



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS						SEAL RINGS				O-RINGS					NOTES			
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N		Aflas	Kalrez	
ACETALDEHYDE				1	1					1	1					4	1	4				
ACETAMIDE															3	1	1	1				
ACETIC ACID		10%	70	1	1	2	1	1	1	2	1	1	1	1	1	1	1	2	4	1		
ACETIC ACID		100%	70	2	2	1	1	2	1	3	1	2	2	1	1	4	1	4	4	1		Double seal
ACETIC ACID		70%	428	3	3	1	1	3	2	3	1	1	2	1	1	4	3	4	4	1		Double seal
ACETIC ACID (GLACIAL)		94%	80	2	2	1	1	2	1	3	1	1	3	1	1	4	1	4	4	1		Double seal
ACETIC ACID AMINE		100%	80	1	1	1	1	1			1	1	1	1	1	3	1	1				
ACETIC ANHYDRIDE		100%	212	1	1	1	1	1	4	1	1	2	1	1	1	4	2	4	2	1		Double seal
ACETIC ANHYDRIDE		100%	70	1	1	3	1	1	4	1	1	1	1	1	1	4	2	4	2	1		Double seal
ACETIC ANHYDRIDE		30%	180	2	2	1	1	1	1		1	2	1	1	1	4	2	4	2	1		Double seal
ACETIC ANHYDRIDE		70%	180	1	2	1	1	1	2	1	1	2	1	1	1	4	2	4	2	1		Double seal
ACETONE		100%	<200	1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	4	1		Double seal
ACETONITRILE				1	1	1					1			1		3	1	3		1		Double seal; toxic
ACETOPHENONE				1	1	1	1	1	1	1	1	1	1	1	1	4	1	4		1		
ACETYL ACETONE				1	1	1	1	1	2	1	1	1	1	1	1	4	1	4	4	1		
ACETYL CHLORIDE				1	2	1	1	2	1		3		1	1	1	1	4	4		1		Double seal
ACETYLENE GAS		100%	80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		Double seal
ACETYLENE LIQUID				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
ACETYLENE TETRABROMIDE				3	1	1	2	1	4	1	1	1	2	1	1	1	1	4	1			
ACROLEIN											1			1		4	1	3				
ACRYLIC ACID		>5%		1			1	1			1		1	1	1	4	4		1			
ACRYLONITRILE		100%	<100	1		1	1	1	1	1	1	1	1	1	1	4	4	4	1			Double seal; toxic
ADIPIC ACID		100%	200	1			1	2	1	2	1	1	2	1	1	2	2	2	2			
AEROZENE			140	1							1	2		1	1	4	1	3		1		
ALKAZENE											1	1		1	1	1	4	4		1		
ALKYD RESINS				1	1	1	1	1	1	1	1			1	1	1	1	1				
ALKYL ARYLSULFONIC ACID		100%	10	1	1	1		1	4		1	1	2	1	1	4	1	3		1		Double seal
ALKYL BENZENE				1	1	1	1	1	1		1	1	1	1	1	1	4	3		1		
ALKYL BENZENE SULFONATE				1	1	1	1			1	1	1	1	1	1	4	4		1			
ALKYLATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
ALLYL ALCOHOL				1	1	1	1	1			1	1	1	1	1	2	1	1		1		Double seal; toxic
ALLYL AMINE				2	2	1	1	1	1	1	4	1	1	1	1	4	1	1				Double seal; toxic
ALLYL CHLORIDE			80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		Double seal; toxic
ALPHA-PICOLINE				1		1	1	1			1	1	1	1	1	4	1	1	1			
ALUMINUM CHLORATE				3	3	1	3	4	1	2	4		1	1	1	1	1	1	1	1		
ALUMINUM CHLORIDE		10%	<125	3	3	3	1	4	4	3	1	1	3	2	3	1	1	1	1			
ALUMINUM CHLORIDE		>20%	212	3	3	3	1	4	4	3	1	1	3	2	3	1	1	1	1			
ALUMINUM HYDROXIDE				*	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1			
ALUMINUM NITRATE				2	2				1		1	1	1	1	1	1	1	1	1			
ALUMINUM POTASSIUM SULFATE				1	1	1	1	1	1	1	1	1	1	1	1	4	1	1				
ALUMINUM SULFATE, AQUEOUS				1	1	2	1	1	3	3	1	1	2	1	1	1	1	1				
AMINES, MIXED				1	1	1	1	1	1	1	1	1	1	1	1	4	2	4	1	1		
AMMONIA ANHYDROUS (LIQUID)		100%	>65	1	1	1	1	1	1	2	1	1	1	1	1	4	1	2		1		Double seal
AMMONIA BRINE			216								4	1	1	4	1	4	1					Double seal
AMMONIA GAS			<200	1	1	1	1	4		1	1	1		1	1	4	1	2	1	1		Double seal
AMMONIUM BICARBONATE				2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1			
AMMONIUM BISULFIDE		HI%	<225	1	1	1	1	1		1	1	3	1	1	1	4	1	1	1			
AMMONIUM BROMIDE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
AMMONIUM CARBONATE				1	1	1	1	2	1	2	1	1	2	1	1	1	1	4	1	1		
AMMONIUM CHLORIDE			80	4	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1			
AMMONIUM HYDROXIDE		HI%	>70	*	1	2	1	4	1	1	1	1	1	1	2	4	2	4	1	1		Double seal
AMMONIUM NITRATE		<20%	<400	1	1	4	2	4	1	3	1	1	2	1	1		1	1	1	1		
AMMONIUM NITRATE		>30%	<200	1	1	4	3	4	1	3	1	1	3	1	1		1	1	1	1		
AMMONIUM PERCHLORATE				2	2	4	3		1		4	1		1								Double seal; explosive
AMMONIUM PERSULFATE		10%		2	1	4	1	4	2	4	1	1	3	1	1	1	1	1	1			Double seal
AMMONIUM PHOSPHATE		30%	<200	2	2	2	2	2	1	2	1	1	1	1	1		1	1	1			
AMMONIUM SULFATE		<10%	<200	1	2	2	2	1	1	2	1	1	2	1	1	1	1	1	1			
AMMONIUM SULFIDE		HI%	<225	1	1		1	1		1	1	3	1	1	1	4	1	1	1			
AMMONIUM SULFITE		ANY	<200	1	1		1	3		4	1	1	4	1	1	1	1	1	1			
AMMONIUM THIOCYANATE			<180	1	1	1	1	1		2	1	1	2	1	1	1	1	1	1			
AMYL ACETATE				1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	4	1		Double seal
AMYL ALCOHOL			<160	1	1	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1		Double seal
AMYL CHLORIDE		ANY	150	1	1	1	1	1		1	1	1	2	1	1	1	4	4		1		
AMYL CHLORONAPHTHALENE														1		1	4	3		1		
AMYL NAPHTHALENE														1		1	4	4				
AMYL NITRATE				1							1	1	1	1	1	1	1	1	1			
ANHYDROUS HYDRAZINE				1							1			1	1	4	2	4		1		Double seal
ANHYDROUS HYDROGEN FLUORIDE				1	1	1	1	1	1	1	1	4		1	1	1	2	4	2			Double seal
ANILINE				1	1	1	1	1	1	1	1	1	3	1	1	2	2	4	1			Double seal
ANILINE DYES				1	1	2	2	2	1	2	1	1	4	1	1	2	2	4		1		Double seal



