



CORROLON VIII™



Product Code # SOL-XG08H

Pioneered For Hostile Environments:

Chemical Protection Designed For Extreme Wear And Barrier Dielectric Properties

- ▶ Reduces wear and friction on metal substrates
- ▶ Superior chemical protection properties
- ▶ High dielectric protection (2000 volts/mil)
- ▶ Flexible application by extrusion, injection mold, and applied by fluidized bed or electrostatic processes
- ▶ Maximum abrasion and corrosion protection
- ▶ Machinable Characteristics (similar to nylon 6)
- ▶ Allows engineers a variety of metal substrates
- ▶ Radiation resistance and Continuous Operating Temperature 400°F (204°C)

CORROLON VIII™ is a premium resin bonded, multi-step coating process that creates an extremely durable (with post-process machinable similar to nylon 6), chemical resistant, and electric-reducing application. This specially developed coating system protects metal substrates against extreme wear, corrosion, and impact resistance at ambient and subambient temperatures.

With its ability to lower the coefficient of friction **CORROLON VIII™** can provide superior performance in aggressive environments, where chemical attack is a significant factor. Custom engineering designs enable this robust coating system to achieve a surface that is up to four times harder than a traditional fluoropolymer application and provides excellent tensile and flexural strength, adding superior wear-related properties.

Engineering Data & High Performance Characteristics:

Chemical Protection

CORROLON VIII™ resists organic and inorganic compound attacks by means of a barrier (that can be applied in multi-step coats) which protect the metal substrate. In environments where chemical attack is significant, **CORROLON VIII™** provides a comprehensive barrier to such solvents and chemicals as strong acids, chlorine, and aqueous caustics. *No known solvent dissolves or stress cracks this pioneered polymer system at temperatures of up to 250°F (120°C).*

See attached *Expanded Chemical Resistance Table* for a detailed listing of barrier performance.



As a result of its flexibility and multiple-application processes, **CORROLON VIII™** can be applied to dissimilar metal substrates in order to provide chemical & dielectric protection, wear resistance, and environmental temperature barriers.

Solutions for Extreme Wear & Chemical Applications



Tel: (780) 413-4545
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Custom Global Coatings



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Corrosion Resistance

Designed to significantly reduce wear to parts and fail-safe mechanisms, **CORROLON VIII™** prevents asperities (metal surface peaks) from making physical contact in metal-to-metal applications. This innovative coating provides a solid barrier against galvanic response, thus preventing nuclei-site formation in service.

TENSILE & FLEXURAL PROPERTIES: 73°F (23°C):	
Tensile Strength	
at yield, psi	4,700
at break, psi	6,600
Elongation	
at yield, %	5
at break, %	325
Flexural Strength, psi	6,800
Modulus	
Tensile, psi	240,000
Flexural, psi	245,000



CORROLON VIII™ applied to turbine stators and housing impellers for extreme wear and chemical protection.

Designed in order to achieve maximum coverage, CORROLON VIII™ is process compatible with most metal substrates, enabling custom masking and design tolerances to be achieved.

Thickness

CORROLON VIII™ provides an even application that enables protective enhancement without affecting critical engineering tolerances in designs. This coating system is uniform in thickness and range from 0.005" to 0.035" (+-0.002").

In addition, high build requirements of up to 0.065" (+-0.003") can be achieved with this versatile coating for re-works and tolerance build-ups. *This coating is post-process machinable.*

Temperature Specifications

CORROLON VIII™ operates very efficiently in high temperature environments. The thermosetting resins in this innovative coating enable it to perform in both cryogenic and high temperature settings. Coated parts exhibit tensile and flexural strength, adding wear-related properties in demanding industrial use.

Continuous Operating Temp	300°F (150°C)
Intermittent Temperature	400°F (205°C)
- Thermoplast Weld Temp	500°F (260°C)

Hardness

CORROLON VIII™ has a hardness rating (ASTM D 785) of Rockwell R 90 (+-4.0) and Shore D 75 (+-4.0).

