Cable and pipe transits

FOR OFFSHORE POWER APPLICATIONS

ABOUT ROXTEC

- ■ The world's leading provider of multi-cable and pipe transits
- ■ Founded in Sweden in 1990
- ■ Inventor of Multidiameter™
- ■ Local support in more than 80 markets
- ■ Certified according to ISO 9001/14001 and EN 13980
- ■ More than 250 product certifications and safety listings

Standardize with a complete sealing solution

Roxtec provides the offshore power industry with solutions for cable entry sealing, cable management and vibration damping. Standardization with our seals means efficient design, quick installation, and certified protection.

Germanischer Lloyd · FM APPROVED · BUREAU VERITAS · DNV · ABS TYPE APPROVAL PROGRAM

One specified sealing solution covering all needs in offshore substations, converter stations and other units is of great value to all players involved in applications for power generation, transmission and distribution. Simplify the entire process and save time and money from the design phase through to maintenance!

Lower cost of ownership
Roxtec seals ensure operational reliability and secure a safe grid connection. The seals are certified to protect equipment against water, fire, gas, dust and electromagnetic disturbance, as well as from vibrations – to help you extend cable lifetime. Avoid downtime while maximizing cost-efficiency!

Flexible solutions
Our seals are adaptable to any size of cable and quick to install. The cable density capacity welcomes multiple cables in the same opening. The frame openings allow routing of cables with lugs or connectors.

Utilizing the "weather window"
When time has come for maintenance or expansion, service teams know exactly what to expect on site: flexibility. They can open up the cable entry, add cables or make changes, and then reseal the transit again. This work can be done quickly, without any spare parts, whenever the "weather window" occurs.

Cost-saving design services
We help you find the optimal solution for your specific needs – or we use our expertise to develop tailored solutions that deliver superior results. Whether you use our complimentary design services or our free design software, Roxtec will reduce design time and bring safety, efficiency and flexibility to your project.

Roxtec in action

Discover some of the applications where Roxtec is used to protect life and sensitive equipment in offshore power facilities.

Transits in cranes: Roxtec R seal protects cables from vibration and secures crane equipment onboard.

