



A—No damage after 30 days of constant exposure.

B—Little or no damage after 30 days of constant exposure.

C—Some effect after 7 days of constant exposure. Effects may include: cracking, crazing, loss of strength, discoloration, softening, or swelling. Softening and swelling are reversible in some cases.

D—Not recommended for continuous use. Immediate damage may occur.

"_" Test data unavailable or not applicable.

Formulation	Operating temperature	Resin certification(s)	Durometer	Chemical resistance summary						Permeability (approx)† Units: {cc-mmsec-cm ² -cm Hg } x 10 ⁻¹⁰			
				Acids, weak	Acids, strong	Bases, weak	Bases, strong	Ozone	UV light	CO ₂	H ₂	O ₂	N ₂
Bev-A-Line® IV	-60 to 160°F (-51 to 71°C)	FDA, USP, USDA,	80 (D)	B	D	B	B	D	—	—	—	—	—
Bev-A-Line® V	-60 to 200°F (-51 to 93°C)*	National Formulary	80 (D)	B	B	B	B	D	—	—	—	—	—
Bev-A-Line® XX	-60 to 160°F (-51 to 71°C)	FDA*, NSF*	55 (D)	C	D	C	D	C	A	—	—	—	—
C-FLEX®	-100 to 275°F (-73 to 135°C)	FDA, USP, USDA, GMP	50 (A)	A	A	A	A	—	B	—	—	150	—



Chemfluor® 367	-400 to 450°F (-240 to 260°C)	FDA	58 (A)	A	A	A	A	A	—	—	—	—	—
Copper	-60 to 400°F (-53 to 204°C)	None	—	D	D	C	C	A	A	—	—	—	—
EPDM food- grade; PTFE-lined; wire- reinforced	-40 to 300°F (-40 to 148°C)	FDA, USDA, 3A	—	A	B	A	A	—	—	—	—	—	—
ETFE	-150 to 302°F (-101 to 150°C)	GMP	75 (D)	A	A	A	A	A	A	—	—	—	—
FEP	-454 to 400°F (-270 to 205°C)	FDA, USP, GMP	55 (D)	A	A	A	A	A	A	5.9	1.3	14	2.0
Gum rubber	-15 to 158°F (-26 to 70°C)	GMP	35 (A)	A	D	A	B	C	D	1311	492	307	118



Hypalon®	40 to 220°F (4 to 104°C)	None	70 (D)	—	A	—	—	—	—	—	—	—	—
Kynar®	-40 to 260°F (-40 to 127°C)	FDA, USP, USDA	80 (D)	A	A	A	A	A	A	—	—	—	—
MFA	-103 to 482°F (-75 to 250°C)	USP	59 (D)	A	A	A	A	A	A	—	—	—	—
Norprene®	-75 to 275°F (-60 to 135°C)	GMP	61 (A)	A	B	A	C	A	B	1200	—	80	200
Norprene® food-grade	-60 to 275°F (-51 to 135°C)	FDA, NSF, GMP	61 (A)	A	B	A	C	A	B	1200	—	80	200
Norprene® pressure	-60 to 275°F (-51 to 135°C)	FDA, 3A, NSF	61 (A)	A	B	A	C	A	B	1200	—	80	200
Nylon	-60 to 200°F (-51 to 93°C)	None	—	A	D	A	C	C	D	20	19	5.4	1.1
PEEK	Up to 212°F (Up to	None	—	A	A	A	A	A	A	—	—	—	—



	100°C)												
PFA	-320 to 500°F (-195 to 260°C)	FDA, USP, GMP	60 (D)	A	A	A	A	A	A	—	—	—	—
PFA-450 high-purity	-320 to 500°F (-195 to 260°C)	FDA, GMP	60 (D)	A	A	A	A	A	A	—	—	—	—
PharMed®	-75 to 275°F (-59 to 135°C)	FDA, USP, NSF, GMP	64 (A)	A	B	A	C	A	B	1200	—	80	200
Polyethylene	-100 to 175°F (-73 to 80°C)	FDA, USDA	50 (D)	A	D	B	B	B	A	280	—	60	20
Polyethylene, FEP-lined	-100 to 175°F (-73 to 80°C)	FDA, GMP	—	A	A	A	A	A	A	5.9*	1.3*	14*	2.0*
Polyimide	-418 to 896°F (-250 to 480°C)	USP, NEMA	—	A	A	A	A	A	A	—	—	—	—



