

Section 6: Insulating Covers, Tapes and Tubings

INSULATING COVERS

BCAC	Bushing Connection Animal Cover - up to 35kV	100
BCIC	Raysulate Bird Protection Cover - up to 24kV	101
BISG	Bus Insulator Squirrel (Possum) Guard	102
MVLC	Medium Voltage Line Cover - up to 24kV	103
OLIC	Overhead Line Insulating Cover - up to 24kV	104
OLIT	Overhead Line Insulating Tape - up to 24kV	105
MVCC	Medium Voltage Conductor Cover - up to 24kV	106

LOW VOLTAGE TAPES AND TUBING

LVBT	Busbar Insulation Tape - up to 1Kv	107
LVIT	Busbar Insulation Tubing - up to 1Kv	108
ZBIT	Zero Halogen - Low Fire Hazard Busbar Insulation Tubing - up to 3.6kV	109

MEDIUM VOLTAGE TAPES AND TUBING

BPTM	Busbar Insulation Tubing - up to 24kV	110
BBIT	Busbar Insulation Tubing - up to 36kV	112
HVBT	Busbar Insulation Tape - up to 24kV	114
HVIS	Busbar Insulation Sheeting - up to 36kV	115
RRBB	Rigid Red Barrier Board - Phase separation device	116

CREEPAGE EXTENDERS

HVCE	High Voltage Creepage Extenders - up to 66kV	117
HVCE-WA	High Voltage Creepage Extenders - Wraparound	118

Bushing Connection Animal Cover

BCAC

These insulating covers are designed to prevent animal caused outages on bushings ranging from 11 to 33kV. They fit a wide range of bushing sizes and are suitable for substation and distribution applications.

Reliable Outage Protection

TE's insulating covers have been successfully eliminating outages from all types of animals for years. These covers have been designed to provide the same great protection with enhanced features.

Fast and Versatile Installation

These BCACs are fast and easy to install. No trimming is required and they fit a wide range of bushing skirt diameters (see chart below). If needed, they can be installed on energised equipment as well. The

feathered edges of these covers allow for conductor exits in both vertical and horizontal directions. These same edges act as thermal scan sites for true temperature evaluation of the covered hardware.

High Performance Material

Superior high-voltage outdoor materials are used in the BCAC cover design. The rugged, non tracking, UV-resistant polymer ensures long-term performance even in the most extreme environmental conditions.



Product Details

Catalogue Reference	Max. Shed Diameter	Cover Height
	(mm)	(mm)
BCAC-5D/8(B12)	122	203
BCAC-7D/10(B6)	172	266
BCAC-8D/14(B6)	203	355

Bus Connection Insulating Covers

BCIC

Designed to protect energised conductors or busbar from flashovers due to contact from birds, squirrels and other wildlife. BCIC parts are made from a UV stable, track resistant, high performance Raysulate material to ensure years of reliable service.

A variety of different shapes and sizes are available to cover circuit breaker bushings, bus standoff insulators, capacitors, transformer bushings, voltage regulators, potential transformers and more.

Installation can be made quickly in the field by trimming the entry and exit holes to the required dimensions. The BCIC covers can be reentered for other maintenance needs and then reused, thus lowering overall lifetime costs.

Refer to the BCIC Quick Reference Guide for more details.



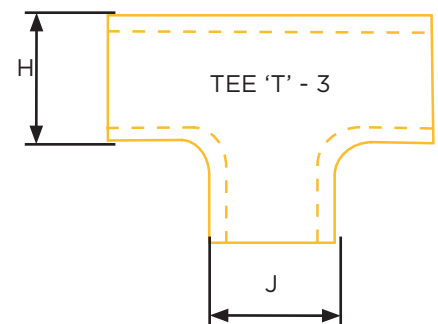
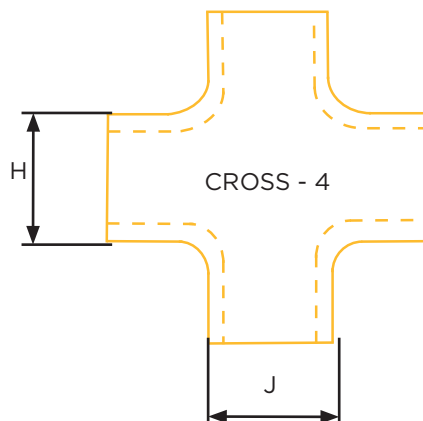
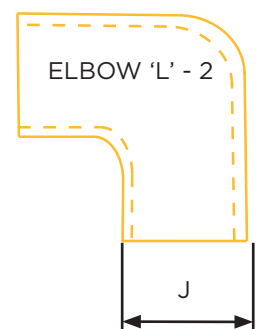
BCIC - X X X X

Represents its geometry (see below)

Represents diameter (mm) H/50 (e.g. 130 mm = 3)

Represents diameter (mm) J/50 (e.g. 180 mm = 4)

Mod code: used to distinguish two similar parts.
(e.g. BCIC-3331 and BCIC-3332 have H = 140 mm and H = 160 mm -without the mod code, they would have the same part number).



