

## General information and description

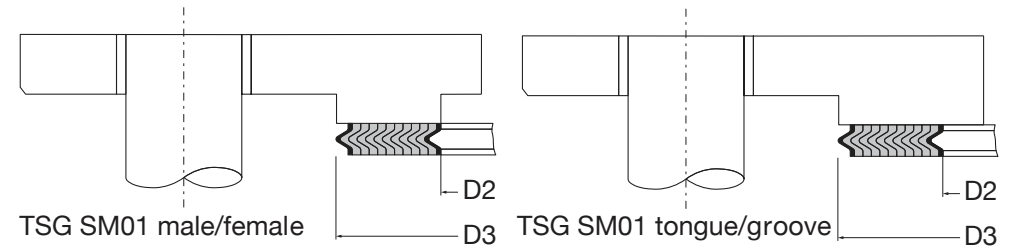
The sealing element of the spiral wound gasket consists of a v-shaped metal strip spirally wound in combination with a soft sealing material filler. The metal strip provides outstanding resilience, while the flexible sealing filler guarantees excellent sealing. Due to this combination of materials the spiral wound gasket is suitable for sealing under severely fluctuating temperature and pressure conditions. Depending on the application the spiral wound gasket can be specified with outer and/or inner rings.

## Characteristics

- The spiral wound gasket is suitable for use across a wide pressure range and is therefore virtually applicable.
- The spiral wound gasket can be used to seal fluid pressures up to 250 bar and damage (although extra care should be taken during transportation and installation of large diameter gasket without guide rings).
- The outer guide ring serves to locate the spiral element centrally on the flange faces and prevent blow-out.
- By combining different winding materials and metals the gasket can be tailored to a wide variety of operating conditions.
- Due to its non-adhesive character the gasket is easy to remove after service.
- The gasket does not cause damage to the flange faces

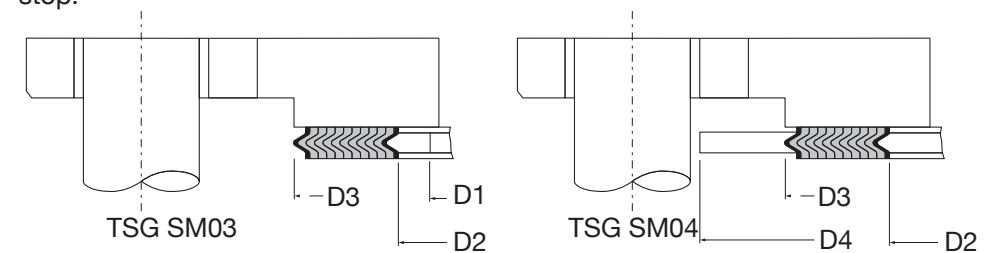
## TSG SM01 SWG without guide or inner ring

This style of gasket is mainly used for male and female flanges or projection and recess flanges and used in load-bearing flange configurations, such as tongue and groove flanges. Standard dimensions according to EN/ASME.



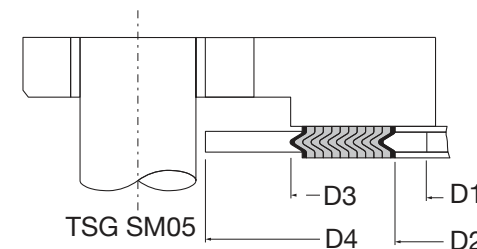
## TSG SM03 SWG with inner ring TSG SM04 SWG with outer guide ring

Mainly used for male and female flanges or projection and recess flanges. The inner ring is necessary as a compression stop. Standard type for RF flange connections.



## TSG SM05 SWG with inner and outer guide ring

This style offers the best performance for raised-face flange connections.



## Benefits of the centring ring

The spiral wound gasket outer centring ring provides the following benefits:

- Optimum location between the bolts.
- Protection of the spiral wound element.
- Additional security against gasket blow-out.
- Acts as compression limiter preventing overloading and overcompression of the spiral wound element.
- Prevents radial-flow of soft fillers, such as P.T.F.E.

For these reasons it is preferable to use spiral wound gasket with outer centring rings. The the outer ring is marked with nominal size, pressure class, standard and materials.

## Benefits of the inner ring

The spiral gasket inner ring provides the following benefits:

- Prevents radial-flow of soft fillers, such as P.T.F.E.
- Reduces turbulence-minimising flow resistance and crevice corrosion.
- Acts as a heat shield when the spiral wound gasket is subjected to high temperatures.
- Avoidance of over-compression at elevated seating loads in high-pressure service
- Improvement of the load distribution over the gasket

Inner and outer rings are particularly recommended for use on spiral wound askets exceeding class 600lbs, but specifically recommended for high temperatures and Pressures to optimise the operational reliability of the spiral wound sealing element.

## Material selection

Material selected for the inner ring and winding metal is usually the same as the flange metal, in order to prevent corrosion and differential expansion problems. The outer centring ring is generally manufactured from carbon steel with an anti-corrosion treatment, however the ring may also be manufactured in the same metal as the flange to prevent corrosion.

## Ring materials

| Material        | DIN specification | DIN Nr. | AISI/ ASTM UNS | B.S.         | Temp. [°C] |      |
|-----------------|-------------------|---------|----------------|--------------|------------|------|
|                 |                   |         |                |              | min        | max  |
| Carbon steel    | RSt. 37.2 CS      | 1.0038  | 238-C          | 40B          | -40        | 500  |
| SS 304          | X5CrNi 18         | 1.4301  | 304            | 304S15/16/31 | -250       | 550  |
| SSI 304L        | X2CrNi 189        | 1.4306  | 304L           | 304S11       | -250       | 550  |
| SS 309          | X15CrNiSi 2012    | 1.4828  | 309            | 309S24       | -100       | 1000 |
| SSI 316         | X5CrNiMo 1810     | 1.4401  | 316            | 316S31/33    | -100       | 550  |
| SS 316L         | X2CrNiMo 1810     | 1.4404  | 316L           | 316S11/13    | -100       | 550  |
| SS 316Ti        | X10CrNiMoTi 1810  | 1.4571  | 316Ti          | 320S31       | -100       | 550  |
| SS 321          | X10CrNiTi 189     | 1.4541  | 321            | 321S12/49/87 | -250       | 550  |
| SS 347          | X6CrNiNb 1810     | 1.4550  | 347            | 347S31       | -250       | 550  |
| Monel 400       | NiCu 30 Fe        | 2.4360  | NO4400         | 3072-76NA13  | -125       | 600  |
| Inconel 600     | NiCr 15 Fe        | 2.4816  | NO6600         | 3072-76NA14  | -100       | 950  |
| Incoloy 800     | X10NiCrAlTi 3220  | 1.4876  | NO8800         | 3072-76NA15  | -100       | 850  |
| Incoloy 825     | NiCr 21 Mo        | 2.4858  | NO8825         | 3072-76NA16  | -100       | 450  |
| Hastelloy B2    | NiMo 28           | 2.4617  | N10665         | ---          | -200       | 450  |
| Hastelloy C276  | NiMo16Cr15W       | 2.4819  | N10267         | ---          | -200       | 450  |
| Titanium (gr.1) | Ti 99,8           | 3.7025  | ---            | ---          | -250       | 350  |

The table below may be used for determining the correct filler. It should be pointed out that graphite is the optimum filler in many cases. Only when graphite would cause medium pollution, or is not chemically resistant, is it advisable to apply another type of filler material.

## Standard fillers

| Material | Temp. [°C] |      | Max. operating press. [MPa] | Gastight-ness | Application       | Colour code |
|----------|------------|------|-----------------------------|---------------|-------------------|-------------|
|          | Min.       | Max. |                             |               |                   |             |
| Graphite | -200       | 550  | 25                          | Good          | aggressive medium | Grey        |
| PTFE     | -200       | 250  | 10                          | Good          | aggressive medium | White       |

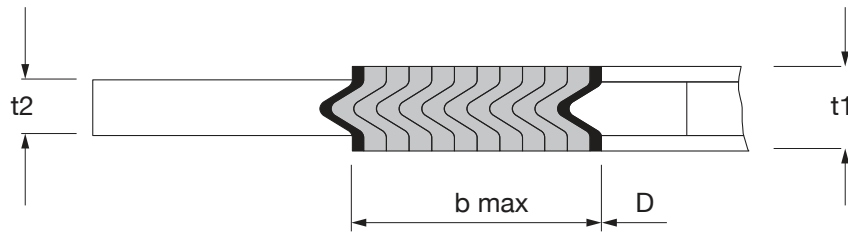
Graphite is universally applicable, high-quality, asbestos-free material with a very good chemical resistance, resistance to ageing, good gastightness.

PTFE is a high quality synthetic material with an excellent chemical resistance, resistance to temperature up to 250°C, resistant to ageing, excellent gastightness.

