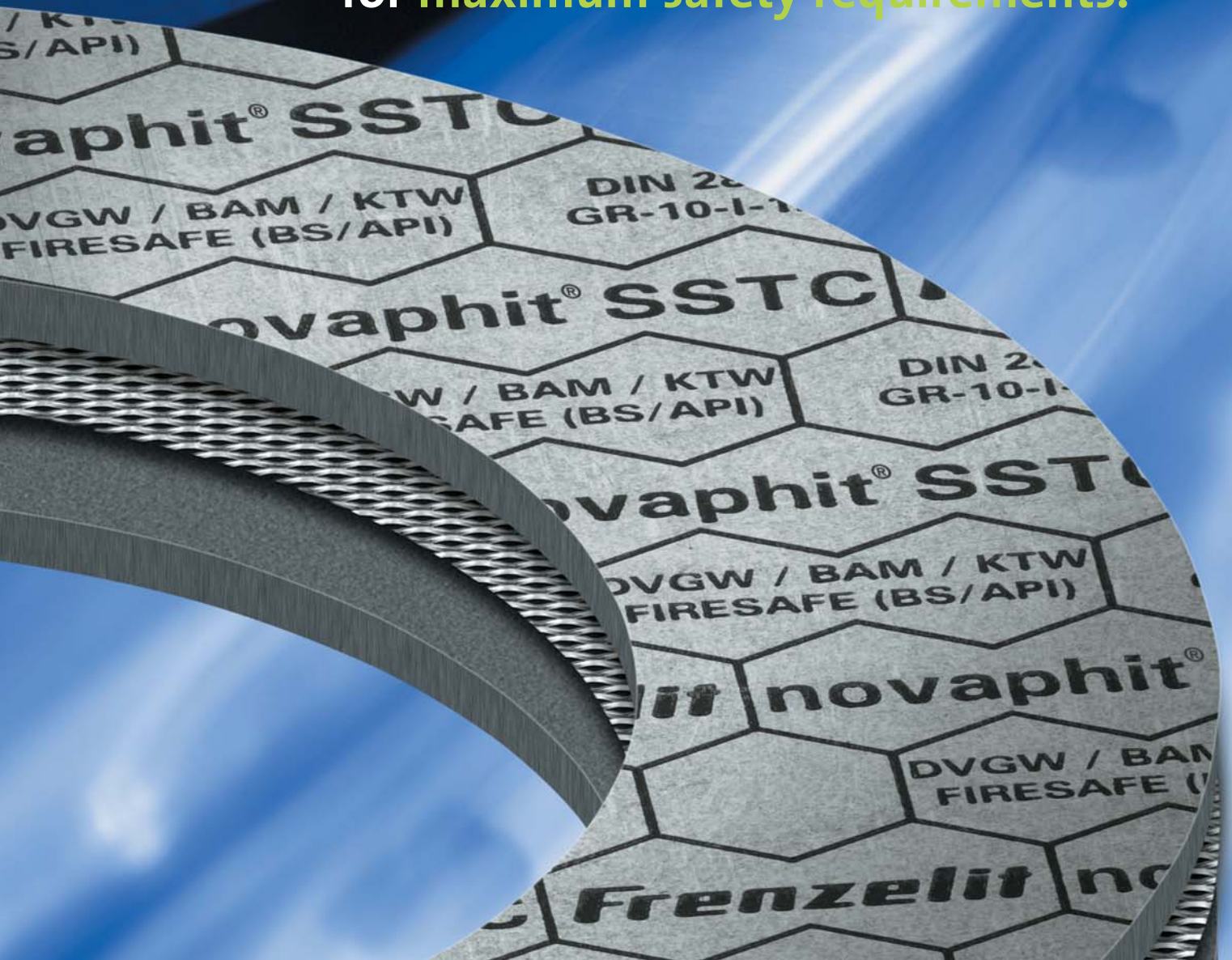


novaphit® – high-pressure gasket material made from expanded graphite for maximum safety requirements.



