

Dimensions for maintenance of nozzles and discs - High Performance

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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 valves. This LGS is valid for:

- full nozzles
- nozzles
- discs with removable lifting gear (called disc)

The scope of the product group High Performance includes Type 441/442, 455/456, 457/458 and 444. Furthermore, flanged safety valve with lever and weight type 421 is also included because dimensions are identically to type 441.

3 References

Not applicable.

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resp. depart.:	TD	date of release:	01/25/24	revision No.:	1		
doc. type:	LGS	change rep. No.:	NA	retention period:	10y.	prot. class:	public

4 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 High Performance valves and supersede any dimensions provided in previous versions or revisions.

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resp. depart.:	TD	date of release:	01/25/24	revision No.:	1		
doc. type:	LGS	change rep. No.:	NA	retention period:	10y.	prot. class:	public

6.1 Measures and facing profile

Tables, together with the corresponding figures, contain the linear and angle 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.

6.2 Surface Quality

A surface quality to a mean roughness depth of R_z 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 plastic and soft sealing, different surface qualities may be as shown in the figures. These sealing surfaces may be achieved alternatively through smooth turning.

6.3 Test

In a final test on the mounted valve, it must 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 case of lift restricted valves, the lift restriction must be checked and if necessary, the lift restriction bushing extended or lift restriction screw adjusted.

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7 Refinishing nozzle and disc, High Performance valves, metal sealing

