Premium Laboratory Equipment

Hei-FLOW

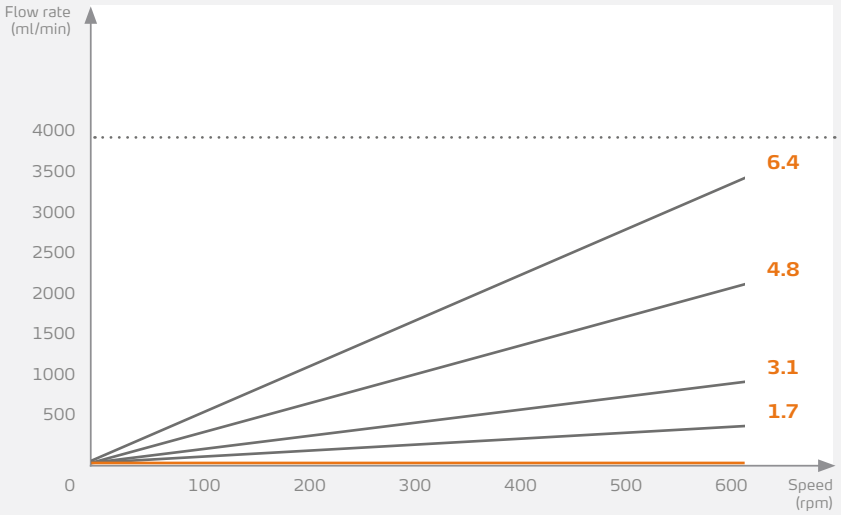
Pump head flow rates and tubing sizes

heidolph
research made easy

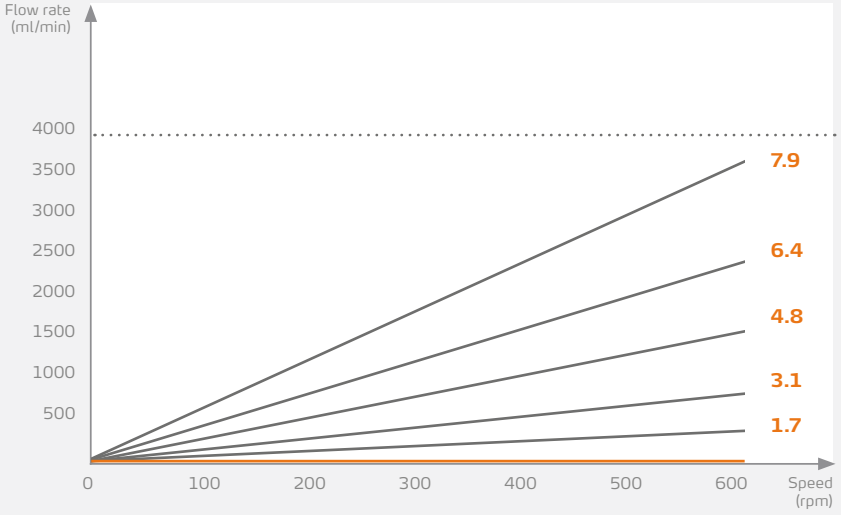
Single-Channel Pump Heads

Flow rate

SP standard
SP vario



SP quick



Tubing sizes and flow rates for Singel-Channel Pumps

Tubing sizes						
Inner diameter	**(mm)**	0.8	1.7	3.1	4.8	6.4
Outer diameter	**(mm)**	4	4.9	6.3	8	9.5
Wall thickness (wt)	**(mm)**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
Max. pressure (continuous/short time)	**(bar)**	0.7/1.7	0.7/1.7	0.7/1.7	0.5/1.5	0.5/1.5
Suction height	**(mH_2O)**	8.8	8.8	8.8	8.8	6.7

