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## Neutral section

Sicat® 8WL5545-4D/4F  
for overhead contact line systems

[siemens.com/rail-electrification](https://www.siemens.com/rail-electrification)

When installed in pairs, the type Sicat® 8WL5545-4D/4F neutral sections serve as phase separation section or as shortened neutral section. Typically, they are used for overhead contact line systems in main-line railways.

### Features

- Universally applicable for many contact wire types
- Easy installation due to low weight and optimum construction
- Long service life due to very good arc extinguishing capability
- Low life cycle costs due to corrosion resistant materials

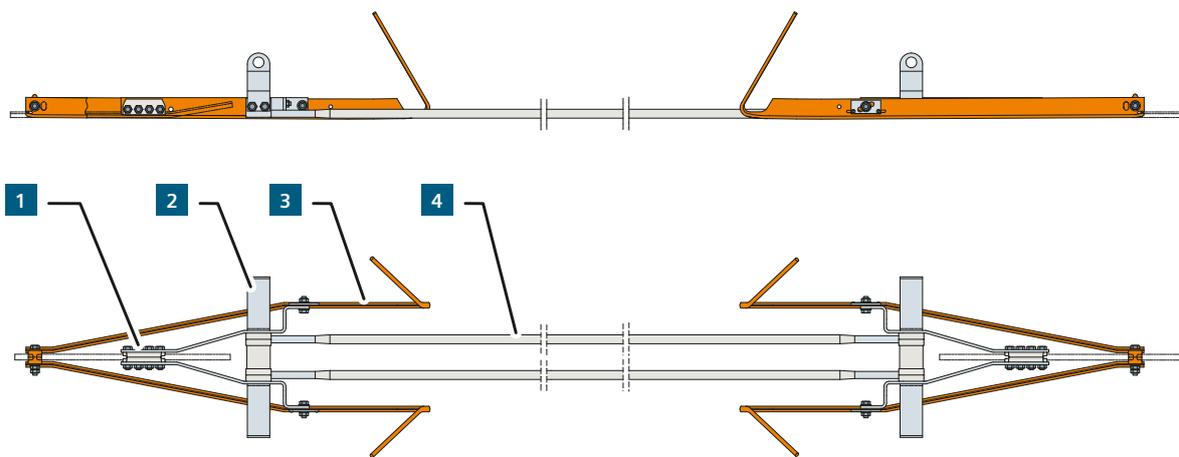
# Design

The Sicat 8WL5545-4D/4F neutral sections consist of the following main components:

- Contact wire dead-end clamps with connection device
- Insulating rods
- Runners with arcing horns
- Suspension straps

The mounting of the insulating rods at the same height as the contact wire rules out bending torques at the neutral section. The insulating rods are contacted by the pantograph in the area of clearances in air.

Thanks to the modular design and type of fastening, spare parts and accessories can be installed easily and quickly.



- |                               |                           |
|-------------------------------|---------------------------|
| 1 Contact wire dead-end clamp | 3 Runner with arcing horn |
| 2 Suspension strap            | 4 Insulating rod          |

Design of the neutral section for one contact wire Sicat 8WL5545-4D

# Function und application

A vehicle with one or more pantographs can pass the separation section. The pantographs should not be electrically connected with one another and must have been electrically separated from the power car by the main circuit-breaker before the train passes the section.

## Application

The following functions can be realized by combining two neutral sections:

### Phase separation section (25 kV / 50 Hz)

A phase separation section separates electrical feeder sections of the overhead contact line from one another, when phase differences between the neighboring feeder sections occur. An earthed overhead contact line section must be inserted between the two neutral sections.

### Shortened neutral section (15 kV / 16,7 Hz)

May also be used as a shortened neutral section with a decentralized power supply of a 15 kV / 16.7 Hz system:

- In curves and gradients where a train could come to a standstill in a normal neutral section
- Before signals, as the train cannot continue in a normal neutral section with red illumination

### Use in narrow spaces

When existing railway installations are being electrically connected in narrow space conditions, it can happen that the observance of the minimum electrical clearance between the contact line and a railway structure is not possible. The neutral section delivers a simple and inexpensive solution for this requirement: one neutral section is installed before, and one after, the structure in order to create a neutral and earthed overhead contact line section underneath the structure.

## Excellent arc extinguishing capability

Taking the running speed into consideration, the clearance in air is dimensioned so that no vagabond voltages will be produced by the pantograph.

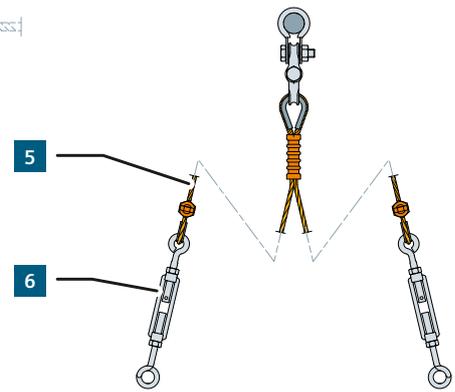
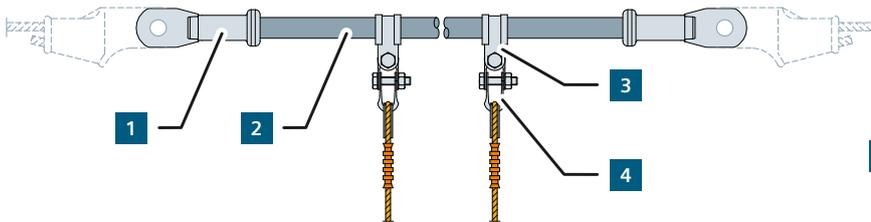
Even if a vehicle unintentionally passes the neutral section with its main circuit-breaker closed, any arcs produced at the arcing horns will be extinguished quickly and effectively. This, together with the high level of corrosion resistance of the materials, ensures a long product service life.

