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*Mechanical seals*

*Systems*

*Rotary joints*

*Couplings*

*Hydraulic seals*



**DIE DICHTUNG.**

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## Spring-loaded sealing systems for flanges

The existing system solutions can be used independent of the flange type and its geometry. Adaptations that might be required will be implemented inside the spring-loaded sealing system.

### Essential components are:

Tensioning elements:

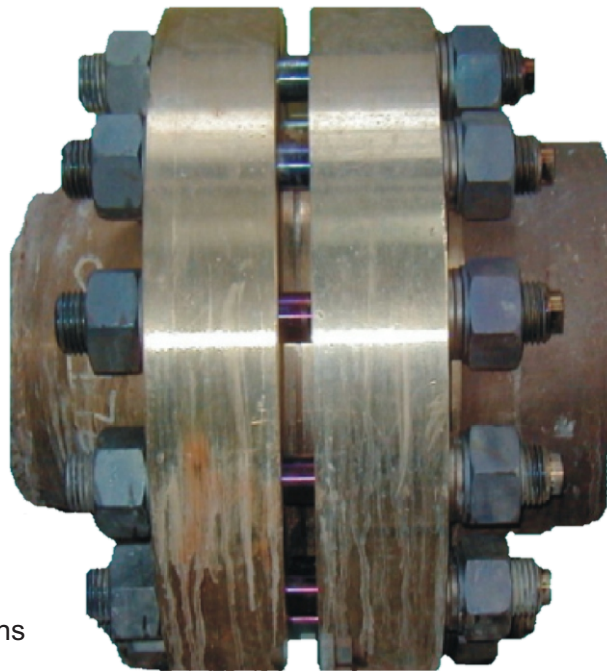
- Adapted to the settling behaviour of seal
- Adapted to customer's specification

### Seal:

- Construction according to customer's specification
- Adapted to the operation conditions
- Calculated according to test and operation conditions

### Bolts:

- High-strength materials
- Safety certificate to DIN 2505



### The METAX conception

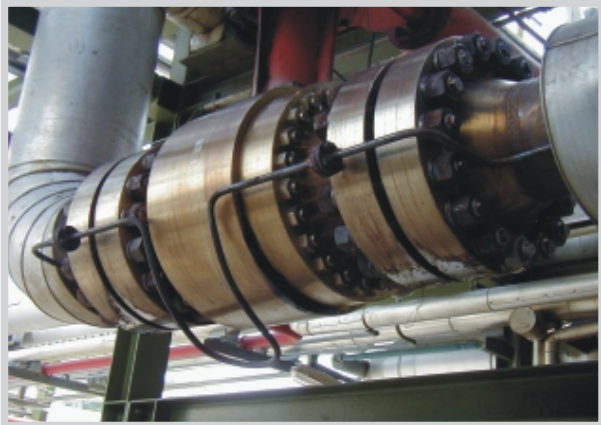
- Standardized sizes
- Universally applicable up to 500°C
- The sealing pressure force can be set by varying the number of springs and the seal width
- Compound metal seals
- Defined spring-backeffect
- Highest sealing effect through labyrinth rings
- Design with or without web
- Bolts with expansion shank to standard KSW 11

Spring-loaded sealing systems for flanged connections are preferentially used for solution of problems in plants existing already. Therefore, the quick availability of all components is a prominent feature of the used METAX systems. Up to bolt size M36, all components can be supplied within three days.

The documentation comprises the required data, the calculation proof of leak tightness and the safety proof for the overall system, the installation instructions with the specification of the tightening and operating torques and a works certificate 3.1A, B or C on the used materials.

## Let's talk about elasticity

In the beginning, leaks on flanged connections most frequently occur during start-up and shut-down of plants, since these operating states are associated with the highest temperature and pressure changes.



### Start-up process

- Heating from inside to outside
- Risk of excessive stressing of bolt and seal
- Leaks produced by uneven expansions

### Shut-down process

- Lower stressing of bolt and seal
- The risk exists that the actual sealing pressure falls below the required minimum so that sealing material is carried out

Small leakages during the start-up and shut-down process frequently cause the carrying-out of sealing material, and insufficient sealing pressure during operation may cause permanent leakage as a promoter for further destruction of the seal.