Bus Insulator Squirrel Guard for Energised Installations

BISG

This improved isolation guard prevents animal-caused outages in electrical substation equipment.

Reliable Outage Prevention

BISG discs have been successfully eliminating outages from squirrels, raccoons, possums, cats and other animals in substations for years. The BISG-24 guard has been designed to provide the same great protection with added features.

Same High Performance Material

Superior high voltage outdoor materials are used in the BISG-24 guard design. The rugged, non-tracking, UV-resistant polymer ensures long term performance even in the most extreme environmental conditions.

Faster, Easier Installation

The BISG-24 guard can be installed on energised equipment by one person. The new design incorporates

a wedge device which makes hot-stick installations on vertical and horizontal mounted insulators quick and easy.

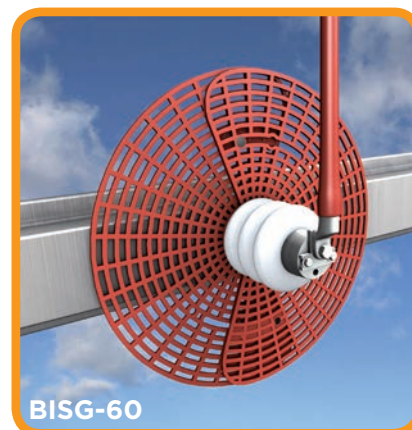
Size Range/Secure

The BISG-24 guard fits insulator core diameters ranging from 62mm through 125mm. The “grill” type design allows easy field modifications for even larger diameters (see your local TE sales representative for details). For tight phase-to-phase insulator applications, the BISG outside diameter can be reduced by trimming along the grill ribs.

The BISG continues to maintain excellent mechanical resistance to power arcs and high wind speeds.

“Invisible” Appearance

The “invisible” design allows excellent visibility of switch blades and other equipment components through the guard



Product Details

Catalogue Reference	Application	Insulator Core Diameter Range	Overall Product Diameter*
		(mm)	(mm)
BISG-60/115-02-(S10)	Dead - Hand Installed	25 - 115	580
BISG-60/115-03-HOT(B10)	Live - Hot Stick Applied	25 - 115	580
BISG-24-01(B10)	Dead - Hand Installed	62 - 125	610

* Overall product diameter can be trimmed down to 430mm for BISG-60, and 406mm diameter for BISG-24

Medium Voltage Line Cover

MVLC

Outage Prevention

The MVLC line cover provides state of the art insulation to help prevent electrical outages caused by trees or wildlife coming into contact with distribution lines.

Cost Effective

The MVLC cover is designed to insulate existing bare lines without costly conductor replacement expenditures or additional line hardware. The MVLC cover may be applied selectively on problem spans when temperatures are above 0°C.

Live, Consistent Installation

TE has designed a special tool that ensures fast and reliable application of the MVLC cover. The tool allows application on energised lines. It attaches directly to the overhead conductor and remains stationary in a single location on each span. The tool may be manually or automatically operated, using a hand crank or with the aid of a gasoline

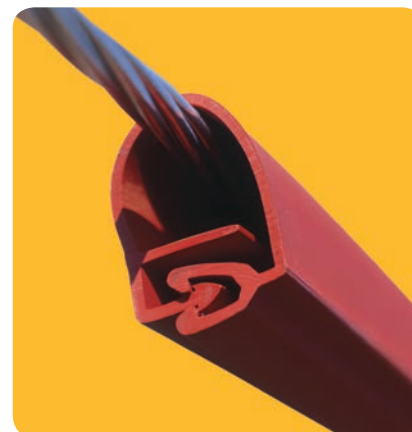
powered drill. The tool forms, closes, and feeds the MVLC cover along the conductor with speed and consistency. The MVLC hand tool also allows for quick installation on short lengths of conductors, especially in substations.

Wide Use Range

Three sizes cover conductors from 16 - 800mm². Higher performance product available. A mastic sealed version of the product is available for 25 kV or higher performance at 15 kV.

