

Tubing selection



Tygon® standard

General applications in the laboratory

- Non-toxic, non-oxidizing
- Good resistance to acids, lyes and inorganic media
- Very low gas permeability, long service life
- Thermoplastic soft PVC, transparent



Tygon® 2001 for food

Ideal for products with a high fat content

- Extremely resistant to chemicals, e.g. suitable for the use of polar solvents
- Contains no plasticizers or oils
- Particularly long service life
- Transparent for improved visual inspection
- Extremely flexible
- Thermoplastic, transparent



Tygon® for hydrocarbons

Especially for hydrocarbons, petroleum products and distillates

- Ideal for petrol, kerosene, fuels and lubricants, heating oil, cutting fluids and glycol-based coolants
- Ozone- and UV-resistant
- Thermoplastic soft PVC, yellow translucent



PharMed®

Ideal for medical, laboratory and research applications

- High flexural fatigue strength
- Non-toxic, biocompatible
- Very low gas permeability
- Well suited for acids and lyes
- Polypropylene-based thermoplastic elastomer with plasticizers, opaque beige



Silicone

For use in pharmacy and biology

- Extremely smooth inner surface (platinum plated) prevents possible bacterial growth
- Biocompatible, minimal adsorption and absorption
- Best flow properties, high temperature stability
- Absolutely inert, plasticizer-free
- Polydimethylsiloxane with silica earth and silicone additives, excellent contact pressure resistance, translucent white



Viton®

Excellent acid resistance - at high temperatures

- Low gas permeability
- Resistant to solvents and corrosive media
- Fluorocarbon rubber, thermoformed Viton B (67% fluorinated), opaque black

Complies with the following standards:

FDA (21 CFR 177.2601),
USP Class VI, ISO 10993,
10/ 204/EU

Temperature range:

-50 to +75 °C

Sterilization:

Autoclavable at 120 °C,
30 min. at 1 bar (takes on milky color)
or with ethylene oxide

Restriction:

Release of plasticizers possible

Complies with the following standards:

FDA (21 CFR 177.2600),
USP Class VI and GLP

Temperature range:

-78 to +71 °C

Sterilization:

Autoclavable, 30 min. at 1 bar,
sterilizable by radiation or
ethylene oxide

Complies with the following standards:

GLP

Temperature range:

-40 to +75 °C

Sterilization:

not recommended

Restriction:

Not suitable for strong lyes
and acids as well as food
and pharmaceuticals.

Complies with the following standards:

USP Class VI, GLP, USP and Ph. Eur.

Temperature range:

-51 to +135 °C

Sterilization:

Autoclavable or sterilizable by ethylene
oxide
or radiation

Restriction:

Release of additives possible

Complies with the following standards:

USP Class VI, GLP and NSF

Temperature range:

-80 to +200 °C

Sterilization:

Autoclavable, 30 min. at 1 bar
or sterilizable by radiation

Restriction:

Unsuitable for concentrated solvents,
oils, acids or diluted caustic soda,
relatively high gas permeability

Complies with the following standards:

GLP

Temperature range:

-30 to +205 °C

Sterilization:

not recommended

Restriction:

Limited service life

Tubing characteristics



Used with	Tygon® standard	Tygon® 2001 for food	Tygon® for hydrocarbons
Acids	good	excellent	good
Lyes	good	excellent	good
Solvents	not suitable	good	conditional
Pressure	good	good	good
Vacuum	good	good	good
Viscous media	excellent	good	excellent
Sterile media	conditional	good	conditional



Used with	PharMed®	Silicone	Viton®
Acids	good	conditional	excellent
Lyes	good	conditional	excellent
Solvents	not suitable	not suitable	varying, test recommended
Pressure	good	conditional	good
Vacuum	excellent	good	good
Viscous media	good	conditional	good
Sterile media	excellent	excellent	conditional

