# 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

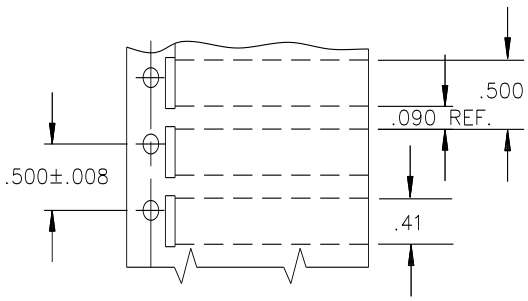


Figure 1: CM-SCE-1/4 Size

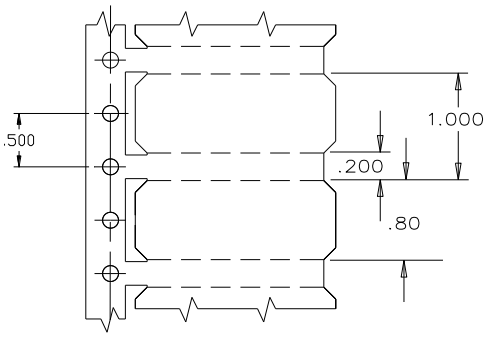


Figure 2: CM-SCE-1/2 Size

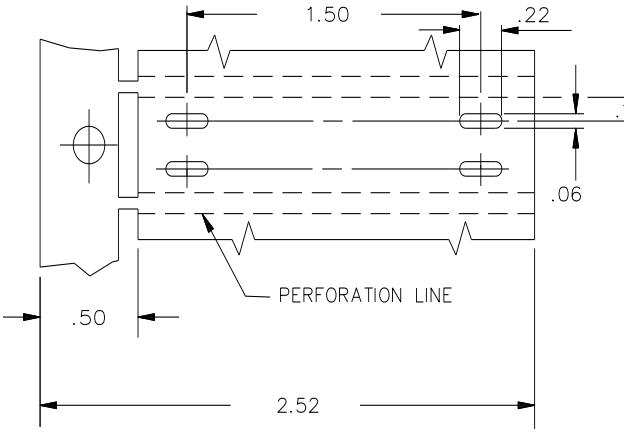


Figure 3: CM-SCE-1/4-4H

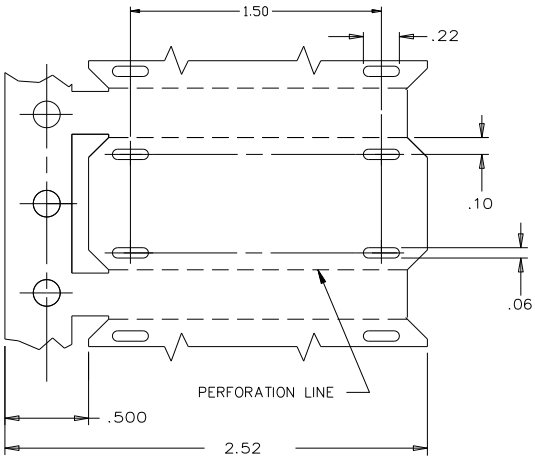


Figure 4: CM-SCE-1/2-4H



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## 2.2 CM-SCE System 6 continued