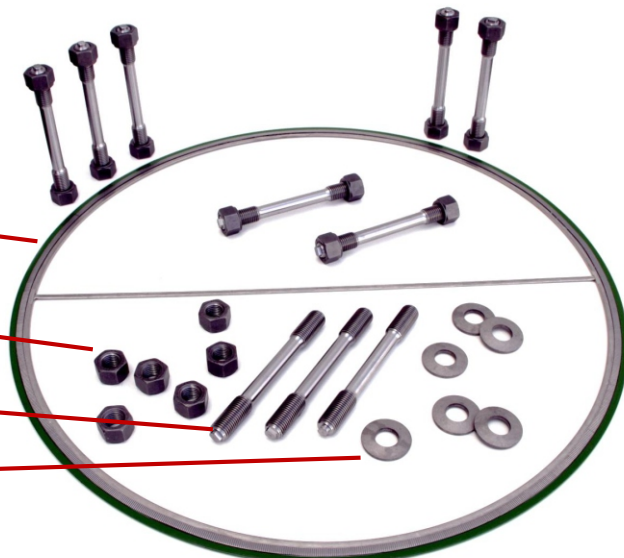
## A new component

Additional components are used to maintain the sealing pressure even under changing operating conditions and to compensate settling phenomena of the seal and ageing of the whole sealing system: Clamping rings with elasticity much higher than the overall elasticity of the remaining sealing system.

