

Insulators



enia
energy networks & industrial applications

Παγγαίου 6, Ν. Φιλοθέη Αμαρουσίου
Αθήνα 15123

Τηλ: 210 6754801, Fax: 210 6754804

info@enia.gr

www.enia.gr



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 Raychem’s 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.

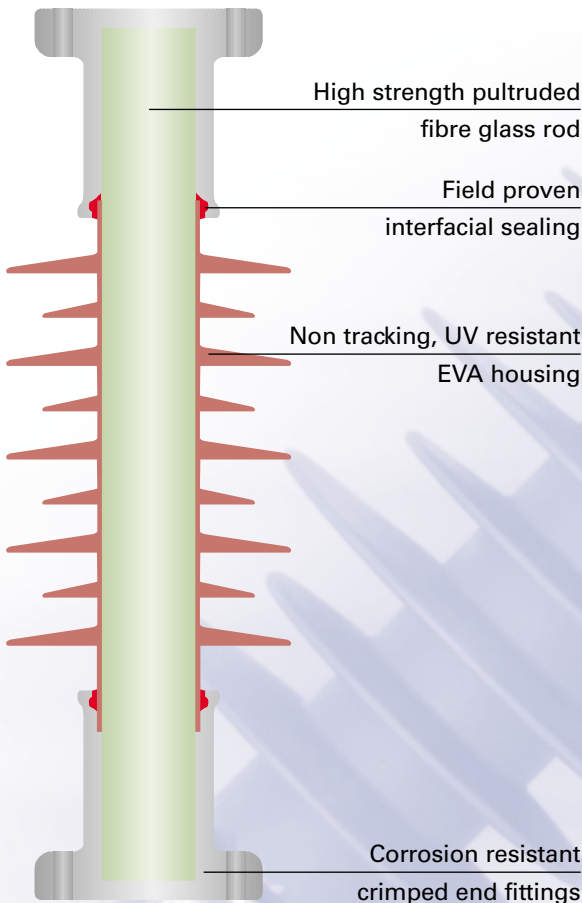


Composite Insulators

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 Raychem’s 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



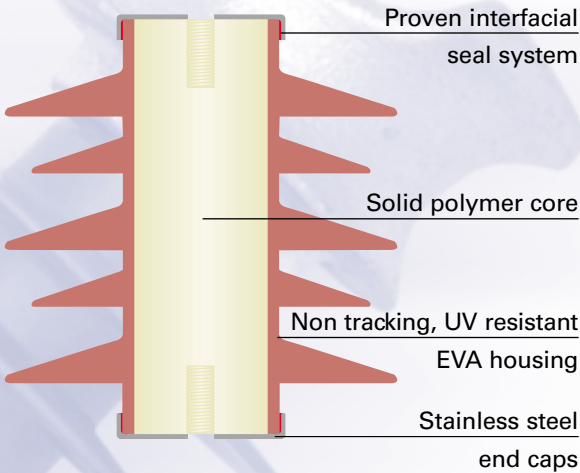
Composite post insulators on an overhead line switch



*(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



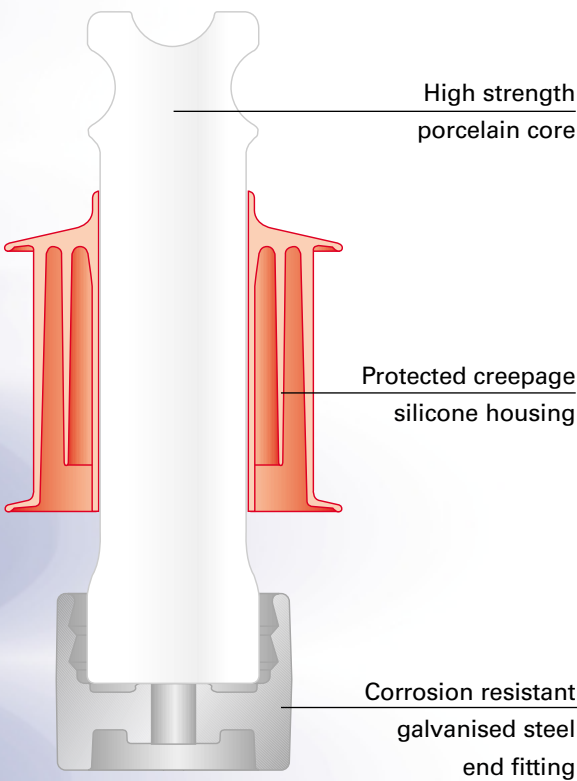
Modular lightweight insulators in combination with Raychem surge arresters in overhead line fuseholders

