



GASKETS

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CORRUGATED & GROOVED GASKETS



Introduction:

Corrugated and grooved gaskets are integral components within the semi-metallic gasket category. They combine metal with a sealing material to function as an elastic element between sealing surfaces, ensuring effective sealing performance across various applications.

Types of Gaskets:

1. Piping Gaskets (Flange Gaskets): Used for sealing flange joints in piping systems.
2. Vehicle Gaskets: Employed in automotive, marine, aviation, and rail applications.
3. Material-Specific Gaskets: Made from materials like cork, rubber, and paper for specific applications.
4. Functional Gaskets: Designed to withstand pressure, temperature, or chemical exposure.
5. Custom Gaskets: Tailored to meet specific requirements and applications.

Corrugated and Grooved Gaskets:

Corrugated and grooved gaskets, classified under the semi-metallic category, are designed to seal flange joints, especially in demanding environments such as heat exchangers, pressure vessels, valves, and high-pressure pumps. Their primary applications span industries including petrochemical, oil refining, paper, energy, and nuclear sectors.



Grooved Gaskets:

Grooved gaskets, also known as kammprofile gaskets, are widely used due to their effective sealing capabilities and refurbishment potential. They excel in applications with variable seating stresses and are particularly effective in high-temperature and pressure fluctuation environments. The recommended dimensions are:

- Ring Thickness: 3 mm or 4 mm
- Sealing Material Thickness: 2 x 0.5 mm or 2 x 1 mm

Main Standards for Grooved Gaskets:

- ASME B16.20
- EN 1514-6
- EN 12560-6

Materials:

- Metallic Rings: SS 304, SS 316L, SS 321, SS 304L, Carbon Steel
- Sealing Materials: Flexible Graphite, PTFE, Mica, Ceramics

Advantages of Grooved Gaskets:

- Refurbishable, making them cost-effective over their lifespan
- Excellent sealing performance across a broad range of stresses
- Capable of compensating for temperature and pressure variations
- Suitable for narrow flanges
- Ease of handling and installation

Corrugated Gaskets:

Corrugated gaskets feature a profiled metal core that provides rigidity and durability. The profile shape and gasket thickness are customized according to diameter and width requirements. Graphite layers may cover the entire metallic profile or be confined to the inner part, with options for a central ring.

Working Parameters:

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- Temperature Range: -200°C to 550°C
- Pressure: Up to 160 bar
- pH Range: 0 to 14
- Core Thickness: 0.5 mm
- Sealing Material Thickness: 2 x 1 mm

Advantages of Corrugated Gaskets:

- Superior sealing at low seating stress levels
- Excellent resistance to radial shear
- Durable under thermal cycling conditions
- Effective for flanges with imperfections

Materials:

- Metallic: SS 304, SS 316L, SS 321, SS 304L, Carbon Steel
- Sealing Materials: Flexible Materials, PTFE, Mica, Ceramics

Conclusion:

Both corrugated and grooved gaskets offer robust sealing solutions tailored to specific industry needs. Their design and material properties ensure reliable performance under various operational conditions, making them essential components in complex piping and sealing systems.

HEAT EXCHANGER GASKETS



A heat exchanger is a device engineered to transfer heat between two or more fluids efficiently. These fluids can be in the form of liquids, such as water or oil, or gases, including air. One common example of a heat exchanger is the car radiator, which transfers heat from the engine coolant to the air, thereby cooling the engine.

Function and Design:

The primary function of a heat exchanger is to facilitate the transfer of heat from one fluid to another without the fluids mixing or coming into direct contact. This process allows for efficient thermal energy exchange while maintaining fluid separation. Heat exchangers are critical components in various systems, including air conditioning, cooling systems, and heating systems.

Types and Applications:

- **Car Radiators:** Transfer heat from the engine coolant to the ambient air.
- **Heat Sinks:** Passive heat exchangers that dissipate heat generated by electronic or mechanical devices to a surrounding medium, such as air or a liquid coolant.

