



Roxtec Cable Seals

FOR POWER TRANSMISSION AND DISTRIBUTION APPLICATIONS

We Seal Your World™

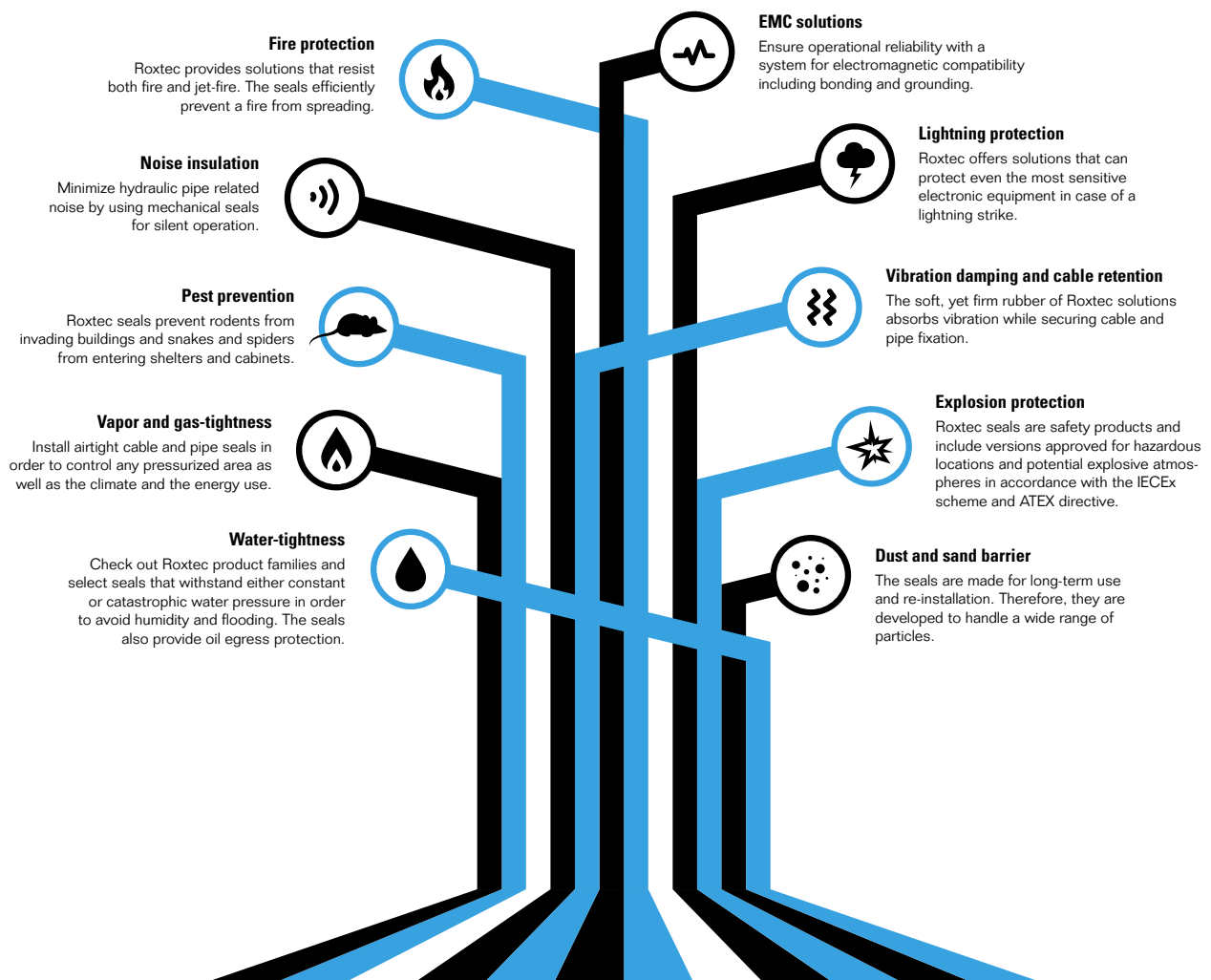


ABOUT ROXTEC

- World leader in seals for single and multiple cables and pipes
- Founded in Sweden in 1990
- Inventor of Multidiameter™
- Local support in more than 80 markets
- Certified according to ISO 9001/14001 and ISO/ICE 80079-34
- More than 250 product certifications and safety listings

Protecting life and assets

The Roxtec sealing system for equipment, cable and duct penetrations provides certified protection against multiple risks. Use it in your next project to ensure a safe, reliable and secure power supply.