It has nylon-like durability and provides excellent impact resistance at ambient and sub ambient temperatures.

HARDNESS PROPERTIES:	
Coefficient of Friction	
Static	0.19
Dynamic, 50 cm/sec	1.09
Abrasion Resistance Taber (ASTM D 1044)	
500 revs	0.002
1000 revs	0.005
Armstrong (ASTM D 1242)	
volume loss, cc	0.3

FDA /CFIA Compliance

Utilized in Foodservice processing equipment and cookware applications, **CORROLON VIII™** complies with FDA (US)* and CFIA (Canada) regulations. This coating system is suitable for repeated applications at temperatures of 212°F (100°C) in contact with foods.

* - Sec. 21 CFR 177.1380



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Electrical Properties

The dielectric constant of **CORROLON VIII™** is low (2.6 for solid insulation to 1.5 for foamed insulation) and engineered to be stable across a broad frequency and temperature range.

- Dielectric strength: 2000 volts/mil in 1 mil DFT

ELECTRICAL PROPERTIES:	
Dielectric strength	
0.001 in. thick V /mil	2000
1/8 in. thick V /mil	340
Dielectric constant	
at 10 ³ Hz	2.47
at 10 ⁶ Hz	2.57
Dissipation factor	
at 10 ³ Hz	0.0017
at 10 ⁶ Hz	0.017

Radiation Resistance

CORROLON VIII™ possesses excellent resistance to a wide range of radiation environments. Developed to withstand hostile conditions, **CORROLON VIII™** can maintain useful properties on exposure to cobalt 60 radiation of 200 megarads.

RADIATION RESISTANCE:	
Tensile Breaking Strength	Cobalt - 60 dosage (megarads)
7000 /210	0
4600 /105	50
4200 /65	100
2800 /10	1,000

Flammability

CORROLON VIII™ fluoropolymer, in thicknesses as low as 7 mils, has received a UL 94 V-0 rating. The oxygen index (ASTM D-2863) is the minimum of 52 and subsequently, has received a UL 910 (NFPA 262) listing up to 200 pair communication plenum cable due to its low flame spread and smoke generation characteristics.

Impermeability to Gases & Vapors

CORROLON VIII™ has low permeability to water vapor and various other gases. Water vapor permeability measured at 100°F (38°C) and 90% RH was found to be:

0.15 g-mil /100 in²/24 hrs

CORROLON VIII™ has superior moisture vapor impermeability at elevated service temperature compared to certain fluoropolymer compounds at the same conditions.



CORROLON VIII™ application for downwell tools and industrial parts. Providing protection from chemical attack and environmental temperature, this high build coating system permits post-machining.

One major advantage of CORROLON VIII™ is its ability to work in conjunction with other coating systems, such as this CORROLON II™ application on the external of a downhole pup joint.



High Performance Applications

- ▶ Downwell Packer Systems
- ▶ Pipe & Tubing
- ▶ Heavy Wire & Cabling
- ▶ Military Applications
- ▶ Housings & Actuators
- ▶ Cryogenic Tools
- ▶ Fasteners and Threaded Parts
- ▶ Mining Pumps
- ▶ Scientific Equipment
- ▶ Tanks & Valves
- ▶ Gears & Springs
- ▶ Foodservice Units & Cookware
- ▶ Aerospace & Aeronautical
- ▶ Industrial Housings
- ▶ Blades
- ▶ Medical Instruments
- ▶ Filters & Coils
- ▶ Moulds



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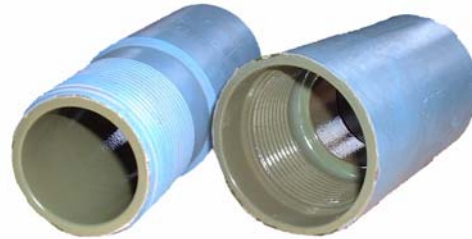
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CORROLON VIII		
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TECHNICAL MANGER:	R. HUIZINGA	
APPROVAL BY:	M. FEARON	
REVISION 3.2.2	ISO DATA SHEET #737-B-9	

