

Industrial Coatings from PPG

Presenter Name or Date



PPG is a global maker of paints, coatings and specialty materials





We are a recognized leader in...





Two product segments **\$15.1B** business*

Performance Coatings: 60%



Aerospace



Architectural Coatings**

Industrial Coatings: 40%



Automotive OEM Coatings



Industrial Coatings



Automotive Refinish Coatings

Protective and Marine Coatings



Packaging Coatings



Specialty Coatings and Materials



We deliver value beyond the surface

Your	Differentiated	Manufacturing	Ease of Doing	Value Chain	Long-Term
priorities:	Products	Performance	Business	Support	Partnership
	Color,	Cost,	Reliability,	Approvals,	Innovation,
	durability,	application,	flexibility,	relationships,	solutions,
	functionality	sustainability	globality	insight	trust
PPG offers:	Global leader in coatings R&D	Line optimization and cost savings	Secure Launch, customized conversion plans	OEM-tier approval coordination	Co-development and trend prediction
	Full-technology	Application	Supportive	Customer	Solutions
	portfolio of	expertise and	commercial	and supplier	beyond
	products	robust platforms	partnerships	networks	coatings
	Color styling,	Environmentally	Global and	Market	Ethical
	design and	responsible	regional service	relationships	standards and
	matching	solutions	and delivery	and intelligence	integrity



A global R&D leader



PPG coatings innovation center Allison Park, PA

Core activities Synthesis, Formulation, Application, Analytical capability



Average investment annually over the last 4 years in R&D



250+ researchers focused on developing market-changing coatings technology



500+ patents in past 10 years



Greater investment in R&D than any other coatings company





Impacting the communities around us: The COLORFUL COMMUNITIES[™] Program







Our sustainability vision

We are committed to delivering lasting value for shareholders and customers by operating with integrity, working safely, respecting the contributions of our people, preserving the environment and supporting the communities where we operate.







We are committed to sustainability

2025 Goals

40% of sales from sustainable products and processes by 2025

25% reduction in total waste disposal intensity by 2025 from a 2017 baseline

Reduce GHG emissions intensity by **15%** measured in total tons discharged by 2025 from a 2017 baseline

65% per year improvement in our spills and releases rate by 2025 from a 2017 baseline

On our path to zero injuries, we achieve an improvement of at least **5%** per year in our injury and illness rate

Implement wellness programs at **100%** of PPG facilities globally by 2025

Invest at least **\$10 million** by 2025 through the COLORFUL COMMUNITIES[™] initiative

2019 Progress





We believe in the value of a diverse workforce

Our global workforce comprises a wide variety of cultures, languages, nationalities, religions, ethnicities, and professional and educational backgrounds across an array of business units and geographic locations. A rich blend of perspectives and experiences is requisite to understanding and serving our customers' needs, resolving the challenges that lie ahead of us, and ensuring that we continue to be successful and grow.

Michael McGarry Chairman & Chief Executive Officer





An industry leader in Environmental Health and Safety standards

We are committed to:

Designing, building and operating in ways that:

- Make a **positive contribution** to the surrounding community and society
- Prevent harm to employees, public health and the environment
- Conserve energy, water and raw materials
- Integrate pollution prevention

Implementing initiatives to improve employee safety, health and well-being, reducing injury and illness rates

Creating **global processes** to track new regulations and emerging issues





Did you know?

PPG paints and coatings are used to protect and enhance some of the world's best-known products, landmarks and brands...





Industrial Coatings



We are proud to serve these primary markets...



Transportation



Automotive Parts and Accessories



Heavy Duty Equipment



eel



Coil Coatings



Interior Building Products



Consumer Electronics



Kitchenware and Industrial Bakeware



Appliance



General Industrial





Office Furniture and Equipment



We are one of the few suppliers offering products and capabilities in every major coatings technology









Pretreatment



A complete line of pre-treatment products and a variety of other solutions that strengthen, protect and enhance the production and presentation of products.

PPG ZIRCOBOND®

Zircobond pretreatment products cut sludge by-product from the pretreatment process by at least 80 percent compared to zinc-phosphate-based products. As an added benefit, Zircobond can be used in existing pretreatment lines.

PPG X-BOND®

X-Bond zirconium-based, thin-film pretreatment system prepares steel, galvanized steel and aluminum substrates for optimum paint adhesion. With performance equivalent to that of iron phosphates, it provides excellent corrosion resistance and is compatible with low application temperatures.

