

thoenes® SF TRD 401

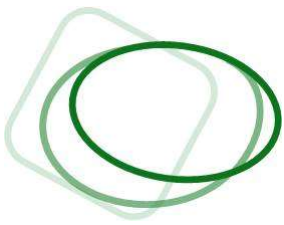
thoenes® SF TRD 401 is a gasket material based on expanded graphite with excellent chemical and thermal resistance. Due to the very high creep resistance and the very high compressibility, the sealing material can be used under demanding conditions in the chemical and petrochemical industry.

- Basis:** Expanded natural graphite (purity > 99 %)
- Colour:** Black
- Surface coating:** Standard - without non-stick coating
- Certifications:** DVGW -DIN 3535-6, DVGW -DIN 30653
- Applications:** Use in gas supply, compressors and pumps. Ideal sealing material under high temperatures and pressures, during mechanical and thermal cycles and shock loads. Expanded graphite is suitable for steam and for almost all chemical media, except for strongly oxidizing, such as nitric and chromic acid.

Technical specifications (typical values 2 mm thickness)

Description	DIN 28091-4		GR-10-O-O
Density	DIN 28090-2	g/cm ³	1.0
Compressibility	ASTM F 36/A	%	45
Resilience	ASTM F 36/A	%	13
Pressure resistance	DIN 52913		
50 MPa, T= 300°C, 16 h		MPa	49
Specific leakage rate	DIN 3535/6	mg/m*s	0.05
Leachable chloride content	FSA NMG 202	ppm	20
Leachable fluoride content	FSA NMG 203	ppm	20
Ash content of graphite	DIN 51903	%	< 1
Cold compression value ϵ_{KSW}	DIN 28090-2	%	41
Cold rebound value ϵ_{KRW}	DIN 28090-2	%	5,0
Warm setting value $\epsilon_{WSW/300^\circ C}$	DIN 28090-2	%	0.9
Warm rebound value $\epsilon_{WRW/300^\circ C}$	DIN 28090-2	%	4.0
Operating conditions			
Minimum temperature		°C	-200
Continuous temperature			
Oxidizing atmosphere		°C	550
Reducing or inert atmosphere		°C	700
Pressure			
Demanding gasses		bar	30
Steam, gasses		bar	60
Liquids		bar	100

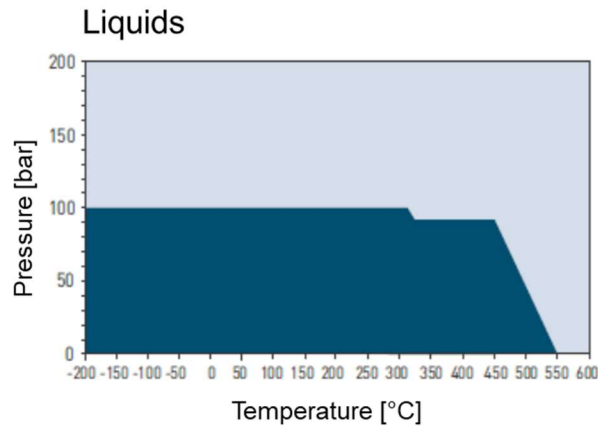
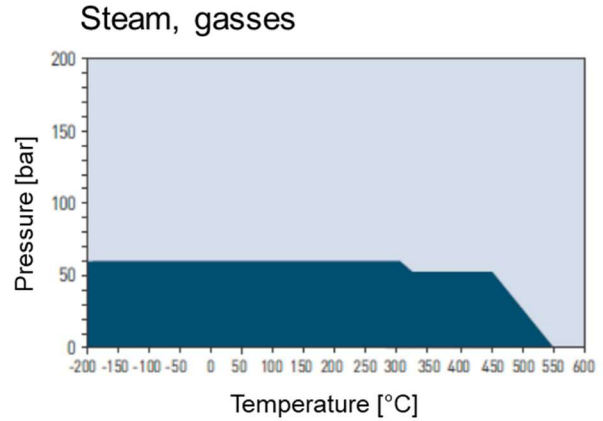
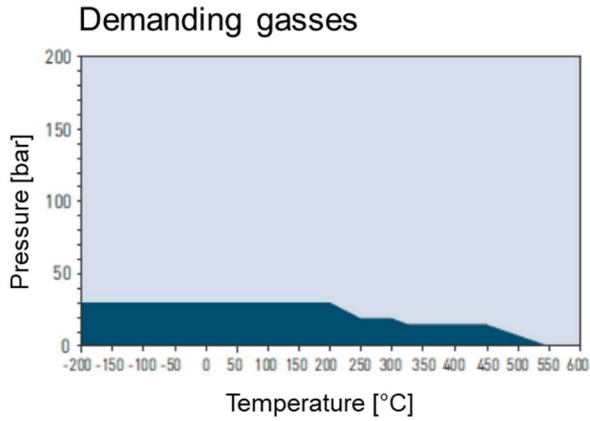
- Dimensions:** Plate sizes * 1000 mm x 1000 mm; 1500 mm x 1500 mm
- Thicknesses * 0.5 mm; 1.0 mm; 1.5 mm; 2.0 mm; 3.0 mm
- * Different sizes and thicknesses on request



Gaskets

Graphite sealings

Recommendations for use



- General suitability - Under common installation practices and chemical compatibility.
- Limited suitability – Technical consultation is mandatory.

