Spiral-Wound Gaskets

A solution to your static sealing problems
1) TECHNETICS GROUP’S RANGE OF SPIRAL-WOUND GASKETS

1.1) INTRODUCTION

The VITAFLEX® and FLEXSEAL® spiral-wound gasket concept can solve a large variety of the most difficult sealing problems. Although its basic fundamental principle has changed little since its creation, the production techniques and materials that have been developed over the last 40 years have enabled our gaskets to be adapted to a much broader range of applications.

The winding, or the active part of the gasket, consists of an alternating combination of a formed metal strip and soft filler material wound together. The soft filler material is selected to suit the medium to be sealed (pressure, temperature, fluid). Several consecutive turns of the metal strip are welded together at the beginning and end of the winding in order to maintain the tension.

<table>
<thead>
<tr>
<th>GASKET</th>
<th>CHARACTERISTICS</th>
<th>APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAFLEX®</td>
<td>High-end gasket - Graphite (high purity, 99.8%) or PTFE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘TOTAL’ approved</td>
<td>Flanges</td>
</tr>
<tr>
<td></td>
<td>The custom technical gasket</td>
<td>Specific applications</td>
</tr>
<tr>
<td></td>
<td>All materials - dichromate plating/zinc plating</td>
<td>High temperature</td>
</tr>
<tr>
<td>VITAFLEX® BPA</td>
<td>High-end, low-stress gasket - Graphite (high purity, 99.8%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘TOTAL’ approved</td>
<td>Flat replacement gasket</td>
</tr>
<tr>
<td></td>
<td>The custom technical gasket</td>
<td>Specific applications</td>
</tr>
<tr>
<td></td>
<td>All materials - dichromate plating/zinc plating</td>
<td>Low leakage</td>
</tr>
<tr>
<td>VITAFLEX® load</td>
<td>Controlled-stress gasket</td>
<td></td>
</tr>
<tr>
<td>certified</td>
<td>Can be used in metal-metal-type grooves</td>
<td>High pressure</td>
</tr>
<tr>
<td>VITAFLEX® special</td>
<td>Custom gasket adapted to special problems</td>
<td>Corrosive fluids</td>
</tr>
<tr>
<td></td>
<td>(different shapes and materials)</td>
<td>(specific applications)</td>
</tr>
<tr>
<td>(*) FLEXSEAL®</td>
<td>Standard industrial gasket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stainless steel/graphite, 98%/ADX - Stainless steel/PTFE/ADX</td>
<td>Flanges</td>
</tr>
</tbody>
</table>

(*) FLEXSEAL® is a registered trademark of Garlock Sealing Technologies

1.2) MATERIALS

<table>
<thead>
<tr>
<th>METAL STRIPS</th>
<th>GASKET THICKNESS</th>
<th>INSERT STRIP</th>
<th>INTERNAL REINFORCEMENT EXTERNAL CENTER FINDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAFLEX®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN/AISI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standard</td>
<td>1.4307 / 304 L</td>
<td>x</td>
<td>EN/AISI standard soft steel with anti-corrosion coating</td>
</tr>
<tr>
<td>1.4404 / 316 L</td>
<td>x</td>
<td>x</td>
<td>1.4307 / 304 L</td>
</tr>
<tr>
<td>MONEL 300</td>
<td>x</td>
<td>x</td>
<td>1.4404 / 316 L</td>
</tr>
<tr>
<td>MONEL 400</td>
<td>x</td>
<td>x</td>
<td>1.4571 / 316 Ti</td>
</tr>
<tr>
<td>TITANIUM</td>
<td>x</td>
<td>x</td>
<td>1.4541 / 321</td>
</tr>
<tr>
<td>UT40</td>
<td>x</td>
<td>x</td>
<td>MONEL 400</td>
</tr>
<tr>
<td>HASTELLOY</td>
<td>x</td>
<td>x</td>
<td>NICKEL 201</td>
</tr>
<tr>
<td>B2</td>
<td></td>
<td>x</td>
<td>TITANIUM UT40</td>
</tr>
<tr>
<td>Other materials, contact us</td>
<td>x</td>
<td>x</td>
<td>INCONEL 600</td>
</tr>
<tr>
<td>(*) FLEXSEAL®</td>
<td>1.4404 / 316 L</td>
<td>x</td>
<td>HASTELLOY B3</td>
</tr>
</tbody>
</table>