Polypropylene	32 to 250°F (0 to 121 °C)	FDA, USDA	75 (D)	A	D	B	B	C	D	90	—	25	4
Polyurethane (clear, aqua- tint)	-40 to 180°F (-40 to 82 °C)	None	95 (A)	B	D	B	B	A	—	395	66	10.5	17.1
Polyurethane (red, green, blue, black)	-70 to 185°F (-57 to 85 °C)	None	95 (A)	B	D	B	B	A	—	395	66	10.5	17.1
PTFE	-400 to 500°F (-240 to 260 °C)	FDA, USP, GMP	50 (D)	A	A	A	A	A	A	6.8	—	—	1.0
PTFE color-coded	-400 to 500°F (-240 to 260 °C)	None	50 (D)	A	A	A	A	A	A	6.8	—	—	1.0
PVC	10 to 140°F (-12 to 60 °C)	None	65 (A)	A	A	A	A	A	A	6.8	—	—	1.0
PVC Bubble®	-5 to 180°F (-21 to 82 °C)	None	55 (A)	A	D	A	D	B	D	1305	—	1345	—
PVC food-	10 to 140°F	FDA, 3A,	65 (A)	A	A	A	A	A	A	6.8	—	—	1.0



grade	(-12 to 60 °C)	USDA											
PVC reinforced	-5 to 180 °F (-21 to 82 °C)	FDA, USDA, NSF, 3A	65 (A)	A	D	A	A	B	D	36	—	36	—
PVC wire-reinforced	25 to 150 °F (-4 to 65 °C)	FDA, USDA, 3A, NSF	70 (A)	A	D	A	A	B	D	36	—	36	—
Silicone, peroxide-cured	-60 to 460 °F (-51 to 238 °C)	FDA, USP, GMP	50 (A)	B	D	A	A	A	—	20,132	6579	7961	2763
Silicone, platinum-cured	-60 to 460 °F (-51 to 238 °C)	FDA, USP, USDA, GMP	50 (A)	B	D	A	A	A	—	20,132	6579	7961	2763
Silicone reinforced, peroxide	-60 to 400 °F (-51 to 204 °C)	FDA, USP, GMP	60 (A)	B	D	A	A	A	—	20,132	6579	7961	2763
Stainless steel, 316	-65 to 550 °F (-53 to 289 °C)	None	—	A	B	A	C	A	A	—	—	—	—
Tygon®, FEP-lined	-40 to 180 °F (-40 to 82 °C)	FDA*, USP*, GMP	67 (A)	A	A	A	A	B	B	5.9*	1.3*	14*	2.0*



Tygon® fuel/lubricant	-35 to 165°F (-37 to 74 °C)	GMP	57 (A)	B	C	C	D	A	A	100	—	12	22
Tygon® food/beverage	-49 to 165°F (-45 to 74 °C)	FDA, NSF, 3A	63 (A)	A	B	A	B	B	D	270	—	30	60
Tygon® high-purity	-94 to 125°F (-70 to 52 °C)	FDA, USP, GMP	72 (A)	A	C	A	A	B	B	745	—	135	45
Tygon® high-purity reinforced	-94 to 125°F (-70 to 52 °C)	FDA, NSF, GMP	72 (A)	A	C	A	A	B	B	745	—	135	45
Tygon® lab; vacuum	-58 to 165°F (-50 to 74 °C)	FDA, GMP	55 (A)	A	D	A	D	B	D	360	—	40	80
Tygon® LFL	-58 to 165°F (-50 to 74 °C)	FDA, USP, GMP	56 (A)	A	A	A	B	—	—	—	—	—	—
Tygon® pressure	-47 to 165°F (-44 to 74 °C)	FDA, 3A, NSF	65 (A)	A	A	B	A	—	—	2700	—	600	300
Tygon® sanitary silicone pres.	-112 to 320°F (-51 to 160 °C)	FDA, USP, NSF, GMP	70 (A)	B	D	A	A	A	—	—	—	—	—
Tygon®	-112 to 392°F	FDA, USP,	50 (A)	A	C	A	A	B	B	—	—	—	—



silicone	(-80 to 200 °C)	NSF, GMP											
Tygon® ultra chemical-resistant	-108 to 125°F (-78 to 52°C)	GMP	72 (A)	A	C	A	A	B	B	4840	—	980	350
Tygothane® pressure	-100 to 180°F (-73 to 82°C)	FDA, NSF	82 (A)	C	C	B	D	A	—	1680	—	180	60
Vinyl	-45 to 180°F (-43 to 82°C)	GMP	67 (A)	A	D	A	A	C	D	360	—	40	80
Viton®	-25 to 400°F (-32 to 204°C)	GMP	75 (A)	A	A	C	D	A	A	79	—	15	4.3

*Based on liner

†At 25°C

Bev-A-Line—Reg TM Thermoplastic Processes, Inc.

Bubble—Reg TM Sherwood Medical Industries Inc.

Chemfluor, Norprene, PharMed, Tygon, Tygothane—Reg TM Norton Performance Plastics Corp.

C-FLEX—Reg TM Consolidated Polymer Technologies, Inc.



Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.

Kynar, Superflex—Reg TM Elf Atochem North America

PTFE—Reg TM E. I. DuPont de Nemours & Co.