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

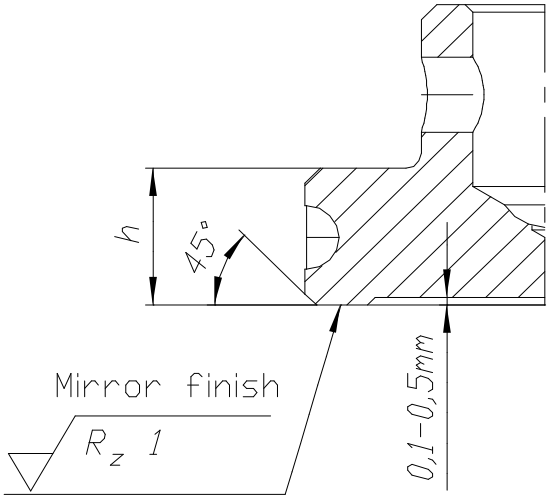

Illustration 5.1

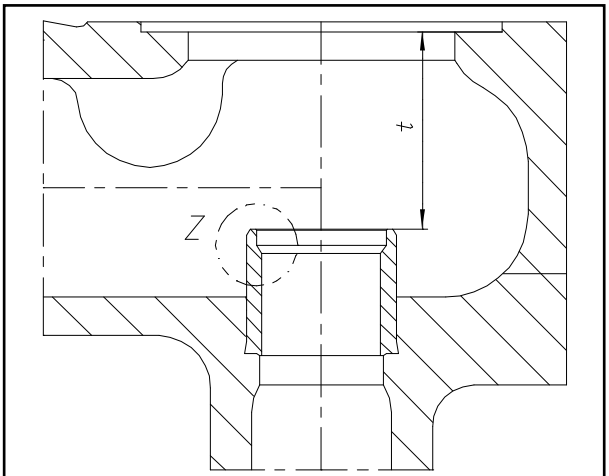

Illustration 5.3

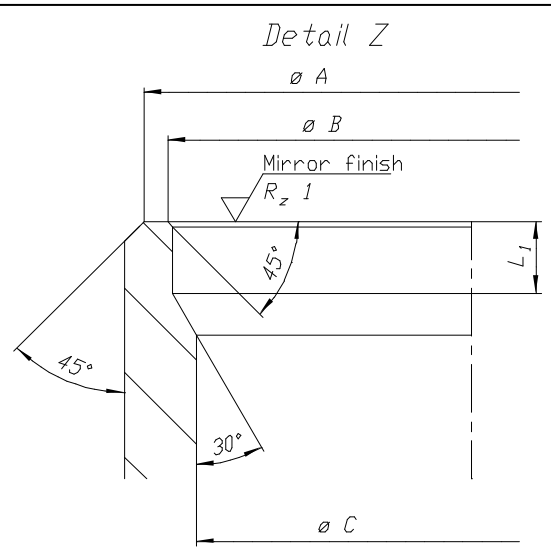

Illustration 5.2

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.

