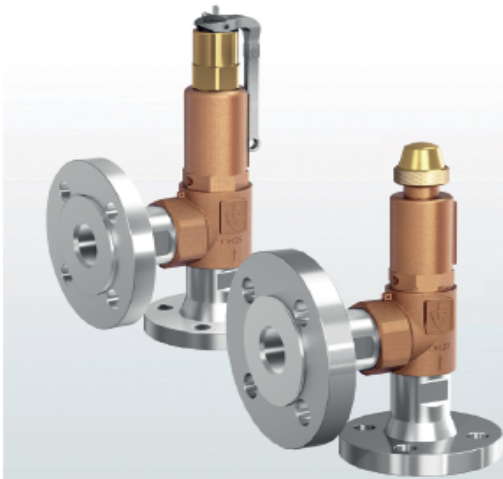


## → Series 851 FL

**851**

Safety valves made of  
gunmetal, angle-type  
with flange connections



### ■ SUITABLE FOR

|                        |                         |                                                                                     |
|------------------------|-------------------------|-------------------------------------------------------------------------------------|
| Liquids                | neutral and non-neutral |  |
| Air, gases and vapours | neutral and non-neutral |  |
| Steam                  |                         |  |

### ■ EXAMPLES OF USE

For the protection of:

- Pressure-vessels/-systems for neutral / non-neutral vapours, gases and liquids
- Steam boilers and steam plants
- Stationary silos and bulk transport vehicles for liquid, granular and powdery goods

taking into account the plant-specific regulations and making use of the suitable valve versions and sealing materials.

- Mechanical engineering
- pump protection
- Apparatus construction and medical technology ( sterilizers, autoclaves )
- shipbuilding and -repair
- Pressure booster systems water- / air-side
- Steam- and industrial-boiler systems

**Safety valves are set and sealed at the factory.**

### ■ APPROVALS

|                                 |                                      |
|---------------------------------|--------------------------------------|
| TÜV-Type test approval 666, 684 | D/G, F, F/K/S <sup>1</sup>           |
| EU type examination             | S/G, L, F/K/S <sup>1</sup>           |
| ASME                            | S, G, L                              |
| CRN                             | G                                    |
| TSG ZF001-2006                  | D/G (S/G), F (L), F/K/S <sup>1</sup> |
| KGS                             | G                                    |
| TR ZU 032/2013 - TR ZU 010/2011 | D/G (S/G), F (L), F/K/S <sup>1</sup> |

#### Requirements

AD 2000 Data sheet A2  
TRD 421  
TRB 801 No. 22 and No. 23<sup>1</sup>  
DIN EN ISO 4126-1

PED 2014/68/EU  
ASME-Code Sec. XIII  
KGS AA 319

#### Classification society

DNV  
Lloyd's Register EMEA  
American Bureau of Shipping  
Bureau Veritas  
Russian Maritime Register of Shipping

DNV  
LR EMEA  
ABS  
BV  
RS

CE 0035 TS EAC   CRN

### ■ MATERIAL



### ■ SPECIFICATION



DN15 - DN50



- 60°C to + 225°C  
depending on version



0,5 - 50 bar

### ■ MATERIALS

| Component          | Material        | DIN EN | ASME   |
|--------------------|-----------------|--------|--------|
| Inlet body         | Stainless steel | 1.4404 | 316 L  |
| Body               | Gunmetal        | CC499K | CC499K |
| Outlet body        | Stainless steel | 1.4404 | 316 L  |
| Internal parts     | Brass           | CW617N | CW617N |
| Spring             | Stainless steel | 1.4310 | 302    |
| Bellows (optional) | Bronze          | CW452K | C51900 |

<sup>1</sup>only for versions with bellows

## Series 851 FL ■ VALVE VERSION

|           |                                                      |                                                                                                                                                                                                                                                      |
|-----------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>s</b>  | Standard, non-gastight version of the spring housing | for neutral media without counter pressure.                                                                                                                                                                                                          |
| <b>b</b>  | with bellows                                         | for neutral and non-neutral media and/or counter pressure up to 4 bar. Spring, moving parts and the environment are protected from being affected by the medium.                                                                                     |
| <b>t</b>  | gastight version of spring housing                   | for neutral and non-neutral media without counter pressure. The environment is protected from being affected by the medium. Only available without lifting device. This version is not available for inlet / outlet 15/15 and 20/20!                 |
| <b>tb</b> | gastight version with bellows                        | for neutral and non-neutral an particularly for flammable, toxic and environmentally hazardous media and/or counter pressure up to 4 bar. Spring, moving parts and the environment are protected from being affected by the medium. Double gastight. |

## ■ MEDIUM

|           |                    |                                                                                                                                         |
|-----------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>G</b>  | gaseous            | Air, vapours, gases and - depending on safety valve version and seal - also for steam                                                   |
| <b>F</b>  | liquid             | The temperature of the medium under atmospheric pressure must not reach boiling point                                                   |
| <b>GF</b> | gaseous and liquid | Air, vapours, gases, liquids and - depending on safety valve version and seal - also for steam - Not in combination with ASME Approval- |

## ■ TYPE OF LIFTING MECHANISM

|          |                                                        |
|----------|--------------------------------------------------------|
| <b>K</b> | Standard with twist-type lifting mechanism             |
| <b>L</b> | Lifting lever                                          |
| <b>O</b> | without lifting device, standard for gastight versions |

## ■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

| Nominal diameter DN | 15        |           |         | 20        |         |             | 25      |             |             | 32          |             |         |
|---------------------|-----------|-----------|---------|-----------|---------|-------------|---------|-------------|-------------|-------------|-------------|---------|
| Inlet DN (NPS)      | 15 (1/2") | 20 (3/4") | 25 (1") | 20 (3/4") | 25 (1") | 32 (1 1/4") | 25 (1") | 32 (1 1/4") | 40 (1 1/2") | 32 (1 1/4") | 40 (1 1/2") | 50 (2") |
| 15 (1/2")           | ■         |           |         |           |         |             |         |             |             |             |             |         |
| 20 (3/4")           | ■         | ■         |         | ■*        |         |             |         |             |             |             |             |         |
| 25 (1")             | ■         | ■         | ■       | ■*        | ■*      |             |         |             |             |             |             |         |
| 32 (1 1/4")         |           |           |         | ■         | ■       | ■           |         |             |             |             |             |         |
| 40 (1 1/2")         |           |           |         |           |         |             | ■       | ■           | ■           |             |             |         |
| 50 (2")             |           |           |         |           |         |             |         |             |             | ■           | ■           | ■       |

\*20/20, 20/25 and 25/25 from 200 bar upwards only available as „b“ or „tb“ version.

