immuG
Rohr + Schlauch GmbH

# Original Instruction Manual

# for GUR , AWEG, Allerit

# & Expert series

Version 1.10 EN

Check for new versions on our homepage before using this document:
https://immug.de/downloads

Please read this instruction manual carefully to ensure safe operation
and keep it for future use.

These instructions were created to the best of our knowledge. If you notice any errors or ambiguities, we ask you to let us know. We would also be grateful for any tips and suggestions. Please contact:

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# Inhaltsverzeichnis

# 1. Scope

This operating manual contains much general information and instructions. In particular, it only applies to immuG products from the following series:

- GUR
- AWEG
- Allerit (except for Allerit BEL, 2GG, BN and GS)
- Expert

# 2. Pressure Equipment Directive 2014/68/EU (PED)

Our product is a pressure device in accordance with the Pressure Equipment Directive 2014/68/EU (PED), provided that a permissible operating pressure of more than 0.5 bar is specified and the product is furnished with connecting parts (flanges or couplings).

| | |
|---|---|
|  | Information<br><br>Hoses without fittings are classified as “individual piping components” and not as “piping”, and therefore pressure equipment, according to the PED. The manufacturer of the hose assembly is responsible for compliance with the Pressure Equipment Directive. |

If the hose assembly does not have a CE marking:

- The hose assembly is designed and manufactured according to good engineering practice.
- The use of the hose assembly is only permitted within the limits of Art. 4, Paragraph 3 of the Pressure Equipment Directive. This corresponds to a classification in “no category”. Therefore a use in a pipeline of category 1 or higher is not permitted!

If the hose assembly is suitable for a category 1 application, this can be recognized by a CE mark and further markings regarding the application limits. For hose lines with category classification, a declaration of conformity with relevant information is included.

# 3. Before assembly

## 3.1 Intended use

The hoses and pipes are used to transport media. Any other use is not permitted. immuG Rohr + Schlauch GmbH is not liable for damage caused by improper assembly or improper use.

It should be noted that all products are individually designed and manufactured and therefore each has an individual area of application in terms of permissible operating pressure, temperature, possible movements, vacuum loads or compatible fluids or fluid groups.

## 3.2 Safety

### 3.2.1 Structure of safety instructions

| | |
|---|---|
|  | **Danger!**<br>Death or serious physical injury will occur if appropriate precautions are not taken. |

| | |
|---|---|
|  | **Warning!**<br>Death or serious physical injury can occur if appropriate precautions are not taken. |

| | |
|---|---|
|  | **Caution!**<br>Minor physical injury can occur if appropriate precautions are not taken. |

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|  | **Attention!**<br>Property damage can occur if appropriate precautions are not taken. |

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|  | **Information**<br>Here you will find information and tips on how to carry out the following activities effectively and safely. |

### 3.2.2 General safety instructions

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|  | **Attention!**<br>Do not step on pipes or hoses. Do not hit it with hard or sharp objects. |
|  | **Attention!**<br>The products are designed for the conveyed goods specified in the technical data or order confirmation. Deviations may damage the product. |
|  | **Attention!**<br>Some products are not designed to withstand vacuum. In such a case and if there is a risk of vacuum, adequate air supply to the line must be provided. |
|  | **Warning!**<br>Improper assembly can lead to damage to the component or failure of the component. |
|  | **Warning!**<br>Improper use may result in damage to the component or component failure. |
|  | **Warning!**<br>The components may not be altered without the consent of the manufacturer. |
|  | **Warning!**<br>Keep labels on the product clean and legible and protect them against negative influences. |
|  | **Information**<br>Always use the current version of these instructions. You can find these at www.immug.de/downloads or via the QR code on the flange tag. |

| | |
|---|---|
|  | **Warning!**<br>The components must be suitable for the intended use. This comprehends particularly the |
| | **Maximum operating pressure (PS):**<br>You will find a marking of the maximum operating pressure on the connecting parts (flanges) and/or the hose body. The lowest stated value applies to the entire product. |
| | **Fluid temperature**<br>Depending on the core rubber compund and the hose structure, our products can only be used up to the following limit temperatures (TS) unless otherwise stated:<br>Core rubber quality NR-SBR: max. 80°C<br>Core rubber quality CR: max. 90°C<br>Core rubber quality NBR: max. 110°C<br>Core rubber quality EPDM: max. 110°C |
| | **Fluid:**<br>The inner layer rubber compund must be stable against the medium. This information can be found in resistance lists. We are looking forward to advise you on that. |

| | |
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|  | **Warning!**<br>To avoid a pressure surge (also called water hammer), the pressure should only be increased or decreased slowly. To do this, pumps must be started up and shut down in a controlled manner and valves or flaps must be opened or closed slowly. |

| | |
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|  | **Caution!**<br>When conveying hot fluids, the surface temperature of the product may also become hot. At the latest when the surface temperature exceeds 60°C, measures must be taken to protect users according to the TOP principle. |

| | |
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|  | **Caution!**<br>Hoses and hose assemblies must not be operated with a bending radius smaller than the value specified or recommended by the manufacturer. |

| | |
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|  | **Caution!**<br>In principle, hoses and hose lines must not be subjected to tensile stress unless they are expressly suitable for this purpose. |

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|  | **Caution!**<br>In principle, hoses and hose assemblies are not designed for torsion. The hoses must be laid in such a way that twisting of the hose is prevented. |

| | |
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|  | **Caution!**<br>A hose repair is not permitted unless this is explicitly approved by the manufacturer. |

| | |
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|  | **Caution!**<br>Conveying with electrostatic charges: The electrical conductivity required for these hose assemblies should be checked at regular intervals to ensure the actual dissipation of static charges. |

| | |
|---|---|
|  | **Attention!**<br>Conveying with abrasion: For maximum service life, the bending radii of the hoses should be as large as possible and the hoses should be rotated regularly to wear the entire inner surface evenly. |

## 3.3 Technical data of the product

The pipes and hoses of the GUR, AWEG, Allerit and Expert series are customer-specific products.

The technical data of the product can be found in the order confirmation, identification markings on the component and, if applicable, any documents supplied such as component or line drawings.

We will be happy to provide additional information upon request.

# 4. Preparation

## 4.1 Delivery

The scope of delivery can be found on the delivery note.

| | |
|---|---|
|  | **Information**<br>Check the items included in the shipment against the delivery note upon delivery. Unfortunately, subsequent complaints about missing parts cannot be accepted. |

Items are usually packed on pallets or wooden racks that are suitable for transport by forklift.

## 4.2 Storage

The ideal storage room should be dark, cool, dry, low-dust and moderately ventilated. Outdoor storage, unprotected from weather, is not recommended.

| | |
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|  | **Attention!**<br>Improper storage can shorten the lifespan of the product. |

### Temperature

The storage temperature should be between -10°C and 25°C. Short-term undershooting or overshooting is permitted. Items should not be stored next to heat sources or exposed to unusual temperature changes. In heated storage rooms, rubber products must be shielded from the heat source.

