

PFISTERER Dry Retrofit Solution

EST-SUB R, PFISTERER dry retrofit solution

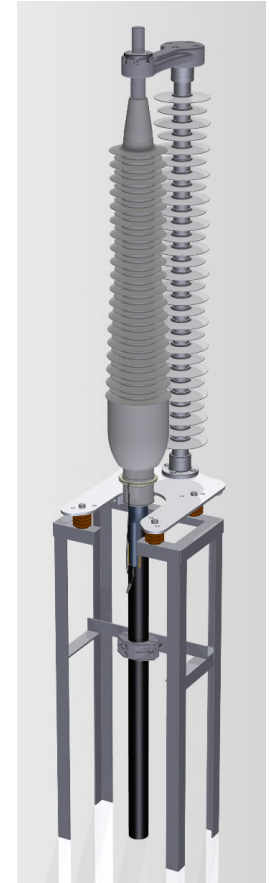
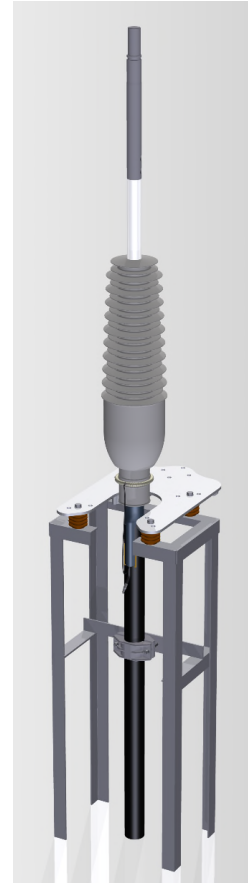
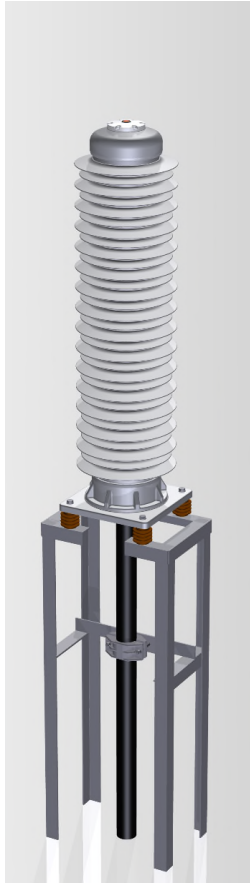
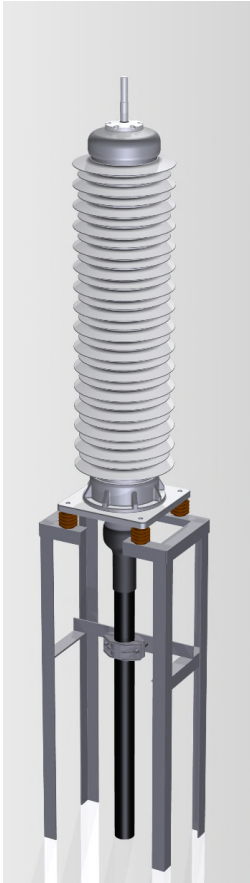
Situation: - oil leakage / humidity ingress is a common issue for old oil filled outdoor termination increase the risk of system shutdown

- Utilitities and grid operators seeking a egological and economical alternative to existing solution of replacing the old termination with a new cable, one joint and one termination
- No modification of the support structure
- No ground working (excavation etc.)
- No further investment in the cable system

- PFISTERER accepted the challenge and developed an own solution based on existing and reliable concepts

EST-SUB R, PFISTERER dry retrofit solution

- Initial situation
- Removal of head armature
- Check of cable dimensions
- Adaption to PFISTERER solution
- Installation of adapted SICON
- Final EST SUB-R



EST-SUB R, PFISTERER dry retrofit solution

Pilot Projects have been installed:

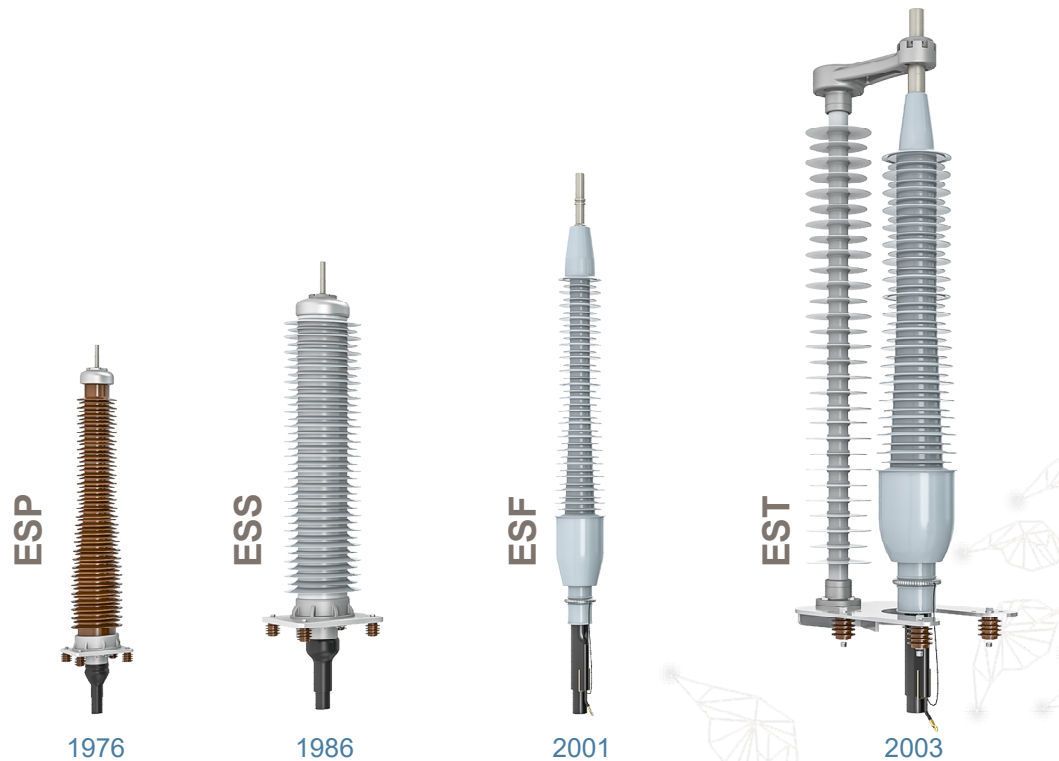
- **1st installation in Switzerland**
- **1st installation in Spain**
 - In total 12 pieces installed on EPR insulated 132 kV cable
 - 6 installed in a substation and 6 installed on a tower
 - In service since November 2020



DOC

Dry outdoor composite termination

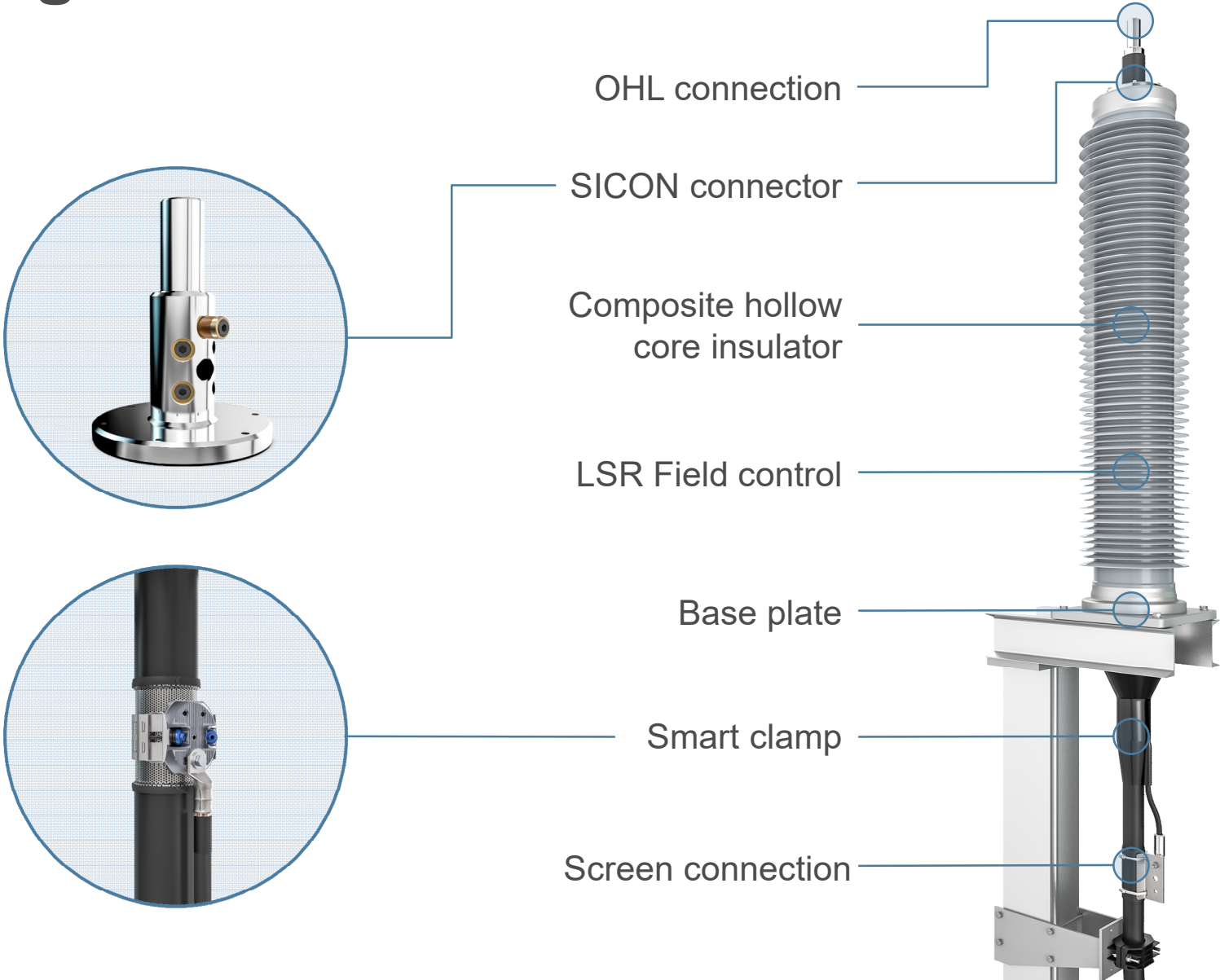
Evolution of outdoor terminations



Evolution of cable terminations →

oil insulated | maintenance free | dry | ecological | modular →

New generation of outdoor termination



New generation of outdoor termination

Modular system with few parts based on proven material
(SICON, Central unit, Screen handling)

Ecological

- No risk of oil leakage as the main insulation is polymeric (instead of liquid)

Reduced assembly time

- Pre-configured termination instead of an accessory kit
- Installation made easy

Stock-keeping made easy

Routine testing



New generation of dry type terminations routine testing

IEC 60840 chapter 9.1:

“The main insulation of each prefabricated accessory shall undergo partial discharge (see 9.2) and voltage routine tests (see 9.3) according to either 1), 2) or 3) below:

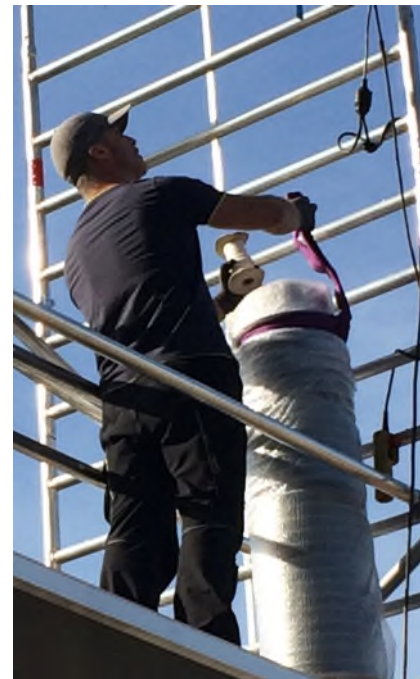
- 1) on accessories installed on cable;
 - 2) by using a host accessory into which a component of an accessory is substituted for the test;
 - 3) by using a simulated accessory rig in which the electrical stress environment of a main insulation component is reproduced.”
- Pre-tested accessory instead of a pre-tested field controlling element.
Less human influenced interfaces on site



Pilot project



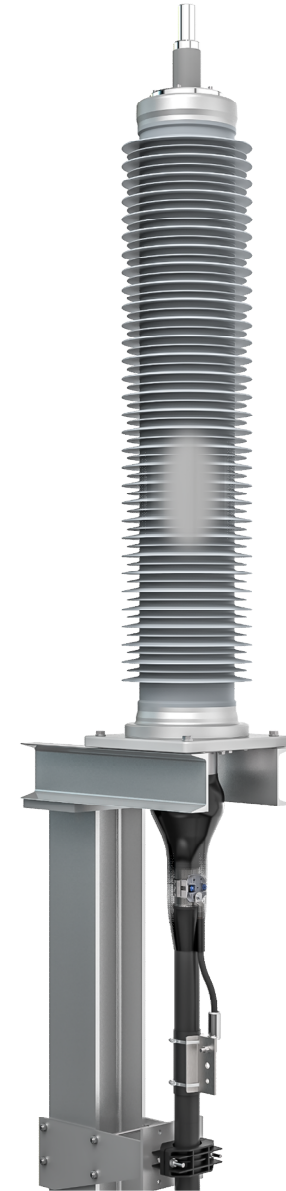
- Number of accessories: 3
- Type: DOC123-C39-OP
- Installation in October 2019 including a marketing video within 5 days



Specifications, market availability

Type	U_m [kV]	BIL [kV]	PD at $1.5 U_0$	IEC 60815 / IEC 60815-3	Peeled Insul. Ø
DOC123-C39	123	550	<5 pC	IV / E	51-91
DOC145-C45	145	650	<5 pC	IV / E	51-91
DOC170-C58	170	750	<5 pC	IV / E	51-101

OHL connection Ø [mm]	Standard
30, 40, 50, 60	Alu blank & bolted
	Compressed on request



Slip on joint portfolio

MSA 72.5 up to 550 kV

MSA Joints

Si rubber push on technology

All IEC 60840 and 62067 voltage classes

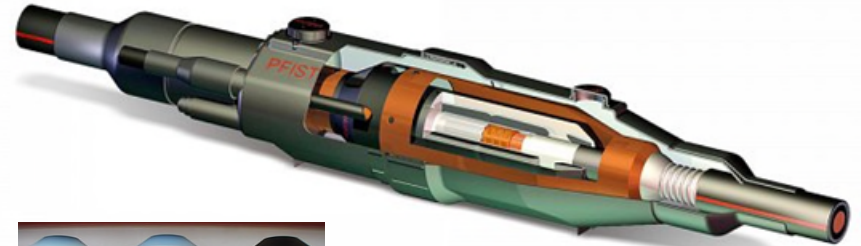
Screen connections for all types of cables