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



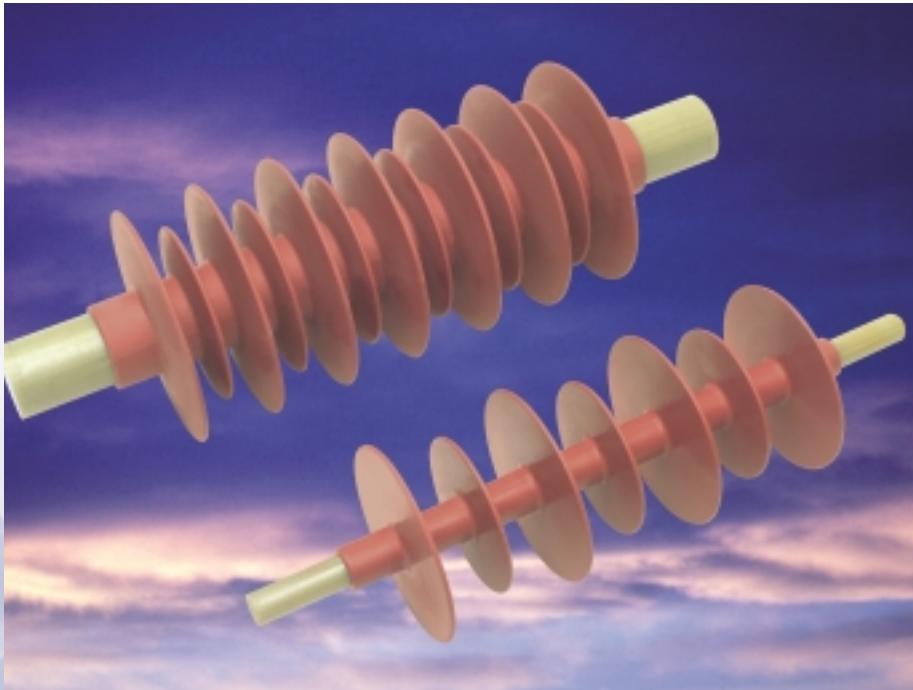
Disc and line post insulators used on overhead lines



Tension and strut insulators in railway lines

Mold in Place (MIP) components

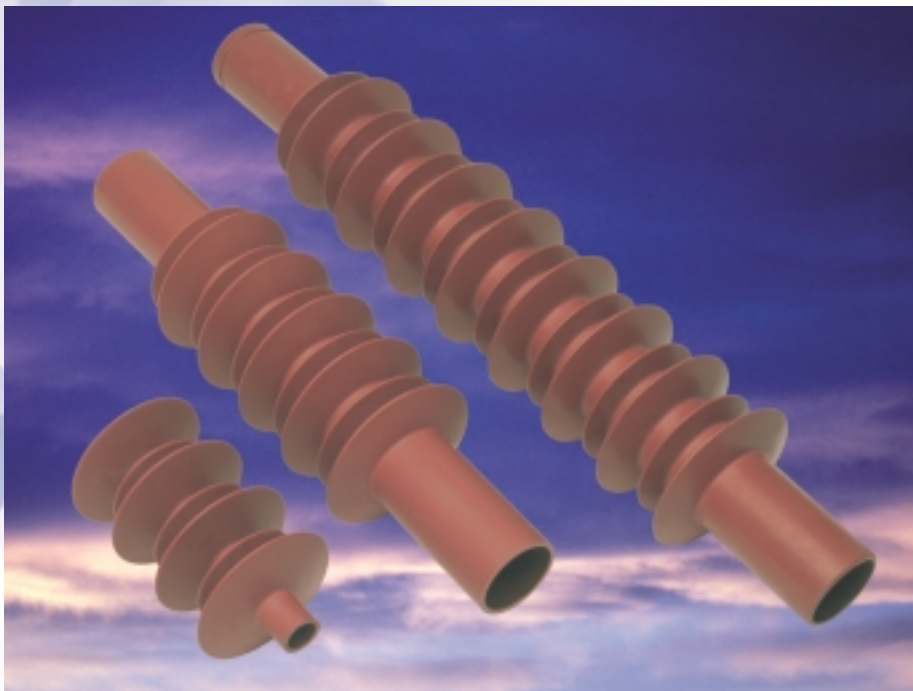
Raychem offers OEM customers all the benefits of composite insulators through Mold in Place (MIP) components which consist of a fiberglass rod and a molded polymeric housing. Mold in Place components are available for various diameters of fiberglass rod depending on the mechanical requirement of the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