High Voltage Material

The MVLC cover material formulation is based on TE's Raychem products field-proven experience with HV products in harsh environments. The MVLC material is UV stable as well as tracking and erosion resistant. The MVLC cover is electronically cross-linked to create an extremely robust insulation system, ensuring many years of reliable operation in the harshest environments.



Product Details

Catalogue Reference	Voltage Class	Spool Length	Conductor Size	Substation Installation Tool	Overhead Installation Tool
	(kV)	(m)	(mm ²)		
MVLC-14-A/U	15	Up to 99	100	MVLC-HAND-TOOL-14	MVLC-14-TOOL-100
MVLC-14-A/241	25	Up to 99	100	MVLC-HAND-TOOL-14	MVLC-14-TOOL-100
MVLC-18-A/U	15	Up to 185	75	MVLC-HAND-TOOL-02	MVLC-18-TOOL-03-2006
MVLC-18-A/241	25	Up to 185	75	MVLC-HAND-TOOL-02	MVLC-18-TOOL-03-2006
MVLC-38-A/U	15	Up to 800	50	MVLC-HAND-TOOL-02	MVLC-38-TOOL-03-2006
MVLC-38-A/241	25	Up to 800	50	MVLC-HAND-TOOL-02	MVLC-38-TOOL-03-2006

Overhead Line Insulating Channel

OLIC

OLIC is a 'clip-on' insulating channel which provides flashover protection for overhead lines. Installation of OLIC prevents power outages from swinging conductors and intermittent contact with birds, animals and trees. OLIC is made from a track-resistant, cross-linked polymer of high dielectric strength. Installation is simple, requiring no heat and no tools, making OLIC ideal for retrofit applications. OLIC-O sections clip over the conductor and are held in place with UV stabilised plastic tie-wraps. OLIC-C sections clip over the conductor and are held in place with a removable and re-usable closure rail.

Applications

OLIC-O and OLIC-C are suitable for use on overhead line conductors with diameter from 4 mm to 25 mm. Both channels are available in 1 m and 3 m lengths. These can be cut easily to form a range of shapes and linked together to form long lengths. OLIC has passed test programmes

set by Raychem and utilities for applications up to 15 kV (OLIC-O) and 24 kV (OLIC-C).

Live line working

OLIC-O has been installed by one large utility using live-line working techniques.

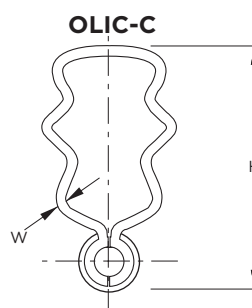
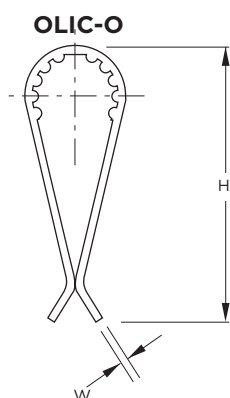
Features/benefits

- Clip-on, tool-free installation allows easy retrofit application
- Modular design permits re-enterable and re-usable applications
- High dielectric strength provides good protection against accidental line flashovers
- UV-resistance and weather resistance gives maintenance-free lifetime
- Raychem's high voltage test programme assures long term reliability
- Mechanically robust polymer design is lightweight and vandal resistant



Product Details

Catalogue Reference	Dimension H nom.	Dimension W min	Length
	(mm)	(mm)	(mm)
OLIC-O-1000	85	1.5	1000
OLIC-O-3000	85	1.5	3000
OLIC-C-1000	76	1.5	1000
OLIC-C-3000	76	1.5	3000



Overhead Line Insulation Tape

OLIT

OLIT tape is an adhesive-lined, heat shrinkable insulating tape which has been helically preformed to make it easy to install on overhead conductors. When the tape is wrapped around the conductor and shrunk down by the application of heat, the adhesive melts and amalgamates the overlapping layers of tape together thus producing, in effect, a wraparound tube. Although self-amalgamating, OLIT tape does not adhere to metal allowing easy removal for maintenance.

Applications

OLIT tape provides overhead line insulation for the prevention of faults caused by swinging conductors and intermittent contact with tree branches, birds and animals. OLIT tape provides flashover protection up to 17.5 kV or 25 kV if a second layer of tape is applied.

Features/benefits

- Compatible with all other products in the Raychem MV insulation enhancement system
- Remains flexible at low temperatures
- High dielectric strength, weather and track-resistance ensure excellent electrical performance
- Continuous operating temperature up to 70°C
- Suitable for indoor and outdoor use
- Preformed into a spiral for easy installation on overhead conductors
- Easily and cleanly removed for maintenance
- Can be stored indefinitely at temperatures up to 50°C without loss of performance



Product Details

Catalogue Reference	Conductor Outside Diameter	Conductor Size	Spool Length	Conductor Length Insulated per Piece
	(mm)	(mm ²)	(mm)	(mm)
OLIT-M	7	35	8000	6700
OLIT-M	9	50	8000	6200
OLIT-M	12	95	8000	5300
OLIT-M	15	150	8000	4400

Note: Maximum longitudinal change after free recovery: -30 %.

