MAINTENANCE

Maintenance Handbook for LESER Product Group

High Performance Series 441 / 441 Full Nozzle / XXL / 444 / 458
Modulate Action Series 429 / 433

Introduction

About MAINTENANCE

MAINTENANCE provides a collection of documents for repairing or maintaining LESER safety valves. The following topics are covered:

- Maintenance Fundamentals of LESER safety valves (terminology, design elements relevant for valve operation)
- Repair process
- Suggested equipment for assembling, disassembling and rework of critical parts
- Disassembly, including sectional drawings
- Rework of critical parts including an overview of critical dimensions
- Assembly, including options
- Spring charts
- Testing procedures (set pressure and leak tests)
- Spare parts lists
- Guidelines for inspection, storage and transport
- Trouble shooting

The following chart provides an overview about the available documents, the contents and applicable valve types. While the information is complete for most valve types, the sections 1.5, 1.6,1.7 do not provide specific information on type 444 and 441 XXL.

Contents

Chapter	Content	Sources
1.1 Introduction	Introduction and table of contents	LID 1003.01 “Introduction”
1.2 Maintenance Fundamentals	Terminology: - Parts - Set pressure - Overpressure & blowdown Critical parts: - Nozzle & disc - Spring - Adjusting ring - Parts providing alignment - Lifting devices	LID 1002.00 “Maintenance Fundamentals”
1.3 Repair process	-Process of Safety Valves to Repair -Repair Traveller	LGS 4111 “Process for Safety Valves to Repair” LGS 4112 “Repair Traveller”
1.4 Suggested equipment	Equipment for disassembly and lapping - Required equipment with technical information - Order numbers of LESER equipment - Equipment and materials	LGS 4457 “High-Performance_ Tool-Kit Specifications” LGS 4456 “Standard Tool Specification“ LGS 4116 “Operating materials and supplies for repaired valves
1.5 Disassembly and Cleaning	Disassembly instruction: - Step-by-step instruction for disassembly -Cleaning instructions	LGS 4106 “Dismantling instructions for types 441,442,433,457,458 “

Chapter	Content	Sources
		LGS 4115 “Cleaning repaired valves”
1.6 Rework of critical parts	Critical dimensions for refinishing disc and nozzle: - Lowest allowable tolerances for refinishing - LDeS 3309.05 includes dimensions for other LESER safety valves. Relevant pages for this valve type: High Performance Page 3-4; 7-13 Modulate Action Page 5-7	LDeS 3309.05 “Refinishing of seats and discs”
	Rework of the seat: - Procedure of lapping by hand, illustrated with pictures	LGS 4113 “Reworking repaired valves”
1.7 Assembly	Assembly instruction: - Step-by-step instruction for assembly Torques: - Assembly torques for body-bonnet connection, caps, test gags, O-ring discs and bellows	LGS 4101 “Assembly instructions for types 441,442,433,457,458” LGS 3323 “Torques for screw, nuts and caps H2 / lifting devices” LGS 3325 “Torque for O-Ring-Disc and bellows connection”
	After Assembly: - Color finishing and painting - Component plate	LGS 4114 “Paint touch-up and painting repaired valves” LGS 4118 “Component plates”

Chapter	Content	Sources
1.8 Spring charts	Spring charts: - Overview of spring ranges for set pressure adjustments and spring selection in bar and psi - High Performance - Modulate Action	LGS 3604 “Spring-data-list Type 424, 440, 441, 442“ LGS 3607 “Spring charts – type 455,458“ LGS 3626 “Spring charts – type 444“ LGS 3602 “Spring charts – type 427,429,431,433”
1.9 Testing Procedures	Testing set pressure: - Procedures and equipment for setting and testing the cold differential test pressure, including tolerances	LDeS 1001.69 “CDTP-Cold differential test pressure”
	Leak testing: - Procedures and equipment for testing functional tightness (disc-nozzle connection) - Procedures and equipment for testing shell tightness (nozzle, cap)	LGS 4434 “Performing Leak Tests”
	Tightness requirements: - Seat tightness - Shell tightness - Back seat tightness	LGS 0201 “Tightness Test”
	Last visual check up	LGS 4117 “Final visual inspection of repaired valves“
1.10 Spare parts	Spare parts list	LWN 485.01 “Spare Parts Type 427, 429”

Chapter	Content	Sources
	- High Performance - Modulate Action	LWN 485.01 “Spare Parts Type 431, 433” LWN 485.01 “Spare Parts Type 431, 433 PN 160” LWN 482.01 “Spare Parts Type 441,442 ANSI” LWN 482.01 “Spare Parts Type 441,442 DIN” LWN 488.01 “Spare Parts Type 441,442 Full nozzle ANSI” LWN 488.01 “Spare Parts Type 441,442 Full nozzle DIN” LWN 482.01 ”Spare Parts Type 441,442 XXL” LWN 482.01 “Spare Parts Type 444 ANSI” LWN 482.01 “Spare Parts Type 444 DIN” LWN 488.01 “Spare Parts Type 455,456” LWN 488.01 “Spare Parts Type 457,458”
1.11 Installation & storage	Testing and inspection before installation: - visual inspection of the valve - hydraulic pressure test	Extract from LWN 753.00 “Testing and Inspection of Safety Valves before Installation”

Chapter	Content	Sources
	Inspection intervals	Extract from LWN 753.00 “Recommendation for Testing and Inspection during Operation”
	Storage and transport	Extract from LWN 753.00 “Storage and Handling of Safety Valves”
1.12 Trouble shooting	Typical errors	Extract from LWN 765.01 “Typical Mistakes as a Result of Unauthorized Repair”

1 Maintenance Fundamentals

1.1 Introduction

This chapter deals with basic information considered as necessary for assembly and disassembly of LESER's safety valves. Fundamentals include:

- Parts description
- Definition of overpressure, blowdown and set pressure at LESER
- Explanation of relevant construction elements

1.2 Terminology

1.2.1 Parts Description acc. to ASME PTC 25

Item	Component	Description per ASME PTC 25 – Parts used by LESER
1	**Body**	A pressure-retaining or containing component of a pressure relief device that supports the parts of the valve assembly and has provision(s) for connecting to the primary and/or secondary pressure source(s).
5	**Nozzle**	A primary pressure- containing component in a safety valve that forms a part or the entire inlet flow passage.
5	**Seat**	The pressure-sealing surfaces of the fixed and moving pressure-containing components.
6	**Adjusting ring (blowdown ring)**	A ring assembled to the nozzle or guide of a direct spring valve, used to control the opening characteristics and/or the reseat pressure.
7	**Disc**	A moveable component of a pressure relief device that contains the primary pressure when it rests against the nozzle.
9	**Bonnet**	A component of a direct spring valve or of a pilot in a pilot-operated valve that supports the spring. It may or may not be pressure containing.
8	**Guide**	A component in a direct spring or pilot-operated pressure relief device used to control the lateral movement of the disc or disc holder.
12	**Spindle (stem)**	A part whose axial orientation is parallel to the travel of the disc. It may be used in one or more of the following functions: (a) assist in alignment, (b) guide disc travel, and (c) transfer of internal or external forces to the seats.
15	**Bellows**	A flexible pressure-containing component of a balanced direct spring valve used to prevent changes in set pressure when the valve is subject to superimposed back pressure, or to prevent corrosion between the disc holder and guide.
16/17	**Spring plate (spring step, -button, -washer)**	Or spring step: a load-transferring component in a safety valve that supports the spring.
18	**Adjustment screw**	A screw used to adjust the set pressure or the reseat pressure of a reclosing pressure relief device.
40	**Cap**	A component used to restrict access and/or protect the adjustment screw in a reclosing pressure-relief device. It may or may not be a pressure containing part.
40	**Lift lever**	A device to apply an external force to the stem of a pressure relief valve to manually operate the valve at some pressure below the set pressure
54	**Spring**	The element in a safety valve that provides the force to keep the disc on the nozzle.

Table 1: Parts description acc. to ASME PTC 25

The following parts are described in ASME PTC 25, but are not used in LESER safety valves.

Component	Description per ASME PTC 25	Not used in LESER safety valves, because
Disc holder	A moveable component in a pressure relief device that contains the disc	One piece spindle with different disc design, does not require a disc holder
Yoke	A pressure-retaining component in a pressure relief device that supports the spring in a pressure relief valve or pin in a non-reclosing device but does not enclose them from the surrounding ambient environment	Open bonnets are used for the same purpose.

Table 2: Parts description acc. to ASME PTC 25 – not contained in LESER safety valves

1.2.2 Definition of set pressure

ASME PTC 25, 2001, 2.7 OC of PRD

LESER defines the set pressure as the value of increasing inlet static pressure at which the first audible/visible discharge (first steady flow for liquids) for gas and steam occurs. Furthermore a “popping” point of safety valve exists when the vessel pressure rises above the set pressure. At this pressure the valve opens rapidly with small or no increase in system.

1.2.3 Definition of overpressure

ISO 4126-1, 2004, 3.2.3

Overpressure is defined as the pressure increase over the set pressure at which the valve attains the lift specified by the manufacturer. Usually overpressure is expressed as a percentage of the set pressure.
For steam and gas applications the maximum overpressure varies between 3% and 10% depending on applicable code and application. For liquids most codes specify a maximum overpressure of 10%.

1.2.4 Definition of blowdown

ASME PTC 25, 2001, 2.7 OC of PRD

Blowdown is considered as the difference between actual popping pressure of a pressure relief valve and actual reseating pressure expressed as a percentage of set pressure or in pressure units.
Typical values for the blowdown are 4% to 15% for steam and gas and 20% to unlimited for liquids.

Figure 1 gives a graphical representation of the definitions.

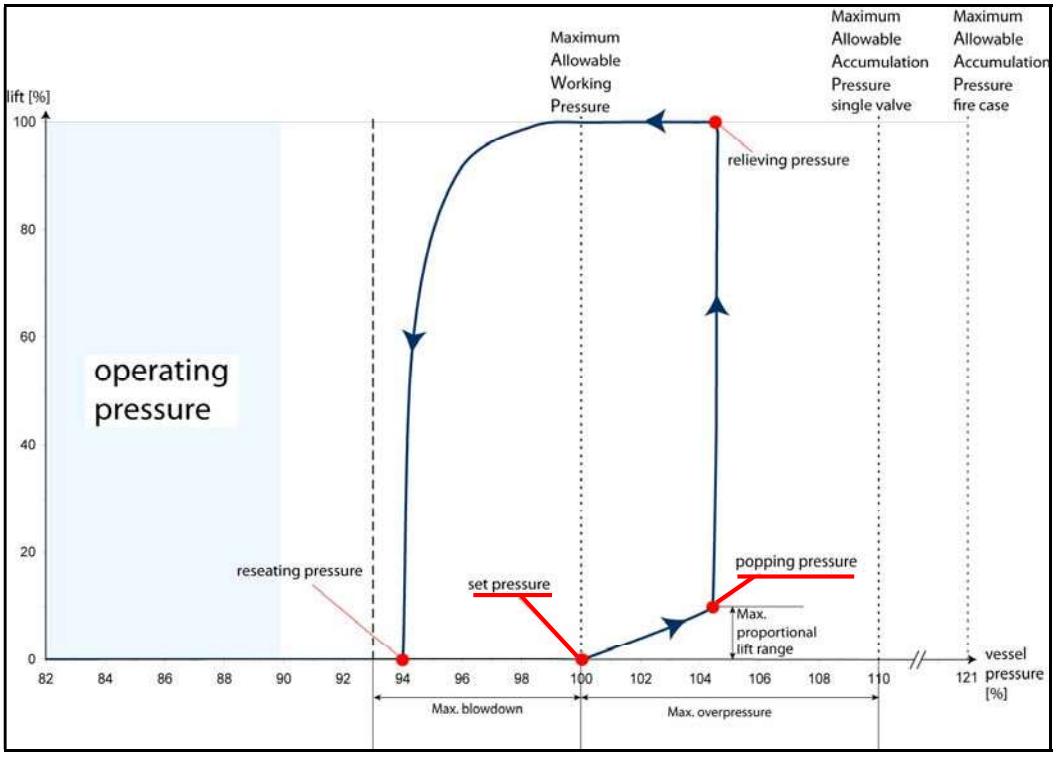


Figure 1: general characteristic of LESER safety valves for steam/gases acc. to ASME VIII

1.3 Critical parts

This chapter contains a description of critical parts influencing the operation characteristic. Emphasized were different disc and nozzle constructions, correct spring selection, positioning and function of the adjustment ring and parts which provide alignment.

1.3.1 Nozzle and disc

The geometry of nozzle and disc is critical to the valve operation. Small changes to the dimensions of these parts can change overpressure, blowdown and general valve operation significantly. Maintenance instructions include default dimensions of these parts in chapter rework of critical dimension. These diameters must be maintained when performing repair and maintenance work. Nozzle and disc also form the seat of the valve. The surface finish of the contact surfaces is critical for the tightness of the safety valve. For a metal to metal seat the contact surfaces are lapped for a specified tightness acc. to API 527 (see chapter rework of critical parts).

Table 3 provides differences between optional disc constructions of flanged and threaded valves.

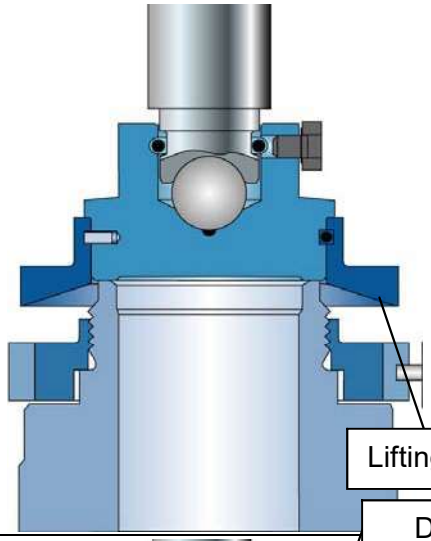
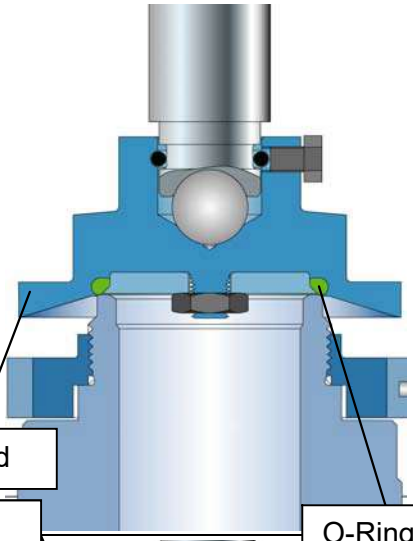
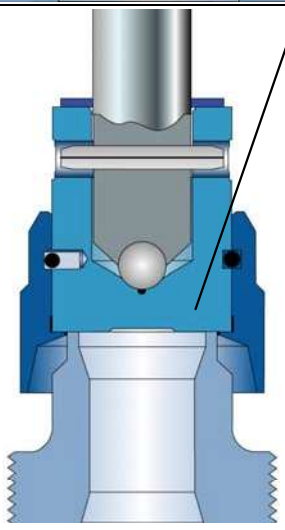
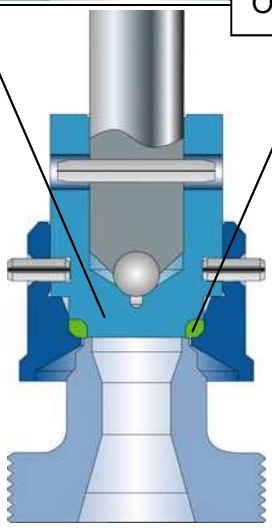
	Metal to metal seat	Soft seat – o-ring disc
Flanged valves (type 526)		
Threaded valves (type 459)		

Table 3: soft seat and metal to metal seat constructions of flanged and threaded valves

1.3.2 Spring

The closing force on the disc is applied by the compression of the spring. When the valve opens, a further compression of the spring must be achieved by the opening forces underneath the disc. The correct spring rate is critical to overpressure and blowdown of the valve. Each spring has a defined set pressure range. The spring charts (chapter 6: spring charts) of the manufacturer must be followed when readjusting or changing the set pressure of the safety valve.
The following table lists the potential consequences of using a spring for a set pressure outside of its range.

Condition	Consequences
Set pressure above spring range	- increased blowdown - risk of excessive spring compression with coils approaching each other, resulting in restricted lift - pressure accumulation in the vessel above acceptable levels due to restricted lift
Set pressure below spring range	- increased overpressure - potential pressure accumulation in the vessel above acceptable levels

Table 4: Influence of incorrect set pressure on overpressure and blowdown

1.3.3 Adjusting Ring

Codes and standards specify limits for the overpressure and blowdown of safety valves. In some designs adjusting rings are used to adjust the overpressure and blowdown of the safety valve in order to meet the requirements of codes and standards. In many of them a 10% accumulation pressure is used as a basis for the design strength calculation of a pressure vessel. Therefore the overpressure for safety valves is limited to 10% of the set pressure for the majority of the applications.

The position of these rings is usually factory set to meet overpressure and blowdown requirements of the applicable codes. The position of the rings can be adjusted to fine tune overpressure and blowdown of the valve.
For the most common design with one lower adjusting ring, changing the ring position has the following effects:

Lowering ring:	overpressure increases, blowdown decreases
Rising ring:	overpressure decreases, blowdown increases

The adjusting ring in LESER's type 526 should be turned to the lowest possible position on the nozzle to ensure all code requirements are met. No further ring adjustment depending on set pressure or medium is required.
The benefit for the user is the easier maintenance, because no complicated ring adjustment is necessary.

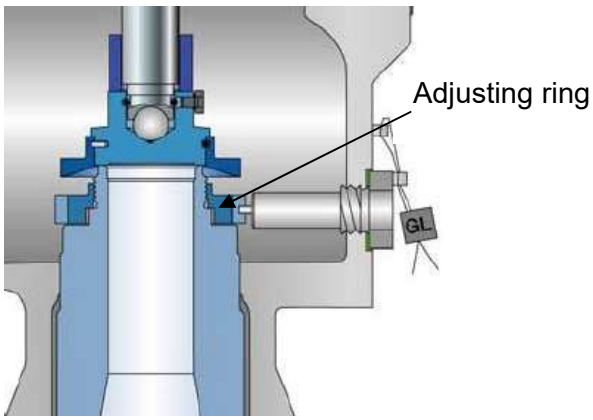


Figure 2: Blowdown ring of LESER's Type 526

1.3.4 Parts Providing Alignment

Correct alignment of nozzle and disc are critical for proper valve operation and tightness. Disc and spindle of the valve will move up and down during valve operation.

Proper guiding of the spindle is essential for trouble free valve performance. The spindle is guided by the guide and the adjusting screw.

When installed, the user must ensure that no dust, particles in the fluid or sticky media may enter the guiding surfaces and negatively influence the valve performance. In some cases the use of a bellows is advisable to protect the guiding parts.

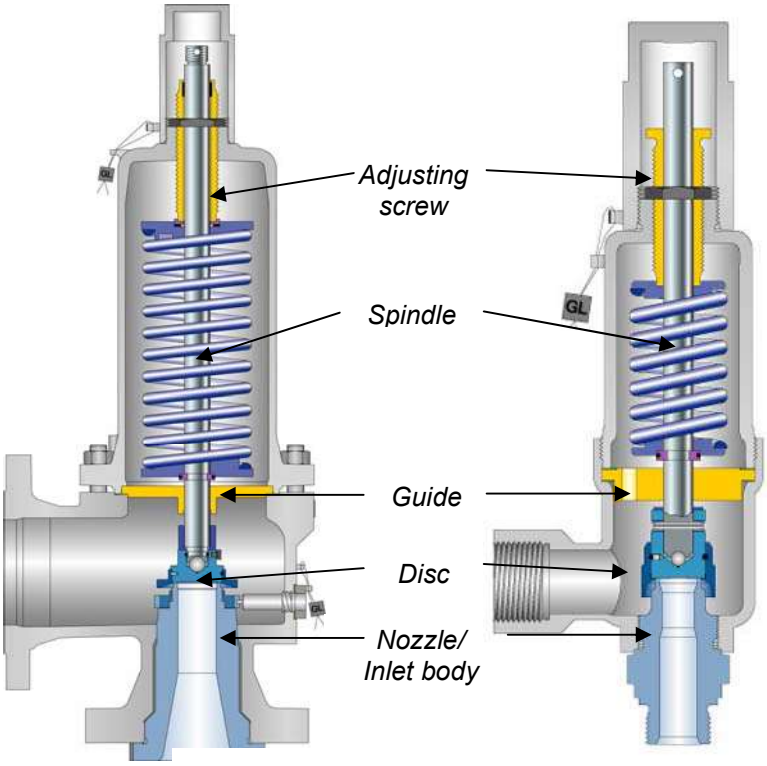


Figure 3: overview of parts providing alignment

1.4 Lifting devices

The standard design for the valve top is a plain cap, covering and sealing the adjustment of the safety valve.
Lifting levers allow users to check if the safety valve is still operational by lifting the disc off the seat. The valve remains in place while testing is performed.
Lifting levers must allow users to lift the disc off the seat when 75% of the set pressure is present at the valve inlet.
Caps and levers are sealed to prevent any unauthorized modification of the set pressure.
Figure 4 offers different caps and lever used for different LESER safety valves.

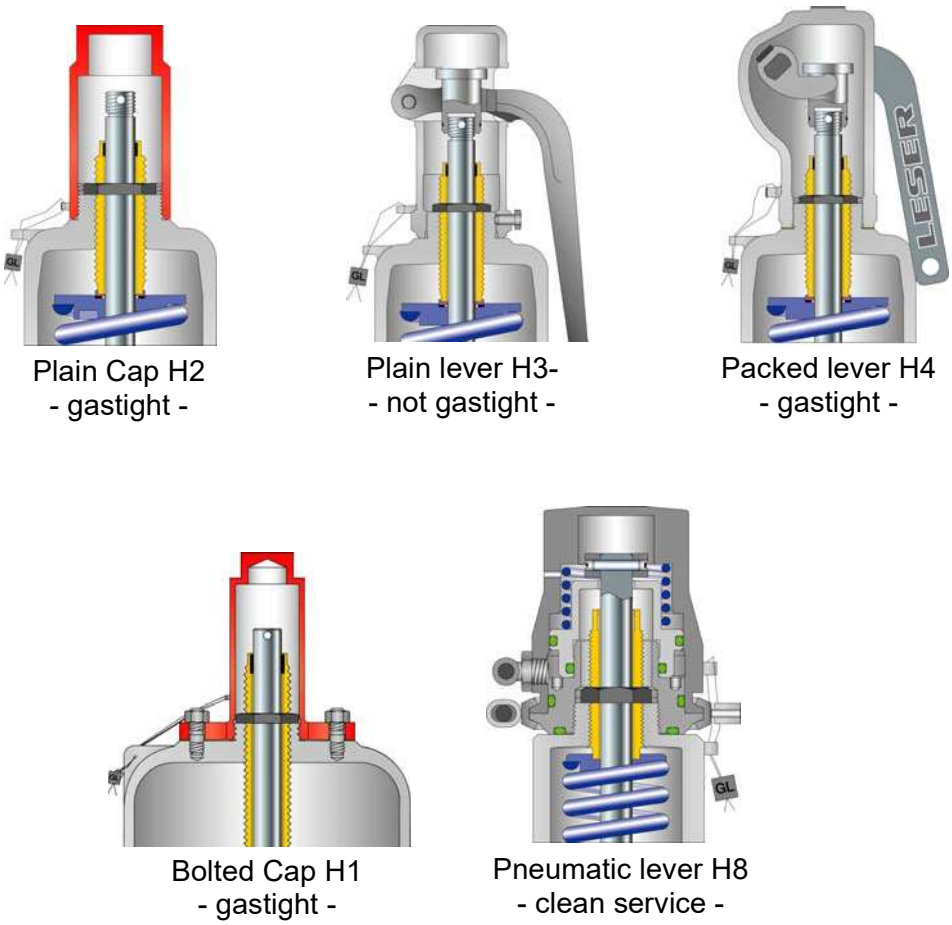


Figure 4: overview of different cap and levers

Content

1 Purpose

This LESER Global Standard (LGS) shows the process for safety valves to repair.

2 Scope

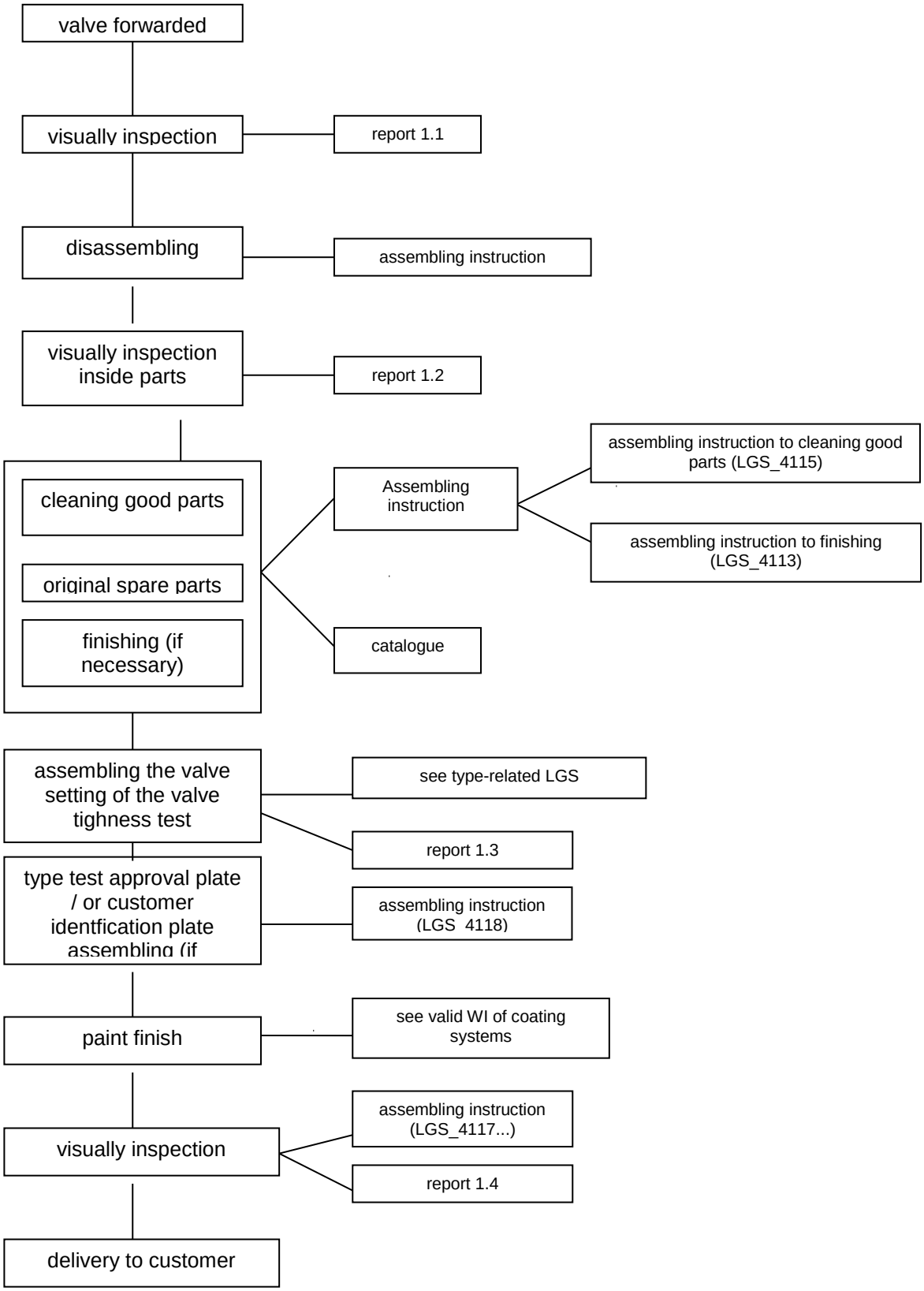
This LGS applies to all members of the LESER Quality Cluster.

3 Introduction

The following flow chart shows the process steps, which are necessary for valve repair.

The right side give references to forms of inspection documentation, LESER standards, instructions and spare part lists.

4 Safety valve to repair



Repair Traveller

Customer			
Date		Valve type	
Serial no. / Job no.		Medium	

1.1 Forwarded Inspection

	Repair necessary	Remarks
Painting	☐	_____
Inlet / outlet surface	☐	_____
Lead seal	☐	_____
Type test approval plate	☐	_____

1.2 Disassembling

	Repair necessary	Remarks
Spring	☐	_____
Spring plate	☐	_____
Disc	☐	_____
Spindle	☐	_____
Guide	☐	_____
Spindle cap	☐	_____
Lifting device	☐	_____

	Repair necessary	Remarks
Seat / full nozzle	☐	_____
Bellows	☐	_____

1.3 Assembling Inspection

Set pressure psig	target:	actual:
Seat tightness bubbles / min.	target:	actual:

	i.o.	n.i.o.
Backpressure / 6 psig	☐	☐

1.4 Delivery inspection

	i.o.	n.i.o.
Type test approval plate	☐	☐
Painting	☐	☐
Components	☐	☐

_____
Date/Signature

Content

1 Purpose

This LESER Global (LGS) describes the Took KIT requirements for equipping an agency or a warehouse for goods receiving/storage, adjusting, testing and shipping of safety valves.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

3 Introduction

- The High Performance Additional Tool KIT is an assembly of tools that are required for work on safety valves of the High Performance series shown in section 5 in addition to the Standard Tool KIT.

External order	**0161.0001**
Internet	**www.sales@leser.com**

4 Designated use of the High Performance Additional Tool KIT

- Assembly of safety valves
- Disassembly of safety valves
- Adjusting the set pressure of safety valves

5 Components of the High Performance Additional Tool KIT

- All tools found in this LWN are part of the High Performance Additional Tool KIT. The following pages specify the individual tools through descriptions and by

giving practical examples. The technical illustrations show what the respective tools look like.

5.1 Double open-end spanner with unequal widths across flats

The double open-end spanners are an important part of the equipment of an assembly workplace. They are used for tightening or unscrewing bolts and nuts.

Designated purpose of double open-end spanners

- tool for tightening or unscrewing bolts and nuts like, for example, caps, levers, and inflow devices
- screw connection of a variety of nuts and bolts on the safety valve (e.g. drainage screws).

Fig. 1 Unscrewing a screw connection

Fig. 2 Sealing the drain hole

Technical requirements

Requirements / Quality	Data	Data
DIN	3110	
Width across flats in mm	24 x 27	30 x 32
Manufacturer	GEDORE	
Material	Chrome-vanadium-steel	
Length	266 mm	302 mm
Vendor	Hahn & Kolb	
External order number	52012-320	52012-380
LESER order number	596.0090.0000	596.0091.0000
Tool kit number	0161.0001	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 1: Double open-end spanner

5.2 Single open-end spanner

Single open-end spanners are required for tightening or unscrewing the lever and cap.

Designated purpose of single open-end spanners

- lever and cap screw connections

Fig. 3 Installation of the lever and cap

Technical requirements

Requirements / Quality	Data	Data
DIN	894	
Width across flats in mm	46	75
Manufacturer	ORION	
Material	Special steel	
Length	380 mm	610 mm
Head thickness	15 mm	20 mm
Vendor	Hahn & Kolb	
External order number	52002-046	52002-075
LESER order number	596.0092.0000	596.0031.0000
Tool kit number	0161.0001	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 2: Single open-end spanner

Content

1 Purpose

This LESER Global (LGS) describes the recommended Took KIT requirements for equipping an agency or a warehouse for goods receiving/storage, adjusting, testing and shipping of safety valves.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

3 Introduction

- The Tool KIT is an important part of the equipment of an assembly workplace. It is required for the different work listed for most series of safety valves.

Order number	**0161.0000**
Internet	**www.sales@leser.com**

3.1 Designated use

- Assembly of safety valves
- Disassembly of safety valves
- Adjusting the set pressure of safety valves
- Lapping the valve seat
- Repair work

4 Components of the Standard Tool KIT

- All tools found in this LWN are part of the Standard Tool KIT. The following pages specify the individual tools through descriptions and by giving practical examples. The technical illustrations show how the respective tools look.

4.1 Double-ended open spanner with unequal widths across flats

The double-ended open spanner is used for tightening or unscrewing bolts and nuts.

Designated use

- Tool for tightening or unscrewing bolts and nuts such as caps, levers, and inflow devices

Fig. 1 Unscrewing a screw connection

Fig. 2 Sealing the drain hole

Technical requirements (1)

Requirements / Quality	Data	Data	Data
DIN		3110	
Spanner width in mm	16 x 18	17 x 19	22 x 24
Length	205 mm	222 mm	250 mm
Manufacturer		GEDORE	
Material		Chrome-vanadium-steel	
Vendor		Hahn & Kolb	
External order number	52012-222	52012-230	52012-290

Technical illustration

Fig. 1: Double-ended open spanner

LESER order number	596.0058.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical requirements (2)

Requirements / Quality	Data	Data	Data
DIN		3110	
Spanner width in mm	27 x 32	41 x 46	50 x 55
Manufacturer		GEDORE	
Material		Chrome-vanadium-steel	
Length	302 mm	400 mm	460 mm
Vendor		Hahn & Kolb	
External order number	52012-370	52012-420	52008-370
LESER order number	596.0061.000	596.0062.000	596.0063.000
Tool kit number		0161.0000	
Internet		www.hahn-kolb.de	

4.2 Single-ended open spanner

Single-ended open spanners are required for tightening or unscrewing the lever and cap.

Designated use

- lever and cap screw connections

Fig. 3 Installation of the lever and cap

Technical requirements

Requirements / Quality	Data	Data
DIN	894	
Spanner width in mm	41	60
Manufacturer	ORION	
Material	Special steel	
Length	345 mm	495 mm
Head thickness	14 mm	18 mm
Vendor	Hahn & Kolb	
External order number	52002-041	52002-060
LESER order number	596.0063.0000	596.0030.0000
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 2: Single-ended open spanner

4.3 Flat-tip and Phillips PH screwdrivers

The screw driver is required for a variety of auxiliary work such as, for example, to remove jammed workpieces or to insert an O-ring.

Designated use

- screwing in of locking screws (H4 lever)
- insert O-rings (type 462)
- remove jammed workpieces

Fig. 3 Lifting the protective cap

Technical requirements

Requirements / Quality	Data	Data	Data	Data
DIN		5265A		
Edge width mm	3.5	4.5	5.5	6.5
Edge thickness mm	0.6	0.8	1.0	1.2
Shaft length mm	100	125	150	150
Total length mm	204	236	261	268
Vendor		Hahn & Kolb		
External order number	52736-120	52736-135	52736-141	52736-150
LESER order number		596.0039.0000		
Tool kit number		0161.0000		
Internet		www.hahn-kolb.de		

Technical illustration

Illustration 3: Flat-head/Phillips screwdriver

4.4 Combination pliers

The combination pliers are required as an auxiliary tool for various work. For example, it can be used to cut soft and hard wire. The long cutting edges are suitable for thick cable.

Designated use

- removal of sealing wire

Technical requirements

Requirements / Quality	Data
DIN ISO	5746
Length	180 mm
Largest Ø that can be cut	3.4 mm
Cutting edges	Induction-hardened 60 HRC
Vendor	Hahn & Kolb
External order number	52279-130
LESER order number	596.0064.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 4: Combination pliers

4.5 Pin punch

The pin punch is required for the assembly and disassembly of discs and spindles. The pins are driven in and out by means of a pin punch.

Designated use

- driving pins in and out
- fixing the spindle in place, when adjusting the set pressure

Technical requirements

Requirements / Quality	Data
DIN	6450 C
Tips – Ø mm	3 / 4 / 5 / 6 / 7 / 8
Length x thickness mm	150 x 10/ 150 x 10/ 150 x 10/ 150 x 10/ 150 x 12/ 150 x 12
Punch head	Hardened and tempered
Delivery	In holder with base
Vendor	Hahn & Kolb
External order number	51284-500
LESER order number	596.0065.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 5: Combination pliers

4.6 Hammer

The hammer is used for marking flanges and bodies and for fastening individual parts like, for example, discs and spindles.

Designated use

- hammering in punch numbers
- fastening of discs and spindles
- hammering in pins

Technical requirements

Requirements / Quality	Data	Data
DIN	1041	
Weight without handle	200	800
Manufacturer	ORION	
External order number	51180-510	51180-560
LESER order number	596.0066.0000	596.0067.0000
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 6: Hammer

4.7 Punch numbers

Punch numbers are required for a variety or marking work. At the request of the customer, the safety valve must also be marked on the edge of the flange or on the body with the set pressure or tag.

Designated use

- marking flanges and bodies

Technical requirements

Requirements / Quality	Data	Data
DIN	1451	
Type of characters	Numbers	
Character height	0.2 mm	0.6 mm
Characters	0 - 9	0 - 9
Number of punches	9	
Max workpiece strength	1200 Nm²	1200 Nm²
Hardness on end of punch	58 – 60 HRC	58 – 60 HRC
Vendor	Hahn & Kolb	
External order number	56930-020	56930-060
LESER order number	596.0068.0000	596.0069.0000
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 7: Punch numbers

4.8 Punch letters

Punch letters are required for a variety or marking work. At the request of the customer, the safety valve must also be marked on the edge of the flange or on the body with the set pressure or tag or name.

Designated use

- marking flanges and bodies

Technical requirements

Requirements / Quality	Data	Data
DIN	1451	
Type of characters	Letters	
Character height	0.2 mm	0.6 mm
Characters	A - Z - &	
Number of punches	27	
Max workpiece strength	1200 Nm²	1200 Nm²
Hardness on end of punch	58 – 60 HRC	58 – 60 HRC
Vendor	Hahn & Kolb	
External order number	56932-020	56932-060
LESER order number	596.0070.0000	596.0071.0000
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 8: Punch letters

4.9 Brush set

The brush set consists of brushes of different sizes.

Designated use

- repair of paint damage
- application of lubricants

Technical requirements

Requirements / Quality		Data
Flat brush	1 each	20 / 25 / 35 / 50 mm
Ring brush	1 each	Size 2 / 4 / 6
Enamel paintbrush		Size 10 / 12 / 16
Vendor		Hahn & Kolb
External order number		56932-005
LESER order number		596.0072.0000
Tool kit number		0161.0000
Internet		www.hahn-kolb.de

Technical illustration

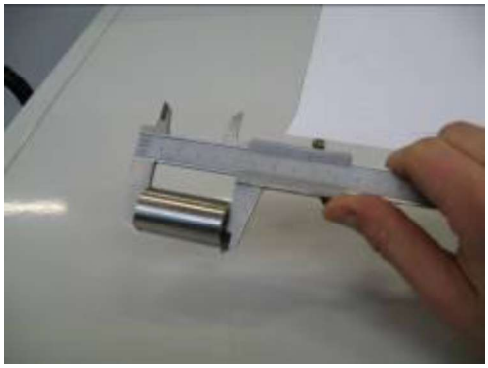
Illustration 9: Brush set

4.10 Sliding vernier calliper

Basically, the sliding vernier calliper is used to measure components, for example stroke limits. The set pressure for several identical safety valves can be roughly adjusted with the sliding vernier calliper.

Designated use

- pressure setting
- measuring stroke limits
- measuring components



Technical requirements

Requirements / Quality	Data
DIN	862
Application	outside, inside, step and depth measurements
Material	INOX steel
Measuring span	150 mm
Measuring jaw length	40 mm
Length of the vernier	15.5 mm
Manufacturer	ATRON
Vendor	Hahn & Kolb
External order number	31065-110
LESER order number	596.0074.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 10: Sliding vernier calliper

4.11 Sealing pliers

Sealing pliers are required for sealing the bonnet and the body after setting the pressure of the safety valve.

Designated use

- sealing bonnets and bodies

Technical requirements

Requirements / Quality	Data
Length	150 mm
Seal Ø	9 mm
Colour	Blue
Vendor	Hahn & Kolb
External order number	53205-145
LESER order number	596.0053.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 11: Sealing pliers

4.12 V-Block

When assembling the disc and spindle, there is a risk of damaging the spindle or disc by incorrect loading. To prevent this, the V-block is used as an underlay or to fix the round components in place.

Designated use

- assembly of discs and spindles
- offloading the spindle

Technical requirements

Requirements / Quality	Data	Data
Name	Small V-block	Large V-block
Weight	0.93 kg	0.90 kg
Material	Steel	
Vendor	LESER	
LESER order number	445.0759.0000	445.0859.0000
Tool kit number	0161.0000	
Internet	www.sales@leser.com	

Technical illustration

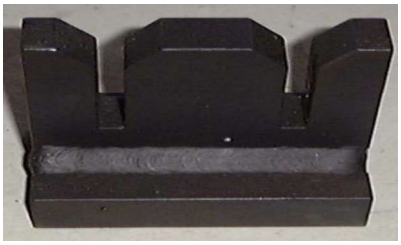


Illustration 19: V-block

4.13 Ratchet box

Besides the “ratchet”, the ratchet box contains two different extenders and a number of different sized sockets.

Designated use

- assembly and disassembly work on safety valves
- various screwing work

Technical requirements

Requirements / Quality	Data
Sockets	Hexagonal 13 sockets, 4 drive handles
Widths across flats	10, 11, 12, 13, 14, 15, 17, 19, 22, 24, 27, 30, 32
T handle	1x
Universal joint	1x
Reversible ratchet	1x
Box outside dimensions	410 x 216 x 65 mm
Vendor	Hahn & Kolb
External order number	58584-025
LESER order number	596.0076.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 20: Ratchet box

protected

4.14 Torque wrench

A defined torque must be applied for screw connections on safety valves (for example for connecting the bonnet and the body). The torque wrench is required for this.
Due to the accessibility of the connection with open-end spanners, such an attachment is recommended.

Designated use

- screw connections of bonnets and bodies
- use with bolt size 9 / 12 mm or alternatively 14 / 18 mm

Technical requirements

Requirements / Quality	Data	Data
Measurement range	20 – 100 Nm	80 – 400 Nm
Scale division value	1 Nm	2 Nm
Ø of seat for heads	9 x 12 mm	14 x 18 mm
Jaw size(s)	19 / 24	19 / 24
Length	400 mm	607 mm
Margin of error	+- 2 % of set value	+- 3 % of set value
Torque application	left / right	
Vendor	Hahn & Kolb	
External order number	52264-010	52264-040
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 21: Torque wrench

4.15 Jaw attachments

Jaw attachments for the torque wrench are required, for example, for connecting the bonnet to the body.
The jaw attachments are used together with the torque wrench (see 6.14).

Designated use

- screw connections of bonnets and bodies
- bolt size 19 / 24 mm

Technical requirements

Requirements / Quality	Data	Data
Spanner width	19 mm	24 mm
Width	41 mm	51 mm
Height	9 mm	11 mm
Plug-in shaft	14 x 18 mm	14 x 18 mm
Vendor	Hahn & Kolb	
External order number	52286-119	52286-124
External order LESER	596.0078.0000	596.0079.0000
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 22: Jaw attachment

4.16 Plug-in reversible ratchet

Plug-in reversible ratchets are required, for example, for connecting the bonnet to the body. The plug-in reversible ratchets are used together with the torque wrench (see 6.14).

Designated use

- screw connections of bonnets and bodies
- to hold the socket (see 6.18)

Technical requirements

Requirements / Quality	Data
Cross-section of the plug-in shaft	14x18 mm
Square drive	Square 12.5 = 1/2 Inch
Vendor	Hahn & Kolb
External order number	52286-655
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 23: Plug-in reversible ratchet

4.17 Plug-in adapter

The plug-in adapter is required as a connecting piece for the torque wrench (see 6.14) and the plug-in reversible ratchet (see 6.16). It makes it possible to connect the two tools.

Designated use

- holder of the plug-in reversible ratchet (see 6.16) or the jaw attachments (see 6.14)
- screw connections of bonnets and bodies

Figure 4.1

Technical requirements

Requirements / Quality	Data
Plug connection	9 x 12 mm
Drive	Square
Step-up	9 x 12 mm to 14x18
Vendor	Hahn & Kolb
External order number	52286-655
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 24: Plug-in adapter

4.18 Socket

The socket is used together with the torque wrench (see 6.14) and the plug-in reversible ratchet (see 6.16). It is used, for example, for the screw connection of the bonnet to the body.

Designated use

- screw connections of bonnets and bodies

Technical requirements

Requirements / Quality	Data
DIN	3120
Width across flats	36 mm
Size	Ø 60/49.5 mm
Material	31 Cr V 3
Vendor	Hahn & Kolb
External order number	58596-360
LESER order number	596.0082.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 25:Socket

4.19 Wire brush

The wire brush made of stainless steel is used on grey cast iron and stainless steel safety valves. Any surface rust can be easily removed with the wire brush.

Designated use

- removal of surface rust
- removal of soiling

Technical requirements

Requirements / Quality	**Data**	**Data**
Wire material	Stainless steel	Steel
Total length	290 mm	290 mm
Width	35 mm	35 mm
Length of wire brushes	25 mm	25 mm
Wire Ø	0.3 mm	0.3 mm
Vendor	Hahn & Kolb	
External order number	56726-530	56725-530
LESER order number	596.0083.0000	
Tool kit number	0161.0000	
Internet	www.hahn-kolb.de	

Technical illustration

Illustration 26: Wire brush

4.20 Safety glasses

The safety glasses are used to protect your eyes. They must be worn during grinding work on safety valves.

Designated use

- general safety of the eyes
- to be worn during grinding work on the safety valve

Technical requirements

Requirements / Quality	Data
DIN EN	166 F
Manufacturer	ARTILUX
Design	with side guards
Vendor	Hahn & Kolb
External order number	55660-100
LESER order number	596.0085.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 27:Safety glasses

4.21 Wire twisting pliers

The wire twisting pliers are required for sealing the bonnet and body. This secures the pressure setting of the safety valve. The sealing wire is twisted and tightened by the pliers.

Designated use

- twisting the sealing wire
- sealing bonnets and bodies

Technical requirements

Requirements / Quality	Data
DIN	5256
Manufacturer	STAHLWILLE
Weight	0.330 kg
Length	230 mm
Vendor	Hahn & Kolb
External order number	53137-010
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 27:Wire twisting pliers

4.22 Sealing blocks

The sealing blocks are used to seal the cap / lever and thus certify the set pressure that has been set.

Designated use

- sealing safety valves

Technical requirements

Requirements / Quality	Data
Size L x H x D	9 x 9 x 5 mm
Hole □	1.5 mm
Material	Plastic
Temp. application limit	+ 85° C
Vendor	Johan Pützfeld B.V.
LESER order number	525.0107.0000
Tool kit number	0161.0000
Internet	www.skiffy.com

Technical illustration

Illustration 29:Sealing blocks

4.23 Sealing wire

After adjusting the set pressure on the safety valve, LESER must guarantee that the pressure cannot be changed without being noticed. For this measure, LESER seals the lever/cap to the bonnet. Sealing wire is used to connect these components.

Designated use

- sealing the bonnet and the lever/cap

Technical requirements

Requirements / Quality	Data
Wire material	Galvanised iron wire
Delivered as	On a roll
Wire gauge	0.3 – 0.5 mm
Quantity	1 kg
For sealing	Lead 9, 12 mm
Vendor	Hahn & Kolb
External order number	53212-010
LESER order number	525.0208.0000
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration 30: Sealing wire

4.24 Pipe for large spanner

The pipe for the large spanner is an extension of the spanner. It is used to extend the lever arm when assembling the lever and makes it possible to apply high torque in order to securely connect the bonnet to the lever.

Designated use

- lever and bonnet connections

Technical requirements

Requirements / Quality	Data
Code	EG Class III
Diameter	50 mm
Length	1500 mm
Rod gauge	0.3 – 0.5 mm
Quantity	1 kg
For sealing	Lead 9, 12 mm
Vendor	LESER
LESER order number	596.0097.0000
Tool kit number	0161.0000
Internet	www.sales@leser.com

Technical illustration

Illustration 24: Pipe for large spanner

4.25 Folding rule

A folding rule is required for any measuring work.

Designated use

- measuring the outside dimensions of packaging

Technical requirements

Requirements / Quality	Data
Length	2 m
Material	Wood
Width of sections	16 mm
EC class	III
Vendor	Hahn & Kolb
External order number	37332-005
LESER order number	TB D
Tool kit number	0161.0000
Internet	www.hahn-kolb.de

Technical illustration

Illustration. 32: Folding rule

4.26 Glass plate

For the finishing of the seat and disc, LESER offers lapping stamps, glass plates and lapping material.
The seat and disc with the integrally attached lifting aid and with the same do are lapped with the lapping stamp or glass plate of the same size. Discs with a detachable lifting aid or generally without a lifting aid are **not** lapped with a lapping stamp, but are lapped on a glass plate after disassembling the lifting aid.

Designated use

- re-lapping discs

Technical requirements

Requirements / Quality	Data
LWN	001.32
Ø	140 mm
Vendor	LESER
LESER order number	828.0000.0016
Tool kit number	0161.0000
Internet	www.sales@leser.com

Technical illustration

Illustration 17:Glass plate

4.27 Lapping stamp

For the finishing of the seat and disc, LESER offers lapping stamps, glass plates and lapping material.
The seat and disc with the integrally attached lifting aid and with the same do are lapped with the lapping stamp of the same size.

Designated use

- relapping seats and nozzles

Technical illustration

Technical requirements (1)

Requirements / Quality	Data	Data	Data
Number	3	4	5
do	18	23	29
Material	0.6025 / 1.4021	0.6025 / 1.4021	0.6025 / 1.4021
Manufacturer	LESER		
Length	205 mm	222 mm	250 mm
LESER order number	445.1359.0000	445.1459.0000	445.1559.0000
Tool kit number	0161.0000		
Internet	www.sales@leser.com		

Technical requirements (2)

Requirements / Quality	Data	Data	Data	Data
Number	6	7	8	9
do	37	46	60	74
Material	0.6025 / 1.4021	0.6025 / 1.4021	0.6025 / 1.4021	0.6025 / 1.4021
Manufacturer	LESER			
Length	172 mm	205 mm	222 mm	250 mm
LESER order number	445.1659.0000	445.1759.0000	445.1859.0000	445.1959.0000
Tool kit number	0161.0000			
Internet	www.sales@leser.com			

Requirements / Quality	Data	Data	Data	Data
Number	10	12	13	14
do	92	125	165	200
Material	0.6025 / 1.4021	0.6025 / 1.4021	0.6025 / 1.4021	0.6025 / 1.4021
Manufacturer	LESER			
Length	172 mm	205 mm	222 mm	250 mm
LESER order number	445.2059.0000	445.2259.0000	445.2359.0000	445.2459.0000
Tool kit number	0161.0000			
Internet	www.sales@leser.com			

4.28 Lapping pastes

As a lapping paste, LESER uses ready-to-use, water-soluble lapping pastes with different grit size depending on the damage to the sealing surface.

Designated use

- lapping discs

Technical requirements

Requirements / Quality	Data	Data	Data	Data
LWN	001.32	001.32	001.32	001.32
Name	TETRABOR			
Identifier	F 320	F 600	F 800	F 1200
Grit size in µ	49 – 17	19 – 3	14 – 2	7 – 1
Packaging	Tube			
Contents	75 ml			
Vendor	Artur Glöckler GmbH			
LESER order number	599.0301.0000	599.0401.0000	599.0101.0000	599.0201.0000
Tool kit number	0161.0000			
Internet	http://www.gloeckler.com			

Technical illustration

Illustration 15: Lapping paste

4.29 Monocrystalline diamond powder

Monocrystalline diamond powder is mixed with an oil solution to the desired consistency and then applied selectively.
The workpiece is re-lapped through uniform movements on the nozzle or on a glass plate.

Designated use

- re-lapping seats and discs

Technical requirements

Requirements / Quality	Data
DIN	001.32
Grit size	1.5 – 3 µ
Package size	50 g
Vendor	Peter Wolters
LESER order number	599.0102.0000
Tool kit number	0161.0000
Internet	www.peter-wolters.com

Technical illustration

Illustration 16:
Monocrystalline diamond powder

4.30 Assembly grease for threads

The assembly grease is used for greasing the adjusting screw. It makes it possible to easily screw the adjusting screw into the bonnet.

Designated use

- greasing the adjusting screw
- greasing components for improved ease of access
- protection against fretting and corrosion

Technical requirements

Requirements / Quality	Data
Name	Molikote
Qualities	- non-combustible - non-corrosive
Packaging	Can
Weight	1 Kg
Internet	www.molykote.com

Technical illustration

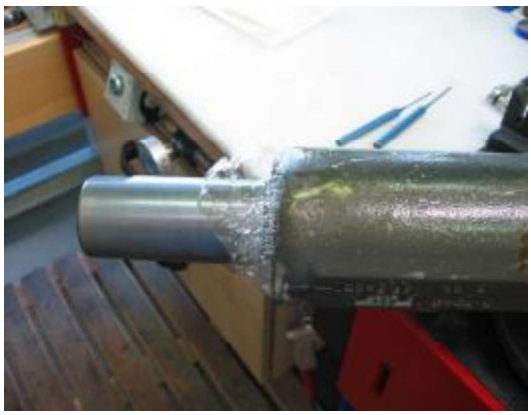
Illustration 12: Molikote

4.31 Leak detection spray

The required body seal tightness is checked by means of a leak detection spray. The leak is located based on bubble formation after applying the leak detection spray to the valve contour. In addition, it can also be used to visualise leaks in the manometer screw connections.

Designated use

- external leak testing of the safety valve
- functional leak testing
- testing the seal tightness of manometer screw connections



Technical requirements

Requirements / Quality	Data
Name	Güpoflex
Application	Gas and compressed air
Qualities	- non-combustible - non-corrosive - toxicologically safe
Package size	500 ml spray can
Packaging unit	10 cans
Vendor	GÜPO
LESER order number	596.0094.0000
Tool kit number	0161.0000

Technical illustration

Illustration 13: Leak detection spray

Internet	www.guepo.de

4.32 LESER paint, blue

Damaged or scratched valve contours must be repaired by LESER blue paint.

Designated use

- repair of damaged valve contours
- repair of scratched valve contours

Technical requirements

Requirements / Quality	Data
Name	LESER paint, blue
Colour	RAL 5005
Application	Valve body
Package size	500 ml can
Packaging unit	1 can
Vendor	LESER
LESER order number	596.0096.0000
Tool kit number	0161.0000
Internet	www.bfl.dk

Technical illustration

Illustration 14: LESER blue paint

Contents

1 Purpose

This LESER Global Standard (LGS) provides a list of operating materials that are used during the assembly of LESER safety valves.

2 Scope

This document must be observed by all agencies and subsidiaries of LESER GmbH & Co. KG.

3 Disclaimer

LESER puts in a great deal of effort into making up-to-date and correct documentation available. Nevertheless, LESER GmbH & Co. KG gives no guarantee that the recommended actions presented here are completely correct and error free. This document is to be used exclusively with the specified type. LESER GmbH & Co. KG declines any liability or responsibility for the correctness and completeness of the content.

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LESER GmbH & Co. KG is available to the users of this document to provide additional information.

4 Qualified fitting personnel

The operating materials/supplies that are used during the installation of LESER safety valves must be used exclusively by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

5 General Information

Observe the safety regulations and warnings on the packaging.

6 Operating materials and supplies

Lapping paste - Tetrabor

Grit size 320
600
800
1200

Monocrystalline diamond powder - material number N145

Grit size 1.5 – 3 µm

Assembly grease

Molykotepaste – D Paste
Klübersynth UH1 14-151

Halocarbon oil

Oleic acid - PH. EUR 6.0 material number N-206

Superglue

Delo-Ca
Delo-ML 5449 anaerobic high temperature resistant

Leak detection spray

Güpoflex for gas & compressed air

Quickleen – universal cleaner

Screw glue – LocTITE 222

Product group	Type
High Performance	441, 442 DIN/ANSI, 441, 442 Full nozzle DIN/ANSI, 455, 456, 457, 458
Modulate Action	433
S & R	440, 424
Critical Service	546

Contents

1 Purpose

This LESER Global Standard (LGS) is disassembly documentation for different installations of LESER safety valves of the High Performance series. The required work steps and tools are described.

2 Scope

This document must be followed in the dismantling a High Performance safety valve in agencies and subsidiaries of LESER GmbH & Co. KG.

3 Disclaimer

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LESER GmbH & Co. KG is available to the users of this document to provide additional information.

4 Qualified fitting personnel

LESER safety valves may only be dismantled by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

5 General illustration

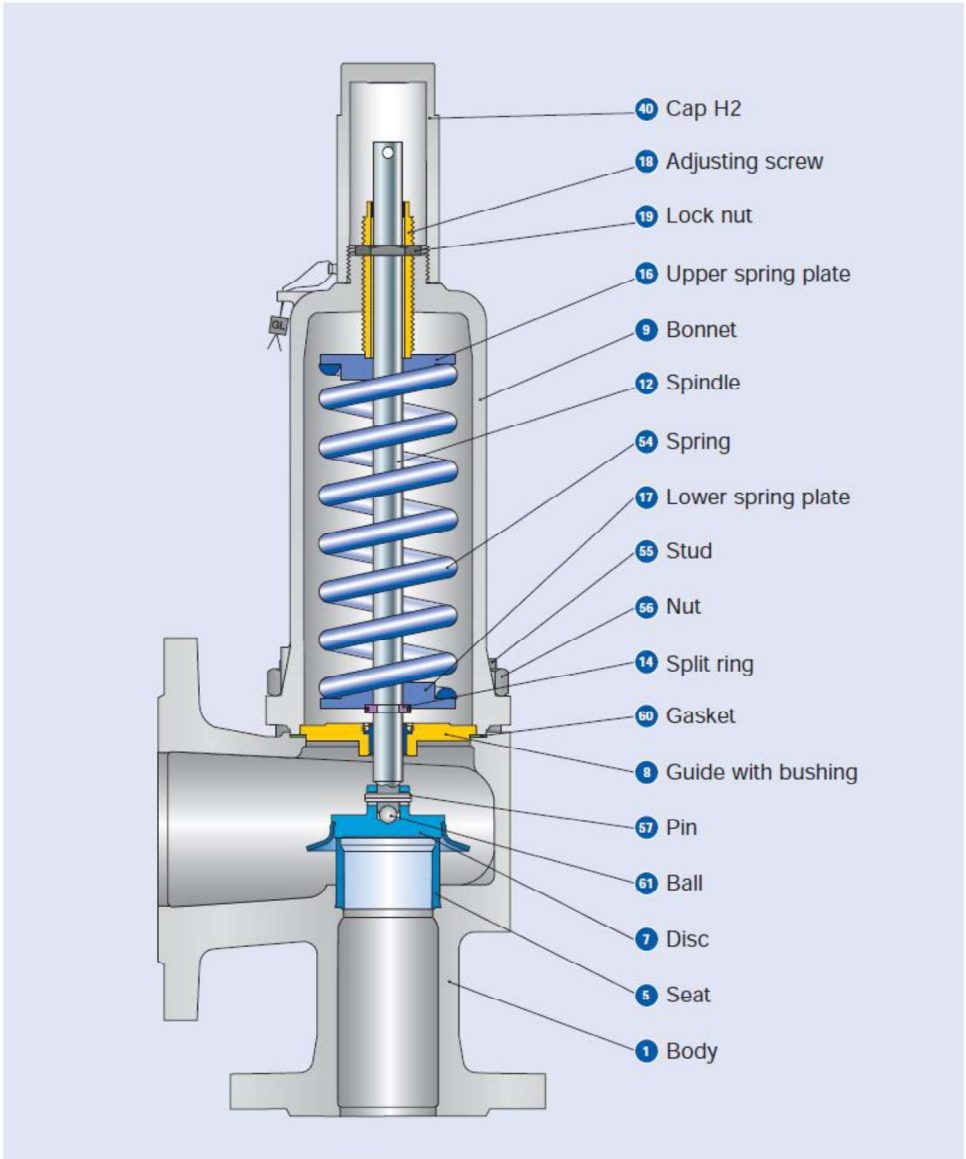


Figure 5 - 1: Cross-sectional view of High Performance 441.

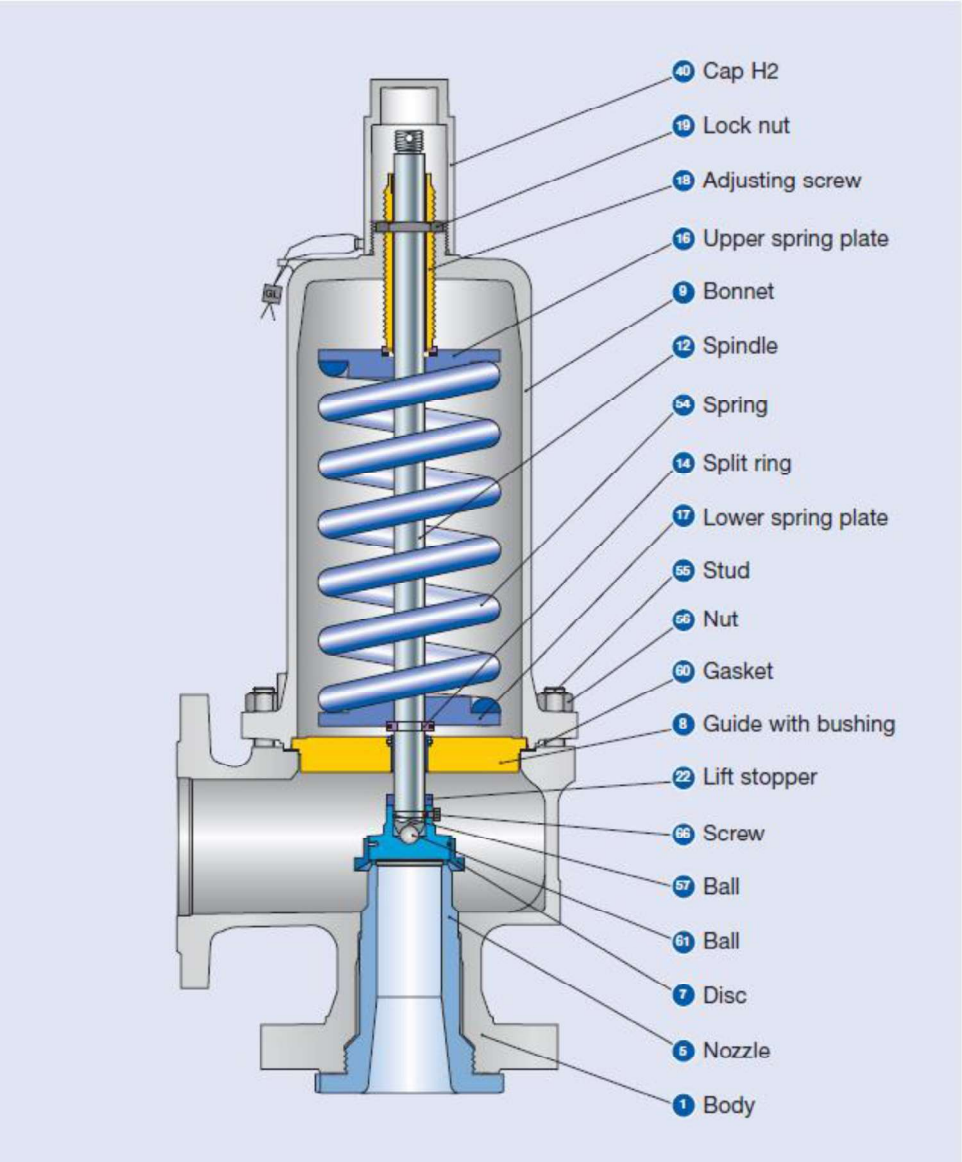


Figure 5 - 2: Cross-sectional view of High Performance 441.

