

**Insulators**





# Insulators

Tyco Electronics Energy Division covers a wide range of polymeric, hybrid and porcelain insulators. For decades all these products have demonstrated reliable performance in various types of applications all over the world.

**Composite insulators** are based on our 30 years experience in the field of crosslinked polymers for medium and high voltage applications. They consist of a polymeric housing over a pultruded fiberglass rod to which galvanized steel or aluminum end fittings are attached. By molding directly over the end fitting, or by using a track resistant polyurethane, moisture ingress to the fiberglass rod is prevented. Housing materials in either ethylene vinyl acetate or silicone are available depending on customer preference.



Modular lightweight insulators consist of a solid polymeric core with a polymeric housing. Stainless steel threads can be threaded directly into the polymeric core without the use of bulky metal fittings. These insulators are ideal for use in outdoor equipment and can be designed according to specific customer requirements.



**Hybrid insulators** consist of a high strength ceramic core with a polymeric housing. The best features of ceramic and polymeric insulators are combined, resulting in high mechanical strength and excellent electrical behavior under polluted conditions. For extremely polluted environments a protected creepage design is available which provides outstanding electrical performance using an economical solution.



**Porcelain insulators** are the traditional choice for distribution line, busbar and apparatus insulation. Manufactured from high quality non-porous electrical porcelain, they provide a long life and cost effective solution for the majority of applications. Porcelain insulators designed, manufactured and sold under the brand names of Morlynn, Dulmison and Zibo have an 80 year service experience in electric power supply and rail applications.



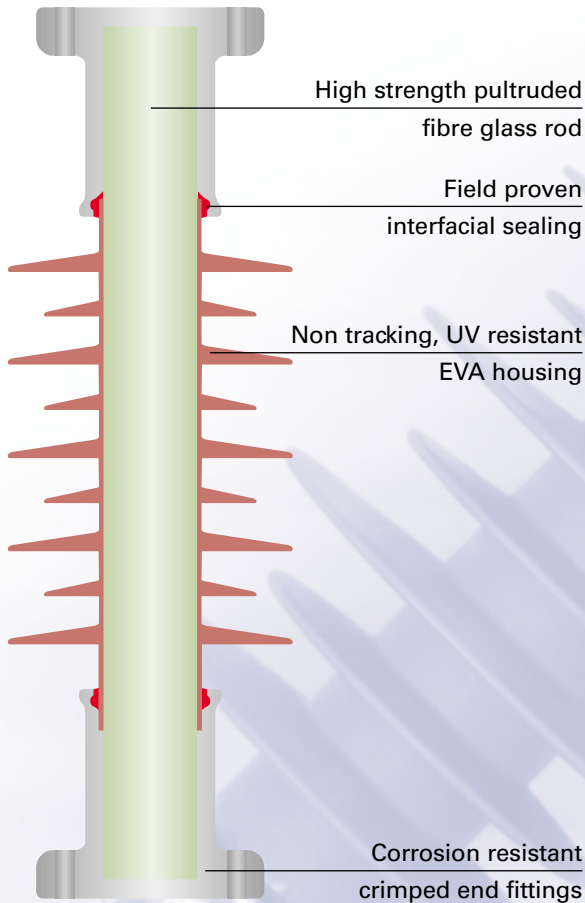
## Composite Insulators

Composite insulators are available for applications up to system voltages of 52 kV. They provide a reliable solution for power utilities and railway companies with installations in severely polluted environments all over the world. The core of a composite insulator is a pultruded fiber glass rod which provides a high mechanical strength. In a direct injection molding process a non-tracking, erosion and UV resistant polymeric housing is molded directly onto the fiberglass rod. A corrosion resistant metal end fitting is crimped onto each end of the rod to provide a high mechanical strength. A new developed crimping control technology monitors the assembly process of the metal fittings and ensures that crimping forces cause no damage to the fiberglass rod while achieving a crimp that will withstand the highest possible mechanical loads. Sealed with a tracking and erosion resistant polyurethane barrier, the core is protected from deterioration due to moisture ingress.