In industrial settings, heat exchangers are essential for maintaining safe operating temperatures for machinery, chemicals, water, and gases. They are integral to processes involving heating, cooling, and temperature regulation.

Effectiveness and Thermal Capacity:

- **Effectiveness:** This dimensionless ratio, ranging from 0 to 1, measures the efficiency of a heat exchanger. It is calculated by comparing the actual heat transfer rate to the maximum possible heat transfer rate. The effectiveness provides insight into the efficiency of the heat exchanger in transferring heat.

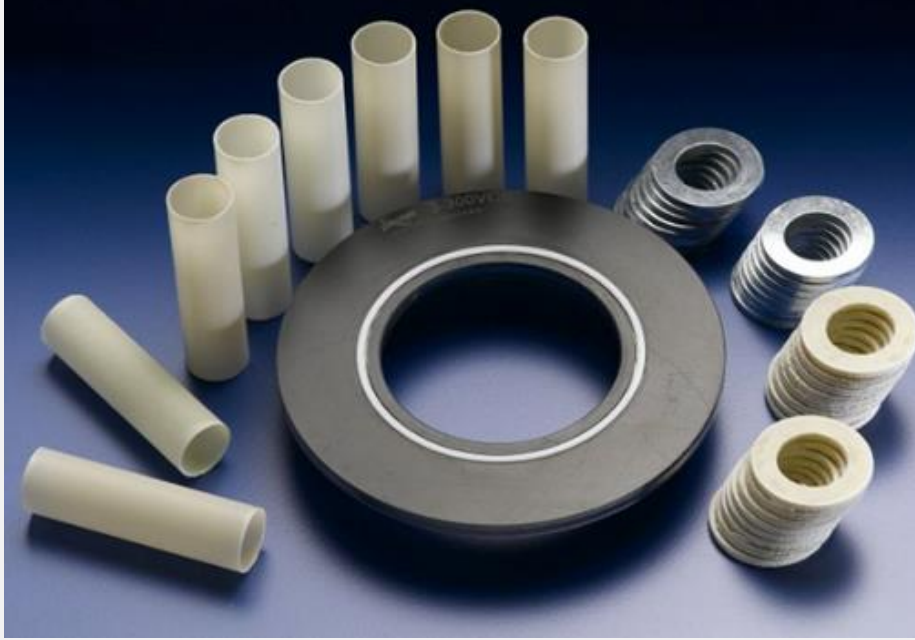


- **Thermal Capacity:** This refers to the heat exchanger's ability to transfer heat between two fluids at different temperatures. The thermal capacity is influenced by the design of the heat exchanger and the properties of the fluids involved.

Conclusion:

Heat exchangers play a pivotal role in various thermal management systems by facilitating efficient heat transfer between fluids. Their design and effectiveness are crucial for optimizing performance in applications ranging from industrial processes to everyday mechanical systems.

INSULATING GASKETS



Flange Insulation Kits and Gaskets: Essential Components for Corrosion Control and Sealing

Flange Insulation Kits:

Flange insulation kits are crucial for controlling corrosion-related losses in various industrial applications. They are primarily employed to manage stray electric currents in piping systems within oil, gas, water, refinery, and chemical plants. By isolating flanges electrically, these kits enhance the effectiveness of cathodic protection systems and mitigate electrolytic corrosion. The insulation provided by these kits not only helps in protecting the integrity of the piping infrastructure but also extends the operational lifespan of the components by preventing unwanted corrosion.

Components of Flange Insulation Kits:

- **Insulating Gaskets:** Prevent electrical conductivity between flanges.
- **Insulating Washers:** Provide electrical isolation and prevent galvanic corrosion.
- **Sleeves and Spacers:** Ensure proper alignment and insulation between bolting materials.



Gaskets:

Gaskets are mechanical seals designed to fill the gap between two or more mating surfaces to prevent leakage of fluids or gases when under compression. They are essential for maintaining the integrity of joints in various applications by providing a tight seal and compensating for surface irregularities.

