Noise Reduction Data

The table below gives a comparison between stamped commercial bearings with standard steel shafts and precision bearings with urethane shaft adapters. An electric motor mounted under a bed of 6 rollers with urethane “O” rings was used for the drive. The frame was a standard 7/16” hex punched unit on 3” centers. Speeds from 100-600 FPM were tested. The noise generated from the drive itself was measured and recorded first. Rollers were then added and the noise level measured again with the drive included. Motor noise was then backed out to reflect only the noise generated by the rollers. Results were recorded using the A scale of the decibel meter. The rollers used for the test are described as follows:

Precision with Urethane Shaft Adapters:

Tube: Galvanized 1.9” diameter x .065” wall thickness; grooved for 3/16” urethane “O” rings
Bearings: ABEC-1 precision ball bearing with C3 clearance in a conductive plastic housing
Shaft: 7/16” hex urethane adapters with a 5/16” hex internal steel support shaft

Commercial with Carbon Steel Shaft:

Tube: Galvanized 1.9” diameter x .065” wall thickness; grooved for 3/16” urethane “O” rings
Bearings: Stamped zinc plated commercial
Shaft: 7/16” hex carbon steel shaft

FPM	Drive Only	Precision w/ Urethane	Commercial w/ Steel shaft	OSHA Threshold Limit
100	49.5	36	67	85
150	49.6	50	72	85
200	52.2	51	75	85
250	52.2	53	77	85
300	52.8	53	79	85
350	52.8	53	81	85
400	53.5	53	82	85
450	54	55	84	85
500	55	55	85	85
550	55.6	56	86	85
600	56	56	87	85

Results vary with different types of drives, varying types of building construction and proximity of conveyor to walls as examples. In every test conducted in a controlled atmosphere, precision rollers with urethane shaft adapters have reduced noise levels a minimum of 9 decibels.

Your results may vary depending on a variety of variables unrelated to the roller. This data is offered as an example and guideline only.

Sprocket Information

The following data is offered as a guideline only.

The table below can be used to determine the largest tube diameter a particular sprocket can be welded onto and allow the chain to run without hitting the weld. Note the table has columns for tube diameters using a "standard weld" which allows for ½" of chain clearance and a column for "special weld" which allows for ¼" of chain clearance. With a special process it is possible to decrease the height of the weld allowing a smaller sprocket on a larger tube diameter. The formula used for this table is:

P.D. – (1/2H+1/2H+C.C.+C.C.) = Largest tube diameter (S.W. or SP.W.)

P.D. = Pitch diameter of the sprocket
H = Height of the side plate of the chain
C.C. = Chain Clearance – Chain side plate to tube
S.W. = Standard Weld
SP.W. = Special Weld

#40 Chain and Sprocket

# of Teeth	Largest Tube Diameter S.W.	Largest Tube Diameter SP.W.
14	1.28	1.53
15	1.44	1.69
16	1.60	1.85
17	1.78	2.01
18	1.91	2.16
19	2.07	2.32
20	2.23	2.48
21	2.39	2.64
22	2.55	2.8
23	2.71	2.96
24	2.87	3.12

#50 Chain and Sprocket

# of Teeth	Largest Tube Diameter S.W.	Largest Tube Diameter SP.W.
14	1.73	1.98
15	1.92	2.17
16	2.12	2.37
17	2.32	2.57
18	2.48	2.73
19	2.71	2.96
20	2.91	3.16
21	3.11	3.36
22	3.31	3.56
23	3.51	3.76
24	3.70	3.95

#60 Chain and Sprocket

# of Teeth	Largest Tube Diameter S.W.	Largest Tube Diameter SP.W.
14	2.17	2.42
15	2.40	2.66
16	2.64	2.89
17	2.88	3.13
18	3.12	3.37
19	3.36	3.61
20	3.59	3.84
21	3.83	4.08
22	4.07	4.32
23	4.31	4.56
24	4.55	4.8

#80 Chain and Sprocket

# of Teeth	Largest Tube Diameter S.W.	Largest Tube Diameter SP.W.
14	3.06	3.31
15	3.38	3.63
16	3.69	3.94
17	4.01	4.26
18	4.33	4.58
19	4.64	4.89
20	4.96	5.21
21	5.28	5.53
22	5.59	5.84
23	5.91	6.16
24	6.23	6.48

