

LABORATORY REPORT

No: 000-EL-00-ELR-20091784-00-A

Date: 7 August 2009

Subject: QDC 15A Time Delay Tests at -55°C

Copies To: C. Holmes
M. Ribeiro

1. Objective

To determine functional performance of the QDC 15A circuit breaker at -55°C

2. Description of samples

Selected and supplied by:	Design Engineering
Lab no.:	20091784
Quantity / description:	3 x QY-1(13) CU2 15A (DC) circuit breakers

3. Reference documents

None

4. Method of test

- 4.1 Time delay verification of 130% (19.5A DC) was carried out at 25°C.
- 4.2 Time delay verification of 130% was carried out after the samples were exposed to -55°C for 1 hour. The temperature chamber was opened and the samples were switched 'on' and 'off' a few times by hand after the test.
- 4.3 Time delay verification of 130% was carried out after the samples were exposed to -55°C for 12 hours.
- 4.4 Time delay verification of 130% was carried out after the samples were allowed to return to room temperature at 25°C.

All trip-out tests at -55°C were carried out inside the temperature chamber.

5. Temperature during tests

The ambient temperature during testing was 25°C ±2°C and -55 ±2°C

6. **Equipment used during the tests**

Equipment	Serial / Cal / Asset no.	Calibration due date
Shunt 50A:50mV	No 8a	11 - 2009
Heraus Shock Chamber	P33520	10 - 2009
Power 10 Inc. DC Power Supply	P35483	NA
Escort Digital Multimeter	P31260	7 - 2010

7 **Results**

Time Delay results

Sample no	130% at 25°C (13-270 sec)	130% at -55°C After 1 hour	130% at -55°C After 12 hours	130% at 25°C (13-270 sec)
1	93 sec	426 sec	517 sec	64 sec
2	83 sec	580 sec	797 sec	79 sec
3	71 sec	469 sec	528 sec	69 sec

8 **Report summary**

All three QY-1(13) CU2 15A (DC) circuit breakers tripped after being exposed to -55°C for a period of 12 hours.

The increase in time delay at -55°C is a direct result of the increase in viscosity of the oil in the tube of the circuit breaker at low temperatures.

A visual inspection after the test showed no evidence of cracking, warping or degradation of the shell material.

Report by:



Mike Marten
Test Technologist

Date of tests: 6-7 Aug 2009

Approved by:



P. Kruger
Test and Evaluation Manager

Date 7 Aug 09

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Originators Signature

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Date: