



The Power to Connect.

TRENCH



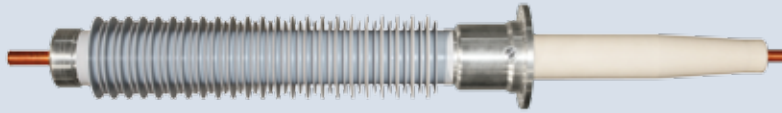
Today HSP & Trench produce condenser bushings for energy applications using state-of-the-art manufacturing and testing facilities

Backed by consistent specialization and the highest standards of quality, HSP & Trench products have been used in numerous applications, including:

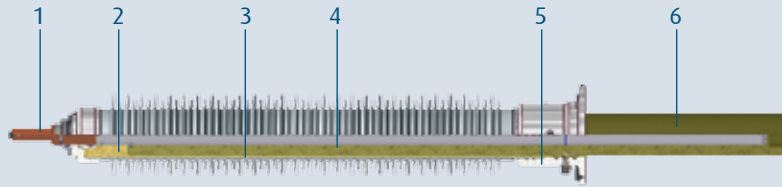
- Transformer bushings
- GIS bushings
- Generator bushings
- HVDC bushings

The Bushing Group
Product Spectrum

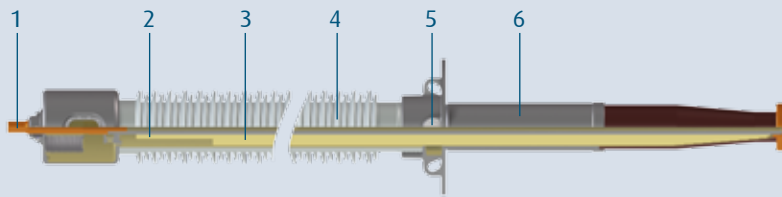
RIS bushing



RIP bushing



OIP bushing



1. Terminal
2. Dry filling
3. Insulator
4. Active part
5. Flange
6. Oil-side end

1. Terminal
2. Oil filling
3. Insulator
4. Active part
5. Flange
6. Oil-side end

Transformer bushings

HSP & Trench transformer bushings are designed to be connected to oil-insulated power transformers and operate with the following environmental media: outdoors, cable junction box-oil and gas insulated substations. Our product spectrum includes transformer outdoor bushings with condenser grading and a choice of active part insulation: OIP (Oil Impregnated Paper), RIP (Resin Impregnated Paper) or RIS (Resin Impregnated Synthetics)

- **RIS insulation** rated voltages up to 245 kV and 2000 A
- **OIP insulation** rated voltages up to 1200 kV and currents up to 5000 A
- **RIP insulation** rated voltages up to 800 kV and currents up to 6000 A



Transformer – SF₆ switchgear



Transformer – Cable junction box

Served application are:

- Transformer – Outdoor
- Transformer – Cable junction box
- Transformer – SF₆ insulated switchgear



HVDC bushings

HSP & Trench offer special HVDC bushings for high voltage direct-current transmission systems, which can be connected to HVDC transformers, inductors or air insulated system parts. They are calculated and designed in accordance with individual requirements. The bushings are provided with dry or gas insulation. In addition to standardized products, we also offer our customers individualized custom products and tested in our fully equipped, internationally accredited test facility.

GIS bushings

HSP & Trench offers standardized products as well as customized bushings with optimum voltage distribution for gas insulated and air insulated switchgear, even when there are VFT (Very Fast Transient). Our offer includes pure SF₆ insulated products, as well as bushing with RIP active component for specific application.

- **SF₆ insulated** directly connected to the GIS pressure, designed for rated voltages up to 550 kV and currents up to 4000 A
- **RIP insulation** (unpressurized bushing) rated voltages up to 550 kV and currents up to 4000 A



GIS bushing

Generator bushings

HSP & Trench bushings for generators or electric machines are suitable for internal spaces and are resistant to generator cooling fluids. The range extends between porcelain insulators, or combination of porcelain insulator for the outdoor side and resin or fiberglass insulation for the internal side, as well as design with RIP (Resin Impregnated Paper) insulation both sides and additional special varnish for not polluted environments.









The range extends up to 36 kV and up to 50 kA for the liquid cooled bushing. The generator bushings are designed in order to operate with the different types of cooling:

- **Natural cooling**
- **Forced gas cooling**
- **Liquid cooling**



Generator bushing

Continuous innovation since 1913

1913	First production of condenser bushings made of impregnated paper	
1958	Oil-impregnated transformer bushing 380 kV	
1960	Initial production of bushings made of resin-impregnated paper	
1987	First 420 kV GIS outdoor bushing with silicone sheds	
1997	First dry version of 500 kV HVDC RIP transformer and wall bushings	
2009	First dry version of 800 kV HVDC RIP transformer and wall bushings	
2012	First dry version of 1100 kV HVDC RIP transformer bushing	
2013	First 800 kV RIP transformer bushings with heatpipe technology	
2014	Initial production of bushings made of resin-impregnated synthetic	

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The required features must therefore be defined in each individual case when concluding the contract.