Material Corrosion Resistance Guide

Hartzell fans and blowers have rings, frames, housings, and supports fabricated from low carbon steel. All steel parts are phosphatized or sandblasted and finished with an enamel coating.

The standard axial flow propeller material is a sand-cast aluminum equivalent to Federal Spec. QQ-A-601, and chosen for its good strength, durability, and casting qualities. Other high strength alloys can be furnished at extra cost for special applications. Standard centrifugal wheels are fabricated from ASTM Standard A569 carbon steel.

Hartzell standard coatings specifications are tied to ASTM standards used within industry. These coatings are considered to be good to excellent for indoor/outdoor structures in an industrial environment.

Corrosion-Resistant Materials and Coatings

For installations where extreme corrosive fumes are encountered, Hartzell fiberglass fans give unsurpassed resistance to the great majority of corrosive elements at a cost substantially below that of corrosion resistant metals. These fan units feature special high grade fiberglass propellers, duct sections, drive housings, bearing covers and seals - plus efficient shaft seals and slingers to protect bearings.

The special vinylester resin used in the construction of Hartzell's regular fiberglass duct fans, offers tremendous advantages over general purpose polyester and epoxy resins. It has higher corrosion resistance and it retains its strength when wet to a much greater degree than other polyester resins.

As a further refinement of the resin system, additives are made which give a flame spread rate of 25 or less without materially affecting the corrosion resistance. This feature is particularly desirable where both extreme corrosion resistance and high flame resistance are required.

Extra strength is built into all Hartzell fiberglass fans by the use of heavy flanges, extra glass tape joints, and extra glass reinforcing. In addition, all fans are given a finish brush coat of resin after assembly for more complete protection.

All bearing bolt and nut heads as well as bearing cover bolts and nuts exposed to the airstream are of stainless steel (or Monel, if specified) and are coated with resin after assembly. Shafts are normally of stainless steel but can be specified Monel for special service.

A modification can be furnished with special flange drilling to meet chemical plant specifications.

Hartzell can also furnish coatings to resist attack to fans made of metal. When conditions are moderate and the corrosive agent is a common acid or mild alkali, an epoxy coating can be used on steel and aluminum. This coating is also moisture and abrasion resistant. Based on converted epoxy/cycloaliphatic amine technology the epoxy coating has superior flexibility and toughness plus resistance to thermal shock. It may be used in air temperatures up to 250°F.

For more severe corrosive fumes and for excellent abrasion resistance plastisol and phenolic coatings are recommended. Applications for coatings of this type are usually sufficiently severe to justify a call to the factory to check on exactly what is needed for your specific application.

Housings and frames can be furnished in all stainless steel, aluminum or Monel. The exact grade of metal used depends on the nature of the installation. Unless otherwise specified, #304 housings will be furnished when stainless steel is ordered. #316 stainless steel is also available. All Hartzell fans and blowers for corrosive applications are guaranteed for one full year from the date of shipment.

Hartzell engineers are continually experimenting with special materials and coatings. Your Hartzell sales representative is prepared to recommend the most dependable solution to your corrosion problem.