### Humidity

The relative humidity should not permanently exceed 70%. Storage in damp rooms and condensation should be avoided.

### Light

The items should be stored in a dark place.

| | |
|---|---|
|  | **Attention!**<br>Sunlight or strong artificial lighting can cause premature aging of certain types of rubber. For longer storage, it is recommended to close or cover the ends of the hose. |

### Contact

Contact with solvents, oils, fats, acids, disinfectants or similar products should be avoided.

During storage, items should not be subjected to excessive stress or deformation. If possible, items should not be stacked beyond the delivery packaging. Sharp, pointed or rough objects or surfaces can cause damage.

The items must not be bent or compressed (with the exception of suitable items that are packaged this way, but these items also benefit from relaxed storage).

Pre-installed end caps should be left on items during storage.

### Ozon

The storage location should be free of ozone and ozone-generating machinery and equipment.

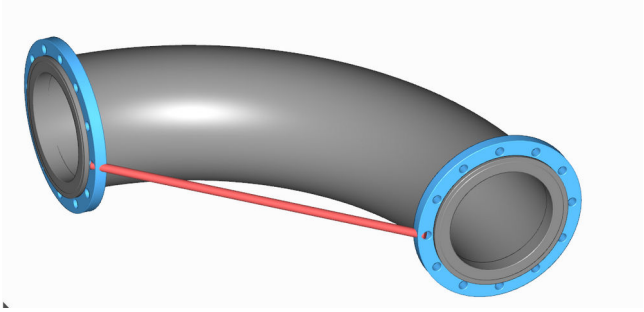
### Cleaning

The rubber products can be cleaned with soap and warm water and dried at room temperature.

| | |
|---|---|
|  | **Attention!**<br>Solvents or sharp objects such as wire brushes or sandpaper can damage the product. |

### Elbows

If elbows are stored for a longer period of time (> 4 weeks), the elbow must be tensioned between the flanges in the inner arch to the target angle (see sketch). **The bracing prevents angle changes over a longer storage period.**

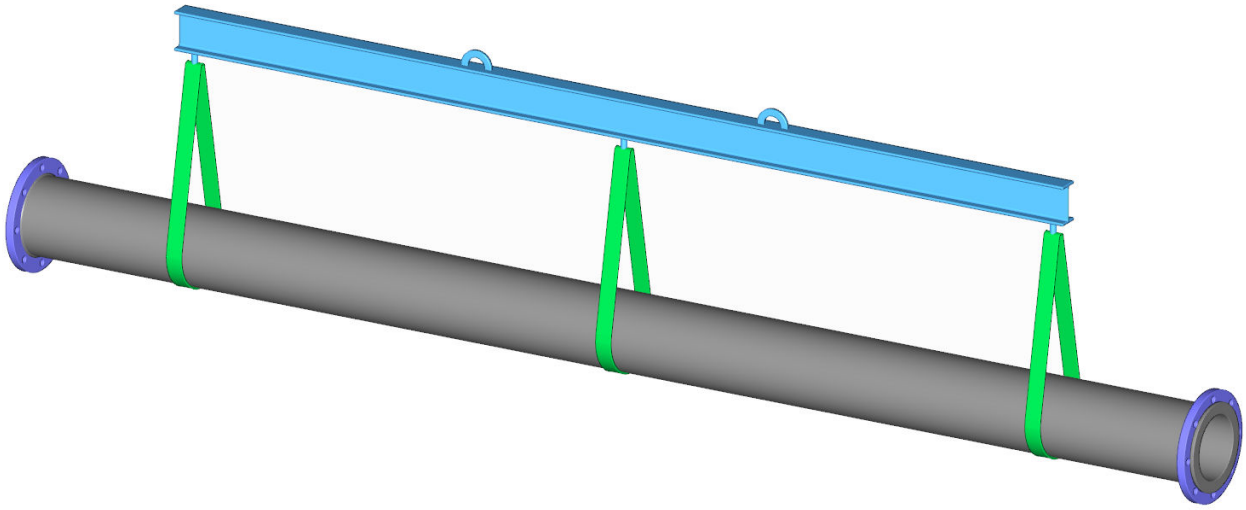


*Picture 1: Elbow-bracing*

## 4.3 Transport

The product is usually delivered on a pallet and is secured to it to ensure safe transport. Transport using a forklift is possible via the pallet.

Large diameter hoses and pipes are supplied in straight lengths and should be supported when lifted during transport.



*Picture 2: Example of a traverse supported pipe or hose for crane transport*

The use of a traverse is recommended for longer products. The distance between the supports should be approx. 2-3 m.

| | |
|---|---|
|  | **Attention!**<br>Transport aids must not have any tips or sharp edges. These can damage the components. |

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|---|---|
|  | **Attention!**<br>Chains or ropes are not suitable as slings. These can damage the components - use round slings or lifting straps. |

| | |
|---|---|
|  | **Attention!**<br>Do not lift components exclusively at the flanges. |

| | |
|---|---|
|  | **Attention!**<br>Components must not be dragged across the floor or other objects. This can damage the components. |

Transport must be carried out in accordance with the applicable regulations and take local conditions into account.

## 4.4 The construction site

The construction site and assembly location should be easily accessible. If work has to be carried out in heights, risk to life and limb is particularly high, due to the risk of falling.

**Danger!**
Work at heights must be secured (fall protection).

The operator is obliged to carry out the assembly in accordance with the safety and health regulations valid for the relevant country. The preparation of a risk assessment for health protection during assembly is one of the operator's obligations.

## 4.5 Visual inspection before assembly

Before assembly, visually inspect the components for external damage.

Damage to the hose body, flanges or sealing surface can lead to leaks or component failure.

**Warning!**
Damaged components must not be installed.

# 5. Mounting accessories

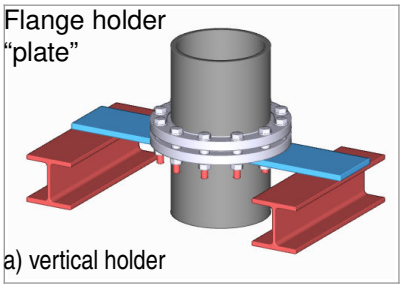
## 5.1 Tools and materials

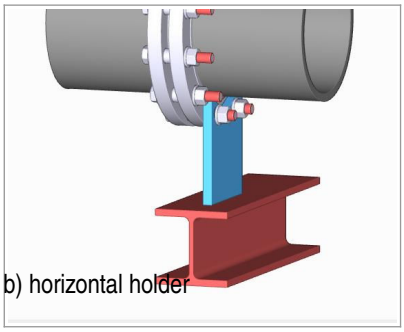
Required for assembly:

- Impact wrench or open-end wrench
- Possibly a torque wrench
- Possibly transport and/or lifting equipment
- Possibly a crane or forklift
- Screws, washers and nuts
- Possibly immuG spacer sleeves (recommended, if applicable)
- Possibly immuG flange holders and/or pipe clamps
- Gauge or tape measure
- instruction manual and component documentation (e.g. drawing)

## 5.2 Flange holder GUR-A

The low weight of rubber pipe components and their self-compensating behavior allows entire pipelines to be assembled with simple fixed mounting points. Our GUR-A flange holders are tailored to the rubber pipe system. They offer a firm hold in inclined installation positions and don't exercise pressure on the rubber body of non-stiffened components (elbows, t-pieces, compensators). By fixing the flanges, the rubber body is also relieved of their weight.