Ensure safety throughout the grid

You can benefit from the safety and reliability of our cable transits by using them in different applications in the entire grid.

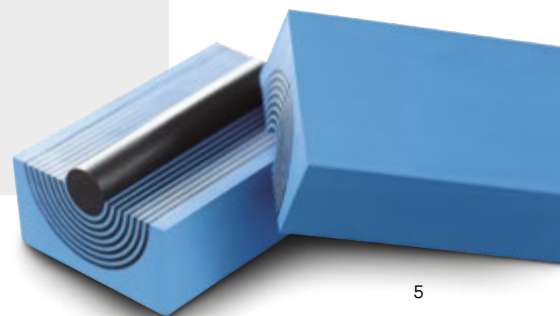
Do not let the specification of cable entries be a field-based decision. Let it be included in the design and engineering scope in order to ensure safety and reduce the total cost of ownership. Use our transit

design software to plan your entries and select the right product. You can use our engineered sealing solutions from the power generation through to the homes.



APPLICATION AREAS

- | | |
|-----------------------------|---------------------------------------|
| ■ Step up substations | ■ Control and communication buildings |
| ■ Primary grid substations | ■ Cable trenches/pull boxes |
| ■ Secondary substations | ■ Enclosures/cabinets |
| ■ Distribution substations | ■ Terminal and junction boxes |
| ■ Power distribution panels | ■ Control houses/PDCs |
| ■ Power distribution vaults | ■ Underground manholes/vaults |
| ■ Modular buildings | ■ Conduits/duct banks |
| ■ Containerized buildings | ■ SCADA/telecom |
| ■ Switchgears | ■ Shielded rooms |



Sealing HVDC converter stations

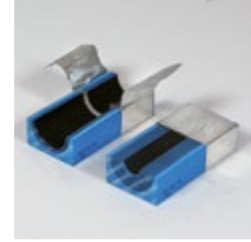
Roxtec seals provide certified protection in a number of demanding applications in HVDC projects. Standardize with our solutions to ensure bonding, grounding and EMC and also that your building is not a source of EMI to the outside environment.



The Roxtec BG™ product family is designed to seal, bond and ground armored and shielded cables.

The Roxtec BG™ B system provides protection against electromagnetic threats such as lightning strikes.

The Roxtec ES system maintains the shielding against air-borne electromagnetic interferences.



Roxtec ES B system provides electromagnetic shielding. It combines a wide conductive tape with an RF shield in the sealing modules to block and divert high frequency radiated and conducted electromagnetic interference (EMI) and pulses (EMP).



Roxtec BG™ B (bonding and grounding) system provides electrical safety by handling high currents. It uses a heavy-duty braid in the sealing modules to efficiently bond and ground armored or shielded cables. It has high current withstand capability for short-circuit and surge currents.

ROXTEC IN HVDC STATIONS

- | | |
|-------------------------------|------------------------------------|
| ■ Main service building | ■ Valve cooling room |
| ■ Filter relay building | ■ Valve ventilation control room |
| ■ Auxiliary relay building | ■ DC hall |
| ■ Additional service building | ■ DC hall ventilation control room |
| ■ Valve hall | ■ MCC room |
| ■ Valve control room | |

