

INSULATION ENHANCEMENT



Insulation Enhancement

- **What is insulation enhancement ?**
- **Main elements**
- **Why and where apply?**
- **Typical application**

Insulation Enhancement

Raychem developed an insulation enhancement system for both enclosed and exposed bus work and for connections in high voltage switchgear, substations and electrical apparatus to provide:

- **Protection against**
 - **Bridges and animals**
 - **Flashover phase-phase phase earth**
 - **Pollution flashover**
 - **Corrosion**
- **Clearance reduction**

Insulation Enhancement

- **Transformer station**

- High Voltage
- Medium Voltage
- Low Voltage



- **Overhead line**

- Medium Voltage
- Low Voltage
- High Voltage



Insulation Enhancement

Transformer station

- **Booster sheds**

 - HVBS**

 - High voltage booster shed, loose-fitting conical collars preventing "heavy-wetting" flashovers by breaking up cascades of polluted water



Insulation Enhancement

Transformer station

- **Busbar insulation tubing**

- **BBIT**

- **BPTM**

- Heat-shrinkable tubings,
suitable for use on long
runs of rectangular or
round busbars



Insulation Enhancement

Transformer station

- **Insulation sheet**

 - HVIS**

 - High voltage insulation sheet enabling rapid and reliable insulation of T-joints, L-joints and difficult shapes



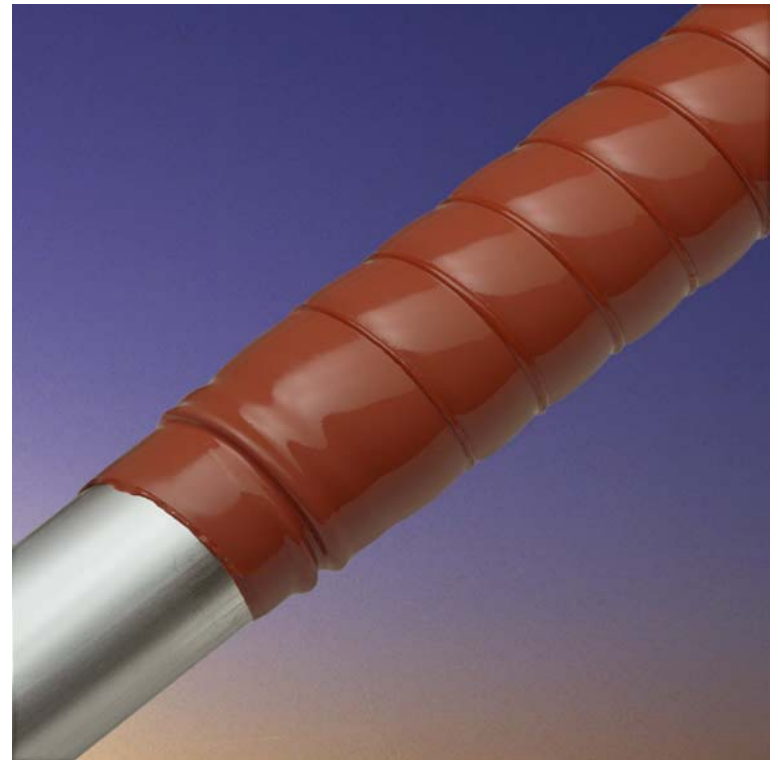
Insulation Enhancement

Transformer station

- **Busbar insulation tape**

 - HVBT**

 - heat-shrinkable tape, is ideal for use on complex shapes and where busbars cannot be disconnected



Insulation Enhancement

Transformer station

- **Performed shapes**

- **BCIC**

- Bus connection insulation covers composed of two halves; ideal for installation where busbars cannot be disconnected; non-shrinkable**

- **SMOE**

- Insulation kits consisting of BCIC, heat-shrinkable tubings, polypropylene support rings and sealing mastic**



Insulation Enhancement

Transformer station

- **Squirrel guards**

 - BISG**

 - BISG squirrel guard is a rigid polymeric disc fitting between the sheds of post insulators and bushings to prevent animals from bridging the phase to ground clearance



Insulation Enhancement

Transformer station

- **LV tubing**

 - LVIT**

 - Low voltage insulation tube,
heat-shrinkable, medium-wall,
flame-retardant tubing for
straight and bent busbars



