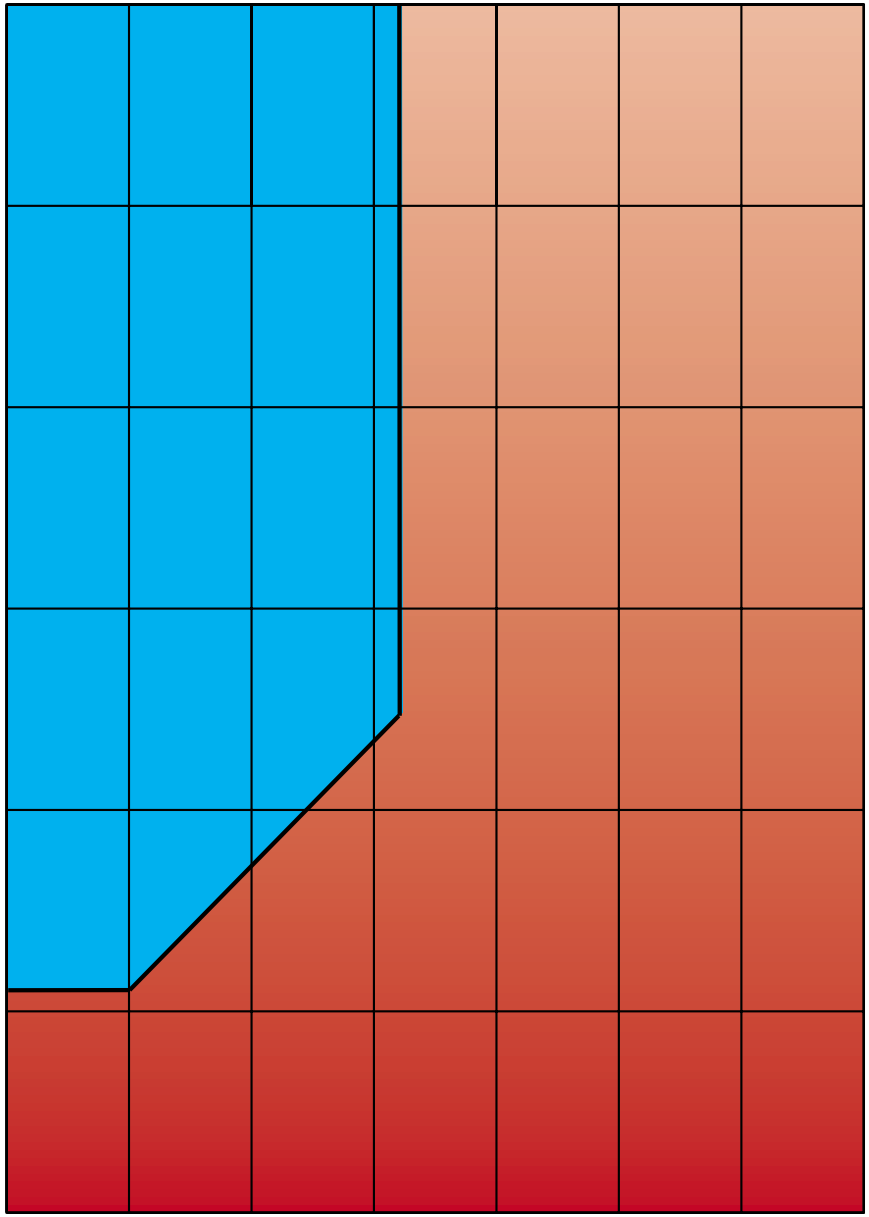


TECHNICAL DATA

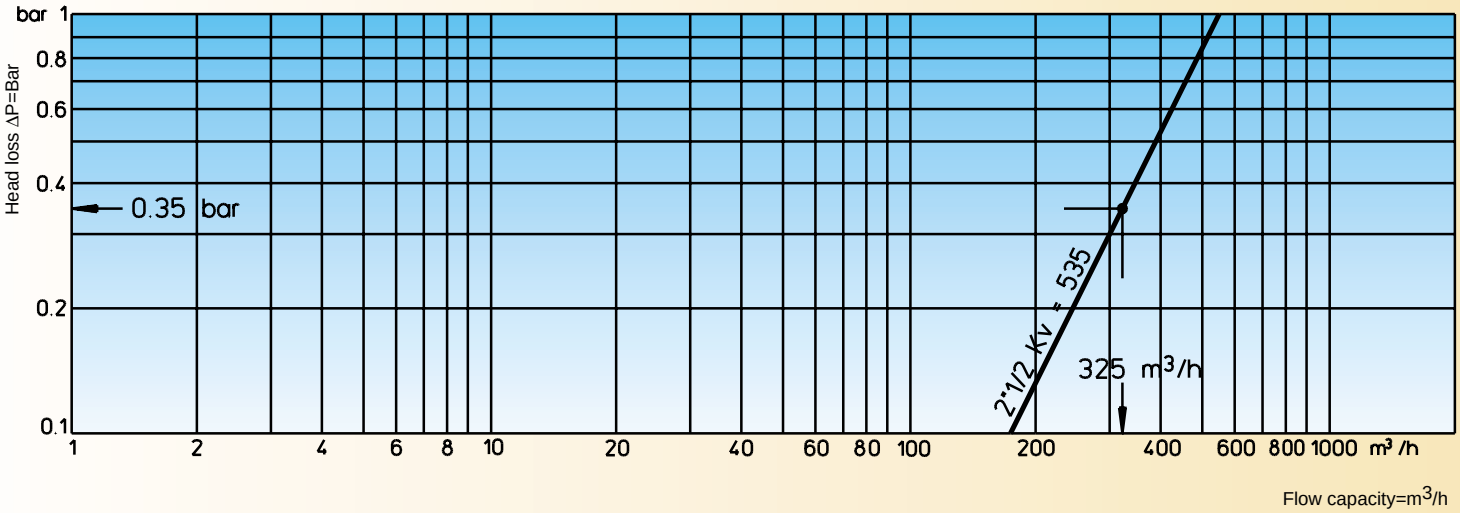
LOSS OF HEAD DIAGRAM

READING GUIDE

The curves of flow rate diagram have been drawn for every size of valve, according to laboratory tests.

The Kv value represents the loss of head expressed in cubic meters per hour of water at 15,5°C causing a loss of head of 1 bar (10,33 m of water gauge): the higher its value is, the lower are head losses.

For every other type of fluid and temperature level, the flow capacity changes accordingly: therefore to calculate it, it is necessary to introduce the relevant corrective coefficients into the formula.



