

# Semi-Metallic Gaskets

- Spiral Wound Gaskets
- High Temperature Spiral Wound Gaskets
- Metal Jacketed Gaskets
- Kammprofile Gaskets

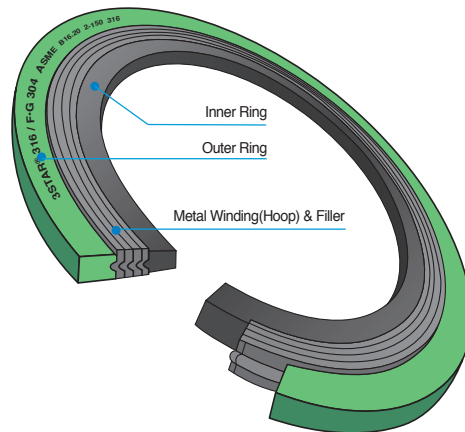
## Spiral wound Gasket

This Spiral Wound Gasket is manufactured by spirally winding a preformed V-shaped metal strip and various filler on the outer periphery under tension properly. Varying metallic inner & outer rings can be attached as required by operating conditions and applications with a variety of winding metal materials.

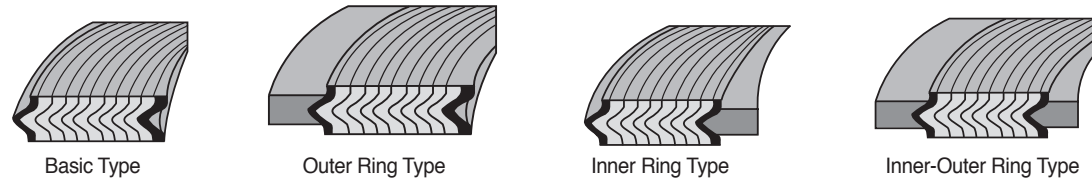
Widely used in the chemical, petrochemical, Oil refining, gas, power plant, various pipe flanges, heat-exchangers and shipbuilding

금속박판(Metal Winding)과 다양한 필러(Filler)를 V자형으로 감아서 제작한 가스켓으로서 극저온에서 극고온, 고압까지 석유정제, 화학, 전력, 가스, 선박과 각종 배관용 플랜지, 열 교환기 등 광범위하게 적용 가능한 복합재질의 가스켓이다.

| Filler Type  | Main Composition         | Applicable Temperature |
|--------------|--------------------------|------------------------|
| STARFOIL®    | Flexible Graphite        | 450°C                  |
| STARFLON®    | PTFE                     | 260°C                  |
| STARPITE®    | MICA                     | 1000°C                 |
| Non Asbestos | Non Asbestos             | 400°C                  |
| CGC          | Ceramic + STARFOIL®      | 600°C                  |
| NGLN         | Non Asbestos + STARFOIL® | 600°C                  |
| HTG          | STARFOIL® + STARPITE®    | 800°C                  |



## Spiral Wound Gaskets Types



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Seeking to Harmonize Industry and the Environment

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# METAL & SEMI-METALLIC GASKETS





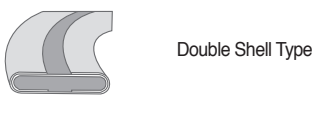
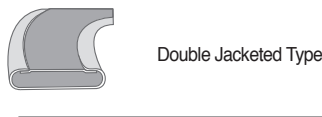
## ➤ Metal Jacketed Gasket

### Characteristic

This Metal Jacketed Gaskets consist of a metallic outer shell with various filler inside. The metal jacket protects the filler and resists pressures, temperature and the filler material gives the gasket resilience. A wide range of materials are available in accordance with the relevant temperature and corrosive conditions. They are used for heat exchanger applications with pass partition bars.

다양한 필러를 충전재로 박판금속을 피복재로 제작한 가스켓이다.  
원형 혹은 비원형 형태로 제작 가능하고, 열교환기용으로 보통 가지가 부착된다.  
피복재로는 여러가지 재질의 금속이 사용 가능

| Filler Type                                                 | Main Composition  | Max Temperature                                                                  | Service Pressure |
|-------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------|------------------|
| STARFOIL®                                                   | Flexible Graphite | 530°C                                                                            | 60 kgf/cm2       |
| CE                                                          | Ceramic           | 1300°C                                                                           | 60 kgf/cm2       |
| NA                                                          | Non Asbestos      | 530°C                                                                            | 60 kgf/cm2       |
| STARFOIL® Tape<br>(Flexible Graphite Tape)<br>Attached Type |                   | 530°C<br>(Neutral or Reducing atmosphere)<br><br>400°C<br>(Oxidizing atmosphere) | 100 kgf/cm2      |