Insulation Enhancement

Transformer station

LV tape

LVBT

Low voltage busbar tape is designed for complex busbar geometries and restricted access areas



Insulation Enhancement

Overhead line

Booster shed

HVBS

High voltage booster shed, loose-fitting conical collars preventing "heavy-wetting" flashovers by breaking up cascades of polluted water



Insulation Enhancement

Overhead line

- **Creepage extender**

 - HVCE**

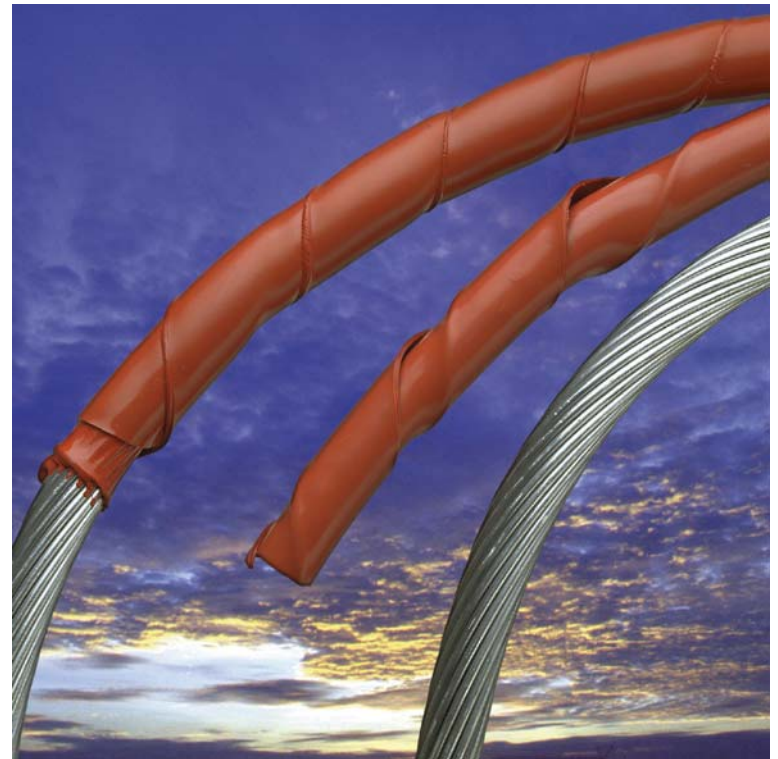
 - High voltage creepage extenders represent a long-term solution to pollution flashovers by making a permanent addition to the creepage distance



Insulation Enhancement

Overhead line

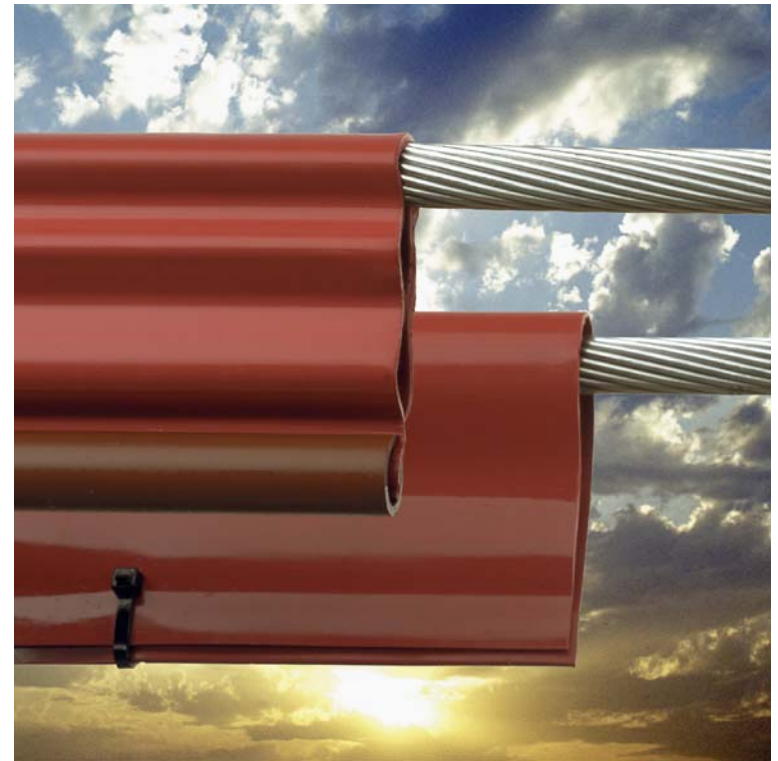
- **Overhead line insulation tape**
OLIT
Heat-shrinkable, pre-formed into a spiral for easy installation onto overhead conductors



