

Corrugated Steel Pipe PERFORMANCE COATINGS

Galvanized

Aluminized Type 2

Polymer-Laminated

ail.ca



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Choose the right coating for the job.

Corrugated Steel Pipe (CSP) is the material of choice for today's infrastructure projects because it offers the optimum combination of strength, flexibility and performance. Research shows that coated CSP can provide a service life of 25 to 100 years for a wide range of environments and applications. AIL offers three factory-applied finishes to accommodate the wide variety of performance and hydrology considerations: Galvanized, Aluminized Type 2, and Polymer-Laminated. Soil conditions and a variety of other site/application factors can influence the choice of CSP coatings.¹ As recommended by the Corrugated Steel Pipe Institute, an environmental assessment will help to select the appropriate coating to meet your Design Service Life requirements.¹ Talk to your AIL Technical Representative about making the best performance/value choice for your job.

Galvanized *Standard Service Life*



Z610 Galvanized steel is the standard finish for all CSP and performs well in low-abrasion conditions. This continuous galvanized coating is applied under strict quality control procedures to provide

excellent bonding to the steel. Its hot-dip-zinc coating is reactive to water environments and is positively affected by higher levels of Calcium Carbonate CaCO_3 (hardness) in the water, which can actually increase service life as calcium is attracted to the galvanized surface and forms an additional protective mineral scale. Galvanized coatings have proven their performance through many years of field application. Many Canadian sites have relatively neutral conditions and the galvanized zinc coating is sufficient. An environmental assessment will help to confirm this.



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Aluminized Type 2 *75-Year Service Life*



For more corrosive environments, Aluminized Type 2 coating offers the superior corrosion resistance and surface characteristics of aluminum with the strength and economy of

steel. In this process, a commercially pure aluminum coating is uniformly applied to both sides of the steel, forming a strong bond between the metals. A hard aluminum-iron alloy layer, just below the aluminum coating, provides further protection. Aluminized Type 2 CSP can provide a 75-year service life in a low-abrasion environment with pH between 5 and 9 and resistivity above 1,500 ohm-cm. CaCO_3 (hardness) levels do not affect service life.

GOOD

Galvanized

BETTER

Aluminized Type 2

Polymer-Laminated *100-Year + Service Life*

Polymer Laminate is a tough, heavy-gauge film that is laminated to both sides of galvanized steel to produce a corrosion and abrasion barrier for the most aggressive environments.

A proven performer with excellent adhesion

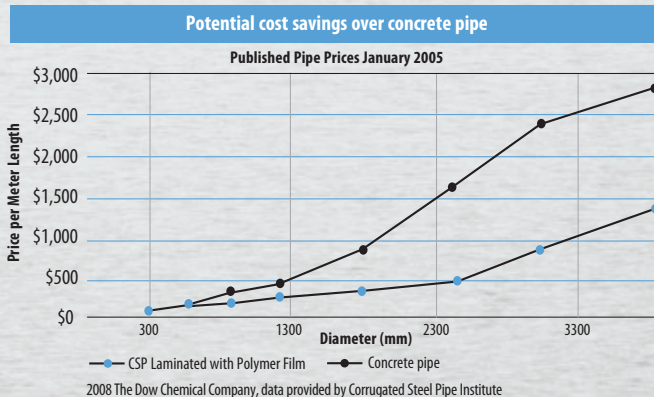


Thick Polymer Laminate is engineered to bond chemically and physically to galvanized steel to become an integral part of the galvanized surface that resists delamination, even under harsh conditions. Experienced

Polymer laminators have been coating galvanized steel for over 35 years to create CSP that outlasts and outperforms concrete pipe and other materials in test after test.

Resists abrasion and corrosion

Polymer-Laminated CSP will stand up to aggressive conditions with high concentrations of acids and alkalis to extend the environmental limits and life expectancies of where traditional galvanized CSP can be used. It performs well in both corrosive and moderate abrasion environments and provides a service life beyond 100 years, if pH is between 5 and 9 and resistivity is above 1500 ohm-cm². Service life is not affected by the CaCO₃ (hardness) level of water.



Potential cost savings

Polymer-Laminated CSP is less expensive across all diameters of concrete pipe. The exceptional durability of Polymer-Laminated CSP provides the potential for reduced lifecycle costs. Plus, CSP can be formed into longer nestable lengths that are substantially lighter than concrete, making it easier to transport and install.

1 For more information, refer to the Corrugated Steel Pipe Institute's Canadian Performance Guideline for Corrugated Steel Pipe Culverts: <http://www.cspi.ca/english/documents/CSPIPerformanceEngNov09.pdf>

2 Service life is reduced to 75 years for pH 4 to 9 and resistivity greater than 750 ohm-cm. In extreme conditions, with pH between 3 and 12 and resistivity above 250 ohm-cm, the service life is reduced to 50 years. 2008 The Dow Chemical Company.