PPG VERSABOND®

Versabond is a fast, kinetic-efficient zinc-phosphate pretreatment system that improves corrosion resistance on mixed-metal substrates while enabling manufacturers to realize the benefits of extended bath life, reduced sludge and lower processing temperatures.





Electrocoat



As a pioneer and global leader in this technology, PPG offers a comprehensive mix of anodic and cathodic products in epoxy, acrylic and other formulations.

PPG POWERCRON® ADVANTAGE

Specifically engineered to provide high-edge protection of cut, stamped or formed edges on complex metal parts. Cure temperatures as low as 320°F (160°C) can help manufacturers reduce energy costs and related carbon emissions.

PPG FRAMECOAT® II

PPG's high-performance cationic epoxy electrocoat technology that provides excellent edge coverage with the added benefit of an improved surface profile. Formulated without lead, it is a state-of-the-art electrodeposition primer formulated to deliver improved corrosion resistance for automotive parts and light-truck chassis components.

PPG ELECTROPOLYSEAL®

Designed specifically for bulk applications, this system offers excellent corrosion protection, outstanding adhesion and precise torque control in a range of performance options. A perfect fit for fasteners and other small parts, Electropolyseal e-coat does not fill recessed heads or threads.





Liquid Coatings



Our liquid coatings technology provides exceptional durability and appearance, delivering a complete line of alkyds, urethanes, epoxies and acrylics.

PPG SPECTRACRON VRP Liquid®

A very robust platform, Spectracron VRP 2K epoxy primer provides corrosion protection over a variety of substrates and conditions. Available in a variety of colors, this technology allows for flexible and efficient OEM application on an assortment of substrates.

PPG DURANAR®

Duranar liquid extrusion and coil coatings are available in a vibrant palette of solid, metallic and mica formulations that add exceptional durability to architectural metals. One of the most trusted architectural products, these coatings have protected buildings of distinction around the world for over 50 years.

PPG SPECTRACRON® Ultra-Durable Monocoat

Spectracron UDM is a one-component carbamate acrylic coating technology designed to bring exceptional durability to the steel wheel market without having to apply a clearcoat. This coating is available in solid and metallic colors with a wide gloss range for customizable finishes.





Powder Coatings



PPG's comprehensive mix of acrylic, epoxy, polyester, epoxy polyester hybrid and urethane coatings can answer virtually any application challenge.

PPG ENVIROCRON® EXTREME PROTECTION EDGE

Delivers extreme corrosion protection on sharp, hard-to-coat edges in just one coat. With a higher first-pass transfer efficiency, reduced powder usage and 20+ micron edge coverage, this patent-pending breakthrough is ideal for laser, fiber, CO2 plasma cut and sharp edges, louvers, blades and mesh.

PPG ENVIROCRON® HIGH TRANSFER EFFICIENCY (HTE)

Envirocron HTE powder is ideal for complex, difficult-to-coat surfaces. Available in durable and ultra-durable proprietary formulations, this innovation helps to increase output while reducing material usage, energy consumption and maintenance costs with first-pass transfer rates of up to 85 percent.

PPG CORAFLON PLATINUM (AAMA 2605)®

Coraflon Platinum fluoropolymer powder combines the benefits of one-coat capability with high gloss, outstanding color retention and resistance to chalking and abrasions. It is ideal for monumental buildings, doors, window frames and railings.





Outsourcing solutions for every major coatings technology



PPG works with our OEM partners around the world to deliver comprehensive coating solutions.

Our flexible, innovative service offerings include:

- Equipment design and construction
- Process optimization and troubleshooting
- End-to-end coating operation management





Ensuring success with the SECURE LAUNCH EXCELLENCE™ Program

A four-phase process that accelerates the development of new coatings, colors and formulations, and transitions them quickly and seamlessly into your manufacturing processes.