Roxtec EMI/EMP solutions

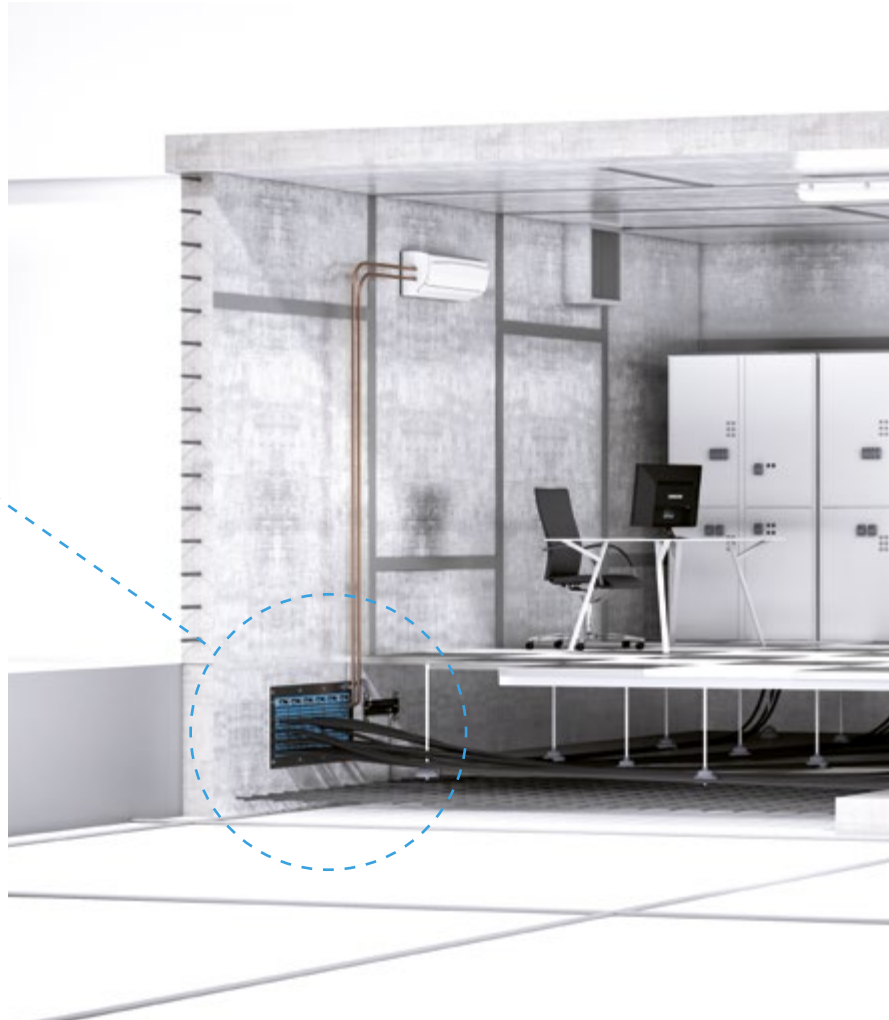
There are potential electromagnetic interferences, disturbances and electrical hazards all along the power generation, transmission and distribution chain. In order to ensure bonding, grounding and protection against electromagnetic interference, you need a strategy for electromagnetic compatibility throughout your site.



The Roxtec ES B solution protects against high frequency radiated and conducted EMI/EMP in shielded environments.



Cut-through of the Roxtec ES system. The seal provides electromagnetic shielding.





Checklist for designers

Cable entries are not the only thing to consider when shielding a control room from unwanted disturbances. A shielding arrangement is never stronger than its weakest link. You must also:

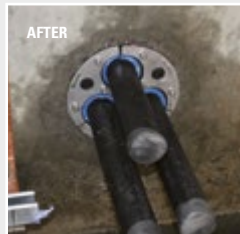
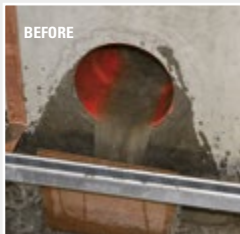
- ☒ plan your civil construction
 - equipotential bonding
 - single entry
 - frame selection, installation
- ☒ use nothing but shielded cables; unshielded cables will ruin the entire shield
- ☒ ensure that all joints between walls and ceiling parts are shielded
- ☒ make sure that you use Faradays cage doors with fingerstock gaskets
- ☒ verify that the ventilation is EMI/RFI secured using honeycomb air filters

Read more in the white paper “Solutions for EMP/EMI protection in control rooms/centers in critical infrastructure” from EB Consulting. The white paper is available on www.roxtec.com

Remember that you do not need any special solutions for pipes – Roxtec works just fine.

