



Type 442 ANSI  
Plain lever H3  
Open bonnet  
Conventional design



Type 441 ANSI  
Packed lever H4  
Closed bonnet  
Conventional design

# Type 441 ANSI 442 ANSI

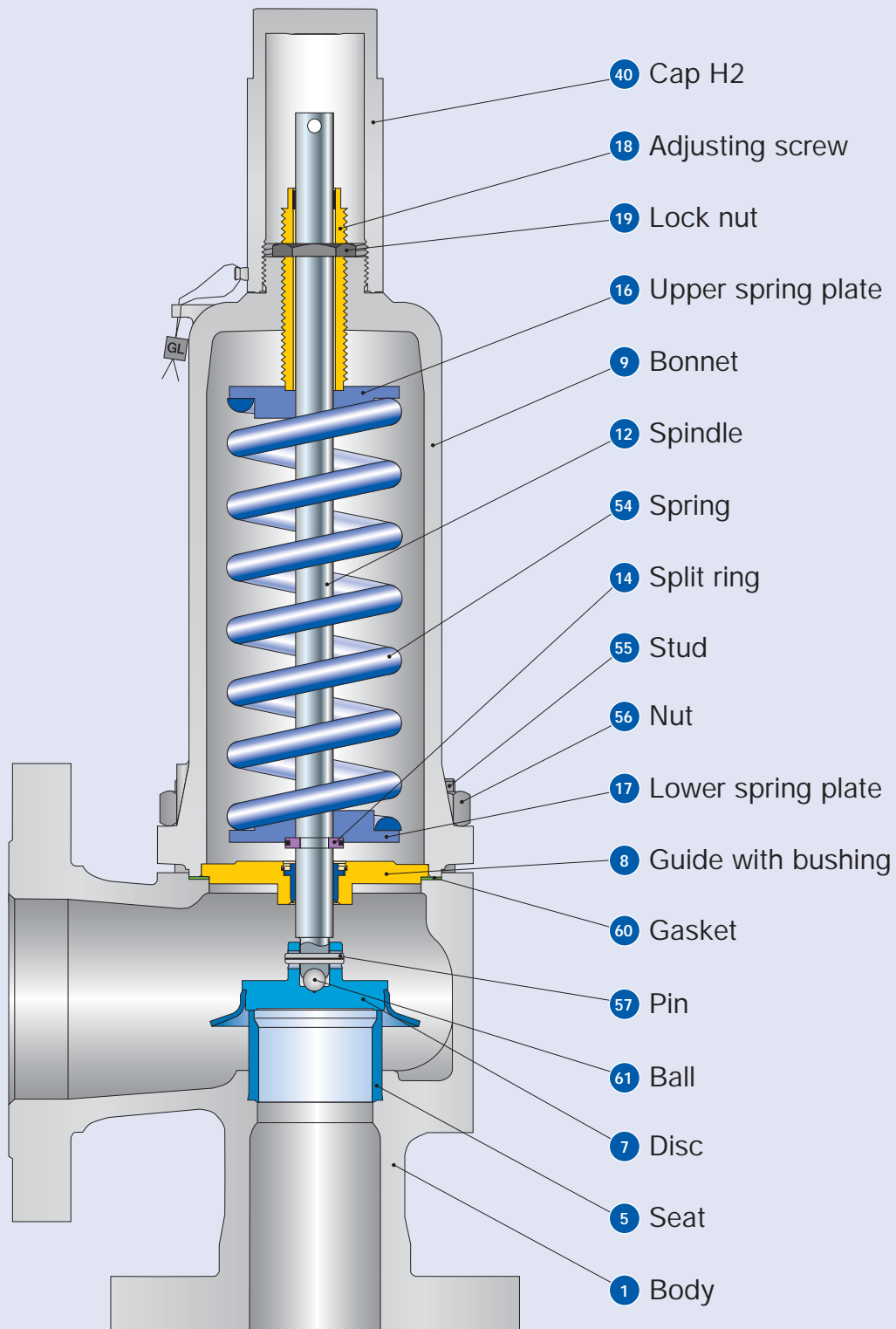
## Flanged Safety Relief Valves – spring loaded

Type 441, 442 ANSI

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## Conventional design

Type 441, 442 ANSI



## Conventional design

| Materials |                                 |                                     |   |
|-----------|---------------------------------|-------------------------------------|---|
| Item      | Component                       | Type 4412 / 4422 ANSI               | Type 4414 ANSI                            |
| 1         | Body                            | 1.0619                              | 1.4408                                    |
|           |                                 | SA 216 WCB                          | SA 351 CF8M                               |
| 5         | Seat                            | 1.4404                              | 1.4404                                    |
|           |                                 | 316L                                | 316L                                      |
| 7         | Disc                            | 1.4122                              | 1.4404                                    |
|           |                                 | Hardened stainless steel            | 316L                                      |
| 8         | Guide<br>with bushing           | 1.4104, 1.0501, 0.7040              | 1.4404                                    |
|           |                                 | Chrome or carbon steel              | 316L                                      |
|           |                                 | 1.4104 tenifer                      | -   |
|           |                                 | Chrome steel tenifer                | -   |
| 9         | Bonnet                          | 0.7040, 0.7043, 1.0619              | 1.4408, 1.4404,<br>1.4571                 |
|           |                                 | Ductile Gr. 60-40-18,<br>SA 216 WCB | SA 351 CF8M, SA 479 316L,<br>SA 479 316Ti |
| 12        | Spindle                         | 1.4021                              | 1.4404                                    |
|           |                                 | 420                                 | 316L                                      |
| 14        | Split ring                      | 1.4104                              | 1.4404                                    |
|           |                                 | Chrome steel                        | 316L                                      |
| 16/17     | Spring plate                    | 1.0718                              | 1.4404                                    |
|           |                                 | Steel                               | 316L                                      |
| 18        | Adjusting screw<br>with bushing | 1.4104 PTFE                         | 1.4404 PTFE                               |
|           |                                 | Chrome steel PTFE                   | 316L PTFE                                 |
| 19        | Lock nut                        | 1.0718                              | 1.4404                                    |
|           |                                 | Steel                               | 316L                                      |
| 40        | Cap H2                          | 1.0718 or 0.7043                    | 1.4404                                    |
|           |                                 | 12L13 or Gr. 60-40-18               | 316L                                      |
| 54        | Spring standard                 | 1.1200, 1.8159, 1.7102              | 1.4310                                    |
|           |                                 | Carbon steel                        | Stainless steel                           |
| 54        | Spring optional                 | 1.4310                              | -   |
|           |                                 | Stainless steel                     | -   |
| 55        | Stud                            | 1.1181                              | 1.4401                                    |
|           |                                 | Steel                               | B8M                                       |
| 56        | Nut                             | 1.0501                              | 1.4401                                    |
|           |                                 | 2H                                  | 8M  |
| 57        | Pin                             | 1.4310                              | 1.4310                                    |
|           |                                 | Stainless steel                     | Stainless steel                           |
| 60        | Gasket                          | Graphite / 1.4401                   | Graphite / 1.4401                         |
|           |                                 | Graphite / 316                      | Graphite / 316                            |
| 61        | Ball                            | 1.3541                              | 1.4401                                    |
|           |                                 | Hardened stainless steel            | 316                                       |

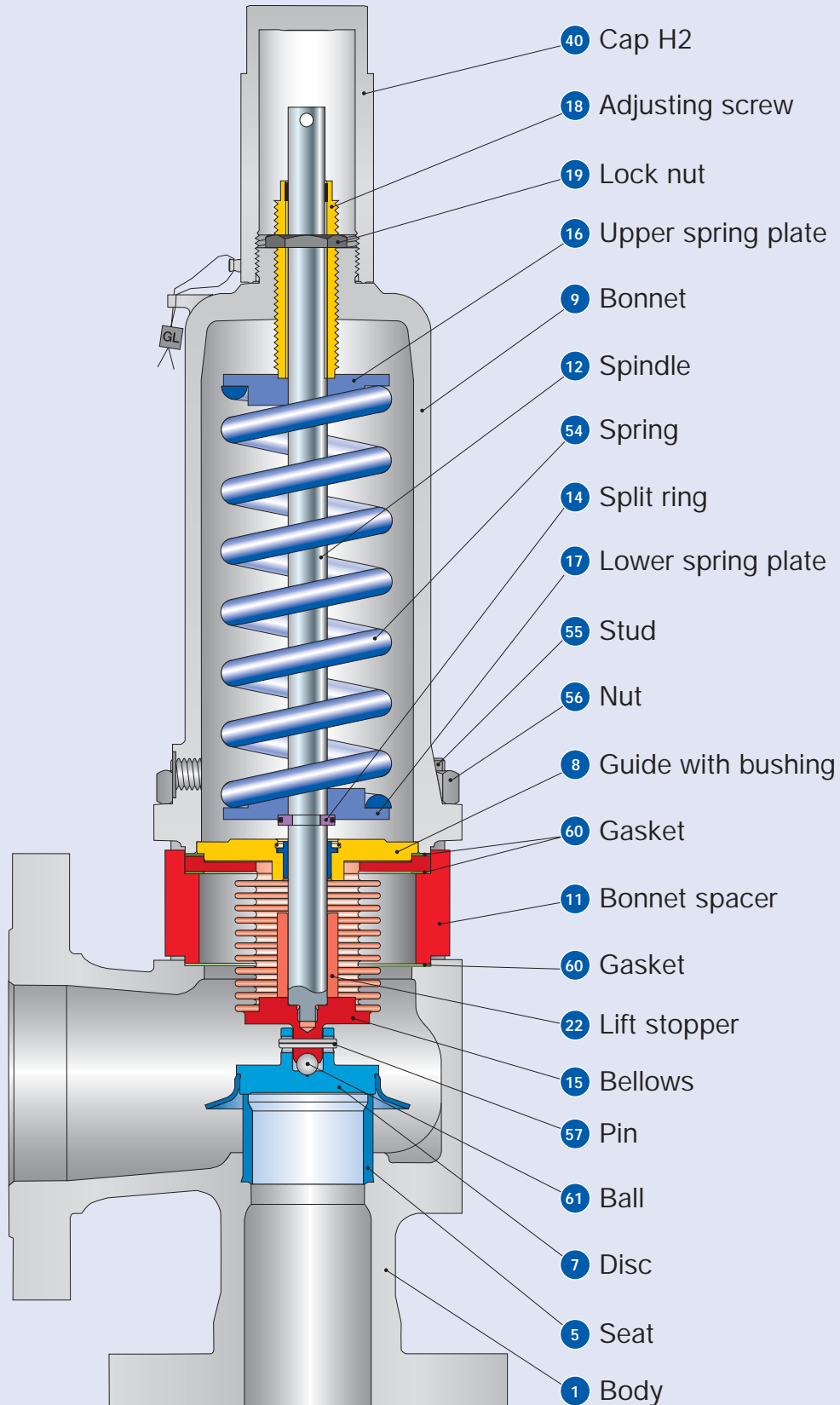
**Please notice:**

- Modifications reserved by LESER.
- LESER can upgrade materials without notice.
- Every part can be replaced by other material acc. to customer specification.

