANCE, DETAIL:

(Continued)

| THREAT                                        | TEST                                                                | EFFECT        |
|-----------------------------------------------|---------------------------------------------------------------------|---------------|
| Glycol rail de-icer<br>(50% glycol/50% water) | LUL C3349 (72hours, 20 strokes dry tissue)                          | Print legible |
| Cleaning solvent                              | LUL C3349 (72hours, 20 strokes dry tissue)                          | Print legible |
| Surface Cleaner (PGP500)                      | LUL C3349 (72hours, 20 strokes dry tissue)                          | Print legible |
| Multi-Purpose Graffiti remover<br>gel         | LUL C3349 (72hours, 20 strokes dry tissue)                          | Print legible |
| CGR gel (Chewing gum<br>remover)              | LUL C3349 (72hours, 20 strokes dry tissue)                          | Print legible |
| IRM 902 oil                                   | BS EN 50343 (24 hours at 50°C (122°F) 10<br>cycles with Crockmeter) | Print legible |
| Hydrochloric acid 5% solution                 | BS EN 50343 (1 minute at 23°C (73°F) 10<br>cycles with Crockmeter)  | Print legible |
| Sodium Hydroxide 5% solution                  | BS EN 50343 (1 minute at 23°C (73°F) 10<br>cycles with Crockmeter)  | Print legible |
| Heat Aging                                    | BS EN 50343 (240hrs 120°C (248°F), 10 cycles<br>with Crockmeter)    | Print legible |
| Wash cycle test                               | 25 cycles at 75°C (167°F), 25 wipes with cloth                      | Print legible |

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(Continued)

| THREAT                                           | TEST                                                                                                        | EFFECT                                   |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Aircraft fuel (ISO 1817 Liquid B)                | 24 hours at 40°C (104°F) then 25 strokes dry tissue; IEC 60684-2 – Tensile Strength and Ultimate Elongation | Print legible; 4MPa TS & 90% UE retained |
| Silicone fluid (S1714)                           | 24 hours at 50°C (122°F) then 25 strokes dry tissue; IEC 60684-2 – Tensile Strength and Ultimate Elongation | Print legible; 4MPa TS & 90% UE retained |
| Propan-2-ol                                      | 24 hours at 23°C (73°F) then 25 strokes dry tissue; IEC 60684-2 – Tensile Strength and Ultimate Elongation  | Print legible; 4MPa TS & 90% UE retained |
| De-icing fluid<br>(50% ethylene glycol in water) | 24 hours at 23°C (73°F) then 25 strokes dry tissue; IEC 60684-2 – Tensile Strength and Ultimate Elongation  | Print legible; 4MPa TS & 90% UE retained |
| Sullage fluid<br>(formaldehyde/cresol)           | 24 hours at 23°C (73°F) then 25 strokes dry tissue; IEC 60684-2 – Tensile Strength and Ultimate Elongation  | Print legible; 4MPa TS & 90% UE retained |

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