

Chemical resistance of SIGRAFLEX® sealing materials



Chemical properties

Graphite is insoluble and infusible. It counts as one of the most chemically resistant materials.

Organic chemistry

Graphite is resistant to virtually all media in the field of organic chemistry. These typically include, for example, the intermediate and/or final products of the following industries:

- Petrochemistry
- Coal conversion
- Synthetics
- Varnish and paint
- Cosmetics
- Food and stimulants industry
- Photochemicals
- Cooling agents
- Anti-freezing agents

Inorganic chemistry

Graphite is resistant to almost all inorganic media as well, for example to many acids and bases, as well as probably all aqueous salt solutions and to most technical gases.

Medium resistance of sealing material made of SIGRAFLEX flexible graphite foil, stainless steel and pure PTFE

The following media resistance list shall provide an overview. For media which are not included it is generally advised to confer with the sealing manufacturer or with SGL Carbon.

The following table provides information for the materials SIGRAFLEX flexible graphite, stainless steel and pure PTFE. Depending on the composition of the gasket material, either one, or two or all three columns need to be considered.

The resistance data apply to operating temperatures of the medium mentioned which are known to us. However for media being operated at above 450 °C or 842 °F, we generally ask for consultation.

Products containing PTFE must not be used above 300 °C or 572 °F.

The information is based on experience and laboratory tests but is partly only analogies. Therefore warranty may not be covered in individual cases. It should be noted, that mixtures can be partly more critical than pure media or vice versa.

Four different cases can be distinguished:

1. resistant ●
2. not resistant ■
3. limited resistance ▲
4. insufficient data –

The third case depends on the stability of operation, operating temperatures or the concentration. It is advised to confer with the sealing manufacturer or with SGL Carbon.

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|---|---|-----------|
| A | | | |
| Abietic acid | ● | – | ● |
| Accumulator acid | 200 °C / 392 °F: ● | – | ● |
| Acetal | ● | – | ● |
| Acetaldehyde | ● | ● | ● |
| Acetamide | ● | – | ● |
| Acetanilide (= N-phenylacetamine) | ● | – | ● |
| Acetic acid, aqueous solution 50 % | ● | 100 °C / 212 °F: ● | ● |
| Acetic acid 100 % (= glacial acetic acid) | ● | 20 °C / 68 °F: ● | ● |
| Acetic acid gas | ● | ■ | ● |
| Acetic anhydride | ● | ● | ● |
| Aceto acetic ester | ● | ● | ● |
| Acetoin (= 3-hydroxid-2-butanone) | ● | ● | ● |
| Acetone | ● | ● | ● |
| Acetone cyanohydrin (= 2-hydroxy-2-methylpropionitrile = 2-cyanopropane-2-ol) | ● | ● | ● |
| Acetonitrile | ● | ● | ● |
| Acetophenone | ● | ● | ● |
| Acetyl chloride | ● | – [p. corr] | ● |
| Acetylene (= ethine = ethyne) | ● | ● | ● |
| Acetylene tetrachloride | ● | – | ● |
| Acrolein (= properal) | ● | ● | ● |
| Acrylamide, aqueous solution | ● | ● | ● |
| Acrylic acid ethyl ester | ● | ● | ● |
| Acrylic acid, anhydrous | ● | ● | ● |
| Acrylonitrile | ● | ● | ● |
| adipic acid | ● | ● | ● |
| Adipic ester | ● | ● | ● |
| Adiponitrile | ● | ● | ● |
| | 400 °C / 752 °F: ●, for higher temperatures please refer to our technical information about tempe- rature resistance and ask for advice. | | |
| Air | | ● | ● |
| Alcohol and alcoholic drinks | ● | ● | ● |
| Alcohols | ● | ● | ● |
| Aldehyde | ● | ● | ● |
| Alkylamine | ● | ● | ● |
| Alkylphenol | ● | – | ● |

● resistant; ■ not resistant; ▲ limited resistance; – insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|--------------------------------|---|-----------|
| Alkylsulfonates | ● | - | ● |
| Allyl acetate (= propenyl-acetate) | ● | - | ● |
| Allyl alcohol | ● | - | ● |
| Allyl bromide | ● | - | ● |
| Allyl chloride | ● | - | ● |
| Allyl chloroformate | ● | - | ● |
| Allyl ether | ● | - | ● |
| Allyl glycidyl ether | ● | - | ● |
| Allyl iodide | ● | - | ● |
| Allyl isothiocyanate | ● | - | ● |
| Allylamine | ● | - | ● |
| Allyltrichlorosilane | ● | - | ● |
| Alpha-methylstyrene | ● | ● | ■ |
| Alpha-pinene | ● | - | ● |
| Alum (= aluminium potassium sulfate) | ● | ▲ | ● |
| Aluminium alkyl halides | ● | - | ● |
| Aluminium alkyl hydrides | ● | - | ● |
| Aluminium alkyls | ● | - | ● |
| Aluminium chlorate | 20 °C / 68 °F: ● | 20 °C / 68 °F: ● | ● |
| Aluminium chloride | ● | ■ | ● |
| Aluminium fluoride | ● | ■ | ● |
| Aluminium nitrate | ▲ | ▲ | ● |
| Aluminium phosphate | ● | - | ● |
| Aluminium sulfate, aqueous solution > 10 % | ● | 20 °C / 68 °F: ● | ● |
| Aluminium sulfate, aqueous solution 10 % | ● | 100 °C / 212 °F: ● | ● |
| Aluminium triethyl | ● | - | ● |
| Amidosulfuric acid | ● | - | ● |
| Amine | ● | - | ● |
| Aminophenols | ● | - | ● |
| Ammonia water (= ammonium hydroxide) | ● | 20 °C / 68 °F: ● | ● |
| Ammonia, liquid | ● | ● | ● |
| Ammonia, gaseous | ● | ● | ● |
| Ammonium bifluoride, not saturated | ● | - | ● |
| Ammonium bifluoride, saturated | ● | ■ | ● |
| Ammonium carbonate | ● | 20 °C / 68 °F: ● | ● |
| Ammonium chloride (= salmiac) | ● | ▲ | ● |
| Ammonium fluoride, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Ammonium fluoride, hydrous | ● | ■ | ● |
| Ammonium nitrate | ▲ | 20 °C / 68 °F: ● | ● |
| Ammonium nitrite, aqueous solution | ● | - | ● |
| Ammonium persulfate, aqueous solution | ● | - | ● |
| Ammonium phosphate | ● | 100 °C / 212 °F: ● | ● |
| Ammonium phosphate, aqueous solution | ● | - | ● |
| Ammonium sulfate | ● | ▲ | ● |
| Ammonium sulfide, aqueous solution | ● | ▲ | ● |
| Ammonium sulfite, aqueous solution > 50 % | ● | - | ● |
| Ammonium sulfite, aqueous solution 50 % | ● | 20 °C / 68 °F: ● | ● |
| Amyl acetate | ● | ● | ● |
| Amyl alcohol | ● | ● | ● |
| Amyl mercaptan | ● | - | ● |
| Amylamine | ● | - | ● |
| Aniline (= aminobenzene) | ● | ● | ● |
| Anisidine (= methoxyaniline) | ● | - | ● |
| Anisole | ● | - | ● |
| Anthranilic acid | ● | - | ● |
| Anthraquinone | ● | - | ● |