Conversion Chart

Fractions to Decimals to Millimeters

Fraction	Decimal	MM	Fraction	Decimal	MM
1/64	0.015625	0.3969	33/64	0.515625	13.0969
1/32	0.031250	0.7938	17/32	0.531250	13.4938
3/64	0.046875	1.1906	35/64	0.546875	13.8906
1/16	0.062500	1.5875	9/16	0.562500	14.2875
5/64	0.078125	1.9844	37/64	0.578125	14.6844
3/32	0.093750	2.3813	19/32	0.593750	15.0813
7/64	0.109375	2.7781	39/64	0.609375	15.4781
1/8	0.125000	3.1750	5/8	0.625000	15.8750
9/64	0.140625	3.5719	41/64	0.640625	16.2719
5/32	0.156250	3.9688	21/32	0.656250	16.6688
11/64	0.171875	4.3656	43/64	0.671875	17.0656
3/16	0.187500	4.7625	11/16	0.687500	17.4625
13/64	0.203125	5.1594	45/64	0.703125	17.8594
7/32	0.218750	5.5563	23/32	0.718750	18.2563
15/64	0.234375	5.9531	47/64	0.734375	18.6531
1/4	0.250000	6.3500	3/4	0.750000	19.0500
17/64	0.265625	6.7469	49/64	0.765625	19.4469
9/32	0.281250	7.1438	25/32	0.781250	19.8438
19/64	0.296875	7.5406	51/64	0.796875	20.2406
5/16	0.312500	7.9375	13/16	0.812500	20.6375
21/64	0.328125	8.3344	53/64	0.828125	21.0344
11/32	0.343750	8.7313	27/32	0.843750	21.4313
23/64	0.359375	9.1281	55/64	0.859375	21.8281
3/8	0.375000	9.5250	7/8	0.875000	22.2250
25/64	0.390625	9.9219	57/64	0.890625	22.6219
13/32	0.406250	10.3188	29/32	0.906250	23.0188
27/64	0.421875	10.7156	59/64	0.921875	23.4156
7/16	0.437500	11.1125	15/16	0.937500	23.8125
29/64	0.453125	11.5094	61/64	0.953125	24.2094
15/32	0.468750	11.9063	31/32	0.968750	24.6063
31/64	0.484375	12.3031	63/64	0.984375	25.0031
1/2	0.500000	12.7000	1	1.000000	25.4000

MM	Inches	MM	Inches	MM	Inches
1	0.0394	13	0.5118	25	0.9843
2	0.0787	14	0.5512	26	1.0236
3	0.1181	15	0.5906	27	1.0630
4	0.1575	16	0.6299	28	1.1024
5	0.1969	17	0.6693	29	1.1417
6	0.2362	18	0.7087	30	1.1811
7	0.2756	19	0.7480	31	1.2205
8	0.3150	20	0.7874	32	1.2598
9	0.3543	21	0.8268	33	1.2992
10	0.3937	22	0.8661	34	1.3386
11	0.4331	23	0.9055	35	1.3780
12	0.4724	24	0.9449	36	1.4173

Chemical Resistance Chart

Reagent	Concentration	HDPE		PP		Polyester	PVC	316SS	Nylon 66	Acetal
		70°	140°	70°	140°					
Acetone	-	C	C	A	A	C	C	A	A	-
Acetaldehyde ★	100%	B	C	A	B	C	C	A	-	-
Acetic Acid	10%	A	A	A	A	A	A	A	C	-
Acetic Acid	60%	A	B	A	A	A	A	A	C	-
Acetic Anhydride ★	-	C	C	-	-	A	C	A	-	-
Air	-	A	A	A	A	-	A	A	-	-
Aluminum Chloride	All	A	A	A	A	A	A	C	B	-
Aluminum Fluoride	All	A	A	A	A	-	A	C	-	-
Aluminum Sulfate	All	A	A	A	A	-	A	B	-	-
Alums	All Types	A	A	A	A	A	A	A	-	-
Ammonia	100% dry gas	A	A	A	A	-	B	A	-	-
Ammonium Carbonate	-	A	A	A	A	C	A	B	-	-
Ammonium Chloride	Saturated	A	A	A	A	A	A	C	B	-
Ammonium Fluoride	Saturated	A	A	A	A	-	A	C	-	-
Ammonium Hydroxide	10%	A	A	A	A	C	A	A	-	-
Ammonium Hydroxide	28%	A	A	A	A	C	A	A	-	-
Ammonium Nitrate	Saturated	A	A	A	A	A	A	A	-	-
Ammonium Persulphate	Saturated	A	A	A	A	C	A	B	-	-
Ammonium Sulphate	Saturated	A	A	A	A	A	A	B	-	-
Ammonium Metaphoshate	Saturated	A	A	A	A	-	A	B	-	-
Ammonium Sulfide	Saturated	A	A	A	A	-	A	B	-	-
Amyl Acetate ★■	100%	C	C	B	C	-	C	A	A	-
Amyl Alcohol ★■	100%	A	A	A	B	A	A	A	-	-
Amyl Chloride ★■	100%	C	C	C	C	-	C	A	-	-
Aniline ★■	100%	C	C	A	A	-	C	B	-	-
Aqua Regia ●	-	C	C	C	C	-	C	C	-	-
Arsenic Acid	All	A	A	A	A	-	A	A	-	-
Aromatic Hydrocarbons ★■	-	C	C	-	-	-	C	C	-	-
Ascorbic Acid	10%	A	A	A	A	-	A	-	-	-
Barium Carbonate	Saturated	A	A	A	A	A	A	B	-	-
Barium Chloride	Saturated	A	A	A	A	A	A	A	-	-
Barium Hydroxide	-	A	A	A	A	C	A	B	-	-
Barium Sulfate	Saturated	A	A	A	A	-	B	B	-	-
Barium Sulfide	Saturated	A	A	A	A	C	A	B	-	-
Beer	-	A	A	A	A	-	A	A	-	-
Benzene ★■	-	C	C	B	C	C	C	B	A	-
Benzoic Acid	All	A	A	A	A	A	A	B	-	-
Bismuth Carbonate	Saturated	A	A	A	A	-	A	A	-	-
Bleachlye	10%	A	A	A	A	-	A	A	-	-
Borax	Saturated	A	A	A	A	-	A	A	-	-
Boric Acid	All	A	A	A	A	A	A	A	-	-
Boron Trifluoride	-	A	A	-	-	-	A	-	-	-
Brine	-	A	A	A	A	-	A	C	-	-
Bromine ●	Liquid	C	C	C	C	-	C	C	C	-
Bromine Water ■	Saturated	C	C	C	-	C	C	C	-	-
Butanediol ★	10%	A	A	A	A	-	-	-	-	-
Butanediol ★	60%	A	A	A	A	-	-	-	-	-
Butanediol ★	100%	A	A	A	A	-	-	-	-	-
Butter ★	-	A	A	A	A	-	-	A	-	-
n-Butyl Acetane ★■	100%	A	C	C	C	-	C	B	A	-
n-Butyl Alcohol	100%	A	A	A	-	C	A	A	B	-
Butyric Acid ★	Concentrated	C	C	-	-	A	B	B	-	-
Calcium Bisulphide	-	A	A	A	A	-	A	B	-	-
Calcium Carbonate	Saturated	A	A	A	A	-	A	B	-	-
Calcium Chlorate	Saturated	A	A	A	A	A	A	-	-	-
Calcium Chloride	Saturated	A	A	A	A	A	A	B	B	-