Average flow rates in combination with pump head and pump drive											
SP quick		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
Hei-FLOW Advantage 06/Hei-FLOW Precision 06	**(ml/min)**	2	33	8	186	26	653	59	1,529	89	2,072
Hei-FLOW Value 06	**(ml/min)**	4	35	17	197	57	695	123	1,494	186	1,765
Hei-FLOW Advantage 01/Hei-FLOW Precision 01	**(ml/min)**	0.38	9	2	40	5	126	12	233	17	409
Hei-FLOW Value 01	**(ml/min)**	0.83	9	3	41	11	134	25	292	36	413
SP standard/SP vario				**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
Hei-FLOW Advantage 06/Hei-FLOW Precision 06	**(ml/min)**			11	257	43	1,017	105	2,549	167	4,056
Hei-FLOW Value 06	**(ml/min)**			22	249	93	1,037	228	2,613	364	4,151
Hei-FLOW Advantage 01/Hei-FLOW Precision 01	**(ml/min)**			2	55	9	221	21	530	33	813
Hei-FLOW Value 01	**(ml/min)**			5	61	19	223	44	519	75	861

Tubing P/N (per meter)						
Silicone		525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®		525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®		525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
Tygon® (standard)		525-63000-00	525-64000-00	525-66000-00	525-60027-00	525-60028-00
Tygon® (hydrocarbon)		525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)		525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Tubing sizes				
Inner diameter	**(mm)**	4.8	6.4	7.9
Outer diameter	**(mm)**	9.8	11.3	12.9
Wall thickness (wt)	**(mm)**	**2.5**	**2.5**	**2.5**
Max. pressure (continuous/short time)	**(bar)**	0.8/1.8	0.8 / 1.8	0.8 / 1.8
Suction height	**(mH_2O)**	8.8	8.8	8.8

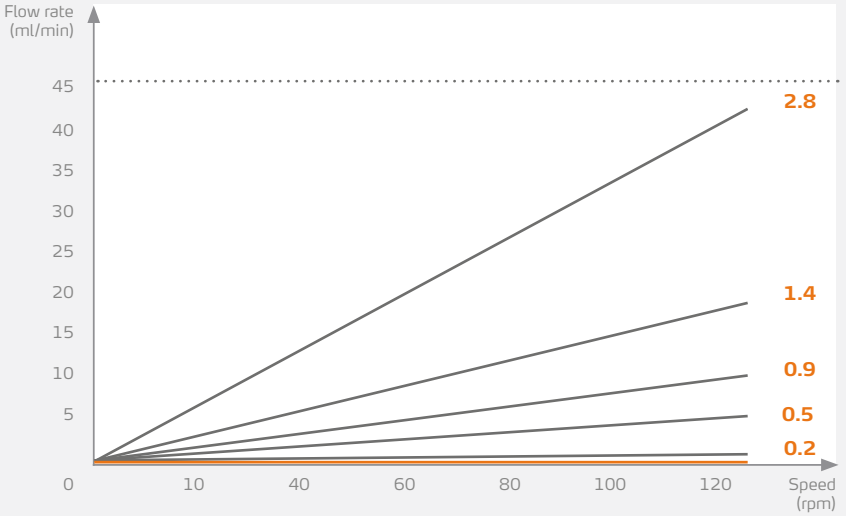
Average flow rates in combination with pump head and pump drive							
SP quick		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
Hei-FLOW Advantage 06/Hei-FLOW Precision 06	**(ml/min)**	58	1,527	85	2,248	113	3,171
Hei-FLOW Value 06	**(ml/min)**	123	1,580	180	2,411	257	3,436
Hei-FLOW Advantage 01/Hei-FLOW Precision 01	**(ml/min)**	12	299	18	435	25	630
Hei-FLOW Value 01	**(ml/min)**	26	299	38	454	50	636
SP standard/SP vario		min.	max.	min.	max.		
Hei-FLOW Advantage 06/Hei-FLOW Precision 06	**(ml/min)**	92	2,390	139	3,821		
Hei-FLOW Value 06	**(ml/min)**	203	2,426	313	3,782		
Hei-FLOW Advantage 01/Hei-FLOW Precision 01	**(ml/min)**	15	491	28	769		
Hei-FLOW Value 01	**(ml/min)**	42	493	68	773		