Composite insulators are available as tension (suspension), line post and station post insulators. For railway applications, tension and strut composite insulators are available in a large variety of configurations.

The maintenance free characteristics of our EVA material have been demonstrated during service experience of more than 30 years. This historical data is supported by long term investigations under severe pollution conditions in railway tunnels in Japan\*.

Composite tension insulators



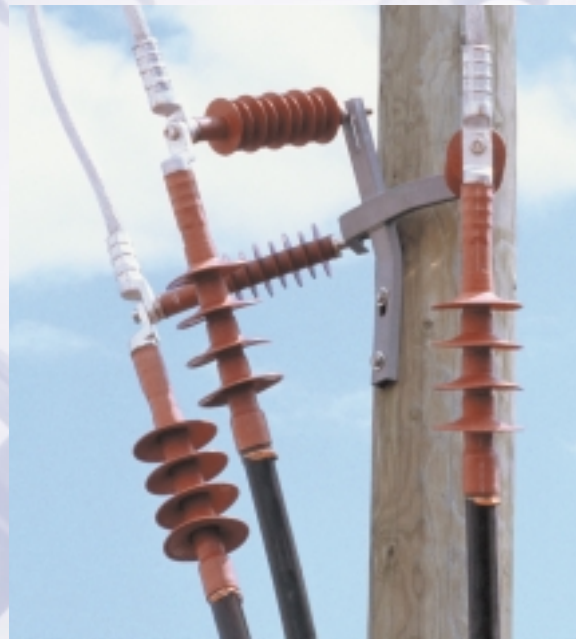
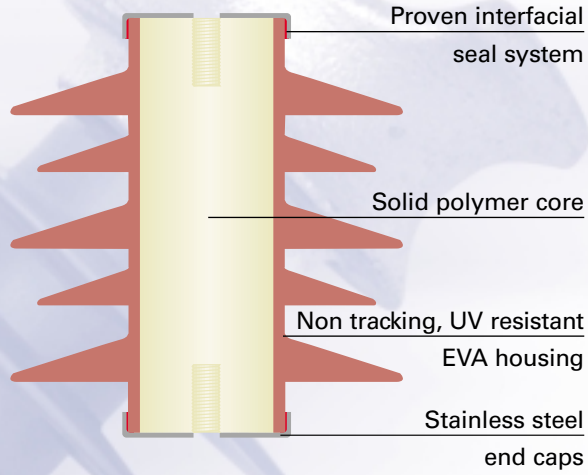
Composite post insulators on an overhead line switch



\*(Kunikazu Izumi, Kenzo Kadotani: „Applications of Polymeric Outdoor Insulation in Japan“; IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 6 No. 5, October 1999)

A modular lightweight insulator is an alternative form of composite insulator. It comprises a solid polymer core covered by elastomeric shedded insulation. A non-tracking, erosion and UV resistant housing is bonded to the polymer core to form an excellent environmental seal. The mechanical connection is achieved by stainless steel studs which are threaded directly into the polymer core.

The modular lightweight insulator can be used as a support in applications such as outdoor cable terminations, busbar supports on trains and OEM applications like disconnectors and fuseholders. Due to the modular construction of the insulator virtually any customer required design can be manufactured. It therefore provides a flexible solution for a multitude of applications.



