FlatSeal™ HMF17

HIGH PERFORMANCE FIBER GASKET

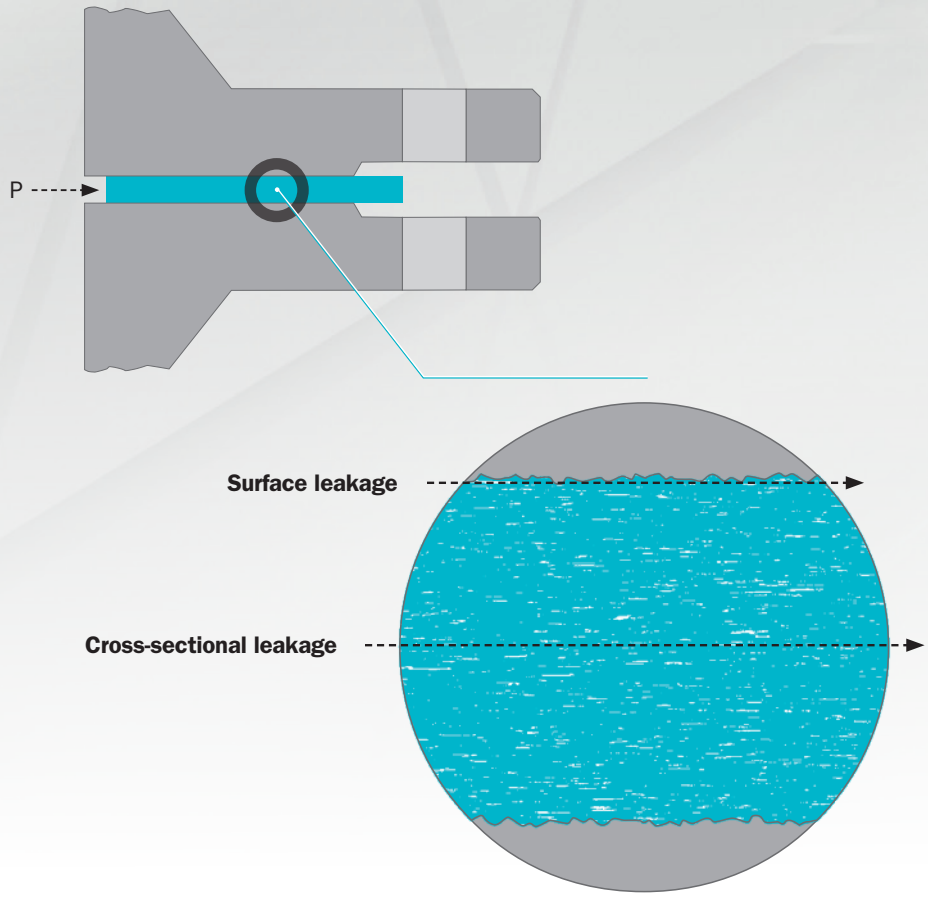
TOGETHER WE SHAPE A SUSTAINABLE FUTURE

The Best of Both Worlds

Meeting the challenge: sealing between flat surfaces

In a variety of industries and critical applications, flat gaskets provide a static seal between two flat sealing surfaces. In flanges they connect valves, fittings, pipes, and pumps, where they are often subjected to aggressive media. To be effective, gaskets must be able to form a tight seal and have the strength to withstand challenging operating environments.

When flat surfaces in components join, unevenness and roughness are unavoidable. Typically, wide spacing of bolts can cause flanges to bend or deform, resulting in a low clamping force and minimal or inconsistent surface pressure on the gasket. In this scenario, conventional fiber gaskets may not provide leak-free sealing, while rubber gaskets lack the mechanical strength to withstand the operating environment, particularly when temperatures rise.

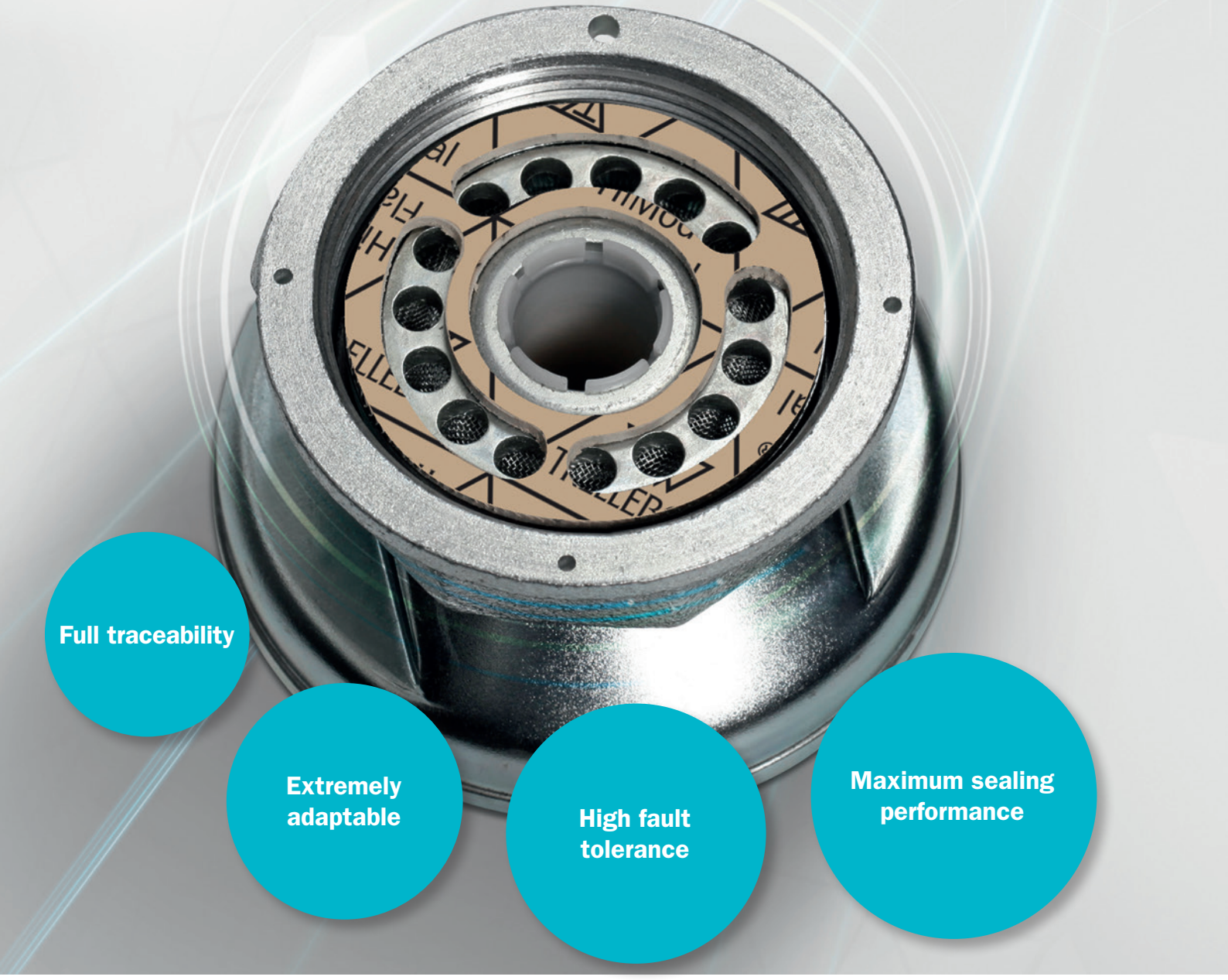


Combining tight fit and robust strength

Flat seals from Trelleborg Sealing Solutions in HMF17 resolve these issues by bridging the gap between traditional fiber gaskets and rubber gaskets. This completely new material composition combines the flexibility and tight fit of an elastomer with the robust strength and mechanical stability of a fiber material. The material's innovative mix of high-quality aramid fibers, special functional fillers, and Nitrile Butadiene Rubber (NBR) provides a unique performance profile.

The material's flexibility, almost like that of an elastomer, simplifies the fitting process of the seal and ensures a perfect fit on uneven surfaces. At the same time, FlatSeal™ HMF17 provides the mechanical robustness of a conventional fiber gasket, making it suitable for applications with higher temperatures and pressures and where chemical compatibility is crucial.