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

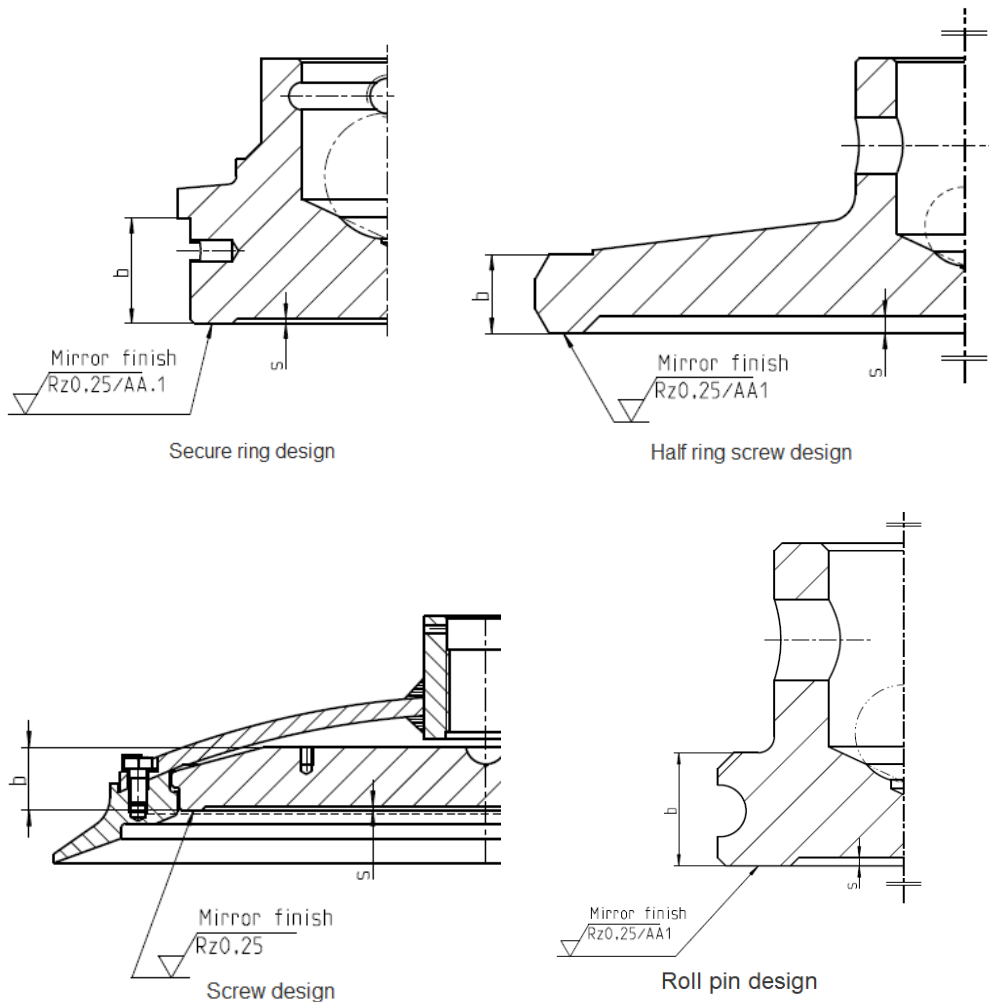


Figure 1. Disc, metal sealing.

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doc. type:	LGS	change rep. No.:	NA	retention period:	10y.		