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Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|--------------------------------|---|-----------|
| Antimony butter, aqueous solution (= antimony chloride, aqueous solution) | ● | ■ | ● |
| Antimony trioxide | ● | - | ● |
| Argon | ● | ● | ● |
| Arsenic acid | ● | 20 °C / 68 °F: ● | ● |
| Arsenic chloride | ● | - | - |
| Arsenic trioxide | ● | ▲ | ● |
| Asphalt | ● | ● | ● |
| B | | | |
| Barium chloride, saturated | ● | 20 °C / 68 °F: ● [p. corr] | ● |
| Barium hydroxide | ● | ● | ● |
| Barium salt, aqueous solution | ● | ● | ● |
| Beer | ● | ● | ● |
| Benzalacetone | ● | ● | ● |
| Benzaldehyde | ● | ● | ● |
| Benzenesulfonic acid | ● | ▲ | ● |
| Benzenesulfonyl chloride | ● | - | ● |
| Benzene, gasoline | ● | ● | ● |
| Benzoic acid | ● | ● | ● |
| Benzol | ● | ● | ● |
| Benzoquinone | ● | ● | ● |
| Benzotriazole | ● | ● | ● |
| Benzyl alcohol | ● | ● | ● |
| Benzyl benzoate | ● | ● | ● |
| Benzyl bromide | ● | ▲ | ● |
| Benzyl chloride, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Benzyl chloride, hydrous | ● | ■ | ● |
| Benzyl chloroformate | ● | - | ● |
| Benzyl iodide | ● | - | ● |
| Benzylphenol | ● | ● | ● |
| Bio-diesel | ● | ● | ● |
| Bio-ethanol | ● | ● | ● |
| Bisphenol A | ● | ● | ● |
| Bitumen | ● | ● | ● |
| Black liquor (sulfate) | ● | - | ● |
| Black liquor (sulfide) | ● | - | ● |
| Blood | ● | ● | ● |
| Borax, aqueous solution (= sodium tetraborate decahydrate, aqueous solution) | ● | ● | ● |
| Borax, melt (= sodium tetraborate, melt) | ● | ■ | ■ |
| Boron trichloride | ● | - | - |
| Brake fluids, glycolbased | ● | - | ● |
| Bromine trifluoride | ■ | ■ | ■ |
| Bromine, liquid | ■ | ■ | ● |
| Butadiene | ● | ● | ● |
| Butanal oxime | ● | - | ● |
| Butane | ● | ● | ● |
| Butanedione | ● | ● | ● |
| Butanethiol | ● | ● | ● |
| Butanol (= butyl alcohol) | ● | ● | ● |
| Butanone (= methyl ethyl ketone) | ● | ● | ● |
| Butin | ● | ● | ● |
| Butter | ● | 20 °C / 68 °F: ● | ● |
| Buttermilk | ● | 20 °C / 68 °F: ● | ● |
| Butyl acetate (= acetic acid butyl ester) | ● | ● | ● |
| Butyl acrylate | ● | ● | - |