									FIBERGLASS ***			COATINGS			
	Aluminum	Stainless 304	Stainless 316	Carbon Steel	Monel	Neoprene	Teflon	Viton	Interplastics 8441	Hetron FR992	Ashland 510A	Epoxy (250 °F)	Inorganic Zinc (150 °F)	Coal Tar Epoxy (300 °F)	Plasite 7122L (HAR, TFE)
Acetic Acid, to 10% (Fumes Only)	F	F	G	N	F	G	G	F	210	210	210	G	N	G	F
Acetone (Fumes Only)	G	G	G	G	G	F	-	N	N	N	180	G	G	-	F
Alcohol - Ethyl	F	G	G	F	F	G	-	F	150	N	80	G	G	-	F
Aluminum Acetate	N	-	G	-	F	N	G	N	-	-	-	G	-	-	F
Aluminum Hydroxide	G	G	G	N	N	G	G	-	180	-	180	G	N	-	F
Aluminum Sulphate	N	F	-	N	N	G	G	G	-	210	210	G	N	-	G
Ammonia (Dry - 1%)	F	G	G	F	N	G	-	-	100	100	100	G	-	G	G
Ammonia (Moist - 1%)	F	G	G	F	N	G	-	-	150	100	N	G	-	-	F
Ammonium Chloride	N	F	F	N	F	G	G	G	*210S	*210	*210	G	N	G	G
Ammonium Hydroxide to 5%	N	G	G	N	N	G	F	F	180S	180S	180S	G	N	G(10)	F
Ammonium Nitrate	F	G	G	N	N	F	G	G	210	210	220	G	N	G(30)	G
Ammonium Perchlorate	-	-	G	-	-	-	-	-	-	-	-	N	-	-	G
Ammonium Persulfate (Saturated)	N	G	G	N	N	G	N	G	180	180	180	N	-	-	G
Ammonium Phosphate	G	G	G	N	N	G	G	G	210	210	210	G	-	-	G
Ammonium Sulphate	N	G	F	N	F	G	G	F	210	210	220	F	-	G(10)	G
Ammonium Sulphite	N	G	F	N	N	G	-	-	-	100	150	G	-	-	G
Barium Chloride	N	G	N	N	F	G	G	G	210	210	210	G	N	-	G
Barium Hydroxide	N	F	G	N	F	G	G	G	150S	150	150	G	N	-	G
Barium Nitrate	F	G	G	G	N	G	-	-	-	-	-	F	N	-	G
Barium Sulphate	N	G	F	N	F	G	G	G	210	210	210	F	-	-	G
Benzene	F	G	G	F	G	N	G	G	N	N	N	G	G	-	G
Benzoic Acid	F	G	G	N	F	N	-	G	210	210	210	G	-	-	G

									FIBERGLASS ***			COATINGS			
	Aluminum	Stainless 304	Stainless 316	Carbon Steel	Monel	Neoprene	Teflon	Viton	Interplastics 8441	Hetron FR992	Dow 510A	Epoxy (250 °F)	Inorganic Zinc (150 °F)	Coal Tar Epoxy (300 °F)	PLASITE 7122L (HAR, TFE)
Boric Acid (5%)	F	G	G	N	F	N	G	-	-	210	210	G	N	-	G
Bromine, Wet Gas	N	N	N	N	N	N	-	-	-	*90	N	G	-	G	F
Butyric Acid, to 50%	F	G	F	N	F	N	-	-	210	160	210	N	-	-	G
Calcium Carbonate	N	G	F	N	F	G	G	-	180S	180S	180S	G	-	-	G
Calcium Chlorate	F	F	F	F	F	F	G	-	210S	210	210	G	-	-	F
Calcium Chloride	N	F	N	N	F	G	G	G	210S	210	210	G	N	-	G
Calcium Hydroxide	N	G	G	N	G	G	G	G	180S	180S	180S	G	N	-	F
Carbolic Acid	-	G	F	N	-	N	-	G	N	-	N	N	F	G(5)	N
Carbon Monoxide Gas	G	G	G	F	F	N	F	G	210	210	250	G	-	-	G
Carbon Tetrachloride	F	G	G	N	G	N	G	G	100	150	150	G	G	G	G
Chlorine Gas (Dry)	F	F	F	F	G	N	G	G	*210S	*180S	*220S	F	N	-	F
Chlorine Gas (Moist)	N	N	N	N	F	N	G	F	180S	180S	*220S	F	N	-	N
Chlorine Water	N	F	F	N	N	N	-	-	*180S	*180	*180	G	N	G	F
Chlorobenzene	F	G	G	F	G	N	G	G	N	N	N	F	F	-	F
Chromic Acid, to 5%	N	F	N	N	N	N	F	G	150	100	150	G(20)	N	N	F
Citric Acid	F	G	F	N	F	G	G	G	*210	*210	*210	G	N	G	F
Copper Acetate	N	-	G	N	N	F	-	N	-	160	-	G	-	-	F
Copper Chloride	N	N	N	N	N	G	G	G	*210	*210	*220	G	N	-	G
Copper Cyanide	N	G	F	N	N	G	G	G	210	210	210	G	-	-	F
Copper Nitrate	N	G	F	N	N	G	-	-	210	210	210	F	-	-	F
Copper Sulphate	N	G	F	N	N	G	G	G	210	210	210	F	N	-	G
Detergents	F	G	G	G	F	F	-	G	210	100	150	G	G	G	G
Ethyl Chloride	N	G	G	N	F	N	G	G	N	N	N	G	F	-	N
Ethylene Chloride	N	G	G	N	F	N	G	F	N	N	N	G	F	-	N

