

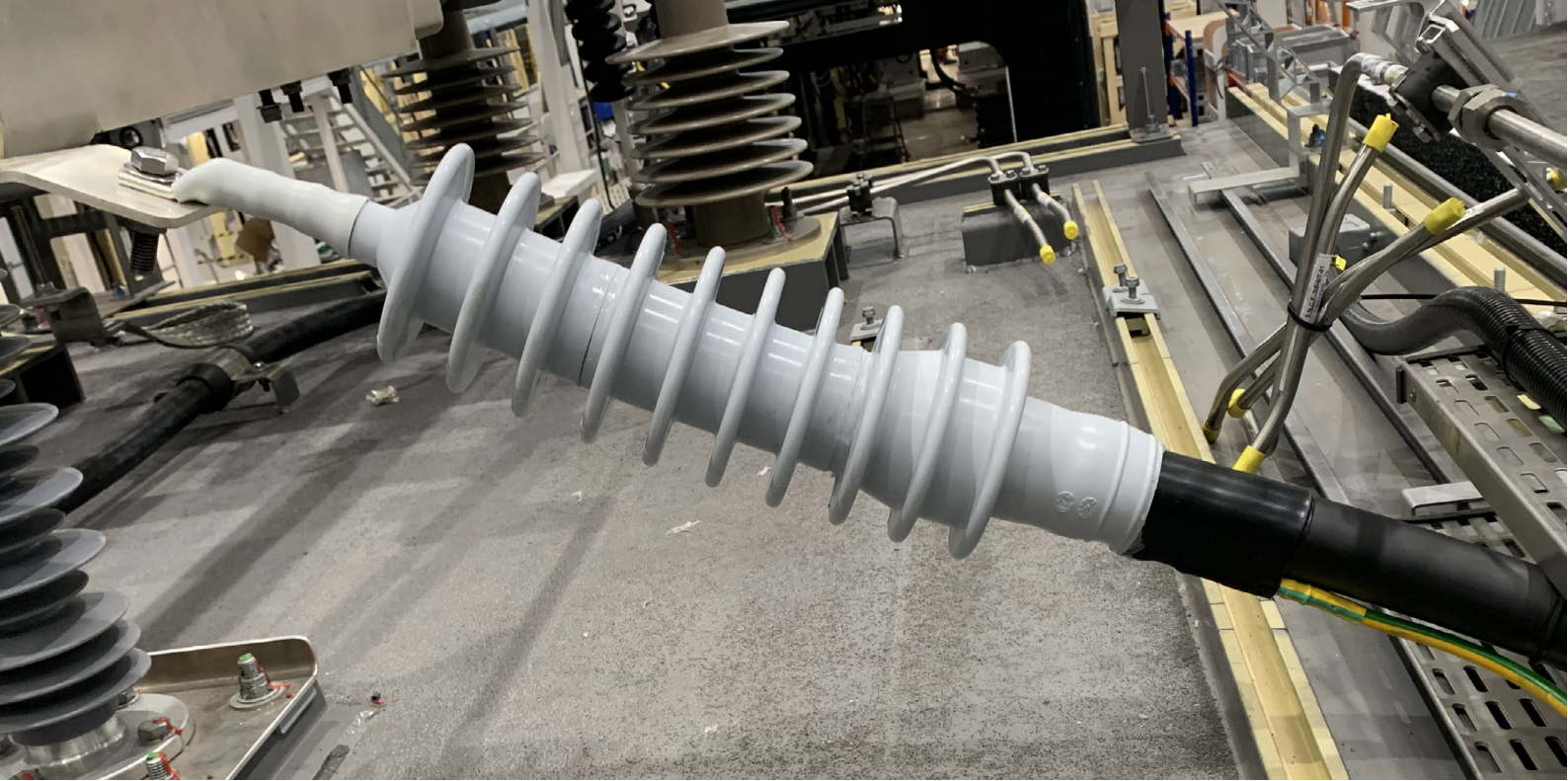
ROLLING STOCK

ESF 40S – Flexible cable termination



**ALPHA-ET**

Current and voltage – our passion



# General description

## General

The flexible cable termination ESF 40S is a dry, slip-on termination for modular assembly. It largely consists of prefabricated, slip-on silicone components. The use of silicone sheds makes it ideally suited for applications in roof installations. The tested and applied silicone material Powersil XLR 630 complies with all electrical, mechanical and also thermal requirements of the cable.

## Special characteristics

The slip-on termination is produced from high-grade silicone rubber. The resultant elasticity enables the termination to accept diameter tolerances as well as changes in cable diameter caused by variations in load. The low hardness of the silicone material prevents constriction of the core insulation even under high alternating load, while allowing it to adapt to any unevenness in the stripped core insulation. This prevents formation of cracks. The stress control elements (deflectors) are cast into the stress cone. This termination system ensures high operating reliability and is also absolutely maintenance free even under extreme stress. The proven slip-on technique requires little assembly work and minimises the fitting risk.

## Contamination class

In addition to its outstanding mechanical and electrical characteristics, silicone rubber is distinguished by its ideal properties against atmospheric pollution. For example, the insulation strength is retained in the presence of severe pollution and thaw conditions. A large number of tests have demonstrated the superiority of silicone rubber insulated insulators over other materials such as porcelain and EPDM. Silicone rubber terminations have been used successfully throughout the world since 1974 under the most severe climatic conditions.

