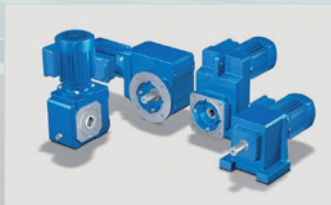




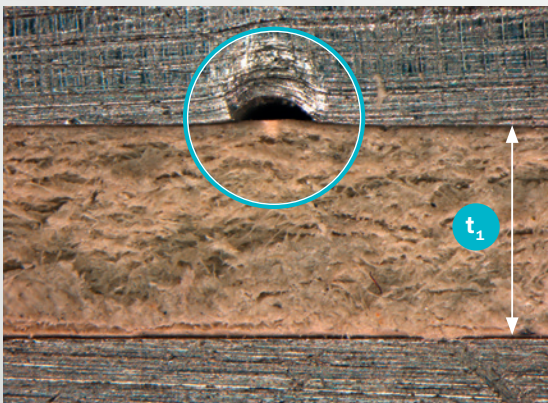
FlatSeal™ HMF18

**HIGH PERFORMANCE FIBER GASKET
FOR CHEMICAL AND INDUSTRIAL APPLICATIONS**

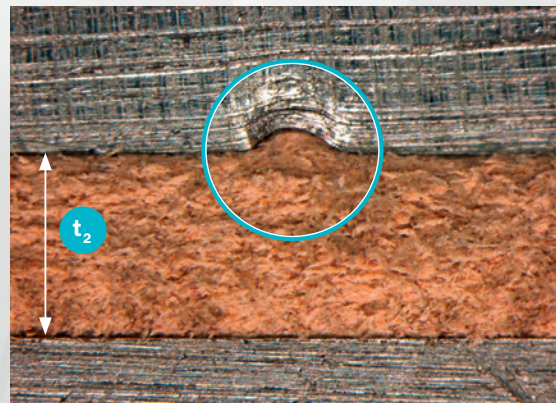


A New Level of Adaptability

Flat gaskets provide a static seal between two flat sealing surfaces and are used in critical applications in numerous industries. They connect valves, fittings, pipes, pumps and flanges, where they are often subjected to aggressive media. Gaskets must be able to form a tight seal by adapting to the sealing surface, while withstanding challenging operating environments.



Classic fiber gasket



FlatSeal™ HMF18

On a sealing surface with a defined level of damage, tests were conducted to compare gasket adaptability at 20 MPa / 2900 psi surface pressure. The difference in thickness between the two gaskets (t_1 and t_2) indicates the superior adaptability of FlatSeal™ HMF18.

Leakage in fiber gaskets

Numerous leakage tests have shown that most fiber gaskets suffer from surface leakage. Lab results and the leakages measured at real flange connections differ considerably in some cases. In particular, substantially higher leakage levels have been recorded with flanges that are not new and which show normal signs of wear or are even damaged.

Due to the limitations on surface pressure dictated by the design of the flange-bolt combination, it can be difficult to comply with regulations and industry standards. The only solution to this challenge is a gasket that is significantly more adaptable to flange unevenness and thereby offers maximum sealing performance.

FlatSeal™ HMF18 **Outperforming classic fiber gaskets**

FlatSeal™ HMF18 solves the long-standing issue with classic fiber gaskets by offering a new level of surface adaptability. With a compressibility level of 18%, in accordance with American Society for Testing and Materials (ASTM) Guideline F36J, it performs approximately three times better than conventional gaskets. The innovative HMF18 material compensates reliably for flange unevenness at comparatively low surface pressure levels.



