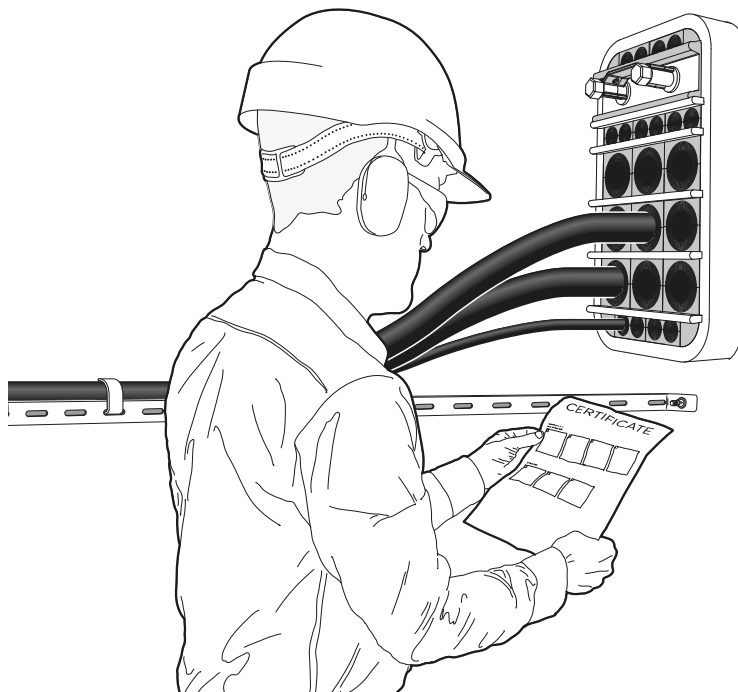


Description and application guidelines

# Service and maintenance guidelines



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# Abstract

Roxtec cable and pipe sealing solutions are designed to be installed in a variety of conditions covering the roughest marine and offshore installations to advanced buildings and train sets. The intention of this document is to give a general idea of handling after the first installation including the expected service and maintenance intervals in terms of ageing, corrosion and wear.

For product descriptions and auxiliary information, see [www.roxtec.com](http://www.roxtec.com).

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# 1 Scheduled maintenance

Normally, a Roxtec sealing system does not require any special service or maintenance after installation during its lifecycle. The robustness of the frames and sealing components is designed to endure time and environmental conditions. With more than 30 years on the market in different application areas, Roxtec is safe to state that a general lifetime of at least 25 years can be expected for Roxylon™ systems. Conditions on the installation site can however change during decades of use. It is recommended to have a proactive approach and perform periodic visual inspections of the installed transits. A visual inspection is mandatory after a nearby incident such as fire or catastrophic pressure build-ups. The visual inspection can then trigger appropriate service and maintenance work. In an area with no specific hazards the service interval can be ten years or even more. Where there has been exposure to hazards such as pollution, mineral oil, high temperatures or strain, it is often possible to detect any degradation by the visual inspection and measures can be taken accordingly.

In installations with extreme conditions beyond those stated or in a highly critical application, we recommend contacting Roxtec for further guidance.

## 1.1 Corrosive areas

The surrounding atmosphere, ambient temperatures and contamination levels can define a hazardous area. An offshore platform is likely to be exposed to a highly corrosive environment and so is a process plant, and a sewer. Coastal cities and areas with high pollution are also more hazardous to metal and rubber than the general application areas and generate considerations regarding planned maintenance. As corrosion and aggressive chemicals can be present, a visual evaluation every one to five years is recommended. If the site already has a periodic maintenance scheduled, one may consider including such site located penetration sealing systems into the same service interval. If no obvious harm is detectable on the penetrations after a few periods, the service interval can be prolonged as seen fit.

## 1.2 General areas

A general area is an installation where no significant corrosive environment or pollution exist and where there is no plausible pressure build-ups or temperature increase. This can be an in-land city or industrial buildings, urban areas or base stations. It can also be indoor applications on marine and offshore vessels where the climate is controlled. A visual inspection every five years is recommended or in accordance with the site's scheduled inspections.