Tubing compatibility

	Chemical	P	S	T	TU	TK	V
A	Acetaldehyde	D	C	D	D	D	D
	Acetone	D	C	D	D	C	D
	Acetonitrile	D	D	D	D	B	D
	Acetyl bromide	C	D	D	D	C	-
	Acetyl chloride	C	D	D	D	C	A
	Aliphatic hydrocarbons	D	D	D	B	D	-
	Aluminum chloride, 53% i. w.	A	A	A	A	A	A
	Aluminum salts	A	A	A	A	A	-
	Aluminum sulfate, 50% i. w.	A	A	A	A	A	A
	Formic acid, 25% i. w.	A	A	A	C	A	D
	Ammonia, anhydrous	A	D	B	B	B	D
	Ammonium acetate, 45% i. w.	A	A	A	A	A	-
	Ammonium carbonate, 20% i. w.	A	A	A	A	A	-
	Ammonium chloride	A	C	A	A	A	A
	Ammonium hydroxide, 30% i. w.	A	D	A	C	A	B
	Ammonium nitrate	A	C	A	A	A	-
	Ammonium phosphate	A	A	A	A	A	-
	Ammonium sulfate	A	A	A	A	A	A
	Amylacetate	B	D	D	D	D	D
	Amylalcohol	D	D	D	A	A	A
	Amylchloride	C	D	D	D	D	-
	Aniline	C	D	D	D	D	D
	Aniline hydrochloride	C	D	D	D	D	B
	Aromatic hydrocarbons	D	D	D	D	D	-
	Arsenic salts	A	A	A	A	A	-
B	Barium salts	A	A	A	A	A	-
	Benzaldehyde	D	C	D	D	C	D
	Benzene	D	D	D	D	-	-
	Benzenesulfonic acid	D	D	D	D	D	A
	Hydrogen cyanide	A	A	A	A	A	A
	Lead acetate, 35% i. w.	A	A	A	A	A	-
	Boric acid, 4% i. w.	A	A	A	A	A	A
	Bromine, (anhydrous liquid)	D	D	D	D	D	A
	Hydrobromic acid, 20-50%	D	D	A	A	A	A
	Butane	A	A	A	A	B	A
	Butanol (Butyl alcohol)	D	B	D	D	A	A
	Butyric acid	B	D	D	C	D	-
	Butyl acetate	B	D	D	D	D	D
C	Calcium oxide	A	A	A	A	A	-
	Chlorobenzene, (Mono, Di, Tri)	D	D	D	D	C	A

	Chemical	P	S	T	TU	TK	V
	Chloroacetic acid 20% i. w.	B	A	A	D	A	D
	Chlorine gas, wet	D	D	B	B	C	B
	Chlorobromomethane	B	D	D	D	-	A
	Chloroform	D	D	D	D	C	A
	Chlorosulfonic acid	D	D	D	D	D	D
	Chromic acid, 20% i. w.	A	D	B	C	B	A
	Chromic acid, 50% i. w.	C	D	C	D	-	-
	Cyclohexane	D	D	D	C	D	A
	Cyclohexanone	D	D	D	D	C	D
D	Diesel	D	D	D	B	-	-
	Dimethylformamide	B	B	D	D	A	D
E	Iron II chloride 40% i. w.	A	A	A	A	A	B
	Iron II sulfate 5% i. w.	A	A	A	A	A	A
	Iron III chloride 43% i. w.	A	A	A	A	A	-
	Iron III sulfate 5% i. w.	A	A	A	A	A	-
	Acetic acid, 10% i. w.	A	A	A	A	A	-
	Acetic acid, (100% glacial acetic acid)	B	D	D	D	-	-
	Acetic anhydride	A	A	D	D	A	D
	Ethanol	A	B	D	B	A	A
	Ether	C	D	D	C	D	-
	Ethylendichloride	C	D	D	D	D	B
	Ethyl acetate	B	D	D	D	D	D
	Ethylamine	D	C	D	D	B	-
	Ethyl bromide	D	D	D	D	C	-
	Ethyl chloride	C	D	D	D	D	A
	Ethylene chlorohydrin	A	B	D	B	A	A
	Ethylene glycol	A	A	A	A	A	A
	Ethylene oxide	A	D	A	A	A	D
F	Fatty acids	C	B	B	C	C	C
	Fluoroborate salts	A	-	A	A	A	-
	Hydrofluoric acid 50%	D	D	D	D	A	A
	Hydrofluoric acid, 10% i. w.	D	D	C	A	A	B
	Formaldehyde, 37% i. w.	D	C	D	D	C	D
	Freon 11	A	A	A	A	-	-
	Fruit juice	A	A	A	A	A	A
G	Tannic acid, 75% i. w.	B	A	B	D	A	-
	Glycerin	A	A	A	A	A	A
H	Uric acid	A	A	A	C	A	-
	Urea, 20% i. w.	A	A	A	A	A	-
	Hypochlorous acid, 25% i. w.	A	A	A	A	A	A