Engineering Economics

As a substitute for metal case hardening and thermal alloy sprays, **CORROLON VIII™** has a Rockwell value of R 90 and can be post-machined for re-tolerance programs. At less than 30% cost of most carbiding and nitriding processes, the economic advantage of **CORROLON VIII™** has obvious benefit for many projects.



Wetted parts coated with CORROLON VIII™ in order to prevent galling and aggressive wear in extreme temperature environments.

Expanded Chemical Resistance Table:

Chemical	Test Temp °C	Tensile Stength	Elongate	Weight Gain, %	Color Change
Acetic Acid	140	I	I	3.4	1
Acetone	100	A	I	3.5	1
Acetone cyanohydrin	50	I	I	0.0	1
Acetonitrile	140	A	I	2.2	1
Acenophenone	75	I	I	3.9	1
Acrylic Acid	100	I	I	0.4	1
Aluminum Chloride 50%	100	I	I	0.0	2
Anisole *	50	I	I	3.9	1
Ammonium Hydroxide 30%	140	I	I	1.2	2
Amyl Acetate, 99%	50	I	I	4.7	1
Aniline	100	I	I	2.5	3
Benzaldehyde	100	A	I	5.4	2
Benzene	66	A	I	4.2	1
Benzyl Chloride, 97% *	50	I	I	2.3	1
Benzyl Alcohol	121	I	I	1.6	1
Butanol n	121	I	I	1.9	1
Butyl Acrylate *	50	I	I	4.4	1
Butyl Acetate	50	I	I	3.8	1
Butylaldehyde *	50	I	I	2.8	1
Butyl Amine *	50	I	I	8.7	3

Chemical	Test Temp °C	Tensile Stength	Elongate	Weight Gain, %	Color Change
Butyl Lactate*	50	I	I	0.5	1
Butyl Phthalate	100	I	I	2.4	1
Calcium Chloride 20%	160	I	A	0.0	1
Calcium Hydroxide, 0.5%	140	I	I	0.3	2
Cellosolv Acetate	100	I	I	4.6	1
Chlorine water, sat.	121	I	I	3.5	2
Chloroacetic acid, 50 %	100	I	I	0.3	3
Chlorobenzene	50	I	I	4.8	1
Chlorosulfonic acid	50	I	I	4.3	3
Chlorotoluene a,	50	I	I	2.9	2
Chromic Acid, 30%	100	I	I	0.0	2
Chromic Acid, 30%	140	A	I	0.0	3
Cresol o,	100	I	I	3.3	1
Cyclohexane	100	A	I	5.0	1
Cyclohexanone	75	I	I	5.7	1
Cyclohexylamine*	50	I	I	2.3	3
Dexron II (Auto Trans Fluid)	150	I	I	1.1	1
Dibutyl Sebacate	100	I	I	2.4	1
Dibutyl Phthalate*	50	I	I	0.1	1
Diethyl Phthalate*	50	I	I	0.08	1

RETAINED PROPERTIES: I = Insignificant A = Reduced 25-50% B = Reduced 50-75% C = Reduced > 75%

COLOR CHANGE: 1 = No Change 2 = Any Shade of Tan 3 = Brown or Black

* - Tested for 28 days; all others tested at 30 days. Values are comparable to one another.



