

Overflow and pressure control valves made of gunmetal, angle-type with threaded connections  
-externally adjustable-

→ Series 617



■ SUITABLE FOR

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

■ EXAMPLES OF USE

For the protection of:

- pumps against overloading in closed circuits for neutral / non-neutral, non-sticking liquids

For the control of:

- systems under pressure for neutral / non-neutral gases and vapours and – depending on the sealing material – also for steam

- pump protection
- test rig construction
- process equipment construction
- shipbuilding industry and marine equipment
- de-icing technology
- mechanical engineering
- industrial applications



■ MATERIAL



■ SPECIFICATION



3/8" – 2"



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



0,2 – 20 bar

■ APPROVALS

European Pressure Equipment Directive

TR ZU 032/2013 - TR ZU 010/2011

Requirements

PED 2014/68/EU

Classification society

|                                       |         |
|---------------------------------------|---------|
| Germanischer Lloyd                    | GL      |
| Lloyd's Register EMEA                 | LR EMEA |
| American Bureau of Shipping           | ABS     |
| Bureau Veritas                        | BV      |
| Russian Maritime Register of Shipping | RS      |

■ MATERIALS

| Component      | Material        | DIN EN | ASME   |
|----------------|-----------------|--------|--------|
| Inlet body     | Gunmetal        | CC499K | CC499K |
| Outlet body    | Gunmetal        | CC499K | CC499K |
| Internal parts | Brass           | CW617N | CW617N |
| Spring         | Stainless steel | 1.4310 | 302    |

## ■ VALVE VERSION

|          |                                    |  |
|----------|------------------------------------|--|
| <b>t</b> | gastight version of spring housing | for neutral and non-neutral media, not counter pressure compensated.<br>The environment is protected from being affected by the medium. Adjustable under operating conditions without medium escaping into the atmosphere. |
|----------|------------------------------------|--|

Valves can be delivered unset within a pressure range or set and sealed at the factory.

## ■ MEDIUM

|           |                    |  |
|-----------|--------------------|--|
| <b>GF</b> | gaseous and liquid | Air, vapours, gases, liquids and - depending on safety valve version and seal - also for steam |
|-----------|--------------------|--|

## ■ TYPE OF LIFTING MECHANISM

|          |                        |
|----------|------------------------|
| <b>0</b> | without lifting device |
|----------|------------------------|

## ■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

| Nominal diameter DN | 10          | 15        | 20        | 25      | 32          | 40          | 50      |
|---------------------|-------------|-----------|-----------|---------|-------------|-------------|---------|
| <b>Inlet</b>        | 3/8" (10)   | 1/2" (15) | 3/4" (20) | 1" (25) | 1 1/4" (32) | 1 1/2" (40) | 2" (50) |
| <b>Outlet</b>       | 3/8" (10)   | ■         |           |         |             |             |         |
|                     | 1/2" (15)   |           | ■         |         |             |             |         |
|                     | 3/4" (20)   |           |           | ■       |             |             |         |
|                     | 1" (25)     |           |           |         | ■           |             |         |
|                     | 1 1/4" (32) |           |           |         |             | ■           |         |
|                     | 1 1/2" (40) |           |           |         |             |             | ■       |
| 2" (50)             |             |           |           |         |             |             | ■       |

## ■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

|            |          |   |                                     |
|------------|----------|---|-------------------------------------|
| <b>f/f</b> | Standard | Female thread BSP-P / Female thread BSP-P | DIN EN ISO 228-1 / DIN EN ISO 228-1 |
|------------|----------|---|-------------------------------------|

## ■ SEALS

|             |                           |                                   |                 |
|-------------|---------------------------|-----------------------------------|-----------------|
| <b>NBR</b>  | Nitrile rubber (standard) | Elastomere flat seal 0,2 – 12 bar | -30°C to +130°C |
| <b>FKM</b>  | Fluorocarbon              | Elastomere flat seal 0,2 – 12 bar | -20°C to +200°C |
| <b>EPDM</b> | Ethylene propylene diene  | Elastomere flat seal 0,2 – 12 bar | -50°C to +150°C |
| <b>PTFE</b> | Polytetrafluoroethylene   | Flat seal 0,5 – 12 bar            | -60°C to +225°C |

If the seat seal is made of PTFE the O-rings of the body and setting spindle seal are made of FPM.