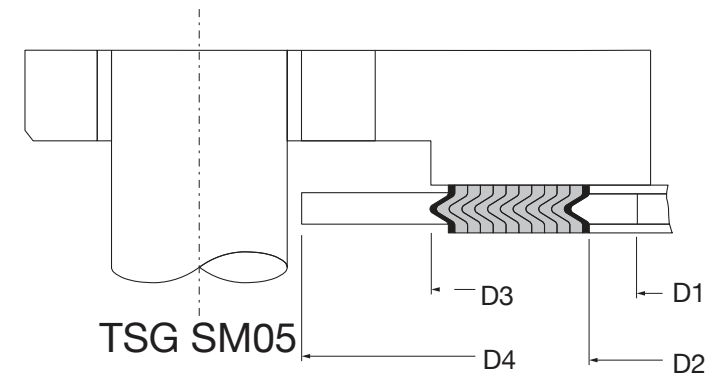
*Non standard materials are available on request.*

## Selection of gasket thickness

Spiral wound gasket is standard produced with a thickness of 4,5mm. However, in some cases another thickness can be selected to obtain effective sealing. Please see the table below:



## Production tolerances (pt)



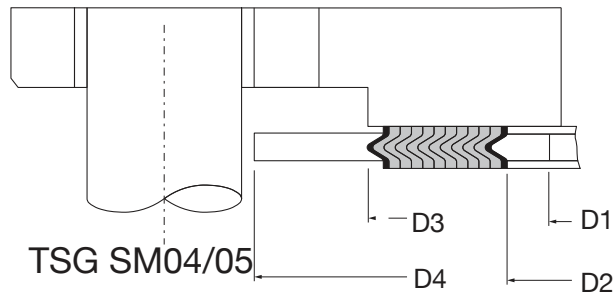
| t1 [mm] | Tolerance [mm] | D [mm]      | b max [mm] | t2  | Thickness after fitting [mm] |
|---------|----------------|-------------|------------|-----|------------------------------|
| 7.2     | + 0,35         | 100 - 3200  | 33         | 5   | 5.3 - 5.6                    |
| 6.4     | + 0,30         | 100 - 1600  | 30         | 4   | 4.7 - 4.9                    |
| 6.4     | + 0,30         | 1601 - 3200 | 25         | 4   | 4.7 - 4.9                    |
| 4.8     | + 0,25         | 15 - 630    | 35         | 3   | 3.2 - 3.4                    |
| 4.8     | + 0,25         | 631 - 1600  | 30         | 3   | 3.2 - 3.4                    |
| 4.8     | + 0,25         | 1601 - 2000 | 20         | 3   | 3.2 - 3.4                    |
| 3.5     | + 0,25         | 15 - 1000   | 25         | 2   | 2.3 - 2.5                    |
| 3.2     | + 0,25         | 15 - 1000   | 20         | 3   | 2.3 - 2.5                    |
| 2.5     | + 0,25         | 15 - 500    | 10         | 1.5 | 1.8 - 2.0                    |

| Gasket Standard | ASME B 16.20                            |                                   | BS 3381                        |         | DIN  |        |
|-----------------|---|-----------------------------------|--------------------------------|---------|--|--------|
|                 | ASME/ANSI B16.5                         | ASME/ANSI B16.47 series A,B       | BS 1560                        | DIN     |  |        |
| Flange Standard | Dim.                                    | Dia.                              | Dia.                           | PT [mm] | Dia.   | PT[mm] |
| D1              | 1/2" - 3" ± 0,8                         | 26" - 60" ± 3,0<br>4" - 24" ± 1,5 | 1/2"-3" + 0,8<br>4"-24" + 1,5  |         | ≤600 ± 0,8<br>>600 ≤800 ± 1,5<br>>800 ≤1600 ± 3<br>>2000 ± 3       |        |
| D2              | 1/2" - 8" ± 0,4<br>10" - 24" ± 0,8      | 26"-34" ± 0,8<br>36"-60" ± 1,3    | 1/2"-8" + 0,4<br>10"-24" + 1,5 |         | ≤600 ± 0,8<br>>600 ≤800 ± 1,5<br>>800 ≤1600 ± 1,5<br>>1600 ± 3,0   |        |
| D3              | 1/2" - 8" ± 0,8<br>10" - 24" +1,5 - 0,8 | 26"-60" ± 1,5                     | 1/2"-8" - 0,8<br>10"-24" - 1,5 |         | ≤600 ± 0,8<br>>600 ≤1600 ± 1,5<br>>1600 ± 3,0                      |        |
| D4              | 1/2" - 24" - 0,8                        | 26"-60" ± 0,8                     | 1/2"-24" - 0,8                 |         | ≤600 - 0,8<br>>600 ≤1000 - 1,5<br>>1000 ≤2000 - 2,0<br>>2000 - 3,0 |        |

# SPIRAL WOUND GASKETS (SWG)

## For BS 1560 and ASME/ ANSI B 16.5 flanges

Dimensions for SWG (seaco® TSG SM04 and SM05) for BS 1560 and ASME/ ANSI B 16.5 flanges in **carbon steel** with gasket standard BS 3381

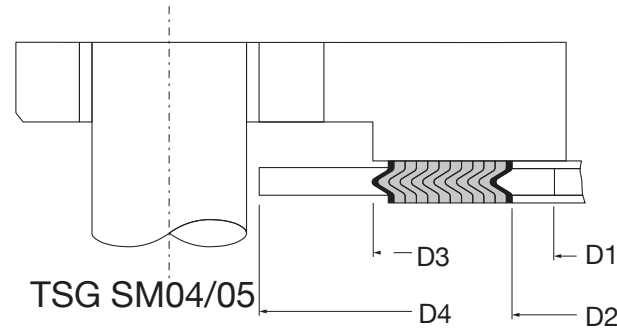


| nominal pipe dia | d1 [mm]<br>Pressure class [lbs]<br>150 - 2500 | d2[mm]<br>Pressure class [lbs] |          |       | d3[mm]<br>Pressure class [lbs]<br>150-2500 | d4[mm]<br>Pressure class [lbs] |       |       |       |       |       |
|------------------|---|--------------------------------|----------|-------|--|--------------------------------|-------|-------|-------|-------|-------|
|                  |   | 150                            | 300-1500 | 2500  |  | 150                            | 300   | 600   | 900   | 1500  | 2500  |
| 1/2"             | 14,3  | 18,7                           | 18,7     | 18,7  | 32,2                                       | 47,6                           | 54,0  | 54,0  | 63,5  | 63,5  | 69,9  |
| 3/4"             | 20,6  | 26,6                           | 25,0     | 25,0  | 40,1                                       | 57,2                           | 66,7  | 66,7  | 69,9  | 69,9  | 76,2  |
| 1"               | 27,0  | 32,9                           | 31,4     | 31,4  | 48,0                                       | 66,7                           | 73,0  | 73,0  | 79,4  | 79,4  | 85,7  |
| 1 1/4"           | 34,9  | 45,6                           | 44,1     | 39,3  | 60,7                                       | 76,2                           | 82,6  | 82,6  | 88,9  | 88,9  | 104,8 |
| 1 1/2"           | 41,3  | 53,6                           | 50,4     | 47,2  | 70,3                                       | 85,7                           | 95,3  | 95,3  | 98,4  | 98,4  | 117,5 |
| 2"               | 52,4  | 69,5                           | 66,3     | 58,3  | 86,1                                       | 104,8                          | 111,1 | 111,1 | 142,9 | 142,9 | 146,1 |
| 2 1/2"           | 63,5  | 82,2                           | 79,0     | 69,5  | 98,8                                       | 123,8                          | 130,2 | 130,2 | 165,1 | 165,1 | 168,3 |
| 3"               | 77,8  | 101,2                          | 94,9     | 91,7  | 121,1                                      | 136,5                          | 149,2 | 149,2 | 168,8 | 174,6 | 196,9 |
| 4"               | 103,2   | 126,6                          | 120,3    | 117,1 | 149,6                                      | 174,6                          | 181,0 | 193,7 | 206,4 | 209,6 | 235,0 |
| 5"               | 128,5   | 153,6                          | 147,2    | 142,5 | 178,2                                      | 196,9                          | 215,9 | 241,3 | 247,7 | 254,0 | 279,4 |
| 6"               | 154,0   | 180,6                          | 174,2    | 171,1 | 210,0                                      | 222,3                          | 250,8 | 266,7 | 288,9 | 282,6 | 317,5 |
| 8"               | 203,2   | 231,4                          | 225,0    | 215,5 | 263,9                                      | 279,4                          | 308,0 | 320,7 | 358,8 | 352,4 | 387,4 |
| 10"              | 254,0   | 286,9                          | 280,6    | 269,5 | 317,9                                      | 339,7                          | 362,0 | 400,1 | 435,0 | 435,0 | 476,3 |
| 12"              | 303,2   | 339,3                          | 333,0    | 323,5 | 375,1                                      | 409,6                          | 422,3 | 457,2 | 498,5 | 520,7 | 549,6 |
| 14"              | 342,9   | 371,1                          | 364,7    |       | 406,8                                      | 450,9                          | 485,8 | 492,1 | 520,7 | 577,9 |       |
| 16"              | 393,7   | 421,9                          | 415,5    |       | 464,0                                      | 514,4                          | 539,8 | 565,2 | 574,7 | 641,4 |       |
| 18"              | 444,5   | 475,9                          | 469,5    |       | 527,5                                      | 549,3                          | 596,9 | 612,8 | 638,2 | 704,9 |       |
| 20"              | 495,3   | 526,7                          | 520,3    |       | 578,3                                      | 606,4                          | 654,1 | 682,6 | 698,5 | 755,7 |       |
| 24"              | 596,9   | 631,4                          | 625,1    |       | 686,2                                      | 717,6                          | 774,7 | 790,6 | 838,2 | 901,7 |       |

# SPIRAL WOUND GASKETS (SWG)

## For ASME/ANSI B 16.5 flange

Dimensions for SWG (seaco® TSG SM04 and SM05) for ASME/ANSI B 16.5 flanges in accordance with gasket standard ASME 16.20 (API 60)