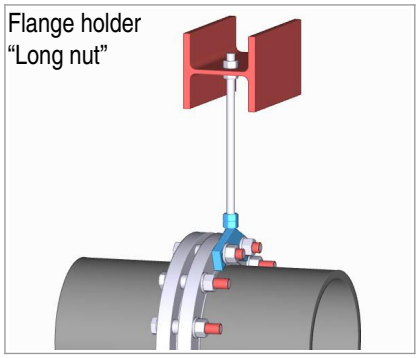


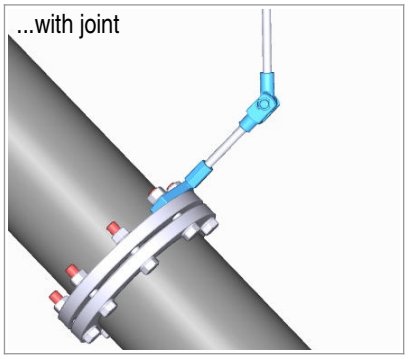




**Information**
All GUR-A are screwed to the outside of the flanges, using two screws from the flange connection. The screws lengthen accordingly.

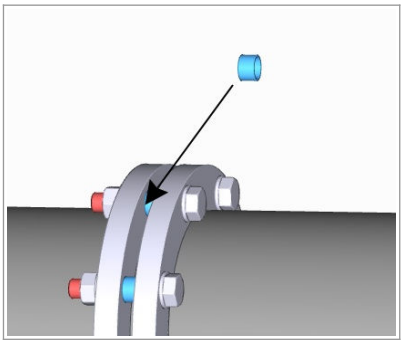
We offer flange holders in two versions:

- "Plate": 300 mm wide plates are suitable as surface-mounted holders and are connected directly to the steel structure.
- "Long nut": For suspension from above, these flange holders end with an M16 long nut. It can be connected to the steel structure using a threaded rod – in the case of inclined lines with an elbow connector in between, see sketches and photo.




## 5.3 Spacer sleeves



For easy installation of our loose flanges FL, we strongly recommend the use of spacer sleeves. These are placed on the screws between the flanges during assembly, guarantee a tight flange connection and protect the sealing surfaces from crushing. **Flange connections with FR fixed flanges are always screwed without spacer sleeves.**

**Attention!**
Sealing surfaces that are compressed too strongly are damaged and can no longer ensure sealing.

With spacer sleeves, the flange distance with optimal sealing compression is achieved. The flanges can be screwed to the sleeves “as far as they will go”. We also strongly recommend the use of spacer sleeves for installing entire pipelines. Their inner diameter depends on the screws used and their length on the sealing surfaces to be compressed.

**Standard sleeve length for loose flanges of type FL up to PN 16**

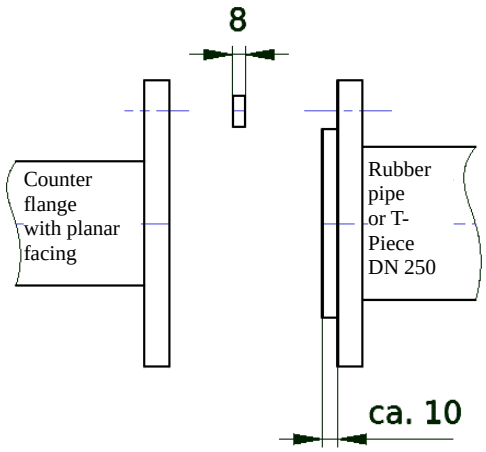
| Component | + | Component | Sleeve length [mm] | Remark |
|---|---|---|---|---|
| GUR/ AWEG /Expert | + | GUR/AWEG/ Expert | 16 | |
| GUR/ AWEG/ Expert | + | elbow GUR-BG | 12 | |
| GUR-BG | + | GUR-BG | 12 | GUR-BG = elbow |
| GUR (straigth)/ AWEG | + | Not immuG-flange | 8 | With a flat counter flange. If the counter flange has a projection on the sealing surface, the sleeve must be correspondingly longer. |
| GUR-BG | + | Not immuG-flange | 8 | |

If ordered, the appropriate spacer sleeves are included in the delivery.

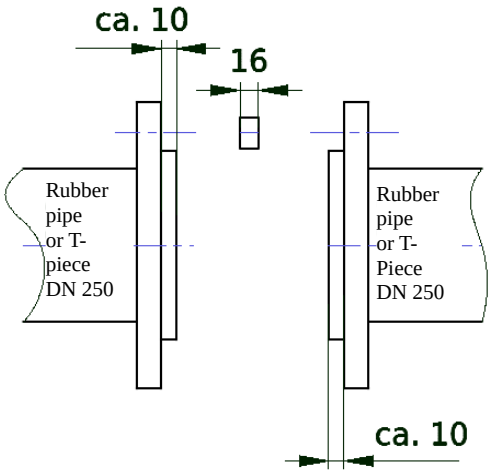
**Information**
For small nominal diameters, pressure ratings PS 25 or higher, for special sealing surfaces or FLR loose flanges, the required sleeve length may differ. Also to be taken into account is Chap. 6.4.3.