CODES: **HDPE** - High Density Polyethylene **PP -** Polypropylene **(-)** Information not yet available.
(A) Resistant, no indication that serviceability would be impaired. **(B)** Variable resistance, depending on conditions of use.
(C) Unresistant, not recommended for service applications under any conditions.
(★) - Stress-Crack Agent **(■)** - Plasticizer **(●)** - Oxidizer

Chemical Resistance Chart

Reagent	Concentration	HDPE 70°	HDPE 140°	PP 70°	PP 140°	Polyester	PVC	316SS	Nylon 66	Acetal
Calcium Hydroxide	Concentrate	A	A	A	A	A	A	B	-	-
Calcium Hypochlorite	Bleach Solution	A	A	A	B	A	B	C	-	-
Calcium Nitrate	50%	A	A	A	A	-	A	A	-	-
Calcium Oxide	Saturated	A	A	-	-	-	A	A	-	-
Calcium Sulphate	-	A	A	A	A	A	A	B	-	-
Camphor Oil ★■	-	C	C	C	C	-	-	A	-	-
Carbon Dioxide	All	A	A	A	A	A	A	A	-	-
Carbon Disulphide	-	C	C	B	C	C	C	B	A	-
Carbon Monoxide	-	A	A	A	A	A	A	A	-	-
Carbon Tetrachloride ■	-	C	C	C	C	B	B	B	A	-
Carbonic Acid	-	A	A	A	A	-	A	A	-	-
Caster Oil ■	Concentrated	A	A	A	A	-	-	A	-	-
Chlorine ●	100% dry gas	C	C	C	C	C	C	C	C	-
Chlorineliquid ●	-	C	C	C	C	C	A	C	-	-
Chlorine Water ●	2% Saturated Sol.	A	A	A	B	A	A	C	-	-
Chlorobenzene ★■	-	C	C	C	C	C	C	A	-	-
Chlorofoam ★■	-	B	C	C	C	C	C	A	B	-
Chlorosulphonic Acid	100%	C	C	C	C	-	C	B	-	-
Chrome Alum	Saturated	A	A	A	A	-	A	A	B	-
Chromic Acid	80%	-	-	A	-	C	C	B	-	-
Chromic Acid	50%	A	B	A	A	C	B	B	-	-
Chromic Acid	10%	A	A	A	A	C	A	B	-	-
Cider ★	-	A	A	A	A	-	-	A	-	-
Citric Acid ★	Saturated	A	A	A	A	A	-	A	-	-
Coconut Oil Alcohols ★	-	A	A	A	A	-	A	A	-	-
Coffee	-	A	A	A	A	-	A	A	-	-
Cola Concentrates ★	-	A	A	A	A	-	A	A	-	-
Copper Chloride	Saturated	A	A	A	A	A	A	C	-	-
Copper Cyanide	Saturated	A	A	A	A	B	A	B	-	-
Copper Fluoride	2%	A	A	A	A	-	A	A	-	-
Copper Nitrate	Saturated	A	A	A	A	-	A	B	-	-
Copper Sulphate	Saturated	A	A	A	A	A	A	B	B	-
Corn Oil ★	-	A	A	A	A	-	A	A	-	-
Cottonseed Oil ★	-	A	A	A	A	-	A	A	-	-
Cuprous Chloride	Saturated	A	A	A	A	-	A	C	-	-
Detergent, Synthetic ★	-	A	A	A	A	-	A	A	-	-
Developers, Photographic	-	A	A	A	A	-	A	A	-	-
Dextrin	Saturated	A	A	A	A	-	A	A	-	-
Dextrose	Saturated	A	A	A	A	-	A	A	-	-
Diazo Salts	-	A	A	A	A	-	A	-	-	-
Dibutylphthalate ★■	-	B	B	A	B	-	C	A	-	-
Dichlorobenzene ★■	-	C	C	-	-	C	-	-	-	-
Diethyl Ketone ★■	-	B	B	-	-	-	-	-	-	-
Diethylene Glycol ★■	-	A	A	A	A	-	C	A	-	-
Digycolic Acid ★	-	A	A	-	-	-	A	A	-	-
Dimethylamine	-	C	C	-	-	-	C	A	-	-
Disodium Phosphate	-	A	A	A	A	-	A	A	-	-
Emulsions, Photographic ★	-	A	A	A	A	-	A	A	-	-
Ethyl Acetate ★■	100%	B	C	B	B	-	C	A	A	-
Ethyl Alcohol ★	100%	A	A	A	A	C	A	A	B	-
Ethyl Alcohol ★	35%	A	A	A	A	B	A	A	B	-
Ethyl Benzene ★■	-	C	C	C	C	-	-	A	-	-
Ethyl Chloride ■	-	C	C	C	C	-	C	A	-	-
Ethyl Ether ■	-	C	C	B	C	C	C	A	-	-
Ethylene Chloride ★■	-	C	C	C	C	C	C	A	-	-
Ethylene Glycol ★	-	A	A	A	A	A	A	A	-	C