Tubing P/N (per meter)				
Silicone		525-35000-00	525-39000-00	525-32000-00
Viton®		525-55000-00	525-59000-00	525-52000-00
PharMed®		525-25000-00	525-29000-00	525-22000-00
Tygon® (standard)		525-65000-00	525-69000-00	525-62000-00
Tygon® (hydrocarbon)		525-75000-00	525-79000-00	525-72000-00
Tygon® 2001 (food)		525-85000-00	525-89000-00	–

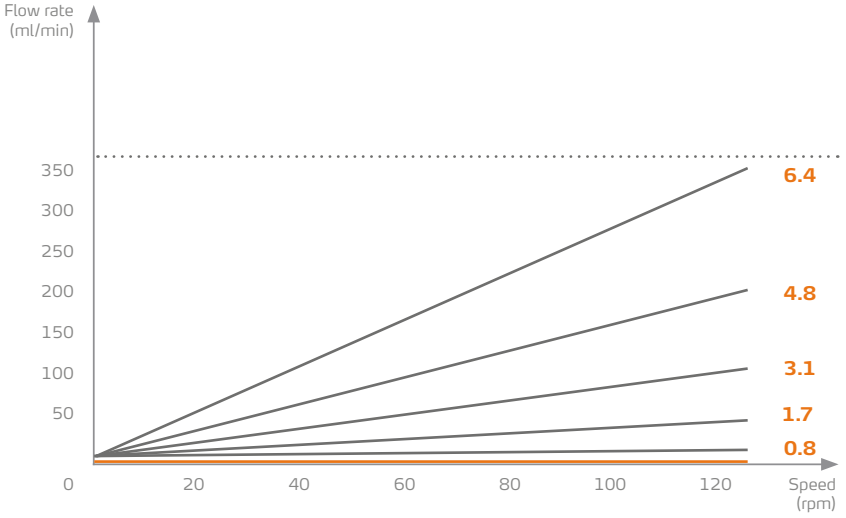
Multi-Channel Pump Heads

Flow rates pertain to water

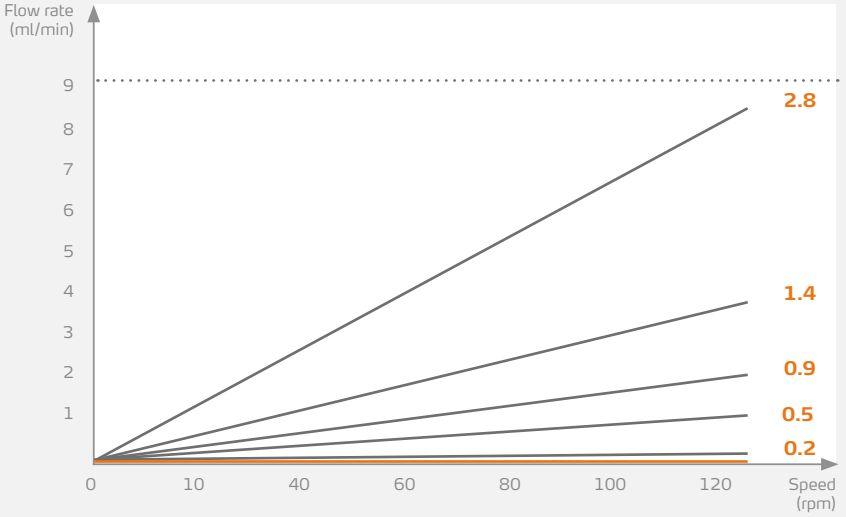
Pump Head C 4



Pump Head C 8



Pump Head C 12



Tubing sizes and flow rates for Multi-Channel Pumps

Tubing sizes		0.2	0.5	0.9	1.4	2.8
Inner diameter	(mm)	0.25	0.51	0.89	1.42	2.79
Outer diameter	(mm)	2.05	2.31	2.69	3.22	4.59
Wall thickness (wt)	(mm)	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**
Max. pressure (continuous / short time)	(bar)	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5
Suction height	(mH_2O)	7	7	7	7	7