## Examples for mounting with standard spacer sleeves:

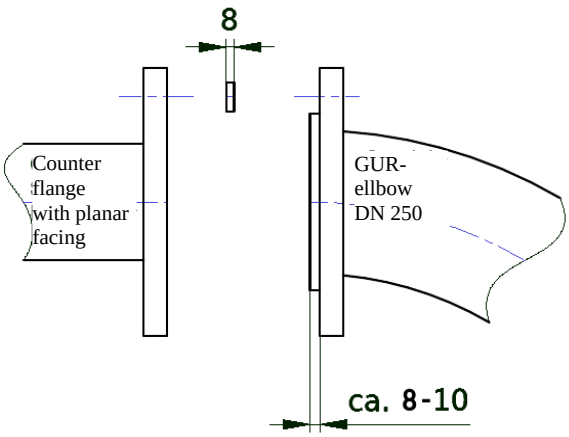
Spacer sleeve
Inner Ø 22x8
is screwed
inbetween



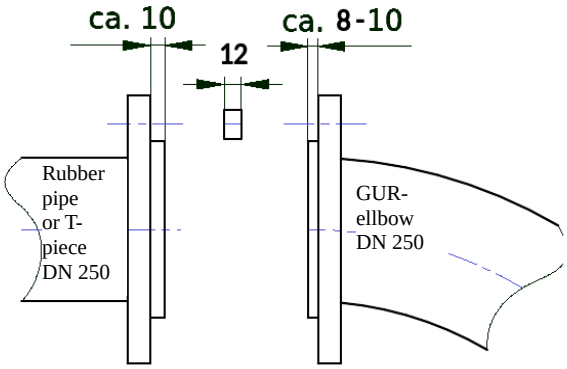

Spacer sleeve
Inner Ø 22x16
is screwed
inbetween




Spacer sleeve
Inner Ø 22x8
is screwed
inbetween




Spacer sleeve
Inner Ø 22x12
is screwed
inbetween




**Information**
The length of the spacer sleeves required is determined for each component if necessary and is noted in the component documentation (e.g. order confirmation or drawings).

## 5.4 Clamps

Straight, horizontally rubber pipes can be installed at fixed mounting points, like steel pipes, with the specified support width. In addition to flange holders, clamps with a sufficiently large inner diameter can also be used. Between the mounting points, the pipe is supported by the built-in stiffening elements.

Our hoses with steel wire helix can also be firmly installed using clamps. The support widths depend individually on the respective hose and are smaller than with GUR.

**Information**
The wall thickness of immuG rubber pipes and hoses is higher than that of normal steel or plastic pipes of the same nominal diameter. We are happy to offer suitable clamps.

Pipe clamps are less suitable for holding elbows, reducers and T-pieces. Instead, the components are attached with special GUR-A flange holders developed for the GUR system. The GUR-A are also suitable for suspending and supporting shorter pipes, see also Chapter 5.2.

## 5.5 Floats

If floats are included in the delivery, they are screwed between the retaining rings provided on the hose. The floats are axially fixed by retaining rings on the hose and cannot move.

**Information**
We recommend the immuG SCHWIMM Expert with suitable floats.

# 6. Installation

## 6.1 Assembly personnel

The assembly of the flange connections must be carried out by qualified personnel. The site operator is responsible for training and instruction of his own staff.

If a service provider is commissioned to carry out the assembly, they are responsible for the qualifications of their staff and should name them to the client. Upon request, the service provider must provide the operator with proof of the qualifications of its assembly personnel.

**Attention!**
Due to some significant differences between the immuG flanges (types FL / FLR / FR) and their assembly in contrast to normal steel flanges, the assembly personnel must have read and understood the assembly instructions.

## 6.2 Visual inspection before installation

It is important to ensure that

- the components do not show any obvious damage.
- the steel flange sealing surfaces are clean, undamaged and even.
- screws, nuts and washers are clean and undamaged
- the component is suitable for assembly (e.g. check nominal diameter, installation gap and pressure rating).

**Information**
If a gasket was installed before installing an immuG component, the old gasket must be completely removed from the flange sealing surface.

## 6.3 Assembly with sockets

If hoses with sockets (without flange) are supplied, the connections must be made separately.

Hoses without flanges or with stepped sockets can be pushed onto a fitting steel pipe and secured with clamps. The clamps used must be suitable for the planned operating pressure.

Matching fittings can also be integrated.

| | |
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|  | **Attention!**<br>Follow the clamp manufacturer's assembly instructions! |

| | |
|---|---|
|  | **Attention!**<br>Follow the fitting manufacturer's installation instructions! |

## 6.4 Flange mounting

All immuG flange constructions are screwed together in a pressure-tight manner without additional gaskets. First, one end is completely screwed on. The second end is then screwed on. Information about the individual steps can be found in the following chapters.

| | |
|---|---|
|  | **Information**<br>For easy installation, the flanges should be parallel and not offset in the center. Such an offset can be rectified, within limits, according to Chap. 6.4.5 |

| | |
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|  | **Information**<br>The depth of the rubber sealing surface must be taken into account when selecting the optimal screw length. |

| | |
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|  | **Information**<br>Spacer sleeves are recommended for easy installation of FL loose flanges. |

| | |
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|  | **Attention!**<br>The inside diameters of the components to be connected must be centered. Off-center mounting can lead to reduced service life. |

| | |
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|  | **Warning!**<br>All holes must be fitted with screws, nuts and washers. The screw must protrude at least 3 threads from the nut (when screwed on). |

| | |
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|  | **Warning!**<br>Only use screw diameters that match the holes in the flanges. Smaller screws must not be used for flange mounting! |

| | |
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|  | **Warning!**<br>We recommend screws of strength class 8.8 for assembly. The material quality and strength class of the screws and nuts to be used basically depend on the operational and environmental conditions and must therefore be specified by the operator! |

### 6.4.1 The sealing surface

The rubber sealing surface consists of a vulcanized rubber-steel-fabric package protruding in front of the loose or fixed flange. Sealing O-rings are normally formed in the respective sealing surfaces.

**Attention!**
Do not use additional gaskets.

A rubber-fabric package is, compared to hard material gaskets, more sensitive to crushing.

**Information**
Compared to the assembly of normal steel flanges, significantly lower tightening torques are required to assemble the immuG flanges. For more information, see the section 6.4.3.

**Attention!**
Sealing surfaces that are too compressed are damaged and can no longer ensure a tight seal.

Projections or recesses in the counter flange must at least correspond to the diameter of the rubber sealing surface.

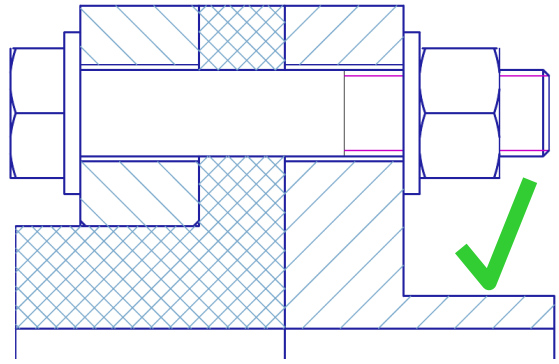
**Attention!**
A non-flat sealing surface on the counter flange can lead to damage to the rubber sealing surface and failure of the component.

