

## Damages



# Objective of this Presentation. Expand specialised knowledge.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations


---

The objective of this presentation is to indicate the essentials in the **maintenance, service and repair of safety valves.**



# Maintenance, Service and Repair. Twisted bellows.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations


Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ Bent stainless steel bellows</li></ul> 	<p>➔</p> <ul style="list-style-type: none"><li>▪ The valve doesn't work</li><li>▪ Bellows was damaged during assembly/disassembly</li></ul>	<p>➔</p> <ul style="list-style-type: none"><li>▪ Follow the LESER maintenance and service instructions</li></ul>

**LESER**

The-Safety-Valve.com

# Maintenance, Service and Repair. Opening and closing characteristics.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations


Situation	Fault / Technical background	LESER Solution
<p>When lapping the disc, the lifting aid got in the way and was twisted off</p> 	<ul style="list-style-type: none"><li>▪ Perfect functioning of the valve is no longer possible</li><li>▪ The performance of the valve cannot be achieved in the stipulated limits</li></ul>	<ul style="list-style-type: none"><li>▪ Use the matching lapping stamps</li><li>▪ Use a removeable lifting aid</li></ul>

**LESER**

The-Safety-Valve.com


# Maintenance, Service and Repair. Leak in bellows.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>A conventional safety valve was subsequently equipped with stainless steel bellows by a specialised workshop</li></ul> 	<ul style="list-style-type: none"><li>The valve is no longer gas-tight</li><li>Poisonous medium escapes between the bonnet and bonnet spacer</li></ul>	<ul style="list-style-type: none"><li>During the modification, it is mandatory to use new seals and not to forget any seals</li></ul>


# Maintenance, Service and Repair. Leak during the Installation.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>The threaded valve is mounted on the inlet and outlet piping. Afterwards, the safety valve is leaky.</li></ul> 	<ul style="list-style-type: none"><li>Slip-joint pliers were used on the valve body to install the valve and align it with the pipelines.</li></ul>	<ul style="list-style-type: none"><li>It is absolutely necessary to only use the appropriate spanner on the hexagonal collar.</li></ul>

# Maintenance, Service and Repair. Leak during the Installation.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations




Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The safety valve knocks</li><li>▪ The safety valve is leaky as a result.</li></ul> 	<ul style="list-style-type: none"><li>▪ Due to the long lasting knocking of the safety valve, the surface of the seat and disc were damaged</li><li>▪ The spindle is damaged near the guide</li></ul>	<ul style="list-style-type: none"><li>▪ Check the design of the safety valve</li><li>▪ Check the design of the supply and discharge lines</li><li>▪ Use an O-ring damper</li></ul>

**LESER**

The-Safety-Valve.com

# Maintenance, Service and Repair. Materials.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The vessel to be protected contains corrosive medium</li><li>▪ A safety valve made of a low-alloy carbon steel is installed for protection, which is not suitable for this application</li></ul>  <p>Hastelloy when HCL is used</p>	 <ul style="list-style-type: none"><li>▪ The safety valve becomes leaky during the operating phase.</li><li>▪ The corrosion resistance of the seatings is not guaranteed. The surfaces are destroyed by the corrosion</li></ul>	 <ul style="list-style-type: none"><li>▪ Use high-alloy material for the parts that are in contact with the medium (seat/disc)</li><li>▪ The other parts of the safety valve can still be made of the standard material, as the valve rarely opens.</li></ul>