6 Dismantling the High Performance series

6.1 Dismantling the O-ring damper

6.1.1 O-ring damper H4 (J66)

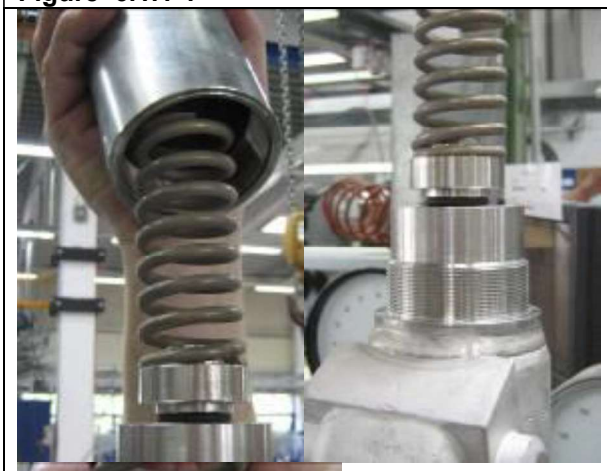
Illustration	Description	Aids / Tools
 **Figure 6.1.1-1**	Unscrew the lever with an open-end spanner.	Open-end spanner
  **Figure 6.1.1-2**	Remove the cap - spring - support sleeve - first O-ring - counter ring - second O-ring from the lever one after the other.	

Illustration	Description	Aids / Tools
 Figure 6.1.1-3	Individual parts of the O-ring damper	
  Figure 6.1.1-4	Remove the retaining clip and steel pin from the spindle. Pull the O-ring damper spindle off the valve spindle.	

6.1.2 O-Ring damper H2 (J65)

Illustration	Description	Aids / Tools
 **Figure 6.1.2-1**	Loosen cap	Open-end spanner
 **Figure 6.1.2-2**	Remove cap. Remove pressure spring from opposite ring.	
 **Figure 6.1.2-3**	Take counter ring from the O-ring or support sleeve.	

Illustration	Description	Aids / Tools
 **Figure 6.1.2-4**	Pull O-ring off the spindle.	
 **Figure 6.1.2-5**	Remove the support sleeve from the adjusting screw	
 **Figure 6.1.2-6**	Individual parts of the O-ring damper H2	

6.2 Dismantling the test gag / blocking screw

Illustration	Description	Aids / Tools
 **Figure 6.1.2-1** Error! No sequence specified.	Loosen the test gag in the cap or lever and remove.	Open-end spanner

6.3 Dismantling lift indicator

Illustration	Description	Aids / Tools
 **Figure 6.3-1**	Remove lock nut Release second nut. Remove lift indicator completely.	Open-end spanner

public

6.4 Dismantling the cap / lever

6.4.1 Dismantling cap H2

Illustration	Description	Aids / Tools
 **Figure 6.4.1-1**	Loosen cap with a spanner and screw off.	Open-end spanner
 **Figure 6.4.1-2**	**Caution:** The sealing ring may only be used once. If it is necessary to dismantle the cap, the sealing ring must be replaced.	

6.4.2 Dismantling lever H3

Illustration	Description	Aids / Tools
 **Figure 6.4.2-1**	Remove the clamping screw on the lever.	Open-end spanner Small ratchet
 **Figure 6.4.2-2**	Push the retaining washers off the pin.	Pliers
 **Figure 6.4.2-3**	Pull pin out. Pull lever out of the cap.	

Illustration	Description	Aids / Tools
 Figure 6.4.2-4	Remove small plastic ball and unscrew screw.	Ring spanner
 Figure 6.4.2-5	Remove the retaining clip and pin from the spindle cap. Pull the spindle cap off the spindle.	

6.4.3 Dismantling lever H4

Illustration	Description	Aids / Tools
 **Figure 6.4.3-1**	Loosen lever and screw it off.	Open-end spanner
 **Figure 6.4.3-2**	Remove retaining clip and pin. Pull spindle cap off the spindle.	

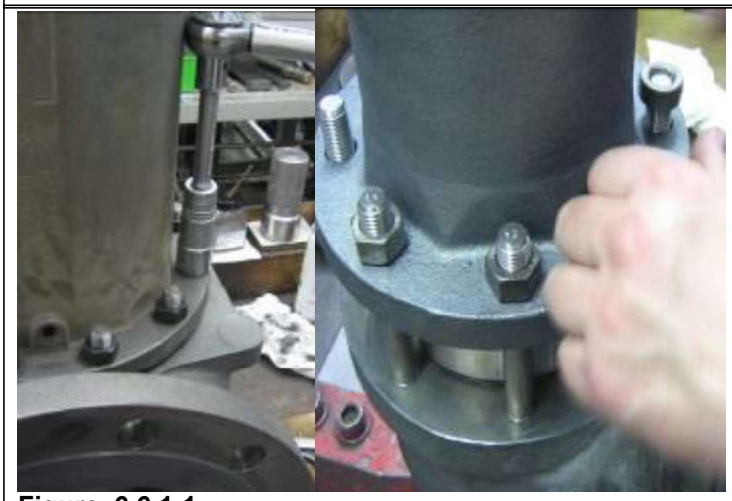
6.5 Dismantling pressure spring and adjusting screw

Illustration	Description	Aids / Tools
 Figure 6.5-1	Remove lock nut from adjusting screw.	Open-end spanner
 Figure 6.5-2	Secure the spindle from turning with a pin punch. Apply the open-end spanner in a clockwise direction until the springs can no longer be felt.	Open-end spanner Pin punch
 Figure 6.5-3	Screw adjusting screw out of the bonnet	

Illustration	Description	Aids / Tools
 **Figure 6.5-4**	Unscrew the lock nut.	
 **Figure 6.5-5**	Remove the plastic bushing	

6.6 Dismantling the bonnet

6.6.1 Dismantling bonnets as of DN 80

Illustration	Description	Aids / Tools
 **Figure 6.6.1-1**	Loosen the nuts and unscrew them from the studs.	Open-end spanner Ratchet
 **Figure 6.6.1-2**	Carefully lift off and remove the bonnet from the body by hand or crane depending on the size and weight.	

6.6.2 Dismantling bonnets up to DN 65

Illustration	Description	Aids / Tools
 Figure 6.6.2-1	Loosen the nuts and unscrew them from the studs.	Open-end spanner Ratchet
 Figure 6.6.2-2	Carefully lift off and remove the bonnet from the body.	

6.7 Removing the assembly

6.7.1 Dismantling the spring / disc / bellows / cooling zone assembly

Illustration	Description	Aids / Tools
 **Figure 6.7.1-1**	If there are any thrust bearings, remove them from the top spring plate. Pull the spring plate off the spindle.	
 **Figure 6.7.1-2**	Pull spring(s) off the spindle.	

Illustration	Description	Aids / Tools
 Figure 6.7.1-3	Lift out the spindle with the bottom spring plate, guide washer, bellows if applicable and disc from the body.	
 Figure 6.7.1-4	Remove the cooling zone / bonnet extender from the body. Remove gaskets.	

6.7.2 Dismantling spindle/disc assembly (with elastomer bellows)

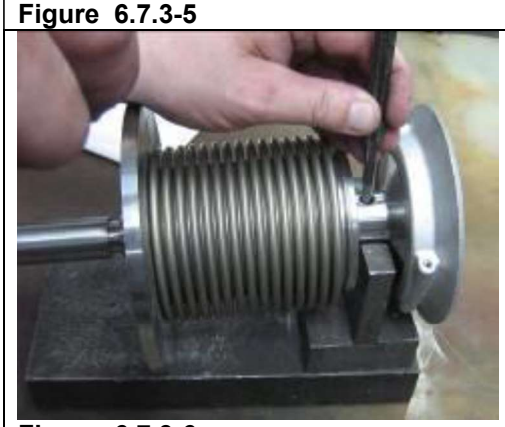
Illustration	Description	Aids / Tools
 Figure 6.7.2-1	Lift of the top spring plate and spring off the spindle one after the other.	

Illustration	Description	Aids / Tools
 Figure 6.7.2-2	Remove the retaining clip. Remove the half-washers from the spindle.	
 Figure 6.7.2-3	Remove the hose clamp from the spring plate with pliers.	Pliers
 Figure 6.7.2-4	Pull the guide washer with the elastomer bellows off the spindle.	
 Figure 6.7.2-5	Remove the hose clamp with pliers.	Pliers

Illustration	Description	Aids / Tools
 Figure 6.7.2-6	Pull the elastomer bellows off the guide washer.	
 Figure 6.7.2-7	Dismantle the spindle - disc connection.	
 Figure 6.7.2-8	Push the pin out of the spindle.	
 Figure 6.7.2-9	Separate the spindle and disc.	

6.7.3 Dismantling spindle/disc assembly (with stainless steel bellows)

Illustration	Description	Aids / Tools
 Figure 6.7.3-1	Remove the bottom spring plate.	
 Figure 6.7.3-2	Remove the retaining clips from the spindle. Remove retaining clip from half-washers.	
 Figure 6.7.3-3	Pull off the guide washer.	

Illustration	Description	Aids / Tools
 Figure 6.7.3-4	Remove sealing ring from bellows.	
 Figure 6.7.3-5	Remove lift stopper, if this is present.	
 Figure 6.7.3-6	Drive out the pin. Separate the stainless steel bellows and disc.	

6.7.4 Dismantling spindle/disc assembly (without bellows)

Illustration	Description	Aids / Tools
 Figure 6.7.4-1	Remove the top spring plate, spring and bottom spring plate from the spindle one after the other.	
 Figure 6.7.4-2	Remove retaining clip. Remove half-washers.	
 Figure 6.7.4-3	Push the guide washer off the spindle.	

Illustration	Description	Aids / Tools
 Figure 6.7.4-4	Remove the lift stopper if this is present.	
 Figure 6.7.4-5	Drive out the pin. Separate the plate and disc.	
 Figure 6.7.4-6	Take the ball out of the disc body.	

6.7.5 Dismantling disc assembly (with lifting aid and securing ring)

Illustration	Description	Aids / Tools
 Figure 6.7.5-1	Remove the end of the securing ring from the recess.	Screwdriver
 Figure 6.7.5-2  Figure 6.7.5-3	Rotate the lifting aid with the sickle spanner in anti-clockwise direction so that the securing comes out of the recess and the assembly is dismantled.	Sickle spanner

6.8 Unscrew the studs from the body.

Illustration	Description	Aids / Tools
 Figure 6.9-1	Remove studs with impact wrench. **Tip:** Place the guide washer on the opening of the body so that no studs can fall on the seat.	Impact wrench

6.9 Dismantling nozzles (types 441 Full Nozzle, 442 Full Nozzle, 457, 458)

Illustration	Description	Aids / Tools
 Figure 6.10-1	Remove nozzle with C-spanner (put a small protective plate between the nozzle and C-spanner).	C-spanner with nose
 Figure 6.10-2	Unscrew nozzle from the body.	

Contents

1 Purpose

This LESER Global Standard (LGS) provides instructions on cleaning LESER safety valves. The required work steps and materials are described.

2 Scope

This document must be applied when cleaning safety valves in agencies and subsidiaries of LESER GmbH & Co. KG.

3 Disclaimer

LESER puts in a great deal of effort into making up-to-date and correct documentation available. Nevertheless, LESER GmbH & Co. KG gives no guarantee that the recommended actions presented here are entirely correct and error. This document is to be applied exclusively to the specified type. LESER GmbH & Co. KG declines any liability or responsibility for the correctness and completeness of the content.

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4 Qualified fitting personnel

LESER safety valves may only be cleaned by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

5 General Information

- Gloves must be worn during the entire cleaning process (except for stainless steel and painted valves).
- Wear safety glasses.

6 Cleaning repaired valves

6.1 Blast cleaning

Stainless steel valves - glass bead blast cleaning

Cast steel - sand or bead blast cleaning

The body and bonnet must be blasted from the **inside and outside** for as long as it takes to remove all residual paint, rust or other soiling.

Caution: Protect the seat sealing surface and working surfaces, otherwise they will be damaged.

Figure 6.1-1: Flange covering, plastic

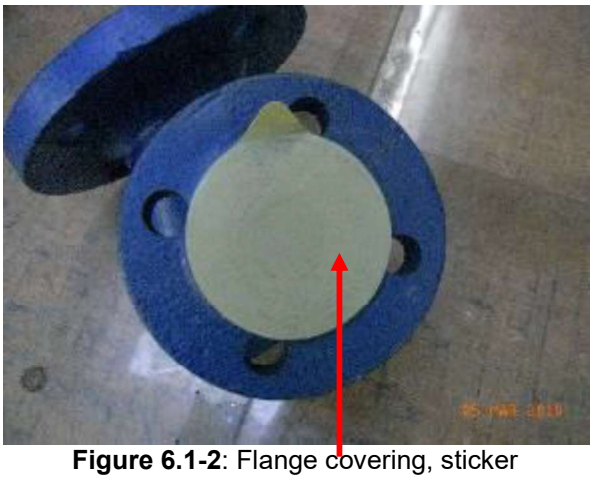


Figure 6.1-2: Flange covering, sticker

6.2 Brushing

The inside parts and inside of the body and bonnet are to be cleaned with a wire-cup brush and drill / pneumatic grinder until they are clean - until all soiling is removed.

Caution: Protect the seat sealing surface and working surfaces, otherwise they will be damaged.

6.3 Washing

When washing, make sure that **all parts** that belong to **one repaired safety valve** are washed together. When filling the washing machine, make sure that the washing medium can flow out of the bodies, bonnets and caps / levers without any residue.

Figure 6.3-1

The bodies must **always** be placed on the lid section.

Figure 6.3-2

WRONG

Figure 6.3-3

RIGHT

Note: Any waste that occurs when cleaning must be disposed of according to the applicable rules and regulations of the respective country.

7 Handling the components

Generally, the wearing of gloves when handling cleaned and unpainted components is compulsory.

Such components must never be touched at any time without protection.
This applies both to employees from the operating as well as administrative areas.

Figure 7-1

Wet gloves must be replaced with dry ones.

Damaged gloves that cannot exclude contact between the metal surface and skin must not be used.

In particular
In particular, valves, especially the sealing surfaces on the flanges and also the interior areas, must not be touched **without** gloves, because these areas will not be protected even in later process steps by paint. Nor may spare parts be touched **without** gloves when unpainted and unpackaged.

7.1 Exceptions:

The requirement for gloves is removed in the following cases:

- assembly of Compact Performance valves (for process-related reasons)
- assembly of stainless steel valves (no danger of corrosion)

It is also mandatory to wear gloves in the initially mentioned cases when performing the order picking for spare parts.

7.2 Process overview

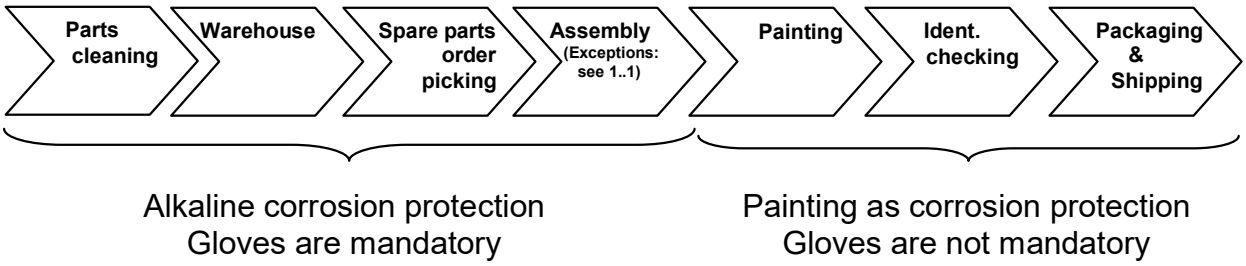


Figure 7.1-1

Content

1 Purpose

This LDeS gives information about the dimensions and the surface quality which have to be observed during the refinishing work, it also provides the work instructions. This LDeS replaces dimensional drawing no. 395 19 09.

2 Scope

This LDeS applies to the LESER sites Hamburg and Hohenwestedt. This LDeS is valid for:

- semi nozzles
- discs without lifting gear
- discs with removable lifting gear for screwed nozzles

3 References

None

4 Conditional Agreement

The further mentioned rules for the refinishing of seats and discs have been issued and explained in all conscience and describe the particular final design of the components.

LESER reserves the right to make necessary modifications at the components without determining these changes in this standard directly. So, if there are any doubts on user side when applying these rules, LESER has to be contacted before performance of rework to clarify the actual situation.

When applying these rules and regulations it has to be considered generally that they describe the refinishing at components which have an effect on the function and capacity of the safety valves. Even marginal deviations to this guidelines can effect a malfunction or constricted capacity of the safety valve and therewith an inadmissible pressure increase can arise during application/operation. This could possibly have serious consequences for humans and environment. Therefore it has to be proceed carefully when applying these rules.

LESER assumes no liability for safety devices which have been repaired or reworked in accordance with this LDeS. The repair shop is solely responsible for the function and capacity of the re-introduced safety device.

The user of this LDeS should be clear on the fact that the repair of a safety device against inadmissible overpressure is subjected to European and international laws. The violation of valid rules will be traced and avenged acc. to relevant legislations.

In case of any doubts during application of this LDeS, LESER has to be consulted before starting repair or rework of LESER safety devices.

5 Introduction

If the sealing surfaces of seat and disc have been damaged by frequent setting, for example, or by impurities in the medium, the original sealing quality can be restored by refinishing of the sealing surfaces.

6 Execution

The refinishing by smooth turning and grinding with final lapping should be done on the seat and if necessary also on the disc with the least possible swarf. Please see the limiting values in the following tables.

6.1 Measures and facing profile

Tables 5.1, 6.1, 8.1, 9.1, 10.1, 11.1, 12.1, 13.1, 14.1, 15.1, 16.1 and 17.1, together with the corresponding illustrations, contain the linear and square dimensions which have to be observed. After processing of the seat surface it is also important that the seat profile is restored moderately using inner and outer chamfers. If necessary the contact surface

between the spindle guide and the body has to be refinished coplanar and concentric to the seat.

6.2 Surface quality

A surface quality to a mean roughness depth of Rz1 (Mirror Finish) must be achieved on both sealing surfaces through lapping.

6.3 Test

In a final test on the mounted valve, it has to be guaranteed that:

- The semi rings on the spindle must be off the guide when the valve is closed.
- The lower spring plate may not touch the guide when the spring is assembled.
- In lift restricted valves, the lift restriction must be checked and if necessary the lift restriction bushing extended.

7 Refinishing of seat and disc for types 441 and 421, metal sealing

Work is to be done according to illustrations 5.1, 5.2 and 5.3 and according to table 5.1

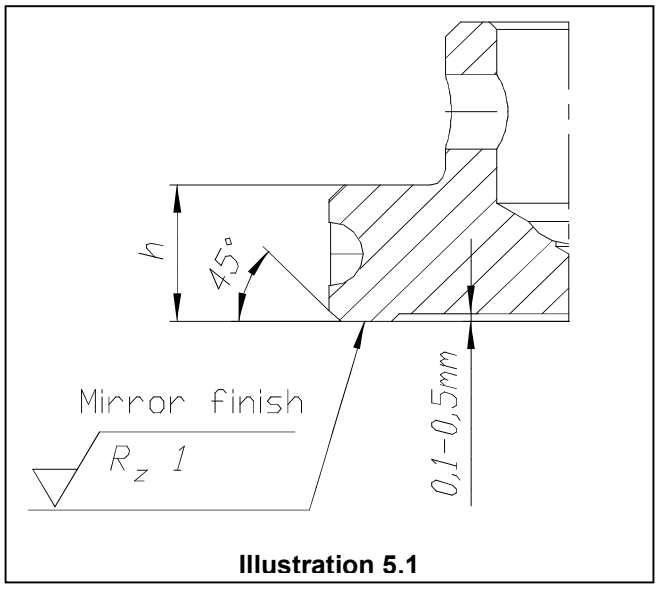


Illustration 5.1

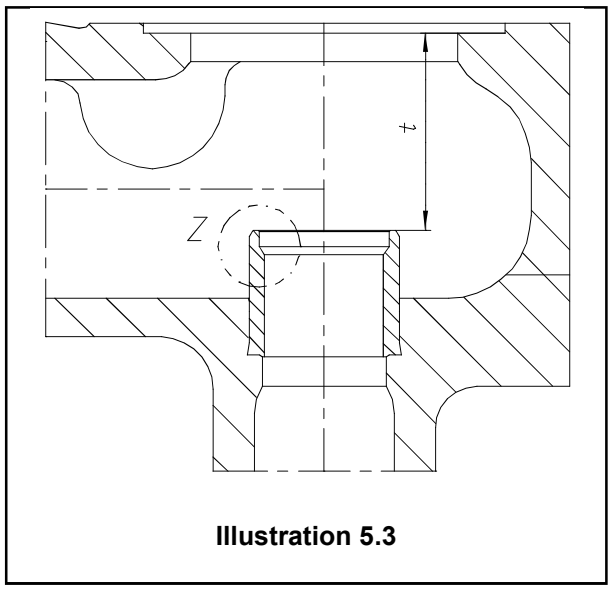


Illustration 5.3

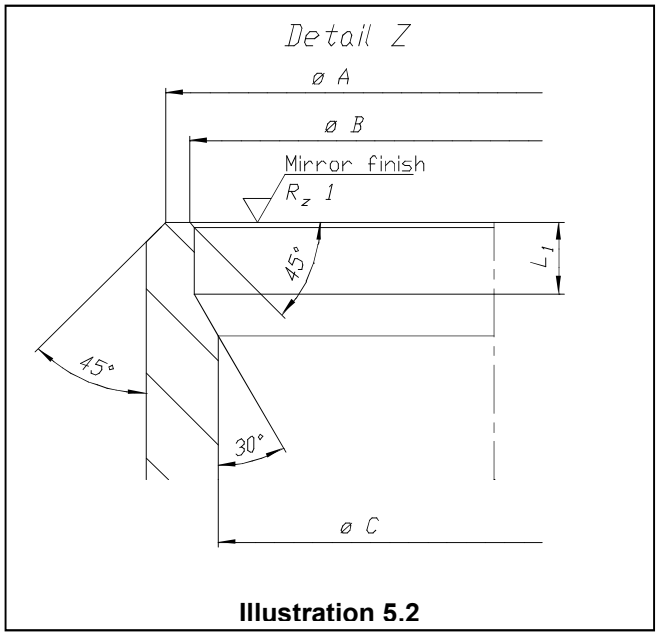


Illustration 5.2

Changes in dimension may only be so large that the highest admissible dimension for t is not exceeded and the smallest admissible dimension for h is not fallen below. The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. The maximum allowable reduction in "L_1" is 0,5 mm.

Table 5.1: seats and discs of type 441 and 421

C [mm]	441 DN [mm]	421 DN [mm]	Refinishing of seat				Refinishing of disc	
			Seat depth T [mm]	Tolerance for t [mm]	B ∅ [mm]	A ∅ [mm]	Boundary height h [mm]	Tolerance for h [mm]
18	20	-	24,5	+0,5	$18,4_{-0,2}$	$20,4^{+0,2}$	7,0	-0,2
23	25	25	38,0	+0,5	$25,4_{-0,2}$	$27,4^{+0,2}$	9,1	-0,2
29	32	32	47,0	+0,5	$32,4_{-0,2}$	$34,4^{+0,2}$	9,1	-0,2
37	40	40	53,0	+0,5	$40,4_{-0,2}$	$42,4^{+0,2}$	9,1	-0,25
46	50	50	53,5	+0,5	$50,4_{-0,3}$	$53,4^{+0,3}$	10,1	-0,25
60	65	65	63,5	+0,5	$67,0_{-0,3}$	$71,0^{+0,3}$	11,0	-0,25
74	80	80	91,0	+0,8	$82,0_{-0,3}$	$86,0^{+0,3}$	10,0	-0,3
92	100	100	114,0	+0,8	$103,0_{-0,3}$	$108,0^{+0,3}$	11,5	-0,3
98	125	125	114,0	+0,8	$103,0_{-0,3}$	$108,0^{+0,3}$	11,5	-0,3
125	150	150	154,5	+1	$130,0_{-0,3}$	$135,0^{+0,3}$	14,5	-0,4
165	200	-	257,1	+1	$180,0_{-0,4}$	$186,0^{+0,4}$	15,5	-0,4
200	250	-	273,0	+1,5	$220,0_{-0,4}$	$226,0^{+0,4}$	17,5	-0,5
235	300	-	318,0	+1,5	$259,0_{-0,5}$	$265,0^{+0,5}$	28,0	-0,5
295	400	-	391,5	+1,5	$326,0_{-0,5}$	$332,0^{+0,5}$	32,0	-0,5

8 Refinishing of seat and disc for types 431 and 411, metal sealing

Work is to be done according to illustrations 6.1, 6.2 and 6.3 and according to table 6.1.

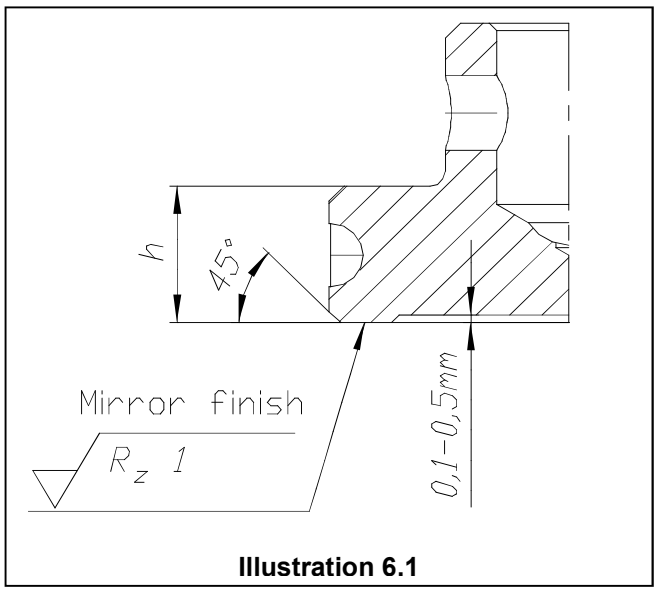


Illustration 6.1

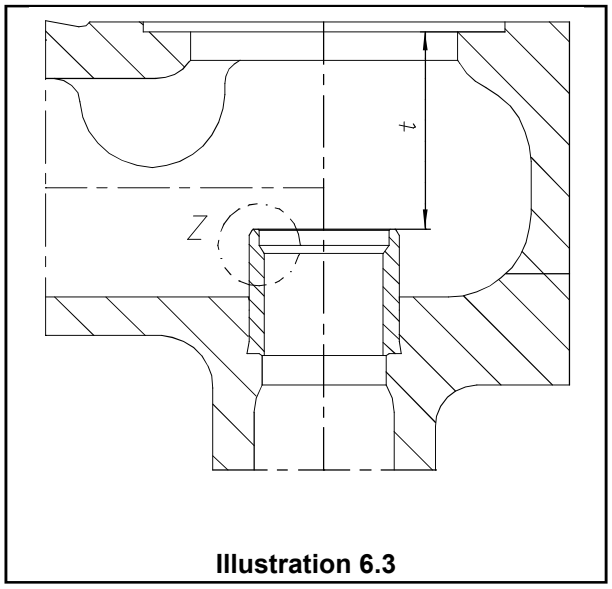


Illustration 6.3

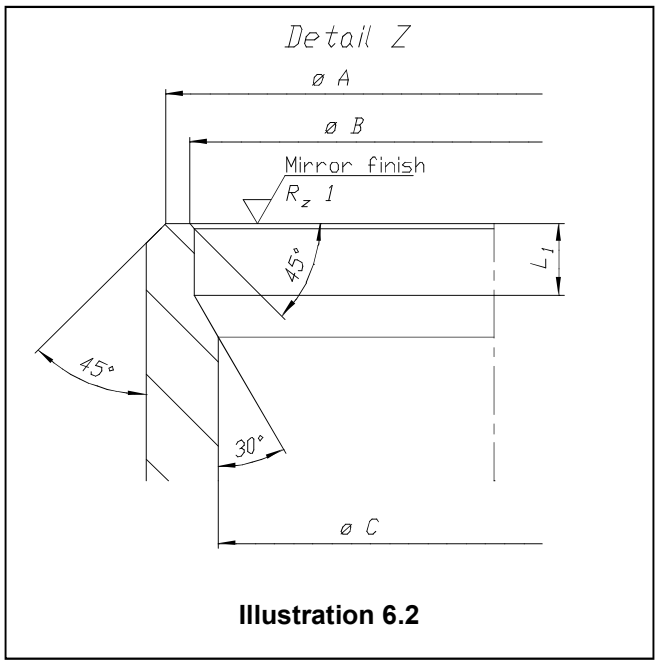


Illustration 6.2

Changes in dimension may only be so large that the highest admissible dimension for t is not exceeded and the smallest admissible dimension for h is not fallen below. The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. The maximum allowable reduction in "L_1" is 0,5 mm.

Table 6.1: seats and discs of type 431 and 411

C [mm]	431 DN [mm]	411 DN [mm]	Refinishing of seat				Refinishing of disc	
			Seat depth t [mm]	Tolerance for t [mm]	B ∅ [mm]	A ∅ [mm]	Boundary height h [mm]	Tolerance for h [mm]
12	15	-	22,0	+0,3	$13,7_{-0,2}$	$15,3^{+0,2}$	20	-0,2
18	20-32	20-32	22,5	+0,5	$18,4_{-0,2}$	$20,4^{+0,2}$	7,0	-0,2
23	40	40	25,0	+0,5	$25,4_{-0,2}$	$27,4^{+0,2}$	9,1	-0,2
29	50	50	28,0	+0,5	$32,4_{-0,2}$	$34,4^{+0,2}$	9,1	-0,2
37	65	65	35,0	+0,5	$40,0_{-0,2}$	$42,4^{+0,2}$	9,1	-0,25
46	80	80	39,0	+0,5	$50,4_{-0,3}$	$53,4^{+0,3}$	10,1	-0,25
60	100	100	55,0	+0,5	$67,0_{-0,3}$	$71,0^{+0,3}$	11,0	-0,25
74	125	125	62,0	+0,8	$82,0_{-0,3}$	$86,0^{+0,3}$	10,0	-0,3
92	150	150	72,0	+0,8	$103,0_{-0,3}$	$108,0^{+0,3}$	11,5	-0,3

9 Refinishing of seat and disc types 441 and 431, O-ring seals

Work is to be done according to illustration 7.1

The outer chamfer of these seats is responsible for the sealing (see illustration 7.1), therefore the diameter of the seat must not be changed. In case of edge damage, the seat surface may be turned or ground by between 0,2 and 0,4 mm until the damage is removed. After that the edge should be carefully treated with smooth emery paper to restore an angle of 45°. Please make sure that the edge is free for burrs.

The O-ring in the disc must be renewed.

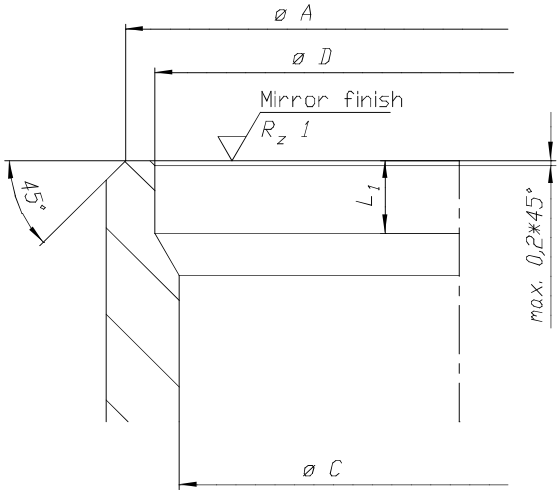


Illustration 7.1

10 Refinishing of seat and disc for type 455 and 456, metal sealing

Work is to be carried out according to the illustrations 8.1, 8.2 and 8.3 and according to table 8.1.

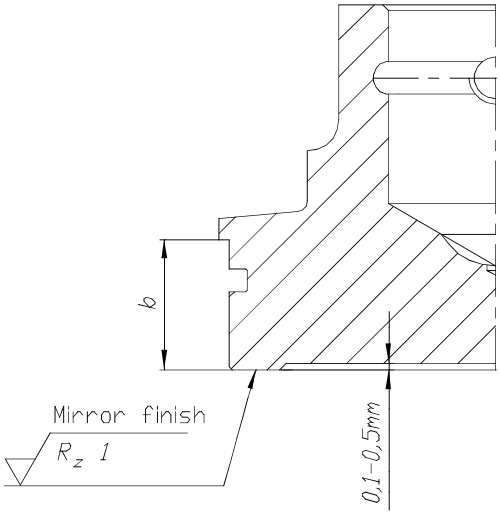


Illustration 8.1

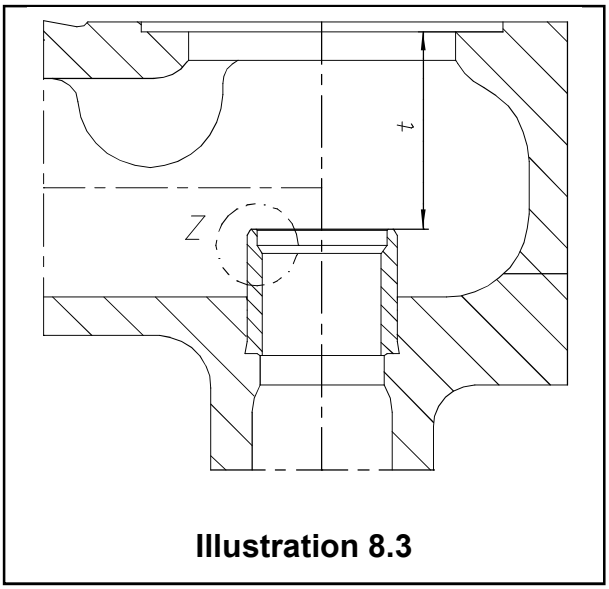


Illustration 8.3

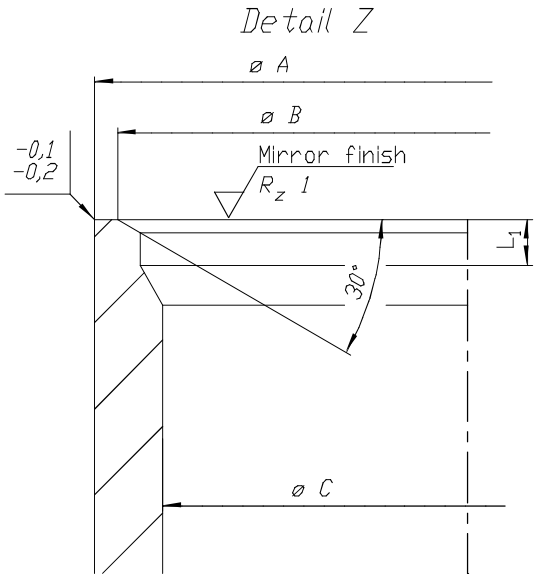


Illustration 8.2

Changes in dimension may only be so large that the highest admissible dimension for t is not exceeded and the smallest admissible dimension for b is not fallen below. The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. The maximum allowable reduction in "L_1" is 0,5 mm.

Table 8.1: seats and discs of type 455

C [mm]	DN [mm]	Refinishing of seat				Refinishing of disc	
		Seat depth t [mm]	Tolerance for t [mm]	B ∅ [mm]	A ∅ [mm]	Boundary height b [mm]	Tolerance for b [mm]
20	25	50,0	+0,5	$22{,}5_{-0{,}2}$	$24{,}5^{+0{,}2}$	10,5	-0,2
40	50	66,0	+0,5	$46{,}5_{-0{,}2}$	$49{,}0^{+0{,}2}$	12,5	-0,3
60	80	85,0	+0,5	$66{,}5_{-0{,}3}$	$71{,}5^{+0{,}3}$	16,0	-0,3
74	100	117,0	+0,8	$82{,}0_{-0{,}3}$	$86{,}0^{+0{,}3}$	17,0	-0,4

11 Refinishing of seat and disc types 455 and 456, O-Ring seals

Work is to be carried out according to the illustrations 9.1 and 9.3 and according to table 9.1.
In these valves the seal is made at the inner chamfer, this is therefore the important feature. The inner chamber is formed with a 30° angle (see Illustration 9.1).

When refinishing according to Table 9.1, the diameter B has to be restored and the chamfer area with surface quality Rz 10 has to be finished / ground free of burrs.

The O-Ring in the disc has to be renewed.

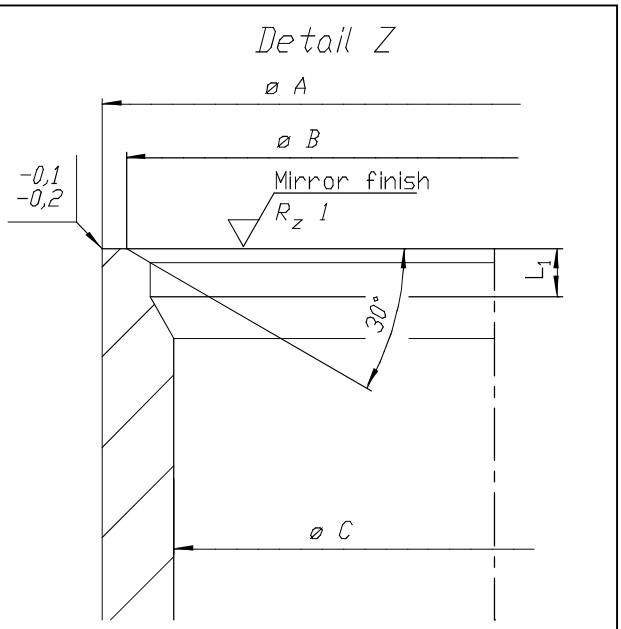


Illustration 9.1

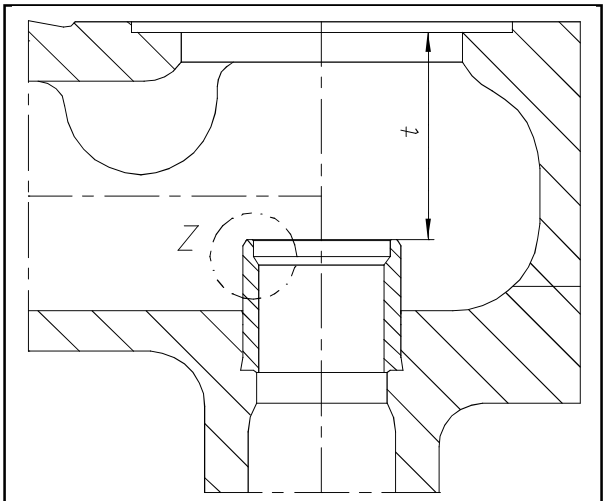


Illustration 9.2

Table 9.1: seats and discs of type 455 and 456

C [mm]	DN [mm]	Refinishing of seat			
		Seat depth t [mm]	Tolerance for t [mm]	B ∅ [mm]	A ∅ [mm]
20	25	50,0	+0,5	$22,5_{-0,2}$	$24,5^{+0,2}$
40	50	66,0	+0,5	$46,5_{-0,2}$	$49,0^{+0,2}$
60	80	85,0	+0,5	$66,5_{-0,3}$	$71,5^{+0,3}$
74	100	117,0	+0,8	$82,0_{-0,3}$	$86,0^{+0,3}$

12 Refinishing of seat and disc for full nozzle types 457 and 458, metal sealing

Work is to be carried out according to the illustrations 10.1, 10.2 and according to table 10.1.

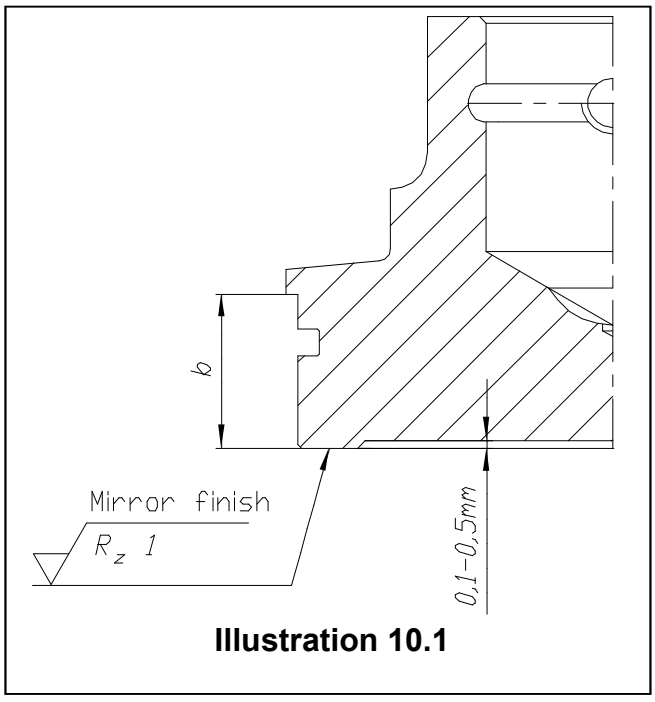


Illustration 10.1

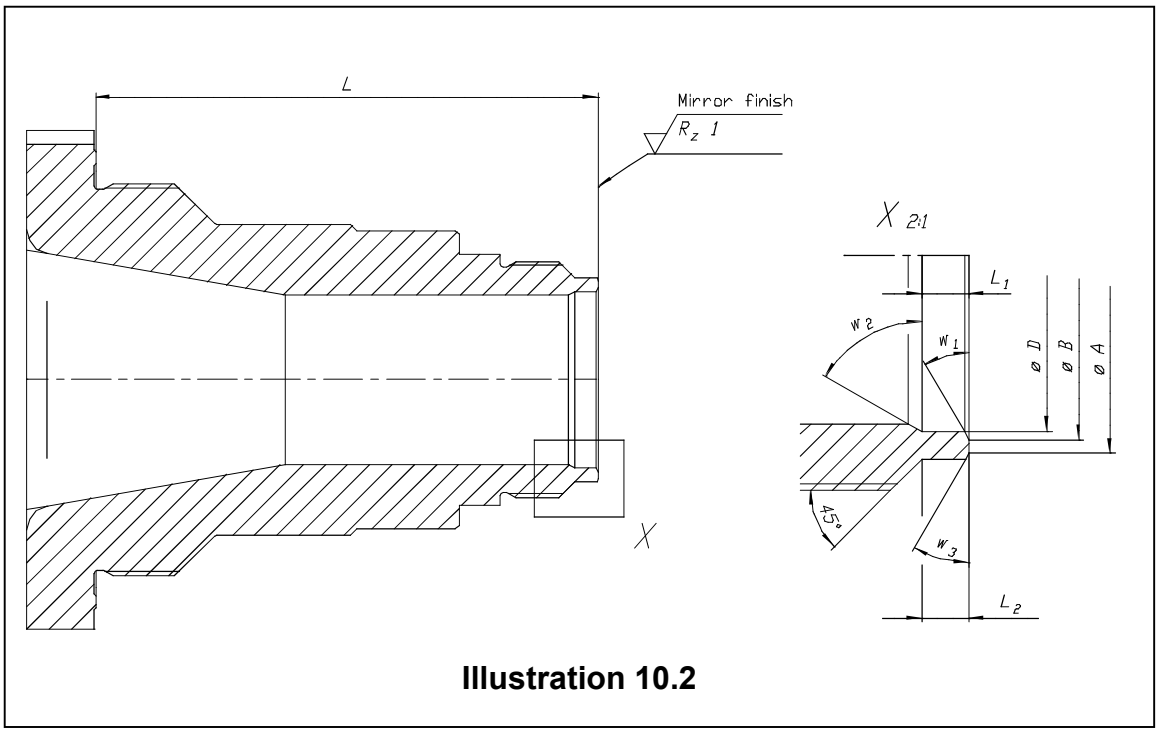


Illustration 10.2

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 10.1). The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. "L_1" can be minimized by about a maximum of … (see table 10.1).

Table 10.1: seats and discs full nozzle type 457/458

Valve DN	Seat											Disc	
	Diameter				Length				Angle				
	do Ø [mm]	D Ø [mm]	B Ø [mm]	A Ø [mm]	L [mm]	L_1 [mm]	L_2 [mm]	Tolerance L; L_1; L_2 [mm]	W_1 [°]	W 2 [°]	W 3 [°]	b [mm]	Tolerance b [mm]
25	15	16	17	19	130	3	-	- 0,2	30	30	30	10,5	-0,1
	20	21	22,5	24,5		3	-	- 0,2		60	30		
50	30	32	36	39	162	3,5	12,5	- 0,3	30	60	45	12,5	-0,2
	40	43	46	49		3	-	- 0,3			-		
80	50	52	55,4	59,4	180	3	4	- 0,3	30	60	45	17,0	-0,2
	60	62	66,5	71,5		4	-	- 0,3		60			
100	50	52	55,4	59,4	215	3	4	- 0,3	30	60	45	17,0	-0,2
	60	64	67,5	71,5		5	-	- 0,3	30	60	45	17,0	-0,2
	74	79	82	86		5	6	- 0,3	30	60	-	17,0	-0,2
	88	93	99	103		6	-	- 0,3	30	60	-	17,0	-0,2
150	110	116	120	124	277,5	5	-	- 0,3	30	90	-	17,0	-0,3

13 Seat geometry for flat sealing O-ring disc design (for valves delivered before 2002)

Work is to be carried out according to the illustration 11.1and according to table 11.1.

The flat sealing O-ring-disc has not been supplied since the redesign of the O-ring dics in 2002. To refinish “old design” discs see the following details.

The flat sealing O-ring disc design is identified internally within Leser by “F-Text” codes L40-43. Where a customer has an O-ring disc valve supplied before 2002, the customer should contact Leser to confirm whether these dimensions are to be used before commencing work on the valve.

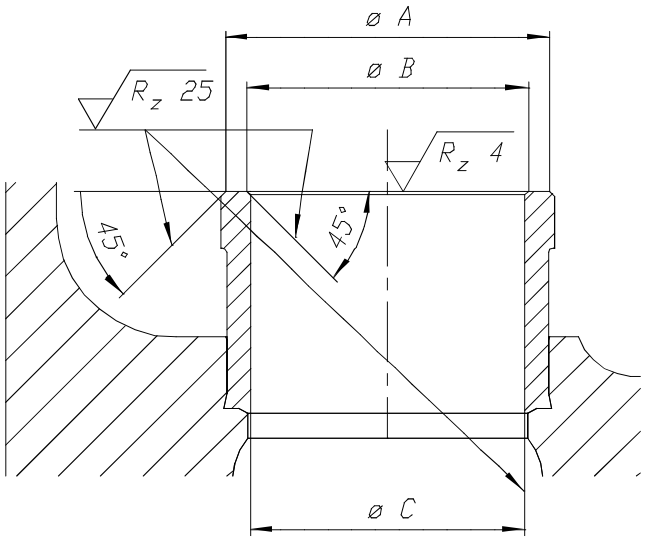


Illustration 11.1

Table 11.1: flat sealing O-ring disc

C	B	A
closest flow area do [mm]	**inner seat chamfer ∅ [mm]**	**outer seat chamfer*1 ∅ [mm]**
18	$18{,}4_{-0{,}2}$	$22{,}8^{+0{,}2}$
23	$23{,}4_{-0{,}2}$	$29{,}8^{+0{,}2}$
29	$29{,}4_{-0{,}2}$	$37{,}1^{+0{,}2}$
37	$37{,}4_{-0{,}2}$	$46{,}0^{+0{,}2}$
46	$46{,}4_{-0{,}2}$	$54{,}4^{+0{,}3}$
60	$60{,}4_{-0{,}3}$	$71{,}0^{+0{,}3}$
74	$74{,}4_{-0{,}3}$	$89{,}0^{+0{,}3}$
92	$92{,}4_{-0{,}3}$	$111{,}0^{+0{,}3}$
98	$98{,}4_{-0{,}3}$	$111{,}0^{+0{,}3}$
125	$125{,}4_{-0{,}3}$	$138{,}0^{+0{,}3}$

*1) outer seat champfer formed with a 45° angle / free of burrs

14 Refinishing of seat and disc type 526, metal sealing

Work is to be carried out according to the illustrations 12.1, 12.2 and according to table 12.1.

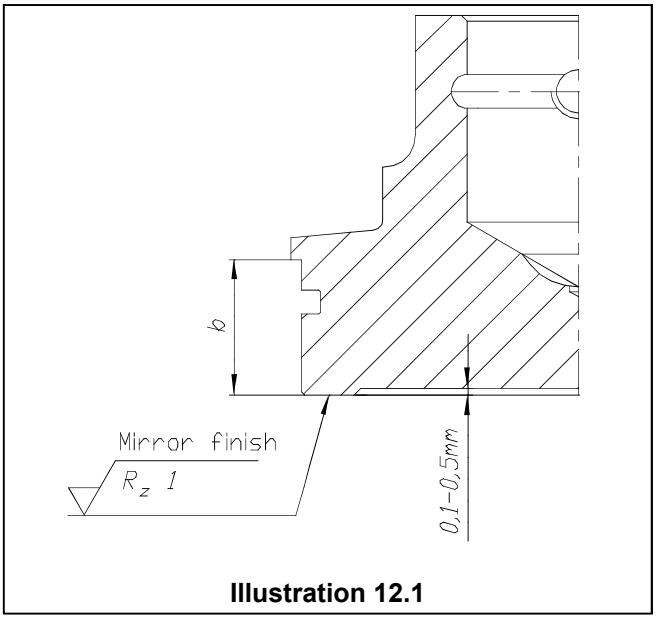


Illustration 12.1

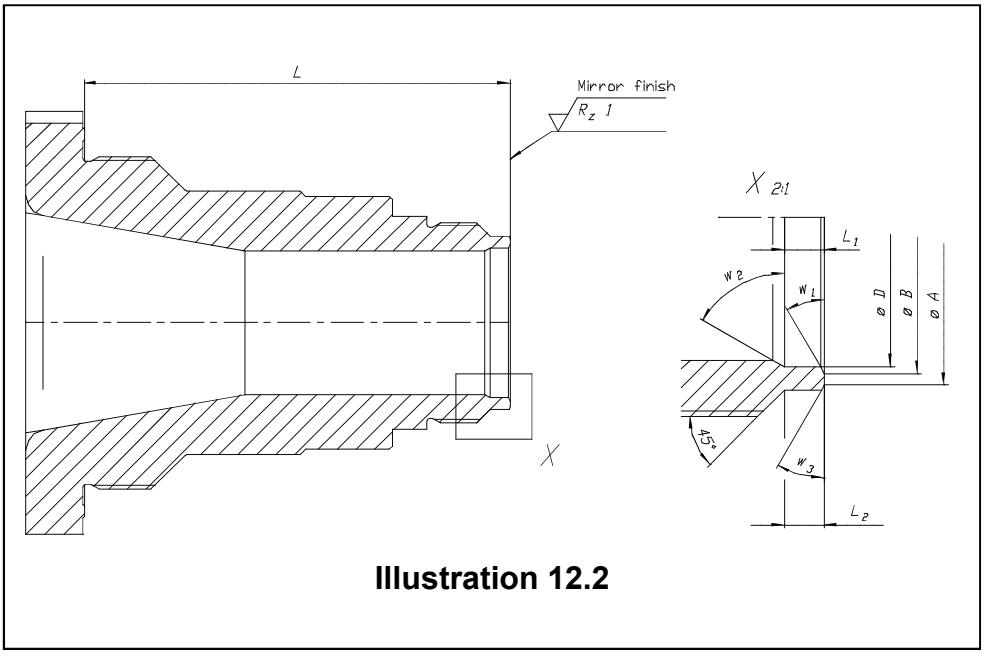


Illustration 12.2

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 12.1). The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. "L_1" can be minimized by about a maximum of … (see table 12.1).

Table 12.1: seats and discs type 526

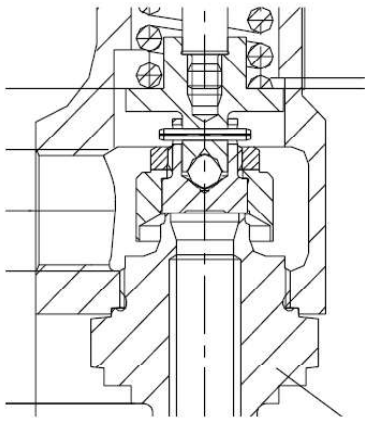
Orifice	Size	Pressure range Inlet / Outlet [lbs]	Seat										Disc	
			Diameter			Length				Angle				
			A Ø [mm]	B Ø [mm]	D Ø [mm]	L [mm]	L_1 [mm]	L_2 [mm]	Tolerance L; L_1; L_2 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	b [mm]	Tolerance [mm]
E	1"x2"	300 x 150	$19,6^{+0,2}$	$18,0_{-0,2}$	17,4	87,3	10,0	-	- 0,2	45,0	60,0	45,0	10,5	-0,1
	1 ½"x2"	1500 x 300	$18,7^{+0,2}$	$16,6_{-0,2}$	16,1	87,3	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,1
	1 ½"x3"	2500 x 300	$18,6^{+0,2}$	$16,6_{-0,2}$	16,1	122,2	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,1
F	1 ½"x2"	900 x 300	$22,5^{+0,2}$	$20,5_{-0,2}$	19,5	106,3	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,2
	1 ½"x3"	2500 x 300	$20,5^{+0,2}$	$19,1_{-0,2}$	19,5	122,6	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,2
G	1½"x3"	900 x 300	$27,5^{+0,2}$	$25,0_{-0,2}$	23,5	106,3	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,2
	2"x3"	1500 x 300	$27,5^{+0,2}$	$25,0_{-0,2}$	23,5	128,1	5,0	3,0	- 0,2	45,0	60,0	60,0	10,5	-0,2
H	1½"x3"	150 x 150	$36,0^{+0,2}$	$33,0_{-0,2}$	30,5	106,3	5,0	3,0	- 0,2	45,0	60,0	45,0	10,5	-0,2
	2"x3"	600 x 150	$35,2^{+0,2}$	$33,0_{-0,2}$	29,4	102,2	5,0	3,0	- 0,2	30,0	60,0	30,0	10,5	-0,2
	2"x3"	1500 x 300	$35,2^{+0,2}$	$33,0_{-0,2}$	29,4	126,5	5,0	3,0	- 0,2	30,0	60,0	30,0	10,5	-0,2
J	2"x3"	150 x 150	$43,5^{+0,2}$	$41,0_{-0,2}$	39,0	102,2	6,0	6,0	- 0,2	30,0	60,0	30,0	12,5	-0,2
	3"x4"	900 x 300	$43,5^{+0,2}$	$41,0_{-0,2}$	37,0	156,5	6,0	6,0	- 0,3	30,0	60,0	30,0	12,5	-0,2
K	3"x4"	150 x 150	$50,5^{+0,3}$	$47,0_{-0,2}$	45,0	127,9	6,0	6,0	- 0,2	30,0	60,0	30,0	12,5	-0,2
	3"x6"	600 x 150	$50,5^{+0,3}$	$47,0_{-0,2}$	45,0	156,5	6,0	6,0	- 0,3	30,0	60,0	30,0	12,5	-0,2
	3"x6"	1500 x 300	$50,5^{+0,3}$	$47,0_{-0,2}$	45,0	169	6,0	7,0	- 0,3	30,0	60,0	45,0	12,5	-0,2
L	3"x4"	150 x 150	$61,5^{+0,3}$	$58,0_{-0,2}$	56,0	127,9	6,0	6,0	- 0,2	30,0	60,0	30,0	15,0	-0,2
	4"x6"	600 x 150	$61,5^{+0,3}$	$58,0_{-0,2}$	56,0	149,9	6,0	6,0	- 0,2	30,0	60,0	30,0	15,0	-0,2
	4"x6"	600 x 150	$61,5^{+0,3}$	$58,0_{-0,3}$	56,0	149,9	6,0	6,0	- 0,2	30,0	60,0	30,0	15,0	-0,2
	4"x6"	1500 x 150	$61,5^{+0,3}$	$58,0_{-0,3}$	56,0	169	6,0	6,0	- 0,3	30,0	60,0	30,0	15,0	-0,2
M	4"x6"	600 x 150	$68,0^{+0,3}$	$64,5_{-0,3}$	61,5	149,9	5,0	6,0	- 0,3	30,0	60,0	30,0	15,0	-0,2
	4"x6“	900 x 150	$69,0^{+0,3}$	$64,5_{-0,3}$	61,5	169	5,0	6,5	- 0,3	30,0	60,0	30,0	15,0	-0,2
N	4"x6“	900 x 150	$74,0^{+0,3}$	$70,0_{-0,3}$	67,0	169	4,0	6,0	- 0,3	30,0	60,0	30,0	15,0	-0,2
P	4"x6"	150 x 150	$89,0^{+0,3}$	$85,0_{-0,3}$	82,0	153,1	5,0	6,0	- 0,3	30,0	45,0	45,0	15,0	-0,2
	4"x6"	900 x 150	$89,0^{+0,3}$	$85,0_{-0,3}$	82,0	197,5	5,0	6,0	- 0,3	30,0	45,0	45,0	15,0	-0,2
Q	6"x8"	300 x 150	$114,5^{+0,3}$	$111,0_{-0,3}$	108,5	209,5	6,0	6,0	- 0,3	45,0	45,0	45,0	17,0	-0,2
R	6"x8"	300 x 150	$137,5^{+0,3}$	$133,0_{-0,3}$	131,0	209,5	25,0	6,0	- 0,3	45,0	60,0	45,0	17,0	-0,2
	6"x10"	600 x 150	$137,5^{+0,3}$	$133,0_{-0,3}$	131,0	189,3	25,0	6,0	- 0,3	45,0	60,0	45,0	17,0	-0,2
T	8"x10"	300 x 150	$171,5^{+0,4}$	$167,0_{-0,4}$	164,0	225,7	6,0	6,0	- 0,3	30,0	60,0	45,0	17,0	-0,3

15 Refinishing of seat and disc type 437, metal sealing or sealing plate

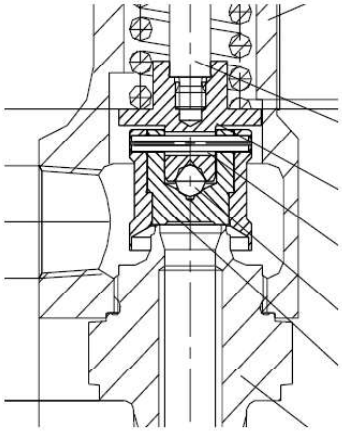
Since 2007 the types 437 do6 + 10 have been converted to the new metal-to-metal disc design. The “old” disc design is not available as spare part at LESER. Instead LESER will offer conversion kits to change over to the new design. For detailed information please ask LESER sales.

Feature-Benefits Type 437 do = 6 and do = 10 (Stainless steel disc): Old vs. New Disc Design

Old:



New:



Feature	Benefit
Easy assembly	No torque wrench needed
Removable lifting aid	Simple repair of sealing surface
Zero-potential assembly of disc	Optimal functional tightness without refinish
Conversion kit available	Refitting of every customer valve possible

Rework shall be done according to illustration 13.1, 13.2 and table 13.1.

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 13.1). The dimensions A and C on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked.

Remark: Small changes at the seat geometry can have big influence to the function of the safety valve. LESER recommends using the new inlet body and disc.

Table 13.1: Seat and disc type 437

do	Seat										Disc		
	Diameter			Length				Angle					
	A ∅ [mm]	B ∅ [mm]	C ∅ [mm]	L [mm]	L_1 [mm]	L_2 [mm]	max. Tolerance L; L_1; L_2 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	b [mm]	max. Tolerance b [mm]	L_2 [mm]
6	$10,5^{-0,05}$	$7,5^{+0,05}$	$8,5^{+0,1}$	16,5	-	1,5	- 0,1	45	18	45	6,0	+/- 0,25	0,5
10	$14,0^{-0,05}$	$12,0^{+0,05}$	-	16,5	-	2,0	- 0,1	-	18	-	6,0	+/- 0,25	0,5

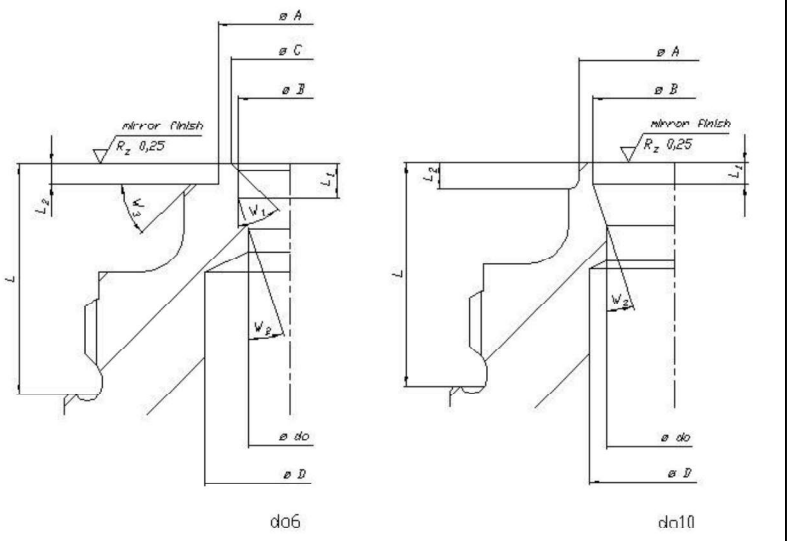


Illustration 13.1

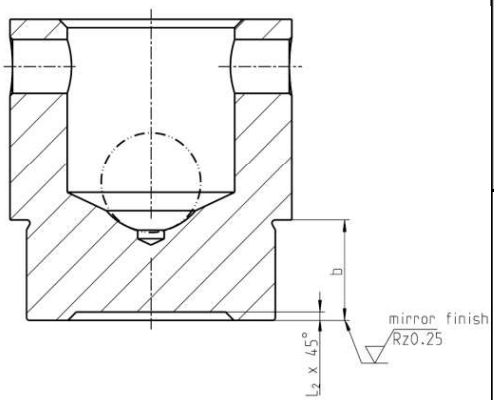


Illustration 13.2

Since April 2014 the inlet body of type 437 do10 have been supplied with new seat geometry. The former inlet body is not available as spare part at LESER. The seat geometry of type 437 do6 has been still the same.