# Type 441, 442 ANSI

## Balanced bellows design

Type 441, 442 ANSI



## Balanced bellows design

| Materials |                                 | Type 4412 / 4422 ANSI               | Type 4414 ANSI                            |
|-----------|---------------------------------|-------------------------------------|---|
| 1         | Body                            | 1.0619                              | 1.4408                                    |
|           |                                 | SA 216 WCB                          | SA 351 CF8M                               |
| 5         | Seat                            | 1.4404                              | 1.4404                                    |
|           |                                 | 316L                                | 316L                                      |
| 7         | Disc                            | 1.4122                              | 1.4404                                    |
|           |                                 | Hardened stainless steel            | 316L                                      |
| 8         | Guide<br>with bushing           | 1.4104, 1.0501, 0.7040              | 1.4404                                    |
|           |                                 | Chrome or carbon steel              | 316L                                      |
|           |                                 | 1.4104 tenifer                      | -   |
|           |                                 | Chrome steel tenifer                | -   |
| 9         | Bonnet                          | 0.7040, 0.7043, 1.0619              | 1.4408, 1.4404,<br>1.4571                 |
|           |                                 | Ductile Gr. 60-40-18,<br>SA 216 WCB | SA 351 CF8M, SA 479 316L,<br>SA 479 316Ti |
| 11        | Bonnet spacer                   | 1.4404                              | 1.4404                                    |
|           |                                 | 316L                                | 316L                                      |
| 12        | Spindle                         | 1.4404                              | 1.4404                                    |
|           |                                 | 316L                                | 316L                                      |
| 14        | Split ring                      | 1.4104                              | 1.4404                                    |
|           |                                 | Chrome steel                        | 316L                                      |
| 15        | Bellows                         | 1.4571                              | 1.4571                                    |
|           |                                 | 316Ti                               | 316Ti                                     |
| 16/17     | Spring plate                    | 1.0718                              | 1.4404                                    |
|           |                                 | Steel                               | 316L                                      |
| 18        | Adjusting screw<br>with bushing | 1.4104 PTFE                         | 1.4404 PTFE                               |
|           |                                 | Chrome steel PTFE                   | 316L PTFE                                 |
| 19        | Lock nut                        | 1.0718                              | 1.4404                                    |
|           |                                 | Steel                               | 316L                                      |
| 22        | Lift stopper                    | 1.4404                              | 1.4404                                    |
|           |                                 | 316L                                | 316L                                      |
| 40        | Cap H2                          | 1.0718 or 0.7043                    | 1.4404                                    |
|           |                                 | 12L13 or Gr. 60-40-18               | 316L                                      |
| 54        | Spring standard                 | 1.1200, 1.8159, 1.7102              | 1.4310                                    |
|           |                                 | Carbon steel                        | Stainless steel                           |
|           | Spring optional                 | 1.4310                              | -   |
|           |                                 | Stainless steel                     | -   |
| 55        | Stud                            | 1.4401                              | 1.4401                                    |
|           |                                 | B8M                                 | B8M                                       |
| 56        | Nut                             | 1.4401                              | 1.4401                                    |
|           |                                 | 8M                                  | 8M  |
| 57        | Pin                             | 1.4310                              | 1.4310                                    |
|           |                                 | Stainless steel                     | Stainless steel                           |
| 60        | Gasket                          | Graphite / 1.4401                   | Graphite / 1.4401                         |
|           |                                 | Graphite / 316                      | Graphite / 316                            |
| 61        | Ball                            | 1.3541                              | 1.3541                                    |
|           |                                 | Hardened stainless steel            | 316                                       |

**Please notice:**

- Modifications reserved by LESER.
- LESER can upgrade materials without notice.
- Every part can be replaced by other material acc. to customer specification.

## How to order – Numbering system

Type 441, 442 ANSI

# 1

### Article Number

|     |   |      |   |
|-----|---|------|---|
| 1   | 2 | 3    | 4 |
| 441 | 2 | .481 | 2 |

**1** Valve Type 441, 442 ANSI  
 Type 441 – with closed bonnet  
 Type 442 – with open bonnet

**2**

| Code | Body material |
|------|---------------|
| 2    | 1.0619 (WCB)  |
| 4    | 1.4408 (CF8M) |

**3** Valve code  
 Identifies valve size and body material, refer to page 02/09.

**4**

| Code | Lifting lever                |    |
|------|------------------------------|----|
| 2    | screwed cap                  | H2 |
| 3    | plain lever                  | H3 |
| 4    | packed lever                 | H4 |
| 5    | plain lever with open bonnet | H3 |

4412.4812

Article No.

# 2

### Set Pressure

Please state unit (in gauge)!

Please do not exceed the pressure range defined in the spring charts.

5 barg

Set Pressure

# 3

### Connections

Please refer to page 02/14

H45

Connections

## 4 Options

| Type 441, 442 ANSI              | Option code |
|---------------------------------|-------------|
| • O-ring-disc                   |             |
| CR                              | "K" J21     |
| EPDM                            | "D" J22     |
| FKM                             | "L" J23     |
| FFKM                            | "C" J20     |
| • Disc 1.4404 / 316L            | L44         |
| • Disc 1.4404 / 316L stellited  | J25         |
| • Detachable lifting aid        | J26         |
| • Stainless steel bellows       |             |
| - open bonnet (Type 442)        | J68         |
| - closed bonnet (Type 441)      | J78         |
| • Elastomer bellows             | J79         |
| • High temperature alloy spring | X01         |
| • Stainless steel spring        | X04         |
| • Adaptor for lift indicator    | H4 J39      |
| • Lift indicator                | J93         |
| • Test gag                      |             |
| - cap                           | H2 J70      |
| - packed lever                  | H4 J69      |
| • Seat 316L stellited           | L61         |
| • Heating jacket                |             |
| - Couplings                     | G 3/8 H29   |
|                                 | G 3/4 H30   |
| - Flanges                       | DN 15 H31   |
|                                 | DN 25 H32   |
| • Drain hole                    | G 1/4 J18   |
|                                 | G 1/2 J19   |
| • Free of oil and grease        | J85         |
| • Materials                     |             |
| - NACE                          | H01         |

Option code applies only if not standard

J22

Options

## 5 Documentation

Please select requested documentation:

| Inspections, tests:                                      | Option code        |
|--|--------------------|
| DIN EN 10204-3.2: TÜV-Nord Certificate for test pressure | M33                |
| <b>LESER Certificate for Global Application</b>          | H03                |
| - Inspection certificate 3.1 acc. to DIN EN 10204        |                    |
| - Declaration of conformity acc. to PED 97/23/EC         |                    |
| <b>Material test certificate:</b>                        |                    |
| DIN EN 10204-3.1   |                    |
| <b>Part</b>  | <b>Option code</b> |
| Body   | H01                |
| Bonnet   | L30                |
| Cap / lever cover  | L31                |
| Disc   | L23                |
| Studs  | N07                |
| Nuts   | N08                |

H01 L30

Documentation

## 6 Code and Medium

|   |   |
|---|---|
| 1   | 2 |
| 2   | 0 |
| <b>1 Code</b>   |   |
| 1. ASME Section VIII                                    |   |
| 2. CE / VdTUEV  |   |
| 3. ASME Section VIII + CE / VdTUEV                      |   |
| <b>2 Medium</b>   |   |
| .1 Gases  |   |
| .2 Liquids  |   |
| .3 Steam  |   |
| .0 Steam / Gases / Liquids (valid only for CE / VdTUEV) |   |