									FIBERGLASS ***			COATINGS			
	Aluminum	Stainless 304	Stainless 316	Carbon Steel	Monel	Neoprene	Teflon	Viton	Interplastics 8441	Hetron FR992	Dow 510A	Epoxy (250 °F)	Inorganic Zinc (150 °F)	Coal Tar Epoxy (300 °F)	PLASITE 7122L (HAR, TFE)
Ferric Nitrate	N	G	G	N	N	G	G	G	210	210	-	F	-	-	-
Ferric Sulphate	N	F	F	N	N	G	G	G	210	210	210	F	-	-	-
Ferrous Sulphate	N	F	N	N	F	G	G	-	210	210	210	F	N	-	G
Fluoboric Acid	N	F	-	-	F	G	G	-	210	180S	210S	N	-	-	F
Formalin Formaldehyde	F	F	G	N	G	N	G	N	150	-	120	G(20)	F	G	F
Formic Acid, to 10%	N	G	F	N	N	G	G	N	180	180	180	N	N	-	F
Furfural, to 10%	G	G	G	F	F	N	N	N	100	120	100	F	N	-	F
Gallic Acid	G	G	G	N	F	F	N	G	-	-	180	F	-	-	-
Gasoline	G	G	G	F	G	N	G	G	180	-	120	G	G	G	G
Hydrobromic Acid, to 25%	N	N	N	N	N	N	-	G	*180	*200	*180	N	-	-	-
Hydrochloric Acid, to 15%	N	N	N	N	N	F	G	F	*180S	*210S	*210S	N	N	G	F
Hypochlorous Acid	N	N	-	N	-	-	-	G	160S	90	100	N	-	-	-
Hydrocyanic Acid, to 10%	G	F	N	F	F	G	-	G	180	150	210	N	-	-	F
Hydrofluosilicic Acid, to 10%	N	N	N	N	F	F	G	G	*150S	*150S	*180S	N	N	-	G
Hydrofluoric Acid, to 10%	N	N	N	N	F	F	G	N	*130S	*100S	*150S	N	N	-	N
Hydrogen Peroxide, to 30%	G	G	F	N	N	N	G	F	150	100	150	G	N	G	F
Hydrogen Sulfide, to 5%	N	F	G	N	N	G	G	N	180	210	210	F	-	G	F
Lactic Acid	N	F	F	N	N	F	G	G	*210	*210	*210	N	-	-	G
Magnesium Carbonate	F	G	F	F	F	G	-	-	210S	-	180	G	G	-	-
Magnesium Chloride	N	N	N	N	F	G	G	G	210	210	210	G	N	-	G
Magnesium Nitrate	F	G	F	F	F	G	-	-	-	160	210	F	-	-	-
Magnesium Oxychloride	-	N	-	-	-	-	-	-	-	-	-	N	-	-	-
Maleic Acid	F	G	G	N	F	N	F	G	210	180	180	N	N	-	G
Manganese Carbonate	F	-	-	-	-	-	-	-	-	-	-	G	-	-	-
Mercurous Nitrate	N	G	G	F	N	F	-	-	-	-	-	F	-	-	F
Methyl Ethyl Ketone, to 10%	G	G	G	G	G	N	G	N	N	N	N	G	G	F	F
Mehtylene Chloride	N	G	G	G	F	N	-	F	N	N	N	N	F	-	F
Naphtha	G	G	G	G	F	N	G	G	180	180	180	G	G	G	G
Napthalensulfonic Acid	-	N	-	-	-	N	-	-	-	-	-	N	-	-	G
Nickel Chloride	N	N	N	N	N	F	G	G	210	210	210	G	-	-	G
Nickel Nitrate	N	G	F	F	N	G	-	-	210	210	210	F	-	-	-
Nickel Sulphate	N	F	F	N	F	G	G	G	210	210	210	F	-	-	-
Nitric Acid, to 5%	N	G	G	N	N	F	G	F	150	160	150	N	N	F	F
Nitrous Acid	N	G	F	N	N	N	-	-	-	-	-	N	-	-	F
Oleic Acid	F	G	G	N	F	N	G	F	210	200	210	G	N	-	G
Oxalic Acid, to 10%	N	G	F	N	F	N	G	G	*210	-	*120	G	N	G(20)	G
Ozone	F	F	G	F	G	N	G	G	-	-	N	-	-	-	-
Perchloric Acid, to 10%**	N	N	F	N	G	F	G	G	150	150	150	N	N	-	F
Phenol, to 10%	G	G	G	N	F	N	G	G	N	-	N	G(10)	F	-	N
Phosphoric Acid, to 10%	N	N	G	N	N	F	-	G	*210S	*210S	*210S	N	N	N	F
Phosphoric Anhydride	G	-	-	N	-	N	-	-	-	-	-	F	-	-	-
Picric Acid, to 10%	N	G	G	N	N	G	G	G	-	-	N	N	-	-	F
Potassium Bromide	N	G	F	N	F	G	-	-	160	160	210	G	-	-	G
Potassium Chloride	N	G	F	N	F	G	G	G	210	210	210	G	N	-	G
Potassium Cyanide	N	G	N	F	F	G	G	G	N	-	-	F	-	-	G
Potassium Dichromate	G	G	G	F	F	G	G	G	210	210	210	F	-	-	-
Potassium Ferricyanide	F	G	G	N	F	G	-	-	210	210	210	G	-	-	-
Potassium Ferrocyanide	F	G	G	N	G	G	-	-	210	210	210	G	-	-	G