The rework of type 437 do10 with new seat geometry shall be done according to illustration 13.1, 13.2 and table 13.2.

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 13.2). The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked.

Remark: Small changes at the seat geometry can have big influence to the function of the safety valve. LESER recommends using the new inlet body and disc.

Within ECO 200071 (valid for serial production since 09/2014) the seat contour of Type 437 do 10 has been optimized (for further informations see LDeS 3001.18 Chapter 5.2). The following table contains the measures of the optimized seat contour for Type 437 do10.

Table 13.2: Seat and disc type 437 with new seat geometry since 2014

do	Sitz											Teller		
	A ∅ [mm]	B ∅ [mm]	C ∅ [mm]	L [mm]	L_1 [mm]	L_2 [mm]	max. Toleranz L; L_1; L_2 [mm]	R_1 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	b [mm]	max. Toleranz b [mm]	L_2 [mm]
10	$14,0^{-0,05}$	$12,5^{+0,05}$	-	16,5	1,6	-	- 0,1	0,2	-	18	-	6,0	+/- 0,25	0,5

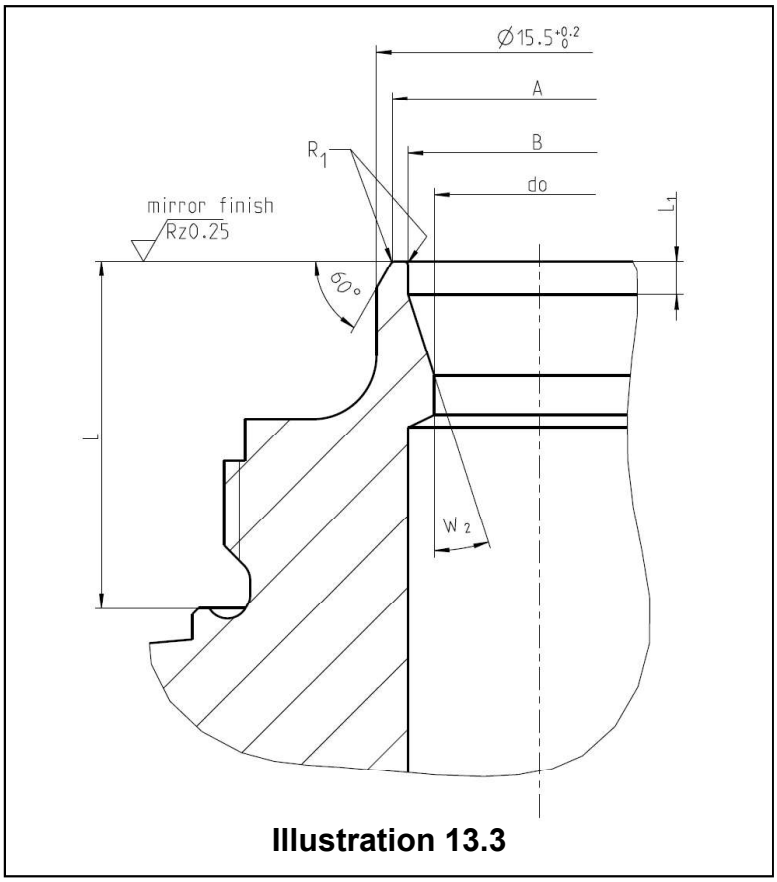


Illustration 13.3

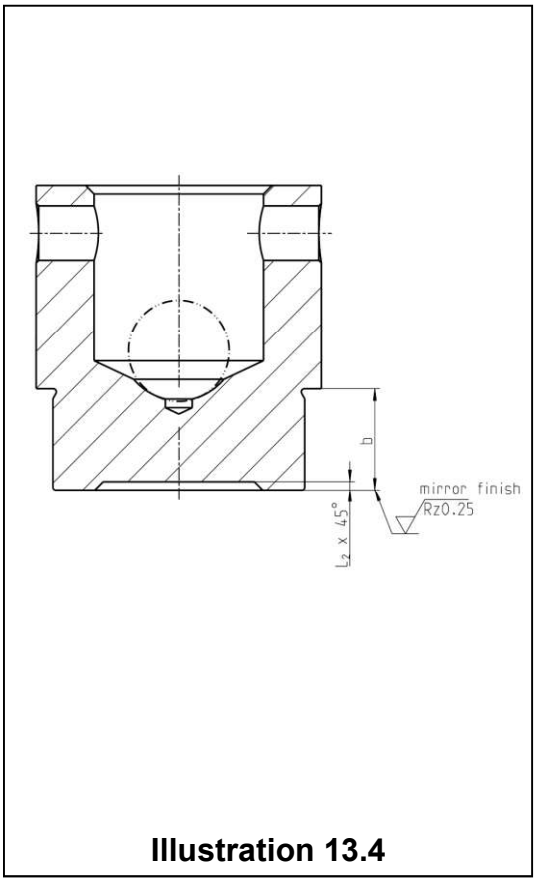


Illustration 13.4

16 Refinishing of seat and disc type 438, O-Ring seals

Rework shall be done according to illustration 14.1 and table 14.1

The outer chamfer of these seats is responsible for the sealing (see illustration 14.1), therefore the diameter of the seat must not be changed. In case of edge damage, the seat surface may be reworked by turning and grinding to remove the damages. After that the edge has to be deburred with abrasive paper (grit 400-800).

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 14.1). The dimensions A and B on the seat must be restored with inner and outer chamfering. The recess dimensions "L_1" do not have to be reworked.

The disc may be reworked within the measurement and tolerances according to tabe 14.1. The O-ring in the disc must be renewed.

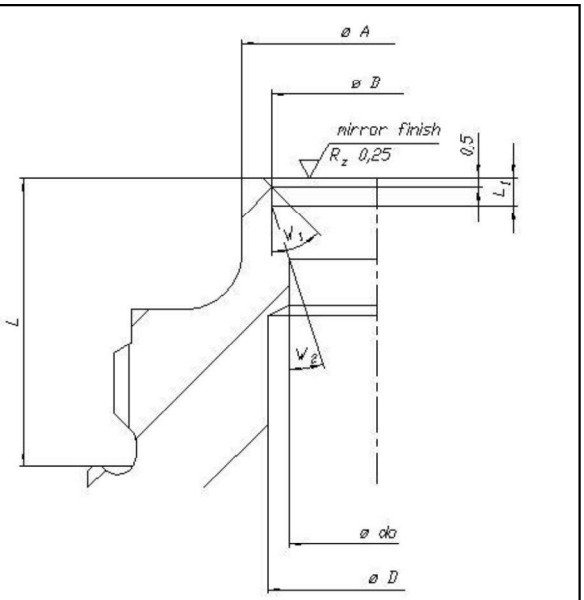


Illustration 14.1

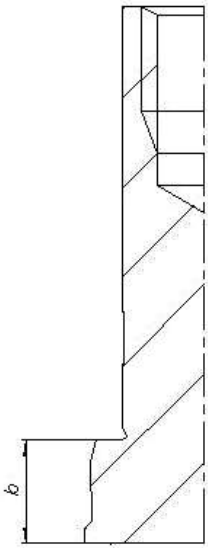


Illustration 14.2

Table 14.1: seats and discs type 438

do	Seat									Disc	
	Diameter			Length			Angle				
	A ∅ [mm]	B ∅ [mm]	D ∅ [mm]	L [mm]	L_1 [mm]	Tolerance L; L_1 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	b [mm]	Tolerance b [mm]
10	$15{,}5_{-0{,}1}$	$12^{+0{,}05}$	-	16,5	1,6	- 0,1	-	18	-	4,9	+ 0,1/-0,2

17 Refinishing of seat and disc type 439, Vulcanized soft seat

The rework shall be done according to illustration 15.1 and table 15.1.

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 15.1). The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked

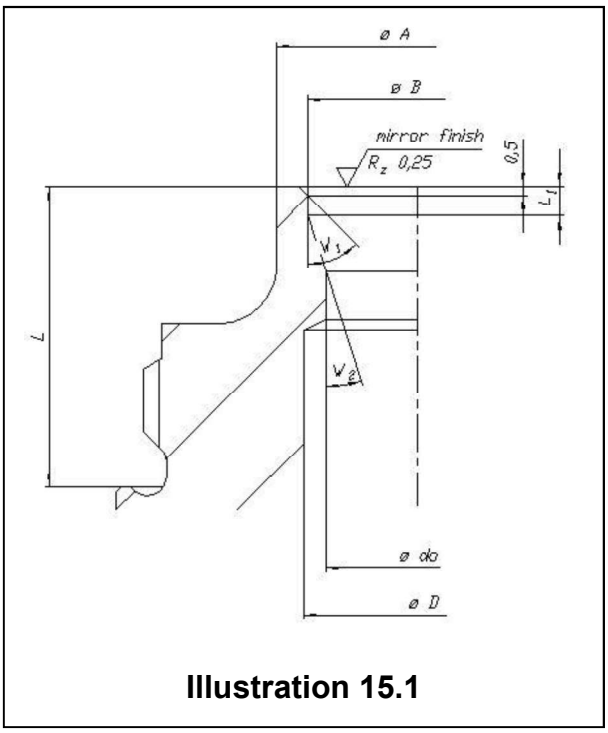


Illustration 15.1

Table 15.1: seats and discs type 439

do	Seat								
	Diameter			Length			Angle		
	A ∅ [mm]	B ∅ [mm]	D ∅ [mm]	L [mm]	L_1 [mm]	Tolerance L; L_1 [mm]	W_1 [°]	W_2 [°]	W_3 [°]
10	$15{,}5_{-0{,}1}$	$12^{+0{,}05}$	-	16,5	1,6	- 0,1	-	18	-

18 Refinishing of seat and disc type 459, metal sealing, sealing plate

Work is to be done according illustration 16.1, 16.2.

Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance (see table 16.1). The dimensions A and B on the seat must be restored with inner and outer chamfering.

The recess dimensions "L_1" do not have to be reworked by a lathe, but must be preserved at their original order of magnitude. "L_1" can be minimized by about a maximum of … (see table 16.1).

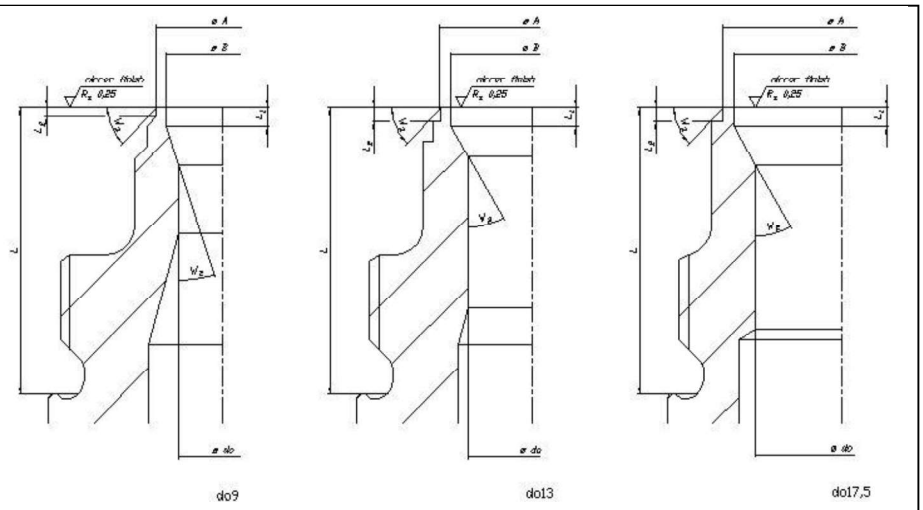


Illustration 16.1

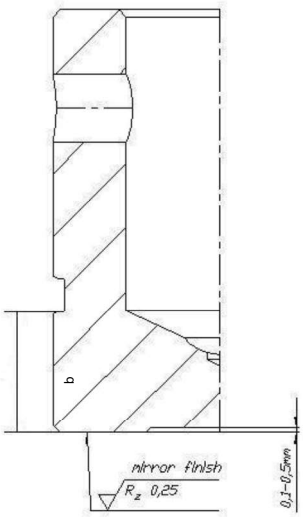


Illustration 16.2

Table 16.1: seats and discs type 459

do	Seat									Disc	
	Diameter		Length				Angle			b	Tolerance b
	A ∅ [mm]	B ∅ [mm]	L [mm]	L_1 [mm]	L_2 [mm]	Tolerance L; L_1; L_2 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	[mm]	[mm]
6	$10,5^{-0,05}$	$8,5^{+0,1}$	29,0	2,5	0,9	- 0,1	-	18	45	8,0	+ 0,1
9	$12,9^{+0,1}$	$11,5^{+0,05}$	29,0	2,0	1,1	- 0,1	-	18	45	8,0	+ 0,1
13	$18,1^{+0,1}$	$16,5^{+0,05}$	29,0	2,0	1,5	- 0,1	-	30	45	8,0	+ 0,1
17,5	$23,8^{+0,1}$	$22,0^{+0,05}$	29,0	2,0	1,5	- 0,1	-	30	45	7,9	+ 0,1

19 Refinishing of seat and disc type 462, O-Ring disc

Work is to be done according to illustration 17.1, 17.2.

The outer chamfer of these seats is responsible for the sealing (see illustration 17.1), therefore the diameter of the seat must not be changed. In case of edge damage, the seat surface may be turned or ground by between 0,2 and 0,4 mm until the damage is removed. Please make sure that the edge is free for burrs.

The O-ring in the disc must be renewed.

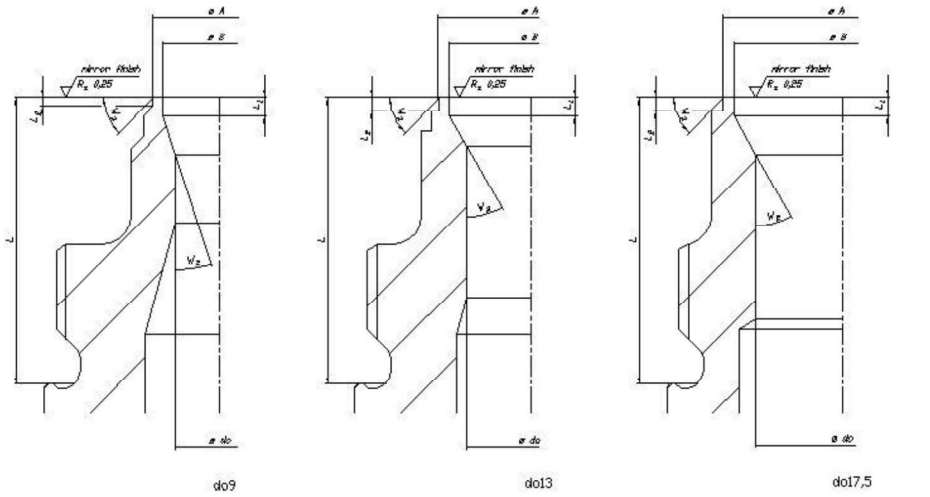


Illustration 17.1

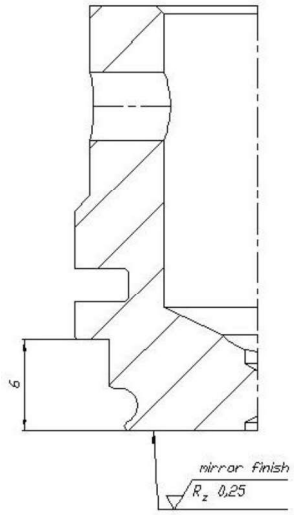


Illustration 17.2

Table 17.1: seats and discs type 462

do	Seat									Disc	
	Diameter		Length				Angle				
	A ∅ [mm]	B ∅ [mm]	L [mm]	L_1 [mm]	L_2 [mm]	Tolerance L; L_1; L_2 [mm]	W_1 [°]	W_2 [°]	W_3 [°]	b [mm]	Tolerance b [mm]
9	12,9	11,5	29,0	2,0	1,1	+0,1	-	18	45	5,3	+0,05
13	18,1	16,5	29,0	2,0	1,5	+0,1	-	30	45	6,0	+0,05
17,5	23,8	22,0	29,0	2,0	1,5	+0,1	-	30	45	6,0	-0,1

20 Refinishing of seat and disc of POSV type 811/821

Rework shall be done in accordance to illustration 18.1, 18.2 and table 18.

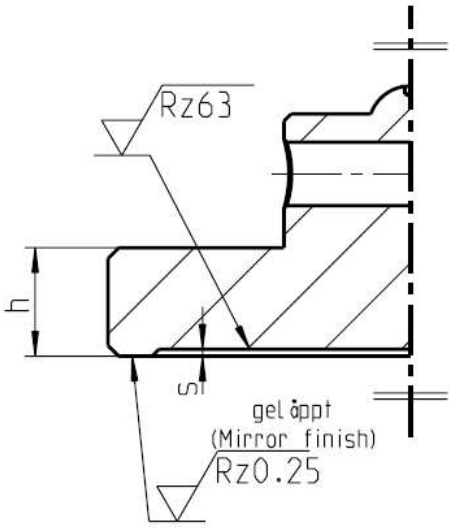


Illustration 18.1: Steel disc

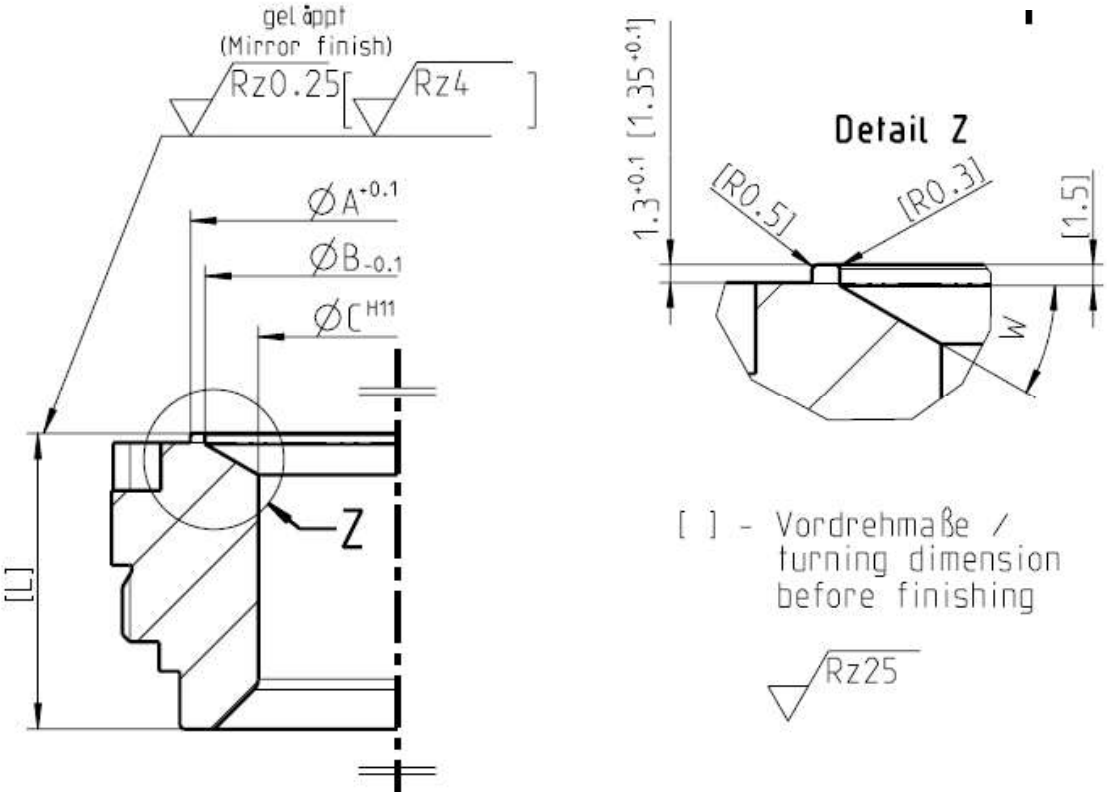


Illustration 18.2: Seat (semi-nozzle)

Rework shall be limited to the lowest allowable dimensions [L_{min}] and h_{min}. The radii [R 0.5] and [R 0.3] and the shoulder [$1.35^{+0.1}$] at the seat shall be reworked exactly to assure the tightness of the o-ring disc. The rework of the shoulder [1.5] and the angle W of the seat and the shoulder s of the steel disc is recommended.

NPS xNPS	DN x DN	Orifice	Seat (semi-nozzle)						Steel disc		
			$A^{+0,1}$ Ø [mm]	$B_{-0,1}$ Ø [mm]	C^{H11} Ø [mm]	[L] [mm]	[L_{min}] [mm]	W [°]	h [mm]	h_{min} [mm]	s [mm]
1x2	25x50	D	29,5	26,5	11	33,4	32,4	45	8,5	7,5	1
		E	29,5	26,5	14,7	33,4	32,4	45	8,5	7,5	1
		F	29,5	26,5	18,4	33,4	32,4	45	8,5	7,5	1
		G	29,5	26,5	23	33,4	32,4	45	8,5	7,5	1
1,5x2	40x50	D	37,5	34,5	11	33,4	32,4	45	10,5	9,5	1
		E	37,5	34,5	14,7	33,4	32,4	45	10,5	9,5	1
		F	37,5	34,5	18,4	33,4	32,4	45	10,5	9,5	1
		H	37,5	34,5	29	33,4	32,4	45	10,5	9,5	1
1,5x3	40x80	G	37,5	34,5	23,6	39,4	38,4	45	10,5	9,5	1
		H	37,5	34,5	29,4	39,4	38,4	45	10,5	9,5	1
		J	38	35,7	35,7	33,4	32,4	-	10,5	9,5	1
2x3	50x80	G	56,5	52,5	23,6	40,4	39,4	30	13,5	12,5	1
		H	56,5	52,5	29,4	40,4	39,4	30	13,5	12,5	1
		J	56,5	52,5	38	40,4	39,4	30	13,5	12,5	1
		K+	56,5	52,5	48	35,4	34,4	30	13,5	12,5	1
3x4	80x100	J	80,5	76	38	61,7	60,7	30	15,4	14,4	1
		K	80,5	76	45	61,7	60,7	30	15,4	14,4	1
		L	80,5	76	56	61,7	60,7	30	15,4	14,4	1
		N+	80,5	76	75	41,7	40,7	30	15,4	14,4	1
4x6	100x150	L	102,5	98	56	64,7	63,7	30	20	19	2
		M	102,5	98	63	64,7	63,7	30	20	19	2
		N	102,5	98	69	64,7	63,7	30	20	19	2
		P	102,5	98	83	50,7	49,7	30	20	19	2
		P+	102,5	98	95	41,7	40,7	30	20	19	2
6x8	150x200	Q	150	145	110	56,7	55,7	30	30	29	2
		R	150	145	133	56,7	55,7	30	30	29	2
		R+	150	145	142	46,7	45,7	30	30	29	2
8x10	200x250	T	188	182	168	68,2	67,2	30	30	29	2
		T+	188	182	180	58,2	57,2	30	30	29	2

Table 18: Seat and steel disc of type 811/821

Contents

1 Purpose

This LESER Global Standard (LGS) provides instruction on reworking LESER safety valves. The required work steps and materials are described.

2 Scope

This document must be applied when reworking safety valves in agencies and subsidiaries of LESER GmbH & Co. KG.

3 References

LWN 313.32 to 313.40

4 Disclaimer

LESER puts in a great deal of effort into making up-to-date and correct documentation available. Nevertheless, LESER GmbH & Co. KG gives no guarantee that the recommended actions presented here are entirely correct and error free. This document is to be applied exclusively to the specified type. LESER GmbH & Co. KG declines any liability or responsibility for the correctness and completeness of the content.

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5 Qualified fitting personnel

The reworking of LESER safety valves may only be performed by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

6 General Information

- During all work on the working surfaces,
- Wear safety glasses.

7 Reworking the of the working surfaces

When re-turning damaged working surfaces, comply with the specifications of LWN 313.32 to 313.40.

8 Re-lapping

8.1 Re-lapping seat and disc sealing surfaces

8.1.1 Lapping with the lapping stamp.

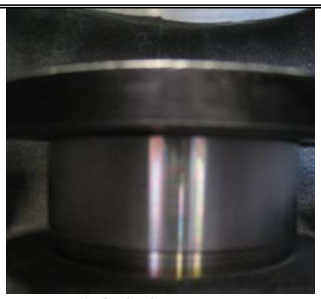
Illustrations	Description	Aids / Tools
 **Figure 8.1.1-1**	The lapping stamp is to be used for reworking damage on the seat sealing surface. Lapping paste and oleic acid must be applied to the lapping stamp. Select the lapping paste depending on the degree of damage. The more severe the damage is, the coarser the lapping paste that is to be used at the beginning	
 Monocrystalline diamond powder Oleic acid **Figure 8.1.1-2**	Wet the disc with the monocrystalline diamond powder and the oleic acid. Four small points on the sealing surface of the disc must be used. Monocrystalline diamond powder is applied to 2 points and oleic acid to the other 2 points.	

 **Figure 8.1.1-3**Error! No sequence specified.	The seat and disc are re-lapped together. The seat and disc are lapped together so that better surface evenness of the disc is achieved. Lapping is performed by slight circular hand movements.	

8.1.2 Re-lapping with a glass plate

Illustrations	Description	Aids / Tools
 Glass plate **Figure 8.1.2-1**	Re-lapping the seat with a glass plate results in greater surface evenness.	

8.1.3 Re-lapping the nozzle and the disc

Illustrations	Description	Aids / Tools
 Nozzle **Figure 8.1.3-1**	Re-lapping of the nozzle and the disc is performed separately on a glass plate. Mix the monocrystalline diamond powder together with the oleic acid on the glass plate and then lap the nozzle and the disc. Lapping is performed by slight circular hand movements.	

Alternate methods that ensure the same effect may be used.

public

Product group	**Type**
High Performance	441, 442 DIN/ANSI, 441, 442 Full nozzle DIN/ANSI, 455, 456, 457, 458
Modulate Action	433
S & R	440, 424
Critical Service	546

Contents

1 Purpose

This LESER Global Standard (LGS) is assembly documentation for different assembly cases for LESER safety valves of the High Performance series. The required work steps, tools and materials are described.

2 Scope

This document must be used for the assembly of a High Performance safety valve in agencies and subsidiaries of LESER GmbH & Co. KG.

3 References

LGS 3325 (LWN 322-04)
WI 3308-08 (LWN 308.08)
LGS 3324 (LWN 324.01)
LGS 3323 (LWN 322.02)

4 Disclaimer

LESER puts in a great deal of effort into making up-to-date and correct documentation available. Nevertheless, LESER GmbH & Co. KG gives no guarantee that the recommended actions presented here are entirely correct and error free. This document is to be applied exclusively to the specified type. LESER GmbH & Co. KG declines any liability or responsibility for the correctness and completeness of the content.

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LESER GmbH & Co. KG is available to the users of this document to provide additional information.

5 Qualified assembly personnel

The assembly of LESER safety valves may only be performed by trained or qualified assembly personnel. The qualifications must be obtained through the appropriate training measures.

6 General Information

- Gloves must be worn during the entire assembly.

7 General illustration

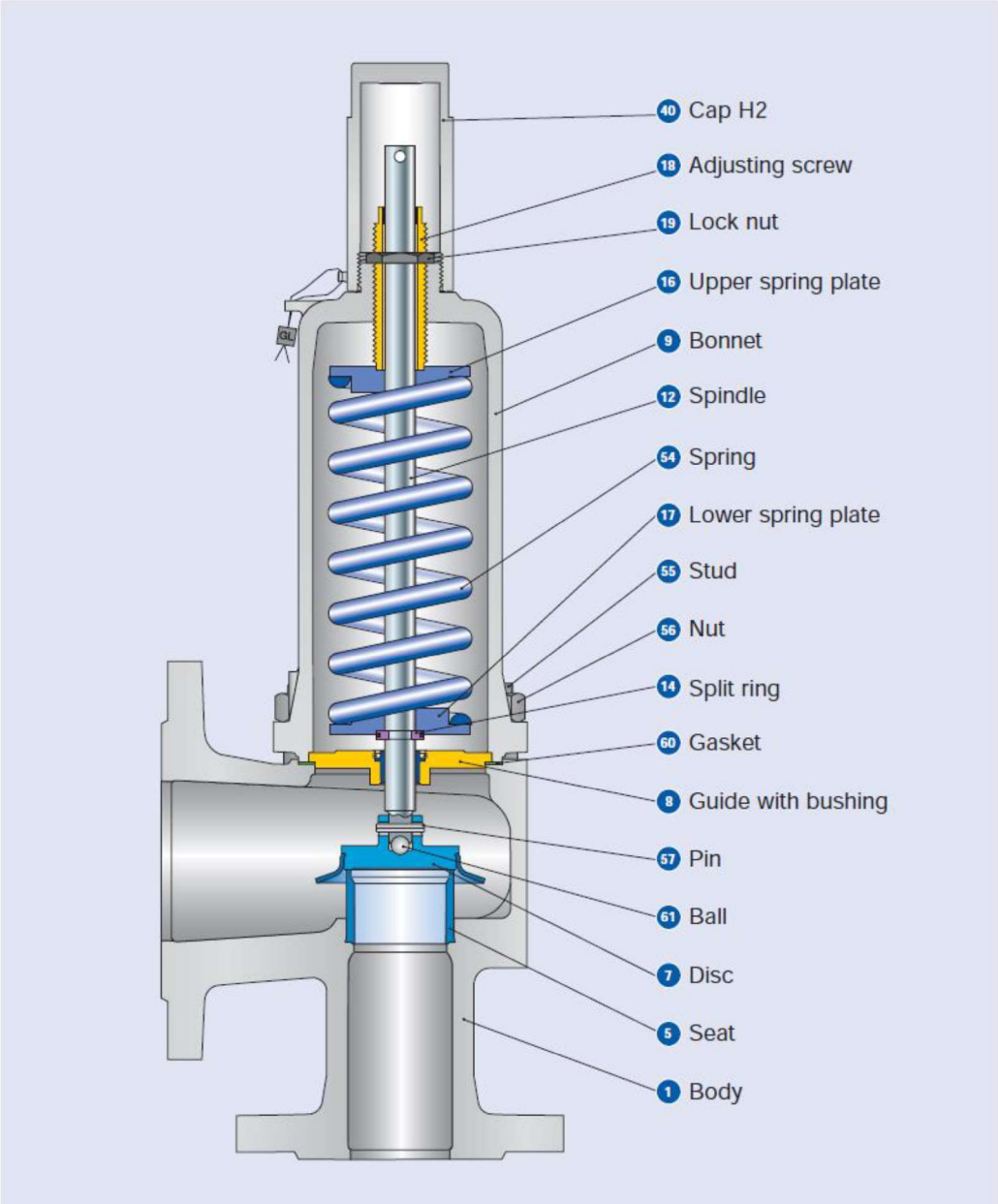


Fig. 7-1 Cross sectional drawing of High Performance 441.

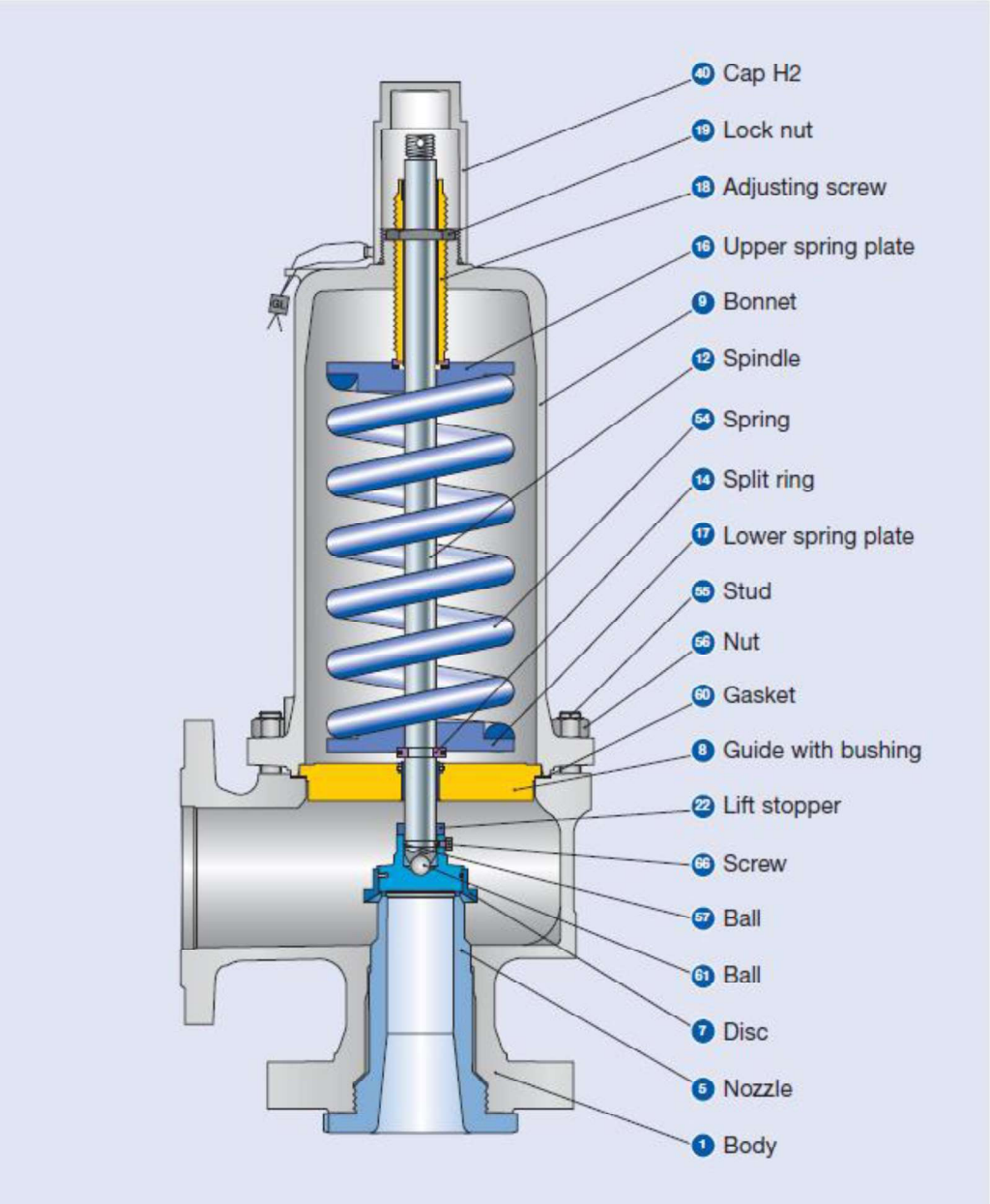


Fig. 7-2 Cross sectional drawing of High Performance 458.

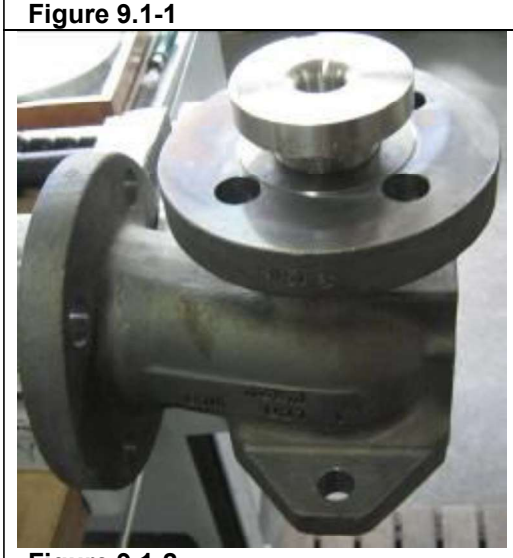
8 Preparation for valve assembly

8.1 Hammer in the punch numbers (if requested in the order).

Illustrations	Description	Aids / Tools
 Figure 8.1-1	Hammer in the markings on the edge of the outlet flange.	Hammer Punch numbers

9 Assembly of the High Performance series

9.1 Assembly of the nozzle (types 441 Full Nozzle, 442 Full Nozzle, 457, 458)

Illustrations	Description	Aids / Tools
 Figure 9.1-1	Grease sealing surface	Assembly grease (Molykote Paste)
 Figure 9.1-2	Screw nozzle into the body.	
 Figure 9.1-3	Tighten nozzle with C-spanner (put a small protective slab between the nozzle and C-spanner).	C-spanner with a nose

9.2 Screw the studs into the body.

Illustrations	Description	Aids / Tools
 Figure 9.2-1	Screw in the studs with an impact wrench. **Tip:** Place the guide washer on the opening of the body so that no studs can fall on the seat.	Impact wrench

9.3 Disc assembly

9.3.1 Assembly of the disc with rotating lifting aid and rollpin

Illustrations	Description	Aids / Tools
 Figure 9.3.1-1	Individual parts of the disc with rotating lifting aid	

Illustrations	Description	Aids / Tools
 Figure 9.3.1-2	Crimp the pin inwards at one end to make assembly easier.	Anvil Hammer
 Figure 9.3.1-3	Use the head of the hammer to lightly curve the pin (hit in the middle of the pin).	
 Figure 9.3.1-4	Put the assembly together (it must be easy to move the disc in the lifting aid by 360°) and secure it with pins.	

9.3.2 Assembly of the disc with a lifting aid and a securing ring

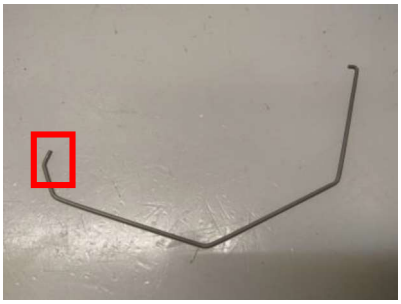
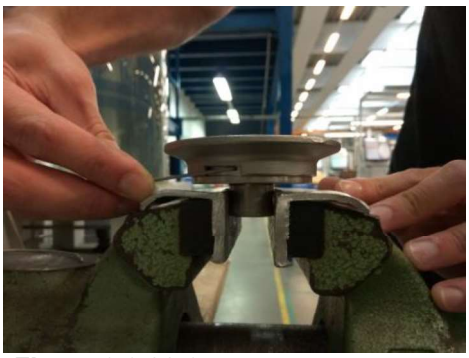
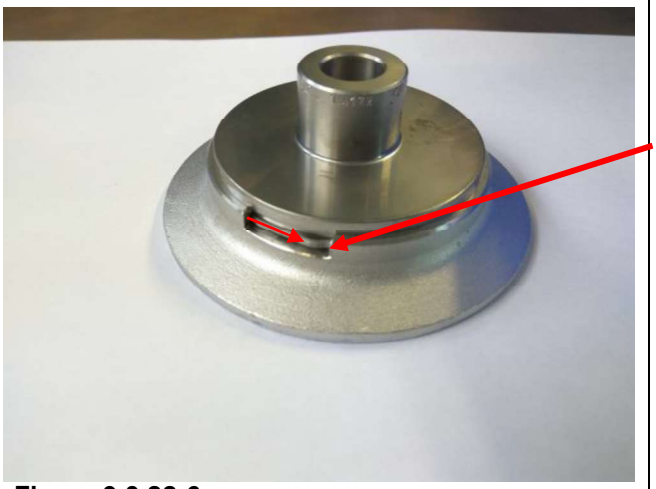
Illustrations	Description	Aids / Tools
 Figure 9.3.22-1	Put the disc in the lifting aid with hands. ATTENTION: Sealing surface must not be damaged!!!	-
 Figure 9.3.22-2  Figure 9.3.22-3	Clamp the disc on the clamping vice and insert the marked end (see Figure 9.3.2-3) of the securing ring in the recess on the side of the disc with hands.	Clamping Vice

 **Figure 9.3.22-4**	Rotate the lifting aid with the sickle spanner.	
 **Figure 9.3.22-5**	Rotate the lifting aid until the other end of the securing ring sits in the recess of the disc.	
 **Figure 9.3.22-6**	**!!ATTENTION!! The securing ring should be rotated until the end bent point of the securing ring. Rotating of the securing ring further of the end bent point of securing ring must be absolutely avoided.**	

9.3.3 Disc assembly, O-ring disc

Illustrations	Description	Aids / Tools
 Figure 9.3.3-1	Individual parts of the O-ring disc	
 Figure 9.3.3-2	Wet O-ring with water and avoid twisting of ring when inserting.	
 Figure 9.3.3-3	Insert retainer.	

Illustrations	Description	Aids / Tools
 Figure 9.3.3-4	Screw nut onto neck and tighten. Set torque as per LGS 3325.	Torque wrench
 Figure 9.3.3-5	Secure the nut by hitting it with a centre punch. Hammer in the marking for the O-Ring material according to WI 3308-08.	Centre punch Hammer Punch numbers

9.3.4 Disc assembly, sealing plate

Illustrations	Description	Aids / Tools
 Figure 9.3.4-1	Put the sealing plate in the disc.	

Illustrations	Description	Aids / Tools
 Figure 9.3.4-2	Put the retainer on the sealing plate.	
 Figure 9.3.4-3	Screw nut onto threaded neck and tighten. Set torque as per LGS 3325.	Torque wrench
 Figure 9.3.4-4	Secure the nut by hitting it with a centre punch Hammer in the marking for the sealing plate material according to WI 3308-08.	Punch numbers Hammer Centre punch

9.4 Assembly of spindle/disc assembly

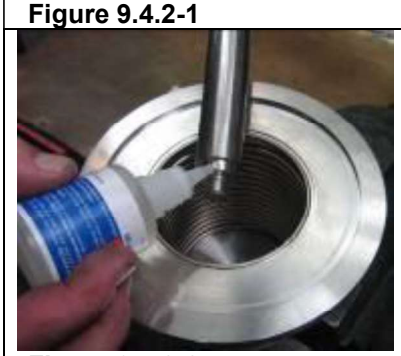
9.4.1 Assembly of spindle/disc assembly (without bellows)

Illustrations	Description	Aids / Tools
 **Figure 9.4.1-1**	Put the ball into the disc body.	
 **Figure 9.4.1-2**	Put the spindle in the disc and secure with a pin.	
 **Figure 9.4.1-3**	Put on lift stopper, if required.	

Illustrations	Description	Aids / Tools
 Figure 9.4.1-4	Push the guide washer onto the spindle.	
 Figure 9.4.1-5	Put half-washers in the recess of the spindle and secure with a retaining clip.	
 Figure 9.4.1-6	Push the lower spring plate, the spring and the upper spring plate over the spindle one after the other.	

Illustrations	Description	Aids / Tools
 Figure 9.4.1-7	Push the spacer onto the top spring disc.	

9.4.2 Assembly of spindle/disc assembly (with stainless steel bellows)

Illustrations	Description	Aids / Tools
 Figure 9.4.2-1	Some bellows versions must be screwed together.	
 Figure 9.4.2-2	If the spindle has a thread on the bottom end, then put a minimal amount of superglue on it and quickly screw into the bellows.	Glue Delo-Ca 2106 / 60H.0760.0001

Illustrations	Description	Aids / Tools
 Figure 9.4.2-3	For valves that are smaller in size, the spindle must be greased first in order to avoid any friction from occurring between the bellows and spindle.	
 Figure 9.4.2-4	Insert the ball into the disc body.	
 Figure 9.4.2-5	Put the stainless steel bellows into the disc and secure with a pin.	Lubricant

Illustrations	Description	Aids / Tools
 Figure 9.4.2-6	If required insert the lift stopper.	Hammer Pin punch
 Figure 9.4.2-7	Place the sealing ring on the bellows.	

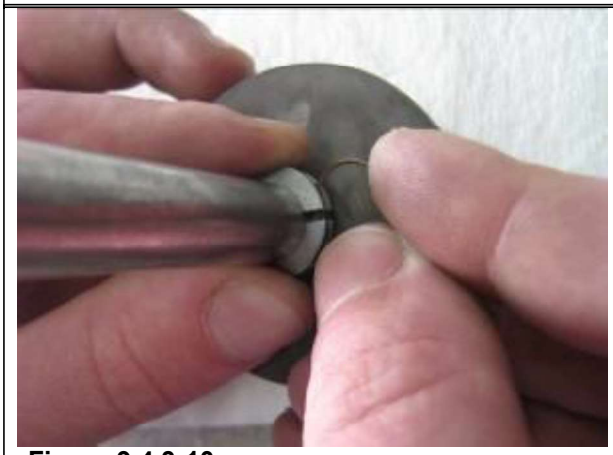
Illustrations	Description	Aids / Tools
 Figure 9.4.2-8	Put on the guide washer (if bellows are not already screwed together with the guide washer)	
 Figure 9.4.2-9	Put half-washers in the recess of the spindle and secure with a retaining clip.	
 Figure 9.4.2-10	Push on the bottom spring plate.	

9.4.3 Assembly of spindle/disc assembly (with elastomer bellows)

Illustrations	Description	Aids / Tools
 Figure 9.4.3-1	Put the ball into the disc body.	
 Figure 9.4.3-2	Put the spindle in the disc and secure with a pin.	
 Figure 9.4.3-3	**CAUTION:** The pin is shorter than usual and must not protrude so that the elastomer bellows are not damaged later.	

Illustrations	Description	Aids / Tools
 Figure 9.4.3-4	Elastomer bellows, hose clamps and guide washer	
 Figure 9.4.3-5	Put the hose clamp onto the elastomer bellows and put both together over the guide washer.	
 Figure 9.4.3-6	Tighten the hose clamp with pliers.	Pliers

Illustrations	Description	Aids / Tools
 Figure 9.4.3-7	Put the second hose clamp with the lock opposite the first hose clamp on the elastomer bellows.	
 Figure 9.4.3-8	Put the elastomer bellows on the spindle over the neck of the disc.	
 Figure 9.4.3-9	Tighten the second hose clamp with pliers. **Attention!** The hole for the pin and lock of the hose clamp must not lie on the seam of the elastomer bellows!	Pliers

Illustrations	Description	Aids / Tools
 Figure 9.4.3-10	Put half-washers in the recess of the spindle and secure with a retaining clip.	
 Figure 9.4.3-11	Push the lower spring plate, the spring and the upper spring plate onto the spindle.	

9.5 Inserting the assembly

9.5.1 Inserting the assembly (without bellows or with elastomer bellows)

Illustrations	Description	Aids / Tools
 **Figure 9.5.1-1**	Put the sealing ring in the sealing surface. Put the assembly (depending on the weight and size with or without the spring and top spring plate) carefully into the outlet body.	
 **Figure 9.5.1-2**	In the process, push the guide washer down and lift the spindle somewhat so that the disc does not touch down.	
 **Figure 9.5.1-3**	Carefully put the disc with the spindle down on the seat. Put on the spring and top spring plate (if not already done).	

9.5.2 Inserting the assembly (with stainless steel bellows).

Illustrations	Description	Aids / Tools
 **Figure 9.5.2-1**	Place the sealing ring in the sealing surface of the body.	
 **Figure 9.5.2-2**	Put the bonnet spacer / cooling zone on the body. Insert the sealing ring in the bonnet spacer / cooling zone.	
 **Figure 9.5.2-3**	Put the assembly (depending on the weight and size with or without the spring and top spring plate) carefully into the outlet body. In the process, push the guide washer down and lift the spindle somewhat so that the disc does not touch down. Carefully put the disc with the spindle onto the seat.	

Illustrations	Description	Aids / Tools
 Figure 9.5.2-4	Put on the spring and top spring plate (if not already done).	
 Figure 9.5.2-5	If a thrust bearing is necessary, then assemble as follows: Adapt the axial needle roller to the top disc plate and grease.	Brush Halocarbon (OI-56 S / 60H)
 Figure 9.5.2-6	Put the bearing washer on the axial needle roller and grease as well.	

9.6 Assembly of the bonnet

9.6.1 Assembly of the bonnet up to DN 65 (AKL) with and without bellows

9.6.1.1 Assembly of the bonnet up to DN 65 (AKL) without bellows or with elastomer bellows

Illustrations	Description	Aids / Tools
 **Figure 9.6.1.1-1**	Put the bonnet on the body.	
 **Figure 9.6.1.1-2**	Screw on the nuts and tighten (torque as per LGS 3324).	Open-end spanner Torque wrench

9.6.1.2 Assembly of bonnet up to DN 65 with stainless steel bellows

Illustrations	Description	Aids / Tools
 **Figure 9.6.1.2-1**Error! No sequence specified.	Put the bonnet on the body.	
 **Figure 9.6.1.2-2**Error! No sequence specified.	Screw on the nuts and tighten (torque as per LGS 3324).	Open-end spanner, torque wrench

9.6.2 Assembly of bonnet as of DN 80 with and without bellows

9.6.2.1 Assembly of bonnet as of DN 80 without bellows or elastomer bellows

Illustrations	Description	Aids / Tools
 Figure 9.6.2.1-1	Put the bonnet on the body and spindle/disc assembly.	
 Figure 9.6.2.1-2	Put nuts on studs and tighten (torque as per LGS 3324).	Open-end spanner, torque wrench

9.6.2.2 Assembly of bonnet as of DN 80 with stainless steel bellows

Illustrations	Description	Aids / Tools
 **Figure 9.6.2.2-1**Error! No sequence specified.	Put the bonnet on the body and spindle/disc assembly.	
 **Figure 9.6.2.2-2**Error! No sequence specified.	Put nuts on studs and tighten (torque as per LGS 3324).	Torque wrench

9.7 Determination and installation of the lift stopper for small and large valves

9.7.1 Lift stopper with ring/sleeve

9.7.1.1 Procedure for small valves without bellows

Illustrations	Description	Aids / Tools
 Figure 9.7.1.1-1	Take the extent to which the stroke has to be limited from the order. Insert the spindle/disc assembly without the spring and spring disc. Put on the bonnet and tighten the nuts. Make sure the adjusting screw and spindle are flush.	
 Figure 9.7.1.1-2	Clamp the body in a vice on the outlet. Carefully open the disc with a screwdriver through the inlet up to the end stop.	Screwdriver
 Figure 9.7.1.1-3	Measure the spindle overlap in an opened state. Obtain the stroke requested in the order from this measurement and have the lift stopper made.	Depth gauge

public

9.7.1.2 Procedure for large valves without bellows

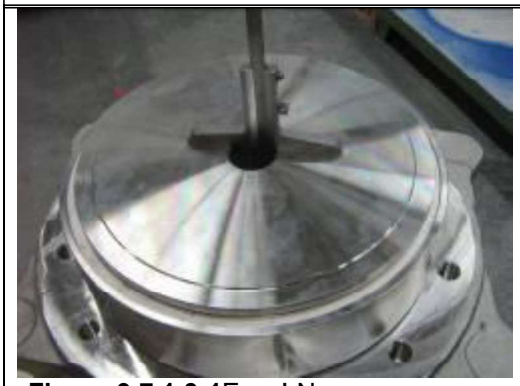
Look in the order to find out at which measurement the stroke is to be stopped.

Illustrations	Description	Aids / Tools
 **Figure 9.7.1.2-1**Error! No sequence specified.	Carefully put the disc on the seat/nozzle and put the sealing ring in the body.	
 **Figure 9.7.1.2-2**Error! No sequence specified.	Put the guide washer on the body and use the depth gauge to measure the path from the top edge of the guide washer to the top edge of the disc.	

Illustrations	Description	Aids / Tools
 **Figure 9.7.1.2-3**Error! No sequence specified.	Deduct the measurement of the guide washer as well as the desired stroke from the order from the total dimensions and have the lift stopper made.	Depth gauge

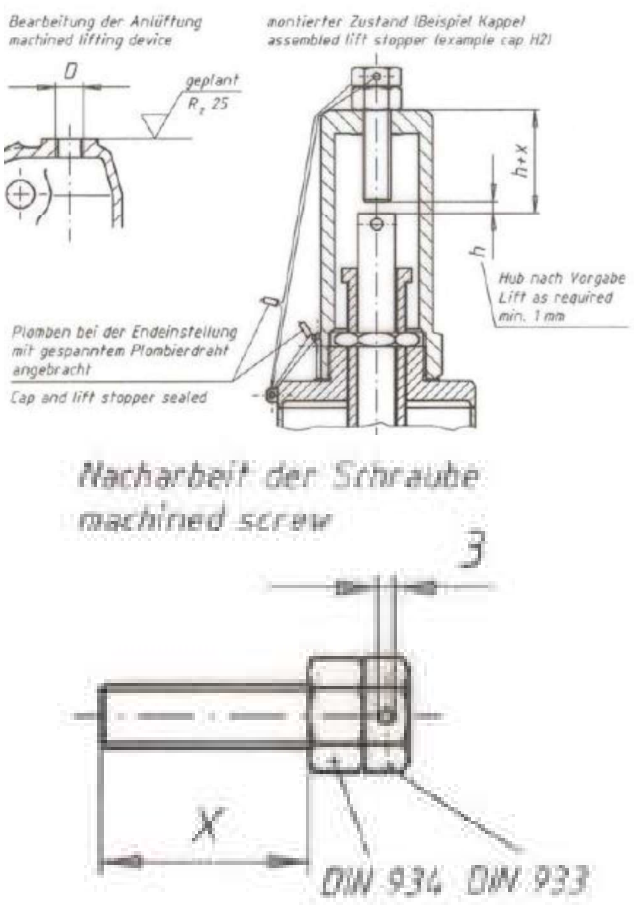
9.7.1.3 Procedure for valves with bellows

Look in the order to find out at which measurement the stroke is to be stopped.

Illustrations	Description	Aids / Tools
 **Figure 9.7.1.3-1**Error! No sequence specified.	Place the completely assembled disc on the seat and insert the ball. Put the bellows with the guide washer in the body, or alternatively the bonnet spacer. Insert all sealing rings. Use the depth gauge to measure the distance from the top edge of the guide washer to the bottom of the bellows, or alternatively to the built-in lift stopper. Deduct the measurement of the guide washer as well as the desired stroke from the order from the total dimensions and have the lift stopper made.	Depth gauge

9.7.2 Lift stopper with set screw (taken from LWN 324.01)

Take the extent to which the stroke has to be limited from the order.

Illustrations	Description	Aids / Tools
 **Figure 9.7.2-1**	Use a completely assembled valve to measure the distance from the top edge of the cap/lever to the end of the spindle. Deduct the measurement of the guide washer as well as the desired stroke from the ZAKL and have the lift stopper made. Seal the screws with PTFE tape, screw them in and tighten (torque as per LGS 3324).	PTFE tape Depth gauge Open-end spanner

9.8 Adjusting the set pressure

9.8.1 Adjusting screw assembly

Illustrations	Description	Aids / Tools
 **Figure 9.8.1-1**	Individual parts of the adjusting screw	
 **Figure 9.8.1-2**	Put the bushing in the adjusting screw.	
 **Figure 9.8.1-3**	Screw the lock nut on approximately three-quarters of the way down the adjusting screw.	

Illustrations	Description	Aids / Tools
 Figure 9.8.1-4	Grease adjusting screw	Assembly grease (Molykote Paste) Brush
 Figure 9.8.1-5	Screw into the bonnet until resistance from the spring is felt.	
 Figure 9.8.1-6	Secure the spindle from turning with a pin punch.	Open-end spanner Pin punch

Illustrations	Description	Aids / Tools
 **Figure 9.8.1-7**	Slowly pressurise the valve on the test bench to find out whether the valve opens at the set pressure. The set pressure of the valve has been reached when you can hear air escaping. Full opening must be achieved. If the valve opens outside the stipulated set pressure tolerance, then the adjusting screw must be adjusted again. → Turning in a clockwise direction causes the valve to open at a higher pressure → Turning in an anti-clockwise direction causes the valve to open at a lower pressure Release the pressure when readjusting the adjusting screw. Readjust the adjusting screw and then pressurise the valve again.	Pressure gauge
 **Figure 9.8.1-8**	Secure the adjusting screw with the lock nut. Afterwards, check the set pressure once again.	Open-end spanner

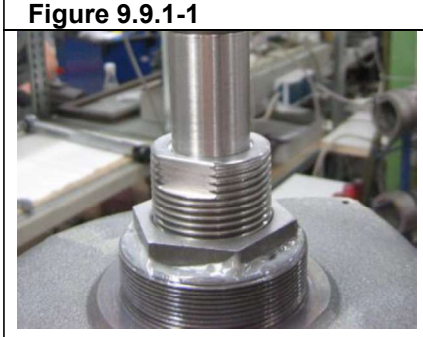
9.8.2 Testing the seat tightness P12

This test is performed for every valve after setting the pressure.

The exact execution of the test is described in a separate work instruction ***AA-EF-013***.

9.9 Assembly of the cap / lever

9.9.1 Assembly of cap H2

Illustrations	Description	Aids / Tools
 **Figure 9.9.1-1**	Grease the thread and sealing face of the cap.	Brush Halocarbon (OI-56 S / 60H)
 **Figure 9.9.1-2**	Put on the E-CTFE sealing ring if it is shown in the parts list. **Caution:** The sealing ring may only be used once. If it is necessary to disassemble the cap, the sealing ring must be replaced.	
 **Figure 9.9.1-3**	Screw on the cap and tighten with a spanner (torque as per LGS 3324).	Open-end spanner Torque wrench

9.9.2 Assembly of lever H3

Illustrations	Description	Aids / Tools
 **Figure 9.9.2-1**	Push the spindle cap onto the spindle. Use a pin and retaining clip to secure.	
 **Figure 9.9.2-2**	Put clamping screw into H3 cap at designated place.	Ring spanner
 **Figure 9.9.2-3**	Grease the thread of the lever and screw it onto the bonnet (lever must be opposite from outlet).	Brush Halocarbon (OI-56 S / 60H)

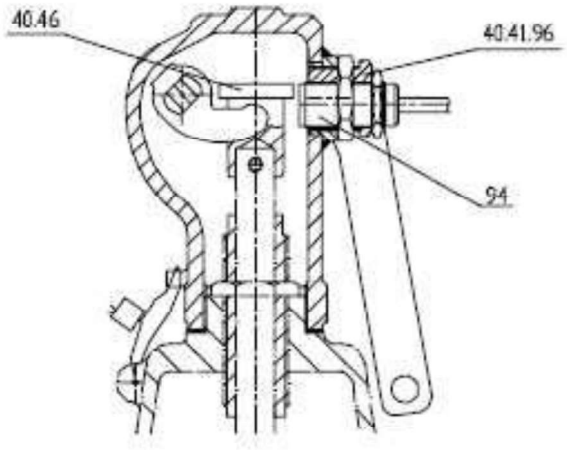
Illustrations	Description	Aids / Tools
 Figure 9.9.2-4	Insert the venting lever into the spindle cap and fasten with a pin and retaining washers.	Pliers
 Figure 9.9.2-5	Make sure that the lever has enough play to vent.	

Illustrations	Description	Aids / Tools
 Figure 9.9.2-6	Tighten the clamping screw on the lever.	Ratchet
 Figure 9.9.2-7	Completely assembled lever H3	Open-end spanner

9.9.3 Assembly of lever H4

Illustrations	Description	Aids / Tools
 **Figure 9.9.3-1**	Put the spindle cap onto the spindle and secure with a pin and retaining clip.	
 **Figure 9.9.3-2**	Put on the E-CTFE sealing ring if it is shown in the parts list. **Caution:** The sealing ring may only be used once. If it is necessary to disassemble the cap, the sealing ring must be replaced.	
 **Figure 9.9.3-3**	Align the lever with sealing rings so that the lever arm is parallel to the outlet. **Caution:** If multiple E-CTFE sealing rings have to be used, then a metal sealing ring must be inserted between each of them. Grease the lever and matching sealing rings. Put them on and tighten with an open-end spanner (torque as per LGS 3324).	Open-end spanner

9.10 Insertion of the lift indicator

Illustrations	Description	Aids / Tools
 **Figure 9.9.310-1**	Individual parts of the lift indicator	
 **Figure 9.9.310-2**	Put the cap into position as described in 10.3 and secure.	Open-end spanner
 **Figure 9.9.310-3**	Put the eccentric hole of the holder into such a position that the collar of the spindle cap would seal on top with the edge of the lift indicator.	Depth gauge

public

Illustrations	Description	Aids / Tools
 Figure 9.9.310-4	Secure the position with a lock nut.	
 Figure 9.9.310-5	Screw the lift indicator into the collar of the spindle cap as far as it will go. Then unscrew it one complete turn. Secure the position of the lift indicator by tightening the first nut hand tight. Then lock with a second nut.	Open-end spanner Depth gauge

9.11 Assembly of the test gag

Illustrations	Description	Aids / Tools
 Figure 9.9.311-1	Grease the sealing surface of the short bolt.	Brush Halocarbon (OI-56 S / 60H)
 Figure 9.9.311-2	Put on the sealing ring and grease it as well.	Brush Halocarbon (OI-56 S / 60H)
 Figure 9.9.311-3	Screw the test gag into the cap or lever and tighten.	Torque wrench

9.12 Assembly of the O-ring damper

9.12.1 O-Ring damper H2 (J65)

Illustrations	Description	Aids / Tools
 **Figure 9.12.1-1**	Individual parts of the O-ring damper H2 (J65)	
 **Figure 9.12.1-2**	Put the support sleeve onto the adjusting screw.	
 **Figure 9.12.1-3**	Put O-ring onto the spindle over the support sleeve. The O-ring must not sit on the cross hole or a thread, if this is present.	

Illustrations	Description	Aids / Tools
 Figure 9.12.1-4	Put the counter ring onto the O-ring or support sleeve.	
 Figure 9.12.1-5	Put pressure spring onto the counter ring.	

Illustrations	Description	Aids / Tools
 Figure 9.12.1-6	Grease the cap on the thread.	Brush Halocarbon (OI-56 S / 60H)
 Figure 9.12.1-7	Tighten the cap with an open-end spanner	Open-end spanner

9.12.2 O-ring damper H4 (J66)

Illustrations	Description	Aids / Tools
 Figure 9.12.2-1	Individual parts of the O-ring damper H4 (J66)	
 Figure 9.12.2-2	Fasten the O-ring damper on the spindle with a steel pin and retaining clip. Then assemble the H4 lever cover as described in 12.3.	

Illustrations	Description	Aids / Tools
 Figure 9.12.2-3	Individual parts of the O-ring damper H4	
 Figure 9.12.2-4	Put the first O-ring - counter ring - second O-ring - support sleeve - spring - cap onto the lever one after the other.	

