

Specification RW-2513

Document Number: 108-121016

TMS CABLE MARKERS – CM-SCE & CM-SCE-TP

Including HL cable marker range

Tie on Identification Product

SCOPE

This quality assurance specification establishes the requirements and performance of CM-SCE, CM-SCE-TP and HL Cable Markers. Designed to identify cable, wire bundles, pipes and conduits. The performance requirements are detailed in Table 7.

The operating temperature for this product is -55°C to +135°C.

This system is an automatic method of identifying items by printing a mark on the cable marker product range. The mark is permanent upon printing.

Products are available in various sizes with four and six fixing holes depending on description.

The marker system comprises specific printers and ribbons (refer to Identification Printer, Product Ribbon Matrix; Document 411-121005). Compliance to this specification can only be guaranteed if TE Connectivity approved printers and ribbons are used.

Laser markable using industrial standard YAG lasers.

The marker size for qualification testing is ½”.

Approved Signatories:

This document is electronically reviewed and approved by TE Connectivity.

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1. REQUIREMENTS

1.1 Composition and Appearance

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

The cable markers are not recommended for use on certain type of neoprene, customers should verify suitability of use.

1.2 Dimensions

The product shall be supplied in one of the following formats:

CM-SCE as shown in figures 1 to 5 and the dimensions of table 1

CM-SCE-TP as shown in figures 6 to 9 and the dimensions in table 1.

HL to the dimensions of tables 2 & 3 and as shown in figure 10.

TABLE 1 – CM-SCE- Dimensions

Part Description	Figure Number	Marker thickness in (mm)	Number of holes	Print method DM = Dot Matrix TT = Thermal Transfer
CM-SCE-1/4-4H	1 & 3	0.02 ± 0.004 (0.51± 0.10)	4	DM
CM-SCE-TP-1/4-4H	8	0.02 ± 0.004 (0.51± 0.10)	4	TT
CM-SCE-1/4-6H	1 & 9	0.02 ± 0.004 (0.51± 0.10)	6	DM
CM-SCE-1/2-4H	2 & 4	0.02 ± 0.004 (0.51± 0.10)	4	DM
CM-SCE-TP-1/2-4H	6	0.02 ± 0.004 (0.51± 0.10)	4	TT
CM-SCE-1/2-6H	2 & 5	0.02 ± 0.004 (0.51± 0.10)	6	DM
CM-SCE-TP-1/2-6H	7	0.02 ± 0.004 (0.51± 0.10)	6	TT