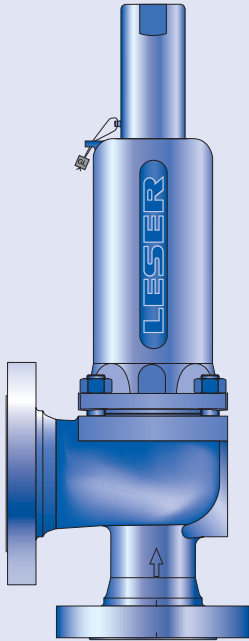
2.0

Code and Medium

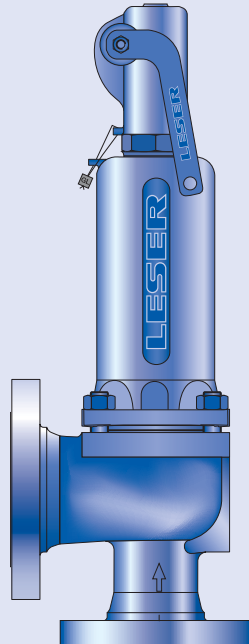
Type 441, 442 ANSI

## How to order – Article numbers

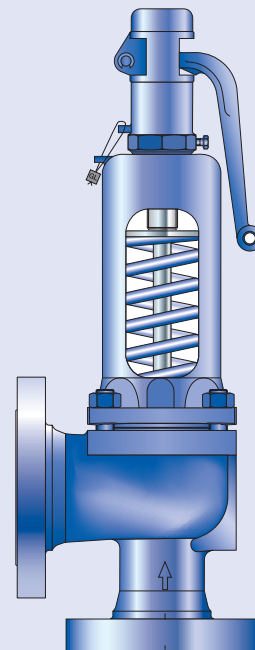
Type 441, 442 ANSI



**Type 441**  
Cap H2  
Closed bonnet  
Conventional design



**Type 441**  
Packed lever H4  
Closed bonnet  
Conventional design



**Type 442**  
Plain lever H3  
Open bonnet  
Conventional design



## How to order – Article numbers

| Article numbers                              |    |                | 1" x 2" | 1 1/2" x 2" | 1 1/2" x 2 1/2" | 2" x 3" | 3" x 4" | 4" x 6" |
|--|----|----------------|---------|-------------|-----------------|---------|---------|---------|
| 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 $A_0$ [mm <sup>2</sup> ] |    |                | 416     | 661         | 1075            | 1662    | 2827    | 6648    |
| <b>Body material: 1.0619 (WCB)</b>           |    |                |         |             |                 |         |         |         |
| Bonnet closed                                | H2 | Art.-No. 4412. | 4812    | 4822        | 4832            | 4842    | 4862    | 4872    |
|  | H3 | Art.-No. 4412. | 4813    | 4823        | 4833            | 4843    | 4863    | 4873    |
|  | H4 | Art.-No. 4412. | 4814    | 4824        | 4834            | 4844    | 4864    | 4874    |
| open   | H3 | Art.-No. 4422. | 4815    | 4825        | 4835            | 4845    | 4865    | 4875    |
| <b>Body material: 1.4408 (CF8M)</b>          |    |                |         |             |                 |         |         |         |
| Bonnet closed                                | H2 | Art.-No. 4414. | 7912    | -           | 7932            | 7942    | 7962    | 7972    |
|  | H4 | Art.-No. 4414. | 7914    | -           | 7934            | 7944    | 7964    | 7974    |

## Dimensions and weights

### Metric Units

| 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 <sub>0</sub> [mm]           | 23      | 29          | 37              | 46      | 60      | 92      |
| Actual Orifice area A <sub>0</sub> [mm <sup>2</sup> ] | 416     | 661         | 1075            | 1662    | 2827    | 6648    |
| <b>Weight</b> [lbs]                                   | 10      | 13          | 16              | 22      | 33      | 75      |
| with bellows  | 11      | 14          | 17              | 24      | 37      | 83      |
| <b>Center to face</b> [mm]                            |         |             |                 |         |         |         |
| Inlet a   | 105     | 124         | 124             | 136     | 156     | 181     |
| Outlet b  | 114     | 121         | 121             | 124     | 165     | 229     |
| <b>Height (H4)</b> [mm]                               |         |             |                 |         |         |         |
| Standard H max.                                       | 339     | 455         | 496             | 556     | 685     | 844     |
| Bellows H max.  | 378     | 497         | 534             | 602     | 741     | 902     |
| <b>Support brackets</b> [mm]                          |         |             |                 |         |         |         |
| A   |         |             |                 |         |         | 280     |
| B   |         |             |                 |         |         | 160     |
| (drilled only on request)                             |         |             |                 |         |         | Ø 18    |
| D   |         |             |                 |         |         | 250     |
| E   |         |             |                 |         |         | 25      |

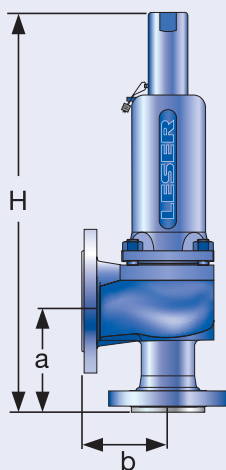
### Body material: 1.0619 (WCB)

|                                       |        |                |
|---------------------------------------|--------|----------------|
| <b>ANSI Flange Class<sup>1)</sup></b> | Inlet  | CL150 or CL300 |
|                                       | Outlet | CL150          |

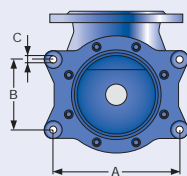
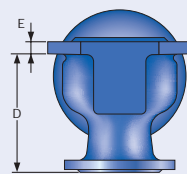
### Body material: 1.4408 (CF8M)

|                                       |        |                |   |                |
|---------------------------------------|--------|----------------|---|----------------|
| <b>ANSI Flange Class<sup>1)</sup></b> | Inlet  | CL150 or CL300 | - | CL150 or CL300 |
|                                       | Outlet | CL150          | - | CL150          |

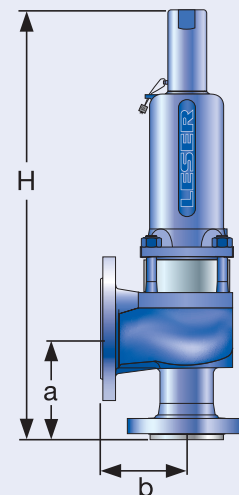
<sup>1)</sup> Standard flange rating. For other flange drillings and facings please refer to page 02/14.



Conventional design



Support brackets



Balanced bellows design

## Dimensions and weights

| US Units                                       |                 | 1" x 2"  | 1 1/2" x 2" | 1 1/2" x 2 1/2" | 2" x 3"  | 3" x 4"  | 4" x 6" |
|--|-----------------|----------|-------------|-----------------|----------|----------|---------|
| 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 $d_0$ [inch]           |                 | 0,91     | 1,14        | 1,46            | 1,81     | 2,36     | 3,62    |
| Actual Orifice area $A_0$ [inch <sup>2</sup> ] |                 | 0,644    | 1,024       | 1,667           | 2,576    | 4,383    | 10,304  |
| <b>Weight</b>                                  |                 |          |             |                 |          |          |         |
| [lbs]  |                 | 22       | 29          | 35              | 49       | 73       | 165     |
|  | with bellows    | 23       | 30          | 38              | 52       | 81       | 183     |
| <b>Center to face</b>                          |                 |          |             |                 |          |          |         |
| [inch]   | Inlet a         | 4 1/8    | 4 7/8       | 4 7/8           | 5 3/8    | 6 1/8    | 7 1/8   |
|  | Outlet b        | 4 1/2    | 4 3/4       | 4 3/4           | 4 7/8    | 6 1/2    | 9       |
| <b>Height (H4)</b>                             |                 |          |             |                 |          |          |         |
| [inch]   | Standard H max. | 13 11/32 | 17 29/32    | 19 17/32        | 21 1/16  | 26 31/32 | 33 7/32 |
|  | Bellows H max.  | 14 7/8   | 19 9/16     | 21 1/32         | 23 11/16 | 29 3/16  | 35 1/2  |
| <b>Support brackets</b>                        |                 |          |             |                 |          |          |         |
| [inch]   | A               |          |             |                 |          |          | 11      |
|  | B               |          |             |                 |          |          | 6 1/4   |
| (drilled only on request)                      | C               |          |             |                 |          |          | Ø 3/4   |
|  | D               |          |             |                 |          |          | 9 7/8   |
|  | E               |          |             |                 |          |          | 25      |

Type 441, 442 ANSI

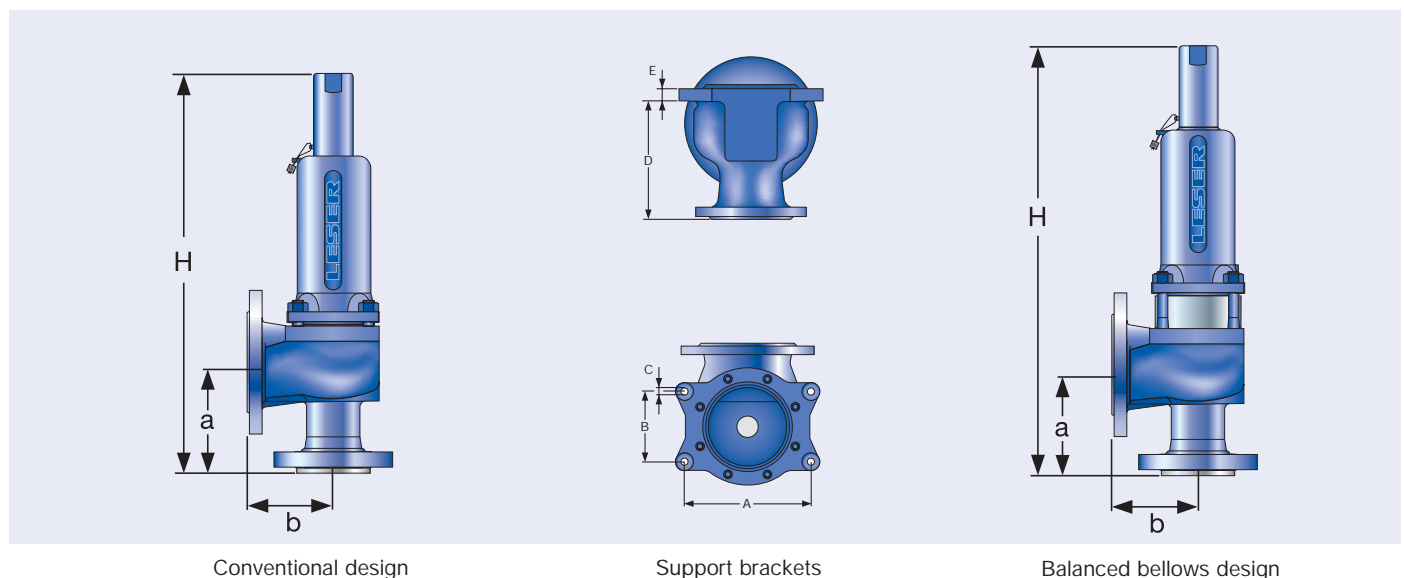
### Body material: 1.0619 (WCB)

|                                       |        |                |  |  |  |  |
|---------------------------------------|--------|----------------|--|--|--|--|
| <b>ANSI Flange Class<sup>1)</sup></b> | Inlet  | CL150 or CL300 |  |  |  |  |
|                                       | Outlet | CL150          |  |  |  |  |

### Body material: 1.4408 (CF8M)

|                                       |        |                |   |                |  |  |
|---------------------------------------|--------|----------------|---|----------------|--|--|
| <b>ANSI Flange Class<sup>1)</sup></b> | Inlet  | CL150 or CL300 | - | CL150 or CL300 |  |  |
|                                       | Outlet | CL150          | - | CL150          |  |  |

<sup>1)</sup> Standard flange rating. For other flange drillings and facings please refer to page 02/14.