GASKETS

TECHNICAL TEXTILES

EXPANSION JOINTS

INSULATION

NEW MATERIALS

 **Frenzelit**

creating
hightech
solutions

Optimum efficiency thanks to the combination of pure graphite and three-dimensional expanded metal reinforcement.

Unique material profile for maximum safety requirements

- Thoroughly proven material structure consisting of high-quality expanded graphite (purity level at least 99 %) and expanded metal inserts made from acid-proof stainless steel
- Material compound without any bonding and filling agents

High heat and mechanical resistance

- From -240 °C to 550 °C
- Very high operating pressure levels of up to 250 bar (depending on the product)
- Suitable for extreme changing loads and cycles

Standardisation throughout the plant

- Thanks to their material concept, novaphit® products can reduce the variety of different gaskets used in the process industry.

Unique media resistance

- Resistant to practically all organic and inorganic acids, alkalis, oils and solvents
- DVGW, KTW and BAM approvals (depending on the product)
- Firesafe tested in accordance with BS and API (depending on the product)



Expanded metal made from extremely acid-resistant stainless steel

The material is resistant to corrosion and acids (material no. 1.4404/AISI 316L).

Thickness of the expanded metal insert used

Expansion of the stainless steel foil used (0.15 mm) produces a three-dimensional structure with a considerably thicker projected height (about 0.5 mm), as a result of which genuine “chambering” of the gasket core is achieved. Irrespective of the gasket thickness chosen and the surface pressure applied, there is never any contact between the expanded metal insert and the gasket surface.

Minimisation of the danger of injury during handling and processing – no “sharp” cut edges.

Geometry of the stainless steel insert

- No undercutting in the insert material.
- Better use of the surface pressure available to compress the graphite, because no crowns have to be bent. Installation of the gasket is completed more quickly.
- Easy cutting, handling benefits in manual and/or in-house finishing.

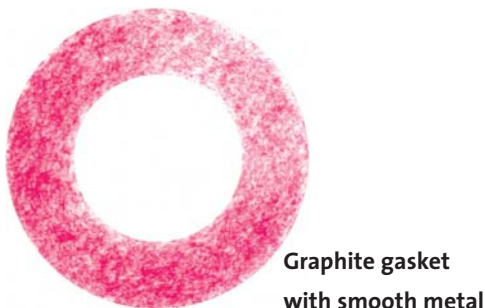
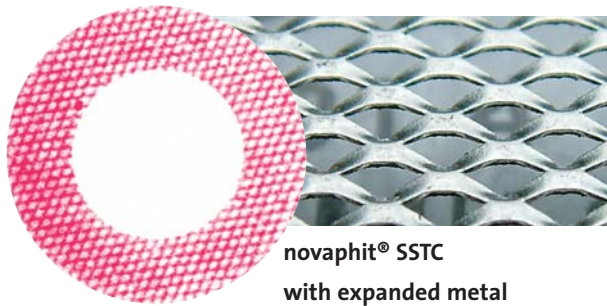
Excellent processing properties

- thanks to optimum choice of parameters and the low mesh size of the expanded metal insert
- novaphit® can be processed very effectively not only with standard die-cutting equipment but also in manual finishing operations and with plotter cutters

Typical application areas for novaphit®

- Universal use in all areas of the chemical industry
- Covers the complete range of classic flat gaskets
- Suitable in general for all applications in extreme conditions, including varying loads
- Excellent oval closure lid gasket in the special novaphit® SSTC^{TRD 401} version approved by the TÜV technical control authorities

Optimisation of surface pressure distribution is a major advantage of expanded metal inserts over other insert concepts. This is shown impressively by closed lines of increased surface pressure (see the Fuji film picture of novaphit® with expanded metal).