Types and Applications:

- **Standard Gaskets:** Used in a variety of general applications to prevent leakage.
- **High-Pressure Steam Gaskets:** May contain asbestos or other specialized materials to withstand extreme temperatures and pressures.

Key Considerations:

- **Material Selection:** Depends on the operating conditions, including temperature, pressure, and the nature of the fluids or gases involved.
- **Compression and Seating:** Proper compression is necessary to achieve an effective seal and prevent leaks.

Conclusion:

Flange insulation kits and gaskets are vital in industrial systems for controlling corrosion and ensuring effective sealing. Flange insulation kits protect against stray currents and enhance cathodic protection, while gaskets provide reliable seals to prevent leakage under various conditions. Proper selection and installation of these components are essential for maintaining system integrity and operational efficiency.



METAL EYELETED FLAT GASKETS



Metal Eyeleted Flat Gaskets:

Metal eyeleted flat gaskets are designed to provide enhanced protection against blowout, making them suitable for sealing critical or hazardous media. The key features of these gaskets include:

- **Sealing Insert:** Typically made from flexible graphite, which offers excellent sealing properties and high temperature resistance.
- **Metal Eyelet:** Provides additional mechanical strength and prevents blowout under high pressure conditions.
- **Design Variations:** Available as cut gaskets with or without metal eyelets to suit different sealing requirements.

Applications: Metal eyeleted flat gaskets are used in environments where the media being sealed is critical, dangerous, or subject to high pressures. They are commonly found in industrial settings, including chemical processing and high-pressure systems.

Metal Jacketed Gaskets:

Metal jacketed gaskets consist of a metallic outer shell combined with a resilient filler material. The key components and their functions include:

- **Metallic Outer Shell:** Protects the filler material from mechanical damage, high temperatures, and corrosive environments. The metal jacket enhances the gasket's ability to withstand high pressures and harsh conditions.



- **Filler Material:** Can be metallic or non-metallic compressed fiber, providing resilience and compressibility to the gasket. This material ensures a tight seal by accommodating flange surface irregularities.

Types and Features:

- **Metallic Fillers:** Often used in applications requiring high pressure and temperature resistance.
- **Non-Metallic Fillers:** Such as compressed fiber or graphite, offer flexibility and resistance to various chemicals.

Applications: Metal jacketed gaskets are employed in a wide range of industrial applications, including petrochemical, power generation, and manufacturing industries. They are particularly effective in environments where both high pressure and corrosive substances are present.

Gasket Materials:

Gaskets are made from various flat materials depending on the application requirements. Common materials include:

- **Paper:** Used for low-pressure applications.
- **Rubber and Silicone:** Provide good sealing for a range of temperatures and chemicals.
- **Metal:** Offers durability and resistance to high temperatures and pressures.
- **Cork and Felt:** Used for their compressibility and sealing properties.
- **Neoprene and Nitrile Rubber:** Suitable for resistance to oils and chemicals.
- **Fiberglass:** Provides high-temperature resistance.
- **PTFE (Teflon):** Known for its chemical resistance and low friction properties.
- **Plastic Polymers:** Such as polychlorotrifluoroethylene, used for specialized applications requiring specific chemical or temperature resistance.

Conclusion:

Metal eyeleted flat gaskets and metal jacketed gaskets are essential components designed for demanding sealing applications. Metal eyeleted gaskets offer enhanced protection against blowout, while metal jacketed gaskets combine resilience with protection from harsh environments. The choice of gasket material depends on the specific requirements of the application, including pressure, temperature, and chemical exposure.

METALLIC GASKETS



Introduction:

Metallic gaskets are engineered from one or multiple metals, shaped and sized to meet specific sealing requirements. They are essential for applications involving extreme temperatures, high pressures, and severe chemical exposure where non-metallic materials might fail.

Types of Metallic Gaskets:

1. Ring-Type Joint (RTJ) Gaskets:

- **Description:** Ring-type joint gaskets are commonly used in high-pressure and high-temperature environments. They consist of a metal ring that fits into a machined groove on the flange faces.
- **Applications:** Ideal for heat exchangers, compressors, condensers, pumps, and valves.