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2. PRODUCT DRAWINGS

2.1 CM-SCE System 6

Note: Dimensions in inches

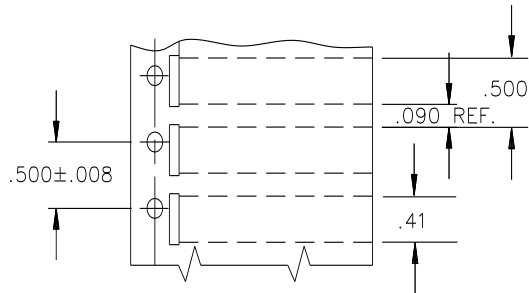


Figure 1: CM-SCE-1/4 Size

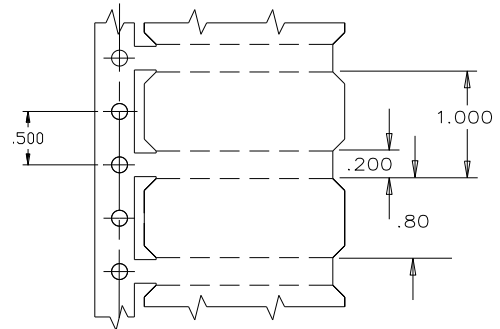


Figure 2: CM-SCE-1/2 Size

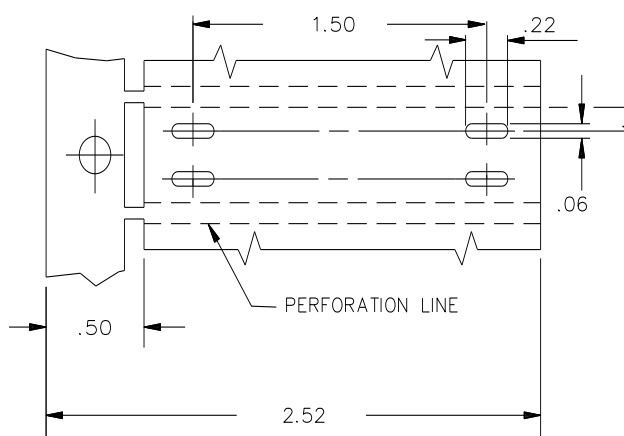


Figure 3: CM-SCE-1/4-4H

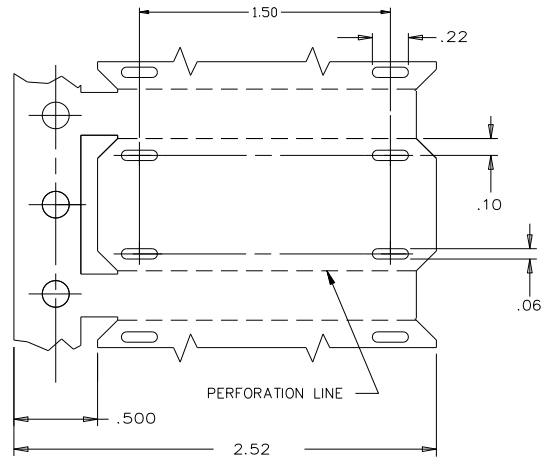


Figure 4: CM-SCE-1/2-4H

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2.2 CM-SCE System 6 continued

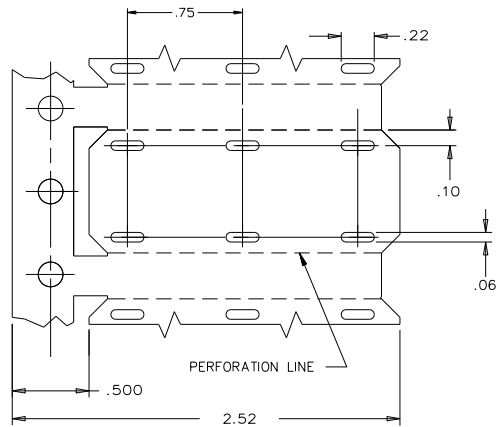


Figure 5: CM-SCE-1/2-6H

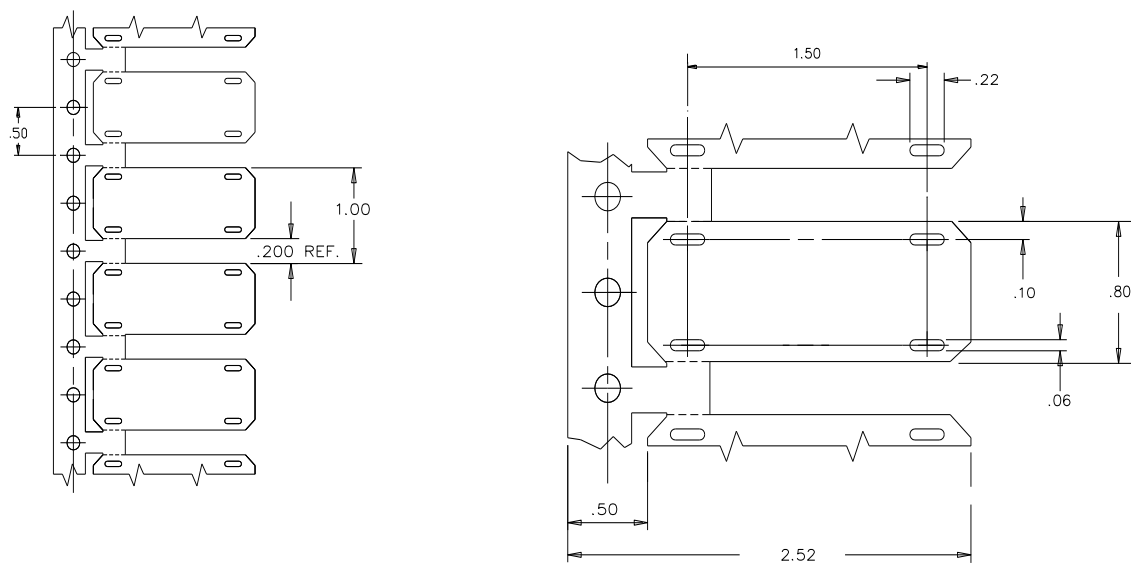


Figure 6: CM-SCE-TP-1/2-4H

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2.3 CM-SCE System 6 continued