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Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|--------------------------------|---|-----------|
| Butyl chloride, anhydrous | ● | ● | ● |
| Butyl chloride, hydrous | ● | ■ | ● |
| Butyl phosphine | ● | - | ● |
| Butyl vinyl ether | ● | ● | ● |
| Butylamine | ● | ● | ● |
| Butylbenzene | ● | ● | ● |
| Butylcyclohexyl chloroformate | ● | - | ● |
| Butylphenol | ● | 20 °C / 68 °F: ● | ● |
| Butyltoluene | ● | ● | ● |
| Butyltrichlorosilane | ● | ■ | ● |
| Butyraldehyde (= butanal) | ● | ● | ● |
| Butyric acid | ● | - | ● |
| C | | | |
| Calcium acetate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Calcium bisulfite, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Calcium chloride | ● | ▲ | ● |
| Calcium hydroxide, hydrous (= caustic lime = lime water = calcium oxide, aqueous) | ● | 20 °C / 68 °F: ● | ● |
| Calcium hypochlorite | ● | ■ | ● |
| Calcium nitrate | ▲ | 20 °C / 68 °F: ● | ● |
| Calcium nitrate, aqueous solution | ● | - | ● |
| Calcium oxide | ● | ● | ● |
| Calcium phosphate, aqueous solution | ● | - | ● |
| Calcium sulfate | ● | 20 °C / 68 °F: ● | ● |
| Calcium sulfide, aqueous solution | ● | - | ● |
| Calcium sulfite, cold saturated | ● | 20 °C / 68 °F: ● | ● |
| Carbon dioxide | ● | ● | ● |
| Carbon disulfide | ● | ● | ● |
| Carbon monoxide, anhydrous | ● | - | ● |
| Carbon tetrachloride, anhydrous (= tetrachlorocarbon, anhydrous) | ● | ● | ● |
| Carbon tetrachloride, hydrous (= tetrachlorocarbon, hydrous) | ● | ■ | ● |
| Cesium melt | - | - | ■ |
| Chlorhexidine | ● | - | ● |
| Chlorinated lime, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Chlorinated lime, hydrous | ● | ■ | ● |
| Chlorine dioxide | ■ | ■ | ● |
| Chlorine trifluoride | ■ | ■ | ■ |
| Chlorine water | ■ | ■ | ● |
| Chlorine, hydrous | ■ | ■ | ● |
| Chlorine, anhydrous | 400 °C / 752 °F: ● | 20 °C / 68 °F: ● | ● |
| Chloroacetic acid (= monochloroacetic acid) | ● | ■ | ● |
| Chloroacetone | ● | - | ● |
| Chlorobenzene, anhydrous (= monochlorobenzene, anhydrous) | ● | ● | ● |
| Chlorobenzene, hydrous (= monochlorobenzene, hydrous) | ● | ■ | ● |
| Chlorobutadiene (= chloroprene) | ● | - | ● |
| Chloronitrobenzene (= nitrochlorobenzene) | ● | 120 °C / 248 °F: ● | ● |
| Chlorosulfonic acid, aqueous solution 10 % | ● | ■ | ● |
| Chlorosulfonic acid 100 % | ● | 20 °C / 68 °F: ● (p. corr) | ● |
| Chromic acid, aqueous solution 10 % | 20 °C / 68 °F: ● | ■ | ● |
| Chromic acid, aqueous solution > 10 % | ■ | ■ | ● |
| Chroming solutions | ▲ | ▲ | ● |
| Chromium(III) potassium sulfate (= chrome alum) | - | ■ | ● |
| Citric acid, aqueous solution 25 % | ● | ● | ● |
| Citric acid, aqueous solution > 25 % | ● | - | ● |
| Clophen | ● | ● | ● |

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Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|--------------------------------|---|-----------------------------------|
| Cobalt chloride, aqueous solution | ● | – | ● |
| Cocoa butter | ● | ● | ● |
| Cod liver | ● | ● | ● |
| Coffee | ● | ● | ● |
| Copper acetate | ● | 20 °C / 68 °F: ● | ● |
| Copper carbonate | ● | 20 °C / 68 °F: ● | ● |
| Copper chloride, aqueous solution | ● | ■ | ● |
| Copper cyanide, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Copper sulfate | ● | 20 °C / 68 °F: ● | ● |
| Copper(II) nitrate, aqueous solution 50 % | ● | ● | ● |
| Copper(II) nitrate, aqueous solution > 50 % | ● | – | ● |
| Creosol | ● | ● | ● |
| Creosote | ● | ● | ● |
| Cresol | ● | ● | ● |
| Crude oil | ● | ● | ● |
| Cryolite [= sodium fluoroaluminate] | ● | – | ● |
| Cumene [= isopropyl benzene] | ● | ● | ● |
| Cyclohexane | ● | ● | ● |
| Cyclohexanol | ● | ● | ● |
| Cyclohexanone | ● | ● | ● |
| D | | | |
| Decahydronaphthalene | ● | ● | ● |
| Decane | ● | ● | ● |
| Dextrin, aqueous solution | ● | ● | ● |
| Diacetone alcohol | ● | ● | ● |
| Dibenzyl ether | ● | ● | ● |
| Dibutyl ether | ● | ● | ● |
| Dibutyl phthalate | ● | ● | ● |
| Dibutylamine | ● | ● | ● |
| Dichloro isopropyl ether | ● | – | ● |
| Dichloro hexylamine | ● | – | ● |
| Dichloroacetic acid methyl ester | ● | – | ● |
| Dichloroethene, anhydrous [= dichloroethylene, anhydrous = vinylidene dichloride, anhydrous] | ● | 32 °C / 90 °F: ● | ● |
| Dichloroethene, hydrous [= dichloroethylene, hydrous = vinylidene dichloride, hydrous] | ● | ■ | ● |
| Dichloroethane, anhydrous [= ethylene chloride, anhydrous = ethylene dichloride, anhydrous] | ● | 20 °C / 68 °F: ● | ● |
| Dichloroethane, hydrous [= ethylene chloride, hydrous = ethylene dichloride, hydrous] | ● | ■ | ● |
| Dichloromethane, anhydrous [= methylene chloride, anhydrous] | ● | ● | ● |
| Dichloromethane, hydrous [= methylene chloride, hydrous] | ● | ■ | ● |
| Diesel oil, Diesel fuel | ● | ● | ● |
| Diethyl ketone [= 3-pentanone] | ● | ● | ● |
| Diethyl ether | ● | ● | ● |
| Diethyl sebacate | ● | ● | ● |
| Diethyl succinate | ● | ● | ● |
| Diethylene glycol | ● | ● | ● |
| | | | ▲, media causes swelling of PTFE. |
| Difluoromethane | ● | – | |
| Diglycolic acid, aqueous solution | ● | – | ● |
| Dihydroxybenzene [= (p-)hydroquinone] | ● | – | ● |
| Diisobutyl ketone | ● | ● | ● |
| Diisobutylene [= iso-octene] | ● | ● | ● |
| Diisopropyl ketone | ● | ● | ● |