CODES: **HDPE** - High Density Polyethylene **PP -** Polypropylene **(-)** Information not yet available.
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Chemical Resistance Chart

Reagent	Concentration	HDPE		PP		Polyester	PVC	316SS	Nylon 66	Acetal
		70°	140°	70°	140°					
Fatty Acids ★	-	A	A	A	A	-	B	A	-	-
Ferric Chloride	Saturated	A	A	A	A	A	A	C	C	-
Ferric Nitrate	Saturated	A	A	A	A	A	A	A	-	-
Ferrous Chloride	Saturated	A	A	A	A	A	A	C	-	-
Ferrous Sulphate	-	A	A	A	A	A	A	A	-	-
Fish Solubles ★	-	A	A	A	A	-	A	A	-	-
Fluoboric Acid	-	A	A	A	A	B	A	C	-	-
Fluosillic Acid	Concentrated	A	B	A	B	C	A	B	-	-
Fluosillic Acid	32%	A	A	A	A	C	A	B	-	-
Formic Acid	All	A	A	A	A	C	A	C	C	-
Fructose	Saturated	A	A	A	A	-	A	A	-	-
Fruit Pulp ★	-	A	A	A	A	-	A	A	-	-
Furtural ■	100%	B	C	C	C	-	C	B	-	-
Furfuryl Alcohol ★■	-	B	C	C	C	-	-	A	-	-
Gallic Acid ★	Saturated	A	B	A	A	-	A	B	-	-
Gasoline ★■	-	B	C	B	C	B	C	A	A	-
Glucose	-	A	A	A	A	-	A	A	-	-
Glycerine★	-	A	A	A	A	A	A	A	-	-
Glycol ★	-	A	A	A	A	-	A	A	-	-
Glycolic Acid ★	30%	A	A	A	A	-	A	A	-	-
Grape Sugar	Saturated ag.	A	A	A	A	-	A	A	-	-
n-Heptane ★■	-	B	B	-	-	A	C	A	-	-
Hexachlorobenzene	-	A	-	-	-	-	-	-	-	-
Hexanol, Tertiary ★	-	A	A	-	-	-	-	A	-	-
Hydrobromic Acid	50%	A	A	A	A	A	A	C	-	-
Hydrochloric Acid	37%	A	A	A	A	A	A	C	C	C
Hydrocyanic Acid	Saturated	A	A	-	-	A	A	C	-	-
Hydrofluoric Acid ★	60%	A	A	A	A	C	A	C	-	-
Hydrogen	100%	A	A	A	A	-	A	A	-	-
Hydrogen Chloride	Dry Gas	A	A	A	A	-	-	-	-	-
Hydrogen Peroxide	30%	B	B	A	-	C	A	B	C	-
Hydrogen Peroxide	10%	A	A	A	B	C	A	B	C	-
Hydrogen Sulphide	-	A	A	A	A	-	A	B	-	-
Hydroquinone	-	A	A	A	A	-	A	-	-	-
Hypochlorous Acid	Concentrated	A	A	A	A	C	A	-	-	-
Inks ■	-	A	A	A	A	-	A	C	-	-
Iodine ●	Ink1 Solution	B	-	-	-	-	C	C	-	-
Isopropyl Alcohol	100%	-	-	A	A	-	A	A	B	-
Lead Acetate	Saturated	A	A	A	A	A	A	A	-	-
Lead Nitrate	-	A	A	-	-	-	A	A	-	-
Lactic Acid ★	20%	A	A	A	A	A	A	B	-	-
Linseed Oil	100%	B	C	A	A	A	A	A	-	-
Magnesium Carbonate	Saturated	A	A	A	A	A	A	A	-	-
Magnesium Chloride	Saturated	A	A	A	A	A	A	A	B	-
Magnesium Hydroxide	Saturated	A	A	A	A	-	A	A	-	-
Magnesium Nitrate	Saturated	A	A	A	A	-	A	A	-	-
Magnesium Sulphate	Saturated	A	A	A	A	A	A	A	B	-
Mercuric Chloride	40%	A	A	A	A	A	A	C	C	-
Mercuric Cyanide	Saturated	A	A	A	A	-	B	C	-	-
Mercury	-	A	A	A	A	-	B	A	-	-
Methyl Alcohol ★	100%	A	A	A	A	C	A	A	B	-
Methylethyl Ketone ★■	100%	B	C	A	B	C	C	A	-	-
Methylethyl Chloride ★■	100%	C	C	B	-	-	C	A	-	-
Milk	-	A	A	A	A	-	A	A	-	-
Mineral Oils ■	-	B	C	A	B	-	A	A	A	-
Molasses	-	A	A	A	A	-	A	A	-	-