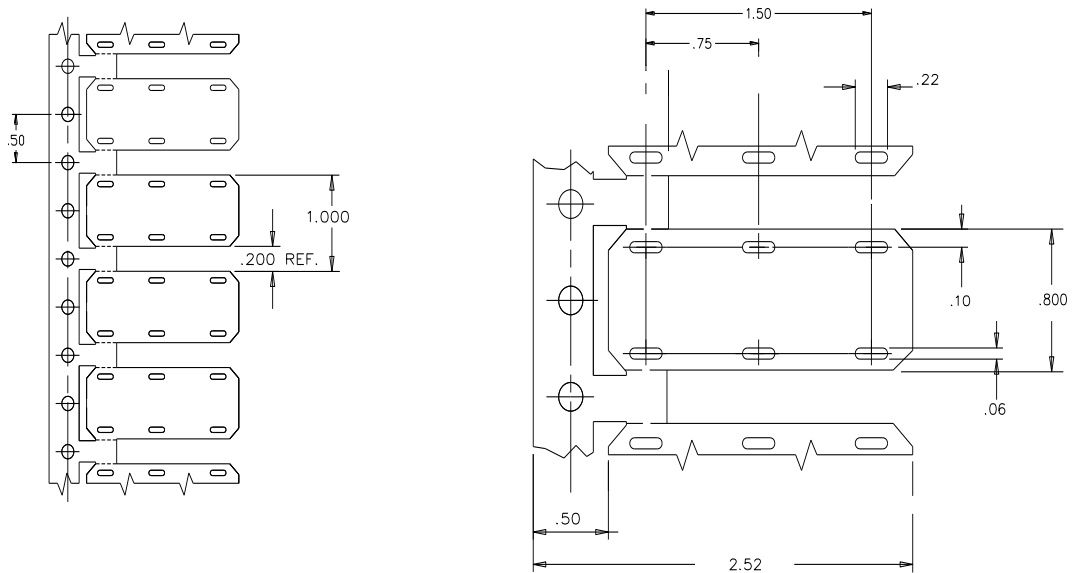


Figure 7: CM-SCE-TP-1/2-6H

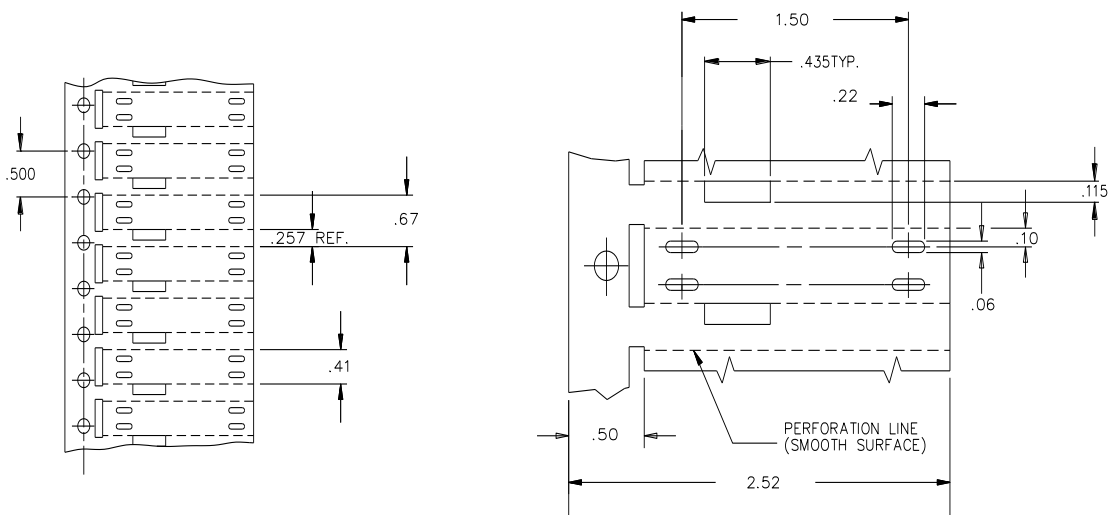


Figure 8: CM-SCE-TP-1/4-4H

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2.4 CM-SCE System 6 continued