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Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|---|---|-----------|
| Dimethyl phthalate | ● | ● | ● |
| Dimethyl sulfate (DMS) | ● | - | ● |
| Dimethyl urea | ● | - | ● |
| Dimethylacetamide (DMAC) | ● | - | ● |
| Dimethylamine | ● | ● | ● |
| Dimethylamino sulfochloride | ● | - | ● |
| Dimethylaniline | ● | ● | ● |
| Dimethylformamide (DMF) | ● | ● | ● |
| Dinitrogen monoxide (= laughing gas) | 20 °C / 68 °F: ● | ● | ● |
| Diocetyl phthalate (DOP) | ● | ● | ● |
| Diocetyl sebacate | ● | ● | ● |
| Dioxane | ● | ● | ● |
| Dipentene (= limonene) | ● | ● | ● |
| Diphenyl ether | ● | ● | ● |
| Dipropyl ketone | ● | ● | ● |
| Disulfur dichloride, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Disulfur dichloride, hydrous | ● | ■ | ● |
| Dithiophosphoric acid | ● | - | ● |
| Dodecyl alcohol | ● | ● | ● |
| E | | | |
| Epichlorohydrine | ● | 20 °C / 68 °F: ● | ● |
| Ethandiole (= monoethylene glycol = ethylene glycol = glycol) | ● | ● | ● |
| Ethane | ● | ● | ● |
| Ethanol (= ethyl alcohol) | ● | ● | ● |
| Ethanolamine (= monoethanolamine = aminoethylethanolamine) | ● | ● | ● |
| Ethyl acetate (= acetic acid ethyl ester) | ● | ● | ● |
| Ethyl acrylate | ● | ● | ● |
| Ethyl benzene | ● | ● | ● |
| Ethyl chloride, anhydrous | ● | ● | ● |
| Ethyl chloride, hydrous | ● | ■ | ● |
| Ethyl formate | ● | - | ● |
| Ethyl mercaptan | ● | - | ● |
| Ethyl silicate | ● | - | ● |
| Ethylene (= ethene) | ● | ● | ● |
| Ethylene chlorohydrin (= 2-chloroethanol) | ● | - | ● |
| Ethylene dibromide (= 1,2-dibromoethane) | ● | - | ● |
| Ethylene oxide (EO) | ●, only use products with BAM test report for EO. | | ● |
| Ethylenediamine (EDA) | ● | ● | ● |
| Ethylhexanol | ● | ● | ● |
| F | | | |
| Fat (mineral, vegetable, animal) | ● | - | ● |
| Fatty acid methyl ester | ● | - | ● |
| Fatty acids | ● | ▲ | ● |
| Ferric chloride, ferric(III) chloride | ● | ■ | ● |
| Ferric(III) nitrate | ▲ | 20 °C / 68 °F: ● | ● |
| Ferric(III) sulfate, aqueous solution 10 % | ● | 20 °C / 68 °F: ● | ● |
| Ferric(III) sulfate, aqueous solution > 10 % | ● | - | ● |
| Ferric(II) sulfate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Ferric oxide (= iron(III) oxide) | ● | - | ● |
| Ferric phosphate | ● | ● | ● |
| Firewater | ● | ● | ● |
| Fluorine dioxide | ■ | ■ | ■ |
| Fluorine, gaseous | ■ | ■ | ■ |
| Fluorine, liquid | ■ | ■ | ■ |
| Fluorobenzene | ● | ● | ● |

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Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|--------------------------------|---|-----------|
| Formaldehyde (= methanal = methyl aldehyde) | ● | ● | ● |
| Formalin | ● | ● | ● |
| Formamide | ● | ● | ● |
| Formic acid | ● | 20 °C / 68 °F: ● | ● |
| Fruit juices and fruit acids | ● | ● | ● |
| Furan (= furfuran) | ● | – | ● |
| Furfuryl alcohol | ● | ● | ● |
| G | | | |
| Gallic acid, aqueous solution (= trihydroxybenzoic acid, aqueous solution) | ● | 20 °C / 68 °F: ● | ● |
| Gelatin, aqueous solution | ● | ● | ● |
| Glucose (= dextrose) | ● | ● | ● |
| Glycerol (= propanetriol) | ● | ● | ● |
| Glycerol triacetate (= triacetin) | ● | – | ● |
| Glycolic acid | ● | – | ● |
| Grain alcohol | ● | ● | ● |
| Green liquor | ● | – | ● |
| H | | | |
| Heat carrier oil | ● | ● | ● |
| Helium | ● | ● | ● |
| Heptane | ● | ● | ● |
| Heptanone | ● | ● | ● |
| Hexachlorobutadiene, anhydrous | ● | ● | ● |
| Hexachlorobutadiene, hydrous | ● | ■ | ● |
| Hexachlorocyclohexane (= lindane) | ● | – | ● |
| Hexafluorosilicic acid, not containing HF (= fluorosilicic acid, not containing HF) | ● | 20 °C / 68 °F: ● | ● |
| Hexafluorosilicic acid, containing HF (= fluorosilicic acid, containing HF) | – | – | ● |
| Hexamethylenediamine (HMDA) | ● | – | ● |
| Hexamethylenetetramine (= urotropine) | ● | – | ● |
| Hexane | ● | ● | ● |
| Hexanetriol | ● | ● | ● |
| Hexyl alcohol | ● | ● | ● |
| Hydraulic oil | ● | ● | ● |
| Hydrazine | ● | ● | ● |
| Hydrazine hydrate | ● | ● | ● |
| Hydrazine sulfate, aqueous solution 10 % | ● | ● | ● |
| Hydrazine sulfate, aqueous solution > 10 % | ● | – | ● |
| Hydrazone ester | ● | – | ● |
| Hydrazone | ● | – | ● |
| Hydrazide | ● | – | ● |
| Hydrocarbons | ● | ● | ● |
| Hydrochloric acid, aqueous solution | ● | ■ | ● |
| Hydrochloric acid, gaseous (= hydrogen chloride, gaseous) | ● | ■ | ● |
| Hydrochlorofluorocarbons (CFC), anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Hydrochlorofluorocarbons (CFC), hydrous | ● | ■ | ● |
| Hydrocyanic acid | ● | 20 °C / 68 °F: ● | ● |
| Hydrofluoric acid, anhydrous | ● | ■ | ● |
| Hydrofluoric acid, aqueous solution 40 % or aqueous solution 60 % | ● | ■ | ● |
| Hydrofluorocarbons, anhydrous | ● | ● | ● |
| Hydrofluorocarbons, hydrous | ● | ■ | ● |
| Hydrofluorosilicic acid | ● | ■ | ● |
| Hydrogen | ● | – | ● |
| Hydrogen bromide | ● | ■ | ● |