2. Spiral Wound Gaskets:

- **Description:** Spiral wound gaskets are constructed from alternating layers of metal and a filler material, wound into a spiral shape. They combine the strength of metals with the compressibility of fillers.
- **Applications:** Suitable for a wide range of temperatures and pressures, often used in refineries, chemical plants, and power generation facilities.

Key Features:

- **Temperature and Pressure Resistance:** Metallic gaskets are designed to withstand extreme temperatures and high pressures, making them suitable for demanding applications where non-asbestos materials would be insufficient.



- **Chemical Resistance:** They offer superior resistance to aggressive chemicals, which is crucial for industrial processes involving harsh substances.
- **Custom Configurations:** Available in both standard and custom designs to meet specific application needs. Custom configurations are tailored to unique process requirements, ensuring optimal performance.

Advantages:

- **Durability:** Metal gaskets provide long-term reliability and durability under harsh operating conditions.
- **High Bolt Load Sealing:** They require a high bolt load to ensure a proper seal, which is essential for high-pressure applications.
- **Versatility:** Adaptable to various process applications and capable of withstanding severe operational environments.

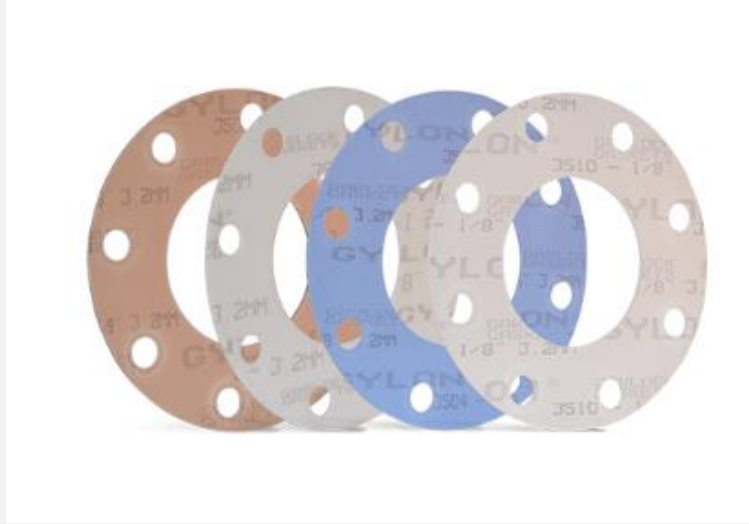
Applications:

- **Heat Exchangers:** To manage heat transfer efficiently and handle high operational pressures and temperatures.
- **Compressors:** Ensuring reliable sealing in high-pressure environments.
- **Condensers:** Effective in maintaining sealing integrity under temperature fluctuations and high pressures.
- **Pumps and Valves:** Providing a robust seal to prevent leaks in high-pressure and high-temperature systems.

Conclusion:

Metallic gaskets are vital components in industrial applications where reliability under extreme conditions is essential. Their ability to endure high temperatures, pressures, and corrosive chemicals makes them indispensable in heat exchangers, compressors, condensers, pumps, and valves. Available in various styles such as ring-type joint and spiral wound gaskets, they offer versatility and performance for demanding sealing needs.

NON METALLIC GASKETS



Introduction:

Non-metallic gaskets are primarily used for sealing flat-face and raised-face flanges in low-pressure class applications. They are made from a variety of composite sheet materials that provide effective sealing in less demanding environments compared to metallic gaskets.

Materials and Types:

1. Materials:

- **Aramid Fiber:** Known for its high strength and resistance to abrasion, aramid fiber is often used in gasket applications requiring durability and flexibility.
- **Glass Fiber:** Provides excellent temperature resistance and mechanical strength, making it suitable for high-temperature applications.
- **Elastomer:** Includes materials such as rubber, which offer good compressibility and flexibility for various sealing needs.
- **Teflon® (PTFE):** Offers exceptional chemical resistance and is ideal for corrosive environments.
- **Flexible Graphite:** Known for its high-temperature resistance and ability to create a tight seal, suitable for severe service conditions.