Medium Voltage Conductor Covers for Outage Prevention

MVCC

Raysulate Medium Voltage Conductor Covers (MVCC) provide high quality electrical insulation for substation leads and jumpers. These covers are made from a non-tracking silicone material that is suitable for harsh medium voltage outdoor environments. MVCC covers are split for easy installation.

Features

- The MVCC's flexibility allows installation on tight bends which makes it ideal for substation applications.
- MVCC covers are designed to protect energised conductors from flashovers due to contact from birds and animals.
- The Medium Voltage Conductor Cover is suitable for applications up to 25 kV phase to earth.
- Two sizes are currently available and will fit conductors with diameters ranging from 12 - 28mm.



Product Details

Catalogue Reference	Conductor Diameter Range	Colour	Length
	(mm)	(mm)	(mm)
MVCC-10/.40	11	Red	30.4
MVCC-G-10/.40	11	Gray	30.4
MVCC-19/0.750	12 - 19	Red	15.2
MVCC-G-19/0.750	12 - 19	Gray	15.2
MVCC-25/1.0	19 - 28	Red	7.6
MVCC-G-25/1.0	19 - 28	Gray	7.6

Low Voltage Busbar Insulating Heat Shrink Tape

LVBT

LVBT is an adhesive-coated, low-voltage heat shrinkable tape.

One wrap insulates straight and bent bars in retrofit applications where tubing cannot be used. In addition, LVBT easily insulates unusual connections and geometries in the factory or field.

Features/benefits

- Adhesive layer fuses the tape layers but does not stick to

bus or hardware, providing tough insulation up to 1 kV in accordance with ANSI C37.20-1987 and up to 3.6 kV in accordance with

- IEC specifications
- Rated to ANSI/IEEE C37.20-1987
- UL-recognised to Standard 224 (file E137417), 600 V-125°C-VW.1
- Rated Voltage: 1kV



Product Details

Catalogue Reference	Roll Width	Roll Length
	(mm)	(mm)
LVBT-1-R	25	7500
LVBT-2-R	50	7500
LVBT-4-R	100	7500

Note: Maximum longitudinal change after free recovery: -30 %.

Rectangular Busbar*



Catalogue Reference	Bus Width	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-1-R	25	1200	8
LVBT-2-R	50	1500	4
LVBT-2-R	75	1100	4
LVBT-2-R	100	800	4
LVBT-2-R	150	600	4
LVBT-4-R	200	900	4

*Maximum thickness: 15mm

Square Busbar



Catalogue Reference	Bus Width	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-2-R	25	2000	4
LVBT-2-R	50	1000	4
LVBT-2-R	75	600	4
LVBT-4-R	100	1000	2
LVBT-4-R	150	600	2
LVBT-4-R	200	900	4

Round Busbar



Catalogue Reference	Bus Diameter	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-1-R	12	2600	8
LVBT-2-R	25	2600	4
LVBT-2-R	50	1300	4
LVBT-2-R	75	900	4
LVBT-4-R	100	1300	2
LVBT-4-R	200	900	4

Low Voltage Busbar Insulation Tubing

LVIT

LVIT is a black, medium wall, flame retarded heat-shrinkable tubing suitable for insulating busbars up to 1 kV. This highly flexible tubing can be used on a variety of curved and bent busbars of both circular and rectangular cross-section. LVIT tubing can be easily installed in a factory environment using an oven or in the field using a gas torch or hot air. LVIT tubing is manufactured in UV resistant material, making it suitable for both indoor and outdoor applications.

Applications

LVIT is suitable for both enclosed and exposed busbars and for connections in switchgear, substations, motor control centres and other electrical equipment.

Features/benefits

- Flame retarded
- Continuous operating temperature rating up to 105°C
- High shrink ratio reduces inventory and simplifies product selection
- Suitable for indoor and outdoor applications
- Electrical and mechanical performance are retained after cleaning with hydrocarbon solvent
- Good thermal emissivity and contact with busbars means no derating is needed
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- UL approved
- Rated Voltage: 1kV



Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
LVIT-30/10-A/U	60	30	10	1.5
LVIT-75/25-A/U	30	75	25	1.5
LVIT-150/50-A/U	30	150	50	1.5
LVIT-235/105-A/U	25	235	105	1.5

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Low Fire Hazard Busbar Insulation Tubing

ZBIT

ZBIT is a halogen free, black, medium wall, heat shrinkable tubing which insulates busbars and other equipment to the same fire safety standards as modern Low Fire Hazard specified cables. The ZBIT range of busbar insulation tubings uses the latest Low Fire Hazard zero halogen polymer technology.