● resistant; ■ not resistant; ▲ limited resistance; – insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|---|---|-----------|
| | ●, only use high-purity graphite in Z-quality, as impurities reduce the content of hydrogen peroxide. | | |
| Hydrogen peroxide (= hydrogen superoxide) | | 80 °C / 176 °F: ● | ● |
| Hydrogen sulfide, aqueous solution 4 % | ● | 400 °C / 752 °F: ● | ● |
| Hydrogen sulfide, aqueous solution > 4 % | ● | – | ● |
| Hydroquinone (= p-dihydroxybenzene) | ● | – | ● |
| Hydroxylamine sulfate, aqueous solution 10 % | ● | ● | ● |
| Hydroxylamine sulfate, aqueous solution > 10 % | ● | – | ● |
| I | | | |
| Iodine, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Iodine, hydrous | ● | 20 °C / 68 °F: ● | |
| Iodine tincture | ● | [p. corr] | ● |
| Isobutyl alcohol | ● | ■ | ● |
| Isododecane | ● | ● | ● |
| Isooctane | ● | ● | ● |
| Isophorone diamine | ● | – | ● |
| Isophorone diisocyanate (IPDI) | ● | – | ● |
| Isoprene | ● | – | ● |
| Isopropanol (= isopropyl alcohol) | ● | ● | ● |
| Isopropyl acetate | ● | ● | ● |
| Isopropyl ether | ● | ● | ● |
| K | | | |
| Kerosene | ● | ● | ● |
| Ketone | ● | ● | ● |
| L | | | |
| Lactam | ● | ● | ● |
| Lactic acid | ● | ▲ | ● |
| Lauryl alcohol | ● | ● | ● |
| Lead acetate | ● | 20 °C / 68 °F: ● | ● |
| Lead arsenate | ● | 20 °C / 68 °F: ● | ● |
| Lead nitrate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Lithium bromide | ● | 20 °C / 68 °F: ● | ● |
| Lithium chloride, aqueous solution | ● | – | ● |
| Lithium melt | – | – | ■ |
| Lysol | ● | ● | ● |
| M | | | |
| Magnesium carbonate | ● | 20 °C / 68 °F: ● | ● |
| | | 20 °C / 68 °F: ● | |
| Magnesium chloride, aqueous solution 30 % | ● | [p. corr] | ● |
| Magnesium chloride, aqueous solution > 30 % | ● | ■ | ● |
| Magnesium hydroxide | ● | 20 °C / 68 °F: ● | ● |
| Magnesium sulfate (= epsom salt) | ● | 20 °C / 68 °F: ● | ● |
| Maleic acid | ● | ● | ● |
| Maleic acid anhydride (MSA) | ● | ● | ● |
| Malic acid, aqueous solution 50 % | ● | 100 °C / 212 °F: ● | ● |
| Malic acid, aqueous solution > 50 % | ● | ■ | ● |
| Mercury | ● | 50 °C / 122 °F: ● | ● |
| Mercury chloride, aqueous solution | ● | ▲ | ● |
| Mercury cyanide | ● | 20 °C / 68 °F: ● | ● |
| Methacrylic acid methyl ester | ● | ● | ● |
| Methane | ● | ● | ● |
| Methanol (= methyl alcohol) | ● | ● | ● |
| Methyl acetate | ● | ● | ● |
| Methyl bromide | ● | – | ● |
| Methyl butyl ketone | ● | ● | ● |

