

Dimensions for maintenance of nozzles and discs - POSV

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1 Purpose

This LGS gives information about the dimensions and the surface quality which must be observed during the refinishing work, it also provides the work instructions.

2 Scope

This LGS applies to the LESER sites Hamburg and Hohenwestedt as well as for valve repair shops repairing and / or maintaining LESER pilot operated safety relief valve (POSV). For type designation of POSV please refer to <https://www.leser.com/en/products/high-efficiency/>. This LGS is valid for:

- full nozzles
- nozzles
- discs

3 References

Not applicable.

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Conditional Agreement

The further mentioned rules for the refinishing of nozzles and discs have been issued and explained in all conscience and describe the 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 guidelines, LESER must be contacted before performance of rework to clarify the actual situation.

When applying these guidelines, it must be considered generally that they describe the refinishing at components which influence the function and capacity of the safety valves. Even marginal deviations to this guideline can affect 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 must be proceeded carefully when applying these rules.

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

The user of this LGS should be clear on the fact that the repair of a safety device against inadmissible overpressure is subjected to 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 LGS, LESER must be consulted before starting repair or rework of LESER safety devices.

5 Introduction

If the sealing surfaces of nozzles and discs have been damaged, the original sealing quality can be restored by refinishing of the sealing surfaces. The minimum and maximum dimensions given in the tables below must be ensured.

Other additional rework like Hardfacing (build-up welding) or similar activities at the surfaces are not allowed.

6 Execution

The refinishing by smooth turning and grinding with final lapping should be done on the nozzle and if necessary, also on the disc with the least possible material removal. Please refer to the limiting values in the following tables.

These critical dimensions apply to POSV and supersede any dimensions provided in previous versions or revisions.

6.1 Measures and facing profile

Table 1 to Table 4, together with the corresponding illustrations, contain the linear and square dimensions which shall be observed. After processing of the nozzle surface, it is also important that the profile of the sealing area is restored moderately using inner and outer chamfers or

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radii. If necessary, the contact surface between the spindle guide and the body must be refinished coplanar and concentric to the sealing area.

6.2 Surface Quality

A surface quality to a mean roughness depth of Rz 0,25 (DIN EN ISO 4287) or AA 1 (ASME B46.1) must be achieved on both sealing surfaces through lapping.

In the case of O-rings and plastics sealing (see chapter 8 and 9), different surface qualities may be as shown in the illustrations. These sealing surfaces may be achieved through smooth turning.

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7 Refinishing of nozzle, full nozzle, and disc POSV, metal sealing

Work is to be carried out according to Figure 1 to Figure 3 and Table 1 to Table 2.