Average flow rates in combination with cassette, pump head and pump drive

Hei-FLOW Advantage 01 / Hei-FLOW Precision 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max.*
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.01	0.54	0.03	1	0.10	3	0.29	9	12
Cassette small / pump head C 4	(ml/min)	0.02	0.49	0.08	2	0.24	6	0.60	14	2	36	4
Hei-FLOW Value 01		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.02	0.42	0.10	1	0.23	3	0.69	8	12
Cassette small / pump head C 4	(ml/min)	0.04	0.53	0.17	2	0.57	6	1	15	4	37	4

* max. number of cassettes

Tubing P/N

Silicone	Two-Stop Tubing for cassette small			525-30014-00	525-30015-00	525-30016-00
	Extension tube (per meter)			525-30024-00	525-30025-00	525-30026-00
Viton®	Two-Stop Tubing for cassette small			525-50014-00	525-50015-00	525-50016-00
	Extension tube (per meter)			525-50024-00	525-50025-00	525-50026-00
PharMed®	Two-Stop Tubing for cassette small	525-20012-00	525-20013-00	525-20014-00	525-20015-00	525-20016-00
	Extension tube (per meter)	525-20022-00	525-20023-00	525-20024-00	525-20025-00	525-20026-00
Tygon® (standard)	Two-Stop Tubing for cassette small	525-60012-00	525-60013-00	525-60014-00	525-60015-00	525-60016-00
	Extension tube (per meter)	525-60022-00	525-60023-00	525-60024-00	525-60025-00	525-60026-00
Fittings for extension tubes (PTFE)		526-22000-00	526-22000-00	526-22000-00	526-22000-00	526-22000-00

Tubing sizes		0.8	1.7	3.1	4.8	6.4
Inner diameter	(mm)	0.8	1.7	3.1	4.8	6.4
Outer diameter	(mm)	4	4.9	6.3	8	9.5
Wall thickness (wt)	(mm)	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
Max. pressure (continuous / short time)	(bar)	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5
Suction height	(mH_2O)	8.8	8.8	8.8	8.8	6.7

Average flow rates in combination with cassette, pump head and pump drive

Hei-FLOW Advantage 01 / Hei-FLOW Precision 01		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
Cassette medium / pump head C 8	(ml/min)	0.24	7	1	26							8
Cassette large / pump head C 8	(ml/min)			1	27	4	90	8	192	11	329	4
Hei-FLOW Value 01		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	
Cassette medium / pump head C 8	(ml/min)	0.55	6.97	2.17	27							8
Cassette large / pump head C 8	(ml/min)			2	27	7	85	18	246	26	364	4

Tubing P/N (per meter):

Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
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Tygon® (hydrocarbon)	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Flow rates pertain to Tygon® (standard) tubing and water

Tubes

Tubing Options



	Tygon® standard	Tygon® 2001 for food	Tygon® for hydrocarbons
Application	For standard applications	Food industry, wellsuited to products with high fat content	Especially for hydrocarbons, mineral oil products and distillates
Features	▪ Non-toxic, non-oxidizing ▪ Good resistance to acids, bases and inorganic media ▪ Very low gas permeability, good performance life	▪ Extremely chemical-resistant, e. g. appropriate for the use of polar solvents ▪ Plasticizer- and oil-free ▪ Superior flex life in peristaltic pumps ▪ Translucent to aid visual inspection ▪ Outstanding flexibility	▪ Ideal for petrol, kerosene, heating oil, cutting solutions and coolants on a glycol base ▪ Resistant to ozone and UV
Material	Thermoplastic soft PVC, transparent	Thermoplastic tube, transparent	Thermoplastic soft PVC, translucent yellow
Complies with the standards	FDA (21 CFR 177.2601) and GLP	USP Class VI, FDA (21 CFR 177.2600) and GLP	GLP conform
Temperature range	-50 to +75 °C	-78 °C to +71 °C	-40 to +75 °C
Sterilization	Can be autoclaved for 30 min at 1 bar and 120 °C (material may change color) or with ethylene oxide	Can be autoclaved for 30 min at 1 bar, sterilized by irradiation or with ethylene oxide	Sterilization is not recommended
Restriction	Segregation of plasticizers is possible	–	Not suitable for concentrated acids, lyes, food and pharmaceutics



