CERTIFIED
TEST REPORT

TEMPERATURE RISE TESTS

Type CMU Power Fuses

Temperature Rise Tests

Type CMU Power Fuses

CERTIFICATION

Statements made and data shown are, to the best of our knowledge and belief, correct and within the usual limits of commercial testing practice. The following report is a true and correct summary of data from tests performed by Powertech High Power Laboratory in Surrey, British Columbia Canada, from November 29 to December 2, 1999 and April 2, 2000. The tests demonstrate the capability of the Cooper Power Systems type CMU Power Fuses to safely interrupt circuits when applied within their assigned ratings.

Frank J. Muench

Manager, Line Protection Devices Engineering

INTRODUCTION

The tests detailed in the following report were performed to present the

THERMAL TEST TO DETERMINE THE TEMPERATURE RISE
OF THE FUSE UNIT WHEN TESTED AT 200A TO
IEEE C37.40-2003, C37.41-2000, IEEE C37.42-1996 & C37.46-2000.

Because of the design characteristics of this range of fuses,
the 200SE rating at 17 kV is the most severe test, and can thus represent the
entire range of CMU fuses when applied in S&C 'drop-out' mountings.

for

TYPE CMU 712200 FUSE UNIT equipped with
S&C type 3095 End Fittings and
tested in an S&C type 92122R3
Overhead Pole-Top Style Mounting

Object

To determine the temperature rise of a Cooper Power Systems CMU 712200 Fuse Unit when equipped type S&C type 3095 end fittings and mounted in an S&C Type 92122R3 Overhead Pole-Top Style Mounting.

Continuous Current	200A rms
Test Voltage	Low
Frequency	60 Hz

Equipment Tested

Cooper Power Systems CMU 712200 Fuse Unit

S&C Type 3095 End Fittings

S&C Overhead Pole-Top Mounting, Catalog # 92122R3

Test Arrangement

The fuse was installed in the normal fuse mount. Fuse mounting terminals were connected to the power source with four-foot lengths of bare 2/0 stranded copper cables.

Test Conditions

Tests were carried out to the requirements of IEEE Std C37.40-2003, IEEE Std C37.41-2000, and ANSI C37.46-2000. Test leads were as specified in Table 17 for a 'Power fuse or distribution current-limiting fuse', for a fuse support with a continuous current rating of 200A, i.e. 2/0, 1.2 m length.

A 'Fuse Unit', Catalog Number CMU 712200 was installed in an S&C Cat # 92122R3 fuse mounting using type 3095 End Fittings.

The arrangement was tested at 200A to prove the assigned 'Rated Continuous Current' value, to clause 4.2.4 of IEEE Std C37.40-2003 and sections 4 and 11 of IEEE Std C37.41-2000. The results are given in Table 1 attached. This Current value also proved to be the Allowable Continuous Current.

The fuse was subjected to 440A for a period of 10 minutes [220% of 200A]. The 'Fuse Unit' element did not melt open during this test. The 'Fuse Unit' was allowed to cool and was then subjected to 528A [264% of 200A]. The 'Fuse Unit' element melted after 3 minutes 54 seconds. This test demonstrated conformance with clause 5.2 b) of ANSI Std C37.46-2000. This test was carried out in the low voltage laboratory at Powertech Labs, Vancouver BC.

Equipment used on these tests included: Multi-Amp Power Supply; Ammeter E355; Voltmeter E069, 0029 Temperature Recorder. All equipment was in calibration.

Test Results

Table 1 Test at 200A

Test at Rated Continuous Current [See C37.40-2003, Clause 4.2.4]
Actual Current - last 3 readings - 200 A. Volt drop - .081 V

Number	Thermocouple Location	Temperature °C													
		Actual	Rise	Actual	Rise	Actual	Rise	Actual	Rise	Actual	Rise	Actual	Rise	Actual	Rise
	Time	Allowable		9.00. a.m.		9.30 a.m.		10.00 a.m.		12.30 p.m.		1.00 p.m.		1.30 p.m.	
1	Ambient			25		25		25		24		24		24	
12	Top Contact	90	50	56	31	56	31	56	31	51	27	52	28	52	28
4	Top End Fitting	105	65	42	17	43	18	43	18	40	16	40	16	40	16
5	Top Conductor tube	105	65	42	17	44	19	44	19	42	18	42	18	42	18
6	Fuse Barrel	180	140	46	21	49	24	50	25	45	21	45	21	46	22
7	Lower Ferrule	105	65	44	19	46	21	46	21	38	14	37	13	37	13
9	Lower End Fitting	105	65	44	19	46	21	45	20	42	18	42	18	42	18
10	Lower Contact	90	50	36	11	38	13	38	13	36	12	35	11	36	12
	Current			228		223		217		200		200		200	

Test at 440 A [220% of 200A] Fuse run at this current from cold for 10 minutes - did not operate.

Test at 528 A [264% of 200A] Fuse run at this current from cold for 3 min 54 sec before the element melted.

Conclusions

The above is a true and correct summary of data obtained from tests performed in various locations. The test results confirm the 200E 'Rated Continuous Current' value assigned to this 'Fuse Unit', and this is also the value of 'Allowable Continuous Current'.

The fuses tested during this test sequence met the requirements of the referenced standards.

COOPER Power Systems

Quality from
Cooper Industries

P.O. Box 1640, Waukesha, WI 53187