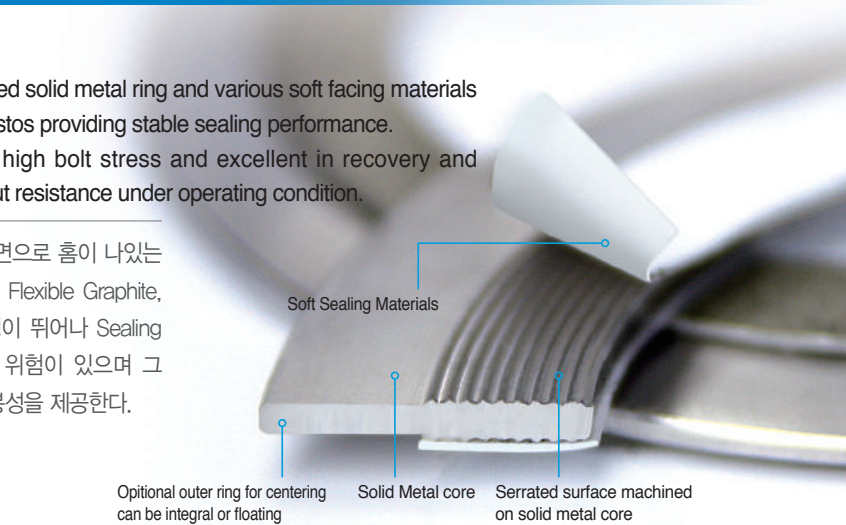
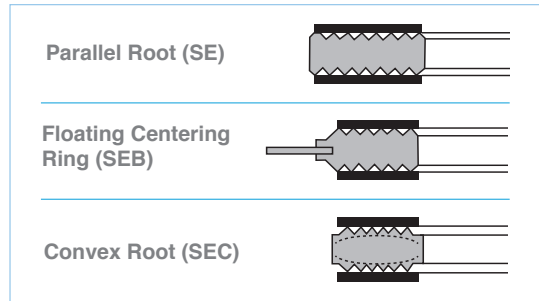
## ➤ Kammprofile Gasket (attached Sealing Material)

### Characteristic

Kammprofile Gasket is comprised of a concentrically serrated solid metal ring and various soft facing materials of soft facing such as flexible Graphite, PTFE, and Non-asbestos providing stable sealing performance. The sealing layers protect flange surface damage from high bolt stress and excellent in recovery and compressibility. Especially, the metal core ensures the blowout resistance under operating condition.

Kammprofile Gasket은 일반적으로 Stainless 재질의 원판에 양쪽면으로 홈이 나있는 형상이다. 보통 양쪽 면에 Sealing층이 적용되며 사용영역에 따라 Flexible Graphite, PTFE, 비석면 재질 등이 사용된다. Kammprofile Gasket은 밀봉성이 뛰어나 Sealing 층이 없어도 사용 가능하나 높은 체부력에 의해 플랜지 손상의 위험이 있으며 그 Sealing 층은 플랜지 표면을 손상으로부터 보호하고 효과적인 밀봉성을 제공한다.

### Structure



| Facing Material                 | Temp. Max.                   |
|---------------------------------|------------------------------|
| STARFOIL® Tape JIC 3850-SE (SF) | 450°C (840°F)                |
| STARFLON® Tape JIC 3850-SE (TF) | 260°C (500°F)                |
| STARPITE® Tape JIC 3850-SE (HT) | 1000°C (1830°F) Per Material |

\* Maximum temp. & pressure combinations can not be used at the same time.

## ➤ Ring Joint Gasket

### Characteristic

This ring joint gasket designed for use in high pressure, temperature applications necessitated the need for a high integrity seal. They are mainly used in the high pressure vessel, pipe flanges, valve bonnets handling high pressure steam, gas, hot oil, oil gas, solvent vapor industries, etc.

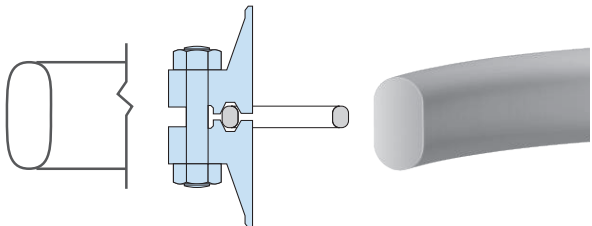
A wide range of sizes and materials are available on request. The hardness of the ring should always be less than the hardness of the flanges.