Keep your substations dry

In light of the threat from partial discharge there is a requirement to maintain optimum operating conditions for equipment such as switchgear. Roxtec UG™ solutions protect against water ingress and constant water pressure. They can be installed in running water conditions and provide excellent cable retention.



Roxtec UG™ solutions are easy to install – even in wet conditions and environments with running water.

Read more in the white paper
"Humidity Effects in Substations"
by EA Technology. It is available on
www.roxtec.com



Roxtec UG™ solutions withstand constant water pressure and resist corrosion and rodents.



Roxtec UG™ seals are ideal for cables entering via foundations. They provide excellent cable retention, eliminate flooding and prevent humidity from damaging equipment.



Roxtec H3 UG™ seals are designed for cables in trefoil formations. The design simplifies retrofit installations.



Tests have proven that the Roxtec H3 200 UG™ provides a cable retention that withstands a pull force of up to 3300N.



The Roxtec knock-out sleeve provides spare capacity and ensure tightness prior to cable routing.

Roxtec in underground applications

Roxtec UG™ solutions are designed for underground applications and developed for efficient water mitigation. They provide protection against environmental ingress in both normal and flood conditions. This product family is ideal when you want to seal power and instrumentation cables entering buildings via concrete foundations. Use the seals in vaults, duct banks or cable

trenches to eliminate flooding and prevent humidity and rodents from damaging equipment. The seals can be installed in running water conditions and provide superior cable retention.

Growing product range

The product family contains sealing solutions for multiple as well as single cable penetrations. The



Roxtec H3 UG™ and R UG™ seals.



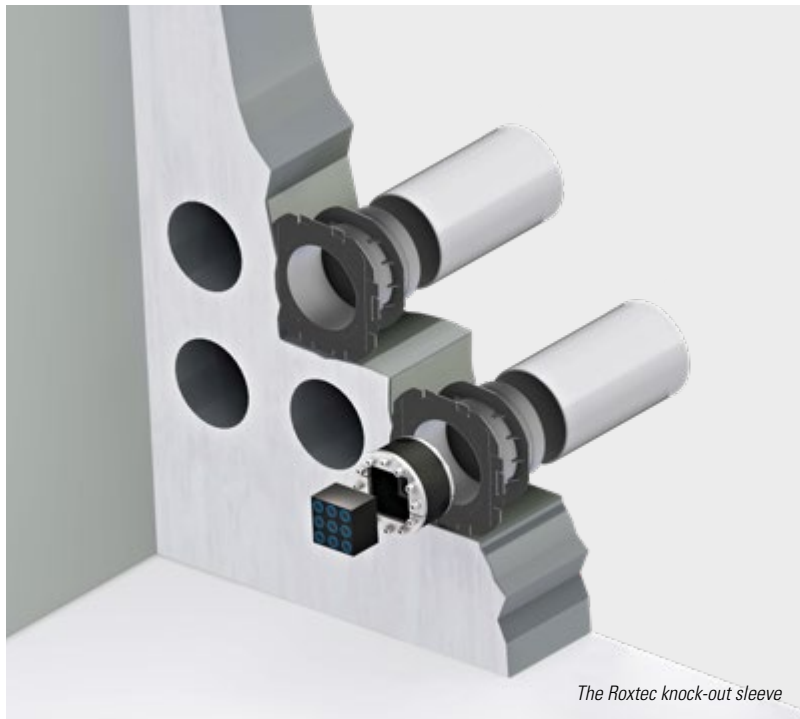
openable Roxtec H3 UG™ seal is ready for direct routing of cables in trefoil formations. The R UG™ kits includes frames and Roxtec UG™ modules that are easy to adapt to cables and pipes of different sizes. The openable Roxtec RS UG™ seal is also adaptable, but designed for a single cable or pipe. The seals are IP68 rated and verified for constant pressure.