Flow capacity=m^3/h

EXAMPLE

The 2"1/2 valve above represented determines a loss of head of 0,35 bar at the flow rate of 325 m^3/h.

Knowing the maximum loss of head allowed and the minimum necessary flow capacity, one chooses the size of the valve which gets as near as possible to the intersection point of the two half lines.

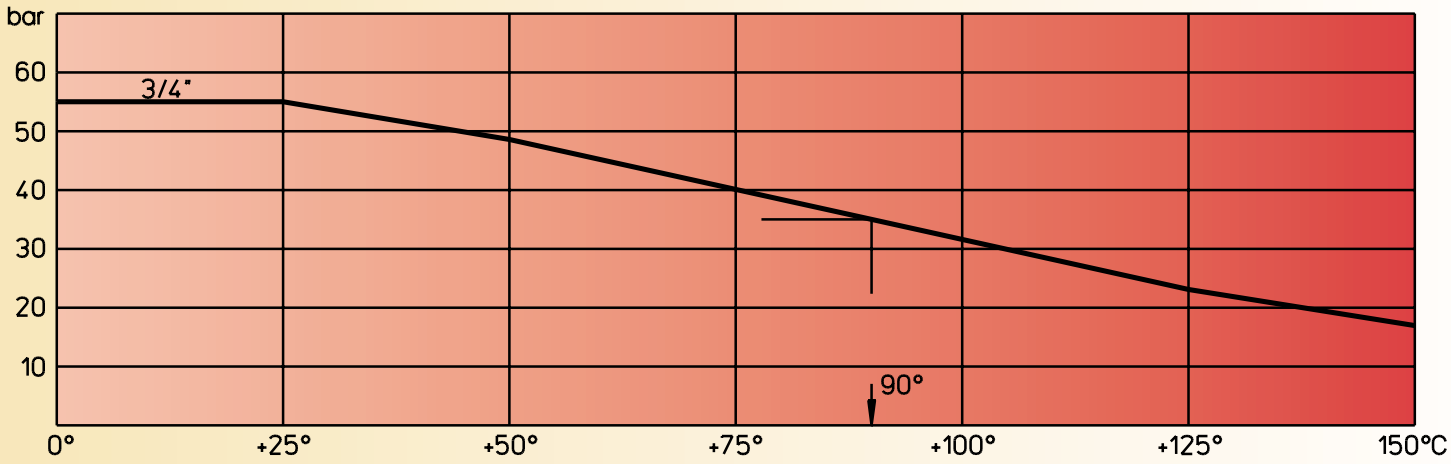
Knowing the flow rate of the installation, one can read the head loss corresponding to the chosen value and vice versa.