# System integration

## Suspension 8WL5545-6C

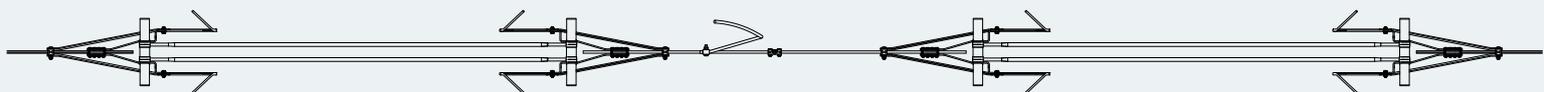
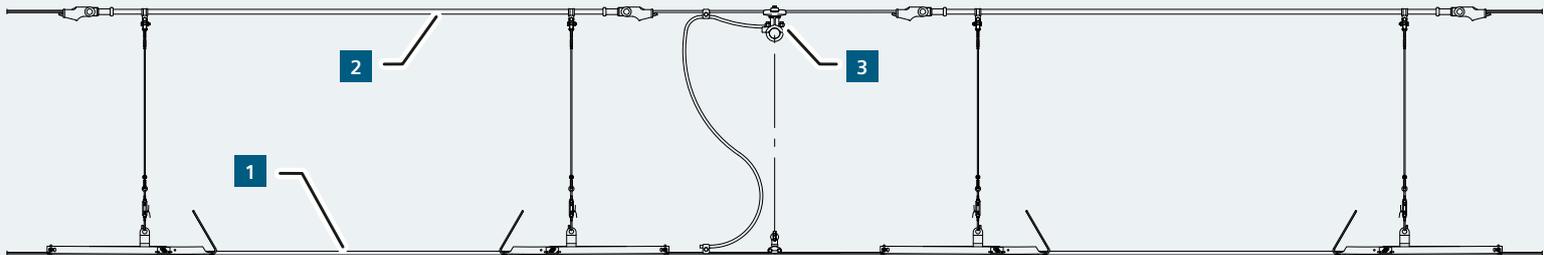
The suspension serves for insulating the catenary wire and for exact positioning of the neutral section in the catenary.

It is not supplied with the neutral section and has to be ordered separately.



- 1 End fitting
- 2 Insulating rod of suspension
- 3 Suspension clip
- 4 Dropper strap
- 5 Dropper wire
- 6 Turnbuckle

## Application example: Phase separation section



- 1 Neutral section 8WL5545-4D
- 2 Suspension with catenary wire insulation
- 3 Support

# Technical data

## Neutral section

Type		8WL5545-4D	8WL5545-4F
Nominal voltage	[kV AC]	15 / 25	15 / 25
Maximum running speed	[km/h]	160	160
Length	[mm]	approx. 3,300	ca. 3,300
Weight	[kg]	14.8	17.2
Maximum permissible operating load	[kN]	30	30
Minimum failing load	[kN]	90	90
Creepage distance	[mm]	2,010	2,010
Clearance in air	[mm]	1,500	1,500
Number of insulating rods		2	2
Number of contact wires		1	2
Clampabel contact wire cross-sections	acc. to EN 50149	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5	
	acc. to British Standard 23	Ri161 , Cu-ETP	
	acc. to Chinese Standard	CTHA-85 to 150, CuAg0.1 CTMH-110 to 150, CuMg0.5	

Materials	
Contact wire dead-end clamps, straps, dropper straps	stainless steel
Clamping fittings	copper nickel wrought alloy
Insulating rods	glass-fiber reinforced plastic
Runners, arcing horns	copper
Bolts, nuts	stainless steel

## Suspension (accessories)

Type		8WL5545-6C
Nominal voltage	[kV AC]	15 / 25
Weight	[kg]	6.60
Maximum permissible operating load	[kN]	30
Minimum failing load	[kN]	90
Minimum creepage distance	[mm]	2,600

Materials	
Insulating rod	glass-fiber reinforced plastic, silicone
End fittings, turnbuckles	stainless steel
Suspension clamp with rubber section	stainless steel, silicone
Dropper wire	bronze, strength grade II

# Tests and standards

Neutral section and suspension undergo the following type tests:

- Yearlong field-test
- Short-circuit test under real-life conditions in the route network of the Hungarian State Railways (MÁV)

## Neutral section

- Lightning-impulse withstand voltage test 1.2/50, dry
- Wet power frequency test
- Mechanical load-time test
- Short-circuit test (accidental arc)
- Tensile load test

## Suspension

- Testing the compound zones and the load transmissions
- of fittings
- Mechanical load-time test

according to the following standards:

- DIN VDE 0216: 1986
- EN 50124-1: 2001
- EN 50119: 2001
- IEC 61109: 1992
- IEC 60383-1: 1993
- IEC 60060-1:1989



# References

Since the market introduction in 2007 worldwide more than 119 Sicat 8WL5545-4D and 8WL5545-4F type neutral sections have been delivered (status as of September 2017).



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