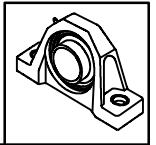


HOW TO ORDER/ NOMENCLATURE



Polymer-Housed Units

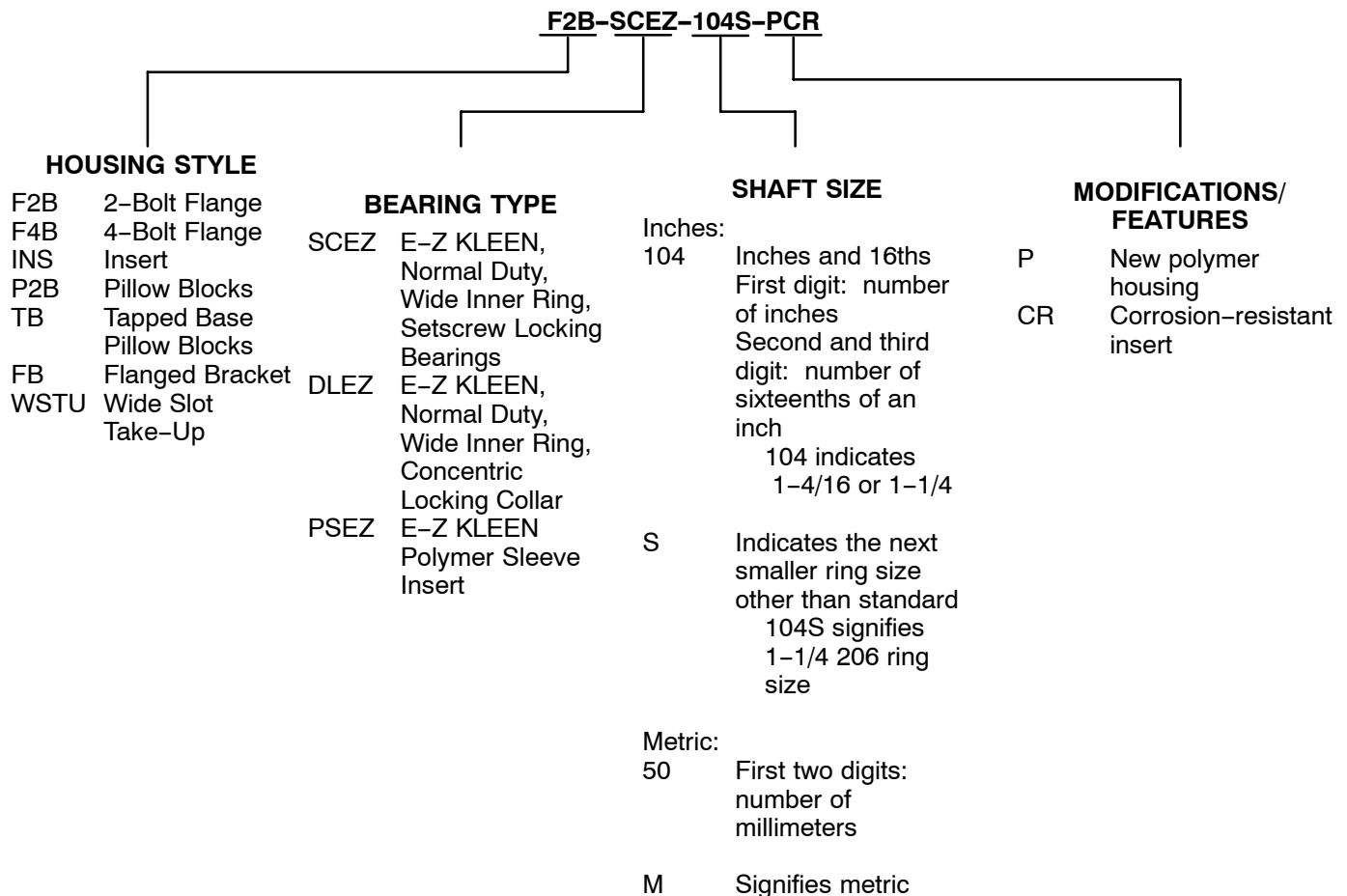
HOW TO ORDER

There are two ways to specify DODGE polymer-housed ball bearings. Most of the product offerings have part numbers with listings shown throughout this brochure. Use of part numbers ensures accurate order processing.