The indicated temperatures and pressures are peak values and should not be used simultaneously. The information can only serve as a guideline, as these are not only dependent on the sealing material, but also on the installation conditions. Very important influencing factors are: seal thickness, type of medium, flange type and surface stress. Special care should be taken with steam applications. In case of doubt, our experts are always ready to find the optimal sealing solution for the application.

Chemical resistance chart

Legend

<input checked="" type="checkbox"/>	Resistant
<input type="checkbox"/>	Resistance/ recommendation depends on operation conditions
<input checked="" type="checkbox"/>	Not resistant

Substance	<input type="checkbox"/>	<input type="checkbox"/>	Substance	<input type="checkbox"/>	<input type="checkbox"/>	Substance	<input type="checkbox"/>	<input type="checkbox"/>
Acetamide	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dioxane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oleic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acetic acid, 10 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Diphenyl (Dowtherm A)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oleum (Sulfuric acid, fuming)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Acetic acid, 100 % (Glacial)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Esters	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oxalic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acetone	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethane (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oxygen (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acetonitrile	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Palmitic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acetylene (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethyl acetate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Paraffin oil	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acid chlorides	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethyl alcohol (Ethanol)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pentane	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acrylic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethyl cellulose	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Perchloroethylene	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acrylonitrile	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethyl chloride (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Petroleum (Crude oil)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Adipic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethylene (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Phenol (Carbolic acid)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Air (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ethylene glycol	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Phosphoric acid, 40 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alcohols	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Formaldehyde (Formalin)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Phosphoric acid, 85 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aldehydes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Formamide	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Phthalic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alum	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Formic acid, 10 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium acetate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aluminium acetat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Formic acid, 85 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium bicarbonate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aluminium chlorate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Formic acid, 100 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium carbonate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aluminium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Freon-12 (R-12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aluminium sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Freon-134a (R-134a)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium cyanide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Amines	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Freon-22 (R-22)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium dichromate	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ammonia (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fruit juices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium hydroxide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ammonium bicarbonate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fuel oil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium iodide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ammonium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gasoline	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium nitrate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ammonium hydroxide	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gelatin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Potassium permanganate	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Amyl acetate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Glycerine (Glycerol)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Propane (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Anhydrides	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Glycols	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Propylene (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Aniline	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Helium (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pyridine	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Anisole	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Heptane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Salicylic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Argon (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydraulic oil (Glycol based)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Seawater/ brine	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Asphalt	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydraulic oil (Mineral type)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Silicones (oil/ greases)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Barium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydraulic oil (Phosphate ester based)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soaps	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Benzaldehyde	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrazine	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium aluminate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Benzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrocarbons	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium bicarbonate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Benzoic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrochloric acid, 10 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium bisulfite	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bio-diesel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrochloric acid, 37 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium carbonate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bio-ethanol	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrofluoric acid, 10 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Black liquor	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrofluoric acid, 48 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium cyanide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Borax	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrogen (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium hydroxide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Boric acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Iron sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium hypochlorite (Bleach)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Butadiene (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Isobutane (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium silicate (Water glass)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Butane (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Isocetane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Butyl alcohol (Butanol)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Isoprene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sodium sulfide	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Butyric acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Isopropyl alcohol (Isopropanol)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Starch	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Calcium chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kerosene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Steam	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Calcium hydroxide	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ketones	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stearic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Carbon dioxide (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lactid acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Styrene	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Carbon monoxide (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lead acetate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sugars	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cellosolve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lead arsenate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfur	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chlorine (gas)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Magnesium sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfur dioxide (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chlorine (in water)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Maleic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfuric acid, 20 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chlorobenzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Malic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfuric acid, 98 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chloroform	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Methane (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfuryl chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chloroprene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Methyl alcohol (Methanol)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tar	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chlorosilanes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Methyl chloride (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tartaric acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Chromic acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Methylene dichloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tetrahydrofuran (THF)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Citric acid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Methyl ethyl ketone (MEK)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Titanium tetrachloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Copper acetate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N-Methyl-pyrrolidone (NMP)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Toluene	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Copper sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Milk	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2,4-Toluenediisocyanate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Creosote	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mineral oil (ASTM no. 1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Transformer oil (Mineral type)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cresols (Cresylic acid)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Motor oil	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trichloroethylene	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyclohexane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Naphtha	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vinegar	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyclohexanol	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nitric acid, 10 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vinyl chloride (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyclohexanone	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nitric acid, 65 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vinylidene chloride	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Decalin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nitrobenzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dextrin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nitrogen (gas)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	White spirits	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dibenzyl ether	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nitrous gases (NO _x)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Xylenes	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dibutyl phthalate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Octane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Xylenol	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dimethylacetamide (DMA)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oils (Essential)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Zinc sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dimethylformamide (DMF)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oils (Vegetable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

The recommendations made here serve only as a guideline for the selection of a suitable gasket. Since the function and durability of a gasket depends on a large number of factors, the information provided cannot be used to substantiate warranty claims. If there are special approval regulations, these must be observed.