LSF performance

This provides ZBIT with exceptionally high flame retardancy and Low Smoke and Fume performance. This significantly reduces potential dangers to people from toxic smoke and reduced visibility. Equipment is also protected from corrosive fumes. Low Smoke and Fume and Low Fire Hazard systems are increasingly specified for places such as railways, buildings, power plants, ships, oil and gas production installations and chemical plants. ZBIT tubing can be easily installed using an oven, gas torch or hot air.

Applications

ZBIT is ideal for enclosed and exposed busbars and connections in substations, switchgear, motors and other electrical equipment. All sizes

of ZBIT are suitable for aluminium or copper busbars of rectangular or round cross sections.

Features/benefits

- Zero-halogen material has low toxicity index and acid gas generation
- Low smoke and fume formulation improves visibility in emergencies and reduces acid gas
- High flame retardants helps fire containment
- Continuous operating temperature up to 105°C
- Radiation cross linked polymer technology gives good solvent resistance
- Good thermal emissivity and contact with busbars means no derating is required
- Extremely high split resistance and excellent flexibility
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- Rated Voltage: 3.6kV



Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
ZBIT-55/22	30	55	22	1.5
ZBIT-80/35	20	80	35	2.0
ZBIT-130/55	25	130	55	2.0

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Medium Wall Busbar Insulation Tubing 25kV

BPTM

BPTM is a medium wall, heat shrinkable tubing which provides insulation enhancement and protection against flashover and accidentally induced discharge. Particularly useful in confined spaces BPTM tubing can be used on both circular and rectangular copper or aluminium busbars. On application of heat the tubing shrinks snugly over the busbar profile ensuring that the required minimum wall thickness is obtained. BPTM tubing can be installed easily during large scale production using an oven or in the field using a gas torch or hot air. BPTM tubing is manufactured from a non-halogen based polymer which has excellent performance in high voltage environments and greatly reduces the noxious and corrosive effects in fire situations.

Applications

The use of BPTM tubing allows equipment designers the freedom to reduce air spacing between busbars, such as in the manufacture of switchgear cabinets where space is at a premium. BPTM provides flashover protection up to 25 kV.

Features/benefits

- Excellent flexibility, can be installed on a wide range of curved or bent busbars without cracking or creasing
- High shrink ratio reduces inventory and simplifies product selection
- Exceptional insulation and long term reliability even at high continuous operating temperatures
- Extremely durable, resists damage from solvents, ultraviolet light, weathering, mechanical impact and general wear and tear
- Suitable for indoor and outdoor use
- Excellent anti-tracking properties
- Good thermal emissivity and contact with busbars means no derating is required
- Flame retardant and non-halogen based material reduces flammability and the toxic and corrosive effects in fire situations
- Rated Voltage: 25kV



Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
BPTM-15/6-A/U-4	30	15	6	1.90
BPTM-30/12-A/U-4	30	30	12	2.20
BPTM-50/20-A/U-4	30	50	20	2.35
BPTM-75/30-A/U-4	20	75	30	2.35
BPTM-100/40-A/U-4	25	100	40	2.35
BPTM-120/50-A/U-4	25	120	50	2.80
BPTM-175/70-A/U-4	15	175	70	2.80
BPTM-205/110-A/U-4	10	205	110	2.80
BPTM-235/130-A/U-4	20	235	130	3.10

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

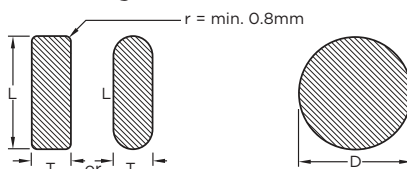
Clearance Reduction

The tables indicate the clearance reductions which are possible using BPTM tubing. These are derived from BIL, AC withstand, DC withstand and discharge extinction tests. These clearances should not be adopted without testing by the user. Sharp electrodes and unusual geometries may require wider clearances.

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	105	160
24	115	150	220
36	200	285	320

Product Selection

BPTM should normally be used on the following busbar sizes.