### Against surcharge

|             |                         |                       |                 |
|-------------|-------------------------|-----------------------|-----------------|
| <b>PTFE</b> | Polytetrafluoroethylene | Flat seal 12 – 20 bar | -60°C to +225°C |
|-------------|-------------------------|-----------------------|-----------------|

## ■ OPTIONS

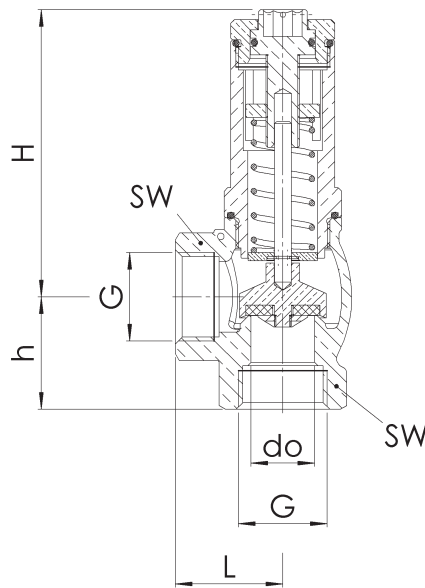
Special versions on request.

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

| Series 617: Connection, installation dimensions, ranges of adjustment |     |                      |                      |                      |                      |                      |                      |                      |
|---|-----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Nominal diameter  | DN  | 10                   | 15                   | 20                   | 25                   | 32                   | 40                   | 50                   |
| Connection DIN EN ISO 228   | G   | 3/8" (10)            | 1/2" (15)            | 3/4" (20)            | 1" (25)              | 1 1/4" (32)          | 1 1/2" (40)          | 2" (50)              |
| Outlet DIN EN ISO 228   | G   | 3/8" (10)            | 1/2" (15)            | 3/4" (20)            | 1" (25)              | 1 1/4" (32)          | 1 1/2" (40)          | 2" (50)              |
| Installation dimensions in mm   | L   | 27                   | 30                   | 33                   | 40                   | 45                   | 50                   | 60                   |
|   | H   | 60                   | 69                   | 86                   | 101                  | 118                  | 139                  | 149                  |
|   | h   | 26                   | 30                   | 35                   | 41                   | 45                   | 51                   | 60                   |
|   | SW  | 24                   | 28                   | 34                   | 41                   | 52                   | 58                   | 70                   |
|   | do  | 10                   | 13                   | 19                   | 25                   | 30                   | 38                   | 50                   |
| Weight  | kg  | 0,3                  | 0,4                  | 0,7                  | 1,2                  | 1,9                  | 2,5                  | 3,8                  |
| Set pressure  | bar | 0,2 - 20             | 0,2 - 20             | 0,2 - 20             | 0,2 - 20             | 0,2 - 20             | 0,2 - 20             | 0,2 - 20             |
| Range of adjustment   | bar | 0,2 - 0,8            | 0,2 - 0,8            | 0,2 - 0,8            | 0,2 - 0,8            | 0,2 - 0,8            | 0,2 - 0,8            | 0,2 - 0,8            |
|   |     | 0,5 - 2,5            | 0,5 - 2,5            | 0,5 - 2,5            | 0,5 - 2,5            | 0,5 - 2,5            | 0,5 - 2,5            | 0,5 - 2,5            |
|   |     | 2 - 8                | 2 - 8                | 2 - 8                | 2 - 8                | 2 - 8                | 2 - 8                | 2 - 8                |
|   |     | 2 - 12               | 2 - 12               | 2 - 12               | 2 - 12               | 2 - 12               | 2 - 12               | 2 - 12               |
|   |     | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> | 12 - 20 <sup>1</sup> |