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Chemical Resistance Chart

Reagent	Concentration	HDPE		PP		Polyester	PVC	316SS	Nylon 66	Acetal
		70°	140°	70°	140°					
Naphtha ★■	-	B	C	-	-	A	A	A	-	-
Naphthalene ★■	-	B	-	A	A	A	C	A	-	-
Nickel Chloride	Concentrated	A	A	A	A	A	A	C	-	-
Nickel Nitrate	Saturated	A	A	A	A	A	A	B	-	-
Nickel Sulphate	Concentrated	A	A	A	A	A	A	B	-	-
Nicotine ★	Dilute	A	A	A	A	-	A	-	-	-
Nitric Acid	0-30%	A	A	C	C	C	A	A	C	C
Nitric Acid ●	30-50&	A	B	C	C	C	B	A	C	C
Nitric Acid ●	70%	A	B	C	C	C	C	A	C	C
Nitric Acid ●	95-98%	C	C	C	C	C	C	A	C	C
Nitrobenzene ★■	100%	C	C	C	C	C	C	A	-	-
n-Octane	-	A	A	-	-	-	-	-	-	-
Oleic Acid	-	B	C	A	B	A	C	B	-	-
Oxalic Acid ★	Saturated	A	A	A	B	A	A	B	-	-
Perchloroethylene ★	-	C	C	-	-	-	C	A	A	-
Phenol	-	-	-	-	-	-	-	-	C	-
Phosphoric Acid	95%	A	A	A	A	A	B	B	C	-
Photographic Solutions	-	A	A	A	A	A	A	A	-	-
Plating Solutions ★ Brass	-	A	A	A	A	-	A	A	-	-
Cadium	-	A	A	A	A	-	A	A	-	-
Chromium	-	A	A	A	A	-	A	C	-	-
Copper	-	A	A	A	A	-	A	A	-	-
Gold	-	A	A	A	A	-	A	A	-	-
Indium	-	A	A	A	A	-	A	-	-	-
Lead	-	A	A	A	A	-	A	C	-	-
Nickel	-	A	A	A	A	-	A	C	-	-
Rhodium	-	A	A	A	A	-	A	A	-	-
Silver	-	A	A	A	A	-	A	C	-	-
Tin	-	A	A	A	A	-	A	C	-	-
Zinc	-	A	A	A	A	-	A	C	-	-
Potassium Bicarbonate	Saturated	A	A	A	A	C	A	B	-	-
Potassium Bromide	Saturated	A	A	A	A	-	A	B	-	-
Potassium Bromate	10%	A	A	A	A	-	A	B	-	-
Potassium Carbonate	-	A	A	A	A	A	A	B	-	-
Potassium Chlorate	Saturated	A	A	A	A	-	A	B	-	-
Potassium Chloride	Saturated	A	A	A	A	A	A	B	-	-
Potassium Chromate	40%	A	A	A	A	-	A	B	-	-
Potassium Cyanide	Saturated	A	A	A	A	-	A	B	-	-
Potassium Dichromate	40%	A	A	A	A	A	A	B	C	-
Potassium Ferri/Ferro Cyanide	Saturated	A	A	A	A	A	A	B	-	-
Potassium Fluoride	-	A	A	A	A	-	A	B	-	-
Potassium Hydroxide	Concentrated	A	A	A	A	C	A	B	A	-
Potassium Nitrate	Saturated	A	A	A	A	A	A	B	B	-
Potassium Perborate	Saturated	A	A	A	A	-	A	B	-	-
Potassium Perchlorate	10%	A	A	A	A	-	A	B	-	-
Potassium Permanganate	20%	A	A	A	A	A	A	B	C	-
Potassium Persulphate	Saturated	A	A	-	-	A	A	B	-	-
Potassium Sulphate	Concentrated	A	A	A	A	A	A	B	-	-
Potassium Sulphide	Concentrated	A	A	A	A	-	A	B	-	-
Potassium Sulphite	Concentrated	A	A	A	A	-	A	B	-	-
Propargyl Alcohol ★	-	A	A	-	-	-	-	-	-	-
n-Propyl Alcohol ★	-	A	A	A	A	-	A	A	-	-
Propylene Dichloride ★■	100%	C	C	C	C	-	A	C	-	-
Propylene Glycol ★	-	A	A	-	-	-	C	B	-	-
Pyridine ★	-	A	-	A	-	-	C	A	A	-