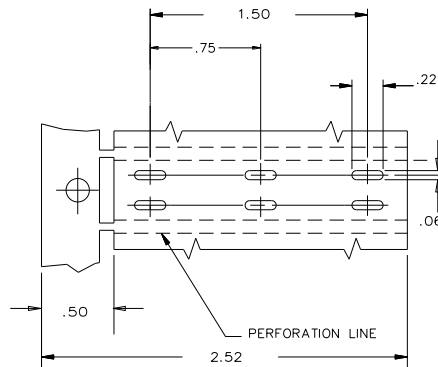


Figure 9: CM-SCE-1/4-6H

2.5 HL Product

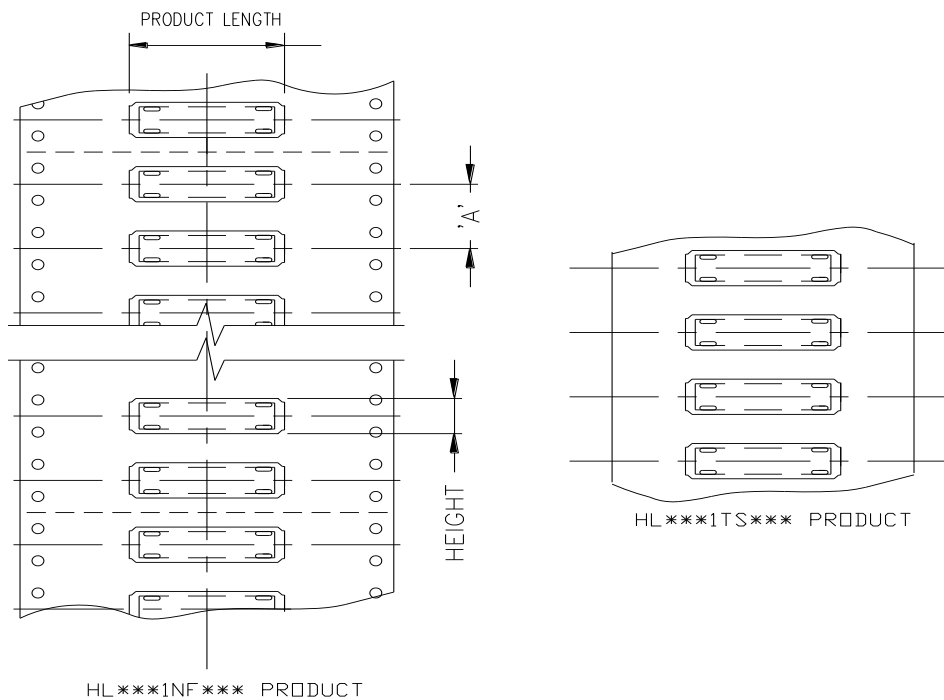


Figure 10: HL product layout

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Table 2: HL Dimensions

Part Description first 5 digits	Pitch in inches (mm)		Thickness inch (mm)	Height inch (mm)
	HL***NF	HL***TS		
HL104***	1" (25.4)	1/2" (25.4)	0.024±0.002 (0.60±0.05)	0.409" (10.4)
HL150***	1" (25.4)	1" (25.4)	0.024±0.002 (0.60±0.05)	0.591" (15.0)
HL203***	1" (25.4)	1" (25.4)	0.024±0.002 (0.60±0.05)	0.799" (20.3)
HL253***	2" (50.8)	2" (50.8)	0.024±0.002 (0.60±0.05)	0.996" (25.3)

Table 3: HL Length dimensions

Part Description last 3 digits	Length inch (mm)
HL***025	1.77" (45)
HL***033	2.09" (53)
HL***038	2.28" (58)
HL***050	2.76" (70)
HL***070	3.54" (90)

Note, all HL products are four hole design and available in the lengths given in table 3.

3. TEST REQUIREMENTS

This specification details the requirements for the CM-SCE(-TP) and HL family of products. Table 7 lists the performance requirements for various properties of the product.

4. RELATED DOCUMENTS

4.1 Identification Engineering Work Instructions

TE Document Number	TE internal reference	TE Title	Complies with
109-121002	IEWI-002	Tensile Strength and Ultimate Elongation at 23°C	ASTM D638
109-121003	IEWI-003	Dimensions	ASTM D2671 (section 8-13)
109-121006	IEWI-006	Low Temperature Flexibility	SAE-AS-23053 (section 36 -43) IEC 60684-2
109-121007	IEWI-007	Heat Shock	SAE-AS-23053 ASTM D2671 (section 26-30)
109-121008	IEWI-008	Heat Resistance	SAE-AS-23053 ASTM D2671 (section 49-54)
109-121009	IEWI-009	Copper Mirror Corrosion	ASTM D2671 (section 93 procedure A)
109-121012	IEWI-012	Print Permanence Testing Using the Mechanical Crockmeter	SAE AS5942 (section 3.4.1)
109-121014	IEWI-014	MIL-STD-202G	MIL-STD-202G, method 215K
109-121015	IEWI-015	Specific Gravity	ASTM D792
109-121016	IEWI-016	Water Absorption	ASTM D570
109-121039	IEWI- 039	Fluid Resistance at Room Temperature	
109-121054	IEWI-054	Limiting Oxygen Index	EN ISO 4589-2