## Pressure temperature ratings

### Metric Units

| 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 $A_0$ [mm <sup>2</sup> ] | 416     | 661         | 1075            | 1662   | 2827   | 6648   |

### Body material: 1.0619 (WCB)

| ANSI Flange Class <sup>1)</sup>                        | Inlet                 |       | CL150 or CL300 |      |      |      |      |      |
|--|-----------------------|-------|----------------|------|------|------|------|------|
|  | Outlet                |       | CL150          |      |      |      |      |      |
| <b>Minimum set pressure</b>                            | p [bar <sub>g</sub> ] | S/G/L | 0,1            | 0,1  | 0,1  | 0,1  | 0,1  | 0,1  |
| <b>Min. set pressure<sup>2)</sup> standard bellows</b> | p [bar <sub>g</sub> ] | S/G/L | 3              | 3    | 3    | 3    | 3    | 3    |
| <b>Min. set pressure low press. bellows</b>            | p [bar <sub>g</sub> ] | S/G/L | 0,98           | 1,41 | 1,11 | 1,81 | 1,50 | 1,18 |
| <b>Maximum set pressure</b>                            | p [bar <sub>g</sub> ] | S/G/L | 49             | 48   | 46   | 51   | 35   | 34   |
| <b>Max. set pressure with special spring</b>           | p [bar <sub>g</sub> ] | S/G/L | 51             | 48   | 46   | 51   | 40   | 34   |
| <b>Temperature acc. to DIN EN</b>                      | min. [°C]             |       | -85            |      |      |      |      |      |
|  | max. [°C]             |       | +450           |      |      |      |      |      |
| <b>Temperature acc. to ASME</b>                        | min. [°C]             |       | -29            |      |      |      |      |      |
|  | max. [°C]             |       | +427           |      |      |      |      |      |

### Body material: 1.4408 (CF8M)

| ANSI Flange Class <sup>1)</sup>                        | Inlet                 |       | CL150 or CL 300 | - | CL 150 or CL 300 |      |      |      |
|--|-----------------------|-------|-----------------|---|------------------|------|------|------|
|  | Outlet                |       | CL 150          | - | CL 150           |      |      |      |
| <b>Minimum set pressure</b>                            | p [bar <sub>g</sub> ] | S/G/L | 0,1             | - | 0,1              | 0,1  | 0,1  | 0,1  |
| <b>Min. set pressure<sup>2)</sup> standard bellows</b> | p [bar <sub>g</sub> ] | S/G/L | 3               | - | 3                | 3    | 3    | 3    |
| <b>Min. set pressure low press. bellows</b>            | p [bar <sub>g</sub> ] | S/G/L | 0,98            | - | 1,11             | 1,81 | 1,50 | 1,18 |
| <b>Maximum set pressure</b>                            | p [bar <sub>g</sub> ] | S/G/L | 42,5            | - | 27               | 25   | 27   | 15   |
| <b>Max. set pressure with special spring</b>           | p [bar <sub>g</sub> ] | S/G/L | 51              | - | 38               | 40   | 27   | 25   |
| <b>Temperature acc. to DIN EN</b>                      | min. [°C]             |       | -270            | - | -270             |      |      |      |
|  | max. [°C]             |       | +400            | - | +400             |      |      |      |
| <b>Temperature acc. to ASME</b>                        | min. [°C]             |       | -268            | - | -268             |      |      |      |
|  | max. [°C]             |       | +538            | - | +538             |      |      |      |

<sup>1)</sup> For flange rating class 150 the pressure temperature ratings according to ASME ANSI B 16.34 apply.

<sup>2)</sup> Min. set pressure standard bellows = Max. set pressure low pressure bellows.

## Pressure temperature ratings

| US Units  |           |         |                |                 |        |        |        |
|---|-----------|---------|----------------|-----------------|--------|--------|--------|
| 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 <sub>0</sub> [inch]           |           | 0,91    | 1,14           | 1,46            | 1,81   | 2,36   | 3,62   |
| Actual Orifice area A <sub>0</sub> [inch <sup>2</sup> ] |           | 0,644   | 1,024          | 1,667           | 2,576  | 4,383  | 1,304  |
| <b>Body material: 1.0619 (WCB)</b>                      |           |         |                |                 |        |        |        |
| ANSI Flange Class <sup>1)</sup>                         | Inlet     |         | CL150 or CL300 |                 |        |        |        |
|   | Outlet    |         | CL150          |                 |        |        |        |
| <b>Minimum set pressure</b>                             | p [psig]  | S/G/L   | 1,5            | 1,5             | 1,5    | 1,5    | 1,5    |
| <b>Min. set pressure<sup>2)</sup> standard bellows</b>  | p [psig]  | S/G/L   | 43,5           | 43,5            | 43,5   | 43,5   | 43,5   |
| <b>Min. set pressure low press. bellows</b>             | p [psig]  | S/G/L   | 14             | 20              | 16     | 26     | 17     |
| <b>Maximum set pressure</b>                             | p [psig]  | S/G/L   | 711            | 696             | 667    | 740    | 508    |
| <b>Max. set pressure with special spring</b>            | p [psig]  | S/G/L   | 740            | 696             | 667    | 740    | 580    |
| <b>Temperature acc. to DIN EN</b>                       | min. [°F] |         | -121           |                 |        |        |        |
|   | max. [°F] |         | +842           |                 |        |        |        |
| <b>Temperature acc. to ASME</b>                         | min. [°F] |         | -20            |                 |        |        |        |
|   | max. [°F] |         | +800           |                 |        |        |        |

| Body material: 1.4408 (CF8M)                           |           |       |                  |   |                  |      |      |
|--|-----------|-------|------------------|---|------------------|------|------|
| ANSI Flange Class <sup>1)</sup>                        | Inlet     |       | CL 150 or CL 300 | - | CL 150 or CL 300 |      |      |
|  | Outlet    |       | CL 150           | - | CL 150           |      |      |
| <b>Minimum set pressure</b>                            | p [psig]  | S/G/L | 1,5              | - | 1,5              | 1,5  | 1,5  |
| <b>Min. set pressure<sup>2)</sup> standard bellows</b> | p [psig]  | S/G/L | 43,5             | - | 43,5             | 43,5 | 43,5 |
| <b>Min. set pressure low press. bellows</b>            | p [psig]  | S/G/L | 14               | - | 16               | 26   | 17   |
| <b>Maximum set pressure</b>                            | p [psig]  | S/G/L | 616              | - | 392              | 363  | 392  |
| <b>Max. set pressure with special spring</b>           | p [psig]  | S/G/L | 740              | - | 551              | 580  | 392  |
| <b>Temperature acc. to DIN EN</b>                      | min. [°F] |       | -454             | - | -454             |      |      |
|  | max. [°F] |       | +752             | - | +752             |      |      |
| <b>Temperature acc. to ASME</b>                        | min. [°F] |       | -450             | - | -450             |      |      |
|  | max. [°F] |       | +1000            | - | +1000            |      |      |

<sup>1)</sup> For flange rating class 150 the pressure temperature ratings according to ASME ANSI B 16.34 apply.

<sup>2)</sup> Min. set pressure standard bellows = Max. set pressure low pressure bellows.

