

TECHNICAL DATA



CHEMICAL RESISTANCE OF ZEBRON® COATINGS

MEDIUM

Water at Ambient
at 250°F

EFFECTS

No effect
0.4 mg, extractives per
square inch in 2 hrs.

APPLYING OR TESTING AGENCY

U.S. Testing Company
per FDA Standards

Sea Water, Immersion

1. No effect in 4 yrs.
2. Six year exposure
on piles no effect
3. One year immersion of
scribed panel. No edge
lifting, no deterioration -
coating intact

U.S. Coast Guard
Rensselaer Polytechnic Institute

Rensselaer Polytechnic Institute

ACIDS

Phosphoric 50 percent
Sulfuric 20 percent
Sulfuric 50 percent
Acetic 20 percent
Hydrofluoric 37 percent
Hydrofluoric 10 percent
Hydrogen Sulfide
Chromic 15 percent
Aqua Regia

No effect
No effect
No effect
No effect
Slight Discoloration
Surface Cloudiness
Slight Discoloration
No effect
No effect

N.W. Testing Lab
L.A. Engineering Bureau
ZEBRON® R&D
L.A. Engineering Bureau
ZEBRON® R&D
N.W. Testing Lab
Orange County Sanitation
N.W. Testing Lab
N.W. Testing Lab

BASES

Sodium Hydroxide 5 percent
Sodium Hydroxide 33 percent
Ammonium Hydroxide 5 percent
Ammonium Hydroxide 5 percent

No effect
No effect
No effect
No effect

L.A. Engineering Bureau
ZEBRON® R&D
L.A. Engineering Bureau
ZEBRON® R&D

ALCOHOLS

Ethanol at 150°F 8 percent

0.2 mg. extractives per
square inch in 2 hrs.

U.S. Testing Company
per FDA Standards

HYDROCARBONS

Crude Oil
Heptane at 150°F

No effect
0.2 mg. extractive per
square inch in 2 hrs.

ZEBRON® R&D
U.S. Testing Company
per FDA Standards

Petroleum oils and greases
Soap and Detergent
Vegetable oils and greases

No effect
No effect
No effect

L.A. Engineering Bureau
L.A. Engineering Bureau

SALT SOLUTIONS

Sodium Chloride 5 percent
Ambient
250°F
Sodium Chloride 20 percent
Magnesium Sulfate, saturated
Ambient
Ferric Chloride 1 percent
Sodium Sulfate (wet solid)
Sodium Sulfite (wet solid)
Sodium Carbonate (wet solid)

No effect
Softens, no other effect
No effect
No effect
No effect
No effect
No effect
No effect

Rensselaer Polytechnic Institute
Tennessee Gas
N.W. Testing Lab
ZEBRON® R&D
L.A. Engineering Bureau
N.W. Testing Lab
N.W. Testing Lab
N.W. Testing Lab

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CHEMICAL RESISTANCE OF ZEBRON® COATINGS

MEDIUM	EFFECTS	APPLYING OR TESTING AGENCY
OTHER CHEMICALS		
Magnetite Acid, Paper Mill	No effect	ZEBRON® R&D
Black Liquor, Paper Mill	No effect	N.W. Testing Lab
Oxygenated Wastewater	No effect	EPA Study
Raw Sewage	No effect	Orange County Sanitation
Alkaline Drilling Mud	No effect	ZEBRON® R&D
Acidic Drilling Mud	No effect	ZEBRON® R&D
Liquid Phosphate Fertilizer	No effect	ZEBRON® R&D
Aqua Regia	Slight discoloration	N.W. Testing Lab
Hydrogen Peroxide 30 percent	Slight discoloration	N.W. Testing Lab
Chlorine Water (filtrate) 0.1 percent	Slight discoloration	N.W. Testing Lab
Sodium Hypochlorite 5.25 percent	Slight discoloration	N.W. Testing Lab
Chlorine Dioxide 1.5 percent	No effect	N.W. Testing Lab
Sulfur Dioxide 5 percent	Slight discoloration	N.W. Testing Lab
Magnesium Bisulfite 5 percent	No effect	N.W. Testing Lab
Ethyl Alcohol 98 percent	Slight discoloration	N.W. Testing Lab

PHYSICAL PROPERTIES OF ZEBRON® COATINGS

PROPERTY	MEASUREMENTS	STANDARDS
Color	Cream, gray or black	Visual
Specific Gravity	300 series: 1.3 (10.84 lbs./gal.) 400 series: 1.11 (9.23 lbs./gal.)	ASTM D-792 ASTM D-792
Tensile Strength	2500 PSI at 25°C (77°F)	ASTM D-638
Bond Strength	1500 PSI on Steel	Elcometer
Flexibility	No effect bending 0.5 mm plate coated with 20 mils of ZEBRON® over mandrel of 8 mm diameter	ASTM D-1737
Elongation	Recoverable: 67% at 25°C (77°F)	ASTM D-638
Impact	1. 1637in./lb. 2. No failures	ASTM G-14 on steel pipe ASTM-1709A
Compressibility	4200 PSI	ASTM G-695
Surface Hardness	60 to 70	Shore "D"
Abrasion Resistance	1. 250,000 units 2. Weight loss .0102m Taber Abraser H-10 wheel, 1000gms. 1000 cycles 3. 1.4 microns/hour from coated discs circulated at 2280 RPM in sea water with 1.9 percent quartz meal 4. 1.5 mils loss in 2800 hrs in circulating 35% SIC and 5% Fe slurry 5. Two microns wear following 1320 hours in rotating drum containing ice and abrasive particles	ASTM D-658 FTMS-141 Netherlands Paint Research Council TNO Rensselaer Polytechnic Institute Rensselaer Polytechnic Institute
Leach Rate	0.03 Mg/Sq. In. (Per EPA Protocol, December 1970)	U.S. Testing Company