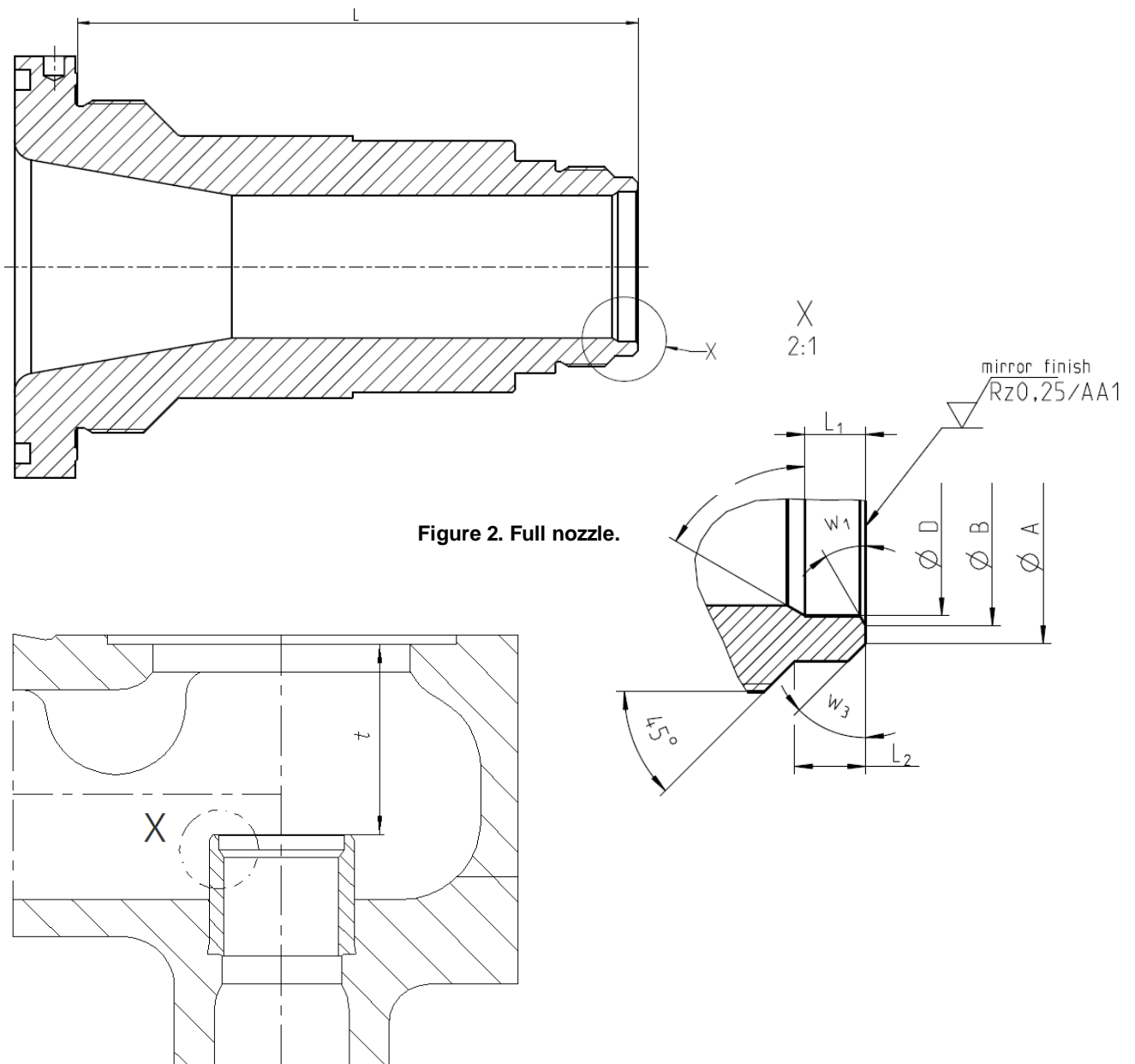


Figure 2. Full nozzle.

Figure 3. Nozzle.

Changes in dimension may only be such as not to reduce dimensions b and/or L below its lower limit.

Changes in dimension may only be such as not to exceed dimension t above its upper limit.

The dimensions A and B of the sealing area of the nozzle shall be restored with inner and outer chamfering within its limits.

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8 Refinishing disc, High Performance valves, plastic sealing

Only a small number of discs were made with plastic sealing. In case of refinishing please contact LESER to provide limits of critical dimensions. If damaged, a replacement is recommended. For nozzles refer to Table 1 to Table 2.

9 Refinishing disc, High Performance valves, soft sealing

It is not permitted to rework the soft sealing disc. If damaged, a replacement is recommended. For nozzles refer to Table 1 to Table 2. In case of flat sealing disc follow chapter 9.1.

9.1 Seat geometry of flat sealing O ring disc design for valves type 441/442 delivered before year 2002.

The flat sealing O ring disc design has not been supplied since the redesign of the O ring disc in year 2002. For refinishing flat sealing disc design see the following details.

The flat sealing disc design is identified internally by option code “F-Text” L40 up to L43.

Work is to be carried out according to Figure 4 and according to Table 3 to Table 4.

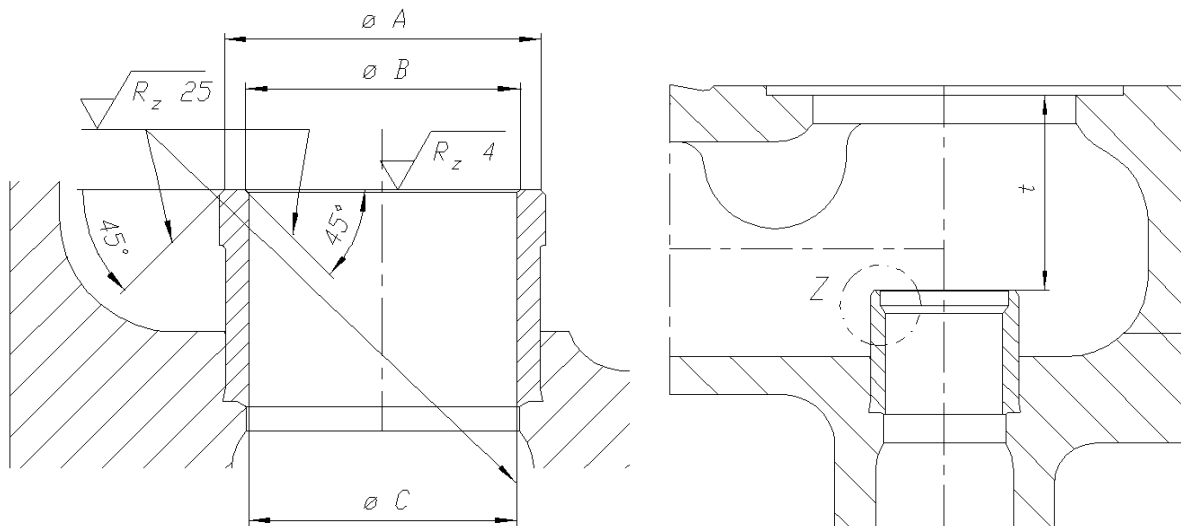


Figure 4. Nozzle, flat sealing O ring disc design.