(*) FLEXSEAL® is a registered trademark of Garlock Sealing Technologies
1.3) MAIN TYPES OF SPIRAL-WOUND GASKETS (VITAFLEX® AND FLEXSEAL®)

**TYPE** | **GASKETS** | **ASSEMBLIES**
--- | --- | ---
501 SW* | | Composed solely of the spiral winding. Generally used in double insertion assemblies for standardized or similar flanges.
501R SWI* | | Composed of one type 501 spiral-wound gasket. Equipped with an internal metal reinforcing ring. Recommended for single insertions to re-establish the conditions of use of the double insertion.
503 RW* | | Composed of one type 501 spiral-wound gasket. Equipped with an external metal ring that ensures centering of the gasket between the bolts and the proper positioning of the winding on the sealing faces. Assembled between flat face or raised face flanges. In the case of a VITAFLEX® BPA (see p. 8), the external ring serves as a crushing limiter (metal-metal contact).
503R RWI* | | Composed of one type 503 spiral-wound gasket equipped internally with a metal reinforcement ring protecting the winding. Particularly recommended for: - aggressive and/or hazardous fluids - high pressure and/or temperatures - CEFIGRAF® or PTFE inserts - reducing the effects of fluid turbulence which causes premature flange wear*.
504 | | Composed of one type 501 gasket. Equipped with two parts formed by the metal strip which enable positioning on two bolts and ensure the winding is centered on the sealing faces. Use at low pressure and/or temperatures.

**FLEXSEAL® references**

**EXTERNAL CENTERING RING**: this ring must be wide enough to prevent excessive deformation due to the external radial reaction of the gasket when tightening. Stainless steel or soft steel for reinforcing the center finder: generally protected by zinc plating or dichromate plating, other protections may be applied on request (paint, Epoxy resin).

**GASKET WITH INSERT**: Option of producing gaskets with MICA filler, with CEFIGRAF® graphite insert.

**INTERNAL REINFORCEMENT**: generally speaking, the use of internal reinforcement is recommended, except for:
- double tongue and groove installations
- spiral-wound VITAFLEX® BPA for low PN (see p. 8)
- installations with center guides and internal vertical supports (autoclave buffer type)
- other cases, contact us.

**PRODUCTION POSSIBILITIES**
For general applications, the gasket width is determined by the diameters and installation conditions by referring to existing standards. The maximum winding width is determined by the component materials, thickness, and gasket diameter. Standard external winding diameters range from 12 mm to 1500 mm. For larger diameters, please contact us.

**FIRE SAFETY**
The VITAFLEX® and FLEXSEAL® spiral-wound gaskets have passed the fire test according to specification API6FB.

**DEGREASED GASKET**
For special applications, such as liquid oxygen service, transporting certain liquefied products, or others. VITAFLEX® spiral-wound gaskets with PTFE or CEFIGRAF® inserts may be degreased and shipped in individual packaging: specify this when submitting a request.
1.4) OPERATING PRINCIPLE

The VITAFLEX® spiral-wound gasket operates by the axial compression of the winding, which results in the plastic deformation of the filler material (PTFE or CEFIGRAF®) on the sealing faces. The metal strip’s optimized profile provides elastic recovery, a vital function in order to maintain sealing on a bolted assembly.

THREE OPERATING GRAPHS CAN BE USED TO EVALUATE THE PERFORMANCE OF THE GASKET:

- The characteristic graph shows the changes in real specific pressure based on the crushing of the gasket (or its loss of thickness) (Figure 1).
- The change in the level of sealing based on the real tightening pressure applied to the gasket, both in compression and in decompression (Figure 2).
- The change in contact pressure of the gasket on the sealing face, based over time for constant crushing assemblies (no metal to metal) (groove, mechanical stop, etc.) (Figure 3).

