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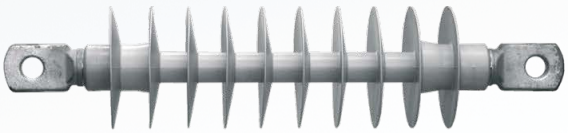
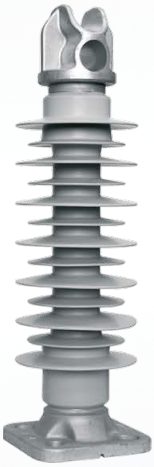




Composite insulators

Sicat 8WL3068, 8WL3078 and 8WL3088 for overhead contact line systems

siemens.com/rail-electrification

The Sicat® 8WL3068, 8WL3078 and 8WL3088 type silicone composite insulators in accordance with EN 50151 insulate the live parts of the overhead contact line from one another and from earth. They must therefore meet both electrical and mechanical requirements.

Features

- Soil- and water-repellent plastic surface of the composite insulators
- Low operating costs as well as resistant to breakage and against vandalism due to modern material compound techniques
- Savings on transport, storage and installation due to significant lower weight compared to ceramic and glass insulators
- Very high resistance to flashover
- Modular design for a varied field of application

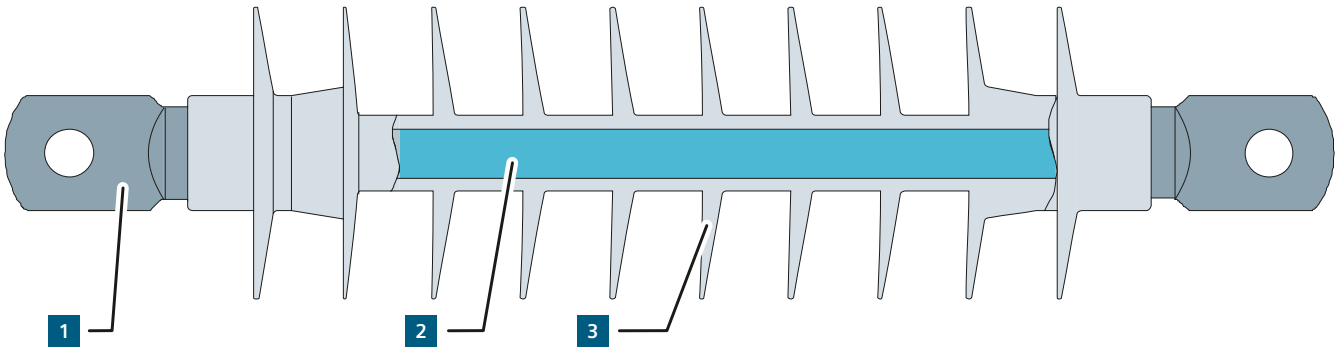
Design

The silicone composite insulators of type Sicat 8WL3068, 8WL3078 and 8WL3088 consist of the following components:

- Insulating rod made of glass-fiber reinforced plastic (GRP, boric free ECR-glass) as core
- Press-fitted fittings made of cast aluminium alloy or hotdip galvanized steel
- Shield and rod sheathing made of silicone

The core acts as the internal insulation and is dimensioned such that the occurring mechanical forces can be absorbed reliably. The shead sleeve in silicone forms the continuous external insulation and the required creepage distance. Thus the core is protected against harmful ambient influences.

Due to the modular construction, any customer specific fittings can be realized on request.



1 Fittings (example)
2 Insulating rod (core)
3 Shield and rod sheathing

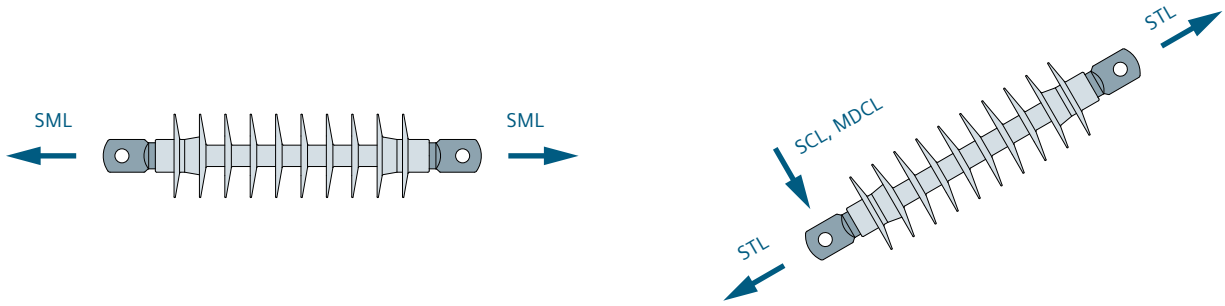
Design of composite insulator, shown at example Sicat 8WL3078-1A