Additionally, HMF17 is equipped with FlatSeal™ Code Technology, a permanent fingerprint that enables full traceability from the material batch through to the cut gasket.



The Perfect Fit

Combining the key properties of elastomer and traditional fiber gaskets, the innovative FlatSeal™ HMF17 is the optimum choice when tight sealing and mechanical strength are required.

FEATURES & BENEFITS

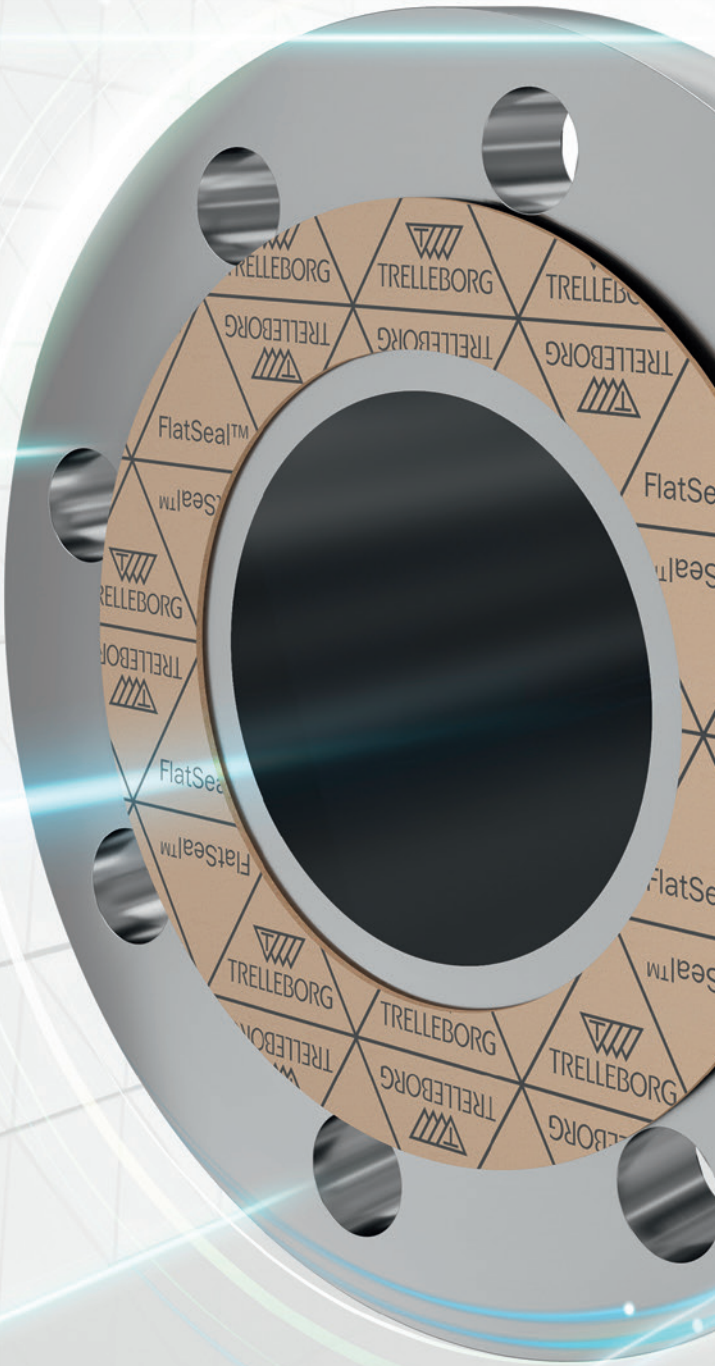
- Excellent adaptability to unevenness at minimum surface pressure levels and during installation
- Extremely low leakage levels even when surface pressure is very low
- Mechanical stability
- Stable long-term properties at moderate operating temperatures
- Good resistance to media and aging
- Smooth processability and safe handling even with complex gasket outlines
- Full traceability of gaskets with FlatSeal™ Code Technology
- Part of the FoodPro® portfolio, FlatSeal™ HMF17 is compliant with global food contact regulations, including FDA and European Union (EC)
- Approvals: DVGW, HTB DIN 30653, KTW and WRAS