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10 Tables

Table 1: nozzles and discs of High Performance valves in mm

Type	Orifice	Size in NPS	Size in DN	Nozzle										Disc			
				Diameter					Length				Angle			Thickness	
				A Ø in mm		B Ø in mm		D Ø	L in mm	t in mm	L ₁ in mm	L ₂ in mm	W ₁ in °	W ₂ in °	W ₃ in °	b in mm	b in mm before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
455, 456	20	1 x 2	25 x 50	24,4	24,6	22,4	22,6	21	-	50,5	2,5	-	30	60	30	10,3	-
455, 456	40	2 x 3	50 x 80	48,9	-	45,9	46,3	43	-	66,5	2,5	-	30	30	-	12,3	-
455, 456	60	3 x 4	80 x 100	71,4	-	66,4	66,8	62	-	85,5	3,5	-	30	30	-	15,7	-
455, 456	74	4 x 6	100 x 150	85,9	-	81,9	82,3	79	-	117,8	3,2	-	30	30	-	16,7	-
457, 458	15	1 x 2	25 x 50	18,9	19,1	16,9	17,1	16	116,5	-	2,5	-	45	45	30	10,3	-
457, 458	20	1 x 2	25 x 50	24,4	24,6	22,4	22,6	21	116,5	-	2,5	-	30	30	30	10,3	-
457, 458	30	2 x 3	50 x 80	38,9	39,1	35,9	36,1	32	146,5	-	3,0	12,0	30	60	45	12,3	-
457, 458	40	2 x 3	50 x 80	48,9	49,1	45,9	46,1	43	146,5	-	2,5	-	30	60	-	12,3	-
457, 458	50	3 x 4	80 x 100	59,3	59,5	55,3	55,5	52	164,5	-	2,5	3,5	30	60	-	16,7	-

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Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc	
				Diameter					Length				Angle			Thickness	
				A Ø in mm		B Ø in mm		D Ø	L in mm	t in mm	L ₁ in mm	L ₂ in mm	W ₁ in °	W ₂ in °	W ₃ in °	b in mm	b in mm before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
457, 458	60	3 x 4	80 x 100	71,4	71,6	66,4	66,6	62	164,5	-	3,5	-	30	60	45	15,7	-
457, 458	50	4 x 6	100 x 150	59,3	59,5	55,3	55,5	52	199,5	-	2,5	3,5	30	60	-	16,7	-
457, 458	60	4 x 6	100 x 150	71,4	71,6	67,4	67,6	64	199,5	-	4,5	-	30	60	45	15,7	-
457, 458	74	4 x 6	100 x 150	86	-	81,8	82,2	79	199,2	-	4,5	5,5	30	60	-	16,7	-
457, 458	88	4 x 6	100 x 150	102,8	103,2	98,8	99,2	93	199,2	-	5,5	-	30	60	45	16,7	-
457, 458	110	6 x 10	150 x 250	123,8	124,2	119,8	120,2	116	261,7	-	4,5	-	30	60	45	16,7	-
441	23	-	25	27,3	27,5	25,3	25,5	25	94,5	-	2,5	12,5	45	60	45	7,4	8,9
441	37	-	40	42,3	42,5	40,3	40,5	40	125,0	-	2,5	23,5	45	60	45	7,4	8,9
441	46	-	50	53,3	53,5	50,3	50,5	53,3	141,0	-	3,0	24,0	45	60	45	8,3	9,9
441	23	1 x 2	-	27,3	27,5	25,3	25,5	25	92,5	-	2,5	12,5	45	30	45	7,4	8,9