THESE THREE GRAPHS ARE CLOSELY DEPENDENT ON THE FOLLOWING GASKET AND ASSEMBLY PARAMETERS:

GASKETS
- Rib shape
- Winding compactness
- Type, quality, and thickness of filler strip

ASSEMBLY
- Surface condition of sealing faces
- Deformation of contact planes with the gasket
- Admissible stresses in the flange and bolts

The behavior of the VITAFLEX® spiral-wound gasket is subject to different loads:
1 - The stress exerted by the bolts
2 - The hydrostatic force
3 - The radial action of the fluid on the internal windings
4 - Stresses due to bending moments external to the installation.

These four loads are specific to each application, which is why the density of the structure of a VITAFLEX® spiral-wound gasket must be altered based on how it will be used. Therefore, it is important for our technical department to have all the pre-study information requested (see technical information sheet, page 19).
1.5) USAGE CONDITIONS

Because of its excellent performance characteristics and the wide range of materials that can be used, the VITAFLEX® spiral-wound gasket is a suitable sealing solution for a number of extreme applications in critical industries.

EXAMPLES OF THE VITAFLEX® SPIRAL-WOUND GASKET IN USE

<table>
<thead>
<tr>
<th>Composition of the winding</th>
<th>Max. temperature (1)</th>
<th>Max. pressure (1)</th>
<th>Fluids</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAINLESS STEEL CEFIGRAF®</td>
<td>550°C</td>
<td>350 bars</td>
<td>Liquid circuits, saturated steam, hydrocarbons, low temperatures, heat-transfer fluids</td>
</tr>
<tr>
<td>STAINLESS STEEL CEFIGRAF® (BPA)</td>
<td>400°C</td>
<td>50 bars</td>
<td>Steam, hydrocarbons</td>
</tr>
<tr>
<td>STAINLESS STEEL PTFE</td>
<td>220°C</td>
<td>From vacuum to 100 bars</td>
<td>Cryogenics, acidic circuits, low temperatures</td>
</tr>
<tr>
<td>INCONEL CEFIGRAF®</td>
<td>600°C 800°C in inert environment</td>
<td>350 bars</td>
<td>High temperature</td>
</tr>
<tr>
<td>INCONEL MICA</td>
<td>900°C</td>
<td>Low pressure</td>
<td>Very high temperature: hot gases</td>
</tr>
</tbody>
</table>

(1) As long as the assembly (flanges, nuts and bolts, gaskets) is thoroughly suited to the service conditions. The maximum values indicated mutually influence one another, so that one cannot take all these values simultaneously. For limit cases, please contact us.

PRINCIPAL APPLICATIONS

- **Chemical/petrochemical industry**: catalytic synthesis, heat exchangers, gaskets on devices, pipes, valves, taps, storage (possibility of O₂ degreasing on request), etc.
- **Industry**: high- and low-pressure steam circuit, autoclaves, reheaters, heat-transfer fluids, hydraulic pipes, high pressure, taps, compressors, pumps, etc.
- **Nuclear**: cooling circuit, taps, manholes, handholes, exchangers with or without bars, etc.

1.6) INSTALLATION CONDITIONS

The reliability of a bolted assembly depends not only on the gasket and its characteristics, but also on other important elements, including:

**ASSEMBLY**

Ensure that the faces of flanges are parallel, aligned, and clean. Ensure that they do not have anything that may trigger leaks, including cuts, scratches, deformations, etc. The faces shall be obtained by turning (no radial grooves). Ensure that the rigidity of the assembly (flange + bolts) is sufficient to keep the initial tightening force on the gasket and to maintain the sealing level over time, checking the stress of the assembly.

**STORAGE**

The gaskets must be stored flat in a clean, dry place, preventing any significant load on the gasket.

**HANDLING**

The gaskets must be handled carefully, in order to prevent any risk of damage to the seal track such as cuts, scratches, impurities, deformations, etc.