PRESSURE/TEMPERATURE DIAGRAM

READING GUIDE

The curves of pressure/temperature diagram have been drawn for every size of valve, on the ground of laboratory tests effected by using water. The values expressed in the curves represent the maximum working limits of the valves. Those values have been achieved by slow variation of pressure/temperature parameters. So, the reported parameters are just indicative: the type of the fluid, changes of pressure, temperature and frequency of manoeuvre operations have a certain influence on valves' life.

Going beyond the temperature of 125°C and getting near to the limit values of the curve, the life of the valves is remarkably reduced.



EXAMPLE

The above curve shows that on 3/4" valves at a working pressure of 35 bar you must not exceed the temperature of 90°C.

NOTE

PN = Nominal Pressure.
PN is the maximum working pressure value at the temperature of 20°C.

INTERNATIONAL UNIT SYSTEM (SI)

CONVERSION FACTORS

In order to pass from the measure expressed in SI system to those expressed in the units of other systems, you have to multiply per K; inversely you have to multiply per 1/K.

Size	Unit System	Unit of other misurement systems					
		Technic	factors K	1/K	Anglo-Saxson	factors K	1/K
lenght	**m(metro)**	m	1	1	in (inch)	39,370	0,0254
					ft (foot)	3,281	0,305
area	**m^2**	m^2	1	1	in^2(sq. in)	1550	0,000645
					ft^2(sq. ft)	10,764	0,0929
volume	**m^3**	m^3	1	1	ft^3(cu. ft)	35,315	0,0283
	$10^{-3}m^3 = dm^3 = 1$ (litro)	$dm^3 = 1$	1	1	gal US (gallon)	0,264	3,785
time	**s (second)**	s	1	1	sec (second)	1	1
		h (ora)	0,000278	3600	hr (hour)	0,000278	3600
rotation speed	**turn/s**	turn/min	60	0,0167	rpm(rev/min)	60	0,0167
speed	**m/s**	m/s	1	1	fpm(ft/min)	196,85	0,0051
frequency	**Hz (hertz)**	Hz (period/s)	1	1	Hz (cycle/sec)	1	1
mass	**kg(kilogram)**				lb (pound)	2,205	0,454
	g (gram)				gr (grain)	15,432	0,0648
volumetric mass	**kg/m^3**	(**)			lb/ft^3	0,0624	16,018
head capacity	**kg/s**	(**)					
force, weight(*)	**N (newton)**	kgf=kp (kg force)	0,102	9,807	lb (pound force)	0,225	4,448
specific, weight	**(**)**	kgf/m^3			lb/ft^3		
weight capacity	**(**)**	kgf/s			lbf/sec		
volum capacity	**m^3/s**	m^3/h	8600	0,000278	cfm (cu.ft/min)	2118,9	0,000472
	l/h	l/h	1	1	gpm (gal/min)	0,0044	227
force moment, torque (*)	**N-m**	kgf- m	0,102	9,807	lb-ft	0,738	1,356
moment of inertia (MR^2) (*)	**$kg-m^2$**	$kgf-s^2-m$(***)	0,102	9,807	$lb-ft^2$(***)	23,73	0,0421
pressure	**Pa (pascal) = N/m^2**	$kgf/m^2 = mmH_2o$	0,102	9,807	in wg(inch water gage)	0,00401	249,09
	10^5Pa=bar	kgf/cm^2= at (****)	0,0000102	98070	psi (lbf/in^2)	0,000145	6895
		torr = mmHg	0,0075	133,322	lbf/ft^2	0,0209	47,88
stress	**$N-mm^2$ = MPa**	kgf/mm^2	0,102	9,807	psi (lbf/in^2)	145	0,0069
material resistence (*)							
work , energy	**j (joule)**	kgf- m	0,102	9,807	lb-ft	0,738	1,356
		Wh (Watt x hour)	0,000278	3600			
		kcal (calory)	0,000239	4186,7	BTU (British Thermal Unit)	0,000948	1055
mechanic power (*)	**W (Watt)**	HP (Horse power)	0,00136	735,5	BHP (Brake Horse Power)	0,00134	745,7
electric power	**W**	W	1	1	W	1	1
thermic power	**W**	kcal/h	0,86	1,163	BTU/hr	3,413	0,293
temperature	**k (kelvin)**	k (*****)	1	1	°R (Rankine)	1,8	0,555
	° C (celsius)	°C	1	1	°F (fahrenheit)	(*****)	(*****)
specific heat	**j/kg k**	kcal/kgf°C	0,000239	4186,7	BTU/lbf°F	0,000239	4186,7
content of mass heat/heat power	**j/kg**	kcal/kgf	0,000239	4186,7	BTU/lbf°F	0,00043	2326
total heat		kcal/kgf					
content of volumetric heat	**j/m^3**	$kcal/m^3$	0,000239	4186,7	BTU/ft^3	$2,68E^{-5}$	37260
conducivity	**W/m k**	kcal/m h°C	0,86	1,163	BTU in/ft^2 hr °F	6,933	0,14423
					BTU/ft hr °F	0,5778	1,7308
thermic coefficient of trasmission	**W/m^2k**	$kcal/m^2h°C$	0,86	1,163	BTU/ft^2hr °F	0,176	5,679
specific thermical power	**W/m^2**	$kcal/m^2h$	0,86	1,163	BTU/ft^2 hr	0,317	3,1546
dynamics viscosity (*)	**Pa s = N s/m^2**	kgf s/m^2	0,102	9,807	lbf sec/ft^2	0,0209	47,88
		cP (centipoise)	1000	0,001			
kinematics viscosity	**m^2/s**	m^2/s	1	1	ft^2 /sec	10,764	0,0929
		cSt (centistoke)	10^6	10^6			
gas constant	**j/kg k**	m /k	0,102	9,807	ft /°R	0,602	1,661

