

Engineering Note

SUBJECT: CICOIL CABLE MEETS RADIATION TESTING

### CICOIL CABLE TESTED TO RADIATION EXPOSURE

This report discusses the resulting effects of gamma radiation exposure to CICOIL’s high performance flat cables. CICOIL’s flat cables are designed with a proprietary jacketing, FLEXX-SIL™, this jacketing is a radiation-hardened component. The high standards set by CICOIL has enabled FLEXX-SIL™ to meet and exceed numerous aerospace and military applications testing.

Eight samples of CICOIL’s cables have had various mechanical property changes tested through vulnerability to gamma radiation, in the tolerance of Mrad. These mechanical properties include: the change of tensile strength (%), elongation change (%), modulus change, durometer change (%) and tear change (%). The samples were tested to withstand an amount of 2.5 Mrad, 5.0 Mrad and 7.5 Mrad of radiation.

Test results are below:

Table 1. Mechanical property changes in samples 1-8 of Cicoil FLEXX-SIL™ jacketing undergoing 2.5 Mrad of gamma radiation exposure.

Property Changes					
Material	Tensile % Change	Elongation % Change	Modulus % Change	Durometer % Change	Tear % Change
<b>2.5 Mrad Exposure</b>					
Test Method 1	59	0	0	1	-20
Test Method 2	76	0	0	1	-4
Test Method 3	0	0	0	0	0
Test Method 4	0	-10	0	0	0
Test Method 5	0	-3	0	0	-6
Test Method 6	0	0	0	0	0
Test Method 7	-4	-20	22	22	45
Test Method 8	-2	-17	-13	-13	6

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Table 2. Mechanical property changes in samples 1-8 of Cicoil FLEXX-SIL™ jacketing undergoing 5 Mrad of gamma radiation exposure.

Property Changes					
Material	Tensile % Change	Elongation % Change	Modulus % Change	Durometer % Change	Tear % Change
<b>5 Mrad Exposure</b>					
Test Method 1	78	0	46	0	-20
Test Method 2	0	-1	0	0	0
Test Method 3	0	5	1	0	0
Test Method 4	0	-19	0	0	0
Test Method 5	0	-3	0	0	0
Test Method 6	0	0	0	0	-19
Test Method 7	-5	-30	74	33	15
Test Method 8	-1	22	20	-13	-2

Table 3. Mechanical property changes in samples 1-8 of Cicoil FLEXX-SIL™ jacketing undergoing 7.5 Mrad of gamma radiation exposure.

Property Changes					
Material	Tensile % Change	Elongation % Change	Modulus % Change	Durometer % Change	Tear % Change
<b>7.5 Mrad Exposure</b>					
Test Method 1	88	0	27	9	-27
Test Method 2	67	0	16	7	-1
Test Method 3	0	-11	4	0	0
Test Method 4	0	-23	13	5	0
Test Method 5	0	-24	7	0	-18
Test Method 6	0	-2	1	0	-11
Test Method 7	-6	-36	93	38	18
Test Method 8	-1	-28	26	-8	-21

The conclusions of the tests shown by a third party substantiate the ability of CICOIL's FLEXX\_SIL™ jacketing to withstand up to 7 Mrads of gamma radiation exposure without severe degradation. One of the outstanding characteristics of CICOIL's FLEXX-SIL™ jacketing is its combined temperature and radiation resistance. The thermal conductivity of CICOIL's FLEXX-SIL jacket is approximately 2 to 3 times greater than that of organic rubbers.

NOTE: Elements within the FLEXX-SIL™ jacket may require additional testing to determine performance after exposure to gamma radiation.

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