Variants

Siemens offers a wide range of variants of silicone composite insulators for different voltage levels and a varied field of application.

Insulators for catenaries and terminations
- Developped acc. to IEC 61109
- Subjected mainly to tension load

Insulators for cantilevers and as post insulators
- Developped acc. to IEC 61952
- Subjected to cantilever, tensile and compressive loads



Loads at composite insulators

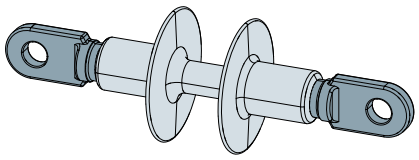
Terms and definitions	
SML	**Specified Mechanical Load, IEC 61109**
	Load, specified by the manufacturer, which is used for mechanical tests in the standard IEC 61109.
SCL	**Specified Cantilever Load, IEC 61952**
	Cantilever load which can be withstood by the insulator at the line end fitting when tested under the prescribed conditions.
MDCL	**Maximum Design Cantilever Load, IEC 61952**
	Load level above which damage to the core begins to occur and which is the ultimate limit for service loads.
STL	**Specified Tensile Load, IEC 61952**
	Tensile load which can be withstood by the insulator when tested under the prescribed conditions.

Selection criteria and technical data

Composite insulators up to 3 kV DC

Tongue / tongue

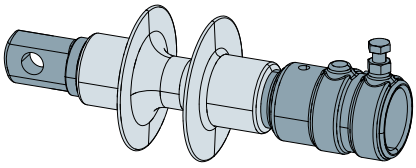
for catenaries and terminations



8WL3088-1A/-1B

Tongue / tube

for cantilevers



8WL3088-2C/-2E/-2F

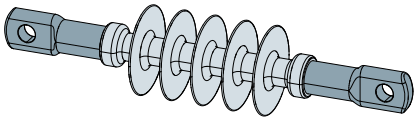
Electrical data		8WL3088-1A	8WL3088-1B	8WL3088-2C	8WL3088-2E	8WL3088-2F
Nominal voltage	[kV DC]	3	3	3	3	3
Minimum creepage distance	[mm]	315	315	305	305	305
Minimum clearance in air	[mm]	195	195	185	185	185
Lightning impulse withstand voltage	[kV]	145	145	110	110	110
Power-frequency withstand voltage, wet	[kV]	50	50	50	50	50

Mechanical data		8WL3088-1A	8WL3088-1B	8WL3088-2C	8WL3088-2E	8WL3088-2F
Weight	[kg]	1.5	1.5	2.1	2.0	2.2
Length	[mm]	300	300	346	346	360
For pin diameter	[mm]	21	17	21	21	21
For tube diameter	[mm]	–	–	60.3	55	70
Specified cantilever load (SCL)	[kN]	3.2	3.2	6.0	6.0	6.0
Max. design cantilever load (MDCL)	[kN]	1	1	1.9	1.9	1.9
Specified mechan. load (SML)	[kN]	90	90	–	–	–
Specified tensile load (STL)	[kN]	–	–	60	60	60
Perm. operating load/tension	[kN]	30	30	10	10	10
Material fittings		htgSt	htgSt	Al	Al	Al