	PharMed®	Silicone	Viton®
Application	Ideal for medical, lab and research uses	Platinum-coated silicone hose for use in pharmaceuticals and biology	Excellent acid resistance at high temperatures
Features	▪ High fatigue strength under repeated reversed bending stresses ▪ Non-toxic, biocompatible ▪ Very low gas permeability ▪ Well suited to acids and bases	▪ Extremely smooth interior prevents bacterial growth ▪ Biocompatible, minimal adsorption and absorption ▪ Best fl ow properties, high temperature stability ▪ Absolutely inert, softener-free	▪ Low gas permeability ▪ Resistant to solvents and corrosives at high temperatures
Material	Thermoplastic elastomer on a polypropylene base with plasticizers, excellent tensile strength, opaque	Polydimethylsiloxane with siliceous earth and silicone additives, excellent resistance to initial pressure, translucent white	Fluorocarbon rubber, thermoformed Viton B (67 % fluorinated), opaque black
Complies with the standards	USP Class VI, GLP, USP and Ph. Eur.	USP Class VI, meets GLP and NSF	GLP conform
Temperature range	-51 to +135 °C	-80 to +200 °C	-30 to +205 °C
Sterilization	Can be autoclaved or sterilized with ethylene oxide or sterilized by irradiation	Can be autoclaved for 30 min at 1 bar or sterilized by irradiation	Sterilization is not recommended
Restriction	Additives may migrate	Not suitable for concentrated solvents, oils, acids or dilute caustic soda, relatively high permeability to gas	Limited performance life

Use with	Tygon® standard	Tygon® 2001 for food	Tygon® for hydrocarbons	PharMed®	Silicone	Vilton®
Acids	good	excellent	good	good	conditional	excellent
Lyes	good	excellent	good	good	conditional	excellent
Solvents	unsuitable	good	conditional	unsuitable	unsuitable	varies, tests recommended
Pressure	good	good	good	good	satisfactory	good
Vacuum	good	good	good	excellent	good	good
Viscous media	excellent	good	excellent	good	satisfactory	good
Sterile media	conditional	good	conditional	excellent	excellent	satisfactory

Tubing Resistance

	Chemical	P	S	T	TU	TK	V
A	Acetaldehyde	D	C	D	D	D	D
	Acetic acid, 10 % in W.	A	A	A	A	A	–
	Acetic acid, 100 %	B	D	D	D	–	–
	Acetic anhydride	A	A	D	D	A	D
	Acetone	D	C	D	D	C	D
	Acetonitrile	C	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 % in W.	A	A	A	A	A	A
	Aluminum sulfate, 50 % in W.	A	A	A	A	A	A
	Alums	A	A	A	A	A	–
	Ammonia, gas and liquid	A	D	B	B	B	D
	Ammonium acetate, 45 % in W.	A	A	A	A	A	–
	Ammonium carbonate, 20 % in W.	A	A	A	A	A	A
	Ammonium chloride	A	C	A	A	A	A
	Ammonium hydroxide, 30 % in W.	A	D	A	C	A	B
	Ammonium nitrate	A	C	A	A	A	–
	Ammonium phosphate	A	A	A	A	A	–
	Ammonium sulfate	B	A	A	A	A	D
	Amyl acetate	B	D	D	D	D	A
	Amyl alcohol	D	D	D	A	A	A
	Amyl chloride	C	D	D	D	D	–
	Aniline	C	D	D	D	D	D
	Aniline hydrochloride	C	D	D	D	D	B
	Aqua regia (80 % HCl, 20 % HNO_3)	D	D	D	D	A	–
	Aromatic hydrocarbons	A	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
	Boric acid, 4 % in W.	A	A	A	A	A	A
	Bromine	D	D	D	D	D	A
	Butane	A	A	A	A	B	A
	Butanol (butyl alcohol)	D	B	D	A	A	A
	Butyl acetate	B	D	D	D	D	–
	Butyric acid	B	D	D	C	D	D
C	Calcium oxide	A	A	A	A	A	–
	Carbon bisulfide	D	D	D	D	D	–
	Carbon tetrachloride	D	D	D	D	D	A

