AXALTA

Specification Guide

Right-of-Way Equipment Rail

RIGHT-OF-WAY EQUIPMENT

Right-of-Way Equipment is a broad market ID for any equipment used for maintenance on the railway, around the railway, and in the construction of the railway. Some coating needs are as mundane as paint for fire hydrants. Other applications require high performance systems.

- Concrete Mixers (road repair)
- Rail Maintenance Vehicles
- Rail Cars – Track Maintenance
- Pick-Up Trucks
- Forged Parts
- Containers
- Rail Cranes

All systems may be applied to various substrates and various re-paint cycles. Various Axalta Coating Systems product systems may be used, including industrial Imron®, Corlar®, Tufcote®, as well as Cromax® and Nason® product systems.

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Introduction

The Axalta paint products listed in this guide are used for painting rail support systems.

<u>This Rail Guide Contains</u>:

- Surface preparation information.
- Systems and application recommendations
- Paint system specifications for locomotives and railcars of various designs.
- Brief paint product and system descriptions for the rail segment.
- VOC information.

This guide will assist the specifier in choosing the correct coating for the locomotive or railcar applications. At Axalta, the correct coating is defined as one that is applicator friendly, provides corrosion protection and improves communicates our customer's image by using Axalta brand products including Corlar® and Imron®.

To locate your nearest Axalta Coating Systems Distributor or for additional information, visit our website, axalta.us or call 1 855 6 AXALTA.

Axalta has a rich heritage as a leader in the paint and coatings business since entering the market in 1918 formerly as DuPont. Axalta sells many different types of finishes worldwide with our largest focus being transportation related - automobiles, trucks, buses, transit and rail. Axalta is very active with both OEM and repaint sections of these markets.

Axalta understands the complex railroad industry as a supplier, major car owner and leaser, and a very large shipper of a variety of finishes products. This complex understanding, combined with excellent coating technologies, had led to the introduction to railroads of many different types of coatings: DTM alkyds, DTM acrylic enamels and polyurethane enamels and clears.

We offer many different systems from waterborne and alkyd technology for commodity cars to Imron® polyurethane for chemical resistance and appearance retention. Ease of use and cost reductions have long been our focus and Axalta's coatings for the railroad industry by offering solutions for most types of railroad car service.

We look forward to satisfying your painting requirements and providing you with products to meet your needs.

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TABLE I
PAINT SYSTEMS
CONCRETE MIXERS, RAIL MAINTENANCE VEHICLES, PICK-UP TRUCKS & RAIL CRANES

Axalta | Transportation & Nason® Finishes – Solid & Metallic Colors

TRUCK & EQUIPMENT	SURFACE	RATING	COATING SYSTEMS PRODUCTS	COMMENTS
Cab, Pick-up truck, rail Maintenance Vehicles	Fiberglass Cold rolled steel	**Better**	**Primer:** Ful-Poxy® 491-35™ **Topcoat:** Ful-Thane®	HS epoxy primer sealer 3.5 HS single- stage polyurethane
		Best	**Primer:** Corlar® 934S™ **Topcoat:** Imron® Elite S/S or B/C	3.5 epoxy polyamide Polyurethane enamel topcoat Single Stage or Basecoat polyurethane enamel basecoat
Vocational Body / Chassis	Carbon Steel	**Better**	**Primer**: Ful-Poxy® 491-35™ **Topcoat:** Ful-Thane®	HS epoxy primer sealer 3.5 HS single- stage polyurethane
		Best	**Primer:** Corlar® 934S **Topcoat:** Imron® Elite S/S or B/C **Option:** MetaLok® 235S	3.5 epoxy polyamide Polyurethane enamel topcoat Single Stage or Basecoat CVP epoxy pretreatment