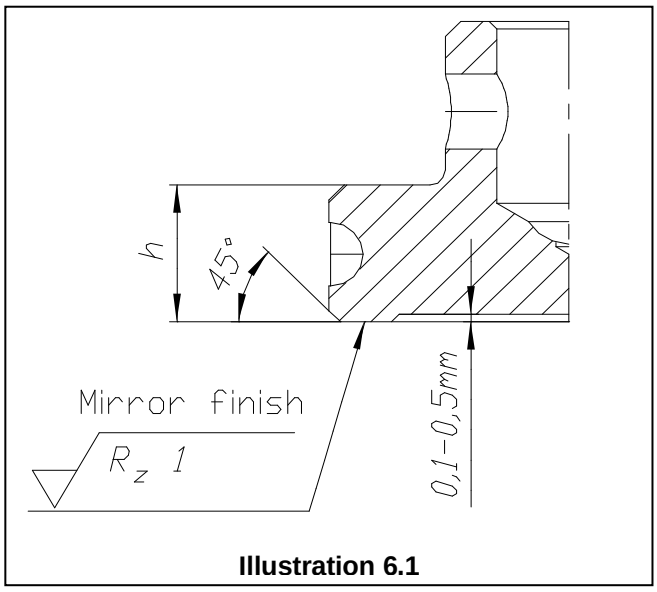

Illustration 6.1

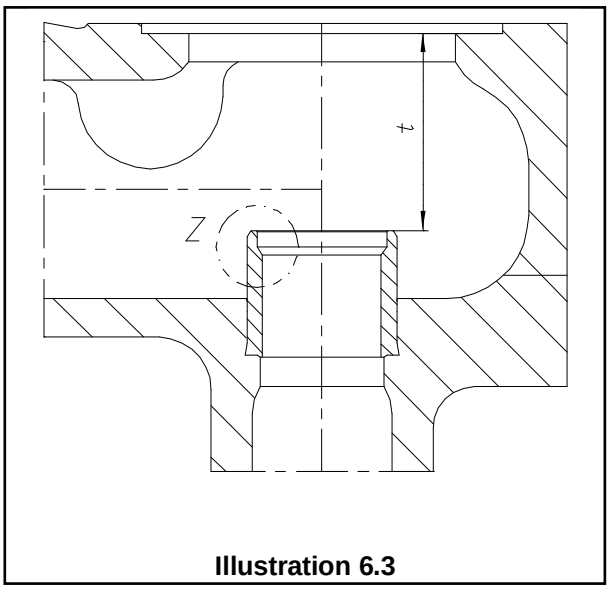

Illustration 6.3

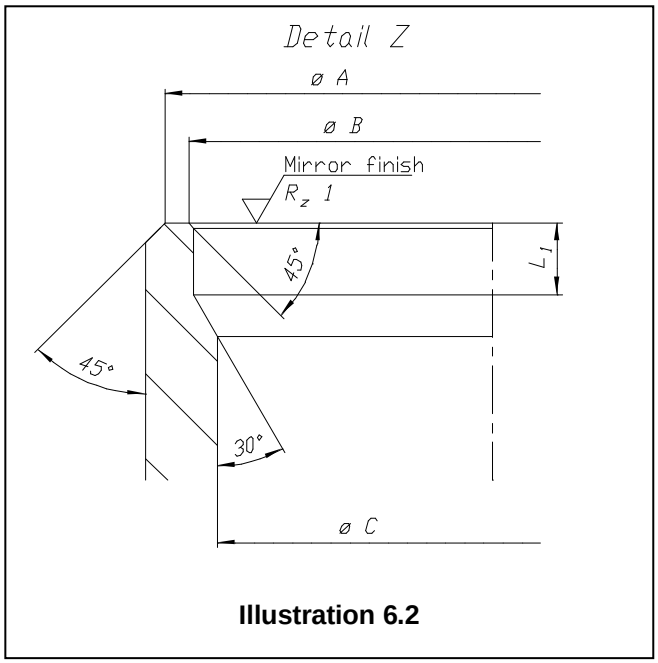

Illustration 6.2

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 Ø [mm]	A Ø [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

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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.

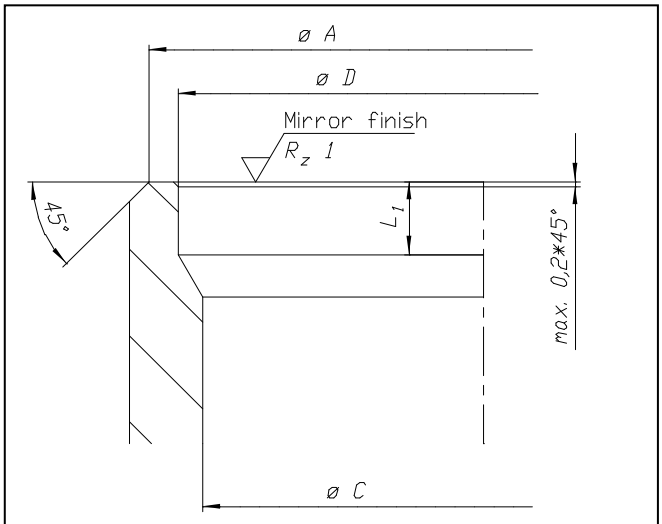

Illustration 7.1

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.