CODES: **HDPE** - High Density Polyethylene **PP -** Polypropylene **(-)** Information not yet available.
(A) Resistant, no indication that serviceability would be impaired. **(B)** Variable resistance, depending on conditions of use.
(C) Unresistant, not recommended for service applications under any conditions.
(★) - Stress-Crack Agent **(■)** - Plasticizer **(●)** - Oxidizer

Chemical Resistance Chart

Reagent	Concentration	HDPE		PP		Polyester	PVC	316SS	Nylon 66	Acetal
		70°	140°	70°	140°					
Resorcinal	Saturated	A	A	-	-	-	-	-	C	-
Sallcylic Acid	Saturated	A	A	-	-	-	A	A	-	-
Sea Water	-	A	A	A	A	-	A	A	-	-
Selenic Acid	-	A	A	-	-	C	A	-	-	-
Shortening ★	-	A	A	A	A	-	A	A	-	-
Silver Nitrate Solution	-	A	A	A	A	A	A	A	-	-
Soap Solution ★	Any	A	A	A	A	-	A	A	-	-
Sodium Acetate	Saturated	A	A	A	A	A	B	B	-	-
Sodium Benzoate	35%	A	A	A	A	-	A	A	-	-
Sodium Bicarbonate	Saturated	A	A	A	A	A	A	B	-	-
Sodium Bisulphate	Saturated	A	A	A	A	A	A	B	-	-
Sodium Bisulphite	Saturated	A	A	A	A	-	A	B	B	-
Sodium Borate	-	A	A	A	A	-	A	B	-	-
Sodium Bromide	Dilute	A	A	A	A	-	A	A	-	-
Sodium Carbonate	Concentrated	A	A	A	A	-	A	A	-	-
Sodium Chlorate	Saturated	A	A	A	A	C	A	B	-	-
Sodium Chloride	Saturated	A	A	A	A	A	A	C	-	-
Sodium Cyanide	-	A	A	A	A	A	A	B	-	-
Sodium Dichromate	Saturated	A	A	A	A	-	A	A	-	-
Sodium Ferri/Ferro Cyanide	Saturated	A	A	A	A	A	A	A	-	-
Sodium Fluoride	Saturated	A	A	A	A	-	A	C	-	-
Sodium Hydroxide	Concentrated	A	A	A	A	C	A	B	A	-
Sodium Hypochlorite	-	A	A	A	B	C	B	C	B	C
Sodium Nitrate	-	A	A	A	A	A	A	B	-	-
Sodium Sulphate	-	A	A	A	A	A	A	B	B	-
Sodium Sulphide	Saturated	A	A	A	A	C	A	B	-	-
Sodium Sulphite	Saturated	A	A	A	A	B	A	B	-	-
Stannic Chloride	Saturated	A	A	A	A	A	A	C	-	-
Stannous Chloride	Saturated	A	A	A	A	A	A	A	-	-
Starch Solution ★	Saturated	A	A	A	A	-	A	A	-	-
Stearic Acid ★	100%	A	A	A	A	A	B	A	-	-
Sulphuric Acid	0-50%	A	A	A	B	A	A	C	C	C
Sulphuric Acid ●	70%	A	B	A	B	C	A	C	C	C
Sulphuric Acid ●	80%	A	C	C	C	C	A	C	C	C
Sulphuric Acid ●	96%	B	C	C	-	C	C	C	C	C
Sulphuric Acid ●	98% - Conc.	B	C	C	-	C	C	C	C	C
Sulphuric Acid ●	Fuming	C	C	C	C	C	C	C	C	C
Sulphurous Acid	-	A	A	A	A	-	A	B	-	-
Tallow ■	-	A	-	A	A	-	-	A	-	-
Tannic Acid ★	Saturated	A	A	A	A	A	A	A	-	-
Tartaric Acid	-	A	A	A	A	A	A	C	-	-
Tetrolydrofuran ★■	-	B	C	C	C	-	C	A	A	-
Titanium Tetrachloride ★	Saturated	C	-	-	-	-	-	A	-	-
Toluene ★	-	B	B	C	C	B	C	A	A	-
Trichlororethylene ★■	-	C	C	C	C	-	C	B	B	-
Triethylene Glycol ★	-	A	A	-	-	-	-	A	-	-
Trisodium Phosphate	Saturated	A	A	A	A	C	A	A	-	-
Turpentine ■	-	C	C	C	C	-	B	A	A	-
Urea	30%	A	A	A	A	-	B	A	-	-
Urine	-	A	A	A	A	-	A	A	-	-
Vanilla Extract ★	-	A	A	A	A	-	-	-	-	-
Vinegar	-	A	A	A	A	-	A	A	-	-
Water	-	A	A	A	A	A	A	A	-	-
Wetting Agent ★	-	A	A	A	A	-	-	-	-	-
Whiskey ★	-	A	A	A	A	-	A	A	-	-