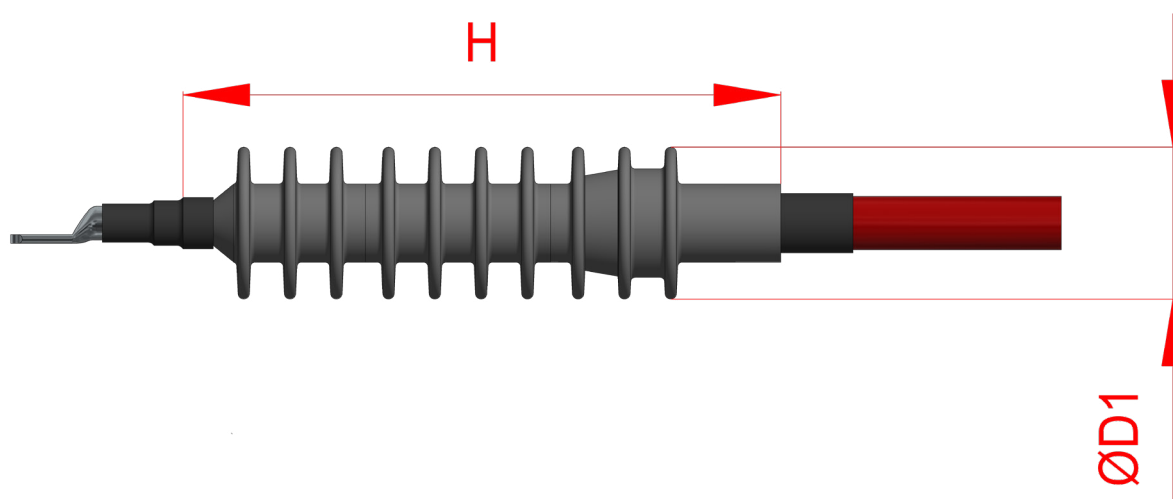
## Application

The ESF 40S termination is used for applications in Rolling Stock installations and can be mounted on any polymeric cables (PE, XLPE, EPR) with copper conductors. The termination ESF 40S complies with the fire protection standard EN 45545-2:2013 required in the Rolling Stock business.

## Benefits ESF 40S

- Cable cross-section 50–240 mm<sup>2</sup>
- Temperature range from -50°C to +130°C
- Creepage distance up to 1464mm with 18 silicone sheds.
- All ESF 40S cable terminations satisfy the requirements of the fire protection standard EN 45545-2:2013.
- Routine test of all assembled cables: AC/DC voltage withstand test according to the standard SN EN 50124-1:2017 and partial discharge test according to the standard IEC 60270:2000 (<10pC for each assembled cable).
- Maintenance free ESF 40S cable termination guarantees low life-time costs.
- Wind tunnel test up to 324 km/h

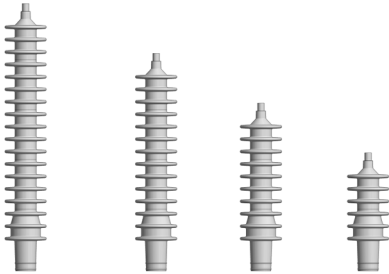
# Technical data



Type	ESF 40S	
Rated voltage (Single phase)	kV	25
Maximum operating voltage (Single phase)	kV	36
Operating temperature	°C	-50 ... +130
Weight	kg	0.8 to 2.2
Lightning impulse withstand voltage	kV	250
Power frequency withstand voltage	kV	124/5 min

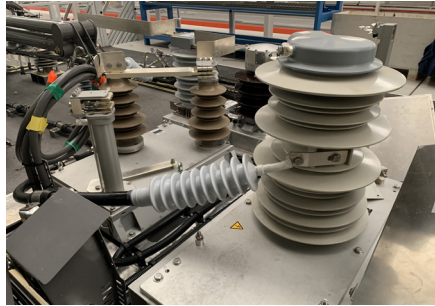
Type	Number of Sheds	Diameter over insulation of cable [mm]	H [mm]	D1 [mm]	Creeping distance [mm]	Safety distance in air [mm]	Weight [kg]
ESF 40S-1	6	26.7-32.9	304	105	561	342	0.8
	10	26.7-32.9	432	105	862	670	1.3
	14	26.7-32.9	560	105	1163	598	1.8
	18	26.7-32.9	688	105	1464	726	2.2
ESF 40S-2	6	33.1-38.9	304	105	561	342	0.8
	10	33.1-38.9	432	105	862	670	1.3
	14	33.1-38.9	560	105	1163	598	1.8
	18	33.1-38.9	688	105	1464	726	2.2

# Highlights



## Adaptable creeping distance

To achieve the required creepage distance at a defined conductor diameter, the cable termination is designed with six, ten, fourteen or eighteen sheds. This ensures that the selected cable termination has the required dielectrically properties at minimum space requirements, weight and costs.



## Reliable and maintenance free

The ALPHA ESF 40S cable termination is totally maintenance free. The used silicone rubber sheds can be used in extreme climatic conditions and high polluted areas. Therefore the ESF 40S is an ideal product for rolling stock applications.



## References of a similar product ESF 40

- Hitachi Rail: IEP, ASR, WOE
- Siemens: Desiro UK, Dosto SBB, Velaro
- Alstom: ETR 600 ETR 610, CDT 680, ETR 470, ETR 480, ENNO, Coradia
- Bombardier: ICN, Twindexx, Talent, Zefiro China, ETR 1000, CRH3
- Škoda: Panter
- SBB, SNCB, DB, BLS



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