Phase I Documenting customer requirements



Phase II Product development and application validation



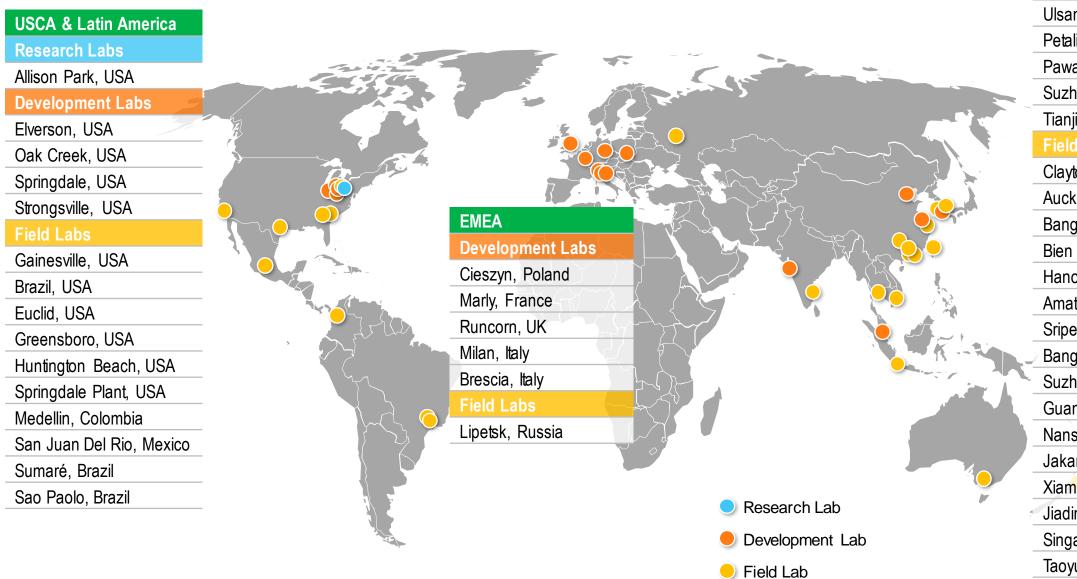
Phase III Production trial planning and execution