BEST

Polymer-Laminated

Polymer-Laminated Steel: for the performance of a lifetime.

Even in some of the harshest conditions, Polymer-Laminated Corrugated Steel Products will consistently deliver outstanding design service life expectancies. The numbers say it all.*

Service life expectancies of Polymer Coating

Estimated Service Life ⁽³⁾	pH Levels	Resistivity
100 years	5 – 9	> 1500 ohm.cm
75 years	4 – 9	> 750 ohm.cm

⁽³⁾ When installed as recommended.

Physical properties of Polymer Coating

Properties	Test Method	Value ⁽⁴⁾
Color	—	Black
Film Thickness, mm (minimum)	— ASTM D 1005	0.254
Yield Tensile Strength, N/mm ²	MD ASTM D 882	10.7
	TD	10.3
Ultimate Tensile Strength, N/mm ²	MD ASTM D 882	20.7
	TD	19.3
Ultimate Elongation, %	MD ASTM D 882	470
	TD	490
2% Secant Modulus, N/mm ²	MD ASTM D 882	160
	TD	165
Elmendorf Tear Strength, g	— ASTM D 1922	2800-3200

⁽⁴⁾ Values are averages of typical film: not to be construed as specifications.

Physical and chemical resistance characteristics of Polymer Coating

Properties	Test Method	Value ⁽⁴⁾
Dielectric Strength, volts/mil	ASTM D 149	2200
Resistance to Acid, 10%, HCl	ASTM D 1308 ⁽⁵⁾	No Change
Resistance to Acid, 10%, HNO ₃	ASTM D 1308 ⁽⁵⁾	No Change
Resistance to Base, 10%, NH ₄ OH	ASTM D 1308 ⁽⁵⁾	No Change
Resistance to Base, 10%, NaOH	ASTM D 1308 ⁽⁵⁾	No Change
Resistance to Acid, 30%, H ₂ SO ₄	ASTM D 543, A 742	No Change
Resistance to Base, 10%, NaOH	ASTM D 543, A 742	No Change
Resistance to Salt, 10%, NaCl	ASTM D 543, A 742	No Change
Resistance to Chloroform ⁽⁶⁾ (trichloromethane)		No Change
Resistance to DMSO ⁽⁶⁾ (dimethylsulfoxide)		No Change
Resistance to Methylene Chloride ⁽⁶⁾ (dichloromethane)		No Change
Resistance to THF ⁽⁶⁾ (tetrahydrofuran)		No Change
Microbial Resistance	AASHTO M 246	No Attack
Adhesion, at 23°C (73°F)	ASTM D 903	Exceeds Tensile Strength of the Film
Imperviousness, 48 Hours Reagent Exposure	ASTM A 742	No Change
Resistance to Moist SO ₂ Attack, 40 cycles	Kesternich Method DIN 50018.2.0L	No Attack or Adhesion Loss
Cleveland Condensing Humidity Cabinet, 6 Months Exposure at 54°C (130°F)	ASTM D 2247-68	No Attack or Adhesion Loss
Weatherability, 3000 Hours	ASTM D 3361	No Cracking or Delamination
Hardness, Shore D, 10 sec	ASTM D 2240	46

⁽⁴⁾ Values are averages of typical film: not to be construed as specifications.

⁽⁵⁾ Exposure to the coated surface for 1400 hours at 23°C (73°F).

⁽⁶⁾ Test method: ISO 175, 28 days exposure at room temperature.

* Chart data from The Dow Chemical Company 2008.

Other Performance Options

Copolymer Coating on Structural Steel Plate

Copolymer Coating can be used on all or part of many types of plate structures to enhance their performance. The Copolymer Coating is engineered to bond chemically and physically to galvanized steel to become an integral part of the galvanized surface and resist delamination, even under harsh conditions. Ask your AIL Technical Representative about specialized coatings for our Super-Cor[®] and Bolt-A-Plate[®] structural plate products.

Corrugated Aluminum Pipe

AIL also offers a wide range of Corrugated Aluminum Pipe, fittings and accessories. Ask your AIL Technical Representative for more information.

Dur-A-Span™ Aluminum Structural Plate

An attractive alternative to coated steel, our corrosion/abrasion-resistant Dur-A-Span™ solid aluminum alloy structural plate products are ideal for saltwater and softwater conditions. Dur-A-Span™ is not affected by deicing agents that leech into waterways.



Atlantic Industries Limited
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For assistance in pricing, ordering, or unusual installations, call toll free in North America: 1-877-245-7473

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