## ■ TYPE OF CONNECTION INLET / OUTLET FLANGE CONNECTIONS

|                      |                                                                                                                                       |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>FLDxA / FLDxA</b> | Flange connection according to DIN EN 1092-1 sealing strip form B / Flange connection according to DIN EN 1092-1 sealing strip form B |
| <b>FLDxB / FLDxB</b> | Flange connection according to DIN EN 1092-1 sealing strip form D / Flange connection according to DIN EN 1092-1 sealing strip form D |
| <b>FLAxA / FLAxA</b> | Flange connection according to ASME B16.5 / Flange connection according to ASME B16.5                                                 |

FL = Flange connection

D = DIN-Version | A = ASME-Version

x = Pressure rating | für DIN: 4 = PN40, 5 = PN63, 6 = PN100 | für ASME: 1 = Class150, 2 = Class300, 3 = Class400, 4 = Class600

A = Flange sealing surface without sealing groove | B = Flange sealing surface with sealing groove | Other versions of the sealing strip on request

## ■ SEALS

|                   |                                  |                                                            |                 |
|-------------------|----------------------------------|------------------------------------------------------------|-----------------|
| <b>NBR</b>        | Nitrile rubber                   | Elastomere moulded seal with metallic support up to 25 bar | -30°C to +130°C |
| <b>EPDM</b>       | Ethylene propylene diene         | Elastomere moulded seal with metallic support up to 25 bar | -40°C to +170°C |
| <b>FKM</b>        | Fluorocarbon                     | Elastomere moulded seal with metallic support up to 25 bar | -20°C to +200°C |
| <b>PTFE</b>       | Polytetrafluoroethylene          | Flat seal up to 25 bar                                     | -60°C to +225°C |
| <b>PTFE+Kohle</b> | Polytetrafluoroethylene + carbon | Flat seal from 25 bar                                      | -60°C to +225°C |
| <b>FFKM</b>       | Perfluorinated rubber            | Elastomere moulded seal with metallic support up to 25 bar | -10°C to +260°C |
| <b>MD</b>         | Metal-to-metal sealing           | Flat seal                                                  | -60°C to +400°C |

■ **NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS**

Series 851 FL: Connection, installation dimensions, ranges of adjustment

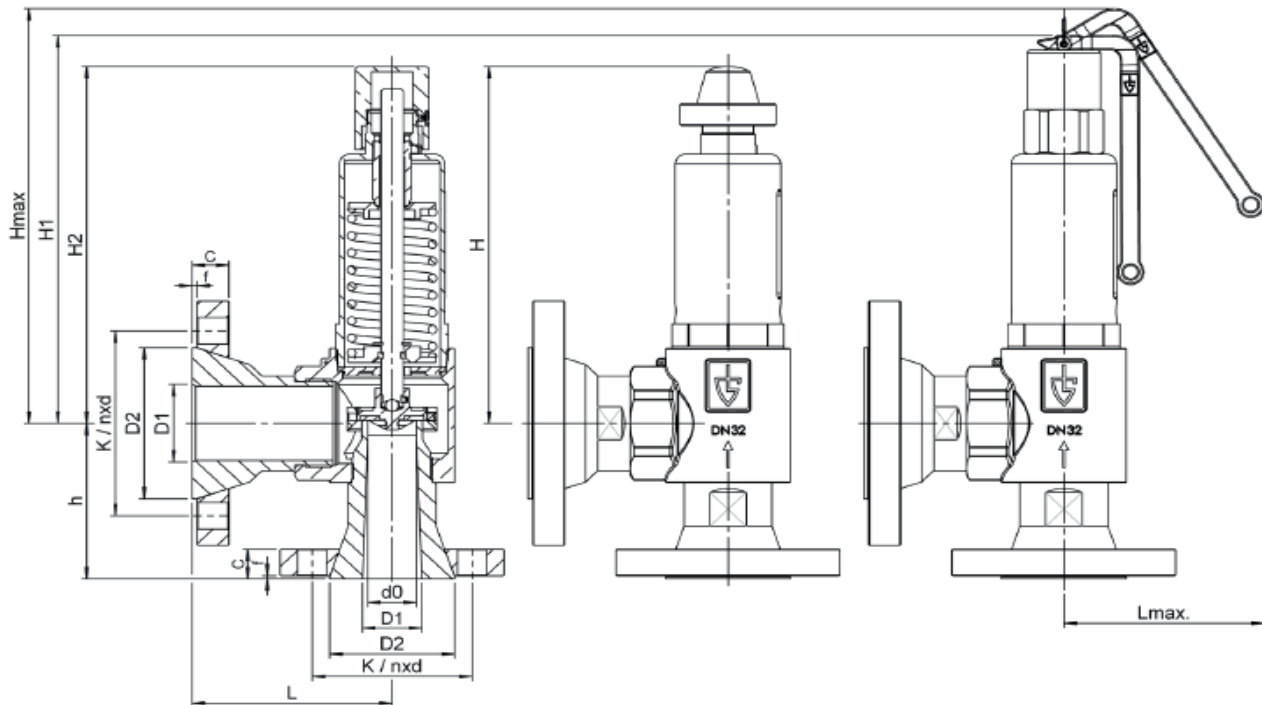
| Nominal diameter              |                            |        | DN (NPS) |                    | 15 (1/2") |      |         |      | 20 (3/4")            |       |          |     | 25 (1") |      |          | 32 (1 1/4") |        |             |     |
|-------------------------------|----------------------------|--------|----------|--------------------|-----------|------|---------|------|----------------------|-------|----------|-----|---------|------|----------|-------------|--------|-------------|-----|
| Connection Inlet              |                            |        | DN1      | 15                 | 20        | 15   | 20      | 25   | 20                   | 25    | 20       | 25  | 32      | 25   | 32       | 40          | 32     | 40          | 50  |
|                               |                            |        | NPS1     | 1/2"               | 3/4"      | 1/2" | 3/4"    | 1"   | 3/4"                 | 1"    | 3/4"     | 1"  | 1 1/4"  | 1"   | 1 1/4"   | 1 1/2"      | 1 1/4" | 1 1/2"      | 2"  |
|                               |                            |        | h        | 90                 | 95        | 90   | 95      | 100  | 95                   | 100   | 95       | 100 | 105     | 100  | 105      | 115         | 105    | 115         | 125 |
| Connection Outlet<br>DN (NPS) | 15                         | 1/2"   | L        | 90                 |           |      |         |      |                      |       |          |     |         |      |          |             |        |             |     |
|                               | 20                         | 3/4"   |          | 95                 | 95        |      |         |      | 95                   |       |          |     |         |      |          |             |        |             |     |
|                               | 25                         | 1"     |          | 100                |           |      | 100     | 100  | 100                  | 100   |          |     |         |      |          |             |        |             |     |
|                               | 32                         | 1 1/4" |          |                    |           |      |         |      |                      | 105   | 105      | 105 |         |      |          |             |        |             |     |
|                               | 40                         | 1 1/2" |          |                    |           |      |         |      |                      |       |          |     | 115     | 115  | 115      |             |        |             |     |
| 50                            |                            |        | 2"       |                    |           |      |         |      |                      |       |          |     |         |      |          | 125         | 125    | 125         |     |
|                               |                            |        | Lmax     | 85                 | 85        |      |         | 85   | 91                   | 91    |          |     | 92      |      |          | 92          |        |             |     |
|                               |                            |        | H        | 79                 | 77        |      |         | 131  | 137                  | 138   |          |     | 178     |      |          | 241         |        |             |     |
|                               |                            |        | H1       | 93                 | 91        |      |         | 149  | 154                  | 158   |          |     | 192     |      |          | 264         |        |             |     |
|                               |                            |        | H2       | 79                 | 77        |      |         | 131  | 138                  | 139   |          |     | 175     |      |          | 241         |        |             |     |
|                               |                            |        | Hmax     | 105                | 103       |      |         | 184  | 189                  | 173   |          |     | 207     |      |          | 277         |        |             |     |
|                               |                            |        | d0       | 15,8               | 15,8      |      |         | 15,8 | 15,8                 | 18    |          |     | 23      |      |          | 30,3        |        |             |     |
| Coefficients of flow          | αw /Kdr (F)                |        | 0,24     | 0,3 <sup>2</sup>   |           |      | 0,38    |      |                      | 0,54  |          |     | 0,54    |      |          | 0,54        |        |             |     |
| ISO 4126-1                    | αw /Kdr (D/G) <sup>1</sup> |        | 0,33     | 0,33               |           |      | 0,52    |      |                      | 0,6   |          |     | 0,58    |      |          | 0,58        |        |             |     |
| Coefficients of flow ASME     | αw /Kdr (F)                |        | -/-      | 2,47 <sup>3</sup>  |           |      | -/-     |      |                      | 0,492 |          |     | 0,492   |      |          | 0,492       |        |             |     |
| Code Sec. VIII Div. 1         | αw /Kdr (D/G)              |        | -/-      | 3,046 <sup>3</sup> |           |      | -/-     |      |                      | 0,859 |          |     | 0,859   |      |          | 0,859       |        |             |     |
| Weight                        | PN40                       |        | 2,8      | 2,9                | 3,3       | 3,6  | 3,8     | 3,9  | 4,1                  | 4,8   | 5,0      | 5,6 | 6,4     | 7,1  | 7,7      | 10,3        | 10,7   | 11,3        |     |
|                               | PN63 / PN100               |        | 4,2      | 5,0                | 5,2       | 6,0  | 6,5     | 6,3  | 6,8                  | 7,2   | 7,7      | 8,4 | 9,4     | 10,2 | 11,1     | 13,1        | 13,8   | 14,1 / 16,5 |     |
|                               | Class150                   |        | 1,9      | 2,1                | 2,6       | 2,8  | 3,0     | 3,1  | 3,3                  | 3,5   | 3,6      | 3,7 | 4,9     | 5,1  | 5,5      | 8,4         | 8,5    | 9,1         |     |
|                               | Class300                   |        | 2,5      | 2,9                | 3,3       | 3,7  | 3,9     | 4,0  | 4,2                  | 4,4   | 4,7      | 4,9 | 6,5     | 6,8  | 7,7      | 9,9         | 10,6   | 10,9        |     |
|                               | Class600                   |        | 2,7      | 3,1                | 3,5       | 3,9  | 4,1     | 4,2  | 4,5                  | 4,8   | 5,1      | 5,4 | 7,0     | 7,4  | 8,4      | 10,4        | 11,2   | 11,5        |     |
| Range of adjustment           | bar                        |        | 0,5-25   |                    | 0,5-25    |      | 25,1-50 |      | 0,5 <sup>2</sup> -50 |       | 0,5-50   |     | 0,5-50  |      | 0,5 - 50 |             |        |             |     |
| Range of adjustment ASME      | psi                        |        | -        |                    | 15-363    |      | 363-725 |      | -                    |       | 15 - 725 |     | 15-725  |      | 15-725   |             | 15-725 |             |     |