Multiples and submultiples of SI unities

Multiplication factor	10^{12}	10^9	10^6	10^3	10^2	10^1	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}	10^{-12}	10^{-15}	10^{-18}
Prefix	tera	giga	mega	kilo	etto	deca	deci	centi	milli	micro	nano	pico	femto	atto
Symbol	T	G	M	K	h	da	d	c	m	µ	n	p	f	a

Notes

(*) Conversion factors are valid only if acceleration of gravity has the value g = 9,807 (m/s2) equivalent to 32,17 (ft/sec2)

(**) Specific weight and weight capacity are not considered in SI system: their numeric values in technic system do correspond, respectively, to those of volumetric mass and mass capacity in SI system.

The volumetric mass of the air in standard conditions (t = 20°C; pa = 100.000 Pa) has the value of 1,20/Kg/m3, same as 0,075 lb/ft3 in Anglo-Saxon system.

(***) Technic system prefers dynamic moment PD2 (kgf•m2).

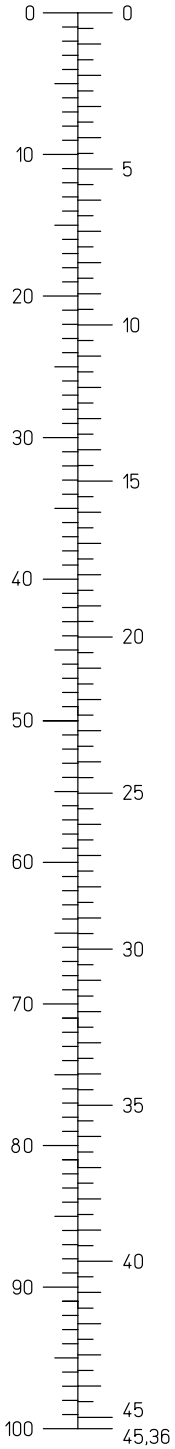
Moment of inertia in SI system results MR2 (Kg•M2) = PD2/4. Anglo-Saxon system uses the fly wheel effect WR2(lb•ft2) = 23,73 MR2

(****) at = metric or technic atmosphere = 736 torr. - atm = normal or physical atmosphere = 760 torr.

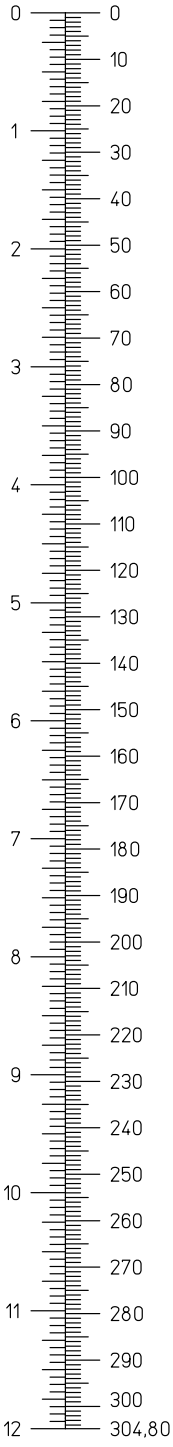
(*****) t (°C) = T(K) - 273,15 t (°C) = 5/9 [t(°F) - 32] - t(°F) = 9/5 t(°C) + 32