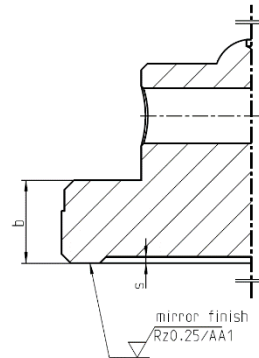


Figure 1. Disc

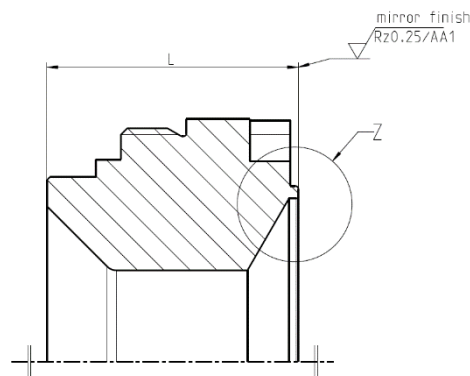


Figure 2. Nozzle

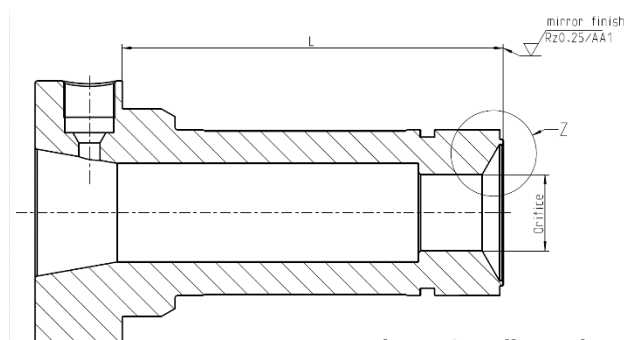
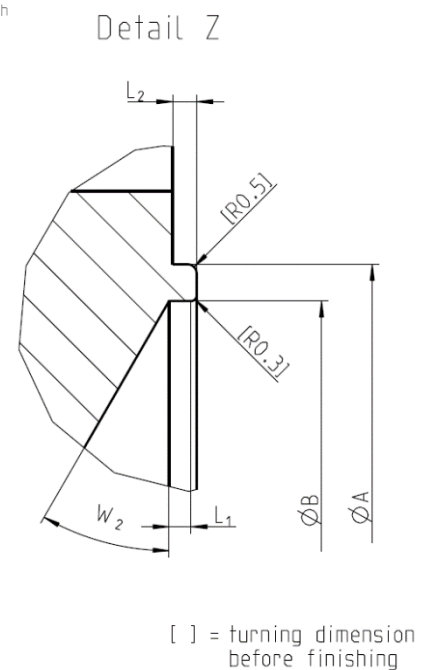


Figure 3. Full Nozzle



Changes in dimension may only be such as not to reduce dimensions b and/or L below the lowest allowable tolerance. The dimensions L, L₂, A and B on the sealing area of the nozzle shall be restored with inner and outer chamfering or rounding. No sharp edges to potentially cut the O-ring seats.

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Table 1: nozzles and discs POSV in mm

Orifice		Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
				Diameter		Length					Angle	Thickness		
				A Ø in mm	B Ø in mm	Nozzle L in mm	Full nozzle L in mm	L ₁ in mm	L ₂ in mm		W ₂ in °	b in mm	s in mm	
	in mm			lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
D	11	1 x 2	25 x 50	29.5	26.5	32.4	110.4	0.5	1.3	1.4	45	7.5	0.1	1
E	14.7			29.5	26.5	32.4	110.4	0.5	1.3	1.4	45	7.5	0.1	1
F	18.4			29.5	26.5	32.4	110.4	0.5	1.3	1.4	45	7.5	0.1	1
G	23			29.5	26.5	32.4	n/a	0.5	1.3	1.4	45	7.5	0.1	1
D	11	1 ½ x 2	40 x 50	37.5	34.5	32.4	134.2	0.5	1.3	1.4	45	9.5	0.1	1
E	14.7			37.5	34.5	32.4	134.2	0.5	1.3	1.4	45	9.5	0.1	1
F	18.4			37.5	34.5	32.4	134.2	0.5	1.3	1.4	45	9.5	0.1	1
H	29			37.5	34.5	32.4	134.2	0.5	1.3	1.4	45	9.5	0.1	1
G	23.6	1½ x 3	40 x 80	37.5	34.5	38.4	140.4	0.5	1.3	1.4	45	9.5	0.1	1
H	29.4			37.5	34.5	38.4	140.4	0.5	1.3	1.4	45	9.5	0.1	1
J	35.7			38	35.7	32.4	n/a	0.5	1.3	1.4	-	9.5	0.1	1
G	23.6	2 x 3	50 x 80	56.5	52.5	39.4	146.2 157.3	0.5	1.3	1.4	30	12.5	0.1	1
H	29.4			56.5	52.5	39.4	146.2 157.3	0.5	1.3	1.4	30	12.5	0.1	1
J	38			56.5	52.5	39.4	146.2 157.3	0.5	1.3	1.4	30	12.5	0.1	1