<sup>1</sup>Against surcharge, with PTFE seal

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

| Series | Valve version | Medium | Lifting device | Nominal diameter DN | Connection type |        | Connection size |        | Seal | Options | Pressure range / set pressure | Quantity |
|--------|---------------|--------|----------------|---------------------|-----------------|--------|-----------------|--------|------|---------|-------------------------------|----------|
|        |               |        |                |                     | Inlet           | Outlet | Inlet           | Outlet |      |         |                               |          |
| 617    | t             | GF     | 0              | 15                  | f               | f      | 15              | 15     | NBR  |         | 2 - 12                        | 10       |
| 617    | t             | GF     | 0              | 25                  | f               | f      | 25              | 25     | PTFE |         | 16,0                          | 2        |
| 617    | t             | GF     | 0              |                     | f               | f      |                 |        |      |         |                               |          |
| 617    | t             | GF     | 0              |                     | f               | f      |                 |        |      |         |                               |          |

In this table you can configure a valve according to your individual requirements (similar to the *example* shown, which should be deleted before you enter your own data). Please complete the table by hand using the abbreviations in this datasheet and then fax it to: +49(0)7141.4889488  
Please do not forget to add your personal data so that our sales team can contact you.

Name \_\_\_\_\_

First Name \_\_\_\_\_

Company \_\_\_\_\_

Telephone \_\_\_\_\_

E-Mail \_\_\_\_\_

■ CAPACITY TABLE

| Series 617: Kv values at 1 bar overpressure |             |      |         |             |       |         |             |      |         |             |      |         |             |      |         |             |      |       |         |         |       |
|---|-------------|------|---------|-------------|-------|---------|-------------|------|---------|-------------|------|---------|-------------|------|---------|-------------|------|-------|---------|---------|-------|
| Nominal diameter DN                         | 10          |      |         | 15          |       |         | 20          |      |         | 25          |      |         | 32          |      |         | 40          |      |       | 50      |         |       |
|   | Air [Nm³/h] |      |         | Air [Nm³/h] |       |         | Air [Nm³/h] |      |         | Air [Nm³/h] |      |         | Air [Nm³/h] |      |         | Air [Nm³/h] |      |       |         |         |       |
| Pressure range bar                          | 0,2-0,8     | 2-8  | 12-20   | 0,2-0,8     | 2-8   | 12-20   | 0,2-0,8     | 2-8  | 12-20   | 0,2-0,8     | 2-8  | 12-20   | 0,2-0,8     | 2-8  | 12-20   | 0,2-0,8     | 2-8  | 12-20 | 0,2-0,8 | 2-8     | 12-20 |
|   | 0,5-2,5     | 2-12 | 0,2-0,8 | 2-8         | 12-20 | 0,2-0,8 | 0,5-2,5     | 2-12 | 0,2-0,8 | 0,5-2,5     | 2-12 | 0,2-0,8 | 0,5-2,5     | 2-12 | 0,2-0,8 | 0,5-2,5     | 2-8  | 12-20 | 0,2-0,8 | 0,5-2,5 | 2-12  |
| Set pressure bar                            |             |      |         |             |       |         |             |      |         |             |      |         |             |      |         |             |      |       |         |         |       |
| 0,2   | 24          |      |         | 53          |       |         | 177         |      |         | 200         |      |         | 600         |      |         | 930         |      |       | 1500    |         |       |
| 0,5   | 28          | 83   |         | 61          | 147   |         | 200         | 209  |         | 220         | 375  |         | 680         | 717  |         | 970         | 847  |       | 1620    | 1376    |       |
| 0,8   | 32          | 90   |         | 67          | 153   |         | 220         | 220  |         | 245         | 384  |         | 700         | 771  |         | 1050        | 878  |       | 1740    | 1478    |       |
| 1   |             | 95   |         |             | 158   |         |             | 228  |         |             | 390  |         |             | 808  |         |             | 899  |       |         | 1546    |       |