Smart knock-out sleeve

Our innovative sleeve with knock-out plate forms an efficient barrier today while providing built-in spare capacity for tomorrow. By installing the knock-out sleeve, you can be sure to have a tight seal until it is time for installation or upgrades.

FEATURES

- Easy to design in and install
- Corrosion and rodent resistant
- Adapts to cables of different sizes
- Pull-out tests performed



Roxtec in walls and floors

You can use Roxtec fire-rated seals in different types of wall penetrations and floor entries. If your project requires multiple cables and pipes through a wall or floor and the structure must meet certain safety ratings, Roxtec is your one-source solution. The system requires less space than cable glands, simplifies design and installation, and provides spare capacity for expansion.

You can seal most items that are required to penetrate walls or floors – power, instrumentation and control cables as well as pipes, conduits and tubing.

Frame flexibility

Roxtec rectangular frames can be bolted, welded or cast into a variety of building structures. The frames can be installed from the top or bot-

tom side of the floor. They are then filled with cables, sealing modules and the compression unit.

Round openings

Our round transits for single or multiple cables are developed for use in demanding environments, and are ideal for area efficient sealing of wall or floor penetrations.



SEALING IN WALLS AND FLOORS

- Pre-fabricated/insulated walls
- Concrete
- Steel
- Gypsum board
- Block walls
- Raised floors
- Containment areas



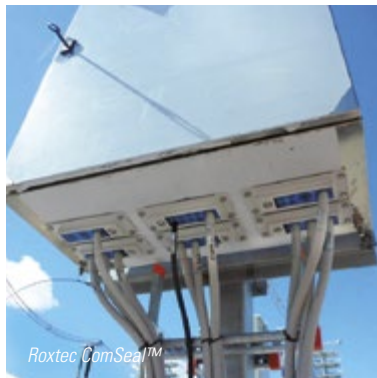
Roxtec in cabinets and enclosures

Use our cable seals for cabinets, junction boxes and electrical and instrumentation enclosures. They are an area efficient replacement to traditional cable glands. Save money and size on enclosures and reduce engineering hours spent on cable data and gland configurations.

Our compact solutions are supplied as kits and pay for themselves by allowing for high cable density which enables designers to reduce the number, size and weight of cabinets. Design openings instead of cable configurations. Use pre-terminated cables without problem. Cut costs instead of holes and eliminate errors due to removing and re-attaching of connectors.

Ready for changes

The seals are openable and have built-in spare capacity for last minute changes. It is never too late to add cables in your power, control and switchgear cabinets. With Roxtec, you can secure, seal and protect equipment within stainless steel, metal, plastic and composite enclosures. Roxtec compact seals are available in versions for EMC.



The flexible sealing system

Roxtec sealing solutions consist of a few reliable components and are available in different shapes and materials. This is just an overview to show you that our seals are perfectly suited for a variety of applications within the power transmission and distribution industry.

Rectangular solutions



Frame



Modules



Wedge



Lubricant



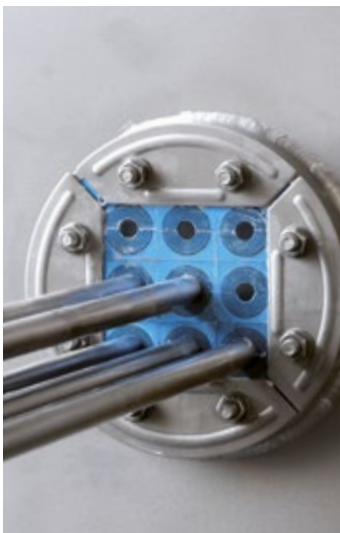
Stayplates



Wedge Clip



Round solutions



Frame



Seal – solution for cables in trefoil formation



Seal – solution for single cable or pipe



Modules



Lubricant



Sleeve (optional)



