

SIGRAFLEX® BTCSS

SIGRAFLEX flexible graphite foil reinforced with tanged stainless steel



SIGRAFLEX BTCSS is an adhesive-free gasket sheet made of SIGRAFLEX B-grade flexible graphite foils reinforced with tanged stainless steel.

Applications

- For all common pipework and vessel flange designs, such as ANSI, API, MSS or ASME B 16.21
- For special design gaskets (square, oblong, oval)
- For one-piece gasket designs up to an outside diameter of 59.1 inch; for diameters above 59.1 inch, two-layer structures with segmented sections and staggered joints are recommended
- For operating pressures from vacuum up to 1500 psi
- For corrosive media, please refer to our technical guideline regarding chemical resistance.
- Operating temperatures range from -400°F up to 932°F depending upon the type of SIGRAFLEX foil grade [e. g. B, BP or APX2®] used for sheet production. Consult the manufacturer when application temperatures exceed 750°F . After consulting the manufacturer application temperatures even slightly exceeding 1000°F might be acceptable. Life time might be limited at high temperatures, please refer to our technical guideline regarding thermal stability. Chemical resistance also needs to be considered.
- Gaskets for the chemical, petrochemical, refinery, power generation, heating equipment, and other industries.



↑ Cross-section

Material data of SIGRAFLEX® BTCSS

| Typical properties ¹⁾ | Units | BTCSS |
|---|--------------------|------------------------------|
| Thickness (ASTM F104) | in | 0.030 – 0.060 – 0.120 |
| Dimensions ²⁾ | in | 39.4 x 39.4 and 59.1 x 59.1 |
| Density of flexible graphite (ASTM F1315) | lb/ft ³ | 70 |
| Ash content of flexible graphite (ASTM C561) | % | ≤ 2.0 |
| Carbon content (ASTM D5373) | % | ≥ 98.0 |
| Moisture content (ASTM C562) | % | < 0.5 |
| Total sulfur content (ASTM D4239) | ppm | < 500 |
| Oxidation rate in air at 670 °C/1238 °F (TGA) | %/h | < 4 |
| Oxidation inhibitor | | yes |
| Reinforcing steel sheet details | | Tanged stainless steel sheet |
| ASTM A240 material number | | 316L |
| Thickness | in | 0.004 |
| Number of sheets | | 1 |
| Gasket factors (ASTM F3149) | „m“-factor | 2.0 |
| | „y“-factor | 2500 |
| Compressibility (ASTM F36) | | 40 |
| Recovery (ASTM F36) | % | 14 |
| Creep relaxation (ASTM F38) | % | < 4 |
| Sealability according DIN 3535 (0.060") | ml/min | 0.5 |
| Tp max at 15,000 psi gasket stress | psi | 2287 |
| PVRC design constants | Gb | 1400 |
| | A | 0.324 |
| | Gs | 0.010 |

¹⁾ Some data are for flexible graphite foil only.

²⁾ Sheet size is based on metal dimensions with overlapping foil to protect the metal edge.

SIGRAFLEX BTCSS is not only available with B-grade flexible graphite foil, but also with other SIGRAFLEX flexible graphite foil grades, see table below.

Material data that deviate from SIGRAFLEX® BTCSS if other SIGRAFLEX® foil grades are used

| Typical properties | Units | APX2 | BP | B | SHL | N |
|---|--------|--------|--------|--------|--------|--------|
| Ash content (ASTM C561) | % | ≤ 2.0 | ≤ 2.0 | ≤ 2.0 | ≤ 2.0 | ≤ 0.5 |
| Carbon content (ASTM D5373) | % | ≥ 98.0 | ≥ 98.0 | ≥ 98.0 | ≥ 98.0 | ≥ 99.5 |
| Moisture content (ASTM C562) | % | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Total sulfur content (ASTM D4239) | ppm | < 300 | < 300 | < 500 | < 300 | < 300 |
| Oxidation rate in air at 670 °C/1238 °F (TGA) | %/hour | ≤ 1.0 | ≤ 2.0 | < 4.0 | ≤ 2.0 | |
| Oxidation inhibitor | | yes | yes | yes | yes | no |

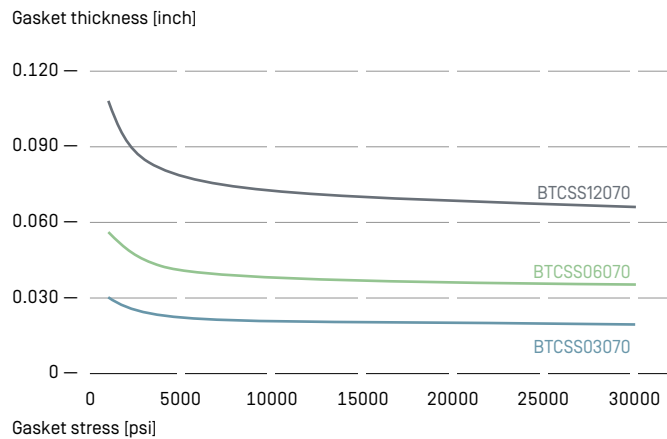
Other dimensions on request.