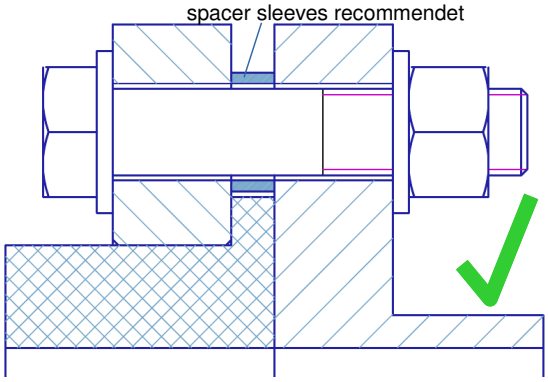
If spacer sleeves are used, a projection or recess must be taken into account in the length of the sleeves.

**Attention!**
The counter flange must be flat, clean, undamaged and dry.

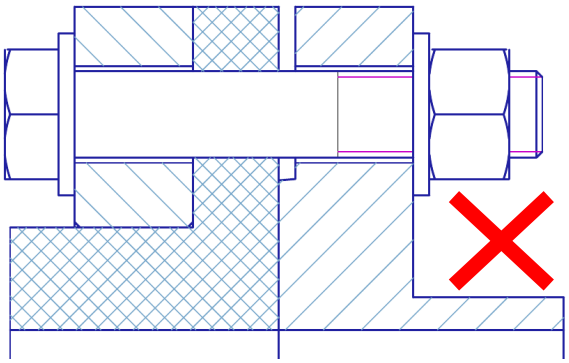
## 6.4.2 The counter flange

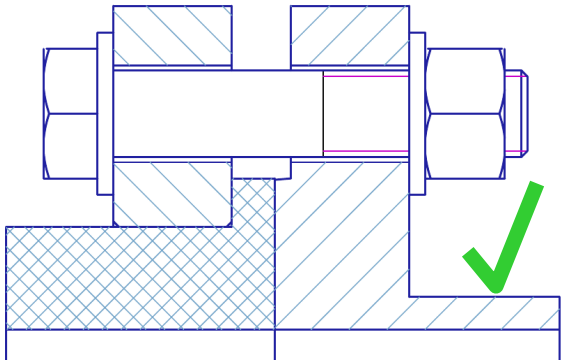
| against fixed flange FR | against loose flange FL / FLR |
|---|---|



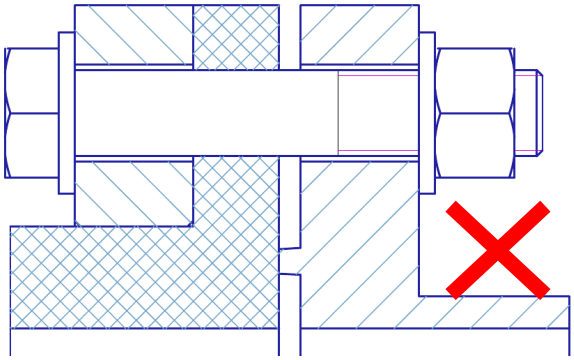


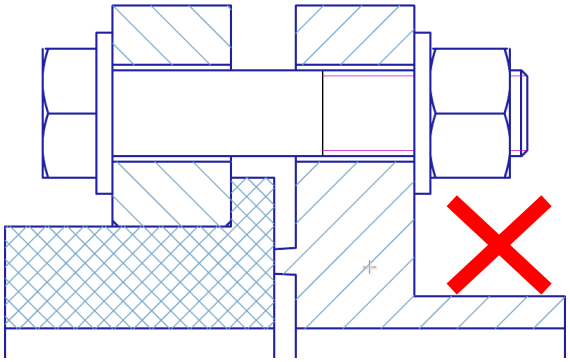

The sealing surfaces of the counter flanges must be flat and clean. Spacer sleeves are recommended for FL flanges.



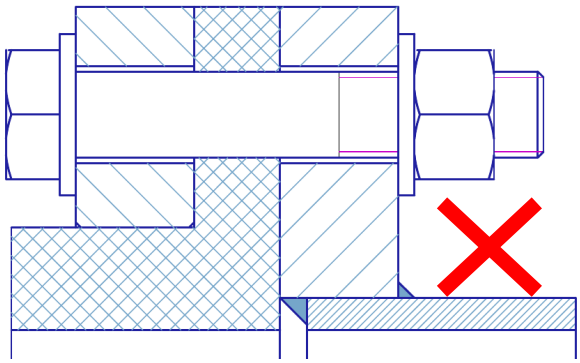
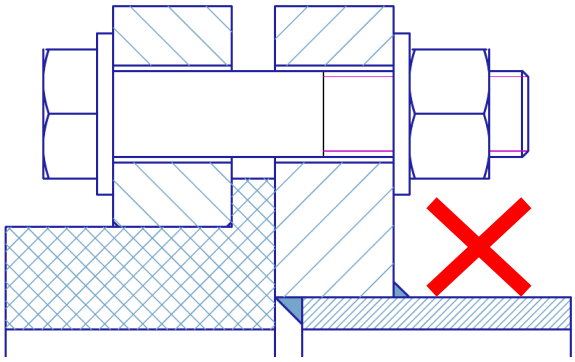
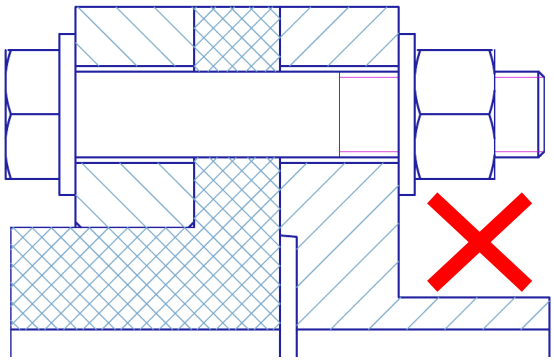
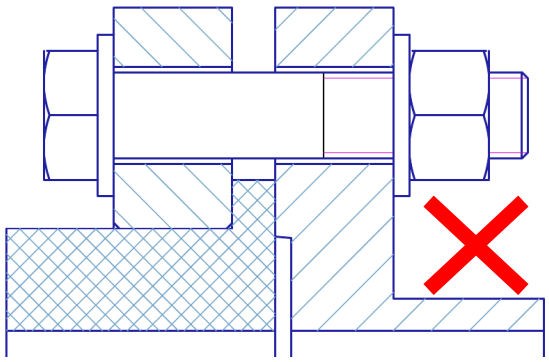
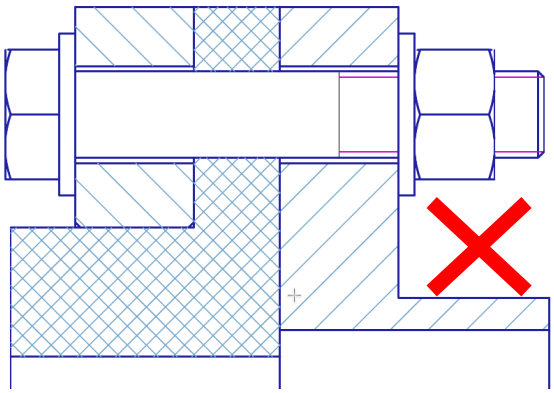
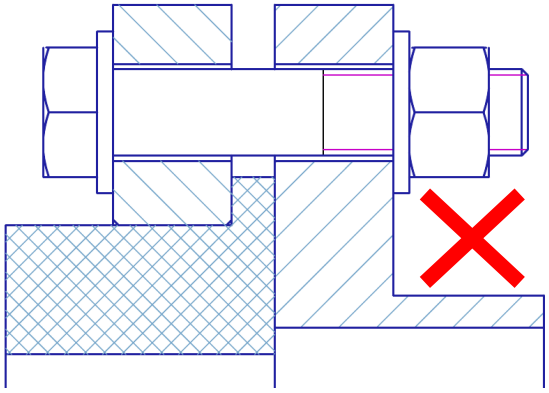