APPLICATION EXAMPLES

- Gaskets for non-rigid structures with minimal and inconsistent surface pressure distribution due to large bolt intervals
- Gaskets for easily bent or deformed structural components made of sheet metal or plastic
- Gaskets for plastic housing designed to protect vehicle batteries
- Lid and housing seals for gearboxes, drives and pumps

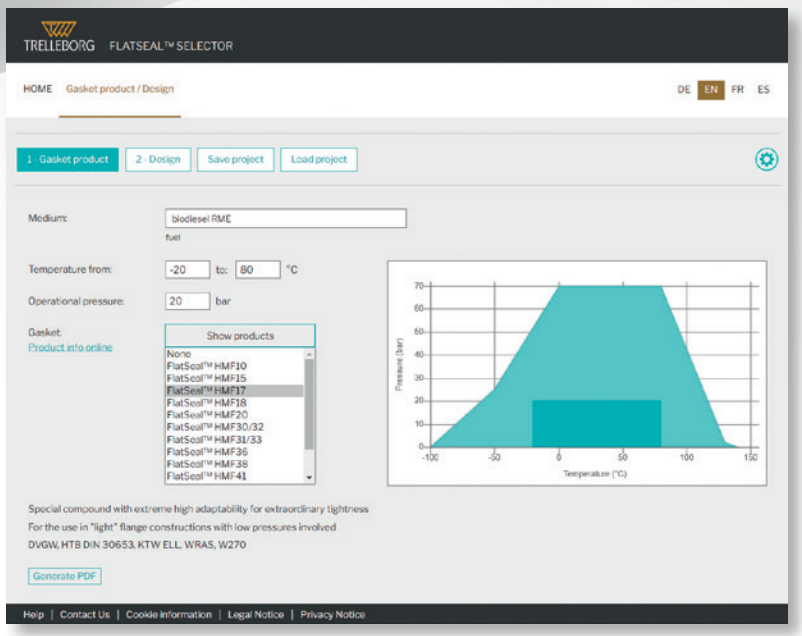
MEDIA COMPATIBILITY

FlatSeal™ HMF17 is considerably more resistant to chemicals and aging than conventional elastomer gaskets, making it suitable for use in applications containing oil, lubricants, grease, fuel, cooling agents, gas and other media.



FlatSeal™ Selector

In addition to FlatSeal™ HMF17, Trelleborg Sealing Solutions offers a wide variety of FlatSeal™ options in materials engineered for specific operating conditions.



Need help specifying a FlatSeal™ for your application?

The new FlatSeal™ Selector helps you select a material based on operating conditions and calculate important data for your sealing system.