	Chemical	P	S	T	TU	TK	V
	Chlorine, wet	D	D	B	B	C	B
	Chloracetic acid, 20 % in W.	B	A	A	D	A	D
	Chlorobenzene	D	D	D	D	C	A
	Chloroform	D	D	D	D	C	A
	Chlorobromomethane	B	D	D	D	–	A
	Chromic acid, 20 % in W.	A	D	B	C	B	A
	Chromic acid, 50 % in W.	C	D	C	D	–	–
	Copper salts	A	A	A	A	A	–
	Cyclohexane	D	D	D	C	D	A
	Cyclohexanone	D	D	D	D	C	D
	Chlorosulfonic acid	D	D	D	D	D	D
D	Diesel	D	D	D	B	–	–
	Dimethyl formamide	B	B	D	D	A	D
E	Ethanol (ethyl alcohol)	A	B	D	B	A	A
	Ether	C	D	D	C	D	–
	Ethyl acetate	B	D	D	D	D	D
	Ethyl bromide	D	D	D	D	C	–
	Ethyl chloride	C	D	D	D	D	A
	Ethylamine	D	C	D	D	B	–
	Ethylene chlorhydrin	A	B	D	B	A	A
	Ethylene dichloride	C	D	D	D	D	B
	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
	Ferric chloride 40 % in W.	A	A	A	A	A	B
	Ferric sulfate 5 % in W.	A	A	A	A	A	A
	Ferrous chloride 43 % in W.	A	A	A	A	A	–
	Ferrous sulfate 5 % in W.	A	A	A	A	A	–
	Fluoboric acid, 10 % in W.	D	D	A	A	A	–
	Fluoroborate salts	A	–	A	A	A	–
	Fluosilicic acid	C	B	D	B	A	–
	Formaldehyde, 37 % in W.	D	C	D	D	C	D
	Formic acid, 25 % in W.	A	A	A	C	A	D
	Freon 11	A	A	A	A	–	–
	Fruit juice	A	A	A	A	A	A
G	Gasoline, high–aromatic	D	D	D	B	D	A
	Gasoline, non–aromatic	D	D	D	B	D	A
	Glycerin	A	A	A	A	A	A
H	Hydrobromic acid, 20 – 50 %	D	D	A	A	A	A
	Hydrochloric acid, 10 % in W.	A	D	A	A	A	A
	Hydrochloric acid, 37 % in W.	B	D	A	D	A	B