- The favourable mesh geometry (mesh aperture = 3.0 mm) makes it possible to produce gaskets with very narrow bridges.
- Considerably less danger of delamination when the gasket is bent. Even in the case of a bent gasket, the graphite foil is pressed into position around the insert again completely when pressure is applied to the gasket during installation in the flange, i.e. larger tolerance with respect to installation faults.
- The “countless” insert flexing operations are irreversible because of strain hardening, i.e. the insert has good recovery properties and participates actively in the sealing process! This guarantees greater gasket reliability, above all at higher surface pressure levels.

Material structure

- Multilayer structure alternating between pure graphite foils and expanded metal inserts
- 2 layers of pure graphite foil and 1 layer of expanded metal are combined in novaphit® SSTC
- To form novaphit® SUPER HPC, up to 5 layers of graphite and up to 3 layers of expanded metal are laid on top of each other alternately – depending on the final thickness required. The metal inserts are placed at right angles to each other to guarantee consistent strength both longitudinally and transversely.

Fuji film pictures

- Sensitivity: medium



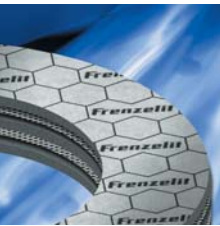
novaphit® product family



novaphit® SSTC

The proven plant standard with one expanded metal insert.

The advantages of novaphit® SSTC are attributable primarily to the use of the expanded metal insert made of stainless steel. This guarantees straight-forward handling before installation and a strong performance in the flange. Whether a standard gasket is chosen or a specially designed gasket with a complicated geometry. Wherever conditions are demanding, the ideal combination of high-quality expanded graphite and a three-dimensional expanded metal insert demonstrates its proven efficiency. novaphit® SSTC is an excellent standard gasket for the entire plant.

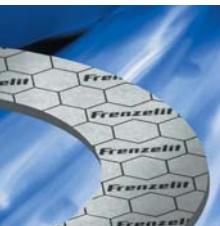


novaphit® SUPER HPC

Pure graphite with several expanded metal inserts.

Several inserts made from expanded metal guarantee maximum mechanical resistance in novaphit® SUPER HPC.

Arrangement of the inserts at right angles to each other makes sure that tensile strength is consistent in all directions.



novaphit® VS

Pure graphite without an insert.

For all applications where a stainless steel insert cannot be used. The material is pre-densified during production in order to optimise the handling properties. It is simple to produce even the narrowest gasket widths as a result.

novaphit® SSTC^{TRD 401}

The TÜV-certified solution for oval closure lid gaskets.

This type of gasket, which is based on the classic novaphit® SSTC product, has become the popular standard for oval gaskets that require official approval since TÜV TRD 401 testing was introduced.

novaphit® SSTC^{TRD 401} has been tested and approved by the TÜV technical control authorities in the highest possible category D (250° C/40 bar) in accordance with the directive TRD 401 (test number: TÜV.D.05-004.d).

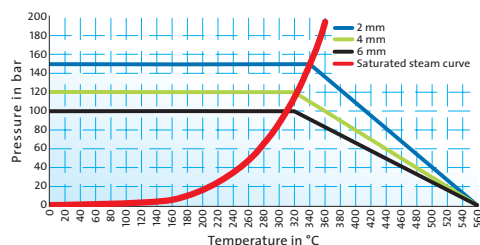
Oval gaskets 2, 4 or 6 mm thick are produced from the original material (which is 2 mm thick) by certified manufacturers. They cover all the different applications, from the new boiler that is being delivered to the steam generator that has already been in operation for a long time.

novaphit® SSTC^{TRD 401}'s strength is its particularly good adaptability to unevenness in the gasket surface. This is due to a sufficiently thick graphite layer. The expanded metal inserts are another positive feature, because they have no adverse impact on compression of the gasket. This means that the low surface pressure in the closure lid area for design reasons can be exploited to full effect to form the graphite.

novaphit® SSTC^{TRD 401} also has all the properties of novaphit® SSTC and can therefore be used smoothly for all other steam generation application areas too.