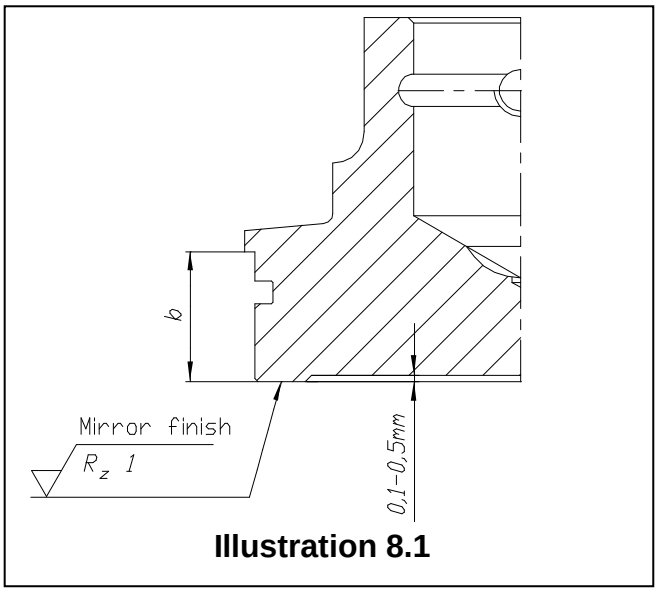

Illustration 8.1

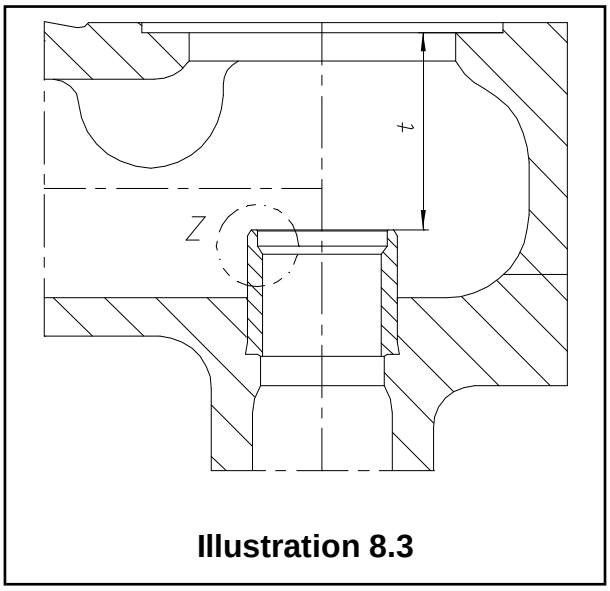

Illustration 8.3

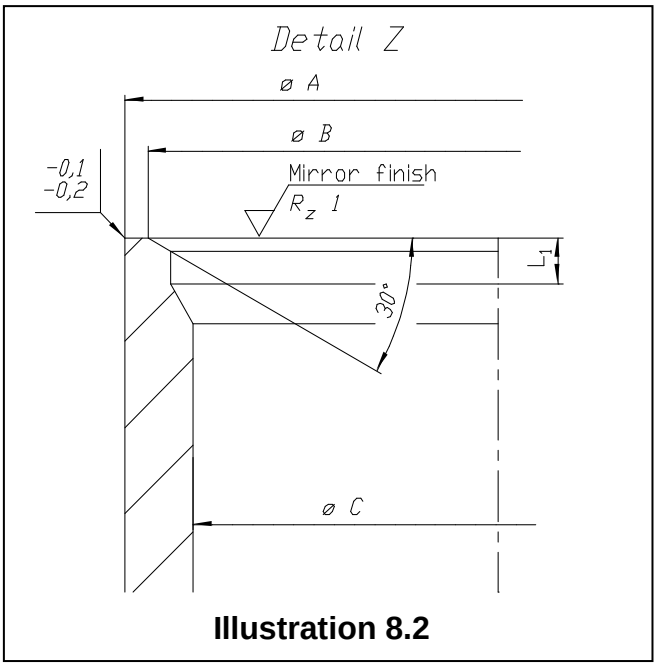

Illustration 8.2

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.

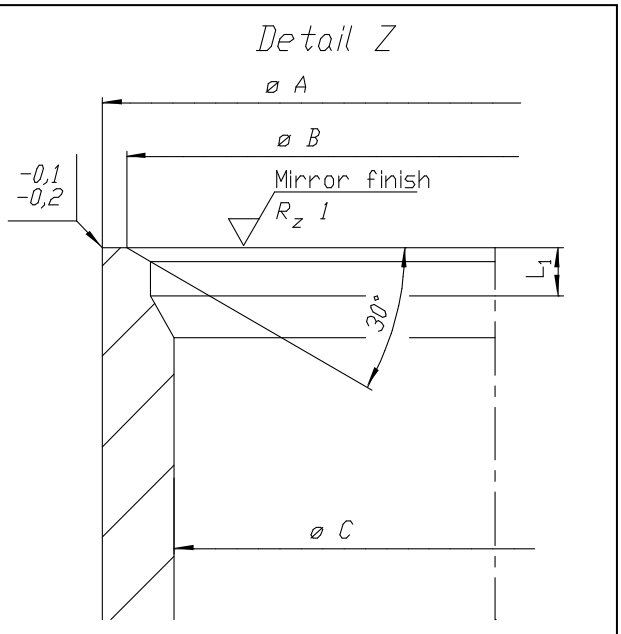

Illustration 9.1

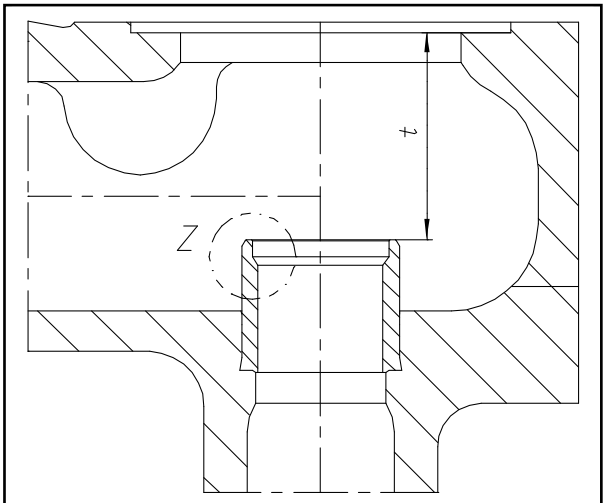

Illustration 9.2

Table 9.1: seats and discs of type 455 and 456

C	DN	Refinishing of seat

[mm]	[mm]	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.

