

Design Test Report

Veri*Lite Suspension Insulators

Catalog Numbers: 405003, 405004, 405005, 405006



This design test report records the results of laboratory tests made on the Ohio Brass Veri*Lite Suspension Insulators.

Test performed in accordance with IEC Standard 1109, clauses 5 and 6, IEEE 1024 clause 8.2.6, and LWIWG 01 clause 5.5.

The Veri*Lite Suspension Insulators meet all applicable requirements of these standards.

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NOTE: Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.

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Section I

Tests on Interfaces and Connection of Metal Fittings

IEC 1109-5.1 (1992)

I.1 Test specimens and preliminary tests

Insulator Design:

Shed/Housing	Ohio Brass ESP
Color	Dark Gray

Core:

Material	Vinylester/Fiberglass
Young's Modulus	41,300 MPa
Rod Diameter	0.619 in.

Metal Fittings:

Material	60-40-18 Ductile Iron
Method of Attachment to Core	Crimp

Dimensional Data, Electrical Ratings and Mechanical Ratings:

Insulator	405003	405004	405005	405006
Section Length (inch)	17.25	23.00	28.75	34.50
Leakage Distance (inch)	39.5	54.5	69.5	84.0
No. of Sheds	6	8	10	12
Shed Diameter (inch)	5.9	5.9	5.9	5.9
60 Hz Dry Flashover (kV)	190	255	315	370
60 Hz Wet Flashover (kV)	140	190	245	305
Impulse Pos. Flashover (kV)	320	420	500	610
Impulse Neg. Flashover (kV)	330	435	510	580
SML (lb.)	15,000	15,000	15,000	15,000

The 405006 insulators were used on the Part I and VIII design tests. All other tests used specimens of each insulator type:

Mechanical Routine Test:

Insulator Type: 405006
Test Date: February 28, 1996

Insulator	#1	#2	#3
Evaluation (Pass)	Yes	Yes	Yes

I.2 Dry power frequency (60 Hz) voltage test

Insulator Type: 405006

Test Date: November 15, 1996

Test Atmospheric conditions:

Dry bulb temperature: 73°F

Wet bulb temperature: 51°F

Barometric pressure: 75.15 psi

Insulator	#1	#2	#3
Uncorrected average flashover voltage (kV rms.)	333	329	326
Corrected average flashover voltage (kV rms.)	359	353	350

I.3 Sudden load release test

Insulator Type: 405006

Test Date: November 15, 1996

Insulator	#1	#2	#3
Evaluation (Pass)	Yes	Yes	Yes

I.4 Thermal-mechanical test

Insulator Type: 405006

Test Date: November 15, 1996

Insulator	#1	#2	#3
Pre-cycle reference length (in.)	32.82	32.89	32.86
Post-cycle reference length (in.)	32.802	32.901	32.85
Evaluation (Pass)	Yes	Yes	Yes

I.5 Water immersion test

Insulator Type: 405006

Test Date: November 18, 1996 - November 21, 1996

Insulator	#1	#2	#3
Visual Evaluation (Pass)	Yes	Yes	Yes

I.6 Steep-front impulse voltage test

Insulator Type: 405006

Test Date: November 21, 1996

Insulator	#1	#2	#3
Evaluation (Pass)	Yes	Yes	Yes

I.7 Post dry power frequency (60 Hz) voltage test

Insulator Type: 405006

Test Date: November 21, 1996

Test Atmospheric conditions:

Dry bulb temperature: 74°F

Wet bulb temperature: 53.5°F

Barometric pressure: 73.23 psi

Insulator	#1	#2	#3
Uncorrected average flashover voltage (kV rms.)	306	305	310
Corrected average flashover voltage (kV rms.)	326	325	320
Evaluation (Pass)	Yes	Yes	Yes

Power frequency (60 Hz) withstand test (30 minutes) at 265 kV.