CODES: **HDPE** - High Density Polyethylene **PP -** Polypropylene **(-)** Information not yet available.
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(C) Unresistant, not recommended for service applications under any conditions.
(★) - Stress-Crack Agent **(■)** - Plasticizer **(●)** - Oxidizer

Chemical Resistance Chart

Reagent	Concentration	HDPE 70°	HDPE 140°	PP 70°	PP 140°	Polyester	PVC	316SS	Nylon 66	Acetal
Wines ★	-	A	A	A	A	-	C	A	-	-
Xylene ■	-	C	C	C	C	B	C	A	A	-
Yeast	-	A	A	A	A	-	A	A	-	-
Zinc Bromide	Saturated	A	A	-	-	-	A	A	-	-
Zinc Carbonate	Saturated	A	A	-	-	-	A	A	-	-
Zinc Chloride	Saturated	A	A	A	A	A	A	A	B	-
Zinc Oxide	Saturated	A	A	A	A	-	A	A	-	-
Zinc Sterate	-	A	A	-	-	-	A	A	-	-
Zinc Sulphate	Saturated	A	A	A	A	A	A	A	-	-

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(C) Unresistant, not recommended for service applications under any conditions.

(★) Stress-crack agent - Certain surface active materials, although they have no chemical effect on polyethylene, can accelerate the cracking of polyethylene when it is under stress.

(■) Plasticizer - Certain types of chemicals are absorbed to varying degrees by polyethylene, causing swelling, weight gain, softening, and some loss of yield strength. These plasticizing materials cause no actual chemical degradation of the resin. Some (e.g. Gasoline). Certain plasticizers are sufficiently volatile that if they are removed from contact with the polyethylene, the part will "dry" out and return to its original condition with no loss of properties.

(●) Oxidizers - Oxidizers are the only group of materials capable of chemically degrading polyethylene. The effect on polyethylene may be gradual even for strong oxidizers, and short term effects may not be measurable. However, if continuos, long-term exposure is intended, the chemical effects should be checked.

Notes:

Weight Chart

Engineering/Shipping Data - Estimated Weight Per Foot for Tubing and Shafting

Tube		Estimated Weight Per Foot		
O.D. / Wall	I.D.	Steel	Aluminum	PVC
0.75 x .035	0.680	0.267	0.094	****
0.84 x .107	0.626	****	****	0.164
1.00 x .035	0.930	0.361	0.128	****
1.00 x .049	0.902	0.498	0.175	****
1.05 x .113	0.824	****	****	0.218
1.12 x .065	0.995	0.736	0.260	****
1.18 x .055	1.070	0.700	0.246	0.138
1.31 x .133	1.049	1.679	0.581	0.324
1.37 x .049	1.277	0.694	0.245	****
1.37 x .065	1.245	0.909	0.321	****
1.50 x .065	1.370	0.996	0.352	****
1.51 x .065	1.380	1.002	0.355	****
1.66 x .065	1.530	1.127	0.396	****
1.66 x .140	1.380	****	****	0.439
1.75 x .065	1.620	1.170	0.413	****
1.90 x .065	1.770	1.275	0.441	****
1.90 x .109	1.682	2.085	0.721	****
1.90 x .112	1.676	****	****	0.4
1.90 x .120	1.660	2.283	0.788	****
1.90 x .200	1.500	****	****	0.705
2.00 x .065	1.870	1.343	0.474	****
2.25 x .065	2.120	1.517	0.533	****
2.38 x .125	2.125	****	****	0.558
2.38 x .218	1.939	****	****	0.918
2.50 x .083	2.334	2.143	0.755	****
2.50 x .120	2.260	3.050	1.081	****
2.50 x .180	2.140	4.460	1.541	****
2.88 x .150	2.575	****	****	0.806
2.88 x .276	2.323	****	****	1.4
3.00 x .065	2.870	2.037	0.714	****
3.00 x .083	2.834	2.586	0.908	****
3.00 x .120	2.760	3.691	1.306	****
3.50 x .083	3.334	3.029	1.064	****
3.50 x .120	3.800	4.332	1.530	****
3.50 x .180	3.140	6.382	2.241	****
3.50 x .188	3.124	6.650	2.350	****
3.50 x .300	2.900	****	****	1.877