Transformer: Roxtec round seals in openable stainless steel plates in deck for heavy high voltage cables to transformers.
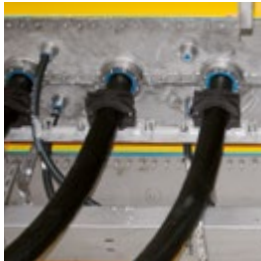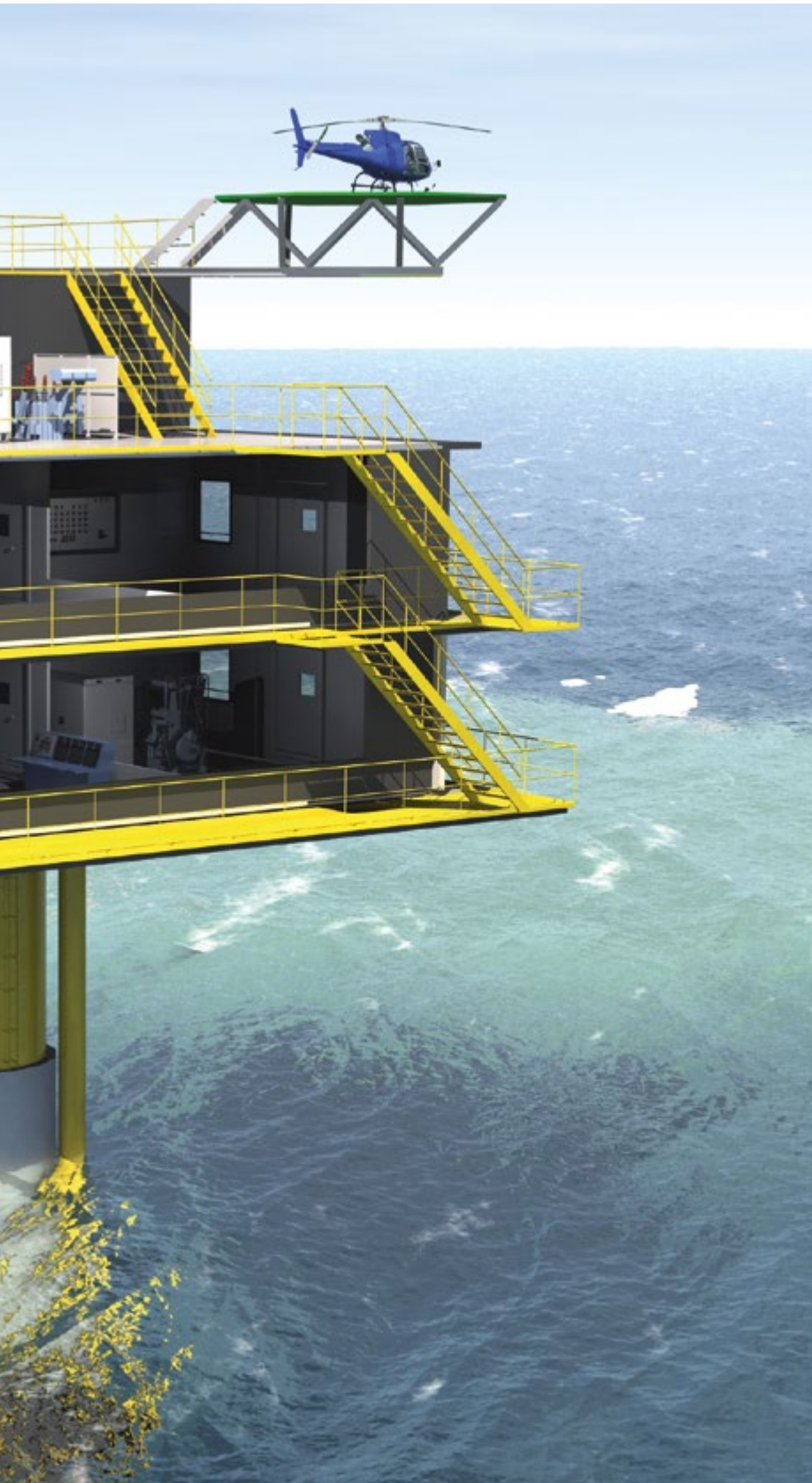
Fire protection: Roxtec round seals for single cable or pipe penetrations are tested and certified to meet fire resistance requirements.

Transits in bulkheads: Roxtec multi-cable transits handle a wide range of cables and pipes of different sizes.

Helicopter pad: Roxtec seals provide environmental protection in demanding offshore projects.

Switchgear area: Roxtec RS and R make it easy to seal cables through decks.

Junction boxes and control cabinets: Roxtec CF32 provides for IP67 and NEMA 4 certifications, sealing up to 32 cables in a single small cut-out.

Containers: Roxtec products for high cable density applications, a space-saving alternative to traditional cable glands.


Hang-off cover: Equipped with a flexible Roxtec S frame, the cover is an excellent anti-corrosion solution.

We Seal Your World™

Roxtec transits in bulkheads and walls

Roxtec systems are used in many different types of bulkhead or wall penetrations to provide safe and certified transitions for cables, pipes and tubing. When your project requires multiple cables and pipes through a bulkhead or wall, and the structure must meet certain ratings, Roxtec is your one-source solution. The cable and pipe transit system simplifies planning and design, speeds up installation work and provides built-in spare capacity for cost-efficient maintenance and upgrades.

Bolted Roxtec SF frame
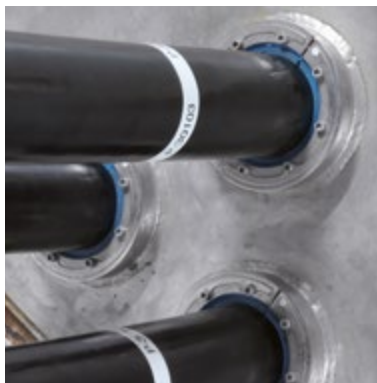
Roxtec RS seal in sleeve

Welded Roxtec S frame

Tested and certified

The most common requirements for bulkhead or wall installations are listed, but if your project requires additional safety certificates, please contact your local Roxtec representative.