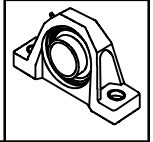
When part numbers are not shown, the product may be specified by description or part name. This method is used when ordering units that include modifications or options. To order by description, use the nomenclature key shown below, and add any special instructions to the end of the description for options not covered by the nomenclature.

NOMENCLATURE

The following is an explanation of the DODGE polymer-housed ball bearing nomenclature system. For example:



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EASY SELECTION

Selection Of DODGE E-Z Kleen Polymer-Housed Ball Bearings

DODGE polymer-housed ball bearings are primarily designed for radial loading. However, they have the capacity to carry thrust loads and combined radial/thrust loads. The maximum recommended load which can be applied is limited by various components in the system, such as bearing, housing, shaft, shaft attachment, speed, and life requirements as listed in this catalog and the instruction manual that accompanies each bearing. DODGE polymer-housed ball bearings have been applied successfully when these limits have been exceeded under controlled operating conditions. Contact DODGE Engineering, 864-297-2800, for applications which exceed these recommendations.

Select a bearing from the Selection Tables that has a radial load rating at the operating speed equal to or greater than the calculated Equivalent Radial Load for a desired (Table 2 for English shaft sizes and Table for metric shaft sizes.) This simple method is all that is required for the majority of general applications and provides for occasional average shock loads.

L₁₀ Hours Life – is the life which may be expected from at least 90% of a given group of bearings operating under identical conditions.

Heavy Service – For heavy shock loads, frequent shock loads or severe vibrations, add up to 50% (according to severity of conditions) to the Equivalent Radial Load to obtain a Modified Equivalent Radial Load. Consult Application Engineering for additional selection assistance.

A maximum thrust load value of C/10 is recommended as a guide for general applications and will give adequate L₁₀ life. If the thrust load exceeds this limit, it is advisable to use auxiliary thrust carrying devices, such as a shaft shoulder, snap ring, or a thrust collar. Where substantial radial load pulls the housing away from the mounting base, both the hold-down bolts and housing must be of adequate strength. Auxiliary load carrying devices, such as shear bars, are advisable for side or end-loading of pillow blocks and radial loads for flange units.

To determine the L₁₀ hours life for loads and RPMs not listed, use the following equation:

$$L_{10} = \left(\frac{C}{P} \right)^3 \times \frac{16667}{n}$$

Where:

- L₁₀ = Life, hours
- C = Dynamics capacity, lbs, (N)
- P = Equivalent Radial Load, lbs, (N)
- n = Rotational speed, RPM

When the load on a ball bearing is solely a radial load with no thrust (axial) load, the Equivalent Radial Load (P) is equal to the actual radial load. However, when the thrust (axial) load is applied, the radial and thrust loads applied must be converted into an Equivalent Radial Load. The use of the X (radial factor) and Y

(thrust factor) from Table 1 convert the actual applied thrust and radial loads to an Equivalent Radial Load, which has the same effect on the life of a bearing as a radial load on this magnitude.

$$P = (X \times F_R) + (Y \times F_A)$$

Where:

- P = Equivalent Radial Loads, lbs
- F_R = Radial load, lbs
- F_A = Thrust load, lbs
- e = Thrust load to radial load factor (Table 1)
- X = Radial load factor (Table 1)
- Y = Thrust factor (Table 1)
- C_O = Basic static capacity (Table 2 or 3)

To find X and Y, first calculate F_A/C_O to determine e. Calculate F_A/F_R, and compare to e to determine the X and Y factors to use from Table 1.

Substitute all known values into the Equivalent Radial Load equation. The Equivalent Radial Load (P) thus determined can be used in the L₁₀ life formula or compared to the allowable Equivalent Radial Load rating desired in the expanded rating chart to select a bearing (Table 2 or 3).

If calculated value of P is less than F_R, use P = F_R.

Table 1

$\frac{F_A}{C_O}$	e	Radial/Thrust Factors			
		If F _A /F _R is equal to or less than e		If F _A /F _R is greater than e	
		F _A /F _R ≤ e		F _A /F _R ≥ e	
		X	Y	X	Y
.014	.19	1	0	.56	2.30
.021	.21	1	0	.56	2.15
.028	.22	1	0	.56	1.99
.042	.24	1	0	.56	1.85
.056	.26	1	0	.56	1.71
.070	.27	1	0	.56	1.63
.084	.28	1	0	.56	1.55
.110	.30	1	0	.56	1.45
.170	.34	1	0	.56	1.31
.280	.38	1	0	.56	1.15
.420	.42	1	0	.56	1.04
.560	.44	1	0	.56	1.00

