

***CERTIFIED
TEST REPORT***

Type L Open Porcelain and Polymer Distribution Cutout

*Design Tests for the Type L Porcelain and Polymer Open Distribution Cutout
Per the following ANSI/IEEE Standards Requirements:*

C37.40

C37.41

C37.42

Part #S4B1P1A – 15.5kV/100A Standard Int. rating – 110kV BIL Polymer Cutout
Part #L4B1P1A – 15.5kV/100A Standard Int. rating – 110kV BIL Porcelain Cutout
Part #S4BAP1A – 15.5kV/100A High Int. rating – 110kV BIL Polymer Cutout
Part #L4BAP1A – 15.5kV/100A High Int. rating – 110kV BIL Porcelain Cutout
Part #S4B2P1A – 15.5kV/200A Standard Int. rating – 110kV BIL Polymer Cutout
Part #L4B2P1A – 15.5kV/200A Standard Int. rating – 110kV BIL Porcelain Cutout
Part #S4B3P1A – 15.5kV/300A Switch Blade – 110kV BIL Polymer Cutout
Part #L4B3P1A – 15.5kV/300A Switch Blade – 110kV BIL Porcelain Cutout
Part #L9C1P1A – 27kV/100A Standard Int. rating – 125kV BIL Porcelain Cutout
Part #L9CAP1A – 27kV/100A High Int. rating – 125kV BIL Porcelain Cutout
Part #L9C2P1A – 27kV/200A Standard Int. rating – 125kV BIL Porcelain Cutout
Part #L9C3P1A – 27kV/300A Switch Blade – 125kV BIL Porcelain Cutout
Part #L9D1P1A – 27kV/100A Standard Int. rating – 150kV BIL Porcelain Cutout
Part #S9D1P1A – 27kV/100A Standard Int. rating – 150kV BIL Polymer Cutout
Part #L9DAP1A – 27kV/100A High Int. rating – 150kV BIL Porcelain Cutout
Part #S9DAP1A – 27kV/100A High Int. rating – 150kV BIL Polymer Cutout
Part #S9D2P1A – 27kV/200A Standard Int. rating – 150kV BIL Polymer Cutout
Part #L9D2P1A – 27kV/200A Standard Int. rating – 150kV BIL Porcelain Cutout
Part #S9D3P1A – 27kV/300A Switch Blade – 150kV BIL Polymer Cutout
Part #L9D3P1A – 27kV/300A Switch Blade – 150kV BIL Porcelain Cutout

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.



5/3/2012

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INTRODUCTION

The Cooper Power Systems' Type L Open Distribution Cutout has been developed to provide an industry standard interchangeable cutout for porcelain and silicone rubber versions.

The report details the testing conducted to verify performance and meet the applicable IEEE standard requirements.

Interruption Tests

Dielectric Tests

Radio Influence Tests

Momentary and Short Time Current Tests

Fuse Link Tension Measurements

Temperature Rise Tests

Mechanical Tests

INTERRUPTION TESTS

Cutouts of each catalog designation were tested per IEEE C37.41-2008, Clause 6 for fault current interrupting performance. Table 1 lists the maximum interrupting rating (series 1) of each version of the Type L Cutout. All Cutouts passed their full standard test series. The circuit TRV conformed to the latest standards requirements. The full standard test series specifies multiple tests at 5 current levels to fully qualify the Cutout.

Sample oscillographs of design test results are available upon request.

Actual measured test currents equaled or exceeded listed ratings.

Table 1:

Current Rating (Amps)	Maximum Design Voltage (kV)	Base Catalog Numbers	Interrupting Rating (kA)	
			Symmetrical	Asymmetrical
100	15.5	S4B1	7.1	10
		S4BA	10.6	16
	15.5	L4B1	7.1	10
		L4BA	10.6	16
	27	S9D1	5.3	8
		S9DA	8	12
	27	L9C1, L9D1	5.3	8
		L9CA, L9DA	8	12
200	15	L4B2, S4B2	8	12
	27	L9C2, L9D2, S9D2	7.1	10

DIELECTRIC TESTS

Cutouts of each voltage-rating category (rated 60 Hz voltage and related BIL) with 100A fuseholders were tested per IEEE C37.41-2008 Clause 5, to the voltage levels specified in IEEE C37.42-2009, Clause 3.3.1. Creepage measurement and voltage withstand levels are identified in Table 2.

