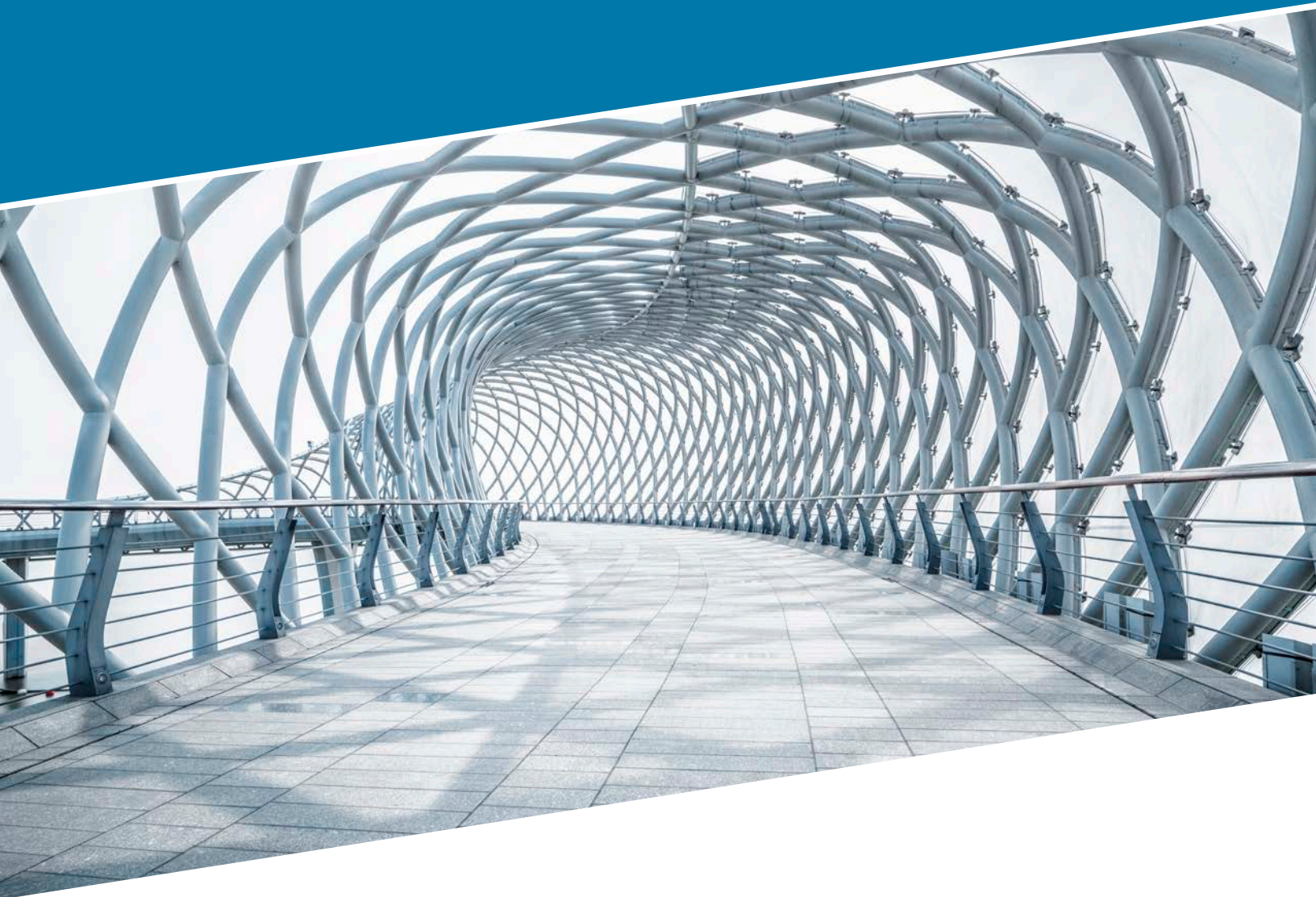


PPG ENVIROCRON® PRIMERON™ Powder Primer Series



High performance powder coatings
for corrosion protection



We protect and
beautify the world®

What is corrosion?