									FIBERGLASS ***			COATINGS			
	Aluminum	Stainless 304	Stainless 316	Carbon Steel	Monel	Neoprene	Teflon	Viton	Interplastics 8441	Hetron FR992	Dow 510A	Epoxy (250 °F)	Inorganic Zinc (150 °F)	Coal Tar Epoxy (300 °F)	PLASITE 7122L (HAR, TFE)
Potassium Hydroxide, to 25%	N	G	G	F	G	G	G	G	-	150S	150S	G	N	G	G
Potassium Hypochlorite	-	N	F	N	N	F	-	-	-	-	-	G	-	-	-
Potassium Nitrate	G	G	G	G	F	G	G	G	210	210	210	G	N	-	G
Potassium Permanganate	F	G	G	G	F	G	-	-	210	210	210	F	-	G(5)	-
Potassium Sulphate	F	G	F	G	G	G	G	G	210	210	210	G	N	-	F
Pyrogallic Acid	F	G	G	G	F	G	-	-	-	-	-	F	-	-	-
Salt Spray	F	F	-	N	F	G	G	G	200	-	210	G	-	G	G
Silver Bromide	N	N	-	N	F	-	-	-	-	-	-	G	-	-	-
Silver Nitrate	N	G	G	N	N	F	G	G	210	210	210	G	-	-	F
Sodium Acetate	G	G	F	N	F	F	G	N	210	210	210	G	N	-	-
Sodium Bisulfate	N	N	G	N	F	G	G	G	210	210	210	G	-	-	G
Sodium Borate	F	G	G	F	F	G	G	G	-	210	210	G	-	-	-
Sodium Carbonate, to 35%	N	G	G	G	G	G	-	-	160S	160S	180S	G	-	-	G
Sodium Chlorate	N	G	G	F	N	G	-	-	210	210	210	N	N	-	G
Sodium Chloride	F	F	F	N	F	G	G	G	210	210	210	G(30)	N	G	G
Sodium Citrate	N	-	-	-	-	-	-	-	210	-	-	F	-	-	G
Sodium Dichromate	-	-	G	F	F	N	-	-	210	210	210	F	-	-	-
Sodium Ferricyanide	G	-	G	-	F	-	-	-	210	210	210	G	-	-	-
Sodium Fluoride	N	N	G	N	F	F	-	-	180S	180S	180S	F	-	-	-
Sodium HyDroxide, to 10%	N	G	G	F	G	F	G	F	150S	160S	180S	G	N	G	F
Sodium Hypochlorite, to 15%	N	F	N	N	N	F	G	G	150S	150S	180S	F	N	G(5)	F
Sodium Hyposulfite	N	G	-	-	F	-	-	-	-	-	-	F	-	-	-
Sodium Nitrate	G	G	F	G	F	F	G	G	210	210	210	F	N	-	G
Sodium Nitrite	G	-	G	F	N	N	-	-	210	210	210	F	N	-	G
Sodium Perchlorate, to 10%	-	-	-	-	-	-	-	-	-	-	100	N	-	-	-
Sodium Peroxide	N	G	G	N	F	F	G	F	-	-	-	F	-	-	-
Sodium Phosphate	N	-	F	F	F	N	G	G	-	-	210	G	N	G(10)	F
Sodium Salicylate	N	-	-	-	-	-	-	-	210	-	-	G	-	-	F
Sodium Silicate	F	G	G	G	F	G	-	-	210S	210	210	G	N	-	G