RECOMMENDED SURFACE CONDITION

<table>
<thead>
<tr>
<th>LCA-CEA No. Ra Rt</th>
<th>N10 12.5 50</th>
<th>N9 6.3 37</th>
<th>N8 3.2 21</th>
<th>N7 1.6 11</th>
<th>N6 0.8 6.2</th>
<th>Insert strip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquids Low-saturation steam Hydrocarbons</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>GRAPHITE, PTFE MICA</td>
</tr>
<tr>
<td>Gases Cryogenics Saturated steam Heat-transfer fluids</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>GRAPHITE, PTFE MICA</td>
</tr>
</tbody>
</table>

◊ Value not recommended ☒ Value accepted ☒ Recommended value
**BOLTING**
Check the condition of the threads, the lubrication method, the presence of a support washer, parameters resulting in a very significant variation in the friction coefficient. Another tightening possibility is the stud tensioner. Don’t forget to calibrate the entire tightening system, verification of stress/torque/extension.

**TIGHTENING PROCEDURE**
Make sure the gasket placement is centered. Tighten bolts according to the sketch opposite, 30% of the load calculated previously. Continue tightening in this pattern until the recommended stress is obtained in three or four phases and until the nuts no longer rotate.

As a general rule, one should not loosen an assembly and then re-tighten it to a lower or identical torque. This makes the gasket performance inconsistent.

**COMPRESSION RATE**
As a general rule, standard VITAFLEX® type 503 or 503 R spiral-wound gaskets with centering ring are not designed to be tightened in metal to metal contact. The recommended thickness after tightening is indicated in the table opposite. A special study is required for metal to metal use (see Special Manufacturing section, page 10).

**MAXIMUM PRESSURE ON THE GASKET**
In order to prevent mechanical damage to the winding, the maximum allowable pressure passing through the gasket is closely linked to the profile, gasket material, geometry of the housing, and service temperature.

**TIGHTENING FORCES**
Technetics Group can supply design calculations that can indicate the tightening force necessary for the gasket of your specific application. Provision of design calculations does not release users from consulting the codes and carrying out the calculations and verifications of the bolted assembly (gasket, bolting, flanges based on the method of their choice).

<table>
<thead>
<tr>
<th>THICKNESS BEFORE TIGHTENING (mm)</th>
<th>AVERAGE THICKNESS AFTER TIGHTENING (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>1.8 to 2.1</td>
</tr>
<tr>
<td>3.2</td>
<td>2.3 to 2.7</td>
</tr>
<tr>
<td>4.5</td>
<td>3.2 to 3.7</td>
</tr>
<tr>
<td>6.4</td>
<td>4.7 to 5.4</td>
</tr>
</tbody>
</table>
### 1.7) REMINDER OF CROSS REFERENCE OF GASKET STANDARDS

<table>
<thead>
<tr>
<th>Gasket standards</th>
<th>Flange standards</th>
<th>Bolting</th>
<th>Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NF (France)</strong></td>
<td><strong>DIN (Germany)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NF E 29 900-3 (*)</td>
<td>ISO PN10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN16</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN25</td>
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<td></td>
<td>ISO PN40</td>
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<tr>
<td></td>
<td>ISO PN50</td>
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<tr>
<td></td>
<td>ISO PN100</td>
<td></td>
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<tr>
<td></td>
<td>ISO PN150</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN250</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN290</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISO PN299</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NF E 29 203</td>
<td>NF E 29 209</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V.1989</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V.1985</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) The dimensional equivalences for the external Ø of 503 and 503R gaskets, between US and ISO PN standards, depend on the bolting used (UNC or ISO). This point should be checked, particularly for DN < 50.

○ Standard eliminated in NF E 29 200-3. The external Ø of gaskets under NF E 29 200-3 are given for ISO bolting.

**CAUTION:** do not confuse PN 100 from the old NF standards and standard NF EN 1514-2 with ISO PN 100 from standard NF E 29 200-3.

Note, “class” gaskets are require UNC bolting. The information provided in these tables may be modified based on changes to the standardization.