Orifice		Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
				Diameter		Length					Angle	Thickness		
				A Ø in mm	B Ø in mm	Nozzle L in mm	Full nozzle L in mm	L ₁ in mm	L ₂ in mm		W ₂ in °	b in mm	s in mm	
				lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
K+	48			56.5	52.5	34.4	n/a	0.5	1.3	1.4	30	12.5	0.1	1
J	38	3 x 4	80 x 100	80.5	76	60.7	174.5	0.5	1.3	1.4	30	14.4	0.1	1
K	45			80.5	76	60.7	174.5	0.5	1.3	1.4	30	14.4	0.1	1
L	56			80.5	76	60.7	174.5	0.5	1.3	1.4	30	14.4	0.1	1
N+	75			80.5	76	40.7	n/a	0.5	1.3	1.4	30	14.4	0.1	1
L	56	4 x 6	100 x 150	102.5	98	63.7	213.2	0.5	1.3	1.4	30	19	1	2
M	63			102.5	98	63.7	213.2	0.5	1.3	1.4	30	19	1	2
N	69			102.5	98	63.7	213.2	0.5	1.3	1.4	30	19	1	2
P	83			102.5	98	49.7	199.2	0.5	1.3	1.4	30	19	1	2
P+	95			102.5	98	40.7	n/a	0.5	1.3	1.4	30	19	1	2
Q	110	6 x 8	150 x 250	150	145	55.7	167.2 173.6	0.5	1.3	1.4	30	29	1	2
R	133			150	145	55.7	167.2 173.6	0.5	1.3	1.4	30	29	1	2
R+	142			150	145	45.7	n/a	0.5	1.3	1.4	30	29	1	2
T	168	8 x 10	200 x 250	188	182	67.2	190.2 210.9	0.5	1.3	1.4	30	29	1	2

Orifice	Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
			Diameter		Length					Angle	Thickness		
			A Ø in mm	B Ø in mm	Nozzle L in mm	Full nozzle L in mm	L ₁ in mm	L ₂ in mm		W ₂ in °	b in mm	s in mm	
	in mm		lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
T+	180		188	182	57.2	n/a	0.5	1.3	1.4	30	29	1	2

Table 2: nozzles and discs POSV in inch

Orifice		Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
				Diameter		Length					Angle	Thickness		
				A Ø in inch	B Ø in inch	Nozzle L in inch	Full nozzle L in inch	L ₁ in inch	L ₂ in inch		W ₂ in °	b in inch	s in inch	
	in inch			lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
D	0.433	1 x 2	25 x 50	1.161	1.043	1.276	4.346	0.020	0.051	0.055	45	0.295	0.004	0.039
E	0.579			1.161	1.043	1.276	4.346	0.020	0.051	0.055	45	0.295	0.004	0.039
F	0,724			1.161	1.043	1.276	4.346	0.020	0.051	0.055	45	0.295	0.004	0.039
G	0.906			1.161	1.043	1.276	n/a	0.020	0.051	0.055	45	0.295	0.004	0.039
D	0.433	1 ½ x 2	40 x 50	1.476	1.358	1.276	5.283	0.020	0.051	0.055	45	0.374	0.004	0.039
E	0.579			1.476	1.358	1.276	5.283	0.020	0.051	0.055	45	0.374	0.004	0.039
F	0,724			1.476	1.358	1.276	5.283	0.020	0.051	0.055	45	0.374	0.004	0.039
H	1.412			1.476	1.358	1.276	5.283	0.020	0.051	0.055	45	0.374	0.004	0.039
G	0.929	1½ x 3	40 x 80	1.476	1.358	1.512	5.528	0.020	0.051	0.055	45	0.374	0.004	0.039
H	1.157			1.476	1.358	1.512	5.528	0.020	0.051	0.055	45	0.374	0.004	0.039
J	1.406			1.496	1.406	1.276	n/a	0.020	0.051	0.055	-	0.374	0.004	0.039
G	0.929	2 x 3	50 x 80	2.224	2.067	1.551	5.756 6.193	0.020	0.051	0.055	30	0.492	0.004	0.039
H	1.157			2.224	2.067	1.551	5.756 6.193	0.020	0.051	0.055	30	0.492	0.004	0.039
J	1.496			2.224	2.067	1.551	5.756 6.193	0.020	0.051	0.055	30	0.492	0.004	0.039