## Improved flange sealing systems by METAX technology

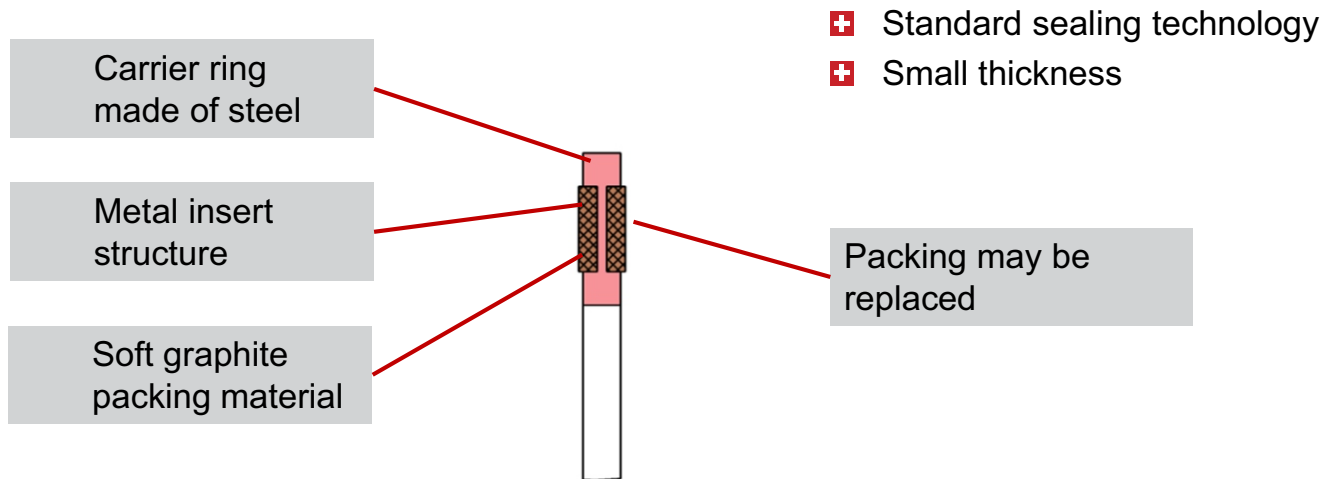
### Components of the sealing system

- Carrier seal ring
- Nuts
- Bolts
- Spring washers

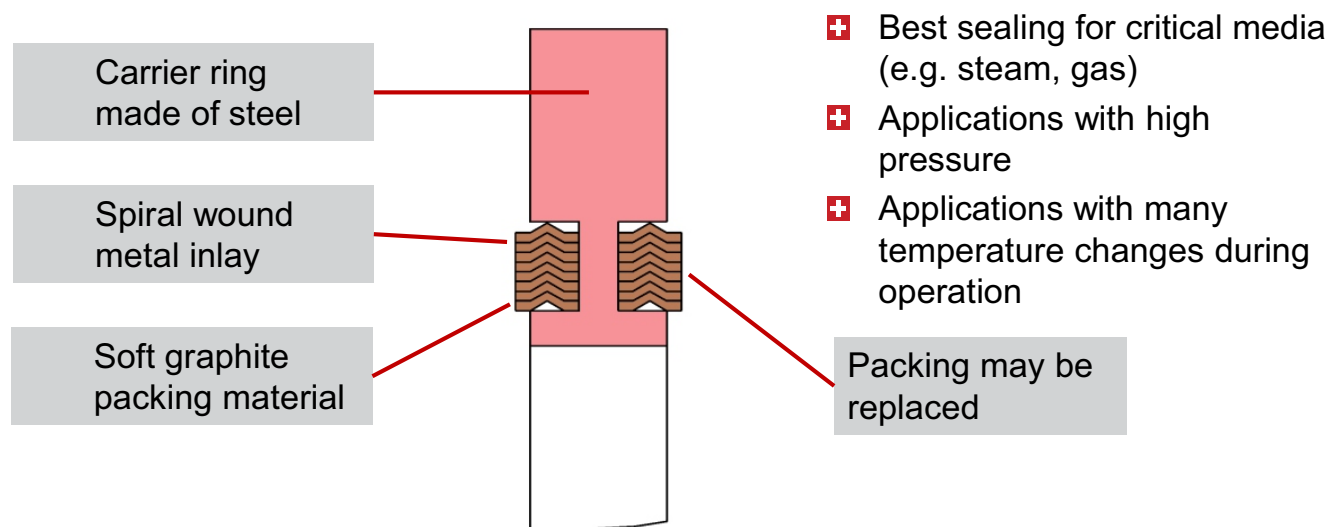


## Improved flange sealing systems by METAX technology

### Carrier seal ring with soft packing and metal insert

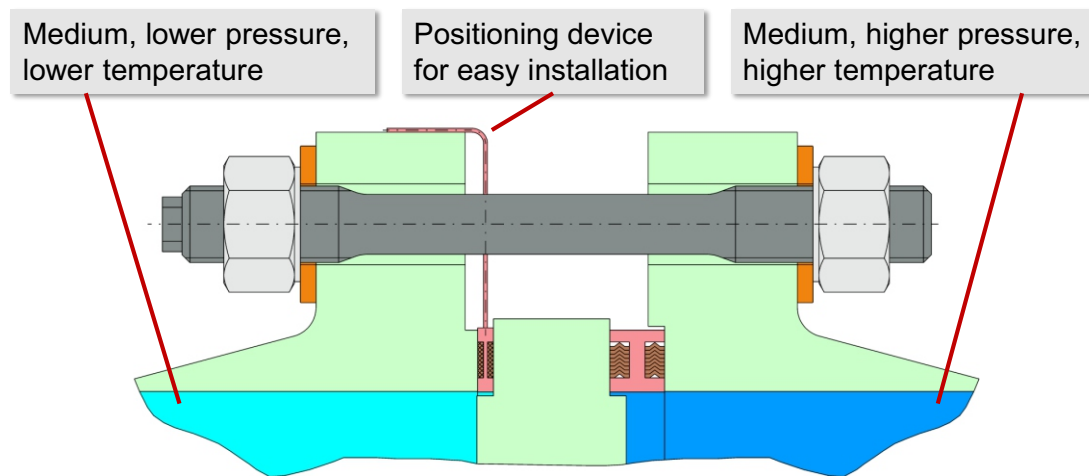


### Carrier seal ring with spiral wound gaskets



## Improved flange sealing systems by METAX technology

### Systems with two different seals

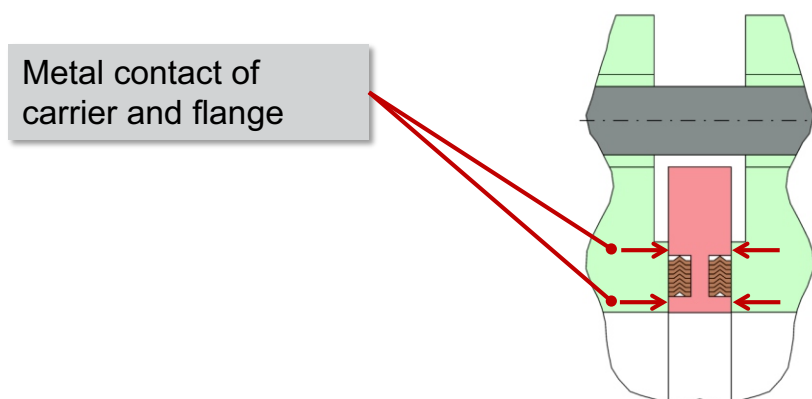


### Key factor number 1

- ⊕ Each single flange seal will be calculation to determine the optimum seal shape, bolt dimension and spring washer shape.
- ⊕ This single calculation will give the best result on the selection.