www.trelleborg.com/seals/tools

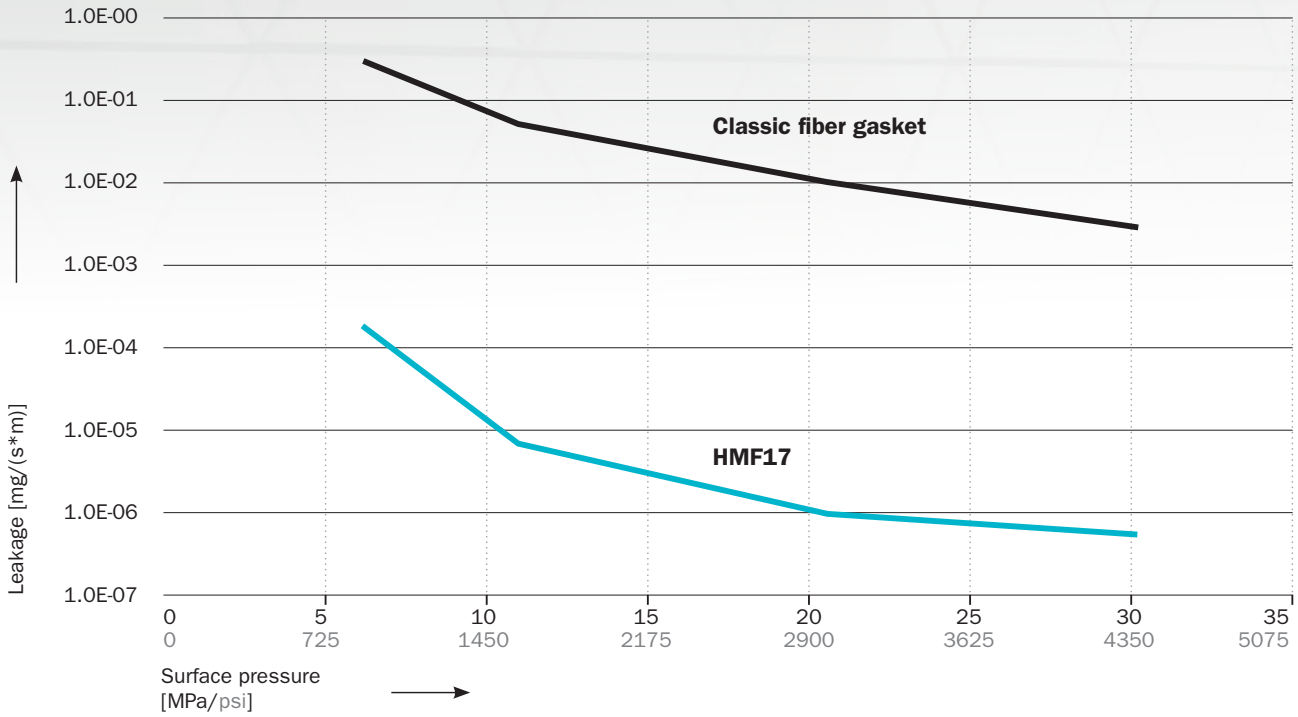
Proven Performance

Because of its unique raw material concept and advanced processing technology that results in enhanced material flexibility, the FlatSeal™ HMF17 offers reliable sealing, even with minimal or inconsistent surface pressure. Numerous tests have been performed to prove the performance of FlatSeal™ HMF 17.

BREAKTHROUGH IN LEAK-TIGHTNESS

At an internal pressure level of 10 bar / 145 psi, in relation to the surface pressure level, FlatSeal™ HMF17 is significantly better at preventing leakage than conventional fiber gaskets.

Comparison of leakage performance - HMF17 with standard flat gasket material
Ring dimension 92 x 49 x 1 mm, 10 bar helium



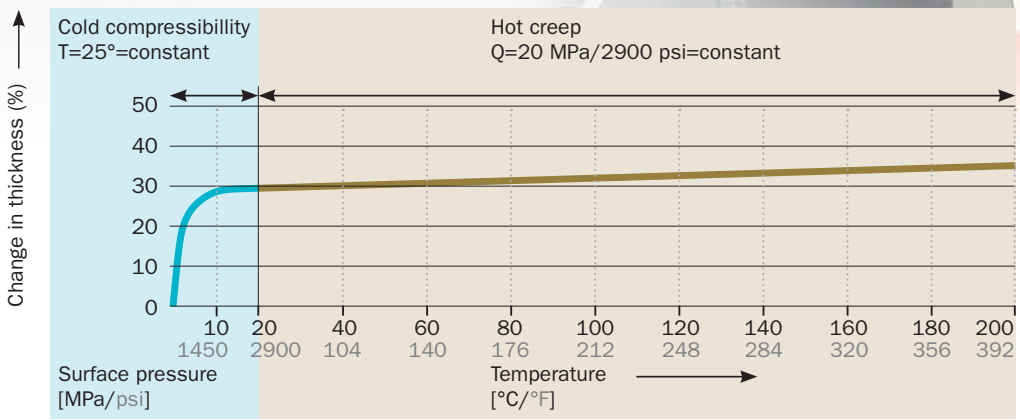
TEMPERATURE TESTS DEMONSTRATE SUPERIOR RESULTS

Testing of FlatSeal™ HMF17 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 20 MPa - sample thickness: 1.0 mm



