



***Society of Cable  
Telecommunications  
Engineers***

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**ENGINEERING COMMITTEE  
Interface Practices Subcommittee**

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**AMERICAN NATIONAL STANDARD**

**ANSI/SCTE 60 2015**

**Test Method for Interface Moisture  
Migration Double Ended**

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## 1. Scope

1. The purpose of this document is to provide a test method for detecting moisture penetration into the coaxial connector/cable and or the connector/port interface.
2. Although the artificial environment cannot be directly correlated to field service, the tests involve several environmental mechanisms that *may* affect a connector's tendency to leak in an outdoor environment.
  - Temperature cycling creates a pumping action with pressure varying above and below barometric pressure.
  - Temperature cycling will accelerate relaxation of the materials.
  - Internal condensation *may* break the surface tension on a connector with a marginal seal.
  - Initial leakage will increase the pumping action due to the introduction of a non-ideal gas (water vapor), which will have a larger pressure change than air.
3. Liquid penetrant examination can be used for investigation of the presence, location, and to an extent, the nature and magnitude of the detected moisture paths.
4. These methods can be used to determine the liquid tightness of integral or external seals, encapsulants or other environmental protection devices.
5. An acceptable performance level for a given cable / connector combination per test method is derived from the visual appearance and condition of the interfaces. The ratio is determined and expressed as a percent passed based on the test data.

## 2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

### 2.1. SCTE References

- ANSI/SCTE 01 2006, Specification for "F" Port, Female, Outdoor
- ANSI/SCTE 15 2006, Specification for Trunk, Feeder and Distribution Coaxial Cable
- ANSI/SCTE 74 2011, Specification for Braided 75 Ohm Flexible RF Coaxial Drop Cable
- ANSI/SCTE 91 2015, Specification for 5/8-24 RF & AC Equipment Port, Female

### 3. Compliance Notation

<i>shall</i>	This word or the adjective “ <b>required</b> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
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### 4. Equipment

1. Visible liquid penetrant: phenol red dye, sodium hydroxide, deionized or distilled water.

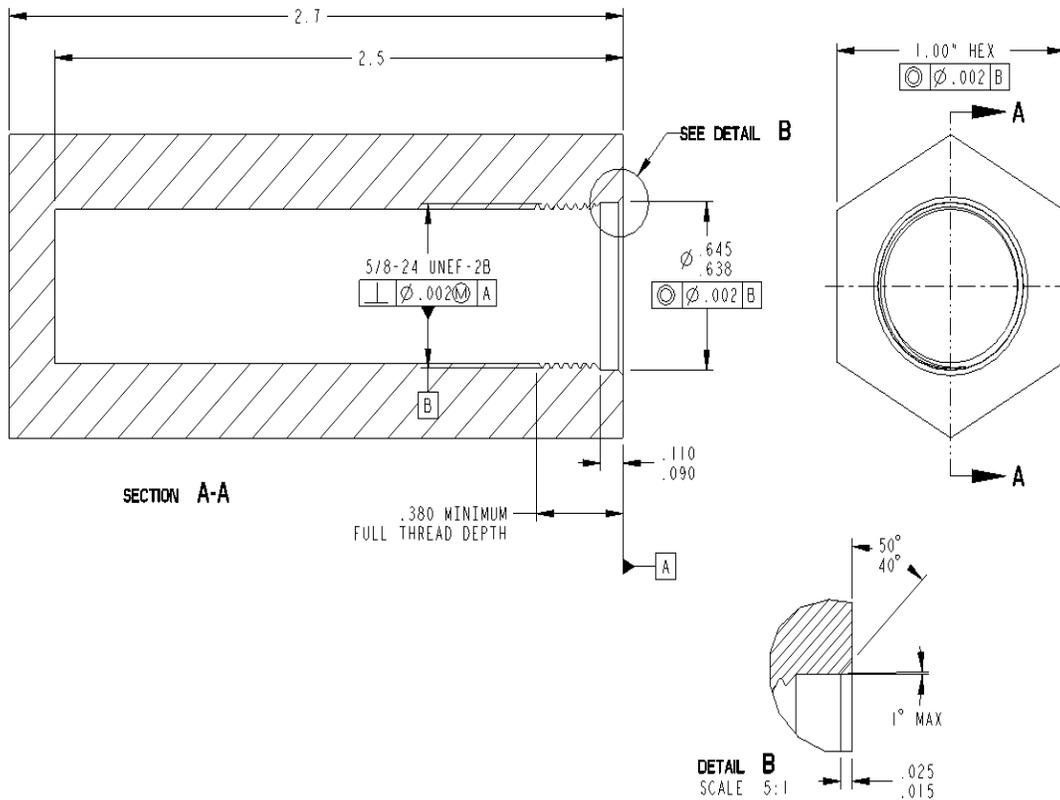
Mix one gram of the phenol red (ASC reagent, CAS#143-74-8) dye per 3.785 liters of water. Add approximately 20 drops of sodium hydroxide (CAS#1310-73-2) to turn the solution a rosy red color.