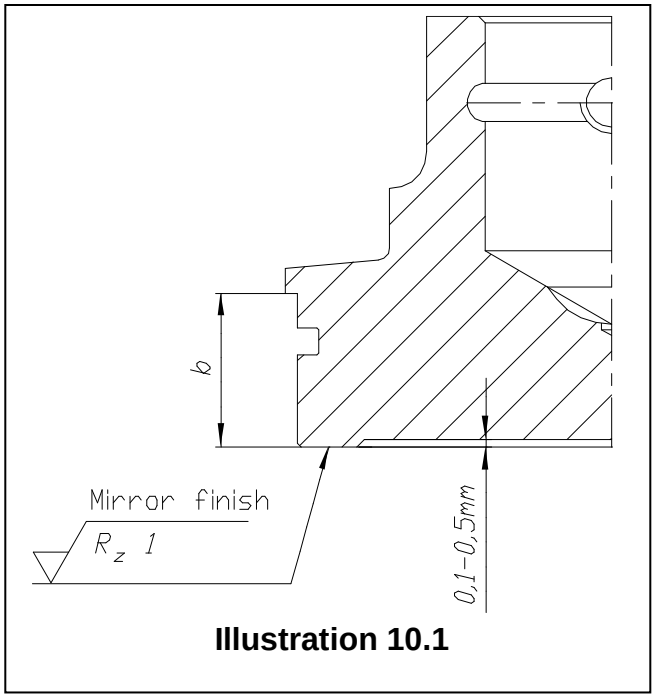

Illustration 10.1

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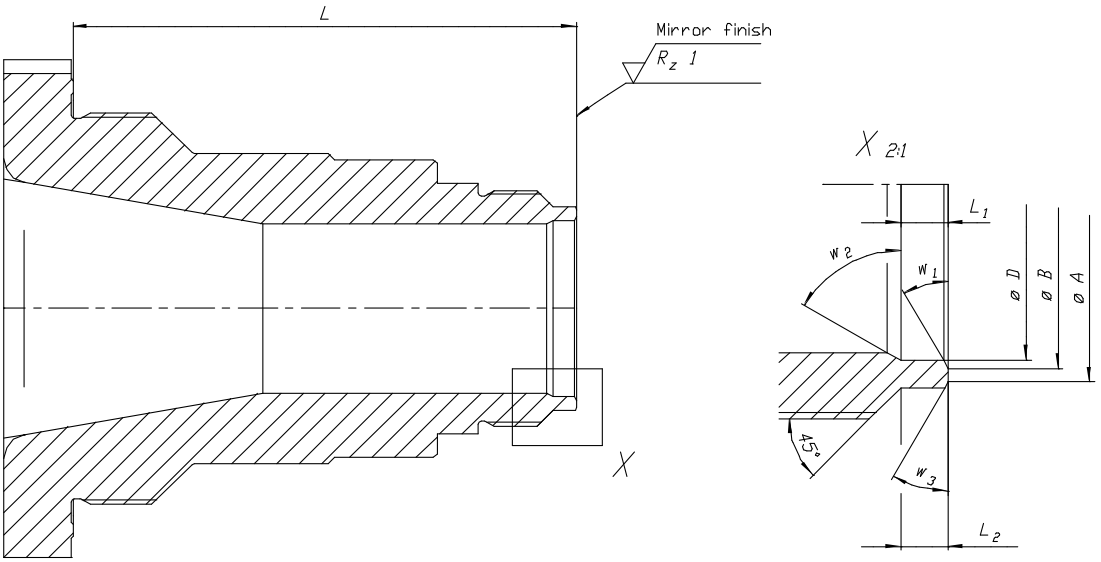


Illustration 10.2

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.

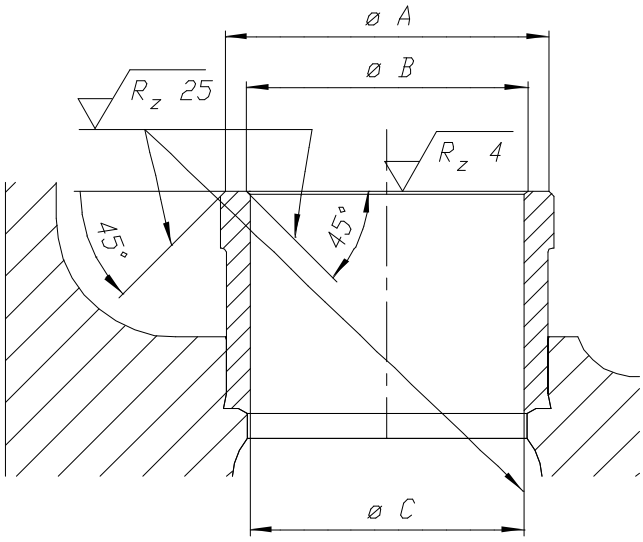


Illustration 11.1

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	$125{,}4_{-0{,}3}$	$138{,}0^{+0{,}3}$

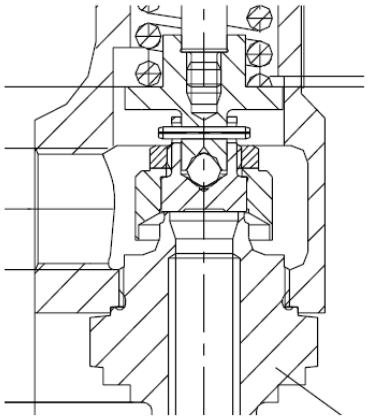
*[1]) outer seat champfer formed with a 45° angle / free of burrs

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

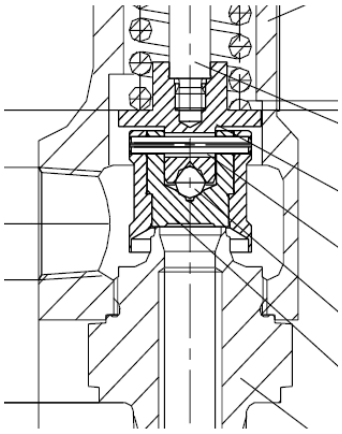
Since 2007 the types 437 do6 + 10 have been converted to the new metal-to-metal disc design. The “old” disc design is not available as spare part at LESER. Instead LESER will offer conversion kits to change over to the new design. For detailed information please ask LESER sales.