CONVERSION TABLE

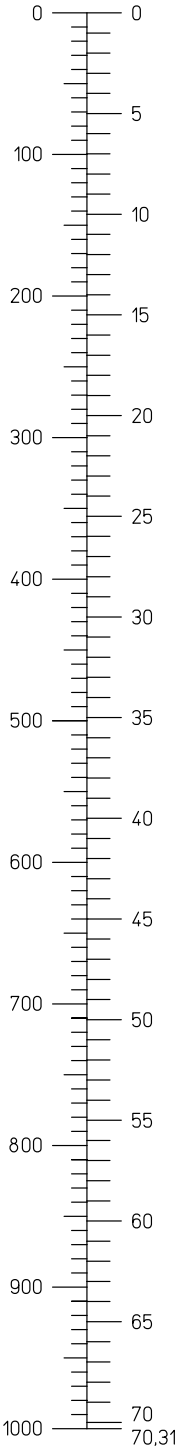
WEIGHT



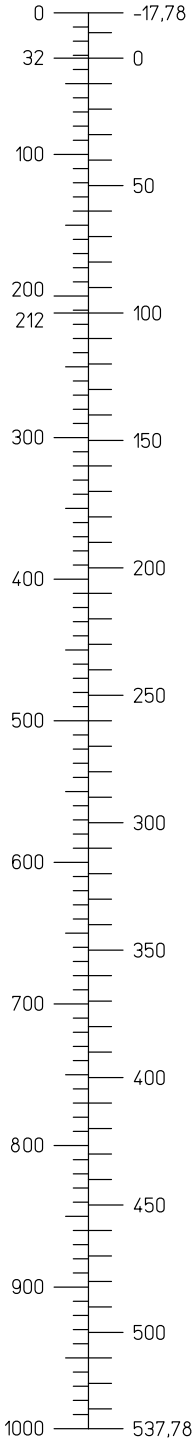
LENGTH



PRESSURE



TEMPERATURE



VOLUME

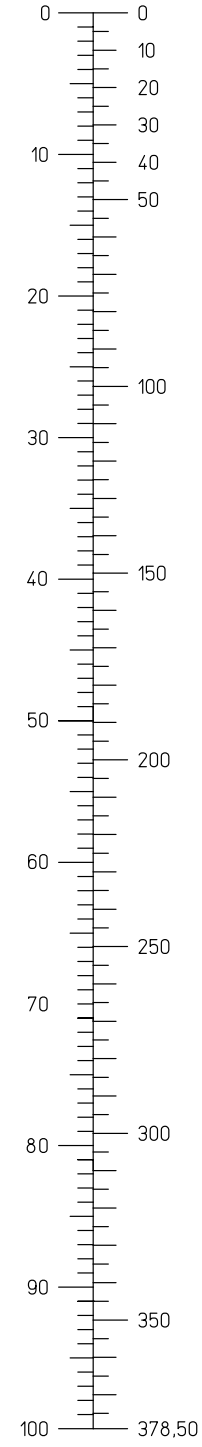


TABLE OF CHEMICAL RESISTANCE

E = EXCELLENT
G = GOOD
P = POOR
N = NOT RECOMMENDED
- = NO INFORMATION

	BRASS	CR-ALLOY	P.T.F.E.	ACETALIC RESIN (copolymer)	FLUOROELASTOMER	BUNA-N (N.B.R.)	A 105 (carbon steel)	AISI 316 (stainless steel)
Acetaldehyde	-	-	E	G	E	N	P	E
Acetic Acid	N	N	E	N	N	G	N	E
Acetic Anhydride	P	N	E	N	N	G	P	G
Acetone	G	G	E	E	N	G	G	E
Acetylene	P	G	E	E	E	G	E	E
Alcohol-amyl	E	N	E	E	G	-	N	E
Alcohol-butyl	E	G	E	E	E	E	G	E
Alumina	G	-	E	E	E	E	N	G
Aluminium Chloride	N	-	E	E	E	E	N	P
Aluminium Fluoride	-	-	N	-	-	E	N	P
Aluminium Sulphate	P	-	E	E	E	E	N	G
Amines	-	P	E	E	N	E	E	E
Ammonia, Anhydrous	E	-	E	-	N	G	G	E
Ammonia, Acqueous	N	N	E	-	N	G	G	E
Ammonium Bicarbonate	-	-	E	E	P	G	P	G
Ammonium Carbonate	-	-	E	E	P	E	G	G
Ammonium Chloride	N	-	E	E	P	E	P	G
Ammonium Hydroxide	N	N	E	E	P	E	G	E
Ammonium Monophosphate	-	N	E	G	P	E	N	E
Ammonium Nitrate	N	-	E	E	P	E	G	G
Ammonium Phosphate	-	N	E	-	-	E	N	G
Ammonium Phosphate (Dibasic)	-	N	E	-	P	E	E	E
Ammonium Phosphate (Tribasic)	-	-	E	-	P	E	G	E
Ammonium Sulphate	N	-	E	E	N	E	P	G
Amyl Acetate	G	N	E	G	N	E	P	G
Aniline Conc.	P	N	E	E	P	P	G	G
Arsenic Acid	-	-	E	E	E	-	N	G
Asphalt Liquid	E	-	E	E	E	E	G	E
Barium Carbonate	E	G	E	E	E	N	G	G
Barium Chloride	N	-	E	E	E	E	P	G
Barium Hydroxide	G	N	E	E	E	E	P	G
Barium Sulphate	E	N	E	E	E	E	G	G
Barium Sulphide	G	G	E	E	E	E	-	-
Beer	G	N	E	E	-	E	P	E
Benzene	E	G	E	E	E	E	G	G
Benzoic Acid	G	-	E	-	E	E	G	G
Borax	E	N	E	E	E	-	G	E
Boric Acid	G	N	E	E	E	E	N	G
Brines	G	G	E	-	-	E	P	G
Bormine (Dry)	E	N	E	-	G	E	N	N
Bromine (Wet)	N	-	E	-	G	N	N	N
Bromine Acid	N	-	E	-	E	N	-	N
Butadiene	-	-	E	E	E	E	G	E
Butane	E	-	E	E	E	E	G	G
Butylene	-	G	E	-	E	E	E	E
Butyrric Acid	P	-	E	E	G	E	P	G
Calcium Bisulphate	G	-	E	-	E	E	N	G
Calcium Carbonate	E	-	E	E	E	E	G	G
Calcium Chloride	N	-	E	E	E	E	P	N
Calcium Hydroxide	G	G	E	E	E	E	G	G