Full traceability

**Outstanding
media
compatibility**

**Wide-ranging
compliance**

**Effective sealing
of uneven surfaces**

Effective Flat Sealing

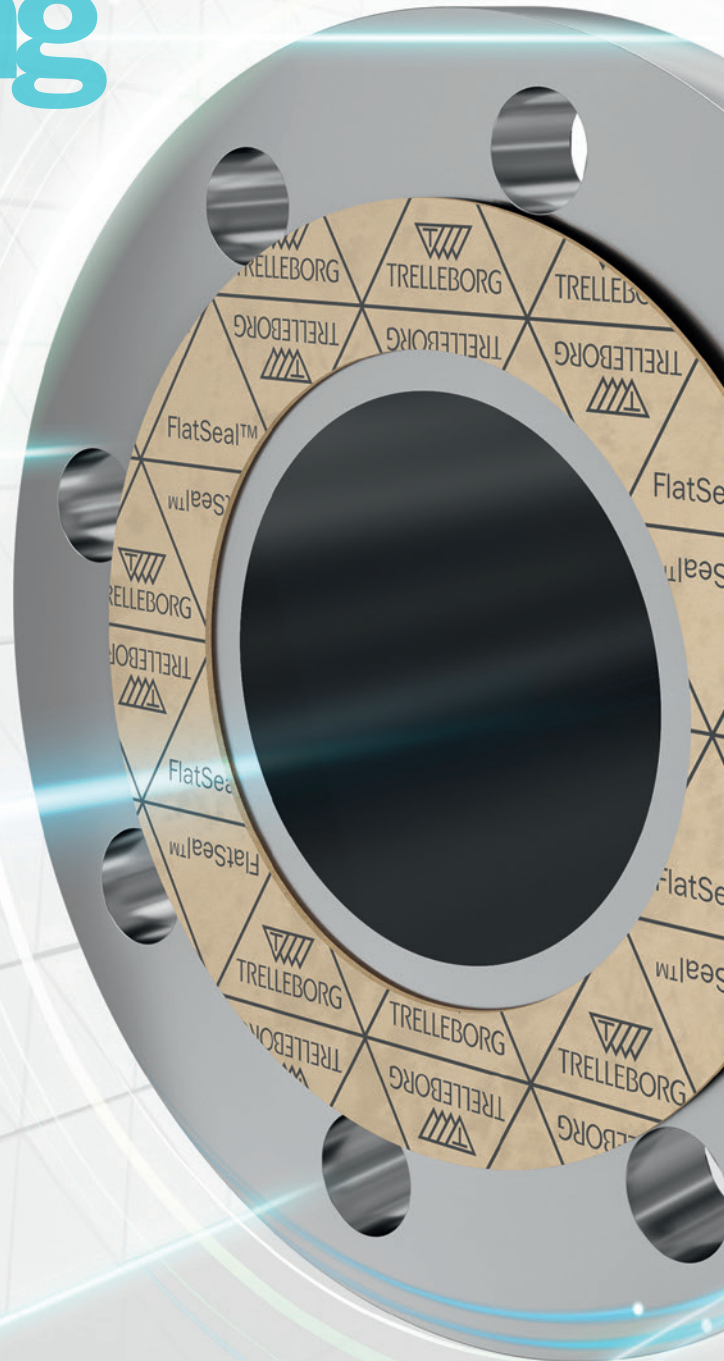
FlatSeal™ HMF18 is produced using an innovative blend of high-quality aramid fibers, special functional fillers, and Nitrile Butadiene Rubber (NBR) to effectively seal uneven surfaces and provide outstanding leak tightness. Thanks to its optimized material composition and advanced processing technology, the HMF18 compound demonstrates media resistance and mechanical stability under temperature stress. It is also equipped with FlatSeal™ Code Technology, a permanent fingerprint that enables full traceability from the material batch through to the cut gasket.

FEATURES & BENEFITS

- 3x higher adaptability to flange unevenness compared to classic fiber gaskets
- Significantly higher tolerance to installation errors
- Mechanical stability
- Excellent leakage performance even at relatively low surface pressure levels
- Minimized maintenance due to more efficient sealing properties
- Extremely low emissions
- Smooth processability and safe handling even with complex gasket outlines
- Full traceability with FlatSeal™ Code Technology
- Meets TA Luft (Technical Instructions on Air Quality Control) requirements, even with manual installation
- Suitable for designs that must comply with VDI (Verein Deutscher Ingenieure, Association of German Engineers) Directive 2290
- Part of the FoodPro® portfolio, FlatSeal™ HMF18 is compliant with global food contact regulations, including FDA and European Union (EC)
- Approvals: DVGW, HTB DIN 30653, and KTW* WRAS

MEDIA COMPATIBILITY

FlatSeal™ HMF18 is considerably more resistant to chemicals and aging than conventional gaskets, making it suitable for use in applications containing water and steam, oil, lubricants, grease, hydrocarbons, fuel, cooling agents, gas, and chlorine.