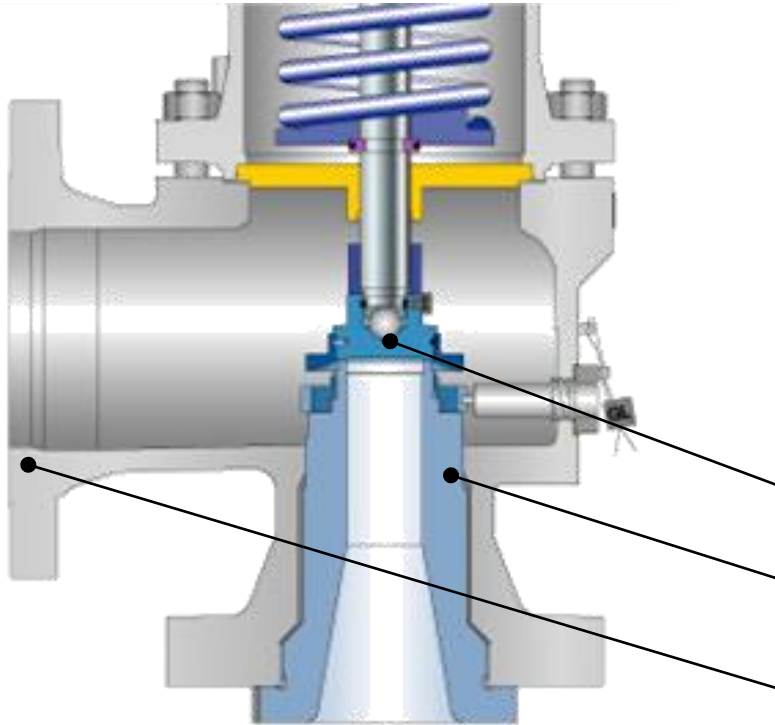
**LESER**

The-Safety-Valve.com



# Installation Situation. Example of special material type 526.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations



## Special materials:

- Hastelloy®
- Zirconium
- Tantalum
- Titanium
- Monel®
- Inconel®

Disc

Nozzle

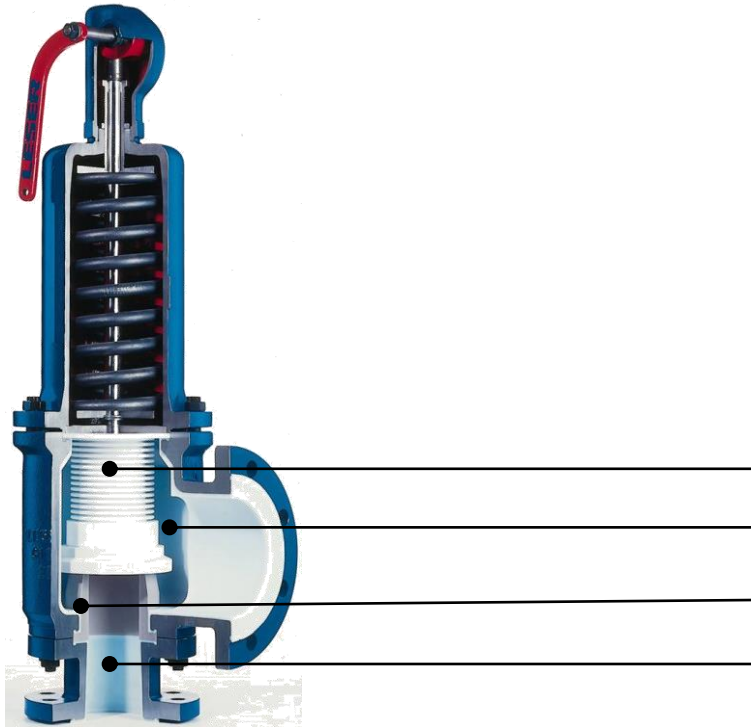
Body

**LESER**

The-Safety-Valve.com

# Installation Situation. Example of special material type 447.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations



## Use:

- Used if the corrosion resistance of austenitic or highly-alloyed metallic materials is inadequate.
- Chemicals industry
- Highly corrosive and aggressive fluids
- Universal use
- Viscose fluids