Underground solutions



Frame



Seal – solution for cables in trefoil formation



Seal – solution for single cable or pipe



Knock-out sleeve



Modules



Lubricant



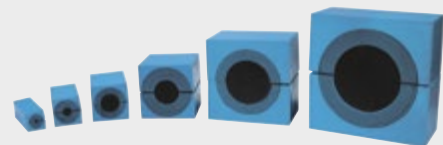
Compact solutions



Frame



Lubricant



Adaptable sealing modules

Multidiameter™ is the Roxtec invention for adaptability to cables of different sizes. It is based on modules with removable layers. Just peel off layers to achieve a perfect fit to any cable. This simplifies design and saves space and installation time. It is also logistically efficient; you can reduce the number of inventory items.

Customized solutions for specific needs



The addition of new transit seals to an existing facility often presents a challenge as you have to adapt the seals to existing conditions. You may need to prepare for a major upgrade or replace leaking seals of other types. The Rextec engineering team is ready to help you by creating special tailor-made solutions.

In fact, we are often able to rapidly deliver customized sealing solutions based upon slight modifications of our existing certified standard products. This design capability and flexibility along with our close cooperation with classification societies normally results in a project specific approval being granted.

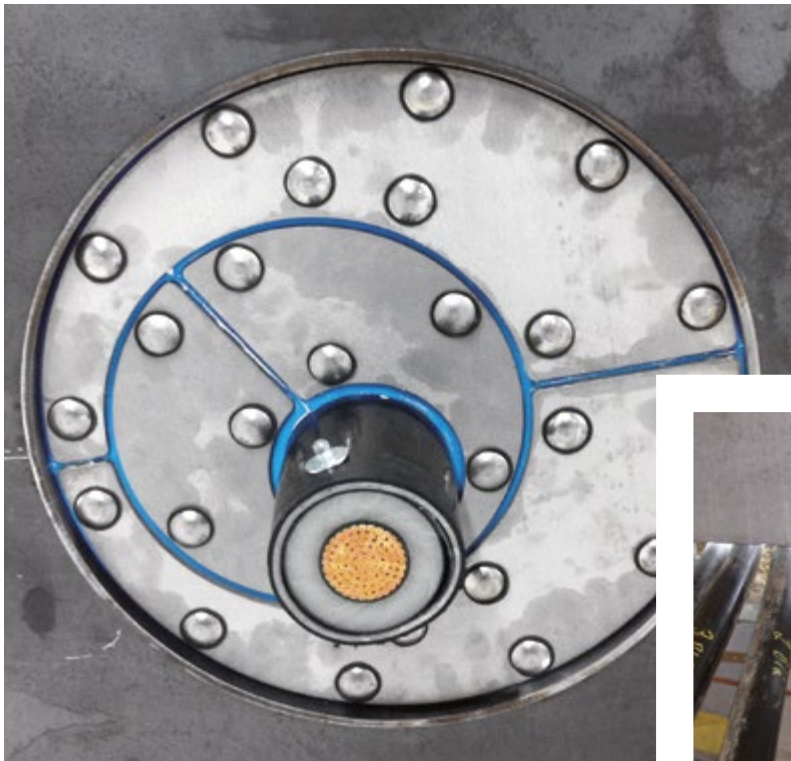
Your problem solver

We are often asked to solve inferior cable installation issues. Regardless of where these challenges are found, along the grid, in equipment or in cabinets, we have many solutions to solve them. We often work together with instrument and electrical engineers in order to find, provide and even create the optimal sealing solutions for your control cabinets, junction boxes and other electrical enclosures.

To the right you find just some examples of our many innovative customized solutions.

APPLICATIONS

- Cable bus
- Cable tray
- Conduit
- Bus bar duct
- Fiber bundler
- EMC box
- Off-center solutions
- Cables in angles
- Manufacturer footprints of cables in switchgear and transformers



Roxtec off-center seals simplify installation of cables that are difficult to move.



The Roxtec GOH frame is openable and angled to suit the orientation of existing cables and pipes.



Tailor-made seal for switchgear applications.



Roxtec openable sleeves for bolting onto structures.