Product Size	Rectangular bars		Round bars	
	L + T (mm)		D (mm)	
	min.	max.	min.	max.
BPTM-15/6	12	18	6.5	12
BPTM-30/12	22	38	13.5	25
BPTM-50/20	36	65	22	43
BPTM-75/30	55	95	33	63
BPTM-100/40	70	130	44	86
BPTM-120/50	90	165	55	105
BPTM-175/70	125	235	80	150
BPTM-205/110	200	276	127	190
BPTM-235/130	235	315	150	220

Key Product Specifications	Test Method	Requirement
Thermal endurance	IEC 216	105 °C min.
Accelerated ageing - Tensile strength - Ultimate elongation	ISO 188, ASTM D2671	168 hrs @ 120 °C 10 MPa min. 300% min.
Comparative tracking index	IEC 112, VDE 0303/1	KA 3c
Dielectric strength	ASTM D149, IEC 243	180 kV/cm min. @ 2 mm 150 kV/cm min. @ 2.5 mm 120 kV/cm min. @ 3 mm
Low temperature flexibility	ASTM D2671 Procedure C	No cracking after 4 hrs @ -40 °C
Smoke index	NES 711	Less than 120
Acid gas generation	Raychem PPS 3010 4.23	Less than 1% by weight

Heavy Wall Busbar Insulation Tubing 36kV

BBIT

BBIT is a thick wall, heat shrinkable tubing which provides insulation enhancement and protection against flashover and accidentally induced discharge. Particularly useful in confined spaces, BBIT tubing can be used on both circular and rectangular copper or aluminium busbars. On application of heat the tubing shrinks snugly over the busbar profile ensuring that the required minimum wall thickness is obtained. BBIT tubing can be installed easily during large scale production using an oven or in the field using a gas torch or hot air. BBIT tubing is manufactured from a non-halogen based polymer which has excellent performance in high voltage environments and reduces the noxious and corrosive effects in fire situations.

Applications

The use of BBIT tubing allows equipment designers the freedom to reduce air spacing between busbars, such as in the manufacture of switchgear cabinets where space is at a premium. BBIT tubing provides flashover protection up to 36 kV.

Features/benefits

- Excellent flexibility means BBIT can be installed on a wide range of curved or bent busbars without cracking or creasing
- Exceptional insulation and long term reliability even at high continuous operating temperatures
- Extremely durable, resists damage from solvents, ultraviolet light, weathering, mechanical impact and general wear and tear
- Suitable for indoor and outdoor use
- Excellent anti-tracking properties
- Good thermal emissivity and contact with busbars means no derating is required
- Flame retardant and non-halogen based material reduces flammability and the toxic and corrosive effects in fire situations
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- Rated Voltage: 36kV



Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
BBIT-25/10-A/U	25	25	10	3.6
BBIT-40/16-A/U	20	40	16	3.6
BBIT-65/25-A/U	15	65	25	3.6
BBIT-100/40-A/U	15	100	40	3.6
BBIT-150/60-A/U	15	150	60	3.6
BBIT-175/80-A/U	10	175	80	3.6

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

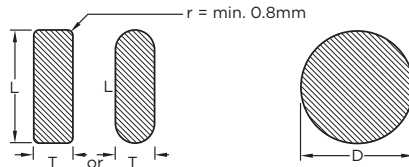
Clearance Reduction

The tables indicate the clearance reductions which are possible using BPTM tubing. These are derived from BIL, AC withstand, DC withstand and discharge extinction tests. These clearances should not be adopted without testing by the user. Sharp electrodes and unusual geometries may require wider clearances.

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	30	40	120
17.5	45	60	160
24	60	90	220
36	100	160	320
Rectangular Busbars			
12	35	45	120
17.5	55	65	160
24	70	100	220
36	140	190	320

Product Selection

BPTM should normally be used on the following busbar sizes.



Product Size	Rectangular bars		Round bars	
	L + T (mm)		D (mm)	
	min.	max.	min.	max.
BBIT-25/10	17	28	11	20
BBIT-40/16	28	45	18	32
BBIT-65/25	44	69	28	47
BBIT-100/40	69	102	44	72
BBIT-150/60	102	148	65	105
BBIT-175/80	133	196	85	125

Key Product Specifications	Test Method	Requirement
Thermal endurance	IEC 216	105 °C min.
Accelerated ageing - Tensile strength - Ultimate elongation	ISO 188, ASTM D2671	168 hrs @ 120 °C 10 MPa min. 300% min.
Comparative tracking index	IEC 112, VDE 0303/1	KA 3c
Dielectric strength	ASTM D149, IEC 243	180 kV/cm min. @ 2 mm 150 kV/cm min. @ 2.5 mm 120 kV/cm min. @ 3 mm
Low temperature flexibility	ASTM D2671 Procedure C	No cracking after 4 hrs @ -40 °C
Smoke index	NES 711	Less than 120
Acid gas generation	Raychem PPS 3010 4.23	Less than 1% by weight