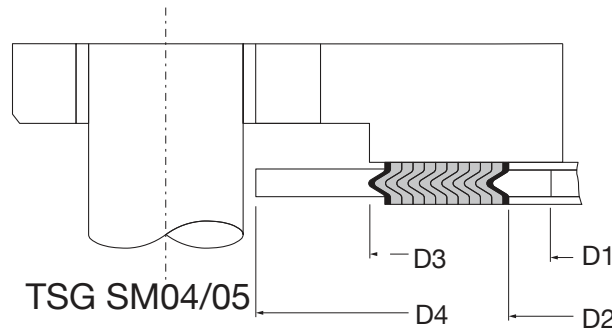


| nom. Pipe Dia. | d1 [mm]<br>pressure class [lbs] |       |       |       |       |       |       | d2[mm]<br>pressure class [lbs] |       |       |       |       |       |       | d3[mm]  |          | d4[mm]<br>pressure class [lbs] |       |       |       |       |       |       |       |
|----------------|---------------------------------|-------|-------|-------|-------|-------|-------|--------------------------------|-------|-------|-------|-------|-------|-------|---------|----------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                | 150                             | 300   | 400   | 600   | 900   | 1500  | 2500  | 150                            | 300   | 400   | 600   | 900   | 1500  | 2500  | 150-600 | 900-2500 | 150                            | 300   | 400   | 600   | 900   | 1500  | 2500  |       |
| 1/2"           | 14,2                            | 14,2  | 14,2  | 14,2  | 14,2  | 14,2  | 14,2  | 19,1                           | 19,1  | 19,1  | 19,1  | 19,1  | 19,1  | 19,1  | 31,8    | 31,8     | 47,8                           | 54,1  | 54,1  | 54,1  | 63,5  | 63,5  | 69,9  |       |
| 3/4"           | 20,6                            | 20,6  | 20,6  | 20,6  | 20,6  | 20,6  | 20,6  | 25,4                           | 25,4  | 25,4  | 25,4  | 25,4  | 25,4  | 25,4  | 39,6    | 39,6     | 57,2                           | 66,8  | 66,8  | 66,8  | 69,9  | 69,9  | 76,2  |       |
| 1"             | 26,9                            | 26,9  | 26,9  | 26,9  | 26,9  | 26,9  | 26,9  | 31,8                           | 31,8  | 31,8  | 31,8  | 31,8  | 31,8  | 31,8  | 47,8    | 47,8     | 66,8                           | 73,2  | 73,2  | 73,2  | 79,5  | 79,5  | 85,9  |       |
| 1 1/4"         | 38,1                            | 38,1  | 38,1  | 38,1  | 33,3  | 33,3  | 33,3  | 47,8                           | 47,8  | 47,8  | 47,8  | 39,6  | 39,6  | 39,6  | 60,5    | 60,5     | 76,2                           | 82,6  | 82,6  | 82,6  | 88,9  | 88,9  | 104,9 |       |
| 1 1/2"         | 44,5                            | 44,5  | 44,5  | 44,5  | 41,4  | 41,4  | 41,4  | 54,1                           | 54,1  | 54,1  | 54,1  | 47,8  | 47,8  | 47,8  | 69,9    | 69,9     | 85,9                           | 95,3  | 95,3  | 95,3  | 98,6  | 98,6  | 117,6 |       |
| 2"             | 55,6                            | 55,6  | 55,6  | 55,6  | 52,3  | 52,3  | 52,3  | 69,9                           | 69,9  | 69,9  | 69,9  | 58,7  | 58,7  | 58,7  | 85,9    | 85,9     | 104,9                          | 111,3 | 111,3 | 111,3 | 143,0 | 143,0 | 146,0 |       |
| 2 1/2"         | 66,5                            | 66,5  | 66,5  | 66,5  | 63,5  | 63,5  | 63,5  | 82,6                           | 82,6  | 82,6  | 82,6  | 69,9  | 69,9  | 69,9  | 98,6    | 98,6     | 124,0                          | 130,3 | 130,3 | 130,3 | 165,1 | 165,1 | 168,4 |       |
| 3"             | 81,0                            | 81,0  | 81,0  | 81,0  | 81,0  | 81,0  | 81,0  | 101,6                          | 101,6 | 101,6 | 101,6 | 95,3  | 92,2  | 92,2  | 120,7   | 120,7    | 136,7                          | 149,4 | 149,4 | 149,4 | 168,4 | 174,8 | 196,9 |       |
| 4"             | 106,4                           | 106,4 | 106,4 | 106,4 | 106,4 | 106,4 | 106,4 | 127,0                          | 127,0 | 127,0 | 127,0 | 120,7 | 120,7 | 117,6 | 117,6   | 149,4    | 149,4                          | 174,8 | 181,1 | 177,8 | 193,8 | 206,5 | 209,6 | 235,0 |
| 5"             | 131,8                           | 131,8 | 131,8 | 131,8 | 131,8 | 131,8 | 131,8 | 155,7                          | 155,7 | 147,6 | 147,6 | 147,6 | 143,0 | 143,0 | 177,8   | 177,8    | 196,9                          | 215,9 | 212,9 | 241,3 | 247,7 | 254,0 | 279,4 |       |
| 6"             | 157,2                           | 157,2 | 157,2 | 157,2 | 157,2 | 157,2 | 157,2 | 182,6                          | 182,6 | 174,8 | 174,8 | 174,8 | 171,5 | 171,5 | 209,6   | 209,6    | 222,3                          | 251,0 | 247,7 | 266,7 | 289,1 | 282,7 | 317,5 |       |
| 8"             | 215,9                           | 215,9 | 209,6 | 209,6 | 209,6 | 206,2 | 200,2 | 233,4                          | 233,4 | 225,6 | 225,6 | 222,3 | 215,9 | 215,9 | 263,7   | 257,3    | 279,4                          | 308,1 | 304,8 | 320,8 | 358,9 | 352,6 | 387,4 |       |
| 10"            | 268,2                           | 268,2 | 260,4 | 260,4 | 260,4 | 257,8 | 247,7 | 287,3                          | 287,3 | 274,6 | 274,6 | 276,4 | 266,7 | 270,0 | 317,5   | 311,2    | 339,9                          | 362,0 | 358,9 | 400,1 | 435,1 | 435,1 | 476,3 |       |
| 12"            | 317,5                           | 317,5 | 317,5 | 317,5 | 314,5 | 314,5 | 292,1 | 339,9                          | 339,9 | 327,2 | 327,2 | 323,9 | 323,9 | 317,5 | 374,7   | 368,3    | 409,7                          | 422,4 | 419,1 | 457,2 | 498,6 | 520,7 | 549,4 |       |
| 14"            | 349,3                           | 349,3 | 349,3 | 349,3 | 342,9 | 339,9 |       | 371,6                          | 371,6 | 362,0 | 362,0 | 355,6 | 362,0 |       | 406,4   | 400,1    | 450,9                          | 485,9 | 482,6 | 492,3 | 520,7 | 577,9 |       |       |
| 16"            | 400,1                           | 400,1 | 400,1 | 400,1 | 393,7 | 387,4 |       | 422,4                          | 422,4 | 412,8 | 412,8 | 412,8 | 406,4 |       | 463,6   | 457,2    | 514,4                          | 539,8 | 536,7 | 565,2 | 574,8 | 641,4 |       |       |
| 18"            | 449,3                           | 449,3 | 449,3 | 449,3 | 444,5 | 438,2 |       | 474,7                          | 474,7 | 469,9 | 469,9 | 463,6 | 463,6 |       | 527,1   | 520,7    | 549,4                          | 596,9 | 593,9 | 612,9 | 638,3 | 704,9 |       |       |
| 20"            | 500,1                           | 500,1 | 500,1 | 500,1 | 495,3 | 489,0 |       | 525,5                          | 525,5 | 520,7 | 520,7 | 520,7 | 520,7 |       | 577,9   | 571,5    | 606,6                          | 654,1 | 647,7 | 682,8 | 698,5 | 755,7 |       |       |
| 24"            | 603,3                           | 603,3 | 603,3 | 603,3 | 603,3 | 577,9 |       | 628,7                          | 628,7 | 628,7 | 628,7 | 628,7 | 628,7 |       | 685,8   | 679,5    | 717,6                          | 774,7 | 768,4 | 790,7 | 838,2 | 901,7 |       |       |

# SPIRAL WOUND GASKETS (SWG)

For ASME/ANSI B 16.5 flanges in accordance with gasket standard ASME 16.20 (API 601)

Spiral wound gaskets (seaco® TSG SM04 and SM05) for ASME B 16.47 series A (MSS SP-44) flanges in accordance with gasket standard ASME 16.20 (API 601)