9.13 Testing the seal tightness of the back seal P21 (seal tightness to the outside)

This test is performed on every gas-tight valve after its assembly.

9.14 Sealing the valve

Illustrations	Description	Aids / Tools
 Figure 9.14-1	If structurally possible (sealing hole/lug on cap/lever and bonnet exist), seal the valve. Otherwise sealing lugs must be welded on at the closest workstation. Closely connect the sealing hole or lug from the cap/lever and bonnet in a clockwise direction and seal the ends of the wire with a lead seal. If classification approvals (TÜV etc.) are required, then seal afterwards.	Sealing pliers Lead seal Seal wire

Inhalt

1 Purpose

This LESER Global Standard (LGS) describes torques ranges for screws and bolts.

2 Range of application

This LGS is valid for all members of LESER Quality union.

3 References

None

4 Introduction

The above torque ranges are valid for material marked full shaft screws or full shaft bolts and nuts used for the connection between body and bonnet according to AD-B7 and similar applications.

The torque ranges are valid for lubricated threads with a friction factor or 0,1 and rectangular facings of the nuts in relation to the bore. With the above torques about 70 – 90 % of the yield strength of the material is reached.

For higher friction factors (0,12 – 0,15) the higher valves for the torque are required. The maximum limits must not be exceeded.

Data base: The 70 % valves (low torque valve) for friction factor 0,1 are taken from the catalogue of „Fa. Gebr. Grohmann, 1991, Wissenswertes über Edelstahlschrauben".

5 Body and bonnet connection

Material	Material equivalent	Min. – max. Torque [Nm]					
DIN	ASME	Thread					
		M10	M 12	M 16	M 20	M 24	M 27
Ck 35/ C 35 (1.1181)	Steel	18 - 22	28 - 36	68 - 87	130 - 166	255 - 288	
A4 Klasse 70 (1.4401)	A193 B8M Cl.2	25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	310 - 345
	A193 B8M Cl.1	25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	
5.6	-	19 - 22	30 - 39	73 - 93	--	--	--
8.8	-	40 - 45	65 - 84	155 - 198	--	--	--
	A320 Gr. B8M	25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	310 - 345
1.7225	A 193 Gr. B7		60 - 70	135 - 170	220 - 250	280 – 320	450-480
	A 320 Gr. L7		60 - 70	135 - 170	220 - 250	280 – 320	450-480
	A 320 Gr. L7M		60 – 70	135 - 170	220 - 250	280 – 320	450-480
1.4301	A 193 Gr. B8 CL. 2		60 - 70	135 - 170	250 - 260	250 – 300	
	A 193 Gr. B8T CL. 2			135 - 170	250 - 260		
	A320 Gr. B8 CL. 2	35 - 40	60 - 70	135 - 170	250 - 260	250 - 300	
1.4462	SA-479	25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	310 - 345
1.4501	SA-479	25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	
	A 193 Gr. B7M		60 - 70	135 - 170	220 - 250	280 – 320	
	A453 Gr.660 Class D		70-85	160-190	280-300	340-360	
A5 Klasse 70 (1.4571)		25 - 30	45 - 58	108 - 138	204 - 261	202 – 258	310 - 345
2.4819	N10276	19 - 22	30 - 39	73 - 93	170-185	280-300	
	B8MLCuN-Cl.1B	18 - 22	28 - 36	68 - 87	130 - 166	255 - 288	
Torque to yield bolts:							
17709	A 193 Gr. B16	-	31 - 37	98 - 118	190 - 228	280 - 320	
	A 193 Gr. B7	-	31 - 37	98 - 118	190 - 228	280 - 320	

Table 1.1 for screws and nuts DIN 931, 933, 938 and EN 24032

Note: In case of Gylon gasket application, the nuts resp. screws have to be tightened again after 15 min.

Material DIN	Material-equivalent ASME	Min. – max. Torque [Nm] * Thread M 12	M 16		
Ck 35/ C 35 (1.1181)	Steel	39 – 41	59 - 61		
5.6	-	39 – 41	59 - 61		

Table 2 for screws and nuts for safety valves Type 447/547

*) The above mentioned torqueses are based on field tests. They allow a tight connection without destroying the PTFE-material.

5.1 Type 48x Clamp rings and Split-rings

Table .1 + Table .2 list torques for screws and nuts for connection of body and bonnet for clean service valves - Type 48X.

Table 2.1: Torques for nuts for **Clamp rings** for clean service - Type 48X

Material DIN	Material-equivalent ASME	Torque [Nm] Thread M 6	M 8
KLAPPRING (1.4404)	(SS316)	6	14

Table 2.2: Torques for screws and nuts for clean service **Split-rings** - Type 48X

Material DIN	Material-equivalent ASME	Torque [Nm] Thread M 6	M 8	M 10
A4 Klasse 70 (1.4401)	(B8M)	11	26	51

6 Caps and lifting devices

Size	Thread	Torque [Nm]**		Wrench size
		Standard	HALAR-coated gasket	
0	M 24 x 1,5	60 – 75	60 - 75	SW 27
I	M 33 x 1,5	80 – 100	60 - 75	SW 46
II	M 42 x 1,5	100 – 125	100 - 125	SW 55
III	M 60 x 1,5	140 – 175	240 - 270	SW 75
IV+V	M 75 x 1,5	175 – 220	n.a.	SW 95

Table 3: Caps and lifting devices (sealing torque)

**) To achieve manually with 200 mm extended wrench.
Sufficient for clean and lubricated threads and not damaged sealing surfaces.

n.a. Gasket not available for this size

7 Test Gag

7.1 Short locking screws

For tightening of the short locking screws (pos. 2, e.g. drawing 190.0309-XX-B01) the torque ranges of table 4 are recommended.

Cap size Size lifting device	Thread size	Torque [Nm]***
0	M12	28 - 32
I	M12	
II	M12	
III	M12	
IV	M16	72 -76
V	M16	

Table 4: Test Gag: Recommended starting torque ranges for short screws

***) The used sealing rings out of vulcanised fibre may not be deformed further because they are soft sealings.

7.2 Long locking screws

For tightening of the long locking screws (pos. 1, e.g. drawing 190.0309-XX-B01) the torque ranges of table 5 are recommended.

Cap size Size lifting device	Thread size	Torque [Nm]*
0	M12	15
I	M12	
II	M12	20
III	M12	
IV	M16	35
V	M16	

Table 5: Test Gag: Recommended starting torque ranges for long screws

*) The torques ranges are not valid for O-ring discs and sealing plates designs. In case of need they have to be required at TB/DD.

7.3 Long locking screw as transport locking device

For tightening the long locking screw as transport locking device (e.g. drawing 190.0809-XX-B01) the torques are adjusted acc. to table 6.

Cap size Size lifting device	Thread size	Torque (All types) [Nm]
0	M12	4
I	M12	
II	M12	
III	M12	
IV	M16	
V	M16	

Table 6 Torque specification of long locking screw as transport locking device.

8 Screwed plugs, locking screws (metal sealing)

Material DIN	Material equivalent ASME	Min. – max. torques [Nm] * Gewinde			
		G 1/8	G1/4	G1/2	
A4 Klasse 70 (1.4401)	(B8M)	15 - 20	35-40	65-90	

Table 7: Recommended locking torques for screwed plugs (e. g. Type 526)

*) Lower values are valid for sealing with sealing ring acc. to DIN 7603.

9 Nozzles, inlet bodies and screwed bonnets (T459/462)

Benennung/Name	Orifice/DN do or Size	Druckstufe/ Pressure Class	Gewindegröße Thread size	Anzugs-drehmoment Torque [Nm]
SITZBUCHSE/Nozzle 526 1E2	1 D+E2	150-600	M38x1,5	95
SITZBUCHSE/Nozzle 526 1.5E2	1,5 D+E2	900 -1500	M38x1,5	95
SITZBUCHSE/Nozzle 526 1.5F2	1,5 F2	150-1500	M48x1,5	95
SITZBUCHSE/Nozzle 526 1.5G3	1,5 G3	150-900	M48x1,5	95
SITZBUCHSE/Nozzle 526 1.5H3	1,5 H3	150-300	M48x1,5	95
SITZBUCHSE/Nozzle 526 1.5EF3	1,5 E+F3	2500	M48x1,5	95
SITZBUCHSE/Nozzle 526 2H3	2 H3	150-1500	M64x1,5	115
SITZBUCHSE/Nozzle 526 2J3	2 J3	150-300L	M64x1,5	115
SITZBUCHSE/Nozzle 526 2G+H3	2 G+H3	2500	M64x1,5	115
SITZBUCHSE/Nozzle 526 3K4	3 K4	150-600	M100x2	300
SITZBUCHSE/Nozzle 526 3L4	3 L4	150-300L	M100x2	300
SITZBUCHSE/Nozzle 526 3J4	3 J4	300-1500	M100x2	300

SITZBUCHSE/Nozzle 526 3K4/6	3 K4/6	900-1500	M100x2	300
SITZBUCHSE/Nozzle 526 4L 6	4 L6	300-600	M120x2	430
SITZBUCHSE/Nozzle 526 4L6	4L6	900-1500	M120x2	430
SITZBUCHSE/Nozzle 526 4M6	4 M6	150-900	M120x2	430
SITZBUCHSE/Nozzle 526 4N6	4N6	150-900	M120x2	430
SITZBUCHSE/Nozzle 526 4P6	4 P6	150-900	M120x2	430
SITZBUCHSE/Nozzle 526 6Q8	6 Q8	150-600	M165x2	610
SITZBUCHSE/Nozzle 526 6R8	6 R8/10	150-600	M165x2	610
SITZBUCHSE/Nozzle 526 8T10	8 T10	150-300	M220x2	700
Type 457/458				
SITZBUCHSE Nozzle 458 DN 25/ 15	d015	Alle/all	M36x1,5	
SITZBUCHSE Nozzle 458 DN 25/ 20	do20	Alle/all	M36x1,5	**95**
SITZBUCHSE Nozzle 458 DN 50/ 30	do30	Alle/all	M64x1,5	
SITZBUCHSE Nozzle 458 DN 50/ 40	do40	Alle/all	M64x1,5	**115**
SITZBUCHSE Nozzle 458 DN 80/ 50	do50	Alle/all	M100x2	**300**
SITZBUCHSE Nozzle 458 DN 80/ 60	do60	Alle/all	M100x2	
SITZBUCHSE Nozzle 458 DN100 do50	do50	Alle/all	M120x2	
SITZBUCHSE Nozzle 458 DN100 do60	do60	Alle/all	M120x2	
SITZBUCHSE Nozzle 458 DN100 do74	do74	Alle/all	M120x2	
SITZBUCHSE Nozzle 458 DN100 do88	do88	Alle/all	M120x2	**450**
SITZBUCHSE Nozzle 458 DN150/110	do110	Alle/all	M165x2	**650**
Type 441/442 Sitzbuchse/Full nozzle				
DN25	do23	Alle/all	M36x1,5	**95**
DN40	do29+37	Alle/all	M48x1,5 M52x1,5	**95**
DN50	do46	Alle/all	M64x1,5	**115**
3"	do60	Alle/all	M85x1,5	**115**
DN80	do60	Alle/all	M100x2	**300**
DN100	do92	Alle/all	M120x2	**450**
Type 437/438/439 Eintrittskörper/Inlet body				
do6+10		Alle/all	M30x1,5	**90**

Type 459/462 Eintrittskörper/Inlet body				
do6+9,13 und 17,5	Alle/all	Alle/all	M33x1,5	**100**
Type 459/462 Gehäuse/Federhaube Outlet body/Bonnet/ Spacer			M64x1,5	**250**
do6+9,13 und 17,5	Alle/all	Alle/all	M33x1,5	**100**
Type 431/433 PN160				
Klemmring/Sitzbuchse Clamps/nozzles	do12	Alle/all	M33x1,5	**100**

Table 8 Recommended torques of valve nozzles for type 441/442; 457/458 and 526, inlet bodies of type 437/438/438/459 and 462 and screwed bonnets (type 459/462)

10 Torques for sealing plate disks (valve types 441/433/526)

Sealing plate disks of valve types 441/433/526 had been modified in project Vendi 95 (ECO 200295) and therefore the torques in table 9 for the fixing nuts are valid.

Thread Size Fixing Nut	Torque [Nm]
M5	**4**
M8	**15**
M12	**43**
M16	**70**

Table 9: Torques for sealing plate disks 441/433/526

Inhalt

1 Zweck / Purpose

Dieser LESER Global Standard (LGS) beschreibt Anzugsdrehmomente für O-Ring-Teller.
This LESER Global Standard (LGS) describes torques ranges for o-ring-disc.

2 Gültigkeitsbereich / Range of application

Dieser LGS gilt für die alle Mitglieder des LESER Qualitätsverbunds.
This LGS is valid for all members of LESER Quality union.

3 Referenzen / References

LGS 3325

4 Geltungsbereich

Die in den Tabellen angegebenen Montage-Anzugsmomente M_A sollen dazu dienen, dass eine Überbeanspruchung (Verdrehung) der Gewindeverbindung beim Festziehen verhindert wird. In Tabelle 2 werden außerdem empfohlene Drehmomente zur Erzielung von Dichtheit genannt.

Bemerkung:
Die Angaben über die Montage-Anzugsdrehmomente sind als annähernde Richtwerte zu betrachten, da das Anzugsdrehmoment durch unterschiedliche Oberflächen- und Schmierverhältnisse, aber auch durch mehrmaliges Anziehen und Lösen der Verbindung beeinflusst wird. Deshalb ist auch eine genaue Berechnung des Anzugsdrehmoments kaum möglich.
Seite 2 dieser LGS ist nur für den LESER internen Gebrauch bestimmt.

4 Range of application

The below mentioned torques MA are maximum valves to avoid damages to the threaded connections. In table 2 alson recommended torques for achieving tightness are mentioned.

Remark:
The torque values shall be taken as a recommendation. Different lubrification, frequent assembly and disassembly can influence the values substantially.
Page 2 of this LGS is limited for LESER internal use.

5 O-Ring-Teller Befestigung, Teller aus 1.4404 / *o-ring-disc, material 1.4404*

Gewindegröße *Thread size*	M 5	M 8	M 10	M 12	M 16	M 30
Max. M_A [Nm]	2	21	40	70	100	570
M_A empfohlen [Nm] *M_A recommended*	2-3	12-15	20-25	45-50	65-70	85-90

Tabelle 1 / *table 1*

6 Faltenbalg-Anschlussteil aus 1.4404 / *bellows connection, material 1.4404*

Gewindegröße *Thread size*	M 24 x 1,5	M 27 x 1,5	M 30 x 1,5	M 36 x 1,5	M 40 x 1,5	M 48 x 1,5	M 60 x 1,5
Max. M_A [Nm]	232	336	500	828	1220	2015	4000
M_A empfohlen *M_A recommended*	60-75	70-85	75 - 90	90-110	100 - 120	110-135	140-175

Tabelle 2 / *table 2*

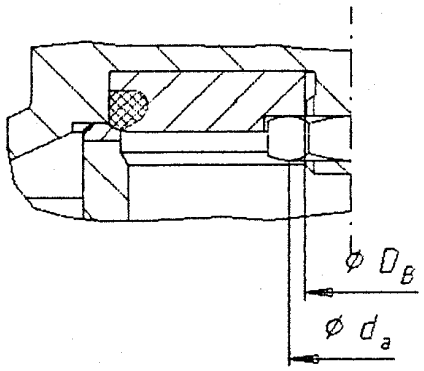


Bild 1

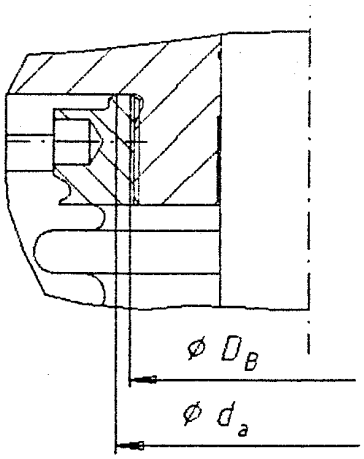


Bild 2

7 Berechnungsformeln (LESER-intern) / *Calculation formulas (LESER internal)*

Annähernde Berechnungsformel für das Anzugsdrehmoment der Schraubenverbindungen bei O-Ring-Teller und oberem Faltenbalg-Anschlussteil.

Montage-Anzugsdrehmoment: M_A
Die in LGS 3325 Blatt 1 angegebenen Tabellen beinhalten die Montage-Anzugsdrehmomente, die nach folgender annähernder Berechnungsformel errechnet sind:

$$M_A = 0{,}9 \times M_{A\,0{,}9} \qquad (1)$$

$$M_{A\,0{,}9} = 0{,}45 * A_s * o_{0,2} * d_2 * \left(\mu_{ges} * \left(1 + \frac{d_a + D_B}{2 * d_2} \right) + \frac{P}{\pi * d_2} \right) \qquad (2)$$

Formel (2) in (1):

$$M_A = 0{,}4 * A_s * o_{0,2} * d_2 * \left(\mu_{ges} * \left(1 + \frac{d_a + D_B}{2 * d_2} \right) + \frac{P}{\pi * d_2} \right) \qquad (3)$$

$M_{A\,0,9}$: Das maximale Anzugsdrehmoment, bei dem 90% der Streckgrenze ausgenutzt wird, in Nmm.

A_S: Spannungsquerschnitt des Gewindes in mm² (siehe Gewindetabellen).

$o_{0,2}$: Streckgrenze der Raumtemperatur in N/mm².

d_2: Flankendurchmesser des Gewindes in mm.

P: Steigung des Gewindes.

d_a, D_B: Siehe Bilder 1 und 2.

$\mu_{ges.}$: Gesamtreibungszahl
$\mu_{ges.} \approx 0{,}14$ im Normalfall, trocken.
$\mu_{ges.} \approx 0{,}1$ bei Gewinden mit MOS_2 - Paste geschmiert.

Contents

1 Purpose

This LESER Global Standard (LGS) provides instructions on painting LESER safety valves. The required work steps and materials are described.

2 Scope

This document must be applied when painting safety valves in agencies and subsidiaries of LESER GmbH & Co. KG.

3 Disclaimer

LESER puts in a great deal of effort into making up-to-date and correct documentation available. Nevertheless, LESER GmbH & Co. KG gives no guarantee that the recommended actions presented here are entirely correct and error free. This document is to be applied exclusively to the specified type. LESER GmbH & Co. KG declines any liability or responsibility for the correctness and completeness of the content.

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4 Qualified fitting personnel

The assembly of LESER safety valves may only be performed by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

5 General Information

- Wear safety glasses
- Wear respirator/dust mask

6 Paint touch-up and painting repaired valves

For valves that have to be repainted, the facing and the welded-on component/customer ID plates must be masked off correctly. Any additional plates will only be attached after painting, if welding is not required. Open bonnets must be sealed with protective caps. The same applies to any existing threaded holes. Outside threads must be protected with a suitable protective cap / existing painting socket or with masking tape.

Figure 6-1: Protective cap for open bonnet

Figure 6-2: Flange sticker

protected

Figure 6-3: Component plate sticker

Figure 6-4: Protective cap

Figure 6-5: Component plate sticker

Figure 6-6: Protective cap

Figure 6-7: Masking tape

Figure 6-8: Protective cap

Figure 6-9

The layer thickness of the coat of paint should be ~ 40µm for one coat of paint.

Contents

1 Purpose

This LESER Global Standard (LGS) provides instructions on attaching the name plates of LESER safety valves. The required work steps and materials are described.

2 Scope

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LESER GmbH & Co. KG is available to the users of this document to provide additional information.

4 Qualified fitting personnel

The name plates of LESER safety valves must attached exclusively by trained or qualified fitters. The relevant qualifications must be obtained through appropriate training measures.

5 General Information

- Gloves must be worn for all fitting work (except for stainless steel and painted valves).
- Wear safety glasses.

6 Attaching component/customer identification plates

If grooved pins with round heads are not required, the plate is to be welded to the designated place with the spot welding device.

The world plate (NGA) is fastened to the bonnet. In exceptional cases, it may also be fastened with grooved pins with round heads, in which case it may also be fastened to the body.

The standard plate is welded to the flat surface designated for that purpose.

Types 437, 438, 439 - outlet body

Types 459, 462, - bonnet

No fastening with grooved pins with round heads

Flanged valves - on the **right** side as seen from the outlet side. **Exception**: Types 457 / 458 / 526 - on the back side using the set screw

6.1 Standard plate

Figure 6.2.1-1

The standard plate comes in two versions.

For valves that are designed according to ASME (feature N68/N70), the version is created with the UV and NB symbols.

For valves that are designed according to TÜV, the UV and NB symbols are not included.

Attachment locations for standard component plates

Figure 6.2.1-2: Type 459

Figure 6.2.1-3: Type 462

Figure 6.2.1-4: Type 437

Figure 6.2.1-5: Type 462

Figure 6.2.1-6: Standard plate on a flanged valve

Figure **6.2.1-7**: Types 457 / 458 / 526

6.2 World plate (NGA)

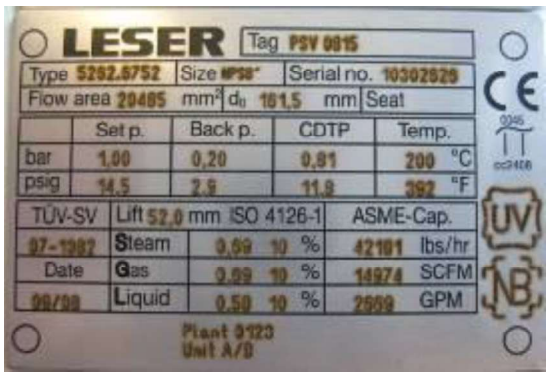


Figure 6.2.1-1

The world plate (NGA) comes in two versions.

For valves that are designed according to ASME (feature N68/N70), the version is created with the UV and NB symbols.

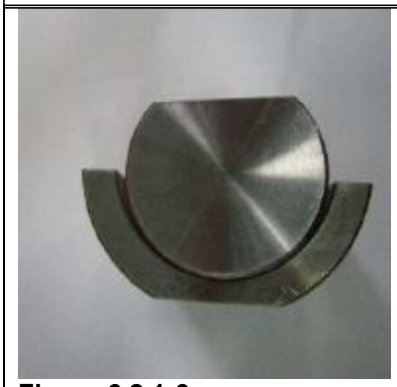
For valves that are designed according to TÜV, the UV and NB symbols are not lasered on.

6.2.1 Pre-curving of the NGA

For bonnets with a curved cross-section, the plate must be pre-curved with a radius. To do this, place the labelled plates in the apparatus with the lettering facing down.

Illustrations	Description	Aids / Tools
 **Figure 6.2.1-1**	Pre-curving the plate	Apparatus
	Pre-curving the plate for open bonnets (V20-V25)	Apparatus

Figure 6.2.1-2		

Illustrations	Description	Aids / Tools
 Figure 6.2.1-3	Adjustment of plate for closed bonnets (V20 - V32)	

When opening bonnets V20-V25, the plate is bent in the longitudinal direction. To do this, put the labelled plates into the apparatus with the lettering facing down (figure 6.2.1-2).

6.2.2 Corrosion protection

All valves that are painted must have corrosion protection under the world sign. To do this, apply the standard primer coat (BURCHARTH'S BLUE - 60M.0120.0001) to the respective place with a sponge.

Illustrations	Description	Aids / Tools
 Figure 6.2.2-1		

Illustrations	Description	Aids / Tools
 **Figure 6.2.2-2**		Sponge
 **Figure 6.2.2-3**	The points where the world plate will be welded must be free of paint.	

6.3 Fastening to bonnets with welding spots

6.3.1 Quadratic cross-section

Illustrations	Description	Aids / Tools
 Figure 6.3.1-1	For API valves, the world plate is fastened to the bonnet of the valve with welding spots. For versions of closed bonnets with a quadratic cross-section, the world plate is attached vertically to the front side of the valve approx. 5 mm above the bevelled edge.	

6.3.2 High Performance valves

For the High Performance series, the world plate is always attached to the bonnet. However, the location where the plate is attached is different for individual bonnet sizes.

a) Closed bonnets (V20 - V32)

Illustrations	Description	Aids / Tools
 Figure 6.3.2-1	The world plate is attached to the bonnet (V20 - V32). For closed bonnets, the world plate is displaced 90° with respect to the eyelet for the sealing wire so that the plate is located on the opposite side of the outlet for a completely assembled valve.	

b) Open bonnets (V20 - V25)

Illustrations	Description	Aids / Tools
 Figure 6.3.2-2	The world plate is attached to open bonnets V20 - V25. It is attached above the cast LESER lettering and should be flush with the letter "L". The plate must be mounted so that it can be read from the right (as shown in the picture).	

c) Open bonnet (V32)

Illustrations	Description	Aids / Tools
 Figure 6.3.2-3	For open bonnets V32, the world plate is displaced 90° with respect to the eyelet in front of the sealing wire so that the plate is displaced by 90° with respect to the outlet for a completely assembled valve. The top edge of the plate should be flush with the bevel of the bonnet.	

d) Open bonnet (V40)
Position of the bonnet:

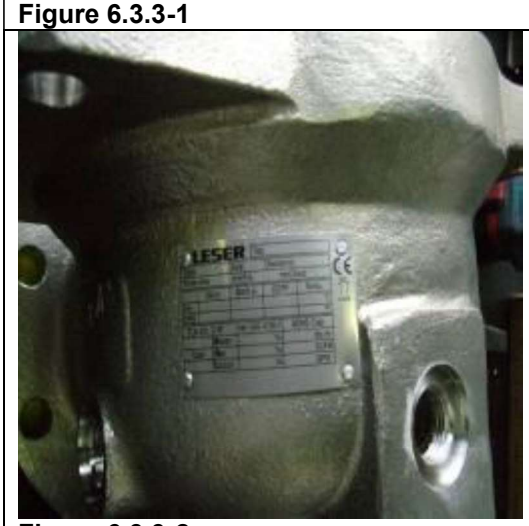
The raised identifier of the product form manufacturer (foundry) is mounted in the direction of the outlet flange.

Position of the world plate

The world plate is positioned on the free back side on the bottom edge of the bonnet.

6.3.3 Fastening with grooved pins with round heads

Illustrations	Description	Aids / Tools

 **Figure 6.3.3-1**	The plate is also curved for this purpose. When grooved pins with round heads are used for fastening, the world plate must be fastened at the back or at the side of the body for the API valve.	
 **Figure 6.3.3-2**		

Content

1 Purpose

This LESER Global Standard (LGS) shows the process for safety valves to repair.

2 Scope

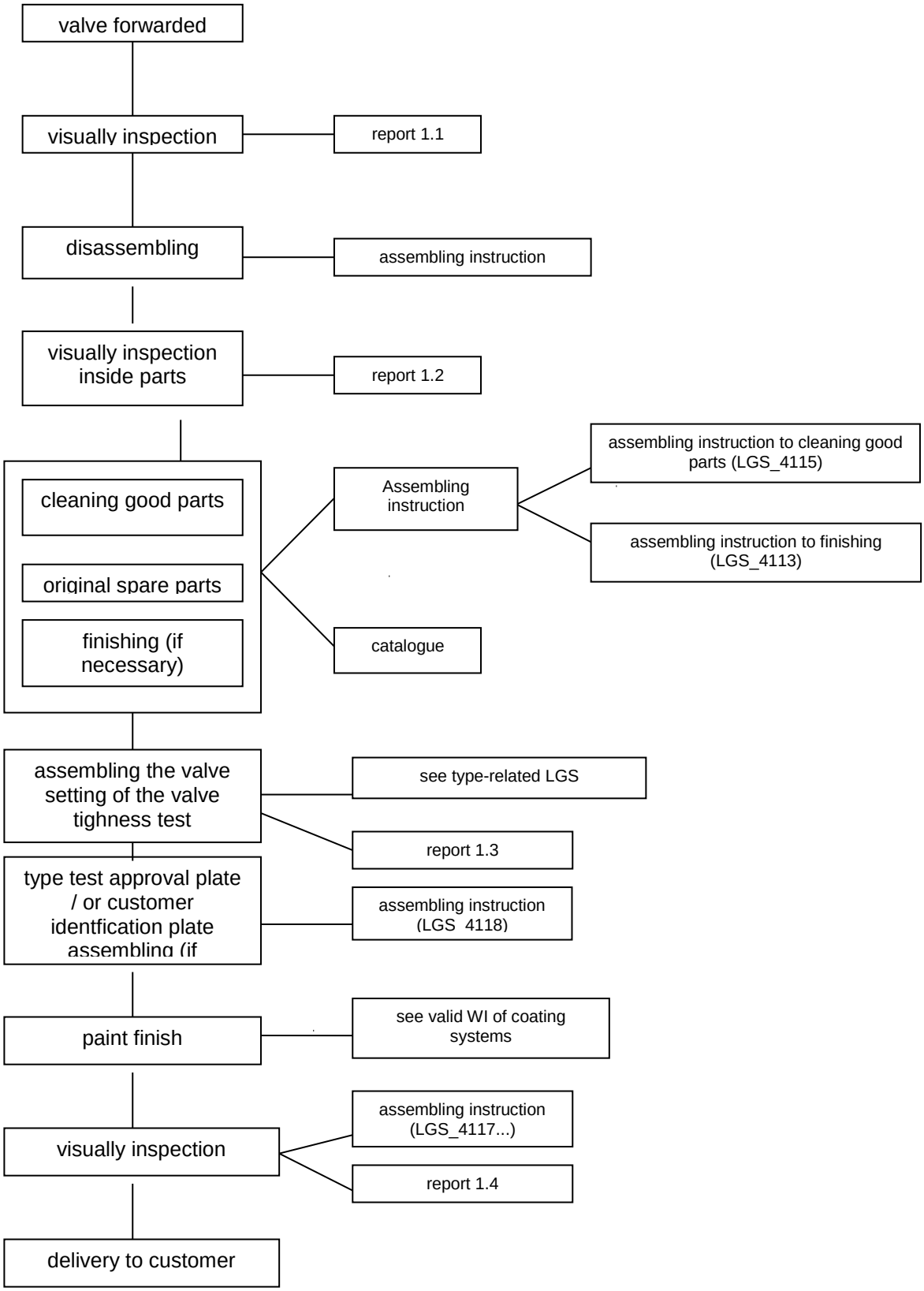
This LGS applies to all members of the LESER Quality Cluster.

3 Introduction

The following flow chart shows the process steps, which are necessary for valve repair.

The right side give references to forms of inspection documentation, LESER standards, instructions and spare part lists.

4 Safety valve to repair



Contents

1 Purpose

This LESER Global Standard (LGS) contains the information about pressure range of all springs, which are installed in valve- types 424, 440, 441, 442.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

This LGS contains information about the pressure range of all springs, which are installed in valve- types 424, 440, 441, 442.
The pressure ranges of the various types are given first in pressure-unit [bar, page 2-8].
This is followed by the pressure-unit [psig, page 9- end].

For additional information please see legend description.

3 References

LDeS 3060.01, LDeS 3265.01

4 Legend / Indices

- S = Sonderauftrag / special order
- O = oberen Spindeleinstich verwenden / use upper spindle groove
- FT oder / or SP = Sonder-Federteller / special spring plate
- Blaue Markierung/ blue marking = Drucklagereinsatz / thrust bearing use
- DS = Druckschraube/ adjusting screw
- V150= Baukastengröße Federn V150/ spring model V150

Ausführung (model)

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				**p [bar]**				**p [bar]**			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
		DN 20 do 18				**DN 20 do 18**				**DN 20 do 18**	
0,10	- 0,19	540.8004.0000		0,10	- 0,19	540.8004.0000		0,10	- 0,19	540.8004.0000	
0,20	- 0,26	540.8014.0000		0,20	- 0,26	540.8014.0000		0,20	- 0,26	540.8014.0000	
0,27	- 0,37	540.8034.0000		0,27	- 0,37	540.8034.0000		0,27	- 0,37	540.8034.0000	
0,38	- 0,54	540.8044.0000		0,38	- 0,54	540.8044.0000		0,38	- 0,54	540.8044.0000	
0,55	- 0,84	540.8054.0000		0,55	- 0,84	540.8054.0000		0,55	- 0,84	540.8054.0000	
0,85	- 1,30	540.4004.0000		0,85	- 1,30	540.4004.0000		0,85	- 1,30	540.4004.0000	
1,31	- 1,79	540.4014.0000		1,31	- 1,79	540.4014.0000		1,31	- 1,79	540.4014.0000	
1,80	- 2,25	540.5021.0190		1,80	- 2,25	540.4024.0000		1,80	- 2,25	540.4024.0000	
2,26	- 3,24	540.5031.0190		2,26	- 3,24	540.4034.0000		2,26	- 3,24	540.4034.0000	
3,25	- 4,50	540.5041.0190		3,25	- 4,50	540.4044.0000		3,25	- 4,50	540.4044.0000	
4,51	- 6,50	540.5051.0190		4,51	- 6,50	540.4054.0000		4,51	- 6,50	540.4054.0000	
6,51	- 9,40	540.5062.0000		6,51	- 9,40	540.5062.0000		6,51	- 9,40	540.4064.0000	
9,41	-15,20	540.5072.0000		9,41	-15,20	540.5072.0000		9,41	-15,20	540.4074.0000	
15,21	-21,70	540.5082.0000		15,21	-21,70	540.5082.0000		15,21	-21,70	540.4084.0000	
21,71	-27,40	540.5092.0000		21,71	-27,40	540.5092.0000		21,71	-27,40	540.4094.0000	
27,41	-32,20	540.5102.0000		27,41	-32,20	540.5102.0000		27,41	-32,20	540.4104.0000	
32,21	-40,00	540.5112.0000		32,21	-40,00	540.5112.0000		32,21	-38,00	540.4114.0000	
								38,01	-40,00	540.5124.0000	
		DN 25 do 23				**DN 25 do 23**				**DN 25 do 23**	
0,10	- 0,19	540.8124.0000		0,10	- 0,19	540.8124.0000		0,10	- 0,19	540.8124.0000	
0,20	- 0,37	540.8134.0000		0,20	- 0,37	540.8134.0000		0,20	- 0,37	540.8134.0000	
0,38	- 0,50	540.4154.0000		0,38	- 0,50	540.4154.0000		0,38	- 0,50	540.4154.0000	
0,51	- 0,69	540.4164.0000		0,51	- 0,69	540.4164.0000		0,51	- 0,69	540.4164.0000	
0,70	- 0,97	540.4174.0000		0,70	- 0,97	540.4174.0000		0,70	- 0,97	540.4174.0000	
0,98	- 1,38	540.5171.0190		0,98	- 1,38	540.4184.0000		0,98	- 1,38	540.4184.0000	
1,39	- 2,07	540.5181.0190		1,39	- 2,07	540.4194.0000		1,39	- 2,07	540.4194.0000	
2,08	- 2,62	540.5191.0190		2,08	- 2,62	540.4204.0000		2,08	- 2,62	540.4204.0000	
2,63	- 3,33	540.9251.0190		2,63	- 3,33	540.9254.0000		2,63	- 3,33	540.9254.0000	
3,34	- 5,34	540.5201.0190		3,34	- 5,34	540.4214.0000		3,34	- 5,34	540.4214.0000	
5,35	- 9,00	540.5211.0190		5,35	- 9,00	540.4224.0000		5,35	- 9,00	540.4224.0000	
9,01	-12,00	540.5221.0190		9,01	-12,00	540.4234.0000		9,01	-12,00	540.4234.0000	
12,01	-15,20	540.5221.0190	O	12,01	-15,20	540.4234.0000	O	12,01	-15,20	540.4234.0000	O
15,21	-19,50	540.5232.0000		15,21	-19,50	540.5232.0000		15,21	-19,50	540.5234.0000	
19,51	-22,10	540.5232.0000	O	19,51	-22,10	540.5232.0000	O	19,51	-22,10	540.5234.0000	O
22,11	-27,00	540.5242.0000		22,11	-27,00	540.5242.0000		22,11	-27,00	540.5244.0000	
27,01	-33,00	540.5252.0000		27,01	-33,00	540.5252.0000		27,01	-33,00	540.5254.0000	
33,01	-40,00	540.5262.0000		33,01	-40,00	540.5262.0000		33,01	-40,00	540.4294.0000	
		DN 32 do 29				**DN 32 do 29**				**DN 32 do 29**	
0,10	- 0,19	540.8214.0000		0,10	- 0,19	540.8214.0000		0,10	- 0,19	540.8214.0000	
0,20	- 0,26	540.8224.0000		0,20	- 0,26	540.8224.0000		0,20	- 0,26	540.8224.0000	
0,27	- 0,33	540.8234.0000		0,27	- 0,33	540.8234.0000		0,27	- 0,33	540.8234.0000	
0,34	- 0,50	540.4354.0000		0,34	- 0,50	540.4354.0000		0,34	- 0,50	540.4354.0000	
0,51	- 0,59	540.4364.0000		0,51	- 0,59	540.4364.0000		0,51	- 0,59	540.4364.0000	
0,60	- 0,85	540.4374.0000		0,60	- 0,85	540.4374.0000		0,60	- 0,85	540.4374.0000	
0,86	- 1,40	540.5311.0190		0,86	- 1,40	540.4384.0000		0,86	- 1,40	540.4384.0000	
1,41	- 2,25	540.5321.0190		1,41	- 2,25	540.4394.0000		1,41	- 2,25	540.4394.0000	
2,26	- 3,00	540.5331.0190		2,26	- 3,00	540.4404.0000		2,26	- 3,00	540.4404.0000	
3,01	- 4,20	540.9431.0190		3,01	- 4,20	540.9434.0000		3,01	- 4,20	540.9434.0000	
4,21	- 6,20	540.5341.0190		4,21	- 6,20	540.4414.0000		4,21	- 6,20	540.4414.0000	
6,21	- 8,50	540.5351.0190		6,21	- 8,50	540.4424.0000		6,21	- 8,50	540.4424.0000	
8,51	-10,00	540.4434.0000		8,51	-10,00	540.4434.0000		8,51	-10,00	540.4434.0000	
10,01	-12,80	540.5361.0190		10,01	-12,80	540.4434.0000		10,01	-12,80	540.4434.0000	
12,81	-16,50	540.5372.0000				540.9474.0205				540.9474.0205	
16,51	-21,00	540.5382.0000		12,81	-16,50	540.5372.0000		12,81	-16,50	540.4444.0000	
21,01	-27,00	540.5392.0000		16,51	-21,00	540.5382.0000				540.9474.0205	
27,01	-34,00	540.5402.0000		21,01	-27,00	540.5392.0000		16,51	-21,00	540.4464.0000	
34,01	-37,00	540.8242.0000		27,01	-34,00	540.5402.0000				540.9474.0205	
37,01	-40,00	540.8262.0000		34,01	-37,00	540.8242.0000		21,01	-27,00	540.4484.0000	
				37,01	-40,00	540.8262.0000		27,01	-31,60	540.4484.0000	
										540.9484.0205	
								31,61	-37,00	540.5404.0000	
										540.9484.0205	
								37,01	-40,00	540.8254.0000	
										540.9484.0205	

Ausführung (model)

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar] **von** **p1** *up*	**bis** **p2** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	p [bar] **von** **p1** *up*	**bis** **p2** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	p [bar] **von** **p1** *up*	**bis** **p2** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
	DN 40 do 37				**DN 40 do 37**				**DN 40 do 37**		
0,10	- 0,21	540.8314.0000		0,10	- 0,21	540.8314.0000		0,10	- 0,21	540.8314.0000	
0,22	- 0,32	540.8334.0000		0,22	- 0,32	540.8334.0000		0,22	- 0,32	540.8334.0000	
0,33	- 0,50	540.4504.0000		0,33	- 0,50	540.4504.0000		0,33	- 0,50	540.4504.0000	
0,51	- 0,80	540.4514.0000		0,51	- 0,80	540.4514.0000		0,51	- 0,80	540.4514.0000	
0,81	- 1,10	540.5441.0190		0,81	- 1,10	540.4524.0000		0,81	- 1,10	540.4524.0000	
1,11	- 1,75	540.5451.0190		1,11	- 1,75	540.4534.0000		1,11	- 1,75	540.4534.0000	
1,76	- 2,20	540.5461.0190		1,76	- 2,20	540.4544.0000		1,76	- 2,20	540.4544.0000	
2,21	- 2,90	540.5471.0190		2,21	- 2,90	540.4554.0000		2,21	- 2,90	540.4554.0000	
2,91	- 4,10	540.5481.0190		2,91	- 4,10	540.4564.0000		2,91	- 4,10	540.4564.0000	
4,11	- 6,20	540.9561.0190		4,11	- 6,20	540.9564.0000		4,11	- 6,20	540.9564.0000	
6,21	-10,00	540.5491.0190		6,21	-10,00	540.4584.0000		6,21	-10,00	540.4584.0000	
10,01	-15,50	540.5501.0190		10,01	-15,50	540.4594.0000		10,01	-15,50	540.4594.0000	
15,51	-20,00	540.5512.0000		15,51	-20,00	540.5512.0000		15,51	-20,00	540.4604.0000	
20,01	-27,00	540.5522.0000		20,01	-27,00	540.5522.0000		20,01	-25,50	540.4604.0000	
27,01	-33,50	540.5542.0000		27,01	-33,50	540.5542.0000				540.4634.0000	
33,51	-40,00	540.8342.0000		33,51	-40,00	540.8342.0000		25,51	-26,60	540.9574.0000	
								26,61	-33,50	540.9574.0000	
										540.4634.0000	
								33,51	-36,60	540.9594.0000	
										540.4634.0000	
								36,61	-40,00	540.9594.0000	
										540.8394.0000	
	DN 50 do 46				**DN 50 do 46**				**DN 50 do 46**		
0,10	- 0,12		S	0,10	- 0,12		S	0,10	- 0,12		S
0,13	- 0,22	540.8404.0000		0,13	- 0,22	540.8404.0000		0,13	- 0,22	540.8404.0000	
0,23	- 0,50	540.8434.0000		0,23	- 0,50	540.8434.0000		0,23	- 0,50	540.8434.0000	
0,51	- 0,80	540.4664.0000		0,51	- 0,80	540.4664.0000		0,51	- 0,80	540.4664.0000	
0,81	- 1,20	540.5581.0190		0,81	- 1,20	540.4674.0000		0,81	- 1,20	540.4674.0000	
1,21	- 1,80	540.5591.0190		1,21	- 1,80	540.4684.0000		1,21	- 1,80	540.4684.0000	
1,81	- 2,60	540.5601.0190		1,81	- 2,60	540.4694.0000		1,81	- 2,60	540.4694.0000	
2,61	- 3,90	540.5611.0190		2,61	- 3,90	540.4704.0000		2,61	- 3,90	540.4704.0000	
3,91	- 5,80	540.5621.0190		3,91	- 5,80	540.4714.0000		3,91	- 5,80	540.4714.0000	
5,81	- 8,60	540.8492.0000		5,81	- 8,60	540.8492.0000		5,81	- 8,60	540.8494.0000	
8,61	-11,30	540.5632.0000		8,61	-11,30	540.5632.0000		8,61	-10,70	540.9604.0000	
11,31	-15,60	540.5642.0000		11,31	-15,60	540.5642.0000		10,71	-14,50	540.4694.0000	
15,61	-19,00	540.5652.0000		15,61	-19,00	540.5652.0000				540.9604.0000	
19,01	-23,10	540.5662.0000		19,01	-23,10	540.5662.0000		14,51	-19,00	540.8494.0000	
23,11	-28,20	540.5672.0000		23,11	-28,20	540.5672.0000				540.9604.0000	
28,21	-34,40	540.5682.0000		28,21	-34,40	540.5682.0000		19,01	-21,50	540.4734.0000	
34,41	-40,00	540.5682.0000		34,41	-40,00	540.5682.0000				540.9604.0000	
		540.9602.0000				540.9602.0000		21,51	-26,50	540.9634.0000	
										540.9604.0000	
								26,51	-33,00	540.9644.0000	
										540.9604.0000	
									-37,00		S
	DN 65 do 60				**DN 65 do 60**				**DN 65 do 60**		
0,10	- 0,12		S	0,10	- 0,12		S				
0,13	- 0,16	540.8514.0000		0,13	- 0,16	540.8514.0000					
0,17	- 0,19	540.8532.0000		0,17	- 0,19	540.8532.0000		0,10	- 0,21		S
0,20	- 0,26	540.8542.0000		0,20	- 0,26	540.8542.0000		0,22	- 0,28	540.8544.0000	
0,27	- 0,50	540.5702.0000		0,27	- 0,50	540.5702.0000		0,29	- 0,50	540.5704.0000	
0,51	- 0,61	540.5712.0000		0,51	- 0,61	540.5712.0000		0,51	- 0,61	540.5714.0000	
0,62	- 0,89	540.5722.0000		0,62	- 0,89	540.5722.0000		0,62	- 0,89	540.5724.0000	
0,90	- 1,49	540.5732.0000		0,90	- 1,49	540.5732.0000		0,90	- 1,49	540.5734.0000	
1,50	- 2,49	540.5742.0000		1,50	- 2,49	540.5742.0000		1,50	- 2,49	540.5744.0000	
2,50	- 3,35	540.5752.0000		2,50	- 3,35	540.5752.0000		2,50	- 3,35	540.5754.0000	
3,36	- 4,99	540.5762.0000		3,36	- 4,99	540.5762.0000		3,36	- 4,99	540.5764.0000	
5,00	- 9,00	540.5772.0000		5,00	- 9,00	540.5772.0000		5,00	- 9,00	540.5774.0000	
9,01	-13,90	540.5782.0000		9,01	-13,90	540.5782.0000		9,01	-13,90	540.5784.0000	
13,91	-18,30	540.5792.0000		13,91	-18,30	540.5792.0000		13,91	-16,00	540.5784.0000	
18,31	-23,10	540.5802.0000		18,31	-23,10	540.5802.0000				540.9924.0205	
23,11	-34,70	540.5802.0000		23,11	-34,70	540.5802.0000		16,01	-18,30	540.4944.0000	
		540.9722.0205				540.9722.0205		18,31	-23,10	540.4944.0000	
34,71	-40,00	540.9492.0000		34,71	-40,00	540.9492.0000				540.9924.0205	
		540.4962.0205				540.4962.0205		23,11	-28,00	540.4944.0000	
										540.9724.0205	

Ausführung (model)

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				**p [bar]**				**p [bar]**			
von *up* **p1**	**bis** *to* **p2**	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up* **p1**	**bis** *to* **p2**	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up* **p1**	**bis** *to* **p2**	**Feder-Sachnummer** *stock no.*	**Indizes**
	DN 80 do 74				**DN 80 do 74**				**DN 80 do 74**		
0,10	- 0,14	540.8602.0000		0,10	- 0,14	540.8602.0000		0,10	- 0,14		S
0,15	- 0,25	540.8624.0000		0,15	- 0,25	540.8624.0000		0,15	- 0,25	540.8624.0000	
0,26	- 0,35	540.8642.0000		0,26	- 0,35	540.8642.0000		0,26	- 0,35	540.8644.0000	
0,36	- 0,49	540.8652.0000		0,36	- 0,49	540.8652.0000		0,36	- 0,49	540.8654.0000	
0,50	- 0,64	540.5812.0000		0,50	- 0,64	540.5812.0000		0,50	- 0,64	540.5814.0000	
0,65	- 1,04	540.5822.0000		0,65	- 1,04	540.5822.0000		0,65	- 1,04	540.5824.0000	
1,05	- 1,50	540.5832.0000		1,05	- 1,50	540.5832.0000		1,05	- 1,50	540.5834.0000	
1,51	- 2,30	540.5842.0000		1,51	- 2,30	540.5842.0000		1,51	- 2,30	540.5844.0000	
2,31	- 3,20	540.5852.0000		2,31	- 3,20	540.5852.0000		2,31	- 3,20	540.5854.0000	
3,21	- 5,50	540.5862.0000		3,21	- 5,50	540.5862.0000		3,21	- 5,50	540.5864.0000	
5,51	- 7,50	540.5872.0000		5,51	- 7,50	540.5872.0000		5,51	- 7,50	540.5874.0000	
7,51	-10,60	540.5882.0000		7,51	-10,60	540.5882.0000		7,51	-10,60	540.5884.0000	
10,61	-15,50	540.5892.0000		10,61	-15,50	540.5892.0000		10,61	-13,60	540.5884.0000	
15,51	-22,50	540.5882.0000		15,51	-22,50	540.5882.0000				540.9884.0000	
		540.9872.0000				540.9872.0000		13,61	-25,00		S
22,51	-32,00	540.9862.0000		22,51	-32,00	540.9862.0000					
		540.9872.0000				540.9872.0000					
32,01	-40,00		S	32,01	-40,00		S				
	DN 100 do 92				**DN 100 do 92**				**DN 100 do 92**		
0,10	- 0,19	540.8732.0000	DS1	0,10	- 0,19	540.8732.0000	DS1	0,10	- 0,21	540.8624.0000	O; V80
0,20	- 0,32	540.8742.0000	DS1	0,20	- 0,32	540.8742.0000	DS1	0,22	- 0,32	540.8644.0000	O; V80
0,33	- 0,49	540.8752.0000	DS1	0,33	- 0,49	540.8752.0000	DS1	0,33	- 0,49	540.8654.0000	O; V80
0,50	- 0,76	540.5912.0000	DS1	0,50	- 0,76	540.5912.0000	DS1	0,50	- 0,76	540.5814.0000	O; V80
0,77	- 1,17	540.5922.0000	DS1	0,77	- 1,17	540.5922.0000	DS1	0,77	- 1,17	540.5834.0000	O; V80
1,18	- 1,79	540.5942.0000	DS1	1,18	- 1,79	540.5942.0000	DS1	1,18	- 1,79	540.5854.0000	O; V80
1,80	- 2,73	540.5952.0000	DS1	1,80	- 2,73	540.5952.0000	DS1	1,80	- 2,73	540.5864.0000	O; V80
2,74	- 4,15	540.5962.0000	DS1	2,74	- 4,15	540.5962.0000	DS1	2,74	- 4,15	540.5874.0000	O; V80
4,16	- 5,93	540.5972.0000	DS1	4,16	- 5,93	540.5972.0000	DS1	4,16	- 5,93	540.5884.0000	O; V80
5,94	- 8,40	540.9952.0000	DS2	5,94	- 8,40	540.9952.0000	DS2	5,94	- 8,40	540.9954.0000	
8,41	-10,70	540.5982.0000	DS2	8,41	-10,70	540.5982.0000	DS2	8,41	-10,40	540.5984.0000	
10,71	-14,00	540.5942.0000	DS2	10,71	-14,00	540.5942.0000	DS2	10,41	-16,00	540.9954.0000	
		540.9982.0205				540.9982.0205				540.9714.0000	
14,01	-19,20	540.5972.0000	DS2	14,01	-19,20	540.5972.0000	DS2	16,01	-20,00	540.5984.0000	
		540.9982.0205				540.9982.0205				540.9984.0205	
19,21	-24,50	540.5982.0000	DS2	19,21	-24,50	540.5982.0000	DS2	20,01	-26,00		S
		540.9982.0205				540.9982.0205					
24,51	-35,00	540.9842.0000	DS2	24,51	-35,00	540.9842.0000	DS2				
		540.9982.0205				540.9982.0205					
35,01	-40,00	540.9842.0000	DS2	35,01	-40,00	540.9842.0000	DS2				
		540.9542.0205				540.9542.0205					
	DN 125 do 98				**DN 125 do 98**				**DN 125 do 98**		
0,10	- 0,19	540.8722.0000		0,10	- 0,19	540.8722.0000		0,10	- 0,19	540.8624.0000	V80
0,20	- 0,24	540.8732.0000		0,20	- 0,24	540.8732.0000		0,20	- 0,24	540.8634.0000	V80
0,25	- 0,35	540.8742.0000		0,25	- 0,35	540.8742.0000		0,25	- 0,35	540.8644.0000	V80
0,36	- 0,51	540.8752.0000		0,36	- 0,51	540.8752.0000		0,36	- 0,51	540.8654.0000	V80
0,52	- 0,67	540.5912.0000		0,52	- 0,67	540.5912.0000		0,52	- 0,67	540.5814.0000	V80
0,68	- 0,90	540.5922.0000		0,68	- 0,90	540.5922.0000		0,68	- 0,90	540.5834.0000	V80
0,91	- 1,40	540.5932.0000		0,91	- 1,40	540.5932.0000		0,91	- 1,40	540.5844.0000	V80
1,41	- 2,00	540.5942.0000		1,41	- 2,00	540.5942.0000		1,41	- 2,00	540.5854.0000	V80
2,01	- 2,90	540.5952.0000		2,01	- 2,90	540.5952.0000		2,01	- 2,90	540.5864.0000	V80
2,91	- 4,50	540.5962.0000		2,91	- 4,50	540.5962.0000		2,91	- 4,50	540.5864.0000	V80
4,51	- 6,00	540.5972.0000		4,51	- 6,00	540.5972.0000				540.9884.0000	
6,01	- 7,50	540.9952.0000		6,01	- 7,50	540.9952.0000		4,51	- 6,00	540.5884.0000	V80
7,51	- 9,50	540.5982.0000		7,51	- 9,50	540.5982.0000		6,01	- 7,50	540.9954.0000	
9,51	-14,00	540.9962.0000		9,51	-14,00	540.9962.0000		7,51	-10,40	540.5984.0000	
14,01	-18,50	540.5972.0000		14,01	-18,50	540.5972.0000		10,41	-15,00	540.9954.0000	
		540.9982.0205				540.9982.0205				540.9714.0000	
18,51	-22,00	540.5982.0000		18,51	-22,00	540.5982.0000		15,01	-17,70	540.5974.0000	
		540.9982.0205				540.9982.0205				540.9984.0205	
22,01	-28,00	540.9552.0000		22,01	-28,00	540.9552.0000		17,71	-24,00		S
		540.9982.0205				540.9982.0205					
DS1 = 270.3639.0000 DS2 = 270.3739.0000				DS1 = 270.4849.0023 (with collar) DS2 = 270.0849.0023 (with collar)							

Ausführung (model)

Standard *(standard)*				warmfest *(creep-resistant steel)*				korrosionsfest (stainless steel)			
p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
	DN 150 do 125				**DN 150 do 125**				**DN 150 do 125**		
0,10	- 0,21	540.8732.0000	FT	0,10	- 0,21	540.8732.0000	FT	0,10	- 0,21		S
0,22	- 0,29	540.8832.0000		0,22	- 0,29	540.8832.0000		0,22	- 0,29		S
0,30	- 0,49	540.8842.0000		0,30	- 0,49	540.8842.0000		0,30	- 0,49	540.8844.0000	
0,50	- 0,69	540.8852.0000		0,50	- 0,69	540.8852.0000		0,50	- 0,69	540.8854.0000	
0,70	- 0,99	540.8862.0000		0,70	- 0,99	540.8862.0000		0,70	- 0,99	540.8864.0000	
1,00	- 1,44	540.8872.0000		1,00	- 1,44	540.8872.0000		1,00	- 1,44	540.8874.0000	
1,45	- 1,80	540.8882.0000		1,45	- 1,80	540.8882.0000		1,45	- 1,80	540.8884.0000	
1,81	- 2,60	540.8892.0000		1,81	- 2,60	540.8892.0000		1,81	- 2,60	540.8894.0000	
2,61	- 3,80	540.8902.0000		2,61	- 3,80	540.8902.0000		2,61	- 3,80	540.8904.0000	
3,81	- 5,50	540.8912.0000		3,81	- 5,50	540.8912.0000		3,81	- 5,50	540.8884.0000	
5,51	- 7,00	540.8922.0000		5,51	- 7,00	540.8922.0000				540.8974.0205	
7,01	- 8,00	540.8932.0000		7,01	- 8,00	540.8932.0000		5,51	- 7,00	540.8904.0000	
8,01	-10,00	540.8942.0000		8,01	-10,00	540.8942.0000				540.8984.0205	
10,01	-11,50	540.8952.0000		10,01	-11,50	540.8952.0000			-10,00		S
11,51	-13,00	540.8912.0000		11,51	-13,00	540.8912.0000					
		540.9912.0205				540.9912.0205					
13,01	-15,00	540.8922.0000		13,01	-15,00	540.8922.0000					
		540.9912.0205				540.9912.0205					
15,01	-17,00	540.8952.0000		15,01	-17,00	540.8952.0000					
		540.9912.0205				540.9912.0205					
	-25,00		S		-25,00		S				
	DN 200 do 165				**DN 200 do 165**				**DN 200 do 165**		
0,10	- 0,19		S	0,10	- 0,19		S	0,20	- 0,29		S
0,20	- 0,32	540.8832.0000	O; V150	0,20	- 0,32	540.8832.0000	O; V150	0,30	- 0,41	540.8844.0000	O; V150
0,33	- 0,43	540.8842.0000	O; V150	0,33	- 0,43	540.8842.0000	O; V150	0,42	- 0,59	540.8854.0000	O; V150
0,44	- 0,59	540.8852.0000	O; V150	0,44	- 0,59	540.8852.0000	O; V150	0,60	- 0,82	540.8864.0000	O; V150
0,60	- 0,82	540.8862.0000	O; V150	0,60	- 0,82	540.8862.0000	O; V150	0,83	- 1,15	540.8874.0000	O; V150
0,83	- 1,15	540.8872.0000	O; V150	0,83	- 1,15	540.8872.0000	O; V150	1,16	- 1,45	540.8884.0000	O; V150
1,16	- 1,48	540.8882.0000	O; V150	1,16	- 1,48	540.8882.0000	O; V150		-10,00		S
1,49	- 2,00	540.8892.0000	O; V150	1,49	- 2,00	540.8892.0000	O; V150				
2,01	- 2,60	540.9082.0205		2,01	- 2,60	540.9082.0205					
2,61	- 3,40	540.9092.0205		2,61	- 3,40	540.9092.0205					
3,41	- 4,20	540.9102.0000		3,41	- 4,20	540.9102.0000					
4,21	- 5,25	540.9162.0000		4,21	- 5,25	540.9162.0000					
5,26	- 6,45	540.9172.0000		5,26	- 6,45	540.9172.0000					
6,46	- 8,10	540.9182.0000		6,46	- 8,10	540.9182.0000					
8,11	-10,00	540.9192.0000		8,11	-10,00	540.9192.0000					
10,01	-11,00	540.9192.0000		10,01	-11,00	540.9192.0000					
		540.9052.0205				540.9052.0205					
11,01	-12,60	540.9132.0000		11,01	-12,60	540.9132.0000					
		540.9072.0205				540.9072.0205					
12,61	-14,00	540.9132.0000		12,61	-14,00	540.9132.0000					
		540.9092.0205				540.9092.0205					
14,01	-16,80	540.9132.0000		14,01	-16,80	540.9132.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
16,81	-19,80	540.9152.0000		16,81	-19,80	540.9152.0000					
		540.9082.0205				540.9082.0205					
		540.9222.0000				540.9222.0000					
19,81	-25,00		S	19,81	-25,00		S				
	DN 250 do 200				**DN 250 do 200**				**DN 250 do 200**		
0,20	- 0,29	540.9022.0205		0,20	- 0,29	540.9022.0205		0,20	- 6,00		S
0,30	- 0,39	540.9032.0205		0,30	- 0,39	540.9032.0205					
0,40	- 0,53	540.9042.0205		0,40	- 0,53	540.9042.0205					
0,54	- 0,72	540.9052.0205		0,54	- 0,72	540.9052.0205					
0,73	- 0,97	540.9062.0205		0,73	- 0,97	540.9062.0205					
0,98	- 1,33	540.9072.0205		0,98	- 1,33	540.9072.0205					
1,34	- 1,80	540.9082.0205		1,34	- 1,80	540.9082.0205					
1,81	- 2,40	540.9092.0205		1,81	- 2,40	540.9092.0205					
2,41	- 3,20	540.9102.0000		2,41	- 3,20	540.9102.0000					
3,21	- 4,20	540.9112.0000		3,21	- 4,20	540.9112.0000					
4,21	- 5,30	540.9122.0000		4,21	- 5,30	540.9122.0000					
5,31	- 7,50	540.9132.0000		5,31	- 7,50	540.9132.0000					
7,51	- 9,80	540.9132.0000		7,51	- 9,80	540.9132.0000					
		540.9092.0205				540.9092.0205					
9,81	-11,00	540.9152.0000		9,81	-11,00	540.9152.0000					
		540.9072.0205				540.9072.0205					
11,01	-12,90	540.9152.0000		11,01	-12,90	540.9152.0000					
		540.9092.0205				540.9092.0205					
12,91	-13,40	540.9152.0000		12,91	-13,40	540.9152.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
	-16,00		S		-16,00		S				

Ausführung (model)											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
		DN 300 do 235				**DN 300 do 235**				**DN 300 do 235**	
0,20	- 0,25	540.9022.0205		0,20	- 0,25	540.9022.0205		0,18	- 3,57		S
0,26	- 0,33	540.9032.0205		0,26	- 0,33	540.9032.0205					
0,34	- 0,45	540.9042.0205		0,34	- 0,45	540.9042.0205					
0,46	- 0,61	540.9052.0205		0,46	- 0,61	540.9052.0205					
0,62	- 0,83	540.9062.0205		0,62	- 0,83	540.9062.0205					
0,84	- 1,11	540.9072.0205		0,84	- 1,11	540.9072.0205					
1,12	- 1,53	540.9082.0205		1,12	- 1,53	540.9082.0205					
1,54	- 2,04	540.9092.0205		1,54	- 2,04	540.9092.0205					
2,05	- 2,72	540.9102.0000		2,05	- 2,72	540.9102.0000					
2,73	- 3,57	540.9112.0000		2,73	- 3,57	540.9112.0000					
3,58	- 4,51	540.9112.0000		3,58	- 4,51	540.9112.0000					
		540.9072.0205				540.9072.0205					
4,52	- 6,30	540.9132.0000		4,52	- 6,30	540.9132.0000					
6,31	- 8,25	540.9132.0000		6,31	- 8,25	540.9132.0000					
		540.9092.0205				540.9092.0205					
8,26	- 9,25	540.9132.0000		8,26	- 9,25	540.9132.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
	-16,00		S		-16,00		S				
		DN 400 do 295				**DN 400 do 295**				**DN 400 do 295**	
0,20	- 0,25	540.9032.0205		0,20	- 0,25	540.9032.0205		0,20	- 2,30		S
0,26	- 0,36	540.9042.0205		0,26	- 0,36	540.9042.0205					
0,37	- 0,48	540.9052.0205		0,37	- 0,48	540.9052.0205					
0,49	- 0,66	540.9062.0205		0,49	- 0,66	540.9062.0205					
0,67	- 0,84	540.9072.0205		0,67	- 0,84	540.9072.0205					
0,85	- 1,10	540.9082.0205		0,85	- 1,10	540.9082.0205					
1,11	- 1,25	540.9092.0205		1,11	- 1,25	540.9092.0205					
	- 8,00		S		- 8,00		S				