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Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc	
				Diameter					Length				Angle			Thickness	
				A Ø in mm		B Ø in mm		D Ø	L in mm	t in mm	L ₁ in mm	L ₂ in mm	W ₁ in °	W ₂ in °	W ₃ in °	b in mm	b in mm before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
441	29	1.5 x 2	-	34,3	34,5	32,3	32,5	32	112,0	-	2,5	16,8	45	60	45	7,4	8,9
441	37	1.5 x 2.5	-	42,3	42,5	40,3	40,5	40	111,0	-	2,5	22,5	45	60	45	7,4	8,9
441	46	2 x 3	-	53,3	53,5	50,3	50,5	50	128,0	-	3,0	24,0	45	60	45	8,3	9,9
441	60	3 x 4	-	70,9	71,1	66,9	67,1	65	144,0	-	3,0	30,0	45	60	45	7,8	10,8
441	92	4 x 6	-	107,8	108,2	102,8	103,2	98	157,2	-	5,5	-	45	60	45	8,8	11,3
441	18		20	20,3	20,5	18,3	18,5	-	-	25,0	-	-	45	-	55	5,8	6,8
441 421	23		25	27,3	27,5	25,3	25,5	25	-	38,5	3,0	-	45	60	55	7,4	8,9
441 421	29		32	34,3	34,5	32,3	32,5	32	-	47,5	3,0	-	45	60	55	7,4	8,9
441 421	37		40	42,3	42,5	40,3	40,5	40	-	53,5	3,0	-	45	60	55	7,4	8,9
441 421	46		50	53,3	53,5	50,3	50,5	50	-	54,0	3,5	-	45	60	45	8,3	9,9

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Type	Orifice	Size in NPS	Size in DN	Nozzle											Disc		
				Diameter					Length				Angle		Thickness		
				A Ø in mm		B Ø in mm		D Ø	L in mm	t in mm	L ₁ in mm	L ₂ in mm	W ₁ in °	W ₂ in °	W ₃ in °	b in mm	b in mm before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
441 421	60		65	70,9	71,1	66,9	67,1	65	-	64,0	3,5	-	45	60	45	7,8	10,8
441 421	74		80	85,8	86,2	81,8	82,2	78	-	91,8	5,0	-	45	60	45	8,3	9,8
441 421	92		100	107,8	108,2	102,8	103,2	98	-	114,8	6,0	-	45	60	45	8,8	11,3
441 421	98		125	107,8	108,2	102,8	103,2	-	-	114,8	-	-	45	-	45	8,8	11,3
441 421	125		150	134,7	135,3	129,7	130,3	-	-	155,5	-	-	45	-	45	14,3	-
441	165		200	185,6	186,4	179,6	180,4	175	-	258,5	9,5	-	45	60	45	17,8	-
441	200		250*	225,6	226,4	219,6	220,4	216	-	274,8	9,5	-	45	60	45	17,8	-
441	235		300*	264,6	265,4	258,6	259,4	256	-	315,5	11,5	-	45	60	45	19,2	27,5 before 09/2012
441	295		400*	331,6	332,4	325,6	326,4	323	-	389,0	11,5	-	45	60	45	22,1	31,5 before 09/2012
441	200		250**	225,6	226,4	219,6	220,4	216	-	305,6	9,5	-	45	60	45	17,8	-

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Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc	
				Diameter					Length				Angle			Thickness	
				A Ø in mm		B Ø in mm		D Ø	L in mm	t in mm	L ₁ in mm	L ₂ in mm	W ₁ in °	W ₂ in °	W ₃ in °	b in mm	b in mm before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
441	235		300**	265,2	266,0	258,1	258,9	253,5	-	358,7	11,3	-	45	60	45	19,2	27,5 before 09/2012
441	295		400**	332,6	333,4	324,2	325,0	318,6	-	441,7	14,5	-	45	60	45	22,1	27,5 before 09/2012
444	23	1 x 2	25 x 50	27,3	27,5	25,3	25,5	25	-	49,0	3,0	-	45	60	45	7,4	8,9
444	37	1,5 x 3	40 x 80	42,3	42,5	40,3	40,5	40	-	69,0	3,0	-	45	60	45	7,4	8,9
444	46	2 x 3	50 x 80	55,3	55,5	50,3	50,5	50	-	69,0	3,5	-	45	60	45	7,8	-
444	60	2,5 x 4	65 x 100	70,9	71,1	66,9	67,1	65	-	83,0	3,5	-	45	60	45	9,3	-
444	74	3 x 4	80 x 100	85,8	86,2	81,8	82,2	79	-	95,8	7,0	-	45	60	45	9,3	-

* 441 XXL with welded body

** 441 DN 250 – 400 with casted body

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Table 2: nozzles and discs of High Performance valves in inch.

Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc, removable	
				Diameter					Length				Angle			Thickness	
				A Ø in inch		B Ø in inch		D Ø	L in inch	t in inch	L ₁ in inch	L ₂ in inch	W ₁ in °	W ₂ in °	W ₃ in °	b in inch	b in inch before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
455, 456	20	1 x 2	25 x 50	0.961	0.969	0.882	0.890	0.827	-	1.988	0.098	-	30	60	30	0.406	-
455, 456	40	2 x 3	50 x 80	1.925	-	1.807	1.823	1.693	-	2.618	0.098	-	30	30	-	0.484	-
455, 456	60	3 x 4	80 x 100	2.811	-	2.614	2.630	2.441	-	3.366	0.138	-	30	30	-	0.618	-
455, 456	74	4 x 6	100 x 150	3.382	-	3.224	3.240	3.110	-	4.638	0.126	-	30	30	-	0.657	-
457, 458	15	1 x 2	25 x 50	0.744	0.752	0.665	0.673	0.630	4.587	-	0.098	-	45	45	30	0.406	-
457, 458	20	1 x 2	25 x 50	0.961	0.969	0.882	0.890	0.827	4.587	-	0.098	-	30	30	30	0.406	-
457, 458	30	2 x 3	50 x 80	1.531	1.539	1.413	1.421	1.260	5.768	-	0.118	0.472	30	60	45	0.484	-
457, 458	40	2 x 3	50 x 80	1.925	1.933	1.807	1.815	1.693	5.768	-	0.098	-	30	60	-	0.484	-
457, 458	50	3 x 4	80 x 100	2.335	2.343	2.177	2.185	2.047	6.476	-	0.098	0.138	30	60	-	0.657	-
457, 458	60	3 x 4	80 x 100	2.811	2.819	2.614	2.622	2.441	6.476	-	0.138	-	30	60	45	0.618	-

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Type	Orifice	Size in NPS	Size in DN	Nozzle													Disc, removable	
				Diameter					Length				Angle			Thickness		
				A Ø in inch		B Ø in inch		D Ø	L in inch	t in inch	L ₁ in inch	L ₂ in inch	W ₁ in °	W ₂ in °	W ₃ in °	b in inch	b in inch before 04/2013	
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit	
457, 458	50	4 x 6	100 x 150	2.335	2.343	2.177	2.185	2.047	7.854	-	0.098	0.138	30	60	-	0.657	-	
457, 458	60	4 x 6	100 x 150	2.811	2.819	2.654	2.661	2.520	7.854	-	0.177	-	30	60	45	0.618	-	
457, 458	74	4 x 6	100 x 150	3.386	-	3.220	3.236	3.110	7.843	-	0.177	0.217	30	60	-	0.657	-	
457, 458	88	4 x 6	100 x 150	4.047	4.063	3.890	3.906	3.661	7.843	-	0.217	-	30	60	45	0.657	-	
457, 458	110	6 x 10	150 x 250	4.874	4.890	4.717	4.732	4.567	10.303	-	0.177	-	30	60	45	0.657	-	
441	23	-	25	1.075	1.083	0.996	1.004	0.984	3.720	-	0.098	0.492	45	60	45	0.291	0.350	
441	37	-	40	1.665	1.673	1.587	1.594	1.575	4.921	-	0.098	0.925	45	60	45	0.291	0.350	
441	46	-	50	2.098	2.106	1.980	1.988	2.098	5.551	-	0.118	0.945	45	60	45	0.327	0.390	
441	23	1 x 2	-	1.075	1.083	0.996	1.004	0.984	3.642	-	0.098	0.492	45	30	45	0.291	0.350	
441	29	1.5 x 2	-	1.350	1.358	1.272	1.280	1.260	4.409	-	0.098	0.661	45	60	45	0.291	0.350	