2. Gasket Types:

- **Full-Face Gaskets:** These gaskets cover the entire flange surface and are suitable for use with flat-face (FF) flanges. They provide a comprehensive seal and are commonly used in applications with low to moderate pressures.



- **Flat-Ring Gaskets:** Designed for use with raised-face (RF) flanges, these gaskets are often used where the flange face has a raised portion, providing effective sealing with minimal material.

Standards:

- **ASME B16.21:** This standard specifies the types, sizes, materials, dimensions, dimensional tolerances, and markings for non-metallic flat gaskets. It ensures consistency and quality across various gasket applications.

Applications:

Non-metallic gaskets are typically employed in low-pressure environments and are suitable for a range of industrial and commercial applications, including:

- **Flat-Face Flanges:** Where full-face gaskets provide complete coverage and effective sealing.
- **Raised-Face Flanges:** Where flat-ring gaskets accommodate the raised portion of the flange and ensure a tight seal.

Advantages:

- **Cost-Effectiveness:** Generally more affordable than metallic gaskets, making them a cost-effective solution for low-pressure applications.
- **Flexibility and Compressibility:** Non-metallic gaskets can conform to flange surface irregularities, improving the sealing effectiveness.
- **Chemical Resistance:** Materials such as PTFE and flexible graphite offer superior resistance to chemical attack, suitable for corrosive environments.

Conclusion:

Non-metallic gaskets play a crucial role in sealing applications where metallic gaskets may not be necessary. Made from materials like aramid fiber, glass fiber, elastomer, PTFE, and flexible graphite, these gaskets offer versatility and effectiveness for flat-face and raised-face flanges in low-pressure systems. Standards like ASME B16.21 ensure that non-metallic gaskets meet industry requirements for performance and quality, making them a reliable choice for various sealing needs.



PTFE ENVELOPE GASKETS



Introduction:

PTFE envelope gaskets are composite gaskets designed to combine the chemical resistance of PTFE with the mechanical strength and resilience of an inlay material. These gaskets are primarily used in applications requiring both high chemical resistance and high pressure tolerance.

Properties of PTFE Envelope Gaskets:

- **Chemical Resistance:** The PTFE envelope provides excellent resistance to a wide range of chemicals, making it ideal for use in aggressive environments where standard gaskets might fail.
- **Temperature Range:** The operational temperature range of PTFE envelope gaskets is influenced by both the PTFE envelope and the inlay material, allowing them to perform effectively across various temperature conditions.
- **Pressure Resistance:** The pressure resistance of the gasket depends on the properties of the inlay material. PTFE envelope gaskets can be tailored to meet specific pressure requirements based on the chosen inlay.
- **Combining Benefits:** PTFE envelope gaskets leverage the advantages of both materials, offering:
 - **Good Chemical Resistance:** Protects against chemical degradation.
 - **Wide Temperature Tolerance:** Adaptable to varying thermal conditions.
 - **Enhanced Pressure Resistance:** Depending on the inlay material used.



Applications of PTFE Envelope Gaskets:

- **Chemical Industry:** In environments where chemical exposure is high and contamination of the medium must be prevented, PTFE envelope gaskets are used to ensure a secure seal.
- **Petrochemical Industry:** Effective in handling harsh chemicals and high pressures, making them suitable for use in petrochemical processes.
- **Process Industry:** Used in various process applications where both chemical resistance and pressure tolerance are required.
- **Food Industry:** PTFE's physiologically inert properties make these gaskets suitable for direct contact with food products. They comply with FDA regulations, ensuring safety and hygiene in food processing environments.

Conclusion:

PTFE envelope gaskets are specialized sealing solutions that offer superior chemical resistance and pressure durability. By combining the benefits of PTFE with a resilient inlay material, these gaskets provide reliable performance in challenging environments. Their suitability for use in the chemical, petrochemical, process, and food industries underscores their versatility and effectiveness in maintaining safe and efficient operations.