Phase IV Product commercialization and production review

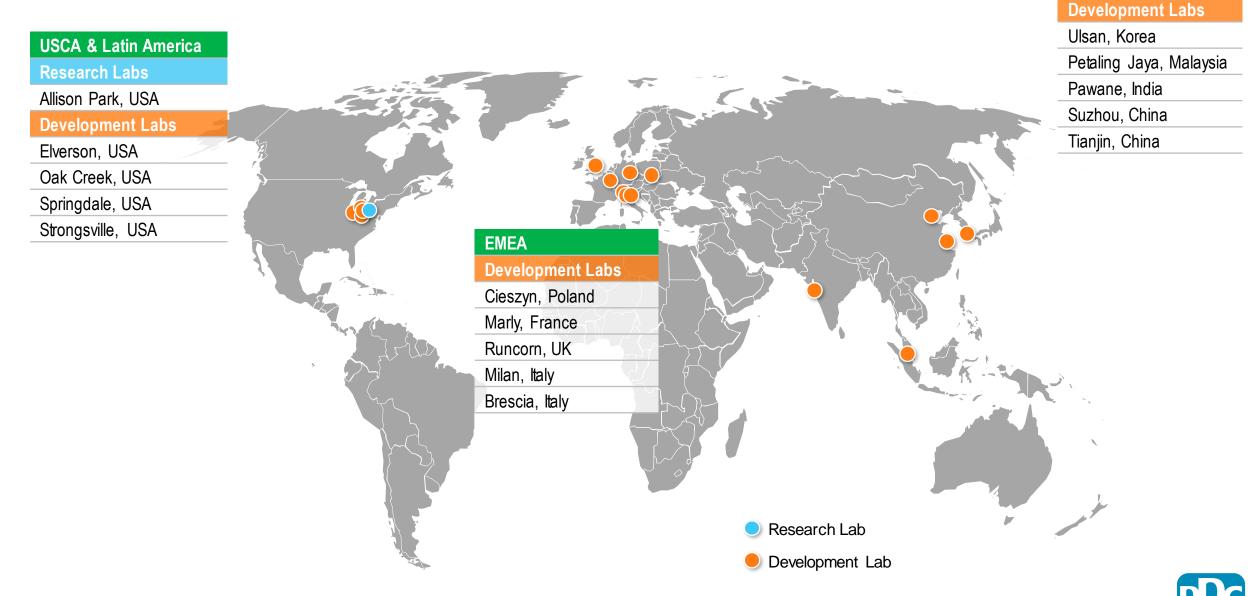


Global R&D labs & field labs



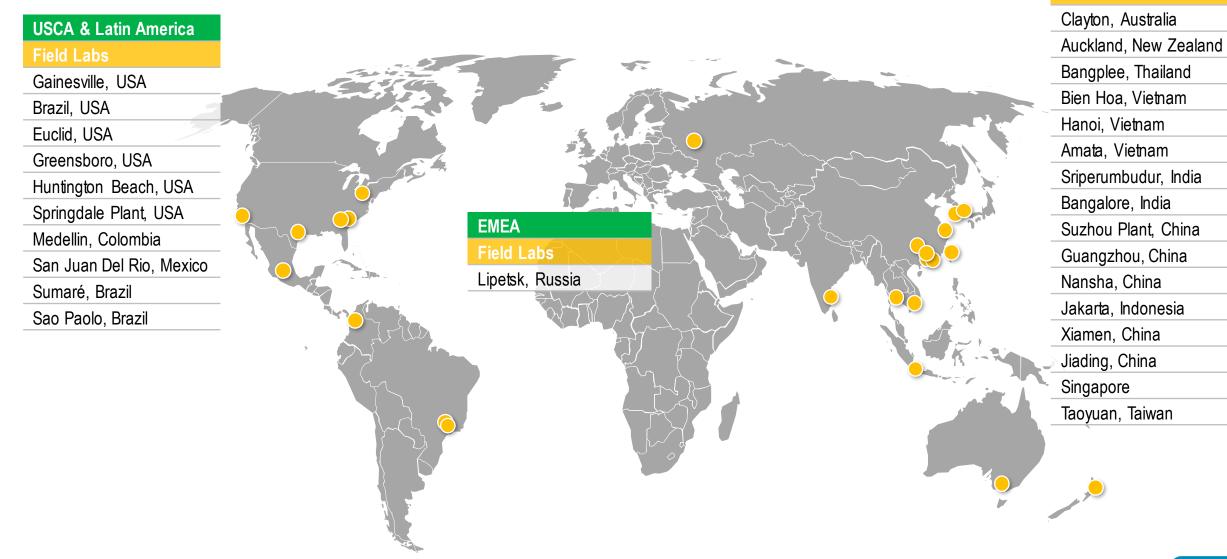
AP **Development Labs** Ulsan, Korea Petaling Jaya, Malaysia Pawane, India Suzhou, China Tianjin, China Field Labs Clayton, Australia Auckland, New Zealand Bangplee, Thailand Bien Hoa, Vietnam Hanoi, Vietnam Amata, Vietnam Sriperumbudur, India Bangalore, India Suzhou Plant, China Guangzhou, China Nansha, China Jakarta, Indonesia Xiamen, China Jiading, China Singapore Taoyuan, Taiwan

Global R&D labs



AP

Global field labs





AP

Global manufacturing plants

USCA & Latin America	
Manufacturing	
Brazil, USA	\odot
Brazil, USA	
Elverson, USA	
Euclid, USA	
Fostoria, USA	\odot
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	Saultain, France	
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	Jiangmen, China		
	Nansha, China		
	Tianjin, China		<i>(</i>)
	Zhangjiagang, China		R
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	Hanoi, Vietnam		
	Ho Chi Minh, Vietnam		

Pretreatment & Specialty Coatings

Ultraviolet and Electrobeam

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Resins

Electrocoat

Delivering global color expertise across multiple industries

A global leader in color styling and trends, PPG defines color direction for more surfaces and across more industries than any other coatings company in the world.

Working with leading original equipment manufacturers and product designers, our color stylists and chemists offer inspiring color services that deliver the ideal shade, tone, value and saturation every time, expertly taking color from conception to the market with batch-after-batch consistency.





PPG coatings for fasteners



Technical Considerations- Construction



Performance

- Life expectancy
- Salt spray resistance
- Corrosion resistance
- Chemical resistance
- Torque precision

- No part-to-part sticking
- Chip and impact resistance
- Outstanding adhesion
- UV resistance
- Field maintenance

Design

- Coating thickness
- Color consistency and coverage
- Will not fill recesses or threads
- Extensive color palette
- Smooth/non-reflective finish option

Multi-technology/multi & single-layer systems









Performance Standards- Construction

- ASTM B117: Salt Spray Resistance
- SAE J2334: Accelerated Cyclic Corrosion
- ASTM 735: Humidity Resistance
- ASTM F1136: Corrosion Protection
- ASTM B571: Coating Adhesion
- ASTM D1308-02R13: Chemical Resistance
- ISO 16047: Torque Precision
- SAE J400: Chip Resistance