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resp. depart.:	TD	date of release:	01/25/24	revision No.:	1		
doc. type:	LGS	change rep. No.:	NA	retention period:	10y.	prot. class:	public

Type	Orifice	Size in NPS	Size in DN	Nozzle													Disc, removable	
				Diameter					Length				Angle			Thickness		
				A Ø in inch		B Ø in inch		D Ø	L in inch	t in inch	L ₁ in inch	L ₂ in inch	W ₁ in °	W ₂ in °	W ₃ in °	b in inch	b in inch before 04/2013	
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit	
441	37	1.5 x 2.5	-	1.665	1.673	1.587	1.594	1.575	4.370	-	0.098	0.886	45	60	45	0.291	0.350	
441	46	2 x 3	-	2.098	2.106	1.980	1.988	1.969	5.039	-	0.118	0.945	45	60	45	0.327	0.390	
441	60	3 x 4	-	2.791	2.799	2.634	2.642	2.559	5.669	-	0.118	1.181	45	60	45	0.307	0.425	
441	92	4 x 6	-	4.244	4.260	4.047	4.063	3.858	6.189	-	0.217	-	45	60	45	0.346	0.445	
441	18		20	0.799	0.807	0.720	0.728	-	-	0.984	-	-	45	-	55	0.228	0.268	
441 421	23		25	1.075	1.083	0.996	1.004	0.984	-	1.516	0.118	-	45	60	55	0.291	0.350	
441 421	29		32	1.350	1.358	1.272	1.280	1.260	-	1.870	0.118	-	45	60	55	0.291	0.350	
441 421	37		40	1.665	1.673	1.587	1.594	1.575	-	2.106	0.118	-	45	60	55	0.291	0.350	
441 421	46		50	2.098	2.106	1.980	1.988	1.969	-	2.126	0.138	-	45	60	45	0.327	0.390	
441 421	60		65	2.791	2.799	2.634	2.642	2.559	-	2.520	0.138	-	45	60	45	0.307	0.425	

Disclosure cat.: I proofread by: BBü publish date: 01/28/24 effect. date: 01/24
 author: Haa released by: JR replaces: initial status: Published
 resp. depart.: TD date of release: 01/25/24 revision No.: 1
 doc. type: LGS change rep. No.: NA retention period: 10y. prot. class: **public**

Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc, removable	
				Diameter					Length				Angle			Thickness	
				A Ø in inch		B Ø in inch		D Ø	L in inch	t in inch	L ₁ in inch	L ₂ in inch	W ₁ in °	W ₂ in °	W ₃ in °	b in inch	b in inch before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
441 421	74		80	3.378	3.394	3.220	3.236	3.071	-	3.614	0.197	-	45	60	45	0.327	0.386
441 421	92		100	4.244	4.260	4.047	4.063	3.858	-	4.520	0.236	-	45	60	45	0.346	0.445
441 421	98		125	4.244	4.260	4.047	4.063	-	-	4.520	-	-	45	-	45	0.346	0.445
441 421	125		150	5.303	5.327	5.106	5.130	-	-	6.122	-	-	45	-	45	0.563	-
441	165		200	7.307	7.339	7.071	7.102	6.890	-	10.177	0.374	-	45	60	45	0.701	-
441	200		250*	8.882	8.913	8.646	8.677	8.504	-	10.819	0.374	-	45	60	45	0.701	-
441	235		300*	10.417	10.449	10.181	10.213	10.079	-	12.421	0.453	-	45	60	45	0.756	1.083 before 09/2012
441	295		400*	13.055	13.087	12.819	12.850	12.717	-	15.315	0.453	-	45	60	45	0.870	1.240 before 09/2012
441	200		250**	8.882	8.913	8.646	8.677	8.504	-	12.031	0.374	-	45	60	45	0.701	-

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 doc. type: LGS change rep. No.: NA retention period: 10y. prot. class: **public**