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Expanded Chemical Resistance Table (Continued):

Chemical	Test Temp °C	Tensile Strength	Elongate	Weight Gain, %	Color Change	Chemical	Test Temp °C	Tensile Strength	Elongate	Weight Gain, %	Color Change
Dichlorobenzene o,	50	I	I	5.6	1	Ether*	50	I	I	3.5	1
Dichloroethane	20	I	I	4.7	1	2 Ethoxy-ethanol, 99%*	50	I	I	0.4	1
Dichloroethylene	50	A	I	4.9	1	Ethyl Acetate	50	I	I	3.4	1
Dichloroethylene 1,2	20	I	I	1.8	1	Ethyl Acrylate	100	I	I	6.4	1
Dichloropropane	100	I	I	6.4	1	Ethyl Formate	100	I	I	3.8	1
Dichlorotoluene a,a	121	I	I	10.5	1	Ethylacetate	75	A	I	3.4	1
Diethylamine*	50	I	I	4.3	3	Ethylacrylate	75	A	I	3.6	1
N,N Diethylethanolamine*	50	I	I	0.2	1	Ethylene Glycol	100	I	I	0.4	1
Diethyl Hydroxy Amine, 85%	30	I	I	0.0	1	Ethylendiamine	20	I	I	0.3	2
Diethylene glycol butyl ether acetate*	50	I	I	0.5	1	Ferric Chloride 55%	100	I	I	-0.1	1
Diethylene glycol mono butyl ether*	50	I	I	0.2	1	Fluoroboric Acid, 10 %	100	I	I	0.1	1
Diethylene Triamine	50	I	I	0.2	2	Formaldehyde, 37%	80	I	I	0.6	1
Diisobutyl Ketone*	50	I	I	1.1	1	Fuming Sulfuric Acid	50	I	I	1.4	3
Diisopropyl Acetate*	20	I	I	0.2	1	Furfural	100	I	I	4.0	3
Diisopropyl Ketone	100	I	I	6.5	1	Hexane	149	A	I	2.7	2
Dimethyl Acetamide N,N	100	I	I	5.9	2	Hydrochloric acid, 37%	100	I	I	0.7	3
Dimethyl Formamide N,N	100	I	I	4.8	2	Hydrofluoric acid, 37%	121	I	I	0.9	2
Dimethyl Phthalate	100	I	I	2.5	2	Hydrofluoric acid, 49%	100	I	I	0.2	2
Dimethyl Sulfoxide	100	I	I	1.9	1	Hydrofluoric acid, 70% HF	50	I	A	0.1	2
Dimethylamine	20	I	I	1.9	1	Hydrogen Peroxide (60%)	30	I	I	0.3	1
Diocetyl Phthalate	50	I	I	0.2	1	4-Hydroxybenzene sulfonic acid*	70	I	I	0.1	2
Dioxane 1,4-	50	I	I	4.7	1	Isopentyl Alcohol	100	A	I	1.5	2
Dioxane 2,4	100	A	I	5.7	1	Isophorone*	50	I	I	0.5	1
Diapropylene glycol methyl ether*	50	I	I	0.2	1	Lithium Hydroxide	100	I	I	0.0	1
Ethanol	140	I	I	1.6	1	Methane Sulfuric Acid, 50%	66	I	I	0.0	1
						Methanol	50	I	I	0.4	1