Hexagonal Shafting

Size in Inches	Est. Wt. Per Foot	
	Steel	Aluminum
1/4	0.184	0.066
5/16	0.288	0.103
** 3/8	0.414	0.146
7/16	0.564	0.202
** 1/2	0.736	0.264
** 9/16	0.932	0.334
5/8	1.15	0.413
11/16	1.392	0.499
** 3/4	1.656	0.594
1	2.945	1.056
1 1/16	3.324	1.192

Round Shafting

Size in Inches	Est. Wt. Per Foot	
	Steel	Aluminum
3/16	0.094	0.034
1/4	0.167	0.06
5/16	0.261	0.094
3/8	0.376	0.135
7/16	0.511	0.183
12mm	0.595	0.213
1/2	0.668	0.24
9/16	0.845	0.303
15mm	0.93	0.334
5/8	1.043	0.374
17mm	1.194	0.428
** 11/16	1.262	0.453
** 3/4	1.502	0.539
** 13/16	1.763	0.632
** 7/8	2.044	0.733
** 15/16	2.347	0.842
** 1	2.67	0.958
** 1 1/4	4.173	1.497
** 1 7/16	5.518	1.979
** 1 1/2	6.008	2.155

**** Special Order Only**

Conductivity of Plastics (Static Electricity Dissipation)

What is Static Electricity?

Static electricity is electricity at rest. This electrical charge is the result of a transfer of electrons that occurs due to the sliding, rubbing, turning or separating of a material, which is a prime generator of electrostatic voltages - e.g.: plastics, fiberglass, rubber, textiles, etc. Under the right conditions, this induced charge can build to 30,000 - 40,000 volts.

When this happens to an insulating material, such as a plastic, the built-up charge tends to remain in the localized area of contact. This electrostatic voltage then can discharge via an arc or spark when the plastic material comes in contact with a body at a sufficiently different potential, such as a person or microcircuit.

If electrostatic discharge (ESD) occurs to a person, the result can range from a mild shock to a very painful shock. In extreme cases, ESD could even result in the loss of life. Sparks are dangerous in an environment containing flammable liquids, solids or gases, such as in a hospital operating room, grain elevator or during the assembly of explosive devices.

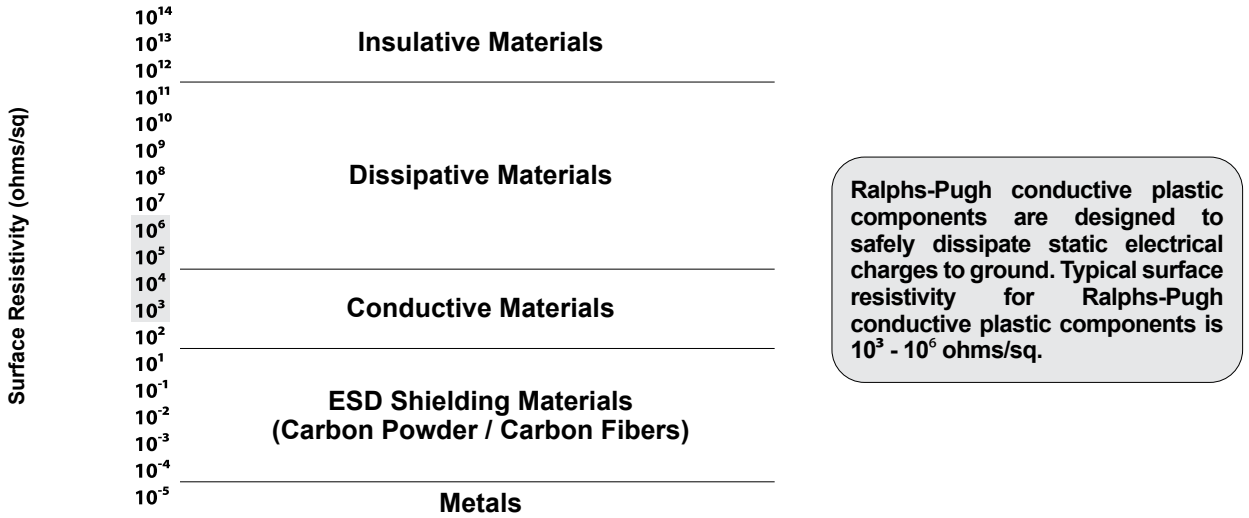
Some micro-electronic parts can be destroyed or damaged by ESD as low as 20 volts. Since people are prime causes of ESD, they often cause damage to sensitive electronic parts, especially during manufacturing and assembly.

Conductive Spectrum

Plastics are classified as insulating materials having typical surface resistivities of 10^{16} - 10^{17} ohms/sq. The electrically conductive plastics commercially available today are composite materials of electrically insulating base resins and electrically conductive fillers or reinforcing agents. Electrical conductivity is achieved via a conductive network of particles or fibers. For electrically conductive plastics, three different conductivity ranges are defined:

- Dissipative Composites
- Conductive Composites
- ESD shielding Composites

See the chart below for the surface resistivity for the above conductivity ranges.



Ralphs-Pugh conductive plastic components are designed to safely dissipate static electrical charges to ground. Typical surface resistivity for Ralphs-Pugh conductive plastic components is 10^3 - 10^6 ohms/sq.