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES		
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N		Aflax	Kalrez
ANILINE HYDROCHLORIDE				4	1	4	4	2	1	2	1	1	3	1	1	3	2	4	1	Double seal	
AQUA REGIA	HI%	ANY		4	4	4	4	4	1	4	4	1	4	1	3	1	4	4	1	Outside seal	
ARSENIC ACID	ANY	80		1	1	1	1	4	2	4	1	1	4	1	1	1	1	1	1	Double seal	
ARSENIC TRIOXIDE	<40%	<180		1	1	1	1	4		4	1	1	4	1	1	2	2	1	1	Double seal	
ASKAREL		<120		1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	1		
ASPHALT EMULSION				1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	Double seal	
BARIUM CHLORIDE	<5%	<100		1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1		
BARIUM CHLORIDE	>10%	>100		*	1	1	1	2	1	2	1	1	3	1	1	1	1	1	1		
BARIUM HYDROXIDE	<50%	<220		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal; toxic	
BARIUM NITRATE	<40%	>100		1	1	3	1	3	1	4	1	1	3	1	1	1	1	1	1	Double seal	
BARIUM SULFIDE				1	1			3	2	1	1	1	1	1	1	1	1	1	1		
BATTERY ACID	95%	80		4	1	2	1	4	4	4	2	1	4	1	2	1	3	4	1	Outside seal	
BEER	ANY	100		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
BEER WORT				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
BEET SUGAR	HI%	200		1	1			1	1	1	1	1	1	1	1	1	1	1	1		
BENZALDEHYDE		<200		1	1	1	1	1	1	1	1	1	2	1	1	4	1	4	2	1	Double seal
BENZENE	100%	<220		1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	3	1	Double seal
BENZENESULFONIC ACID	LOW%	60		1	1	1	1	1	1	4	1	1	4	1	1	1	4	4	1		
BENZOCHLORIDE													1			1	1	1	4		
BENZOIC ACID	ANY	<212		1	1	1	1	1	1	1	1	1	2	1	1	*	4	4	1	Double seal	
BENZOL	100%	<220		1	1	1	1	1	1	1	1	1	1	1	1	*	4	4	1	Double seal	
BENZOPHENONE													1			1	2	4	1		
BENZYL ALCOHOL				1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	1	1	
BENZYL BENZOATE													1			1	2	4	1	Double seal	
BENZYL CHLORIDE				1	1	1		1		1		1	1	1	1	4	4	1	1	Double seal	
BISPHENOL A													1							Double seal	
BLACK LIQUOR (HEAVY)	>50%	>212		1	1		2	1			1	2	1	1	1	1	1	2	1	Double seal	
BLACK LIQUOR (WEAK)	<40%	<180		1	1		1	1		1	1	1	1	1	1	1	1	2	1		
BLEACHING SOLUTIONS				1			1				3	1		1	1	1	3	1	1		
BLOOD				1							2	1	1	1	1	1	1	3	1		
BOILER FEED WATER	100%	<250		1							1	1	1	1	1	2	1	3	1	1	
BORAX				1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	1		
BORIC ACID	12%	<180		1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1		
BORIC ACID	12%	>180		1	2	1	1	2	1	2	*	4	4	1	1	2	1	1	1		
BORIC ACID	2%	<180		1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1		
BORON TRICHLORIDE				1	1	1	1	1	1	1	1	1	1	1	1	1	4	2			
BRINE, CALCIUM CHLORIDE	<30%	ANY		3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
BRINE, CALCIUM CHLORIDE	>30%	ANY		4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
BRINE, SEA WATER	<24%	<70		3	3		1		1	1	1	1	1	1	1	1	1	1	1		
BRINE, SODIUM CHLORIDE	<24%	<70		3	3		1		1	1	1	1	1	1	1	1	1	1	1		
BROMINE		<200		4	4	1	1	4	1	4	3	1	4	1	1	1	4	4	1	1	Outside seal
BROMINE TRIFLUORIDE				4							4					4	4	4	2	Double seal; toxic	
BROMOCHLOROTRIFLUOROETHANE													1			1	4	4	4	1	
BROMOMETHANE				1	1	2	2	1	1	1	1	1	1	1	1	1	3	3	1		
BUNKER "C" FUEL OIL	100%	>400		1	1	1	1	1	1	1	1	3	1	1	1	1	4	2	1		
BUTADIENE				1	1						1	1	1	1	1	1	4	4	1	Double seal	
BUTANAL	100%	<80		1	1	1	1	1	1	1	1	1	1	1	1	4	2	4	1	Double seal	
BUTANE	100%	<200		1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	Double seal	
BUTANOL	100%	<300		2	2	2	2	2	2	2	1	2	2	1	1	1	2	1	1	Double seal	
BUTYL ACETATE				1	1	1	1	1	1	1	1	1	1	1	1	4	2	4	4	1	Double seal
BUTYL ACRYLATE																1	4	4	4	1	
BUTYL ALCOHOL	100%	<300		2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	Double seal	
BUTYL AMINE	ANY	ANY		1	1	1	1	1	1	1	1	1	1	1	1	4	3	3	1	Double seal	
BUTYL BUTYRATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1		
BUTYL CARBITOL				1												3	1	4	1		
BUTYL CELLOSOLVE				1							1					4	1	3	1		
BUTYL ETHER				1							1					4	3	2	4	1	
BUTYL OLEATE				1							1					1	2	4	1		
BUTYL PHTHALATE	ANY	<170		1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1		
BUTYL STEARATE				1	1	1	1	1	1	1	1					1	4	2	1	1	
BUTYLENE				1	1	1	1	1	1	1	1	1	1	1	1	1	4	3	1	Double seal	
BUTYRALDEHYDE	100%	LOW		1	1	1	1	1	1	1	1	1	1	1	1	4	2	4	1	Double seal	
BUTYRIC ACID	100%			1	1	1	1	1	1	1	1	1	1	1	1	2	4	4	1	Double seal	
CALCINE LIQUORS															1	1	1	1			
CALCIUM ACETATE	<50%	<212		2		1	1	1	1	2					1	4	1	2	1	1	
CALCIUM BISULFIDE	<50%	100		1	3		1				1	1		1	1	2	1	2	1		
CALCIUM BISULFITE	<90%	<400		1	1	2	1	4	1	4	1	1	4	1	1	1	3	1	1		
CALCIUM CARBONATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
CALCIUM CARBONATE SLURRY	<90%	>70		1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1		
CALCIUM CHLORATE	>5%	>70		1	1	2	1	1	1	1	*	1	2	1	1	1	1	1	1	Double seal	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS						SEAL RINGS				O-RINGS				NOTES					
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP		Buna-N	Aflas	Kalrez		
CALCIUM CHLORATE, AQUEOUS				1	1	2	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	Double seal
CALCIUM CHLORIDE		>30%	ANY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
CALCIUM CYANIDE				1	1	1	1	1	1	1			1		1	1	1	1	1	1	1	1	
CALCIUM HYDROXIDE		<20%	<150	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
CALCIUM HYDROXIDE		>30%	>175	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	Double seal
CALCIUM HYPOCHLORITE				1	1	4	1	4	1	4	4	1	4	1	1	1	1	4	1	1	1	1	Double seal
CALCIUM NITRATE				1		1					1	1		1	1	1	1	1	1	1	1	1	
CALCIUM PHOSPHATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
CALCIUM SULFATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
CALCIUM SULFIDE				1	1									1			1	1	1	1	1	1	
CAPROIC ACID													1									2	
CAPROLACTAM			>AMB	1							1	1					4	3	4			1	
CARBAMATE											1			1			1	2	3			1	
CARBITOL ACETATE				1							1			1	1		2	4	4			1	
CARBOLIC ACID											1			1			1	2	4			1	
CARBON BISULFIDE		100%	ANY	1	1	1	1	3	1	3	1	1	3	1	1	1	1	4	3			1	Double seal
CARBON DIOXIDE, DRY				1	1	1	1	1	1	1	1	1		1	1	1	1	2	1			1	Double seal
CARBON DIOXIDE, WET				1	1	1	1	1	1	1	1	1		1	1	1	1	2	1			1	
CARBON DISULFIDE		100%	ANY	1	1	1	1	3	1	3	1	1	3	1	1	1	1	4	3	1		1	Double seal
CARBON MONOXIDE				1	1	1	1	1	1	1	1	1		1	1	1	1	1	1			1	Double seal; toxic
CARBON TETRACHLORIDE				1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	4	4	1	1	Double seal; toxic
CARBONIC ACID PHENOL											1			1	1	1	1	2				1	
CARBONIC ACID, AQUEOUS				1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1		1	
CASEIN				1	1	1	1	1	1	1	1			1	1	1	1	2	1			1	
CASTOR OIL				1							1	1		1	1	1	1	2	1			1	
CAUSTIC POTASH		>10%	<160	1	1	1	1	1	1	1	3	4	2	1	4	4	1	2	1			1	
CAUSTIC SODA		<50%	<210	1	1	1	1	1	1	1	1	3	2	1	4	4	2	3				1	
CAUSTIC SODA		>50%	<210	2	1	1	1	1	1	1	1	4	3	1	4	4	2	3				1	
CELLOSOLVE				1	1	1	1	1	1	1	1	1		1	1	4	2	4	1			1	
CELLOSOLVE ACETATE				1	2	2	2	1	2	1	1			1	1	4	2	4				1	
CHLORAL		LOW%	100	1							1	1		1	1	3	3	4				1	Double seal; toxic
CHLORIC ACID		<20%	<140	4	1	4	1	4	1	4	4	1	3	1	4	1	4					1	Double seal
CHLORINATED SOLVENTS (DRY)				1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4			1	
CHLORINATED SOLVENTS (WET)				1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4			1	
CHLORINATED WATER			<200	4	4	2	1	4	1	4	2	1	4	1	1	4	3	4				1	
CHLORINE (DRY)		100%	80	1	1	1	1	1	4	3	1	1	3	1	1	1	2	4				1	Double seal
CHLORINE (WET)				4	4	4	1	3	1	4	2	1	3	1	1	1	3	4	1			1	Double seal
CHLORINE DIOXIDE		<15%	LOW	4	4	2	1	4	1	4	2	1	4	1	1	1	4	4				1	
CHLORINE TRIFLUORIDE											4					4	4	4				2	
CHLOROACETALDEHYDE				2	2	2	2	2	1	1	1	2	1	1	1	4	1	4				1	Double seal
CHLOROACETIC ACID		>70%	<140	1	3	1	1	2	1	2	1	1	3	1	1	4	2	4				1	
CHLOROACETONE		100%		2	2	2	2	1	1	2	1	1	2	1	1	4	1	4	4			1	
CHLOROBENZENE				1	1	1	1	1	1	1	1	1		1	1	1	4	4	4			1	
CHLOROBROMOMETHANE											1			1		1	2	4				1	
CHLOROBUTADIENE											1			1		1	4	4				1	
CHLORODODECANE											1			1		1	4	4				1	
CHLOROFORM			<220	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4			1	Double seal
CHLOROMETHYL ETHER											1			1		4	3	4	4			1	
CHLORONAPHTHALENE														1		1	4	4				1	
CHLOROPRENE														1								1	
CHLOROSULFONIC ACID		<50%	LOW	4	1	1	1	1	1	1	1	1	3	1	1	4	3	4	1			1	Double seal; toxic
CHLOROTOLUENE				1	1	1					1	1	1			1	4	4				1	
CHOCOLATE		100%	>120	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1			1	
CHROME ALUM		100%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	
CHROMIC ACID		50%	<200	3	2	4	2	4	1	4	4	2	4	1	1	1	3	4	1			2	Double seal
CHROMIC ACID (DILUTE)		10%	<200	3	2		2	3	1	1	4	2	3	1	1	1	3	4	1			1	Double seal
CHROMIC ANHYDRIDE				2	2	4	2	4	1	4	4	3	4	1	1	1	3	4				1	Double seal
CHROMIC HYDROXIDE		100%		2	2	4	3	4	1	3	3	1	3	1	1	1	3	4				1	
CHROMIC OXIDE, AQUEOUS		50%		2	2	4	3	4	4		3	1		1	1	1	2	4				1	
CHROMIUM POTASSIUM SULFATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	
CITRIC ACID			HOT	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1			1	
CLOROX				1	3		1	3	1	4	1	1		1	1	1	1	2	2			1	
COBALTOUS CHLORIDE														1		1	1	1				1	
COCOA BUTTER		HI%	LOW	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1				1	Double seal
COCONUT OIL		100%		1	1	1	1	1	1	1	1	1	1	1	1	1	2	1				1	
COKE OVEN GAS			LOW	1	1												1	4	4			1	
CONDENSATE		100%	110	1	1	1	1	4	1	3	1	3	1	1	1	2	1	1				1	
COPPER ACETATE				1	1	1	1	3	1	1	1	1	1	1	1	4	1	4				1	
COPPER AMMONIUM ACETATE				1	1	1	1	1	1	1	1	1	1	1	1	4	1	4				1	
COPPER CHLORIDE				4	4	1	1	4	1	4	1	2	4	1	1	1	1	1				1	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