Straight thru, grounded or X-bonded variants

With or without metallic housing

Heat shrink outer protection

Premoulded PP outer housing



Protection covering and Water barrier

MSA-S



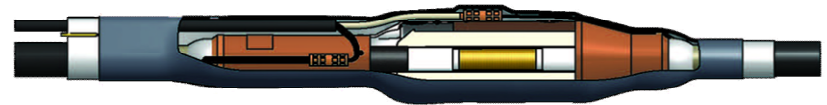
MSA-MS



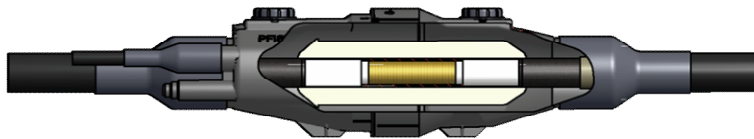
MSA-R



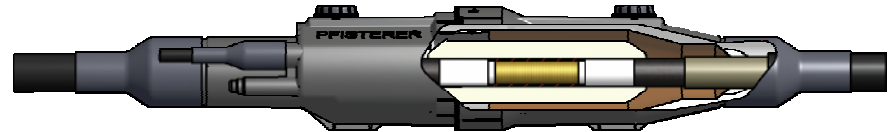
MSA-MR



MSA-G



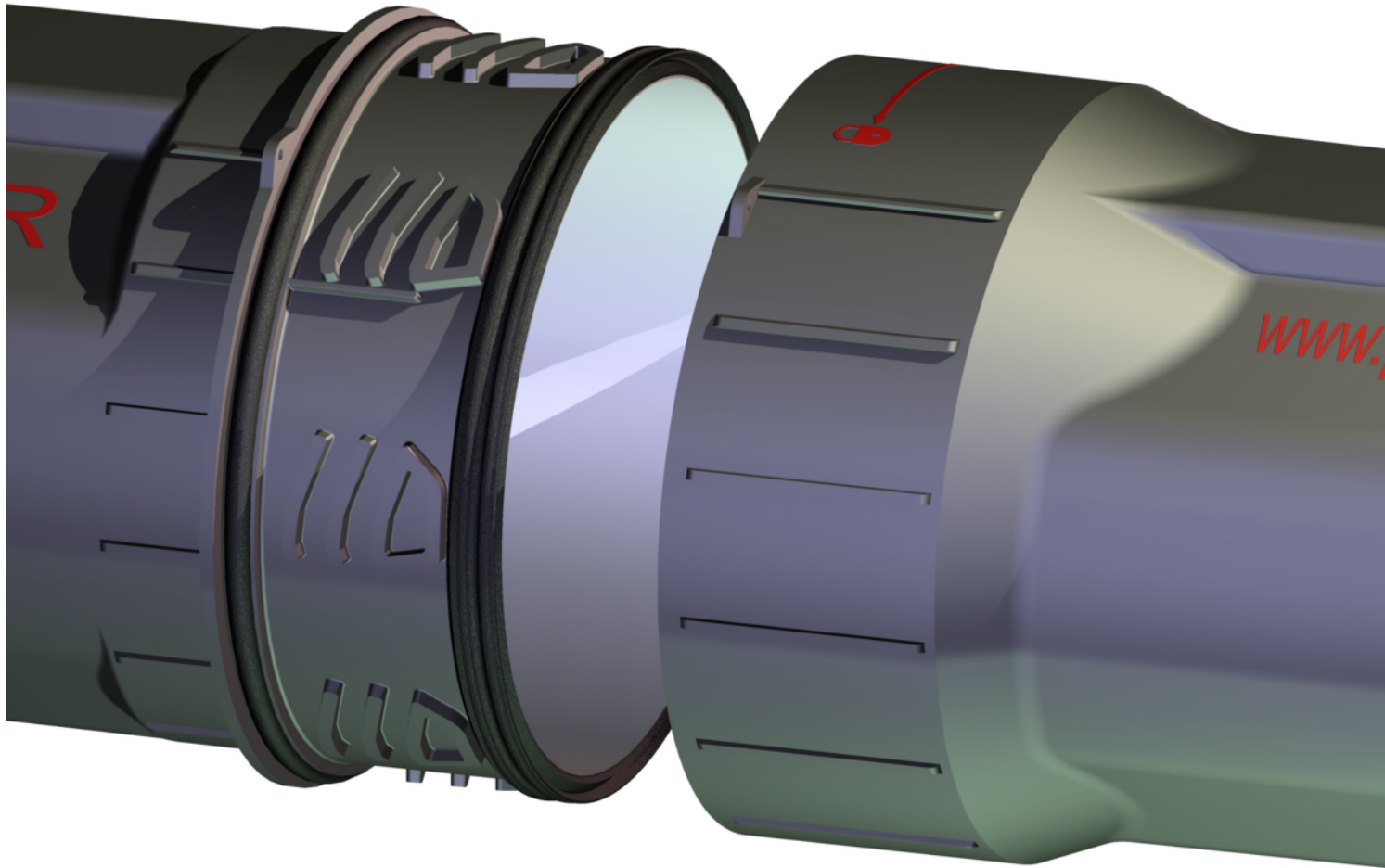
MSA-MG



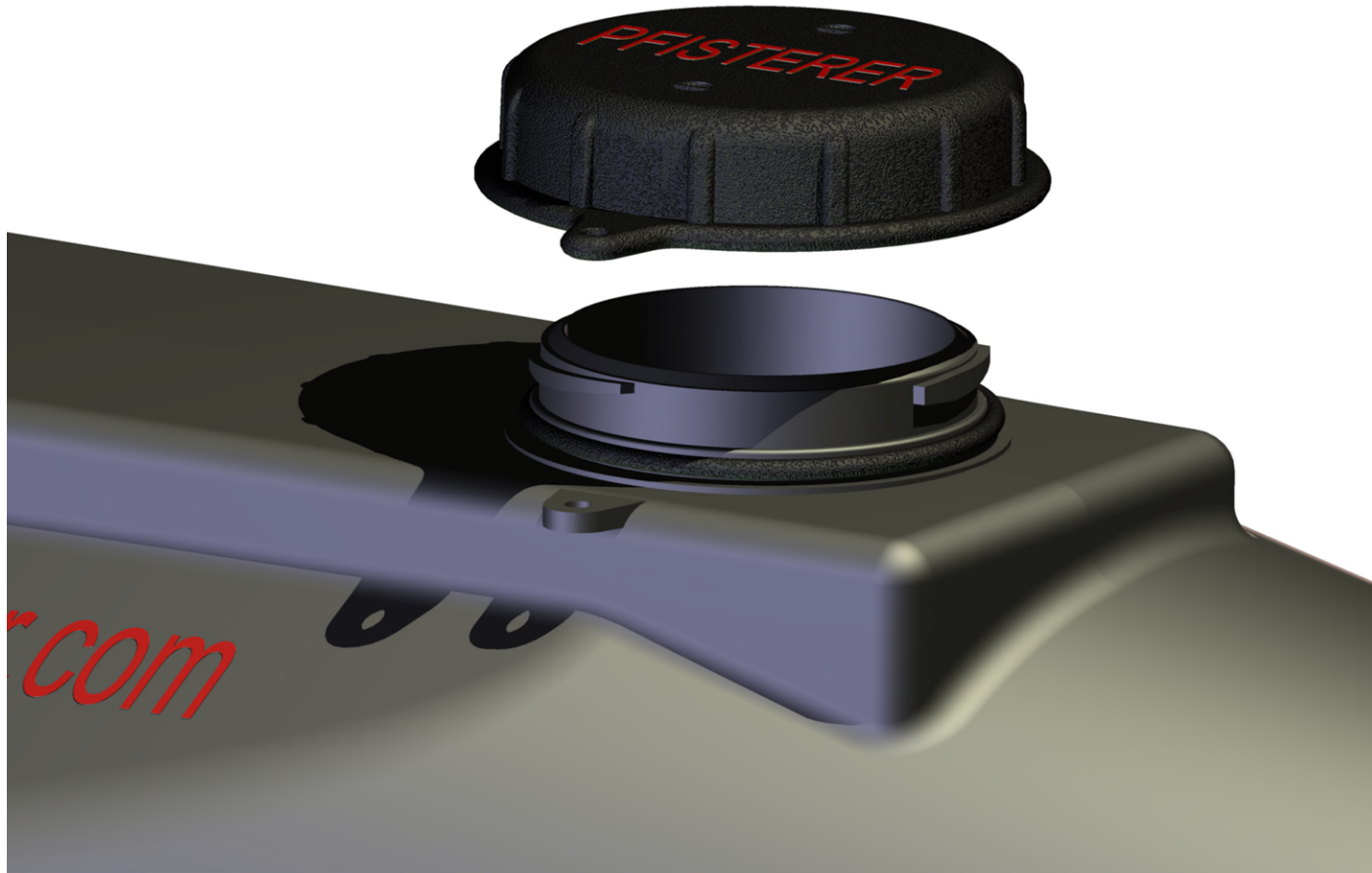
Joint design



Bajonet closure



Filling compound lid