Composite insulators 15 kV AC

Tongue / tongue

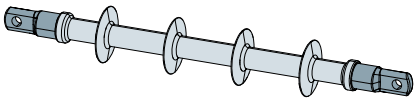
for catenaries and terminations



8WL3068-1C

Tongue / tongue

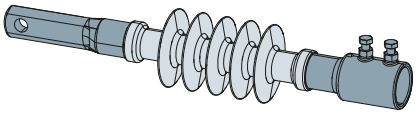
for catenaries and terminations



8WL3068-1D

Tongue / tube

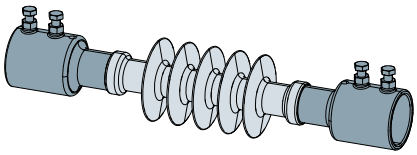
for cantilevers



8WL3068-2B/-2C

Tube / tube

for cantilevers



8WL3068-2L

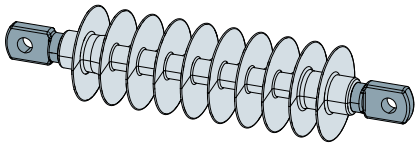
Electrical data		8WL3068-1C	8WL3068-1D	8WL3068-2B	8WL3068-2C	8WL3068-2L
Nominal voltage	[kV AC]	15	15	15	15	15
Minimum creepage distance	[mm]	570	900	605	605	605
Minimum clearance in air	[mm]	270	660	305	305	305
Lightning impulse withstand voltage	[kV]	145	375	170	170	170
Power-frequency withstand voltage, wet	[kV]	86	158	83	83	83

Mechanical data		8WL3068-1C	8WL3068-1D	8WL3068-2B	8WL3068-2C	8WL3068-2L
Weight	[kg]	2.3	4.3	4.8	5.1	5.7
Length	[mm]	440	840	605	605	580
For pin diameter	[mm]	21	21	21	21	–
For tube diameter	[mm]	–	–	55	70	70
Specified cantilever load (SCL)	[kN]	3.8	1.6	6.1	6.1	6.1
Max. design cantilever load (MDCL)	[kN]	1.2	0.5	1.9	1.9	1.9
Specified mechan. load (SML)	[kN]	140	140	–	–	6.0
Specified tensile load (STL)	[kN]	–	–	90	90	90
Perm. operating load/tension	[kN]	35	35	10	10	60
Material fittings		htgSt	htgSt	htgSt, stlSt	htgSt, stlSt	htgSt, stlSt

Composite insulators 25 kV AC

Tongue / tongue

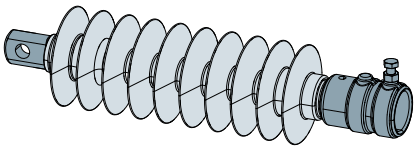
for catenaries and terminations



8WL3078-1A

Tongue / tube

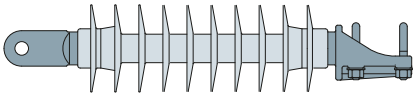
for cantilevers



8WL3078-2A/-2B/-2D

Tongue / tube

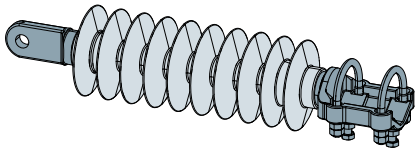
for cantilevers



8WL3078-2C

Tongue / tube

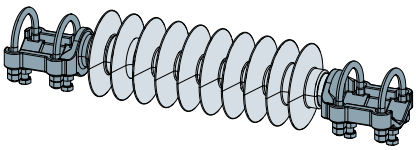
for cantilevers



8WL3078-2L

Tube / tube

for cantilevers



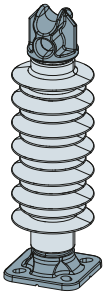
8WL3078-2M

Electrical data		8WL3078-1A	8WL3078-2A	8WL3078-2B	8WL3078-2C	8WL3078-2D
Nominal voltage	[kV AC]	25	25	25	25	25
Minimum creepage distance	[mm]	1,230	1,215	1,215	1,215	1,215
Minimum clearance in air	[mm]	450	445	445	445	445
Lightning impulse withstand voltage	[kV]	250	250	250	250	250
Power-frequency withstand voltage, wet	[kV]	125	125	125	125	125