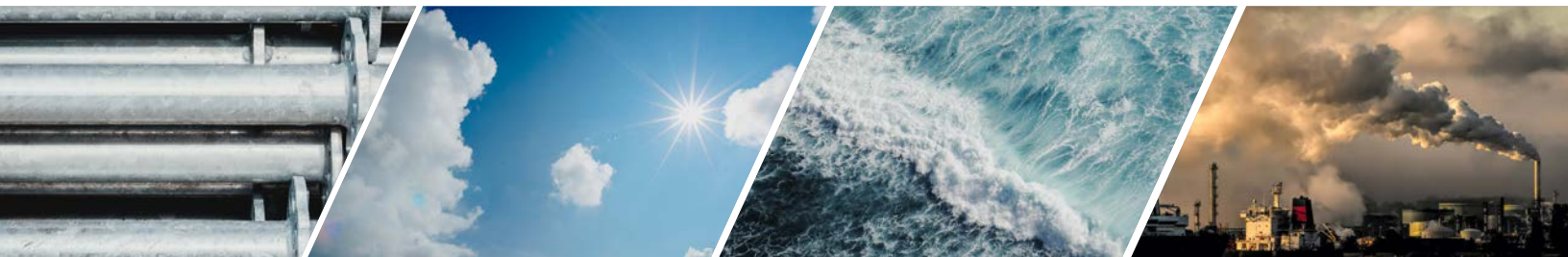
Corrosion is an **irreversible** chemical or electrochemical **reaction between a metal or metal alloy and its environment** leading to substrate **degradation**. The corrosion rate depends on the substrate (part) and environmental conditions.

Substrate and Part Conditions

- **Substrate:** chemical composition, macrostructure, microstructure
- **Part design:** different substrates, part design standards
- **Parts manufacturing:** macrostructure, surface aspect
- **Final use:** environmental & technical constraints, maintenance and cleaning

Environmental Conditions

- Water and humidity
- Atmosphere and air components such as oxygen, carbon dioxide, ozone content, air salinity, sulfur dioxide
- Ground
- Chemicals



Corrosivity Categories

The environmental conditions and, thus, the severity of the environmental impact can vary greatly depending on the region. For this purpose, EN ISO 12944-2 distinguishes between different corrosivity categories with examples of typical environments.

Cat.	Typical Environment	Class	ISO 6270-1 water condensation (h)	ISO 9227 neutral salt spray (h)	ISO 12944-6 cyclic aging (h)
C1	Indoor: Heated indoor spaces without elevated condensation.	low	-	-	-
		medium	-	-	-
		high	-	-	-
		very high	-	-	-
C2	Indoor: Unheated indoor spaces with increased condensation. Outdoor: Atmospheres with low level of pollution. Mainly rural areas.	low	48	-	-
		medium	48	-	-
		high	120	-	-
		very high	240	480	-
C3	Indoor: Production rooms with high humidity and low contamination. Outdoor: Urban and industrial atmospheres with moderate sulfur dioxide pollution. Coastal areas with low salinity.	low	48	120	-
		medium	120	240	-
		high	240	480	-
		very high	480	720	-
C4	Indoor: chemical facilities, swimming pools. Outdoor: Industrial areas and coastal areas with moderate salinity.	low	120	240	-
		medium	240	480	-
		high	480	720	-
		very high	720	1440	1680
C5	Indoor: Buildings with almost permanent condensation and heavy air pollution. Outdoor: Industrial areas with high humidity and aggressive atmosphere.	low	240	480	-
		medium	480	720	-
		high	720	1440	1680
		very high	-	-	2688
CX	Outdoor: Coastal and offshore areas with high salinity and industrial areas with extreme humidity.	low	-	-	-
		medium	-	-	-
		high	-	-	-
		very high	-	-	4200