FR: A flange with a projection is not permitted and will cause damage to the sealing surface!
FL / FLR: A flange with a projection is only permitted if its diameter corresponds to that of the rubber sealing surface.





Counter flanges with tongue or groove are not suitable and will cause damage to the rubber sealing surface!

| against fixed flange FR | against loose flange FL / FLR |
|---|---|
|  |  |
| Sharp-edged ends or recesses lead to damage to the rubber sealing surface! | |
|  |  |
| Recesses, e.g. for seals, must be provided with a spacer ring. | |
|  |  |
| Pipes that are installed at an offset or have an internal diameter that does not match each other are not permitted (unless the product is specifically designed for this). For these cases, we offer suitable conical expansions. | |

### 6.4.3 Maximum tightening torques and compression

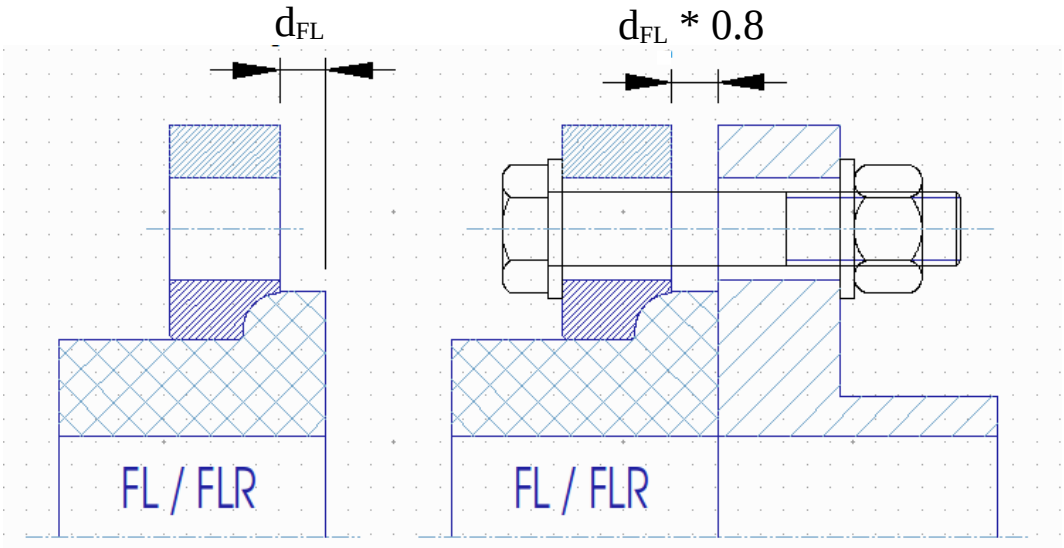
In contrast to the assembly of steel flanges, the assembly of immuG flanges is not based on a specified final tightening torque.

Maximum tightening torques are specified for the different flange types and nominal widths. **The sealing surface compression is crucial for proper assembly of the flange connection.**

The described procedures for assembling and screwing immuG flanges apply to flange types FL, FLR and FR.

The compression of the sealing surface is used as a measurement for assembly. The compression specification always refers to the original sealing surface depth (without O-rings) and is to be understood as follows:

**FL / FLR**




*Picture 3: Sealing surface FL, loose (left) and mounted (right)*

Example: For a 10 mm thick FL sealing surface, it is compressed to 8 mm.

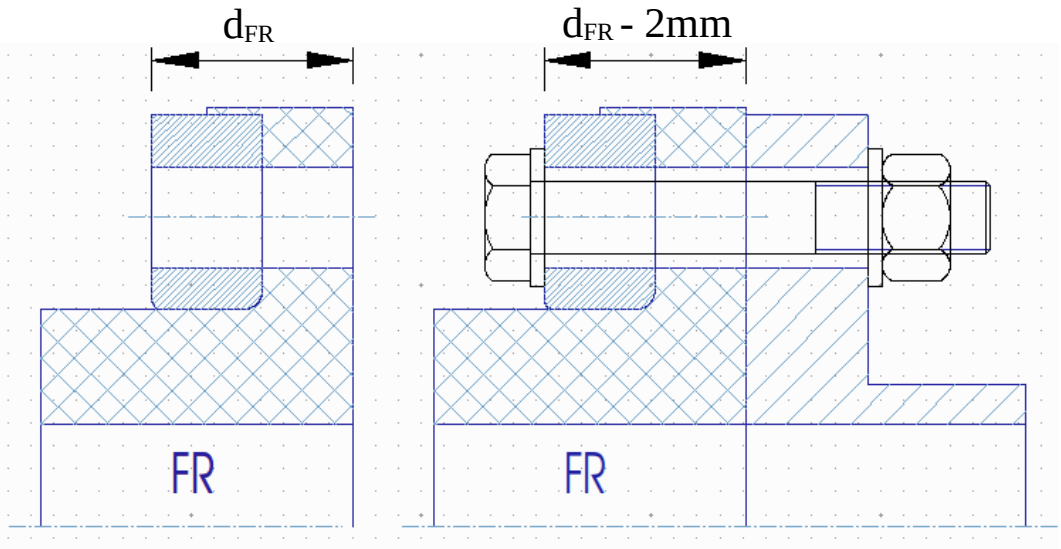
The flanges are tightened according to Section 6.4.4 until the flange spacing corresponds to the compression (taking into account any projection on the steel counterflange).

**Compression specifications for FL/FLR flange connections up to and including PN 16:**

| | per flange | per flange |
|---|---|---|
| Loose flange type FL | standard approx. 20% | at most 30% |
| Loose flange type FLR | standard approx. 20% | at most 30% |

**FR**

The compression of the FR flange connection is specified in absolute terms in mm. The flanges are bolted together according to Section 6.4.4 until the flange surfaces are flush with each other without compression. Bolting is then continued until the entire flange assembly (steel counterflange + FR flange) has been compressed by approximately 2 mm.