Recommendations for use of novaphit® SSTC^{TRD 401}



Product data

novaphit® SSTC

- Dimensions in mm: 1000 x 1000
1500 x 1500
- Thicknesses in mm: 1.0/1.5/2.0/3.0
- Further dimensions and thicknesses are available on request

novaphit® SUPER HPC

- Dimensions in mm: 1000 x 1000
1500 x 1500
- Thicknesses in mm: 1.5/2.0/2.5/3.0
- Further dimensions and thicknesses are available on request

novaphit® VS

- Dimensions in mm: 1000 x 1000
1500 x 1500
- Thicknesses in mm: 0.5/1.0/1.5/2.0
- Further dimensions and thicknesses are available on request

novaphit® SSTC^{TRD 401}

- Dimensions in mm: 1000 x 1000
1500 x 1500
- Thickness in mm: 2.0
- Further dimensions and thicknesses are available on request

novaphit® SSTC^{TA-L}

Safety for all plant areas certified in accordance with fugitive emission regulations

The first graphite gasket for which certification has been obtained that it meets the requirements of the fugitive emission regulations directly from the sheet – no matter whether it has an inner eyelet or not.

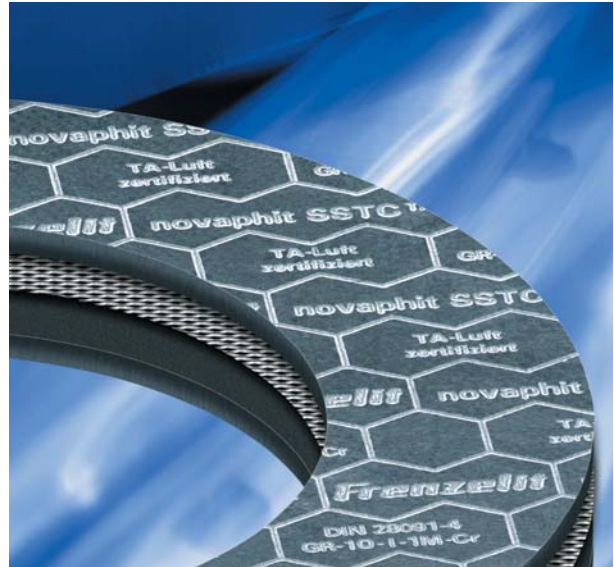
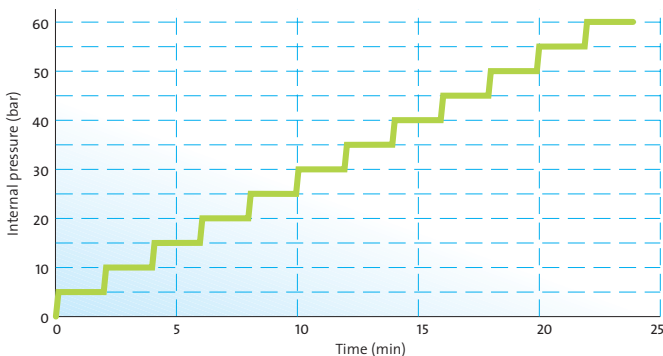
The basis here is also the proven expanded metal insert made from chrome-nickel steel (material no. 1.4404/AISI 316 L). In order to satisfy the new legal requirements, extremely pure graphite foils processed into a gradient gasket material are used in this case. An additional feature is the internal impregnation, which in turn helps to achieve leakage rates that are already considered to be the new standard in the field of graphite gasket materials.

Blow-out test

novaphit® SSTC^{TA-L} demonstrates its efficiency under extreme conditions where blow-out resistance is concerned too:

The gasket even withstands surface pressure of 7.5 N/mm² and internal pressure of 60 bar. Measurement is carried out in accordance with VDI 2200 (06/2005 version) following 24-hour storage at 300° C and subsequent application of nitrogen in a DN40/PN40 flange.

novaphit® SSTC^{TA-L} blow-out test



Certification of compliance with German air pollution regulations

The fugitive emission regulations that have applied in Germany since October 2002 define and specify the commitments for operators of industrial equipment that requires approval. Clear rules are made there for flange connections. In this context, technically tight flange connections have to be used in accordance with VDI 2440 (issue 11/2000).

novaphit® SSTC^{TA-L} has been tested by Amtec. The result: classification as a high-quality gasket in accordance with the test criteria of VDI 2440 for the German pollution regulations.

novaphit® SSTC^{TA-L} observes the leakage criterion of the German pollution regulations comfortably with 8·10⁻⁵ mbar·l/(s·m).