PTFE bellows

Outlet body, PTFE lined

Nozzle, PTFE/glass component

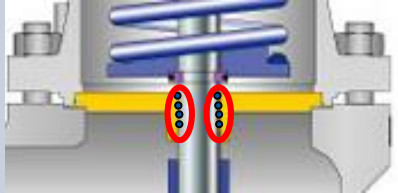
Inlet body, PTFE lined

**LESER**

The-Safety-Valve.com

# Installation Situation. Example of valve configuration.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

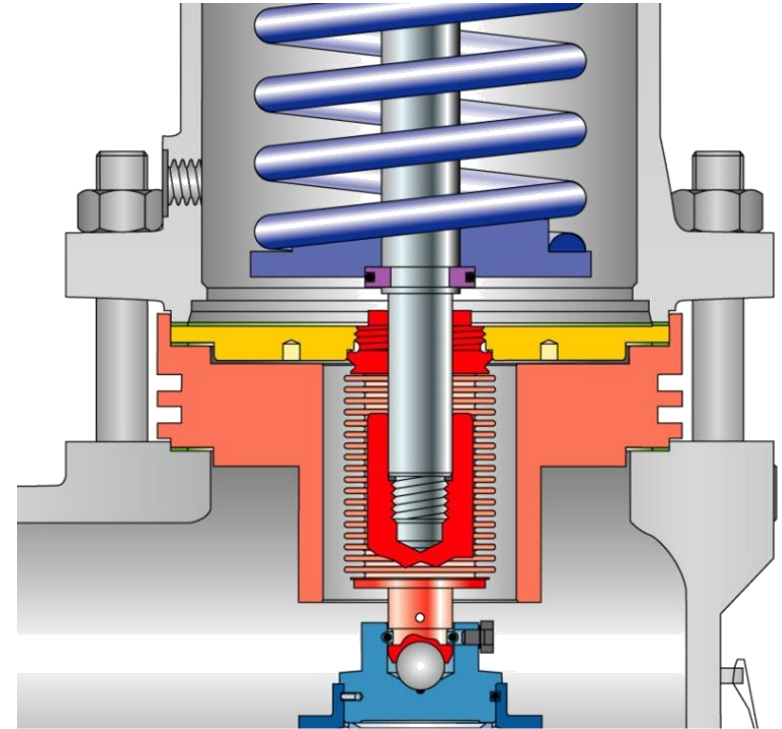
Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>The medium is dirty</li></ul>	<ul style="list-style-type: none"><li>The spindle / guide may be blocked</li></ul>	 <ul style="list-style-type: none"><li>Stainless steel bellows should be used</li></ul>

# Installation Situation. Bellows.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

## Properties:

- Protects moving parts and the spring against dirt, corrosion, impurities, temperatures and the medium itself.
- Standard material  
1.4571/1.4404 (316 SS)

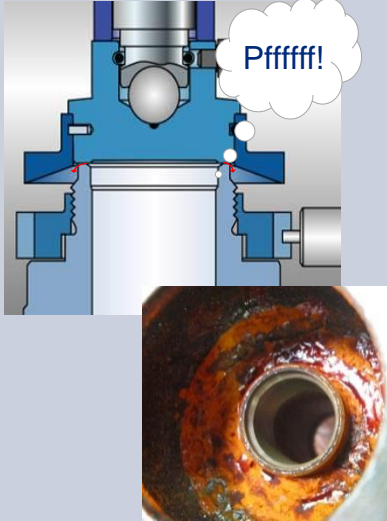


**LESER**

The-Safety-Valve.com

# Installation Situation. Disc with Soft Seal.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

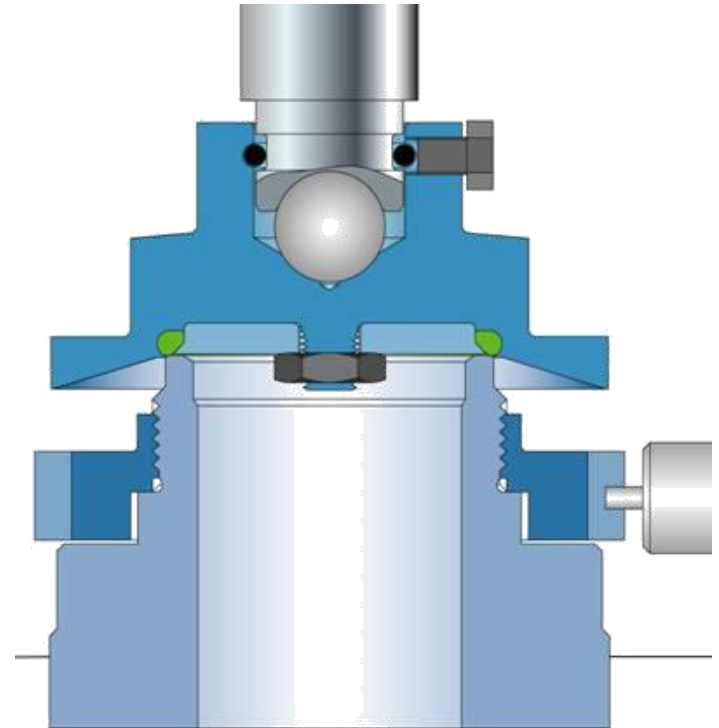
Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>The medium contains particles</li></ul>	<ul style="list-style-type: none"><li>After blowing out, the safety valve no longer meets the seal tightness requirements.</li><li>Particles remain stuck to the surface of the seat after blowing out.</li></ul>	 <p>Pffffff!</p> <ul style="list-style-type: none"><li>By using a soft seal, it is possible to compensate for minor damage to the surface.</li></ul>