- Fire rating
- Blast load protection
- Hazardous locations
- Watertight
- Dust-tight

Bulkhead and wall types

Roxtec has standard solutions for most bulkhead or wall types. Ask your local Roxtec representative about our bulkhead or wall kit solutions to provide your project with a turn-key solution.

- Pre-fabricated/insulated
- Corrugated metal
- Steel

Cable, pipe and tubing

With Roxtec you can seal most items that are required to penetrate a bulkhead or wall, including steel wire armor cables (SWA), braided cables, piping, conduit and tubing.

- Power cable
- Instrumentation and control cables
- Pre-terminated cables
- Fire rated cables
- Process and transmission piping
- Conduits and tubing
- Busbars

Roxtec GHM frame and GE extension frame bolted to a prefabricated bulkhead or wall

A. GHM frame
B. Gasket
C. GE extension frame

- Roxtec frames can be bolted or welded into a variety of building structures
- Pre-configured kits are available with all components required to meet your demands. Ask your Roxtec representative for more information
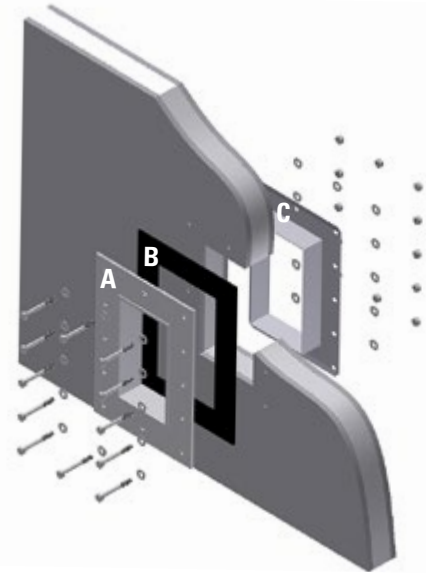
To achieve safety ratings, the following Roxtec components must be used:

RM modules

Wedge

Stayplate

Frame

Lubricant

Wedge Clip

Recommended bulkhead and wall installation tools

- Pre-compression wedge or large eccentric tool to aid with proper mechanical compression
- Stayplate clips to assist with holding stayplates and cables

Roxtec transits
in decks and floors

Our modular-based solutions for multiple cables and pipes require less space than traditional cable glands and provide more flexibility for expansion and maintenance than all other sealing methods. We deliver advanced engineering solutions for control rooms and for other units that have multiple cables and/or pipes entering through decks or floors.

Roxtec R frame in bolted sleeve

Welded Roxtec S frame

Welded Roxtec S frame

Tested and certified
With Roxtec you are covered with more than 250 product certifications. Listed here are the most common requirements for deck or floor installations. Please contact us if your project requires additional safety certificates.

■ Fire rating, including jet-fire
■ Blast load protection
■ Hazardous locations
■ Watertight
■ Dust-tight

Decks and floor types
We have a Roxtec solution to meet the construction and protection requirements for the deck and floor entries of your project. Some of the most common deck and floor applications include:

■ Steel (modular or pre-fabricated units)
■ Raised (data and communication centers)
■ Containment (processing buildings)

Cable, pipe and tubing
Most deck or floor penetrations can be sealed with a Roxtec solution, including Teck cables and other corrugated metal-clad (MC) cables, steel wire armor cables (SWA) and braided cables. Other examples are:

■ Power cables
■ Instrumentation and control cables
■ Pre-terminated cables
■ Fire rated cables
■ Process and transmission piping
■ Conduits and tubing
■ Busbars