2. Separate containers

The solution container **shall** be of adequate size and shape to allow complete submerging of the test samples.

3. Test plugs / ports





**Figure 2 – Hard-Line Brass Test Port**

Hard-line brass test port that meets the dimensional requirements of SCTE 91, Specification for 5/8-24 RF & AC equipment port, female, as shown in Figure 2

4. Cable, connectors, sealing sleeves, cable preparation, connector activation tools, torque wrench and installation instructions.
  - a. Drop cable *shall* conform to the specifications outlined in SCTE 74, Specification for braided 75 ohm flexible RF coaxial drop cable.
  - b. Hard-line cable *shall* conform to the specifications outlined in SCTE 15, Specification for Trunk, feeder and distribution coaxial cable.
  - c. Connectors of interest in sufficient quantity to perform the tests.
  - d. Sealing mechanisms (if applicable) to properly seal interfaces as recommended by the connector manufacturer.
  - e. Cable preparation tools as recommended by the connector manufacturer.
  - f. Connector activation tools as recommended by the connector manufacturer.
  - g. Torque wrench to tighten the connector to the test plug / port according to the connector manufacturer specification
  
5. Environmental Chamber

An environmental chamber capable of cycling between  $35^{\circ}\text{F} \pm 1.8\text{F}^{\circ}$  and  $140^{\circ}\text{F} \pm 1.8\text{F}^{\circ}$  ( $1.7^{\circ}\text{C} \pm 1\text{C}^{\circ}$  and  $60^{\circ}\text{C} \pm 1\text{C}^{\circ}$ ) with one half hour ramp times from room temperature.

## 5. Test Arrangement

1. Place the containers parallel to the airflow in the chamber.
2. Space the containers apart to avoid kinked cables.
3. Ensure that all test ends and interfaces are completely submerged in the penetrant solution.

## 6. Test Samples

1. A minimum of 5 samples of each cable type *shall* be tested.
2. Length of cable samples.
  - a. Cut the drop cable to 24 inches  $\pm$  ½ inch .
  - b. Cut the hard-line Cable to 36 inches  $\pm$  ½ inch.
3. Prepare both ends of the cable following the manufacturers preparation instructions.
4. Connectorize both cable ends following the manufacturers installation instructions.
5. Apply the appropriate sealing mechanisms (if applicable) to the test plug / port according to the installation instructions.
6. Apply the test jumpers connector interfaces to the test plug / port and torque to the specified value according to the connector manufacturer installation instructions.
7. Identify and label each test end.

## 7. Test Method

1. Prepare the test samples as described in Section 4.0.
2. Place each end of the test samples vertically into separate containers.

Do not allow the cable samples to kink.