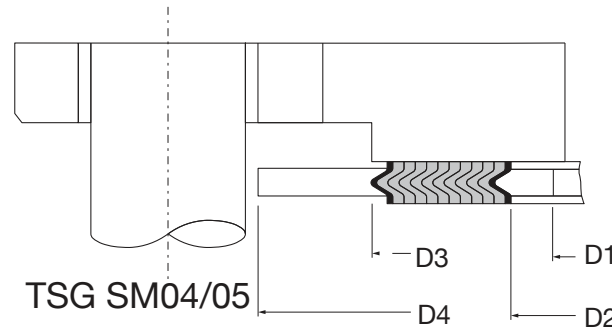


| nom. pipe diam. | D1 [mm]<br>pressure class [lbs] |        |        |        |        | D2[mm]<br>pressure class [lbs] |        |        |        |        | D3[mm]<br>pressure class [lbs] |        |        |        |        | D4[mm]<br>pressure class [lbs] |        |        |        |        |
|-----------------|---------------------------------|--------|--------|--------|--------|--------------------------------|--------|--------|--------|--------|--------------------------------|--------|--------|--------|--------|--------------------------------|--------|--------|--------|--------|
|                 | 150                             | 300    | 400    | 600    | 900    | 150                            | 300    | 400    | 600    | 900    | 150                            | 300    | 400    | 600    | 900    | 150                            | 300    | 400    | 600    | 900    |
| 26"             | 654,1                           | 654,1  | 660,4  | 647,7  | 666,8  | 673,1                          | 685,8  | 685,8  | 685,8  | 685,8  | 704,9                          | 736,6  | 736,6  | 736,6  | 736,6  | 774,7                          | 835,2  | 831,9  | 866,9  | 882,7  |
| 28"             | 704,9                           | 704,9  | 711,2  | 698,5  | 711,2  | 723,9                          | 736,6  | 736,6  | 736,6  | 736,6  | 755,7                          | 787,4  | 787,4  | 787,4  | 787,4  | 831,9                          | 898,7  | 892,3  | 914,4  | 946,2  |
| 30"             | 755,7                           | 755,7  | 755,7  | 755,7  | 774,7  | 774,7                          | 793,8  | 793,8  | 793,8  | 793,8  | 806,5                          | 844,6  | 844,6  | 844,6  | 844,6  | 882,7                          | 952,5  | 946,2  | 971,6  | 1009,7 |
| 32"             | 806,5                           | 806,5  | 812,8  | 812,8  | 812,8  | 825,5                          | 850,9  | 850,9  | 850,9  | 850,9  | 860,6                          | 901,7  | 901,7  | 901,7  | 901,7  | 939,8                          | 1006,6 | 1003,3 | 1022,4 | 1073,2 |
| 34"             | 857,3                           | 857,3  | 863,6  | 863,6  | 863,6  | 876,3                          | 901,7  | 901,7  | 901,7  | 901,7  | 911,4                          | 952,5  | 952,5  | 952,5  | 952,5  | 990,6                          | 1057,4 | 1054,1 | 1073,2 | 1136,7 |
| 36"             | 908,1                           | 908,1  | 917,7  | 917,7  | 920,8  | 927,1                          | 955,8  | 955,8  | 955,8  | 958,9  | 968,5                          | 1006,6 | 1006,6 | 1006,6 | 1009,7 | 1047,8                         | 1117,6 | 1117,6 | 1130,3 | 1200,2 |
| 38"             | 958,9                           | 952,5  | 952,5  | 952,5  | 1009,7 | 977,9                          | 977,9  | 971,6  | 990,6  | 1035,1 | 1019,3                         | 1016,0 | 1022,4 | 1041,4 | 1085,9 | 1111,3                         | 1054,1 | 1073,2 | 1104,9 | 1200,2 |
| 40"             | 1009,7                          | 1003,3 | 1000,3 | 1009,7 | 1060,5 | 1028,7                         | 1022,4 | 1025,7 | 1047,8 | 1098,6 | 1070,1                         | 1070,1 | 1076,5 | 1098,6 | 1149,4 | 1162,1                         | 1114,6 | 1127,3 | 1155,7 | 1251,0 |
| 42"             | 1060,5                          | 1054,1 | 1051,1 | 1066,8 | 1111,3 | 1079,5                         | 1073,2 | 1076,5 | 1104,9 | 1149,4 | 1124,0                         | 1120,9 | 1127,3 | 1155,7 | 1200,2 | 1219,2                         | 1165,4 | 1178,1 | 1219,2 | 1301,8 |
| 44"             | 1111,3                          | 1104,9 | 1104,9 | 1111,3 | 1155,7 | 1130,3                         | 1130,3 | 1130,3 | 1162,1 | 1206,5 | 1178,1                         | 1181,1 | 1181,1 | 1212,9 | 1257,3 | 1276,4                         | 1219,2 | 1231,9 | 1270,0 | 1368,6 |
| 46"             | 1162,1                          | 1152,6 | 1168,4 | 1162,1 | 1219,2 | 1181,1                         | 1178,1 | 1193,8 | 1212,9 | 1270,0 | 1228,9                         | 1228,9 | 1244,6 | 1263,7 | 1320,8 | 1327,2                         | 1273,3 | 1289,1 | 1327,2 | 1435,1 |
| 48"             | 1212,9                          | 1209,8 | 1206,5 | 1219,2 | 1270,0 | 1231,9                         | 1235,2 | 1244,6 | 1270,0 | 1320,8 | 1279,7                         | 1286,0 | 1295,4 | 1320,8 | 1371,6 | 1384,3                         | 1324,1 | 1346,2 | 1390,7 | 1485,9 |
| 50"             | 1263,7                          | 1244,6 | 1257,3 | 1270,0 |        | 1282,7                         | 1295,4 | 1295,4 | 1320,8 |        | 1333,5                         | 1346,2 | 1346,2 | 1371,6 | 1435,1 | 1378,0                         | 1403,4 | 1447,8 |        |        |
| 52"             | 1314,5                          | 1320,8 | 1308,1 | 1320,8 |        | 1333,5                         | 1346,2 | 1346,2 | 1371,6 |        | 1384,3                         | 1397,0 | 1397,0 | 1422,4 | 1492,3 | 1428,8                         | 1454,2 | 1498,6 |        |        |
| 54"             | 1358,9                          | 1352,6 | 1352,6 | 1378,0 |        | 1384,3                         | 1403,4 | 1403,4 | 1428,8 |        | 1435,1                         | 1454,2 | 1454,2 | 1479,6 | 1549,4 | 1492,3                         | 1517,7 | 1555,8 |        |        |
| 56"             | 1409,7                          | 1403,4 | 1403,4 | 1428,8 |        | 1435,1                         | 1454,2 | 1454,2 | 1479,6 |        | 1485,9                         | 1505,0 | 1505,0 | 1530,4 | 1606,6 | 1543,1                         | 1568,5 | 1612,9 |        |        |
| 58"             | 1460,5                          | 1447,8 | 1454,2 | 1473,2 |        | 1485,9                         | 1511,3 | 1505,0 | 1536,7 |        | 1536,7                         | 1562,1 | 1555,8 | 1587,5 | 1663,7 | 1593,9                         | 1619,3 | 1663,7 |        |        |
| 60"             | 1511,3                          | 1524,0 | 1517,7 | 1530,4 |        | 1536,7                         | 1562,1 | 1568,5 | 1593,9 |        | 1587,5                         | 1612,9 | 1619,3 | 1644,7 | 1714,5 | 1644,7                         | 1682,8 | 1733,6 |        |        |

# SPIRAL WOUND GASKETS (SWG)

## For ASME B 16.47 series B (API 605) flanges

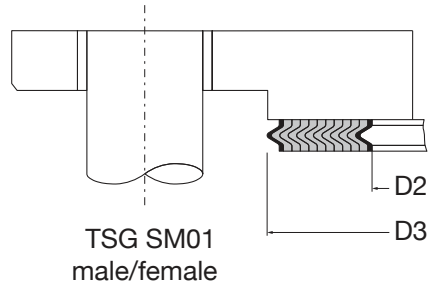
Spiral wound gaskets (seaco® TSG SM04 and SM05) for ASME B 16.47 series B (API 605) flanges in accordance with gasket standard ASME 16.20 (API 601)



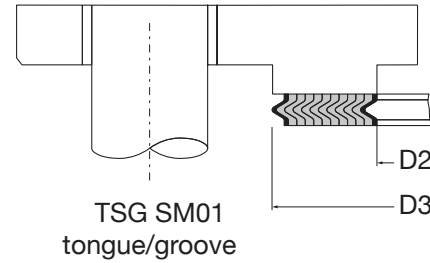
| nom. pipe diam. | D1 [mm]<br>pressure class [lbs] |        |        |        |        | D2 [mm]<br>pressure class [lbs] |        |        |        |        | D3 [mm]<br>pressure class [lbs] |        |        |        |        | D4 [mm]<br>pressure class [lbs] |        |        |        |        |
|-----------------|---------------------------------|--------|--------|--------|--------|---------------------------------|--------|--------|--------|--------|---------------------------------|--------|--------|--------|--------|---------------------------------|--------|--------|--------|--------|
|                 | 150                             | 300    | 400    | 600    | 900    | 150                             | 300    | 400    | 600    | 900    | 150                             | 300    | 400    | 600    | 900    | 150                             | 300    | 400    | 600    | 900    |
| 26"             | 654,1                           | 654,1  | 654,1  | 644,7  | 673,1  | 673,1                           | 673,1  | 666,8  | 663,7  | 692,2  | 698,5                           | 711,2  | 698,5  | 714,5  | 749,3  | 725,4                           | 771,7  | 746,3  | 765,3  | 838,2  |
| 28"             | 704,9                           | 704,9  | 701,8  | 692,2  | 723,9  | 723,9                           | 723,9  | 714,5  | 704,9  | 743,0  | 749,3                           | 762,0  | 749,3  | 755,7  | 800,1  | 776,2                           | 825,5  | 800,1  | 819,2  | 901,7  |
| 30"             | 755,7                           | 755,7  | 752,6  | 752,6  | 787,4  | 774,7                           | 774,7  | 765,3  | 778,0  | 806,5  | 800,1                           | 812,8  | 806,5  | 828,8  | 857,3  | 827,0                           | 886,0  | 857,3  | 879,6  | 958,9  |
| 32"             | 806,5                           | 806,5  | 800,1  | 793,8  | 838,2  | 825,5                           | 825,5  | 812,8  | 831,9  | 863,6  | 850,9                           | 863,6  | 860,6  | 882,7  | 914,4  | 881,1                           | 939,8  | 911,4  | 933,5  | 1016,0 |
| 34"             | 857,3                           | 857,3  | 850,9  | 850,9  | 859,4  | 876,3                           | 876,3  | 866,9  | 889,0  | 920,8  | 908,1                           | 914,4  | 911,4  | 939,8  | 971,6  | 935,0                           | 993,9  | 962,2  | 997,0  | 1073,2 |
| 36"             | 908,1                           | 908,1  | 898,7  | 901,7  | 927,1  | 927,1                           | 927,1  | 917,7  | 939,8  | 946,2  | 958,9                           | 965,2  | 965,2  | 990,6  | 997,0  | 987,6                           | 1047,8 | 1022,4 | 1047,8 | 1124,0 |
| 38"             | 958,9                           | 971,6  | 952,5  | 952,5  | 1009,7 | 974,6                           | 1009,7 | 971,6  | 990,6  | 1035,1 | 1009,7                          | 1047,8 | 1022,4 | 1041,4 | 1085,9 | 1044,7                          | 1098,6 | 1073,2 | 1104,9 | 1200,2 |
| 40"             | 1009,7                          | 1022,4 | 1000,3 | 1009,7 | 1060,5 | 1022,4                          | 1060,5 | 1025,7 | 1047,8 | 1098,6 | 1063,8                          | 1098,6 | 1076,5 | 1098,6 | 1149,4 | 1095,5                          | 1149,4 | 1127,3 | 1155,7 | 1251,0 |
| 42"             | 1060,5                          | 1054,1 | 1051,1 | 1066,8 | 1111,3 | 1079,5                          | 1079,5 | 1076,5 | 1104,9 | 1149,4 | 1114,6                          | 1117,6 | 1127,3 | 1155,7 | 1200,2 | 1146,3                          | 1200,2 | 1178,1 | 1219,2 | 1301,8 |
| 44"             | 1111,3                          | 1124,0 | 1104,9 | 1111,3 | 1155,7 | 1124,0                          | 1162,1 | 1130,3 | 1162,1 | 1206,5 | 1165,4                          | 1200,0 | 1181,1 | 1212,9 | 1257,3 | 1197,1                          | 1251,0 | 1231,9 | 1270,0 | 1368,6 |
| 46"             | 1162,1                          | 1178,1 | 1168,4 | 1162,1 | 1219,2 | 1181,1                          | 1216,2 | 1193,8 | 1212,9 | 1270,0 | 1224,0                          | 1254,3 | 1244,6 | 1263,7 | 1320,8 | 1255,8                          | 1317,8 | 1289,1 | 1327,2 | 1435,1 |
| 48"             | 1212,9                          | 1200,2 | 1206,5 | 1219,2 | 1270,0 | 1231,9                          | 1231,9 | 1244,6 | 1270,0 | 1320,8 | 1270,0                          | 1270,0 | 1295,4 | 1320,8 | 1371,6 | 1306,6                          | 1368,6 | 1346,2 | 1390,7 | 1485,9 |
| 50"             | 1263,7                          | 1267,0 | 1257,3 | 1270,0 |        | 1282,7                          | 1317,8 | 1295,4 | 1320,8 |        | 1325,6                          | 1355,9 | 1346,2 | 1371,6 | 1357,4 | 1419,4                          | 1403,4 | 1447,8 |        |        |
| 52"             | 1314,5                          | 1317,8 | 1308,1 | 1320,8 |        | 1333,5                          | 1368,6 | 1346,2 | 1371,6 |        | 1376,4                          | 1406,7 | 1397,0 | 1422,4 | 1408,2 | 1470,2                          | 1454,2 | 1498,6 |        |        |
| 54"             | 1365,3                          | 1346,2 | 1352,6 | 1378,0 |        | 1384,3                          | 1384,3 | 1403,4 | 1428,8 |        | 1422,4                          | 1422,4 | 1454,2 | 1479,6 | 1463,8 | 1530,4                          | 1517,7 | 1555,8 |        |        |
| 56"             | 1412,7                          | 1428,8 | 1403,4 | 1428,8 |        | 1435,1                          | 1479,6 | 1454,2 | 1479,6 |        | 1472,2                          | 1524,0 | 1505,0 | 1530,4 | 1514,6 | 1593,9                          | 1568,5 | 1612,9 |        |        |
| 58"             | 1463,5                          | 1484,4 | 1454,2 | 1473,2 |        | 1485,9                          | 1535,2 | 1505,0 | 1536,7 |        | 1522,5                          | 1573,3 | 1555,8 | 1587,5 | 1579,6 | 1655,8                          | 1619,3 | 1663,7 |        |        |
| 60"             | 1514,3                          | 1505,0 | 1517,7 | 1530,4 |        | 1536,7                          | 1536,7 | 1568,5 | 1593,9 |        | 1573,3                          | 1574,8 | 1619,3 | 1644,7 | 1630,4 | 1706,6                          | 1682,8 | 1733,6 |        |        |