Calcium Hypochlorite	N	G	E	E	E	E	N	N
Calcium Sulphate	E	N	E	E	E	E	P	G
Carbolic Acid	G	G	E	N	E	E	P	G
Carbon Sulphate	E	N	E	-	-	E	G	G
Carbon Sulphide	G	-	E	E	E	N	G	G

	BRASS	CR-ALLOY	P.T.F.E.	ACETALIC RESIN (copolymer)	FLUOROELASTOMER	BUNA-N (N.B.R.)	A 105 (carbon steel)	AISI 316 (stainless steel)
Carbon Tetrachloride (Wet)	P	G	E	E	E	N	N	P
Carbonated Water	P	-	E	E	E	E	-	E
Castor Oil	P	-	E	E	E	E	G	E
Caustics Soda	P	N	E	-	E	E	G	G
Chlorine Gas (Dry)	N	G	E	E	E	E	-	P
Chlorobenzene (Dry)	-	-	E	E	E	P	E	E
Chloroform (Dry)	E	-	E	E	E	N	E	E
Chromic Acid	N	-	E	N	E	E	N	N
Chromic Anhydride	N	-	E	-	-	E	N	N
Citric Acid	P	N	E	-	-	E	N	G
Coal Tar	G	G	E	E	E	P	E	E
Coconut Oil	-	-	E	E	E	E	P	G
Copper Chloride	N	-	E	E	E	E	N	G
Copper Nitrite	P	-	E	E	-	E	N	E
Copper Sulphate	N	N	E	E	E	E	N	G
Cottonseed Oil	E	G	E	E	P	E	P	G
Creosote Oil	E	-	E	E	E	N	G	G
Cresvlic Acid	G	N	E	N	E	-	G	E
Dichloroethan	-	-	E	-	-	P	N	G
Distilled Water	E	-	E	E	G	E	P	E
Etyhl Acetate	E	G	E	E	N	-	G	G
Ethyl Alcohol	E	-	E	E	N	E	G	G
Ethyl Chloride (Dry)	G	-	E	E	E	E	E	E
Ethilene Oxide	E	-	E	E	N	N	G	G
Ferric Chloride	N	N	E	E	E	E	N	N
Ferric Sulphate	N	N	E	E	E	E	N	E
Ferrous Chloride	N	-	E	E	E	E	N	N
Ferrous Sulphate	N	N	E	E	E	E	P	G
Fish Oil	-	-	E	E	E	E	G	E
Flax Oil	G	-	E	-	-	E	E	G
Fluorosilic Acid	N	-	E	-	N	E	N	N
Formaldehyde	P	P	E	E	N	E	N	P
Formic Acid	N	N	E	N	-	E	N	P
Freon	E	-	E	-	E	G	E	E
Fruit Juices	N	P	E	E	E	E	N	E
Fuel Oil	E	G	E	E	E	E	G	E
Furfural	E	G	E	E	N	N	G	G
Gallic Acid	-	G	E	-	G	E	N	G
Gas, Natural	E	-	E	E	E	E	G	E
Gasoline	E	-	E	E	E	P	E	E
Gelatine	G	G	E	E	E	E	N	E
Glucose	E	G	E	E	E	E	G	G
Glycerine	E	G	E	P	E	E	E	E
Glucol Ethylene	G	-	E	-	E	G	E	E
Ground Water	G	-	E	E	P	E	P	E
Hydrobromic Acid	N	-	E	-	-	E	N	N
Hydrocarbons	E	-	E	-	E	E	E	E
Hydrochloric Acid	N	N	E	N	E	E	P	G
Hydrocyanic Acid	N	N	E	-	E	E	P	G
Hydrofluoric Acid	N	P	E	-	E	G	N	N
Hydrogen Peroxide	P	N	E	-	G	E	-	E
Hydrogen (Dry) Sulphide	E	P	E	-	N	-	-	-
Hydrogen (Wet) Sulphide	P	N	E	-	N	-	-	-
Hydrofluosilic Acid	G	-	E	-	E	E	N	P
Hyppochlorate Sodium	P	-	E	-	-	P	N	P