Further details about novaphit® SSTC^{TA-L} can be found in the novaphit® SSTC^{TA-L} product folder, which can be requested free of charge and is available to be downloaded from the Internet at www.frenzelit.com.

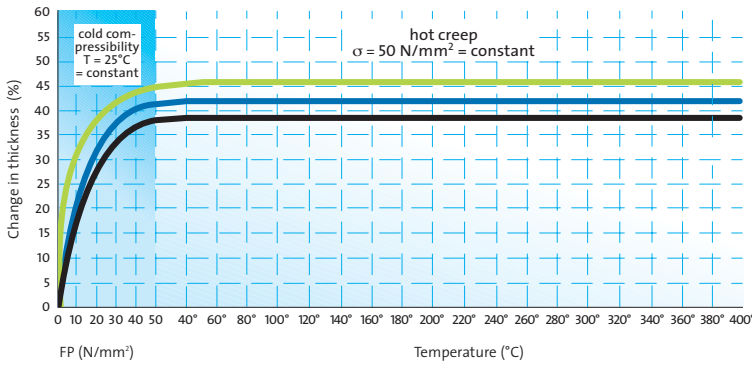
novaphit® SSTC^{TA-L}

- Dimensions in mm: 1000 x 1000
1500 x 1500
- Thicknesses in mm: 1.0/1.6/3.0
- Further dimensions and thicknesses are available on request



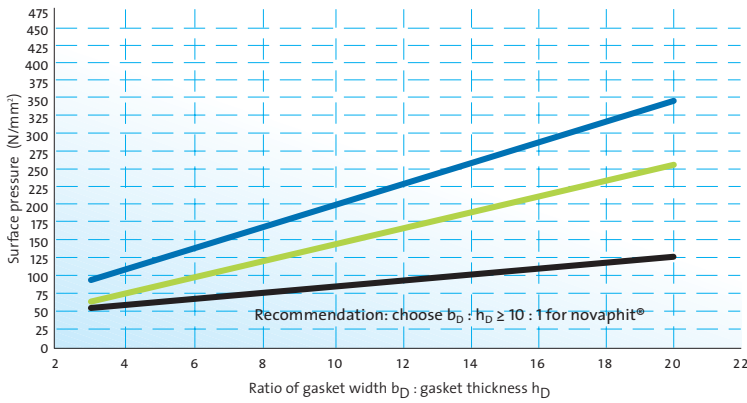
Typical material properties for products with a gasket thickness of 2 mm

Compression set – temperature test: 50 N/mm² – 400 °C



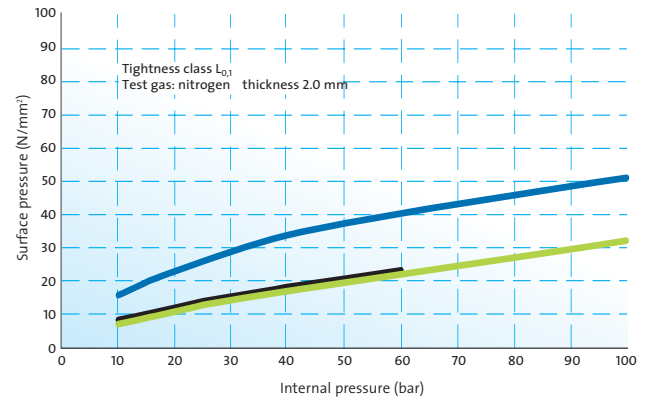
- novaphit® SUPER HPC
- novaphit® SSTC
- novaphit® VS

Maximum surface pressure when installed with smooth sealing faces*



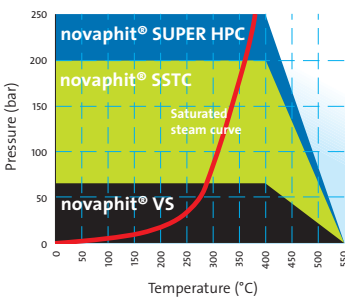
* The maximum surface pressure can be increased by 1.5 in the case of tongue-and-groove flanges.