| 1,5   |             | 101  |         |             | 173   |         |             | 257  |         |             | 433  |         |             | 901  |         |             | 1033 |       |         | 1734    |       |
| 2   |             | 111  | 62      | 48          |       | 180     | 126         | 86   |         | 287         | 180  | 159     |             | 977  | 353     | 233         |      | 1104  | 552     | 426     |       |
| 2,5   |             | 119  | 68      | 50          |       | 202     | 132         | 89   |         | 306         | 197  | 168     |             | 1031 | 361     | 257         |      | 1205  | 564     | 447     |       |
| 3   |             |      | 75      | 51          |       |         | 143         | 95   |         |             | 226  | 188     |             |      | 369     | 272         |      |       | 577     | 481     |       |
| 4   |             |      | 83      | 62          |       |         | 166         | 101  |         |             | 239  | 213     |             |      | 417     | 311         |      |       | 601     | 527     |       |
| 5   |             |      | 95      | 80          |       |         | 169         | 105  |         |             | 233  | 242     |             |      | 459     | 352         |      |       | 726     | 566     |       |
| 6   |             |      | 101     | 90          |       |         | 173         | 111  |         |             | 269  | 250     |             |      | 502     | 397         |      |       | 893     | 597     |       |
| 7   |             |      | 106     | 96          |       |         | 150         | 118  |         |             | 303  | 257     |             |      | 549     | 437         |      |       | 994     | 764     |       |
| 8   |             |      | 112     | 114         |       |         | 139         | 117  |         |             | 324  | 314     |             |      | 606     | 492         |      |       | 1113    | 910     |       |
| 9   |             |      |         | 115         |       |         |             | 123  |         |             |      | 324     |             |      |         | 546         |      |       |         | 949     |       |
| 10  |             |      |         | 122         |       |         |             | 133  |         |             |      | 331     |             |      |         | 600         |      |       |         | 1023    |       |
| 11  |             |      |         | 121         |       |         |             | 138  |         |             |      | 339     |             |      |         | 569         |      |       |         | 1070    |       |
| 12  |             |      | 126     | 96          |       |         | 138         | 112  |         |             | 354  | 221     |             | 261  | 305     |             | 538  | 594   |         | 1095    | 682   |
| 13  |             |      |         | 109         |       |         |             | 103  |         |             |      | 206     |             |      | 291     |             |      | 625   |         |         | 758   |
| 14  |             |      |         | 116         |       |         |             | 94   |         |             |      | 166     |             |      | 282     |             |      |       | 656     |         | 834   |
| 15  |             |      |         | 120         |       |         |             | 85   |         |             |      | 140     |             |      | 269     |             |      |       | 687     |         | 911   |
| 16  |             |      |         | 122         |       |         |             | 76   |         |             |      | 132     |             |      | 257     |             |      |       | 716     |         | 987   |
| 17  |             |      |         | 124         |       |         |             | 57   |         |             |      | 115     |             |      | 245     |             |      |       | 737     |         | 954   |
| 18  |             |      |         | 129         |       |         |             | 56   |         |             |      | 84      |             |      | 233     |             |      |       | 758     |         | 922   |
| 19  |             |      |         | 134         |       |         |             | 44   |         |             |      | 50      |             |      | 220     |             |      |       | 779     |         | 889   |
| 20  |             |      |         | 140         |       |         |             | 36   |         |             |      | 45      |             |      | 208     |             |      |       | 801     |         | 851   |