Insulation Enhancement

Overhead line

- **Overhead line insulation channel
OLIC**
A "clip-on" insulating channel
providing flash-over protection
for overhead lines



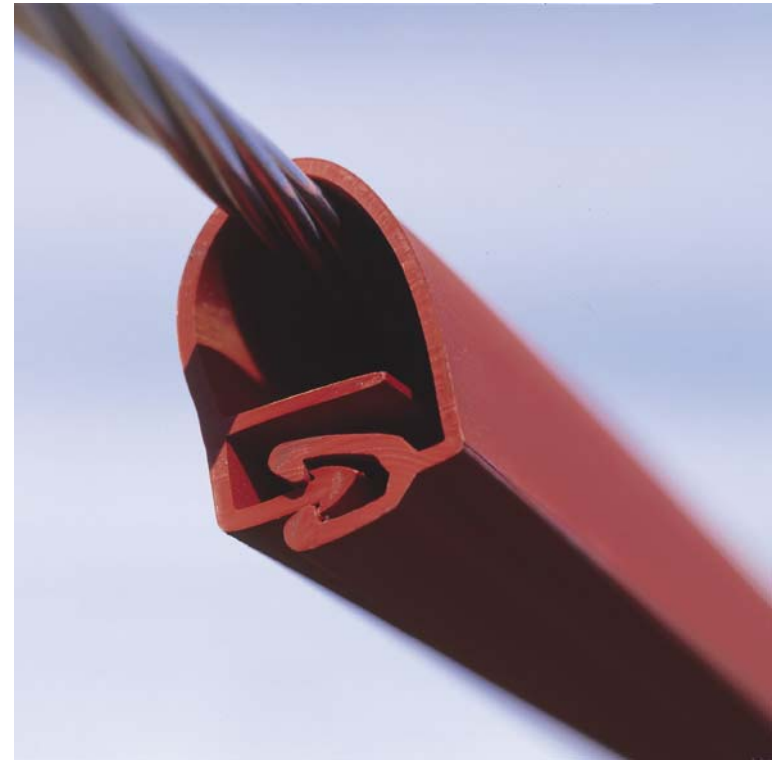
Insulation Enhancement

Overhead line

- **Medium Voltage Line Cover**

 - MVLC**

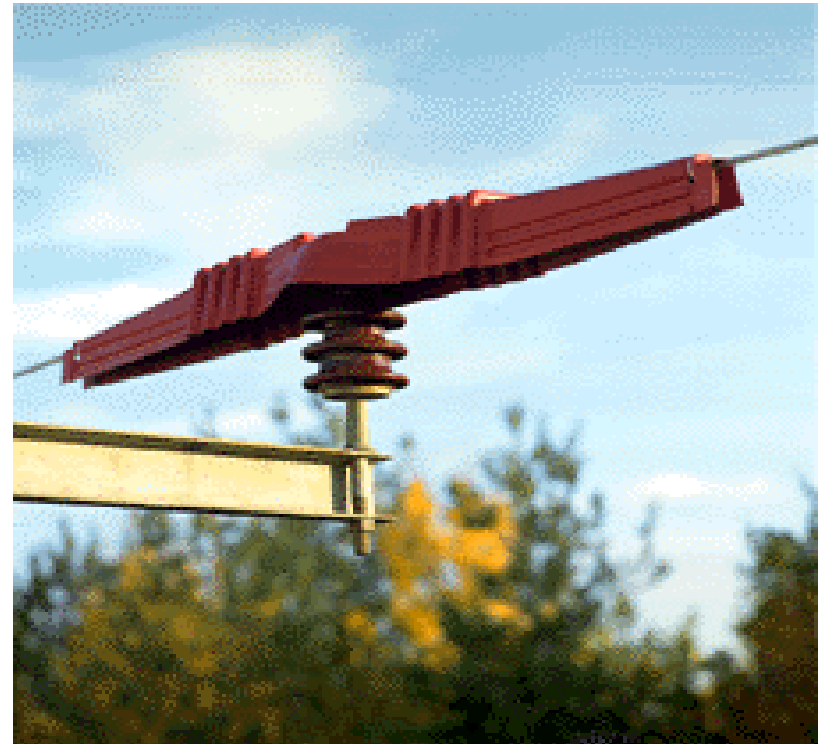
 - Provides state-of-the-art insulation
To help prevent outages caused by
By trees or wildlife. Application on
Lines by special automatic- or hand
-tool