HOSTAFORM: For any information concerning the chemical resistance, please contact ENOLGAS technical department.

NOTE: The tables report the resistance of the materials to chemical corrosion. The data reported are obtained from tables given by the materials manufacturers and are indicative, not binding.
To make sure concerning the practical suitability of materials, one has to consider various factors, such as working conditions, pressure, temperature, time, fluid concentration and eventual dynamic shock.

E = EXCELLENT G = GOOD P = POOR N = NOT RECOMMENDED - = NO INFORMATION	BRASS	CR-ALLOY	P.T.F.E.	ACETALIC RESIN (copolymer)	FLUOROELASTOMER	BUNA-N (N.B.R.)	A 105 (carbon steel)	AISI 316 (stainless steel)
Hypochlorite Sodium	N	-	E	-	-	E	N	P
Hyposulphite Sodium	P	-	E	-	-	E	N	G
Iodoform	-	-	E	E	E	-	N	E
Iso-octane	-	-	E	E	E	E	E	E
Isopropilic Alcohol	-	-	E	E	E	E	G	G
Latic Acid	P	-	E	N	E	E	N	E
Lead Acetate	-	-	E	E	N	E	N	G
Magnesium Chloride	N	G	E	E	E	E	N	G
Magnesium Hydroxide	G	G	E	E	E	E	G	E
Magnesium Oxide	-	-	E	E	E	E	G	G
Magnesium Sulphate	P	G	E	E	E	E	G	G
Maleic Acid	-	N	E	E	E	E	G	G
Malic Acid	-	-	E	E	E	E	N	G
Mercury Salts	N	-	E	-	-	E	-	N
Mercury	N	N	E	E	E	E	G	P
Methane	E	G	E	E	E	E	G	G
Methil Acetate	-	-	E	-	N	N	G	E
Methil Alcohol	E	-	E	E	N	E	G	G
Methil Chloride	G	-	E	-	-	P	N	G
Methil Formate	-	-	E	-	N	P	P	G
Milk	G	P	E	E	E	E	N	E
Mineral Oil	E	-	E	E	E	E	G	E
Mineral Water	G	-	E	E	P	E	P	G
Molasses	G	N	E	-	E	E	-	E
Naphta	G	G	E	E	E	E	G	G
Naphtalene	-	-	E	E	E	-	E	G
Nickel Chloride	P	-	E	E	E	E	N	G
Nickel Nitrate	-	-	E	E	-	E	N	G
Nickel Sulphate	P	G	E	E	E	E	N	G
Nitric Acid 0 To 50%	N	-	E	N	E	G	N	E
Nitric Acid 50 To 90%	N	-	E	N	E	N	N	G
Nitric Acid (Conc.)	N	-	E	N	E	N	N	G
Nitrobenzene	-	G	E	-	G	N	G	G
Nitrogen	E	G	E	E	E	E	E	E
Oleic Acid	P	N	E	E	G	G	P	G
Oleum	-	-	E	N	E	N	G	G
Oxalic Acid	P	P	E	P	E	E	P	G
Oxygen	E	G	E	E	G	E	G	E
Paints	E	-	E	E	E	E	P	E
Paint Solvents	E	-	E	-	G	P	-	E
Palmitic Acid	P	N	E	E	E	G	P	G
Paraffin	E	-	E	E	E	E	E	E
Paraformaldehyde	-	-	E	E	-	G	G	G
Pentane	-	G	E	E	E	E	G	E
Phenol	-	P	E	N	E	G	P	G
Phosphoric Acid	N	-	E	N	E	G	N	N
Phthalic Acid	-	N	E	E	E	P	P	G
Picric Acid	N	-	E	-	E	N	P	G
Pine Oil	-	-	E	E	E	E	G	E
Potassium Bromide	-	-	E	E	E	E	G	G
Potassium Carbonate	P	G	E	E	E	E	G	G
Potassium Chlorate	-	-	E	E	-	E	G	G
Potassium Chloride	P	G	E	E	E	E	N	G
Potassium Cyanide	N	N	E	E	E	E	G	G
Potassium Dichromate	N	N	E	E	E	-	P	G