Roxtec water-cut solution to fit busbars or bus ducts.

Always ready for retrofit and upgrades



We help grid owners, operators, engineers and service companies find the right sealing solution for any retrofit or upgrade project. When you need to solve a problem you can utilize Roxtec's range of retrofit and customized solutions to meet any challenge.

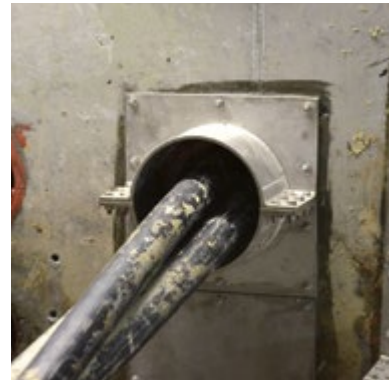
Roxtec cable sealing solutions include extremely flexible frames, seals and sleeves that can be opened, reconfigured and resealed in an easy way. You can install the seals around existing cables, from the beginning of the project or whenever it may be needed. We offer a range of solutions allowing retrofit work to be made without any downtime, because each day out of service is a day with lost revenue.

Built-in spare capacity

You also have the option to plan for future capacity from the start by installing more sealing modules than cables. The solid core of the module keeps tight until you want to open up the transit and add a cable for new equipment. The built-in spare capacity allows for quick and cost-efficient upgrades to new regulations.

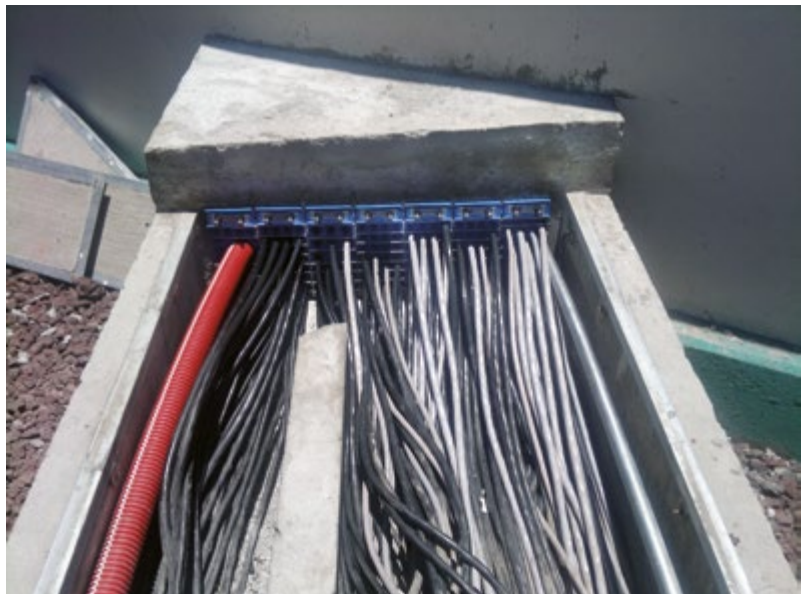
Long-term partnership

We are eager to follow and support your project for years to come and help you keep track of all your cable transits. It is, for example, an advantage to know all facts about earlier changes when you make plans for maintenance and upgrades.





It is always a great pleasure for us to help projects partners replace traditional seals that are leaking by reliable retrofit solutions from Roxtec. We do not only provide openable round seals, but also openable rectangular frames that can be built around existing cables and then filled with sealing modules.



The Roxtec GKO and GOH frames as well as the SLFO sleeve are openable and can easily be installed around existing cables.

Roxtec Transit Designer™

The Roxtec Transit Designer™ is a free, web-based engineering tool. It reduces project risks and simplifies product selection as well as the entire process of designing, purchasing and installing cable and pipe transits.

Its batch import with auto validation feature helps designers create and update thousands of transits automatically and take full control of their largest project designs. They can also validate their complete project by using the Roxtec CAD symbols and the Roxtec Transit Designer™ for easy incorporation of the transits into the design.

