THE FUTURE OF HIGH PERFORMANCE SEALING HAS ARRIVED

Patented FISHBONE™

- 1,000,000 times lower leakage than TA-LUFT Test limit
- 25 times lower leakage than Chevron Fugitive Emissions Test limit
- Pass API 6FB Fire Test
A brief history of Metal Gaskets

In 1912, over 100 years ago

- **Spiral Wound Gaskets** - A great invention for its time
  - Advantages
    - Combine strength from metal strips with sealing capability from a non-metallic material
    - Self-energized by fluid pressure
  - Disadvantages
    - The “un-wind” and crushing problem
    - High minimum sealing load requirement causes bolt yielding and flange rotation

In 1976, over 36 years ago

- **Camprofile Gaskets** - A good improvement in gasket strength
  - Advantages
    - Strong, will not un-wind and will not crush
    - Interchangeable with spiral-wound gaskets
  - Disadvantages
    - Less elastic compared to spiral wound gaskets resulting in poor recovery
    - Sharp teeth bite into flange surfaces causing damage and need to re-surface
    - Not self-energized by fluid pressure

NOW

- **Fishbone™ Gaskets**
  - Balance strength with flexibility
  - Interchangeable with existing gaskets standards
  - Will not damage flanges
  - Uncrushable and does not unwind
  - Extremely low minimum load requirements dramatically improve sealing performance
### The Fishbone™ Gasket Design & Advantages

**Design**
- Helical concentric bevelled ribs, each side covered with Graphite, PTFE or Mica
- Unitary design with or without a centering ring
- Rounded, non-sharp contact surface
- Unique Stop-Step design

**Advantages**
- Internally self-energized and by fluid pressure for better sealing performance
- Interchangeable with all spiral wound gaskets and Camprofile gaskets
- Will not damage flange like Camprofile gaskets and spiral wound gaskets
- Prevents over-compression of sealing element

<table>
<thead>
<tr>
<th>Change This</th>
<th>To This</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Unwound Spiral Wound Gaskets" /></td>
<td><img src="image2.png" alt="Fishbone™ Gasket" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change This</th>
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</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Camprofile Teeth Damaging Flange Face" /></td>
<td><img src="image2.png" alt="Fishbone™ Gasket" /></td>
</tr>
</tbody>
</table>
Test Results

**Leakage Test** - Fishbone™ Gasket vs. Spiral Wound vs. Camprofile

- Test Parameters (ASTM F37) Gasket Stress 30 MPa / 4351 psi | Nitrogen Pressure 4 MPa / 580 psi
- Test Report#: MF-130933 &MF-130935

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Type I Fishbone™ Gasket 8mm Width, 3.5mm thick</th>
<th>Camprofile 8mm Width, 3.2mm thick</th>
<th>Spiral Wound Gasket 8mm Width, 3.5mm thick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage Rate (1×10⁻³ cm³/s)</td>
<td>0.02</td>
<td>0.2</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**TA-LUFT Test** - Fishbone™ Gasket vs. Spiral Wound vs. Camprofile

- Test Parameters – VDI Guideline 2440 & VDI Guideline 2200

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Type I Fishbone™ Gasket 22.5mm Width, 4.5mm thick</th>
<th>Camprofile 22.5mm Width, 4.5mm thick</th>
<th>Spiral Wound Gasket 22.5mm Width, 4.5mm thick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage Rate (mbar<em>l)/(s</em>m)</td>
<td>1.6 × 10⁻⁸</td>
<td>1.0 × 10⁻⁴ *</td>
<td>1.0 × 10⁻⁴ *</td>
</tr>
</tbody>
</table>

*Average values from accredited international laboratory

The Fishbone™ Gasket is considered to be of **High Grade Performance** according to TA-Luft.

**Crush Resistance Test** - Fishbone™ vs. Spiral Wound

- Test Parameters Pressure 205 MPa / 29732 psi
- Test Report#: MF-130936

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Fishbone™ Gasket 22.5mm Width, 4.5mm thick</th>
<th>Spiral Wound Gasket 22.5mm Width, 4.5mm thick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushing Pressure (MPa)</td>
<td>&gt;205</td>
<td>54</td>
</tr>
</tbody>
</table>
Applications

- Critical Flange Applications
- Steam Sealing
- Direct Replacement of All Spiral Wound Gaskets and Camprofile Gaskets
- Low Emissions Sealing
- Fire Safe Requirements
- High Pressure Flanges
- Piping and Equipment

Technical Specifications

Standard Materials

- Metal Materials
  304, 304L, 316, 316L, 321
- Non-metallic Sealing Materials
  Flexible Graphite, PTFE, Mica

※ Other Materials on request

Temperature Range

<table>
<thead>
<tr>
<th>Facing Material</th>
<th>Minimum °C</th>
<th>Maximum °C</th>
<th>Minimum °F</th>
<th>Maximum °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Graphite</td>
<td>-212</td>
<td>450</td>
<td>-350</td>
<td>850</td>
</tr>
<tr>
<td>PTFE</td>
<td>-240</td>
<td>260</td>
<td>-400</td>
<td>500</td>
</tr>
<tr>
<td>Mica</td>
<td>-212</td>
<td>1000</td>
<td>-350</td>
<td>1850</td>
</tr>
</tbody>
</table>

Features

1. Patented helical concentric bevelled ribs.
   The number of ribs grows with the increasing pressure class.
2. Unique Stop-Step design
   Manufactured with single or double stop-steps depends upon the sealing width.
3. Self-energized by fluid pressure
4. Unitary design with (Type II) or without (Type I) a centering ring
How to Order

• Standard Sizes

Imperial
NPS (in): 1/2” ~ 60”
CLASS (lbs): 150 ~ 2500

Metric
DN (mm): 10 ~ 2000
PN (bar): 2.5 ~ 400

• International Standard

EN 1514  ASME B16.20a  JIS B2404
EN 12560  ANSI B 16.21  JPI-7S-41
BS 4865  API 601
BS 3381  DIN 2690~2692

※ Please consult with AIGI Environmental Inc. for all your standard and non standard gasket requirements.

Interchanegable

Basic Construction
Replaces Spiral Wound Style R, Style RIR
& Camprofile Basic Type

Centering Ring Construction
Replaces Spiral Wound Style CG, Style CGI
& Camprofile Reinforced Type

Heat Exchanger is available!

Heat Exchanger and more!

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