	Chemical	P	S	T	TU	TK	V
I	Hydrogen iodide, 7% i. w.	B	B	A	A	A	-
J	Iodine solutions	A	C	A	A	A	-
K	Potassium cyanide, 33% i. w.	A	A	A	A	-	-
	Potassium hydroxide, < 10% i. w.	A	A	A	D	-	B
	Potassium iodide, 56% i. w.	A	A	A	A	A	-
	Potassium carbonate, 55% i. w.	A	A	A	A	A	-
	Kerosene	D	D	D	B	D	A
	Ketones	D	D	D	D	C	-
	Carbon disulfide	D	D	D	D	D	-
	Aqua regia (80% HCl, 20% HNO)	D	D	D	D	A	-
	Copper II chloride 40% i. w.	A	A	A	A	A	-
M	Magnesium chloride, 35% i. w.	A	A	A	A	A	A
	Magnesium sulfate, 25% i. w.	A	A	A	A	A	-
	Manganese salts	A	A	A	A	A	-
	Methane	A	-	A	A	A	A
	Methanol	A	B	D	B	A	D
	Methyl ethyl ketones	D	D	D	D	C	D
	Lactic acid, 10% i. w.	A	A	A	A	A	-
	Lactic acid, 85% i. w.	B	D	D	D	-	-
	Mineral oil	D	D	C	A	D	A
	Monoethanolamines	C	D	D	D	D	D
N	Naphthalene	D	D	D	D	D	A
	Sodium bicarbonate, 7% i. w.	A	A	A	A	A	A
	Sodium bisulfate	A	-	A	A	A	-
	Sodium borate	A	A	A	A	A	A
	Sodium dithionite	A	-	A	A	-	-
	Sodium ferrocyanide	A	A	A	D	-	-
	Sodium hydroxide, 10-15% i. w.	A	A	A	D	A	B
	Sodium hydroxide, 30-40% i. w.	A	C	C	D	A	B
	Sodium carbonate, 7% i. w.	A	A	A	A	A	B
	Sodium nitrate, 3.5% i. w.	A	A	A	A	A	-
	Sodium sulfate, 3.6% i. w.	A	A	A	A	-	A
	Sodium sulfide, 13% i. w.	A	A	A	A	A	-
	Nickel salts	A	A	A	A	A	-
	Nitrobenzene	D	D	D	D	C	-
O	Oils, animal	C	A	D	A	B	-
	Oleic acid	C	B	D	B	D	B
P	Perchloroethylene	C	D	D	D	D	A

	Chemical	P	S	T	TU	TK	V
	Perchloric acid, 67% i. w.	A	D	C	D	A	A
	Phenol, i. w.	A	D	D	C	A	-
	Phosphoric acid, 25% i. w.	A	D	A	A	A	A
	Phthalic acid, 9% i.alc.	A	B	D	C	B	-
	Propanol (Propyl alcohol)	C	A	D	D	A	B
	Pyridine	C	D	D	D	C	D
Q	Mercury salts	A	A	A	A	A	-
S	Nitric acid, 10% i. w.	A	C	A	D	A	A
	Nitric acid, 35% i. w.	A	D	A	D	A	A
	Nitric acid, 68-71% i. w.	D	D	D	D	D	-
	Nitrous acid, 10% i. w.	A	B	A	C	A	-
	Hydrochloric acid, 10% i. w.	A	D	A	A	A	A
	Hydrochloric acid, 37% i. w.	B	D	A	D	A	B
	Sulphurous acid	A	A	A	A	A	A
	Sulfuric acid, 10% i. w.	A	A	A	B	A	A
	Sulfuric acid, 30% i. w.	A	B	A	B	A	A
	Sulfuric acid, 95-98% i. w..	D	D	D	D	C	A
	Soapy water	B	A	A	A	A	A
	Silver nitrate, 55% i. w.	A	A	A	A	A	A
	Silicone oil	C	D	B	A	B	A
	Stearic acid, 5% i.alc.	C	D	D	B	B	-
T	Turpentines	D	D	D	B	A	A
	Carbon tetrachloride	D	D	D	D	D	A
	Toluene	D	D	D	D	C	A
	Trichloroacetic acid, 90% i. w.	B	D	A	D	A	C
	Trichlorethylene	C	D	D	D	C	A
	Trisodium phosphate	A	A	A	A	A	A
W	Hydrogen peroxide, 10% i. w.	A	A	A	A	A	A
	Hydrogen peroxide, 90% i. w.	B	C	D	D	B	-
	Tartaric acid, 56% i. w.	A	A	A	A	A	A
X	Xylene	D	D	D	D	C	B
Z	Zinc chloride, 80% i. w.	A	A	A	A	A	A
	Tin salts	A	A	A	A	A	-

Hoses:

P = PharMed®
S = Silicone
T = Tygon® Standard
TU = Tygon® (Hydrocarbons)
TK = Tygon® 2001 (Food)
V = Viton®

Resistance:

A = very good
B = good
C = satisfactory
D = not suitable
- = not tested

Please note: All information is provided without guarantee. The user must ensure that the tubes are suitable for the desired application; appropriate tests may have to be carried out.

i. W. = in the water