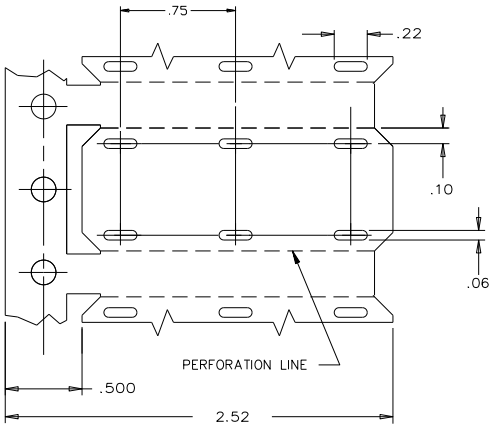


Figure 5: CM-SCE-1/2-6H

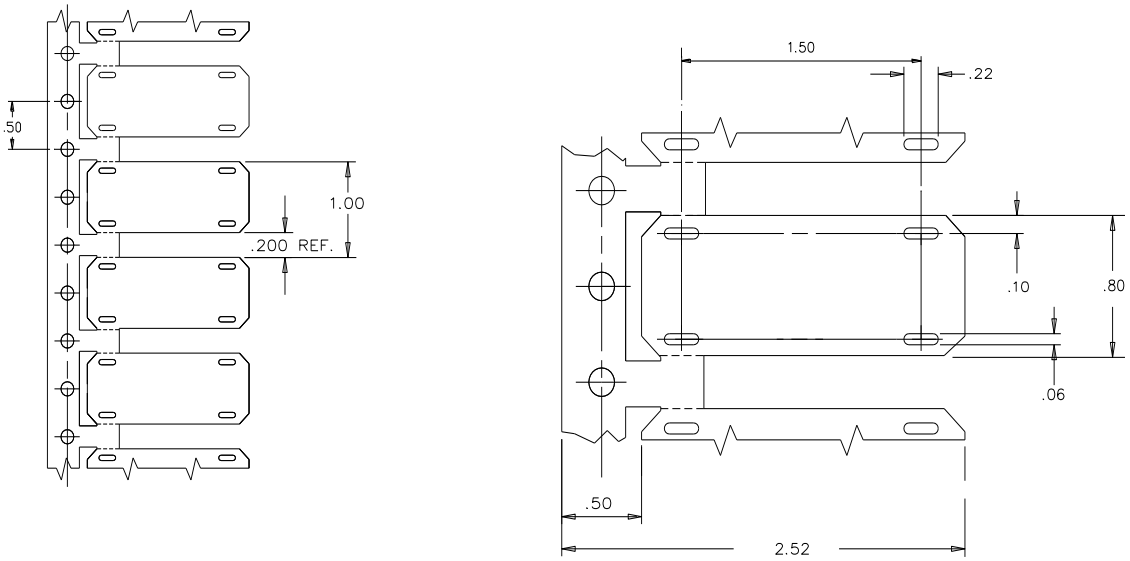


Figure 6: CM-SCE-TP-1/2-4H



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## 2.3 CM-SCE System 6 continued