Necessary minimum surface pressure σ_{vu} σ - p graph

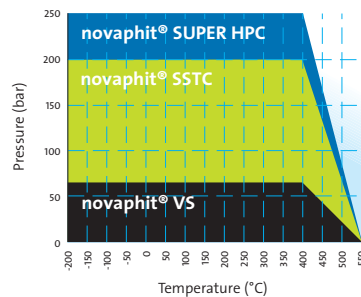


Recommendations for use according to the pressure and temperature

Water/steam



Other media*



The temperature and pressure recommendations in the graphs apply to gaskets with a thickness of 2.0 mm and smooth flanges. Higher stresses are possible when thinner gaskets are used!

* Example for the most common other media. Exact data for specific individual cases are available in the Frenzelit novaDISC programme or contact our application engineering specialists.

Warranty exclusion

In view of the variety of different installation and operation conditions and application and process engineering options, the information given in this prospectus can only provide approximate guidance. There is as a result no basis for warranty claims.

Material data

General information

| | novaphit® SSTC/SSTC ^{TRD 401} | novaphit® SUPER HPC | novaphit® VS |
|-------------------------------------|---|------------------------------|-----------------|
| Binders | without organic binder | | |
| Approvals | DVGW, KTW, BAM (max. 200 °C/130 bar), Fire Safe, TRD 401* | BAM (max. 200 °C/130 bar) | |
| Colour | grey | | |
| Anti-stick coating | none | | |
| Sheet sizes and thickness tolerance | according to DIN 28 091-1 | | |

| Physical properties | Test standard | Unit | Value** | | |
|---------------------------------------|---------------|----------------------|---------------|---------------|-------------|
| Gasket thickness 2.0 mm | | | | | |
| Identification | DIN 28 091-4 | | GR-10-I-1M-Cr | GR-10-I-2M-Cr | GR-10-O-O-O |
| Density | DIN 28 090-2 | [g/cm ³] | 1.35 | 1.60 | 1.20 |
| Tensile strength | DIN 52 910 | [N/mm ²] | | | |
| longitudinal | | | 17 | 20 | 6 |
| transverse | | | 8 | 18 | 5 |
| Residual stress $\sigma_{dE/16}$ | DIN 52 913 | | | | |
| 175 °C | | [N/mm ²] | 47 | 46 | 48 |
| 300 °C | | [N/mm ²] | 45 | 45 | 46 |
| Compressibility | ASTM F 36 J | [%] | 40 | 35 | 34 |
| Recovery | ASTM F 36 J | [%] | 15 | 20 | 18 |
| Cold compressibility ϵ_{KSW} | DIN 28 090-2 | [%] | 39.0 | 35.0 | 35.0 |
| Cold recovery ϵ_{KRW} | DIN 28 090-2 | [%] | 4.0 | 4.0 | 5.0 |
| Hot creep $\epsilon_{WSW/300}$ | DIN 28 090-2 | [%] | 2.0 | 2.0 | 1.0 |
| Hot recovery $\epsilon_{WRW/300}$ | DIN 28 090-2 | [%] | 3.5 | 3.5 | 4.0 |
| Recovery R | DIN 28 090-2 | [mm] | 0.070 | 0.080 | 0.080 |
| Specific leakage rate | DIN 3535-6 | [mg/(s·m)] | ≤ 0.100 | ≤ 0.100 | ≤ 0.100 |
| Specific leakage rate $\lambda_{2,0}$ | DIN 28 090-2 | [mg/(s·m)] | 0.050 | 0.050 | 0.050 |
| Fluid resistance | ASTM F 146 | | | | |
| ASTM IRM 903 | 5h/150 °C | | | | |
| Weight change | | [%] | 30 | 30 | 30 |
| Thickness change | | [%] | 6 | 5 | 6 |
| ASTM Fuel B | 5h/23 °C | | | | |
| Weight change | | [%] | 30 | 30 | 30 |
| Thickness change | | [%] | 6 | 5 | 6 |
| Chloride content | DIN 28 090-2 | [ppm] | ≤ 50 | ≤ 50 | ≤ 50 |