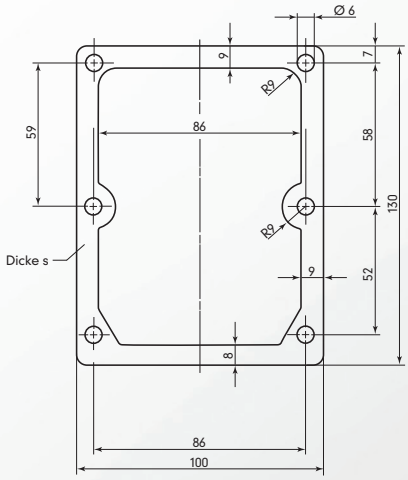
Case Study

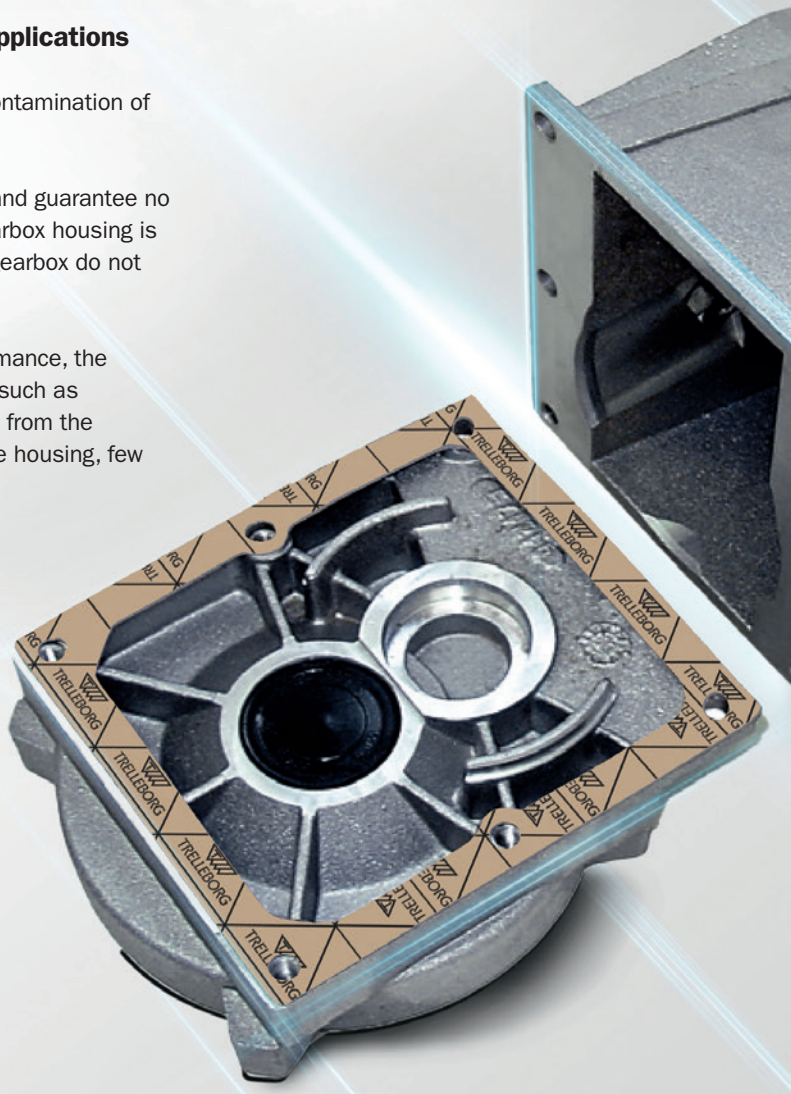
FlatSeal™ HMF17 – The optimum solution for critical applications

Cleanrooms must maintain their purity levels in order to prevent contamination of products and processes taking place in a cleanroom environment.

Gearboxes used in cleanrooms must meet special requirements and guarantee no particles are released into the environment. The gasket on the gearbox housing is responsible for ensuring lubricants and other particles inside the gearbox do not leak into the atmosphere.

Thanks to its excellent adaptability and outstanding sealing performance, the FlatSeal™ HMF17 is the optimum solution for critical applications, such as gearboxes in cleanrooms. It effectively seals and prevents leakage from the gearbox housing by compensating for the low-rigidity material of the housing, few and widely spaced bolts and low, uneven surface pressure.