## 1.3 Safe areas

A safe area is an area where no corrosive environment or pollution is likely to exist. Often it is low humidity and a controlled climate such as indoors, in a basement or storage rooms. As there is no expected presence of harmful exposure, a degradation of the system is unlikely to happen. A visual evaluation as a minimum every ten years is recommended, unless there are signs of ingress or issue. Alternatively if services are added or removed, an inspection should take place.

## 1.4 Wet areas

A wet area is characterized by occasional flooding, heavy rain directly on the transit or random water jets. This can be in underground installations or rooftops on trains as well as a car wash or on deck installations. A visual evaluation is recommended to be performed annually.

## 1.5 Explosive areas

Areas using Ex materials are normally using a scheduled maintenance and inspection interval. Roxtec recommends performing a visual inspection of the Ex system at the same time.

## 2 Visual evaluation

A visual inspection is performed to identify if any damages have occurred on the penetration in terms of catastrophic events, corrosion, impact or wear. The idea is to protect life and assets while preventing failure and being able to plan and perform maintenance in good time. A sudden pressure build-up or nearby fire occurring some time before the evaluation is however not always possible to see on the transit and that is why the overall appearance of the surrounding area is important.

### 2.1 Surrounding area

The surrounding area can show if a transit has been exposed to any contamination. Installations nearby a mud pit or refueling station often have splatter or residues that might have been exposing also the penetration. Corrosive agents, mineral oils and strong solvents should be removed from the transit area prior to the evaluation.



### 2.2 Gaskets and sealants between structure and frame

The gaskets supplied by Roxtec have the same durability as the sealing modules. Check for signs of low or uneven compression or swollen rubber due to chemicals or oil splatter. Any sealant is checked for cracks or missing parts due to ageing. Replace damaged parts if necessary. A damaged surface does not mean the gasket is malfunctioning as the unexposed areas are often unaffected and still operating with full performance. Check for cracks in concrete or unevenities in the structure.



### 2.3 Integrity of coating and corrosion

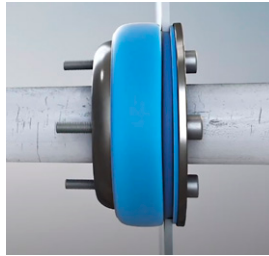
The frames are expected to be in an appropriate material and coated in accordance with surrounding structure on the outer and inner surfaces. Thereby the corrosion wearing on the frame should follow the surrounding structure and not be subject for premature replacement. If heavily corroded frames are left unattended where the surface has corroded several millimeters, there is a risk for decreased performance. Such frames are recommended to be replaced. If corrosion is suspected on the inside of the frame sealing areas it is recommended to open the transit for further inspection and repair the surface treatment, if necessary.



## 2.4 Compression in the system

After reinstallation and addition of new cables and pipes it is important to tighten the compression unit or the compression screws for the round seals. If a seal is found untightened, it should first be determined if the system integrity is compromised in relation to the application. If so, the opening should be reinstalled and all removed rubber components must be re-lubricated. Damaged parts are to be replaced.

A wedge clip shows a complete tightening visually on rectangular frames while bulging rubber identifies a compressed round seal. Consult the installation verification documents for guidance.



## 2.5 Contamination of aggressive chemicals

Chemicals can cause the EPDM rubber to swell as well as drastically destroy the coating of a frame. In such cases the material should be replaced and the transit protected from further contamination. Alternately, a different type of material is better suited for the application.



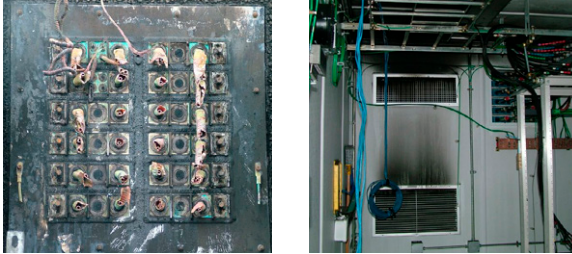
## 2.6 General signs of ageing

Most frames produced by Roxtec are in metal. To cover most customer demands the primary materials are mild steel, acid-proof stainless steel or aluminum. For specific requirements in aggressive areas such as chemical plants, offshore or process industries, other materials or higher grades might be better in the design. Depending on the material chosen, signs of ageing will show on the surfaces and even though corrosion has started or ozone and UV light have started to wear on the material, the integrity of the system will last for many years to come. The root cause should be removed or prevented in good time.