Bonding outlet

Sensors can be integrated

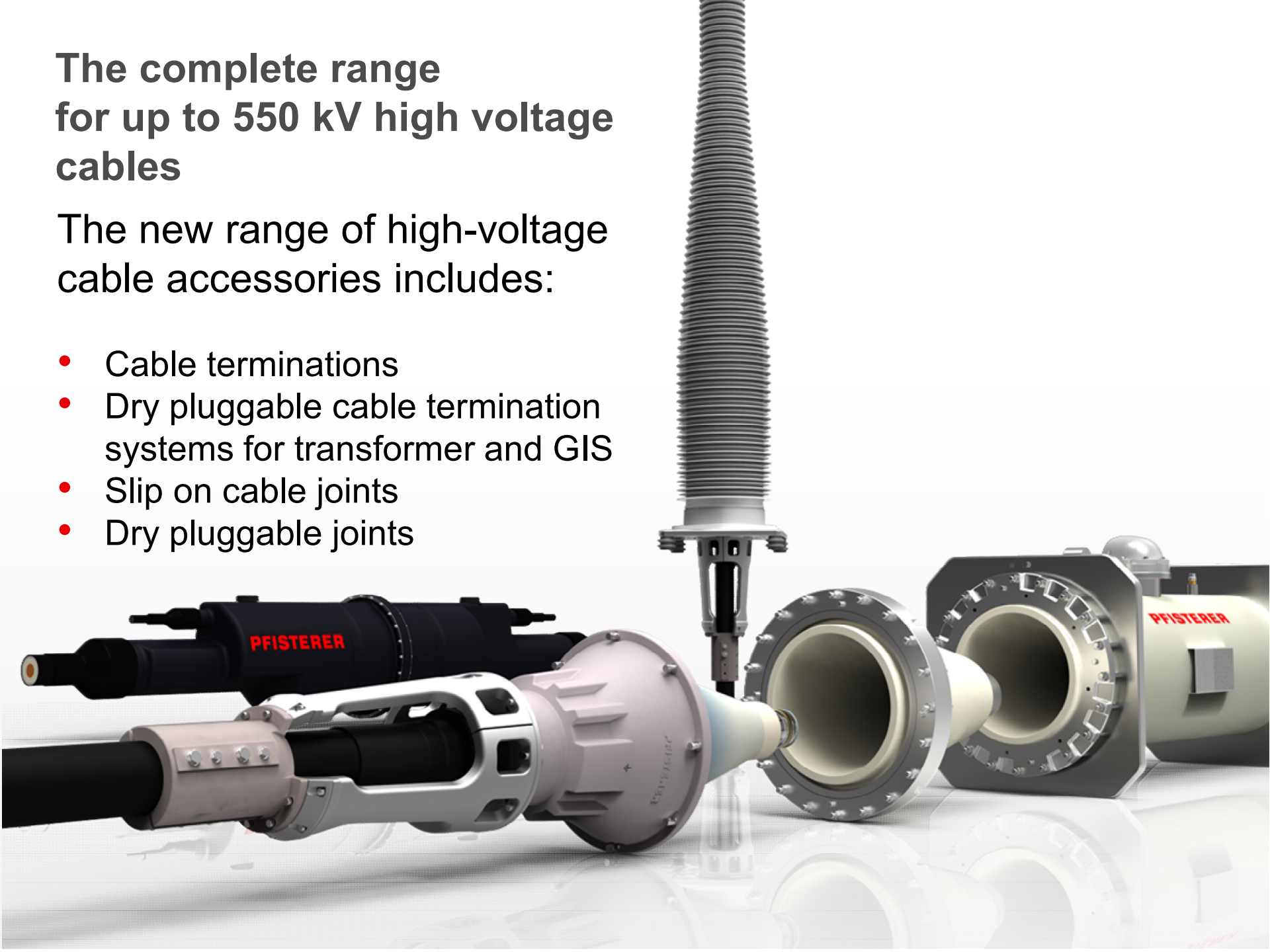


Extra high voltage portfolio

The complete range for up to 550 kV high voltage cables

The new range of high-voltage
cable accessories includes:

- Cable terminations
- Dry pluggable cable termination systems for transformer and GIS
- Slip on cable joints
- Dry pluggable joints



EHV product range

Type	Name	Voltage range [kV]	Applicable standard
Outdoor termination	ESS, ESP	362-550	IEC 62067
Slip on joint	MSA	362-550	IEC 62067
Dry pluggable cable connector	CONNEX	362-550	IEC 62067
Socket for transformer and GIS	CONNEX	362-550	IEC 62271-209 EN 50299
Dry pluggable joint		420-550	IEC 62271-209

Complete product range from 72.5 kV up to 550 kV capable of connecting enameled conductors.

Type Test

- All components type tested according to IEC 62067
- Type tests and PQ test done with different cable manufacturers
- Hellenic 420 kV
- Telefonika 420 kV
- Tatcable 362 kV
- Chongjing Taishan 550 kV
- Southwire 550 kV