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EASY SELECTION

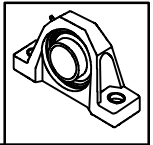


TABLE 2 – EASY SELECTION FOR POLYMER-HOUSED BALL BEARING MOUNTED UNITS – INCH

Load ratings in pounds (lbs)

RING SIZE	SHAFT SIZE	DYNAMIC CAPACITY C ₁ lbs.	STATIC CAPACITY C ₀ LBS	L ₁₀ LIFE HOURS	ALLOWABLE EQUIVALENT RADIAL LOAD RATINGS (lbs) AT VARIOUS RPM*																
					50	150	250	500	750	1000	1500	1750	2000	2500	3000	3500	4500	5000	5500	7500	
204	3/4	2899	1390	20000	740	515	435	345	300	275	240	225	215	200	190	180	165	160	155	140	
				30000	645	450	380	300	260	240	210	200	190	175	165	155	145	140	135	120	
				40000	590	410	345	275	240	215	190	180	170	160	150	145	130	125	125	110	
				60000	515	355	300	240	210	190	165	155	150	140	130	125	115	110	105	95	
				100000	435	300	255	200	175	160	140	130	125	115	110	105	190	95	90	80	
205	7/8 15/16 1	3146	1565	20000	805	560	470	375	325	295	260	245	235	220	205	195	180	175	170	150	
				30000	705	485	410	325	285	260	225	215	205	190	180	170	155	150	145	130	
				40000	640	445	375	295	260	235	205	195	185	175	165	155	140	135	135	120	
				60000	560	385	325	260	225	205	180	170	165	150	140	135	125	120	115	105	
				100000	470	325	275	220	190	175	150	145	135	125	120	115	195	100	100	90	
206	1-1/8 1-3/16 1-1/4	4368	2250	20000	1115	775	655	520	455	410	360	340	325	305	285	270	250	240	235		
				30000	975	675	570	455	395	360	315	300	285	265	250	235	220	210	205		
				40000	885	615	520	410	360	325	285	270	260	240	225	215	200	190	185		
				60000	775	535	455	360	315	285	250	235	225	210	200	190	175	165	160		
				100000	655	455	380	305	265	240	210	200	190	175	165	160	145	140	135		
207	1-1/4 1-3/8 1-7/16	5759	3065	20000	1475	1020	860	685	595	545	475	450	430	400	375	355	330	315	305		
				30000	1285	890	755	595	520	475	415	395	375	350	330	310	285	275	270		
				40000	1170	810	685	545	475	430	375	355	340	315	300	285	260	250	245		
				60000	1020	710	595	475	415	375	330	310	300	275	260	250	230	220	215		
				100000	860	595	505	400	350	315	275	265	250	235	220	210	190	185	180		
208	1-1/2	7332	4005	20000	1875	1300	1095	870	760	690	605	575	550	510	480	455	420	405			
				30000	1640	1135	960	760	665	605	525	500	480	445	420	400	365	355			
				40000	1490	1030	870	690	605	550	480	455	435	405	380	360	330	320			
				60000	1300	900	760	605	525	480	420	400	380	355	330	315	290	280			
				100000	1095	760	640	510	445	405	355	335	320	300	280	265	245	235			
209	1-5/8 1-11/16 1-3/4	7891	4450	20000	2020	1400	1180	935	820	745	650	615	590	550	515	490	450	435			
				30000	1765	1225	1030	820	715	650	570	540	515	480	450	430	395	380			
				40000	1600	1110	935	745	650	590	515	490	470	435	410	390	360	345			
				60000	1400	970	820	650	570	515	450	430	410	380	360	340	310	300			
				100000	1180	820	690	550	480	435	380	360	345	320	300	285	265	255			
210	1-15/16 2	7891	4450	20000	2020	1400	1180	935	820	745	650	615	590	550	515	490	450				
				30000	1765	1225	1030	820	715	650	570	540	515	480	450	430	395				
				40000	1600	1110	935	745	650	590	515	490	470	435	410	390	360				
				60000	1400	970	820	650	570	515	450	430	410	380	360	340	310				
				100000	1180	820	690	550	480	435	380	360	345	320	300	285	265				

*SLIGHT INTERFERENCE FIT REQUIRED WHEN OPERATING TO THE RIGHT OF THE HEAVY LINE OR IN THE SHADED AREA

Note: Because the allowable loads – especially at low speeds – are extremely high, be sure the shaft strength is adequate and the pillow blocks are base loaded. When imposed load is horizontal, be sure hold-down bolts are adequate. If bearings are cap loaded, full details on load, speed, and shaft size should be referred to DODGE Application Engineering.