<sup>1)</sup> Flow coefficients for blow-off pressures > 3,6 bar

<sup>2)</sup> Flow coefficients with bellows is 0,24.

<sup>3)</sup> Rated slope value for D/G in scfm/psia; for F in gpm/root(psid) psid = differential pressure before and after the valve.

■ **MAIN DIMENSIONS, INSTALLATION DIMENSIONS**



■ SERIES 851 FL: FLANGE DIMENSIONS ACCORDING TO DIN EN 1092-1

| Connection nominal diameter | DN      | 15          |             |     | 20          |             |     | 25          |              |     | 32           |              |     | 40           |              |     | 50           |              |              |
|-----------------------------|---------|-------------|-------------|-----|-------------|-------------|-----|-------------|--------------|-----|--------------|--------------|-----|--------------|--------------|-----|--------------|--------------|--------------|
| Pressure rating             | PN      | 40          | 63          | 100 | 40          | 63          | 100 | 40          | 63           | 100 | 40           | 63           | 100 | 40           | 63           | 100 | 40           | 63           | 100          |
| Dimensions in mm            | D1      | 17,3        |             |     | 22,3        |             |     | 28,5        |              |     | 37,2         |              |     | 43,1         |              |     | 54,5         |              |              |
|                             | D2      | 45          |             |     | 58          |             |     | 68          |              |     | 78           |              |     | 88           |              |     | 102          |              |              |
|                             | K / nxd | 65 / 4 x 14 | 75 / 4 x 14 |     | 75 / 4 x 14 | 90 / 4 x 18 |     | 85 / 4 x 14 | 100 / 4 x 18 |     | 100 / 4 x 18 | 110 / 4 x 22 |     | 110 / 4 x 18 | 125 / 4 x 22 |     | 125 / 4 x 18 | 135 / 4 x 22 | 145 / 4 x 26 |
|                             | f       | 2           |             |     | 2           |             |     | 2           |              |     | 2            |              |     | 3            |              |     | 3            |              |              |
|                             | C       | 16          | 22          | 22  | 18          | 24          | 24  | 18          | 26           | 26  | 20           | 26           | 26  | 21           | 29           | 29  | 23           | 29           | 31           |

■ SERIES 851 FL: PRESSURE-TEMPERATUR RATING ACCORDING TO DIN EN 1092-1

| Temperature |       | -60°C – 20°C |  |  | 100°C |  |  | 150°C |  |  | 200°C |  |  | 250°C |  |  |
|-------------|-------|--------------|--|--|-------|--|--|-------|--|--|-------|--|--|-------|--|--|
| PN40        | [bar] | 40           |  |  | 37,9  |  |  | 34,4  |  |  | 31,8  |  |  | 29,9  |  |  |
| PN63        | [bar] | 63           |  |  | 59,7  |  |  | 54,3  |  |  | 50,1  |  |  | 47,1  |  |  |
| PN100       | [bar] | 100          |  |  | 94,7  |  |  | 86,1  |  |  | 79,5  |  |  | 74,7  |  |  |