### Key factor number 2

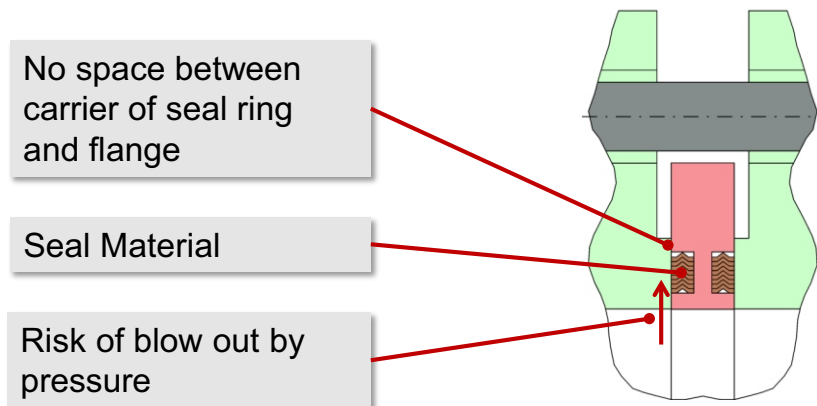
- ⊕ Carrier seal ring design will prevent loss of pre-stress of the seal material.



## Improved flange sealing systems by METAX technology

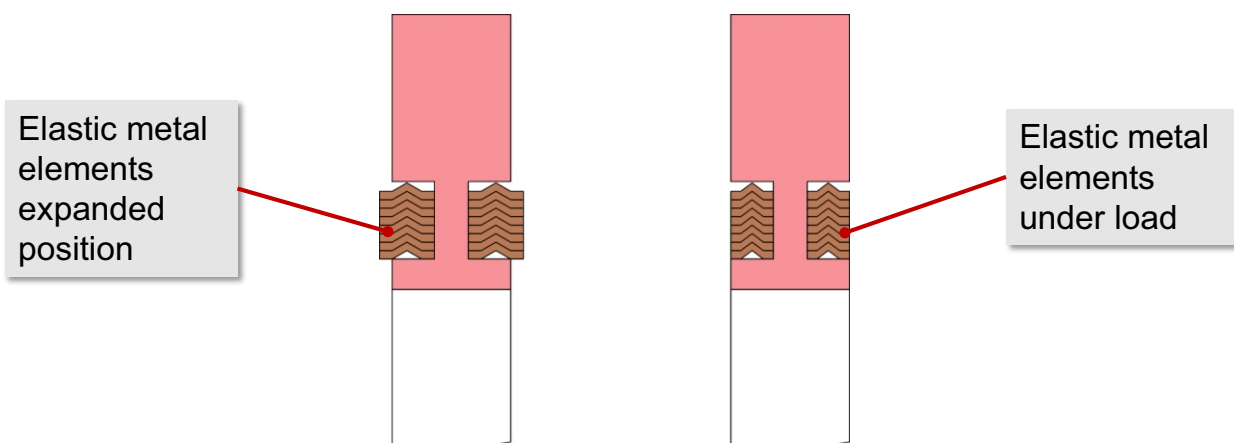
### Key factor number 3

- Carrier seal ring design will prevent blow out of the seal material



### Key factor number 4

- Elastic metal elements will support sealing of seal material





## Improved flange sealing systems by METAX technology

### Key factor number 6

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- Installations will be done by specialist workers
- Depending of the installation situation the perfect method of tensioning the bolts will be selected (Hydraulic torque system or tension cylinders to stretch the bolts without friction)
- Preload of bolts will be controlled within small limits



### Success since 1997

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- Over one hundred systems installed worldwide without failure.





**DIE DICHTUNG.**



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