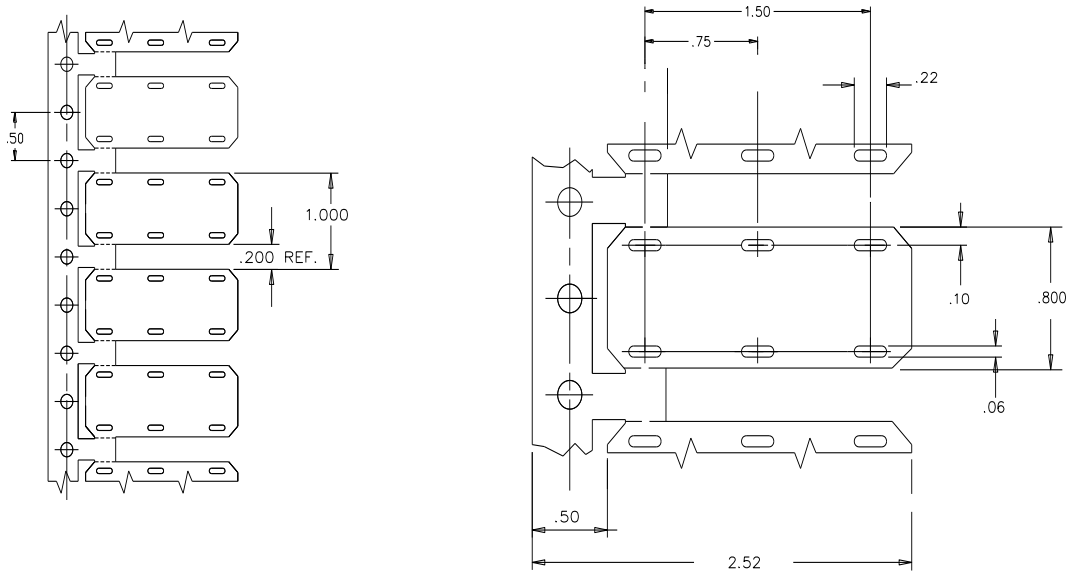


Figure 7: CM-SCE-TP-1/2-6H

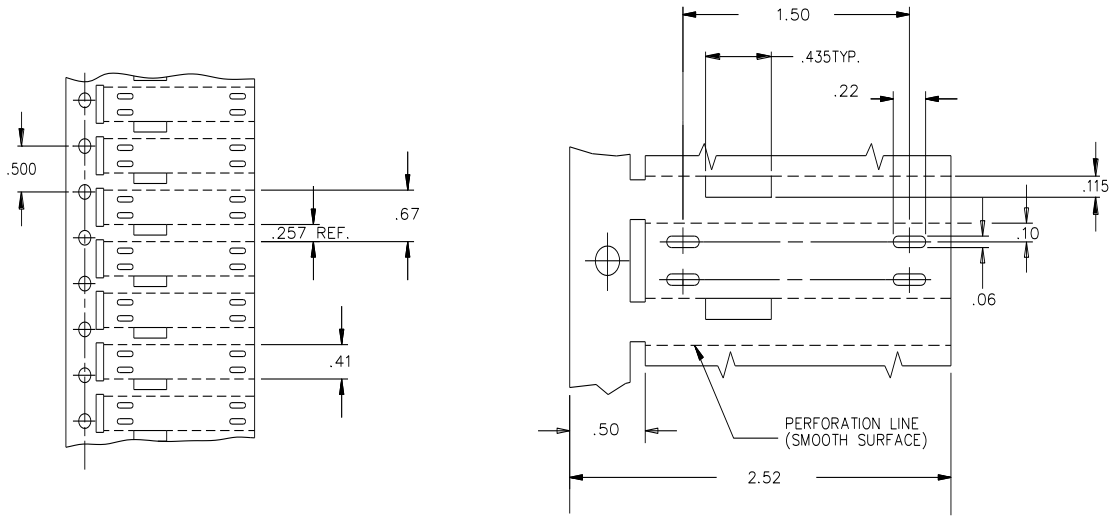


Figure 8: CM-SCE-TP-1/4-4H



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## 2.4 CM-SCE System 6 continued