Always available, everywhere

The Roxtec Transit Designer™ is accessible online. Share your work with project teams anywhere in the world, and our experts are available through the chat function. To start using it, sign-up on www.roxtec.com.



FEATURES

- Free web-based application
- Simple product selection
- Manufacturer-approved outputs
- Improves project efficiency
- Batch import with auto validation
- Import multiple transits to speed up design work

SIMPLE USER INPUT

Cable/pipe schedule or estimates
Sealing/certification requirements
Installation preferences
Material quality selection

APPROVED OUTPUT

2D drawings in DXF and PDF
3D STEP
Bill of material in Excel
Installation instructions

First class services

Roxtec is not only an innovative product supported by an excellent product selection and design software. It is an entire supply concept.

Our team of engineers is ready to support you with tests, designs and specifications. We make sure you get the solution you need and deliver kits covering multiple cable configurations. The kits have one part number for easy standardization

and ordering. We deliver from local stock, even directly to site.

Installation training

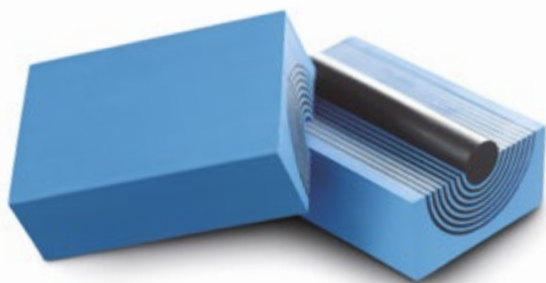
We provide product installation training through our sales staff and technicians. We are there to support

and train you on site; just call us for more information. You find extensive product information and installation instructions as well as educational online videos and white papers on our website: www.roxtec.com

Surveys and inspections

Roxtec installation and inspection experts do not only educate installers, surveyors and quality inspectors on project sites all over the world. We also perform site surveys and post-installation inspections in order to ensure installation quality and increase awareness on how important the cable transit solutions are when striving to ensure power supply and protect life and assets.





Local presence worldwide

Roxtec is the world-leading provider of flexible cable and pipe seals. Our solutions are used to ensure safety, efficiency and operational reliability. We are present on 80 markets worldwide in order to ensure local support and product availability.

Power industry references

We work with major owners, utilities, EPCs, system suppliers and contractors all over the world.

Sweden, Roxtec International AB, HQ
Argentina, INGIAR Representaciones SRL
Australia, Roxtec Australia Ltd
Belgium, Roxtec b.v.b.a/s.p.r.l
Brazil, Roxtec Latin América Ltda
Chile, FACOR Ltda
China, Roxtec Sealing System (Shanghai) Co. Ltd
Croatia, Roxtec d.o.o.
Czech Republic, Roxtec CZ s.r.o
Denmark, Roxtec Denmark ApS
Finland, Roxtec Finland Oy
France, Roxtec France SAS
Germany, Roxtec GmbH
Hungary, Glob-Prot Trade and Service Ltd
India, Roxtec India Pvt Ltd
Israel, C&P Co. Ltd
Italy, Roxtec Italia S.r.l
Japan, Roxtec Japan K.K
Lithuania, SWELBALT UAB
Mexico, Roxtec de México, S.A. de C.V
Nigeria, Structured Resource Business Ltd
The Netherlands, Roxtec BV
Norway, Roxtec AS
Peru, Synixtor S.A.C
Poland, Roxtec Poland Sp.zo.o
Russia, Roxtec RU
Romania, Roxtec RO s.r.l.
Singapore/Indonesia, Roxtec Singapore PTE Ltd
South Africa, Roxtec Africa (PTY) Ltd
South Korea, Roxtec Korea Ltd
Spain, Roxtec Sistemas Pasamuros S.L
Switzerland, Agro AG
Turkey, Roxtec Yalıtım Çözümleri San. ve Tic. Ltd. Şti.
UAE, Roxtec Middle East F.Z.E
UK/Ireland, Roxtec Ltd
USA/Canada, Roxtec Inc
Venezuela, Grupo ES Escorihuela Somes, C.A

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