Ways to avoid corrosion

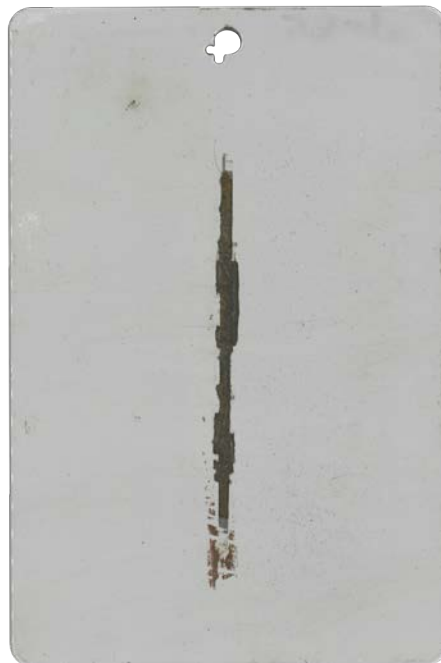
Metallic Alloy	Passivation	Cathodic Protection	Protection Layer
<p>Metallic alloys can also serve as corrosion protection. Alloys are often tin, copper, nickel or lead.</p>	<p>Electrochemical treatment to get a passive layer (salt or oxide on the ground metal) to reduce the chemical reactivity of metals and prevent corrosion spreading.</p>	<p>The metal surface is connected to another chemically active metal ("sacrificial metal"). Thus, the "sacrificial metal" reacts and corrodes instead of the ground metal.</p>	<p>Protection of ground metal with an impermeable / waterproof layer, separating the metal from environmental influences, e.g. layer of enamel or organic coating (paint).</p>

Increasing Durability

Protection Layer: Mono-Layer vs Dual-Layer Systems



Mono-layer System
Topcoat only
after 720h NSS



Dual-layer System
Primer + Topcoat
after 720h NSS

Protective layers are the most durable protection against corrosion. However, there is a performance difference between mono- and dual-layer coating systems.

As visible in the pictures on the left, a dual-layer system (primer + topcoat) significantly increases the corrosion performance both at the edges and the scribe. This is traced back to the reduced influence of the substrate and pretreatment.

PPG ENVIROCRON PRIMERON Primer Portfolio

Corrosion protection is a decisive factor for the durability of a part and one of the most significant challenges for the coating industry.

PPG's ENVIROCRON® PRIMERON™ primer product portfolio is designed to provide high corrosion resistance for substrates including steel, hot-dip-galvanized steel, metalized steel and aluminum substrates.

PPG has developed a full primer range, providing special product features to meet the various requirements depending on typical end use, its environments and the substrates used.

Suggested End Uses

Interior parts

Gas or liquid tanks and pipelines

Trucks, trailers, car parts

Agricultural and construction machinery

Application with high corrosion performance requirements

Qualisteelcoat Approval

All primers show very good corrosion resistance and have been tested accordingly to the corrosivity categories. The systems performances have been approved by Qualisteelcoat.



PRIMERON ZINC

PRIMERON ZINC coating is a **zinc-rich** primer offering strong corrosion protection.

PRIMERON PRO

PRIMERON PRO coating is a solid basic primer for **strong corrosion protection regardless of the pretreatment method**. Furthermore, the primer offers good mechanical performance with a well-balanced property profile.

PRIMERON EDGE

PRIMERON EDGE coating offers best-in-class corrosion protection for substrates with **sharp edges**. Furthermore, the primer system is optimized for **degassing substrates**.

PRIMERON FLEX

PRIMERON FLEX coating provides very good corrosion protection for **multiple substrates** including aluminum and different pretreatment methods.

The ENVIROCRON PRIMERON Performance Overview

Recommended Substrates

Substrate	Pretreatment	ZINC	PRO	EDGE	FLEX
Steel	Chemical		X	X	X
Steel	Mechanical	X	X		
Hot-dip galvanized	Chemical		(X)	X	X
Hot-dip galvanized	Mechanical		(X)	X	X

Corrosion Resistance Performance

Primer	Substrate	Pretreatment	C2	C3	C4	C5
ZINC	Steel	Chemical				
	Steel	Mechanical				
	Hot-dip galvanized	Chemical				
	Hot-dip galvanized	Mechanical				
PRO	Steel	Chemical				
	Steel	Mechanical			ST2 C4H*	
	Hot-dip galvanized	Chemical				
	Hot-dip galvanized	Mechanical				
EDGE	Steel	Chemical			ST2 C4H*	
	Steel	Mechanical				
	Hot-dip galvanized	Chemical				
	Hot-dip galvanized	Mechanical				
FLEX	Steel	Chemical			ST2 C4H*	
	Steel	Mechanical				
	Hot-dip galvanized	Chemical				HD2 C5H*
	Hot-dip galvanized	Mechanical				HD2 C5H*

*Approved by Qualisteelcoat, other performance indications based on lab test results