Ausführung(model)											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
	DN 1" do 23				**DN 1" do 23**				**DN 1" do 23**		
0,10	- 0,24	540.8114.0000		0,10	- 0,24	540.8114.0000		0,10	- 0,24	540.8114.0000	
0,25	- 0,35	540.8134.0000		0,25	- 0,35	540.8134.0000		0,25	- 0,35	540.8134.0000	
0,36	- 0,50	540.4154.0000		0,36	- 0,50	540.4154.0000		0,36	- 0,50	540.4154.0000	
0,51	- 0,70	540.4164.0000		0,51	- 0,70	540.4164.0000		0,51	- 0,70	540.4164.0000	
0,71	- 1,00	540.4174.0000		0,71	- 1,00	540.4174.0000		0,71	- 1,00	540.4174.0000	
1,01	- 1,40	540.5171.0190		1,01	- 1,40	540.4184.0000		1,01	- 1,40	540.4184.0000	
1,41	- 2,00	540.5181.0190		1,41	- 2,00	540.4194.0000		1,41	- 2,00	540.4194.0000	
2,01	- 2,30	540.5191.0190		2,01	- 2,30	540.4204.0000		2,01	- 2,30	540.4204.0000	
2,31	- 2,50	540.9251.0190		2,31	- 2,50	540.9254.0000		2,31	- 2,50	540.9254.0000	
2,51	- 3,60	540.5201.0190		2,51	- 3,60	540.4214.0000		2,51	- 3,60	540.4214.0000	
3,61	- 5,90	540.5211.0190		3,61	- 5,90	540.4224.0000		3,61	- 5,90	540.4224.0000	
5,91	- 9,20	540.5221.0190		5,91	- 9,20	540.4234.0000		5,91	- 9,20	540.4234.0000	
9,21	-15,00	540.5232.0000		9,21	-15,00	540.5232.0000		9,21	-15,00	540.5234.0000	
15,01	-22,00	540.5242.0000		15,01	-22,00	540.5242.0000		15,01	-22,00	540.5244.0000	
22,01	-30,00	540.5252.0000		22,01	-30,00	540.5252.0000		22,01	-30,00	540.5254.0000	
30,01	-40,00	540.5262.0000		30,01	-40,00	540.5262.0000		30,01	-39,00	540.4284.0000	
40,01	-49,00	540.8142.0000		40,01	-49,00	540.8142.0000		39,01	-42,50	540.4294.0000	
	-51,00		S		-51,00		S		-51,00		S
	DN 1½" do 29				**DN 1½" do 29**				**DN 1½" do 29**		
0,10	- 0,19	540.8214.0000		0,10	- 0,19	540.8214.0000					
0,20	- 0,35	540.8224.0000		0,20	- 0,35	540.8224.0000					
0,36	- 0,50	540.8234.0000		0,36	- 0,50	540.8234.0000					
0,51	- 0,65	540.4364.0000		0,51	- 0,65	540.4364.0000					
0,66	- 1,00	540.4374.0000		0,66	- 1,00	540.4374.0000					
1,01	- 1,40	540.5311.0190		1,01	- 1,40	540.4384.0000					
1,41	- 1,80	540.5321.0190		1,41	- 1,80	540.4394.0000					
1,81	- 2,30	540.5331.0190		1,81	- 2,30	540.4404.0000					
2,31	- 2,70	540.9431.0190		2,31	- 2,70	540.9434.0000					
2,71	- 3,20	540.5341.0190		2,71	- 3,20	540.4414.0000					
3,21	- 4,30	540.5331.0190		3,21	- 4,30	540.4404.0000					
		540.9474.0205				540.9474.0205					
4,31	- 5,50	540.5351.0190		4,31	- 5,50	540.4424.0000					
5,51	- 8,00	540.4434.0000		5,51	- 8,00	540.4434.0000					
8,01	-11,00	540.5361.0190		8,01	-11,00	540.4444.0000					
11,01	-15,00	540.5372.0000		11,01	-15,00	540.5372.0000					
15,01	-22,50	540.5382.0000		15,01	-22,50	540.5382.0000					
22,51	-30,00	540.5392.0000		22,51	-30,00	540.5392.0000					
30,01	-40,00	540.5392.0000		30,01	-40,00	540.5392.0000					
		540.9484.0205				540.9484.0205					
40,01	-45,00	540.8252.0000		40,01	-45,00	540.8252.0000					
45,01	-48,00	540.8242.0000		45,01	-48,00	540.8242.0000					
		540.9484.0205				540.9484.0205					
	DN 1½" do 37				**DN 1½" do 37**				**DN 1½" do 37**		
0,10	- 0,19	540.8324.0000		0,10	- 0,19	540.8324.0000		0,10	- 0,19	540.8324.0000	
0,20	- 0,40	540.8334.0000		0,20	- 0,40	540.8334.0000		0,20	- 0,40	540.8334.0000	
0,41	- 0,60	540.4504.0000		0,41	- 0,60	540.4504.0000		0,41	- 0,60	540.4504.0000	
0,61	- 0,80	540.4514.0000		0,61	- 0,80	540.4514.0000		0,61	- 0,80	540.4514.0000	
0,81	- 1,10	540.5441.0190		0,81	- 1,10	540.4524.0000		0,81	- 1,10	540.4524.0000	
1,11	- 1,50	540.5451.0190		1,11	- 1,50	540.4534.0000		1,11	- 1,50	540.4534.0000	
1,51	- 2,00	540.5461.0190		1,51	- 2,00	540.4544.0000		1,51	- 2,00	540.4544.0000	
2,01	- 2,80	540.5471.0190		2,01	- 2,80	540.4554.0000		2,01	- 2,80	540.4554.0000	
2,81	- 4,00	540.5481.0190		2,81	- 4,00	540.4564.0000		2,81	- 4,00	540.4564.0000	
4,01	- 5,00	540.9561.0190		4,01	- 5,00	540.9564.0000		4,01	- 5,00	540.9564.0000	
5,01	- 6,20	540.5491.0190		5,01	- 6,20	540.4584.0000		5,01	- 6,20	540.4584.0000	
6,21	- 7,70	540.5461.0190		6,21	- 7,70	540.4544.0000		6,21	- 7,70	540.4544.0000	
		540.4634.0000				540.4634.0000				540.4634.0000	
7,71	- 9,60	540.5501.0190		7,71	- 9,60	540.4594.0000		7,71	- 9,60	540.4594.0000	
9,61	-12,50	540.9561.0190		9,61	-12,50	540.9564.0000		9,61	-12,50	540.9564.0000	
		540.4634.0000				540.4634.0000				540.4634.0000	
12,51	-17,00	540.5512.0000		12,51	-17,00	540.5512.0000		12,51	-17,00	540.4604.0000	
17,01	-23,00	540.5522.0000		17,01	-23,00	540.5522.0000		17,01	-23,00	540.4604.0000	
23,01	-30,00	540.5532.0000		23,01	-30,00	540.5532.0000				540.4634.0000	
30,01	-34,70	540.5542.0000		30,01	-34,70	540.5542.0000		23,01	-27,00	540.9574.0000	
34,71	-40,00	540.5542.0000		34,71	-40,00	540.5542.0000		27,01	-33,00	540.9574.0000	
		540.4634.0000				540.4634.0000				540.4634.0000	
40,01	-46,00	540.8372.0000		40,01	-46,00	540.8372.0000		33,01	-37,00	540.9594.0000	
		540.8392.0000				540.8392.0000				540.4634.0000	
								37,01	-40,00	540.9594.0000	
										540.8394.0000	

Ausführung (model)											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 2" do 46				**DN 2" do 46**				**DN 2" do 46**			
0,10	- 0,17		S	0,10	- 0,17		S	0,10	- 0,17		S
0,18	- 0,24	540.8424.0000		0,18	- 0,24	540.8424.0000		0,18	- 0,24	540.8424.0000	
0,25	- 0,45	540.8434.0000		0,25	- 0,45	540.8434.0000		0,25	- 0,45	540.8434.0000	
0,46	- 0,65	540.4654.0000		0,46	- 0,65	540.4654.0000		0,46	- 0,65	540.4654.0000	
0,66	- 0,90	540.4664.0000		0,66	- 0,90	540.4664.0000		0,66	- 0,90	540.4664.0000	
0,91	- 1,10	540.5581.0190		0,91	- 1,10	540.4674.0000		0,91	- 1,10	540.4674.0000	
1,11	- 1,60	540.5591.0190		1,11	- 1,60	540.4684.0000		1,11	- 1,60	540.4684.0000	
1,61	- 2,40	540.5601.0190		1,61	- 2,40	540.4694.0000		1,61	- 2,40	540.4694.0000	
2,41	- 3,40	540.5611.0190		2,41	- 3,40	540.4704.0000		2,41	- 3,40	540.4704.0000	
3,41	- 4,80	540.5621.0190		3,41	- 4,80	540.4714.0000		3,41	- 4,80	540.4714.0000	
4,81	- 6,00	540.8492.0000		4,81	- 6,00	540.8492.0000		4,81	- 6,00	540.8494.0000	
6,01	- 8,50	540.5632.0000		6,01	- 8,50	540.5632.0000		6,01	- 8,50	540.8424.0000	
8,51	-13,50	540.5642.0000		8,51	-13,50	540.5642.0000				540.9604.0000	
13,51	-21,00	540.5652.0000		13,51	-21,00	540.5652.0000		8,51	-13,50	540.4734.0000	
21,01	-25,00	540.5662.0000		21,01	-25,00	540.5662.0000		13,51	-21,00	540.8494.0000	
25,01	-35,00	540.5672.0000		25,01	-35,00	540.5672.0000				540.9604.0000	
35,01	-43,00	540.5682.0000		35,01	-43,00	540.5682.0000		21,01	-25,00	540.4734.0000	
43,01	-51,00	540.5682.0000		43,01	-51,00	540.5682.0000				540.9604.0000	
		540.9602.0000				540.9602.0000		25,01	-32,00	540.9634.0000	
										540.9604.0000	
									-40,00		S
DN 3" do 60				**DN 3" do 60**				**DN 3" do 60**			
0,10	- 0,19		S	0,10	- 0,19		S	0,10	- 0,19		S
0,20	- 0,25	540.8532.0000		0,20	- 0,25	540.8532.0000		0,20	- 0,26		S
0,26	- 0,35	540.8542.0000		0,26	- 0,35	540.8542.0000		0,27	- 0,35	540.8544.0000	
0,36	- 0,50	540.5702.0000		0,36	- 0,50	540.5702.0000		0,36	- 0,50	540.5704.0000	
0,51	- 0,70	540.5712.0000		0,51	- 0,70	540.5712.0000		0,51	- 0,70	540.5714.0000	
0,71	- 1,00	540.5722.0000		0,71	- 1,00	540.5722.0000		0,71	- 1,00	540.5724.0000	
1,01	- 1,40	540.5732.0000		1,01	- 1,40	540.5732.0000		1,01	- 1,40	540.5734.0000	
1,41	- 1,90	540.5742.0000		1,41	- 1,90	540.5742.0000		1,41	- 1,90	540.5744.0000	
1,91	- 2,50	540.5752.0000		1,91	- 2,50	540.5752.0000		1,91	- 2,50	540.5754.0000	
2,51	- 4,00	540.5762.0000		2,51	- 4,00	540.5762.0000		2,51	- 4,00	540.5764.0000	
4,01	- 6,10	540.5772.0000		4,01	- 6,10	540.5772.0000		4,01	- 6,10	540.5774.0000	
6,11	- 8,40	540.5782.0000		6,11	- 8,40	540.5782.0000		6,11	- 8,40	540.5784.0000	
8,41	-10,50	540.5772.0000		8,41	-10,50	540.5772.0000		8,41	-11,50	540.5784.0000	
		540.9722.0205				540.9722.0205				540.9924.0205	
10,51	-16,00	540.5792.0000		10,51	-16,00	540.5792.0000		11,51	-17,00	540.5784.0000	
16,01	-21,50	540.5802.0000		16,01	-21,50	540.5802.0000				540.9724.0205	
21,51	-30,00	540.5802.0000		21,51	-30,00	540.5802.0000		17,01	-22,00	540.4944.0000	
		540.9722.0205				540.9722.0205				540.9924.0205	
30,01	-35,00	540.9492.0000		30,01	-35,00	540.9492.0000		22,01	-27,00	540.4944.0000	
		540.4962.0205				540.4962.0205				540.9724.0205	
35,01	-40,00	540.9492.0000		35,01	-40,00	540.9492.0000					
		540.4982.0205				540.4982.0205					
DN 4" do 92				**DN 4" do 92**				**DN 4" do 92**			
0,10	- 0,14	540.8712.0000	DS1	0,10	- 0,14	540.8712.0000	DS1	0,10	- 0,14	540.8624.0000	O; V80
0,15	- 0,25	540.8732.0000	DS1	0,15	- 0,25	540.8732.0000	DS1	0,15	- 0,25	540.8634.0000	O; V80
0,26	- 0,45	540.8752.0000	DS1	0,26	- 0,45	540.8752.0000	DS1	0,26	- 0,45	540.8654.0000	O; V80
0,46	- 0,60	540.5912.0000	DS1	0,46	- 0,60	540.5912.0000	DS1	0,46	- 0,60	540.5814.0000	O; V80
0,61	- 0,80	540.5922.0000	DS1	0,61	- 0,80	540.5922.0000	DS1	0,61	- 0,80	540.5834.0000	O; V80
0,81	- 1,10	540.5932.0000	DS1	0,81	- 1,10	540.5932.0000	DS1	0,81	- 1,10	540.5844.0000	O; V80
1,11	- 1,60	540.5942.0000	DS1	1,11	- 1,60	540.5942.0000	DS1	1,11	- 1,60	540.5854.0000	O; V80
1,61	- 2,20	540.5952.0000	DS1	1,61	- 2,20	540.5952.0000	DS1	1,61	- 2,20	540.5864.0000	O; V80
2,21	- 3,10	540.5962.0000	DS1	2,21	- 3,10	540.5962.0000	DS1	2,21	- 3,10	540.5874.0000	O; V80
3,11	- 4,50	540.5972.0000	DS1	3,11	- 4,50	540.5972.0000	DS1	3,11	- 4,50	540.5884.0000	O; V80
4,51	- 6,00	540.9952.0000	DS1	4,51	- 6,00	540.9952.0000	DS1	4,51	- 6,00	540.9954.0000	
6,01	-10,50	540.5982.0000	DS2	6,01	-10,50	540.5982.0000	DS2	6,01	-10,50	540.5984.0000	
10,51	-15,00	540.9962.0000	DS2	10,51	-15,00	540.9962.0000	DS2	10,51	-15,00	540.5984.0000	
15,01	-20,00	540.5982.0000	DS2	15,01	-20,00	540.5982.0000	DS2			540.9714.0000	
		540.9982.0205				540.9982.0205		15,01	-20,00	540.5984.0000	
20,01	-28,80	540.9552.0000	DS2	20,01	-28,80	540.9552.0000	DS2			540.9534.0000	
		540.9982.0205				540.9982.0205			-25,00		S
28,81	-34,00	540.9842.0000	DS2	28,81	-34,00	540.9842.0000	DS2				
		540.9982.0205				540.9982.0205					
DS1 = 270.3639.0000 DS2 = 270.3439.0000				DS1 = 270.4849.0023 (with collar) DS2 = 270.0849.0023 (with collar)							

Ausführung (model)											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 20 do 18				**DN 20 do 18**				**DN 20 do 18**			
1	- 3	540.8004.0000		1	- 3	540.8004.0000		1	- 3	540.8004.0000	
3	- 4	540.8014.0000		3	- 4	540.8014.0000		3	- 4	540.8014.0000	
4	- 6	540.8034.0000		4	- 6	540.8034.0000		4	- 6	540.8034.0000	
6	- 8	540.8044.0000		6	- 8	540.8044.0000		6	- 8	540.8044.0000	
8	-12	540.8054.0000		8	-12	540.8054.0000		8	-12	540.8054.0000	
12	-19	540.4004.0000		12	-19	540.4004.0000		12	-19	540.4004.0000	
19	-26	540.4014.0000		19	-26	540.4014.0000		19	-26	540.4014.0000	
26	-33	540.5021.0190		26	-33	540.4024.0000		26	-33	540.4024.0000	
33	-47	540.5031.0190		33	-47	540.4034.0000		33	-47	540.4034.0000	
47	-65	540.5041.0190		47	-65	540.4044.0000		47	-65	540.4044.0000	
65	-94	540.5051.0190		65	-94	540.4054.0000		65	-94	540.4054.0000	
94	-136	540.5062.0000		94	-136	540.5062.0000		94	-136	540.4064.0000	
136	-221	540.5072.0000		136	-221	540.5072.0000		136	-221	540.4074.0000	
221	-315	540.5082.0000		221	-315	540.5082.0000		221	-315	540.4084.0000	
315	-397	540.5092.0000		315	-397	540.5092.0000		315	-397	540.4094.0000	
397	-467	540.5102.0000		397	-467	540.5102.0000		397	-467	540.4104.0000	
467	-580	540.5112.0000		467	-580	540.5112.0000		467	-551	540.4114.0000	
								551	-580	540.5124.0000	
DN 25 do 23				**DN 25 do 23**				**DN 25 do 23**			
1	- 3	540.8124.0000		1	- 3	540.8124.0000		1	- 3	540.8124.0000	
3	- 6	540.8134.0000		3	- 6	540.8134.0000		3	- 6	540.8134.0000	
6	- 7	540.4154.0000		6	- 7	540.4154.0000		6	- 7	540.4154.0000	
7	-10	540.4164.0000		7	-10	540.4164.0000		7	-10	540.4164.0000	
10	-14	540.4174.0000		10	-14	540.4174.0000		10	-14	540.4174.0000	
14	-20	540.5171.0190		14	-20	540.4184.0000		14	-20	540.4184.0000	
20	-30	540.5181.0190		20	-30	540.4194.0000		20	-30	540.4194.0000	
30	-38	540.5191.0190		30	-38	540.4204.0000		30	-38	540.4204.0000	
38	-48	540.9251.0190		38	-48	540.9254.0000		38	-48	540.9254.0000	
48	-78	540.5201.0190		48	-78	540.4214.0000		48	-78	540.4214.0000	
78	-131	540.5211.0190		78	-131	540.4224.0000		78	-131	540.4224.0000	
131	-174	540.5221.0190		131	-174	540.4234.0000		131	-174	540.4234.0000	
174	-221	540.5221.0190	O	174	-221	540.4234.0000	O	174	-221	540.4234.0000	O
221	-283	540.5232.0000		221	-283	540.5232.0000		221	-283	540.5234.0000	
283	-321	540.5232.0000	O	283	-321	540.5232.0000	O	283	-321	540.5234.0000	O
321	-392	540.5242.0000		321	-392	540.5242.0000		321	-392	540.5244.0000	
392	-479	540.5252.0000		392	-479	540.5252.0000		392	-479	540.5254.0000	
479	-580	540.5262.0000		479	-580	540.5262.0000		479	-580	540.4294.0000	
DN 32 do 29				**DN 32 do 29**				**DN 32 do 29**			
1	- 3	540.8214.0000		1	- 3	540.8214.0000		1	- 3	540.8214.0000	
3	- 4	540.8224.0000		3	- 4	540.8224.0000		3	- 4	540.8224.0000	
4	- 5	540.8234.0000		4	- 5	540.8234.0000		4	- 5	540.8234.0000	
5	- 7	540.4354.0000		5	- 7	540.4354.0000		5	- 7	540.4354.0000	
7	- 9	540.4364.0000		7	- 9	540.4364.0000		7	- 9	540.4364.0000	
9	-12	540.4374.0000		9	-12	540.4374.0000		9	-12	540.4374.0000	
12	-20	540.5311.0190		12	-20	540.4384.0000		12	-20	540.4384.0000	
20	-33	540.5321.0190		20	-33	540.4394.0000		20	-33	540.4394.0000	
33	-44	540.5331.0190		33	-44	540.4404.0000		33	-44	540.4404.0000	
44	-61	540.9431.0190		44	-61	540.9434.0000		44	-61	540.9434.0000	
61	-90	540.5341.0190		61	-90	540.4414.0000		61	-90	540.4414.0000	
90	-123	540.5351.0190		90	-123	540.4424.0000		90	-123	540.4424.0000	
123	-145	540.4434.0000		123	-145	540.4434.0000		123	-145	540.4434.0000	
145	-186	540.5361.0190		145	-186	540.4434.0000		145	-186	540.4434.0000	
186	-239	540.5372.0000				540.9474.0205				540.9474.0205	
239	-305	540.5382.0000		186	-239	540.5372.0000		186	-239	540.4444.0000	
305	-392	540.5392.0000		239	-305	540.5382.0000				540.9474.0205	
392	-493	540.5402.0000		305	-392	540.5392.0000		239	-305	540.4464.0000	
493	-537	540.8242.0000		392	-493	540.5402.0000				540.9474.0205	
537	-580	540.8262.0000		493	-537	540.8242.0000		305	-392	540.4484.0000	
				537	-580	540.8262.0000		392	-458	540.4484.0000	
										540.9484.0205	
								458	-537	540.5404.0000	
										540.9484.0205	
								537	-580	540.8254.0000	
										540.9484.0205	

Ausführung (model)

Standard (standard)				warmfest *(creep-resistant steel)*				korrosionsfest *(stainless steel)*			
p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 40 do 37				**DN 40 do 37**				**DN 40 do 37**			
1	- 3	540.8314.0000		1	- 3	540.8314.0000		1	- 3	540.8314.0000	
3	- 5	540.8334.0000		3	- 5	540.8334.0000		3	- 5	540.8334.0000	
5	- 7	540.4504.0000		5	- 7	540.4504.0000		5	- 7	540.4504.0000	
7	-12	540.4514.0000		7	-12	540.4514.0000		7	-12	540.4514.0000	
12	-16	540.5441.0190		12	-16	540.4524.0000		12	-16	540.4524.0000	
16	-26	540.5451.0190		16	-26	540.4534.0000		16	-26	540.4534.0000	
26	-32	540.5461.0190		26	-32	540.4544.0000		26	-32	540.4544.0000	
32	-42	540.5471.0190		32	-42	540.4554.0000		32	-42	540.4554.0000	
42	-60	540.5481.0190		42	-60	540.4564.0000		42	-60	540.4564.0000	
60	-90	540.9561.0190		60	-90	540.9564.0000		60	-90	540.9564.0000	
90	-145	540.5491.0190		90	-145	540.4584.0000		90	-145	540.4584.0000	
145	-225	540.5501.0190		145	-225	540.4594.0000		145	-225	540.4594.0000	
225	-290	540.5512.0000		225	-290	540.5512.0000		225	-290	540.4604.0000	
290	-392	540.5522.0000		290	-392	540.5522.0000		290	-370	540.4604.0000	
392	-486	540.5542.0000		392	-486	540.5542.0000				540.4634.0205	
486	-580	540.8342.0000		486	-580	540.8342.0000		370	-386	540.9574.0000	
								386	-486	540.9574.0000	
										540.4634.0205	
								486	-531	540.9594.0000	
										540.4634.0205	
								531	-580	540.9594.0000	
										540.8394.0205	
DN 50 do 46				**DN 50 do 46**				**DN 50 do 46**			
1,5	- 2		S	1,5	- 1,8		S	1,5	- 1,8		S
1,9	- 3,2	540.8404.0000		1,9	- 3,2	540.8404.0000		1,9	- 3,2	540.8404.0000	
3,3	- 7,4	540.8434.0000		3,3	- 7,4	540.8434.0000		3,3	- 7,4	540.8434.0000	
7,4	-11,7	540.4664.0000		7,4	-11,7	540.4664.0000		7,4	-11,7	540.4664.0000	
11,7	-17,5	540.5581.0190		11,7	-17,5	540.4674.0000		11,7	-17,5	540.4674.0000	
17,5	-26,2	540.5591.0190		17,5	-26,2	540.4684.0000		17,5	-26,2	540.4684.0000	
26,2	-37,8	540.5601.0190		26,2	-37,8	540.4694.0000		26,2	-37,8	540.4694.0000	
37,8	-56,7	540.5611.0190		37,8	-56,7	540.4704.0000		37,8	-56,7	540.4704.0000	
56,7	-84,2	540.5621.0190		56,7	-84,2	540.4714.0000		56,7	-84,2	540.4714.0000	
84,2	-124,8	540.8492.0000		84,2	-124,8	540.8492.0000		84,2	-124,8	540.8494.0000	
124,8	-164,0	540.5632.0000		124,8	-164,0	540.5632.0000		124,8	-155,3	540.9604.0205	
164,0	-226	540.5642.0000		164,0	-226	540.5642.0000		155,3	-210	540.4694.0000	
226	-276	540.5652.0000		226	-276	540.5652.0000				540.9604.0205	
276	-335	540.5662.0000		276	-335	540.5662.0000		210	-276	540.8494.0000	
335	-409	540.5672.0000		335	-409	540.5672.0000				540.9604.0205	
409	-499	540.5682.0000		409	-499	540.5682.0000		276	-312	540.4734.0000	
499	-580	540.5682.0000		499	-580	540.5682.0000				540.9604.0205	
		540.9602.0205				540.9602.0205		312	-384	540.9634.0000	
										540.9604.0205	
								384	-479	540.9644.0000	
										540.9604.0205	
DN 65 do 60				**DN 65 do 60**				**DN 65 do 60**			
1,5	- 1,8		S	1,5	- 1,8		S	1,5	- 2,8		S
1,9	- 2,4	540.8514.0000		1,9	- 2,4	540.8514.0000		2,9	- 3,9	540.8544.0000	
2,5	- 2,8	540.8532.0000		2,5	- 2,8	540.8532.0000		3,9	- 7,4	540.5704.0000	
2,9	- 3,9	540.8542.0000		2,9	- 3,9	540.8542.0000		7,4	- 9,0	540.5714.0000	
4	- 7,4	540.5702.0000		3,9	- 7,4	540.5702.0000		9,0	-13,0	540.5724.0000	
7,4	- 9,0	540.5712.0000		7,4	- 9,0	540.5712.0000		13,1	-21,7	540.5734.0000	
9,0	-13,0	540.5722.0000		9,0	-13,0	540.5722.0000		21,8	-36,2	540.5744.0000	
13,1	-21,7	540.5732.0000		13,1	-21,7	540.5732.0000		36,3	-48,7	540.5754.0000	
21,8	-36,2	540.5742.0000		21,8	-36,2	540.5742.0000		48,7	-72,5	540.5764.0000	
36,3	-48,7	540.5752.0000		36,3	-48,7	540.5752.0000		72,5	-130,6	540.5774.0000	
48,7	-72,5	540.5762.0000		48,7	-72,5	540.5762.0000		130,6	-201,7	540.5784.0000	
72,5	-130,6	540.5772.0000		72,5	-130,6	540.5772.0000		202	-232	540.5784.0000	
130,6	-201,7	540.5782.0000		130,6	-201,7	540.5782.0000				540.9924.0205	
202	265	540.5792.0000		202	-265	540.5792.0000		232	-265	540.4944.0000	
265	335	540.5802.0000		265	-335	540.5802.0000		265	-335	540.4944.0000	
335	503	540.5802.0000		335	-503	540.5802.0000				540.9924.0205	
		540.9722.0205				540.9722.0205		335	-406	540.4944.0000	
503	580	540.9492.0000		503	-580	540.9492.0000				540.9724.0205	
		540.4962.0205				540.4962.0205					

protected

Ausführung (model)											
Standard (standard)				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
	DN 80 do 74				**DN 80 do 74**				**DN 80 do 74**		
1	- 2	540.8602.0000		1	- 2	540.8602.0000		1	- 2		S
2	- 4	540.8624.0000		2	- 4	540.8624.0000		2	- 4	540.8624.0000	
4	- 5	540.8642.0000		4	- 5	540.8642.0000		4	- 5	540.8644.0000	
5	- 7	540.8652.0000		5	- 7	540.8652.0000		5	- 7	540.8654.0000	
7	- 9	540.5812.0000		7	- 9	540.5812.0000		7	- 9	540.5814.0000	
9	-15	540.5822.0000		9	-15	540.5822.0000		9	-15	540.5824.0000	
15	-22	540.5832.0000		15	-22	540.5832.0000		15	-22	540.5834.0000	
22	-33	540.5842.0000		22	-33	540.5842.0000		22	-33	540.5844.0000	
33	-47	540.5852.0000		33	-47	540.5852.0000		33	-47	540.5854.0000	
47	-80	540.5862.0000		47	-80	540.5862.0000		47	-80	540.5864.0000	
80	-109	540.5872.0000		80	-109	540.5872.0000		80	-109	540.5874.0000	
109	-154	540.5882.0000		109	-154	540.5882.0000		109	-154	540.5884.0000	
154	-225	540.5892.0000		154	-225	540.5892.0000		154	-197	540.5884.0000	
225	-326	540.5882.0000		225	-326	540.5882.0000				540.9884.0205	
		540.9872.0000				540.9872.0000		197	-363		S
326	-464	540.9862.0000		326	-464	540.9862.0000					
		540.9872.0000				540.9872.0000					
464	-580		S	464	-580		S				
	DN 100 do 92				**DN 100 do 92**				**DN 100 do 92**		
1	- 3	540.8732.0000	DS1	1	- 3	540.8732.0000	DS1	1	- 3	540.8624.0000	O; V80
3	- 5	540.8742.0000	DS1	3	- 5	540.8742.0000	DS1	3	- 5	540.8644.0000	O; V80
5	- 7	540.8752.0000	DS1	5	- 7	540.8752.0000	DS1	5	- 7	540.8654.0000	O; V80
7	-11	540.5912.0000	DS1	7	-11	540.5912.0000	DS1	7	-11	540.5814.0000	O; V80
11	-17	540.5922.0000	DS1	11	-17	540.5922.0000	DS1	11	-17	540.5834.0000	O; V80
17	-26	540.5942.0000	DS1	17	-26	540.5942.0000	DS1	17	-26	540.5854.0000	O; V80
26	-40	540.5952.0000	DS1	26	-40	540.5952.0000	DS1	26	-40	540.5864.0000	O; V80
40	-60	540.5962.0000	DS1	40	-60	540.5962.0000	DS1	40	-60	540.5874.0000	O; V80
60	86	540.5972.0000	DS1	60	86	540.5972.0000	DS1	60	-86	540.5884.0000	O; V80
86	-122	540.9952.0000	DS2	86	-122	540.9952.0000	DS2	86	-122	540.9954.0000	
122	-155	540.5982.0000	DS2	122	-155	540.5982.0000	DS2	122	-151	540.5984.0000	
155	-203	540.5942.0000	DS2	155	-203	540.5942.0000	DS2	151	-232	540.9954.0000	
		540.9982.0205				540.9982.0205				540.9714.0205	
203	-279	540.5972.0000	DS2	203	-279	540.5972.0000	DS2	232	-290	540.5984.0000	
		540.9982.0205				540.9982.0205				540.9984.0205	
279	-355	540.5982.0000	DS2	279	-355	540.5982.0000	DS2	290	-377		S
		540.9982.0205				540.9982.0205					
355	-508	540.9842.0000	DS2	355	-508	540.9842.0000	DS2				
		540.9982.0205				540.9982.0205					
508	-580	540.9842.0000	DS2	508	-580	540.9842.0000	DS2				
		540.9542.0205				540.9542.0205					
	DN 125 do 98				**DN 125 do 98**				**DN 125 do 98**		
1	- 3	540.8722.0000		1	- 3	540.8722.0000		1	- 3	540.8624.0000	V80
3	- 4	540.8732.0000		3	- 4	540.8732.0000		3	- 4	540.8634.0000	V80
4	- 5	540.8742.0000		4	- 5	540.8742.0000		4	- 5	540.8644.0000	V80
5	- 8	540.8752.0000		5	- 8	540.8752.0000		5	- 8	540.8654.0000	V80
8	-10	540.5912.0000		8	-10	540.5912.0000		8	-10	540.5814.0000	V80
10	-13	540.5922.0000		10	-13	540.5922.0000		10	-13	540.5834.0000	V80
13	-20	540.5932.0000		13	-20	540.5932.0000		13	-20	540.5844.0000	V80
20	-29	540.5942.0000		20	-29	540.5942.0000		20	-29	540.5854.0000	V80
29	-42	540.5952.0000		29	-42	540.5952.0000		29	-42	540.5864.0000	V80
42	-65	540.5962.0000		42	-65	540.5962.0000		42	-65	540.5864.0000	V80
65	-87	540.5972.0000		65	-87	540.5972.0000				540.9884.0205	
87	-109	540.9952.0000		87	-109	540.9952.0000		65	-87	540.5884.0000	V80
109	-138	540.5982.0000		109	-138	540.5982.0000		87	-109	540.9954.0000	
138	-203	540.9962.0000		138	-203	540.9962.0000		109	-151	540.5984.0000	
203	-269	540.5972.0000		203	-269	540.5972.0000		151	-218	540.9954.0000	
		540.9982.0205				540.9982.0205				540.9714.0205	
269	-319	540.5982.0000		269	-319	540.5982.0000		218	-257	540.5974.0000	
		540.9982.0205				540.9982.0205				540.9984.0205	
319	-406	540.9552.0000		319	-406	540.9552.0000		257	-348		S
		540.9982.0205				540.9982.0205					
DS1 = 270.3639.0000 DS2 = 270.3739.0000				DS1 = 270.4849.0023 (with collar) DS2 = 270.0849.0023 (with collar)							

Ausführung (model)											
Standard (standard)				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
	DN 150 do 125				**DN 150 do 125**				**DN 150 do 125**		
1	- 3	540.8732.0000	SP	1	- 3	540.8732.0000	SP	1	- 3		S
3	- 4	540.8832.0000		3	- 4	540.8832.0000		3	- 4		S
4	- 7	540.8842.0000		4	- 7	540.8842.0000		4	- 7	540.8844.0000	
7	-10	540.8852.0000		7	-10	540.8852.0000		7	-10	540.8854.0000	
10	-14	540.8862.0000		10	-14	540.8862.0000		10	-14	540.8864.0000	
15	-21	540.8872.0000		15	-21	540.8872.0000		15	-21	540.8874.0000	
21	-26	540.8882.0000		21	-26	540.8882.0000		21	-26	540.8884.0000	
26	-38	540.8892.0000		26	-38	540.8892.0000		26	-38	540.8894.0000	
38	-55	540.8902.0000		38	-55	540.8902.0000		38	-55	540.8904.0000	
55	-80	540.8912.0000		55	-80	540.8912.0000		55	-80	540.8884.0000	
80	-102	540.8922.0000		80	-102	540.8922.0000				540.8974.0205	
102	-116	540.8932.0000		102	-116	540.8932.0000		80	-102	540.8904.0000	
116	-145	540.8942.0000		116	-145	540.8942.0000				540.8984.0205	
145	-167	540.8952.0000		145	-167	540.8952.0000			-145		S
167	-189	540.8912.0000		167	-189	540.8912.0000					
		540.9912.0205				540.9912.0205					
189	-218	540.8922.0000		189	-218	540.8922.0000					
		540.9912.0205				540.9912.0205					
218	-247	540.8952.0000		218	-247	540.8952.0000					
		540.9912.0205				540.9912.0205					
	-363		S		-363		S				
	DN 200 do 165				**DN 200 do 165**				**DN 200 do 165**		
1	- 3		S	1	- 3		S	3	- 4		S
3	- 4	540.8832.0000	0; V150	3	- 4	540.8832.0000	0; V150	4	- 6	540.8844.0000	0; V150
4	- 6	540.8842.0000	0; V150	4	- 6	540.8842.0000	0; V150	6	- 9	540.8854.0000	0; V150
6	- 9	540.8852.0000	0; V150	6	- 9	540.8852.0000	0; V150	9	-12	540.8864.0000	0; V150
9	-12	540.8862.0000	0; V150	9	-12	540.8862.0000	0; V150	12	-17	540.8874.0000	0; V150
12	-17	540.8872.0000	0; V150	12	-17	540.8872.0000	0; V150	17	-21	540.8884.0000	0; V150
17	-21	540.8882.0000	0; V150	17	-21	540.8882.0000	0; V150		-145		S
21	-29	540.8892.0000	0; V150	21	-29	540.8892.0000	0; V150				
29	-38	540.9082.0205		29	-38	540.9082.0205					
38	-49	540.9092.0205		38	-49	540.9092.0205					
49	-61	540.9102.0000		49	-61	540.9102.0000					
61	-76	540.9162.0000		61	-76	540.9162.0000					
76	-94	540.9172 .0000		76	-94	540.9172.0000					
94	-118	540.9182.0000		94	-118	540.9182.0000					
118	-145	540.9192.0000		118	-145	540.9192.0000					
145	-160	540.9192.0000		145	-160	540.9192.0000					
		540.9052.0205				540.9052.0205					
160	-183	540.9132.0000		160	-183	540.9132.0000					
		540.9072.0205				540.9072.0205					
183	-203	540.9132.0000		186	-203	540.9132.0000					
		540.9092.0205				540.9092.0205					
203	-244	540.9132.0000		203	-244	540.9132.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
244	-287	540.9152.0000		244	-287	540.9152.0000					
		540.9082.0205				540.9082.0205					
		540.9222.0000				540.9222.0000					
	-363		S		-363		S				
	DN 250 do 200				**DN 250 do 200**				**DN 250 do 200**		
3	- 4	540.9022.0205		3	- 4	540.9022.0205		3	-87		S
4	- 6	540.9032.0205		4	- 6	540.9032.0205					
6	- 8	540.9042.0205		6	- 8	540.9042.0205					
8	-11	540.9052.0205		8	-11	540.9052.0205					
11	-14	540.9062.0205		11	-14	540.9062.0205					
14	-19	540.9072.0205		14	-19	540.9072.0205					
19	-26	540.9082.0205		19	-26	540.9082.0205					
26	-35	540.9092.0205		26	-35	540.9092.0205					
35	-47	540.9102.0000		35	-47	540.9102.0000					
47	-61	540.9112.0000		47	-61	540.9112.0000					
61	-77	540.9122.0000		61	-77	540.9122.0000					
77	-109	540.9132.0000		77	-109	540.9132.0000					
109	-142	540.9132.0000		109	-142	540.9132.0000					
		540.9092.0205				540.9092.0205					
142	-160	540.9152.0000		142	-160	540.9152.0000					
		540.9072.0205				540.9072.0205					
160	-187	540.9152.0000		160	-187	540.9152.0000					
		540.9092.0205				540.9092.0205					
187	-194	540.9152.0000		187	-194	540.9152.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
	-232		S		-232		S				

Ausführung (model)											
Standard (standard)				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	**bis** p2 *to*	**Feder-Materialnummer** *stock no.*	**Indizes**	**von** p1 *up*	**bis** p2 *to*	**Feder-Materialnummer** *stock no.*	**Indizes**	**von** p1 *up*	**bis** p2 *to*	**Feder-Materialnummer** *stock no.*	**Indizes**
		DN 300 do 235				**DN 300 do 235**				**DN 300 do 235**	
3	- 4	540.9022.0205		3	- 4	540.9022.0205		3	-52		S
4	- 5	540.9032.0205		4	- 5	540.9032.0205					
5	- 7	540.9042.0205		5	- 7	540.9042.0205					
7	- 9	540.9052.0205		7	- 9	540.9052.0205					
9	-12	540.9062.0205		9	-12	540.9062.0205					
12	-16	540.9072.0205		12	-16	540.9072.0205					
16	-22	540.9082.0205		16	-22	540.9082.0205					
22	-30	540.9092.0205		22	-30	540.9092.0205					
30	-40	540.9102.0000		30	-40	540.9102.0000					
40	-52	540.9112.0000		40	-52	540.9112.0000					
52	-66	540.9112.0000		52	-66	540.9112.0000					
		540.9072.0205				540.9072.0205					
66	-91	540.9132.0000		66	-91	540.9132.0000					
91	-120	540.9132.0000		91	-120	540.9132.0000					
		540.9092.0205				540.9092.0205					
120	-134	540.9132.0000		120	-134	540.9132.0000					
		540.9092.0205				540.9092.0205					
		540.9222.0000				540.9222.0000					
	-232		S		-232		S				
		DN 400 do 295				**DN 400 do 295**				**DN 400 do 295**	
3	- 4	540.9032.0205		3	- 4	540.9032.0205		3	-33		S
4	- 5	540.9042.0205		4	- 5	540.9042.0205					
5	- 7	540.9052.0205		5	- 7	540.9052.0205					
7	-10	540.9062.0205		7	-10	540.9062.0205					
10	-12	540.9072.0205		10	-12	540.9072.0205					
12	-16	540.9082.0205		12	-16	540.9082.0205					
16	-18	540.9092.0205		16	-18	540.9092.0205					
	-116		S		-116		S				

Ausführung (model)

Standard (standard)				warmfest *(creep-resistant steel)*				korrosionsfest *(stainless steel)*			
p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 1" do 23				**DN 1" do 23**				**DN 1" do 23**			
1	- 4	540.8114.0000		1	- 4	540.8114.0000		1	- 4	540.8114.0000	
4	- 5	540.8134.0000		4	- 5	540.8134.0000		4	- 5	540.8134.0000	
5	- 7	540.4154.0000		5	- 7	540.4154.0000		5	- 7	540.4154.0000	
7	-10	540.4164.0000		7	-10	540.4164.0000		7	-10	540.4164.0000	
10	-15	540.4174.0000		10	-15	540.4174.0000		10	-15	540.4174.0000	
15	-20	540.5171.0190		15	-20	540.4184.0000		15	-20	540.4184.0000	
20	-29	540.5181.0190		20	-29	540.4194.0000		20	-29	540.4194.0000	
29	-33	540.5191.0190		29	-33	540.4204.0000		29	-33	540.4204.0000	
33	-36	540.9251.0190		33	-36	540.9254.0000		33	-36	540.9254.0000	
36	-52	540.5201.0190		36	-52	540.4214.0000		36	-52	540.4214.0000	
52	-86	540.5211.0190		52	-86	540.4224.0000		52	-86	540.4224.0000	
86	-134	540.5221.0190		86	-134	540.4234.0000		86	-134	540.4234.0000	
134	-218	540.5232.0000		134	-218	540.5232.0000		134	-218	540.5234.0000	
218	-319	540.5242.0000		218	-319	540.5242.0000		218	-319	540.5244.0000	
319	-435	540.5252.0000		319	-435	540.5252.0000		319	-435	540.5254.0000	
435	-580	540.5262.0000		435	-580	540.5262.0000		435	-566	540.4284.0000	
580	-711	540.8142.0000		580	-711	540.8142.0000		566	-616	540.4294.0000	
	-740		S		-740		S		-740		S
DN 1½" do 29				**DN 1½" do 29**				**DN 1½" do 29**			
1	- 3	540.8214.0000		1	- 3	540.8214.0000					
3	- 5	540.8224.0000		3	- 5	540.8224.0000					
5	- 7	540.8234.0000		5	- 7	540.8234.0000					
7	-10	540.4364.0000		7	-10	540.4364.0000					
10	-15	540.4374.0000		10	-15	540.4374.0000					
15	-20	540.5311.0190		15	-20	540.4384.0000					
20	-26	540.5321.0190		20	-26	540.4394.0000					
26	-33	540.5331.0190		26	-33	540.4404.0000					
33	-39	540.9431.0190		33	-39	540.9434.0000					
39	-47	540.5341.0190		39	-47	540.4414.0000					
47	-62	540.5331.0190 540.9474.0205		47	-62	540.4404.0000 540.9474.0205					
62	-80	540.5351.0190		62	-80	540.4424.0000					
80	-116	540.4434.0000		80	-116	540.4434.0000					
116	-160	540.5361.0190		116	-116	540.4444.0000					
160	-218	540.5372.0000		116	-218	540.5372.0000					
218	-326	540.5382.0000		218	-326	540.5382.0000					
326	-435	540.5392.0000		326	-435	540.5392.0000					
435	-580	540.5392.0000 540.9484.0205		435	-580	540.5392.0000 540.9484.0205					
580	-653	540.8252.0000		580	-653	540.8252.0000					
653	-696	540.8242.0000 540.9484.0205		653	-696	540.8242.0000 540.9484.0205					
DN 1½" do 37				**DN 1½" do 37**				**DN 1½" do 37**			
1	- 3	540.8324.0000		1	- 3	540.8324.0000		1	- 3	540.8324.0000	
3	- 6	540.8334.0000		3	- 6	540.8334.0000		3	- 6	540.8334.0000	
6	- 9	540.4504.0000		6	- 9	540.4504.0000		6	- 9	540.4504.0000	
9	-12	540.4514.0000		9	-12	540.4514.0000		9	-12	540.4514.0000	
12	-16	540.5441.0190		12	-16	540.4524.0000		12	-16	540.4524.0000	
16	-22	540.5451.0190		16	-22	540.4534.0000		16	-22	540.4534.0000	
22	-29	540.5461.0190		22	-29	540.4544.0000		22	-29	540.4544.0000	
29	-41	540.5471.0190		29	-41	540.4554.0000		29	-41	540.4554.0000	
41	-58	540.5481.0190		41	-58	540.4564.0000		41	-58	540.4564.0000	
58	-73	540.9561.0190		58	-73	540.9564.0000		58	-73	540.9564.0000	
73	-90	540.5491.0190		73	-90	540.4584.0000		73	-90	540.4584.0000	
90	-112	540.5461.0190 540.4634.0205		90	-112	540.4544.0000 540.4634.0205		90	-112	540.4544.0000 540.4634.0205	
112	-139	540.5501.0190		112	-139	540.4594.0000		112	-139	540.4594.0000	
139	-181	540.9561.0190 540.4634.0205		139	-181	540.9564.0000 540.4634.0205		139	-181	540.9564.0000 540.4634.0205	
181	-247	540.5512.0000		181	-247	540.5512.0000		181	-247	540.4604.0000	
247	-334	540.5522.0000		247	-334	540.5522.0000		247	-334	540.4604.0000 540.4634.0205	
334	-435	540.5532.0000		334	-435	540.5532.0000		334	-392	540.9574.0000	
435	-503	540.5542.0000		435	-503	540.5542.0000		392	-479	540.9574.0000 540.4634.0205	
503	-580	540.5542.0000 540.4634.0205		503	-580	540.5542.0000 540.4634.0205		479	-537	540.9594.0000 540.4634.0205	
580	-667	540.8372.0000 540.8392.0205		580	-667	540.8372.0000 540.8392.0205		537	-580	540.9594.0000 540.8394.0205	

Ausführung (model)

Standard (standard)				warmfest *(creep-resistant steel)*				korrosionsfest *(stainless steel)*			
p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 2" do 46				**DN 2" do 46**				**DN 2" do 46**			
1,5	- 2,5		S	1,5	- 2,5		S	1,5	- 2,5		S
2,6	- 3,5	540.8424.0000		2,6	- 3,5	540.8424.0000		2,6	- 3,5	540.8424.0000	
3,6	- 6,6	540.8434.0000		3,6	- 6,6	540.8434.0000		3,6	- 6,6	540.8434.0000	
6,7	- 9,6	540.4654.0000		6,7	- 9,6	540.4654.0000		6,7	- 9,6	540.4654.0000	
9,6	-13,2	540.4664.0000		9,6	-13,2	540.4664.0000		9,6	-13,2	540.4664.0000	
13,2	-16,1	540.5581.0190		13,2	-16,1	540.4674.0000		13,2	-16,1	540.4674.0000	
16,1	-23,3	540.5591.0190		16,1	-23,3	540.4684.0000		16,1	-23,3	540.4684.0000	
23,3	-34,9	540.5601.0190		23,3	-34,9	540.4694.0000		23,3	-34,9	540.4694.0000	
34,9	-49,4	540.5611.0190		34,9	-49,4	540.4704.0000		34,9	-49,4	540.4704.0000	
49,4	-69,7	540.5621.0190		49,4	-69,7	540.4714.0000		49,4	-69,7	540.4714.0000	
69,7	-87,1	540.8492.0000		69,7	-87,1	540.8492.0000		69,7	-87,1	540.8494.0000	
87,1	-123,4	540.5632.0000		87,1	-123,4	540.5632.0000		87,1	123,4	540.8424.0000	
123,4	-195,9	540.5642.0000		123,4	-195,9	540.5642.0000				540.9604.0205	
196	-305	540.5652.0000		196	-305	540.5652.0000		123,4	-196	540.4734.0000	
305	-363	540.5662.0000		305	-363	540.5662.0000		196	-305	540.8494.0000	
363	-508	540.5672.0000		363	-508	540.5672.0000				540.9604.0205	
508	-624	540.5682.0000		508	-624	540.5682.0000		305	-363	540.4734.0000	
624	-740	540.5682.0000		624	-740	540.5682.0000				540.9604.0205	
		540.9602.0205				540.9602.0205		363	-464	540.9634.0000	
										540.9604.0205	
									-580		S
DN 3" do 60				**DN 3" do 60**				**DN 3" do 60**			
1,5	- 2,9		S	1,5	- 2,9		S	1,5	- 3,8		S
2,9	- 3,6	540.8532.0000		2,9	- 3,6	540.8532.0000		3,9	- 5,2	540.8544.0000	
3,7	- 5,2	540.8542.0000		3,7	- 5,2	540.8542.0000		5,2	- 7,4	540.5704.0000	
5,2	- 7,4	540.5702.0000		5,2	- 7,4	540.5702.0000		7,4	-10,3	540.5714.0000	
7,4	-10,3	540.5712.0000		7,4	-10,3	540.5712.0000		10,3	-14,6	540.5724.0000	
10,3	-14,6	540.5722.0000		10,3	-14,6	540.5722.0000		14,6	-20,4	540.5734.0000	
14,6	-20,4	540.5732.0000		14,6	-20,4	540.5732.0000		20,4	-27,7	540.5744.0000	
20,4	-27,7	540.5742.0000		20,4	-27,7	540.5742.0000		27,7	-36,4	540.5754.0000	
27,7	-36,4	540.5752.0000		27,7	-36,4	540.5752.0000		36,4	-58,1	540.5764.0000	
36,4	-58,1	540.5762.0000		36,4	-58,1	540.5762.0000		58,1	-88,6	540.5774.0000	
58,1	-88,6	540.5772.0000		58,1	-88,6	540.5772.0000		88,6	-121,9	540.5784.0000	
88,6	-121,9	540.5782.0000		88,6	-121,9	540.5782.0000		121,9	-167	540.5784.0000	
121,9	-152	540.5772.0000		121,9	-152	540.5772.0000				540.9924.0205	
		540.9722.0205				540.9722.0205		167	-247	540.5784.0000	
152	-232	540.5792.0000		152	-232	540.5792.0000				540.9724.0205	
232	-312	540.5802.0000		232	-312	540.5802.0000		247	-319	540.4944.0000	
312	-435	540.5802.0000		312	-435	540.5802.0000				540.9924.0205	
		540.9722.0205				540.9722.0205		319	-392	540.4944.0000	
435	-508	540.9492.0000		435	-508	540.9492.0000				540.9724.0205	
		540.4962.0205				540.4962.0205					
508	-580	540.9492.0000		508	-580	540.9492.0000					
		540.4982.0205				540.4982.0205					
DN 4" do 92				**DN 4" do 92**				**DN 4" do 92**			
1	- 2	540.8712.0000	DS1	1	- 2	540.8712.0000	DS1	1	- 2	540.8624.0000	O V80
2	- 4	540.8732.0000	DS1	2	- 4	540.8732.0000	DS1	2	- 4	540.8634.0000	O V80
4	- 7	540.8752.0000	DS1	4	- 7	540.8752.0000	DS1	4	- 7	540.8654.0000	O V80
7	- 9	540.5912.0000	DS1	7	- 9	540.5912.0000	DS1	7	- 9	540.5814.0000	O V80
9	-12	540.5922.0000	DS1	9	-12	540.5922.0000	DS1	9	-12	540.5834.0000	O V80
12	-16	540.5932.0000	DS1	12	-16	540.5932.0000	DS1	12	-16	540.5844.0000	O V80
16	-23	540.5942.0000	DS1	16	-23	540.5942.0000	DS1	16	-23	540.5854.0000	O V80
23	-32	540.5952.0000	DS1	23	-32	540.5952.0000	DS1	23	-32	540.5864.0000	O V80
32	-45	540.5962.0000	DS1	32	-45	540.5962.0000	DS1	32	-45	540.5874.0000	O V80
45	-65	540.5972.0000	DS1	45	-65	540.5972.0000	DS1	45	-65	540.5884.0000	O V80
65	87	540.9952.0000	DS1	65	87	540.9952.0000	DS1	65	-87	540.9954.0000	
87	-152	540.5982.0000	DS2	87	-152	540.5982.0000	DS2	87	-152	540.5984.0000	
152	-218	540.9962.0000	DS2	152	-218	540.9962.0000	DS2	152	-218	540.5984.0000	
218	-290	540.5982.0000	DS2	218	-290	540.5982.0000	DS2			540.9714.0205	
		540.9982.0205				540.9982.0205		218	-290	540.5984.0000	
290	-418	540.9552.0000	DS2	290	-418	540.9552.0000	DS2			540.9534.0205	
		540.9982.0205				540.9982.0205			-363		S
418	-493	540.9842.0000	DS2	418	-493	540.9842.0000	DS2				
		540.9982.0205				540.9982.0205					
DS1 = 270.3639.0000 DS2 = 270.3439.0000				DS1 = 270.4849.0023 (with collar) DS2 = 270.0849.0023 (with collar)							

Contents

1 Purpose

This LESER Global Standard (LGS) contains the information about pressure range of all springs, which are installed in valve- types 455-458.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

This LGS contains information about the pressure range of all springs, which are installed in valve- types 455-458.
The pressure ranges of the various types are given first in pressure-unit [bar, page 2- 6].
This is followed by the pressure-unit [psig, page 7- end].

For additional information please see legend description.