| Kv values at 1 bar overpressure |              |      |         |              |       |         |              |      |         |              |      |         |              |      |         |              |      |       |         |         |       |
|---------------------------------|--------------|------|---------|--------------|-------|---------|--------------|------|---------|--------------|------|---------|--------------|------|---------|--------------|------|-------|---------|---------|-------|
| Nominal diameter DN             | 10           |      |         | 15           |       |         | 20           |      |         | 25           |      |         | 32           |      |         | 40           |      |       | 50      |         |       |
|                                 | Water [m³/h] |      |         | Water [m³/h] |       |         | Water [m³/h] |      |         | Water [m³/h] |      |         | Water [m³/h] |      |         | Water [m³/h] |      |       |         |         |       |
| Pressure range bar              | 0,2-0,8      | 2-8  | 12-20   | 0,2-0,8      | 2-8   | 12-20   | 0,2-0,8      | 2-8  | 12-20   | 0,2-0,8      | 2-8  | 12-20   | 0,2-0,8      | 2-8  | 12-20   | 0,2-0,8      | 2-8  | 12-20 | 0,2-0,8 | 2-8     | 12-20 |
|                                 | 0,5-2,5      | 2-12 | 0,2-0,8 | 2-8          | 12-20 | 0,2-0,8 | 0,5-2,5      | 2-12 | 0,2-0,8 | 0,5-2,5      | 2-12 | 0,2-0,8 | 0,5-2,5      | 2-12 | 0,2-0,8 | 0,5-2,5      | 2-8  | 12-20 | 0,2-0,8 | 0,5-2,5 | 2-12  |
| Set pressure bar                |              |      |         |              |       |         |              |      |         |              |      |         |              |      |         |              |      |       |         |         |       |
| 0,2                             | 2,7          |      |         | 4,4          |       |         | 5,6          |      |         | 6,0          |      |         | 18,3         |      |         | 29,0         |      |       | 41,0    |         |       |
| 0,5                             | 2,9          | 2,7  |         | 4,6          | 4,3   |         | 5,6          | 6,1  |         | 6,4          | 10,8 |         | 19,5         | 16,0 |         | 29,0         | 21,7 |       | 44,4    | 31,6    |       |
| 0,8                             | 2,9          | 2,8  |         | 4,9          | 4,5   |         | 5,6          | 6,3  |         | 7,1          | 11,5 |         | 20,0         | 16,4 |         | 29,0         | 22,6 |       | 47,0    | 34,0    |       |
| 1                               |              | 3,0  |         |              | 4,6   |         |              | 6,5  |         |              | 11,9 |         |              | 16,7 |         |              | 23,3 |       |         | 35,6    |       |
| 1,5                             |              | 3,2  |         |              | 4,8   |         |              | 6,7  |         |              | 12,6 |         |              | 17,5 |         |              | 24,0 |       |         | 37,7    |       |
| 2                               |              | 3,4  | 1,9     | 1,6          |       | 5,0     | 2,2          | 1,8  |         | 6,9          | 4,5  | 3,7     |              | 13,0 | 8,5     | 4,2          |      | 18,1  | 7,6     | 6,2     |       |
| 2,5                             |              | 3,7  | 2,2     | 1,7          |       | 5,2     | 2,1          | 1,8  |         | 7,3          | 4,8  | 3,8     |              | 13,7 | 8,9     | 4,3          |      | 18,9  | 7,5     | 6,2     |       |
| 3                               |              |      | 2,3     | 1,9          |       |         | 1,9          | 1,8  |         |              | 5,2  | 4,1     |              |      | 9,3     | 4,3          |      |       | 7,4     | 6,1     |       |
| 4                               |              |      | 2,7     | 2,2          |       |         | 1,6          | 1,7  |         |              | 5,7  | 4,6     |              |      | 10,0    | 4,5          |      |       | 7,3     | 6,1     |       |