Key Feature Summary

Substrate	ZINC	PRO	EDGE	FLEX
Key Features	Zinc primer	Balanced features, low consumption, good mechanical properties, high chemical resistance	Edge protection, very good edge coverage, hides casting defects, suitable for degassing substrates	Suitable for different substrates , good intercoat adhesion, no delamination, good over-curing behavior
Chemistry	Epoxy	Epoxy	Epoxy	Epoxy-Polyester
Color & Finish	dark gray, semi gloss smooth	medium gray, semi gloss smooth	medium gray, matt smooth	dark gray, matt smooth
Overall Corrosion Performance	★ ★	★ ★ ★	★ ★ ★	★ ★
Edge Protection	★	★	★ ★ ★	★
Mechanical Properties	★ ★	★ ★ ★	★ ★	★ ★
Consumption	★	★ ★	★ ★ ★	★ ★ ★
Density	2,9 g/m ³	1,7 g/m ³	1,5 g/m ³	1,5 g/m ³
Process Stability	★ ★	★ ★ ★	★ ★ ★	★ ★ ★

★ good ★ ★ strong ★ ★ ★ very strong

PPG ENVIROCRON PRIMERON ZINC

*A zinc-rich primer
for strong corrosion
protection*



PPG ENVIROCRON® PRIMERON™ ZINC is a **zinc-rich primer** offering strong corrosion protection.

Product Characteristics and Benefits

- Zinc-rich formulation
- Good corrosion performance on mechanically pre-treated steel
- Very good flow and appearance
- Low bake capabilities



Properties	Test Method	Value
Color		dark gray
Surface		semi-gloss, smooth
Gloss at 60°	ISO 2813	60-80 gloss units
Specific Gravity	Calculated	2,94 g/cm ³
Impact Resistance	ISO 6272 / ASTM D2794	40 inlb direct 20 inlb reverse
Adhesion	ISO 2409	GTO
Conical Mandrel	ISO 6860	0-10 mm

Partial Curing	
7 - 10 min	130°C
5 - 7 min	140°C
3 - 5 min	150°C

Full Curing	
25 - 30 min	140°C
20 - 25 min	150°C
15 - 20 min	160°C

Storage Condition
12 months / 30°C

PPG ENVIROCRON PRIMERON PRO

*An allrounder primer
with balanced
features*



PPG ENVIROCRON® PRIMERON™ PRO is a solid basic primer for **strong corrosion protection regardless of the pretreatment method**. Furthermore, the primer offers good mechanical performance with a well-balanced property profile.

Product Characteristics and Benefits

- Strong corrosion resistance regardless of the pretreatment method
- Very good flow and appearance
- Good mechanical properties
- High chemical resistance
- Good application stability
- Low consumption
- Specifically formulated without zinc NIA*

Qualisteelcoat Approvals

- PE-0162 - ST2 Mechanical, C4H

Properties	Test Method	Value
Color		medium gray
Surface		semi-gloss, smooth
Gloss at 60°	ISO 2813	60-80 gloss units
Specific Gravity	Calculated	1,67 g/cm ³
Impact Resistance	ISO 6272 / ASTM D2794	20 inlb direct 20 inlb reverse
Adhesion	ISO 2409	GTO
Conical Mandrel	ISO 6860	0-10 mm

Partial Curing	
7 - 10 min	130°C
5 - 7 min	140°C
3 - 5 min	150°C

Full Curing	
20 - 25 min	170°C
15 - 20 min	180°C
10 - 15 min	190°C

Storage Condition
24 months / 30°C

*Not intentionally added

PPG ENVIROCRON PRIMERON EDGE

*A primer for
best-in-class
edge protection*



PPG ENVIROCRON® PRIMERON™ EDGE offers best-in-class corrosion protection for substrates with **sharp edges**. Furthermore the primer system is optimized for **degassing substrates**.