■ SERIES 851 FL: FLANGE DIMENSIONS ACCORDING TO ASME B16.5

| Connection nominal diameter | NPS     | 1/2"            |                 |           | 3/4"            |                 |           | 1"              |                 |           | 1 1/4"          |                 |           | 1 1/2"          |                  |           | 2"               |                |           |
|-----------------------------|---------|-----------------|-----------------|-----------|-----------------|-----------------|-----------|-----------------|-----------------|-----------|-----------------|-----------------|-----------|-----------------|------------------|-----------|------------------|----------------|-----------|
| Pressure rating             | Class   | 150             | 300             | 400 / 600 | 150             | 300             | 400 / 600 | 150             | 300             | 400 / 600 | 150             | 300             | 400 / 600 | 150             | 300              | 400 / 600 | 150              | 300            | 400 / 600 |
| Dimensions in mm            | D1      | 15,8            |                 |           | 20,9            |                 |           | 26,6            |                 |           | 35,1            |                 |           | 40,9            |                  |           | 52,5             |                |           |
|                             | D2      | 34,9            |                 |           | 42,9            |                 |           | 50,8            |                 |           | 63,5            |                 |           | 73              |                  |           | 92,1             |                |           |
|                             | K / nxd | 60,3 / 4 x 15,9 | 66,7 / 4 x 15,9 |           | 66,9 / 4 x 15,9 | 82,6 / 4 x 19,1 |           | 79,4 / 4 x 15,9 | 88,9 / 4 x 19,1 |           | 88,9 / 4 x 15,9 | 98,4 / 4 x 19,1 |           | 98,4 / 4 x 15,9 | 114,3 / 4 x 22,2 |           | 120,7 / 4 x 19,1 | 127 / 8 x 19,1 |           |
|                             | f       | 2               |                 |           | 2               |                 |           | 2               |                 |           | 2               |                 |           | 2               |                  |           | 2                |                |           |
|                             | C       | 11,6            | 14,7            | 16,3      | 13,2            | 16,3            | 17,9      | 14,7            | 17,9            | 19,5      | 16,3            | 19,5            | 22,7      | 17,9            | 21,1             | 24,3      | 19,5             | 22,7           | 27,4      |

■ SERIES 851 FL: PRESSURE-TEMPERATUR RATING ACCORDING TO ASME B16.5

| Temperature |       | -60°C – 38°C |  |  | 50°C |  |  | 100°C |  |  | 150°C |  |  | 200°C |  |  | 250°C |  |  |
|-------------|-------|--------------|--|--|------|--|--|-------|--|--|-------|--|--|-------|--|--|-------|--|--|
| Class 150   | [bar] | 15,9         |  |  | 15,3 |  |  | 13,3  |  |  | 12    |  |  | 11,2  |  |  | 10,5  |  |  |
| Class 300   | [bar] | 41,4         |  |  | 40   |  |  | 34,8  |  |  | 31,4  |  |  | 29,2  |  |  | 27,5  |  |  |
| Class 400   | [bar] | 55,2         |  |  | 53,4 |  |  | 46,4  |  |  | 41,9  |  |  | 38,9  |  |  | 36,6  |  |  |
| Class 600   | [bar] | 82,7         |  |  | 80   |  |  | 69,6  |  |  | 62,8  |  |  | 58,3  |  |  | 54,9  |  |  |

**Series 851 FL ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION**

| Series | Valve version | Medium   | Lifting device | Nominal diameter DN | Connection type |              | Connection size |           | Seal        | Set pressure |
|--------|---------------|----------|----------------|---------------------|-----------------|--------------|-----------------|-----------|-------------|--------------|
|        |               |          |                |                     | Inlet           | Outlet       | Inlet           | Outlet    |             |              |
| 851    | <i>b</i>      | <i>F</i> | <i>L</i>       | <i>15</i>           | <i>FLD4A</i>    | <i>FLD4A</i> | <i>15</i>       | <i>20</i> | <i>EPDM</i> | <i>15</i>    |
| 851    | <i>s</i>      | <i>G</i> | <i>L</i>       | <i>25</i>           | <i>FLA2A</i>    | <i>FLA2A</i> | <i>25</i>       | <i>40</i> | <i>PTFE</i> | <i>21</i>    |
| 851    |               |          |                |                     |                 |              |                 |           |             |              |
| 851    |               |          |                |                     |                 |              |                 |           |             |              |

**■ TECHNICAL FINISHES, VARIANTS, ACCESSORIES**

|            |                                                                                                      |                          |
|------------|------------------------------------------------------------------------------------------------------|--------------------------|
| <b>S18</b> | Inlet area in hygienic finish by means of a flat seal (despite of an o-ring fixed by a nut)          | <input type="checkbox"/> |
| <b>S60</b> | Pressure sensor connection M5 or G1/4 for monitoring the springhousing (only for valves with bellow) | <input type="checkbox"/> |
| <b>S62</b> | Inductive proximity sensor, fitted, for indication of valve position, including connection cable 5m  | <input type="checkbox"/> |

**■ PROPERTIES**

|            |                                                                                                                              |                          |                          |
|------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| <b>G0X</b> | Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>P01</b> | Oil- and grease-free production                                                                                              | <input type="checkbox"/> | <input type="checkbox"/> |
|            |                                                                                                                              | <input type="checkbox"/> | <input type="checkbox"/> |

**■ CERTIFICATES / APPROVALS**

|            |                                                                                                                            |                          |            |                                                                                                                                   |                          |
|------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>C01</b> | Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)                                                                        | <input type="checkbox"/> | <b>C06</b> | ATEX evaluation acc. to 2014/34/EU                                                                                                | <input type="checkbox"/> |
| <b>C02</b> | Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)                                                                           | <input type="checkbox"/> | <b>C07</b> | SIL evaluation relating to IEC 61508-2                                                                                            | <input type="checkbox"/> |
| <b>C03</b> | Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)                                        | <input type="checkbox"/> | <b>C09</b> | Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204 | <input type="checkbox"/> |
| <b>C04</b> | TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)                                                          | <input type="checkbox"/> | <b>C10</b> | Certificate of oil- and grease free production                                                                                    | <input type="checkbox"/> |
| <b>C05</b> | Sealing material<br>Manufacturer certification (FDA, USP 3, 3-A,...),<br>Please indicate description of certificate: ..... | <input type="checkbox"/> | <b>C11</b> | Certification of the production process especially for gaseous oxygen applications by employment of specific materials            | <input type="checkbox"/> |