Unless stated otherwise, all values are valid at room temperature, typical, non-binding and subject to change. Please note some values correspond to the graphite foil only. For engineering or design purposes please contact our technical sales team.

Properties

- High blow-out resistance and mechanical strength
- High fault tolerance during assembly and operation
- Good chemical resistance
- Long-term stability of compressibility and recovery, even under fluctuating temperatures
- No measurable cold or warm flow characteristics up to the maximum permissible gasket stress
- No aging or embrittlement (no adhesives or binders)
- Asbestos-free (no associated health risks)

Compressibility of SIGRAFLEX BTCSS



Minimum required gasket stress

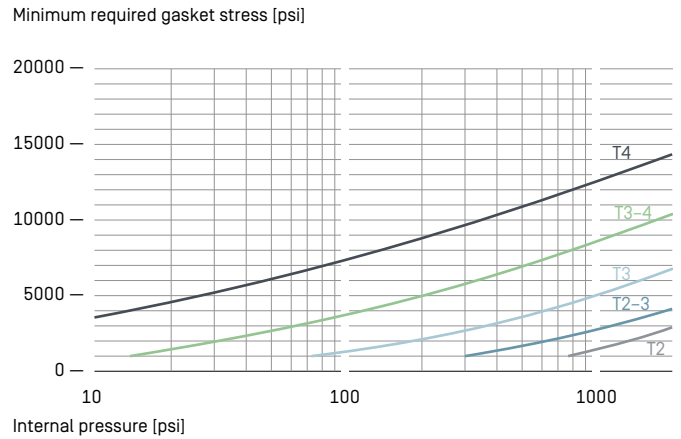
Internal pressure characteristics (plots of gasket stress, internal pressure, tightness class) are used when critical hazardous or dangerous media needs to be sealed.

The Pressure Vessel and Research Council (PVRC) defines certain tightness classes for bolted joints:

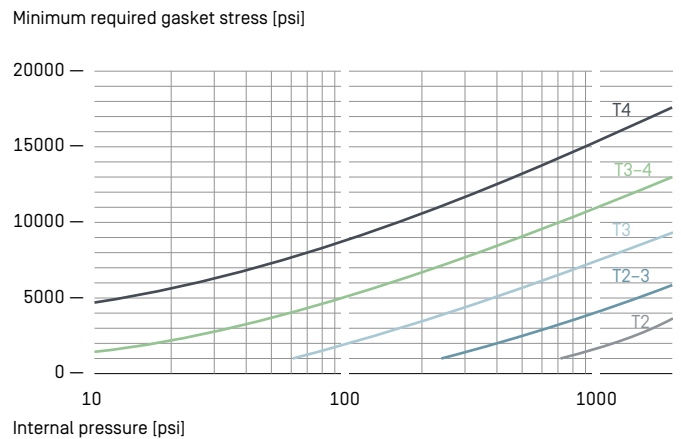
- T1 = $2 \cdot 10^{-1}$ mg/(s*mm): Economy
- T2 = $2 \cdot 10^{-3}$ mg/(s*mm): Standard
- T3 = $2 \cdot 10^{-5}$ mg/(s*mm): Tight
- T4 = $2 \cdot 10^{-7}$ mg/(s*mm): Extremely Tight

The minimum required gasket stress during operation can simply be taken by the expected internal pressure and the required tightness (Standard or Tight).

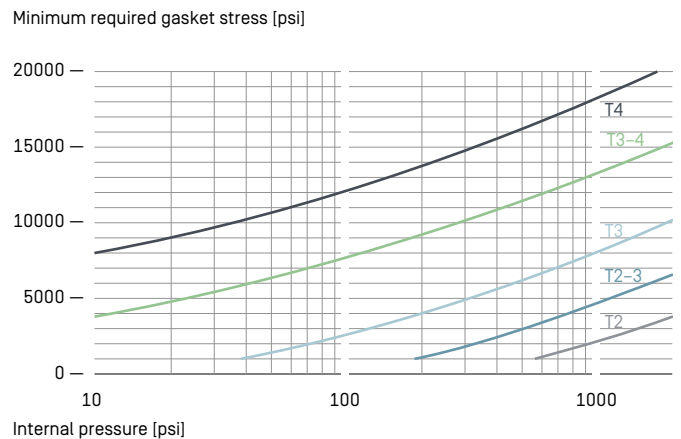
Minimum required gasket stress of SIGRAFLEX BTCSS 0.030"