3 References

LDeS 3060.01, LDeS 3265.01

4 Legend / Indices

- S = Sonderauftrag / special order
- O = oberen Spindeleinstich verwenden / use upper spindle groove
- Blaue Markierung/ blue marking = Drucklagereinsatz / thrust bearing use
- V80 = Baukastengröße Federn/ model spring V80

Ausführung

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	DN 25 do 15				**DN 25 do 15**				**DN 25 do 15**		
2,50	- 3,40	540.8324.0000		2,50	- 3,40	540.8324.0000		2,50	- 3,40	540.8324.0000	
3,41	- 4,90	540.8334.0000		3,41	- 4,90	540.8334.0000		3,41	- 4,90	540.8334.0000	
4,91	- 7,20	540.4504.0000		4,91	- 7,20	540.4504.0000		4,91	- 7,20	540.4504.0000	
7,21	- 10,50	540.4514.0000		7,21	- 10,50	540.4514.0000		7,21	- 10,50	540.4514.0000	
10,51	- 14,50	540.4524.0000		10,51	- 14,50	540.4524.0000		10,51	- 14,50	540.4524.0000	
14,51	- 20,50	540.4534.0000		14,51	- 20,50	540.4534.0000		14,51	- 20,50	540.4534.0000	
20,51	- 29,00	540.4544.0000		20,51	- 29,00	540.4544.0000		20,51	- 29,00	540.4544.0000	
29,01	- 44,00	540.4554.0000		29,01	- 44,00	540.4554.0000		29,01	- 44,00	540.4554.0000	
44,01	- 49,00	540.4634.0000		44,01	- 49,00	540.4634.0000		44,01	- 49,00	540.4634.0000	
49,01	- 67,00	540.4574.0000		49,01	- 67,00	540.4574.0000		49,01	- 67,00	540.4574.0000	
67,01	- 83,00	540.4584.0000		67,01	- 83,00	540.4584.0000		67,01	- 83,00	540.4584.0000	
83,01	-107,00	540.4594.0000		83,01	-107,00	540.4594.0000		83,01	-107,00	540.4594.0000	
107,01	-142,00	540.5512.0000		107,01	-142,00	540.5512.0000		107,01	-120,00	540.4604.0000	
142,01	-180,00	540.5522.0000		142,01	-180,00	540.5522.0000		120,01	-142,00	540.4594.0000	
180,01	-200,00	540.5532.0000		180,01	-200,00	540.5532.0000				540.4634.0000	
200,01	-225,00	540.5542.0000		200,01	-225,00	540.5542.0000		142,01	-160,00	540.4604.0000	
225,01	-246,00	540.5532.0000		225,01	-246,00	540.5532.0000				540.4634.0000	
		540.4634.0000				540.4634.0000		160,01	-200,00	540.9574.0000	
246,01	-280,00	540.5542.0000		246,01	-280,00	540.5542.0000				540.4634.0000	
		540.4634.0000				540.4634.0000		200,01	-250,00	540.9594.0000	
280,01	-300,00	540.8342.0000		280,01	-300,00	540.8342.0000				540.4634.0000	
		540.4634.0000				540.4634.0000					
	DN 25 do 20				**DN 25 do 20**				**DN 25 do 20**		
2,50	- 3,00	540.4514.0000		2,50	- 3,00	540.4514.0000		2,50	- 3,00	540.4514.0000	
3,01	- 4,20	540.4524.0000		3,01	- 4,20	540.4524.0000		3,01	- 4,20	540.4524.0000	
4,21	- 6,20	540.4534.0000		4,21	- 6,20	540.4534.0000		4,21	- 6,20	540.4534.0000	
6,21	- 9,00	540.4544.0000		6,21	- 9,00	540.4544.0000		6,21	- 9,00	540.4544.0000	
9,01	- 13,50	540.4554.0000		9,01	- 13,50	540.4554.0000		9,01	- 13,50	540.4554.0000	
13,51	- 20,00	540.4564.0000		13,51	- 20,00	540.4564.0000		13,51	- 20,00	540.4564.0000	
20,01	- 30,00	540.4584.0000		20,01	- 30,00	540.4584.0000		20,01	- 30,00	540.4584.0000	
30,01	- 44,00	540.4594.0000		30,01	- 44,00	540.4594.0000		30,01	- 44,00	540.4594.0000	
44,01	- 65,00	540.5512.0000		44,01	- 65,00	540.5512.0000		44,01	- 65,00	540.4604.0000	
65,01	- 90,00	540.5522.0000		65,01	- 90,00	540.5522.0000		65,01	- 90,00	540.4604.0000	
90,01	-110,00	540.5532.0000		90,01	-110,00	540.5532.0000				540.4634.0000	
110,01	-134,00	540.5532.0000		110,01	-134,00	540.5532.0000		90,01	-122,00	540.9574.0000	
		540.4634.0000				540.4634.0000				540.4634.0000	
134,01	-152,00	540.5542.0000		134,01	-152,00	540.5542.0000		122,01	-146,00	540.9594.0000	
		540.4634.0000				540.4634.0000				540.8394.0000	
152,01	-180,00	540.8372.0000		152,01	-180,00	540.8372.0000					
		540.8392.0000				540.8392.0000					

Ausführung											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 50 do 30				**DN 50 do 30**				**DN 50 do 30**			
2,50	- 2,90	540.5712.0000		2,50	- 2,90	540.5712.0000		2,50	- 2,90	540.5714.0000	
2,91	- 4,15	540.5722.0000		2,91	- 4,15	540.5722.0000		2,91	- 4,15	540.5724.0000	
4,16	- 6,00	540.5732.0000		4,16	- 6,00	540.5732.0000		4,16	- 6,00	540.5734.0000	
6,01	- 8,60	540.5742.0000		6,01	- 8,60	540.5742.0000		6,01	- 8,60	540.5744.0000	
8,61	- 12,30	540.5752.0000		8,61	- 12,30	540.5752.0000		8,61	- 12,30	540.5754.0000	
12,31	- 17,60	540.5762.0000		12,31	- 17,60	540.5762.0000		12,31	- 17,60	540.5764.0000	
17,61	- 25,20	540.5772.0000		17,61	- 25,20	540.5772.0000		17,61	- 25,20	540.5774.0000	
25,21	- 36,00	540.5782.0000		25,21	- 36,00	540.5782.0000		25,21	- 36,00	540.5784.0000	
36,01	- 50,00	540.5792.0000		36,01	- 50,00	540.5792.0000		36,01	- 47,00	540.5784.0000	
50,01	- 68,00	540.5802.0000		50,01	- 68,00	540.5802.0000				540.9924.0205	
68,01	- 92,00	540.5802.0000		68,01	- 92,00	540.5802.0000		47,01	- 61,00	540.4944.0000	
		540.9722.0205				540.9722.0205		61,01	- 82,00	540.4944.0000	
92,01	-125,00	540.9492.0000		92,01	-125,00	540.9492.0000				540.9724.0205	
		540.4982.0205				540.4982.0205			-130,00		S
	-210,00		S		-210,00		S				
DN 50 do 40				**DN 50 do 40**				**DN 50 do 40**			
2,50	- 3,60	540.5732.0000		2,50	- 3,60	540.5732.0000		2,50	- 3,60	540.5734.0000	
3,61	- 4,80	540.5742.0000		3,61	- 4,80	540.5742.0000		3,61	- 4,80	540.5744.0000	
4,81	- 6,00	540.9924.0205		4,81	- 6,00	540.9924.0205		4,81	- 6,00	540.9924.0205	
6,01	- 7,20	540.5752.0000		6,01	- 7,20	540.5752.0000		6,01	- 7,20	540.5754.0000	
7,21	- 8,60	540.9732.0000		7,21	- 8,60	540.9732.0000		7,21	- 8,60	540.5724.0000	
8,61	- 10,20	540.5732.0000		8,61	- 10,20	540.5732.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		8,61	- 10,20	540.5734.0000	
10,21	- 12,20	540.5762.0000		0,21	- 12,20	540.5762.0000				540.9924.0205	
12,21	- 14,60	540.9752.0000		12,21	- 14,60	540.9752.0000		10,21	- 12,20	540.5764.0000	
14,61	- 18,50	540.5772.0000		14,61	- 18,50	540.5772.0000		12,21	- 13,40	540.5744.0000	
18,51	- 24,00	540.9752.0000		18,51	- 24,00	540.9752.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		13,41	- 14,60	540.5754.0000	
24,01	- 32,00	540.5782.0000		24,01	- 32,00	540.5782.0000				540.9924.0205	
32,01	- 43,50	540.5782.0000		32,01	- 43,50	540.5782.0000		14,61	- 18,50	540.5774.0000	
		540.9924.0205				540.9924.0205		18,51	- 22,00	540.5764.0000	
43,51	- 56,00	540.5792.0000		43,51	- 56,00	540.5792.0000				540.9924.0205	
56,01	- 67,00	540.5792.0000		56,01	- 67,00	540.5792.0000		22,01	- 32,00	540.5784.0000	
		540.9924.0205				540.9924.0205		32,01	- 43,50	540.5784.0000	
67,01	- 75,00	540.5802.0000		67,01	- 75,00	540.5802.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		43,51	- 51,00	540.5784.0000	
75,01	- 87,00	540.5802.0000		75,01	- 87,00	540.5802.0000				540.9724.0205	
		540.4962.0205				540.4962.0205		51,01	- 61,00	540.4944.0000	
87,01	- 98,00	540.9492.0000		87,01	- 98,00	540.9492.0000				540.9724.0205	
		540.4962.0205				540.4962.0205			- 65,00		S
	-114,50		S		-114,50		S				

Ausführung											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 80 do 50				**DN 80 do 50**				**DN 80 do 50**			
2,50	- 3,20	540.5932.0000		2,50	- 3,20	540.5932.0000		2,50	- 3,20	540.5844.0000	O; V80
3,21	- 4,90	540.5942.0000		3,21	- 4,90	540.5942.0000		3,21	- 4,90	540.5854.0000	O; V80
4,91	- 7,90	540.5952.0000		4,91	- 7,90	540.5952.0000		4,91	- 7,90	540.5864.0000	O; V80
7,91	- 10,00	540.5962.0000		7,91	- 10,00	540.5962.0000		7,91	- 10,00	540.5864.0000	O; V80
10,01	- 16,00	540.5972.0000		10,01	- 16,00	540.5972.0000				540.9884.0000	
16,01	- 19,00	540.9952.0000		16,01	- 19,00	540.9952.0000		10,01	- 16,00	540.5874.0000	O; V80
19,01	- 27,00	540.5982.0000		19,01	- 27,00	540.5982.0000				540.9884.0000	
27,01	- 38,00	540.9962.0000		27,01	- 38,00	540.9962.0000		16,01	- 19,00	540.9954.0000	
38,01	- 54,00	540.9952.0000		38,01	- 54,00	540.9952.0000		19,01	- 27,00	540.5984.0000	
		540.9982.0205				540.9982.0205		27,01	- 38,00	540.5984.0000	
54,01	- 75,00	540.9962.0000		54,01	- 75,00	540.9962.0000				540.9714.0000	
		540.9982.0205				540.9982.0205		38,01	- 54,00	540.9954.0000	
75,01	-107,00	540.9842.0000		75,01	-107,00	540.9842.0000				540.9534.0000	
		540.9982.0205				540.9982.0205		54,01	- 61,00	540.5984.0000	
107,01	-130,00	540.9842.0000		107,01	-130,00	540.9842.0000				540.4994.0000	
		540.9542.0205				540.9542.0205			-104,00		S
	-160,00		S		-160,00		S				
DN 80 do 60				**DN 80 do 60**				**DN 80 do 60**			
Dämpfe/Gase *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*			
2,50	- 2,60	540.5824.0000	V80	2,50	- 2,60	540.5824.0000	V80	2,50	- 2,60	540.5824.0000	O; V80
		540.9884.0000				540.9884.0000				540.9884.0000	
2,61	- 4,20	540.5844.0000	V80	2,61	- 4,20	540.5844.0000	V80	2,61	- 4,20	540.5844.0000	O; V80
		540.9884.0000				540.9884.0000				540.9884.0000	
4,21	- 5,20	540.5952.0000		4,21	- 5,20	540.5952.0000		4,21	- 5,20	540.5864.0000	O; V80
5,21	- 7,20	540.9714.0000		5,21	- 7,20	540.9714.0000		5,21	- 7,20	540.9714.0000	
7,21	- 9,20	540.5962.0000		7,21	- 9,20	540.5962.0000		7,21	- 9,20	540.5864.0000	O; V80
9,21	- 10,90	540.5872.0000	O; V80	9,21	- 10,90	540.5872.0000	O; V80			540.9884.0000	
10,91	- 13,20	540.5972.0000		10,91	- 13,20	540.5972.0000		9,21	- 10,90	540.5874.0000	O; V80
13,21	- 17,50	540.9952.0000		13,21	- 17,50	540.9952.0000		10,91	- 13,20	540.5874.0000	O; V80
17,51	- 22,00	540.5982.0000		17,51	- 22,00	540.5982.0000				540.9884.0000	
22,01	- 27,50	540.5972.0000		22,01	- 27,50	540.5972.0000		13,21	- 17,50	540.9954.0000	
		540.9714.0000				540.9714.0000		17,51	- 22,00	540.5984.0000	
27,51	- 35,00	540.9962.0000		27,51	- 35,00	540.9962.0000		22,01	- 27,50	540.9954.0000	
35,01	- 43,00	540.5972.0000		35,01	- 43,00	540.5972.0000				540.9714.0000	
		540.9982.0205				540.9982.0205		27,51	- 35,00	540.5984.0000	
43,01	- 56,00	540.5982.0000		43,01	- 56,00	540.5982.0000				540.9714.0000	
		540.9982.0205				540.9982.0205			- 51,50		S
56,01	- 62,00	540.9962.0000		56,01	- 62,00	540.9962.0000					
		540.9982.0205				540.9982.0205					
62,01	- 77,00	540.9552.0000		62,01	- 77,00	540.9552.0000					
		540.9982.0205				540.9982.0205					
DN 80 do 60				**DN 80 do 60**				**DN 80 do 60**			
Flüssigkeit *(liquids)*				**Flüssigkeit** *(liquids)*				**Flüssigkeit** *(liquids)*			
2,50	-106,00		S	2,50	-106,00		S	2,50	- 61,00		S

Ausführung

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				**p [bar]**				**p [bar]**			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**		**p1**	**p2**	**Sachnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	DN 100 do 50				**DN 100 do 50**				**DN 100 do 50**		
2,50	- 2,90	540.8872.0000	O	2,50	- 2,90	540.8872.0000	O	2,50	- 2,90	540.8874.0000	O
2,91	- 4,10	540.8882.0000	O	2,91	- 4,10	540.8882.0000	O	2,91	- 4,10	540.8884.0000	O
4,11	- 5,90	540.8892.0000	O	4,11	- 5,90	540.8892.0000	O	4,11	- 5,90	540.8894.0000	O
5,91	- 8,30	540.8902.0000	O	5,91	- 8,30	540.8902.0000	O	5,91	- 8,30	540.8904.0000	O
8,31	- 11,40	540.8912.0000	O	8,31	- 11,40	540.8912.0000	O	8,31	- 11,40	540.8884.0000	O
11,41	- 15,80	540.8922.0000	O	11,41	- 15,80	540.8922.0000	O			540.8984.0205	
15,81	- 22,00	540.8942.0000	O	15,81	- 22,00	540.8942.0000	O	11,41	- 15,80	540.8904.0000	O
22,01	- 30,60	540.8942.0000	O	22,01	- 30,60	540.8942.0000	O			540.8984.0205	
		540.8984.0205				540.8984.0205			- 71,00		S
30,61	- 43,00	540.8952.0000	O	30,61	- 43,00	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
	-160,00		S		-160,00		S				
	DN 100 do 60				**DN 100 do 60**				**DN 100 do 60**		
2,50	- 2,80	540.8882.0000	O	2,50	- 2,80	540.8882.0000	O	2,50	- 2,80	540.8884.0000	O
2,81	- 4,00	540.8892.0000	O	2,81	- 4,00	540.8892.0000	O	2,81	- 4,00	540.8894.0000	O
4,01	- 5,40	540.8902.0000	O	4,01	- 5,40	540.8902.0000	O	4,01	- 5,40	540.8904.0000	O
5,41	- 7,75	540.8912.0000	O	5,41	- 7,75	540.8912.0000	O	5,41	- 7,75	540.8884.0000	O
7,76	- 11,00	540.8922.0000	O	7,76	- 11,00	540.8922.0000	O			540.8984.0205	
11,01	- 13,00	540.8932.0000	O	11,01	- 13,00	540.8932.0000	O	7,76	- 11,00	540.8904.0000	O
13,01	- 15,00	540.8942.0000	O	13,01	- 15,00	540.8942.0000	O			540.8984.0205	
15,01	- 18,00	540.8952.0000	O	15,01	- 18,00	540.8952.0000	O		- 55,00		S
18,01	- 26,00	540.8952.0000	O	18,01	- 26,00	540.8952.0000	O				
		540.8974.0205				540.8974.0205					
26,01	- 34,50	540.8942.0000	O	26,01	- 34,50	540.8942.0000	O				
		540.9912.0205				540.9912.0205					
34,51	- 46,00	540.8952.0000	O	34,51	- 46,00	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
		540.0044.0000				540.0044.0000					
	-160,00		S		-160,00		S				

Ausführung

Standard *(standard)*

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 100 do 74			
2,50	- 2,95	540.8882.0000	
2,96	- 3,80	540.8892.0000	
3,81	- 6,70	540.8902.0000	
6,71	- 10,40	540.8912.0000	
10,41	- 16,90	540.8922.0000	
16,91	- 25,00	540.8942.0000	
25,01	- 36,50	540.8912.0000	
		540.9912.0205	
36,51	- 49,10	540.8942.0000	
		540.9912.0205	
49,11	- 53,00	540.8952.0000	O
		540.9912.0205	
	- 77,00		S
DN 100 do 88			
2,50	- 5,80		S
5,81	- 7,60	540.8922.0000	O
7,61	- 10,00	540.8932.0000	O
10,01	- 14,70	540.8942.0000	O
14,71	- 20,00	540.8912.0000	O
		540.9912.0205	
20,01	- 27,40	540.8942.0000	O
		540.9912.0205	
27,41	- 34,00	540.8952.0000	O
		540.9912.0205	
	- 53,00		S
DN 150 do 110			
Dämpfe/Gase *(steam/gases)*			
0,20	- 0,30	540.8832.0000	
0,31	- 0,40	540.8842.0000	
0,41	- 0,55	540.8852.0000	
0,56	- 0,75	540.8862.0000	
0,76	- 1,00	540.8872.0000	
1,01	- 1,50	540.8882.0000	
1,51	- 2,00	540.8974.0205	
2,01	- 2,60	540.8902.0000	
2,61	- 3,50	540.8912.0000	
3,51	- 4,40	540.8922.0000	
4,41	- 5,80	540.8932.0000	
5,81	- 7,60	540.8942.0000	
7,61	- 10,00	540.8932.0000	
		540.8982.0205	
10,01	- 13,50	540.8952.0000	
		540.8974.0205	
13,51	- 18,00	540.8942.0000	
		540.9912.0205	
	- 40,00		S
Flüssigkeit *(liquids)*			
0,20	- 40,00		S

warmfest *(creep-resistant steel)*

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 100 do 74			
2,50	- 2,95	540.8882.0000	
2,96	- 3,80	540.8892.0000	
3,81	- 6,70	540.8902.0000	
6,71	- 10,40	540.8912.0000	
10,41	- 16,90	540.8922.0000	
16,91	- 25,00	540.8942.0000	
25,01	- 36,50	540.8912.0000	
		540.9912.0205	
36,51	- 49,10	540.8942.0000	
		540.9912.0205	
49,11	- 53,00	540.8952.0000	O
		540.9912.0205	
	- 77,00		S
DN 100 do 88			
2,50	- 5,80		S
5,81	- 7,60	540.8922.0000	O
7,61	- 10,00	540.8932.0000	O
10,01	- 14,70	540.8942.0000	O
14,71	- 20,00	540.8912.0000	O
		540.9912.0205	
20,01	- 27,40	540.8942.0000	O
		540.9912.0205	
27,41	- 34,00	540.8952.0000	O
		540.9912.0205	
	- 53,00		S
DN 150 do 110			
Dämpfe/Gase *(steam/gases)*			
0,20	- 0,30	540.8832.0000	
0,31	- 0,40	540.8842.0000	
0,41	- 0,55	540.8852.0000	
0,56	- 0,75	540.8862.0000	
0,76	- 1,00	540.8872.0000	
1,01	- 1,50	540.8882.0000	
1,51	- 2,00	540.8974.0205	
2,01	- 2,60	540.8902.0000	
2,61	- 3,50	540.8912.0000	
3,51	- 4,40	540.8922.0000	
4,41	- 5,80	540.8932.0000	
5,81	- 7,60	540.8942.0000	
7,61	- 10,00	540.8932.0000	
		540.8982.0205	
10,01	- 13,50	540.8952.0000	
		540.8974.0205	
13,51	- 18,00	540.8942.0000	
		540.9912.0205	
	- 40,00		S
Flüssigkeit *(liquids)*			
0,20	- 40,00		S

korrosionsfest (stainless steel)

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 100 do 74			
2,50	- 2,95	540.8884.0000	
2,96	- 3,80	540.8894.0000	
3,81	- 6,70	540.8904.0000	
6,71	- 10,40	540.8884.0000	
		540.8984.0205	
10,41	- 16,90	540.8904.0000	
		540.8984.0205	
	- 49,00		S
DN 100 do 88			
2,50	- 32,00		S
DN 150 do 110			
Dämpfe/Gase *(steam/gases)*			
0,20	- 1,00		S
1,01	- 1,50	540.8884.0000	
1,51	- 2,00	540.8974.0205	
2,01	- 2,60	540.8904.0000	
2,61	- 3,50	540.8894.0000	
		540.8974.0205	
3,51	- 4,40	540.8904.0000	
		540.8944.0205	
	- 10,00		S
Flüssigkeit *(liquids)*			
0,20	- 14,50		S

Ausführung *(model)*											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von	bis	Feder-	Indizes	von	bis	Feder-	Indizes	von	bis	Feder-	Indizes
p1	p2	Materialnummer		p1	p2	Materialnummer		p1	p2	Materialnummer	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
DN 25 do 15				**DN 25 do 15**				**DN 25 do 15**			
36	- 49	540.8324.0000		36	- 49	540.8324.0000		36	- 49	540.8324.0000	
49	- 71	540.8334.0000		49	- 71	540.8334.0000		49	- 71	540.8334.0000	
71	-105	540.4504.0000		71	-105	540.4504.0000		71	-105	540.4504.0000	
105	-152	540.4514.0000		105	-152	540.4514.0000		105	-152	540.4514.0000	
152	-210	540.4524.0000		152	-210	540.4524.0000		152	-210	540.4524.0000	
210	-297	540.4534.0000		210	-297	540.4534.0000		210	-297	540.4534.0000	
297	-421	540.4544.0000		297	-421	540.4544.0000		297	-421	540.4544.0000	
421	-638	540.4554.0000		421	-638	540.4554.0000		421	-638	540.4554.0000	
638	-711	540.4634.0000		638	-711	540.4634.0000		638	-711	540.4634.0000	
711	-972	540.4574.0000		711	-972	540.4574.0000		711	-972	540.4574.0000	
972	-1204	540.4584.0000		972	-1204	540.4584.0000		972	-1204	540.4584.0000	
1204	-1552	540.4594.0000		1204	-1552	540.4594.0000		1204	-1552	540.4594.0000	
1552	-2059	540.5512.0000		1552	-2059	540.5512.0000		1552	-1740	540.4604.0000	
2059	-2610	540.5522.0000		2059	-2610	540.5522.0000		1740	-2059	540.4594.0000	
2610	-2900	540.5532.0000		2610	-2900	540.5532.0000				540.4634.0000	
2900	-3263	540.5542.0000		2900	-3263	540.5542.0000		2059	-2320	540.4604.0000	
3263	-3567	540.5532.0000		3263	-3567	540.5532.0000				540.4634.0000	
		540.4634.0000				540.4634.0000		2320	-2900	540.9574.0000	
3567	-4060	540.5542.0000		3567	-4060	540.5542.0000				540.4634.0000	
		540.4634.0000				540.4634.0000		2900	-3625	540.9594.0000	
4060	-4350	540.8342.0000		4060	-4350	540.8342.0000				540.4634.0000	
		540.4634.0000				540.4634.0000					
DN 25 do 20				**DN 25 do 20**				**DN 25 do 20**			
36	- 44	540.4514.0000		36	- 44	540.4514.0000		36	- 44	540.4514.0000	
44	- 61	540.4524.0000		44	- 61	540.4524.0000		44	- 61	540.4524.0000	
61	- 90	540.4534.0000		61	- 90	540.4534.0000		61	- 90	540.4534.0000	
90	-131	540.4544.0000		90	-131	540.4544.0000		90	-131	540.4544.0000	
131	-196	540.4554.0000		131	-196	540.4554.0000		131	-196	540.4554.0000	
196	-290	540.4564.0000		196	-290	540.4564.0000		196	-290	540.4564.0000	
290	-435	540.4584.0000		290	-435	540.4584.0000		290	-435	540.4584.0000	
435	-638	540.4594.0000		435	-638	540.4594.0000		435	-638	540.4594.0000	
638	-943	540.5512.0000		638	-943	540.5512.0000		638	-943	540.4604.0000	
943	-1305	540.5522.0000		943	-1305	540.5522.0000		943	-1305	540.4604.0000	
1305	-1595	540.5532.0000		1305	-1595	540.5532.0000				540.4634.0000	
1595	-1943	540.5532.0000		1595	-1943	540.5532.0000		1305	-1769	540.9574.0000	
		540.4634.0000				540.4634.0000				540.4634.0000	
1943	-2204	540.5542.0000		1943	-2204	540.5542.0000		1769	-2117	540.9594.0000	
		540.4634.0000				540.4634.0000				540.8394.0000	
2204	-2610	540.8372.0000		2204	-2610	540.8372.0000					
		540.8392.0000				540.8392.0000					

Ausführung (model)											
Standard *(standard)*				warmfest *(creep-resistant steel)*				korrosionsfest *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
	DN 50 do 30				DN 50 do 30					DN 50 do 30	
36	- 42	540.5712.0000		36	- 42	540.5712.0000		36	- 42	540.5714.0000	
42	- 60	540.5722.0000		42	- 60	540.5722.0000		42	- 60	540.5724.0000	
60	- 87	540.5732.0000		60	- 87	540.5732.0000		60	- 87	540.5734.0000	
87	-125	540.5742.0000		87	-125	540.5742.0000		87	-125	540.5744.0000	
125	-178	540.5752.0000		125	-178	540.5752.0000		125	-178	540.5754.0000	
178	-255	540.5762.0000		178	-255	540.5762.0000		178	-255	540.5764.0000	
255	-366	540.5772.0000		255	-366	540.5772.0000		255	-366	540.5774.0000	
366	-522	540.5782.0000		366	-522	540.5782.0000		366	-522	540.5784.0000	
522	-725	540.5792.0000		522	-725	540.5792.0000		522	-682	540.5784.0000	
725	-986	540.5802.0000		725	-986	540.5802.0000				540.9924.0205	
986	-1334	540.5802.0000		986	-1334	540.5802.0000		682	-885	540.4944.0000	
		540.9722.0205				540.9722.0205		885	-1189	540.4944.0000	
1334	-1813	540.9492.0000		1334	-1813	540.9492.0000				540.9724.0205	
		540.4982.0205				540.4982.0205			-1885		S
	-3045		S		-3045		S				
	DN 50 do 40				DN 50 do 40					DN 50 do 40	
36	- 52	540.5732.0000		36	- 52	540.5732.0000		36	- 52	540.5734.0000	
52	- 70	540.5742.0000		52	- 70	540.5742.0000		52	- 70	540.5744.0000	
70	- 87	540.9924.0205		70	- 87	540.9924.0205		70	- 87	540.9924.0205	
87	-105	540.5752.0000		87	-105	540.5752.0000		87	-105	540.5754.0000	
105	-125	540.9732.0000		105	-125	540.9732.0000		105	-125	540.5724.0000	
125	-148	540.5732.0000		125	-148	540.5732.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		125	-148	540.5734.0000	
148	-177	540.5762.0000		148	-177	540.5762.0000				540.9924.0205	
177	-212	540.9752.0000		177	-212	540.9752.0000		148	-177	540.5764.0000	
212	-268	540.5772.0000		212	-268	540.5772.0000		177	-194	540.5744.0000	
268	-348	540.9752.0000		268	-348	540.9752.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		194	-212	540.5754.0000	
348	-464	540.5782.0000		348	-464	540.5782.0000				540.9924.0205	
464	-631	540.5782.0000		464	-631	540.5782.0000		212	-268	540.5774.0000	
		540.9924.0205				540.9924.0205		268	-319	540.5764.0000	
631	-812	540.5792.0000		631	-812	540.5792.0000				540.9924.0205	
812	-972	540.5792.0000		812	-972	540.5792.0000		319	-464	540.5784.0000	
		540.9924.0205				540.9924.0205		464	-631	540.5784.0000	
972	-1088	540.5802.0000		972	-1088	540.5802.0000				540.9924.0205	
		540.9924.0205				540.9924.0205		631	-740	540.5784.0000	
1088	-1262	540.5802.0000		1088	-1262	540.5802.0000				540.9724.0205	
		540.4962.0205				540.4962.0205		740	-885	540.4944.0000	
1262	-1421	540.9492.0000		1262	-1421	540.9492.0000				540.9724.0205	
		540.4962.0205				540.4962.0205			-943		S
	-1660		S		-1660		S				

Ausführung (model)											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				**p [psig]**				**p [psig]**			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
DN 80 do 50				**DN 80 do 50**				**DN 80 do 50**			
36	- 47	540.5932.0000		36	- 47	540.5932.0000		36	- 47	540.5844.0000	O; V80
47	- 71	540.5942.0000		47	- 71	540.5942.0000		47	- 71	540.5854.0000	O; V80
71	-115	540.5952.0000		71	-115	540.5952.0000		71	-115	540.5864.0000	O; V80
115	-145	540.5962.0000		115	-145	540.5962.0000		115	-145	540.5864.0000	O; V80
145	-232	540.5972.0000		145	-232	540.5972.0000				540.9884.0000	
232	-276	540.9952.0000		232	-276	540.9952.0000		145	-232	540.5874.0000	O; V80
276	-392	540.5982.0000		276	-392	540.5982.0000				540.9884.0000	
392	-551	540.9962.0000		392	-551	540.9962.0000		232	-276	540.9954.0000	
551	-783	540.9952.0000		551	-783	540.9952.0000		276	-392	540.5984.0000	
		540.9982.0205				540.9982.0205		392	-551	540.5984.0000	
783	-1088	540.9962.0000		783	-1088	540.9962.0000				540.9714.0000	
		540.9982.0205				540.9982.0205		551	-783	540.9954.0000	
1088	-1552	540.9842.0000		1088	-1552	540.9842.0000				540.9534.0000	
		540.9982.0205				540.9982.0205		783	-885	540.5984.0000	
1552	-1885	540.9842.0000		1552	-1885	540.9842.0000				540.4994.0000	
		540.9542.0205				540.9542.0205			-1508		S
	-2320		S		-2320		S				
DN 80 do 60				**DN 80 do 60**				**DN 80 do 60**			
Dämpfe/Gase *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*			
36	- 38	540.5824.0000	V80	36	- 38	540.5824.0000	V80	36	- 38	540.5824.0000	O; V80
		540.9884.0000				540.9884.0000				540.9884.0000	
38	- 61	540.5844.0000	V80	38	- 61	540.5844.0000	V80	38	- 61	540.5844.0000	O; V80
		540.9884.0000				540.9884.0000				540.9884.0000	
61	- 76	540.5952.0000		61	- 76	540.5952.0000		61	- 76	540.5864.0000	O; V80
76	-105	540.9714.0000		76	-105	540.9714.0000		76	-105	540.9714.0000	
105	-134	540.5962.0000		105	-134	540.5962.0000		105	-134	540.5864.0000	O; V80
134	-158	540.5872.0000	O; V80	134	-158	540.5872.0000	O; V80			540.9884.0000	
158	-192	540.5972.0000		158	-192	540.5972.0000		134	-158	540.5874.0000	O; V80
192	-254	540.9952.0000		192	-254	540.9952.0000		158	-192	540.5874.0000	O; V80
254	-319	540.5982.0000		254	-319	540.5982.0000				540.9884.0000	
319	-399	540.5972.0000		319	-399	540.5972.0000		192	-254	540.9954.0000	
		540.9714.0000				540.9714.0000		254	-319	540.5984.0000	
399	-508	540.9962.0000		399	-508	540.9962.0000		319	-399	540.9954.0000	
508	-624	540.5972.0000		508	-624	540.5972.0000				540.9714.0000	
		540.9982.0205				540.9982.0205		399	-508	540.5984.0000	
624	-812	540.5982.0000		624	-812	540.5982.0000				540.9714.0000	
		540.9982.0205				540.9982.0205			-747		S
812	-899	540.9962.0000		812	-899	540.9962.0000					
		540.9982.0205				540.9982.0205					
899	-1117	540.9552.0000		899	-1117	540.9552.0000					
		540.9982.0205				540.9982.0205					
DN 80 do 60				**DN 80 do 60**				**DN 80 do 60**			
Flüssigkeit *(liquids)*				**Flüssigkeit** *(liquids)*				**Flüssigkeit** *(liquids)*			
36	-1537		S	36	-1537		S	36	-885		S

Ausführung (model)

Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
	DN 100 do 50				**DN 100 do 50**				**DN 100 do 50**		
36	- 42	540.8872.0000	O	36	- 42	540.8872.0000	O	36	- 42	540.8874.0000	O
42	- 60	540.8882.0000	O	42	- 60	540.8882.0000	O	42	- 60	540.8884.0000	O
60	- 86	540.8892.0000	O	60	- 86	540.8892.0000	O	60	- 86	540.8894.0000	O
86	-120	540.8902.0000	O	86	-120	540.8902.0000	O	86	-120	540.8904.0000	O
120	-165	540.8912.0000	O	120	-165	540.8912.0000	O	120	-165	540.8884.0000	O
165	-229	540.8922.0000	O	165	-229	540.8922.0000	O			540.8984.0205	
229	-319	540.8942.0000	O	229	-319	540.8942.0000	O	165	-229	540.8904.0000	O
319	-444	540.8942.0000	O	319	-444	540.8942.0000	O			540.8984.0205	
		540.8984.0205				540.8984.0205			-1030		S
444	-624	540.8952.0000	O	444	-624	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
	-2320		S		-2320		S				
	DN 100 do 60				**DN 100 do 60**				**DN 100 do 60**		
36	- 41	540.8882.0000	O	36	- 41	540.8882.0000	O	36	- 41	540.8884.0000	O
41	- 58	540.8892.0000	O	41	- 58	540.8892.0000	O	41	- 58	540.8894.0000	O
58	- 78	540.8902.0000	O	58	- 78	540.8902.0000	O	58	- 78	540.8904.0000	O
78	-113	540.8912.0000	O	78	-113	540.8912.0000	O	78	-113	540.8884.0000	O
113	-160	540.8922.0000	O	113	-160	540.8922.0000	O			540.8984.0205	
160	-189	540.8932.0000	O	160	-189	540.8932.0000	O	113	-160	540.8904.0000	O
189	-218	540.8942.0000	O	189	-218	540.8942.0000	O			540.8984.0205	
218	-261	540.8952.0000	O	218	-261	540.8952.0000	O		-798		S
261	-377	540.8952.0000	O	261	-377	540.8952.0000	O				
		540.8974.0205				540.8974.0205					
377	-500	540.8942.0000	O	377	-500	540.8942.0000	O				
		540.9912.0205				540.9912.0205					
500	-667	540.8952.0000	O	500	-667	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
		540.0044.0000				540.0044.0000					
	-2320		S		-2320		S				

Ausführung *(model)*												
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
	DN 100 do 74				**DN 100 do 74**				**DN 100 do 74**		
36	- 43	540.8882.0000		36	- 43	540.8882.0000		36	- 43	540.8884.0000	
43	- 55	540.8892.0000		43	- 55	540.8892.0000		43	- 55	540.8894.0000	
55	- 97	540.8902.0000		55	- 97	540.8902.0000		55	- 97	540.8904.0000	
97	-151	540.8912.0000		97	-151	540.8912.0000		97	-151	540.8884.0000	
151	-245	540.8922.0000		151	-245	540.8922.0000				540.8984.0205	
245	-363	540.8942.0000		245	-363	540.8942.0000		151	-245	540.8904.0000	
363	-529	540.8912.0000		363	-529	540.8912.0000				540.8984.0205	
		540.9912.0205				540.9912.0205			-711		S
529	-712	540.8942.0000		529	-712	540.8942.0000					
		540.9912.0205				540.9912.0205					
712	-769	540.8952.0000	O	712	-769	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
	-1117		S		-1117		S				
	DN 100 do 88				**DN 100 do 88**				**DN 100 do 88**		
36	- 84		S	36	- 84		S	36	-464		S; O
84	-110	540.8922.0000	O	84	-110	540.8922.0000	O				
110	-145	540.8932.0000	O	110	-145	540.8932.0000	O				
145	-213	540.8942.0000	O	145	-213	540.8942.0000	O				
213	-290	540.8912.0000	O	213	-290	540.8912.0000	O				
		540.9912.0205				540.9912.0205					
290	-397	540.8942.0000	O	290	-397	540.8942.0000	O				
		540.9912.0205				540.9912.0205					
397	-493	540.8952.0000	O	397	-493	540.8952.0000	O				
		540.9912.0205				540.9912.0205					
	-769		S		-769		S				
	DN 150 do 110				**DN 150 do 110**				**DN 150 do 110**		
	Dämpfe/Gase *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*				**Dämpfe/Gase** *(steam/gases)*		
3	- 4	540.8832.0000		3	- 4	540.8832.0000		3	- 15		S
4	- 6	540.8842.0000		4	- 6	540.8842.0000		15	- 22	540.8884.0000	
6	- 8	540.8852.0000		6	- 8	540.8852.0000		22	- 29	540.8974.0205	
8	- 11	540.8862.0000		8	- 11	540.8862.0000		29	- 38	540.8904.0000	
11	- 15	540.8872.0000		11	- 15	540.8872.0000		38	- 51	540.8894.0000	
15	- 22	540.8882.0000		15	- 22	540.8882.0000				540.8974.0205	
22	- 29	540.8974.0205		22	- 29	540.8974.0205		51	- 64	540.8904.0000	
29	- 38	540.8902.0000		29	- 38	540.8902.0000				540.8944.0205	
38	- 51	540.8912.0000		38	- 51	540.8912.0000			-145		S
51	- 64	540.8922.0000		51	- 64	540.8922.0000					
64	- 84	540.8932.0000		64	- 84	540.8932.0000					
84	-110	540.8942.0000		84	-110	540.8942.0000					
110	-145	540.8942.0000		110	-145	540.8942.0000					
		540.9222.0205				540.9222.0205					
145	-196	540.8952.0000		145	-196	540.8952.0000					
		540.8974.0205				540.8974.0205					
196	-261	540.8942.0000		196	-261	540.8942.0000					
		540.9912.0205				540.9912.0205					
	-580		S		-580		S				
	Flüssigkeit *(liquids)*				**Flüssigkeit** *(liquids)*				**Flüssigkeit** *(liquids)*		
3	-580		S	3	-580		S	3	-210		S

Contents

1 Purpose

This LESER Global Standard (LGS) contains the information about pressure range of all springs, which are installed in valve- types 444.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

This LGS contains information about the pressure range of all springs, which are installed in valve- types 444.
The pressure ranges of the various types are given first in pressure-unit [bar].
This is followed by the pressure-unit [psig].

3 References

LDeS 3060.01, LDeS 3265.01

Ausführung

korrosionsfest (stainless steel)

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 25 do 23			
0,10	- 0,14	540.8014.0000	
0,15	- 0,18	540.8024.0000	
0,19	- 0,25	540.8034.0000	
0,26	- 0,34	540.8044.0000	
0,35	- 0,50	540.8054.0000	
0,51	- 0,90	540.4004.0000	
0,91	- 1,30	540.4014.0000	
1,31	- 1,70	540.4024.0000	
1,71	- 2,30	540.4034.0000	
2,31	- 2,70	540.4044.0000	
2,71	- 3,90	540.4054.0000	
3,91	- 5,10	540.4064.0000	
5,11	- 8,00	540.4074.0000	
8,01	-10,50	540.4084.0000	
10,51	-14,50	540.4094.0000	
14,51	-16,00	540.4104.0000	
DN 50 do 46			
0,20	- 0,33	540.8414.0000	
0,34	- 0,50	540.8424.0000	
0,51	- 0,75	540.8434.0000	
0,76	- 1,05	540.4645.0000	
1,06	- 1,50	540.4664.0000	
1,51	- 2,00	540.4674.0000	
2,01	- 2,90	540.4684.0000	
2,91	- 4,00	540.4694.0000	
4,01	- 5,30	540.4704.0000	
5,31	- 7,50	540.4714.0000	
7,51	- 9,50	540.8494.0000	
9,51	-11,00	540.9604.0000	
11,01	-13,00	540.4724.0000	
13,01	-15,00	540.4694.0000 540.9604.0000	
15,01	-16,00	540.4704.0000 540.9604.0000	

korrosionsfest (stainless steel)

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 32 do 29			
Nennweite nicht ausgeführt (nominal size not available)			
DN 65 do 60			
0,25	- 0,42	540.8514.0000	
0,43	- 0,70	540.8534.0000	
0,71	- 1,00	540.8544.0000	
1,01	- 1,30	540.5704.0000	
1,31	- 1,75	540.5714.0000	
1,76	- 2,30	540.5724.0000	
2,31	- 3,50	540.5734.0000	
3,51	- 4,80	540.5744.0000	
4,81	- 7,50	540.5754.0000	
7,51	-10,00	540.5764.0000	
10,01	-13,50	540.5774.0000	
13,51	-16,00	540.5764.0000 540.9924.0205	

korrosionsfest (stainless steel)

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 40 do 37			
0,25	- 0,50	540.8414.0000	
0,51	- 0,80	540.8424.0000	
0,81	- 1,20	540.8434.0000	
1,21	- 1,80	540.4654.0000	
1,81	- 2,40	540.4664.0000	
2,41	- 3,00	540.4674.0000	
3,01	- 4,80	540.4684.0000	
4,81	- 6,20	540.4694.0000	
6,21	- 8,60	540.4704.0000	
8,61	-12,80	540.4714.0000	
12,81	-16,00	540.4724.0000	
DN 80 do 74			
0,20	- 0,30	540.8514.0000	
0,31	- 0,50	540.8534.0000	
0,51	- 0,70	540.8544.0000	
0,71	- 0,95	540.5704.0000	
0,96	- 1,40	540.5714.0000	
1,41	- 1,70	540.5724.0000	
1,71	- 2,05	540.5734.0000	
2,06	- 3,30	540.5744.0000	
3,31	- 5,10	540.5754.0000	
5,11	- 6,80	540.5764.0000	
6,81	- 9,00	540.5774.0000	
9,01	-12,30	540.5784.0000	
12,31	-16,00	540.5784.0000 540.9924.0205	

Ausführung *(model)*

korrosionsfest *(stainless steel)*

p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 25 do 23			
1	- 2	540.8014.0000	
2	- 3	540.8024.0000	
3	- 4	540.8034.0000	
4	- 5	540.8044.0000	
5	- 7	540.8054.0000	
7	- 13	540.4004.0000	
13	- 19	540.4014.0000	
19	- 25	540.4024.0000	
25	- 33	540.4034.0000	
33	- 39	540.4044.0000	
39	- 57	540.4054.0000	
57	- 74	540.4064.0000	
74	-116	540.4074.0000	
116	-152	540.4084.0000	
152	-210	540.4094.0000	
210	-232	540.4104.0000	
DN 50 do 46			
3	- 5	540.8414.0000	
5	- 7	540.8424.0000	
7	- 11	540.8434.0000	
11	- 15	540.4645.0000	
15	- 22	540.4664.0000	
22	- 29	540.4674.0000	
29	- 42	540.4684.0000	
42	- 58	540.4694.0000	
58	- 77	540.4704.0000	
77	-109	540.4714.0000	
109	-138	540.8494.0000	
138	-160	540.9604.0000	
160	-189	540.4724.0000	
189	-218	540.4694.0000 540.9604.0000	
218	-232	540.4704.0000 540.9604.0000	

korrosionsfest *(stainless steel)*

p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 32 do 29			
Nennweite nicht ausgeführt (nominal size not available)			
DN 65 do 60			
4	- 6	540.8514.0000	
6	- 10	540.8534.0000	
10	- 15	540.8544.0000	
15	- 19	540.5704.0000	
19	- 26	540.5714.0000	
26	- 33	540.5724.0000	
33	- 51	540.5734.0000	
51	- 70	540.5744.0000	
70	-109	540.5754.0000	
109	-145	540.5764.0000	
145	-196	540.5774.0000	
196	-232	540.5764.0000 540.9924.0205	

korrosionsfest *(stainless steel)*

p [psig] von p1 *up*	bis p2 *to*	Feder-Materialnummer *stock no.*	Indizes
DN 40 do 37			
4	- 7	540.8414.0000	
7	- 12	540.8424.0000	
12	- 18	540.8434.0000	
18	- 26	540.4654.0000	
26	- 35	540.4664.0000	
35	- 44	540.4674.0000	
44	- 70	540.4684.0000	
70	- 90	540.4694.0000	
90	-125	540.4704.0000	
125	-186	540.4714.0000	
186	-232	540.4724.0000	
DN 80 do 74			
3	- 4	540.8514.0000	
4	- 7	540.8534.0000	
7	- 10	540.8544.0000	
10	- 14	540.5704.0000	
14	- 20	540.5714.0000	
20	- 25	540.5724.0000	
25	- 30	540.5734.0000	
30	- 48	540.5744.0000	
48	- 74	540.5754.0000	
74	- 99	540.5764.0000	
99	-131	540.5774.0000	
131	-178	540.5784.0000	
178	-232	540.5784.0000 540.9924.0205	

Contents

1 Purpose

This LESER Global Standard (LGS) contains the information about pressure range of all springs, which are installed in valve- types 427, 429, 431, 433.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

This LGS contains information about the pressure range of all springs, which are installed in valve- types 427, 429, 431, 433.
The pressure ranges of the various types are given first in pressure-unit [bar, page 2-5]. This is followed by the pressure-unit [psig, page 6-end].

For additional information please see legend description.

3 References

LDeS 3060.01, LDeS 3265.01

4 Legend / Indices

- S = Sonderauftrag / special order
- Keine BTP = keine Bauteilzulassung / no approval
- Blaue Markierung/ blue marking = Drucklagereinsatz / thrust bearing use

Ausführung

Standard *(standard)*

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
Type 427 , 429 DN 15 do 12			
0,30	- 0,41	540.8004.0000	keine BTP
0,42	- 0,57	540.8014.0000	keine BTP
0,58	- 0,79	540.8024.0000	keine BTP
0,80	- 1,10	540.8034.0000	keine BTP
1,11	- 1,50	540.8044.0000	keine BTP
1,51	- 2,10	540.8054.0000	
2,11	- 2,90	540.4004.0000	
2,91	- 4,00	540.4014.0000	
4,01	- 5,65	540.5021.0190	
5,66	- 7,80	540.5031.0190	
7,81	- 10,90	540.5041.0190	
10,91	- 15,00	540.5051.0190	
15,01	- 20,80	540.5062.0000	
20,81	- 28,90	540.5072.0000	
28,91	- 40,00	540.5082.0000	
Type 431 , 433 DN 15 do 12			
Stahlteller *(steel disk)*			
0,20	- 0,29		S
0,30	- 0,35	540.8024.0000	
0,36	- 0,50	540.8034.0000	
0,51	- 0,70	540.8044.0000	
0,71	- 1,20	540.8054.0000	
1,21	- 2,10	540.4004.0000	
2,11	- 3,00	540.4014.0000	
3,01	- 4,40	540.5021.0190	
4,41	- 6,30	540.5031.0190	
6,31	- 9,00	540.5041.0190	
9,01	- 13,00	540.5051.0190	
13,01	- 19,00	540.5062.0000	
19,01	- 26,70	540.5072.0000	
26,71	- 38,30	540.5082.0000	
38,31	- 51,30	540.5092.0000	
51,31	- 70,00	540.5102.0000	
70,01	- 81,00	540.5112.0000	
81,01	-100,00	540.5122.0000	
100,01	-122,00	540.8062.0000	
122,01	-135,00	540.8062.0000	
		540.2204.0205	
135,01	-144,00	540.8062.0000	
		540.5134.0205	
144,01	-160,00	540.8062.0000	
		540.4314.0205	
O-Ring-Teller *(O-ring disk)*			
0,30	- 0,35	540.8004.0000	
0,36	- 0,49	540.8014.0000	
0,50	- 0,70	540.8024.0000	
0,71	- 0,90	540.8034.0000	
0,91	- 1,33	540.8044.0000	
1,34	- 1,96	540.8054.0000	
1,97	- 2,95	540.4004.0000	
2,96	- 4,40	540.4014.0000	
4,41	- 6,00	540.5021.0190	
6,01	- 8,40	540.5031.0190	
8,41	- 11,30	540.5041.0190	
11,31	- 16,00	540.5051.0190	
16,01	- 22,00	540.5062.0000	
22,01	- 30,40	540.5072.0000	
30,41	- 42,00	540.5082.0000	
42,01	- 58,00	540.5092.0000	
58,01	- 79,50	540.5102.0000	
79,51	-103,00	540.5122.0000	
103,01	-126,00	540.8062.0000	
126,01	-142,00	540.8062.0000	
		540.2204.0205	
	-160,00		S

warmfest *(creep-resistant steel)*

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
Type 427 , 429 DN 15 do 12			
0,30	- 0,41	540.8004.0000	keine BTP
0,42	- 0,57	540.8014.0000	keine BTP
0,58	- 0,79	540.8024.0000	keine BTP
0,80	- 1,10	540.8034.0000	keine BTP
1,11	- 1,50	540.8044.0000	keine BTP
1,50	- 2,10	540.8054.0000	
2,11	- 2,90	540.4004.0000	
2,91	- 4,00	540.4014.0000	
4,01	- 5,65	540.4024.0000	
5,66	- 7,80	540.4034.0000	
7,81	- 10,90	540.4044.0000	
10,91	- 15,00	540.4054.0000	
15,01	- 20,80	540.5062.0000	
20,81	- 28,90	540.5072.0000	
28,91	- 40,00	540.5082.0000	
Type 431 , 433 DN 15 do 12			
Stahlteller *(steel disk)*			
0,20	- 0,29		S
0,30	- 0,35	540.8024.0000	
0,36	- 0,50	540.8034.0000	
0,51	- 0,70	540.8044.0000	
0,71	- 1,20	540.8054.0000	
1,21	- 2,10	540.4004.0000	
2,11	- 3,00	540.4014.0000	
3,01	- 4,40	540.4024.0000	
4,41	- 6,30	540.4034.0000	
6,31	- 9,00	540.4044.0000	
9,01	- 13,00	540.4054.0000	
13,01	- 19,00	540.5062.0000	
19,01	- 26,70	540.5072.0000	
26,71	- 38,30	540.5082.0000	
38,31	- 51,30	540.5092.0000	
51,31	- 70,00	540.5102.0000	
70,01	- 81,00	540.5112.0000	
81,01	-100,00	540.5122.0000	
100,01	-122,00	540.8062.0000	
122,01	-135,00	540.8062.0000	
		540.2204.0205	
135,01	-144,00	540.8062.0000	
		540.5134.0205	
144,01	-160,00	540.8062.0000	
		540.4314.0205	
O-Ring-Teller *(O-ring disk)*			

korrosionsfest (stainless steel)

p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
Type 427 , 429 DN 15 do 12			
0,30	- 0,41	540.8004.0000	keine BTP
0,42	- 0,57	540.8014.0000	keine BTP
0,58	- 0,79	540.8024.0000	keine BTP
0,80	- 1,10	540.8034.0000	keine BTP
1,11	- 1,50	540.8044.0000	keine BTP
1,50	- 2,10	540.8054.0000	
2,11	- 2,90	540.4004.0000	
2,91	- 4,00	540.4014.0000	
4,01	- 5,65	540.4024.0000	
5,66	- 7,80	540.4034.0000	
7,81	- 10,90	540.4044.0000	
10,91	- 15,00	540.4054.0000	
15,01	- 20,80	540.4064.0000	
20,81	- 28,90	540.4074.0000	
28,91	- 40,00	540.4084.0000	
Type 431 , 433 DN 15 do 12			
Stahlteller *(steel disk)*			
0,20	- 0,29		S
0,30	- 0,35	540.8024.0000	
0,36	- 0,50	540.8034.0000	
0,51	- 0,70	540.8044.0000	
0,71	- 1,20	540.8054.0000	
1,21	- 2,10	540.4004.0000	
2,11	- 3,00	540.4014.0000	
3,01	- 4,40	540.4024.0000	
4,41	- 6,30	540.4034.0000	
6,31	- 9,00	540.4044.0000	
9,01	- 13,00	540.4054.0000	
13,01	- 19,00	540.4064.0000	
19,01	- 26,70	540.4074.0000	
26,71	- 38,30	540.4084.0000	
38,31	- 51,30	540.4094.0000	
51,31	- 70,00	540.4104.0000	
70,01	- 85,00	540.4094.0000	
		540.5134.0205	
85,01	-100,50	540.8064.0000	
100,51	-120,00	540.5124.0000	
		540.5134.0205	
120,01	-140,00	540.8064.0000	
		540.5134.0205	
140,01	-160,00	540.8064.0000	
		540.4314.0205	
O-Ring-Teller *(O-ring disk)*			
0,30	- 0,35	540.8004.0000	
0,36	- 0,49	540.8014.0000	
0,50	- 0,70	540.8024.0000	
0,71	- 0,90	540.8034.0000	
0,91	- 1,33	540.8044.0000	
1,34	- 1,96	540.8054.0000	
1,97	- 2,95	540.4004.0000	
2,96	- 4,40	540.4014.0000	
4,41	- 6,00	540.4024.0000	
6,01	- 8,40	540.4034.0000	
8,41	- 11,30	540.4044.0000	
11,31	- 16,00	540.4054.0000	
16,01	- 22,00	540.4064.0000	
22,01	- 30,40	540.4074.0000	
30,41	- 42,00	540.4084.0000	
42,01	- 52,50	540.4094.0000	
52,51	- 73,50	540.4104.0000	
73,51	- 85,00	540.4094.0000	
		540.5134.0205	
	-150,00		S

Ausführung											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 20/25 do 18				**DN 20/25 do 18**				**DN 20/25 do 18**			
0,20	- 0,23	540.8024.0000		0,20	- 0,23	540.8024.0000		0,20	- 0,23	540.8024.0000	
0,24	- 0,30	540.8034.0000		0,24	- 0,30	540.8034.0000		0,24	- 0,30	540.8034.0000	
0,31	- 0,50	540.8044.0000		0,31	- 0,50	540.8044.0000		0,31	- 0,50	540.8044.0000	
0,51	- 0,85	540.8054.0000		0,51	- 0,85	540.8054.0000		0,51	- 0,85	540.8054.0000	
0,86	- 1,19	540.4004.0000		0,86	- 1,19	540.4004.0000		0,86	- 1,19	540.4004.0000	
1,20	- 1,69	540.4014.0000		1,20	- 1,69	540.4014.0000		1,20	- 1,69	540.4014.0000	
1,70	- 2,39	540.5021.0190		1,70	- 2,39	540.4024.0000		1,70	- 2,39	540.4024.0000	
2,40	- 3,39	540.5031.0190		2,40	- 3,39	540.4034.0000		2,40	- 3,39	540.4034.0000	
3,40	- 4,49	540.5041.0190		3,40	- 4,49	540.4044.0000		3,40	- 4,49	540.4044.0000	
4,50	- 6,40	540.5051.0190		4,50	- 6,40	540.4054.0000		4,50	- 6,40	540.4054.0000	
6,41	- 9,20	540.5062.0000		6,41	- 9,20	540.5062.0000		6,41	- 9,20	540.4064.0000	
9,21	- 12,80	540.5072.0000		9,21	- 12,80	540.5072.0000		9,21	- 12,80	540.4074.0000	
12,81	- 18,60	540.5082.0000		12,81	- 18,60	540.5082.0000		12,81	- 18,60	540.4084.0000	
18,61	- 24,00	540.5092.0000		18,61	- 24,00	540.5092.0000		18,61	- 24,00	540.4094.0000	
24,01	- 28,40	540.5102.0000		24,01	- 28,40	540.5102.0000		24,01	- 28,40	540.4104.0000	
28,41	- 33,90	540.5112.0000		28,41	- 33,90	540.5112.0000		28,41	- 33,90	540.4114.0000	
33,91	- 40,00	540.5122.0000		33,91	- 40,00	540.5122.0000		33,91	- 40,00	540.5124.0000	
DN 32 do 18				**DN 32 do 18**				**DN 32 do 18**			
0,24	- 0,30	540.8034.0000		0,24	- 0,30	540.8034.0000		0,24	- 0,30	540.8034.0000	
0,31	- 0,42	540.8044.0000		0,31	- 0,42	540.8044.0000		0,31	- 0,42	540.8044.0000	
0,43	- 0,58	540.8054.0000		0,43	- 0,58	540.8054.0000		0,43	- 0,58	540.8054.0000	
0,59	- 0,80	540.4004.0000		0,59	- 0,80	540.4004.0000		0,59	- 0,80	540.4004.0000	
0,81	- 0,99	540.4014.0000		0,81	- 0,99	540.4014.0000		0,81	- 0,99	540.4014.0000	
1,00	- 1,49	540.5021.0190		1,00	- 1,49	540.4024.0000		1,00	- 1,49	540.4024.0000	
1,50	- 2,19	540.5031.0190		1,50	- 2,19	540.4034.0000		1,50	- 2,19	540.4034.0000	
2,20	- 3,09	540.5041.0190		2,20	- 3,09	540.4044.0000		2,20	- 3,09	540.4044.0000	
3,10	- 4,09	540.5051.0190		3,10	- 4,09	540.4054.0000		3,10	- 4,09	540.4054.0000	
4,10	- 5,70	540.5062.0000		4,10	- 5,70	540.5062.0000		4,10	- 5,70	540.4064.0000	
5,71	- 7,80	540.5072.0000		5,71	- 7,80	540.5072.0000		5,71	- 7,80	540.4074.0000	
7,81	- 11,40	540.5082.0000		7,81	- 11,40	540.5082.0000		7,81	- 11,40	540.4084.0000	
11,41	- 15,40	540.5092.0000		11,41	- 15,40	540.5092.0000		11,41	- 15,40	540.4094.0000	
15,41	- 19,70	540.5102.0000		15,41	- 19,70	540.5102.0000		15,41	- 19,70	540.4104.0000	
19,71	- 24,00	540.5112.0000		19,71	- 24,00	540.5112.0000		19,71	- 24,00	540.4114.0000	
24,01	- 28,50	540.5122.0000		24,01	- 28,50	540.5122.0000		24,01	- 28,50	540.5124.0000	
28,51	- 33,90	540.8062.0000		28,51	- 33,90	540.8062.0000		28,51	- 33,90	540.8064.0000	
33,91	- 40,00	540.8062.0000		33,91	- 40,00	540.8062.0000		33,91	- 40,00	540.8064.0000	
		540.5134.0205				540.5134.0205				540.5134.0205	
DN 40 do 23				**DN 40 do 23**				**DN 40 do 23**			
0,20	- 0,23	540.8034.0000		0,20	- 0,23	540.8034.0000		0,20	- 0,23	540.8034.0000	
0,24	- 0,34	540.8044.0000		0,24	- 0,34	540.8044.0000		0,24	- 0,34	540.8044.0000	
0,35	- 0,49	540.8054.0000		0,35	- 0,49	540.8054.0000		0,35	- 0,49	540.8054.0000	
0,50	- 0,63	540.4004.0000		0,50	- 0,63	540.4004.0000		0,50	- 0,63	540.4004.0000	
0,64	- 0,90	540.4014.0000		0,64	- 0,90	540.4014.0000		0,64	- 0,90	540.4014.0000	
0,91	- 1,27	540.5021.0190		0,91	- 1,27	540.4024.0000		0,91	- 1,27	540.4024.0000	
1,28	- 1,80	540.5031.0190		1,28	- 1,80	540.4034.0000		1,28	- 1,80	540.4034.0000	
1,81	- 2,55	540.5041.0190		1,81	- 2,55	540.4044.0000		1,81	- 2,55	540.4044.0000	
2,56	- 3,60	540.5051.0190		2,56	- 3,60	540.4054.0000		2,56	- 3,60	540.4054.0000	
3,61	- 5,08	540.5062.0000		3,61	- 5,08	540.5062.0000		3,61	- 5,08	540.4064.0000	
5,09	- 7,18	540.5072.0000		5,09	- 7,18	540.5072.0000		5,09	- 7,18	540.4074.0000	
7,19	- 10,10	540.5082.0000		7,19	- 10,10	540.5082.0000		7,19	- 10,10	540.4084.0000	
10,11	- 14,30	540.5092.0000		10,11	- 14,30	540.5092.0000		10,11	- 14,30	540.4094.0000	
14,31	- 20,20	540.5102.0000		14,31	- 20,20	540.5102.0000		14,31	- 20,20	540.4104.0000	
20,21	- 23,60	540.5112.0000		20,21	- 23,60	540.5112.0000		20,21	- 23,60	540.4114.0000	
23,61	- 30,80	540.8062.0000		23,61	- 30,80	540.8062.0000		23,61	- 30,80	540.8064.0000	
30,81	- 40,00	540.8062.0000		30,81	- 40,00	540.8062.0000		30,81	- 40,00	540.8064.0000	
		540.5134.0205				540.5134.0205				540.5134.0205	

Ausführung											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 50 do 29				**DN 50 do 29**				**DN 50 do 29**			
0,20	- 0,23	540.8104.0000		0,20	- 0,23	540.8104.0000		0,20	- 0,23	540.8104.0000	
0,24	- 0,34	540.8114.0000		0,24	- 0,34	540.8114.0000		0,24	- 0,34	540.8114.0000	
0,35	- 0,49	540.8124.0000		0,35	- 0,49	540.8124.0000		0,35	- 0,49	540.8124.0000	
0,50	- 0,63	540.8134.0000		0,50	- 0,63	540.8134.0000		0,50	- 0,63	540.8134.0000	
0,64	- 0,90	540.4154.0000		0,64	- 0,90	540.4154.0000		0,64	- 0,90	540.4154.0000	
0,91	- 1,24	540.4164.0000		0,91	- 1,24	540.4164.0000		0,91	- 1,24	540.4164.0000	
1,25	- 1,90	540.4174.0000		1,25	- 1,90	540.4174.0000		1,25	- 1,90	540.4174.0000	
1,91	- 2,60	540.5171.0190		1,91	- 2,60	540.4184.0000		1,91	- 2,60	540.4184.0000	
2,61	- 3,70	540.5181.0190		2,61	- 3,70	540.4194.0000		2,61	- 3,70	540.4194.0000	
3,71	- 4,90	540.5191.0190		3,71	- 4,90	540.4204.0000		3,71	- 4,90	540.4204.0000	
4,91	- 7,00	540.5201.0190		4,91	- 7,00	540.4214.0000		4,91	- 7,00	540.4214.0000	
7,01	- 9,30	540.5211.0190		7,01	- 9,30	540.4224.0000		7,01	- 9,30	540.4224.0000	
9,31	- 12,00	540.5221.0190		9,31	- 12,00	540.5224.0000		9,31	- 12,00	540.5224.0000	
12,01	- 16,40	540.5232.0000		12,01	- 16,40	540.5232.0000		12,01	- 16,40	540.5234.0000	
16,41	- 20,50	540.5242.0000		16,41	- 20,50	540.5242.0000		16,41	- 20,50	540.5244.0000	
20,51	- 24,60	540.5252.0000		20,51	- 24,60	540.5252.0000		20,51	- 24,60	540.5254.0000	
24,61	- 28,60	540.5262.0000		24,61	- 28,60	540.5262.0000		24,61	- 28,60	540.4284.0000	
28,61	- 30,80	540.8142.0000		28,61	- 30,80	540.8142.0000		28,61	- 31,60	540.4294.0000	
30,81	- 40,00	540.8152.0000		30,81	- 40,00	540.8152.0000		31,61	- 40,00		S
DN 65 do 37				**DN 65 do 37**				**DN 65 do 37**			
0,20	- 0,23	540.8224.0000		0,20	- 0,23	540.8224.0000		0,20	- 0,23	540.8224.0000	
0,24	- 0,34	540.8234.0000		0,24	- 0,34	540.8234.0000		0,24	- 0,34	540.8234.0000	
0,35	- 0,49	540.4354.0000		0,35	- 0,49	540.4354.0000		0,35	- 0,49	540.4354.0000	
0,50	- 0,63	540.4364.0000		0,50	- 0,63	540.4364.0000		0,50	- 0,63	540.4364.0000	
0,64	- 0,90	540.4374.0000		0,64	- 0,90	540.4374.0000		0,64	- 0,90	540.4374.0000	
0,91	- 1,27	540.5311.0190		0,91	- 1,27	540.4384.0000		0,91	- 1,27	540.4384.0000	
1,28	- 1,80	540.5321.0190		1,28	- 1,80	540.4394.0000		1,28	- 1,80	540.4394.0000	
1,81	- 2,55	540.5331.0190		1,81	- 2,55	540.4404.0000		1,81	- 2,55	540.4404.0000	
2,56	- 3,60	540.5341.0190		2,56	- 3,60	540.4414.0000		2,56	- 3,60	540.4414.0000	
3,61	- 5,08	540.5351.0190		3,61	- 5,08	540.4424.0000		3,61	- 5,08	540.4424.0000	
5,09	- 7,18	540.4434.0000		5,09	- 7,18	540.4434.0000		5,09	- 7,18	540.4434.0000	
7,19	- 10,10	540.5372.0000		7,19	- 10,10	540.5372.0000		7,19	- 10,10	540.4454.0000	
10,11	- 14,30	540.5382.0000		10,11	- 14,30	540.5382.0000		10,11	- 14,30	540.4464.0000	
14,31	- 20,20	540.5392.0000		14,31	- 20,20	540.5392.0000		14,31	- 20,20	540.4484.0000	
20,21	- 24,00	540.5402.0000		20,21	- 24,00	540.5402.0000		20,21	- 24,00	540.5404.0000	
24,01	- 26,70	540.8242.0000		24,01	- 26,70	540.8242.0000		24,01	- 26,70	540.5404.0000	
26,71	- 31,00	540.8252.0000		26,71	- 31,00	540.8252.0000				540.9484.0205	
31,01	- 35,00	540.8262.0000		31,01	- 35,00	540.8262.0000		26,71	- 31,00	540.8254.0000	
	- 40,00		S		- 40,00		S				
DN 80 do 46				**DN 80 do 46**				**DN 80 do 46**			
0,20	- 0,23	540.8314.0000		0,20	- 0,23	540.8314.0000		0,20	- 0,23	540.8314.0000	
0,24	- 0,34	540.8324.0000		0,24	- 0,34	540.8324.0000		0,24	- 0,34	540.8324.0000	
0,35	- 0,49	540.8334.0000		0,35	- 0,49	540.8334.0000		0,35	- 0,49	540.8334.0000	
0,50	- 0,63	540.4504.0000		0,50	- 0,63	540.4504.0000		0,50	- 0,63	540.4504.0000	
0,64	- 0,90	540.4514.0000		0,64	- 0,90	540.4514.0000		0,64	- 0,90	540.4514.0000	
0,91	- 1,27	540.5441.0190		0,91	- 1,27	540.4524.0000		0,91	- 1,27	540.4524.0000	
1,28	- 1,80	540.5451.0190		1,28	- 1,80	540.4534.0000		1,28	- 1,80	540.4534.0000	
1,81	- 2,55	540.5461.0190		1,81	- 2,55	540.4544.0000		1,81	- 2,55	540.4544.0000	
2,56	- 3,60	540.5471.0190		2,56	- 3,60	540.4554.0000		2,56	- 3,60	540.4554.0000	
3,61	- 5,08	540.5481.0190		3,61	- 5,08	540.4564.0000		3,61	- 5,08	540.4564.0000	
5,09	- 7,18	540.5491.0190		5,09	- 7,18	540.4574.0000		5,09	- 7,18	540.4574.0000	
7,19	- 10,10	540.5501.0190		7,19	- 10,10	540.4594.0000		7,19	- 10,10	540.4594.0000	
10,11	- 14,30	540.5512.0000		10,11	- 14,30	540.5512.0000		10,11	- 14,30	540.4604.0000	
14,31	- 20,10	540.5522.0000		14,31	- 20,10	540.5522.0000		14,31	- 20,10	540.4604.0000	
20,11	- 24,00	540.5532.0000		20,11	- 24,00	540.5532.0000				540.4634.0000	
24,01	- 26,70	540.5542.0000		24,01	- 26,70	540.5542.0000		20,11	- 25,00	540.9574.0000	
26,71	- 30,00	540.8342.0000		26,71	- 30,00	540.8342.0000				540.4634.0000	
30,01	- 35,00	540.8352.0000		30,01	- 35,00	540.8352.0000		25,01	- 30,00	540.9594.0000	
										540.8394.0000	