Roxtec S frame in a steel plate deck or floor

■ Roxtec frames can be bolted, welded or cast into a variety of building structures. The frames can be installed from the top side or the bottom side of the deck or floor

■ Extensions to Roxtec floor entries (drop boxes) are available to provide additional working space and allow for cable bend radius
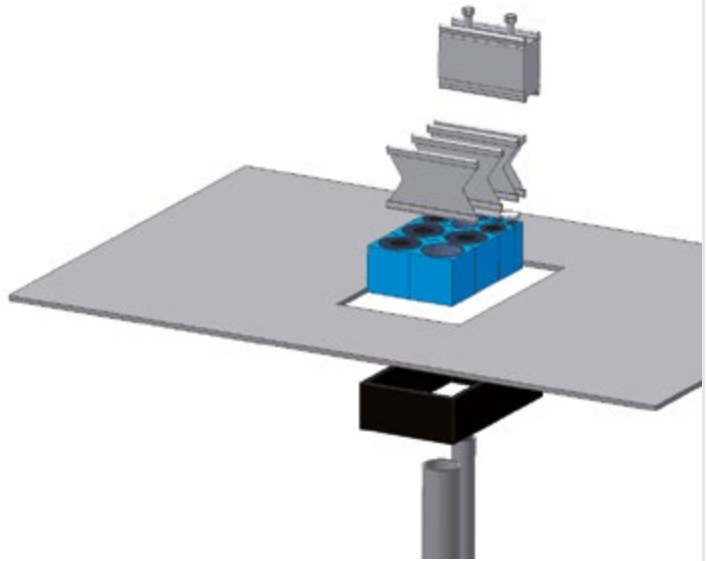
To achieve safety ratings, the following Roxtec components must be used:

RM modules

Wedge

Stayplate

Frame

Lubricant

Wedge Clip

Recommended deck and floor installation tools

■ Pre-compression wedge or large eccentric tool to aid with proper mechanical compression

■ Stayplate clamps to assist with holding stayplates and cables

Roxtec transits in cabinets and enclosures

Use Roxtec multi-cable glands for control cabinets, junction boxes and other electrical and instrumentation enclosures. Roxtec solutions often pay for themselves by allowing for high cable density which enables designers to reduce the size and weight of the cabinets. The flexible Roxtec solutions further reduce time and labor since they are ready for last minute changes. You can easily add new cables or change cables in your cabinets.
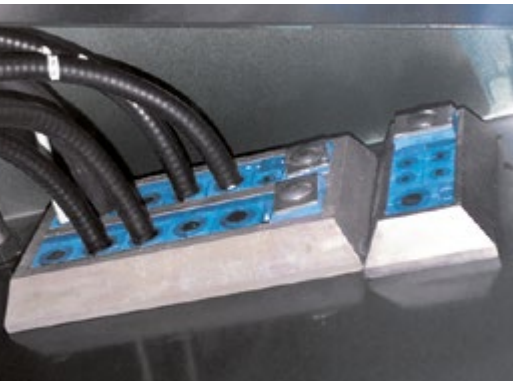
Roxtec CF 32 and 8 frame

Roxtec ComSeal™

Roxtec GHM frame

Tested and certified
Some of the most common applications for Roxtec cable seals include enclosures that require the following local and international ratings:

■ NEMA 4, 4X, 12, 13
■ IP 67
■ Hazardous locations
■ EMC – ES (electromagnetic shielding) and PE (potential equalization)

Common applications
Roxtec secures, seals and protects equipment within stainless steel, metal, plastic and composite enclosures. Some of the most common applications are:

■ Electric heat trace cabinets
■ Safety instrumented systems
■ Fire and gas detection equipment cabinets
■ Control cabinets
■ Communication equipment enclosures

Cable types
Roxtec provides cable gland solutions for power, control and instrumentation cables. Some examples are:

■ Tray cables
■ Teck cables
■ Fiber optic cables
■ Steel wired armor (SWA) and braided cables
■ Pre-terminated connectors
■ LV cables
■ MV cables
■ Control cables