Minimum required gasket stress of SIGRAFLEX BTCSS 0.060"



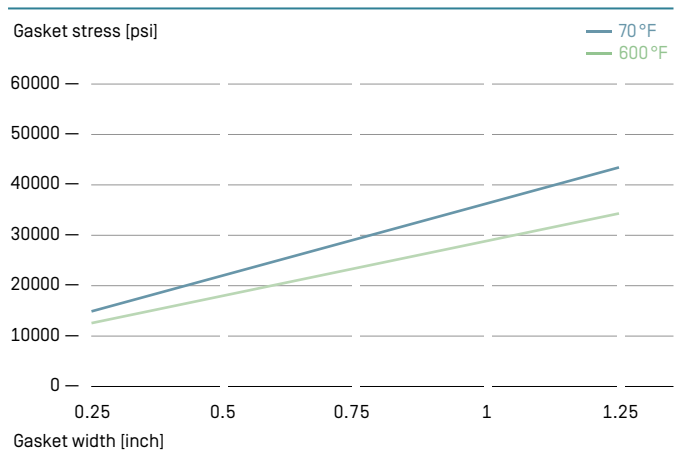
Minimum required gasket stress of SIGRAFLEX BTCSS 0.120"



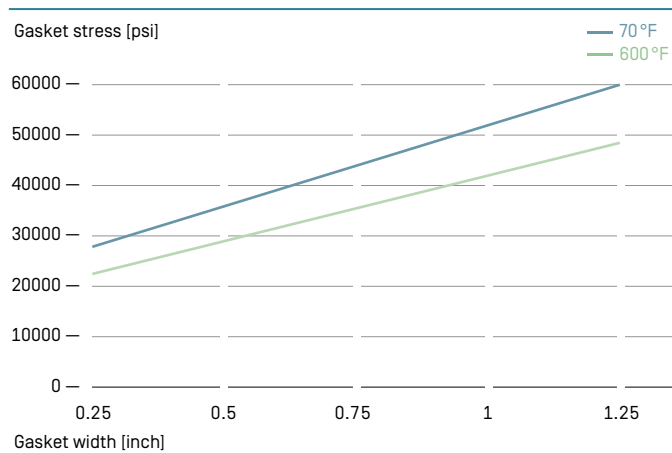
Maximum applicable gasket stress

The hydrostatic end force that leads to gasket stress reduction needs to be considered. The maximum allowable gasket stress is used for the evaluation of safe load limits. For narrow gaskets and with increasing service temperatures, the maximum allowable gasket stress in service decreases.

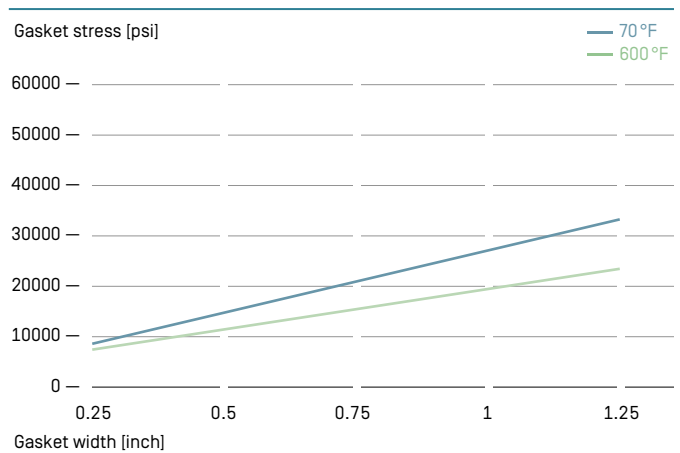
Typical maximum permissible gasket stress of SIGRAFLEX BTCSS 0.060"



Typical maximum permissible gasket stress of SIGRAFLEX BTCSS 0.030"



Typical maximum permissible gasket stress of SIGRAFLEX BTCSS 0.120"



Additional information on our SIGRAFLEX sealing materials can be found under "Download Center" on our homepage.

www.sigraflex.com/downloads

Assembly instructions

Our detailed assembly instructions are available on request. These instructions provide generic procedures for flange assembly. For troubleshooting, please use the recommendations of the user's own technical division or the gasket manufacturer.



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