	1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES				
					316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N		Aflas	Kalrez		
COPPER CYANIDE			HI%	<240	1	1	1	1	1	4	1	4	1	1	4	1	1	1	1	1	1	1	1	Double seal
COPPER CYANIDE			LOW%	HOT	1	1	1	1	4	1	4	1	4	1	1	4	1	1	1	1	1	1	1	Double seal
COPPER NITRATE					1	1	4	1	4	1	4	1	1	3	1	1	1	1	1	1	1	1	1	Double seal
COPPER SULFATE			35%	80	1	1	1	1	3	1	3	1	1	3	1	1	1	1	1	1	1	1	1	Double seal
CORN OIL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	
COTTONSEED OIL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	
CREOSOLS					1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	
CREOSOTE, COAL TAR					1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	
CRESYLIC ACID					1	1	1	1	3	1	1	1	1	1	1	1	1	1	4	4	1	1	1	Double seal; toxic
CROTONALDEHYDE					1	1	1	1	1	1	1	1	1	1	1	1	3	1	4	1	1	1	1	
CRUDE ARSENIC			ANY	80	1	1	1	1	4	2	4	1	1	4	1	1	1	1	1	1	1	1	1	Double seal
CRUDE OIL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	
CUPRIC (COPPER) CHLORIDE			>5%	>100	4	4	1	1	4	1	4	1	1	4	1	1	1	1	1	1	1	1	1	
CUPRIC SULFATE					1	1	1	1	3	1	3	1	1	3	1	1	1	1	1	1	1	1	1	Double seal; toxic
CUPROUS ACETATE,AMMONIACAL					1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	
CUTTING OIL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	
CYANIC ACID																								
CYANOGEN					1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	Double seal; toxic
CYANOGEN CHLORIDE			100%		2	2	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	Double seal; toxic
CYCLOHEXANE					1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	2	1	1	1	Double seal
CYCLOHEXANONE			100%		1	1	1	1	1	1	1	1	1	1	1	4	2	4	2	1	1	1	1	Double seal
CYCLOHEXENE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
CYMENE (PARA-)																								Double seal
DE-BUTANIZER REFLUX					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	
DE-ETHANIZER CHARGE					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	
DECALIN																								
DECANE-n																								
DEIONIZED WATER (AERATED)			100%	>AMB	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	
DEIONIZED WATER (NO AIR)			100%	>AMB	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	
DEMINERALIZED WATER			100%	>AMB	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DENATURED ALCOHOL			ANY	80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
DI(2-ETHYLHEXYL)AMINE			100%		1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	1	1	1	
DI-n-BUTYLAMINE					1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1	1	1	
DIACETIN					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	
DIACETONE ALCOHOL					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	Double seal
DIAMINE			ANY		1	1	3	1	4	1	4	1	4	1	1	3	1	2	1	1	1	1	1	Double seal
DIAMINOETHANE					1	1	1	4	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	Double seal
DIAZINON																								
DIBENZYL SEBACATE																								
DIBROMOETHYL BENZENE					1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	
DIBUTYL CELLUSOLVE ADIPATE					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	Double seal
DIBUTYL ETHER					1	1	1	1	1	1	1	1	1	1	1	3	3	4	1	1	1	1	1	Double seal
DIBUTYL PHTHALATE					1	1	1	1	1	1	1	1	1	1	1	3	1	4	1	1	1	1	1	Double seal
DIBUTYL SEBACATE																								
DICHLOROBENZENE					1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	
DICHLOROBUTANE					1	1	1	1	1	1	2	1	1	2	1	1	4	2	1	1	1	1	1	Double seal
DICHLOROETHANE			100%		1	1	1	1	1	1	3	1	1	2	1	1	4	4	1	1	1	1	1	
DICHLOROISOPROPYL ETHER																								
DICYCLOHEXYLAMINE																								
DIESEL FUEL			100%		1	1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	1	1	1	
DIESTER LUBRICANT					1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1	1	
DIETHANOLAMINE				HOT	1	1	1	1	1	1	3	1	1	2	1	1	4	1	3	1	1	1	1	
DIETHYL CARBONATE					1	1	1	1	1	1	1	1	1	1	1	1	3	4	1	1	1	1	1	Double seal
DIETHYL ETHER			ANY	>180	1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1	1	1	Double seal; toxic
DIETHYL MALEATE																								
DIETHYL SEBACATE																								
DIETHYL SULFATE																								
DIETHYLAMINE			100%	<170	1	1	1	1	1	1	2	1	1	1	1	4	2	3	1	1	1	1	1	Double seal
DIETHYLBENZENE																								
DIETHYLENE GLYCOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
DIETHYLENE TRIAMINE					1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	1	1	1	Double seal
DIFLUORODIBROMOMETHANE																								
DIHYDROXYPROPANE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DIISOBUTYL KETONE			100%	ANY	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	Double seal
DIISOBUTYLENE																								
DIISOCTYL SEBACATE																								
DIISOPROPYL BENZENE																								
DIISOPROPYL ETHER					1	1	1	1	1	1	1	1	1	1	1	4	4	2	1	1	1	1	1	Double seal
DIISOPROPYL KETONE			100%	ANY	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	
DIMETHYL PHTHALATE					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS						SEAL RINGS				O-RINGS				NOTES		
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP		Buna-N	Aflas
DIMETHYL SULFOXIDE DMSO	100%	LOW		1	1	1	1	1	1	1	2	1	1	1	4	3	1	1	1	
DIMETHYL TEREPHTHALATE	100%	300		1	1	1	1	1	1	1	1	1	1	1	1	2	4	1	1	
DIMETHYLANILINE				1	1	1	1	1	1	1		1	1	1	4	2	4	1	1	Double seal
DIMETHYLBENZENE	99%	<200		1	1	1	1	1	1	1	1	1	1	1	2	4	4	1	1	Double seal
DIMETHYLFORMAMIDE	100%	ANY		1	1	1	1	1	1	1	1	1	1	1	4	2	3	1	1	Double seal
DIMETHYLHYDRAZINE	100%	ANY		1	1	1	1	1	1	1	1	1	1	1	4	1	3			Double seal; toxic
DIMETHYLKETONE	100%			1	1	1	1	1	1	1	1	2	1	1	4	1	4	1	1	Double seal
DIMETHYLMETHANE				1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	Double seal
DIMETHYLPHENOL													1		1	4	4	1	1	Double seal; toxic
DINITROBENZENE															1	4		1	1	
DINITROCHLOROBENZENE																	1			
DINITROGEN TEXTROXIDE															4	4	4	1	1	
DINITROTOLUENE	100%			1						1	1	1	1	1	4	4	4	1	1	Double seal
DIOCTYL AMINE										1			1	1	4	1	3			
DIOCTYL PHTHALATE				1		1		1	1	1			1	1	2	2	4	1	1	
DIOCTYL SEBACATE													1		2	2	4	1	1	
DIOXANE				1	1	1	1	1	1	1			1	1	4	1	4	4	1	
DIOXITOL				1	1	1	1	1	1	1	1	1	1	1	1	2	2		1	Double seal
DIPENTENE										1			1	1	1	4	2	1	1	
DIPHENYL	100%	ANY		1		1	1	1	1	1	1	1	1	1	1	4	4	2	1	Double seal
DIPHENYL OXIDES				1		1	1	1	1	1					1	4	4	2	1	
DIPHENYL, CHLORINATED															1	4	4		1	
DIPROPYLENE GLYCOL				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DIVINYL BENZENE	55%									1			1	1	1	4	4			
DOWTHERM "A"	100%	450		1	1	1	1	1	1	1	4	1	1	1	1	3	4	1	1	
DOWTHERM 209	50%									1			1		3	4	4	1	1	
DOWTHERM E	100%	LOW		3	3	1	1	3	1	3	1	1	3	1	1	1	4	4	1	
EPICHLOROHYDRIN				1	1	1	1	1	1	1			1	1	4	3	4	1	1	Double seal
EPSOM SALT	<45%			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ETHANAMIDE				1			1	1							2	1	1	1	1	
ETHANE				1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	Double seal
ETHANOIC ACID	100%	70		1	1	1	1	2	1	4	1	1	4	1	4	1	4	1	1	Double seal
ETHANOL	99%	>78		1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	Double seal
ETHANOL	ANY	>200		3	1	1	1	1	1	2	1	1	2	1	3	1	1	1	1	Double seal
ETHANOLAMINE	100%	ANY		1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	1	Double seal
ETHER	100%			1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	Double seal
ETHYL ACETATE	100%	<212		1	1	1	1	1	1	2	1	1	3	1	4	2	4	4	1	Double seal
ETHYL ACETOACETATE				1							1	1			4	2	4	1	1	
ETHYL ACRYLATE				1		1	1		1	1	1	1	1	1	4	2	4	1	1	Double seal
ETHYL ALCOHOL	ANY	>200		1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1	Double seal
ETHYL AMYL KETONE											1									Double seal
ETHYL BENZENE	100%	150		1	1	1	1	1	1	1	1	1	1	1	1	4	4	2	1	Double seal
ETHYL BENZOATE				1							1	1		1	1	4	4	3	1	
ETHYL CELLOSOLVE				1					1		1	1	1	1	1	4	3	4	1	
ETHYL CELLULOSE													1	1	4	2	2	1	1	
ETHYL CHLORIDE				1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	Double seal
ETHYL CHLOROCARBONATE											1		1	1	1	4	4	1	1	
ETHYL ETHER				1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	Double seal
ETHYL FORMATE											1		1	1	1	2	4	1	1	
ETHYL HEXANOL				1	1					1	1	1		1	1	1	1	1	1	Double seal
ETHYL HEXANOL										1	1	1		1	1	1	1	1	1	Double seal
ETHYL MERCAPTAN	100%	ANY		1	1	1	1	1	1	2	1	1	3	1	1	2	4	4	1	Double seal
ETHYL OXALATE															1	4	4	1	1	Double seal
ETHYL PENTACHLOROBENZENE															1	4	4	1	1	
ETHYL SILICATE														1	1	1	1	1	1	Double seal
ETHYLENE				1		1	1	1	1	4	1	1	1	1	1	4	1	1	1	Double seal
ETHYLENE BROMIDE				1	1	1	1	1	1	1	1			1	1	3	4	1	1	
ETHYLENE CHLORIDE	100%			1	1	1	1		1	1	1	1	1	1	1	4	4	1	1	Double seal
ETHYLENE CHLOROCARBONATE																				
ETHYLENE CHLOROHYDRIN				1	1						1	1		1	1	2	4	1	1	
ETHYLENE CYANOHYDRIN	100%	ANY		2	2	2	2		1	2	1	1		1				1	1	Double seal
ETHYLENE DIAMINE	100%	ANY		1	1	1	4	1	1	1	1	1	1	1	4	1	1	1	1	Double seal
ETHYLENE DICHLORIDE		80		1	1	1	1	1	1	3	1	1	2	1	1	3	4	2	1	Double seal
ETHYLENE GLYCOL	<99%	>AMB		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ETHYLENE OXIDE		<100		1	1	1	1	1	1	1	2	1	1	1	4	3	4	2	1	Double seal; toxic
ETHYLENE TRICHLORIDE											1			1	1	3	4	1	1	
ETHYLENEDIAMINETETRAACETIC ACID (EDTA)				1							1	1		1	4	2	3	1	1	
FATTY ACID, TALLOW				1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	
FERRIC CHLORIDE	<40%			4	4	3	3	4	1	4	4	1	4	1	1	1	1	1	1	Double seal
FERRIC HYDROXIDE				1	2	2	2	1	1	1	1	1		1	1	1	1	1	1	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