Technical Considerations-Oil & Gas



Performance

- Wearlife
- Salt spray resistance
- Corrosion resistance
- Chemical resistance
- Torque precision

- Mar and abrasion resistance
- Outstanding adhesion
- UV degradation
- High temperature resistance (500°F)



Design

- Coating thickness
- Color consistency and coverage
- Will not fill recesses or threads
- Extensive color palette
- Smooth/non-reflective finish option

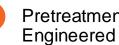
Multi-technology / multi & single-layer systems



Liquid Coatings



Electrocoat







Performance Standards- Oil & Gas

- ASTM B117: Salt Spray Resistance
- SAE J2334: Accelerated Cyclic Corrosion
- ASTM 735: Humidity Resistance
- ASTM F1136: Corrosion Protection
- ASTM B571: Coating Adhesion
- ASTM D1308-02R13: Chemical Resistance
- ISO 16047: Torque Precision
- SAE J400: Chip Resistance





PPG product offering: application and system example

Coated substrates: individual layers and/or system

Coatings and Materials for:

Metal

Steel

- Aluminum
- Alloys
- Glass
- Fiber Glass

• Plastic

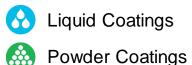
Concrete

Non-Metal

- Wood
- Composites

- **Functionality:**
- Decorative coatings
- Soft-touch coatings
- Sound insulation coatings
- Sealants and adhesives

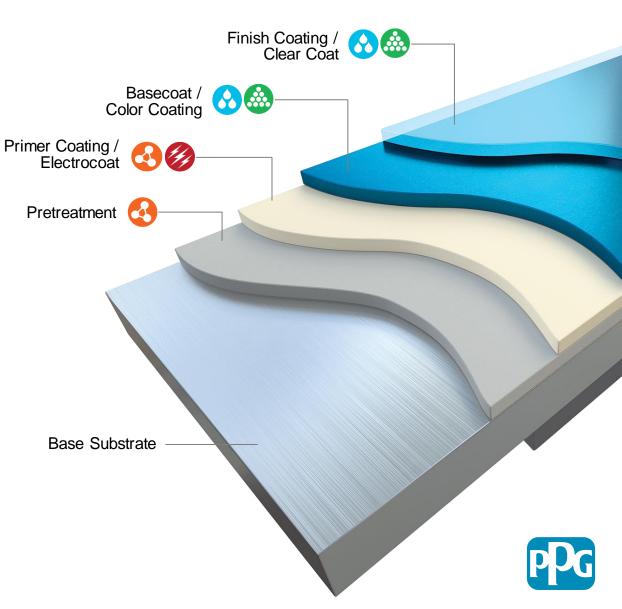
PPG Technologies





Pretreatment and **Engineered Products**

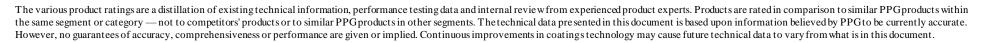
Electrocoat





Powder Coatings

Features	Potential Customer Benefits	Oil & Gas	Construction
Outstanding corrosion resistance (ISO 12944-6 C5-M)	Protects assets in industrial and seacoast locations (harsh environments)	\checkmark	\checkmark
Semi-conductive properties reduce back ionization	Improves topcoat transfer efficiency	\checkmark	\checkmark
Smooth profile for application of topcoat layers	Reduces rework to achieve desire appearance	\checkmark	\checkmark
Excellent exterior durability	Protects and maintains longevity of product color and appearance	\checkmark	\checkmark
Good chemical resistance	Protects surface from incidental chemical contact	\checkmark	\checkmark
Low cure capabilities (250°F)	Reduces energy consumption and process cost	\checkmark	\checkmark



Availability	Technology	Coating Type	Chemistry	Substrates
USCA	Powder	Primer and Topcoat	Semi-Conductive Zinc Ultra Epoxy & Ultra durable Epoxy	Metal or Steel





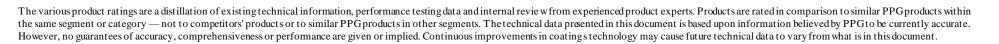
Suggested Markets

Construction

Oil & Gas



Features	Potential Customer Benefits	Oil & Gas	Construction
Low friction & extreme temperature options	Provides optimum combination of low friction, wear resistance and high temperature release for component efficiency and durability	\checkmark	
Film hardness and durability	Outstanding abrasion-resistance for better asset longevity	\checkmark	
Mar and abrasion protection	Protects assets and increases product life span	\checkmark	
Bright color palette	Allows for easy identification of component parts	\checkmark	Multiple coat only
Corrosion resistance	Reduces make-up and break-out torque, even after prolonged exposure to corrosive environments.	\checkmark	Multiple coat only
UV resistance	Provides stain-resistance and easy-clean capabilities		\checkmark
Compatible with zinc phosphate pretreatment, zinc or zinc-nickel plating	Allows for incorporation into various coating systems		\checkmark