| 5                               |              |      | 2,9     | 2,5          |       |         | 1,4          | 1,6  |         |              | 6,5  | 5,1     |              |      | 10,4    | 4,6          |      |       | 7,2     | 6,0     |       |
| 6                               |              |      | 3,4     | 2,8          |       |         | 1,3          | 1,5  |         |              | 7,1  | 6,1     |              |      | 11,0    | 4,7          |      |       | 7,0     | 5,9     |       |
| 7                               |              |      | 3,6     | 2,9          |       |         | 1,1          | 1,5  |         |              | 7,9  | 6,5     |              |      | 11,2    | 5,0          |      |       | 6,7     | 5,8     |       |
| 8                               |              |      | 3,9     | 3,1          |       |         | 1,0          | 1,4  |         |              | 8,5  | 7,1     |              |      | 11,3    | 5,1          |      |       | 6,5     | 5,6     |       |
| 9                               |              |      |         | 3,2          |       |         |              | 1,4  |         |              |      | 7,3     |              |      |         | 5,3          |      |       |         | 5,5     |       |
| 10                              |              |      |         | 3,4          |       |         |              | 1,4  |         |              |      | 8,3     |              |      |         | 5,5          |      |       |         | 5,3     |       |
| 11                              |              |      |         | 3,5          |       |         |              | 1,4  |         |              |      | 9,1     |              |      |         | 5,8          |      |       |         | 5,2     |       |
| 12                              |              |      | 3,7     | 1,7          |       |         | 1,3          | 0,4  |         |              | 9,3  | 2,8     |              | 5,9  | 2,2     |              | 5,0  | 6,8   |         | 17,6    | 10,1  |
| 13                              |              |      |         | 1,4          |       |         |              | 0,4  |         |              |      | 2,4     |              |      | 2,2     |              |      | 6,5   |         |         | 10,3  |
| 14                              |              |      |         | 1,3          |       |         |              | 0,5  |         |              |      | 2,2     |              |      | 1,9     |              |      | 6,3   |         |         | 10,5  |
| 15                              |              |      |         | 1,1          |       |         |              | 0,5  |         |              |      | 1,7     |              |      | 1,6     |              |      | 6,1   |         |         | 10,6  |
| 16                              |              |      |         | 0,8          |       |         |              | 0,5  |         |              |      | 1,4     |              |      | 1,3     |              |      | 6,0   |         |         | 10,9  |
| 17                              |              |      |         | 0,6          |       |         |              | 0,5  |         |              |      | 1,1     |              |      | 1,1     |              |      | 5,8   |         |         | 11,0  |
| 18                              |              |      |         | 0,4          |       |         |              | 0,6  |         |              |      | 0,9     |              |      | 1,0     |              |      | 5,6   |         |         | 11,3  |
| 19                              |              |      |         | 0,2          |       |         |              | 0,6  |         |              |      | 0,7     |              |      | 0,8     |              |      | 5,1   |         |         | 11,4  |
| 20                              |              |      |         | 0,2          |       |         |              | 0,6  |         |              |      | 0,7     |              |      | 0,7     |              |      | 5,0   |         |         | 11,5  |