Sodium Sulfate	F	G	F	F	G	G	-	G	210	210	210	F	N	-	F
Sodium Sulfite	F	G	F	N	N	G	-	-	210	210	210	F	N	-	G
Sodium Sulfide	N	G	F	F	F	G	-	-	210S	210S	210S	G	N	-	G
Stannic Chloride	N	N	N	N	N	F	G	G	*210	*180	*210	N	-	-	-
Stannous Chloride	N	F	F	N	F	G	-	G	*210	*210	*210	F	-	-	G
Steam Vapor	G	G	G	G	F	N	G	-	200	210	180	F	-	-	N
Stearic Acid	G	G	G	N	F	F	G	G	210	210	210	G	N	-	G
Strontium Hydroxide	N	-	G	-	-	-	-	-	-	-	-	G	-	-	-
Strontium Nitrate	N	-	-	-	-	-	-	-	-	-	-	F	-	-	-
Sulfur Dioxide Gas	F	N	G	F	F	N	G	F	210	210	210	N	-	-	G
Sulfuric Acid, to 25%	N	N	F	N	F	F	G	G	*200	*210	*210	N	N	G	F
Sulfurous Acid, to 10%	N	F	F	N	N	N	G	N	100	100	120	N	-	-	F
Tannic Acid	N	G	G	F	F	G	F	G	210	210	210	G(50)	N	G	G
Tartaric Acid	F	F	G	N	F	G	G	G	210	210	210	G	N	-	F
Trichlorethylene	F	G	G	F	F	N	G	G	N	N	N	N	F	-	F
Water (Moisture)	G	G	G	N	G	G	G	G	180	180	200	G	G	G	G
Xylol-Toluol	G	G	G	G	F	N	G	G	N	N	80	G	G	G	G
Zinc Chloride	N	G	N	N	-	G	G	G	-	*210	*210	G	N	-	G
Zinc Cyanide (Moist)	N	-	-	-	-	-	-	-	-	-	-	G	-	-	-
Zinc Nitrate	-	-	G	-	-	-	-	-	210	210	210	F	-	-	-
Zinc Sulfate	N	G	F	N	F	G	G	G	210	210	210	F	N	-	-

* - Special shaft and hardware required.
** - Special design considerations (explosive environment), contact factory.
*** - Temperature values shown for fiberglass resins are for immersion or condensate contact applications.

Where temperature values are shown, resin is suitable for hood and duct type applications for the full operating temperature of the product. See product specifications for materials of construction and maximum operating temperature limits. Concentrations are considered to be 100% except when indicated by (%).

KEY: G = Good F = Fair N = Not Recommended
- = Unknown S = Synthetic Veil Required
H&D – Suitability for hood and duct applications at ambient conditions only