	1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES
					316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N	
FERRIC NITRATE			<50%		1	1									1	1	1	1		
FERRIC SULFATE			<30%	<200	1	1	4	1	1	1	4	1	1	3	1	1	1	1	1	1
FILMOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FLUORINE, GAS			<99%		1	1	2	1	1	1	1	4	1	3	1	2	1	1	4	2
FLUOROLUBE					1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
FLUOSILICIC ACID			10%	100	1	1	1	1	1	4	1	1	3	2	1	2	1	1	1	2
FLUOSILICIC ACID			>10%	>100	1	1	2	2	1	4	2	1	3	2	1	2	1	1	1	2
FLUOSULFONIC ACID			50%	>70	2	1	1	1	1	1	1	1	1	1	1	3	2	3	1	1
FORMALDEHYDE			ANY	HOT	1	1	1	1	1	1	1	1	1	2	1	1	4	2	3	1
FORMIC ACID			<10%	<200	1	1	1	1	1	3	1	1	1	1	1	1	4	1	3	2
FREON 11			100%	-20	1						1	1	1	1	1	4	4	1	4	
FREON 112			100%	80	1	1	1	1	1	1	1	1	1	1	1	1	4	4	2	2
FREON 113 W/REFRIGERANT OIL					1	1	1	1	1	1	1	1	1	1	1	2	4	1	2	
FREON 114 W/REFRIGERANT OIL					1	1	1	1	1	1	1	1	1	1	1	4	4	1	2	
FREON 12			100%	-35	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	
FREON 121 W/REFRIGERANT					1	1	1	1	1	1	1	1	1	1	1				1	
FREON 22 W/REFRIGERANT OIL					1			1	1	1	1	1	1	1	1	2	4	4	1	
FRUIT JUICES					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
FUEL OIL					1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1
FUEL OIL #1, 2, 3, 4					1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1
FUEL OIL #6, #5			100%	<400	1	1	1	1	4	1	4	1	3	3	1	1	1	4	2	2
FUMARIC ACID											1			1		1	2	1	1	
FURFURAL				ANY	1	1	1	1	1	1	1	1	1	1	1	4	3	4	2	1
FURFURALDEHYDE				ANY	1	1	1	1	1	1	1	1	1	1	1	4	3	4	1	
FURFURYL ALCOHOL					1	1		1	1	1	1			1	1	3	2	4	1	
GASOLINE			100%	ANY	1	1	1	1	1	1	1	1	1	1	1	1	4	1	3	1
GELATIN					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GLAUBERS SALT			<30%	<230	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GLUCOSE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GLUE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
GLYCERINE				<250	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	
GLYCEROL					1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	
GLYCOL ETHER					1	1	1	1	1	1	1	1	1	1	1	3	1	2	1	
GLYCOLS					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GREASE, PETROLEUM					1						1			1	1	1	4	1	1	
GREEN LIQUOR				>180	1	1	1	1	1	1	4	1	2	3	1	2	2	1	2	1
GYPSUM					1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
HEPTANE			100%		1	1	1	1	1	1	1	1	1	1	1	1	4	1	3	1
HEXANE					1	1	1	1	1	1	1	1	1	1	1	1	4	1	2	1
HEXONE					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	
HEXYL ALCOHOL					1	1	1	1	1	1	1			1	1	1	2	3	1	
HEXYLENE GLYCOL					1	1	1	1	1	1	1			1	1	1	3	1	1	
HOT WATER			100%	<400	1	1					1	2	1	1	1	3	1	1	2	
HYDRAULIC OIL (PETROL BASE)					1	1	1	1	1	1	1	1	1	1	1	2	4	1	1	
HYDRAZINE					1						1	1		1	1	4	1	2	2	1
HYDRO-LUBE WATER/GLYCOL															1	1	1	1	1	
HYDROBROMIC ACID			20%	<200	4	4	1	1	4	1	4	1	1	4	1	1	1	4	1	
HYDROCARBONS (SATURATED)											1			1	1	1	4	1	1	
HYDROCHLORIC ACID			<1%	<160	4	4	1	1	1	1	1	1	3	1	1	1	2	3	1	1
HYDROCHLORIC ACID			<20%	<200	4	4	2	4	4	4	4	1	1	3	1	1	2	2	1	1
HYDROCHLORIC ACID			>20%	>AMB	4	4	2	3	4	4	4	1	4	1	1	2	3	4	1	1
HYDROCYANIC ACID				<120	1	1	1	1	1	1	3	1	1	3	1	1	1	2	1	
HYDROFLUORIC ACID			40%	<200	4	4	1	1	1	4	4	*	1	4	1	4	+	3	3	1
HYDROFLUORIC ACID			<30%	<200	4	1	1	1	1	4	4	*	1	4	1	4	+	3	3	1
HYDROFLUORIC ACID			<70%	<120	4	4	1	1	1	4	1	*	1		1	4	+	3	4	1
HYDROFLUOSILICIC ACID			<50%	<120	1	1	1	1	1	4	4	1	3	2	1	2	1	1	1	2
HYDROGEN CHLORIDE GAS					1	1	1	1	1	1	1	1			1	1	1	3	1	
HYDROGEN CYANIDE				<120	1	1	1	1	1	1	3	1	1	3	1	1	1	1	2	1
HYDROGEN PEROXIDE			<30%	80	1	1	1	1	1	1	2	1	1	2	1	1	2	4	1	1
HYDROGEN PEROXIDE			>30%	>120	1	1	1	1	1	1	4	4	1	4	1	1	1	4	4	1
HYDROGEN SULFIDE			100%	HOT	1	2	1	1	4	1	4	1	2	3	1	1	3	2	4	1
HYDROGEN SULFIDE			5%	100	1	1	1	1	4	1	4	1	2	3	1	1	1	4	1	1
HYDROQUINONE					1	1	1	1	1	1	1			1	1	2	3	4	1	
HYDROXYACETIC ACID					1	1	1	1	1	1	1	1	1	3	1	1	2	1	2	2
HYDYNE											1			1	1	4	1	2	1	
HYPOCHLOROUS ACID					4	4	1	1	4	1	4	1	1	4	1	1	1	2	4	1
IODINE			>5%	>200	4	4	4	1	4	2	4	4	1	3	1	2	1	2	2	1
IODINE PENTAFLUORIDE												4				4	4	4	2	
IODOFORM					1	1	4	4	3	1	1	1	1	1	1	1	2	4	1	
ISO(DO)DECANE					1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