Heatshrinkable shedded components

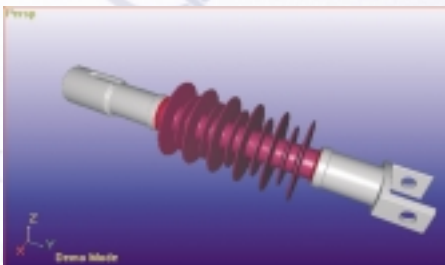
Heatshrinkable shedded components can be used to protect a variety of inner substrates against the adverse conditions of an outdoor environment. They are available in a number of sizes and shed configurations, allowing creepage and arcing distances to be tailored to customer requirements.

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 Raychem's 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:

of products which
s, Thermofit marker
ion and corrosion
Adhesive businesses.

Original Approval: 10 March 1998
Certificate No: LRQ 0959457



April 2002
March 2005



Inventory



Overview of insulators

| Type | Material | Mechanical rating (kN) | Application | System voltage (kV) from to | |
|--|---|------------------------|-----------------------|-------------------------------------|------|
| Medium voltage tension insulators | | | | | |
| RST (PRI, EPCI) | EVA | up to 70 | Utility, Railway | 1 | 28 |
| DULMISON Suspension | Porcelain | up to 125 | Utility, Railway | 1 | 275 |
| Medium voltage line post insulators | | | | | |
| 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 |
| Medium voltage station post insulators | | | | | |
| 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 |
| Medium voltage pin insulators | | | | | |
| DULMISON Pin | Porcelain | up to 13 | Utility | 1 | 36 |
| Spool insulators | | | | | |
| DULMISON Spool | Porcelain | up to 20 | Utility | n.a. | n.a. |
| Strain insulators | | | | | |
| DULMISON Strain | Porcelain | 220 | Utility | n.a. | n.a. |
| Insulators for railway application | | | | | |
| 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



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All of the above information, including drawings, illustrations and graphic designs, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances does this constitute an assurance of any particular quality or performance. Such an assurance is only provided in the context of our product specifications or explicit contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale. ALR, AMP, AXICOM, B&H, BOWTHORPE EMP, CROMPTON INSTRUMENTS, DORMAN SMITH, DULMISON, GURO, HELLSTERN, LA PRAIRIE, MORLYNN, RAYCHEM, and SIMEL are trademarks.



Energy Division – a pioneer in the development of economical solutions for the electrical power industry. Our product range includes: cable accessories, connectors & fittings, electrical equipment, instruments, lighting, insulators & insulation enhancement and surge arresters.



For more information and your country contact person, please visit us at:
<http://energy.tycoelectronics.com>



Tyco Electronics Raychem GmbH, Energy Division
Finsinger Feld 1, 85521 Ottobrunn/Munich, Germany
Phone: +49-89-6089-0, Fax: +49-89-6096345