Insulation Enhancement

Overhead line

- **Bird protection cap**
BCIC-3313
to protect birds and other animals from live conductors and insulator tops



Insulation Enhancement

Why and where apply?

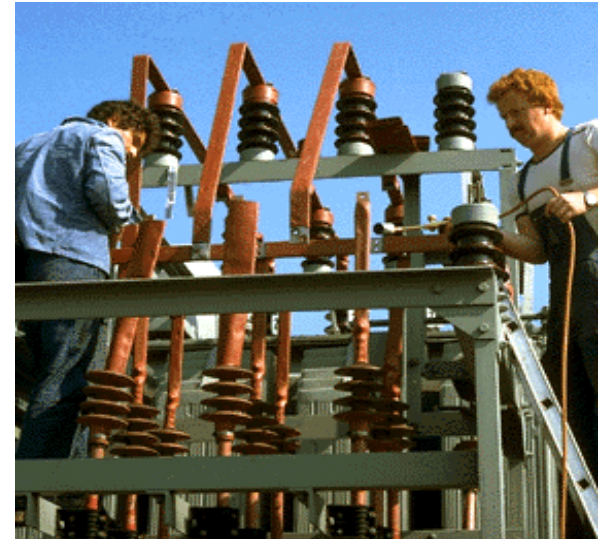
- **1 million EURO damage due to animals bridging air-clearances**



Insulation Enhancement

Increase the safety of the network in new and old transformer stations

- The transformer station is a very important part of the network
 - station failure - a district without current**
- Cable network 99% insulated**
 - less than 1% busbar**
- Protection**
 - energy system against people, animals**
 - animals against electrical shock**
 - pollution, rain, snow, wind flash-over**
 - corrosion**



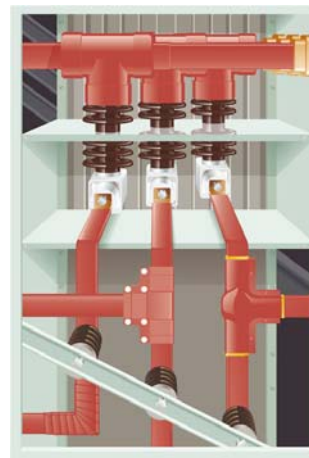
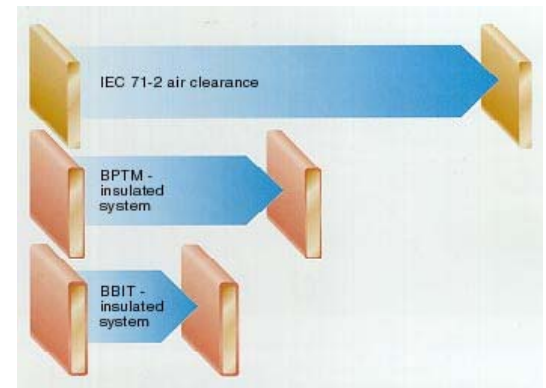
Insulation Enhancement

Save place in new transformer stations

- Phase-phase
- Phase-earth

BBIT/BPTM tubing have shown significant air clearance reduction over conventional air-insulated systems

- Transformer switch gear



Insulation Enhancement

Typical application at existing transformer station

Out door

HV
110 kV

MV
10 kV

In door

Booster sheds

Complete insulation:

- Bushing
- Bus bars
- Insulators
- Cables
- Surge Arresters

Bus bar insulation

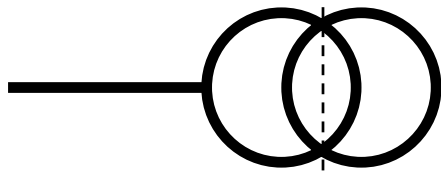
- Elements:
- Bushing
 - Bars
 - Insulators
 - Critical part