	1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES			
					316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N		Aflas	Kalrez	
ISO-BUTYL METHYL KETONE			100%		1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1		
ISOBUTANE			100%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	
ISOBUTYL ALCOHOL			100%	ANY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	
ISOBUTYLENE					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	
ISOCTANE			100%		1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	1	
ISOPENTANE			100%		1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	
ISOPHORONE					1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	2	1	1	
ISOPROPANOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ISOPROPYL ACETATE			100%	ANY	1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	Double seal
ISOPROPYL ALCOHOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
ISOPROPYL CHLORIDE					1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	
ISOPROPYL ETHER					1	1	1	1	1	1	1	1	1	1	1	1	4	4	2	4	1	1	Double seal
ISOPROPYLAMINE			100%		1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	Double seal
JET FUEL				80	1	1	1	1	1	1	1	1	3	1	1	1	1	4	1	1	1	1	
KEROSENE			100%	>AMB	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	
KETCHUP					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LACTIC ACID			<10%	HOT	1	1	1	1	4	1	4	1	1	4	1	1	1	1	3	1	1	1	
LATEX					1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	Double seal
LATEX PAINT				<100	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	
LAVENDER OIL					1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1	
LEAD ACETATE, LIQUID			100%		1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	
LEAD NITRATE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LIME BLEACH					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LIME SULPHUR					1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	
LIME WATER					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LIMESTONE			<90%	>70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LINDOL					1	1	1	1	1	1	1	1	1	1	1	1	3	1	4	1	1	1	
LINOLEIC ACID					1	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1	
LINSEED OIL			100%	180	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	
LIQUID OXYGEN			100%	LOW	1	1	1	1	1	3	1	1	1	1	1	1	4	4	1	1	1	1	Double seal
LIQUID PETROLEUM GAS			100%		1	1	1	1	1	1	1	1	2	1	1	1	4	1	1	1	1	1	
LITHIUM BROMIDE BRINE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LITHIUM CHLORIDE, AQUEOUS					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
LITHIUM HYDROXIDE					2	2	2	2	2	2	2	*	1	3	1	2	2	1	4	1	1	1	
LUBE OILS (PETROLEUM BASE)			100%		1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	
LYE			>10%	<160	1	1	1	1	1	1	1	*	4	2	1	2	3	1	2	1	1	1	
MAGNESIUM CHLORIDE			<50%	<220	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MAGNESIUM HYDROXIDE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MAGNESIUM NITRATE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MAGNESIUM SULFATE			>45%	HOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MAGNESIUM SULFATE, AQUEOUS			<45%	212	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MAGNESIUM SULFITE					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MALEIC ACID					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	Double seal
MALEIC ANHYDRIDE					1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	Double seal
MALIC ACID			ANY	<212	*	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	
MANGANESE SULFATE, AQUEOUS					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MANNITOL			100%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MERCAPTANS					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
MERCURIC CHLORIDE			DIL	ANY	1	1	4	1	4	1	3	1	1	3	1	1	1	1	1	1	1	1	Double seal
MERCURY					1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	Double seal
MERCURY BICHLORIDE			DIL	ANY	1	1	4	1	4	1	3	1	1	3	1	1	1	1	1	1	1	1	Double seal
MESITYL OXIDE					1	1	1	1	1	1	1	1	1	1	1	1	4	2	4	4	1	1	Double seal
METHANE					1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	
METHANOL					1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	1	1	1	Double seal
METHYL ACETATE					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	
METHYL ACRYLATE					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	Double seal
METHYL ALCOHOL			ANY	<212	1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	1	1	1	Double seal
METHYL BROMIDE					1	1	2	2	1	1	1	1	1	1	1	1	3	3	1	1	1	1	Double seal
METHYL BUTYL KETONE			100%		1	1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	Double seal
METHYL CELLOSOLVE			<99%	>AMB	1	1	1	1	1	1	1	1	1	1	1	4	2	3	1	1	1	1	Double seal
METHYL CHLORIDE					1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	Double seal
METHYL CHLOROFORM					1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	1	1	
METHYL CYANIDE					1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	1	1	
METHYL DIOXITOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
METHYL ETHER					1	1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	Double seal
METHYL ETHYL KETONE (MEK)			100%	<200	1	1	1	1	1	1	1	1	1	1	1	4	1	4	4	1	1	1	Double seal
METHYL FORMATE					1	1	1	1	1	1	1	1	1	1	4	1	4	1	1	1	1	1	
METHYL ISOBUTYL CARBINOL (MIBC)					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
METHYL ISOBUTYL KETONE (MIBK)			100%	100	1	1	1	1	1	1	1	1	1	1	4	3	4	4	1	1	1	1	Double seal
METHYL ISOPROPYL KETONE					1	1	1	1	1	1	1	1	1	1	4	3	4	1	1	1	1	1	Double seal