FlatSeal™ Selector

In addition to FlatSeal™ HMF18, Trelleborg Sealing Solutions offers a wide variety of FlatSeal™ options in materials engineered for specific operating conditions.

Special compound with extreme high adaptability for extraordinary tightness
For the use in "light" flange constructions with low pressures involved
DVGW, HTB DIN 30653, KTW ELL, WRAS, W270



Need help specifying a FlatSeal™ for your application?

The new FlatSeal™ Selector helps you select a material based on operating conditions and calculates the surface pressure in your application.



www.trelleborg.com/seals/tools

Proven Performance

Because of its unique raw material concept and advanced processing technology that results in enhanced material flexibility, the FlatSeal™ HMF18 offers reliable sealing, even with minimal or inconsistent surface pressure. Numerous tests have been performed to prove the performance of FlatSeal™ HMF 18.

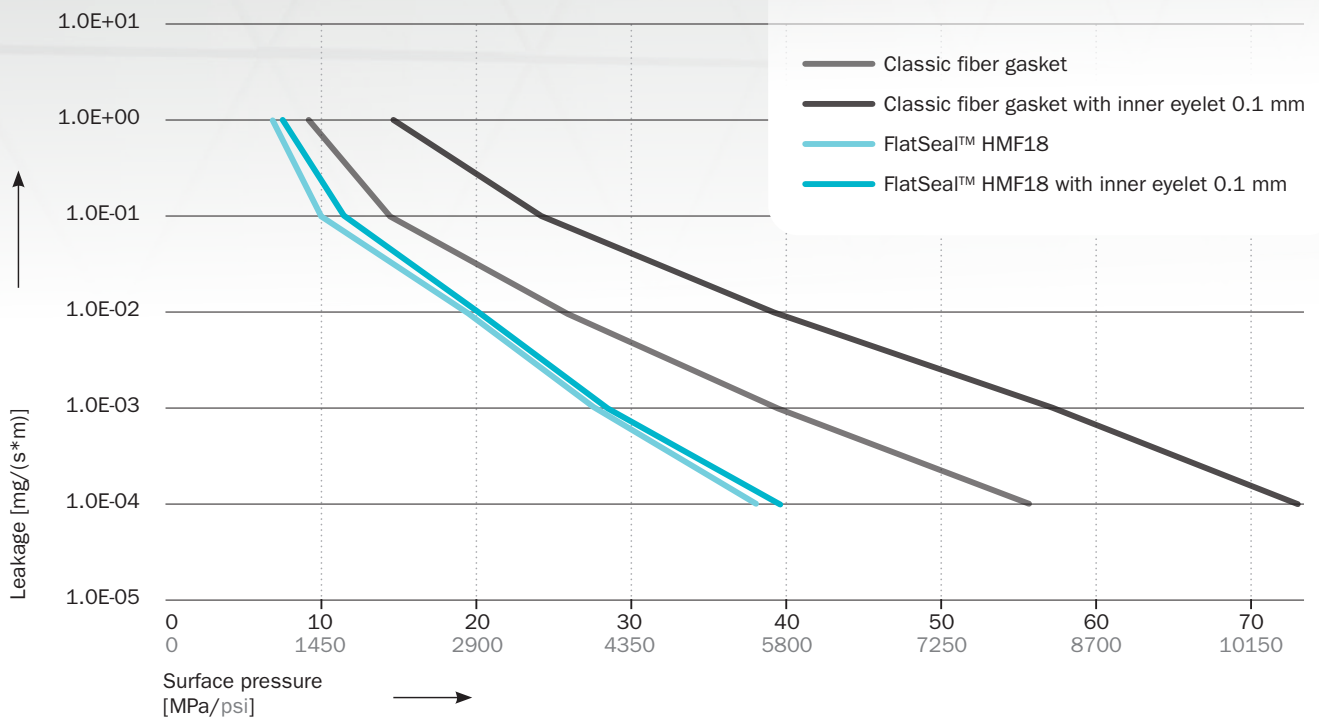
Outstanding leakage performance even at low surface pressure levels

At an internal pressure level of 40 bar / 580 psi, in relation to the surface pressure level, tests show that FlatSeal™ HMF18 is significantly better at preventing leakage than conventional fiber gaskets.