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EASY SELECTION

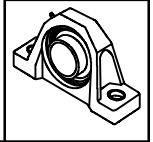


TABLE 3 – EASY SELECTION FOR POLYMER-HOUSED BALL BEARING MOUNTED UNITS – METRIC

Load ratings in Newtons (N)

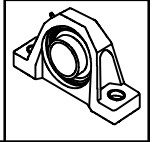
RING SIZE	SHAFT SIZE	DYNAMIC CAPACITY C, N	STATIC CAPACITY C ₀ , N	L ₁₀ LIFE HOURS	ALLOWABLE EQUIVALENT RADIAL LOAD RATINGS (N) AT VARIOUS RPM*															
					50	150	250	500	750	1000	1500	1750	2000	2500	3000	3500	4500	5000	5500	7500
204	20mm	12895	6183	20000	3292	2291	1935	1535	1334	1223	1068	1001	956	890	845	801	734	712	689	623
				30000	2869	2002	1690	1334	1156	1068	934	890	845	778	734	689	645	623	600	534
				40000	2624	1824	1535	1223	1068	956	845	801	756	712	667	645	578	556	556	489
				60000	2291	1579	1334	1068	934	845	734	689	667	623	578	556	512	489	467	423
				100000	1935	1334	1134	890	778	712	623	578	556	512	489	467	400	423	400	356
205	25mm	13993	6961	20000	3581	2491	2091	1668	1446	1312	1156	1090	1045	979	912	867	801	778	756	667
				30000	3136	2157	1824	1446	1268	1156	1001	956	912	845	801	756	689	667	645	578
				40000	2847	1979	1668	1312	1156	1045	912	867	823	778	734	689	623	600	600	534
				60000	2491	1712	1446	1156	1001	912	801	756	734	667	623	600	556	534	512	467
				100000	2091	1446	1223	979	845	778	667	645	600	556	534	512	467	445	445	400
206	30mm	19429	10008	20000	4960	3447	2913	2313	2024	1824	1601	1512	1446	1357	1268	1201	1112	1068	1045	
				30000	4337	3002	2535	2024	1757	1601	1401	1334	1268	1179	1112	1045	979	934	912	
				40000	3936	2736	2313	1824	1601	1446	1268	1201	1156	1068	1001	956	890	845	823	
				60000	3447	2380	2024	1601	1401	1268	1112	1045	1001	934	890	845	778	734	712	
				100000	2913	2024	1690	1357	1179	1068	934	890	845	778	734	712	645	623	600	
207	35mm	25616	13633	20000	6561	4537	3825	3047	2647	2424	2113	2002	1913	1779	1668	1579	1468	1401	1357	
				30000	5716	3959	3358	2647	2313	2113	1846	1757	1668	1557	1468	1379	1268	1223	1201	
				40000	5204	3603	3047	2424	2113	1913	1668	1579	1512	1401	1334	1268	1156	1112	1090	
				60000	4537	3158	2647	2113	1846	1668	1468	1379	1334	1223	1156	1112	1023	979	956	
				100000	3825	2647	2246	1779	1557	1401	1223	1179	1112	1045	979	934	845	823	801	
208	40mm	32613	17814	20000	8340	5782	4871	3870	3380	3069	2691	2558	2446	2268	2135	2024	1868	1801		
				30000	7295	5048	4270	3380	2958	2691	2335	2224	2135	1979	1868	1779	1624	1579		
				40000	6628	4581	3870	3069	2691	2446	2135	2024	1935	1801	1690	1601	1468	1423		
				60000	5782	4003	3380	2691	2335	2135	1868	1779	1690	1579	1468	1401	1290	1245		
				100000	4871	3380	2847	2268	1979	1801	1579	1490	1423	1334	1245	1179	1090	1045		
209	45mm	35099	19794	20000	8985	6227	5249	4159	3647	3314	2891	2736	2624	2446	2291	2180	2002	1935		
				30000	7851	5449	4581	3647	3180	2891	2535	2402	2291	2135	2002	1913	1757	1690		
				40000	7117	4937	4159	3314	2891	2624	2291	2180	2091	1935	1824	1735	1601	1535		
				60000	6227	4315	3647	2891	2535	2291	2002	1913	1824	1690	1601	1512	1379	1334		
				100000	5249	3647	3069	2446	2135	1935	1690	1601	1535	1423	1334	1268	1179	1134		
210	50mm	35099	19794	20000	8985	6227	5249	4159	3647	3314	2891	2736	2624	2446	2291	2180	2002			
				30000	7851	5449	4581	3647	3180	2891	2535	2402	2291	2135	2002	1913	1757			
				40000	7117	4937	4159	3314	2891	2624	2291	2180	2091	1935	1824	1735	1601			
				60000	6227	4315	3647	2891	2535	2291	2002	1913	1824	1690	1601	1512	1379			
				100000	5249	3647	3069	2446	2135	1935	1690	1601	1535	1423	1334	1268	1179			