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Methanol	140	B	B	1.6	2	Phosphorous Oxychloride	50	I	I	12.8	1
5-Methyl-2-hexanone*	50	I	I	4.1	1	Potassium Carbonate, 53.2%	140	I	I	-0.1	2
Methyl Acetate*	50	I	I	5.8	1	Potassium Carbonate, 53.2% sat.	100	I	I	-0.1	1
Methyl Acrylate*	50	I	I	5.5	1	Potassium Hydroxide, 50%	121	I	I	-0.1	2
Methyl Cellosolv	140	I	I	2.4	1	Potassium Hydroxide, 50%	140	C	C	-0.2	3
Methyl Ethyl Ketone	100	I	I	6.1	1	Propanol*	50	I	I	0.16	1
Methyl Formate	100	A	I	5.5	1	Propyl Acetate	50	I	I	3.6	1
Methyl Isobutyl Ketone	100	I	I	5.7	1	Sodium Carbonate, 33.7% sat.	100	I	I	0.0	1
Methyl Methacrylate	50	I	I	3.7	1	Sodium Chlorite, 45.9% sat.	100	I	I	0.1	1
N- Methylpyrrolidinone	20	I	I	1.5	1	Sodium Hydrosulfide, 50%	140	I	I	0.0	2
1-methyl-2-pyrrolidinone	20	I	I	0.3	1	Sodium Hydroxide, 50%	132	I	I	-0.2	2
Methylene Chloride	50	I	I	4.1	1	Sodium Hypochlorite, 12.5-15.5%	45	I	I	0.1	1
Mesityloxide*	50	I	I	4.5	2	Sodium Hypochlorite, 5%	121	I	I	0.1	1
N,N-Dimethyldodecylamine	75	I	I	0.5	1	Stearoyl Chloride	125	A	A	2.0	13
Napthalene	121	I	I	8.8	1	Sulfuric Acid, 98%	121	I	I	0.7	3
Nitric Acid, 10%	121	I	I	0.4	1	Sulfuric Acid, 98%	150	A	B	1.7	3
Nitric Acid, 50%	50	I	I	0.1	1	Tetrachloroethylene	50	I	I	7.9	1
Nitric Acid, 90%	71	I	I	2.3	2	Tetrahydrofuran	50	A	I	4.3	1
Nonyl Phenol*	50	I	I	0.1	1	Tetramethyl Ammonium Hydroxide	100	I	I	0.6	2
2-Octanol	50	I	I	0.2	1	Thionyl Chloride*	50	A	I	12.9	2
Oleum 30% in Sulfuric Acid	20	I	I	0.4	1	p-Toluenesulfonic acid (sol. sat.)*	70	I	I	0.0	1
Oleum 30% in Sulfuric Acid	50	A	B	3.4	3	Toluene	20	I	I	0.7	1
Pentanedione 2,4	100	I	I	6.3	1	Toluene	50	A	I	3.8	1
Pentyl Acetate	50	I	I	3.9	1	Tributyl Phosphate*	50	I	I	0.12	1
Phenol	50	I	I	0.1	1						
Phosphoric Acid, 30%	100	I	I	0.1	1						
Phosphoric Acid, 85%	140	I	I	-0.1	2						

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Trichlorobenzene	50	I	I	4.0	1
Trichloroethylene 1,1,1	20	I	I	0.3	1
Trichloroethylene and nitric acid*	50	I	I	4.6	2
Trichloroethylene in methanol*	50	I	I	0.5	1
Triethylamine*	50	I	I	0.93	2
Tricresyl Phosphate	100	I	I	0.3	1
Triethyl Phosphate	100	I	I	4.5	1
Triethylene Tetramine	50	I	I	0.0	2
Vinyl Acetate	50	I	I	3.1	1
Water	140	I	I	0.6	2
Xylene	50	I	I	3.4	1



Application of CORROLON VIII™ to downwell completion systems to replace case hardening (frac-hardening) and metal hardening treatments.

Factors Affecting Chemical Resistance

Chemical resistance and attack are very complex matters. The known factors which affect the chemical stability of **CORROLON VIII™** fluoropolymer for chemical application, not listed in order of priority, are as follows:

- ▶ Environment temperature and temperature variations.
- ▶ Specific chemical or mixture composition.
- ▶ Exotherm or heat of reaction or mixing.
- ▶ Pressure due to the effects of pressure on concentration of reactive gas.
- ▶ Concentration of the chemical which may be a complex different than the individual components.
- ▶ Velocity.
- ▶ Suspended solids.
- ▶ Thickness.
- ▶ EMF potential of the supporting metal compared to the ground potential.
- ▶ Time of exposure.
- ▶ Stress levels.

Other factors affecting chemical resistance probably exist but the aforementioned list is all of the known factors at this time.

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