Insulation Enhancement

Typical application at new transformer station

Out door

HV
110 kV



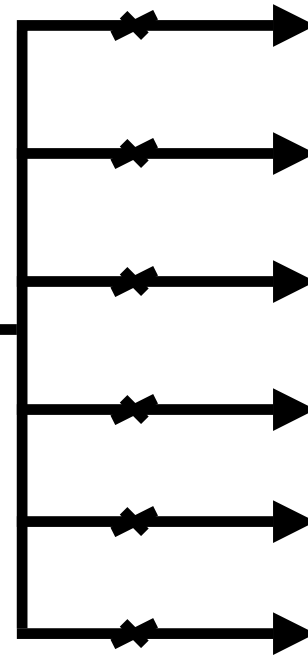
Booster sheds

MV
10 kV

Complete insulation:

- Bushing
- Bus bars
- Insulators
- Cables
- Surge Arresters

In door

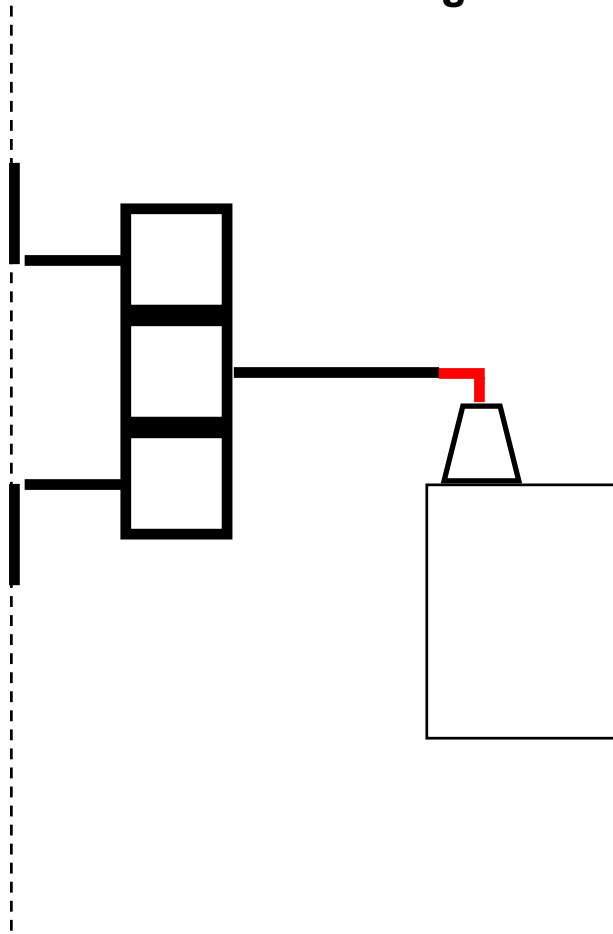


Bus bar insulation

Complete
insulation
or covered
-SF6
-Connection

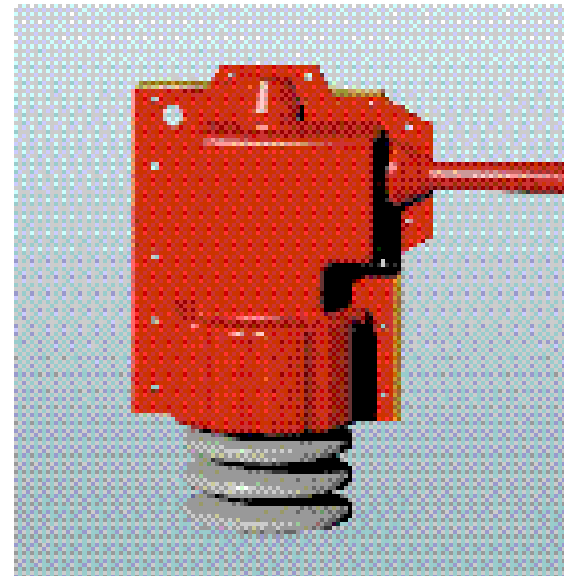
Insulation Enhancement

Application with SF6 switch gear



Bus bar insulation

BCIC 4411



Insulation Enhancement

Advantages of the **Raychem** insulation system
from TE Connectivity

- Few components
- Versatile system fitting all design
- Track erosion, UV and weathering resistant
- Simple installation
- Training and engineering support