| Series 617: Kv values at 1 bar overpressure |              |      |       |              |     |       |              |      |       |              |     |       |              |      |       |              |     |       |              |      |       |      |      |
|---|--------------|------|-------|--------------|-----|-------|--------------|------|-------|--------------|-----|-------|--------------|------|-------|--------------|-----|-------|--------------|------|-------|------|------|
| Nominal diameter DN                         | 10           |      |       | 15           |     |       | 20           |      |       | 25           |     |       | 32           |      |       | 40           |     |       | 50           |      |       |      |      |
|   | Steam [kg/h] |      |       | Steam [kg/h] |     |       | Steam [kg/h] |      |       | Steam [kg/h] |     |       | Steam [kg/h] |      |       | Steam [kg/h] |     |       | Steam [kg/h] |      |       |      |      |
| Pressure range bar                          | 0,2-0,8      | 2-8  | 12-20 | 0,2-0,8      | 2-8 | 12-20 | 0,2-0,8      | 2-8  | 12-20 | 0,2-0,8      | 2-8 | 12-20 | 0,2-0,8      | 2-8  | 12-20 | 0,2-0,8      | 2-8 | 12-20 | 0,2-0,8      | 2-8  | 12-20 |      |      |
|   | 0,5-2,5      | 2-12 |       | 0,5-2,5      | 2-8 |       | 0,5-2,5      | 2-12 |       | 0,5-2,5      | 2-8 |       | 0,5-2,5      | 2-12 |       | 0,5-2,5      | 2-8 |       | 0,5-2,5      | 2-12 |       |      |      |
| Set pressure bar                            |              |      |       |              |     |       |              |      |       |              |     |       |              |      |       |              |     |       |              |      |       |      |      |
| 0,2   | 18           |      |       | 41           |     |       | 138          |      |       | 156          |     |       | 468          |      |       | 726          |     |       | 1172         |      |       |      |      |
| 0,5   | 22           | 65   |       | 47           | 113 |       | 156          | 163  |       | 172          | 295 |       | 531          | 509  |       | 757          | 665 |       | 1265         | 1100 |       |      |      |
| 0,8   | 25           | 70   |       | 52           | 120 |       | 172          | 173  |       | 191          | 305 |       | 547          | 541  |       | 820          | 700 |       | 1359         | 1173 |       |      |      |
| 1   |              | 74   |       |              | 125 |       |              | 181  |       |              | 313 |       |              | 553  |       |              | 724 |       |              | 1222 |       |      |      |
| 1,5   |              | 81   |       |              | 135 |       |              | 200  |       |              | 345 |       |              | 615  |       |              | 798 |       |              | 1345 |       |      |      |
| 2   |              | 86   | 53    | 40           | 143 | 98    | 73           | 221  | 144   | 126          | 373 | 280   | 218          | 642  | 283   | 194          | 862 | 455   | 311          | 1451 |       |      |      |
| 2,5   |              | 93   | 60    | 45           | 157 | 104   | 79           | 235  | 161   | 141          | 384 | 302   | 244          | 619  | 301   | 218          | 940 | 510   | 349          | 1535 | 787   | 663  |      |
| 3   |              |      | 66    | 43           |     | 111   | 80           |      | 171   | 156          |     | 309   | 258          |      | 297   | 223          |     | 506   | 387          |      | 884   | 698  |      |
| 4   |              |      | 79    | 53           |     | 129   | 79           |      | 187   | 160          |     | 339   | 308          |      | 333   | 244          |     | 499   | 428          |      | 876   | 670  |      |
| 5   |              |      | 77    | 66           |     | 135   | 82           |      | 186   | 176          |     | 412   | 322          |      | 361   | 283          |     | 579   | 455          |      | 987   | 740  |      |
| 6   |              |      | 78    | 75           |     | 132   | 88           |      | 212   | 200          |     | 388   | 326          |      | 441   | 323          |     | 707   | 518          |      | 1145  | 859  |      |
| 7   |              |      | 84    | 81           |     | 118   | 93           |      | 225   | 198          |     | 275   | 298          |      | 429   | 363          |     | 740   | 635          |      | 1224  | 816  |      |
| 8   |              |      | 89    | 89           |     | 123   | 96           |      | 249   | 190          |     | 254   | 279          |      | 475   | 402          |     | 821   | 645          |      | 1284  | 916  |      |
| 9   |              |      |       | 89           |     |       | 98           |      |       | 193          |     |       | 250          |      |       | 441          |     |       | 707          |      |       | 1015 |      |
| 10  |              |      |       | 97           |     |       | 106          |      |       | 192          |     |       | 273          |      |       | 480          |     |       | 770          |      |       | 1002 |      |
| 11  |              |      |       | 94           |     |       | 106          |      |       | 189          |     |       | 262          |      |       | 472          |     |       | 833          |      |       | 1090 |      |
| 12  |              |      | 101   | 79           |     |       | 105          | 78   |       | 204          | 183 |       | 282          | 247  |       | 406          | 457 |       | 814          | 570  |       | 1179 | 987  |
| 13  |              |      |       | 84           |     |       |              | 68   |       |              | 174 |       |              | 189  |       |              | 489 |       |              | 610  |       |      | 1056 |
| 14  |              |      |       | 90           |     |       |              | 57   |       |              | 162 |       |              | 201  |       |              | 521 |       |              | 650  |       |      | 1125 |
| 15  |              |      |       | 95           |     |       |              | 54   |       |              | 123 |       |              | 213  |       |              | 552 |       |              | 590  |       |      | 1022 |
| 16  |              |      |       | 94           |     |       |              | 51   |       |              | 130 |       |              | 180  |       |              | 584 |       |              | 728  |       |      | 1261 |
| 17  |              |      |       | 99           |     |       |              | 46   |       |              | 110 |       |              | 142  |       |              | 615 |       |              | 768  |       |      | 1140 |
| 18  |              |      |       | 96           |     |       |              | 32   |       |              | 87  |       |              | 150  |       |              | 576 |       |              | 693  |       |      | 1399 |
| 19  |              |      |       | 101          |     |       |              | 28   |       |              | 61  |       |              | 105  |       |              | 604 |       |              | 606  |       |      | 1678 |
| 20  |              |      |       | 105          |     |       |              | 21   |       |              | 32  |       |              | 165  |       |              | 632 |       |              | 634  |       |      | 1537 |