● resistant; ■ not resistant; ▲ limited resistance; – insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|--|---|-----------|
| Methyl chloride, anhydrous (= chloromethane, anhydrous = monochloromethane, anhydrous) | ● | ● | ● |
| Methyl chloride, hydrous (= chloromethane, hydrous = monochloromethane, hydrous) | ● | ■ | ● |
| Methyl ether | ● | ● | ● |
| Methyl formate | ● | ● | ● |
| Methyl glycol acetate | ● | ● | ● |
| Methyl isobutyl ketone | ● | ● | ● |
| Methyl isopropyl ketone | ● | ● | ● |
| Methyl methacrylate | ● | ● | ● |
| Methyl oleate | ● | ● | ● |
| Methyl sulfuric acid, aqueous solution | ● | ▲ | ● |
| Methylamine, aqueous solution | ● | - | ● |
| Methylcyclohexanol | ● | ● | ● |
| Methylcyclopentane | ● | ● | ● |
| Milk | ● | 70 °C / 158 °F: ● | ● |
| Mine gas | ● | ● | ● |
| Mineral oil | ● | ● | ● |
| Mineral water | ● | ● | ● |
| Molasses | ● | ● | ● |
| Mono bromobenzene, anhydrous | ● | ● | ● |
| Mono bromobenzene, hydrous | ● | ■ | ● |
| Morpholine | ● | - | ● |
| N | | | |
| Naphthalene | ● | - | ● |
| Naphtha | ● | - | ● |
| Natural gas | ● | ● | ● |
| Neon | ● | ● | ● |
| Nickel acetate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Nickel chloride | ● | ■ | ● |
| Nickel nitrate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Nickel sulfate, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Nitric acid, aqueous solution 10 % | 20 °C / 68 °F: ● | 100 °C / 212 °F: ● | ● |
| Nitric acid, aqueous solution 37 % | ▲ | 100 °C / 212 °F: ● | ● |
| Nitric acid, aqueous solution 65 % | ▲ | 20 °C / 68 °F: ● | ● |
| Nitric acid fuming | ■ | ■ | ● |
| Nitro thinner | ● | ● | ● |
| Nitrobenzene | ● | ● | ● |
| Nitroethane | ● | - | ● |
| Nitrogen | ● | ● | ● |
| Nitrogen oxides, hydrous (= nitrous fumes, hydrous = NOx, hydrous) | ■ | - | ● |
| Nitrogen oxides, anhydrous (= nitrous fumes, anhydrous = NOx, anhydrous) | 400 °C / 752 °F: ●, but please always ask for advice. | - | ● |
| Nitrogen tetroxide | ■ | - | ● |
| Nitrohydrochloric acid | ■ | ■ | ● |
| Nitromethane | ● | - | ● |
| Nitropropane | ● | - | ● |
| Nitrosulfuric acid | ■ | ■ | ● |
| Nitrotoluene | ● | ● | ● |
| Nonane | ● | ● | ● |
| Norbornadiene (= bicycloheptadiene) | ● | ● | ● |
| O | | | |
| Octadiene | ● | ● | ● |
| Octane | ● | ● | ● |
| Octanol (= octane alcohol) | ● | ● | ● |
| Octyl cresol | ● | ● | ● |

● resistant; ■ not resistant; ▲ limited resistance; - insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|--|---|---|-----------|
| Oil (mineral, vegetable, animal) | ● | ● | ● |
| Oleic acid | ● | 300 °C / 572 °F: ● | ● |
| Oleum (= sulfur trioxide dissolved in sulfuric acid) | ■ | ■ | ● |
| Orthoboric acid | ● | ● | ● |
| Oxalic acid, aqueous solution 10 % | ● | 20 °C / 68 °F: ● | ● |
| Oxalic acid, aqueous solution > 10 % | ● | ■ | ● |
| | 250 °C / 482 °F: ●, SGL technical information about temperature resistance and BAM test report needs to be considered. | | |
| Oxygen | | ● | ● |
| | 100 °C / 212 °F: ●, for higher temperatures please refer to our technical information about tempe- rature resistance and ask for advice. | | |
| Ozone or ozone-air-mixture | | ● | ● |
| P | | | |
| Palmitic acid | ● | ● | ● |
| Paraffin | ● | ● | ● |
| Pentachlorophenol | ● | - | ● |
| Pentafluoroethane | ● | - | ● |
| Pentane | ● | ● | ● |
| Pentene | ● | ● | ● |
| | ■, explosion danger when in contact with carbon materials. | | |
| Perchloric acid | | ■ | ● |
| Petroleum | ● | ● | ● |
| Petroleum ether | ● | ● | ● |
| Phenol (= carbolic acid) | ● | ● | ● |
| Phenyl benzene | ● | ● | ● |
| Phenylethyl ether | ● | ● | ● |
| Phenylhydrazine | ● | ● | ● |
| Phosgene, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Phosgene, hydrous | ● | ■ | ● |
| Phosphoric acid, aqueous solution > 20 % | ● | 20 °C / 68 °F: ● | ● |
| Phosphoric acid, aqueous solution 20 % | ● | 100 °C / 212 °F: ● | ● |
| Phosphoric acid, impure | ● | ▲ | ● |
| Phosphorus oxychloride | ● | ■ | ● |
| Phosphorus trichloride | ● | ■ | ● |
| Phthalic acid | ● | 20 °C / 68 °F: ● | ● |
| Phthalic acid anhydride (PSA) | ● | - | ● |
| Picric acid, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Piperidine | ● | ● | ● |
| Polyethersulfone | ● | - | ● |
| Potassium acetate | ● | 20 °C / 68 °F: ● | ● |
| Potassium bifluoride, saturated | ● | ■ | ● |
| Potassium borate, aqueous solution | ● | - | ● |
| Potassium bromate, aqueous solution | ■ | - | ● |
| | | 20 °C / 68 °F: ● [p. corr] | ● |
| Potassium bromide, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Potassium carbonate (= potash) | ● | 20 °C / 68 °F: ● | ● |
| Potassium chlorate, aqueous solution | 20 °C / 68 °F: ● | 20 °C / 68 °F: ● | ● |
| | | 20 °C / 68 °F: ● [p. corr] | ● |
| Potassium chloride | ● | | ● |
| Potassium chromate | ▲ | ■ | ● |
| Potassium cyanate | ● | 20 °C / 68 °F: ● | ● |
| Potassium cyanide (= cyan potassium) | ● | 20 °C / 68 °F: ● | ● |
| Potassium formate | ● | 20 °C / 68 °F: ● | ● |
| Potassium hexacyanoferrate III | ● | ● | ● |
| Potassium hydroxide, solid | ● | ● | ● |