**Roxtec CF 32 frame in an electrical
or control cabinet**

- Thanks to the area efficiency and
  compact design of the Roxtec cabinet
  solutions, it is also possible to reduce
  the size of the cabinet
- More cable, less cabinet: seal up to
  32 cables (up to 16.5 mm, 0.65 in)
  within a single cut-out. Available in
  nickel-plated aluminum
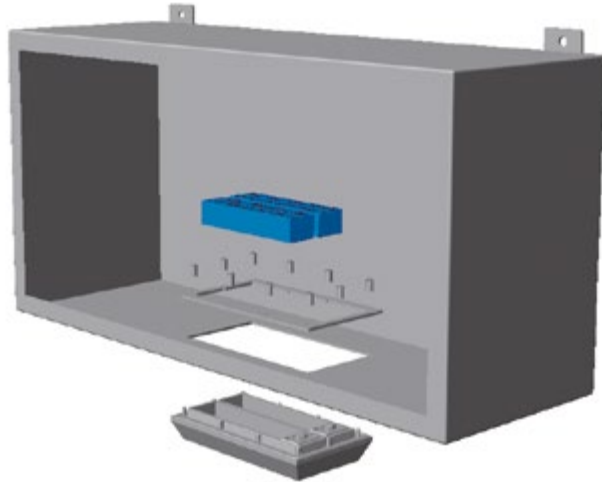
**To achieve safety ratings, the following
Roxtec components must be used:**

Frame   CM modules   Lubricant

For full compact frame range, contact
your local Roxtec representative.

Recommended cabinet (CF) installation tools

- Small pre-compression wedge or small eccentric tool

Efficient sealing of round openings

Roxtec round transits are available for multiple cable and pipe penetrations as well as for single cables or pipes. Our solutions are easy to install and developed for various applications and materials. You can use our seals for plastic pipes, metal pipes and conduit. Our round frames also accommodate the largest cables including high voltage cables to transformers and switchgear.

Roxtec round transits are truly flexible. They are developed for use in a wide range of demanding environments and designed to protect against common hazards such as fire, gas and water. We supply round sealing solutions consisting of frames, adaptable sealing modules and integrated compression units. These are ideal for area efficient sealing of multiple cables and pipes penetrating walls, floors, decks or bulkheads.

Fits any cable or pipe
We also supply round seals for single cables or pipes where the adaptability feature is integrated in the rubber body of the seals. Roxtec transits feature Multidiameter™, our unique solution based on rubber modules or bodies with removable layers.


Roxtec R 200 seals for cables in trefoil

Roxtec RS seals for power cables

COMMON APPLICATIONS

- HV cabling to transformer and switchgear
- Sprinkler systems
- Hydraulic and pneumatic lines
- Water supply and waste water lines
- Cables – power, control and instrumentation

Roxtec hang-off cover in stainless steel

The light-weight Roxtec hang-off cover is supplied in customized dimensions, tailor-made according to configuration and equipped with flexible Roxtec seals. It provides excellent protection from the salty, aggressive environment in offshore projects.
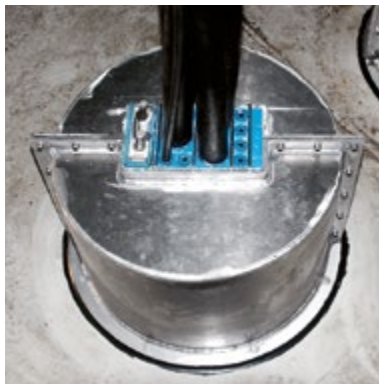
Hang-off with square opening for power cables and optic fiber

Hang-off with round opening
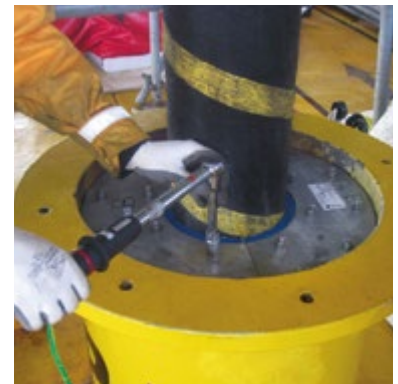
Special H seal for transport cable

The Roxtec hang-off cover protects equipment against harsh offshore conditions such as aggressive salty air and constantly splashing salt water. The water- and air-tight cover is built upon the hang-off fixing the power and optical fiber cables.