RING JOINT GASKETS



Understanding Gaskets: Types, Features, and Applications

Definition:

A gasket is a mechanical seal designed to fill the gap between two or more mating surfaces. Its primary function is to prevent leakage from or into the joined objects while under compression. Gaskets play a crucial role in creating a tight seal, which is essential for maintaining system integrity and preventing fluid or gas leaks.

Types of Gaskets:

1. Ring Gaskets:

- **Description:** Ring gaskets have a defined inner diameter (ID) and outer diameter (OD). They are typically used in applications where the gasket needs to seal around the circumference of a circular flange or connection.
- **Applications:** Commonly used in various industrial and automotive applications to seal pipe flanges, pumps, and valves.

2. Full Face Flange Gaskets:

- **Description:** Full face gaskets are similar to ring gaskets but cover the entire flange surface. They include bolt holes aligned in a bolt circle between the ID and OD, which facilitate secure attachment to the flange.
- **Applications:** Suitable for applications where a complete flange surface needs to be sealed, providing a comprehensive seal around the entire flange face.



Key Features:

- **Mechanical Seal:** Gaskets create a seal between mating surfaces to prevent leakage, ensuring that fluids or gases do not escape or enter the system.
- **Compression:** The gasket material compresses under pressure, filling irregularities and imperfections in the mating surfaces to ensure a tight seal.
- **Flexibility:** Gaskets accommodate less-than-perfect mating surfaces, which helps in maintaining an effective seal despite minor surface irregularities.

Applications:

- **Industrial Equipment:** Used in pumps, compressors, and other machinery where maintaining a leak-proof seal is critical.
- **Automotive:** Employed in engines and exhaust systems to prevent leaks and ensure proper operation.
- **Piping Systems:** Essential for sealing flanges and joints in pipelines to prevent leakage of fluids or gases.

Conclusion:

Gaskets are essential components in various mechanical and industrial systems, providing a reliable seal between mating surfaces to prevent leakage. Whether in the form of ring gaskets, which seal around the circumference, or full face gaskets, which cover the entire flange surface, their ability to fill irregularities and accommodate less-than-perfect surfaces is crucial for maintaining system integrity and operational efficiency.



RUBBER GASKETS



Introduction:

Rubber gaskets, though often underappreciated, play a crucial role in countless machines and household appliances. Their function extends from sealing refrigerator doors to protecting ammunition from moisture and even contributing to structural integrity in bridges. But what exactly is a rubber gasket, and how does it fit into so many applications?

What is a Rubber Gasket?

A rubber gasket is a mechanical seal designed primarily to prevent the leakage of gases or liquids between two surfaces. It can also serve as a barrier between different materials, such as metals or chemicals, and provide protection from external elements. Rubber gaskets are used extensively across various industries due to their versatility and effectiveness.

Applications of Rubber Gaskets:

1. Household Appliances:

- **Refrigerator Doors:** Rubber gaskets seal the doors to maintain an airtight environment, ensuring food remains fresh and energy is conserved.

2. Ammunition:

- **Protection from Moisture:** Rubber gaskets prevent moisture ingress, protecting sensitive components and preserving the ammunition's functionality.

3. Structural Applications:

- **Bridges and Infrastructure:** Rubber gaskets are used in construction to provide flexible, weather-resistant seals that accommodate movement and prevent water ingress.



4. Camera Lenses:

- **Moisture and Dust Protection:** Rubber gaskets seal camera lenses, ensuring they remain free from dust and moisture, thereby maintaining focus and clarity.

Customization and Manufacturing:

Rubber gaskets are highly customized for their specific applications. Unlike standardized components, each gasket is tailored to meet the precise needs of its use. This customization includes:

- **Shaping and Cutting:** Rubber gaskets are cut or shaped from rubber sheets to the required sizes and profiles. This process ensures that the gasket fits perfectly in its intended application.
- **Material Selection:** Engineers select rubber sheets based on various criteria, including:
 - **Media Temperature:** Ensures the gasket can withstand the operating temperature.
 - **Rubber Hardness:** Affects the gasket's ability to form a seal and its durability.
 - **Tensile Strength:** Determines the gasket's resistance to stretching and deformation.
 - **Compound Percentage:** Impacts the gasket's overall performance and suitability for specific environments.