E = EXCELLENT G = GOOD P = POOR N = NOT RECOMMENDED - = NO INFORMATION	BRASS	CR-ALLOY	P.T.F.E.	ACETALIC RESIN (copolymer)	FLUOROELASTOMER	BUNA-N (N.B.R.)	A 105 (carbon steel)	AISI 316 (stainless steel)
Potassium Diphosphate	-	-	E	E	-	E	E	E
Potassium Disulphite	-	-	E	E	E	E	N	G
Potassium Hydroxide	P	N	E	-	-	E	E	E
Potassium Iodide	-	-	E	E	-	E	P	G
Potassium Sulphate	G	G	E	E	E	E	G	G
Propane	E	G	E	E	E	E	G	G
Pyrogallic Acid	-	N	E	E	E	-	G	G
Salicilic Acid	-	N	E	E	E	E	N	G
Sea Water	P	-	E	E	P	E	N	G
Silver Nitrate	N	-	E	E	E	E	N	G
Soap Solution	G	G	E	-	-	E	G	G
Sodium Acetate	-	-	E	E	P	G	P	G
Sodium Bicarbonate	P	G	E	E	E	E	P	G
Sodium Bisulfate	N	G	E	-	-	E	N	G
Sodium Bisulfite	G	-	E	E	E	E	N	E
Sodium Borate	-	-	E	E	E	E	P	G
Sodium Carbonate	P	P	E	E	E	E	G	G
Sodium Chloride	P	G	E	E	E	E	P	G
Sodium Cyanide	N	N	E	E	P	E	G	G
Sodium Fluoride	-	-	N	E	E	-	N	G
Sodium Hydrate	G	-	E	-	-	E	E	E
Sodium Hydroxide	P	N	E	-	E	E	E	E
Sodium Metalsilicate	-	-	E	-	-	E	P	E
Sodium Nitrate	P	-	E	E	P	E	G	G
Sodium Perborate	-	N	E	E	E	E	G	G
Sodium Phosphate	P	-	E	-	E	E	P	G
Sodium Phosphate(Dibasic)	G	-	E	-	-	E	N	G
Sodium Silicate	G	-	E	E	E	E	G	G
Sodium Sulphate	G	G	E	E	E	E	G	G
Sodium Sulphide	G	N	E	E	E	E	G	G
Sodium Sulphite	G	-	E	E	E	E	G	G
Sodium Thiosulphate	P	N	E	E	E	E	G	E
Soybean Oil	-	G	E	E	E	E	P	E
Steam	P	-	E	N	P	-	E	E
Stearic Acid	P	G	E	E	P	E	P	E
Styrene	-	-	E	-	G	G	E	E
Sulphur Anhydride(Dry)	E	-	E	N	E	E	G	G
Sulphur Anhydride(Wet)	N	-	E	E	E	E	-	P
Sulphur	E	-	E	-	N	E	G	E
Sulphur Dioxide(Dry)	N	G	E	E	N	N	G	G
Sulphuric Acid 0 To 10%	P	-	E	E	E	G	N	P
Sulphuric Acid 10 To 90%	N	N	E	P	E	N	N	P
Sulphuric Acid (Conc.)	N	-	E	N	E	P	G	G
Sulphurous Acid	P	N	E	P	E	N	N	G
Tannic Acid	G	P	E	E	E	E	N	E
Tartaric Acid	P	N	E	E	E	E	N	E
Toluene Or Toluol	E	G	E	E	E	P	E	E
Trichloroacetic Acid	P	-	E	-	-	-	N	N
Trichloroethylene(Dry)	E	-	E	-	G	P	G	G
Trychloroethylene(Wet)	P	-	E	-	G	P	-	-
Turpentine	G	G	E	E	E	N	E	E
Vinegar	N	P	E	-	E	E	N	E
Xylene	-	-	E	-	-	N	G	E
Zinc Chloride	N	N	E	E	E	E	N	G
Zinc Sulphate	N	G	E	E	E	E	N	G

HOSTAFORM: For any information concerning the chemical resistance, please contact ENOLGAS technical department.