## Flange drillings and facings

### Flange drillings

| 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 <sub>0</sub> [mm]           |            | 23      | 29          | 37              | 46      | 60      | 92      |
| Actual Orifice area A <sub>0</sub> [mm <sup>2</sup> ] |            | 416     | 661         | 1075            | 1662    | 2827    | 6648    |
| Body material: 0.6025 (cast iron)                     |            |         |             |                 |         |         |         |
| Inlet   | ASME B16.5 | CL150   | H64         | H64             | H64     | H64     | H64     |
|   |            | CL300   | *           | *               | *       | *       | *       |
| Outlet  | ASME B16.5 | CL150   | *           | *               | *       | *       | *       |
|   |            | CL300   | -           | -               | -       | -       | -       |

### Flange facings

| Indication                                 | Standard               | Nozzle            | Outlet                      | Remark                           |   |                 |           |             |        |     |
|--|------------------------|-------------------|-----------------------------|----------------------------------|---|-----------------|-----------|-------------|--------|-----|
| <b>General</b>                             |                        |                   |                             |                                  |   |                 |           |             |        |     |
| Flange undrilled                           | -                      | H38               | H39                         |                                  |   |                 |           |             |        |     |
| Linde-V-Nut, Form V48                      | Linde Standard 420-08  | J07               | J08                         | Groove: Rz 16                    |   |                 |           |             |        |     |
| Linde-V-Nut, Form V48A                     | LWN 313.36             | J05               | J06                         | Groove: Rz 4, e.g. with hydrogen |   |                 |           |             |        |     |
| Lens seal form L<br>(without sealing lens) | DIN 2696<br>LWN 313.35 | J11               | J12                         |                                  |   |                 |           |             |        |     |
| <b>Acc. to DIN EN</b>                      |                        |                   |                             |                                  |   |                 |           |             |        |     |
| <b>Flange facing</b>                       |                        |                   | <b>Inlet</b>                | <b>Outlet</b>                    | <b>Remark</b>                             |                 |           |             |        |     |
| DIN EN 1092<br>(new)                       |                        | DIN 2526<br>(old) |                             |                                  | Rz-data according to<br>DIN EN 1092 in µm |                 |           |             |        |     |
| (see also LWN 313.40)                      |                        |                   | PN 10 – PN 40               | PN 10 – PN 40                    |   |                 |           |             |        |     |
| Raised face                                | Type B1                | Type C            | *                           | *                                | Facing: Rz = 12,5 – 50                    |                 |           |             |        |     |
|  | Type B2                | Type D            |                             |                                  |   |                 |           |             |        |     |
|  |                        | Type E            | L36                         | L38                              | Facing: Rz = 3,2 – 12,5                   |                 |           |             |        |     |
| Tongue face C <sup>1)</sup>                |                        | Tongue face F     | H94                         | H92                              | Steel flanges only                        |                 |           |             |        |     |
| Groove face D <sup>1)</sup>                |                        | Groove face N     | H93                         | H91                              |   |                 |           |             |        |     |
| Male face E                                |                        | Male face V13     | H96                         | H98                              |   |                 |           |             |        |     |
| Female face F                              |                        | Female face R13   | H96                         | H99                              |   |                 |           |             |        |     |
| O-ring male face G                         |                        | Male face V14     | J01                         | J02                              |   |                 |           |             |        |     |
| O-ring female face H                       |                        | Female face R14   | J03                         | J04                              |   |                 |           |             |        |     |
| <b>Acc. to ASME B16.5</b>                  |                        |                   |                             |                                  |   |                 |           |             |        |     |
| Body material                              | Inlet                  | Outlet            | Smooth finish <sup>2)</sup> |                                  |   | Serrated finish |           | RTJ-groove  |        |     |
|  |                        |                   | Inlet                       | Outlet                           | Inlet                                     | Outlet          | Inlet     |             | Outlet |     |
|  |                        |                   | Option code                 | Option code                      | RTJ-Class                                 | Option code     | RTJ-Class | Option code |        |     |
| 1.0619, 1.4408                             | all                    | all               | L51                         | L53                              | *   | *               | CL150     | H62         | CL150  | H63 |

<sup>1)</sup> According to DIN EN 1092 groove depths and tongue heights increased compared to the formerly valid DIN (refer to LWN 313.40). LESER manufactures the groove at flanged valves by milling. If a customer demands a turned surface in the soil of the groove according to DIN 2512 and/or DIN EN 1092-1 an additional option code is necessary: "S01: bottom of the groove drilled". Groove and tongue for PN160 flanges refer to DIN 2512/LWN 313.32.

<sup>2)</sup> Smooth finish is not defined in the effective standards. For LESER's definition for smooth finish see page 00/07.

For signs and symbols refer to page 00/07

Note: Flange drillings and facings meet always the requirements of mentioned flange standards. Flange thickness and outer diameter may vary from flange standard.

## 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 <sub>0</sub> [mm]           |                     |                                | 23            | 29            | 37            | 46            | 60            | 92            |
| Actual Orifice area A <sub>0</sub> [mm <sup>2</sup> ] |                     |                                | 416           | 661           | 1075          | 1662          | 2827          | 6648          |
| <b>Disc (Item 7): Metal to metal seat</b>             |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Disc</b>   | 1.4122              | 210.9739.9000                  | 210.9839.9000 | 210.9939.9000 | 210.8739.9000 | 220.1639.9000 | 220.1839.9000 |               |
| detachable lifting aid                                | 1.4404              | 210.9749.9000                  | 210.9849.9000 | 210.9949.9000 | 210.8749.9000 | 220.1649.9000 | 220.1849.9000 |               |
| <b>Disc (Item 7): Soft seal</b>                       |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Disc</b>   | 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 |
|   | FPM                 | "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    |
| <b>O-ring (Item 7.4): Soft seal</b>                   |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>O-ring</b>   | 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    |
| <b>Bellows (Item 15): 1.4571</b>                      |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Standard bellows</b>                               |                     | 400.0949.0000                  | 400.1049.0000 | 400.1149.0000 | 400.1249.0000 | 400.1349.0000 | 400.0849.0000 |               |
| <b>Conversion kit standard<sup>1)</sup></b>           |                     | 5021.1041                      | 5021.1042     | 5021.1043     | 5021.1044     | 5021.1045     | 5021.1047     |               |
| <b>Low pressure bellows</b>                           |                     | 400.0949.0021                  | 400.1049.0021 | 400.1149.0021 | 400.1249.0021 | 400.1349.0021 | 400.0849.0021 |               |
| <b>Conversion kit low pressure<sup>1)</sup></b>       |                     | please specify in writing      |               |               |               |               |               |               |
| <b>Gasket – Body / bonnet (Item 60)</b>               |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Gasket</b>   | 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 |               |
| <b>Ball (Item 61)</b>                                 |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Ball</b>   | 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 |               |
| <b>Split ring (Item 14)</b>                           |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Split ring</b>                                     | 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 |               |
| <b>Pin (Item 57)</b>                                  |                     | <b>Material-No. / Art.-No.</b> |               |               |               |               |               |               |
| <b>Pin</b>  | 1.4310              | 480.0505.0000                  | 480.0705.0000 | 480.0705.0000 | 480.0705.0000 | 480.1005.0000 | 480.1105.0000 |               |

<sup>1)</sup> 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 ANSI

## Available Options

For further information refer to "Accessories and Options", page 99/01

Type 441, 442 ANSI

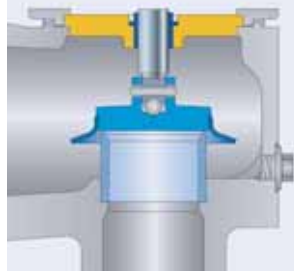
### Heating jacket

H29, H30: Couplings G 3/8, G 3/4  
H31, H32: Flanges DN 15, DN 25



### Drain hole

J18: G 1/4  
J19: G 1/2



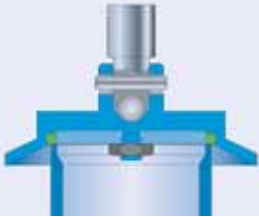
### Open bonnet

See Art.-No.



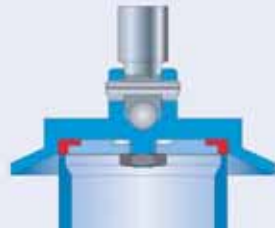
### O-ring-disc

J20: FFKM "C"  
J21: CR "K"  
J22: EPDM "D"  
J23: FKM "L"



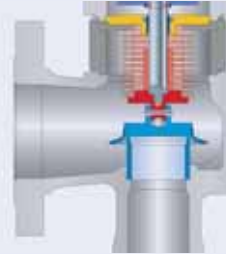
### Disc with inserted sealing plate

J44: PTFE-FDA  
J48: PCTFE  
J49: SP



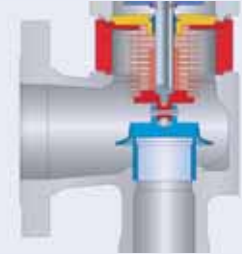
### Stainless steel bellows

J68: Open bonnet  
J78: Closed bonnet



### Conversion kit for stainless steel bellows

See Art.-No. page 02/15



### Screwed cap H2

H2



### Plain lever H3

H3



### Packed lever H4

H4



### Test gag

J69: H4  
J70: H2



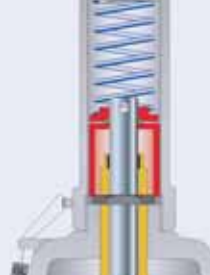
### Lift indicator

J39: Adaptor H4  
J93: Lift indicator



### O-ring-damper H2

J65



### O-ring-damper H4

J66





## Approvals

| Approvals   |  |  |
|---|--|--|
|   | Valve size                                   | 1" x 2" up to 4" x 6"  |
|   | Actual Orifice diameter $d_0$ [mm]           | 23 – 92  |
|   | Actual Orifice area $A_0$ [mm <sup>2</sup> ] | 416 – 6648   |
| <b>Europe</b>   |  | <b>Coefficient of discharge <math>K_{dr}</math></b>              |
| DIN EN ISO 4126-1   | Approval No.                                 | 072020111Z0008/0/08-2  |
|   | S/G  | 0,7  |
|   | L  | 0,45   |
| <b>Germany</b>  |  | <b>Coefficient of discharge <math>\alpha_w</math></b>            |
| AD 2000-Merkblatt A2  | Approval No.                                 | TÜV SV 576   |
|   | S/G  | 0,7  |
|   | L  | 0,45   |
| <b>United States</b>  |  | <b>Coefficient of discharge K</b>                                |
| ASME Sec. VIII  | Approval No.                                 | M37044   |
|   | S/G  | 0,699  |
|   | Approval No.                                 | M37055   |
|   | L  | 0,521  |
| <b>Canada</b>   |  | <b>Coefficient of discharge K</b>                                |
| Canada: CRN   | Approval No.                                 | OG1182.9C  |
|   | S/G  | 0,699  |
|   | L  | 0,521  |
| <b>China</b>  |  | <b>Coefficient of discharge <math>\alpha_w</math></b>            |
| CSBQTS  | Approval No.                                 |  |
|   | S/G  | 0,7  |
|   | L  | 0,45   |
| <b>Russia</b>   |  | <b>Coefficient of discharge <math>\alpha_w</math></b>            |
| GGTN/<br>GOSGOTECHNADZOR<br>GOST R  | Approval No.                                 | PPC 00-18458   |
|   | S/G  | 0,7  |
|   | L  | 0,45   |
| <b>Classification societies</b>   |  | <b>Homepage</b>  |
| Bureau Veritas  | BV   | <a href="http://www.bureauveritas.com">www.bureauveritas.com</a> |
| Det Norske Veritas  | DNV  | <a href="http://www.dnv.com">www.dnv.com</a>                     |
| Germanischer Lloyd  | GL   | <a href="http://www.gl-group.com">www.gl-group.com</a>           |
| Lloyd' s register EMEA  | LREMEA                                       | <a href="http://www.lr.org">www.lr.org</a>                       |
| Registro Italiano Navale  | RINA   | <a href="http://www.rina.org">www.rina.org</a>                   |
| <p>The valid certification number is changed with every renewal.</p> <p>A sample certificate including the valid certification number can be taken from the homepage of the classification societies.</p> |  |  |