Tests performed in accordance to EN 13555 demonstrate that advanced manufacturing technology and material composition result in excellent gasket constants.

Comparison of leakage performance – HMF18 and standard flat gasket material with and without inner eyelet

Ring dimension 92 x 49 x 2 mm, 40 bar helium



INFLUENCE OF AN INNER EYELET

FlatSeal™ HMF18 is punched out of a sheet and can be finished with a stainless steel inner eyelet. A unique feature of this highly adaptable gasket is that it achieves similar performance levels both with and without an inner eyelet. The ability to produce both versions with nearly identical performance characteristics, reduces storage and logistics in gasket production and offers potential savings.



TEMPERATURE TESTS DEMONSTRATE SUPERIOR RESULTS

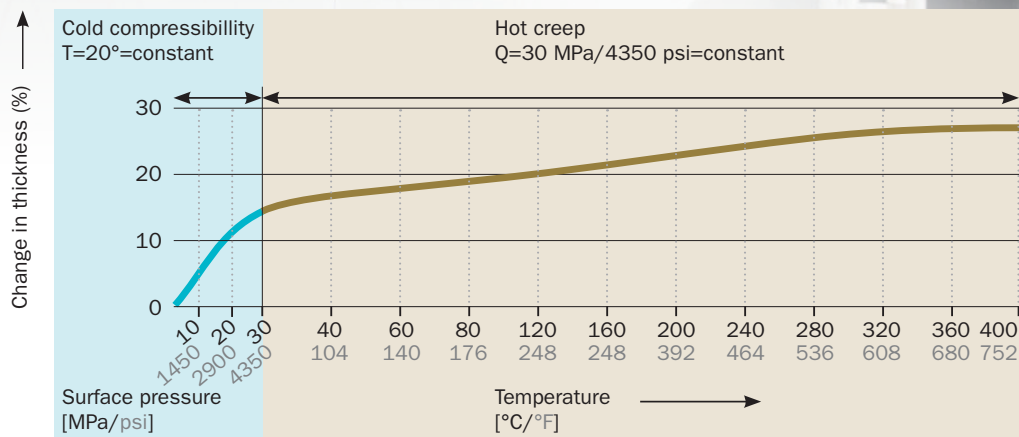
Testing of FlatSeal™ HMF18 focused on determining how the gasket deforms when application temperatures increase.

Temperature testing consists of two parts:

- First, the gasket is compressed at room temperature between two surfaces. The curve in the graph indicates the adaptability of the gasket during installation.
- In the second part of the test, the temperature is increased at a specified speed, while the surface pressure from the first step is held constant – the system is not allowed to “relax” as a result of gasket compression. The test significantly exceeds real-life operating conditions where the load on the gasket would be lower, thereby proving gasket performance.

Temperature Test

at 30 MPa - sample thickness: 2.0 mm



Case Study

FlatSeal™ HMF18 – Reliable sealing for pumps

A pump is a mechanical device that moves liquids from one place to another. They are used all over the world, in different industries and for numerous applications. Sealing solutions, including flat gaskets are responsible for preventing leakage within the pump and where the pump is connected to other components and pipes.

In the chemical processing industry, high demands are placed on pumps. They must effectively manage corrosive or aggressive fluids, while ensuring a safe environment and productive manufacturing process.

In large pumps, flat gaskets are used in many positions and must offer reliable sealing when large amounts of fluids are moving at high pressures. Thanks to its high surface adaptability and ability to tightly seal between surfaces, FlatSeal™ HMF18 is an effective solution for critical applications. It is compatible to a wide range of media and its long service life means minimum downtime for maintenance.