Modular lightweight insulators as stand-off insulators for MV terminations



Modular lightweight insulators in combination with Raychem surge arresters in overhead line fuseholders

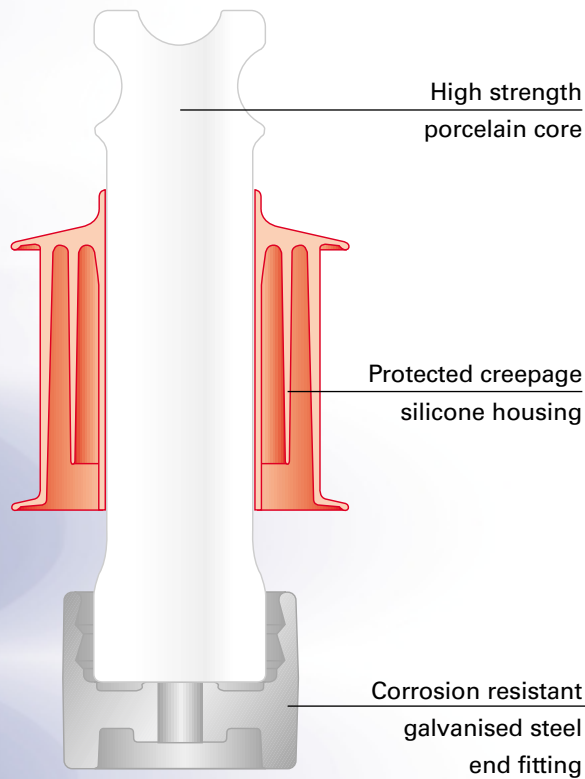
## Hybrid Insulators

Hybrid insulators combine the best features of ceramics and polymers. A ceramic core provides high mechanical strength and rigidity while a hydrophobic polymeric housing offers considerable weight reduction and superior electrical performance.

Available products include line post insulators for system voltages up to 25 kV, station post insulators for system voltages up to 115 kV and railway catenary insulators for 15/25 kV lines.

Designed especially for highly polluted areas, an insulator with a highly protected creepage polymeric housing has been developed. Its protected creepage design prevents both the deposition of contaminants and the complete wetting of the surface. Reduced leakage currents lead to a reduced flashover probability and therefore to significant energy savings. Compared to an equivalent porcelain insulator the hybrid insulator has a reduced weight and is less prone to vandalism.

The high strength porcelain core and the cemented end fittings have the mechanical strength and reliability of an equivalent porcelain insulator. Hybrid insulators combine the ceramic technology experience of Dulmison, Morlynn and Zibo over 80 years with Raychem's 30 years of experience in polymeric outdoor materials. Field experience in some of the worlds most severely polluted environments have demonstrated the excellent performance of this type of insulator.



Raybowl insulators installed in a high polluted area in Latin America.



Working conditions of Raybowl insulators

## Porcelain Insulators

Trading under the names Morlynn, Dulmison and Zibo, Tyco Electronics Energy Division offers a comprehensive range of cost effective porcelain solutions for the electricity supply and rail industries. Experience in the design and manufacture of porcelain insulators exceeds 80 years.

The manufacturing processes employ some of the most advanced technologies in the field of ceramic insulator production. A commitment to quality is evidenced by independent certification of quality systems complying with international standards. This is further reinforced by our accredited testing laboratories which are capable of conducting a wide range of design and development tests along with type, sample and routine testing to recognized international and national standards.

Insulators are made from high quality non porous electrical porcelain and galvanized ferrous (or non-ferrous) end fittings which provide long life and reliable performance over a wide range of environmental conditions. They are made to a number of international standards including ANSI, IEC, BS, AS and GB.