**■ ADMISSIONS / ACCREDITATIONS**

|            |                                                                                           |                          |            |                                                                                  |                          |
|------------|-------------------------------------------------------------------------------------------|--------------------------|------------|----------------------------------------------------------------------------------|--------------------------|
| <b>AA1</b> | EC Type examination acc. to Directive 2014/68/EU                                          | <input type="checkbox"/> | <b>AK1</b> | Det Norske Veritas (DNV) type approval                                           | <input type="checkbox"/> |
| <b>AA2</b> | TÜV component test acc. to VdTÜV specification sheet SV 100                               | <input type="checkbox"/> | <b>AK2</b> | Lloyd's Register (LR) type approval                                              | <input type="checkbox"/> |
| <b>AA3</b> | Certification acc. to ASME Boiler and Pressure Vessel Code, Sec. XIII (ASME) <sup>1</sup> | <input type="checkbox"/> | <b>AK3</b> | American Bureau of Shipping (ABS) type approval                                  | <input type="checkbox"/> |
| <b>AA4</b> | EAC - certificate/declaration with passport for the valve and laser marking of the valve  | <input type="checkbox"/> | <b>AK4</b> | Bureau Veritas (BV) type approval                                                | <input type="checkbox"/> |
| <b>AA5</b> | Manufacture License of Special Equipment People's Republic of China (ML)                  | <input type="checkbox"/> | <b>AK5</b> | Russian Maritime Register of Shipping (RMRS) type approval                       | <input type="checkbox"/> |
| <b>AA6</b> | Certification acc. to Korean Gas Safety Corporation (KGS) <sup>2,3</sup>                  | <input type="checkbox"/> | <b>AK6</b> | Registro Italiano Navale (RINA) type approval                                    | <input type="checkbox"/> |
| <b>AA7</b> | Registration according to Canadian Registration Number (CRN) <sup>4</sup>                 | <input type="checkbox"/> | <b>AL</b>  | Individual inspection by notified body inspector – (body to be indicated): ..... | <input type="checkbox"/> |

<sup>1</sup>ASME not for gases in combination with liquids | <sup>2</sup>KGS only for gases | <sup>3</sup>KGS from 10 bar and only in combination with ASME | <sup>4</sup>CRN only in combination with ASME

■ CAPACITY TABLE ACC. TO ISO 4126-1 / AD2000 A2

| Series 851 FL: Blowing-off rates at 10% above set pressure |     |         |     |                |             |           |      |      |         |      |      |
|------------------------------------------------------------|-----|---------|-----|----------------|-------------|-----------|------|------|---------|------|------|
| Nominal diameter DN                                        |     | 15      |     |                |             | 20        |      |      |         |      |      |
|                                                            |     | Bellows |     |                |             | do = 15,8 |      |      | do = 18 |      |      |
| Set pressure bar                                           |     | I       | II  | without<br>III | with<br>III | I         | II   | III  | I       | II   | III  |
| Air I<br>Nm <sup>3</sup> /h                                | 0,5 | 56      | 42  | 2,3            | 1,9         | 64        | 48   | 2,9  | 127     | 96   | 5,4  |
|                                                            | 1   | 87      | 69  | 3,1            | 2,5         | 120       | 96   | 4,0  | 189     | 151  | 7,3  |
|                                                            | 1,5 | 113     | 90  | 3,8            | 3,1         | 166       | 132  | 4,9  | 252     | 200  | 9,0  |
|                                                            | 2   | 141     | 111 | 4,4            | 3,6         | 205       | 161  | 5,6  | 316     | 249  | 10,4 |
| Steam II<br>kg/h                                           | 2,5 | 165     | 129 | 5,0            | 4,0         | 250       | 196  | 6,3  | 383     | 300  | 11,6 |
|                                                            | 3   | 189     | 148 | 5,4            | 4,4         | 298       | 233  | 6,9  | 447     | 349  | 12,7 |
| Water III<br>m <sup>3</sup> /h                             | 3,5 | 214     | 166 | 5,9            | 4,7         | 336       | 262  | 7,4  | 504     | 392  | 13,7 |
|                                                            | 4   | 238     | 184 | 6,3            | 5,0         | 375       | 291  | 8,0  | 561     | 435  | 14,7 |
|                                                            | 4,5 | 262     | 203 | 6,7            | 5,3         | 413       | 319  | 8,4  | 618     | 478  | 15,6 |
|                                                            | 5   | 286     | 221 | 7,0            | 5,6         | 451       | 348  | 8,9  | 675     | 521  | 16,4 |
|                                                            | 5,5 | 310     | 239 | 7,4            | 5,9         | 489       | 377  | 9,3  | 732     | 564  | 17,2 |
|                                                            | 6   | 335     | 257 | 7,7            | 6,2         | 527       | 406  | 9,7  | 790     | 608  | 18,0 |
|                                                            | 6,5 | 359     | 275 | 8,0            | 6,4         | 565       | 434  | 10,1 | 847     | 650  | 18,7 |
|                                                            | 7   | 383     | 293 | 8,3            | 6,6         | 604       | 462  | 10,5 | 904     | 692  | 19,4 |
|                                                            | 7,5 | 407     | 311 | 8,6            | 6,9         | 642       | 491  | 10,9 | 961     | 735  | 20,1 |
|                                                            | 8   | 431     | 329 | 8,9            | 7,1         | 680       | 519  | 11,3 | 1018    | 777  | 20,8 |
|                                                            | 8,5 | 456     | 347 | 9,2            | 7,3         | 718       | 547  | 11,6 | 1075    | 820  | 21,4 |
|                                                            | 9   | 480     | 365 | 9,4            | 7,5         | 756       | 576  | 11,9 | 1132    | 862  | 22,0 |
|                                                            | 9,5 | 504     | 383 | 9,7            | 7,7         | 794       | 604  | 12,3 | 1190    | 905  | 22,6 |
|                                                            | 10  | 528     | 401 | 9,9            | 7,9         | 833       | 632  | 12,6 | 1247    | 947  | 23,2 |
|                                                            | 11  | 577     | 437 | 10,4           | 8,3         | 909       | 688  | 13,2 | 1361    | 1031 | 24,3 |
|                                                            | 12  | 625     | 472 | 10,9           | 8,7         | 985       | 744  | 13,8 | 1475    | 1115 | 25,4 |
|                                                            | 13  | 674     | 508 | 11,3           | 9,1         | 1061      | 801  | 14,3 | 1590    | 1199 | 26,5 |
|                                                            | 14  | 722     | 544 | 11,8           | 9,4         | 1138      | 857  | 14,9 | 1704    | 1284 | 27,5 |
|                                                            | 15  | 770     | 580 | 12,2           | 9,7         | 1214      | 914  | 15,4 | 1818    | 1368 | 28,4 |
|                                                            | 16  | 819     | 616 | 12,6           | 10,1        | 1290      | 970  | 15,9 | 1932    | 1453 | 29,4 |
|                                                            | 17  | 867     | 650 | 13,0           | 10,4        | 1367      | 1025 | 16,4 | 2047    | 1535 | 30,3 |
|                                                            | 18  | 916     | 686 | 13,3           | 10,7        | 1443      | 1081 | 16,9 | 2161    | 1619 | 31,1 |
|                                                            | 19  | 964     | 721 | 13,7           | 11,0        | 1519      | 1137 | 17,3 | 2275    | 1703 | 32,0 |
|                                                            | 20  | 1013    | 757 | 14,0           | 11,2        | 1596      | 1193 | 17,8 | 2390    | 1787 | 32,8 |
|                                                            | 21  | 1061    | 793 | 14,4           | 11,5        | 1672      | 1250 | 18,2 | 2504    | 1872 | 33,6 |
|                                                            | 22  | 1109    | 829 | 14,7           | 11,8        | 1748      | 1306 | 18,7 | 2618    | 1956 | 34,4 |
|                                                            | 23  | 1158    | 865 | 15,1           | 12,1        | 1825      | 1363 | 19,1 | 2732    | 2040 | 35,2 |
|                                                            | 24  | 1206    | 900 | 15,4           | 12,3        | 1901      | 1419 | 19,5 | 2847    | 2125 | 35,9 |
|                                                            | 25  | 1255    | 936 | 15,7           | 12,6        | 1977      | 1475 | 19,9 | 2961    | 2209 | 36,7 |
|                                                            | 26  | 1303    | -   | 16,0           | 12,8        | 2054      | -    | 20,3 | 3075    | -    | 37,4 |
|                                                            | 27  | 1352    | -   | 16,3           | 13,1        | 2130      | -    | 20,7 | 3190    | -    | 38,1 |
|                                                            | 28  | 1400    | -   | 16,6           | 13,3        | 2206      | -    | 21,1 | 3304    | -    | 38,8 |
|                                                            | 29  | 1449    | -   | 16,9           | 13,5        | 2283      | -    | 21,4 | 3418    | -    | 39,5 |
|                                                            | 30  | 1497    | -   | 17,2           | 13,8        | 2359      | -    | 21,8 | 3532    | -    | 40,2 |
|                                                            | 32  | 1594    | -   | 17,8           | 14,2        | 2511      | -    | 22,5 | 3761    | -    | 41,5 |
|                                                            | 34  | 1691    | -   | 18,3           | 14,7        | 2664      | -    | 23,2 | 3990    | -    | 42,8 |
|                                                            | 36  | 1788    | -   | 18,8           | 15,1        | 2817      | -    | 23,9 | 4218    | -    | 44,0 |
|                                                            | 38  | 1884    | -   | 19,4           | 15,5        | 2969      | -    | 24,5 | 4447    | -    | 45,2 |
|                                                            | 40  | 1981    | -   | 19,9           | 15,9        | 3122      | -    | 25,2 | 4675    | -    | 46,4 |
|                                                            | 42  | 2078    | -   | 20,4           | 16,3        | 3275      | -    | 25,8 | 4904    | -    | 47,6 |
|                                                            | 44  | 2175    | -   | 20,8           | 16,7        | 3427      | -    | 26,4 | 5132    | -    | 48,7 |
|                                                            | 46  | 2272    | -   | 21,3           | 17,0        | 3580      | -    | 27,0 | 5361    | -    | 49,8 |
|                                                            | 48  | 2369    | -   | 21,8           | 17,4        | 3732      | -    | 27,6 | 5589    | -    | 50,8 |
|                                                            | 50  | 2466    | -   | 22,2           | 17,8        | 3885      | -    | 28,1 | 5818    | -    | 51,9 |