No problem for designers
The seals ensure tightness and safe cable management. They simplify design, engineering and installation – saving time and minimizing project costs.

Roxtec representatives can assist you on site and help you standardize for adaptable or fixed diameters.

Cable entry solutions for switchgear

Roxtec has developed openable solutions for sealing and managing large and stiff cables with connectors in offshore substations and other units. The solutions are designed to simplify installation of HV and MV cables. You can either use round RS seals, openable steel plates or tailored H frame solutions.

Roxtec RS seals for cables to switchgear
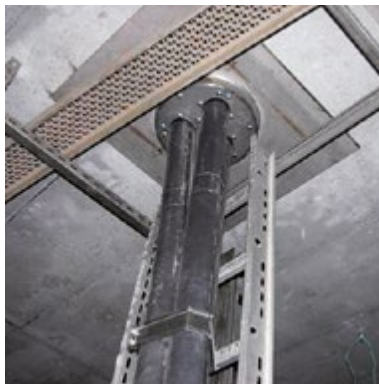
Tailor-made H seal for 132 kV switchgear

Special Roxtec H frame solutions for large cables

In most cases, HV and MV cables can be sealed with standard Roxtec round seals. In more challenging applications, you can reduce risk, simplify installation, save time and avoid future costs by using openable sealing solutions with Roxtec RS seals or by building up special Roxtec H frame solutions. You route pre-terminated cables through the opening, and then you mount the openable plates and install the seals around the cables.

Extended service life
Roxtec sealing materials are made of rubber. The cables are thereby protected from damage due to vibrations and the lifetime of

cables and related components is extended.

Ready for the future
It is cost-efficient to standardize, given the estimated lifetime of the substation and power generation units. There will be many upgrades of equipment. Designers can draw openings instead of cable configurations and use modules with removable cores for future needs and expected additional cables.

Design services
Many offshore substations are built to a unique design. We can help you with the design process

in regards to cable sealing. We can also engineer and manufacture bespoke products for your facilities in order to allow flexibility in design and ease of installation.

Sealing solutions for transformers

Roxtec stainless steel plates are openable in order to simplify installation after the HV and MV cable routing process. Roxtec off-center solutions are also useful when cables are already fixed or simply too heavy to move.

Openable steel plates with cable seals for transformers

Roxtec off-center seals simplify installation of large, pre-terminated cables that are difficult to position

Roxtec cable entry solutions for transformers include tailored combinations of stainless steel plates with round seals. They can be used to seal HV cables with large connectors. You can thereby route the single power cable lines together, but seal them separately.

Flexibility for stiff cables
Roxtec off-center solutions consist of extremely flexible round single penetration seals. They are very beneficial when it is impossible to change the position of an existing, already connected heavy power cable. You just turn the seal according to the large cable, and secure it in its actual transit position.

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.

GET STARTED ON
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

Multidiameter™ by Roxtec
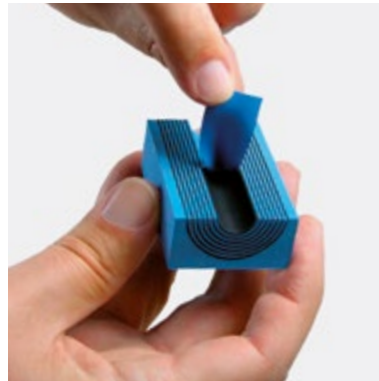
Our invention for adaptability to cables and pipes of different sizes is based on sealing modules and rubber bodies with removable layers. You just peel off layers to enable a perfect fit to any cable or pipe. This solution simplifies design, and saves a lot of installation labor time. It is also logistically efficient; you can drastically reduce the number of inventory items. In all, it

makes electrical installations and maintenance work easy and safe.