Because of the superior performance characteristics of FlatSeal™ HMF18, significantly thinner gaskets can be used, which match or outperform conventional flat gaskets and withstand even the highest internal pressure levels.

APPLICATION EXAMPLES

Alongside pump applications, FlatSeal™ HMF18 is ideal for use in:

- Transmissions
- Valves
- Pipe works
- Gear boxes
- Oil pan gaskets
- Other fuel and oil applications



Contact your Customer Solution Center

Does your application require resistance to aggressive chemicals? Or is the operating environment of your application especially challenging? Reach out to your local Customer Solution Center for support with FlatSeal™ selection to meet your specific requirements.



www.trelleborg.com/seals/csc

FlatSeal™ Code Technology

Ensuring the highest quality every step of the way

Using a state-of-the-art calendaring process, HMF FlatSeal™ gaskets are manufactured with the highest quality raw materials. Every batch of material must match precise specifications and is subject to rigorous inspection to ensure that only approved materials are used in production.

To guarantee consistent high quality at all steps, a process control system monitors and controls the preparation of formulations, their blending operation, and the calendaring process that forms the material sheet from which a FlatSeal™ is formed. Every production batch is given a unique ID, which enables full traceability of the calendared sheet.



UNIQUE IDENTIFICATION FOR FULL TRACEABILITY

With FlatSeal™ Code Technology, the material batch can be identified using the unique ID, which serves as a permanent fingerprint after punching and cutting operations; something that was not previously possible. The specially developed technology enables identification of gaskets, regardless of the temperatures and exposure time of media, as well as the length of time in operation.

FlatSeal™ Code Technology makes FlatSeal™ HMF18 suitable for “Industry 4.0” applications that need full traceability.

Material Information

Recommended temperature range:

-100 °C to 200 °C / -148 °F to 392 °F

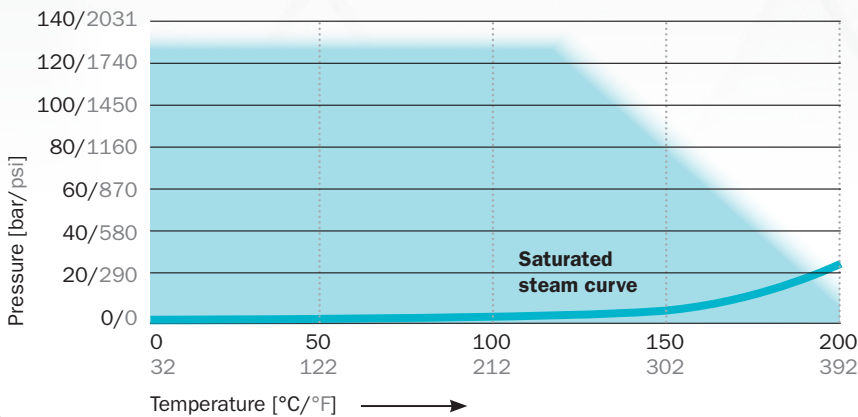
Recommended pressure range:

From high vacuum to a maximum of 125 bar / 1800 psi.

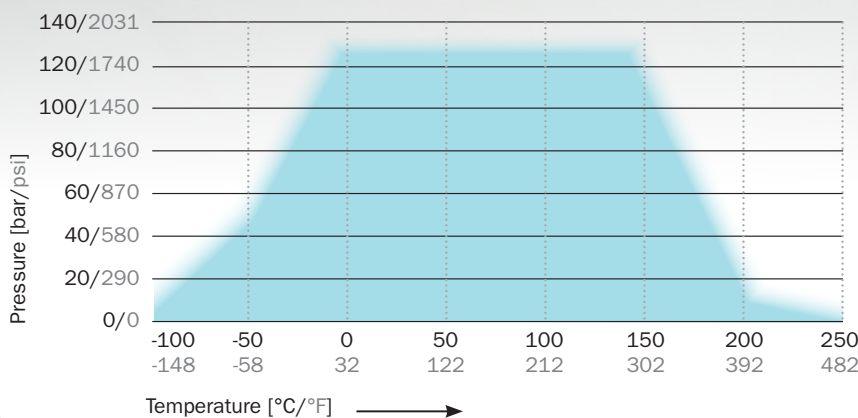
The temperature and pressure recommendations in the graphs apply to gaskets 2.0 mm/0.08 inch thick that are used with raised face flanges. Higher stresses are possible when thinner gaskets are used. The recommendations are based on material characteristics and installation conditions.