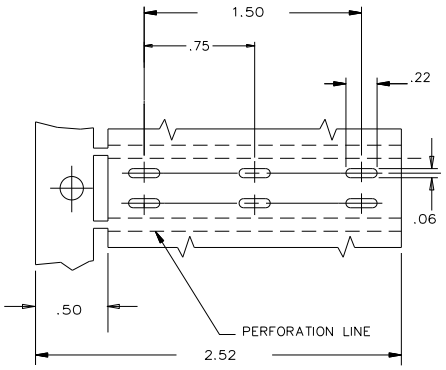


Figure 9: CM-SCE-1/4-6H

## 2.5 HL Product

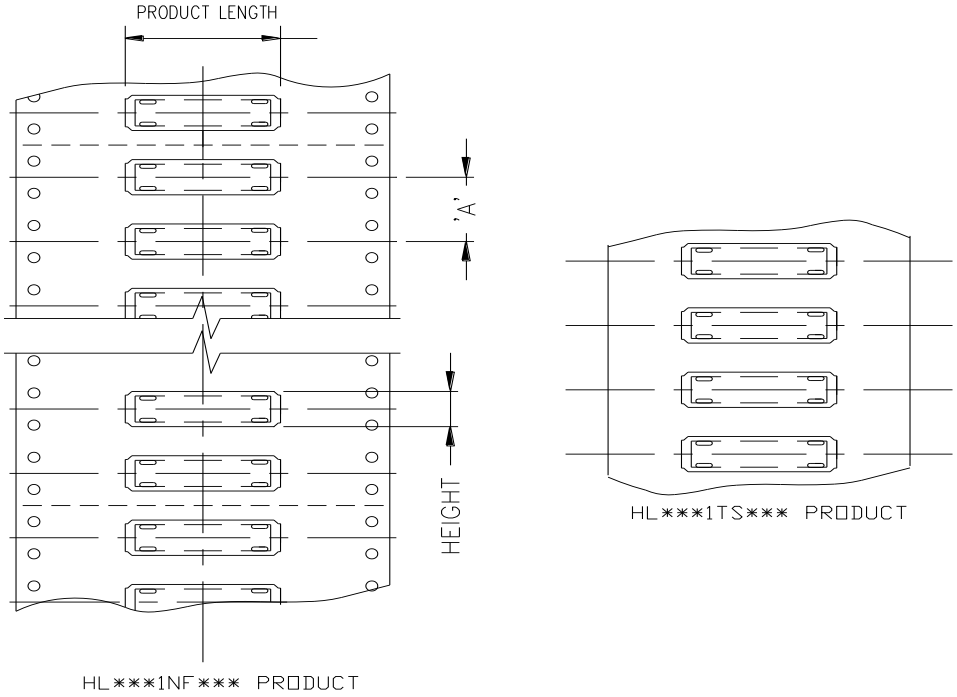


Figure 10: HL product layout



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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.



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## 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)<br>IEC 60684-2 |
| 109-121007 | IEWI-007 | Heat Shock | SAE-AS-23053<br>ASTM D2671 (section 26-30) |
| 109-121008 | IEWI-008 | Heat Resistance | SAE-AS-23053<br>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**<br>Speed 500mm/min. (19.7"/min.) | IEWI-002 | MPa (psi) | 10.3 (1500) minimum |
| **Ultimate Elongation**<br>Speed 500mm/min. (19.7"/min.) | IEWI-002 | % | 200 minimum |
| **Specific Gravity** | IEWI-015 | $g/cm^3$ | 1.48 maximum |
| **THERMAL** | | | |
| **Heat Ageing**<br>168hr 175±2°C (347±4°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm)<br>Mark Adherence | IEWI-008<br><br>IEWI-012 | - | No damage to the marker and print legible after 50 rubs. Minimum Print Contrast 3. |
| **Heat Shock**<br>4hr at 250±3°C (482±5°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm)<br>Mark Adherence | IEWI-007<br><br>IEWI-012 | - | No dripping, flowing or cracking and print legible after 50 rubs. Minimum Print Contrast 3. |
| **Low Temperature Flex**<br>4hr at -55±2°C (-67±4°F) followed by: Mandrel Bend, (Diameter 5/16", 7.9mm)<br>Mark Adherence | IEWI-006<br><br>IEWI-012 | - | No damage to the marker and print legible after 20 rubs. Minimum Print Contrast 3. |
| **CHEMICAL** | | | |
| **Copper Mirror Corrosion**<br>16hr at 175±3°C (347±5°F) | IEWI-009 | % | Non Corrosive |
| **Water Absorption** | IEWI-016 | % | 0.5 maximum |
| **ENVIRONMENTAL** | | | |
| **Fungus Resistance**<br>28day exposure, followed by Mark adherence | ASTM G21<br>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**<br>24hr fluid immersion<br>at 24±3°C (75±4°F)followed by:<br>Print Permanence | IEWI-039<br><br>IEWI-012 | --- | <br><br>Print legible after 20 wipes, minimum contrast C3 |
| MIL-PRF-7808<br>Skydrol 500 B4<br>Hydraulic fluid MIL-PRF-5606<br>JP-8<br>Aviation Gasoline 100LL<br>5% Sodium chloride solution<br>Anti-Icing fluid to SAE-AS-8243[1] | | | |

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



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## 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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