Better space management
Thanks to the modular-based seal, cables are neatly organized. A small, but proper space between each cable creates area efficiency and facilitates inspection and maintenance. The flexibility – and the fact that your stock of seals

is already onsite – allows you to modify the installation and add cables of different dimensions later on. Using Roxtec is a small investment, but it provides a lot of opportunities for meeting future regulations and for performing upgrades.

TIPS FOR DESIGN AND ENGINEERING

- Let cable entries be a design/engineering function, not a field-based decision.

- Plan for cut-out sizes to standard sized Roxtec frames.

- Remember that bolted frame installations should include a gasket.

- Request additional length of flange/plate if an opening is oversized for our frame.

- Choose materials and precise rating needs.

- Design Roxtec multi-cable transits for entries of cables to reduce the number and size of deck cut-outs or openings.

- Integrate Roxtec solutions at the time of deck and equipment layouts to properly size and place the transit frames. We work with shipyards, design firms and architects to assure proper sizing.

- It is common to weld Roxtec frames into steel decks of prefabricated structures.

Easy installation with Roxtec

Installation training

High safety standards require correctly installed and easily inspected products. On site installation training for local contractors and post-installation inspection are part of our full line of service. In addition to our on site training we have developed a range of practical tools to simplify quick and safe on site installations and reinstallations of Roxtec systems.

Include them in your specification or bill of materials.

■ Decrease installation time and labor costs

■ Ensure quality installation

■ Engineered specifically for Roxtec products

■ Online instruction videos available

Basic steps in the assembly of a **MODULAR-BASED** Roxtec sealing solution.

1
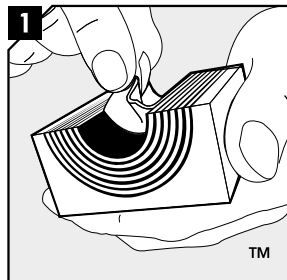
Adapt modules, which are to hold cables or pipes, by peeling off layers until you reach the gap seen in pic. 2. The halves may not differ by more than one layer.

2
0.1-1.0 mm
0.004-0.039"
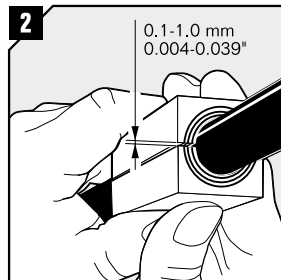
Achieve a 0.1-1.0 mm gap between the two halves when held against the cable/pipe.
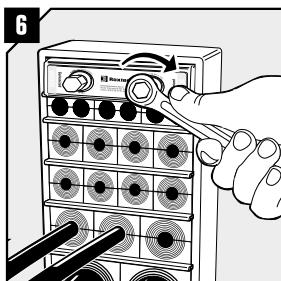
3
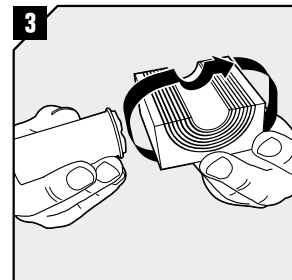
Lubricate all modules for the frame thoroughly, both the inside and the outside surfaces.

4
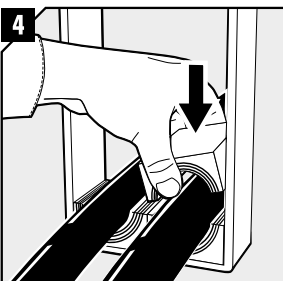
Insert the modules according to your installation plan (transit plan). It is recommended to seal cables/pipes at the bottom of the frame and put spare modules on top.

5
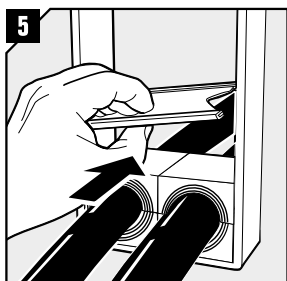
Insert a stayplate on top of every finished row of modules.