Orifice		Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
				Diameter		Length					Angle	Thickness		
				A Ø in inch	B Ø in inch	Nozzle L in inch	Full nozzle L in inch	L ₁ in inch	L ₂ in inch		W ₂ in °	b in inch	s in inch	
				lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
K+	1.890			2.224	2.067	1.354	n/a	0.020	0.051	0.055	30	0.492	0.004	0.039
J	1.496	3 x 4	80 x 100	3.169	2.992	2.390	6.870	0.020	0.051	0.055	30	0.567	0.004	0.039
K	1.772			3.169	2.992	2.390	6.870	0.020	0.051	0.055	30	0.567	0.004	0.039
L	0.236			3.169	2.992	2.390	6.870	0.020	0.051	0.055	30	0.567	0.004	0.039
N+	2.953			3.169	2.992	1.602	n/a	0.020	0.051	0.055	30	0.567	0.004	0.039
L	0.236	4 x 6	100 x 150	4.035	3.858	2.508	8.394	0.020	0.051	0.055	30	0.748	0.039	0.079
M	2.480			4.035	3.858	2.508	8.394	0.020	0.051	0.055	30	0.748	0.039	0.079
N	2.717			4.035	3.858	2.508	8.394	0.020	0.051	0.055	30	0.748	0.039	0.079
P	3.268			4.035	3.858	1.957	7.843	0.020	0.051	0.055	30	0.748	0.039	0.079
P+	3.740			4.035	3.858	1.602	n/a	0.020	0.051	0.055	30	0.748	0.039	0.079
Q	4.331	6 x 8	150 x 250	5.906	5.709	2.193	6.683 6.835	0.020	0.051	0.055	30	1.142	0.039	0.079
R	5.236			5.906	5.709	2.193	6.683 6.835	0.020	0.051	0.055	30	1.142	0.039	0.079
R+	5.591			5.906	5.709	1.799	n/a	0.020	0.051	0.055	30	1.142	0.039	0.079
T	6.614	8 x 10	200 x 250	7.401	7.165	2.646	7.488 8.303	0.020	0.051	0.055	30	1.142	0.039	0.079

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Orifice		Size in NPS	Size in DN	Nozzle / Full Nozzle								Disc		
				Diameter		Length					Angle	Thickness		
				A Ø in inch	B Ø in inch	Nozzle L in inch	Full nozzle L in inch	L ₁ in inch	L ₂ in inch		W ₂ in °	b in inch	s in inch	
				lower limit	upper limit	lower limit	lower limit	lower limit	lower limit	upper limit		lower limit	lower limit	upper limit
T+	7.087			7.401	7.165	2.252	n/a	0.020	0.051	0.055	30	1.142	0.039	0.079

8 Refinishing of sealing plate disc POSV, plastic seal

Work is to be carried out according to Figure 4 and Table 3 to Table 4. For nozzle and full nozzle refer to Table 1 to Table 2.

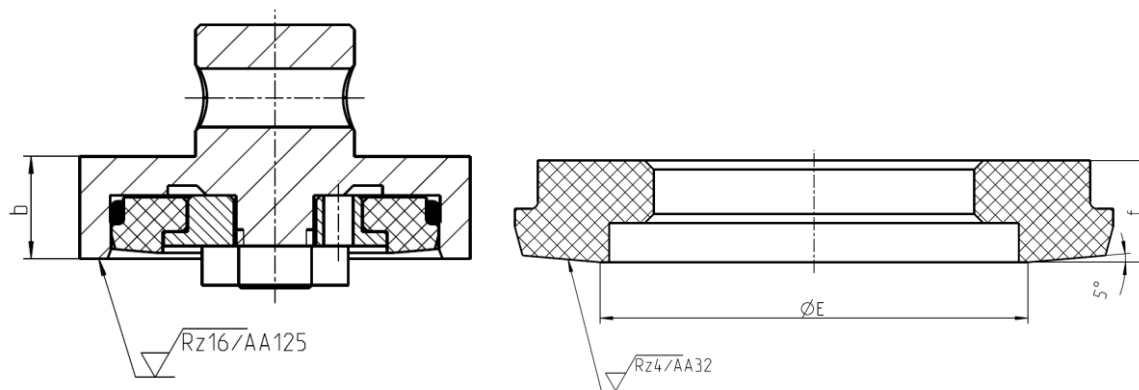


Figure 4. Sealing plate disc

Dimensions b and f shall be always refinished by the same value. It may be easier to refinish dimension b and f in assembled state.