Insulator	#1	#2	#3
Pre-test temperature (°F)	71	72	72
Post-test temperature (°F)	81	82	79
Evaluation (Pass)	Yes	Yes	Yes

Section II

Assembled Core Load-Time Test IEC 1109-5.2 (1992)

II.1 Determination of the average failing load of the core of the assembled insulator

Insulator Type: 405006
Test Date: May 29, 1996

Insulator	#1	#2	#3	Average
Mechanical failing load (lb.)	19,600	20,000	19,200	19,600

II.2 Control of the slope of the strength-time curve of the insulator

Insulator Type: 405006
Test Date: May 29, 1996 - June 2, 1996

Insulator	#4	#5	#6
Evaluation (Pass)	Yes	Yes	Yes

Section III

Test of Housing: Tracking and Erosion Test IEC 1109-5.3 (1992)

Insulator Type: 405004
Test Date: June 6, 1996 - July 19, 1996

Insulator	#1	#2	#3
Mounting	Horizontal	Vertical	Vertical
Evaluation (Pass)	Yes	Yes	Yes

Section IV

Dry Penetration and Water Diffusion Tests IEC 1109-5.4 (1992)

IV.1 Determination of Dye Penetration Performance

Insulator Type: 405006-1301
Test Date: October 22, 1997

Insulator	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Evaluation (Pass)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

IV.2 Voltage Test

Insulator Type: 405006-1301
Test Date: December 15, 1996

Insulator	#1	#2	#3	#4	#5	#6
Applied kV	12	12	12	12	12	12
Current (r.m.s.), uA	34	400	41	69	245	27
Evaluation (Pass)	Yes	Yes	Yes	Yes	Yes	Yes

Section V

RIV and Corona Tests

IEEE 1024 Sec. 8.2.6 (1988)

Insulator Type: 405003, 405004, 405005, 405006
Test Date: July 6, 1996 - July 19, 1996

Date:	7/19/96	7/22/96
Dry Bulb Temperature (°F):	79	78
Wet Bulb Temperature (°F):	70	64.5
Barometric Pressure (mm Hg):	730	732

Note: All insulator types start with 40500X

Insulator	#3	#4	#5	#6
Test Date	19	22	22	22
Test Voltage (kV)	120	95	155	260
RIV @ 1000 kHz (µV)	<10	<3	<8	<10

Section VI

Impulse Flashover Test

IEC 1109-6.1 (1992)

Insulator Type: 405003, 405004, 405005, 405006
Test Date: May 21, 1996 - May 24, 1996

Date:	5/21/96	5/22/96	5/24/96
Dry Bulb Temperature (°F):	73	80	80
Wet Bulb Temperature (°F):	62	62	67
Barometric Pressure (in. Hg):	29.02	28.89	29.125

Note: All insulator types start with 40500X

Insulator Type	3	3	4	4	5	5	6	6
Test Date	21	21	22	22	24	24	24	24
Polarity	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Flashover Value (kV)	339	350.8	443.2	461.8	521.8	538	643.3	611.8
Maximum Withstand (kV)	324.6	341.8	421.8	445.8	509.9	522.9	632.6	588.3

Section VII

Low Frequency Flashover Test

IEC 1109-6.2 (1992)

Insulator Type: 405003, 405004, 405005, 405006

Test Date: May 21, 1996 - May 24, 1996

Note: See Section VI for atmospheric conditions on test dates.

All insulator types begin with the number 40500X.

Insulator Type	3	3	4	4	5	5	6	6
Test Date	21	21	22	22	24	24	24	24
Dry or Wet Flashover	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Flashover Value (kV)	203.1	148.8	268.8	203.1	332.7	259.4	389.6	321.1
Maximum Withstand (kV)	195.6	142.7	260.5	188.9	328.8	244.5	380.5	296.9

Section VIII

Power Arc

LWIWG-01 Sec. 5.5 (1996)

Insulator Type: 405006

Test Date: July 10, 1996

Note: All insulators are subject to 3220 lb. of tension during the test.

Insulator	#1	#2	#3	#4
Current (amps)	9724	9547	9477	9618
No. of cycles	17	17	16	16.5
KA - cycles	165.3	162.3	151.6	158

There were no mechanical failures of end fittings or end fitting slips during the tests.

All insulators were subjected to the Moisture Penetration Test. There was no dye penetration to the interfaces.