# SPIRAL WOUND GASKETS (SWG)

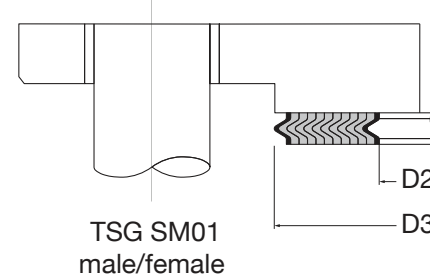
Seaco TSG® SM01, 150lbs-1500lbs  
for flange shape male/female  
in acc. with ASME/ANSI B16.5



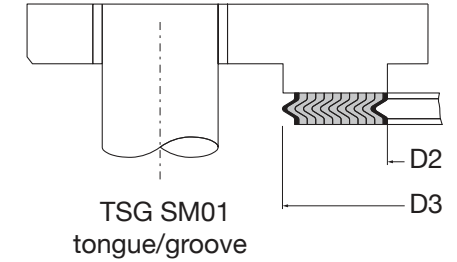
Seaco TSG® SM01, 150lbs-1500lbs  
for flange shape tongue/groove  
in acc. with ASME/ANSI B16.5



Seaco TSG® SM01, PN 10-100 bar  
for flange shape male/female  
DIN 2692 in acc. with DIN 2692



Seaco TSG® SM01, PN 10-100 bar  
for flange shape tongue/groove  
DIN 2512 in acc. with DIN 2691



| Nom pipe dia. | Narrow D3 [mm] | Wide    |         |
|---------------|----------------|---------|---------|
|               |                | D3 [mm] | D2 [mm] |
| 1/2"          | 18             | 21      | 35      |
| 3/4"          | 24             | 27      | 43      |
| 1"            | 30             | 33      | 51      |
| 1 1/4"        | 38             | 42      | 64      |
| 1 1/2"        | 44             | 48      | 73      |
| 2"            | 57             | 60      | 92      |
| 2 1/2"        | 68             | 73      | 105     |
| 3"            | 84             | 89      | 127     |
| 3 1/2"        | 97             | 102     | 140     |
| 4"            | 110            | 114     | 157     |
| 5"            | 137            | 141     | 186     |
| 6"            | 162            | 168     | 216     |
| 8"            | 213            | 219     | 270     |
| 10"           | 267            | 273     | 324     |
| 12"           | 318            | 324     | 381     |
| 14"           | 349            | 356     | 413     |
| 16"           | 400            | 406     | 470     |
| 18"           | 451            | 457     | 535     |
| 20"           | 502            | 510     | 585     |
| 24"           | 603            | 610     | 690     |

| Nom. pipe dia. | D2 [mm] | Narrow D3 [mm] | Wide D3 [mm] |
|----------------|---------|----------------|--------------|
|                |         |                |              |
| 3/4"           | 33      | 43             | 43           |
| 1"             | 38      | 48             | 51           |
| 1 1/4"         | 48      | 57             | 64           |
| 1 1/2"         | 54      | 64             | 73           |
| 2"             | 73      | 83             | 92           |
| 2 1/2"         | 86      | 95             | 105          |
| 3"             | 108     | 118            | 127          |
| 3 1/2"         | 121     | 130            | 140          |
| 4"             | 132     | 145            | 157          |
| 5"             | 160     | 173            | 186          |
| 6"             | 190     | 203            | 216          |
| 8"             | 238     | 254            | 270          |
| 10"            | 286     | 305            | 324          |
| 12"            | 343     | 36             | 381          |
| 14"            | 375     | 394            | 413          |
| 16"            | 425     | 448            | 470          |
| 18"            | 489     | 511            | 535          |
| 20"            | 535     | 559            | 585          |
| 22"            | 591     | 616            | 641          |
| 24"            | 640     | 667            | 690          |

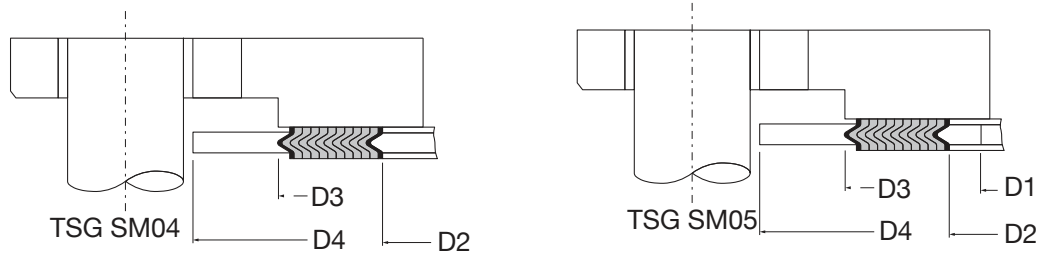
| Nom. pipe diam. | d2 [mm] | d3 [mm] |
|-----------------|---------|---------|
|                 |         |         |
| 15              | 22      | 39      |
| 20              | 28      | 50      |
| 25              | 35      | 57      |
| 32              | 43      | 65      |
| 40              | 49      | 75      |
| 50              | 61      | 87      |
| 65              | 77      | 109     |
| 80              | 90      | 120     |
| 100             | 115     | 149     |
| 125             | 141     | 175     |
| 150             | 169     | 203     |
| 175             | 195     | 233     |
| 200             | 220     | 259     |
| 250             | 274     | 312     |
| 300             | 325     | 363     |
| 350             | 368     | 421     |
| 400             | 420     | 473     |
| 500             | 520     | 575     |
| 600             | 620     | 675     |
| 700             | 720     | 777     |
| 800             | 820     | 882     |
| 900             | 920     | 987     |
| 1000            | 1020    | 1091    |

| Nom. pipe diam. | D2 [mm] | D3 [mm] |
|-----------------|---------|---------|
|                 |         |         |
| 8               | 22      | 32      |
| 10              | 24      | 34      |
| 15              | 29      | 39      |
| 20              | 36      | 50      |
| 25              | 43      | 57      |
| 32              | 51      | 65      |
| 40              | 61      | 75      |
| 50              | 73      | 87      |
| 65              | 95      | 109     |
| 80              | 106     | 120     |
| 100             | 129     | 149     |
| 125             | 155     | 175     |
| 150             | 183     | 203     |
| 175             | 213     | 233     |
| 200             | 239     | 259     |
| 250             | 292     | 312     |
| 300             | 343     | 363     |
| 350             | 395     | 421     |
| 400             | 447     | 473     |
| 500             | 549     | 575     |
| 600             | 649     | 675     |
| 700             | 751     | 777     |
| 800             | 856     | 882     |
| 900             | 961     | 987     |
| 1000            | 1062    | 1092    |