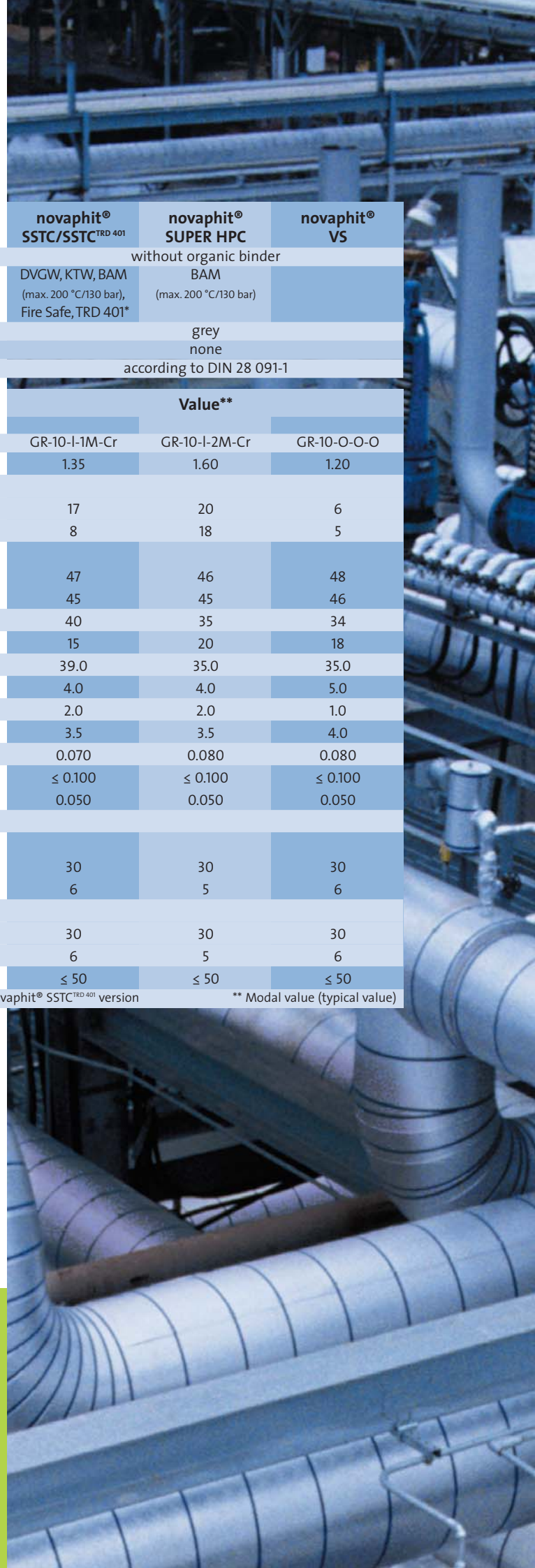
* Applies to the TÜV-approved novaphit® SSTC^{TRD 401} version

** Modal value (typical value)

Do you have any questions
about your application?

The gasket information service will help you:

gaskets@frenzelit.de



Good for people and the environment.

Frenzelit has obtained certification that the company complies with the requirements of both ISO/TS 16949 and ISO 14001. This means complete transparency in all areas and a high degree of security for our customers.

Quality management

ISO/TS 16949

Environmental management

ISO 14001

GASKETS

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NEW MATERIALS

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