Table 3: sealing plate disc POSV in mm

Orifice		Size in NPS	Size in DN	Sealing plate disc			
				Diameter		Thickness	
				E Ø in mm		f in mm	b in mm
	in mm			lower limit	upper limit	lower limit	lower limit
D	11	1 x 2	25 x 50	23.8	24.2	4.6	9.3
E	14.7			23.8	24.2	4.6	9.3
F	18.4			23.8	24.2	4.6	9.3
G	23			23.8	24.2	4.6	9.3
D	11	1 ½ x 2	40 x 50	31.7	32.3	4.6	11.3
E	14.7			31.7	32.3	4.6	11.3
F	18.4			31.7	32.3	4.6	11.3
H	29			31.7	32.3	4.6	11.3
G	23.6	1½ x 3	40 x 80	31.7	32.3	4.6	11.3
H	29.4			31.7	32.3	4.6	11.3
J	35.7			31.7	32.3	4.6	11.3
G	23.6	2 x 3	50 x 80	49.7	50.3	4.6	15.3
H	29.4			49.7	50.3	4.6	15.3

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Orifice		Size in NPS	Size in DN	Sealing plate disc			
				Diameter		Thickness	
	in mm			E Ø in mm		f in mm	b in mm
				lower limit	upper limit	lower limit	lower limit
J	38			49.7	50.3	4.6	15.3
K+	48			49.7	50.3	4.6	15.3
J	38	3 x 4	80 x 100	72.7	73.3	6.1	17.0
K	45			72.7	73.3	6.1	17.0
L	56			72.7	73.3	6.1	17.0
N+	75			72.7	73.3	6.1	17.0
L	56	4 x 6	100 x 150	94.7	95.3	6.1	21.8
M	63			94.7	95.3	6.1	21.8
N	69			94.7	95.3	6.1	21.8
P	83			94.7	95.3	6.1	21.8
P+	95			94.7	95.3	6.1	21.8
Q	110	6 x 8	150 x 250	141.5	142.5	12.5	31.8
R	133			141.5	142.5	12.5	31.8
R+	142			141.5	142.5	12.5	31.8
T	168	8 x 10	200 x 250	178.5	179.5	12.5	31.8
T+	180			178.5	179.5	12.5	31.8

Table 4: sealing plate disc POSV in inch

Orifice		Size in NPS	Size in DN	Sealing plate disc			
				Diameter		Thickness	
				E Ø in inch		f in inch	b in inch
	in inch			lower limit	upper limit	lower limit	lower limit
D	0.433	1 x 2	25 x 50	0.937	0.953	0.181	0.366
E	0.579			0.937	0.953	0.181	0.366
F	0,724			0.937	0.953	0.181	0.366
G	0.906			0.937	0.953	0.181	0.366
D	0.433	1 ½ x 2	40 x 50	1.248	1.272	0.181	0.445

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Orifice		Size in NPS	Size in DN	Sealing plate disc			
				Diameter		Thickness	
				E Ø in inch		f in inch	b in inch
	in inch			lower limit	upper limit	lower limit	lower limit
E	0.579			1.248	1.272	0.181	0.445
F	0.724			1.248	1.272	0.181	0.445
H	1.412			1.248	1.272	0.181	0.445
G	0.929	1½ x 3	40 x 80	1.248	1.272	0.181	0.445
H	1.157			1.248	1.272	0.181	0.445
J	1.406			1.248	1.272	0.181	0.445
G	0.929	2 x 3	50 x 80	1.957	1.980	0.181	0.602
H	1.157			1.957	1.980	0.181	0.602
J	1.496			1.957	1.980	0.181	0.602
K+	1.890			1.957	1.980	0.181	0.602
J	1.496	3 x 4	80 x 100	2.862	2.886	0.240	0.669
K	1.772			2.862	2.886	0.240	0.669
L	0.236			2.862	2.886	0.240	0.669
N+	2.953			2.862	2.886	0.240	0.669
L	0.236	4 x 6	100 x 150	3.728	3.752	0.240	0.858
M	2.480			3.728	3.752	0.240	0.858
N	2.717			3.728	3.752	0.240	0.858
P	3.268			3.728	3.752	0.240	0.858
P+	3.740			3.728	3.752	0.240	0.858
Q	4.331	6 x 8	150 x 250	5.570	5.610	0.492	1.252
R	5.236			5.570	5.610	0.492	1.252
R+	5.591			5.570	5.610	0.492	1.252
T	6.614	8 x 10	200 x 250	7.028	7.067	0.492	1.252
T+	7.087			7.028	7.067	0.492	1.252

9 Refinishing of O ring disc POSV, soft seal

It is not permitted to rework the O-ring disc. If damaged, a replacement is recommended. For nozzle and full nozzle refer to Table 1 to Table 2.

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