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PHYSICAL PROPERTIES OF ZEBRON® COATINGS

PROPERTY	MEASUREMENTS	STANDARDS
Thermal Conductivity	0.000723 cal./sec. cm ² °C per cm at 20° C (0.175BTU/HR.ft.°F per ft at 77° F)	ASTMC-177
Permeability	.262 gms/24 hr/M ² Type 386 .0358 U.S. Perms .193 gms/24 hr/M ² Type 396 .0264 U.S. Perms	ASTM E-96

SERVICE PROPERTIES OF ZEBRON® COATINGS

SERVICE	EFFECT	STANDARDS																					
Welding steel substrate Off Gases	Under controlled conditions the following gas concentrations obtained from welding ZEBRON® coated steel plate	North England Industrial Health Service Report July 1979																					
	<table border="1"> <thead> <tr> <th>Gas</th> <th>Concentration Tested (PPM)</th> <th>Threshold Limit (PPM)</th> </tr> </thead> <tbody> <tr> <td>CO</td> <td>10</td> <td>50</td> </tr> <tr> <td>CO₂</td> <td>0.5</td> <td>5000</td> </tr> <tr> <td>Mixed NO</td> <td>5</td> <td>25</td> </tr> <tr> <td>NO₂</td> <td>0.5</td> <td>5</td> </tr> <tr> <td>Phosgene</td> <td>0</td> <td>0.1</td> </tr> <tr> <td>HCN</td> <td>1</td> <td>10</td> </tr> </tbody> </table>	Gas	Concentration Tested (PPM)	Threshold Limit (PPM)	CO	10	50	CO ₂	0.5	5000	Mixed NO	5	25	NO ₂	0.5	5	Phosgene	0	0.1	HCN	1	10	
Gas	Concentration Tested (PPM)	Threshold Limit (PPM)																					
CO	10	50																					
CO ₂	0.5	5000																					
Mixed NO	5	25																					
NO ₂	0.5	5																					
Phosgene	0	0.1																					
HCN	1	10																					
Cathodic Disbondment	<ol style="list-style-type: none"> No effect after 6 weeks in seawater at 1200 mV. No effect after 11 weeks in seawater at 900 mV. No effect after 24 days with 2700 micron (106 mil) thick ZEBRON® under 1022 mV in seawater at 25°C. No disbondment after 5 days with 150 mil ZEBRON® 5VDC in 5 percent NaCl in glycerol at 300°F. Minor disbondment at side of holiday after 22 days. 	<p>Netherlands Paint Research Council TNO</p> <p>Netherlands Paint Research Council TNO</p> <p>Tennessee Gas</p>																					
Ignition and Flame Spread	Index of performance 3.3P. The 3.3 index means a "coating having low flame spread characteristics" and the letter P means "not easily ignitable". Overall rating was Class 2 by Lloyds meaning ZEBRON® coating is acceptable for ships and offshore drilling rigs.	Firto, Llyods Register of Shipping Certificate No. ICD/F79/223 TE3484 and TE3485																					

TECHNICAL DATA



PROPERTIES OF UNREACTED ZEBRON® MATERIALS

WEIGHTS

Material	Specific Gravity	Lb./Gal	Lb./Drum	Total Drum Weight/Lb.
ZEBRON® 385 Resin	1.32	11.0	528	563
ZEBRON® 386 Resin	1.30	10.8	518	553
ZEBRON® 486 Resin	1.02	8.6	413	443
ZEBRON® 9000 Activator	1.24	10.34	500	535

VISCOSITY

Centipoises by Brookfield RVT

ZEBRON® 385 Resin	2000 to 3500 CPS at 77°
ZEBRON® 386 Resin	1500 to 3000 CPS at 77°
ZEBRON® 486 Resin	1000 to 1500 CPS at 77°
ZEBRON® 9000 Activator	150 to 450 CPS at 77°

FLASH POINT

ZEBRON® 300 and 400 Series Resins	268°C (515°F) COC
ZEBRON® 9000 Activator	199°C (390°F) PMCC

MIXING RATIOS

ZEBRON® 300 Series	3 parts 300 Series to 1 part 9000 Activator
ZEBRON® 400 Series	2 parts 400 Series to 1 part 9000 Activator

USES

ZEBRON® 385	For rolling, brushing or toweling, High build product for platforms and heavy traffic areas.
ZEBRON® 386 and 486	For spraying. High build product for 30 mils or thicker

APPLICATION MACHINE

Recommended Equipment	Graco Hydra-Cat System
Hydraulic pressure at tip:	1500 to 2500 PSI
Spray tip:	0.019 inches to 0.037 inches

SHELF LIFE

Over one year. Drums must be rotated every 90 days.

PURGE MATERIAL FOR SPRAY

DOP (Di-Octal-Pthalate). Flash Point 216°C (420°F) COC / Acetone Flash Point - 20°C (-4°F) CC
Autoignition temperature: 465°C (869°F)

CLEANING SOLVENT

Toluene, Flash Point 5°C (40°F) TCC
Xylene, flash Point 27°C (81°F) TCC
Methylene Di Chloride, Flash Point 25°C (77°F)
Methyl Ethyl Ketone, Flash Point -6°C (21°F)

PRIMER

P-111. Flash Point 28°C (83°F) TCC For metal surfaces
Zebron Low Temperatures Epoxy. (ZLTE) Flash Point 110°C (230°F). For concrete & wood surfaces