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

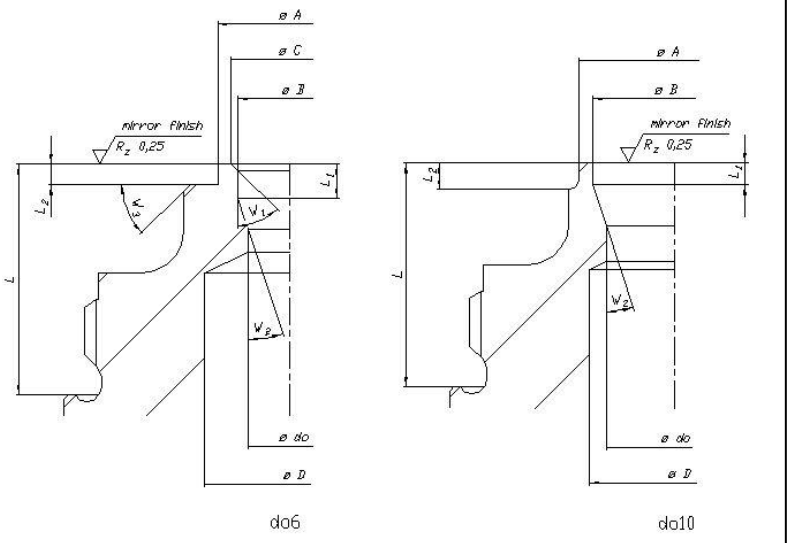


Illustration 13.1

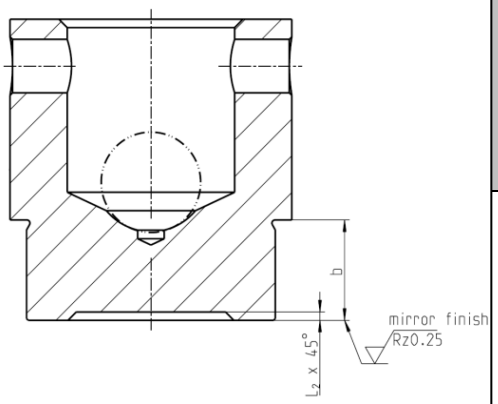


Illustration 13.2

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

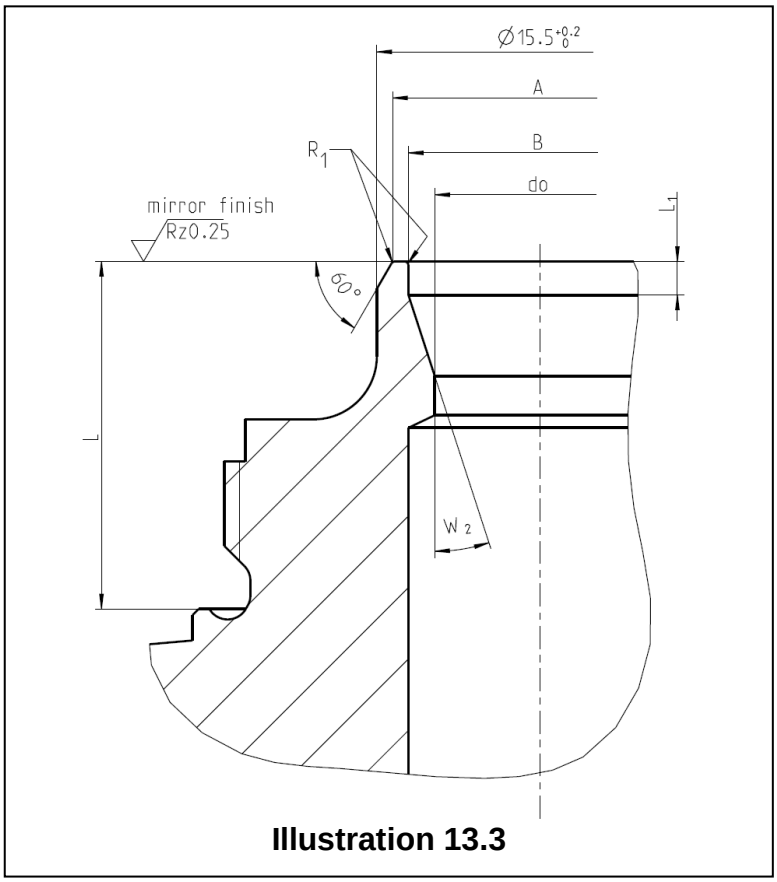


Illustration 13.3

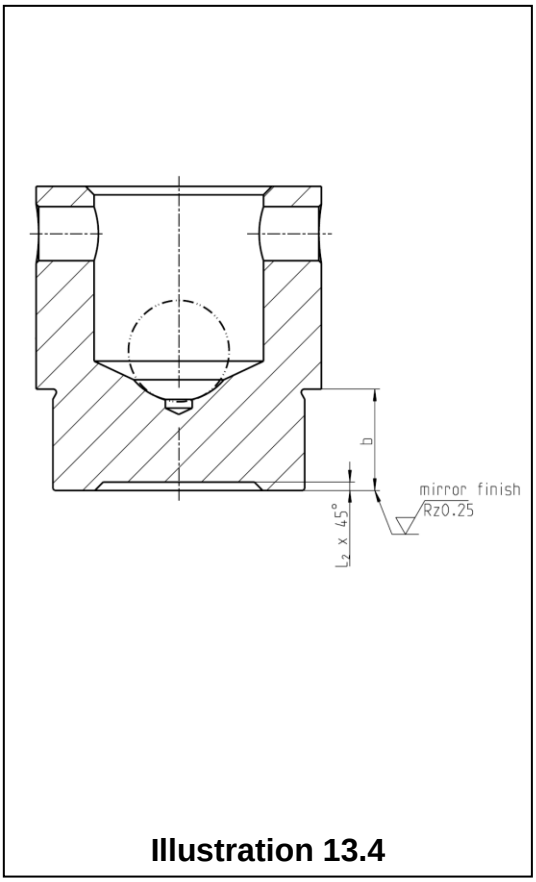


Illustration 13.4

public

15 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.