*SLIGHT INTERFERENCE FIT REQUIRED WHEN OPERATING TO THE RIGHT OF THE HEAVY LINE OR IN THE SHADED AREA

Note: Because the allowable loads – especially at low speeds – are extremely high, be sure the shaft strength is adequate and the pillow blocks are base loaded. When imposed load is horizontal, be sure hold-down bolts are adequate. If bearings are cap loaded, full details on load, speed, and shaft size should be referred to DODGE Application Engineering.

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EASY SELECTION



E-Z KLEEN HOUSINGS

General Resistance to Chemical Groups at Room Temperature (20°C/68°F)

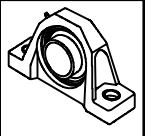
Chemical Group	Condition Or Subgroup	Resistance
Inorganic Acids (non-oxidizing)	concentrated	–
	diluted (1:1)	+(1)
	highly diluted	+(1)
Inorganic Acids (oxidizing)	concentrated	–
	diluted (1:1)	–
	highly diluted	+
Organic Acids	concentrated	=
	diluted (1:1)	+
	highly diluted	+
Bases	concentrated	–
	diluted (1:1)	–
	highly diluted	=
Salt Solutions	acidic	+
	neutral	+
	basic	=
Aliphatic Hydrocarbons		+
	oils and greases	+
Aromatic Hydrocarbons		=
	phenols	–
Halogenated Hydrocarbons	perhalogenated	+
	partially halogenated	–
Alcohols	monovalent	+
	polyvalent	=
Ketones		=
Esters		=
Ethers		+
(1) except hydrofluoric acid		
(+) excellent resistance (=) good-fair resistance (–) fair-poor resistance (blank) no data available		

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EASY SELECTION



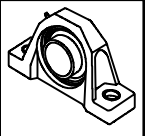
BALL BEARING AND POLYMER INSERT WITH E-Z KLEEN HOUSINGS

CHEMICAL RESISTANCE CHART

Chemical Agent	Solution Conc.	@ 23°C (73°F)		@ 60°C (140°F)		@ 80°C (175°F)
		Housing	Polymer Insert	Housing	Polymer Insert	Housing
A						
Acetic Acid	5%	+	+	=		=
Acetic Acid	10%	+		=		=
Acetic Acid	20%	=	–	=	–	=
Acetic Acid	80%	=	–	=	–	=
Acetic Acid	100%	=		=		=
Acetone		=	=			
Ammonium Chloride	10%		+		+	
Ammonium Hydroxide	10%	=	–			
Ammonium Hydroxide	conc.	–				
Aniline		+	=		=	
B						
Benzene		=	=	=	=	
Bleaching Lye		+		+		
Brake Fluid		+	+	+	+	+
Butane		+				
Butanol		=		=		
Butyl Acetate		+		=		
C						
Calcium Chloride	5%	+	+	+		
Calcium Chloride	10%	+		+		
Calcium Hydroxide	10%		+		+	
Calcium Hypochlorite		+		+		
Carbon Disulphide		+				
Carbon Tetrachloride		+	+			
Castor Oil			+			
Chloroform		–				
Chromic Acid	40%	+		–		–
Citric Acid	10%	+		+		+
Cottonseed Oil		+		+		+
Cresol		–		–		–
D						
Detergents	1%	+	+	=		–
Detergents	25%	+	+	=		–
Dibutyl Phthalate		+		+		
Diesel Oil		+				
Dioxane		+	=	–	=	
E						
Ethanol		+	=			
Ether (diethyl–)		+				
Ethyl Acetate		=	=			
Ethylene Dichloride		–				
(+) excellent resistance (=) good–fair resistance (–) fair–poor resistance (blank) no data available						