Table 5. Test References

4.2 REFERENCE DOCUMENTS

ASTM G21:	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
TE Doc. No: 411-121002	TE Connectivity Print contrast reference scale
TE Doc. No: 411-121005	TE Identification Printer Product Ribbon Matrix
TE Doc. No: 411-121000	Installation of Heatshrink Marker Sleeves

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

Table 6. Reference Documents

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5. SAMPLING

Tests shall be carried out on samples taken at random from a batch of product.

A batch of markers is defined as that quantity of flat strip extruded at any one time.

Testing frequency shall be production routine or qualification.

Production routine tests consisting of visual examination, dimensions, print quality and adherence of marking shall be carried out on every batch of product.

6. PACKAGING

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

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7. General Tests for Identification Products

PROPERTY	TEST METHOD	UNITS	REQUIREMENTS
PHYSICAL			
Visual Examination		-	RW-2513 Section 1.1
Dimensions	IEWI-003	mm (inch)	In accordance with Table 1, 2 or 3 above
Tensile Strength Speed 500mm/min. (19.7"/min.)	IEWI-002	MPa (psi)	10.3 (1500) minimum
Ultimate Elongation Speed 500mm/min. (19.7"/min.)	IEWI-002	%	200 minimum
Specific Gravity	IEWI-015	g/cm ³	1.48 maximum
THERMAL			
Heat Ageing 168hr 175±2°C (347±4°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm) Mark Adherence	IEWI-008 IEWI-012	-	No damage to the marker and print legible after 50 rubs. Minimum Print Contrast 3.
Heat Shock 4hr at 250±3°C (482±5°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm) Mark Adherence	IEWI-007 IEWI-012	-	No dripping, flowing or cracking and print legible after 50 rubs. Minimum Print Contrast 3.
Low Temperature Flex 4hr at -55±2°C (-67±4°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm) Mark Adherence	IEWI-006 IEWI-012	-	No damage to the marker and print legible after 20 rubs. Minimum Print Contrast 3.
CHEMICAL			
Copper Mirror Corrosion 16hr at 175±3°C (347±5°F)	IEWI-009	%	Non Corrosive
Water Absorption	IEWI-016	%	0.5 maximum
ENVIRONMENTAL			
Fungus Resistance 28day exposure, followed by Mark adherence	ASTM G21 IEWI-012	---	Rating 1 or less. Print legible after 20 rubs. Minimum Print Contrast 3.

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Table 7. General Tests for Identification Products - continued

PROPERTY	TEST METHOD	UNITS	REQUIREMENTS
FLAMMABILITY			
Limiting Oxygen Index (LOI)	IEWI-054	%	25 Minimum
PRINT PERFORMANCE			
Print Quality	TE Doc. 411-121002	---	Initial contrast score C8 minimum
Mark Adherence	IEWI-012	---	Print legible after 50 rubs, minimum contrast C3
Solvent Resistance	IEWI-014	---	Print legible after 50 brush strokes, minimum contrast C3
Fluid Resistance 24hr fluid immersion at 24±3°C (75±4°F) followed by: Print Permanence	IEWI-039 IEWI-012	---	Print legible after 20 wipes, minimum contrast C3
MIL-PRF-7808 Skydrol 500 B4 Hydraulic fluid MIL-PRF-5606 JP-8 Aviation Gasoline 100LL 5% Sodium chloride solution Anti-Icing fluid to SAE-AS-8243 ¹			

¹SAE-AS-8243 uses a 50/50 mix of Propylene Glycol + Water

9. Tests Fluids

Fluid	Description
JP-8 to MIL-T-83133	Kerosene based jet fuel, replacement for JP-4. NATO code is F-34. It's specified by MIL-DTL-83133 and British Defense Standard 91-87.
Skydrol 500 B4	Aviation phosphate ester hydraulic fluid.
MIL-PRF-5606	Military aircraft hydraulic fluid
Aviation Gasoline 100LL	Low Lead aviation fuel
MIL-PRF-7808	Aircraft Turbine engine lubricating oil
5% Sodium chloride solution	Sodium chloride is a universal component of many chemicals and deicing fluids
SAE-AS-8243	Anti-icing, De-icing fluid

TABLE 9. Test Fluids Description

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