Design and Engineering Considerations:

Engineers and designers must understand the specific requirements of their equipment and match these with the appropriate elastomer properties. This involves:

- **Analyzing Equipment Needs:** Understanding the operational conditions and mechanical requirements.
- **Choosing Materials:** Selecting rubber compounds that will endure the conditions and provide an effective seal.
- **Creating Specifications:** Detailed drawings and material specifications are prepared for the gasket cutting process.

Conclusion:

Rubber gaskets are essential components that facilitate the smooth operation of various machines and devices, ensuring that they function efficiently and reliably. Their ability to provide a tight seal, withstand varying conditions, and be customized for specific applications underscores their importance across industries. Understanding the engineering and manufacturing processes involved in rubber gasket production highlights the complexity and significance of this often-overlooked component.



SPIRAL WOUND GASKETS



Introduction:

The spiral wound gasket is a semi-metallic sealing component designed to handle the rigorous demands of high-pressure, high-temperature, and chemically aggressive environments. Comprising a combination of metal and non-metallic materials, it offers exceptional performance for critical applications in industries such as oil refining, gas, and petrochemicals.

Construction:

- Metallic Strip:** The core of a spiral wound gasket consists of a spirally wound V-shaped stainless steel strip. This metal strip provides structural strength and flexibility, enabling the gasket to withstand high pressures and temperatures.
- Non-Metallic Filler:** Between the metal strips, a non-metallic filler material such as graphite or PTFE (Polytetrafluoroethylene) is used. This filler material enhances the gasket's sealing capability by compressing and conforming to the flange surfaces, ensuring a leak-proof seal.
- Outer Ring:** A solid outer ring is incorporated into the design. This ring serves multiple purposes:
 - Centering:** Helps align the gasket correctly within the flange.
 - Compression Control:** Regulates the amount of compression applied to the gasket, ensuring optimal sealing performance.

Historical Development:

Spiral wound gaskets were developed in the early 20th century to address the increasing demands of oil refinery operations. Their ability to maintain a reliable seal under extreme conditions quickly made them a preferred choice for various high-demand applications.

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Applications:

Spiral wound gaskets are particularly suited for use in the following environments:

1. **Oil and Gas Industry:** These gaskets are designed to cope with the high pressures and aggressive chemicals commonly encountered in oil and gas operations.
2. **Petrochemical Industry:** Their ability to handle extreme temperatures and chemical exposure makes them ideal for petrochemical processing.
3. **General Industrial Applications:** Often used in industries requiring robust sealing solutions for high-pressure and high-temperature conditions.

Performance Characteristics:

1. **Flexibility and Recovery:** Spiral wound gaskets are engineered to adapt to fluctuating pressures, temperatures, and temperature differentials across the flange face. They possess excellent recovery properties, allowing them to return to their original shape after compression, which is critical for maintaining a continuous seal despite changing conditions.
2. **Resistance to Chemical Attack:** The non-metallic filler materials, such as graphite and PTFE, offer outstanding resistance to chemical attack, enhancing the gasket's durability and effectiveness in harsh environments.
3. **Temperature Tolerance:** Capable of withstanding extreme temperatures, spiral wound gaskets ensure reliable sealing even in demanding thermal conditions.

Conclusion:

Spiral wound gaskets are a vital component in many high-pressure and high-temperature applications, offering a combination of strength, flexibility, and chemical resistance. Their design, incorporating a metal core and non-metallic fillers, provides exceptional performance in challenging environments, making them indispensable in the oil, gas, and petrochemical industries. Understanding their construction and capabilities can help machinists and engineers select and maintain the appropriate gaskets for their specific applications.



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