링 조인트 가스켓는 관플랜지, 압력용기, 고압증기를 취급하는 밸브 본네트, 기체, 열유, 유류가스, 고온의 용제 증기 등에 사용되는 내압 가스켓.



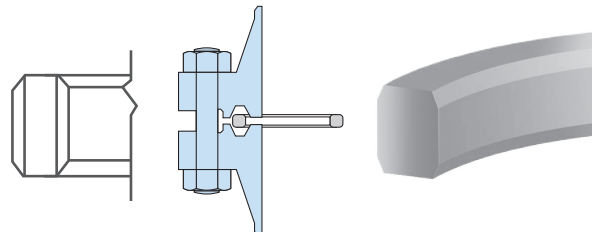
#### • 3850-V (Ring joint Oval Type)

This type is the original Joint design. Contacts flange face at the curved surface and provides a high reliability seal. But due to its shape, it is harder to achieve accuracy of dimensions and surface finish in oval type than in octagonal one and also more expensive to make. Reduce is not possible. Complies with ASME B16, 20, API 6A, JIS F 7102 510SR, JPI-7S-23.



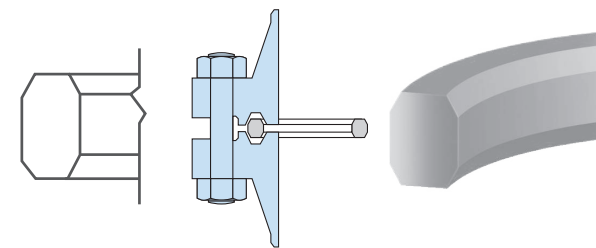
#### • 3850-BX (Ring joint BX Type)

Designed to API 6A for use with grooved flanges on special applications involving high pressures from 5,000 to 15,000 psi



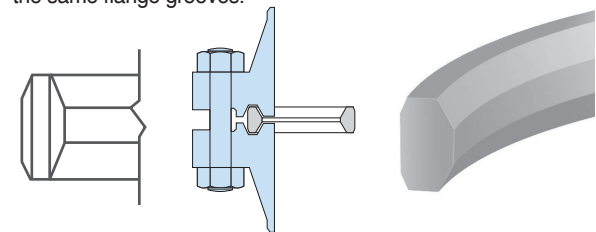
#### • 3850-C (Ring joint Octagonal Type)

More economical to make and more accurate in dimensions and surface finish than oval type because it consists of straight surfaces only. But more torque load is required to flow the gasket material into imperfections on the flange facings. Reuse is possible. Complies with the same standards as above.



#### • 3850-RX (Ring joint RX Type)

Designed to API 6A. Interchangeable with the oval and octagonal series of identical reference numbers, and used in the same flange grooves.