6

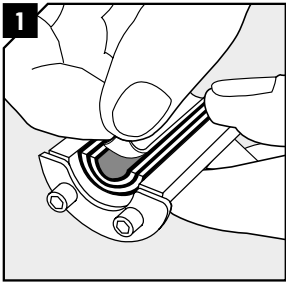Insert the Roxtec Wedge and tighten the screws until full stop.

7
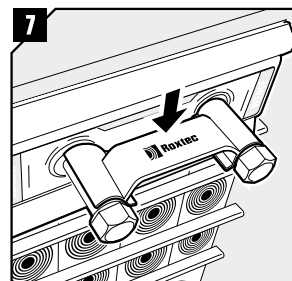
Attach the Wedge Clip to the wedge bolts to check that the wedge is properly tightened.
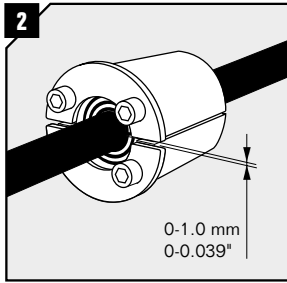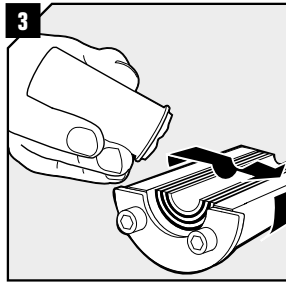
Basic steps in the assembly of a **ROUND ROXTEC SEAL** and **OFF-CENTER** solution.
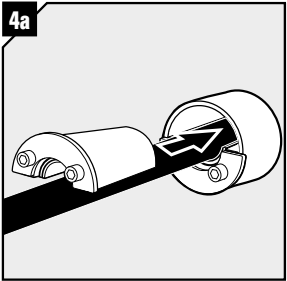
1

Adapt the seal to the cable/pipe by peeling off layers from the halves until you reach the gap seen in pic.2. The halves may not differ by more than one layer.
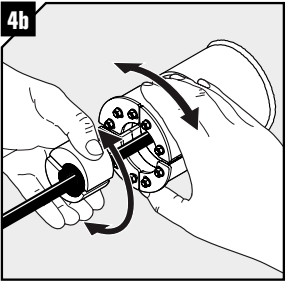
2

0-1.0 mm
0-0.039"

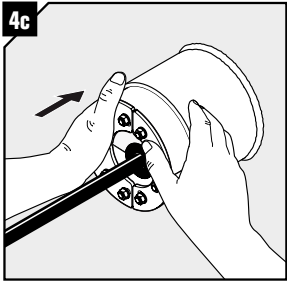Try to achieve a 0-1.0 mm gap between the two halves when held against the cable/pipe.

3

Lubricate thoroughly on the inside surfaces and sparsely on the outside of the seal with Roxtec Lubricant.
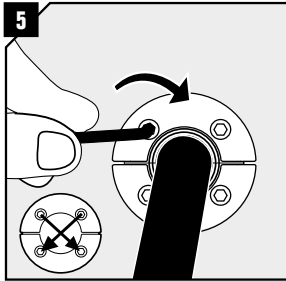
4a

Insert the halves into the sleeve.

4b

For off-center seals: Rotate the halves/core to align the opening with the existing cable.

4c

For off-center seals: Push the off-center seal into the sleeve.

5

Tighten the screws crosswise. The seal will compress and seal the transit.

It is easy to purchase Roxtec products

Just send your bill of material to your local Roxtec representative. We ensure product availability from local stocks on more than 70 markets – and we are ready to support large and changing delivery requirements. Our presence worldwide allows us to offer complimentary services such as technical support, installation training and inspections.

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, Groupo ES Escorihuela Sornes, C.A

For other markets and detailed contact information, please visit **www.roxtec.com**

Roxtec