# Installation Situation. Disc with Soft Seal.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

## Properties:

- Increased seal tightness
- Compensation for minor damage to seat
- Different elastomer materials are available (CR, NBR, EPDM, FPM, FKM, FFKM)
- Vacuum-tight
- Lasting seal tightness even after repeated opening




**LESER**

The-Safety-Valve.com

# Installation Situation. Wear on seat and disc.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

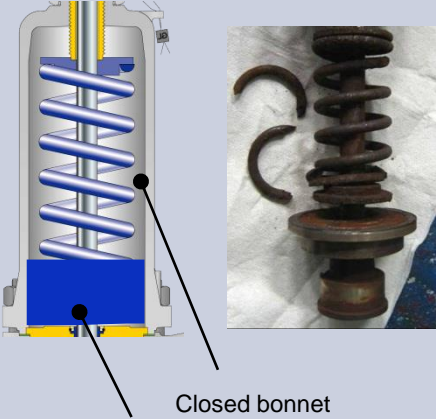
Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The safety valve leaks</li><li>▪ The medium is aggressive</li></ul> 	<p>→</p> <ul style="list-style-type: none"><li>▪ Seat and top disc surface eroding</li><li>▪ Operating pressure too close to set pressure</li></ul>	<p>→</p> <ul style="list-style-type: none"><li>▪ The difference between the operating pressure and set pressure must be more than 10% to prevent a leak.</li></ul>

**LESER**

The-Safety-Valve.com

# Installation Situation. Spring corrosion.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The valve is open and can no longer be closed.</li><li>▪ The system must be switched off.</li></ul>	<p>→</p> <ul style="list-style-type: none"><li>▪ The spring was damaged by fluid in the bonnet.</li></ul>  <p>Closed bonnet</p> <p>Medium (e.g. water) cannot flow out.</p>	<p>→</p> <ul style="list-style-type: none"><li>▪ The bonnet and body should be emptied using a drainage hole.</li><li>▪ The outlet piping should also be given a drainage hole.</li></ul>




# Installation Situation. Icing in bonnet.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The safety valve is connected to an outdoor system</li><li>▪ The piping at the outlet is on an incline.</li></ul>	<ul style="list-style-type: none"><li>▪ The valve can fill with fluid.</li><li>▪ The fluid can freeze.</li></ul> 	<ul style="list-style-type: none"><li>▪ Equip the valve with an additional drainage hole so that the fluid can drain out.</li></ul>

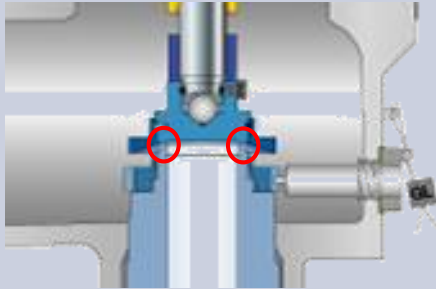
# Installation Situation. Cracked stainless steel bellows.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The safety valve is connected to an outdoor system</li></ul>	<ul style="list-style-type: none"><li>▪ Condensed water or other fluids have collected in the stainless steel bellows.</li><li>▪ In frosty conditions, the fluid in the bellows froze.</li><li>▪ The spring chamber monitor is not connected.</li></ul> 	<ul style="list-style-type: none"><li>▪ Connection of a suitable bonnet vent piping which prevents the intrusion of moisture.</li></ul>