Type	Orifice	Size in NPS	Size in DN	Nozzle												Disc, removable	
				Diameter					Length				Angle			Thickness	
				A Ø in inch		B Ø in inch		D Ø	L in inch	t in inch	L ₁ in inch	L ₂ in inch	W ₁ in °	W ₂ in °	W ₃ in °	b in inch	b in inch before 04/2013
				lower limit	upper limit	lower limit	upper limit	in mm	lower limit	upper limit	lower limit	lower limit				lower limit	lower limit
441	235		300**	10.441	10.472	10.161	10.193	9.980	-	14.122	0.445	-	45	60	45	0.756	1.083 before 09/2012
441	295		400**	13.094	13.126	12.764	12.795	12.543	-	17.390	0.571	-	45	60	45	0.870	1.083 before 09/2012
444	23	1 x 2	25 x 50	1.075	1.083	0.996	1.004	0.984	-	1.929	0.118	-	45	60	45	0.291	0.350
444	37	1,5 x 3	40 x 80	1.665	1.673	1.587	1.594	1.575	-	2.717	0.118	-	45	60	45	0.291	0.350
444	46	2 x 3	50 x 80	2.177	2.185	1.980	1.988	1.969	-	2.717	0.138	-	45	60	45	0.307	-
444	60	2,5 x 4	65 x 100	2.791	2.799	2.634	2.642	2.559	-	3.268	0.138	-	45	60	45	0.366	-
444	74	3 x 4	80 x 100	3.378	3.394	3.220	3.236	3.110	-	3.772	0.276	-	45	60	45	0.366	-

* 441 XXL with welded body

** 441 DN 250 – 400 with casted body

Disclosure cat.:	I	proofread by:	BBü	publish date:	01/28/24	effect. date:	01/24
author:	Haa	released by:	JR	replaces:	initial	status:	Published
resp. depart.:	TD	date of release:	01/25/24	revision No.:	1		
doc. type:	LGS	change rep. No.:	NA	retention period:	10y.	prot. class:	public

Table 3: nozzles of type 441/442, 421 flat sealing disc design in mm.

Type	Orifice	Size in NPS	Size in DN	Nozzle				
				Diameter				Length
				A Ø in mm		B Ø in mm		t in mm
				lower limit	upper limit	lower limit	upper limit	upper limit
441	18	-	20	22,8	23,0	18,2	18,4	25,0
441 421	23	-	25	29,8	30,0	23,2	23,4	38,5
441 421	29	-	32	37,1	37,3	29,2	29,4	47,5
441 421	37	-	40	46,0	46,2	37,2	37,4	53,5
441 421	46	-	50	54,4	54,7	46,1	46,4	54,0
441 421	60	-	65	71,0	71,3	60,1	60,4	64,0
441 421	74	-	80	89,0	89,3	74,1	74,4	91,8
441 421	92	-	100	111,0	111,3	92,1	92,4	114,8
441 421	98	-	125	111,0	111,3	98,1	98,4	114,8
441 421	125	-	150	138,0	138,3	125,1	125,4	155,3

Table 4: nozzles of type 441/442, 421 flat sealing disc design in inch.

Type	Orifice	Size in NPS	Size in DN	Nozzle				
				Diameter				Length
				A Ø in inch		B Ø in inch		t in inch
				lower limit	upper limit	lower limit	upper limit	upper limit
441	18	-	20	0.898	0.906	0.717	0.724	0.984
441 421	23	-	25	1.173	1.181	0.913	0.921	1.516
441 421	29	-	32	1.461	1.469	1.150	1.157	1.870
441 421	37	-	40	1.811	1.819	1.465	1.472	2.106
441 421	46	-	50	2.142	2.154	1.815	1.827	2.126

Type	Orifice	Size in NPS	Size in DN	Nozzle				
				Diameter				Length
				A Ø in inch		B Ø in inch		t in inch
				lower limit	upper limit	lower limit	upper limit	upper limit
441 421	60	-	65	2.795	2.807	2.366	2.378	2.520
441 421	74	-	80	3.504	3.516	2.917	2.929	3.614
441 421	92	-	100	4.370	4.382	3.626	3.638	4.520
441 421	98	-	125	4.370	4.382	3.862	3.874	4.520
441 421	125	-	150	5.433	5.445	4.925	4.937	6.114