Reprint

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ONTARIO HYDRO TECHNOLOGIES TEST REPORT 96-5815-001
REVISION: 0
September 26, 1996

TESTING OF HYDROTHANE SYSTEMS TRASHRACKS FOR ONTARIO HYDRO HYDROELECTRIC

Tests were performed to verify the suitability of Trash Rack material to survive 35 year usage. Aging was done using Arrhenius methodology. The tests were controlled by the attached test procedure 96-5815-001. The material withstood the testing virtually without damage. Experience with cables indicates that a small amount of carbon black of 1 to 2% is sufficient to protect the cable against solar radiation for many years. This trash rack material contains slightly less than 1% carbon black.

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1.0 SCOPE

Two samples of trash rack material were tested in accordance with the test procedure 96-5815-001, Appendix 1. This report documents the results of the tests.

2.0 SAMPLE DESCRIPTION

The samples were visually inspected as per Paragraph 6.1 of the test procedure, see Appendix 11 for the test specimen inspection. The length of each sample was 24 inches.

3.0 BASELINE FUNCTIONAL TESTS

3.1 Samples I and 2 were suspended on a flexible string after sitting in the lab atmosphere for several hours. Plots of tests were produced from the impact hammer tests, see Appendix 111. The tests showed that Samples I and 2 were very similar to each other and the first mode of vibration was 50 Hz.

4.0 THERMAL AGING

4.1 Samples I and 2 were supported on a wire shelf in an oven. The temperature was logged, see Appendix IV. The log shows that the aging requirements of the procedure were satisfied. Aging was at 111.3 °C for 13.55 days.

5.0 POST THERMAL AGING FUNCTIONAL TEST

5.1 Samples I and 2 showed similar results as the baseline functional tests, see Appendix V. The first mode natural frequency remained at 50 Hz.

6.0 THERMAL SHOCK TEST

6.0 Samples I and 2 were placed in an environmental chamber and cooled to -41.9°C to -43.3 °C for 5.45 hours. Sample I was removed from the chamber and placed in hot water at 99.9°C for 1.05 minutes. The water bath was 3 feet in diameter by 5 feet deep. Sample I was not damaged. Sample 2 was then removed from the environmental chamber and immersed in the hot water at 99.9°C for 1.05 minutes, see Appendix VI for the log.

7.0 POST THERMAL SHOCK TEST FUNCTIONAL TEST

7.1 Samples I and showed similar results as the baseline functional tests, see Appendix VII. The first mode natural frequency remained at 50 Hz.

8.0 WEAR TEST

8.1 Sample I was clamped horizontally with the narrow edge up. A smooth round steel rod 3/8 inch in diameter was placed across the top edge and a normal load of 45,726 g or 100.9 lbf was applied. One hundred complete cycles was applied by hand. The amount of wear was estimated at 1/32 inches, see Appendix VIII.

9.0 INSTRUMENTS USED

9.1 Appendix IX shows the list of instruments used for the testing.

10.0 CHEMICAL ANALYSIS

10.1 A sample was analyzed to give percent carbon black, percent fillers and finger print the material, see Appendix X.

11.0 CONCLUSIONS

11.1 Tests were performed to verify the suitability of Trash Rack material to survive 35 year usage. Aging was done using Arrhenius methodology The tests were controlled by the attached test procedure 96-5815-001. The material withstood the testing virtually without damage. Experience with cables indicates that a small amount of carbon black I to 2% is sufficient to protect the cable against solar radiation for many years. This trash rack material contains slightly less than I% carbon black.