Oil & Gas

Construction

Suggested Markets



Availability	Technology	Coating Type	Chemistry	Substrates
USCA	Liquid	Single & Multiple Coats	PAI/PTFE, Epoxy, Silicone Polyester, Epoxy-Phenolic	Metal or Steel

SPECTRACRON[®]

Liquid Coatings

Features	Potential Customer Benefits	Oil & Gas*	Construction
Fast drying & easy application	Lowers cost and increases throughput	\checkmark	\checkmark
Wide color palette	Provides differentiation through color	\checkmark	\checkmark
Corrosion resistance	Protects assets and increases product longevity	\checkmark	\checkmark
Lower cure temperature available (20min at 400°F, or as low as 325°F)	Protects surfaces with high blast profiles	\checkmark	\checkmark
Dip tank capable	Lowers costs with higher transfer efficiency with small complex parts	\checkmark	\checkmark
Torque capabilities (Range: 0.15 CoF +/-0.3 to 0.20 CoF +/-0.3)	Low coefficients of friction reduce and improve the uniformity of make-up torque	\checkmark	\checkmark
The various product ratings are a distillation of existing techn	ical information, performance testing data and internal review from experienced pro	oduct experts. Products are rated in com	parison to similar PPG products within

the same segment or category — not to competitors' products or to similar PPG products in other segments. The technical data presented in this document is based upon information believed by PPG to be currently accurate.

However, no guarantees of accuracy, comprehensiveness or performance are given or implied. Continuous improvements in coatings technology may cause future technical data to vary from what is in this document.



PPG Segments

Construction

Oil & Gas

*Product Codes PT10005 to PT10025 not applicable to oil & gas industry

	Availability	Technology	Coating Type	Chemistry	Substrates
35	USCA	Liquid (Solventborne & Waterborne)	Primer & Topcoat	Inorganic Polymer, Aluminum- Rich Epoxy-Polymer, Alkyd	Metal or Steel



Features	Potential Customer Benefits	Oil & Gas*	Construction
Application uniformity and consistency	Will not fill recesses or threads and lowers cost and increases throughput	\checkmark	\checkmark
Wide color palette	Provides differentiation through color	\checkmark	\checkmark
Accelerated cyclic corrosion protection	Protects assets and increases product longevity	\checkmark	\checkmark
Chip and impact protection (SAE J2334)	Protects surfaces with high blast profiles	\checkmark	\checkmark
Specially formulated without chrome or lead	Meets specific customer requirements	\checkmark	\checkmark



Precise torque control (ISO 10647) Low coefficients of friction reduce and improve the uniformity of make-up torque / /

The various product ratings are a distillation of existing technical information, performance testing data and internal review from experienced product experts. Products are rated in comparison to similar PPG products within the same segment or category — not to competitors' products or to similar PPG products in other segments. The technical data presented in this document is based upon information believed by PPG to be currently accurate. However, no guarantees of accuracy, comprehensiveness or performance are given or implied. Continuous improvements in coatings technology may cause future technical data to vary from what is in this document.

PPG Segments

Construction

Oil & Gas

*Electropolyseal III not applicable to oil & gas

Availability	Technology	Coating Type	Chemistry	Substrates
USCA	E-coat	Zinc phosphate, zinc-rich base coat, zinc or zinc-rich nickel plating	Epoxy, Acrylic	Metal or Steel



Chemistry	Features	Potential Customer Benefits	Oil & Gas	Construction	
	Low temperature (85-120°F)	Provides energy savings and protection of temperature-sensitive parts	\checkmark	\checkmark	
Alkaline Cleaner	Soil loading capacity Reduces dumping and bath recharging		\checkmark	\checkmark	
	Process versatility	Handles wide variety of parts	\checkmark	\checkmark	