● resistant; ■ not resistant; ▲ limited resistance; - insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|--|---|-----------|
| Potassium hydroxide, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Potassium hydroxide, melt | – | ■ | ■ |
| Potassium hypochloride | ● | ■ | ● |
| Potassium hypochlorite | ● | ■ | ● |
| Potassium iodide | ● | 20 °C / 68 °F: ● [p. corr] | ● |
| Potassium melt | 350 °C / 662 °F: ● | – | ■ |
| Potassium nitrate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Potassium nitrate, melt [= saltpeter, melt] | ■ | 340 °C / 644 °F: ● | ■ |
| Potassium oxalate | ● | 20 °C / 68 °F: ● | ● |
| Potassium permanganate | 20 °C / 68 °F: ● | 100 °C / 212 °F: ● | ● |
| Potassium silicate [= water glass] | ● | 100 °C / 212 °F: ● | ● |
| Potassium sulfate, aqueous solution | ● | 20 °C / 68 °F: ● | ● |
| Printer's acetate | ● | 100 °C / 212 °F: ● | ● |
| Propane | ● | ● | ● |
| Propanol [= propyl alcohol] | ● | ● | ● |
| Propene [= propylene] | ● | ● | ● |
| Propionic acid | ● | – | ● |
| Propyl acetate | ● | ● | ● |
| Propyl nitrate | ● | – | ● |
| Propylamine | ● | ● | ● |
| Propylene glycol | ● | ● | ● |
| Propylene oxide [PO] | ●, only use products with BAM test report for PO. | | ● |
| Pyridine | ● | ● | ● |
| Pyrrole | ● | ● | ● |
| S | | | |
| Sal volatile, cold saturated | ● | ● | ● |
| Salicylic acid | ● | ● | ● |
| Salt water [= seawater] | ● | 20 °C / 68 °F: ● [p. corr] | ● |
| Silicone greases, silicone oils | ● | ● | ● |
| Silver nitrate, aqueous solution 10 % | ● | 100 °C / 212 °F: ● | ● |
| Silver nitrate, aqueous solution > 10 % | ● | – | ● |
| Silver nitrate, melt | 350 °C / 662 °F: ● | 250 °C / 482 °F: ● | ● |
| Soap | ● | ● | ● |
| Sodium acetate | ● | 20 °C / 68 °F: ● | ● |
| Sodium aluminate | ● | – | ● |
| Sodium ammonium hydrogen phosphate | ● | 100 °C / 212 °F: ● | ● |
| Sodium benzoate, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Sodium borate, aqueous solution | ● | – | ● |
| Sodium carbonate [= soda] | ● | 100 °C / 212 °F: ● | ● |
| Sodium chlorate, aqueous solution 30 % | 20 °C / 68 °F: ● | 100 °C / 212 °F: ● | ● |
| Sodium chlorate, aqueous solution > 30 % | 20 °C / 68 °F: ● | – | ● |
| Sodium chloride [= cooking salt] | ● | 20 °C / 68 °F: ● [p. corr] | ● |
| Sodium chlorite, aqueous solution | ■ | ■ | ● |
| Sodium cyanide | ● | 100 °C / 212 °F: ● | ● |
| Sodium fluoride, aqueous solution 5 % | ● | 20 °C / 68 °F: ● | ● |
| Sodium fluoride, aqueous solution > 5 % | ● | – | ● |
| Sodium hydrogen carbonate [= sodium bicarbonate] | ● | 20 °C / 68 °F: ● | ● |
| Sodium hydrogen phosphate | ● | 100 °C / 212 °F: ● | ● |
| Sodium hydrogen sulfate [= sodium bisulfate] | ● | – | ● |
| Sodium hydrogen sulfate, aqueous solution 10 % [= sodium bisulfate, aqueous solution 10 %] | ● | 100 °C / 212 °F: ● | ● |
| Sodium hydrogen sulfate, aqueous solution > 10 % [= sodium bisulfate > 10 %] | ● | – | ● |