High Voltage Busbar Insulation Tape

HVBT

TE's HVBT is a heat shrinkable, adhesive coated tape which provides insulation enhancement and protection against accidentally induced discharge. HVBT tape is designed to combine the integrity of a heat shrinkable tubing with the versatility of a wraparound product. HVBT is quick and easy to install. Upon application of heat the tape shrinks down and the adhesive lining melts amalgamating the overlapping layers together, producing a complete lap to lap seal. A single layer of HVBT tape, two-thirds overlapped, will provide AC voltage withstand (flashover protection) to at least 17.5 kV increasing to 25 kV if

a second layer is applied.

Although HVBT tape will stick to itself and other insulating materials it will not adhere to metal or porcelain allowing easy removal for maintenance.

Applications

HVBT tape offers a simple and effective solution to the problems of retrofit insulation of busbars particularly where existing equipment cannot be dismantled. It can be used for indoor and outdoor applications and is easily installed over a wide variety of shapes including complex connections.

- Rated Voltage: 36kV

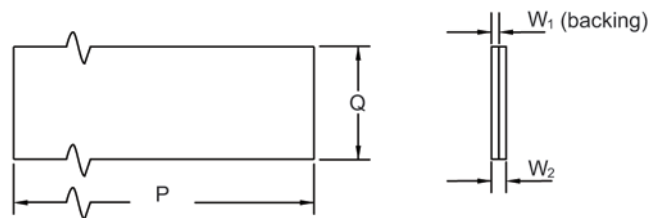


Product Details

Catalogue Reference	Dimensions				
	Q a min	W ₁ a min	W ₁ b min	W ₂ b min	Spool Length P
	(mm)	(mm)	(mm)	(mm)	(m)
HVBT-12-A	25	0.38	0.56	0.86	10
HVBT-14-A	50	0.38	0.56	0.86	10
HVBT-15-A	75	0.38	0.56	0.86	10
HVBT-16-A	100	0.38	0.56	0.86	10

Clearance Reduction

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	104	160
24	115	150	220
36	200	285	320



High Voltage Insulation Sheets

HVIS

HVIS is an adhesive coated, heat shrinkable sheet which provides insulation enhancement and protection against accidentally induced discharge. When heated the HVIS sheet shrinks in two directions to tightly conform to complex shapes. A Raychem void filling mastic, S1061, can be added to ensure that even protruding shapes are insulated. A Raychem sealing mastic, S1085, can also be applied to provide an environmentally sealed connection. The sheet can be cut to size on site and loosely secured in place with clamps and brackets available from us. Once installed, the clamps and brackets can be

removed and re-used. HVIS sheet will provide flashover protection up to 17.5 kV or up to 25 kV if the void-filling mastic is applied underneath the sheet, or up to 36 kV if a double layer of HVIS is used. Re-usable joint covers can also be made to allow access or maintenance when required.

Applications

HVIS sheet will cover almost any size or shape of busbar joint, making it ideal for insulating busbar tees, elbows and other connections where tubing and tape cannot be used.

- Rated Voltage: 36kV

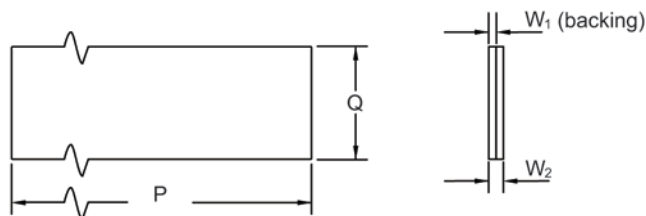


Product Details

Catalogue Reference	Dimensions			
	Q a min	W ₁ a min	W ₂ b min	Length P
	(mm)	(mm)	(mm)	(m)
HVIS-05	660	1.5	2.4	0.5
HVIS-10	660	1.5	2.4	10.0
S1061-8-300	60	-	-	0.3
S1085-1-300	20	-	-	0.3
HVIS-TOOLS-01	(basic clamp and bracket kit)			
HVIS-TOOLS-02	(extended clamp and bracket kit)			

Clearance Reduction

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	104	160
24	115	150	220
36	200	285	320



Interphase Insulating Barrier Board

RRBB

RRBB board is a red, non-structural, interphase barrier for switchgear applications. The RRBB board is made from a homogeneous polymer and has excellent track resistance, especially after a power-arc. It can be easily fabricated into a shape; it produces less nuisance dust and less tooling wear than other boards.