## Capacities – Steam

Capacities for saturated steam according to AD 2000-Merkblatt A2, based on set pressure plus 10 % overpressure.  
Capacities at 1 bar (14,5 psig) and below are based on 0,1 bar (1,45 psig) overpressure.

| Metric Units  | AD 2000-Merkblatt A2 [kg/h] |          |           |         |         |         |
|---|-----------------------------|----------|-----------|---------|---------|---------|
| Valve size  | 1"x 2"                      | 1½" x 2" | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |
| Act. Orifice dia. d <sub>0</sub> [mm]                 | 23                          | 29       | 37        | 46      | 60      | 92      |
| Act. Orifice area A <sub>0</sub> [mm <sup>2</sup> ]   | 416                         | 661      | 1075      | 1662    | 2827    | 6648    |
| LEO <sub>S/G</sub> <sup>*)</sup> [inch <sup>2</sup> ] | 0,462                       | 0,734    | 1,195     | 1,847   | 3,142   | 7,387   |
| Set pressure [bar]                                    | Capacities [kg/h]           |          |           |         |         |         |
| 0,1   | 0                           | 0        | 0         | 0       | 0       | 0       |
| 0,2   | 140                         | 223      | 363       | 561     | 954     | 2243    |
| 0,5   | 224                         | 356      | 579       | 895     | 1523    | 3580    |
| 1   | 326                         | 518      | 843       | 1302    | 2215    | 5209    |
| 2   | 519                         | 825      | 1343      | 2075    | 3531    | 8302    |
| 3   | 699                         | 1111     | 1808      | 2794    | 4754    | 11178   |
| 4   | 871                         | 1385     | 2254      | 3485    | 5928    | 13938   |
| 5   | 1043                        | 1658     | 2699      | 4172    | 7097    | 16687   |
| 6   | 1214                        | 1930     | 3142      | 4856    | 8262    | 19426   |
| 7   | 1381                        | 2196     | 3574      | 5525    | 9399    | 22098   |
| 8   | 1551                        | 2466     | 4014      | 6205    | 10556   | 24818   |
| 9   | 1721                        | 2736     | 4454      | 6884    | 11712   | 27535   |
| 10  | 1891                        | 3006     | 4893      | 7562    | 12866   | 30250   |
| 12  | 2230                        | 3545     | 5770      | 8919    | 15174   | 35675   |
| 14  | 2562                        | 4073     | 6629      | 10247   | 17433   | 40987   |
| 16  | 2900                        | 4610     | 7505      | 11600   | 19735   | 46400   |
| 18  | 3239                        | 5149     | 8382      | 12955   | 22041   | 51820   |
| 20  | 3578                        | 5688     | 9260      | 14312   | 24350   | 57249   |
| 22  | 3907                        | 6212     | 10111     | 15629   | 26590   | 62515   |
| 24  | 4247                        | 6752     | 10991     | 16988   | 28903   | 67953   |
| 26  | 4588                        | 7294     | 11873     | 18351   | 31222   | 73405   |
| 28  | 4930                        | 7837     | 12757     | 19718   | 33547   | 78873   |
| 30  | 5272                        | 8382     | 13644     | 21089   | 35880   | 84358   |
| 32  | 5616                        | 8929     | 14534     | 22465   | 38220   | 89860   |
| 34  | 5945                        | 9451     | 15384     | 23779   | 40455   | 95115   |
| 36  | 6290                        | 10000    | 16278     | 25160   | 42806   |         |
| 38  | 6637                        | 10551    | 17175     | 26547   | 45165   |         |
| 40  | 6985                        | 11104    | 18076     | 27939   | 47533   |         |
| 42  | 7334                        | 11660    | 18980     | 29337   |         |         |
| 44  | 7685                        | 12218    | 19888     | 30740   |         |         |
| 46  | 8037                        | 12778    | 20800     | 32150   |         |         |
| 48  | 8391                        | 13341    |           | 33566   |         |         |
| 50  | 8747                        |          |           | 34988   |         |         |
| 51  | 8900                        |          |           | 35600   |         |         |

Capacities for saturated steam according to ASME Section VIII (UV), based on set pressure plus 10% overpressure.  
Capacities at 2,07 bar (30 psig) and below are based on 0,207 bar (3 psig) overpressure.

| US Units  | ASME Section VIII [lb/h] |          |           |         |         |         |
|---|--------------------------|----------|-----------|---------|---------|---------|
| Valve size  | 1"x 2"                   | 1½" x 2" | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |
| Act. Orifice dia. d <sub>0</sub> [inch]               | 0,91                     | 1,14     | 1,46      | 1,81    | 2,36    | 3,62    |
| Act. Orifice area A <sub>0</sub> [inch <sup>2</sup> ] | 0,644                    | 1,024    | 1,667     | 2,576   | 4,383   | 10,304  |
| LEO <sub>S/G</sub> <sup>*)</sup> [inch <sup>2</sup> ] | 0,462                    | 0,734    | 1,195     | 1,847   | 3,142   | 7,387   |
| Set pressure [psig]                                   | Capacities [lb/h]        |          |           |         |         |         |
| 15  | 757                      | 1204     | 1959      | 3028    | 5152    | 12113   |
| 20  | 873                      | 1388     | 2259      | 3492    | 5941    | 13968   |
| 30  | 1105                     | 1756     | 2859      | 4419    | 7519    | 17677   |
| 40  | 1360                     | 2162     | 3519      | 5439    | 9254    | 21757   |
| 50  | 1615                     | 2567     | 4179      | 6459    | 10989   | 25837   |
| 60  | 1870                     | 2973     | 4839      | 7479    | 12725   | 29917   |
| 70  | 2125                     | 3378     | 5499      | 8499    | 14460   | 33997   |
| 80  | 2380                     | 3783     | 6159      | 9519    | 16196   | 38078   |
| 90  | 2635                     | 4189     | 6819      | 10539   | 17931   | 42158   |
| 100   | 2890                     | 4594     | 7479      | 11559   | 19666   | 46238   |
| 120   | 3400                     | 5405     | 8799      | 13600   | 23137   | 54398   |
| 140   | 3910                     | 6216     | 10118     | 15640   | 26608   | 62558   |
| 160   | 4420                     | 7027     | 11438     | 17680   | 30079   | 70719   |
| 180   | 4930                     | 7838     | 12758     | 19720   | 33550   | 78879   |
| 200   | 5440                     | 8648     | 14078     | 21760   | 37020   | 87039   |
| 220   | 5950                     | 9459     | 15398     | 23800   | 40491   | 95200   |
| 240   | 6460                     | 10270    | 16718     | 25840   | 43962   | 103360  |
| 260   | 6970                     | 11081    | 18038     | 27880   | 47433   | 111520  |
| 280   | 7480                     | 11892    | 19358     | 29920   | 50904   | 119680  |
| 300   | 7990                     | 12703    | 20677     | 31960   | 54375   | 127841  |
| 320   | 8500                     | 13513    | 21997     | 34000   | 57845   | 136001  |
| 340   | 9010                     | 14324    | 23317     | 36040   | 61316   | 144161  |
| 360   | 9520                     | 15135    | 24637     | 38080   | 64787   | 152321  |
| 380   | 10030                    | 15946    | 25957     | 40120   | 68258   | 160482  |
| 400   | 10540                    | 16757    | 27277     | 42161   | 71729   | 168642  |
| 420   | 11050                    | 17567    | 28597     | 44201   | 75199   | 176802  |
| 440   | 11560                    | 18378    | 29917     | 46241   | 78670   | 184963  |
| 460   | 12070                    | 19189    | 31236     | 48281   | 82141   | 193123  |
| 480   | 12580                    | 20000    | 32556     | 50321   | 85612   | 201283  |
| 500   | 13090                    | 20811    | 33876     | 52361   | 89083   | 209443  |
| 550   | 14365                    | 22838    | 37176     | 57461   | 97760   |         |
| 600   | 15640                    | 24865    | 40476     | 62561   |         |         |
| 650   | 16915                    | 26892    | 43775     | 67661   |         |         |
| 700   | 18190                    | 28919    |           | 72762   |         |         |
| 740   | 19210                    |          |           | 76842   |         |         |

<sup>\*)</sup> LEO<sub>S/G</sub> = LESER Effective Orifice steam/gas please refer to page 00/11  
How to use capacity-sheets refer to page 00/09

## Capacities – Air

Capacities for air according to AD 2000-Merkblatt A2, based on set pressure plus 10 % overpressure at 0 °C and 1013 mbar. Capacities at 1 bar (14,5 psig) and below are based on 0,1 bar (1,45 psig) overpressure.

