



Subject: Pulse Endurance Testing on 3M™ TufQUIN Electrical Insulation

Summary and Background:

The presence of partial discharge (corona) will degrade electrical insulation, leading to reduced dielectric strength.

3M TufQUIN and 3M TufQUIN TFT were evaluated using a DEI 1250 testing assembly and results were compared to comparable thickness (organic) m-aramid paper. 3M TufQUIN insulations exhibited greater time without failure compared to m-aramid insulation.

Procedure:

The DEI 1250 applies fast rise time square wave to test specimens. The square wave can be applied at a rate of up to 20 kHz. The wave form is such that it reaches a maximum positive voltage followed by the maximum negative voltage. The rise time of the wave is in tens of nanoseconds. The test fixture used for testing insulation is arranged so that one side of the paper is contacted by a disk about ½ inch in diameter. The other side of the paper is in contact with a metal sheet that acts as a ground. Testing is conducted inside of an oven so that the specimens can be tested at elevated temperatures.

Results:

	3M TufQUIN 7 mil	m-aramid Paper 7 mil	3M TufQUIN TFT 3-5-3	m-aramid Laminate 3-5-3
Positive Voltage	+1000 volts	+1000 volts	+1250 volts	+1250 volts
Negative Voltage	-1000 volts	-1000 volts	-1250 volts	-1250 volts
Frequency	20 kHz	20 kHz	20 kHz	20 kHz
Temperature	150°C	150°C	150°C	150°C
Test Results in Minutes (Test terminated at Dielectric Failure or at 6000 minutes)				
Sample 1	>6000	2611	>6000	5841
Sample 2	>6000	>6000	>6000	>6000
Sample 3	>6000	>6000	>6000	>6000