## 2.7 Fire

After a fire or extreme temperature build-ups, all packing material is to be replaced. The Roxylon™ rubber is not designed to be used in ambient temperatures above 100°C other than for catastrophic fire protection. Often one side of the transit is visually unaffected if the exposure is only for a short time.



## 3 Repairing transits

Making repairs to a seal is not always possible, but changing single components is often easy to do. Make sure to gather all materials and tools needed to perform the operation before starting.

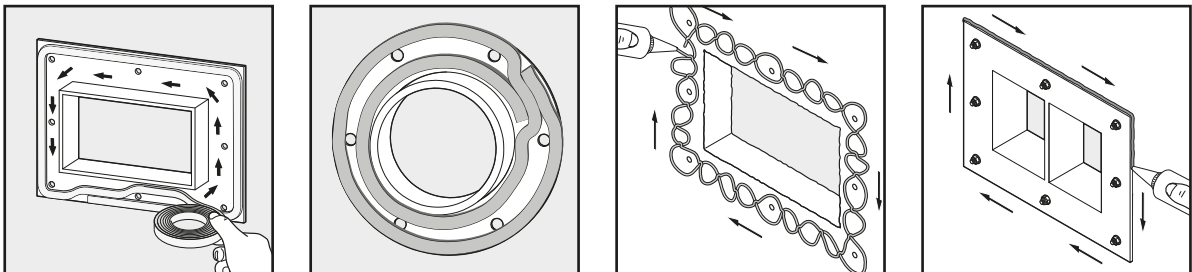
### 3.1 Changing sealing components

Changing or upgrading components is a part of the functionality in the modular system. Chapter 4 in this document shows how to perform this operation in combination with the installation instructions for the re-assembly.

### 3.2 Repairing a gasket between flange and structure

Depending on the moveability of the cables this can be done in two ways. Either the frame can be simply untightened and pulled back, provided the cables are allowed to move, or all packing material can be removed prior to pulling the frame back. With the back side of the flange exposed, the new gasket can be placed around the cables and pipes and onto the flange.

If the water ingress protection is low it is recommended to first evaluate if a single bead of sealant around the circumference of the flange is enough for the application area. In this way, no action must be taken regarding disassembly and reinstallation of all the sealing modules and the time for service is drastically reduced.



### 3.3 Repairing the coating

It is not a problem to add coating directly on top of the rubber. If the type of coating is aggressive to EPDM rubber it will stop dissolving the rubber as soon as it has dried out. This only causes surface defects and is not harmful to the system. It is however recommended to avoid coating on rubber surfaces if possible.



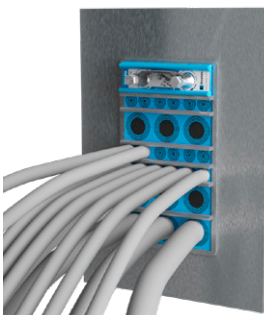
### 3.4 Replacing screws, washers and nuts

It is not recommended to replace a specific component in the system such as screws and washers. Some seals require mounting grease or gaskets that are not available in all markets. Replacing sealing components such as stayplates, wedges or sealing modules is however described in the installation instructions supplied with the spare part and easy to do.



## 4 Adding and removing services

The Roxtec system is due to its modular design prepared for adding new services to the transits during its lifecycle. In most cases, there is spare capacity to use in openings where cables and pipes are already routed or the designer planned for future expansion in an unused opening in a combination frame. The procedure is always the same. When removing a cable or pipe that no longer is of use, the same procedure is followed.