# SPIRAL WOUND GASKETS (SWG)

## Seaco TSG® SM04 and SM05) for DIN flanges



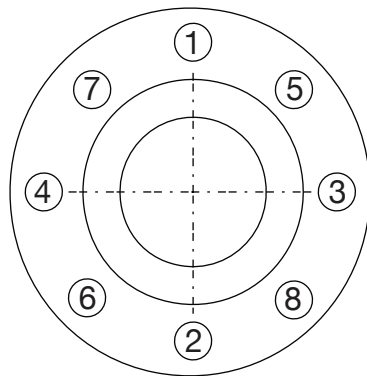
| DN   |       | PN10 |      |      |      | PN16      |      | PN25      |      | PN40      |      | PN63      |     |     | PN100     |           |     | PN160     |           |     |     |     |     |     |     |     |     |
|------|-------|------|------|------|------|-----------|------|-----------|------|-----------|------|-----------|-----|-----|-----------|-----------|-----|-----------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|
| mm   | inch  | D0   | D1   | D2   | D3   | D0/D1/D2  | D3   | D0/D1/D2  | D3   | D0/D1/D2  | D3   | D0/D1     | D2  | D3  | D0/D1     | D2        | D3  | D0/D1     | D2        | D3  |     |     |     |     |     |     |     |
| 10   | 1/4   | 18   | 24   | 34   | 46   | idem PN10 | 46   | idem PN10 | 46   | idem PN10 | 46   | idem PN10 | 34  | 56  | idem PN10 | idem PN64 | 61  | idem PN10 | idem PN64 | 61  |     |     |     |     |     |     |     |
| 20   | 3/4   | 28   | 34   | 46   | 61   |           | 61   |           | -    |           | -    |           | -   | -   |           |           | 61  |           |           | -   | -   | -   | -   | -   | -   | -   | -   |
| 25   | 1     | 35   | 41   | 53   | 71   |           | 71   |           | 53   |           | 82   |           | 71  | 71  |           |           | 53  |           |           | 82  | 82  | 82  | 82  | 82  | 82  | 82  | 82  |
| 32   | 1 1/4 | 43   | 49   | 61   | 82   |           | 82   |           | -    |           | -    |           | 82  | 82  |           |           | -   |           |           | -   | -   | -   | -   | -   | -   | -   | -   |
| 40   | 1 1/2 | 50   | 56   | 68   | 92   |           | 92   |           | 68   |           | 103  |           | 92  | 92  |           |           | 68  |           |           | 103 | 103 | 103 | 103 | 103 | 103 | 103 | 103 |
| 50   | 2     | 61   | 70   | 86   | 107  |           | 107  |           | 86   |           | 113  |           | 107 | 107 |           |           | 86  |           |           | 113 | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| 65   | 2 1/2 | 77   | 86   | 102  | 127  |           | 127  |           | 106  |           | 137  |           | 127 | 127 |           |           | 106 |           |           | 137 | 143 | 143 | 143 | 143 | 143 | 143 | 143 |
| 80   | 3     | 90   | 99   | 115  | 142  |           | 142  |           | 119  |           | 148  |           | 142 | 142 |           |           | 119 |           |           | 148 | 154 | 154 | 154 | 154 | 154 | 154 | 154 |
| 100  | 4     | 115  | 127  | 143  | 162  |           | 162  |           | 147  |           | 174  |           | 162 | 162 |           |           | 147 |           |           | 174 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |
| 125  | 5     | 140  | 152  | 172  | 192  |           | 192  |           | 176  |           | 210  |           | 192 | 192 |           |           | 176 |           |           | 210 | 217 | 217 | 217 | 217 | 217 | 217 | 217 |
| 150  | 6     | 167  | 179  | 199  | 218  |           | 218  |           | 203  |           | 247  |           | 218 | 218 |           |           | 203 |           |           | 247 | 257 | 257 | 257 | 257 | 257 | 257 | 257 |
| 200  | 8     | 216  | 228  | 248  | 273  |           | 273  |           | 252  |           | 309  |           | 273 | 273 |           |           | 252 |           |           | 309 | 324 | 324 | 324 | 324 | 324 | 324 | 324 |
| 250  | 10    | 267  | 279  | 303  | 327  |           | 327  |           | 307  |           | 364  |           | 327 | 327 |           |           | 307 |           |           | 364 | 391 | 391 | 391 | 391 | 391 | 391 | 391 |
| 300  | 12    | 318  | 330  | 354  | 377  |           | 377  |           | 358  |           | 424  |           | 377 | 377 |           |           | 358 |           |           | 424 | 458 | 458 | 458 | 458 | 458 | 458 | 458 |
| 350  | 14    | 360  | 376  | 400  | 437  |           | 437  |           | 404  |           | 486  |           | 437 | 437 |           |           | 404 |           |           | 486 | 512 | 512 | 512 | 512 | 512 | 512 | 512 |
| 400  | 16    | 410  | 422  | 450  | 488  |           | 488  |           | 456  |           | 543  |           | 488 | 488 |           |           | 456 |           |           | 543 | 572 | 572 | 572 | 572 | 572 | 572 | 572 |
| 500  | 20    | 510  | 522  | 550  | 593  | 593       | 556  | 657       | 593  | 593       | 556  | 657       | 704 | 704 | 704       | 704       | 704 | 704       | 704       |     |     |     |     |     |     |     |     |
| 600  | 24    | 610  | 622  | 650  | 695  | 695       | 656  | 764       | 695  | 695       | 656  | 764       | 813 | 813 | 813       | 813       | 813 | 813       | 813       |     |     |     |     |     |     |     |     |
| 700  | 28    | 710  | 722  | 756  | 810  | 810       | 762  | 879       | 810  | 810       | 762  | 879       | 950 | 950 | 950       | 950       | 950 | 950       | 950       |     |     |     |     |     |     |     |     |
| 800  | 32    | 810  | 830  | 864  | 917  | 917       | 870  | 988       | 917  | 917       | 870  | 988       | -   | -   | -         | -         | -   | -         | -         |     |     |     |     |     |     |     |     |
| 900  | 36    | 910  | 930  | 964  | 1017 | 1017      | 970  | 1108      | 1017 | 1017      | 970  | 1108      | -   | -   | -         | -         | -   | -         | -         |     |     |     |     |     |     |     |     |
| 1000 | 40    | 1010 | 1030 | 1074 | 1124 | 1124      | 1080 | -         | 1124 | 1124      | 1080 | -         | -   | -   | -         | -         | -   | -         | -         |     |     |     |     |     |     |     |     |

## Installation procedure

Please pay attention to the installation procedure.

Most of the spiral wound gasket's failures is breach of the recommended assembly procedure.

- Clean contact surfaces of the flanges and check them if they are not damaged.
- Inspect and clean bolts, nuts and washers.
- Make certain the parallelism of the contact surfaces.
- Put spiral wound gasket right in the centre
- Tight the bolts approximately 50% of the final torque according to the sequence in the figure (repeat then 75%, 100%).  
If the correct tighten sequence is not followed the gasket will be damaged and not reach required sealing performance.
- We do not recommend bolts un-tightening and re-tightening.
- Pay extra attention during installation spiral wound gaskets type seaco® TSG SM01



## Loading calculation of gasket compresibility

If a gasket has to reach its performance it must be loaded properly.

| Filler   | Q [N/mm <sup>2</sup> ] at 20° C |    | M   | GASKETS WITH OUTER RINGS |       |       |       |       |     |
|----------|---------------------------------|----|-----|--------------------------|-------|-------|-------|-------|-----|
|          |                                 |    |     | Qt [N/mm <sup>2</sup> ]  |       |       |       |       |     |
|          |                                 |    |     | 100°C                    | 200°C | 300°C | 400°C | 500°C |     |
| Graphite | 50                              | 95 | 180 | 2                        | 140   | 130   | 120   | 110   | 100 |
| PTFE     | 50                              | 80 | 130 | 1,8                      | 105   | 90    | -     | -     | -   |

| Filler   | Q [N/mm <sup>2</sup> ] at 20° C |     | M   | GASKETS WITH OUTER RINGS |       |       |       |       |     |
|----------|---------------------------------|-----|-----|--------------------------|-------|-------|-------|-------|-----|
|          |                                 |     |     | Qt [N/mm <sup>2</sup> ]  |       |       |       |       |     |
|          |                                 |     |     | 100°C                    | 200°C | 300°C | 400°C | 500°C |     |
| Graphite | 50                              | 122 | 300 | 2                        | 180   | 170   | 160   | 150   | 140 |
| PTFE     | 0                               | 110 | 250 | 1,8                      | 150   | 130   | -     | -     | -   |

### Example

Gasket type seaco® OR/IR, Temperature 400°C, DN = 100 mm, PN = 40 Bar, Filler = graphite

### Assembling stress

recommended  $Q_{rec} = 122 \text{ N/mm}^2$ , Minimal<sup>1)</sup>,  $Q_{min}=50 \text{ N/mm}^2$ , Maxima<sup>2)</sup>  
 $Q_{max}=300 \text{ N/mm}^2$

<sup>1)</sup> Gasket sealing is started, <sup>2)</sup> Gasket damage will occur

### Gasket loading calculation

Gasket service area :  $A = (d32-d22) \cdot \pi/4$   $A = (1402-1222) \cdot \pi/4 = 4716 \text{ mm}^2$

### Bolt loading

Recommended.:  $F_{rec}=Q_{rec} \cdot A$ ,  $F_{rec} = 122 \cdot 4716 = 575352 \text{ N}$ ,

Minimal:  $F_{min}=Q_{min} \cdot A$ ,  $F_{min} = 50 \cdot 4716 = 235800 \text{ N}$ ,