Line post insulators

Station post insulators



Spool, strain, pin and disk insulators



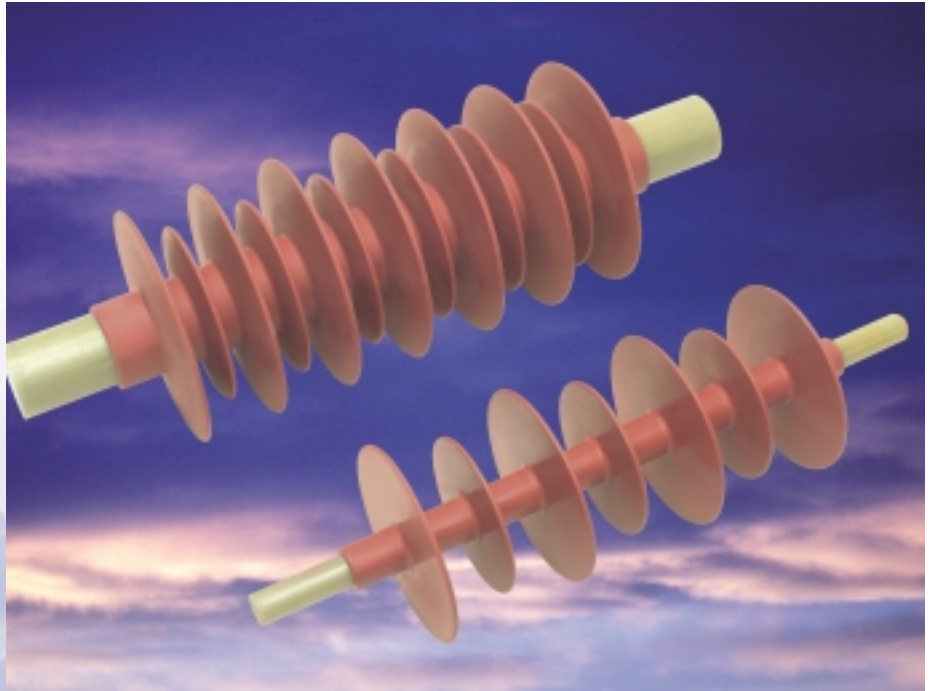
Disc and line post insulators used on overhead lines



Tension and strut insulators in railway lines

## Mold in Place (MIP) components

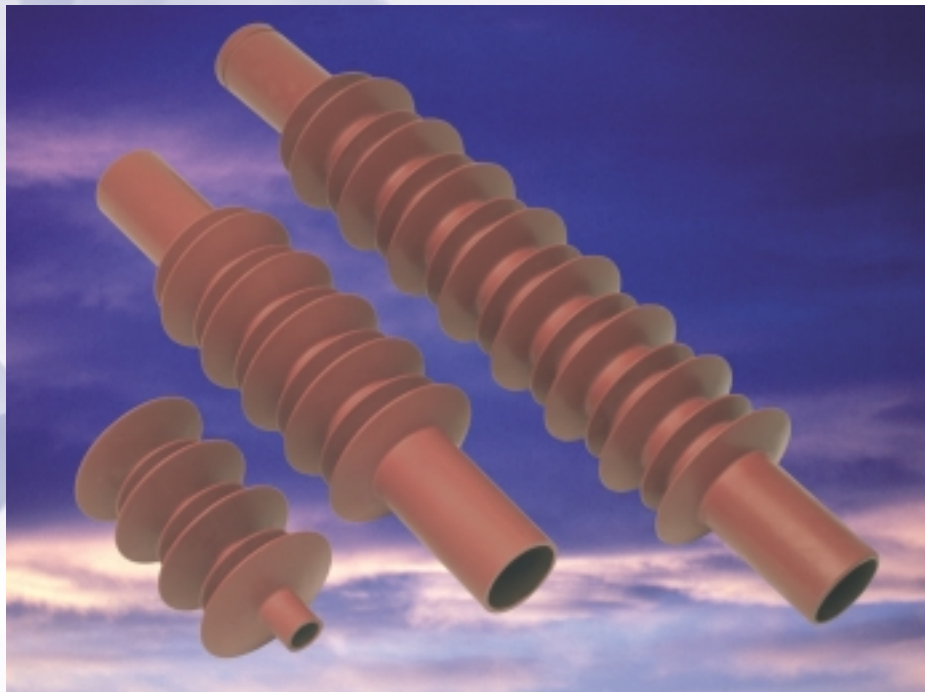
We offer OEM customers all the benefits of composite insulators through Mold in Place (MIP) components which consist of a fiberglass rod and a molded polymeric housing. Mold in Place components are available for various diameters of fiberglass rod depending on the mechanical requirement of the final product. They can be used for insulators or insulating systems up to system voltages of 52 kV.