● resistant; ■ not resistant; ▲ limited resistance; – insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|--------------------------------|---|-----------|
| Sodium hydrogen sulfite, aqueous solution > 50 %, [= sodium bisulfite, aqueous solution > 50 %] | ● | – | ● |
| Sodium hydrogen sulfite, aqueous solution 50 % [= sodium bisulfite, aqueous solution 50 %] | ● | 100 °C / 212 °F: ● | ● |
| Sodium hydrogen sulfite (= sodium bisulfite) | ● | 100 °C / 212 °F: ● | ● |
| Sodium hydroxide, aqueous solution 25 % [= caustic soda 25 % = caustic soda solution 25 %] | ● | 20 °C / 68 °F: ● | ● |
| Sodium hydroxide, aqueous solution > 25 % [= caustic soda > 25 % = caustic soda solution > 25 %] | ● | – | ● |
| Sodium hypochloride | ● | ■ | ● |
| Sodium hypochlorite | ● | ■ | ● |
| Sodium methoxide | ● | – | ● |
| Sodium melt | 350 °C / 662 °F: ● | – | ■ |
| Sodium nitrate, melt [= Chile saltpeter, melt] | ■ | 310 °C / 590 °F: ● | ■ |
| Sodium nitrate, aqueous solution [= Chile saltpeter, aqueous solution] | ● | 20 °C / 68 °F: ● | ● |
| Sodium nitrite, saturated | ● | 100 °C / 212 °F: ● | ● |
| Sodium peroxide [= sodium superoxide] | ■ | ■ | ● |
| Sodium phosphate, dibasic | ● | 100 °C / 212 °F: ● | ● |
| Sodium phosphate, tribasic | ● | 100 °C / 212 °F: ● | ● |
| Sodium silicate [= water glass] | ● | 100 °C / 212 °F: ● | ● |
| Sodium sulfate, [e.g. Glauber's salt sodium sulfate decahydrate] | ● | 20 °C / 68 °F: ● | ● |
| Sodium sulfide | ● | ▲ | ● |
| Sodium sulfite, aqueous solution 50 % | ● | 100 °C / 212 °F: ● | ● |
| Sodium sulfite, aqueous solution > 50 % | ● | – | ● |
| Sodium thiosulfate, aqueous solution 25 % | ● | 100 °C / 212 °F: ● | ● |
| Sodium thiosulfate, aqueous solution > 25 % | ● | – | ● |
| Starch, aqueous solution | ● | ● | ● |
| Steam | ● | ● | ● |
| Stearic acid | ● | ● | ● |
| Styrene | ● | ● | ■ |
| Succinic acid | ● | ● | ● |
| Succinic acid ester | ● | ● | ● |
| Sugar, aqueous solution | ● | ● | ● |
| Sulfur chloride, anhydrous | ● | 100 °C / 212 °F: ● | ● |
| Sulfur chloride, hydrous | ● | ■ | ● |
| Sulfur dichloride, anhydrous | ● | 100 °C / 212 °F: ● | ● |
| Sulfur dichloride, hydrous | ● | ■ | ● |
| Sulfur dioxide, anhydrous | ● | 100 °C / 212 °F: ● | ● |
| Sulfur dioxide, hydrous | ● | ■ | ● |
| Sulfur hexafluoride | ● | – | ● |
| Sulfur trioxide | ■ | ■ | ● |
| Sulfur, anhydrous, liquid | ● | 130 °C / 266 °F: ● | ● |
| Sulfur, hydrous | ● | 20 °C / 68 °F: ● | ● |
| Sulfuric acid 98 % | 100 °C / 212 °F: ● | ■ | ● |
| Sulfuric acid, aqueous solution < 70 % | 100 °C / 212 °F: ● | ■ | ● |
| Sulfurous acid | 100 °C / 212 °F: ● | ▲ | ● |
| T | | | |
| Tannic acid [= tannin] | ● | ● | ● |
| Tetrabromomethane | ● | – | ● |
| Tetrachloroethane, anhydrous | ● | ● | ● |
| Tetrachloroethane, hydrous | ● | ■ | ● |
| Tetrachloroethylene, anhydrous [= perchloroethylene, anhydrous] | ● | ● | ● |
| Tetrachloroethylene, hydrous [= perchloroethylene, hydrous] | ● | ■ | ● |
| Tetrafluoroboric acid, containing HF | ● | ■ | ● |

● resistant; ■ not resistant; ▲ limited resistance; – insufficient data; p.corr = pitting corrosion

Material suitability for specific media

| Medium | SIGRAFLEX flexible graphite | Stainless steel 316, 316L, 1.4401, 1.4404 | Pure PTFE |
|---|--------------------------------|---|---|
| Tetrafluoroboric acid, not containing HF | ● | ■ | ● |
| 1,1,1,2-Tetrafluoroethane | ● | - | ● |
| Tetrahydrofuran | ● | ● | ● |
| Tetralin (= 1,2,3,4-tetrahydronaphthalene) | ● | ● | ● |
| Thionyl chloride | ● | - | ● |
| Tin chloride, aqueous solution | ● | ▲ | ● |
| Tin, liquid | ● | ▲ | ● |
| Titanium tetrachloride | ● | - | ● |
| Toluene | ● | ● | ● |
| Tributyl phosphate | ● | ● | ● |
| Tricalcium phosphate | ● | ● | ● |
| Trichloroacetic acid | ● | ■ | ● |
| Trichloroethane, anhydrous | ● | 20 °C / 68 °F: ● | ● |
| Trichloroethane, hydrous | ● | ■ | ● |
| Trichloroethene, anhydrous (= trichloroethylene, anhydrous) | ● | 100 °C / 212 °F: ● | ● |
| Trichloroethene, hydrous (= trichloroethylene, hydrous) | ● | ■ | ● |
| Trichloromethane, anhydrous (= chloroform, anhydrous) | ● | ● | ● |
| Trichloromethane, hydrous (= chloroform, hydrous) | ● | ■ | ● |
| Trichlorosilane | ● | ■ | ● |
| Trichlorotrifluoroethane, anhydrous [= Freon 113, anhydrous] | ● | ● | ▲, media causes swelling of PTFE. |
| Trichlorotrifluoroethane, hydrous [= Freon 113, hydrous] | ● | ■ | ▲, media causes swelling of PTFE. |
| Triethanolamine | ● | - | ● |
| Triethylamine | ● | ● | ● |
| Triethylenetetramine (TETA) | ● | - | ● |
| Trimethylaluminium | ● | - | ■ |
| trioctyl phosphate | ● | ● | ● |
| Trisodium phosphate | ● | ● | ● |
| Turpentine | ● | ● | ● |
| U | | | |
| Uranium hexafluoride | ■ | - | ■ |
| Urea | ● | ● | ● |
| V | | | |
| Vaseline | ● | ● | ● |
| Vinegar, aqueous solution 50 % (= wine vinegar) | ● | 100 °C / 212 °F: ● | ● |
| Vinyl chloride (= chloroethene) | ● | ● | ● |
| W | | | |
| Water | ● | ● | ● |
| Water, purified | ● | ● | ● |
| Wine | ● | ● | ● |
| X | | | |
| Xenon | ● | ● | ● |
| Xylene | ● | ● | ● |
| Y | | | |
| Yeast, aqueous solution | ● | ● | ● |
| Z | | | |
| Zinc acetate, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Zinc chloride, aqueous solution | ● | ▲ | ● |
| Zinc cyanide | ● | 20 °C / 68 °F: ● | ● |
| Zinc sulfate, aqueous solution | ● | 100 °C / 212 °F: ● | ● |
| Zinc, liquid | ● | ■ | ■ |

● resistant; ■ not resistant; ▲ limited resistance; - insufficient data; p.corr = pitting corrosion



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