Maximal:  $F_{max}=Q_{max} \cdot A$ ,  $F_{max} = 300 \cdot 4716 = 1\,414\,800 \text{ N}$

## More precise calculation

|                       |   |
|-----------------------|---|
| Sealing coefficient   | $m, M=2$  |
| Bolt loading minimal  | $F_m[N] \quad F_m=m.P.A \quad F_m=2.4.4716=37728 \text{ N}$                       |
| Medium pressure       | $P [N/mm^2] \quad P=4 \text{ N/mm}^2$   |
| Separation force      | $F_p[N] \quad F_p=d22.\pi.P/4 \quad F_p=1202.\pi.4/4=45\,239 \text{ N}$           |
| Minimal total loading | $F_{cmin}[N] \quad F_{cmin}=F_m+F_p \quad F_{cmin}=37728+45\,239=82967 \text{ N}$ |

## Assembling stress

According to temperature:  $Q_t[N/mm^2], Q_t=150 \text{ N/mm}^2$

Bolt loading maximal  $F_{tmax}[N] \quad F_{tmax}=Q_t.A \quad F_{tmax}=150*4716=707400 \text{ N}$

Bolt loading final  $F [N] \quad F < F_{max}, F_{tmax}$

$F > F_{min}, F_{cmin} \quad F < 414800 \text{ N}, 707400 \text{ N}$

$F < 707400 \text{ N}$

$F > 235800 \text{ N}, 82967 \text{ N}$

$F > 235800 \text{ N}$

$235800 \text{ N} < F < 707400 \text{ N}$

$F=471000 \text{ N}$

Number of bolts  $x$  See table of bolts for DIN flanges  $8 \text{ pc M20}$

Loading per 1 bolt  $F_{\check{s}}[N] \quad F_{\check{s}}=F/x \quad 471000/8=58875 \text{ N}$

Bolt torque  $M [N.m]$  See table of bolt torque and bolt loading

Chosen quality 5,6 (5D) \*  $M=184 \text{ N.m}$

\* It could be used also bolt quality 6.9(6G). In this case the bolt torque equals  $M = 335 \text{ N.m}$  (Tight for 60% M!)

# SPIRAL WOUND GASKETS (SWG)

## Bolt numbers and sizes for ASME flanges (12" - 32")

| Nomi. Diam. | Pressure class |           |           |           |           |           |           |
|-------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
|             | 150 lbs        | 300 lbs   | 400 lbs   | 600 lbs   | 900 lbs   | 1500 lbs  | 2500 lbs  |
| 1/2"        | 4x1/2"         | 4x1/2"    | 4x5/8"    | 4x1/2"    | 4x3/4"    | 4x3/4"    | 4x3/4"    |
| 3/4"        | 4x1/2"         | 4x5/8"    | 4x5/8"    | 4x5/8"    | 4x3/4"    | 4x3/4"    | 4x3/4"    |
| 1"          | 4x1/2"         | 4x5/8"    | 4x5/8"    | 4x5/8"    | 4x7/8"    | 4x7/8"    | 4x7/8"    |
| 1 1/4"      | 4x1/2"         | 4x5/8"    | 4x5/8"    | 4x5/8"    | 4x7/8"    | 4x7/8"    | 4x1"      |
| 1 1/2"      | 4x1/2"         | 4x3/4"    | 4x3/8"    | 4x3/4"    | 4x1"      | 4x1"      | 4x1 1/8"  |
| 2"          | 4x5/8"         | 5x5/8"    | 8x5/8"    | 5x5/8"    | 8x7/8"    | 8x7/8"    | 8x1"      |
| 2 1/2"      | 4x5/8"         | 8x3/4"    | 8x3/4"    | 8x3/4"    | 8x1"      | 8x1"      | 8x1 1/8"  |
| 3"          | 4x5/8"         | 8x3/4"    | 8x3/4"    | 8x3/4"    | 8x7/8"    | 8x1 1/8"  | 8x1 1/4"  |
| 3 1/2"      | 8x5/8"         | 8x3/4"    | 8x7/8"    | 8x7/8"    |           |           |           |
| 4"          | 8x5/8"         | 8x3/4"    | 8x7/8"    | 8x7/8"    | 8x1 1/8"  | 8x1 1/4"  | 8x1 1/2"  |
| 5"          | 8x3/4"         | 8x3/4"    | 8x7/8"    | 8x1"      | 8x1 1/4"  | 8x1 1/2"  | 8x1 3/4"  |
| 6"          | 8x3/4"         | 12x3/4"   | 12x7/8"   | 12x1"     | 12x1 1/8" | 12x1 3/8" | 8x2"      |
| 8"          | 8x3/4"         | 12x7/8"   | 12x1"     | 12x1 1/8" | 12x1 3/8" | 12x1 5/8" | 12x2"     |
| 10"         | 12x7/8"        | 16x1"     | 16x1 1/8" | 16x1 1/4" | 16x1 3/8" | 12x1 7/8" | 12x2 1/2" |
| 12"         | 12x7/8"        | 16x1 1/8" | 16x1 1/4" | 20x1 1/4" | 20x1 3/8" | 16x2"     | 12x2 3/4" |
| 14"         | 12x1"          | 20x1 1/8" | 20x1 1/4" | 20x1 3/8" | 20x1 1/2" | 16x2 1/4" |           |
| 16"         | 16x1"          | 20x1 1/4" | 20x1 3/8" | 20x1 1/2" | 20x1 5/8" | 16x2 1/2" |           |
| 18"         | 16x1 1/8"      | 24x1 1/4" | 24x1 3/8" | 20x1 5/8" | 20x1 7/8" | 16x2 3/4" |           |
| 20"         | 20x1 1/8"      | 24x1 1/4" | 24x1 1/2" | 24x1 5/8" | 20x2"     | 16x3"     |           |
| 22"         | 20x1 1/4"      | 24x1 1/2" | 24x1 5/8" | 24x1 3/4" |           |           |           |
| 24"         | 20x1 1/4"      | 24x1 1/2" | 24x1 3/4" | 24x1 7/8" | 20x2 1/2" | 16x3 1/2" |           |
| 26"         | 24x1 1/4"      | 26x1 5/8" | 28x1 3/4" | 28x1 7/8" | 20x2 3/4" |           |           |
| 28"         | 28x1 1/4"      | 28x1 5/8" | 28x1 7/8" | 28x2"     | 20x3"     |           |           |
| 30"         | 28x1 1/4"      | 28x1 3/4" | 28x2"     | 28x2"     | 20x3"     |           |           |
| 32"         | 28x1 1/2"      | 28x1 7/8" | 28x2"     | 28x2 1/4" | 20x3 1/4" |           |           |

## Bolt numbers and sizes for ASME flanges (34" - 60")

| Nomi.<br>Diam. | Pressure class |           |           |           |           |
|----------------|----------------|-----------|-----------|-----------|-----------|
|                | 150 lbs        | 300 lbs   | 400 lbs   | 600 lbs   | 900 lbs   |
| 34"            | 32x1 1/2"      | 28x1 7/8" | 28x2"     | 28x2 1/4" | 20x3 1/2" |
| 36"            | 32x1 1/2"      | 32x2"     | 32x2"     | 28x2 1/2" | 20x3 1/2" |
| 38"            | 32x1 1/2"      | 32x1 1/2" | 32x1 3/4" | 28x2 1/4" | 20x3 1/2" |
| 40"            | 36x1 1/2"      | 32x1 5/8" | 32x1 7/8" | 32x2 1/4" | 24x3 1/2" |
| 42"            | 36x1 1/2"      | 36x2"     | 32x2 1/2" | 28x2 3/4" | 24x3 1/2" |
| 44"            | 40x1 1/2"      | 32x1 3/4" | 32x2"     | 32x2 1/2" | 24x3 3/4" |
| 46"            | 40x1 1/2"      | 28x1 7/8" | 36x2"     | 32x2 1/2" | 24x4"     |
| 48"            | 44x1 1/2"      | 32x1 7/8" | 28x2 1/4" | 32x2 3/4" | 24x4"     |
| 50"            | 44x1 3/4"      | 32x2"     | 32x2 1/4" | 28x3"     |           |
| 52"            | 44x1 3/4"      | 32x2"     | 32x2 1/4" | 32x3"     |           |
| 54"            | 44x1 3/4"      | 28x2 1/4" | 28x2 1/2" | 32x3"     |           |
| 56"            | 48x1 3/4"      | 32x2 1/4" | 32x2 1/2" | 32x3 1/4" |           |
| 58"            | 48x1 3/4"      | 28x2 1/4" | 32x2 1/2" | 32x3 1/4" |           |
| 60"            | 52x1 3/4"      | 32x2 1/4" | 32x2 3/4" | 28x3 1/2" |           |