APPLICATION EXAMPLES

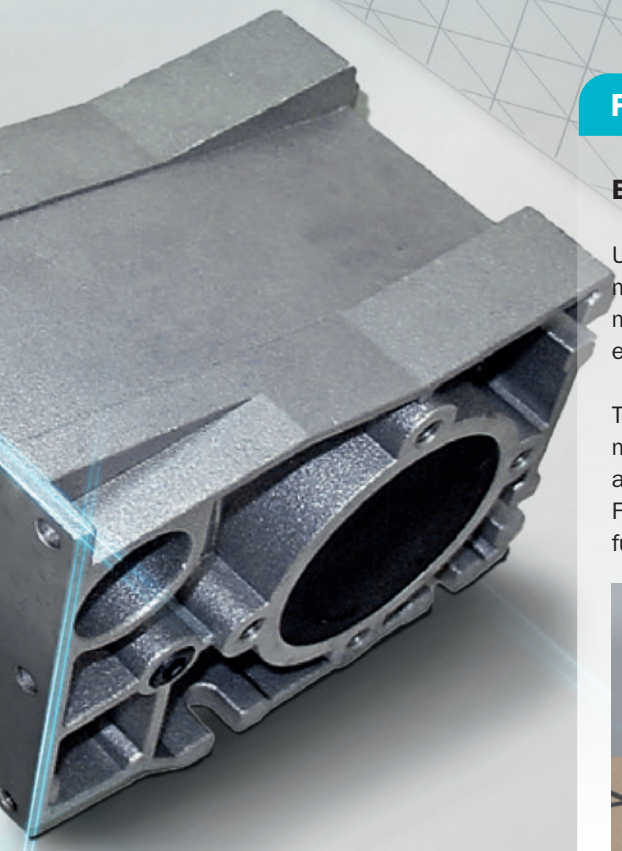
Alongside gearbox applications, the FlatSeal™ HMF17 is ideal for use in:

- Transmissions
- Valves
- Compressors
- Gas meters
- Oil pan gaskets
- Other fuel and oil applications
- Battery housings

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™ HMF17 suitable for “Industry 4.0” applications that need full traceability.

Material Information

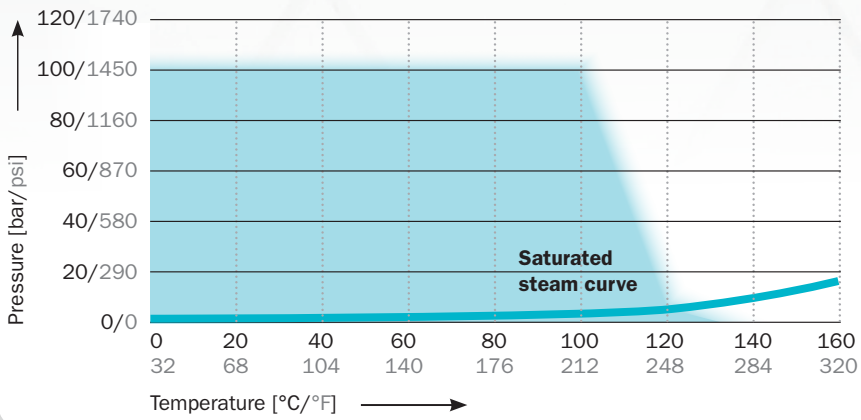
Recommended temperature range:
-100 °C to +130 °C / -148 °F to +266 °F

Recommended pressure range:
From high vacuum to a maximum of 100 bar / 1450 psi.