| Metric Units  |   | AD 2000-Merkblatt A2 [m <sub>n</sub> <sup>3</sup> /h] |           |         |         |         |  |
|---|---|---|-----------|---------|---------|---------|--|
| Valve size  | 1"x 2"                                      | 1½" x 2"  | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |  |
| Act. Orifice dia. d <sub>0</sub> [mm]                 | 23  | 29  | 37        | 46      | 60      | 92      |  |
| Act. Orifice area A <sub>0</sub> [mm <sup>2</sup> ]   | 416   | 661   | 1075      | 1662    | 2827    | 6648    |  |
| LEO <sub>S/G</sub> <sup>*)</sup> [inch <sup>2</sup> ] | 0,462                                       | 0,734   | 1,195     | 1,847   | 3,142   | 7,387   |  |
| Set pressure [bar]                                    | Capacities [m <sub>n</sub> <sup>3</sup> /h] |   |           |         |         |         |  |
| 0,1   | 0   | 0   | 0         | 0       | 0       | 0       |  |
| 0,2   | 162   | 258   | 420       | 649     | 1105    | 2597    |  |
| 0,5   | 263   | 418   | 680       | 1051    | 1789    | 4206    |  |
| 1   | 388   | 617   | 1004      | 1552    | 2641    | 6209    |  |
| 2   | 627   | 996   | 1622      | 2507    | 4265    | 10026   |  |
| 3   | 854   | 1357  | 2209      | 3414    | 5809    | 13657   |  |
| 4   | 1071  | 1703  | 2773      | 4286    | 7291    | 17143   |  |
| 5   | 1289  | 2050  | 3337      | 5157    | 8774    | 20629   |  |
| 6   | 1507  | 2396  | 3900      | 6029    | 10257   | 24114   |  |
| 7   | 1725  | 2742  | 4464      | 6900    | 11739   | 27600   |  |
| 8   | 1943  | 3089  | 5028      | 7771    | 13222   | 31086   |  |
| 9   | 2161  | 3435  | 5592      | 8643    | 14704   | 34571   |  |
| 10  | 2379  | 3781  | 6155      | 9514    | 16187   | 38057   |  |
| 12  | 2814  | 4474  | 7283      | 11257   | 19152   | 45028   |  |
| 14  | 3250  | 5167  | 8411      | 13000   | 22117   | 52000   |  |
| 16  | 3686  | 5859  | 9538      | 14743   | 25082   | 58971   |  |
| 18  | 4121  | 6552  | 10666     | 16486   | 28047   | 65942   |  |
| 20  | 4557  | 7245  | 11793     | 18228   | 31012   | 72913   |  |
| 22  | 4993  | 7938  | 12921     | 19971   | 33977   | 79885   |  |
| 24  | 5429  | 8630  | 14048     | 21714   | 36943   | 86856   |  |
| 26  | 5864  | 9323  | 15176     | 23457   | 39908   | 93827   |  |
| 28  | 6300  | 10016   | 16304     | 25200   | 42873   | 100799  |  |
| 30  | 6736  | 10708   | 17431     | 26942   | 45838   | 107770  |  |
| 32  | 7171  | 11401   | 18559     | 28685   | 48803   | 114741  |  |
| 34  | 7607  | 12094   | 19686     | 30428   | 51768   | 121713  |  |
| 36  | 8043  | 12786   | 20814     | 32171   | 54733   |         |  |
| 38  | 8478  | 13479   | 21941     | 33914   | 57698   |         |  |
| 40  | 8914  | 14172   | 23069     | 35657   | 60663   |         |  |
| 42  | 9350  | 14864   | 24197     | 37399   |         |         |  |
| 44  | 9786  | 15557   | 25324     | 39142   |         |         |  |
| 46  | 10221                                       | 16250   | 26452     | 40885   |         |         |  |
| 48  | 10657                                       | 16942   |           | 42628   |         |         |  |
| 50  | 11093                                       |   |           | 44371   |         |         |  |
| 51  | 11311                                       |   |           | 45242   |         |         |  |

Capacities for air according to ASME Section VIII (UV), based on set pressure plus 10 % overpressure at 16 °C (60 °F). Capacities at 2,07 bar (30 psig) and below are based on 0,207 bar (3 psig) overpressure.

| US Units  |                       | ASME Section VIII [S.C.F.M.] |           |         |         |         |  |
|---|-----------------------|------------------------------|-----------|---------|---------|---------|--|
| Valve size  | 1"x 2"                | 1½" x 2"                     | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |  |
| Act. Orifice dia. d <sub>0</sub> [inch]               | 0,91                  | 1,14                         | 1,46      | 1,81    | 2,36    | 3,62    |  |
| Act. Orifice area A <sub>0</sub> [inch <sup>2</sup> ] | 0,644                 | 1,024                        | 1,667     | 2,576   | 4,383   | 10,304  |  |
| LEO <sub>S/G</sub> <sup>*)</sup> [inch <sup>2</sup> ] | 0,462                 | 0,734                        | 1,195     | 1,847   | 3,142   | 7,387   |  |
| Set pressure [psig]                                   | Capacities [S.C.F.M.] |                              |           |         |         |         |  |
| 15  | 270                   | 429                          | 698       | 1079    | 1835    | 4315    |  |
| 20  | 311                   | 494                          | 805       | 1244    | 2116    | 4976    |  |
| 30  | 394                   | 626                          | 1019      | 1574    | 2679    | 6297    |  |
| 40  | 484                   | 770                          | 1254      | 1938    | 3297    | 7750    |  |
| 50  | 575                   | 915                          | 1489      | 2301    | 3915    | 9204    |  |
| 60  | 666                   | 1059                         | 1724      | 2664    | 4533    | 10657   |  |
| 70  | 757                   | 1204                         | 1959      | 3028    | 5152    | 12111   |  |
| 80  | 848                   | 1348                         | 2194      | 3391    | 5770    | 13564   |  |
| 90  | 939                   | 1492                         | 2430      | 3754    | 6388    | 15018   |  |
| 100   | 1029                  | 1637                         | 2665      | 4118    | 7006    | 16471   |  |
| 120   | 1211                  | 1926                         | 3135      | 4845    | 8243    | 19378   |  |
| 140   | 1393                  | 2215                         | 3605      | 5571    | 9479    | 22285   |  |
| 160   | 1574                  | 2504                         | 4076      | 6298    | 10716   | 25192   |  |
| 180   | 1756                  | 2792                         | 4546      | 7025    | 11952   | 28099   |  |
| 200   | 1938                  | 3081                         | 5016      | 7751    | 13189   | 31006   |  |
| 220   | 2120                  | 3370                         | 5486      | 8478    | 14425   | 33913   |  |
| 240   | 2301                  | 3659                         | 5957      | 9205    | 15662   | 36820   |  |
| 260   | 2483                  | 3948                         | 6427      | 9932    | 16898   | 39727   |  |
| 280   | 2665                  | 4237                         | 6897      | 10658   | 18135   | 42633   |  |
| 300   | 2846                  | 4526                         | 7368      | 11385   | 19371   | 45540   |  |
| 320   | 3028                  | 4815                         | 7838      | 12112   | 20608   | 48447   |  |
| 340   | 3210                  | 5104                         | 8308      | 12839   | 21844   | 51354   |  |
| 360   | 3391                  | 5392                         | 8778      | 13565   | 23081   | 54261   |  |
| 380   | 3573                  | 5681                         | 9249      | 14292   | 24317   | 57168   |  |
| 400   | 3755                  | 5970                         | 9719      | 15019   | 25554   | 60075   |  |
| 420   | 3936                  | 6259                         | 10189     | 15745   | 26791   | 62982   |  |
| 440   | 4118                  | 6548                         | 10660     | 16472   | 28027   | 65889   |  |
| 460   | 4300                  | 6837                         | 11130     | 17199   | 29264   | 68796   |  |
| 480   | 4481                  | 7126                         | 11600     | 17926   | 30500   | 71703   |  |
| 500   | 4663                  | 7415                         | 12070     | 18652   | 31737   | 74610   |  |
| 550   | 5117                  | 8137                         | 13246     | 20469   | 34828   |         |  |
| 600   | 5572                  | 8859                         | 14422     | 22286   |         |         |  |
| 650   | 6026                  | 9581                         | 15598     | 24103   |         |         |  |
| 700   | 6480                  | 10303                        |           | 25920   |         |         |  |
| 740   | 6843                  |                              |           | 27373   |         |         |  |

<sup>\*)</sup> LEO<sub>S/G</sub> = LESER Effective Orifice steam/gas please refer to page 00/11  
How to use capacity-sheets refer to page 00/09

Type 441, 442 ANSI

## Capacities – Water

Capacities for water according to AD 2000-Merkblatt A2, based on set pressure plus 10 % overpressure at 20 °C (68 °F). Capacities at 1 bar (14,5 psig) and below are based on 0,1 bar (1,45 psig) overpressure.