\*) only possible with metal-to-metal sealing

\*\*) Version with bellows only available from 1 bar

■ CAPACITY TABLE ACC. TO ISO 4126-1 / AD2000 A2

| CONTINUATION - Series 851 FL: Blowing-off rates at 10% above set pressure |     |      |      |      |       |      |       |  |
|---------------------------------------------------------------------------|-----|------|------|------|-------|------|-------|--|
| Nominal diameter DN                                                       |     | 25   |      |      | 32    |      |       |  |
|                                                                           |     | I    | II   | III  | I     | II   | III   |  |
| Set pressure bar                                                          |     |      |      |      |       |      |       |  |
| Air I<br>Nm <sup>3</sup> /h                                               | 0,5 | 199  | 150  | 8,8  | 353   | 266  | 15,4  |  |
|                                                                           | 1   | 291  | 232  | 12,0 | 515   | 411  | 20,8  |  |
|                                                                           | 1,5 | 390  | 309  | 14,7 | 683   | 542  | 25,5  |  |
|                                                                           | 2   | 489  | 385  | 16,9 | 832   | 656  | 29,4  |  |
|                                                                           | 2,5 | 583  | 457  | 18,9 | 1012  | 793  | 32,9  |  |
| Steam II<br>kg/h                                                          | 3   | 681  | 532  | 20,8 | 1182  | 924  | 36,0  |  |
|                                                                           | 3,5 | 768  | 597  | 22,4 | 1333  | 1036 | 38,9  |  |
|                                                                           | 4   | 855  | 663  | 24,0 | 1484  | 1151 | 41,6  |  |
|                                                                           | 4,5 | 942  | 729  | 25,4 | 1635  | 1265 | 44,1  |  |
|                                                                           | 5   | 1029 | 794  | 26,8 | 1786  | 1378 | 46,5  |  |
| Water III<br>m <sup>3</sup> /h                                            | 5,5 | 1116 | 860  | 28,1 | 1937  | 1492 | 48,8  |  |
|                                                                           | 6   | 1203 | 926  | 29,3 | 2088  | 1607 | 50,9  |  |
|                                                                           | 6,5 | 1290 | 990  | 30,5 | 2239  | 1719 | 53,0  |  |
|                                                                           | 7   | 1377 | 1054 | 31,7 | 2390  | 1830 | 55,0  |  |
|                                                                           | 7,5 | 1464 | 1119 | 32,8 | 2542  | 1943 | 56,9  |  |
|                                                                           | 8   | 1552 | 1184 | 33,9 | 2693  | 2056 | 58,8  |  |
|                                                                           | 8,5 | 1639 | 1249 | 34,9 | 2844  | 2168 | 60,6  |  |
|                                                                           | 9   | 1726 | 1314 | 35,9 | 2995  | 2281 | 62,4  |  |
|                                                                           | 9,5 | 1813 | 1379 | 36,9 | 3146  | 2392 | 64,1  |  |
|                                                                           | 10  | 1900 | 1443 | 37,9 | 3297  | 2504 | 65,8  |  |
|                                                                           | 11  | 2074 | 1571 | 39,7 | 3599  | 2727 | 69,0  |  |
|                                                                           | 12  | 2248 | 1699 | 41,5 | 3902  | 2948 | 72,0  |  |
|                                                                           | 13  | 2422 | 1827 | 43,2 | 4204  | 3172 | 75,0  |  |
|                                                                           | 14  | 2596 | 1957 | 44,8 | 4506  | 3396 | 77,8  |  |
|                                                                           | 15  | 2771 | 2085 | 46,4 | 4808  | 3618 | 80,5  |  |
|                                                                           | 16  | 2945 | 2214 | 47,9 | 5111  | 3842 | 83,2  |  |
|                                                                           | 17  | 3119 | 2339 | 49,4 | 5413  | 4059 | 85,7  |  |
|                                                                           | 18  | 3293 | 2467 | 50,8 | 5715  | 4281 | 88,2  |  |
|                                                                           | 19  | 3467 | 2594 | 52,2 | 6017  | 4503 | 90,6  |  |
|                                                                           | 20  | 3641 | 2723 | 53,6 | 6320  | 4726 | 93,0  |  |
|                                                                           | 21  | 3816 | 2852 | 54,9 | 6622  | 4950 | 95,3  |  |
|                                                                           | 22  | 3990 | 2981 | 56,2 | 6924  | 5173 | 97,5  |  |
|                                                                           | 23  | 4164 | 3109 | 57,5 | 7226  | 5396 | 99,7  |  |
|                                                                           | 24  | 4338 | 3238 | 58,7 | 7529  | 5619 | 101,9 |  |
|                                                                           | 25  | 4512 | 3366 | 59,9 | 7831  | 5842 | 104,0 |  |
|                                                                           | 26  | 4686 | -    | 61,1 | 8133  | -    | 106,0 |  |
|                                                                           | 27  | 4860 | -    | 62,3 | 8435  | -    | 108,0 |  |
|                                                                           | 28  | 5035 | -    | 63,4 | 8738  | -    | 110,0 |  |
|                                                                           | 29  | 5209 | -    | 64,5 | 9040  | -    | 112,0 |  |
|                                                                           | 30  | 5383 | -    | 65,6 | 9342  | -    | 113,9 |  |
|                                                                           | 32  | 5731 | -    | 67,8 | 9947  | -    | 117,6 |  |
|                                                                           | 34  | 6080 | -    | 69,9 | 10551 | -    | 121,2 |  |
|                                                                           | 36  | 6428 | -    | 71,9 | 11156 | -    | 124,8 |  |
|                                                                           | 38  | 6776 | -    | 73,9 | 11760 | -    | 128,2 |  |
|                                                                           | 40  | 7124 | -    | 75,8 | 12365 | -    | 131,5 |  |
|                                                                           | 42  | 7473 | -    | 77,6 | 12969 | -    | 134,8 |  |
|                                                                           | 44  | 7821 | -    | 79,5 | 13574 | -    | 137,9 |  |
|                                                                           | 46  | 8169 | -    | 81,3 | 14178 | -    | 141,0 |  |
|                                                                           | 48  | 8518 | -    | 83,0 | 14783 | -    | 144,1 |  |
|                                                                           | 50  | 8866 | -    | 84,7 | 15387 | -    | 147,0 |  |