It is a tough insulating board that can be secured to the underside of structures to insulate them from live equipment where there are

reduced clearances. Raychem RRBB can be easily cut, drilled or formed on site to allow fitting to complex structures.



Product Details

Catalogue Reference	Dimensions		
	Width	Length	Thickness
	(mm)	(mm)	(mm)
RRBB-6-1.25Mx1.25M-B	1220	1220	6
RRBB-2440/1220-6.2-BP	1220	2440	6

High Voltage Creepage Extenders

HVCE

Raysulate Creepage Extenders increase the flashover performance of insulators by reducing the surface electric stress, reducing the leakage current and increasing the electric strength of the insulators. Installation of creepage extenders:

Increases creepage length

This increases electric strength by reducing leakage current and surface stress.

Improves insulator shape

The increased shed diameter improves strike distance and improves heavy wetting performance by creating an umbrella effect.

Bonds to insulator surface

The extender adhesive has been

specially formulated to strongly bond to the existing porcelain or glass skirt. Thus, the assembly needs only periodic inspection and will be effective many times longer than grease.

Rugged

Extenders are designed to be resistant to conventional spray washing techniques and will withstand all normal handling abuse and extreme weather conditions.

Simple to install

Just degrease the insulator and shrink the extender with a gas torch or hot air gun. Raychem can provide installation training.



Product Details

Catalogue Reference	Dimensions	Application Range		
	Min. Internal Dia. of the Extender (as supplied)	Max. Shed Dia. of Insulator	Min. Shed Dia. of Insulator	Nominal Creepage Extension per Extender
	(mm)	(mm)	(mm)	(mm)
HVCE-100/ 80-01	115	100	80	100
HVCE-120/100-01	135	120	100	100
HVCE-140/120-01	155	140	120	100
HVCE-160/140-01	180	160	140	100
HVCE-183/161-01	205	183	161	100
HVCE-205/184-01	230	205	184	100
HVCE-226/206-11	241	226	206	100
HVCE-247/227-11	262	247	227	100
HVCE-268/248-11	283	268	248	100
HVCE-289/269-11	304	289	269	100
HVCE-310/290-11	325	310	290	100
HVCE-331/311-11	346	331	311	100
HVCE-352/332-11	367	352	332	100
HVCE-373/353-11	388	373	353	100
HVCE-394/374-11	409	394	374	100

High Voltage Creepage Extenders - Wraparound

HVCE-WA

TE has now added a range of cold applied wraparound creepage extenders to its list of Raychem heat shrink creepage extenders (HVCE's). This will considerably reduce installation time in situations where heavy metal work or complicated connection geometry makes disconnection on the insulator or bushing difficult.

Cold-applied wraparound creepage extenders work the same way as conventional extenders but leave a gap where the extender has stretched open allowing it to wrap around the porcelain or glass skirt onto which it is installed. Typically the gap is between 20mm and 30mm. Although it may appear to offer the leakage current an easy

path along the insulator or bushing profile, extensive testing and field application clearly prove otherwise.

Application Range

Each extender is tailored to suit the insulator or bushing profile used. There is a wide range of extenders already available, many of which fit the more commonly used profiles. When an extender is required for a previously unused profile, it is straight forward to create.

The range already covers many insulator and bushing profiles from approximately 150mm to 500mm in diameter. There is no upper voltage limit to the use of creepage extenders with applications in use >250kV a.c. and d.c.



Product Details

Catalogue Reference	Shed Diameter of Insulator	Standard Pack
	(mm)	(pcs/box)
HVCE-WA-109-01-FT(B6)	109	6
HVCE-WA-206-01 (B6)	206	6
HVCE-WA-216-01 (B6)	216	6
HVCE-WA-248-01 (B6)	248	6
HVCE-WA-251-01 (B6)	251	6
HVCE-WA-267-01 (B6)	267	6
HVCE-WA-280-01-FT (B6)	280	6
HVCE-WA-303-01 (B6)	303	6
HVCE-WA-319-01 (B6)	319	6
HVCE-WA-320-01 (B6)	320	6
HVCE-WA-330-01 (B6)	330	3
HVCE-WA-341-01 (B6)	340	6
HVCE-WA-356-01(B6)	356	6
HVCE-WA-367-01 (B6)	367	6
HVCE-WA-393-01 (B6)	393	6
HVCE-WA-440-01 (B6)	440	6
HVCE-WA-452-01 (B6)	452	6
HVCE-WA-501-01 (B6)	501	6
HVCE-WA-528-01 (B6)	528	3
HVCE-WA-611-01 (B6)	611	6

Other sizes available on request