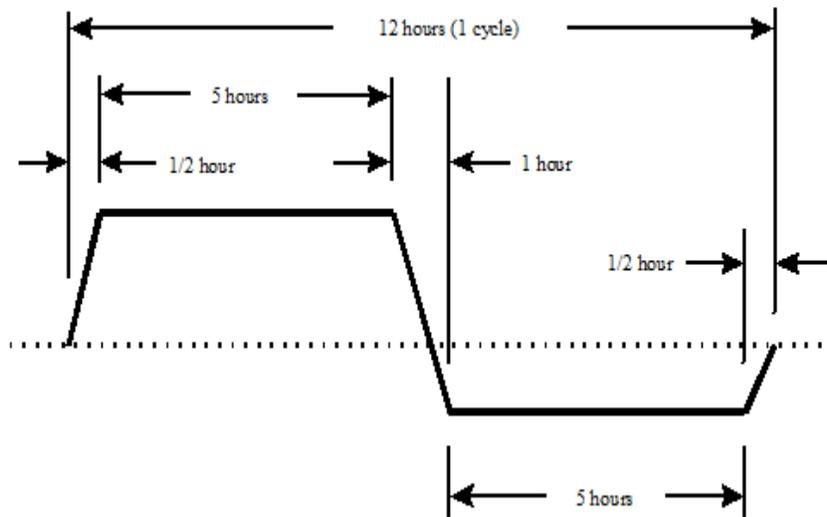
3. Fill each container with the liquid penetrant to submerge the cable entry ends of the test samples to a level of 1 inch above the interface.

As evaporation of the penetrant solution occurs, water *should* be added as needed, to ensure complete submersion of the samples during the course of the test cycle.

4. Temperature cycle the test samples.
  - a. Set the environmental chamber lower temperature limit to 35°F  $\pm$  1.8F°, (1.7°C  $\pm$  1C°) and the upper temperature limit to 140°F  $\pm$  1.8F°, (60°C  $\pm$  1C°).
  - b. Place container into environmental chamber as outlined in section 3.0.
  - c. Starting at ambient temperature set the environmental chamber to cycle 10 times from 35°F to 140°F (1.7°C to 60°C) for five days or 120 hours.

One cycle is 12 hours in duration. Dwell times at the upper and lower temperature limits *shall* be 300  $\pm$  20 minutes with ramp times from ambient temperature, to either the upper or lower limits *shall* be 30  $\pm$  10 minutes as shown in figure 3.

5. After completion of the test, remove test samples from the containers and let air dry for 24 hours or oven dry at 86°F  $\pm$  1.8F°, (30°C  $\pm$  1C°) for 4 hours.



**Figure 3 – Temperature Cycle Profile**

## 8. Inspection – Drop

1. Carefully remove the test plugs and observe and record presence or absence of penetrant at the interface.

Look for visible red penetrant, water droplets or discoloration on the center conductor, dielectric, inside surfaces of “F” plug and on the outer surfaces of the test plug port.

2. Carefully make a radial cut in the jacket, just behind the end of the connector, slit the cable jacket down the length to expose the shielding.

Look for visible red penetrant, white chalky substance, water droplets or discoloration on any of the shield(s). If there is a presence, record the length of contamination from the end surface of the connector to the end of the contamination.

## 9. Reporting – Drop

<i>SCTE 60 Test Report</i>			
Cable Manufacturer:		Connector Manufacturer:	
Part Number:		Part Number:	
Construction:		Sealing Device:	
		Part Number:	

<i>Test Results</i>				
	End “A”		End “B”	
Sample Number	Nut	Shield(s)	Nut	Shield(s)

Start Date / Time:		Replenished Penetrant:	
Finish Date / Time:		<b>M / d / yy</b>	<b>H : mm</b>
Tested By:			

## 10. Inspection – Hard-Line

1. Carefully remove the test ports and observe and record presence or absence of penetrant on any of the surfaces of the interface.

Look for visible red penetrant, water droplets or discoloration on the center pin, threads, surfaces of the 5/8 male connector or on the inner surfaces of the test port.

2. Carefully disassemble the connector and note the presence or absence of contamination on the internal connector components or cable.

If there is a presence, record the length of contamination from the end surface of the connector to the end of the contamination.

Look for visible red penetrant, white chalky substance, water droplets or discoloration on the connector components or cable.

### 11. Reporting Data – Hard-Line

<i>SCTE 60 Test Report</i>			
Cable Manufacturer:		Connector Manufacturer:	
Part Number:		Part Number:	
Construction:		Sealing Device:	
		Part Number:	

<b>Test Results</b>				
Sample Number	End “A”		End “B”	
	5/8 Interface	Cable	5/8 Interface	Cable

Start Date / Time:		Replenished Penetrant:	
Finish Date / Time:		<b>M / d / yy</b>	<b>H : mm</b>
Tested By:			