■ CAPACITY TABLE ACC. TO ASME-CODE SEC. VIII DIV. 1

| Series 851 FL: Blowing-off rates at 10% above set pressure |        |                           |        |        |                         |        |        |                         |        |         |                           |         |        |
|------------------------------------------------------------|--------|---------------------------|--------|--------|-------------------------|--------|--------|-------------------------|--------|---------|---------------------------|---------|--------|
| Nominal diameter DN                                        |        | 15                        |        |        | 20                      |        |        | 25                      |        |         | 32                        |         |        |
|                                                            |        | d0 = 0,622 inch (15,8 mm) |        |        | d0 = 0,709 inch (18 mm) |        |        | d0 = 0,906 inch (23 mm) |        |         | d0 = 1,193 inch (30,3 mm) |         |        |
| Set pressure psi(g)                                        |        | I                         | II     | III    | I                       | II     | III    | I                       | II     | III     | I                         | II      | III    |
| Air I                                                      | 15     | 80,8                      | 226,9  | 12,9   | 155,9                   | 437,7  | 31,2   | 254,5                   | 714,7  | 51,0    | 441,8                     | 1240,4  | 88,5   |
|                                                            | 30     | 117,9                     | 331,0  | 17,5   | 227,4                   | 638,5  | 42,3   | 371,3                   | 1042,5 | 69,1    | 644,4                     | 1809,3  | 119,9  |
|                                                            | SCFM   | 40                        | 145,1  | 407,4  | 20,2                    | 279,9  | 785,8  | 48,8                    | 456,9  | 1282,9  | 79,8                      | 793,0   | 2226,6 |
| Steam II                                                   | 50     | 172,3                     | 483,7  | 22,6   | 332,3                   | 933,0  | 54,6   | 542,6                   | 1523,4 | 89,2    | 941,6                     | 2643,8  | 154,8  |
|                                                            | 60     | 199,5                     | 560,1  | 24,7   | 384,7                   | 1080,3 | 59,8   | 628,2                   | 1763,8 | 97,7    | 1090,2                    | 3061,1  | 169,5  |
|                                                            | PPH    | 70                        | 226,7  | 636,4  | 26,7                    | 437,2  | 1227,5 | 64,6                    | 713,8  | 2004,2  | 105,5                     | 1238,8  | 3478,3 |
| Water III                                                  | 87     | 253,9                     | 712,7  | 28,6   | 489,6                   | 1374,8 | 69,1   | 799,4                   | 2244,6 | 112,8   | 1387,4                    | 3895,6  | 195,8  |
|                                                            | 90     | 281,1                     | 789,1  | 30,3   | 542,1                   | 1522,0 | 73,3   | 885,1                   | 2485,0 | 119,6   | 1536,1                    | 4312,8  | 207,6  |
|                                                            | GPM    | 100                       | 308,3  | 865,4  | 31,9                    | 594,5  | 1669,3 | 77,2                    | 970,7  | 2725,4  | 126,1                     | 1684,7  | 4730,1 |
|                                                            | 110    | 335,5                     | 941,8  | 33,5   | 647,0                   | 1816,5 | 81,0   | 1056,3                  | 2965,9 | 132,3   | 1833,3                    | 5147,3  | 229,5  |
|                                                            | 120    | 362,6                     | 1018,1 | 35,0   | 699,4                   | 1963,8 | 84,6   | 1141,9                  | 3206,3 | 138,1   | 1981,9                    | 5564,6  | 239,7  |
|                                                            | 130    | 389,8                     | 1094,4 | 36,4   | 751,9                   | 2111,0 | 88,1   | 1227,6                  | 3446,7 | 143,8   | 2130,5                    | 5981,8  | 249,5  |
|                                                            | 140    | 417,0                     | 1170,8 | 37,8   | 804,3                   | 2258,3 | 91,4   | 1313,2                  | 3687,1 | 149,2   | 2279,1                    | 6399,0  | 259,0  |
|                                                            | 150    | 444,2                     | 1247,1 | 39,1   | 856,7                   | 2405,5 | 94,6   | 1398,8                  | 3927,5 | 154,4   | 2427,7                    | 6816,3  | 268,0  |
|                                                            | 160    | 471,4                     | 1323,5 | 40,4   | 909,2                   | 2552,8 | 97,7   | 1484,5                  | 4167,9 | 159,5   | 2576,3                    | 7233,5  | 276,8  |
|                                                            | 170    | 498,6                     | 1399,8 | 41,7   | 961,6                   | 2700,0 | 100,7  | 1570,1                  | 4408,4 | 164,4   | 2724,9                    | 7650,8  | 285,4  |
|                                                            | 180    | 525,8                     | 1476,1 | 42,9   | 1014,1                  | 2847,3 | 103,6  | 1655,7                  | 4648,8 | 169,2   | 2873,5                    | 8068,0  | 293,6  |
|                                                            | 190    | 553,0                     | 1552,5 | 44,0   | 1066,5                  | 2994,5 | 106,5  | 1741,3                  | 4889,2 | 173,8   | 3022,1                    | 8485,3  | 301,7  |
|                                                            | 200    | 580,2                     | 1628,8 | 45,2   | 1119,0                  | 3141,8 | 109,2  | 1827,0                  | 5129,6 | 178,3   | 3170,7                    | 8902,5  | 309,5  |
|                                                            | 210    | 607,4                     | 1705,2 | 46,3   | 1171,4                  | 3289,0 | 111,9  | 1912,6                  | 5370,0 | 182,7   | 3319,3                    | 9319,8  | 317,2  |
|                                                            | 220    | 634,6                     | 1781,5 | 47,4   | 1223,9                  | 3436,3 | 114,6  | 1998,2                  | 5610,4 | 187,0   | 3467,9                    | 9737,0  | 324,6  |
|                                                            | 230    | 661,8                     | 1857,8 | 48,4   | 1276,3                  | 3583,5 | 117,1  | 2083,8                  | 5850,9 | 191,2   | 3616,5                    | 10154,3 | 331,9  |
