

Chapter 20 (D10)

Dry Arc Tracking Test Procedure

20.1 Purpose

The Dry Arc Tracking Test for wire insulation provides a comparative assessment of insulation degradation and arc propagation of wires in a bundle when subjected to electrical arcing. This test method is for use in obtaining comparative data.

20.2 Test Samples

Twenty-gauge wires were selected as test standards, since this size is one of the most commonly used gauges in transport category aircraft. At least three tests must be run on each wire insulation material.

20.2.1 Sample (Preparation)

Cut seven segments of wire, each 14 inches in length. Strip 3/16 inch of insulation from both ends of each wire.

20.2.1.1 Assemble the wires in a 6 around 1 configuration, as shown in figure 20-1.

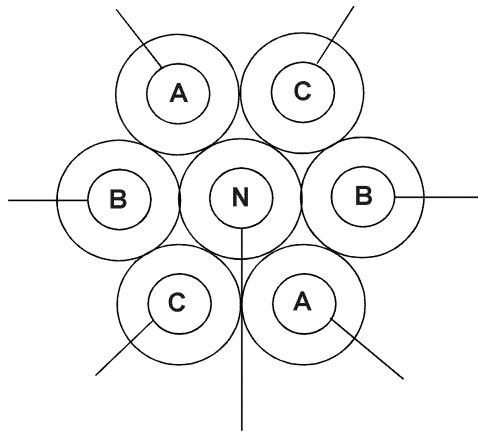


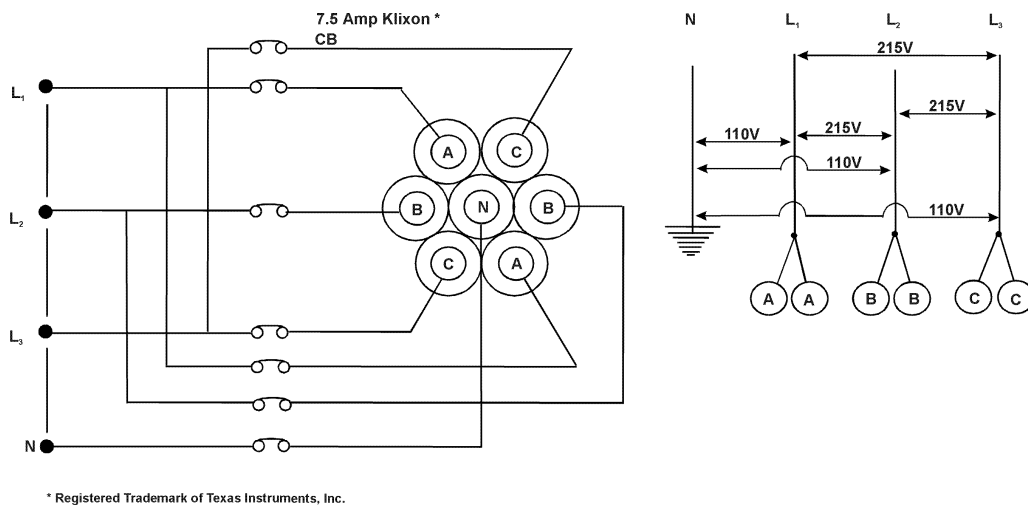
Figure 20-1. Wire Bundle Configuration

20.2.1.2 Arrange the wires straight and parallel. Using a high-temperature lacing tape, mil-tie the wires into a bundle, making a tie 1/4 inch back on the insulation from one set of stripped ends. The other ends are left untied to better facilitate connecting to test leads from a power supply. Make a second tie 2 inches farther back from the first tie. After tying the bundle, apply a small amount of finely powdered conductive graphite to the exposed wire ends (Graphite, 96 percent, 325 Mesh Technical, J.T. Baker, Inc., is acceptable). This can be accomplished by dipping the wire ends directly into a container of the graphite powder. Ensure that the graphite does not get on the wire insulation.

20.2.2 Electrical Connections

Support the bundle horizontally in a laboratory stand using two clamps, approximately 8 inches apart. Position one clamp 1/2 inch from the bundle tie farthest in from the graphite powdered wire ends. The other clamp is used to support the wires toward the end that is connected to the power supply.

20.2.2.1 Connect each of the seven 20-gauge wires to a 7.5-amp aircraft circuit breaker. (This size conforms to standards for circuit breaker protection of bundled 20-gauge airplane wiring.) The 7.5-amp breakers can be mounted in a test box with alligator clips on seven test leads to facilitate connecting to the test wires. Use a three-phase Wye connected power supply derived from a rotary machine of not less than 5 KVA rating, delivering 215 volts line-to-line at 400 cycles (see figure 20-2).



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Figure 20-2. Electrical Connections

20.2.3 Protective Screen and Test Location

A transparent screen should be used to protect personnel from molten metal and other debris that may be ejected from the sample during the arc test. Use eye protection for visual observation of the arc. Conduct the test in a ventilated, draft-free location to remove any potentially toxic fumes. Perform testing at room temperature.

20.3 Procedure

Initiate the test arc by closing a power contactor. Then, leaving the contactor closed, visually examine, but do not touch, the wires in the bundle after the initial arc. Following that, reset each tripped circuit breaker one time only.

20.4 Report

Report the following for each test:

1. A description of the wire tested

2. The power, frequency, and voltage of the three-phase power supply
3. Any damage to the wire bundle after the initial arc
4. The number of open circuit breakers after the initial arc
5. A description of damage to the insulation of each wire in the bundle, including the length of insulation damage, tube effects, welds, etc., after resetting the circuit breakers.