To: Colin McCullough
3M Company

KINECTRICS NORTH AMERICA INC. TEST REPORT FOR 3M COMPANY ELEVATED TEMPERATURE SUSTAINED LOAD TEST ON 795 KCMIL ACCR COMPRESSION DEAD-ENDS

Kinectrics North America Report: 9513-004-RC-0004-R00
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A tensile load test was performed for 3M Company on their 795 kcmil ACCR conductor. The test was performed by Kinectrics North America Inc. personnel at 800 Kipling Avenue, Toronto, Ontario, M8Z 6C4, Canada.

OBJECTIVE

The objective of the test was to determine if the tensile strength of the conductor/dead-end clamp system was adversely affected after being subjected to sustained elevated temperature at a constant tensile load.

Test Conductor

3M prepared the cable sample with a pre-installed compression dead-end at one end and a spelter type fitting at the other end. The sample length was 40 feet.

Test Apparatus

The conductor sample was installed in a hydraulically-activated horizontal test machine. Several inches of fibreglass insulation was wrapped around the conductor to minimize convection cooling.

For the elevated temperature test, an electrical ac power supply was connected to each end of the cable. This supply was cycled on and off to maintain a constant temperature.

The tests were carried out in a temperature-controlled laboratory at 20ºC ± 2ºC.

Instrumentation and Data Acquisition

The conductor tension as measured by the load cell and the temperature as measured by thermocouples were monitored continuously using a digital data logging system. The thermocouples were located between two adjacent aluminum alloy strands on the outside layer.

The measuring instruments and equipment used in this test are listed in Appendix C.

TEST PROCEDURE

The conductor was tensioned to 4,670 lbf or 15% of the cable RTS (31,134 lbf) and heated to 240ºC. This condition was maintained for 168 hours (7 days). At the end of the 168 hours, the cable was unloaded, allowed to cool naturally to room temperature and then tensioned to failure.

TEST RESULTS

The breaking load is shown in Table 1. The conductor had a clean break at about midspan. Figure 3 shows the conductor after breaking.

Table 1: Breaking Load Result

Cable Designation	Breaking Load (lbf)	Percent of RTS
Elevated Temperature	32,228	103.5 %

Figure 3 – “Elevated Temperature” sample after breaking

ACKNOWLEDGEMENTS

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DISCLAIMER

Kinectrics North America Inc. has prepared this report in accordance with, and subject to, the terms and conditions of the contract between Kinectrics North America Inc. and 3M Company, dated August 15, 2002.

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APPENDIX C
INSTRUMENT SHEET
3M Company (Reference: 795 kcmil ACCR Conductor)

Test Description: Breaking Load Tests
Project Number: 9513-004-2003

Test Start Date: January 23, 2003
Test Finish Date: February 3, 2003

TEST DESCRIPTION	EQUIPMENT DESCRIPTION	MAKE	MODEL	ASSET # or SERIAL #	ACCURACY CLAIMED	CALIBRATION DATE	CALIBRATION DUE DATE	TEST USE
Breaking Load And Elevated Temperature Test	A/D Board	National Instruments	PCI-6034E	CA1C1A	±0.1% of reading	September 14, 2002	September 14, 2003	Data Acquisition
	Load Cell (MTS)	Lebow	3156	17356-0				
	Load Cell Conditioner	MTS	493.01DC	10000686-0	±1% of reading	February 13, 2002	February 13, 2003	Breaking Load
	Data Logger	Campbell Scientific	21X	11119-0	±0.1% of F.S.	January 28, 2003	January 28, 2004	Data Acquisition

DISTRIBUTION

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