|                                                            | 240    | 688,9                     | 1934,2 | 49,5   | 1328,7                  | 3730,8 | 119,7  | 2169,5                  | 6091,3 | 195,4   | 3765,1                    | 10571,5 | 339,1  |
|                                                            | 250    | 716,1                     | 2010,5 | 50,5   | 1381,2                  | 3878,0 | 122,1  | 2255,1                  | 6331,7 | 199,4   | 3913,8                    | 10988,8 | 346,0  |
|                                                            | 260    | 743,3                     | 2086,9 | 51,5   | 1433,6                  | 4025,3 | 124,5  | 2340,7                  | 6572,1 | 203,3   | 4062,4                    | 11406,0 | 352,9  |
|                                                            | 270    | 770,5                     | 2163,2 | 52,5   | 1486,1                  | 4172,5 | 126,9  | 2426,3                  | 6812,5 | 207,2   | 4211,0                    | 11823,3 | 359,6  |
|                                                            | 280    | 797,7                     | 2239,5 | 53,5   | 1538,5                  | 4319,8 | 129,2  | 2512,0                  | 7052,9 | 211,0   | 4359,6                    | 12240,5 | 366,2  |
|                                                            | 290    | 824,9                     | 2315,9 | 54,4   | 1591,0                  | 4467,0 | 131,5  | 2597,6                  | 7293,3 | 214,8   | 4508,2                    | 12657,8 | 372,7  |
|                                                            | 300    | 852,1                     | 2392,2 | 55,3   | 1643,4                  | 4614,3 | 133,8  | 2683,2                  | 7533,8 | 218,4   | 4656,8                    | 13075,0 | 379,1  |
|                                                            | 320    | 906,5                     | 2544,9 | 57,1   | 1748,3                  | 4908,8 | 138,2  | 2854,5                  | 8014,6 | 225,6   | 4954,0                    | 13909,5 | 391,5  |
|                                                            | 340    | 960,9                     | 2697,6 | 58,9   | 1853,2                  | 5203,2 | 142,4  | 3025,7                  | 8495,4 | 232,5   | 5251,2                    | 14744,0 | 403,6  |
|                                                            | 360    | 1015,3                    |        | 60,6   | 1958,1                  |        | 146,5  | 3197,0                  |        | 239,3   | 5548,4                    |         | 415,3  |
|                                                            | 380    | 1069,6                    |        | 62,3   | 2063,0                  |        | 150,6  | 3368,2                  |        | 245,8   | 5845,6                    |         | 426,6  |
|                                                            | 400    | 1124,0                    |        | 63,9   | 2167,9                  |        | 154,5  | 3539,5                  |        | 252,2   | 6142,8                    |         | 437,7  |
| 420                                                        | 1178,4 |                           | 65,5   | 2272,7 |                         | 158,3  | 3710,7 |                         | 258,4  | 6440,1  |                           | 448,5   |        |
| 440                                                        | 1232,8 |                           | 67,0   | 2377,6 |                         | 162,0  | 3882,0 |                         | 264,5  | 6737,3  |                           | 459,1   |        |
| 460                                                        | 1287,2 |                           | 68,5   | 2482,5 |                         | 165,7  | 4053,2 |                         | 270,5  | 7034,5  |                           | 469,4   |        |
| 480                                                        | 1341,6 |                           | 70,0   | 2587,4 |                         | 169,2  | 4224,5 |                         | 276,3  | 7331,7  |                           | 479,5   |        |
| 500                                                        | 1395,9 |                           | 71,4   | 2692,3 |                         | 172,7  | 4395,8 |                         | 282,0  | 7628,9  |                           | 489,4   |        |
| 550                                                        | 1531,9 |                           | 74,9   | 2954,5 |                         | 181,1  | 4823,9 |                         | 295,7  | 8371,9  |                           | 513,3   |        |
| 600                                                        | 1667,9 |                           | 78,3   | 3216,7 |                         | 189,2  | 5252,0 |                         | 308,9  | 9115,0  |                           | 536,1   |        |
| 650                                                        | 1803,8 |                           | 81,4   | 3479,0 |                         | 196,9  | 5680,1 |                         | 321,5  | 9858,0  |                           | 558,0   |        |
| 700                                                        | 1939,8 |                           | 84,5   | 3741,2 |                         | 204,3  | 6108,3 |                         | 333,6  | 10601,0 |                           | 579,0   |        |
| 750                                                        | 2075,7 |                           | 87,5   | 4003,4 |                         | 211,5  | 6536,4 |                         | 345,4  | 11344,1 |                           | 599,4   |        |
| 800                                                        | 2211,7 |                           | 90,4   | 4265,6 |                         | 218,5  | 6964,5 |                         | 356,7  | 12087,1 |                           | 619,0   |        |
| 850                                                        | 2347,7 |                           | 93,1   | 4527,8 |                         | 225,2  | 7392,7 |                         | 367,7  | 12830,1 |                           | 638,1   |        |
| 900                                                        | 2483,6 |                           | 95,8   | 4790,1 |                         | 231,7  | 7820,8 |                         | 378,3  | 13573,2 |                           | 656,6   |        |
| 950                                                        | 2619,6 |                           | 98,5   | 5052,3 |                         | 238,1  | 8248,9 |                         | 388,7  | 14316,2 |                           | 674,6   |        |
| 1015                                                       | 2796,3 |                           | 101,8  | 5393,2 |                         | 246,1  | 8805,5 |                         | 401,8  | 15282,1 |                           | 697,3   |        |