Capacities for water according to ASME Section VIII (UV), based on set pressure plus 10 % overpressure at 21 °C (70 °F). Capacities at 2,07 bar (30 psig) and below are based on 0,207 bar (3 psig) overpressure.

| Metric Units  | AD 2000-Merkblatt A2 [10 <sup>3</sup> kg/h] |          |           |         |         |         |
|---|---|----------|-----------|---------|---------|---------|
| Valve size  | 1"x 2"                                      | 1½" x 2" | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |
| Act. Orifice dia. d <sub>0</sub> [mm]               | 23  | 29       | 37        | 46      | 60      | 92      |
| Act. Orifice area A <sub>0</sub> [mm <sup>2</sup> ] | 416   | 661      | 1075      | 1662    | 2827    | 6648    |
| LEO <sub>L</sub> <sup>*)</sup> [inch <sup>2</sup> ] | 0,516                                       | 0,821    | 1,336     | 2,065   | 3,513   | 8,259   |
| Set pressure [bar]                                  | Capacities [10 <sup>3</sup> kg/h]           |          |           |         |         |         |
| 0,1   | 4,25  | 6,76     | 11,0      | 17,0    | 28,9    | 68,0    |
| 0,2   | 5,21  | 8,28     | 13,5      | 20,8    | 35,4    | 83,3    |
| 0,5   | 7,37  | 11,7     | 19,1      | 29,5    | 50,1    | 118     |
| 1   | 10,0  | 15,9     | 25,8      | 39,9    | 67,9    | 160     |
| 2   | 14,1  | 22,4     | 36,5      | 56,4    | 96,0    | 226     |
| 3   | 17,3  | 27,5     | 44,7      | 69,1    | 118     | 276     |
| 4   | 19,9  | 31,7     | 51,6      | 79,8    | 136     | 319     |
| 5   | 22,3  | 35,5     | 57,7      | 89,2    | 152     | 357     |
| 6   | 24,4  | 38,8     | 63,2      | 97,7    | 166     | 391     |
| 7   | 26,4  | 42,0     | 68,3      | 106     | 180     | 422     |
| 8   | 28,2  | 44,8     | 73,0      | 113     | 192     | 451     |
| 9   | 29,9  | 47,6     | 77,4      | 120     | 204     | 479     |
| 10  | 31,5  | 50,1     | 81,6      | 126     | 215     | 505     |
| 12  | 34,6  | 54,9     | 89,4      | 138     | 235     | 553     |
| 14  | 37,3  | 59,3     | 96,6      | 149     | 254     | 597     |
| 16  | 39,9  | 63,4     | 103       | 160     | 271     | 638     |
| 18  | 42,3  | 67,3     | 110       | 169     | 288     | 677     |
| 20  | 44,6  | 70,9     | 115       | 178     | 304     | 714     |
| 22  | 46,8  | 74,4     | 121       | 187     | 318     | 748     |
| 24  | 48,9  | 77,7     | 126       | 195     | 333     | 782     |
| 26  | 50,9  | 80,9     | 132       | 203     | 346     | 814     |
| 28  | 52,8  | 83,9     | 137       | 211     | 359     | 844     |
| 30  | 54,6  | 86,8     | 141       | 219     | 372     | 874     |
| 32  | 56,4  | 89,7     | 146       | 226     | 384     | 903     |
| 34  | 58,2  | 92,5     | 151       | 233     | 396     | 931     |
| 36  | 59,8  | 95,1     | 155       | 239     | 407     |         |
| 38  | 61,5  | 97,7     | 159       | 246     | 418     |         |
| 40  | 63,1  | 100      | 163       | 252     | 429     |         |
| 42  | 64,6  | 103      | 167       | 259     |         |         |
| 44  | 66,2  | 105      | 171       | 265     |         |         |
| 46  | 67,6  | 108      | 175       | 271     |         |         |
| 48  | 69,1  | 110      |           | 276     |         |         |
| 50  | 70,5  |          |           | 282     |         |         |
| 51  | 71,2  |          |           | 285     |         |         |

| US Units  | ASME Section VIII [US-G.P.M.] |          |           |         |         |         |
|---|-------------------------------|----------|-----------|---------|---------|---------|
| Valve size  | 1"x 2"                        | 1½" x 2" | 1½" x 2½" | 2" x 3" | 3" x 4" | 4" x 6" |
| Act. Orifice dia. d <sub>0</sub> [inch]               | 0,91                          | 1,14     | 1,46      | 1,81    | 2,36    | 3,62    |
| Act. Orifice area A <sub>0</sub> [inch <sup>2</sup> ] | 0,644                         | 1,024    | 1,667     | 2,576   | 4,383   | 10,304  |
| LEO <sub>L</sub> <sup>*)</sup> [inch <sup>2</sup> ]   | 0,516                         | 0,821    | 1,336     | 2,065   | 3,513   | 8,259   |
| Set pressure [psig]                                   | Capacities [US-G.P.M.]        |          |           |         |         |         |
| 15  | 54,0                          | 85,9     | 140       | 216     | 368     | 864     |
| 20  | 61,1                          | 97,1     | 158       | 244     | 416     | 977     |
| 30  | 73,1                          | 116      | 189       | 293     | 498     | 1170    |
| 40  | 84,5                          | 134      | 219       | 338     | 575     | 1351    |
| 50  | 94,4                          | 150      | 244       | 378     | 643     | 1511    |
| 60  | 103                           | 164      | 268       | 414     | 704     | 1655    |
| 70  | 112                           | 178      | 289       | 447     | 760     | 1787    |
| 80  | 119                           | 190      | 309       | 478     | 813     | 1911    |
| 90  | 127                           | 201      | 328       | 507     | 862     | 2027    |
| 100   | 134                           | 212      | 346       | 534     | 909     | 2136    |
| 120   | 146                           | 233      | 379       | 585     | 996     | 2340    |
| 140   | 158                           | 251      | 409       | 632     | 1075    | 2528    |
| 160   | 169                           | 269      | 437       | 676     | 1150    | 2702    |
| 180   | 179                           | 285      | 464       | 717     | 1219    | 2866    |
| 200   | 189                           | 300      | 489       | 755     | 1285    | 3021    |
| 220   | 198                           | 315      | 513       | 792     | 1348    | 3169    |
| 240   | 207                           | 329      | 535       | 827     | 1408    | 3310    |
| 260   | 215                           | 342      | 557       | 861     | 1465    | 3445    |
| 280   | 223                           | 355      | 578       | 894     | 1521    | 3575    |
| 300   | 231                           | 368      | 599       | 925     | 1574    | 3700    |
| 320   | 239                           | 380      | 618       | 955     | 1626    | 3822    |
| 340   | 246                           | 391      | 637       | 985     | 1676    | 3939    |
| 360   | 253                           | 403      | 656       | 1013    | 1724    | 4054    |
| 380   | 260                           | 414      | 674       | 1041    | 1772    | 4165    |
| 400   | 267                           | 425      | 691       | 1068    | 1818    | 4273    |
| 420   | 274                           | 435      | 708       | 1095    | 1862    | 4378    |
| 440   | 280                           | 445      | 725       | 1120    | 1906    | 4481    |
| 460   | 286                           | 455      | 741       | 1146    | 1949    | 4582    |
| 480   | 293                           | 465      | 757       | 1170    | 1991    | 4681    |
| 500   | 299                           | 475      | 773       | 1194    | 2032    | 4777    |
| 550   | 313                           | 498      | 811       | 1253    | 2131    |         |
| 600   | 327                           | 520      | 847       | 1308    |         |         |
| 650   | 340                           | 541      | 881       | 1362    |         |         |
| 700   | 353                           | 562      |           | 1413    |         |         |
| 740   | 363                           |          |           | 1453    |         |         |

<sup>\*)</sup> LEO<sub>L</sub> = LESER Effective Orifice liquids please refer to page 00/12  
How to use capacity-sheets please refer to page 00/09

## Determination of coefficient of discharge in case of lift restriction or back pressure

- $h$  = Lift [mm]
- $d_0$  = Flow diameter [mm] of selected safety valve, refer to table article numbers
- $h/d_0$  = Ratio of lift / flow diameter
- $p_{a0}$  = Back pressure [bar<sub>a</sub>]
- $p_0$  = Set pressure [bar<sub>a</sub>]
- $p_{a0}/p_0$  = Ratio of back pressure / set pressure
- $K_{dr}$  = Coefficient of discharge acc. to DIN EN ISO 4126-1
- $\alpha_w$  = Coefficient of discharge acc. to AD 2000-Merkblatt A2
- $K_b$  = Back pressure correction factor acc. to API 520 topic 3.3

Diagram for evaluation of ratio of lift / flow diameter ( $h/d_0$ ) in reference to the coefficient of discharge ( $K_{dr}/\alpha_w$ )

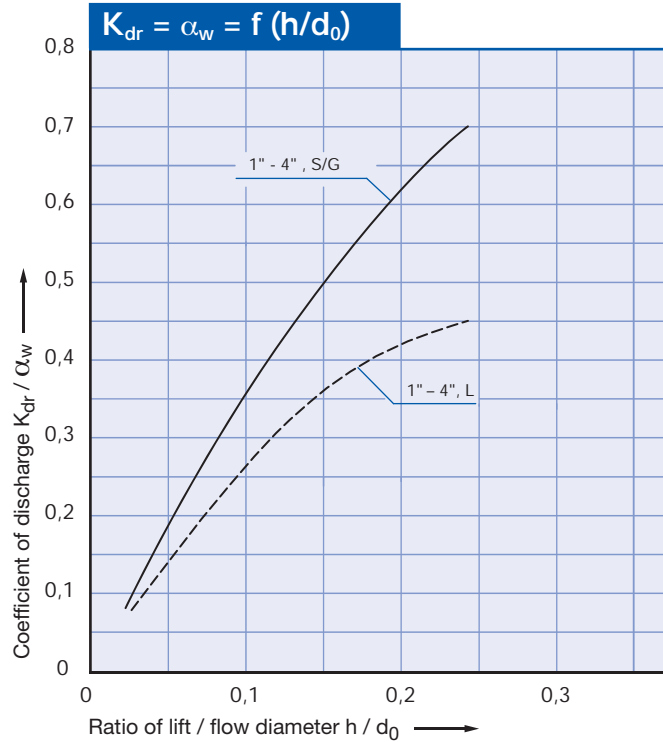


Diagram for evaluation of coefficient of discharge ( $K_{dr}/\alpha_w$ ) or  $K_b$  in reference to the ratio of back pressure / set pressure ( $p_{a0}/p_0$ )