Tubing Resistance

	Chemical	P	S	T	TU	TK	V
	Hydrocyanic acid	A	A	A	A	A	A
	Hydrofluoric acid, 10 % in W.	D	D	C	A	A	B
	Hydrofluoric acid, 50 %	D	D	D	D	A	A
	Hydrogen peroxide, 10 % in W.	A	A	A	A	A	A
	Hydrogen peroxide, 90 % in W.	B	C	D	D	B	–
	Hydroiodic acid	B	B	A	A	A	–
	Hypochlorous acid, 25 % in W	A	A	A	A	A	A
I	Iodine solutions	A	C	A	A	A	–
K	Ketones	D	D	D	D	C	–
L	Lactic acid, 10 % in W.	A	A	A	A	A	–
	Lactic acid, 85 % in W.	B	D	D	D	–	–
	Lead acetate, 35 % in W.	A	A	A	A	A	–
M	Manganese salts	A	A	A	A	A	–
	Magnesium chloride, 35 % in W.	A	A	A	A	A	A
	Magnesium sulfate, 25 % in W.	A	A	A	A	A	–
	Mercury salts	A	A	A	A	A	–
	Methane	A	–	A	A	A	A
	Methanol	A	B	D	B	A	D
	Methyl Ethyl Ketone	D	D	D	D	C	D
	Monoethanolamine	C	D	D	D	D	D
N	Naphtha	D	D	D	D	D	A
	Nickel salts	A	A	A	A	A	–
	Nitric acid, 10 % in W.	A	C	A	D	A	A
	Nitric acid, 35 % in W.	A	D	A	D	A	A
	Nitric acid, 68 – 71 % in W.	D	D	D	D	D	–
	Nitrobenzene	D	D	D	D	C	–
	Nitrous acid, 10 % in W.	A	B	A	C	A	–
O	Oils, animal	C	A	D	A	B	–
	Oils, mineral	D	D	C	A	D	A
	Oleic acid	C	B	D	B	D	B
P	Perchloric acid, 67 % in W.	A	D	C	D	A	A
	Perchlorethylene	C	D	D	D	D	A
	Phenol, 91 % in W.	A	D	D	C	A	–
	Phosphoric acid 25 % in W.	A	D	A	A	A	A
	Phthalic acid, 9 % in Alc.	A	B	D	C	B	–
	Potassium carbonate, 55 % in W.	A	A	A	A	A	–
	Potassium cyanide, 33 % in W.	A	A	A	A	–	–
	Potassium hydroxide, <10 % in W.	A	A	A	D	–	B
	Potassium iodide, 56 % in W.	A	A	A	A	A	–
	Propanol (propyl alcohol)	C	A	D	D	A	B
	Pyridine	C	D	D	D	C	D

	Chemical	P	S	T	TU	TK	V
S	Silicone oils	C	D	B	A	B	A
	Silver nitrate, 55 % in W.	A	A	A	A	A	A
	Soap solutions	B	A	A	A	A	A
	Sodium bicarbonate, 7 % in W.	A	A	A	A	A	A
	Sodium bisulfate	A	–	A	A	A	–
	Sodium borate	A	A	A	A	A	A
	Sodium carbonate	A	A	A	A	A	B
	Sodium ferrocyanide	A	A	A	D	–	–
	Sodium hydrosulfite	A	–	A	A	A	–
	Sodium hydroxide, 10 – 15 % in W.	A	A	A	D	A	B
	Sodium hydroxide, 30 – 40 % in W.	A	C	C	D	A	B
	Sodium nitrate, 3.5 % in W.	A	A	A	A	A	–
	Sodium sulfate, 3.6 % in W.	A	A	A	A	–	A
	Sodium sulfide, 13 % in W.	A	A	A	A	A	–
	Stearic acid, 5 % in Alc.	C	D	D	B	B	–
	Sulfuric acid, 10 % in W.	A	A	A	B	A	A
	Sulfuric acid, 30 % in W.	A	B	A	B	A	A
	Sulfuric acid, 95 – 98 % in W.	D	D	D	D	C	A
	Sulfurous acid	A	A	A	A	A	A
T	Tannic acid, 75 % in W.	B	A	B	D	A	–
	Tartaric acid, 56 % in W.	A	A	A	A	A	A
	Tin salts	A	A	A	A	A	–
	Toluene (toluol)	D	D	D	D	C	A
	Trichloroacetic acid, 90 % in W.	B	D	A	D	A	C
	Trichlorethylene	C	D	D	D	C	A
	Trisodium phosphate	A	A	A	A	A	A
	Turpentine	D	D	D	B	A	A
U	Urea, 20 % in W.	A	A	A	A	A	–
	Uric acid	A	A	A	C	A	–
X	Xylene	D	D	D	D	C	B
Z	Zinc chloride, 80 % in W.	A	A	A	A	A	A

Tubing:

P = PharMed®
S = Silicone
T = Tygon® standard
TU = Tygon® for hydrocarbons
TK = Tygon® 2001 for food
V = Viton®

Resistance:

A = excellent
B = good
C = conditional
D = unsuitable
– = not tested

Please note:
All information provided here is not guaranteed to be correct.
Recommended testing of tubing prior to application use.