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Telecommunications
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**Test Method for Voltage / Spark
Test of Outer Jacket**

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140 Philips Road

Exton, PA 19341

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1.0 SCOPE

This procedure specifies the spark test method to be used in determining if the outer jacket of a coaxial cable will withstand a specified voltage.

2.0 COMPLIANCE NOTATION

“SHALL”	This word or the adjective “REQUIRED” means that the item is an absolute requirement of this specification.
“SHALL NOT”	This phrase means that the item is an absolute prohibition of this specification.
“SHOULD”	This word or the adjective “RECOMMENDED” 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 weighed before choosing a different course.
“SHOULD NOT”	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

3.0 EQUIPMENT

- 3.1 A voltage / spark tester shall include a voltage source capable of maintaining the test voltage as specified in the relevant cable specification. The test fixture shall also have an electrode, a voltmeter, automatic shut-off capability in the event of arcing through the cable jacket material and must be capable of detecting, counting and signaling momentary faults.
- 3.2 The electrode shall be of chain-link or bead-chain type capable of attachment to the voltage source, and making intimate contact with the jacket of the coaxial cable under test.

4.0 VOLTAGE TESTING

- 4.1 The test sample is a jacketed coaxial cable of sufficient length to be passed through the bead electrodes of the voltage / spark tester at a maximum defined rate (See Section 4.3) as it is being wound onto the cable reel.
- 4.2 The outer conductor and the center conductor of the coaxial cable being tested shall be securely bonded to ground at the payoff reel or at any other location

which assures a continuous low impedance contact between the outer conductor and the center conductor of the coaxial cable being tested and ground. In addition, the voltage / spark tester shall also be securely bonded to ground.

- 4.3 Jacketed coaxial cable shall be passed through the link or bead electrode at a maximum defined rate that will insure uniform electrode contact with the moving jacketed cable. The maximum rate at which the jacketed coaxial cable passes through the bead-chain electrode shall keep any point on the jacket in contact with the bead-chain electrode for greater than 18 positive and negative crests of the AC supply voltage (9 complete cycles.) The following formulas, as applicable, may be used to calculate the coaxial cable maximum rate through the voltage / spark tester:

$$RATE_{\max_in} = \frac{5}{9} * f * L_{in} \text{ in feet per minute}$$

$$RATE_{\max_mm} = \frac{1}{150} * f * L_{mm} \text{ in meters per minute}$$

where:

$Rate_{\max}$ = The maximum rate in feet per minute (3.2.1) or meters per minute (3.2.2) at which the jacketed coaxial cable may pass through the bead-chain electrode.

f = Test frequency of the AC spark tester in Hertz.

L_{in} = The electrode (bead Chain) length in inches (3.2.1)

L_{mm} = The electrode (bead Chain) length in millimeters (3.2.2).

- 4.4 The test fixture voltage setting shall be adjusted to provide the test voltage specified as continuously indicated by the voltmeter. A fault detector will detect, indicate and count any momentary faults that occur.
- 4.5 The magnitude of voltage that is applied is proportional to the thickness of the jacket material. Table 1 below provides recommended test voltages, dependent upon the outer jacket thickness. The cable specification and / or safety listing requirements; (examples: UL 1581, paragraph 900; UL 13, paragraph 27) shall be the final authority for the voltage setting.

Table 1 – Jacket Voltage / Spark Test Voltages

Jacket Thickness-inches (mm)	Test Voltage (kilovolts)
Less than 0.020 (0.5)	See Note 1
0.020 (0.5) to 0.030 (0.79)	2.0 kilovolts
0.031 (0.8) to 0.040 (1.0)	3.0 kilovolts
Greater than 0.040 (1.0)	5.0 kilovolts

Note 1: Samples that have a jacket thickness less than 0.020 inches (0.5 mm) should not be subjected to voltage tests.

5.0 REQUIREMENT

The cable under test shall be passed through the bead electrode of the test fixture at a defined rate less than the $Rate_{max}$ defined in Section 4.3 as it is being wound onto the cable reel. Arcing between the spark test electrode through the cable jacket into the outer conductor shall constitute a failure. The cable under test shall exhibit no more failures per unit length than the maximum specified in the applicable coaxial cable specification.

6.0 REPORT

- 6.1 Each manufacturer conducting voltage testing may report the following information as a minimum on internally developed and approved forms:
- 6.1.1 The product part number
 - 6.1.2 The date of the voltage / spark test
 - 6.1.3 The jacket type (i.e. PVC or PE)
 - 6.1.4 The Voltage level
 - 6.1.5 The number of indicated faults