Table 2:

Rated Voltage	Rated BIL	Creepage Nominal		Base Catalog Numbers	60 HZ Dry Withstand 1 Minute	60 HZ Wet Withstand 10 Seconds	Impulse 3 positive 3 negative kV
		Inches	(mm),		kV, rms	kV, rms	
kV, rms	kV						
15.5	110	14.2	(361)	S4B1/S4BA	35	30	110
15.5	110	8.5	(216)	L4B1/L4BA	35	30	110
27	125	11.0	(279)	L9C1/L9CA	42	36	125
27	150	22.3	(566)	S9D1/S9DA	70	60	150
27	150	17.0	(432)	L9D1/L9DA	70	60	150

RADIO INFLUENCE TESTS

IEEE C37.42-2009, Clause 3.3.4 lists a maximum RIV (Radio Influence Voltage Level) of 250 μ volts when energized to a specified voltage. Cutouts of each voltage rating and frame size, with 100A fuseholder were tested.

There was no measured RIV at the IEEE specified test voltage levels.

MOMENTARY AND SHORT TIME CURRENT TESTS

Type L Open Cutouts equipped with disconnect blades were tested for short time current withstand per IEEE C37.41-2008, Clause 9. The cutouts passed these tests by withstanding the current levels specified in C37.42-2009, Clause 3.3 and shown in Table 3.

Table 3:

Base Catalog Numbers	Momentary Current, kA, Asym	15 Cycle Current, kA, Sym	3 Second Current, kA, Sym
S4B3	12	10.6	1.6
L4B3	12	10.6	1.6
S9D3	12	8	1.6
L9C3, L9D3	12	8	1.6

FUSE LINK TENSION MEASUREMENTS

Static tests on the forces imposed on a fuse link resulting from installation of the fuse in the Type L Open Cutout has been performed. Tests were done using 100A fuseholders only.

Table 4 gives average measured forces of twenty trials.

Table 4:

Operation	Average (lbs)
Initial Fuse Link Tension (1)	5.1
Fuseholder Closed	5.1
Notes:	
(1) Fuse Link Installed, fuseholder not in frame.	