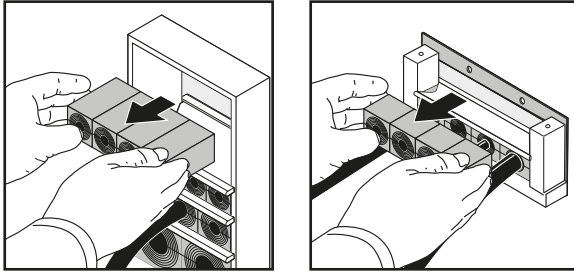
A frame prepared for expansion



The frame after upgrade expansion

#### 4.1 Opening the transit

Start by loosening the compression in the system by untightening the wedge screws in rectangular frames or untighten the screws or nuts in round and compact frames. Remove the compression unit and necessary sealing material to fit the new services. Make sure to keep the removed packing material sorted in rows as they were initially installed. The natural behavior of rubber materials is to have a small but lasting deformation after compression. By keeping the rows sorted, the optimal pressure distribution is achieved when the system is compressed again. For the same reason, a complete row of modules must be replaced if a module is severely damaged during removal. If a cable or pipe is to be permanently removed, the whole module row is to be replaced with new sealing modules.



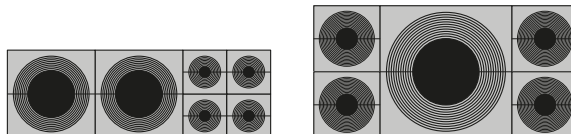
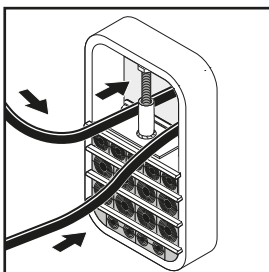
#### 4.2 Preparing the transit for new services

Once the packing material is removed the remaining packing material in the transit should be compressed by using a Roxtec compression tool or other clamping device. The reason is to keep the remaining sealing material in the frame during the routing of new services and to prevent movement in the lower parts of the transit. If a sealing module is removed from its original position it must be lubricated before being put back, so holding the packing material in place can save time.



#### 4.3 Routing of new services

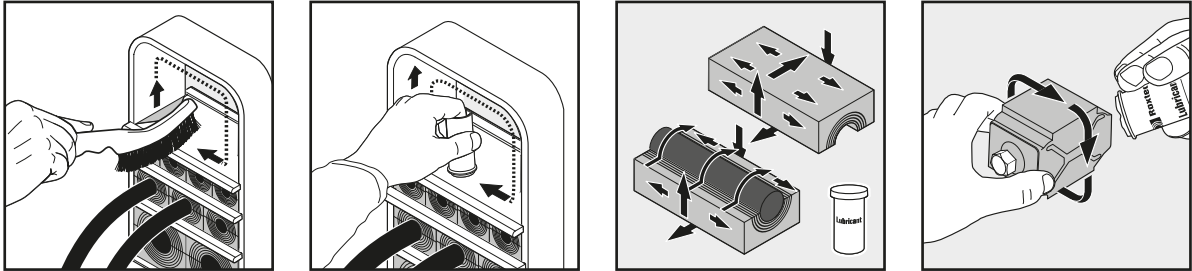
Route new services suitable for the removed packing material. A cable or pipe must be routed straight through the opening to allow the sealing modules to fit tightly. A few big sealing modules can easily be replaced by several smaller if required and allowed by type approvals and certificates. The total packing height must always be respected.





## 4.4 Installation

Installation of sealing modules follows the same procedure as a new transit. Make sure the frame is clean from dirt and contamination before lubrication. Lubricate the sealing modules and compression unit before closing the transit as per the installation instructions.



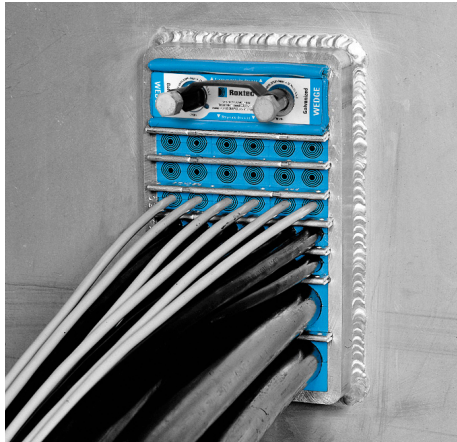
## 5 Spare parts

Spare parts can be found in our web shop or at a local distributor. A few pictures make it easy to identify the parts needed and shorten the time for delivery of new material. Most of the sealing materials are stock items. See Appendix A for the most common solutions to identify your spare parts.