## ➤ Other Metallic Gasket

### Cross Section and JIC No.

|  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                  |
|--|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>3850-P</b><br>(Plain)        | Flat ring punched or lathed from comparatively soft metal such as aluminum, copper etc. Relatively inexpensive to make.                                                                                                                                                                                                                                                                          |
|  | <b>3850-L</b><br>(Lens Ring)    | Designed to DIN 2696. Bolt load will be comparatively small, because its contact surface with flange face is spherical.                                                                                                                                                                                                                                                                          |
|  | <b>3850-DC</b><br>(Double Cone) | Auto seal type gasket. For effective sealability, aluminum sheets of 1.5~2.0mm are used together. Used for pressure vessel.                                                                                                                                                                                                                                                                      |
|  | <b>3850-B</b><br>(Bridgeman)    | Auto seal type gasket. It is called a seal ring when this gasket is used for valve. Used for valve bonnet, pressure vessel, heat exchanger.                                                                                                                                                                                                                                                      |
|  | <b>3850-D</b><br>(Delta)        | Auto seal type gasket. For effective sealability, silver is plated on surface. Used for pressure vessel.                                                                                                                                                                                                                                                                                         |
|  | <b>3850-SE</b><br>(Serrated)    | Flat ring with concentric serrations made of various types of metal, Used when bolting force is not sufficient to seal a flat gasket because it contacts flange face only at serration peaks, commonly used on valve bonnets and flanges attached to equipment. 3 types of cross section- basic, with outer ring and with inner & outer ring-are available.                                      |
|  | <b>3850-WR</b><br>(H)           | The use of welded gasket with hollow lip type "H" is recommended for connecting constructional part with different thermal expansion coefficients. This Welded Ring type "H" gasket have the advantage of increased ability to absorb movement. For example, this type "H" is preferably installed to seal heat exchanger bonnet Flanges and tube plate, Where different radial movement occurs. |
|  | <b>3850-WR</b><br>(HR)          | "HR" type gaskets supplied with a female face and Grooved Gasket inserted, so that if there is any damage to the gasket it can be replaced. The advantage of the welded ring gasket lies in its great ability to absorb movement. It is mainly used on heat exchangers to cope with different radial expansions, for instance of bonnet flange and tube plate.                                   |
|  | <b>3850-WR</b><br>(B)           | Type "B" Gaskets are predominantly used in pipeline construction, where the twin flange design means that no large differences in strain properties arise when the same material for the gasket and flange is selected.                                                                                                                                                                          |
|  | <b>3850-COR</b><br>(SF)         | This graphite laminate is produced by bonding two flexible graphite sheets either to each other or to a central metal inset. Since only very small quantities of adhesive-thickness below 20mm are used, the outstanding chemical resistance of flexible graphite remains unaffected.                                                                                                            |

### Metal O-Ring

Metal O-Ring shape gasket made of stainless steel (SUS 321) or Inconel (IN-600) tube, Bent metal tube is welded and finished very precisely. For sealing of gases and volatile fluids, vacuum service, PTFE coated type or silver plated type are recommended. 2 types are available as follows.

Metal O-Ring SUS 321 혹은 Inconel 600 tube로 제작한 형태의 가스켓이다. 치수에 맞게 구부린 튜브를 정밀하게 용접 제작한다. 가스회발성액체 및 진공의 Seal을 위하여 불소수지코팅 혹은 은도금 타입이 추천된다. 아래와 같이 2가지 타입이 가능.

### Type and Recommendation

|  |                                                                                                                                                                                                                  |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>3800-P</b><br><br><b>Standard type :</b><br>From vacuum to 70kgf/cm <sup>2</sup>                                                                                                                              |
|  | <b>3800-V</b><br><br><b>With small vent holes type :</b> Small vent holes of 2 and over are made either ID or OD side of gasket.<br><b>Self sealing type :</b> For high pressure seal over 70kgf/cm <sup>2</sup> |

### Service Range

|                                                                                         |                                                                                                                                      |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Maximum Pressure Range</b>                                                           | up to 4000kgf/cm <sup>2</sup> for water<br>up to 3000kgf/cm <sup>2</sup> for gases<br>up to 10 <sup>6</sup> mm Hg for vacuum service |
| Lubricating oil, Hydraulic fluid, Fuel, Molten plastic, Molten rubber, Steam, Hot water |                                                                                                                                      |

### Standard Material and Service Temperature

| Material    | Code | Coating | Service Temp.(°C) | Remarks                                                            |
|-------------|------|---------|-------------------|--------------------------------------------------------------------|
| SUS 321     | 321  | PTFE    | -250 ~ 300        | Coating Thickness : 0.03~0.05mm<br>Plating Thickness : 0.03~0.05mm |
|             |      | Silver  | ~ 300             |                                                                    |
| Inconel 600 | IN   | None    | ~ 500             | Coating Thickness : 0.03~0.05mm<br>Plating Thickness : 0.03~0.05mm |
|             |      | PTFE    | ~ 250             |                                                                    |
|             |      | Silver  | ~ 500             |                                                                    |

### Standard Dimensions

| Tube Diameter | Standard Wall Thickness | Available Size(OD) | Recommended Size | Compression Load(1) |
|---------------|-------------------------|--------------------|------------------|---------------------|
| 0.8           | 0.15                    | 6~30               | 6~25             | 60kgf/cm            |
| 1.6           | 0.36                    | 13~200             | 15~50            | 200~250             |
| 2.4           | 0.48                    | 40~500             | 40~200           | 200~250             |
| 3.2           | 0.50                    | 50~1500            | 65~700           | 150~250             |
| 4.8           | 0.80                    | 150~1500           | 500~1200         | 300~350             |
| 6.4           | 0.80                    | 250~1500           | 1000~1500        | 150~200             |

(1) For SUS 321