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

	1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS						SEAL RINGS				O-RINGS				NOTES			
					316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP		Buna-N	Aflas	Kalrez
METHYL METHACRYLATE				80	1	1				1	1	1	1	1	1	4	4	4	1	Double seal		
METHYL OLEATE																1	2	4				
METHYL SALICYLATE					1	1	1	1	1	1				1	1	2	2	4	3	1		
METHYL-T-BUTYL ETHER (MTBE)					1						1		1	1	1	4	1	1	4	1		
METHYLCYCLOPENTANE											1	1	1	1	1	1	4	4		1		
METHYLENE CHLORIDE OR "DI-"	100%	>200			1	1	1	1	1	1	2	1	1	3	1	1	2	4	4	2	1	Double seal, toxic
METHYLENE CHLORIDE OR "DI-"	<80%	80			*	1	1	1	1	1	1	1	1	2	1	1	2	4	4	2	1	Double seal, toxic
MINERAL OIL					1	1	1	1	1	1	1	1	1	1	1	1	4	1				
MINERAL SPIRITS	100%	LOW			1	1	1	1	1	1	1	1	1	1	1	1	4	1				
MIXED SULFURIC & NITRIC ACID					2	1			4		4	4	1	3	1	2	4	1	4		1	Double seal
MOLASSES					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
MONOBROMOBENZENE																1	4	4	2			
MONOCHLOROACETIC ACID	40%	>140			4	3	2	2	2	2	2	1	1	3	1	1	3	2	4		1	Double seal
MONOCHLOROACETIC ACID	>70%	<140			1	3	1	1	2	1	2	1	1	3	1	1	3	2	4		1	
MONOCHLOROBENZENE					1	2	1	1	2	1	2	1	1	1	1	1	4	4		1		
MONODIETHANOLAMINE (MDEA)	100%	<250										1		1	1	1	4	2	2		1	
MONOETHANOLAMINE	100%	<220			1	1	1	1	1	1	1	1	1	1	1	4	2	2	1	1		
MONOMETHYL ANILINE																2	3	3		1		Double seal; toxic
MONOVINYL ACETYLENE																						
MURIATIC ACID	<20%	<200			4	4	2	4	4	4	4	*	1	3	1	1	1	2	2		1	Outside seal
N-BUTYL BENZOATE												1			1	1	1	4		1		
NAPHTHA	100%	<200			1	1	1	1	1	1	1	1	1	1	1	2	4	1	1	1		
NAPHTHALENE					1	1	1	1	1	1	1	1	1	1	1	1	4	4	2	1		
NAPHTHENIC ACID	ALL	<290			1	1	1	1	1	1	1	1	1	1	1	1	4	3	1	1		Double seal
NATURAL GAS (LNG)		80			1	1	1	1	1	1	1	1	1	1	1	1	4	1				
NEOPENTYL GLYCOL																						
NICKEL ACETATE												1	1		1	1	4	1	2		1	
NICKEL NITRATE	100%	>70			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	
NICKEL PLATING SOLUTION	ANY	<200			1							1	1	3	1	1	1	1	1		1	
NICKEL SULFATE	<10%	<212			1	1	4	1	2	1	1	1	1	1	1	1	1	1	1		1	
NICKEL SULFATE	>30%	<212			1	1	4	1	3	1	1	1	1	1	1	1	1	1	1		1	
NITRATING ACIDS					2	1	1	1	4		4	4	1	3	1	2	4	1	4		1	Double seal
NITRIC ACID	100%	>120			4	4	4	2	4	1	4	*	1	4	1	2	2	4	2	1		Outside seal
NITRIC ACID	20%	<160			1	1	1	1	4	1	4	*	1	4	1	2	1	3	4	2	1	Outside seal; acid-rst Viton
NITRIC ACID	70%	<210			1	1	4	2	4	1	4	*	1	4	1	2	1	4	4	1	~	Outside seal; acid-rst Viton
NITRIC TETROXIDE					3	3	1	1	1			4	1		1	2	1				1	Double seal
NITROBENZENE					1	1	4	1	1	1	1	1	1	1	1	4	2	4	1	1		Double seal
NITROETHANE												1			1	1	4	2	4	2	1	
NITROGEN TETROXIDE					1	1	1	1	1	1	1					4	3	4		1		Double seal
NITROMETHANE		<200			1	1	1	1	1	1	4	1		3	1	1	4	2	4	1		Double seal
NITROPROPANE		<200			1	1	1	1	1	1	1	1			1	1	4	2	4	2	1	
NUT OIL					1							1	1	1	1	1	4	1			1	
NUTRASWEET					1							1	1	1	1	1					1	
OAKITE (ACIDIC)	100%	>80										1	1	1	1	1	1	4	4			
OAKITE (CAUSTIC)	100%	80			1							1	1	1	1	3	1	2				
OCTACHLOROTOLUENE												1			1	1	4	1		1		
OCTANE-(n)					1							1		1	1	1	4	1		1		
OCTANOL					1	1	1	1	1	1	1	1	1	1	1	1	1	1	2		1	
OCTYL-ALCOHOL					1	2	1	1	1	1	1	1	1	1	1	1	1	2		1		
OLEFIN CRUDE												1			1	1	4	1		1		
OLEIC ACID		<230			1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1		
OLEUM	>99%	<100			2	2	2	2	4	2	4	4	1	4	1	2	2	4	4		1	Outside seal
OLIVE OIL												1	1	1	1	1	2	1		1		
ORTHO-PHOSPHORIC ACID	HI%	<350			1	1	1	1	3	3	4	1	1	3	1	1	2	1	4		1	Double seal
ORTHOCHLOROETHYLBENZENE												1			1	1	1	4	4		1	
ORTHODICHLOROBENZINE												1			1	1	4	4		1		
OXALIC ACID	<50%	<200			1	1	1	1	2	4	2	1	1	1	1	1	1	4		1		Double seal
OXALIC ACID	>50%	<20			1	1	1	1	1	1	1	1	1	1	1	1	1	2		1		Double seal
OXYGEN		>150			1	1			1	4		1		1	1	2	4	4		1		
OZONE		<100			1	1			1			4			1	1	1	4		1		
P-TERT BUTYL BENZOIC ACID															1							Double seal
PALMITIC ACID					1	1	1	1	1	1	1	1	1	1	1	1	2	1		1		
PAR-AL-KETONE															1	4	4	4	4			
PARADICHLOROBENZENE					1	1	1	1	1	1	1	1	1	1	1	1	4	4	3	1		
PARA NITROPHENOL															1							Double seal
PARACYMENE												1			1	1	4	4		1		Double seal
PARAFFIN					1	1	1	1	1	1	1	1	1	1	1	1	4	1		1		
PARAFORMALDEHYDE	ANY	ANY			1	1	1	1	1	1	1	1	1	1	1	3	1	2		2		Double seal
PARANITRANILINE															1							Double seal
PEANUT OIL					1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1		