Ausführung											
Standard *(standard)*				**warmfest** *(creep-resistant steel)*				**korrosionsfest** (stainless steel)			
p [bar]				p [bar]				p [bar]			
von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
DN 100 do 60				**DN 100 do 60**				**DN 100 do 60**			
0,20	- 0,32	540.8424.0000		0,20	- 0,32	540.8424.0000		0,20	- 0,32	540.8424.0000	
0,33	- 0,49	540.4654.0000		0,33	- 0,49	540.4654.0000		0,33	- 0,49	540.4654.0000	
0,50	- 0,75	540.4664.0000		0,50	- 0,75	540.4664.0000		0,50	- 0,75	540.4664.0000	
0,76	- 1,23	540.5581.0190		0,76	- 1,23	540.4674.0000		0,76	- 1,20	540.4674.0000	
1,24	- 1,85	540.5601.0190		1,24	- 1,85	540.4694.0000		1,21	- 1,85	540.4694.0000	
1,86	- 2,60	540.5611.0190		1,86	- 2,60	540.4704.0000		1,86	- 2,60	540.4704.0000	
2,61	- 3,45	540.5621.0190		2,61	- 3,45	540.4714.0000		2,61	- 3,45	540.4714.0000	
3,46	- 5,20	540.5632.0000		3,46	- 5,20	540.5632.0000		3,46	- 5,20	540.8424.0000	
5,21	- 7,85	540.5642.0000		5,21	- 7,85	540.5642.0000				540.9604.0000	
7,86	- 10,00	540.5652.0000		7,86	- 10,00	540.5652.0000		5,21	- 7,85	540.4734.0000	
10,01	- 14,50	540.5662.0000		10,01	- 14,50	540.5662.0000		7,86	- 9,30	540.8494.0000	
14,51	- 18,60	540.5672.0000		14,51	- 18,60	540.5672.0000				540.9604.0000	
18,61	- 22,20	540.5682.0000		18,61	- 22,20	540.5682.0000		9,31	- 13,00	540.4734.0000	
22,21	- 30,00	540.5682.0000		22,21	- 30,00	540.5682.0000				540.9604.0000	
		540.9602.0000				540.9602.0000		13,01	- 18,00	540.9634.0000	
										540.9604.0000	
								18,01	- 22,00	540.9644.0000	
										540.9604.0000	
DN 125 do 74				**DN 125 do 74**				**DN 125 do 74**			
0,20	- 0,32	540.8552.0000		0,20	- 0,32	540.8552.0000					
0,33	- 0,49	540.5712.0000		0,33	- 0,49	540.5712.0000					
0,50	- 0,77	540.5722.0000		0,50	- 0,77	540.5722.0000					
0,78	- 1,20	540.5732.0000		0,78	- 1,20	540.5732.0000					
1,21	- 1,82	540.5742.0000		1,21	- 1,82	540.5742.0000					
1,83	- 2,80	540.5752.0000		1,83	- 2,80	540.5752.0000					
2,81	- 4,30	540.5762.0000		2,81	- 4,30	540.5762.0000					
4,31	- 6,60	540.5772.0000		4,31	- 6,60	540.5772.0000					
6,61	- 10,20	540.5782.0000		6,61	- 10,20	540.5782.0000					
10,21	- 16,00	540.5792.0000		10,21	- 16,00	540.5792.0000					
16,01	- 25,00	540.5792.0000		16,01	- 25,00	540.5792.0000					
		540.9722.0205				540.9722.0205					
25,01	- 32,00	540.9492.0000		25,01	- 32,00	540.9492.0000					
		540.9722.0205				540.9722.0205					
DN 150 do 92				**DN 150 do 92**				**DN 150 do 92**			
0,20	- 0,26	540.8632.0000		0,20	- 0,26	540.8632.0000					
0,27	- 0,38	540.8642.0000		0,27	- 0,38	540.8642.0000					
0,39	- 0,54	540.8652.0000		0,39	- 0,54	540.8652.0000					
0,55	- 0,80	540.5812.0000		0,55	- 0,80	540.5812.0000					
0,81	- 1,10	540.5822.0000		0,81	- 1,10	540.5822.0000					
1,11	- 1,45	540.5832.0000		1,11	- 1,45	540.5832.0000					
1,46	- 2,40	540.5842.0000		1,46	- 2,40	540.5842.0000					
2,41	- 3,40	540.5852.0000		2,41	- 3,40	540.5852.0000					
3,41	- 4,50	540.5862.0000		3,41	- 4,50	540.5862.0000					
4,51	- 6,00	540.5872.0000		4,51	- 6,00	540.5872.0000					
6,01	- 8,20	540.5882.0000		6,01	- 8,20	540.5882.0000					
8,21	- 13,20	540.5892.0000		8,21	- 13,20	540.5892.0000					
13,21	- 16,00	540.9862.0000		13,21	- 16,00	540.9862.0000					

Ausführung *(model)*

Standard *(standard)*				**warmfest** *(creep-resistant)*				**korrosionsfest** *(stainless steel)*			
p [psig]				**p [psig]**				**p [psig]**			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	Type 427 , 429 DN 15 do 12				**Type 427 , 429 DN 15 do 12**				**Type 427 , 429 DN 15 do 12**		
4	- 6	540.8004.0000	no approval	4	- 6	540.8004.0000	no approval	4	- 6	540.8004.0000	no approval
6	- 8	540.8014.0000	no approval	6	- 8	540.8014.0000	no approval	6	- 8	540.8014.0000	no approval
8	- 12	540.8024.0000	no approval	8	- 12	540.8024.0000	no approval	8	- 12	540.8024.0000	no approval
12	- 16	540.8034.0000	no approval	12	- 16	540.8034.0000	no approval	12	- 16	540.8034.0000	no approval
16	- 22	540.8044.0000	no approval	16	- 22	540.8044.0000	no approval	16	- 22	540.8044.0000	no approval
22	- 31	540.8054.0000		22	- 31	540.8054.0000		22	- 31	540.8054.0000	
31	- 42	540.4004.0000		31	- 42	540.4004.0000		31	- 42	540.4004.0000	
42	- 58	540.4014.0000		42	- 58	540.4014.0000		42	- 58	540.4014.0000	
58	- 82	540.5021.0190		58	- 82	540.4024.0000		58	- 82	540.4024.0000	
82	-113	540.5031.0190		82	-113	540.4034.0000		82	-113	540.4034.0000	
113	-158	540.5041.0190		113	-158	540.4044.0000		113	-158	540.4044.0000	
158	-218	540.5051.0190		158	-218	540.4054.0000		158	-218	540.4054.0000	
218	-302	540.5062.0000		218	-302	540.5062.0000		218	-302	540.4064.0000	
302	-419	540.5072.0000		302	-419	540.5072.0000		302	-419	540.4074.0000	
419	-580	540.5082.0000		419	-580	540.5082.0000		419	-580	540.4084.0000	
	Type 431 , 433 DN 15 do 12				**Type 431 , 433 DN 15 do 12**				**Type 431 , 433 DN 15 do 12**		
Stahlteller (steel disk)				**Stahlteller (steel disk)**				**Stahlteller (steel disk)**			
3	- 4		S	3	- 4		S	3	- 4		S
4	- 5	540.8024.0000		4	- 5	540.8024.0000		4	- 5	540.8024.0000	
5	- 7	540.8034.0000		5	- 7	540.8034.0000		5	- 7	540.8034.0000	
7	- 10	540.8044.0000		7	- 10	540.8044.0000		7	- 10	540.8044.0000	
10	- 18	540.8054.0000		10	- 18	540.8054.0000		10	- 18	540.8054.0000	
18	- 31	540.4004.0000		18	- 31	540.4004.0000		18	- 31	540.4004.0000	
31	- 44	540.4014.0000		31	- 44	540.4014.0000		31	- 44	540.4014.0000	
44	- 64	540.5021.0190		44	- 64	540.4024.0000		44	- 64	540.4024.0000	
64	- 91	540.5031.0190		64	- 91	540.4034.0000		64	- 91	540.4034.0000	
91	-131	540.5041.0190		91	-131	540.4044.0000		91	-131	540.4044.0000	
131	-189	540.5051.0190		131	-189	540.4054.0000		131	-189	540.4054.0000	
189	-276	540.5062.0000		189	-276	540.5062.0000		189	-276	540.4064.0000	
276	-387	540.5072.0000		276	-387	540.5072.0000		276	-387	540.4074.0000	
387	-555	540.5082.0000		387	-555	540.5082.0000		387	-555	540.4084.0000	
555	-744	540.5092.0000		555	-744	540.5092.0000		555	-744	540.4094.0000	
744	-1015	540.5102.0000		744	-1015	540.5102.0000		744	-1015	540.4104.0000	
1015	-1175	540.5112.0000		1015	-1175	540.5112.0000		1015	-1233	540.4094.0000	
1175	-1450	540.5122.0000		1175	-1450	540.5122.0000				540.5134.0205	
1450	-1769	540.8062.0000		1450	-1769	540.8062.0000		1233	-1015	540.8064.0000	
1769	-1958	540.8062.0000		1769	-1958	540.8062.0000		1457	-1740	540.5124.0000	
		540.2204.0205				540.2204.0205				540.5134.0205	
1958	-2088	540.8062.0000		1958	-2088	540.8062.0000		1740	-2030	540.8064.0000	
		540.5134.0205				540.5134.0205				540.5134.0205	
2088	-2320	540.8062.0000		2088	-2320	540.8062.0000		2030	-2320	540.8064.0000	
		540.4314.0205				540.4314.0205				540.4314.0205	
O-Ring-Teller (O-ring disk)				**O-Ring-Teller (O-ring disk)**				**O-Ring-Teller (O-ring disk)**			
4	- 5	540.8004.0000						4	- 5	540.8004.0000	
5	- 7	540.8014.0000						5	- 7	540.8014.0000	
7	- 10	540.8024.0000						7	- 10	540.8024.0000	
10	- 13	540.8034.0000						10	- 13	540.8034.0000	
13	- 19	540.8044.0000						13	- 19	540.8044.0000	
19	- 29	540.8054.0000						19	- 29	540.8054.0000	
29	- 43	540.4004.0000						29	- 43	540.4004.0000	
43	- 64	540.4014.0000						43	- 64	540.4014.0000	
64	- 87	540.5021.0190						64	- 87	540.4024.0000	
87	-122	540.5031.0190						87	-122	540.4034.0000	
122	-164	540.5041.0190						122	-164	540.4044.0000	
164	-232	540.5051.0190						164	-232	540.4054.0000	
232	-319	540.5062.0000						232	-319	540.4064.0000	
319	-441	540.5072.0000						319	-441	540.4074.0000	
441	-609	540.5082.0000						441	-609	540.4084.0000	
609	-841	540.5092.0000						609	-761	540.4094.0000	
841	-1153	540.5102.0000						761	-1066	540.4104.0000	
1153	-1494	540.5122.0000						1066	-1233	540.4094.0000	
1494	-1827	540.8062.0000								540.5134.0205	
1827	-2059	540.8062.0000							-2175		S
		540.2204.0205									
	-2320		S								

Ausführung *(model)*

Standard *(standard)*				**warmfest** *(creep-resistant)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	DN 20/25 do 18				**DN 20/25 do 18**				**DN 20/25 do 18**		
3	- 3,5	540.8024.0000		3	- 3,5	540.8024.0000		3	- 3,5	540.8024.0000	
3,6	- 4	540.8034.0000		3,6	- 4	540.8034.0000		3,6	- 4	540.8034.0000	
4	- 7	540.8044.0000		4	- 7	540.8044.0000		4	- 7	540.8044.0000	
7	- 12	540.8054.0000		7	- 12	540.8054.0000		7	- 12	540.8054.0000	
12	- 17	540.4004.0000		12	- 17	540.4004.0000		12	- 17	540.4004.0000	
17	- 25	540.4014.0000		17	- 25	540.4014.0000		17	- 25	540.4014.0000	
25	- 35	540.5021.0190		25	- 35	540.4024.0000		25	- 35	540.4024.0000	
35	- 49	540.5031.0190		35	- 49	540.4034.0000		35	- 49	540.4034.0000	
49	- 65	540.5041.0190		49	- 65	540.4044.0000		49	- 65	540.4044.0000	
65	- 93	540.5051.0190		65	- 93	540.4054.0000		65	- 93	540.4054.0000	
93	-134	540.5062.0000		93	-134	540.5062.0000		93	-134	540.4064.0000	
134	-186	540.5072.0000		134	-186	540.5072.0000		134	-186	540.4074.0000	
186	-270	540.5082.0000		186	-270	540.5082.0000		186	-270	540.4084.0000	
270	-348	540.5092.0000		270	-348	540.5092.0000		270	-348	540.4094.0000	
348	-412	540.5102.0000		348	-412	540.5102.0000		348	-412	540.4104.0000	
412	-492	540.5112.0000		412	-492	540.5112.0000		412	-492	540.4114.0000	
492	-580	540.5122.0000		492	-580	540.5122.0000		492	-580	540.5124.0000	
	DN 32 do 18				**DN 32 do 18**				**DN 32 do 18**		
3	- 4	540.8034.0000		3	- 4	540.8034.0000		3	- 4	540.8034.0000	
4	- 6	540.8044.0000		4	- 6	540.8044.0000		4	- 6	540.8044.0000	
6	- 9	540.8054.0000		6	- 9	540.8054.0000		6	- 9	540.8054.0000	
9	- 12	540.4004.0000		9	- 12	540.4004.0000		9	- 12	540.4004.0000	
12	- 14	540.4014.0000		12	- 14	540.4014.0000		12	- 14	540.4014.0000	
15	- 22	540.5021.0190		15	- 22	540.4024.0000		15	- 22	540.4024.0000	
22	- 32	540.5031.0190		22	- 32	540.4034.0000		22	- 32	540.4034.0000	
32	- 45	540.5041.0190		32	- 45	540.4044.0000		32	- 45	540.4044.0000	
45	- 59	540.5051.0190		45	- 59	540.4054.0000		45	- 59	540.4054.0000	
59	- 83	540.5062.0000		59	- 83	540.5062.0000		59	- 83	540.4064.0000	
83	-113	540.5072.0000		83	-113	540.5072.0000		83	-113	540.4074.0000	
113	-165	540.5082.0000		113	-165	540.5082.0000		113	-165	540.4084.0000	
165	-223	540.5092.0000		165	-223	540.5092.0000		165	-223	540.4094.0000	
223	-286	540.5102.0000		223	-286	540.5102.0000		223	-286	540.4104.0000	
286	-348	540.5112.0000		286	-348	540.5112.0000		286	-348	540.4114.0000	
348	-413	540.5122.0000		348	-413	540.5122.0000		348	-413	540.5124.0000	
413	-492	540.8062.0000		413	-492	540.8062.0000		413	-492	540.8064.0000	
492	-580	540.8062.0000		492	-580	540.8062.0000		492	-580	540.8064.0000	
		540.5134.0205				540.5134.0205				540.5134.0205	
	DN 40 do 23				**DN 40 do 23**				**DN 40 do 23**		
3	- 3,5	540.8034.0000		3	- 3,5	540.8034.0000		3	- 3,5	540.8034.0000	
3,6	- 5	540.8044.0000		3,6	- 5	540.8044.0000		3,6	- 5	540.8044.0000	
5	- 7	540.8054.0000		5	- 7	540.8054.0000		5	- 7	540.8054.0000	
7	- 9	540.4004.0000		7	- 9	540.4004.0000		7	- 9	540.4004.0000	
9	- 13	540.4014.0000		9	- 13	540.4014.0000		9	- 13	540.4014.0000	
13	- 19	540.5021.0190		13	- 19	540.4024.0000		13	- 19	540.4024.0000	
19	- 26	540.5031.0190		19	- 26	540.4034.0000		19	- 26	540.4034.0000	
26	- 37	540.5041.0190		26	- 37	540.4044.0000		26	- 37	540.4044.0000	
37	- 52	540.5051.0190		37	- 52	540.4054.0000		37	- 52	540.4054.0000	
52	- 74	540.5062.0000		52	- 74	540.5062.0000		52	- 74	540.4064.0000	
74	-104	540.5072.0000		74	-104	540.5072.0000		74	-104	540.4074.0000	
104	-147	540.5082.0000		104	-147	540.5082.0000		104	-147	540.4084.0000	
147	-207	540.5092.0000		147	-207	540.5092.0000		147	-207	540.4094.0000	
207	-293	540.5102.0000		207	-293	540.5102.0000		207	-293	540.4104.0000	
293	-342	540.5112.0000		293	-342	540.5112.0000		293	-342	540.4114.0000	
342	-447	540.8062.0000		342	-447	540.8062.0000		342	-447	540.8064.0000	
447	-580	540.8062.0000		447	-580	540.8062.0000		447	-580	540.8064.0000	
		540.5134.0205				540.5134.0205				540.5134.0205	

Ausführung *(model)*

Standard *(standard)*				**warmfest** *(creep-resistant)*				**korrosionsfest** *(stainless steel)*			
p [psig]				p [psig]				p [psig]			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	DN 50 do 29				**DN 50 do 29**				**DN 50 do 29**		
3	- 3,5	540.8104.0000		3	- 3,5	540.8104.0000		3	- 3,5	540.8104.0000	
3,6	- 5	540.8114.0000		3,6	- 5	540.8114.0000		3,6	- 5	540.8114.0000	
5	- 7	540.8124.0000		5	- 7	540.8124.0000		5	- 7	540.8124.0000	
7	- 9	540.8134.0000		7	- 9	540.8134.0000		7	- 9	540.8134.0000	
9	- 13	540.4154.0000		9	- 13	540.4154.0000		9	- 13	540.4154.0000	
13	- 18	540.4164.0000		13	- 18	540.4164.0000		13	- 18	540.4164.0000	
18	- 28	540.4174.0000		18	- 28	540.4174.0000		18	- 28	540.4174.0000	
28	- 38	540.5171.0190		28	- 38	540.4184.0000		28	- 38	540.4184.0000	
38	- 54	540.5181.0190		38	- 54	540.4194.0000		38	- 54	540.4194.0000	
54	- 71	540.5191.0190		54	- 71	540.4204.0000		54	- 71	540.4204.0000	
71	-102	540.5201.0190		71	-102	540.4214.0000		71	-102	540.4214.0000	
102	-135	540.5211.0190		102	-135	540.4224.0000		102	-135	540.4224.0000	
135	-174	540.5221.0190		135	-174	540.5224.0000		135	-174	540.5224.0000	
174	-238	540.5232.0000		174	-238	540.5232.0000		174	-238	540.5234.0000	
238	-297	540.5242.0000		238	-297	540.5242.0000		238	-297	540.5244.0000	
297	-357	540.5252.0000		297	-357	540.5252.0000		297	-357	540.5254.0000	
357	-415	540.5262.0000		357	-415	540.5262.0000		357	-415	540.4284.0000	
415	-447	540.8142.0000		415	-447	540.8142.0000		415	-458	540.4294.0000	
447	-580	540.8152.0000		447	-580	540.8152.0000		458	-580		S
	DN 65 do 37				**DN 65 do 37**				**DN 65 do 37**		
3	- 3,5	540.8224.0000		3	- 3,5	540.8224.0000		3	- 3,5	540.8224.0000	
3,6	- 5	540.8234.0000		3,6	- 5	540.8234.0000		3,6	- 5	540.8234.0000	
5	- 7	540.4354.0000		5	- 7	540.4354.0000		5	- 7	540.4354.0000	
7	- 9	540.4364.0000		7	- 9	540.4364.0000		7	- 9	540.4364.0000	
9	- 13	540.4374.0000		9	- 13	540.4374.0000		9	- 13	540.4374.0000	
13	- 19	540.5311.0190		13	- 19	540.4384.0000		13	- 19	540.4384.0000	
19	- 26	540.5321.0190		19	- 26	540.4394.0000		19	- 26	540.4394.0000	
26	- 37	540.5331.0190		26	- 37	540.4404.0000		26	- 37	540.4404.0000	
37	- 52	540.5341.0190		37	- 52	540.4414.0000		37	- 52	540.4414.0000	
52	- 74	540.5351.0190		52	- 74	540.4424.0000		52	- 74	540.4424.0000	
74	-104	540.4434.0000		74	-104	540.4434.0000		74	-104	540.4434.0000	
104	-147	540.5372.0000		104	-147	540.5372.0000		104	-147	540.4454.0000	
147	-207	540.5382.0000		147	-207	540.5382.0000		147	-207	540.4464.0000	
207	-293	540.5392.0000		207	-293	540.5392.0000		207	-293	540.4484.0000	
293	-348	540.5402.0000		293	-348	540.5402.0000		293	-348	540.5404.0000	
348	-387	540.8242.0000		348	-387	540.8242.0000		348	-387	540.5404.0000	
387	-450	540.8252.0000		387	-450	540.8252.0000				540.9484.0205	
450	-508	540.8262.0000		450	-508	540.8262.0000		387	-450	540.8254.0000	
	-580		S		-580		S				
	DN 80 do 46				**DN 80 do 46**				**DN 80 do 46**		
3	- 3,5	540.8314.0000		3	- 3,5	540.8314.0000		3	- 3,5	540.8314.0000	
3,6	- 5	540.8324.0000		3,6	- 5	540.8324.0000		3,6	- 5	540.8324.0000	
5	- 7	540.8334.0000		5	- 7	540.8334.0000		5	- 7	540.8334.0000	
7	- 9	540.4504.0000		7	- 9	540.4504.0000		7	- 9	540.4504.0000	
9	- 13	540.4514.0000		9	- 13	540.4514.0000		9	- 13	540.4514.0000	
13	- 19	540.5441.0190		13	- 19	540.4524.0000		13	- 19	540.4524.0000	
19	- 26	540.5451.0190		19	- 26	540.4534.0000		19	- 26	540.4534.0000	
26	- 37	540.5461.0190		26	- 37	540.4544.0000		26	- 37	540.4544.0000	
37	- 52	540.5471.0190		37	- 52	540.4554.0000		37	- 52	540.4554.0000	
52	- 74	540.5481.0190		52	- 74	540.4564.0000		52	- 74	540.4564.0000	
74	-104	540.5491.0190		74	-104	540.4574.0000		74	-104	540.4574.0000	
104	-147	540.5501.0190		104	-147	540.4594.0000		104	-147	540.4594.0000	
147	-209	540.5512.0000		147	-209	540.5512.0000		147	-207	540.4604.0000	
209	-293	540.5522.0000		209	-293	540.5522.0000		207	-292	540.4604.0000	
293	-349	540.5532.0000		293	-349	540.5532.0000				540.4634.0000	
349	-349	540.5542.0000		349	-389	540.5542.0000		292	-363	540.9574.0000	
349	-436	540.8342.0000		389	-436	540.8342.0000				540.4634.0000	
436	-508	540.8352.0000		436	-508	540.8352.0000		363	-435	540.9594.0000	
										540.8394.0205	

Ausführung *(model)*

Standard *(standard)*				**warmfest** *(creep-resistant)*				**korrosionsfest** *(stainless steel)*			
p [psig]				**p [psig]**				**p [psig]**			
von	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**	**von**	**bis**	**Feder-**	**Indizes**
p1	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**		**p1**	**p2**	**Materialnummer**	
up	*to*	*stock no.*		*up*	*to*	*stock no.*		*up*	*to*	*stock no.*	
	DN 100 do 60				**DN 100 do 60**				**DN 100 do 60**		
3	- 5	540.8424.0000		3	- 5	540.8424.0000		3	- 5	540.8424.0000	
5	- 7	540.4654.0000		5	- 7	540.4654.0000		5	- 7	540.4654.0000	
7	- 11	540.4664.0000		7	- 11	540.4664.0000		7	- 11	540.4664.0000	
11	- 18	540.5581.0190		11	- 18	540.4674.0000		11	- 18	540.4674.0000	
18	- 27	540.5601.0190		18	- 27	540.4694.0000		18	- 27	540.4694.0000	
27	- 38	540.5611.0190		27	- 38	540.4704.0000		27	- 38	540.4704.0000	
38	- 50	540.5621.0190		38	- 50	540.4714.0000		38	- 50	540.4714.0000	
50	- 76	540.5632.0000		50	- 76	540.5632.0000		50	- 76	540.8424.0000	
76	-114	540.5642.0000		76	-114	540.5642.0000				540.9604.0000	
114	-145	540.5652.0000		114	-145	540.5652.0000		76	-114	540.4734.0000	
145	-210	540.5662.0000		145	-210	540.5662.0000		114	-135	540.8494.0000	
210	-270	540.5672.0000		210	-270	540.5672.0000				540.9604.0000	
270	-322	540.5682.0000		270	-322	540.5682.0000		135	-189	540.4734.0000	
322	-435	540.5682.0000		322	-435	540.5682.0000				540.9604.0000	
		540.9602.0000				540.9602.0000		189	-261	540.9634.0000	
										540.9604.0000	
								261	-319	540.9644.0000	
										540.9604.0000	
	DN 125 do 74				**DN 125 do 74**				**DN 125 do 74**		
3	- 5	540.8552.0000		3	- 5	540.8552.0000					
5	- 7	540.5712.0000		5	- 7	540.5712.0000					
7	- 11	540.5722.0000		7	- 11	540.5722.0000					
11	- 18	540.5732.0000		11	- 18	540.5732.0000					
18	- 27	540.5742.0000		18	- 27	540.5742.0000					
27	- 41	540.5752.0000		27	- 41	540.5752.0000					
41	- 62	540.5762.0000		41	- 62	540.5762.0000					
62	- 96	540.5772.0000		62	- 96	540.5772.0000					
96	-148	540.5782.0000		96	-148	540.5782.0000					
148	-232	540.5792.0000		148	-232	540.5792.0000					
232	-363	540.5792.0000		232	-363	540.5792.0000					
		540.9722.0205				540.9722.0205					
363	-464	540.9492.0000		363	-464	540.9492.0000					
		540.9722.0205				540.9722.0205					
	DN 150 do 92				**DN 150 do 92**				**DN 150 do 92**		
3	- 4	540.8632.0000		3	- 4	540.8632.0000					
4	- 6	540.8642.0000		4	- 6	540.8642.0000					
6	- 8	540.8652.0000		6	- 8	540.8652.0000					
8	- 12	540.5812.0000		8	- 12	540.5812.0000					
12	- 16	540.5822.0000		12	- 16	540.5822.0000					
16	- 21	540.5832.0000		16	- 21	540.5832.0000					
21	- 35	540.5842.0000		21	- 35	540.5842.0000					
35	- 49	540.5852.0000		35	- 49	540.5852.0000					
49	- 65	540.5862.0000		49	- 65	540.5862.0000					
65	- 87	540.5872.0000		65	- 87	540.5872.0000					
87	-119	540.5882.0000		87	-119	540.5882.0000					
119	-192	540.5892.0000		119	-192	540.5892.0000					
192	-232	540.9862.0000		192	-232	540.9862.0000					

Contents

1 Purpose

This LESER Global Standard (LGS) contains the information about pressure range of all springs, which are installed in valve- type 820.

2 Scope

This LGS applies to all members of the LESER quality cluster as defined in the global quality management manual.

This LGS contains information about the pressure range of all springs, which are installed in valve- type 820.

The pressure ranges of the various models are given first in pressure-unit [bar].
This is followed by the pressure-unit [psig].

3 References

LDeS 3060.01, LDeS 3265.01

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes	p [bar] von p1 *up*	bis p2 *to*	Feder-Sachnummer *stock no.*	Indizes
1D2 - 2K+3 Membran/ diaphragm				**1D2 - 2K+3 Membran/ diaphragm**				**1D2 - 2K+3 Membran/ diaphragm**				**1D2 - 2K+3 Membran/ diaphragm**			
1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4077.0000	
1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4087.0000	
1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4097.0000	
2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4107.0000	
3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5127.0000	
4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8067.0000	
6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9407.0000	
8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9417.0000	
11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8097.0000	
14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0057.0000	
20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9417.0000	
40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8097.0000	
50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0057.0000	
70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 17.5				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**			
102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8097.0000	
115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0057.0000	
185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0057.0000	
		540.9374.0205				540.9374.0205				540.9374.0205				540.9377.0205	
256,01	- 305,00	540.1804.0000		256,01	- 305,00	540.1804.0000		256,01	- 305,00	540.1804.0000		256,01	- 305,00	540.1807.0000	
305,01	- 360,00	540.1814.0000		305,01	- 360,00	540.1814.0000		305,01	- 360,00	540.1814.0000		305,01	- 360,00	540.1817.0000	
360,01	- 426,00	540.1824.0000		360,01	- 426,00	540.1824.0000		360,01	- 426,00	540.1824.0000		360,01	- 426,00	540.1827.0000	

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [bar]				**p [bar]**				**p [bar]**				**p [bar]**			
von *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
3J4 - 4P+6 Membran/ diaphragm				**3J4 - 4P+6 Membran/ diaphragm**				**3J4 - 4P+6 Membran/ diaphragm**				**3J4 - 4P+6 Membran/ diaphragm**			
1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4074.0000		1,00	- 1,38	540.4077.0000	
1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4084.0000		1,39	- 1,86	540.4087.0000	
1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4094.0000		1,87	- 2,50	540.4097.0000	
2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4104.0000		2,51	- 3,50	540.4107.0000	
3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5124.0000		3,51	- 4,90	540.5127.0000	
4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8064.0000		4,91	- 6,40	540.8067.0000	
6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9404.0000		6,41	- 8,50	540.9407.0000	
8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9414.0000		8,51	- 11,00	540.9417.0000	
11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8094.0000		11,01	- 14,00	540.8097.0000	
14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8094.0000		14,01	- 17,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0054.0000		17,01	- 20,00	540.0057.0000	
20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0054.0000		20,01	- 30,00	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9414.0000		30,01	- 40,00	540.9417.0000	
40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8094.0000		40,01	- 50,00	540.8097.0000	
50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8094.0000		50,01	- 60,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0054.0000		60,01	- 70,00	540.0057.0000	
70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0054.0000		70,01	- 102,05	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 17.5				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**			
102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8094.0000		102,06	- 115,00	540.8097.0000	
115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8094.0000		115,01	- 145,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0054.0000		145,01	- 185,00	540.0057.0000	
185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0054.0000		185,01	- 256,00	540.0057.0000	
		540.9374.0205				540.9374.0205				540.9374.0205				540.9377.0205	

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [bar]				**p [bar]**				**p [bar]**				**p [bar]**			
von *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
6Q8 - 8T+10 Membran/ diaphragm				**6Q8 - 8T+10 Membran/ diaphragm**				**6Q8 - 8T+10 Membran/ diaphragm**				**6Q8 - 8T+10 Membran/ diaphragm**			
1,00	1,38	540.4074.0000		1,00	1,38	540.4074.0000		1,00	1,38	540.4074.0000		1,00	1,38	540.4077.0000	
1,39	1,86	540.4084.0000		1,39	1,86	540.4084.0000		1,39	1,86	540.4084.0000		1,39	1,86	540.4087.0000	
1,87	2,50	540.4094.0000		1,87	2,50	540.4094.0000		1,87	2,50	540.4094.0000		1,87	2,50	540.4097.0000	
2,51	3,50	540.4104.0000		2,51	3,50	540.4104.0000		2,51	3,50	540.4104.0000		2,51	3,50	540.4107.0000	
3,51	4,90	540.5124.0000		3,51	4,90	540.5124.0000		3,51	4,90	540.5124.0000		3,51	4,90	540.5127.0000	
4,91	6,40	540.8064.0000		4,91	6,40	540.8064.0000		4,91	6,40	540.8064.0000		4,91	6,40	540.8067.0000	
6,41	8,50	540.9404.0000		6,41	8,50	540.9404.0000		6,41	8,50	540.9404.0000		6,41	8,50	540.9407.0000	
8,51	11,00	540.9414.0000		8,51	11,00	540.9414.0000		8,51	11,00	540.9414.0000		8,51	11,00	540.9417.0000	
11,01	14,00	540.8094.0000		11,01	14,00	540.8094.0000		11,01	14,00	540.8094.0000		11,01	14,00	540.8097.0000	
14,01	17,00	540.8094.0000		14,01	17,00	540.8094.0000		14,01	17,00	540.8094.0000		14,01	17,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
17,01	20,00	540.0054.0000		17,01	20,00	540.0054.0000		17,01	20,00	540.0054.0000		17,01	20,00	540.0057.0000	
20,01	30,00	540.0054.0000		20,01	30,00	540.0054.0000		20,01	30,00	540.0054.0000		20,01	30,00	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
30,01	40,00	540.9414.0000		30,01	40,00	540.9414.0000		30,01	40,00	540.9414.0000		30,01	40,00	540.9417.0000	
40,01	50,00	540.8094.0000		40,01	50,00	540.8094.0000		40,01	50,00	540.8094.0000		40,01	50,00	540.8097.0000	
50,01	60,00	540.8094.0000		50,01	60,00	540.8094.0000		50,01	60,00	540.8094.0000		50,01	60,00	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
60,01	70,00	540.0054.0000		60,01	70,00	540.0054.0000		60,01	70,00	540.0054.0000		60,01	70,00	540.0057.0000	
70,01	102,05	540.0054.0000		70,01	102,05	540.0054.0000		70,01	102,05	540.0054.0000		70,01	102,05	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [psig]				**p [psig]**				**p [psig]**				**p [psig]**			
von *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
1D2 - 2K+3 Membran/ diaphragm				**1D2 - 2K+3 Membran/ diaphragm**				**1D2 - 2K+3 Membran/ diaphragm**				**1D2 - 2K+3 Membran/ diaphragm**			
14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4077.0000	
20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4087.0000	
27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4097.0000	
36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4107.0000	
50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5127.0000	
71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8067.0000	
92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9407.0000	
123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9417.0000	
160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8097.0000	
203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0057.0000	
290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9417.0000	
580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8097.0000	
725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0057.0000	
1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 17.5				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**			
1480	- 1668	540.8094.0000		1480	- 1668	540.8094.0000		1480	- 1668	540.8094.0000		1480	- 1668	540.8097.0000	
1668	- 2103	540.8094.0000		1668	- 2103	540.8094.0000		1668	- 2103	540.8094.0000		1668	- 2103	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
2103	- 2683	540.0054.0000		2103	- 2683	540.0054.0000		2103	- 2683	540.0054.0000		2103	- 2683	540.0057.0000	
2683	- 3713	540.0054.0000		2683	- 3713	540.0054.0000		2683	- 3713	540.0054.0000		2683	- 3713	540.0057.0000	
		540.9374.0205				540.9374.0205				540.9374.0205				540.9377.0205	
3713	- 4424	540.1804.0000		3713	- 4424	540.1804.0000		3713	- 4424	540.1804.0000		3713	- 4424	540.1807.0000	
4424	- 5221	540.1814.0000		4424	- 5221	540.1814.0000		4424	- 5221	540.1814.0000		4424	- 5221	540.1817.0000	
5221	- 6179	540.1824.0000		5221	- 6179	540.1824.0000		5221	- 6179	540.1824.0000		5221	- 6179	540.1827.0000	

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [psig]				**p [psig]**				**p [psig]**				**p [psig]**			
von *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
3J4 - 4P+6 Membran/ diaphragm				**3J4 - 4P+6 Membran/ diaphragm**				**3J4 - 4P+6 Membran/ diaphragm**				**3J4 - 4P+6 Membran/ diaphragm**			
14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4077.0000	
20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4087.0000	
27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4097.0000	
36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4107.0000	
50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5127.0000	
71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8067.0000	
92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9407.0000	
123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9417.0000	
160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8097.0000	
203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0057.0000	
290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9417.0000	
580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8097.0000	
725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0057.0000	
1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 17.5				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**				**Kolben/ piston do = 17.5**			
1480	- 1668	540.8094.0000		1480	- 1668	540.8094.0000		1480	- 1668	540.8094.0000		1480	- 1668	540.8097.0000	
1668	- 2103	540.8094.0000		1668	- 2103	540.8094.0000		1668	- 2103	540.8094.0000		1668	- 2103	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
2103	- 2683	540.0054.0000		2103	- 2683	540.0054.0000		2103	- 2683	540.0054.0000		2103	- 2683	540.0057.0000	
2683	- 3713	540.0054.0000		2683	- 3713	540.0054.0000		2683	- 3713	540.0054.0000		2683	- 3713	540.0057.0000	
		540.9374.0205				540.9374.0205				540.9374.0205				540.9377.0205	

Ausführung *(model)*

Standard (standard)				**warmfest** (creep-resistant steel)				**korrosionsfest** (stainless steel)				**Inconel X750 (high creep-resistant steel)**			
p [psig]				**p [psig]**				**p [psig]**				**p [psig]**			
von *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**	**von** *up*	**bis** *to*	**Feder-Sachnummer** *stock no.*	**Indizes**
6Q8 - 8T+10 Membran/ diaphragm				**6Q8 - 8T+10 Membran/ diaphragm**				**6Q8 - 8T+10 Membran/ diaphragm**				**6Q8 - 8T+10 Membran/ diaphragm**			
14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4074.0000		14,5	- 20,0	540.4077.0000	
20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4084.0000		20,1	- 27,0	540.4087.0000	
27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4094.0000		27,1	- 36,3	540.4097.0000	
36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4104.0000		36,4	- 50,8	540.4107.0000	
50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5124.0000		50,9	- 71,1	540.5127.0000	
71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8064.0000		71,2	- 92,8	540.8067.0000	
92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9404.0000		92,9	- 123	540.9407.0000	
123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9414.0000		123	- 160	540.9417.0000	
160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8094.0000		160	- 203	540.8097.0000	
203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8094.0000		203	- 247	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0054.0000		247	- 290	540.0057.0000	
290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0054.0000		290	- 435	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
Kolben/ piston do = 25.5				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**				**Kolben/ piston do = 25.5**			
435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9414.0000		435	- 580	540.9417.0000	
580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8094.0000		580	- 725	540.8097.0000	
725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8094.0000		725	- 870	540.8097.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	
870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0054.0000		870	- 1015	540.0057.0000	
1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0054.0000		1015	- 1480	540.0057.0000	
		540.4314.0205				540.4314.0205				540.4314.0205				540.4317.0205	

1 Purpose

The purpose of this LESER information document (LID) is to provide valve repair shops with a guideline and the necessary assessment criteria to test LESER safety valves after assembly. It is valid for all LESER safety valves except the Clean Service “Easy to Maintain” configuration. Please refer to LGS 0201 and 0202 for those valves.

2 Overview

This document describes the tests that need to be done for every new or repaired LESER safety valve after the valve is assembled. It is written with external service partners, like LESER partners, LARCs or Assemblers, in mind. Therefore, no explanation for certain procedures or acceptance criteria is given. Please consult the referenced documents for detailed information. The image below shows what tests are required for gas tight and non-gas tight valves and in what chapter of this document the testing procedures can be found.

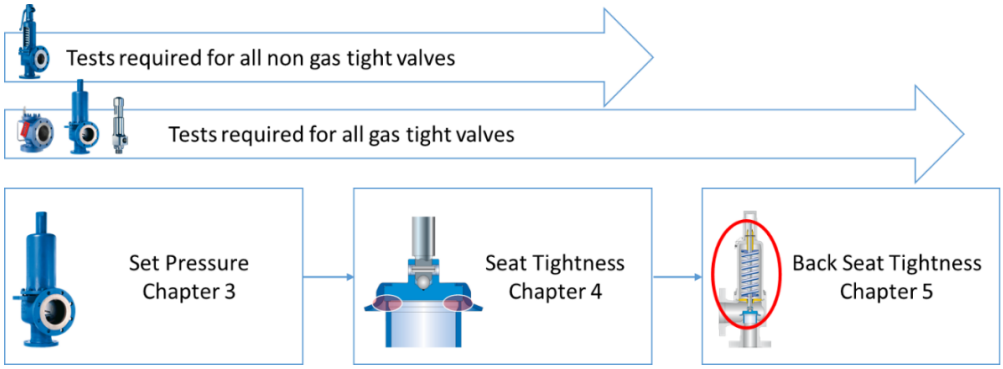


Figure 1: Required tests for gas tight and non-gas tight valves.

3 Cold differential set pressure test

Each safety valve shall be adjusted to its designated set or cold differential test pressure (hereafter CDTP). The purpose of this test is to ensure that all the safety valves meet the requirements for which they have been designed. CDTP is used if correction of set pressure of safety valves according to deviation of service conditions is necessary (temperatures and superimposed constant back pressure). The test medium is used according to the below table, if not otherwise specified by the customer.

Table 1: Medium of operation vs test medium

Medium of Operation	Test medium for valves with CE (PED)	Test medium for valves with UV (ASME)
Gas	Air at room temperature	Air at room temperature
Liquid	Air at room temperature	Water at room temperature
Steam	Air at room temperature	Steam (see ASME UG-136(d)(4) for exemption)

Each safety valve will be pressurized and the set pressure will be determined at the cold differential test pressure. The set pressure tolerances for LESER valves are as per below table:

Table 2: Set pressure tolerances

Set Pressure P_{set}	Tolerance
$P_{set} \leq$ 1,65 barg (24 psig)	+ 0,05 barg (1 psig)
1,65 barg (24 psig) < P_{set} < 3,96 barg (58 psig)	+ 0,1 barg (2 psig)
$P_{set} \geq$ 3,96 barg (58 psig)	+ 3%

For evaluation of actual set pressure 3 single serial values have to be within a repeat accuracy of 1%. The average value of these 3 single values is the determined actual set pressure, which has to be within the above specified allowable tolerance. See the below sample graphic for 10 barg.

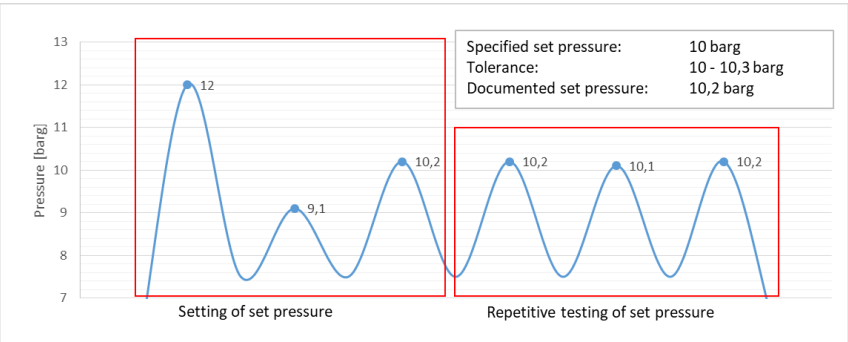


Figure 2: Exemplary set pressure test for 10 barg

3.1 CDTP Correction

The CDTP-correction is the correction of set pressure at test bench condition to achieve the correct set pressure at service condition. For calculating the CDTP, the below formula applies:

LESER datasheet of CDTP (Cold differential test pressure)

$P_{CDTP} = (P_{set} - P_a) * k_T$ $P_{CDTP} = (P_{set} * k_{af}) * k_T$ (Type 459/462 w. bellows only)

P_{CDTP}: cold differential test pressure [psig or barg]
P_{set}: set pressure at service conditions [psig or barg]
P_a: constant superimposed back pressure [psig or barg]
k_T : correction factor for CDTP , temperature influence [-]
k_{af}: correction factor for type 459 / 462 w. bellows, deviating effective area influence [-]

The correction factors for k_T and k_{af} can be found in the two following tables, where missing values can be interpolated using the below formula:

$$y = y_0 + (x - x_0) * \frac{y_1 - y_0}{x_1 - x_0} \quad ; with\ y: k_T / k_{af}\ and\ x: °C / °F$$

Table 3: CDTP correction factor k_T calculation

°C	°F	Conventional		Balanced Bellows or Inconel spring	
		Open Bonnet	Closed Bonnet	Open Bonnet	Closed Bonnet
550	1022	Limitation at 427°C	Limitation at 350°C	1,049	1,049
500	932			1,032	1,032
450	842			1,021	1,021
400	752	1,049		1,013	1,013
350	662	1,032	1,049	1,007	1,007
300	572	1,021	1,032	No influence of service condition on CDTP, correction factor: 1,000	
250	482	1,013	1,021		
200	392	1,007	1,013		
150	302	No influence of service condition on CDTP, correction factor: 1,000	1,007		
100	212				
-250	-418				

Table 4: Deviating effective area correction factor k_{af} for 459/462

P_a/P_{set} * 100 [%]	k_{af}		P_a/P_{set} * 100 [%]	k_{af}	
	d_0 = 9 [mm]	d_0= 17,5 [mm]		d_0 = 9 [mm]	d_0= 17,5 [mm]
0,0	0,999	0,998	14,0	1,048	0,904
1,0	1,001	0,990	16,0	1,059	0,893
2,0	1,003	0,983	18,0	1,070	0,882
3,0	1,005	0,975	20,0	1,083	0,872
4,0	1,008	0,968	22,0	1,097	0,863
5,0	1,011	0,961	24,0	1,111	0,855
6,0	1,014	0,954	26,0	1,126	0,847
7,0	1,018	0,947	28,0	1,143	0,840
8,0	1,021	0,940	30,0	1,160	0,833
9,0	1,025	0,934	32,0	1,178	0,827
10,0	1,029	0,927	34,0	1,197	0,822
12,0	1,038	0,915	35,0	1,207	0,819

3.2 Set Pressure Definitions

LESER's set pressure definitions are as following:

Test Procedure	Set Pressure Definition	Additional Notes
Air	Initial Audible Discharge	Simmer point (Not pop)
Water	First Steady Stream	Water streaming steadily and perpendicularly (90°) from the outlet
Steam	Initial Audible Discharge	Valve seat to be heated to min. 50° C (122° F)

For all testing media: during the interval starting at 90% of the set pressure, the rate of pressure increase shall not exceed 2.0 psi/sec [0.15bar/sec.] or whatever lesser rate of increase is necessary for the accurate and repeatable reading of the pressure.

3.3 Test Procedure for Air

After assembly the safety valve will be pressurized and adjusted via adjusting screw to the given set pressure. The procedure of setting and testing of cold differential test pressure with air is described exactly for each valve type in the working instructions (assembly / installation documentation). The set pressure is reached when the first discharge of air is audible. A saturated opening with clear clicking noise or crack shall be reached. A slow response is not allowed.

3.4 Test Procedure for Water

The valve is first set on air to the desired cold differential test pressure. Then it is mounted on the water test bench and the inlet body is filled with water, without an air cushion. This is ensured by increase of pressure to the safety valve until the first water flow drains off. After the air cushion was removed from the inlet the pressure must be reduced to 0 bar (psig). Then, the set pressure is set with water. The set pressure of the valves is reached when you see the first continuous water flow, the first steady stream.

3.5 Test Procedure for Steam

The safety valves are initially set and tested on air. The assembly and pressure preset on air of safety valves with pressure setting to steam is carried out the same way as for safety valves on air. The steam generator and the steam test bench are started up in accordance with the instruction manual. The test bench is warmed up at approx. 90 % of CDTP until the test temperature has been reached.

Each safety valve then has to be opened min. 3 times to warm up the valve seat and the valve disk to min. 50°C (above 50°C no condensation will occur below the seat). Alternatively, the valve may be opened using a mechanical lifting device so that the valve reaches the required test temperature.

The set pressure of the valve is reached when the discharge of steam is audible (swooshing or roaring hiss sound). It is important to ensure that the audible sound is indicating the start of the opening of the valve (equilibrium of pressure induced force and spring force is reached) and not just the beginning of leakage between the disc and seat caused by system pressure approaching set pressure (slight hissing sound).

3.6 Differences in the procedure for POSVs

In case where a special pilot test bench is available the pilot control should be set to cold differential set pressure, together with the blow down for pop action pilots, on its own. After setting the pilot and performing the leak test, the complete POSV is assembled. Each complete POSV is then tested for its definite cold set pressure. If this has been achieved by setting the pilot, then no other settings are necessary. However, if there are deviations from the specified cold set pressure, then they will be corrected by resetting the pilot.

If no special pilot test bench is available the whole pilot operated safety valve is assembled first and then set pressure testing and leakage test are performed on the valve as a whole, using the procedures for flanged safety valves.

After setting the POSV on water the assembly must be cleared of any water residue. Therefore, the pilot assembly shall be actuated two times at the test-bench with air. Then, the plug of the pilot (Item 20) shall be removed to release the water. Compressed air is then used to blow dry the return spring area. The plug shall be re-assembled after this. Next, the pilot and manifold block will be detached from the main valve. The manifold block shall be dried with compressed air and assembled again.

4 Seat Tightness Test

All LESER safety valves have to be tested on tightness. The tightness test is set up to ensure that each safety valve fulfils the requirements for which they have been design without suffering from leakage of pressurized parts or seals. The tightness test is standard practiced at LESER after the set pressure is demonstrated. The leakage rates shall be documented. The test medium for determining the seat tightness, air, steam or water, shall be the same as that used for determining the set pressure of the valve. For dual- service valves, the test medium, air, steam or water, shall be the same as the primary relieving

medium. As a standard technique, the minimum or maximum temperature shall not be below 5°C (40°F) nor above 50°C (122°F) during the test.

The test pressure, procedures and acceptance criteria for each medium are described in the following subchapters.

4.1 Test Pressure for all mediums

Set Pressure / CDTP, p_0	Test pressure, p_{test}
0,1 < p_0 < 0,7 (bar) 1,45 < p_0 < 10,15 (psi)	0,5 * p_0
0,7 ≤ p_0 ≤ 3,5 (bar) 10,15 ≤ p_0 ≤ 50,8 (psi)	p_0 - 0,35 (bar) p_0 - 5,08 (psi)
p_0 > 3,5 (bar) p_0 > 50,8 (psi)	0,9 * p_0

4.2 Seat Tightness Test on Air

4.2.1 Testing on air for gas tight safety valves

4.2.1.1 Procedure

Testing on air is done according to and with the specified equipment in the API 527. The valve shall be vertically mounted on the test stand, and the test apparatus shall be attached to the valve outlet. All openings-including but not limited to caps, drain holes, vents, and outlets-shall be closed.

The valve shall then reach set pressure once and afterwards the inlet pressure is decreased to the test pressure. The water shall then be observed for 1 minute at the test pressure and the number of bubbles counted.

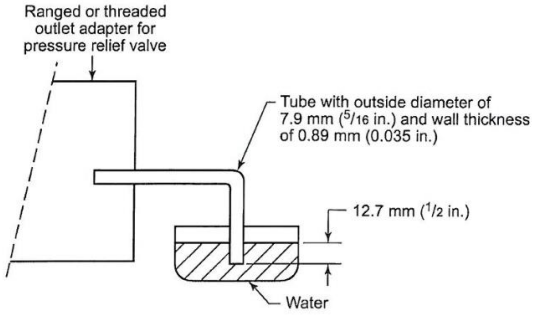


Figure 3: Apparatus to test seat tightness with air. (API 527)

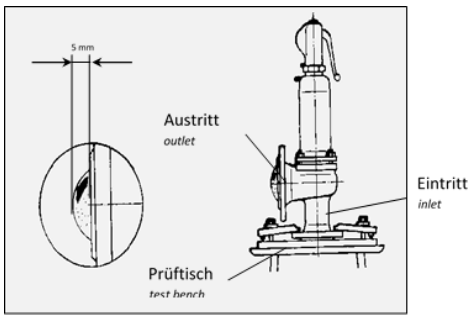
4.2.1.2 Acceptance Criteria

	Set pressure po (related to 16°C)		Allowed Number of Bubbles [Bubbles / min]	
	bar	psi	d0 < 18 [mm]	d0 > 18 [mm]
Metal-to-metal sealing	0,1 - 66	1,45 - 657,3	40	20
	> 66 - 165	> 657,3 - 2393,1	60	30
	> 165 - 700	> 2393,1 - 10152,6	80	40
Soft sealing plate	All ranges		20	10
Soft sealing O-Ring or disc with vulcanized soft sealing	All ranges		0	0

4.2.2 Testing on air for non-gas tight safety

4.2.2.1 Procedure

The safety valves are mounted via clamping jaw vertically at the inlet flange on the test bench. For the sealing a rubber pad is laid down under the inlet flange of the safety valve.



After setting of the safety valve the seat leakage test is carried out. A foamy lotion is drawn over the outlet orifice. The extension under pressure and the leakage volume is then observed at the outlet for 1 minute at test pressure.

4.2.2.2 Acceptance Criteria

The sealing between seat and disc fulfils the tightness requirements, if the bubble extends not more than 5 mm.

4.3 Seat Tightness Test on Water

4.3.1 Procedure

Before starting the seat tightness test the inlet body bowl shall be filled with water, which shall be allowed to stabilize with no visible flow from the valve outlet. The inlet pressure shall then be increased to the test pressure. The valve shall then be observed for 1 minute at test pressure.

4.3.2 Acceptance Criteria

	Nominal Inlet Size DN and NPS	10	15	20	25	40	50	80	100	125	150	200	250	300	400
		3/8"	1/2"	3/4"	1"	1 1/2"	2"	3"	4"	5"	6"	8"	10"	12"	16"
Allowable number of water drops per inlet size	Metal seated	1				2	3	5	6	8	10	13	16	20	26
	Soft seated	No visible leakage													

4.4 Seat Tightness Test on Steam

4.4.1 Procedure

Any condensate in the body bowl shall be removed before the seat tightness test. Air (or nitrogen) may be used to dry condensate. After any condensate has been removed, the inlet pressure shall be increased to the test pressure and be held for at least three minutes to heat up the valve. Tightness is then checked visually using a black background. The valve shall be observed for leakage for at least one minute.

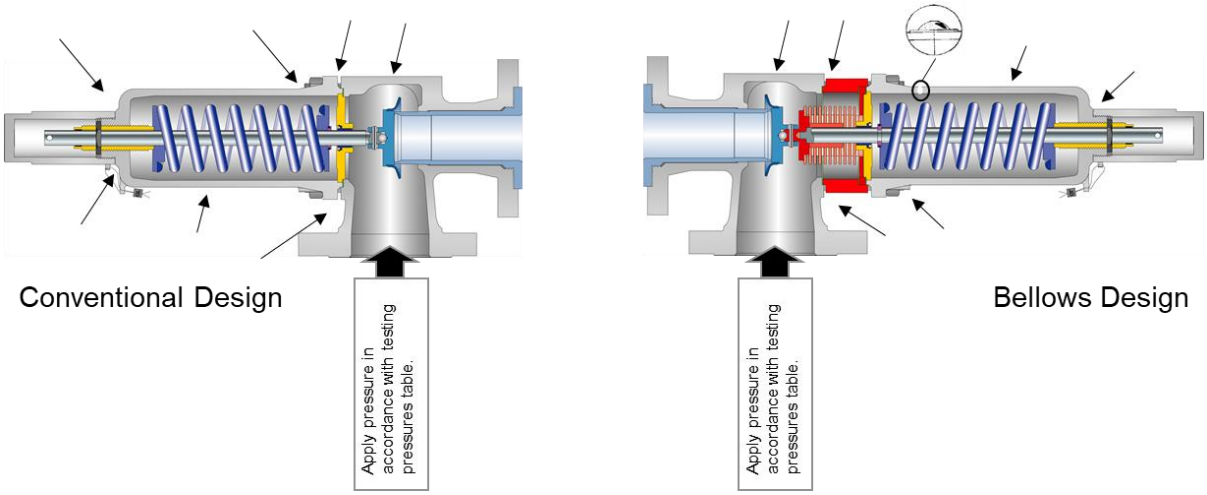
4.4.2 Acceptance Criteria

No recognized or visible leakage.

5 Back seat tightness (Outlet tightness)

5.1.1 Procedure

The tightness test of the back sealing, LESER named it tightness outwards, is carried out for all LESER's safety valves in gastight design and for all POSVs. After testing of the seat leakage and the test pressure the safety valve will be tightened (outlet) on the test bench and admitted with pressure. Reaching the test pressure, the safety valves will be sprayed at the connections and the outlet area with a non- volatile and viscous test fluid. In case of a balanced bellows design the test fluid is drawn over the drainage whole in the bonnet.



The below testing times and test pressures apply.

Table 5: Testing pressures and times for back seat tightness test

Nominal Size	Minimum test time [s]	Test pressure P_{test} Normal		Test pressure P_{test} PFTE / Elamstomer components			
				p0 < 3 bar		p0 ≥ 3 bar	
		bar	psi	bar	psi	bar	psi
≤ DN 50 (2")	15	6	87	0.15 x P0	0.15 x P0	2	28
DN 65 (3") - DN 150 (6")	60	6	87				
≥ DN 200 (8")	60	2,5	36				

5.1.2 Acceptance Criteria

The acceptance criteria is that no foam appears on the tested area and the fluid film over the drainage whole does not have a bubble.

Contents

1 Purpose

This LESER Global Standard (LGS) provides instruction on the visual final inspection of LESER safety valves. The required work steps and materials are described.

2 Scope

This document must be observed in the visual final inspection of safety valves in agencies and subsidiaries of LESER GmbH & Co. KG.

3 Disclaimer

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4 Qualified fitting personnel

The visual final inspection of LESER safety valves may only be performed by trained or qualified fitters. The qualifications must be obtained through the appropriate training measures.

5 General Information

- Gloves must be worn during the final inspection of oil and grease-free safety valves.

6 Flow chart for the visual inspection (final inspection)

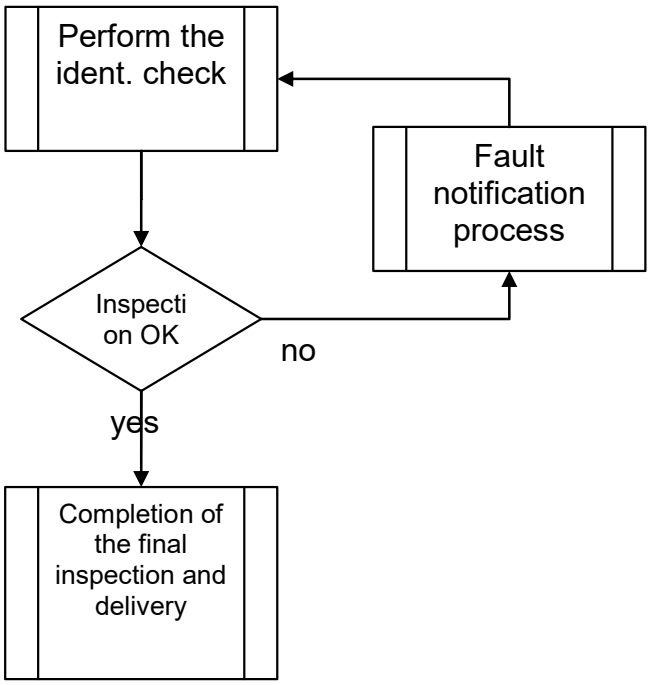
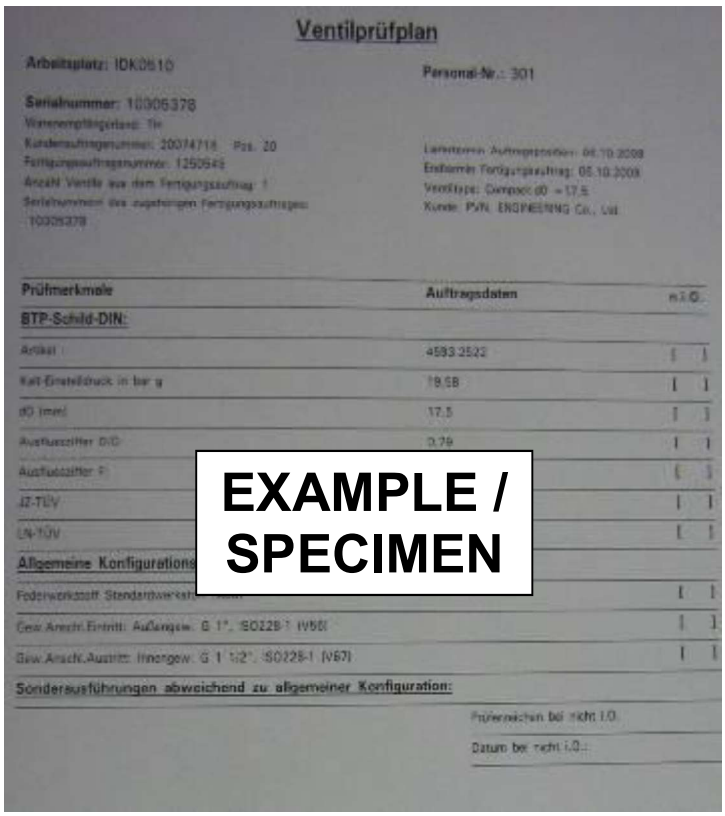


Figure 6-1

7 Performing the final inspection

7.1 General inspections

a) Compare the content of the valve inspection plan or repair order to the valve model.


Ventilprüfplan

Arbeitsplatz: IDK0610

Personal-Nr.: 301

Seriennummer: 10305378

Prüfmerkmale | Auftragsdaten | i.O. | n.i.O.

BTP-Schild-DIN:

Artikel | 4593.2522

Kalt-Einstelldruck in bar g | 19,58

dO (mm) | 17,5

Ausflusszifer D/G | 0,79

Ausflusszifer F | 0,52

JZ-TÜV

LN-TÜV

Allgemeine Konfigurations

Federwerkstoff Standardwerkstoff

Gew.Anschl.Eintritt: Außengew. G 1", ISO228-1 (V66)

Gew.Anschl.Austritt: Innengew. G 1 1/2", ISO228-1 (V67)

Sonderausführungen abweichend zu allgemeiner Konfiguration:

Prüfzeichen bei nicht i.O.