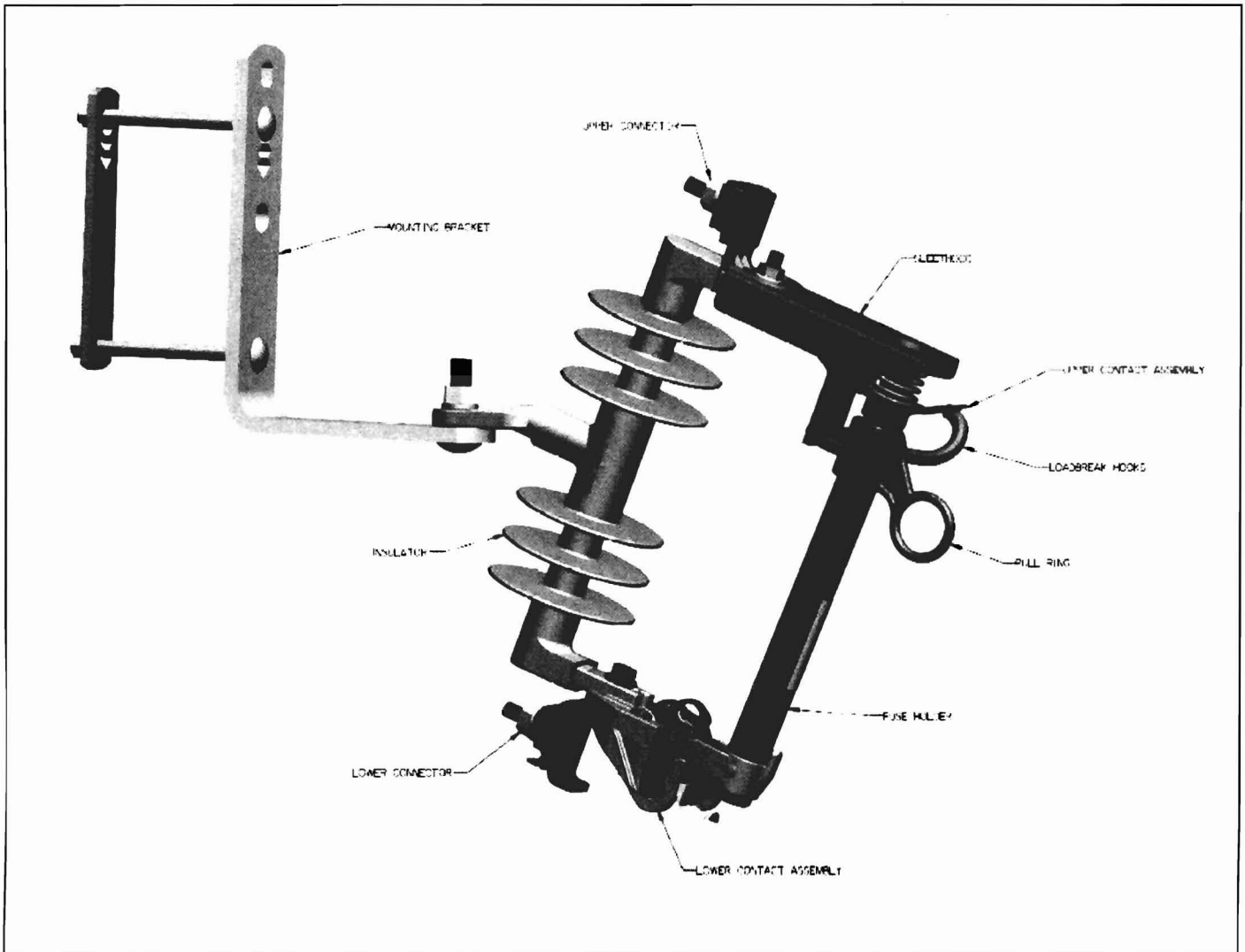
TEMPERATURE RISE TESTS

Per the test method IEEE C37.41-2008 clause 10, the maximum temperature rise allowed by IEEE C37.40-2003, Clause 4.1.2 on open cutouts with silver plated contacts is 65 °C. The temperature rise tests on both Porcelain and Polymer Type L open Cutouts when tested per IEEE C37.41-2008, Clause 10 met the requirements of the standards. The data for the Polymer version is detailed in table 5.

Table 5:

		Maximum Temperature Rise °C at Key Current Interchanges For Porcelain or Silicone Rubber: 15.5 kV or 27 kV Type L Cutouts.				
		1	2	3	4	5
Current	Link	Upper Contact	Top Shunt	Center of Blade	Trunion	Lower Contact
100A	100T	10	8	10	12	12
150A	100T	23	18	27	27	26
300A	Switch Blade	32	30	34	37	45

Figure 1: Example-UltraSIL Type L Interchangeable Cutout



MECHANICAL TESTS

Mechanical tests were performed on Type L Porcelain and UltraSIL Cutouts. The Cutouts passed the following mechanical tests per the requirements of C37.41-2008, Clause 12.

1. Opening and closing, 200 operations per C37.41-2008, Clause 12.
2. Torque all threaded fasteners to the specified torque per C37.41-2008, Clause 12.3.
3. Thermal Cycle the Cutouts per C37.41-2008 Clause 13.2.

The test samples were not damaged during any of these tests.

Revision No.	Date	What was added/changed:
1	2/28/1999	Original Porcelain Type L Cutouts
2	3/30/2007	Added 15 kV Polymer Cutout and updated format
3	6/28/2007	Corrected reference to table 5 on temperature test; had called for table 6. Updated standards callout. The standards are now IEEE documents recognized by ANSI. Minor editorial changes were made.
4	10/3/2008	Added 27 kV Polymer Cutout.
5	3/12/2009	Added L9CA Interrupting Data (16 kA Single Shot Asymmetric, 10.6 Symmetric.) Removed EP number reference. Added L4B1 Interrupting Data (12 Single Shot Asymmetric, 8 Symmetric)
6	5/2/2012	Removed the 16 kA Single Shot Asymmetric, 10.6 Symmetric from interrupting data. Removed all S9C1/S9CA catalog numbers referenced in the result tables. Updated the temperature rise values per latest test results. Updated picture illustrating new design cutout components. Results represent new designed components implemented in 2011-2012.