### 1.8) SPIRAL-WOUND GASKET SUMMARY TABLE

<table>
<thead>
<tr>
<th>Spiral Types</th>
<th>Types / Dimensions</th>
<th>Gasket standards</th>
<th>Flange standards</th>
<th>Bolting</th>
<th>Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>503 BPA</td>
<td>DN - PN</td>
<td>NF EN 1092-1</td>
<td>Feb-2013</td>
<td>ISO bolting</td>
<td>T1</td>
</tr>
<tr>
<td>503R BPA</td>
<td>CLASS / NPS ≤ 24</td>
<td>NF EN 1759-1</td>
<td>May-2005</td>
<td>UNC bolting (With D3 calculated not standardized)</td>
<td>T2</td>
</tr>
<tr>
<td>503 (RW)</td>
<td>DN - PN</td>
<td>NF EN 1092-1</td>
<td>Feb-2013</td>
<td>ISO bolting</td>
<td>T3</td>
</tr>
<tr>
<td>503R (RWI)</td>
<td>CLASS / NPS ≤ 24</td>
<td>NF EN 1759-1</td>
<td>May-2005</td>
<td>UNC bolting (With D3 calculated not standardized)</td>
<td>T5, T4</td>
</tr>
<tr>
<td></td>
<td>CLASS / NPS &gt; 26</td>
<td>ASME B 16.20</td>
<td>Aug-2007</td>
<td>UNC bolting (With D3 calculated not standardized)</td>
<td>T6, T7</td>
</tr>
<tr>
<td></td>
<td>- Series A</td>
<td>ASME B 16.20</td>
<td>Aug-2007</td>
<td>UNC bolting (With D3 calculated not standardized)</td>
<td>T8, T9</td>
</tr>
<tr>
<td></td>
<td>DN - PN10 to 40</td>
<td>NF E29 203</td>
<td>Jul-1989</td>
<td>Replacement gaskets dimensioned for NF E 29 203 flanges</td>
<td>T12-A</td>
</tr>
<tr>
<td></td>
<td>DN - PN64 to 320</td>
<td>AFNOR-DIN-BS</td>
<td>Replacement gaskets dimensioned for NF or DIN flanges</td>
<td>T12-B</td>
<td></td>
</tr>
<tr>
<td>501 (SW)</td>
<td>DN - PN</td>
<td>NF EN 1092-1</td>
<td>Feb-2013</td>
<td></td>
<td>T11</td>
</tr>
<tr>
<td>501R (SWI)</td>
<td>CLASS / NPS ≤ 24</td>
<td>ASME B 16.20</td>
<td>Jan-2013</td>
<td></td>
<td>T10</td>
</tr>
</tbody>
</table>

| DN-PN type standard | NPS-Class type standard |

- DN-PN type standard
- NPS-Class type standard
2) SPECIFIC SPIRAL-WOUND GASKETS

For our specific spiral-wound gaskets, manufacturing possibilities range from DN 20 to DN 1600. Custom dimensions can be created. To select the product best suited to your application and to optimize tightening torques, please contact our technical department.

2.1) VITAFLEX® BPA LOW-SEATING-PRESSURE GASKET

**EXTERNAL CENTER FINDER** in zinc-plated ADX stainless steel, etc.

**METAL STRIP** in 304L stainless steel, 316L stainless steel, inconel 600, nickel, etc.

**INTERNAL REINFORCEMENT** (AVAILABLE) Grade matching metal strip

**FILLER**
- Graphite CEFIGRAF® NP with 99.8% carbon with corrosion inhibitor
- Graphite CEFIGRAF® NS 200*
- PMUC graphite quality with 99.5% carbon
(*) Special grade with sulfur and halogen content < 200 ppm.

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**APPLICATIONS**
- Low PN pipe line for chemical, petrochemical, nuclear, etc.
- Replacement of flat-cut gaskets.
- Body/hat connection in groove for low PN taps.
- Exhaust for engine: e.g. marine diesel engine, etc.
- Device gaskets (exchangers), etc.