The information provided should therefore be considered cautious estimates rather than specific operational limits. Please contact your local Customer Solution Center to verify that this material is suitable for the operating environment in your application.

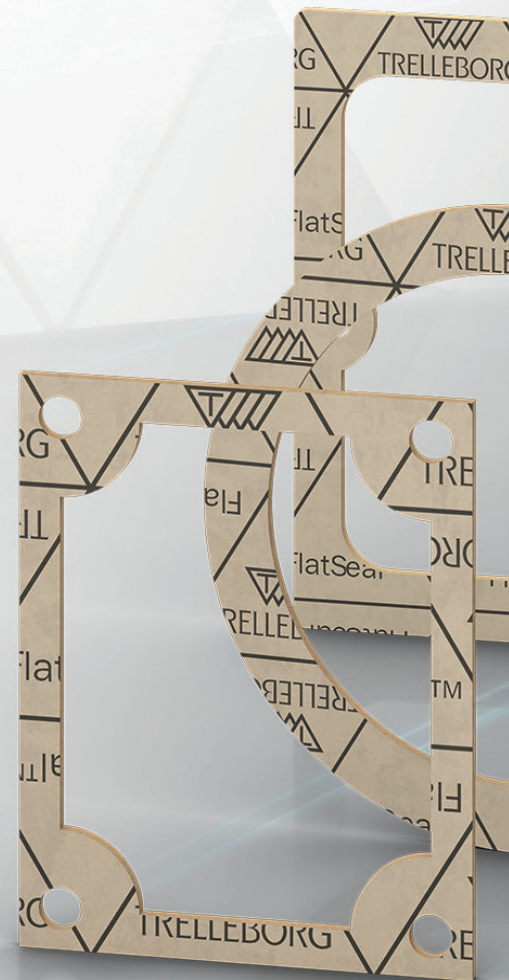
Water/water vapor

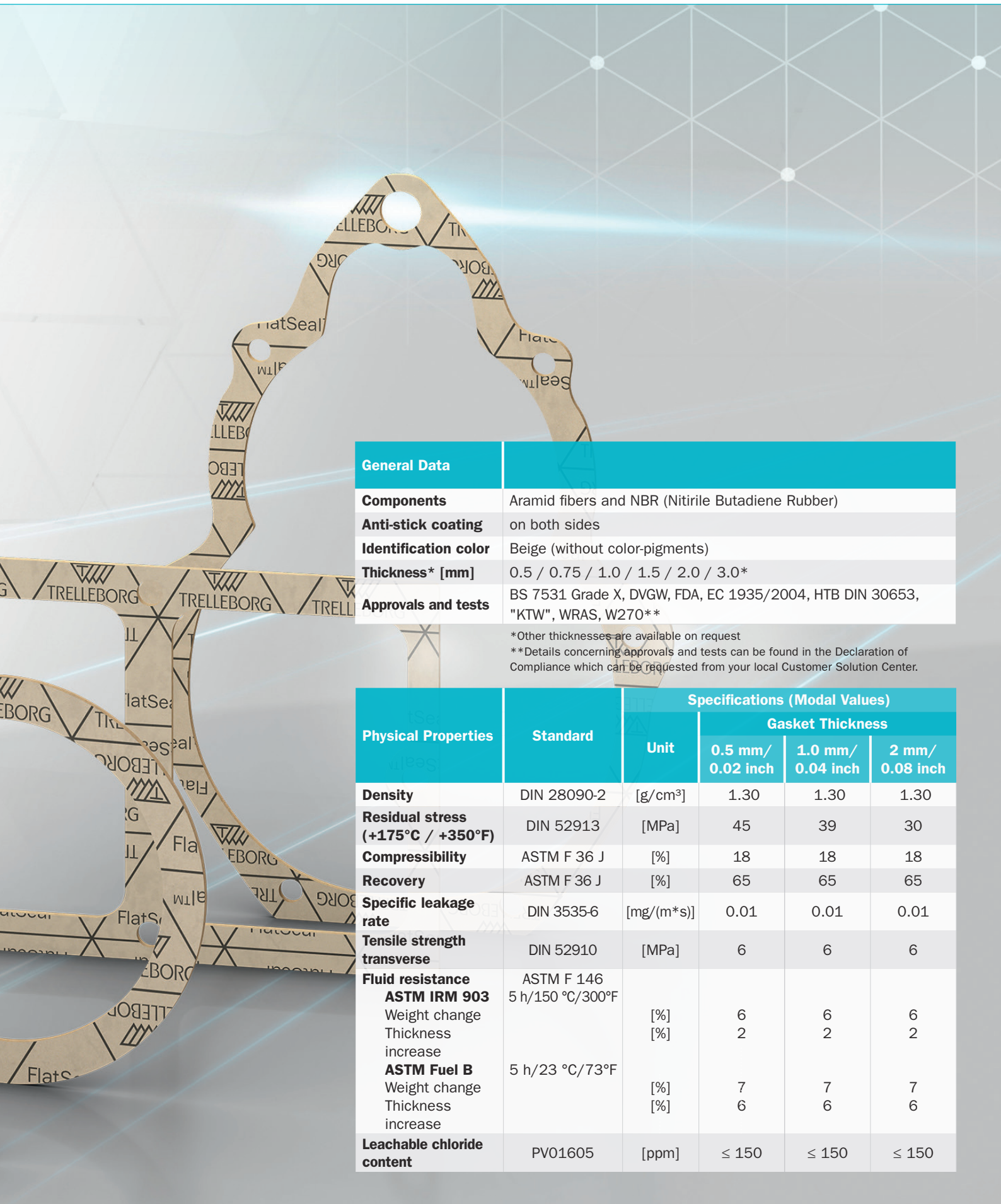


Other media*



* Other media refers to other media commonly used in gasket applications that is not chemically critical.





General Data	
Components	Aramid fibers and NBR (Nitrile Butadiene Rubber)
Anti-stick coating	on both sides
Identification color	Beige (without color-pigments)
Thickness* [mm]	0.5 / 0.75 / 1.0 / 1.5 / 2.0 / 3.0*
Approvals and tests	BS 7531 Grade X, DVGW, FDA, EC 1935/2004, HTB DIN 30653, "KTW", WRAS, W270**

*Other thicknesses are available on request

**Details concerning approvals and tests can be found in the Declaration of Compliance which can be requested from your local Customer Solution Center.

Physical Properties	Standard	Specifications (Modal Values)			
		Unit	Gasket Thickness		
			0.5 mm/ 0.02 inch	1.0 mm/ 0.04 inch	2 mm/ 0.08 inch
Density	DIN 28090-2	[g/cm ³]	1.30	1.30	1.30
Residual stress (+175°C / +350°F)	DIN 52913	[MPa]	45	39	30
Compressibility	ASTM F 36 J	[%]	18	18	18
Recovery	ASTM F 36 J	[%]	65	65	65
Specific leakage rate	DIN 3535-6	[mg/(m*s)]	0.01	0.01	0.01
Tensile strength transverse	DIN 52910	[MPa]	6	6	6
Fluid resistance	ASTM F 146				
ASTM IRM 903	5 h/150 °C/300°F				
Weight change		[%]	6	6	6
Thickness increase		[%]	2	2	2
ASTM Fuel B	5 h/23 °C/73°F				
Weight change		[%]	7	7	7
Thickness increase		[%]	6	6	6
Leachable chloride content	PV01605	[ppm]	≤ 150	≤ 150	≤ 150

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions is a leading developer, manufacturer and supplier of precision seals, bearings and custom-molded polymer components. It focuses on meeting the most demanding needs of aerospace, automotive and general industrial customers with innovative solutions.

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