Mechanical data		8WL3078-1A	8WL3078-2A	8WL3078-2B	8WL3078-2C	8WL3078-2D
Weight	[kg]	2.9	3.2	3.6	6.6	3.2
Length	[mm]	510	559	573	616	559
For pin diameter	[mm]	21	21	21	21.5	22
For tube diameter	[mm]	–	55	70	34-51	60.3
Specified cantilever load (SCL)	[kN]	3	6	6	6	6
Max. design cantilever load (MDCL)	[kN]	1	1.9	1.9	1.9	1.9
Specified mechan. load (SML)	[kN]	135	–	–	–	–
Specified tensile load (STL)	[kN]	–	60	60	60	40
Perm. operating load/tension	[kN]	30	12	12	12	12
Material fittings		htgSt	Al	Al	htgSt	Al

Post insulator

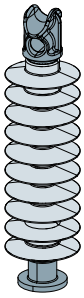
for supply and feeder lines



8WL3078-6A

Post insulator

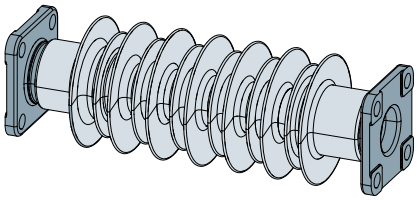
for supply and feeder lines



8WL3078-7A

Insulator with flat connections

for soffit conductor rail



8WL3078-6D

Electrical data		8WL3078-2L	8WL3078-2M	8WL3078-6A	8WL3078-7A	8WL3078-6D
Nominal voltage	[kV AC]	25	25	25	25	25
Minimum creepage distance	[mm]	1,215	1,215	1,230	1,215	1,255
Minimum clearance in air	[mm]	445	445	410	445	430
Lightning impulse withstand voltage	[kV]	250	250	250	250	250
Power-frequency withstand voltage, wet	[kV]	125	125	125	125	125

Mechanical data		8WL3078-2L	8WL3078-2M	8WL3078-6A	8WL3078-7A	8WL3078-6D
Weight	[kg]	8.1	9.0	9.6	6.4	8.5
Length	[mm]	616	660	506	517.5	460
For pin diameter	[mm]	21.5	–	31	31	–
For tube diameter	[mm]	55/70	55/70	–	–	–
Specified cantilever load (SCL)	[kN]	6	6	19.2	8	19.2
Max. design cantilever load (MDCL)	[kN]	1.9	1.9	6	2.5	6
Specified mechan. load (SML)	[kN]	–	–	–	–	–
Specified tensile load (STL)	[kN]	60	60	60	60	60
Perm. operating load/tension	[kN]	12	12	12	12	12
Material fittings		htgSt	htgSt	htgSt	htgSt	htgSt

Tests and standards

The silicone composite insulators acc. to EN 50151 have been subjected to the following type tests:

- Mechanical load-time test
- Tensile load test
- Cantilever failing load test
- Wet power-frequency withstand voltage test
- Dry lightning impulse withstand voltage test 1.2/50

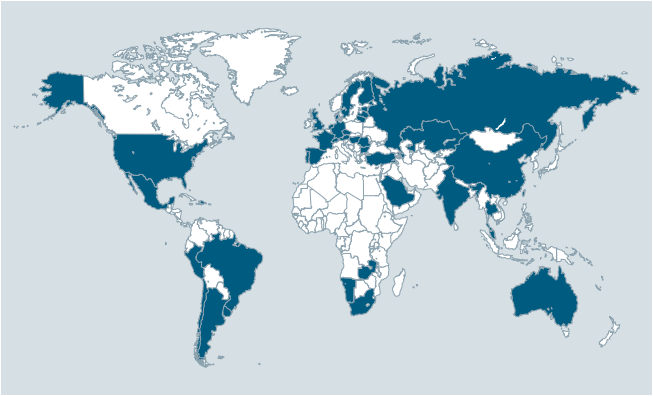
according to the standards:

- IEC 61109: 1995
- IEC 61952: 2002
- DIN VDE 0216: 1986

References

The silicone composite insulators are successfully in use since market introduction in the year 2000 (status as of August 2018):

Type	Nominal voltage	Market introduction	Units
8WL3088	up to 3 kV DC	2005	43,230
8WL3068	15 kV AC	2017	9,390
8WL3078	25 kV AC	2000	239,110



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Sicat 8WL3068, 8WL3078 and 8WL3088 / Product information
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