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EASY SELECTION



BALL BEARING AND POLYMER INSERT WITH E-Z KLEEN HOUSINGS

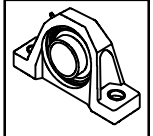
CHEMICAL RESISTANCE CHART

Chemical Agent	Solution Conc.	@ 23°C (73°F)		@ 60°C (140°F)		@ 80°C (175°F)
		Housing	Polymer Insert	Housing	Polymer Insert	Housing
F						
Ferrous Chloride	5%		+			
Formic Acid	5%	+		=		+
Formic Acid	90%	=		–		–
Freon 11		+				
G						
Gasoline		+	+			
Glycerol (Glycerin)		=		=		
Glycol		=		=		
Grease		+	+	+	+	+
H						
Heptane		+				
Hexane		+	+		+	
Hydrochloric Acid	10%	+	–	=	–	–
Hydrochloric Acid	90%	–	–	–	–	–
Hydrofluoric Acid	5%	–		–		–
Hydrofluoric Acid	50%	–		–		–
Hydrogen Peroxide	3%	+	+			
Hydrogen Peroxide	30%	=	+			
IJ						
Isoamyle Alcohol			=		=	
Isopropanol		=		=		
KL						
Kerosene		+	+		+	
Lithium Chloride	43%		+		+	
M						
Methanol		+	=		=	
Methylene Chloride		–	+	–		
Methyl Ethyl Ketone		+	+	=	+	
Methyl Salicylate			+			
Mineral Oil		+	+	+	+	+
Motor Oils		+	+	+	+	+
N						
Nitric Acid	10%	+	–	=	–	=
Nitric Acid	40%	–	–	–	–	–
Nitric Acid	70%	–	–	–	–	–
O						
Oleic Acid	100%	+		+		+
Olive Oil		+	+	+	+	+
P						
Perchloroethylene		+	=	=	=	
Petroleum Ether		+				
Phenol		=		–	–	–
(+) excellent resistance (=) good–fair resistance (–) fair–poor resistance (blank) no data available						

(+) excellent resistance (=) good-fair resistance (-) fair-poor resistance (blank) no data available

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EASY SELECTION



BALL BEARING AND POLYMER INSERT WITH E-Z KLEEN HOUSINGS

CHEMICAL RESISTANCE CHART

Chemical Agent	Solution Conc.	@ 23°C (73°F)		@ 60°C (140°F)		@ 80°C (175°F)
		Housing	Polymer Insert	Housing	Polymer Insert	Housing
P						
Phosphoric Acid	3%	+		+		+
Phosphoric Acid	30%	+	–	+	–	+
Phosphoric Acid	85%	+	–	+	–	–
Potassium Chloride	10%	+		=		–
Potassium Dichromate	10%	+				
Potassium Hydroxide	1%	–		–		–
Potassium Hydroxide	10%	–		–		–
Potassium Hydroxide	60%	–		–		–
Potassium Permanganate	10%	+	+		+	
S						
Silicone Fluids		+		+		+
Soap Solution	1%	+	+	=	=	–
Sodium Bicarbonate	10%	+		=		–
Sodium Bisulfate	5%		+			
Sodium Bisulfite	5%	+	–			
Sodium Bisulfite	10%	+	–	=		–
Sodium Carbonate	10%	+		–		–
Sodium Carbonate	20%	+		–		–
Sodium Chloride	10%	+	+	=	+	–
Sodium Hydroxide	1%	–		–		–
Sodium Hydroxide	10%	–	–	–		–
Sodium Hydroxide	60%	–		–		–
Sodium Hypochlorite	5%	+	–			
Sodium Hypochlorite	10%	+		=		–
Sulfuric Acid	3%	+	–	+	–	+
Sulfuric Acid	30%	+	–	+	–	–
Sulfuric Acid	98%	–	–	–	–	–
T						
Tetrahydrofuran		=				
Toulene		+	=			
Transformer Oil		+	+	+	+	+
Trichlorethylene		=				
Triethylamine			=		=	
Turpentine		+				
V						
Vaseline		+		+		+
Vegetable Oils		+	+	+	+	+
W						
Water		+	+	=	=	–
White Spirits		+				
X						
Xylene		+				
(+) excellent resistance (=) good–fair resistance (–) fair–poor resistance (blank) no data available						

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