PPG Segments



T TOU OUTHON					Construction
Chemistry	Features	Potential Customer Benefits	Oil & Gas	Construction	Oil & Gas
	Blend of sulfuric and phosphoric acid	Blend of acids makes it operationally easier to use.	\checkmark	\checkmark	
Acid Pickler/ Descaler	Low temperature (Ambient-120°F)	Increases energy savings from reduced natural gas consumption	\checkmark	\checkmark	
	Weld cleaning	Improves performance on weld areas.	\checkmark	\checkmark	

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Chemistry	Features	Potential Customer Benefits	Oil & Gas	Construction
	Sludge reduction	Reduces tank dumps	\checkmark	\checkmark
Zinc- Phosphate	Chemical and corrosion resistance	Protects assets and increases product longevity	\checkmark	\checkmark
	System versatility + expanded process	Handles variety of substrate requirements + provides multi-metal capabilities	\checkmark	\checkmark



Sector 21 COBOND® Pretreatment

				Construction
Chamiotry		Retential Customer Repolite	Construction	COnstruction
Chemistry	Features	Potential Customer Benefits	Construction	Oil & Gas
	Process versatility	Widens substrate options	\checkmark	
Thin Film -	Low temperature (60-115°F)	Increases energy savings with less natural gas consumption	\checkmark	
Zirconium	E-coat compatibility	Increases performance with e-coat technologies	\checkmark	
	Chemical and corrosion performance	Protects assets and increases product longevity	\checkmark	

PPG Segments

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Fastener Product Matrix

Technology	Product	Chemistry	Product Code	Color
Dourdon	ENVIROCRON [®]	Semi-Conductive Zinc Ultra Epoxy Primer	PCMT70101	Dark Gray
Powder	ENVIROCRON	Ultradurable Polyester Topcoat	PCTT99115	Black
			SPR67868A	Dark Gray
		Zinc-Rich Inorganic Polymer Primers	SPR67868B	Silver
	SPECTRACRON®		SEP70958A	Silver
		Aluminum-Rich Epoxy-Polymer Topcoats	SEP70958B	Silver
			SEP70958C	Silver
	Spincoat	Alkyd Topcoat	PT10005 to PT10025	Full Color Pallette
	Xylan	PAI/PTFE – Single Coat	1010	Multiple
			1014	Medium Blue, Black, Green, Yellow
Liquid			1070	Black, Dark Blue, Green, Gray, Light Blue, Yellow, Brown
		Epoxy – Single Coat	1270	Multiple
			1424	Dark Blue, Yellow, Orange, Red, Green, Blue, Black
			1427	Multiple
		Silicone Polyester – Single Coat	1514	Multiple
		Epoxy – Multiple Coats	5230	Black, Dark Blue, Silver-Gray
		Silicone Polyester – Multiple Coats	5164	Multiple
		Epoxy-Phenolic – Multiple Coats	5250	Multiple



Fastener Product Matrix

Technology	Product	Chemistry	Product Code	Color
	ULTRAX [™] 94D	Alkaline Cleaner	UT94D	N/A
	CORROSOL™	A sid Disklar (Descalar	COR851S	N/A
	CORROSOL	Acid Pickler / Descaler	COR890S	N/A
Pretreatment	CHEMFOS® Zinc-Phosphate Pretreatment	CF700/710V VERSABOND™	N/A	
and Engineered Products			CF810	N/A
	ZetaPhos LS	Lloga, Zing Dheenhote Drotreatment	eatment PT36214 N/A PT75200 N/A	N/A
	IRCO BOND® Z24	Heavy Zinc-Phosphate Pretreatment		N/A
	ZIRCOBOND® 4200	Thin-Film Zirconium Pretreatment	ZB4200	N/A
	RUSTAREST [™] 53253	Rust-Preventative Soluble Oil	RA53	N/A

		ELECTROPOLYSEAL® III	Zinc-Phosphate Pretreatment + POWERCRON® XP Epoxy Electrocoat		
	Electrocoat Systems	Electropolyseal IV	Zinc-Phosphate Pretreatment + Zinc- Rich Basecoat + <i>Powercron</i> XP Epoxy or <i>Powercron</i> AL Acrylic Electrocoat	Powercron XP Powercron AL	Black, Brown, Green, Gray, Tan, Dark Green, Silver, Gold, Blue, Gold Metallic, Sandstone, Redwood
		Electropolyseal V	Zinc or Zinc-Nickel Plating + <i>Powercron</i> XP Epoxy or <i>Powercron</i> AL Acrylic Electrocoat	Powercron XP Powercron AL	