**TYPES RECOMMENDED FOR ASSEMBLY WITH STANDARDIZED FLANGES**

<table>
<thead>
<tr>
<th>ISO ASSEMBLY</th>
<th>PN 10</th>
<th>PN 16</th>
<th>PN 20</th>
<th>PN 25</th>
<th>PN 40</th>
<th>PN 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Class 150</td>
<td></td>
<td></td>
<td>Class 300</td>
</tr>
<tr>
<td>503 BPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITHOUT internal ring</td>
<td>GENERAL CASE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>503 R BPA</td>
<td></td>
<td></td>
<td>POSSIBLE IF SPECIFIC APPLICATION</td>
<td>RECOMMENDED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITH internal ring</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Economical:**
- Without internal rings for series ISO PN 10-16-20 (150 lbs) - 25
- With optimized internal rings for series ISO PN 40 - 50 (300 lbs)
**Works with any surface condition:**
- From Ra = 0.8 to 12.5 μ (turned surface)
**Can be produced in all the normal dimensions.**

---

See dimensions on next page.
### OUR STANDARD DIMENSIONS FOR VITAFLEX® BPA

**T1**

<table>
<thead>
<tr>
<th>DN</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3 PN10</th>
<th>D3 PN16</th>
<th>D3 PN25</th>
<th>D3 PN40</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>inch</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>10</td>
<td>1/4</td>
<td>15</td>
<td>24</td>
<td>36</td>
<td></td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>15</td>
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<td>19</td>
<td>28</td>
<td>40</td>
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For PN 10-16-25 and PN 40 up to DN 150, we recommend the gasket:

**VITAFLEX® 503 BPA**

For PN 40 from DN 200 the internal ring is strongly recommended, we recommend the gasket:

**VITAFLEX® 503R BPA**

**Flange standards:** for flanges NF EN 1092-1 V.2013 ISO bolting, (flat face or raised face flanges)

**D3 PN40**

For the 150 lbs series (Pa = 35 MPa), we recommend the gasket:

**VITAFLEX® 503 BPA**. Internal reinforcement possible for specific applications

**Flange standards:** for PN 10-16-25 and PN 40 up to DN 150, we recommend the gasket:

**VITAFLEX® 503 BPA**

For the 300 lbs series (Pa = 50 MPa), we recommend the gasket:

**VITAFLEX® 503R BPA**. Internal reinforcement strongly recommended

**Thickness:**

- 3.5mm for class 150
- 3.2mm for class 300

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For the 150 lbs series (Pa = 35 MPa), we recommend the gasket:

**VITAFLEX® 503 BPA**. Internal reinforcement possible for specific applications

**Flange standards:** for flat face or raised face flanges NF EN 1759-1 V.2005 or ASME B16.5 V.2013

Flange standards: for flat face or raised face flanges NF EN 1759-1 V.2005 or ASME B16.5 V.2013

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**BOLTS**

- Thickness: 3.5mm for class 150
- 3.2mm for class 300

A table of min/max tightening torques is available on request, by series of standardized flanges
2.2) SPECIAL MANUFACTURE: “LOAD CERTIFIED” VITAFLEX GASKETS

PRESENTATION
Technets Group produces spiral-wound gaskets with mechanical characteristics controlled by the creation of a compression curve. These gaskets are referred to as “load certified.” As a leader in custom sealing solutions, we are able to design VITAFLEX® spiral-wound gaskets suited to the most extreme conditions. These gaskets are the result of unparalleled industry experience and are produced using our unique testing and manufacturing techniques.

TECHNICAL ADVANTAGES OF LOAD CERTIFIED GASKETS
• Elastic return greater than a standard spiral-wound gasket
• Seating effort specifically adapted to the application
• Metal-metal contact gasket
• Optimum crushing
• Ease of installation (no risk of over-tightening the gasket thanks to a mechanical stop)
• The gasket is no longer subject to the mechanical and thermal stresses of the assembly, due to better behavior in the presence of transitory P/T and a better life span

CONTROLLED-THICKNESS GASKET UNDER A PREDETERMINED LOAD
The control of essential parameters tied to the performance of the gasket enables Technets Group to define and create VITAFLEX® spiral-wound gaskets with PTFE or CEFIGRAF® inserts, which ensure, for a given load, a thickness after tightening compatible with installation in a groove or a tightening limiter. This type of manufacture must be the subject of an appropriate technical study (see information sheet, page 19).