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES	
			316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP	Buna-N		Aflas
PECTIN, LIQUOR			1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PENTACHLOROPHENOL			1		1	1				1	1	1	1	1	1	3	4	1	Double seal
PENTANE			1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PEPPERMINT OIL			1	1	1	1	1	1	1	1	1	1	1	1	1	4			
PERCHLORIC ACID	10%	80	4	4	4	1	4	4	4	4	1	4	1	1	1	2	4	1	Double seal
PERCHLORIC ACID	70%	80	4	1	4	1	4	4	4	4	1	4	1	1	3	3	4	2	Double seal
PERCHLOROETHYLENE			1	1	1	1	1	1	1	1	1	1	1	1	1	4	3	1	
PETROL			1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PETROLATUM			1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PETROLEUM ETHER			1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PETROLEUM OIL (CRUDE)			1		1	1	4	1	1	1	1	1	1	1	1	4	1	1	
PHENOL	>10%	100	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	Double seal
PHENYL ACETATE	100%	100	1	1	1	1	X	X	1	1	1	1	1	1	3	2	4	1	
PHENYL BENZENE													1		1	4	4	1	
PHENYL ETHYL ETHER													1		4	4	4	1	
PHENYL HYDRAZINE	10%		1	1	1	1	1	1	3				1		1	3	4	1	
PHENYLACETIC ACID			2	1	1	1	1	1	1	1			1	1	3	1	4	1	
PHORONE													1		4	2	4	1	
PHOSGENE GAS			*		1	1	1	1	1	1			1	1	4	1	4	1	
PHOSPHATE ESTERS													1		4	1	4	1	
PHOSPHATE TRIBUTYL													1					3	
PHOSPHATE TRICRESYL													1					1	
PHOSPHATE TRIPHENYL													1					1	
PHOSPHORIC ACID (AERATED)	<80%	212	3	2	2	1	4	4	4	1	2	4	1	1	1	2	4	1	
PHOSPHORIC ACID (AERATED)	<80%	<175	2	1	1	1	4	4	4	1	1	3	1	1	1	2	4	1	
PHOSPHORIC ACID (AIR FREE)	<50%	<220	2	1	1	3	4	4	4	1	1	4	1	1	1	2	4	1	Double seal
PHOSPHORUS TRICHLORIDE		80	1	1	2	1	1	1	1	4	1	1	1	1	1	1	4	1	
PHTHALATE DIBUTYL													1					2	
PHTHALATE DIOCTYL													1					2	
PHTHALIC ANHYDRIDE	100%	>270	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	1	Double seal
PICKLING SOLUTION			3	1	2	2	4	4	4	1			1	1	3	3	4	1	
PICRIC ACID (H2O SOLUTION)	ANY	<200	1	1	1	1	4		4	1	1	4	1	1	1	2	2	1	Double seal
PICRIC ACID (MOLTEN)			1	1	1	1	4	1	4	1	1	4	1	1	2	3	4	2	Double seal
PINE OIL		>150	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	
PINENE													1		1	4	2	1	
PIPERIDINE													1		4	4	4	1	
PLASTICIZER										1			1	1	1	1	4	1	
PLATING SOLUTION, CHROMIUM			1	1	3	1		4		*	2	1	1	1	1	1	4	1	
PNEUMATIC SERVICE										1	1		1	1	1	1	1	1	
POLY GLYCEROL										1			1					1	
POLY VINYL ACETATE			1	1	1					1	1	1	1	1	4	1	1	1	Double seal
POLY VINYL ALCOHOL										1			1	1	1	1	1	1	
POLY VINYLIDENE CHLORIDE													1					1	
POLYBUTADIENE													1					1	
POLYETHYLENE TEREPHTHALATE													1					1	
POLYGLYCOL			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POLYISOBUTYLENE													1					1	
POLYISOPRENE													1					1	
POLYMETHACRYLATE RESIN													1					1	
POLYPROPYLENE			1							1	2	1	1	1	1	1		1	
POLYSTYRENE			1	1	1	1	1	1	1	1			1	1				1	
POTASH ALUM			1	1	3	1		1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM ACETATE			1	1	1	1	1	1	1				1		3	1	2	1	
POTASSIUM BICARBONATE	30%	80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM BICHROMATE	20%	80	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	
POTASSIUM BROMIDE	30%	<200	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM CARBONATE, AQUEOUS			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM CHLORIDE	30%	<200	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM CHROMATE	30%	<200	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	Double seal
POTASSIUM CUPROCYANIDE			1	1	1	1	1	1	1	1	1		1	1	1	2	1	1	Double seal
POTASSIUM DICHROMATE	<30%	<212	1	1	4	1	1	1	1	4	1	2	1	1	1	1	1	1	Double seal; toxic
POTASSIUM DICHROMATE	>60%	>150	1	1	4	2	2	2	2	4	1		1	1	1	2	2	1	
POTASSIUM FLUORIDE	<30%	<200	1	1	4	2	1		1	1	4	2	1	4	1	1	1	1	Double seal
POTASSIUM HYDROXIDE	<10%		1	1	1	1	1	1	1	*	3	1	1	4	3	1	2	1	Double seal
POTASSIUM HYDROXIDE	>10%	<160	1	1	1	1	1	4	1	*	3	2	1	4	3	1	2	1	Double seal
POTASSIUM NITRATE, AQUEOUS			1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM PERMANGANATE			1	1	4	1	1	1	1	1	1	1	1	1	2	1	2	1	Double seal
POTASSIUM PHOSPHATE (DI, TRI)		<200	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM PYROPHOSPHATE			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
POTASSIUM SULFATE, AQUEOUS			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS						SEAL RINGS				O-RINGS				NOTES				
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RBSiC	Viton	EP		Buna-N	Aflas	Kalrez	
POTASSIUM SULFIDE				1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1		
PROPANE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PROPANOIC ACID		>5%		1		1		1			1	1	1	1	1	2	1	3		1		
PROPIONALDEHYDE				1	1	1	1	1	1	1	1	1	1	1	4	1	4		1		Double seal	
PROPIONIC ACID			<180	2	2	1	1	3	4	4	1	1	4	1	1	4	1	4	1		1	Double seal
PROPYL ALCOHOL											1	1	1	1	1	1	1	1	1			
PROPYLENE		100%	ANY	1	1	1	1	1	1	1	1	1	1	1	1	4	4		1		Double seal	
PROPYLENE GLYCOL				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	Double seal
PYRIDINE				1	1	1	1	1	1	1	1	1	1	1	4	2	4	2	1			Double seal
PYROGALLIC ACID				1	1	1	1	1	1	1	1	1	2	1	1	1	3	2		1		Double seal
PYROLIGNEOUS ACID			80	1	1	2	2	1	1	1	1	1	1	1	4	2	4		1			
PYROLUBE														1	1	1	2	4	1			
PYRROLE													1	1	4	4	4		1			
RAFFINATE				1		1	1	1		1	1	1	1	1			1					
RED LIQUOR			>150	1	1	1	1	1	1	2	1	1	3	1	1	2	1	2		1		Double seal
RED OIL				1	1	1	1	1	1	1	1	1	1	1	1	1	4	1				
ROSIN		100%	>150	1	1	1	1	1	1	1	1	1	1	1	1	2	1		1			
SALICYLIC ACID			<212	1	1	3	1	2	1	2	1	1	2	1	1	1	1	2		1		
SEWAGE			80	2	1	1	1	1	1	3	1	1	2	1	1	1	1	1	1			
SILICATE ESTERS											1	1	1	1	1	4	2		1			
SILICONE FLUID				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
SILICONE OILS & GREASES				1	1	1		2	1	1	1	1	1	1	1	1	1	1	1			
SILVER NITRATE		<50	<100	1	1	1	1	4	1	4	1	1	3	1	1	1	1	1		1		
SODA ASH		<30%	<200	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1		1		
SODIUM ACETATE		<60%	<200	1	1	1	1	1	1	1	1	1	1	2	4	1	2	1		1		
SODIUM ALUMINATE		ANY	80	1	1	1		1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM BICARBONATE		ANY	LOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM BICARBONATE		LOW%	HIGH	1	1	1	1	1	1	1	1	1	1	1	1	2	2		1			
SODIUM BICARBONATE, AQUEOUS				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM BICHROMATE		ANY	<100	1	1	1	1	1	1	1	2		1	1	1	1	1	1		1		
SODIUM BISULFATE		ANY	<200	2	1	1	1	1	1	1	1	1	1	1	1	2	3		1			Double seal
SODIUM BISULFIDE		ANY	<200	1	1	1	2		1	3	1	1	4	1	1	1	1	1		1		Double seal
SODIUM BISULFITE		ANY	<100	1	1	1	2	1	1	2	1	1	2	1	1	1	1	1		1		Double seal
SODIUM BISULFITE		ANY	>100	1	1	1	2	1	1	3	1	1	3	1	1	1	2	2	1	1		Double seal
SODIUM BORATE				1	1	1	1	1	1	1	1		1	1	1	1	1	2	1	1		
SODIUM CARBONATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
SODIUM CHLORATE		70%	<210	2	2	4	2	1	1	1	1	1	4	1	1	1	1	1		1		Double seal
SODIUM CHLORIDE		<30%	<200	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1			
SODIUM CHLORIDE		>10%	>100	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1			
SODIUM CHLORITE		>20%	<200	1	1	1	1	4	1	4	1	1	4	1	4	4	4	2	1			Double seal
SODIUM CHROMATE				1	1	1	1	1	1	1	*	1	1	1	1	1	1	1		1		Double seal
SODIUM CYANIDE		ANY	HIGH	1	1	2	2	4	2	4	1	1	4	1	1	1	1	1		1		
SODIUM CYANIDE		LOW%	80	1	1	1	1	4	1	4	1	1	3	1	1	1	1	1		1		
SODIUM DICHROMATE				1	1	1	1	1	1	1	4	1	1	1	1	1	1	1		1		Double seal
SODIUM DITHIONITE		ANY	<165	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM GLUTAMATE		100%		1	1	1		1		1	1	1	2	1	1	1			1			
SODIUM HYDROSULFITE		100%	80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM HYDROXIDE #1		>50%	<220	2	2	1	1	1	2	1	1	4	2	1	4	2	1	3	1	1		
SODIUM HYDROXIDE #2		<50%	<210	1	1	1	1	1	1	1	1	3	1	1	4	4	2	3	1	1		
SODIUM HYPOCHLORITE		>5%	80	3	3	4	1	4	1	4	#	1	4	1	1	2	1	3	1	1		Outside seal
SODIUM METAPHOSPHATE				1	1	1	1	1	1	1	*	1	1	1	1	1	2	1				
SODIUM NITRATE											1		1			1	2	1				
SODIUM PHOSPHATE, AQUEOUS				1	1	1	1	1	1	1	*	1	1	1	1	1	1	2	1	1		
SODIUM PLUMBITE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM SILICATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM SULFATE		<30%	<230	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM SULFIDE		<30%	<110	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1		1		
SODIUM SULFIDE		>50%	>170	4	2	2	2	2	1	2	1	1	2	1	1	2	2	1		1		
SODIUM SULFITE		ANY	<165	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM SULFONATES													1									Double seal
SODIUM TETRABORATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SODIUM THIOCYANATE		HI%	>AMB	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		Double seal
SODIUM THIOSULFATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
SOUR (H2S) GAS				1	1	1	1	4	1	4	1	2	3	1	1	4	1	4	1	1		Double seal
SOUR WATER				1	1	1	1	4	1	4	1	2	3	1	1	4	1	4	1	1		Double seal
STANNIC CHLORIDE				4	4	1	1	4	1	4	1	1	4	1	1	1	1	1		1		Double seal
STANNOUS CHLORIDE		<10%	<200	1	1	1	1	1	1	1	1	1	1	1	1	3	1		1			Double seal
STARCH SOLUTION				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
STEARIC ACID				1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1			
STYRENE MONOMER		100%	80	1	1	1	1	1	1	1	1	1	1	1	3	4	4	3	1			Double seal