## Heatshrinkable shedded components

Heatshrinkable shedded components can be used to protect a variety of inner substrates against the adverse conditions of an outdoor environment. They are available in a number of sizes and shed configurations, allowing creepage and arcing distances to be tailored to customer requirements.

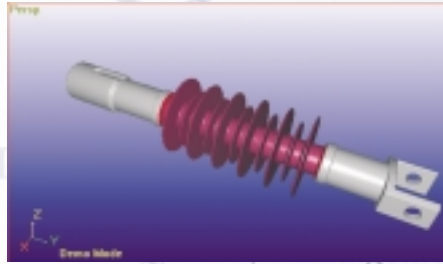
The components are internally coated with track resistant sealant which flows during heat recovery to prevent the formation of air voids and to produce a moisture barrier to protect the underlying substrates. Typically they are used for surge arresters, bushings and insulators with either ceramic or non-ceramic cores. Based on our outdoor polymeric material they have more than 30 years of established service in the field.





## Committed to quality

Recognizing that customers often require unique solutions, our technical and engineering capability ensures that virtually any custom design solution can be manufactured.



CERTIFICATE OF APPROVAL  
 This is to certify that the Quality Management System of:  
**Tyco Electronics Raychem International  
 Shannon, Co. Clare  
 Eire**

ISO 9000 series certifications for our manufacturing sites in both Ireland and China underline our continuing commitment to quality, and because all products are subjected to a series of rigorous checks before they are shipped, customers can have complete confidence in the products, services and data we supply.



Quality Assurance  
 in Standards:

Applicable to:

Design, development, manufacture and distribution of products which include insulators, surge arresters, cable accessories, Thermofit marker systems (TMS), power distribution board protection and corrosion protection products for Tyco's Energy, Telecom, and Adhesive businesses.

Original Approval: 10 March 1998

LRQA No: LRQ 0959457



April 2002

March 2005



Inventory



This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA. The use of the LRQA Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001. For further information regarding the scope of this certificate and the applicability of ISO 9001:2000 requirements may be obtained by consulting the organisation.

## Overview of insulators

Type	Material	Mechanical rating (kN)	Application	System voltage (kV)	
				from	to
<b>Medium voltage tension insulators</b>					
RST (PRI, EPCI)	EVA	up to 70	Utility, Railway	1	28
DULMISON Suspension	Porcelain	up to 125	Utility, Railway	1	275
<b>Medium voltage line post insulators</b>					
RLP (PLI)	EVA	up to 14	Utility	1	52
HSHI	Hybrid (Porcelain core & polymeric housing)	up to 12.5	Utility	1	25
DULMISON Line Post	Porcelain	up to 12.5	Utility	1	72
<b>Medium voltage station post insulators</b>					
RAP (PSI)	EVA	up to 18	Utility, OEM, Railway	1	52
EPBI	EVA	up to 4.5	Utility, OEM, Railway	1	36
DULMISON Station Post	Porcelain	up to 6	Utility, OEM, Railway	1	72
<b>Medium voltage pin insulators</b>					
DULMISON Pin	Porcelain	up to 13	Utility	1	36
<b>Spool insulators</b>					
DULMISON Spool	Porcelain	up to 20	Utility	n.a.	n.a.
<b>Strain insulators</b>					
DULMISON Strain	Porcelain	220	Utility	n.a.	n.a.
<b>Insulators for railway application</b>					
RRA	EVA	on request	Railway	15 *	25*
HCI	Hybrid (Porcelain core & polymeric housing)	on request	Railway	15 *	25*
DULMISON Tension and Strut	Porcelain	on request	Railway	1.5(DC)	25*

\* single phase voltage



**tyco**

*Electronics*

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*a vital part of your world*

**Energy Division – economical solutions for the electrical power industry: cable accessories, connectors & fittings, electrical equipment, instruments, lighting controls, insulators & insulation enhancement and surge arresters.**