Datum bei nicht i.O.:

EXAMPLE / SPECIMEN

Figure 7.1-1

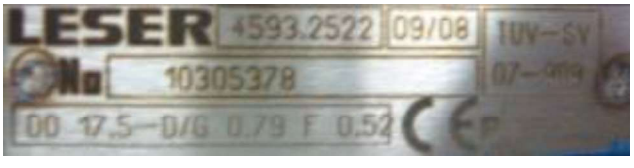


Figure 7.1-2: Check the type number against the valve inspection plan / repair order	**Figure 7.1-3:** Check the BT plate / customer ID plate data against the valve inspection plan / repair order

7.2 Visual inspection of other items

7.2.1 Inspection of the paintwork

a) Valve is not completely painted

OK specimen:	**Rejected specimen:**
	
Figure 7.2.1-1	**Figure 7.2.1-2**

b) Paint coat is cracked (too much paint)

OK specimen:	**Rejected specimen:**
	
Figure 7.2.1-3	**Figure 7.2.1-4**

c) Paint coat is not complete due to oil / grease

OK specimen:	**Rejected specimen:**
	
Figure 7.2.1-5	**Figure 7.2.1-6**

OK specimen:	**Rejected specimen:**

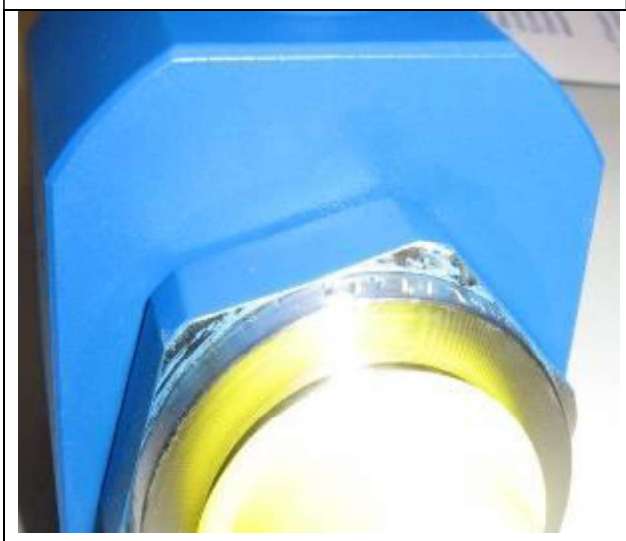
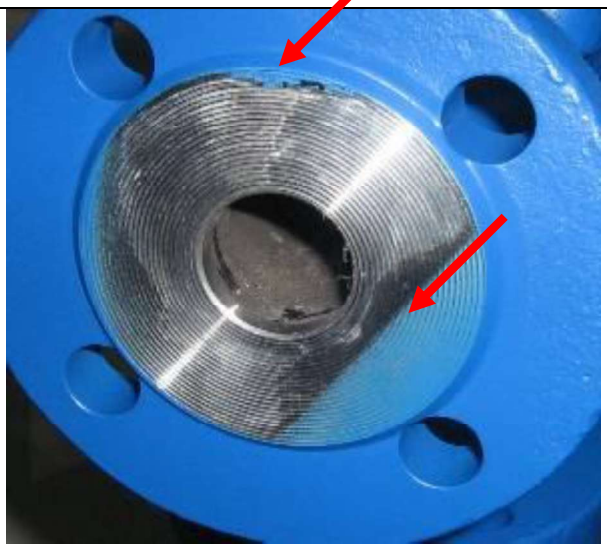



Figure 7.2.1-7	

	Figure 7.2.1-8

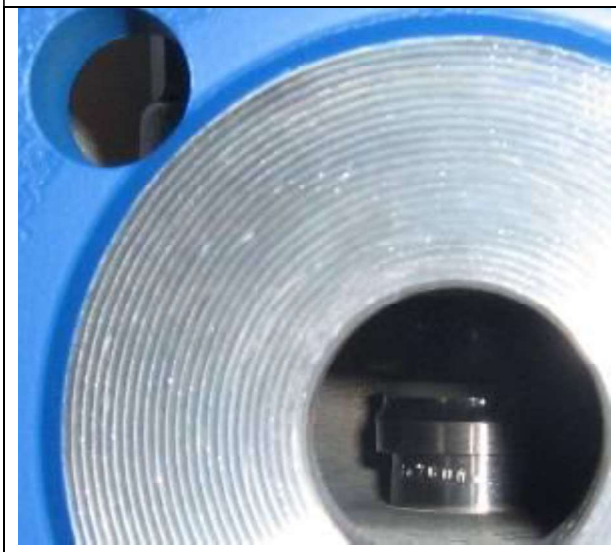
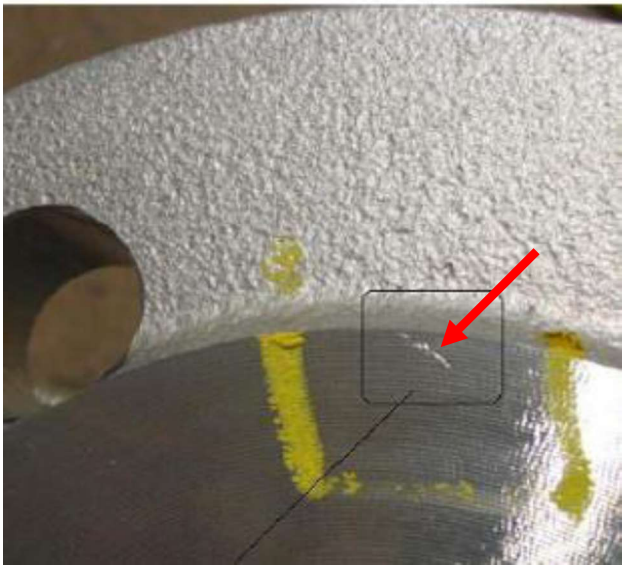
d) Paint on masked off areas

OK specimen:	**Rejected specimen:**
	
Figure 7.2.1-9	**Figure 7.2.1-10**

OK specimen:	**Rejected specimen:**
	
Figure 7.2.1-11	**Figure 7.2.1-12**

Reason: The legibility of the plate is not guaranteed.

7.2.2 Inspection of the sealing surfaces

OK specimen:	**Rejected specimen:**
 **Figure 7.2.2-1**	 **Figure 7.2.2-2**

7.2.3 Inspection of the seal

OK specimen:	**Rejected specimen:**
 **Figure 7.2.3-1**	Seal is missing for sealed valves, or it is not crimped.

If the result of the inspection is okay, then the safety valve is sent for packaging and shipment.

7.3 Fault notification process

- If the result of the inspection is not okay, then the fitting is sent to the fault notification process that is to be determined.
- The final inspection is performed again after completion of the fault notification process.

Order information – Spare parts

Spare parts

	DN_I	15	20	25	32	40	50
	DN_O	15	20	25	32	40	50
	Actual orifice diameter d_0 [mm]	12	18	18	18	23	29
	Actual orifice area A_0 [mm²]	113	254	254	254	416	661
Disc (item 7): Metal seat				Material-No. / Art.-No.			
Disc Detachable lifting aid	1.4122	212.3439.9000	211.0139.9000	211.0139.9000	211.0139.9000	211.0239.9000	211.0339.9000
	1.4404	212.3449.9000	211.0149.9000	211.0149.9000	211.0149.9000	211.0249.9000	211.0349.9000
Disc (item 7): Soft seal				Material-No. / Art.-No.			
Disc	CR “K”	–	200.6849.9051	200.6849.9051	200.6849.9051	200.6849.9051	200.7049.9051
	EPDM “D”	–	200.6849.9041	200.6849.9051	200.6849.9041	200.6849.9051	200.7049.9041
	FKM “L”	–	200.6849.9071	200.6849.9051	200.6849.9071	200.6849.9051	200.7049.9071
	FFKM “C”	–	200.6849.9091	200.6849.9051	200.6849.9091	200.6849.9051	200.7049.9091
O-ring (item 7.4): Soft seal				Material-No. / Art.-No.			
O-ring	CR “K”	–	502.0171.2651	502.0171.2651	502.0171.2651	502.0249.3551	502.0313.3551
	EPDM “D”	–	502.0171.2641	502.0171.2641	502.0171.2641	502.0249.3541	502.0313.3541
	FKM “L”	–	502.0171.2671	502.0171.2671	502.0171.2671	502.0249.3571	502.0313.3571
	FFKM “C”	–	502.0171.2691	502.0171.2691	502.0171.2691	502.0249.3591	502.0313.3591
Bellows (item 15): 1.4571				Material-No. / Art.-No.			
Standard bellows		400.0149.0000	400.0149.0000	400.0149.0000	400.0149.0000	400.0249.0000	400.0349.0000
Conversion kit, standard[1]		5021.1030	5021.1034	5021.1034	5021.1034	5021.1035	5021.1036
Low pressure bellows		–	400.0149.0021	400.0149.0021	400.0149.0021	400.0249.0021	400.0349.0021
Conversion kit low pressure[1]				Please specify application conditions			
Gasket – body / bonnet (item 60)				Material-No. / Art.-No.			
Gasket	Graphite + 1.4401	500.0407.0000	500.0407.0000	500.0407.0000	500.0407.0000	500.0407.0000	500.0507.0000
Option code L68 Gylon (PTFE compliance)		500.0405.0000	500.0405.0000	500.0405.0000	500.0405.0000	500.0405.0000	500.0505.0000
Ball (item 61):				Material-No. / Art.-No.			
Ball	Ball Ø [mm]	6	6	6	6	6	6
	1.4404	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000
Split ring (item 14):				Material-No. / Art.-No.			
Split ring	Spindle Ø [mm]	12	12	12	12	12	12
	1.4404	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000
Pin (item 57)				Material-No. / Art.-No.			
Pin	1.4310	480.0505.0000	480.0505.0000	480.0505.0000	480.0505.0000	480.0505.0000	480.0705.0000
O-ring damper				Material-No. / Art.-No.			
	Conversion kit H2	5021.1060	–	5021.1060	5021.1060	5021.1060	5021.1060
	Conversion kit H4	5021.1064	–	5021.1064	5021.1064	5021.1064	5021.1064

[1] Pressure range, see page 03/10 – 03/11

A conversion kit includes the following components:

Item.	Components	No.
8	Guide with bushing	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** dependant on valve size
60	Gasket	**2, 3** dependant on valve size
	Installation instruction LWN 037.05	1

Refer to page 03/04

Order information – Spare parts

Spare parts

		DN_I	65	80	100	125	150
		DN_O	65	80	100	125	150
		Actual orifice diameter d_0 [mm]	37	46	60	74	92
		Actual orifice area A_0 [mm²]	1075	1662	2827	4301	6648
Disc (item 7): Metal seat					**Material-No. / Art.-No.**		
Disc Detachable lifting aid		1.4122	211.0439.9000	211.0639.9000	212.0539.9000	212.0639.9000	211.1239.9000
		1.4404	211.0449.9000	211.0649.9000	212.0549.9000	212.0649.9000	212.0749.9000
Disc (item 7): Soft seal					**Material-No. / Art.-No.**		
Disc	CR	"K"	200.7149.9051	200.7249.9051	200.7349.9051	200.7449.9051	on request
	EPDM	"D"	200.7149.9041	200.7249.9041	200.7349.9041	200.7449.9041	on request
	FKM	"L"	200.7149.9071	200.7249.9071	200.7349.9071	200.7449.9071	200.7549.9071
	FFKM	"C"	200.7149.9091	200.7249.9091	on request	on request	on request
O-ring (item 7.4): Soft seal					**Material-No. / Art.-No.**		
O-ring	CR	"K"	502.0408.3551	502.0503.3551	502.0660.5351	502.0819.5351	on request
	EPDM	"D"	502.0408.3541	502.0503.3541	502.0660.5341	502.0819.5341	on request
	FKM	"L"	502.0408.3571	502.0503.3571	502.0660.5371	502.0819.5371	502.1041.5371
	FFKM	"C"	502.0408.3591	502.0503.3591	on request	on request	on request
Bellows (item 15): 1.4571					**Material-No. / Art.-No.**		
Standard bellows			400.0449.0000	400.0549.0000	400.0649.0000	400.0749.0000	400.0849.0000
Conversion kit, standard[1]			5021.1037	5021.1038	5021.1039	Component parts	Component parts
Low pressure bellows			400.0449.0021	400.0549.0021	400.0649.0021	400.1107	400.0849.0021
Conversion kit low pressure[1]			Please specify application conditions			–	–
Gasket – body / bonnet (item 60)					**Material-No. / Art.-No.**		
Gasket	Graphite + 1.4401		500.0907.0000	500.1007.0000	500.1507.0000	500.1807.0000	500.2107.0000
Option code L68 Gylon (PTFE compliance)			500.0905.0000	500.1005.0000	500.1505.0000	500.1805.0000	500.2105.0000
Ball (Item 61):					**Material-No. / Art.-No.**		
Ball	Ball Ø [mm]		9	9	12	12	15
	1.4404		510.0204.0000	510.0204.0000	510.0304.0000	510.0304.0000	510.0404.0000
Split ring (item 14):					**Material-No. / Art.-No.**		
Split ring	Spindle Ø [mm]		16	16	16	20	24
	1.4404		251.0249.0000	251.0249.0000	251.0249.0000	251.0349.0000	251.0449.0000
Pin (item 57)					**Material-No. / Art.-No.**		
Pin	1.4310		480.0705.0000	480.0705.0000	480.1005.0000	480.1005.0000	480.1105.0000
O-ring damper					**Material-No. / Art.-No.**		
	Conversion kit H2		5021.1061	5021.1061	–	–	–
	Conversion kit H4		5021.1065	5021.1065	–	–	–

[1] Pressure range, see page 03/10 – 03/11

One bellows conversion set includes the following components:

Item.	Components	No.
8	Guide with bushing	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** dependant on valve size
60	Gasket	**2, 3** dependant on valve size
	Installation instruction LWN 037.05	1

Refer to page 03/04

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Order information – spare parts

Spare parts

			O-ring disc	Metal disc					
		DN_I	15	15	20	25	32	40	50
		DN_O	15	15	20	25	32	40	50
		Actual orifice diameter d_0 [mm]]	12	12	18	18	18	23	29
		Actual orifice area A_0 [mm²]	113	113	254	254	254	416	661
Disc (item 7): Metal to metal seat						Material-No. / Art.-No.			
Disc Detachable lifting aid		1.4122	–	230.9339.9000	210.6939.9000	210.6939.9000	210.6939.9000	220.0139.9000	220.0239.9000
		1.4404	–	230.9349.9000	210.6949.9000	210.6949.9000	210.6949.9000	220.0149.9000	220.0249.9000
Disc (item 7): Soft seal						Material-No. / Art.-No.			
Disc	CR	"K"	230.3049.9051	–	200.6049.9051	200.6049.9051	200.6049.9051	200.6149.9051	200.6249.9051
	EPDM	"D"	230.3049.9041	–	200.6049.9041	200.6049.9041	200.6049.9041	200.6149.9041	200.6249.9041
	FKM	"L"	230.3049.9071	–	200.60049.9071	200.6049.9071	200.6049.9071	200.6149.9071	200.6249.9071
	FFKM	"C"	230.3049.9091	–	200.60049.9091	200.6049.9091	200.6049.9091	200.6149.9091	200.6249.9091
O-ring (item 7.4): Soft seal						Material-No. / Art.-No.			
O-Ring	CR	"K"	502.0107.2651	–	502.0171.2651	502.0171.2651	502.0171.2651	502.0249.3351	502.0313.3551
	EPDM	"D"	502.0107.2641	–	502.0171.2641	502.0171.2641	502.0171.2641	502.0249.3341	502.0313.3541
	FKM	"L"	502.0107.2671	–	502.0171.2671	502.0171.2671	502.0171.2671	502.0249.3371	502.0313.3571
	FFKM	"C"	502.0107.2691	–	502.0171.2691	502.0171.2691	502.0171.2691	502.0249.3391	502.0313.3591
Bellows (item 15): 1.4571						Material-No. / Art.-No.			
Standard bellows			400.7949.0000	400.7949.0000	400.0149.0000	400.0149.0000	400.0149.0000	400.0249.0000	400.0349.0000
Conversion kit, standard[1]			5021.1030	5021.1030	5021.1034	5021.1034	5021.1034	5021.1035	5021.1036
Low pressure bellows			–	400.0149.0021	400.0149.0021	400.0149.0021	400.0149.0021	400.0249.0021	400.0349.0021
Conversion kit low pressure[1]						Please specify application conditions			
Gasket – body / bonnet (item 60)						Material-No. / Art.-No.			
Gasket	Graphite + 1.4401		500.0407.0000	500.0407.0000	500.0407.0000	500.0407.0000	500.0407.0000	500.0407.0000	500.0507.0000
Option code L68 Gylon (PTFE compliance)			500.0405.0000	500.0405.0000	500.0405.0000	500.0405.0000	500.0405.0000	500.0405.0000	500.0505.0000
Ball (item 61):						Material-No. / Art.-No.			
Ball	Ball Ø [mm]		6	6	6	6	6	6	6
	1.4401		510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000	510.0104.0000
Split ring (item 14):						Material-No. / Art.-No.			
Split ring	Spindle Ø [mm]		12	12	12	12	12	12	12
	1.4404		251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000	251.0149.0000
Pin (item 57)						Material-No. / Art.-No.			
Pin	1.4310		480.0505.0000	480.0505.0000	480.0505.0000	480.0505.0000	480.0505.0000	480.0505.0000	480.0705.0000
O-ring damper						Material-No. / Art.-No.			
	Conversion kit H2		5021.1060	5021.1060	–	5021.1060	5021.1060	5021.1060	5021.1060
	Conversion kit H4		5021.1064	5021.1064	–	5021.1064	5021.1064	5021.1064	5021.1064

[1] Pressure range, refer to page 01/10 – 01/11

A conversion kit includes the following components:

Item.	Components	No.
8	Guide with bushing	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** dependant on valve size
60	Gasket	**2, 3** dependant on valve size
	Installation instruction LWN 037.05	1

Refer to page 01/04

Order information – spare parts

Spare parts

		DN_I	65	80	100	125	150
		DN_O	65	80	100	125	150
		Actual orifice diameter d_0 [mm]]	37	46	60	74	92
		Actual orifice area A_0 [mm²]	1075	1662	2827	4301	6648
Disc (item 7): Metal to metal seat					**Material-No. / Art.-No.**		
Disc Detachable lifting aid		1.4122	220.0339.9000	210.9639.9000	220.2539.9000	220.2639.9000	220.2739.9000
		1.4404	220.0349.9000	210.9649.9000	220.2549.9000	–	–
Disc (item 7): Soft seal					**Material-No. / Art.-No.**		
Disc	CR	"K"	200.6349.9051	200.6449.9051	200.6549.9051	200.6649.9051	–
	EPDM	"D"	200.6349.9041	200.6449.9041	200.6549.9041	200.6649.9041	200.6749.9041
	FKM	"L"	200.6349.9071	200.6449.9071	200.6549.9071	200.6649.9071	–
	FFKM	"C"	200.6349.9091	200.6449.9091	–	–	–
O-ring (item 7.4): Soft seal					**Material-No. / Art.-No.**		
O-Ring	CR	"K"	502.0408.3551	502.0503.3551	502.0660.5351	502.0819.5351	–
	EPDM	"D"	502.0408.3541	502.0503.3541	502.0660.5341	502.0819.5341	502.1041.5341
	FKM	"L"	502.0408.3571	502.0503.3571	502.0660.5371	502.0819.5371	–
	FFKM	"C"	502.0408.3591	502.0503.3591	–	–	–
Bellows (item 15): 1.4571					**Material-No. / Art.-No.**		
Standard bellows			400.0149.0000	400.0549.0000	400.0649.0000	400.0749.0000	400.0849.0000
Conversion kit, standard[1]			5021.1037	5021.1038	5021.1039	Component parts	Component parts
Low pressure bellows			400.0449.0021	400.0549.0021	400.0649.0021	400.1107	400.0849.0021
Conversion kit low pressure[1]			Please specify application conditions			–	–
Gasket – body / bonnet (item 60)					**Material-No. / Art.-No.**		
Gasket	Graphite + 1.4401		500.0907.0000	500.1007.0000	500.1507.0000	500.1807.0000	500.2107.0000
Option code L68 Gylon (PTFE compliance)			500.0905.0000	500.1005.0000	500.1505.0000	500.1805.0000	500.2105.0000
Ball (item 61):					**Material-No. / Art.-No.**		
Ball	Ball Ø [mm]		9	9	12	12	15
	1.4404		510.0204.0000	510.0204.0000	510.0304.0000	510.0304.0000	510.0404.0000
Split ring (item 14):					**Material-No. / Art.-No.**		
Split ring	Spindle Ø [mm]		16	16	16	20	24
	1.4404		251.0249.0000	251.0249.0000	251.0249.0000	251.0349.0000	251.0449.0000
Pin (item 57)					**Material-No. / Art.-No.**		
Pin	1.4310		480.0705.0000	480.0705.0000	480.1005.0000	480.1005.0000	480.1105.0000
O-ring damper					**Material-No. / Art.-No.**		
	Conversion kit H2		5021.1061	5021.1061	–	–	–
	Conversion kit H4		5021.1065	5021.1065	–	–	–

[1] Pressure range, refer to page 01/10 – 01/11

A conversion kit includes the following components:

Item.	Components	No.
8	Guide with bushing	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** dependant on valve size
60	Gasket	**2, 3** dependant on valve size
	Installation instruction LWN 037.05	1

Refer to page 01/04

Order information – spare parts

Spare parts

			O-ring disc	Metal disc
		DN_I	15	15
		DN_O	25	25
		Actual orifice diameter d_0 [mm]	12	12
		Actual orifice area A_0 [mm²]	113	113
Disc (item 7): Metal seat			**Material-No. / Art.-No.**	
Disc Detachable lifting aid		1.4122	–	230.9339.9000
		1.4404	–	230.9349.9000
Disc (item 7): Soft seal			**Material-No. / Art.-No.**	
Disc	CR	"K"	230.2949.9053	–
	EPDM	"D"	230.2949.9042	–
	FKM	"L"	230.2949.9073	–
	FFKM	"C"	230.2949.9091	–
O-ring (item 7.4): Soft seal			**Material-No. / Art.-No.**	
O-Ring	CR	"K"	502.0107.2653	–
	EPDM	"D"	502.0107.2642	–
	FKM	"L"	502.0107.2673	–
	FFKM	"C"	502.0107.2691	–
Bellows (item 15): 1.4571			**Material-No. / Art.-No.**	
Standard bellows			400.6349.0000	400.6349.0000
Conversion kit, standard[1)]			Please specify application conditions	
Low pressure bellows			–	–
Conversion kit low pressure[1)]			–	–
Gasket – body / bonnet (item 60)			**Material-No. / Art.-No.**	
Gasket	Graphite + 1.4401		500.0407.0000	500.0407.0000
Option code L68 Gylon (PTFE compliance)			500.0405.0000	500.0405.0000
Ball (item 61):			**Material-No. / Art.-No.**	
Ball	Ball Ø [mm]		6	6
	1.4404		510.0104.0000	510.0104.0000
Split ring (item 14):			**Material-No. / Art.-No.**	
Split ring	Spindle Ø [mm]		12	12
	1.4404		251.0149.0000	251.0149.0000
Pin (item 57)			**Material-No. / Art.-No.**	
Pin	1.4310		480.0505.0000	480.0505.0000
O-ring damper			**Material-No. / Art.-No.**	
	Conversion kit H2		5021.1060	5021.1060
	Conversion kit H4		5021.1064	5021.1064

Item.	Components	No.
8	Guide; upper connection of balanced bellows	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	4
60	Gasket	2
	Instruction guide LWN 037.05	1

Refer to page page 02/04

Order information – Spare parts

Spare parts

		Valve size	1" x 2"	1½" x 2"	1½" x 2½"	2" x 3"	3" x 4"	4" x 6"
		Actual Orifice diameter d_0 [mm]	23	29	37	46	60	92
		Actual Orifice area A_0 [mm²]	416	661	1075	1662	2827	6648
Disc (Item 7): Metal to metal seat			Material-No. / Art.-No.					
Disc detachable lifting aid		1.4122	210.9739.9000	210.9839.9000	210.9939.9000	210.8739.9000	220.1639.9000	220.1839.9000
		1.4404	210.9749.9000	210.9849.9000	210.9949.9000	210.8749.9000	220.1649.9000	220.1849.9000
Disc (Item 7): Soft seal			Material-No. / Art.-No.					
Disc	CR	"K"	200.5049.9051	200.5149.9051	200.5249.9051	200.5349.9051	200.5449.9051	on request
	EPDM	"D"	200.5049.9041	200.5149.9041	200.5249.9041	200.5349.9041	200.5449.9041	200.5649.9041
	FKM	"L"	200.5049.9071	200.5149.9071	200.5249.9071	200.5349.9071	200.5449.9071	200.5649.9071
	FFKM	"C"	200.5049.9091	200.5149.9091	200.5249.9091	200.5349.9091	on request	on request
O-ring (Item 7.4): Soft seal			Material-No. / Art.-No.					
O-ring	CR	"K"	502.0249.3551	502.0313.3551	502.0408.3551	502.0503.3551	502.0660.5351	on request
	EPDM	"D"	502.0249.3541	502.0313.3541	502.0408.3541	502.0503.3541	502.0660.5341	502.1041.5341
	FKM	"L"	502.0249.3571	502.0313.3571	502.0408.3571	502.0503.3571	502.0660.5371	502.1041.5371
	FFKM	"C"	502.0249.3591	502.0313.3591	502.0408.3591	502.0503.3591	on request	on request
Bellows (Item 15): 1.4571			Material-No. / Art.-No.					
Standard bellows			400.0949.0000	400.1049.0000	400.1149.0000	400.1249.0000	400.1349.0000	400.0849.0000
Conversion kit standard[1]			5021.1041	5021.1042	5021.1043	5021.1044	5021.1045	5021.1047
Low pressure bellows			400.0949.0021	400.1049.0021	400.1149.0021	400.1249.0021	400.1349.0021	400.0849.0021
Conversion kit low pressure[1]			please specify in writing					
Gasket – Body / bonnet (Item 60)			Material-No. / Art.-No.					
Gasket	Graphite + 1.4401		500.0607.0000	500.0807.0000	500.1007.0000	500.1207.0000	500.1607.0000	500.2107.0000
Option code L68	Gylon (filled PTFE)		500.0605.0000	500.0805.0000	500.1005.0000	500.1205.0000	500.1605.0000	500.2105.0000
Ball (Item 61)			Material-No. / Art.-No.					
Ball	Ball Ø [mm]		6	6	9	9	12	15
	1.4404		510.0104.0000	510.0104.0000	510.0204.0000	510.0204.0000	510.0304.0000	510.0404.0000
Split ring (Item 14)			Material-No. / Art.-No.					
Split ring	Spindle Ø [mm]		12	16	16	16	20	24
	1.4404		251.0149.0000	251.0249.0000	251.0249.0000	251.0249.0000	251.0349.0000	251.0449.0000
Pin (Item 57)			Material-No. / Art.-No.					
Pin	1.4310		480.0505.0000	480.0705.0000	480.0705.0000	480.0705.0000	480.1005.0000	480.1105.0000

[1] For pressure range see page 02/12 – 02/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 02/04

Type 441, 442 DIN

LESER

Order information – Spare parts

Spare parts

		DN_I	20	20	25	32	40	50	65
		DN_O	32	40	40	50	65	80	100
		Actual Orifice diameter d_0 [mm]	18	18	23	29	37	46	60
		Actual Orifice area A_0 [mm²]	254	254	416	661	1075	1662	2827
Disc (Item 7): Metal to metal seat						**Material-No. / Art.-No.**			
Disc detachable lifting aid		1.4122	210.7039.9000	210.9739.9000	210.9839.9000	210.9939.9000	210.8739.9000	220.1639.9000
		1.4404	–	210.9749.9000	210.9849.9000	210.9949.9000	210.8749.9000	220.1649.9000
Disc (Item 7): Soft seal						**Material-No. / Art.-No.**			
Disc	CR	"K"	200.4939.9051	200.5049.9051	200.5149.9051	200.5249.9051	200.5349.9051	200.5449.9051
	EPDM	"D"	200.4939.9041	200.5049.9041	200.5149.9041	200.5249.9041	200.5349.9041	200.5449.9041
	FKM	"L"	200.4939.9071	200.5049.9071	200.5149.9071	200.5249.9071	200.5349.9071	200.5449.9071
	FFKM	"C"	200.4939.9091	200.5049.9091	200.5149.9091	200.5249.9091	200.5349.9091	on request
O-ring (Item 7.4): Soft seal						**Material-No. / Art.-No.**			
O-ring	CR	"K"	502.0171.2651	502.0249.3551	502.0313.3551	502.0408.3551	502.0503.3551	502.0660.5351
	EPDM	"D"	502.0171.2641	502.0249.3541	502.0313.3541	502.0408.3541	502.0503.3541	502.0660.5341
	FKM	"L"	502.0171.2671	502.0249.3571	502.0313.3571	502.0408.3571	502.0503.3571	502.0660.5371
	FFKM	"C"	502.0171.2691	502.0249.3591	502.0313.3591	502.0408.3591	502.0503.3591	on request
Bellows (Item 15): 1.4571						**Material-No. / Art.-No.**			
Standard bellows			400.0149.0000	400.0949.0000	400.1049.0000	400.1149.0000	400.1249.0000	400.1349.0000
Conversion kit standard[1]			5021.1040	5021.1041	5021.1042	5021.1043	5021.1044	5021.1045
Low pressure bellows			400.0149.0021	400.0949.0021	400.1049.0021	400.1149.0021	400.1249.0021	400.1349.0021
Conversion kit low pressure[1]						please specify in writing		
Gasket – Body / bonnet (Item 60)						**Material-No. / Art.-No.**			
Gasket	Graphite + 1.4401		500.0407.0000	500.0607.0000	500.0807.0000	500.1007.0000	500.1207.0000	500.1607.0000
Option code L68	Gylon (filled PTFE)		500.0405.0000	500.0605.0000	500.0805.0000	500.1005.0000	500.1205.0000	500.1605.0000
Ball (Item 61)						**Material-No. / Art.-No.**			
Ball	Ball Ø [mm]		6	6	6	9	9	12
	1.4404		510.0104.0000	510.0104.0000	510.0104.0000	510.0204.0000	510.0204.0000	510.0304.0000
Split ring (Item 14)						**Material-No. / Art.-No.**			
Split ring	Spindle Ø [mm]		12	12	16	16	16	20
	1.4404		251.0149.0000	251.0149.0000	251.0249.0000	251.0249.0000	251.0249.0000	251.0349.0000
Pin (Item 57)						**Material-No. / Art.-No.**			
Pin	1.4310		480.0505.0000	480.0505.0000	480.0705.0000	480.0705.0000	480.0705.0000	480.1005.0000

[1] For pressure range see page 01/12 – 01/15.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	4
60	Gasket	3
	Installation instruction LWN 037.05	1

Refer to page 01/04

Type 441, 442 DIN

LESER

Order information – Spare parts

Spare parts

		DN_I	80	100	125	150	200
		DN_O	125	150	200	250	300
		Actual Orifice diameter d_0 [mm]	74	92	98	125	165
		Actual Orifice area A_0 [mm^2]	4301	6648	7543	12272	21382
Disc (Item 7): Metal to metal seat					**Material-No. / Art.-No.**		
Disc detachable lifting aid		1.4122	220.1739.9000	220.1839.9000	220.0439.9000	220.1949.9000	–
		1.4404	220.1749.9000	220.1849.9000	220.0449.9000	220.1949.9000	230.1549.9000
Disc (Item 7): Soft seal					**Material-No. / Art.-No.**		
Disc	CR	“K”	200.5549.9051	on request	on request	on request	–
	EPDM	“D”	200.5549.9041	200.5649.9041	200.5749.9041	200.5849.9041	–
	FKM	“L”	200.5549.9071	200.5649.9071	200.5749.9071	on request	–
	FFKM	“C”	on request	on request	on request	on request	–
O-ring (Item 7.4): Soft seal					**Material-No. / Art.-No.**		
O-ring	CR	“K”	502.0819.5351	on request	on request	on request	–
	EPDM	“D”	502.0819.5341	502.1041.5341	502.1041.5341	502.1295.5341	–
	FKM	“L”	502.0819.5371	502.1041.5371	502.1041.5371	on request	–
	FFKM	“C”	on request	on request	on request	on request	–
Bellows (Item 15): 1.4571					**Material-No. / Art.-No.**		
Standard bellows			400.1449.0000	400.0849.0000	400.0849.0000	400.3949.0000	400.5449.0000
Conversion kit standard[1]			5021.1046	5021.1047	5021.1047	5021.1048	single parts
Low pressure bellows			400.1449.0021	400.0849.0021	400.0849.0021	–	–
Conversion kit low pressure[1]			please specify in writing			–	–
Gasket – Body / bonnet (Item 60)					**Material-No. / Art.-No.**		
Gasket	Graphite + 1.4401		500.1907.0000	500.2107.0000	500.2107.0000	500.2207.0000	500.2807.0000
Option code L68	Gylon (filled PTFE)		500.1905.0000	500.2105.0000	500.2105.0000	500.2205.0000	500.2805.0000
Ball (Item 61)					**Material-No. / Art.-No.**		
Ball	Ball Ø [mm]		12	15	15	15	18
	1.4404		510.0304.0000	510.0404.0000	510.0404.0000	510.0404.0000	510.0505.0000
Split ring (Item 14)					**Material-No. / Art.-No.**		
Split ring	Spindle Ø [mm]		24	24	24	30	35
	1.4404		251.0449.0000	251.0449.0000	251.0449.0000	251.0549.0000	251.1949.0000
Pin (Item 57)					**Material-No. / Art.-No.**		
Pin	1.4310		480.1005.0000	480.1105.0000	480.1105.0000	480.1205.0000	480.1405.0000

[1] For pressure range see page 01/12 – 01/15.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**8, 12** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 01/04

Type 441, 442 Full nozzle ANSI

Order information – Spare parts

Spare parts

	Valve Size		1" x 2"	1 1/2" x 2"	1 1/2" x 2 1/2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [mm]		23	29	37	46	60	92
	Actual Orifice area A_0 [mm²]		416	661	1075	1662	2827	6648
Disc (Item 7): Metal to Metal seal					Material-No. / Art.-No.			
Disc detachable lifting aid		1.4122	210.9739.9000	210.9839.9000	210.9939.9000	210.8739.9000	220.1639.9000	220.1839.9000
		1.4404	210.9749.9000	210.9849.9000	210.9949.9000	210.8749.9000	220.1649.9000	220.1849.9000
Disc (Item 7): Soft seal					Material-No. / Art.-No.			
Disc	CR	"K"	200.5049.9051	200.5149.9051	200.5249.9051	200.5349.9051	200.5449.9051	on request
	EPDM	"D"	200.5049.9041	200.5249.9041	200.5249.9041	200.5349.9041	200.5449.9041	200.5649.9041
	FKM	"L"	200.5049.9071	200.5249.9071	200.5249.9071	200.5349.9071	200.5449.9071	200.5649.9071
	FFKM	"C"	200.5049.9091	200.5249.9091	502.0408.3591	200.5349.9091	on request	on request
Disc (Item 7.4): Soft seal					Material-No. / Art.-No.			
O-ring	CR	"K"	502.0249.3551	502.0313.3551	502.0408.3551	502.0503.3551	502.0660.5351	on request
	EPDM	"D"	502.0249.3541	502.0313.3541	502.0408.3541	502.0503.3541	502.0503.3541	502.1041.5341
	FKM	"L"	502.0249.3571	502.0313.3571	502.0408.3571	502.0503.3571	502.0503.3571	502.1041.5371
	FFKM	"C"	502.0249.3591	502.0313.3591	502.0408.3591	502.0503.3591	on request	on request
Bellows (Item 15) 1.4571					Material-No. / Art.-No.			
Standard bellows			400.0949.0000	400.1049.0000	400.1149.0000	400.1249.0000	400.1349.0000	400.0849.0000
Conversion kit standard[1]			5021.1041	5021.1042	5021.1043	5021.1044	5021.1045	5021.1047
Low pressure bellows			400.0949.0021	400.1049.0021	400.1149.0021	400.1249.0021	400.1349.0021	400.0849.0021
Conversion kit low pressure[1]					please specify in writing			
Gasket – Body / bonnet (Item 60)					Material-No. / Art.-No.			
Gasket	Graphite + 1.4401		500.0607.0000	500.0807.0000	500.1007.0000	500.1207.0000	500.1607.0000	500.2107.0000
Option code L68	Gylon (filled PTFE)		500.0605.0000	500.0805.0000	500.1005.0000	500.1205.0000	500.1605.0000	500.2105.0000
Ball (Item 61)					Material-No. / Art.-No.			
Ball	Ball Ø [mm]		6	6	9	9	12	15
		1.4404	510.0104.0000	510.0104.0000	510.0204.0000	510.0204.0000	510.0304.0000	510.0404.0000
Split ring (Item 14)					Material-No. / Art.-No.			
Split ring	Spindle Ø [mm]		12	16	16	16	20	24
		1.4404	251.0149.0000	251.0249.0000	251.0249.0000	251.0149.0000	251.0349.0000	251.0449.0000
Pin (Item 57)					Material-No. / Art.-No.			
Pin		1.4310	480.0505.0000	480.0705.0000	480.0705.0000	480.0705.0000	480.1005.0000	480.1105.0000

[1] For pressure range see page 07/12 – 07/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 07/04

Type 441, 442 Full nozzle DIN

Order information – Spare parts

Spare parts

		DN_I	25	40	50
		DN_O	40	65	80
		Actual Orifice diameter d_0 [mm]	23	37	46
		Actual Orifice area A_0 [mm^2]	416	1075	1662
Disc (Item 7): Metal to metal seat				**Material-No. / Art.-No.**	
Disc detachable lifting aid		1.4122	200.9739.9000	200.9939.9000	200.8739.9000
		1.4404	200.9749.9000	200.9949.9000	200.8749.9000
Disc (Item 7): Soft seal				**Material-No. / Art.-No.**	
Disc	CR	"K"	200.5049.9051	200.5249.9051	200.5349.9051
	EPDM	"D"	200.5049.9041	200.5249.9041	200.5349.9041
	FKM	"L"	200.5049.9071	200.5249.9071	200.5349.9071
	FFKM	"C"	200.5049.9091	502.0408.3591	502.0503.3591
Disc (Item 7.4): Soft seal				**Material-No. / Art.-No.**	
O-ring	CR	"K"	502.0249.3551	502.0408.3551	502.0503.3551
	EPDM	"D"	502.0249.3541	502.0408.3541	502.0503.3541
	FKM	"L"	502.0249.3571	502.0408.3571	502.0503.3571
	FFKM	"C"	502.0249.3591	502.0408.3591	502.0503.3591
Bellows (Item 15) 1.4571				**Material-No. / Art.-No.**	
Standard bellows			400.0949.0000	400.1149.0000	400.1249.0000
Conversion kit standard[1]			5021.1041	5021.1043	5021.1044
Low pressure bellows			400.0949.0021	400.1149.0021	400.1249.0021
Conversion kit low pressure[1]				please specify in writing	
Gasket – body / bonnet (Item 60)				**Material-No. / Art.-No.**	
Gasket	Graphite + 1.4401		500.0607.0000	500.1007.0000	500.1207.0000
Option code L68	Gylon (filled PTFE)		500.0605.0000	500.1005.0000	500.1205.0000
Ball (Item 61)				**Material-No. / Art.-No.**	
Ball	Ball Ø [mm]		6	9	9
	1.4404		510.0104.0000	510.0204.0000	510.0204.0000
Split ring (Item 14)				**Material-No. / Art.-No.**	
Split ring	Spindle Ø [mm]		12	16	16
	1.4404		251.0149.0000	251.0249.0000	251.0249.0000
Pin (Item 57)				**Material-No. / Art.-No.**	
Pin	1.4310		480.0505.0000	480.0705.0000	480.0705.0000

[1] For pressure range see page 06/12 – 06/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	4
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 06/04

Order information – Spare parts

Spare parts

	DN_{I+O}	200 x 300	250 x 350	300 x 400	400 x 500
	Valve size	8" x 12"	10" x 14"	12" x 16"	16" x 20"
	Actual Orifice diameter d_0 [mm]	165	200	235	295
	Actual Orifice area A_0 [mm^2]	21382	31416	43374	68349
Disc (Item 7): Metal to metal seat			Material-No. / Art.-No.		
Disc with detachable lifting aid	1.4571	230.1549.9000	230.1649.9000	200.2349.9000	200.2449.9000
Bellows (Item 15): 1.4571			Material-No. / Art.-No.		
Standard bellows	1.4571	400.5449.0000	400.5349.0000	on request	on request
Conversion kit standard[1)]		single parts	single parts	on request	on request
Gasket – Body / bonnet (Item 60)			Material-No. / Art.-No.		
Gasket	Graphite + 1.4401	500.2807.0000	500.2807.0000	500.3507.0000	500.3607.0000
Ball (Item 61)			Material-No. / Art.-No.		
Ball	Ball Ø [mm]	18	18	18	18
	1.4401	510.0504.0000	510.0504.0000	510.0504.0000	510.0504.0000
Split ring (Item 14)			Material-No. / Art.-No.		
Split ring	Spindle ø [mm]	35	35	35	35
	1.4404	251.1549.0000	251.1549.0000	–	–
Pin (Item 57)			Material-No. / Art.-No.		
Pin	1.4310	480.1405.0000	480.1405.0000	480.0605.0000	480.0605.0000

[1)] For pressure range see page 03/12 – 03/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	–
12	Spindle	1
15	Bellows	1
22	Lift stopper	1
60	Gasket	3
	Installation instruction LWN 037.05	1

Refer to page 03/04

Order information – Spare parts

Spare parts

	Valve size		1" x 2"	1 1/2" x 2"	2" x 3"	2 1/2" x 4"	3" x 4"	3" x 4"
	Actual Orifice diameter d_0 [mm]		23	37	46	60	74	74
	Actual Orifice area A_0 [mm^2]		416	1075	1662	2827	4301	4301
	Set pressure range S/G/L [bar$_g$]		see page 05/08				0.1 – 6.8	6.81 – 16
	Set pressure range S/G/L [psig]						1.5 – 98.6	98.61 – 232
Disc (Item 7): Metal to metal seat			**Material-No. / Art.-No.**					
Disc detachable lifting aid		1.4404	225.4149.9000	225.4349.9000	225.4449.9000	225.4549.9000	225.4649.9000	225.4649.9000
O-ring (Item 60 + 67)			**Material-No. / Art.-No.**					
Gasket	EPDM	"D"	502.0600.3041	502.1130.4041	502.1130.4041	502.1580.5041	502.1580.5041	502.1580.5041
	FKM	"L"	502.0600.3071	502.1130.4071	502.1130.4071	502.1580.5071	502.1580.5071	502.1580.5071
Ball (Item 61)			**Material-No. / Art.-No.**					
Ball	ø [mm]		6	9	9	12	12	12
		1.4401	510.0104.0000	510.0204.0000	510.0204.0000	510.0304.0000	510.0304.0000	510.0304.0000
Pin (Item 57)			**Material-No. / Art.-No.**					
Pin		1.4310	480.0505.0000	480.0705.0000	480.0705.0000	480.1005.0000	480.1005.0000	480.1005.0000

Order information – Spare parts

Spare parts

	DN_I	25	40	50	65	80	80
	DN_O	50	80	80	100	100	100
Actual Orifice diameter d_0 [mm]		23	37	46	60	74	74
Actual Orifice area A_0 [mm^2]		416	1075	1662	2827	4301	4301
Set pressure range S/G/L [bar_g]		see page 04/08				0.1 – 6.8	6.81 – 16
Set pressure range S/G/L [psig]						1.5 – 98.6	98.61 – 232
Disc (Item 7): Metal to metal seat		**Material-No. / Art.-No.**					
Disc detachable lifting aid	1.4404	225.4149.9000	225.4349.9000	225.4449.9000	225.4549.9000	225.4649.9000	225.4649.9000
O-ring (Item 60 + 67)		**Material-No. / Art.-No.**					
O-ring	EPDM "D"	502.0600.3041	502.1130.4041	502.1130.4041	502.1580.5041	502.1580.5041	502.1580.5041
	FKM "L"	502.0600.3071	502.1130.4071	502.1130.4071	502.1580.5071	502.1580.5071	502.1580.5071
Ball (Item 61)		**Material-No. / Art.-No.**					
Ball	ø [mm]	6	9	9	12	12	12
	1.4401	510.0104.0000	510.0204.0000	510.0204.0000	510.0304.0000	510.0304.0000	510.0304.0000
Pin (Item 57)		**Material-No. / Art.-No.**					
Pin	1.4310	480.0505.0000	480.0705.0000	480.0705.0000	480.1005.0000	480.1005.0000	480.1005.0000

Order information – Spare parts

Spare parts

	DN_{I-O}	25 x 50	50 x 80	80 x 100	100 x 150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [mm]	20	40	60	74
	Actual Orifice area A_0 [mm²]	314	1257	2827	4301
Disc (Item 7): Metal to metal seat			**Material-No. / Art.-No.**		
Disc with detachable lifting aid	1.4122	200.0239.9000	200.0439.9000	200.0639.9000	200.0939.9000
	1.4404	200.0269.9000	200.0469.9000	200.0669.9000	200.0969.9000
Disc (Item 7): Soft seal			**Material-No. / Art.-No.**		
Disc	CR “K”	–	–	–	–
	EPDM “D”	–	–	–	–
	FKM “L”	200.1149.9073	200.1349.9073	200.1549.9073	200.1849.9073
	FFKM “C”	–	–	–	–
Disc (Item 7.4): Soft seal			**Material-No. / Art.-No.**		
O-ring	CR “K”	–	–	–	–
	EPDM “D”	–	–	–	
	FKM “L”	200.1149.9073	200.1349.9073	200.1549.9073	200.1849.9073
	FFKM “C”	–	–	–	–
Bellows (Item 15)			**Material-No. / Art.-No.**		
Standard bellows		400.5749.0000	400.5949.0000	400.6149.0000	400.6249.0000
Conversion kit standard[1]		on request	on request	on request	on request
Low pressure bellows		on request	on request	on request	on request
Conversion kit low pressure[1]		on request	on request	on request	on request
Gasket – body / bonnet (Item 60)			**Material-No. / Art.-No.**		
Gasket	Graphite + 1.4401	500.1007.0000	500.1607.0000	500.2107.0000	500.2207.0000
Option code L68	Gylon (filled PTFE)	500.1005.0000	500.1605.0000	500.2105.0000	500.2205.0000
Ball (Item 61)			**Material-No. / Art.-No.**		
Ball	Ball Ø [mm]	9	12	15	15
	1.4401	510.0204.0000	510.0304.0000	510.0404.0000	510.0404.0000
Split ring (Item 14)			**Material-No. / Art.-No.**		
Split ring	Spindle Ø [mm]	16	20	24	30
	1.4404	251.0249.0000	251.0349.0000	251.0449.0000	251.0549.0000
Ball (Item 57)			**Material-No. / Art.-No.**		
Ball (15 pieces)	Ball Ø [mm]	3	3	3	3
	1.4310	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000
Screw (Item 66)			**Material-No. / Art.-No.**		
Screw	1.4401	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000

[1] For pressure range see page 08/12 – 08/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**4, 8** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 08/04

LESER

Order information – Spare parts

Spare parts

	DN_{I+O}	25 x 50	25 x 50	50 x 80	50 x 80	80 x 100	80 x 100
	Valve size	1" x 2"	1" x 2"	2" x 3"	2" x 3"	3" x 4"	3" x 4"
	Actual Orifice diameter d_0 [mm]	15	20	30	40	50	60
	Actual Orifice area A_0 [mm^2]	177	314	707	1257	1964	2827
Disc (Item 7): Metal to metal seat		**Material-No. / Art.-No.**					
Disc detachable lifting aid	1.4122	200.0139.9000	200.0239.9000	200.0339.9000	200.0439.9000	200.0539.9000	200.0639.9000
	1.4404	200.0169.9000	200.0269.9000	200.0369.9000	200.0469.9000	200.0569.9000	200.0669.9000
Disc (Item 7): Soft seal		**Material-No. / Art.-No.**					
Disc	CR "K"	–	200.1149.9053	200.1249.9053	200.1349.9053	200.1449.9053	200.1549.9053
	EPDM "D"	–	200.1149.9043	200.1249.9043	200.1349.9043	200.1449.9043	200.1549.9043
	FKM "L"	–	200.1149.9073	200.1249.9073	200.1349.9073	200.1449.9073	200.1549.9073
	FFKM "C"	–	200.1149.9093	200.1249.9093	200.1349.9093	200.1449.9093	200.1549.9093
Disc (Item 7.4): Soft seal		**Material-No. / Art.-No.**					
O-ring	CR "K"	–	502.0154.3553	502.0247.5353	502.0342.5353	502.0438.5353	502.0533.5353
	EPDM "D"	–	502.0154.3543	502.0247.5343	502.0342.5343	502.0438.5343	502.0533.5343
	FKM "L"	–	502.0154.3573	502.0247.5373	502.0342.5373	502.0438.5373	502.0533.5373
	FFKM "C"	–	502.0154.3593	502.0247.5393	502.0342.5393	502.0438.5393	502.0533.5393
Bellows (Item 15)		**Material-No. / Art.-No.**					
Standard bellows		400.5749.0000	400.5749.0000	400.5849.0000	400.5949.0000	400.6049.0000	400.6149.0000
Conversion kit standard[1]		on request	on request	on request	on request	on request	on request
Low pressure bellows		on request	on request	on request	on request	on request	on request
Conversion kit low pressure[1]		on request	on request	on request	on request	on request	on request
Gasket – body / bonnet (Item 60)		**Material-No. / Art.-No.**					
Gasket	Graphite + 1.4401	500.1007.0000	500.1007.0000	500.1607.0000	500.1607.0000	500.2107.0000	500.2107.0000
Option code L68	Gylon (filled PTFE)	500.1005.0000	500.1005.0000	500.1605.0000	500.1605.0000	500.2105.0000	500.2105.0000
Ball (Item 61)		**Material-No. / Art.-No.**					
Ball	Ball Ø [mm]	9	9	12	12	15	15
	1.4401	510.0204.0000	510.0204.0000	510.0304.0000	510.0304.0000	510.0404.0000	510.0404.0000
Split ring (Item 14)		**Material-No. / Art.-No.**					
Split ring	Spindle Ø [mm]	16	16	20	20	24	24
	1.4404	251.0249.0000	251.0249.0000	251.0349.0000	251.0349.0000	251.0449.0000	251.0449.0000
Ball (Item 57)		**Material-No. / Art.-No.**					
Ball (15 pieces)	Ball Ø [mm]	3	3	3	3	3	3
	1.4310	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000
Screw (Item 66)		**Material-No. / Art.-No.**					
Screw	1.4401	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000

[1] For pressure range see page 09/12 – 09/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	**1**
11	Bonnet spacer	**1**
12	Spindle	**1**
15	Bellows	**1**
55	Stud	**4, 8** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	**1**

Refer to page 09/04

Order information – Spare parts

Spare parts

	DN_{I+O}	100 x 150	100 x 150	100 x 150	100 x 150	150 x 250
	Valve size	4" x 6"	4" x 6"	4" x 6"	4" x 6"	6" x 10"
	Actual Orifice diameter d_0 [mm]	50	60	74	88	110
	Actual Orifice area A_0 [mm^2]	1964	2827	4301	6082	9503
Disc (Item 7): Metal to metal seat		**Material-No. / Art.-No.**				
Disc detachable lifting aid	1.4122	200.0539.9000	200.0839.9000	200.0939.9000	200.1039.9000	220.0939.9000
	1.4404	200.0569.9000	200.0869.9000	200.0969.9000	200.1069.9000	220.0969.9000
Disc (Item 7): Soft seal		**Material-No. / Art.-No.**				
Disc	CR “K”	200.1449.9053	200.1749.9053	200.1849.9053	200.1949.9053	–
	EPDM “D”	200.1449.9043	200.1749.9043	200.1849.9043	200.1949.9043	–
	FKM “L”	200.1449.9073	200.1749.9073	200.1849.9073	200.1949.9073	–
	FFKM “C”	200.1449.9093	200.1749.9093	200.1849.9093	200.1949.9093	–
Disc (Item 7.4): Soft seal		**Material-No. / Art.-No.**				
O-ring	CR “K”	502.0438.5353	502.0533.5353	502.0692.5353	502.0819.5353	–
	EPDM “D”	502.0438.4353	502.0533.5343	502.0692.5343	502.0819.5343	–
	FKM “L”	502.0438.7353	502.0533.5373	502.0692.5373	502.0819.5373	–
	FFKM “C”	502.0438.9353	502.0533.5393	502.0692.5393	502.0819.5393	–
Bellows (Item 15)		**Material-No. / Art.-No.**				
Standard bellows		400.6049.0000	400.6149.0000	400.6249.0000	400.6249.0000	400.7849.0000
Conversion kit standard[1]		on request	on request	on request	on request	on request
Low pressure bellows		on request	on request	on request	on request	on request
Conversion kit low pressure[1]		on request	on request	on request	on request	on request
Gasket – body / bonnet (Item 60)		**Material-No. / Art.-No.**				
Gasket	Graphite + 1.4401	500.2207.0000	500.2207.0000	500.2207.0000	500.2207.0000	500.2207.0000
Option code L68	Gylon (filled PTFE)	500.2205.0000	500.2205.0000	500.2205.0000	500.2205.0000	500.2205.0000
Ball (Item 61)		**Material-No. / Art.-No.**				
Ball	Ball Ø [mm]	15	15	15	15	15
	1.4401	510.0404.0000	510.0404.0000	510.0404.0000	510.0404.0000	510.0404.0000
Split ring (Item 14)		**Material-No. / Art.-No.**				
Split ring	Spindle Ø [mm]	30	30	30	30	30
	1.4404	251.0549.0000	251.0549.0000	251.0549.0000	251.0549.0000	251.0549.0000
Ball (Item 57)		**Material-No. / Art.-No.**				
Ball (15 pieces)	Ball Ø [mm]	3	3	3	3	3
	1.4310	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000	510.0604.0000
Screw (Item 66)		**Material-No. / Art.-No.**				
Screw	1.4401	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000	451.0114.0000

[1] For pressure range see page 09/12 – 09/13.
A conversion kit contains the following components:

Item	Component	No.
8	Guide	1
11	Bonnet spacer	1
12	Spindle	1
15	Bellows	1
55	Stud	**8, 12** depends on valve size
60	Gasket	**2, 3** depends on valve size
	Installation instruction LWN 037.05	1

Refer to page 09/04

6.2.11 Testing and Inspection of Safety Valves before Installation

“The condition of all safety valves should be visually inspected before installation. Before installation all protective materials on the valve flanges have to be completely removed. Bonnet shipping plugs must be removed from balanced safety valves.”[6)]
API 520 Part II recommends that the inlet surface must be cleaned, since foreign materials clinging to the inside of the nozzle will be blown across the seats when the safety valve is operated. Some of these materials may damage the seats or get trapped between the seats in such a way that they cause leakage. Valves should be tested before installation to confirm their set pressure.

LESER Note:
Due to the LESER types of packing, LESER safety valves are delivered ready-to-install. As long as safety valves remain in the packing during storage, the safety valves do not need to be inspected, cleaned or tested before initial installation. For more details see the LESER operating instructions.

[6)] API RP 520 Part II, 5th Edition 2003, Sect. 12.3

6.2.11.1 Pressure Test before Operation

Before a plant can be started up a hydraulic pressure test has to be performed. For this test all safety valves in the system must be prevented from opening.
Three different possibilities are feasible:

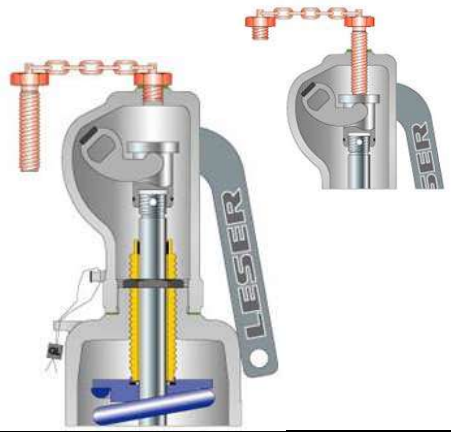
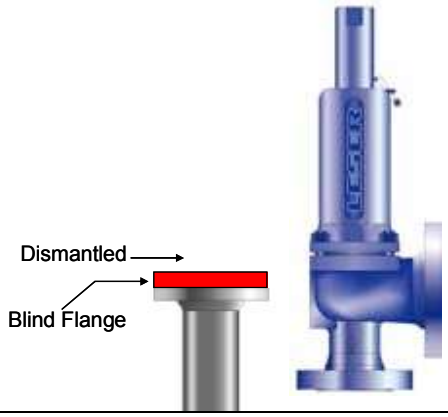
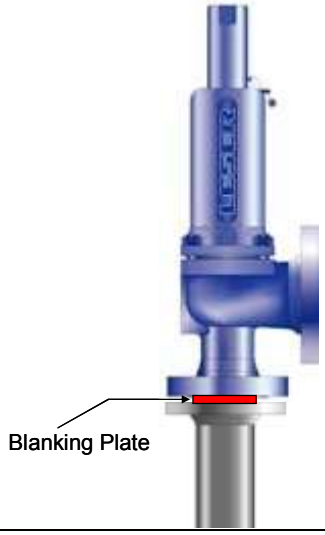
Possibility	Figure	Description
Test gag		The test gag blocks the spindle and keeps the safety valve tight while the system pressure exceeds the set pressure. Advantage: It is possible to perform pressure tests in a system without dismantling the safety valve. After testing, the test gag must be removed! Otherwise the safety valve cannot protect the system against unallowable overpressure.
Blind flange		The safety valve is replaced by a blind flange for the duration of the pressure test. After testing the safety valve has to be reinstalled.
Blanking plate/ Isolation plate		To block the safety valve during a pressure test a blanking plate is placed between inlet pipe and safety valve. After testing, the blanking plate must be removed! Otherwise the safety valve cannot protect the system against unallowable overpressure.

Table 6.2.11.1-1:Options for the hydraulic pressure test

6.2.12 Recommendation for Testing and Inspection during Operation

When and how often safety valves should be inspected is a frequently asked question. This question cannot be answered in general but has to be regarded for each application individually.

6.2.12.1 Inspection Intervals for LESER Safety Valves

Due to the individual operating conditions and in consideration of the different mediums, LESER gives no general reference for an inspection time interval.

In coordination between LESER, different operators, and the notified body, the following procedure has proven itself:

1. Determination of an ininitial inspection time interval:
In accordance with the operating conditions an initial interval of 24 month has proven itself. If the safety valve opens frequently or the medium is corrosive the inspection time interval should be 12 months.

2. Inspection of safety valves after this period of time:
- ► Set pressure repeat accuracy (this requirement is fulfilled if the set pressure corresponds to the test pressure with a tolerance of ± 3 %)
- ► Tightness test of the safety valve (this requirement is fulfilled if the tightness is tested according to API standard 527 or LWN 220.01)
- ► Testing of the mobility (this requirement is fulfilled if the safety valve can be opened with the lifting device at an operating pressure >75 % without the use of any additional tools).

3. Adapting the inspection time interval
The inspection time interval can be increased if the safety valve fulfills the requirements of the above mentioned tests. If not, the interval should be reduced to 12 months or less. In case the following inspection fulfills the requirements again the inspection interval can be lengthened by two month.

If the safety valve is leaking the inspection has to be done immediately.

6.2.12.2 Statements in Codes and Standards

Within the below stated codes and standards the following guidelines for inspection intervals for LESER safety valves are important:

API Recommended Practice 576, Inspection of Pressure-Relieving Devices
Chapter 6.4:
“The inspection of pressure-relieving devices provides data that can be evaluated to determine a safe and economical frequency of scheduled inspections. This frequency varies widely with the various operating conditions and environments to which relief devices are subjected. Inspections may usually be less frequent when operation is satisfactory and more frequent when corrosion, fouling, and leakage problems occur. Historical records reflecting periodic test results and service experiences for each relief device are valuable guides for establishing safe and economical inspection frequencies.
A definite time interval between inspections or tests should be established for every pressure-relieving device on operating equipment. Depending on operating experiences, this interval may vary from one installation to another. The time interval should be sufficiently firm to ensure that the inspection or test is made, but it should also be flexible enough to permit revision as justified by past test records.”

In API 510, the subsection on pressure-relieving devices establishes a maximum interval between device inspections or tests of 10 years. It also indicates that the intervals between pressure relief device testing or inspection should be determined by the performance of the devices in the particular service concerned.

AD2000-Merkblatt A2: Safety Devices against excess pressure – Safety Valves
Chapter 4.7:
“Tests on the response pressure and checks on the smooth running of moving parts within the guides shall be carried out at regular intervals. The intervals for regular tests shall be stipulated by the user in accordance with the operating conditions, using as a basis the recommendations of the manufacturer and the relevant third party. These tests and checks shall be carried out at the latest on the occasion of the external or internal tests on the relevant pressure vessel.”

Ordinance on Industrial Safety and Health – BetrSichV (Betriebssicherheitsverordnung).
Section 15 – Recurrent inspection
“ (1) An installation subject to monitoring and its components shall be subjected to recurrent inspections in certain intervals by an approved body to ensure their proper condition with respect to its operation. The operator shall determine the inspection intervals of the entire installation and its components on the basis of a technical safety assessment...“

The following testing periods for category IV pressure equipment (including safety valves) are defined in section 15:

- External inspection: 2 Years
- Internal inspection: 5 Years
- Strength inspection: 10 Years

6.2.13 Storage and Handling of Safety Valves

"Because cleanliness is essential to the satisfactory operation and tightness of a safety valve, precautions should be taken to keep out all foreign materials during storage or transportation. Safety valves should be closed off properly at both inlet and outlet flanges. Specific care should be taken to keep the valve inlet absolutely clean.
If possible, safety valves should be stored indoors, on pallets, and away from dirt and other forms of contamination.
Safety valves should be handled with care and should not be subjected to shock. Otherwise, considerable internal damage or misalignment can occur and seat tightness may be adversely affected."[7)]
Depending on the size and weight of the safety valve, the quantity of safety valves in one shipment, and the shipping method, LESER offers different types of packing (see LWN 617.08), e.g.:

Individual safety valve in a cardboard box (Figure 6.2.13-1)
Tied-down on a pallet (Figure 6.2.13-2)
Cardboard or wooden crate (Figure 6.2.13-3)

Figure 6.2.13-1: Individual cardboard box

Figure 6.2.13-2: Tied-down on a pallet

Figure 6.2.13-3 Wooden crate

During storage until installation, safety valves should be kept in their own packaging. The advantages of the LESER types of packing are:

- Due to secure packaging, no damage during transport.
- Unpacking of safety valves before stocking is not necessary.
- Safety valves are protected against dust and dirt during storage.
- Easy and space-saving storage of safety valves on shelves or racking.
- Easy identification of the content from the outside via labels (Figure 6.2.13-4).

Figure 6.2.13-4: Outside label on a cardboard box

It is also possible to transport LESER Safety valves horizontally. The advantages of this kind of transportation are:

- ► requires little space
- ► less freight charge
- ► lower risk of damages in horizontal transport due to lower center of gravity

[7)] API RP 520 Part II, 5th Edition 2003, Sect. 12.2

4 Typical Mistakes as a Result of Unauthorized Repair

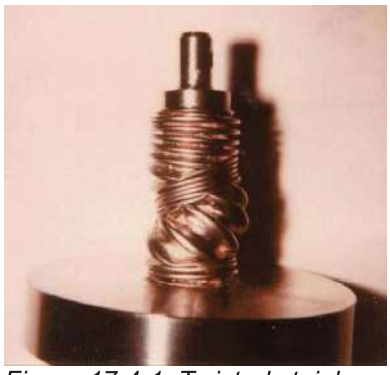


Figure 17.4-1: Twisted stainless steel bellows

Safety valves are safety devices and improper repair may cause damage to equipment and serious injury or death! The following table lists typical mistakes that are made when repair is performed by unauthorized or untrained personnel or when maintenance instructions are not followed.

No.	Mistake	Effect
1	Assembly of incorrect spring	1. Spring is too soft: Safety valve closes too late 2. Spring is too strong: Safety valve opens too late
2	Spring is compressed to solid after assembly	Safety valve does not open or does not achieve the required lift
3	Wrong disc is mounted	The safety valve may have the wrong operating characteristic for the application
4	Due to excessive machining of seat/ disc the tolerances of the critical dimensions (chamfer) may be exceeded	The safety valve will have the wrong operating characteristic
5	After repair lifting aid was not reinstalled	The safety valve will have the wrong operating characteristic
6	After repair lift restriction was not reinstalled	The safety valve will blow off with a higher capacity. Pressure drop in the inlet and outlet line may occur as well as chattering
7	During assembly the spindle was not secured against rotation: → the stainless steel bellows is twisted	Safety valve does not open
8	Unsuitable or insufficient grease is used for the lubrication of the actuator of the pneumatic lifting device H8	The Lifting device H8 fails; the safety valve continues to function
9	Lifting lever left in open position - lever with knob - H4 for Clean Service	The safety valves stays open