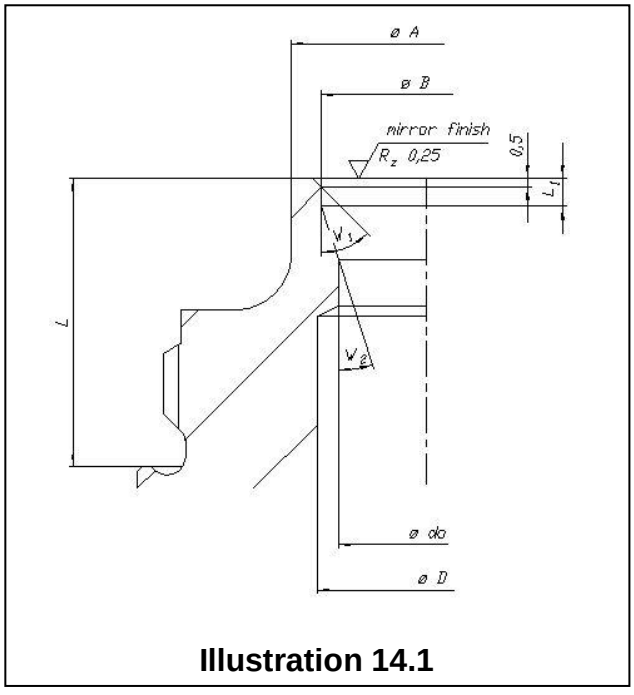


Illustration 14.1

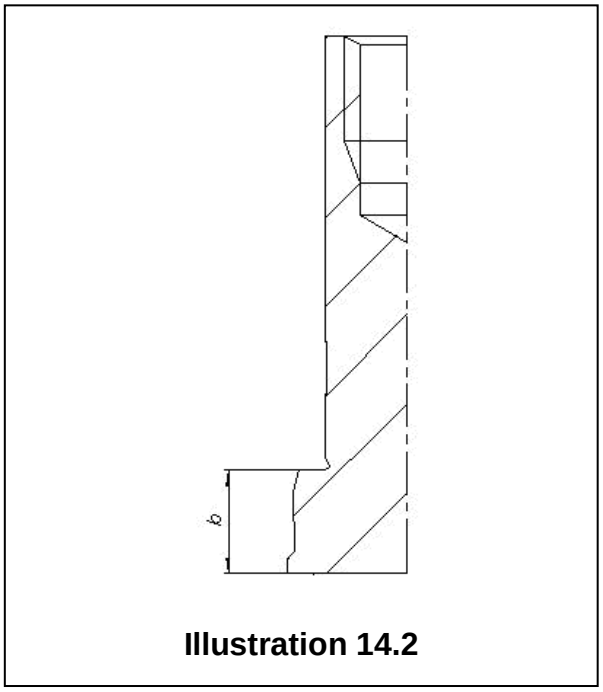


Illustration 14.2

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

16 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

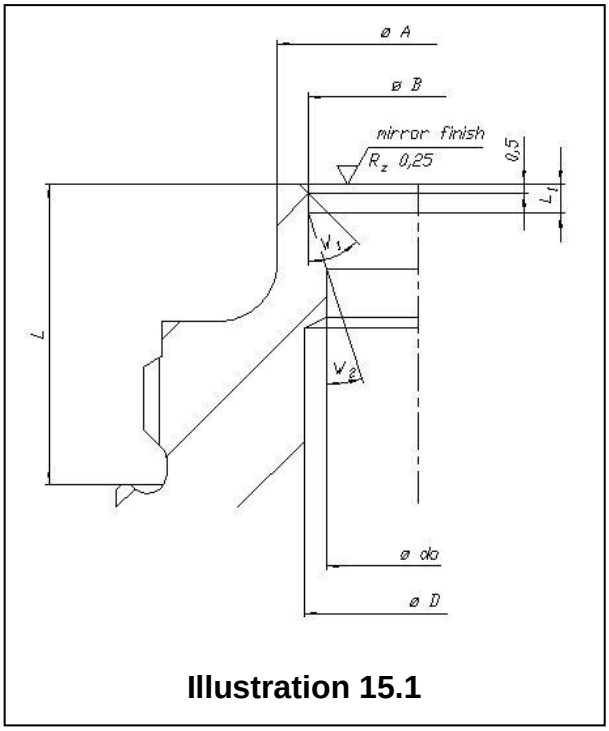


Illustration 15.1

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	-

17 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 to a maximum of … (see table 16.1).

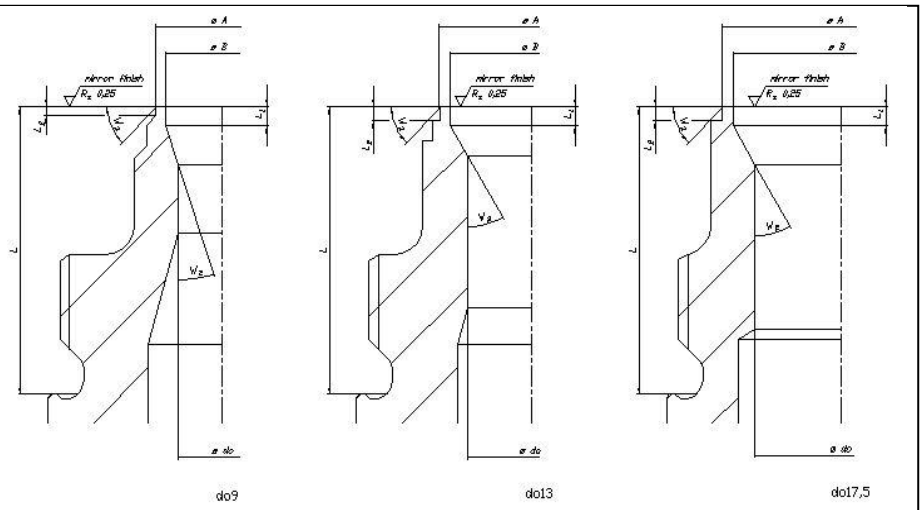


Illustration 16.1

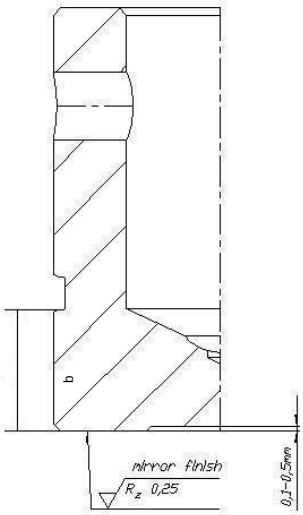


Illustration 16.2

Table 16.1: seats and discs type 459

do	Seat									Disc	
	Diameter		Length				Angle				
	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]
6	$10,5^{-0,05}$	$8,5^{+0,1}$	$29_{\pm 0,2}$	2,5	0,9	- 0,1	-	18	45	8,0	+ 0,1
9	$12,9^{+0,1}$	$11,5^{+0,05}$	$29_{\pm 0,2}$	2,0	1,1	- 0,1	-	18	45	8,0	+ 0,1
13	$18,1^{+0,1}$	$16,5^{+0,05}$	$29_{\pm 0,2}$	2,0	1,5	- 0,1	-	30	45	8,0	+ 0,1
17,5	$23,8^{+0,1}$	$22,0^{+0,05}$	$29_{\pm 0,2}$	2,0	1,5	- 0,1	-	30	45	7,9	+ 0,1

18 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.