# SPIRAL WOUND GASKETS (SWG)

## Bolt numbers and sizes for DIN flanges


















| DN/PN | 1 - 2,5 | 6       | 10      | 16      | 25      | 40      | 64      | 100     | 160     | 250     | 320     | 400     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 6     |         | 4 M 10  |         |         |         | 4 M 10  |         |         |         |         |         |         |
| 8     |         | 4 M 10  |         |         |         | 4 M 10  |         |         |         |         |         |         |
| 10    |         | 4 M 10  |         |         |         | 4 M 12  | 4 M 12  | 4 M 12  | 4 M 12  | 4 M 16  | 4 M 16  | 4 M 16  |
| 15    |         | 4 M 10  |         |         |         | 4 M 12  | 4 M 12  | 4 M 12  | 4 M 12  | 4 M 16  | 4 M 16  | 4 M 20  |
| 20    |         | 4 M 10  |         |         |         | 4 M 12  |         |         |         |         |         |         |
| 25    |         | 4 M 10  |         |         |         | 4 M 12  | 4 M 16  | 4 M 16  | 4 M 16  | 4 M 20  | 4 M 20  | 4 M 24  |
| 32    |         | 4 M 12  |         |         |         | 4 M 16  |         |         |         |         |         |         |
| 40    |         | 4 M 12  |         |         |         | 4 M 16  | 4 M 20  | 4 M 20  | 4 M 20  | 4 M 24  | 4 M 24  | 4 M 27  |
| 50    |         | 4 M 12  |         |         |         | 4 M 16  | 4 M 20  | 4 M 24  | 4 M 24  | 8 M 24  | 8 M 24  | 8 M 27  |
| 65    |         | 4 M 12  |         | 4 M 16  |         | 8 M 16  | 8 M 20  | 8 M 24  | 8 M 24  | 8 M 24  | 8 M 27  | 8 M 30  |
| 80    |         | 4 M 16  |         | 8 M 16  |         | 8 M 16  | 8 M 20  | 8 M 24  | 8 M 24  | 8 M 27  | 8 M 27  | 8 M 30  |
| 100   |         | 4 M 16  |         | 8 M 16  |         | 8 M 20  | 8 M 24  | 8 M 27  | 8 M 27  | 8 M 30  | 8 M 33  | 8 M 36  |
| 125   |         | 8 M 16  |         | 8 M 16  |         | 8 M 24  | 8 M 27  | 8 M 30  | 8 M 30  | 12 M 30 | 12 M 33 | 12 M 36 |
| 150   |         | 8 M 16  |         | 8 M 20  |         | 8 M 24  | 8 M 30  | 12 M 30 | 12 M 30 | 12 M 33 | 12 M 36 | 12 M 39 |
| 175   |         |         | 8 M 20  | 12 M 24 |         | 12 M 27 | 12 M 30 | 12 M 30 | 12 M 33 | 12 M 36 | 12 M 39 | 12 M 45 |
| 200   |         | 8 M 16  | 8 M 20  | 12 M 20 | 12 M 24 | 12 M 27 | 12 M 33 | 12 M 33 | 12 M 33 | 12 M 39 | 16 M 39 | 16 M 45 |
| 250   |         | 12 M 16 | 12 M 20 | 12 M 24 | 12 M 27 | 12 M 30 | 12 M 33 | 12 M 36 | 12 M 39 | 16 M 45 | 16 M 48 |         |
| 300   |         | 12 M 16 | 12 M 20 | 12 M 24 | 16 M 27 | 16 M 30 | 16 M 39 | 16 M 39 | 16 M 39 | 16 M 48 |         |         |
| 350   |         | 12 M 20 | 16 M 20 | 16 M 24 | 16 M 30 | 16 M 33 | 16 M 36 | 16 M 45 |         |         |         |         |
| 400   |         | 16 M 20 | 16 M 24 | 16 M 27 | 16 M 33 | 16 M 36 | 16 M 39 | 16 M 45 |         |         |         |         |
| 450   |         | 16 M 20 | 20 M 24 | 20 M 27 |         | 20 M 36 |         |         |         |         |         |         |
| 500   |         | 20 M 20 | 20 M 24 | 20 M 30 | 20 M 33 | 20 M 39 | 20 M 45 | 20 M 52 | 20 M 52 |         |         |         |
| 600   |         | 20 M 24 | 20 M 27 | 20 M 33 | 20 M 36 | 20 M 45 | 20 M 52 | 20 M 56 |         |         |         |         |
| 700   |         | 24 M 24 | 24 M 27 | 24 M 33 | 24 M 39 | 24 M 45 | 24 M 52 | 24 M 64 |         |         |         |         |
| 800   |         | 24 M 27 | 24 M 30 | 24 M 36 | 24 M 45 | 24 M 52 | 24 M 56 |         |         |         |         |         |
| 900   |         | 24 M 27 | 28 M 30 | 28 M 36 | 28 M 45 | 28 M 52 | 28 M 56 |         |         |         |         |         |
| 1000  |         | 28 M 27 | 28 M 33 | 28 M 39 | 28 M 52 | 28 M 52 | 29 M 64 |         |         |         |         |         |
| 1200  | 32 M 27 | 32 M 30 | 32 M 36 | 32 M 45 | 32 M 52 | 32 M 56 | 32 M 72 |         |         |         |         |         |
| 1400  | 36 M 27 | 36 M 33 | 36 M 39 | 36 M 45 | 36 M 56 | 36 M 56 |         |         |         |         |         |         |
| 1600  | 40 M 27 | 40 M 33 | 40 M 45 | 40 M 52 | 40 M 56 | 40 M 64 |         |         |         |         |         |         |
| 1800  | 44 M 27 | 44 M 36 | 44 M 45 | 44 M 52 | 44 M 64 |         |         |         |         |         |         |         |
| 2000  | 48 M 27 | 48 M 39 | 48 M 45 | 48 M 56 | 48 M 64 |         |         |         |         |         |         |         |
| 2200  | 52 M 30 | 52 M 39 | 52 M 52 | 52 M 56 |         |         |         |         |         |         |         |         |
| 2400  | 56 M 30 | 56 M 39 | 56 M 52 |         |         |         |         |         |         |         |         |         |
| 2600  | 60 M 30 | 60 M 45 | 60 M 52 |         |         |         |         |         |         |         |         |         |
| 2800  | 64 M 33 | 64 M 45 | 64 M 52 |         |         |         |         |         |         |         |         |         |
| 3000  | 68 M 33 | 68 M 45 | 68 M 56 |         |         |         |         |         |         |         |         |         |

## Bolt loading F and bolt torque M

| Bolt Marking | 3.6 (4D) |         | 5.6 (5D) |         | 6.9 (6G) |         | 8.8 (8G) |         | 10.9 (10K) |         | 12.9 (12K) |         |
|--------------|----------|---------|----------|---------|----------|---------|----------|---------|------------|---------|------------|---------|
|              | F [N]    | M [N.m] | F [N]    | M [N.m] | F [N]    | M [N.m] | F [N]    | M [N.m] | F [N]      | M [N.m] | F [N]      | M [N.m] |
| M10          | 8640     | 17      | 11500    | 22      | 22200    | 43      | 26300    | 51      | 37000      | 72      | 44400      | 87      |
| M12          | 12600    | 29      | 16800    | 39      | 32400    | 75      | 38400    | 89      | 54000      | 125     | 64800      | 150     |
| M14          | 17300    | 46      | 23100    | 62      | 44500    | 119     | 52700    | 141     | 741000     | 198     | 89000      | 240     |
| M16          | 23800    | 71      | 31700    | 95      | 61200    | 182     | 72600    | 215     | 102000     | 305     | 122500     | 365     |
| M18          | 28900    | 97      | 38600    | 130     | 74400    | 250     | 88200    | 295     | 124000     | 420     | 149000     | 500     |
| M20          | 37200    | 138     | 49600    | 184     | 95700    | 355     | 113500   | 420     | 159500     | 590     | 191500     | 710     |
| M22          | 46500    | 186     | 62000    | 250     | 119500   | 480     | 142000   | 570     | 190500     | 800     | 239000     | 960     |
| M24          | 53600    | 235     | 71400    | 315     | 138000   | 610     | 163500   | 725     | 230000     | 1020    | 276000     | 1220    |
| M27          | 70600    | 350     | 94100    | 470     | 181500   | 905     | 215000   | 1070    | 302000     | 1510    | 363000     | 1810    |
| M30          | 85700    | 475     | 114500   | 635     | 220000   | 1230    | 261000   | 1450    | 367000     | 2050    | 441000     | 2450    |
| M33          | 10700    | 645     | 142500   | 865     | 275000   | 1660    | 326000   | 1970    | 458000     | 2770    | 550000     | 3330    |
| M36          | 125500   | 830     | 167500   | 1110    | 323000   | 2140    | 382000   | 2530    | 538000     | 3560    | 645000     | 4280    |
| M39          | 151000   | 1080    | 201000   | 1440    | 388000   | 2770    | 460000   | 3290    | 646000     | 4620    | 776000     | 5550    |
| M42          | 172500   | 1330    | 230000   | 1780    | 444000   | 3430    | 526000   | 4070    | 740000     | 5720    | 888000     | 6860    |
| M45          | 202000   | 1670    | 270000   | 2220    | 520000   | 4290    | 616000   | 5090    | 867000     | 7150    | 1040000    | 8580    |
| M48          | 227000   | 2020    | 303000   | 2690    | 585000   | 5180    | 693000   | 6140    | 975000     | 8640    | 1170000    | 10350   |
| M52          | 273000   | 2590    | 364000   | 3460    | 702000   | 6670    | 832000   | 7900    | 1170000    | 11100   | 1405000    | 13350   |

Values correspond for friction coefficient 0,14 e.g. usual bolts with slightly oiled friction surfaces.

## ASME B16.20 color code chart Spiral wound gasket metallic windings and non-metallic fillers

| Metal                   | OD ring color |   | Metal                        | OD ring color |   |
|-------------------------|---------------|---|------------------------------|---------------|---|
| 304 stainless steel     | Yellow        |  | HastelloyC <sup>®</sup>      | Beige         |  |
| 316L stainless steel    | Green         |  | Incoloy800 <sup>®</sup>      | White         |  |
| 317L stainless steel    | Maroon        |  |                              |               |   |
| 321 stainless steel     | Turquoise     |  |                              |               |   |
| 347 stainless steel     | Blue          |  |                              |               |   |
| Monel <sup>®</sup>      | Orange        |  | Material                     | Stripe color  |   |
| Nickel                  | Red           |  | Flexible graphite            | Gray          |  |
| Titanium                | Purple        |  | PTFE                         | White         |  |
| Alloy 20                | Black         |  | Ceramic                      | Lt. Green     |  |
| Inconel600 <sup>®</sup> | Gold          |  | Verdicarb<br>(mica graphite) | Pink          |  |
| HastelloyB <sup>®</sup> | Brown         |  |                              |               |   |

### Waranty exclusion

In view of the variety of different installation and operation conditions as well as application and process engineering options, the information given in this datasheet can only provide approximate guidance and cannot be used as basis for warranty claims.