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES			
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SSSiC	RSiC	Viton	EP	Buna-N		Aflas	Kalrez	
SUCCINIC ACID				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
SUCCINIC ANHYDRIDE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Double seal
SUGAR SOLUTIONS				2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
SULFAMIC ACID				3																		
SULFUR CHLORIDE				2	2	1	1	3	4	1	1	1	1	1	1	1	1	4	4	1	1	Double seal
SULFUR DI-, TRIOXIDE (WET)				1	1	4	1	4	4	4	1	1	4	1	2	2	1	4	1	1	1	Double seal
SULFUR DICHLORIDE																						Double seal
SULFUR, MOLTEN	100%	HOT		1	1	4	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	Double seal
SULFURIC ACID	<5%	<100		1	1	1	1	4	4	4	1	1	4	1	1	1	4	4	1	1	1	
SULFURIC ACID	>95%	<100		1	1	1	1	4	4	4	#	1	4	1	1	1	4	4	1	1	1	
SULFURIC ACID	<40%	<100		4	1	1	1	4	4	4	1	1	4	1	1	1	4	4	1	1	1	
SULFURIC ACID	<95%	<100		2	1	1	1	4	4	4	#	1	4	1	1	1	4	4	1	1	1	Outside seal
SULFURIC ACID, FUMING	103%	80		1				4		4	4	1	4	1	2	2	4	4	1	1	1	
SULFUROUS ACID		<140		2	1	1	1	4	1	4	1	1	4	1	1	1	2	4		1	1	Double seal
TALL OIL	100%	220		1	1	1	1	1	1	1	1	1	1	1	1	1	4	1				
TANNIC ACID		<80		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
TAR, BITUMINOUS	100%	HIGH		1	1	1	1	1	1	1	1	3	1	1	1	1	4	2		1		
TARTARIC ACID		<220		1	1	1	1	3	1	1	1	1	1	1	1	1	3	1		1		
TEREPHTHALEIC ACID	100%	100		1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1		1	Double seal
TERPINEOL				1	1	1	1	1	1	1	1	1	1	1	1	1	3	2		1		
TERTIARY BUTYL ALCOHOL																						
TERTIARY BUTYL MERCAPTAN				1	1	1	1															
TETRABROMOETHANE																						
TETRABUTYL TITANATE																						
TETRACHLOROETHANE																						
TETRACHLOROETHYLENE				1	1	1	1	1	1	1	1	1	1	1	1	1	4	3	4	1		
TETRAETHYL LEAD				1	1	1	1	1	1	1	1	1	1	1	1	1	4	2		1		
TETRAHYDROFURAN (THF)				1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	1	Double seal
TETRALIN				1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1			
TETRAPOTASSIUM PYRPHOSPHATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
THERMINOL(MONSANTO)44,55,66	100%	>400		1																		
TITANIUM DIOXIDE	<35%			1																		
TITANIUM TETRACHLORIDE				1	1	4	1	1	1	1	1	1	1	1	1	1	4	3	2		1	Double seal
TOLUENE	100%	<212		1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	Double seal
TOLUENE DIISOCYANATE																						
TOLUOL	100%	<212		1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	Double seal
TOMATO JUICE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
TOXAPHENE				1		1	1	1	1	1	1	1	1	1	1							
TRANSFORMER OIL				1	1	1	1	1	1	1	1	1	1	1	1	1	4	1		1		
TRIACETIN				1	1	1	1	1	1	1	1	1	1	1	1	4	1	2		1		
TRIARYL PHOSPHATE																						
TRIAZOLE	50%	200		1	1	1	1	1	1	1	1	1	1	1	1	1	3	1		1		
TRIBUTOXYETHYL PHOSPHATE																						
TRIBUTYL MERCAPTAN																						
TRIBUTYL PHOSPHATE																						
TRICHLOROACETIC ACID	<50%	<200		4	3	1	1	1	4	2	1	1	2	1	1	4	2	3	1	1	1	Double seal
TRICHLOROBENZENE				1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1			
TRICHLOROETHANE		4		1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	Double seal
TRICHLOROETHYLENE				1	2	1	1	1	1	1	1	1	1	1	1	1	4	4	4	1	1	Double seal
TRICHLOROFLUOROMETHANE				1																		
TRICHLOROTRIFLUOROETHANE																						
TRICHLORYL BENZENE																						
TRICRESYL PHOSPHATE				2	2	1	1	1	1	1	1	1	1	1	1	2	1	4		1		Double seal
TRITHANOLAMINE	ANY	ANY		1	1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	1	
TRIETHYLAMINE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	Double seal
TRIPOTASSIUM PHOSPHATE				1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1		1	
TRISODIUM PHOSPHATE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	Double seal
TUNG OIL				1																		
TURPENTINE (OIL)	100%	200		1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	3	1	1	Double seal
UCON HYDROLUBES																						
UCON OIL																						
UREA (CARBAMIDE)	<50%	<200		1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1		1	
VARNISH																						
VEGETABLE JUICES				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		
VEGETABLE OIL		>200		1	1	1	1	1	1	1	1	1	1	1	1	2	1		1			
VINEGAR				1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		1		
VINYL ACETATE		80		1	1	1	1	1	1	1	1	1	1	1	1	2	4	4	1	1	1	Double seal
VINYL CHLORIDE GAS	ANY			1																		
VINYL CHLORIDE LIQUID	ANY			1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	1	1	1	Double seal, toxic
VINYL PYRIDINE				1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	1	1	1	Double seal, toxic



ADVANCED SEALING TECHNOLOGY SEAL MATERIAL SELECTION GUIDE

1 Acceptable 2 Use with caution	3 Doubtful 4 Not recommended	Conc	°F	METAL PARTS							SEAL RINGS				O-RINGS				NOTES		
				316	Alloy 20	HastB	HastC	Monel	Titanium	Nickel	Carbon	Alumina	TC	SS316	RS316	Viton	EP	Buna-N		Aflas	Kalrez
VINYL TOLUENE				1	1	1	1	1													Double seal
VITRIOL, OIL OF		5-96	ANY	4	1	1	1	1	4	4	4	*	1	4	1	2	#	4	4	1	Acid-resistant Viton OK
VITRIOL, WHITE		30%	<200	1	1	1	1	1	1	1	1	*	1	2	1	3	1	1	1	1	
WATER, BOILER FEED		100%	<250	1								1	1	1	1	1	2	1	3	1	Viton to 200F
WATER, BRINE				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
WATER, DEIONIZED		100%	>AMB	1	1	2	1	1	1	1	1	*	1	1	1	1	1	1	1	1	
WATER, FRESH				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
WATER, SEA				1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	
WHISKEY & WINES				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
WHITE LIQUOR		20%	310	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	Double seal
WHITE OIL											1			1	1	1	4	1	1	1	
WHITE PINE TAR											1			1	1	1	4	4	1	1	
WHITE WATER			HIGH	1							1	1	1	1	1	1	1	1	1	1	
WOOD ALCOHOL				1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	2	1	
WOOD OIL											1			1	1	1	4	1	1	1	
WORT				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
XYLENE		99%	<140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	3	Double seal
XYLIDINES				1	1	1	1	1	1	1	1			1		4	4	3	1	1	Double seal
XYLOL		99%	<140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	Double seal
ZEOLITES				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
ZINC ACETATE				1												2	1	2	1	1	
ZINC CHLORIDE		70%	<210	1	1	1	1	1	1	1	1	1	3	1	1	1	2	1	1	1	
ZINC NITRATE			<150	1	1	1	1	1	1			1	1	2	1	1	1				Double seal
ZINC OXIDE				1							1			1	1					1	Double seal
ZINC PHENOLSULFONATE				1																1	
ZINC PHOSPHATE						1					1	1		1	1	1	1	1	1	1	
ZINC SALTS																1	1	1	1	1	
ZINC SILICOFLUORIDE		60%	<180	1		4	3	1	2											1	Double seal
ZINC SULFATE		30%	<210	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1

TEMPERATURE RANGES FOR O-RING ELASTOMERS

	°F	°C
Viton (fluorocarbon, fluoroelastomer)	-15 to 400 (to 200 in water)	-26 to 205 (to 100 in water)
EP (EPDM, EPR)	-70 to 300	-57 to 150
Buna-N (Nitrile)	-30 to 250	-34 to 120
Aflas (TFE/propylene copolymer)	-10 to 400	-23 to 205
Kalrez (perfluoroelastomer)	-4 to 550-600	-20 to 288-316

Viton and Kalrez are registered trademarks of DuPont Dow Elastomers.
Hastelloy is a registered trademark of Haynes International, Inc.
Aflas is a registered trademark of Asahi Glass Co., Ltd.

CAUTION: The above data and information are drawn from the open literature and from material manufacturers' data. We do not make any warranty or assume any legal liability or responsibility for its accuracy, completeness, or usefulness, nor do we represent that its use would not infringe upon private rights. Compatibility tests conducted under actual service conditions are recommended. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental, or consequential, arising out of the use of this information or the use of or inability to use the product.