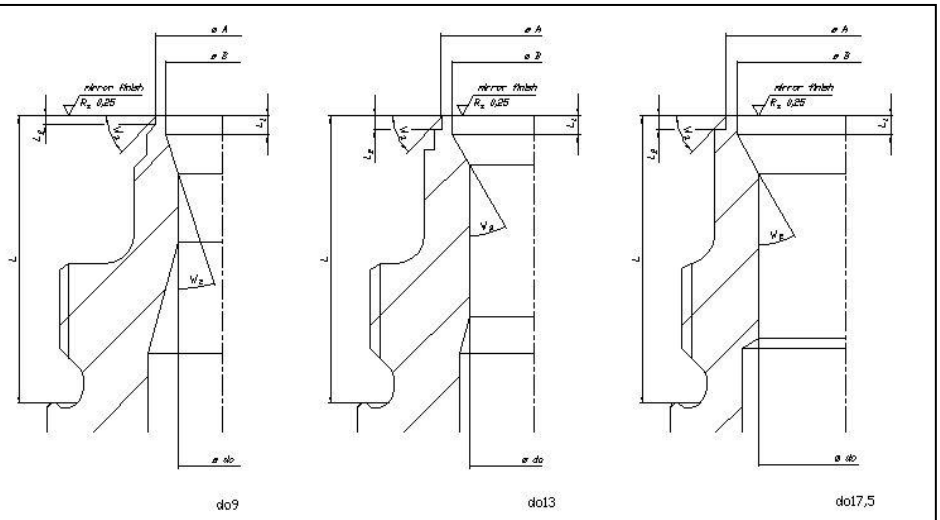


Illustration 17.1

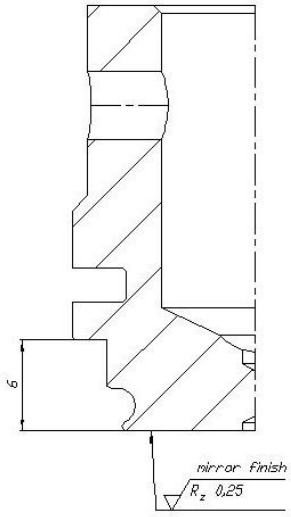


Illustration 17.2

Table 17.1: seats and discs type 462

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

19 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.

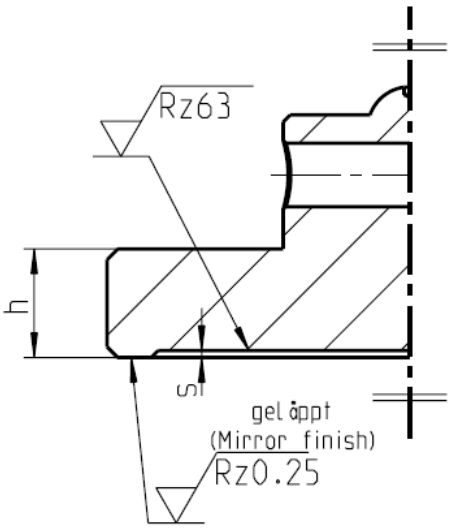


Illustration 18.1: Steel disc

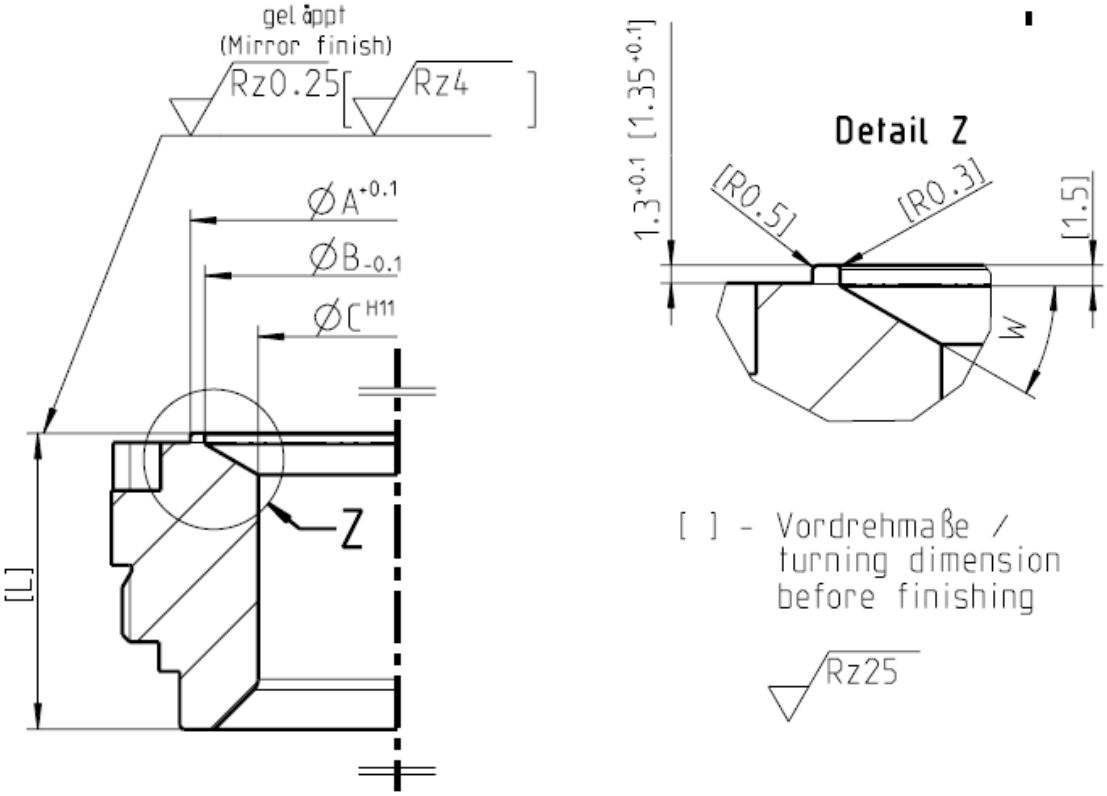


Illustration 18.2: Seat (semi-nozzle)

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		
			$A^{+0,1}$ ∅ [mm]	$B_{-0,1}$ ∅ [mm]	C^{H11} ∅ [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