Examples of applications:
• body/hat connection in valves or taps,
• closing large devices (exchanger, pressure vessel, etc.),
• assembly with bolted flanges for specific industries such as nuclear, etc.

A report, provided with delivery, contains a load deflection curve, a material certificate, and an inspection report (dimensions/appearance).
2.3) SPECIAL MANUFACTURE: ALKYLATION

AREAS OF USE
- Petrochemical
- Hydrofluoric acid content
- Design specific to the conditions of alkylation units

TECHNICAL CHARACTERISTICS
- Monel/PTFE gasket: monel ring with PTFE fillers on the reinforcement.
- Available for ASME flanges

SPECIFIC PROPERTIES AND APPLICATIONS
- With the PTFE ring, the seal is as close as possible to the flange/pipe ID in order to prevent corrosion of the flange.
- Reduces flange maintenance costs.
- No more corrosive leaks damaging the bolts. Possibility of adapting to all designs. Ideal for corrosive and flammable fluids.

WINDING COMPOSITION
The VITAFLEX® gasket for alkylation units is a spiral-wound gasket with a monel/PTFE filler.

2.4) SPECIAL MANUFACTURE: MICA/GRAPHITE/MICA

COMPOSITION
The VITAFLEX® MICA/GRAPHITE/MICA is a spiral-wound gasket with a graphite/mica filler: an internal and external mica filler and the internal part in graphite.

AREAS OF USE
Temperature: > 500°C
Pressure: < 10 bars

TECHNICAL CHARACTERISTICS
Chemical composition
The VITAFLEX® MICA/GRAPHITE/MICA gasket is available in standard dimensions and special dimensions

SPECIFIC PROPERTIES
The gasket combines both the characteristics of graphite in terms of sealing and the characteristics of mica in temperature resistance. This gasket maintains an excellent level of sealing due to the graphite. The mica protects the graphite from premature oxidation.

Possibility of adapting to all designs.

EXAMPLES OF APPLICATIONS
- High temperature
- Furnaces
- Exhaust gases for engines
- Petrochemical: high-temperature process, FCC
### 3) COMMON SPIRAL-WOUND GASKETS: STANDARD DIMENSIONS

**TYPE 503R**

- **Flange standards:** for NF EN 1092-1 V.2013 flanges, ISO bolting.
- **Gasket standards:** NF EN 1514-2 V.2014 designated PN. DN 10 to DN 40 on type 11 flanges. Other types, contact us.

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**Flange standards:** for ASME/ANSI B16.5 V.2013 flanges or NF EN 1759-1 V.2005 flanges designated “class” with flat faces or raised faces (FF or RF) and ISO bolting. DN 1”/4 to DN 1 1/2” for Welding-Neck flanges.

**Gasket standards:** DO, D1, D2 according to standards: EN 12560-2 V.2013 and ASME B16.20 V.2012. D3 adapted for installation with ISO bolting. Other types, contact us.
- Flange standards: for NF EN 1759-1 V.2005 flanges or ASME B16.5 V.2013 flanges designated "CLASS" with flat faces or raised faces and UNC bolting.
- Gasket standards: ASME B16.20 V.2012 or NF EN 12560-2 V.2013

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**Note:** T5 and T6 specifications include dimensions for all standard flange sizes. For specific dimensions and bolting options, please refer to the table.
**Technetics Group**

*EnPro Industries companies*

90, rue de la Roche du Géai
CS 52913
42029 Saint Étienne cedex 1 FRANCE

Phone: +33 (0) 4 77 43 51 00
Fax: +33 (0) 4 77 43 51 51
france@technetics.com
technetics.com

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**TYPE S03R**

- Flange standards: for MSS-SP-44 flanges or ASME B16.47 series A V.2011 flanges and ISO bolting.