# Installation Situation. High temperatures.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>▪ The temperature of the leaking medium is higher than 450°C.</li></ul>	<p>→</p> <ul style="list-style-type: none"><li>▪ The safety valve begins to leak. The seal tightness requirements are no longer fulfilled.</li><li>▪ The disc material is not suitable for temperatures above 450°C. The surface may deform, resulting in a leak.</li></ul>	 <ul style="list-style-type: none"><li>▪ For applications with temperatures above 450°C, use a stellite sealing surface.</li></ul>

# Installation Situation. High temperatures.

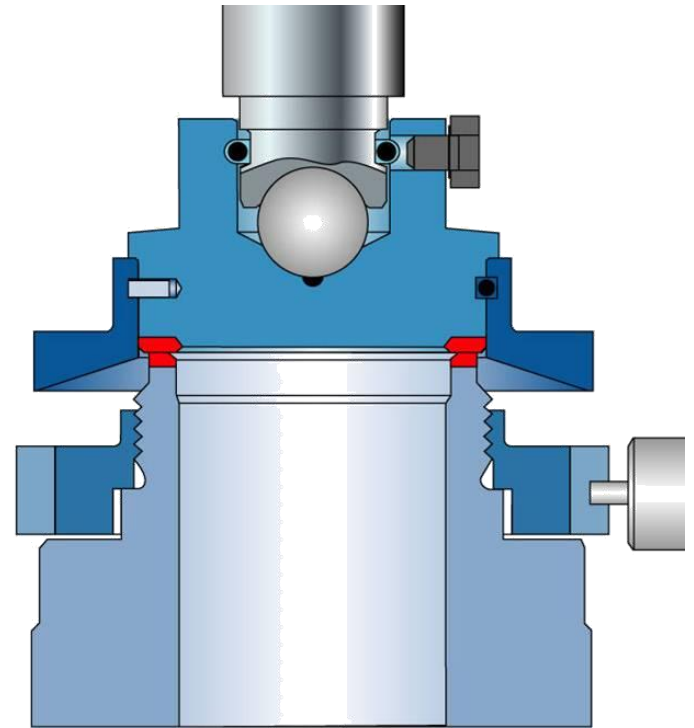
1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

## Properties:

- Suitable for temperatures above 450°C. Protection of the sealing surface against aggressive media
- Stellite seatings of the disc, seat, and/or nozzle

## Advantages:

- Anti-corrosion protection
- Resistant to the effects and changing temperatures.

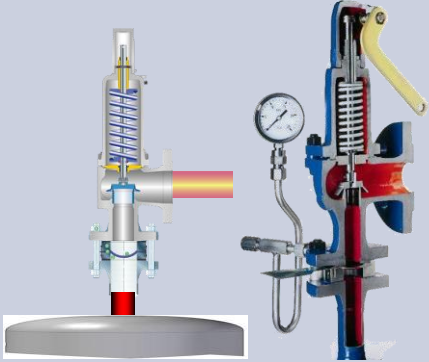


**LESER**

The-Safety-Valve.com

# Installation Situation. Highest seal tightness requirements.

1. Objectives | 2. Maintenance, Service and Repair | 3. Installation Situations

Situation	Fault / Technical background	LESER Solution
<ul style="list-style-type: none"><li>Absolute seal tightness regarding corrosion or poisonous media</li></ul>	<p>→</p> <ul style="list-style-type: none"><li>The leak rate of the safety valve is too high. Absolute seal tightness cannot be assured.</li></ul> <p>→</p>	 <p>The image shows two components: on the left, a safety valve with a blue and silver body and a red stem; on the right, a bursting disc assembly with a blue and red body and a yellow handle. A pressure gauge is attached to the bursting disc assembly.</p> <ul style="list-style-type: none"><li>Combination of safety valve and bursting disc</li><li>Both pressure units fulfil the requirements of the National Board</li></ul>

**LESER**

[The-Safety-Valve.com](http://The-Safety-Valve.com)

## Damages

Thank you for your attention.