*Picture 4: Sealing surface FR, loose (left) and mounted (right)*

**Compression specifications for FR flange connections up to and including PN 16:**

Fixed flange type FR (per side) standard approx. 1-2 mm at most 3 mm

This means that an FR-FR flange connection is compressed by 2-4 mm as standard.

For pressures greater than PN 16, the compression ratio above must be used first. In case of leaks, the specified values may be slightly exceeded.

The **maximum** tightening torques are:

| | **DN<=100** | **100<DN<= 300** | **300<DN<=500** | **DN>500** |
|---|---|---|---|---|
| **Flange type** | $M_{tight,\ max}$ [Nm] | $M_{tight,\ max}$ [Nm] | $M_{tight,\ max}$ [Nm] | $M_{tight,\ max}$ [Nm] |
| Loose flange FL | 25 | 50 | 100 | 150 |
| Loose flange FLR | 35 | 75 | 150 | 200 |
| Fixed flange FR | 35 | 75 | 150 | 200 |

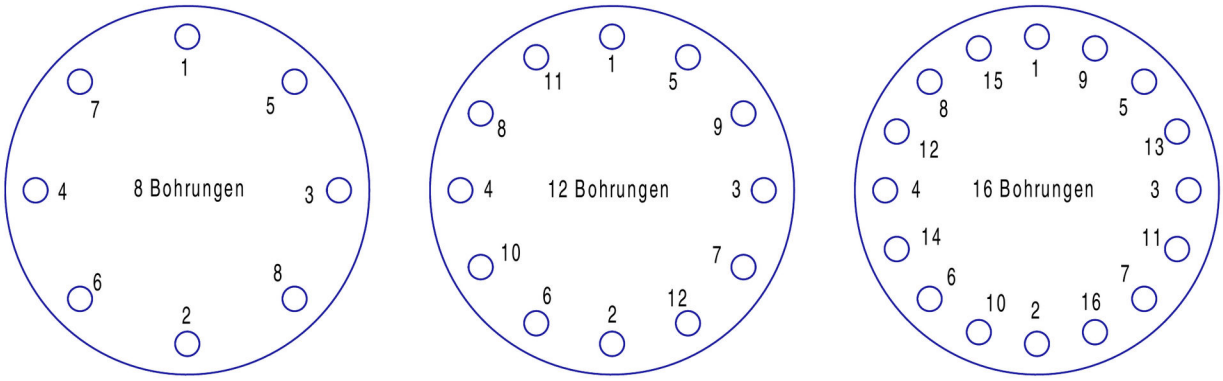
| | |
|---|---|
|  | **Caution!**<br>Even with the specified maximum tightening torque, the sealing surfaces must not be compressed beyond the specified level.<br>The maximum compression specification represents the end of the flange assembly, even if the maximum specified torque has not yet been reached! |

### 6.4.4 Tighten screws

To achieve an optimal flange connection, the order in which the screws are tightened is important.

**Information**
Incorrect tightening of the screws can lead to leaks due to unevenly distributed preload forces.

Screws, nuts and washers must lie planar. The screws must be pre-assembled by hand. The screws must be tightened crosswise:




Flanges with a different number of holes are screwed together using the same pattern.

1. Pre-assemble screws by hand
2. Tighten screws slightly
3. Tighten screws further
4. Repeat 3rd until the spacer sleeves jam or the specified compression is reached.

**Information**
Please consider the maximum tightening torques of the flanges (Chap. 6.4.3). acccording to type and ND.

**Information**
It is recommended to slightly lubricate the threads of screws and nuts, as well as the sliding surfaces of screws and washers before assembly (thin film). This results in up to three times higher screwing forces with the same torque.

### 6.4.5 Offset, twist or angular deviation

Rubber components without stiffening inlays (hoses, elbows and compensators GUR-K, GUR-KR) are generally suitable for compensating for moderate misalignments or angular deviations in a pipeline.

Due to their geometry, immuG elbows GUR-BG can usually compensate for even larger deviations. Since all immuG components are manufactured customer-specifically, no generally valid guideline values can be given.

When compensating for an offset, the rubber component (without stiffening inlays) can be pulled into position using the screws of the flange connection. First tighten the screws carefully until both sealing surfaces are parallel without any center offset, then tighten all the screws according to Chapter. 6.4.4 evenly. Supporting the change in position from outside is advantageous.

**Attention!**
For components with larger diameters or larger nominal pressure ratings, PN 25 and higher, the force required for axial expansion can be high.

We will be happy to provide further information about your component if required.

## 6.5 Special features when installing GUR system pipes

Rubber pipes can simply be placed on normal pipeline routes. Clamps or other commercially available pipe brackets, similar to those used for steel pipes, can also be used for rubber pipes. It should be noted that the outer diameter of rubber pipes is usually larger than that of steel pipes of the same nominal diameter. When installing rubber pipes in existing pipe systems and on existing routes, it may be necessary to adapt or replace the fastening elements.

**Information**
The maximum span width for straight rubber pipes GUR and GUR-V is 3 m.

**Information**
When installing GUR-S: from a pipe length of 2 m, both the flanges, or the direct flange area, as well as the pipe itself must be supported.

**Information**
All rubber pipes are self-compensating. No additional compensators are required for the rubber pipeline; simple fixed mounting points are sufficient.

Rubber pipes are therefore simply “screwed” to the mounting point. Fixed mounting points of the simplest design are sufficient. Compensating, sliding mounting points or special elbow constructs are not required in GUR system pipes.

**Attention!**
When installing, take care not to damage the outer rubber layer. It serves as corrosion protection for the underlying stiffening structure.

## 6.6 Special features when assembling GUR-BG elbows

GUR-BG elbows can compensate for larger pipe deviations thanks to their design and geometry. For elbows without steel spirals or rings, the deformation should not restrict the cross-section too much. A significant narrowing of the cross-section leads to a reduced service life for elbows with abrasive stress.

## 6.7 Special features when assembling GUR-T & GUR-Y branches

The components are assembled as described in 6.4.

| | |
|---|---|
|  | **Information**<br>As a rule, outlets do not contain any stiffening inserts and must not be subjected to large bending moments. Attached measuring devices or valves may need to be supported separately. |

| | |
|---|---|
|  | **Information**<br>T-pieces can be supplied with or without stiffening inlays. If bending of the component is required, find out the exact type of component. |

## 6.8 Special features during assembly and GUR-KR on pumps

In the case of compensating GUR-KR reducers, the pump side is first screwed on, taking into account the chap. 6.4. It should be noted that the component, which is installed horizontally, needs to be supported on the other side, to ensure a distortion-free installation.

| | |
|---|---|
|  | **Information**<br>The ***gap dimension*** refers to the distance between the rubber sealing surface and the adjacent pipe flange sealing surface after the pump side has been installed. The standard gap size for nominal widths up to DN 500 is approx. 6 mm, and for nominal widths up to 1200 approx. 10 mm. Maintaining the gap dimension ensures optimal operation of the compensator and relieves the load on adjacent components during operation. |

| | |
|---|---|
|  | **Information**<br>The gap dimension is a result of the defined expansion behavior of the GUR-KR under pressure. The optimal gap dimensions are component-specific and can vary. |

| | |
|---|---|
|  | **Attention!**<br>For the GUR-KR to function as intended, there must be a fixed point in the pipeline on the second flange or in the immediate vicinity. |

Then, taking into account Chap. 6.4 the gap is closed and the flange connection is sealed.