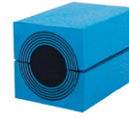
# Appendix A – Basic components

## Rectangular solutions

Rectangular frames consist of the same basic sealing components. These are universal and fit all frames of RM size or 60mm depth.



Frame



Module



Wedge



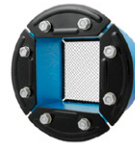
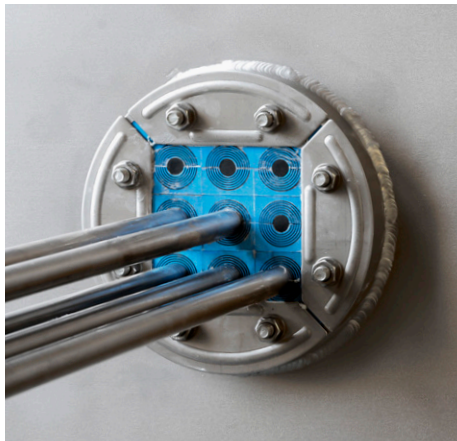
Stayplate



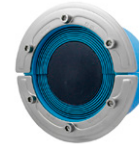
Lubricant

## Round solutions

Round solutions have different shapes but often share the same sealing components.



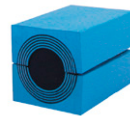
Frame



Seal



Sleeve



Module



Lubricant

## Appendix B – General frames used

The appendix B is used to identify the name of the product installed. It is not the complete offer but reflect the most common versions provided.

### Rectangular frames



S frame



SF frame



SK frame



SBTB frame



SRC frame



SFHM frame



GHM frame



GH FL100  
frame



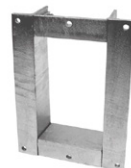
GH frame



G frame



GKO frame



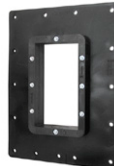
B frame



Swan Neck  
frame



ComShelt  
frame

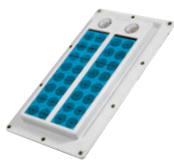


KFO frame



ComPlus  
frame

### Rectangular transits/frames for cabinets and enclosures



ComSeal kit



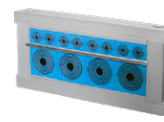
ComSeal AISI  
316 kit



CF 8/32 kit



CF 16 kit



CF 24 kit



EzEntry kit



HD kit



C ComShelt  
kit



C KFO frame

## DISCLAIMER

"The Roxtec cable entry sealing system ("the Roxtec system") is a modular-based system of sealing products consisting of different components. Each and every one of the components is necessary for the best performance of the Roxtec system. The Roxtec system has been certified to resist a number of different hazards. Any such certification, and the ability of the Roxtec system to resist such hazards, is dependent on all components that are installed as a part of the Roxtec system. Thus, the certification is not valid and does not apply unless all components installed as part of the Roxtec system are manufactured by or under license from Roxtec ("authorized manufacturer"). Roxtec gives no performance guarantee with respect to the Roxtec system, unless (I) all components installed as part of the Roxtec system are manufactured by an authorized manufacturer and (II) the purchaser is in compliance with (a), and (b), below.

(a) During storage, the Roxtec system or part thereof, shall be kept indoors in its original packaging at room temperature.

(b) Installation shall be carried out in accordance with Roxtec installation instructions in effect from time to time.

The product information provided by Roxtec does not release the purchaser of the Roxtec system, or part thereof, from the obligation to independently determine the suitability of the products for the intended process, installation and/or use. Roxtec gives no guarantee for the Roxtec system or any part thereof and assumes no liability for any loss or damage whatsoever, whether direct, indirect, consequential, loss of profit or otherwise, occurred or caused by the Roxtec systems or installations containing components not manufactured by an authorized manufacturer and/or occurred or caused by the use of the Roxtec system in a manner or for an application other than for which the Roxtec system was designed or intended.

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