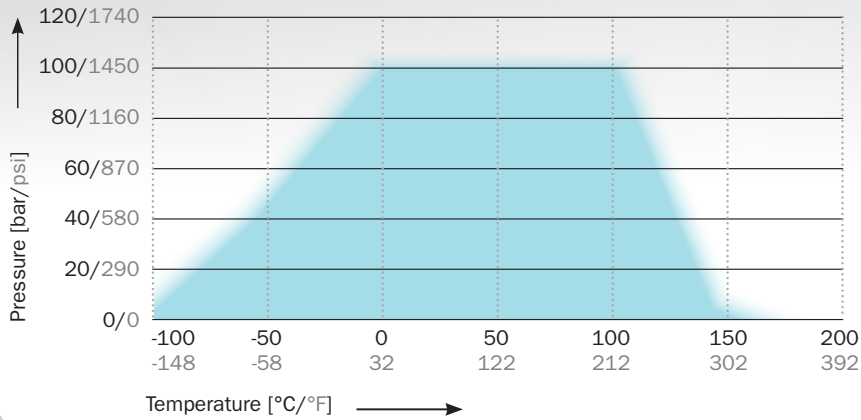
The temperature and pressure recommendations in the graphs apply to gaskets 2.0 mm/0.08 inch thick that are used with raised face flanges. Higher stresses are possible when thinner gaskets are used. The recommendations are based on material characteristics and installation conditions.

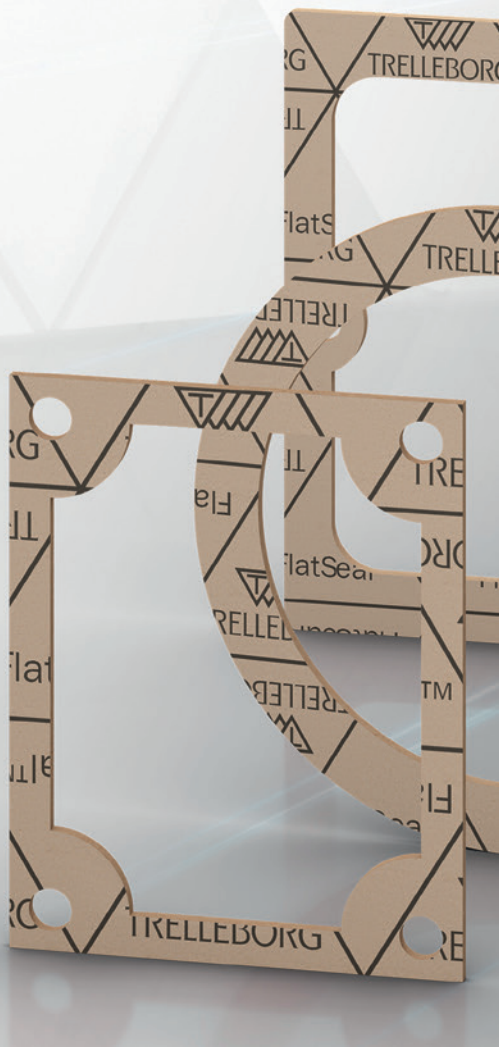
The information provided should therefore be considered cautious estimates rather than specific operational limits. Please contact your local Customer Solution Center to verify that this material is suitable for the operating environment in your application.

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	Non-standard
Identification color	Both sides light brown
Thickness [mm]	0.5 / 0.75 / 1.0 / 1.5 / 2.0*
Approvals and tests	DVGW, HTB DIN 30653, KTW, WRAS**

*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	Unit	Specifications (Modal Values)		
			Gasket Thickness		
			0.5 mm/ 0.02 inch	1.0 mm/ 0.04 inch	2 mm/ 0.08 inch
Density	DIN 28090-2	[g/cm³]	1.25	1.35	1.35
Residual stress (+175°C / +350°F)	DIN 52913	[MPa]	35	32	26
Compressibility	ASTM F 36 J	[%]	39	39	39
Recovery	ASTM F 36 J	[%]	60	60	60
Specific leakage rate	DIN 3535-6	[mg/(m*s)]	0.001	0.001	0.001
Tensile strength transverse	DIN 52910	[MPa]	5	5	5
Fluid resistance	ASTM F 146				
ASTM IRM 903	5 h/150 °C/300°F				
Weight change		[%]	8	8	8
Thickness increase		[%]	2	2	2
ASTM Fuel B	5 h/23 °C/73°F				
Weight change		[%]	12	12	12
Thickness increase		[%]	9	9	9
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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If you'd like to talk to Trelleborg Sealing Solutions, find your local contact at: www.trelleborg.com/seals/worldwide

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