# 7. After assembly

## 7.1 Test before initial operation

Before the initial operation, the correct assembly of the line components must be checked and ensured. The components must be checked for external damage. Further testing or a commissioning test in accordance with applicable regulations may be required.

## 7.2 Start up

First, the pipeline is filled with medium and thus vented. Then the pressure may be increased up to operating levels.

After reaching operating or nominal pressure, it is recommended to check for leaks. If there is a leak, release the pressure and tighten the screws of the affected flange connection slightly according to Chapter. 6.4.4.

| | |
|---|---|
|  | **Information**<br>A stress-free mounting is achieved if the support is secured after the operating pressure has been reached. |

## 7.3 Pressure test

For pressure testing, the components are closed with blind flanges. The blind flanges are installed according to chap. 6. Slightly increased compression of the flange connection may be required to maintain the test pressure.

| | |
|---|---|
|  | **Attention!**<br>elbows must be fixed in their geometry for a pressure test. |

| | |
|---|---|
|  | **Attention!**<br>Large reductions (a DN >= 400 mm) must be limited to a maximum of 3% in their axial expansion for a pressure test. |

| | |
|---|---|
|  | **Warning!**<br>Only carry out pressure tests with water! Vent all air completely! |

| | |
|---|---|
|  | **Information**<br>All pipes and hoses have an appropriate burst pressure safety based on the nominal pressure. We will be happy to provide the bursting pressure of the respective component upon request. |

## 7.4 Maintenance and inspection

Regular inspection of the components is recommended. An appropriate inspection interval must be determined by the operator. This applies in particular to components subject to wear. If necessary, further national regulations must be taken into account.

Basic checks during inspection include:

- Is there a leak at the flange, fitting or pipe ?
- Are there any damages, cracks or signs of wear visible in the inner layer ?
- Is there any damage to the flange or fitting that endangers function or safety ?
- Is there any damage to the outer layer up to the inlay (fabric), particularly due to abrasion or tears? Is the outer layer brittle ?
- Do layers separate? Do bubbles, twists, kinks or atypical longitudinal expansions occur without pressure or under pressure ?
- Is the marking intact and readable ?
- Have storage times or usage periods been exceeded ?
- Does the inner layer harden (measurement of shore hardness) between test intervals ?

**Attention!**
If the inner layer hardens due to temperature or media influences, the shore hardness should be checked regularly. If the Shore hardness exceeds 80°Sh, replacing the component is recommended.

If a flange connection is leaking, the pressure must be released. The screws can then be tightened.

**Information**
If the product is subject to wear and tear, it should, if possible, be rotated at regular intervals by approximately 90° to utilize the entire inner surface. This can increase the overall service life.

## 7.5 Disassembly

Before dismantling, the operator must ensure that the affected pipe or line section is drained, depressurized and, if necessary, cooled down.

| | |
|---|---|
|  | **Warning!**<br>Only loosen depressurized flange connections of drained and cooled lines! |

| | |
|---|---|
|  | **Caution!**<br>The component to be released must be secured against falling. |

Screws and nuts are deinstalled crosswise according to Chap. 6.4.4 (at least two passes).

## 7.6 Duration of use

Based on “DGUV Rule 113-020 - Hydraulic hose lines and hydraulic fluids - Rules for safe use”, the maximum recommended period of use for our products is 6 years .

Factors that have a negative impact on the service life of hose lines are:

- high operating or ambient temperatures, within the permissible limits
- small bending radius
- conveying of abrasive material
- conveying of unsuitable fluids in relation to inner layer rubber quality
- exterior abrasion
- kinking of the line
- tensile or torsional loads, compression
- frequent load changes (pressure or bending)
- frequent movements

An extension of the maximum duration of use is possible if

- corresponding tests or experience of the operator allow safe further use.
- protective measures, based on a written risk assessment by the operator, are implemented for the event of a failure.
- the hose assembly is checked by a qualified person in adjusted, possibly shortened, periods of time.

## 7.7 Defects and complaints

Despite careful design, production and quality controls, defects in components cannot be completely ruled out.

When submitting a complaint, it is advantageous to provide information identifying the component (e.g. order, part or article number) and to report the complaint in writing.

We ask for a description of the defect that is as precise as possible and the date on which the defect was discovered. Detailed close-up and general view photos of the component and its installation environment make it easier for us to make an initial assessment.

If a technical defect occurs, the next steps can be clarified in consultation with the manufacturer and, if necessary, the conditions for continued operation of the component can be checked.

Please address your concerns to your immuG sales representative or to:

immuG Rohr + Schlauch GmbH
Schwarzer Weg 5
39356 Walbeck
Tel: 039061/4666-0
Fax: 039061/466646
E-Mail: zentral@immug.de
Web: www.immug.de

## 7.8 Disposal

When disposing, the steel flanges must be separated from the rubber body. The individual components must be recycled or disposed of in accordance with country-specific regulations and requirements.

# 8. Attachment

## 8.1 Terms

| | |
|---|---|
| AWEG | Designates immuG hoses with flanges |
| PED | Pressure equipment directive 2014/68/EU |
| DN | Nominal diameter of the flange or hose or pipe |
| Expert | Hoses from the immuG-Expert series |
| FL | Loose flange type FL |
| FLR | Loose flange type FLR |
| FR | fixed flange type FR |
| GUR | System name: rubber pipe system |
| GUR | As a component name: A straight rubber tube |
| GUR-A | Flange holder |
| GUR-BG | Rubber elbow |
| GUR-H | Spacer sleeves for flange mounting |
| GUR-K | Straight compensator, standard without stiffening inlay |
| GUR-KR | Compensating reducer, standard without stiffening inlay |
| GUR-V | A straight rubber pipe (vacuum proof version) |
| PN | Nominal pressure |
| PS | Maximum permissible operating pressure in bar |
| TOP | TOP principle describes the order in which protective measures should be taken. First of all, dangers should be averted through technical measures. If this is not possible, organizational measures should be taken and, as a last resort, personal protective equipment should be provided. |
| TS | Maximum permissible operating temperature in °C |