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Sides in mm

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**Flange standards:** for API STANDARD 605 V.1988 or ASME B16.47 series B V.2011 flanges and UNC bolting.
**TYPE 503R**


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### Type 501 R

- **Double tongue and groove**
- **Single tongue and groove**

### Large series single tongue and groove

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(*) Measurements given for informational purposes.
**TYPE 501**  
Double tongue and groove

For DN 15 up to DN 150, we recommend the VITAFLEX® 501 gasket

**TYPE 501 R**  
Single tongue and groove

For DN 250 up to DN 1000, we recommend the VITAFLEX® 501 R gasket

- **Flange standards:** for NF EN 1092-1 V.2013 and AFNOR-DIN-BS flanges.

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Sides in mm  
(*) Measurements given for informational purposes.
TYPE 503R


**T12-A**

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Sides in mm

- Flange standards: for AFNOR-DIN-B5 standard flanges and ISO bolting. The gaskets used for PN64-100-160-250-320 must be used solely for replacement.

**T12-B**

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Sides in mm

TECHNETICS GROUP
EnPro Industries companies
90, rue de la Roche du Geai
CS 52913
42029 Saint Etienne cedex 1 FRANCE
MAESTRAL: THE LABORATORY THAT USES SCIENCE TO SERVE SEALING

Maestral brings together the strengths of Technetics Group, leader in the field of high performance industrial sealing and CEA (French Atomic Energy and Alternative Energy Agency), a major player in research and innovative developments for energy technologies. Maestral’s expertise is the result of a successful collaboration, since 1969, between CEA and Technetics Group. Our skill is constantly growing as a result of the real-life cases we study and our experts have the ability to quickly assess situations in order to offer suitable R&D programs and solutions.

Maestral offers a multi-scale scientific approach combining tests, characterization and simulation in order to develop sealing solutions that meet present and future needs. Maestral technicians are experienced and certified in COFREND (French Confederation for Non-destructive Testing) II, Leak Testing.

Maestral has the latest generation test and characterization equipment, amply instrumented, offering the ability to quickly and thoroughly analyze the behavior of seals.

Simulation does not replace tests on mock-ups but it allows the latter, and experimental artifacts, to be reduced. Simulation is an efficient tool for conceiving and optimizing a sealing system by checking its performance in all circumstances, in order to best respond to clients’ issues. Today, prediction abilities of models are advanced enough to extrapolate life-size results when the size of the mock-ups or the duration of the tests makes them impossible in real conditions. Our modelers are particularly experienced in the mechanics of largely non-linear behaviors, such as deformations, creep, complex contacts with flanges and friction.

Maestral is committed to actively developing digital simulation tools and resources, applied to sealing.

In order to develop product lines or for special applications, Maestral designs and develops specific benches or mock-ups reproducing actual operating conditions. To do so, it calls on the advanced analytical skills of CEA and on the manufacturing and research abilities of Technetics Group.

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Revised May 2018 - This document replaces all previous versions
**APPLICATION DATA SHEET - STATIC STUDY**

**COMPANY:**

**TEL:**

**CONTACT:**

**FAX:**

**ADDRESS:**

**EMAIL:**

**DATE:**

**END USER:**

**PLACE OF INSTALLATION:**

**BUSINESS REFERENCE:**

**No.:**

Activity sector:  
Type of device:  

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  Normalized: [ ] Standard: [ ]  |
  (for non-normalized assembly, attach a plan or a sketch)  
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  PN:  
  Materials: |
| BOLTING:  
  NB:  
  M:  
  Size:  
  Perforation diameter: |
| PLACEMENT:  
  Existing [ ] Adjustable [ ] To be defined [ ]  
  Flat surfaces: [ ] Raised faces: [ ] (Ext. diam. of raised face)  
  Groove: [ ] Single insertion: [ ]  |
| Dimensions:  
  Groove:  
  Male (for insertion):  
  State of opening surfaces:  |
  From:  
  From:  
  Depth:  
  Height:  
  Ra=  
  µm/ |
| GASKETS:  
  Previously used: [ ] Desired: [ ] To be defined: [ ] |
| Type:  
  Material: |
| Additional information: |

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| Other commercial information:  
  Transmitter: |
| Estimated quantity:  
  Yearly requirements:  
  Date: |
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