Product Characteristics and Benefits

- Strong corrosion protection
- Enhanced edge coverage
- Very good coverage of casting defects
- Very good flow and appearance
- High chemical resistance
- Very good results on degassing substrates
- Low consumption
- Specifically formulated without zinc NIA*

Qualisteelcoat Approvals

- PE-0161 - ST2, Chemical, C4H



Edge Panels 480h NS

Panel Left: Topcoat without primer

Panel Middle: standard primer + topcoat

Panel Right: PRIMERON EDGE + topcoat

Properties	Test Method	Value
Color		medium gray
Surface		matt, smooth
Gloss at 60°	ISO 2813	15-30 gloss units
Specific Gravity	Calculated	1,54 g/cm ³
Impact Resistance	ISO 6272 / ASTM D2794	40 inlb direct 20 inlb reverse
Adhesion	ISO 2409	GTO
Conical Mandrel	ISO 6860	0-10 mm

Partial Curing	
7 - 10 min	130°C
5 - 7 min	140°C
3 - 5 min	150°C

Full Curing	
20 - 25 min	170°C
15 - 20 min	180°C
10 - 15 min	190°C

Storage Condition
24 months / 30°C

**Not intentionally added*

PPG ENVIROCRON PRIMERON FLEX

*A versatile primer
for multi-substrate
use*

PPG ENVIROCRON® PRIMERON™ FLEX provides very good corrosion protection for **multiple substrates** including aluminum and different pretreatment methods.

Product Characteristics and Benefits

- Strong corrosion protection
- Suitable for various substrates
- Very good flow and appearance
- High chemical resistance
- Good application stability
- Good intercoat adhesion, compatible with a wider range of topcoats
- Low consumption
- Specifically formulated without zinc NIA*

Qualisteelcoat Approvals

- PE-0163 - ST2, Chemical, C4H
- PE-0165 - HD2, Chemical, C5H
- PE-0166 - HD2, Mechanical, C5H

Properties	Test Method	Value
Color		dark gray
Surface		matt, smooth
Gloss at 60°	ISO 2813	20-40 gloss units
Specific Gravity	Calculated	1,54 g/cm ³
Impact Resistance	ISO 6272 / ASTM D2794	40 inlb direct 20 inlb reverse
Adhesion	ISO 2409	GTO
Conical Mandrel	ISO 6860	0-10 mm

Partial Curing	
7 - 10 min	130°C
5 - 7 min	140°C
3 - 5 min	150°C

Full Curing	
20 - 40 min	170°C
15 - 35 min	180°C
10 - 25 min	190°C

Storage Condition
24 months / 30°C

*Not intentionally added



PPG: WE PROTECT AND BEAUTIFY THE WORLD®



A trusted global coatings leader

Operations in 70+ countries, with 100+ manufacturing facilities and ~50,000 employees



Renowned color expertise

Trend-setting palettes for home, auto and industry paired with unrivaled color matching



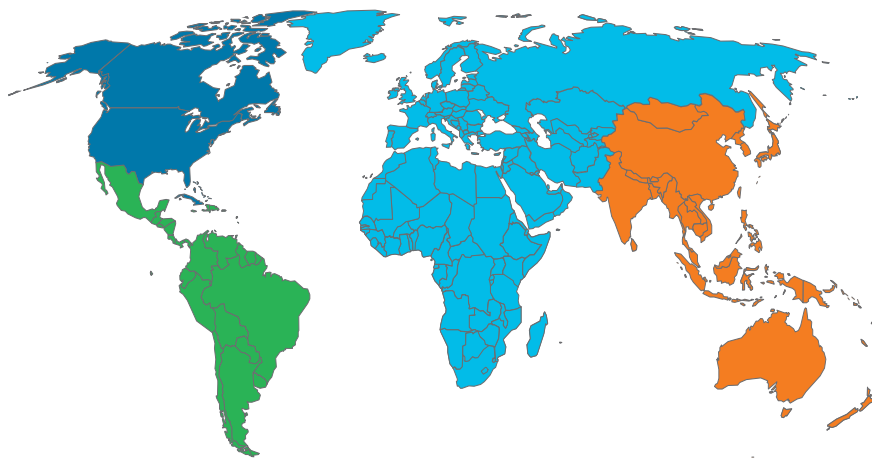
Commitment to sustainability

Over 38% of annual sales from sustainably advantaged products and processes



Dedication to innovation

3,500+ technical employees and \$463 MM average annual R&D investment



Industrial coatings from PPG

- World-class technical services and training
- Help meeting specific, coatings-related environmental mandates
- Assistance setting up new equipment and identifying areas where your processes may be streamlined
- Troubleshooting production issues
- SECURE LAUNCH EXCELLENCE® accelerated custom product formulation and color development process

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