Axalta | General Industrial – Solid Colors

TRUCK & EQUIPMENT	SURFACE	RATING	COATING SYSTEMS PRODUCTS	COMMENTS
Cab, Pick-up truck, rail Maintenance Vehicles	Fiberglass Cold rolled steel	**Good**	**Primer:** Imron® 1.5 PR™ (3-4) **Topcoat:** Imron® 1.2 HG™ (2-3)	Waterborne polyurethane copolymer Waterborne polyurethane copolymer
		Better	**Primer:** Corlar® 2.1 PR-P™ (3-4) **Topcoat:** Imron® 2.1 HG™ **+** (2-3)	High solids productive epoxy primer **New** High gloss polyurethane enamel
		Best	**Primer:** Corlar® 2.1 PR-P™ (3-4) **Topcoat:** Imron® Industrial Strength (2-3)	High solids productive epoxy primer High Gloss Polyurethane Ultra Low VOC
Sheet Metal	Carbon Steel Cold rolled steel	**Good**	**Primer:** Imron® 1.5 PR™ (3-4) **Topcoat:** Imron® 1.2 HG™ (2-3)	Waterborne polyurethane primer Waterborne polyurethane copolymer
		Better	**Primer:** Corlar® 2.1 PR-P™ (3-4) **Topcoat:** Imron® 2.1 HG™ **+** (2-3)	High solids productive epoxy primer **New** High gloss polyurethane enamel
		Best	**Primer:** Corlar® 2.1 ST™ (4-5) **Topcoat:** Imron® Industrial Strength (2-3)	High solids Epoxy Mastic High Gloss Polyurethane Ultra Low VOC

TABLE I
PAINT SYSTEMS
CONCRETE MIXERS, RAIL MAINTENANCE VEHICLES, PICK-UP TRUCKS, RAIL CRANES
(Continued)

Axalta | General Industrial – Solid Colors

TRUCK & EQUIPMENT	SURFACE	RATING	COATING SYSTEMS PRODUCTS	COMMENTS
Vocational Body / Chassis	Carbon Steel	**Good**	**DTM:** Imron® 2.1 HG-D™ **+** (5-6)	**New** High Gloss Polyurethane Direct to Metal (DTM)
		Better	**Primer:** Corlar® 2.1 PR-P™ (3-5) **Topcoat:** Imron® 2.1 HG™ **+** (2-3)	High solids productive epoxy primer **New** High gloss polyurethane enamel
		Best	**Primer:** Corlar® 2.1 ST™ (4-5) **Topcoat:** Imron® Industrial Strength (2-3)	High solids Epoxy Mastic High Gloss Polyurethane Ultra Low VOC

TABLE II
PAINT SYSTEMS
FORGED PARTS

Axalta | General Industrial – Solid Colors

FORGED PARTS	SURFACE	RATING	COATING SYSTEMS PRODUCTS	COMMENTS
Forged Parts	Iron	**Good**	**Primer:** Imron® 1.5 ST-D™ (4-5) **Topcoat:** Imron® 1.2 HG™ (3-4)	Waterborne polyurethane copolymer Waterborne polyurethane copolymer
		Better	**Primer:** Corlar® 2.1 PR-P™ (3-4) **Topcoat:** Imron® 2.1 HG™ **+** (2-3)	High solids productive epoxy primer **New** High gloss polyurethane enamel
		Best	**Primer:** Corlar® 2.1 ST™ (4-5) **Topcoat:** Imron® Industrial Strength (2-3)	High solids Epoxy Mastic High Gloss Polyurethane Ultra Low VOC

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TABLE III
PRODUCT DESCRIPTIONS
DTM (Direct-To-Metal) & Primer Rail Products

Product	Description	Components	Mix Ratio	Application	Dry Times @ 70°F
Imron® 1.5 PR™	A high performance, low VOC, Zero HAPS, fast drying waterborne polyurethane copolymer. Designed for use under Imron® 1.2 HG™ topcoat.	Fac-Pac Colors: 1632 WF White 1633 WF Shale Gray 1637 WF Cirrus Gray 1640 WF Black 711 WF Red Oxide	Single component. Ready to Spray	Apply by spray for Maximum Appearance. Film Build: 8-12 mils wet 3-5 mils dry	Dry to touch 20-30 minutes Dry to handle 1 hour Dry to recoat 30 minutes Hard Dry 2 hours
Corlar® 2.1 PR-P™	High solids, two components, low VOC (2.1 lbs. /gal.), low HAPS, productive epoxy primer, based on Axalta modified polyamide epoxy technology.	Fac-Pac Colors: 525-880 Red Oxide 525-882 Buff 525-885 ANSI 61 Grey 525-886 Black 525-971 ANSI 70 Grey	2 Parts Corlar® 2.1 PR-P™ Base 1 Part FG-040 Activator * Reduction Optional 5% by volume. T-1021 below 80°F T-1025	Apply by spray for Maximum Appearance. Film Build: 6 mils wet 3 mils dry	Dust free 30 minutes Dry to touch 1 hour Dry to recoat 45 minutes Hard Dry 2 hours
Corlar® 2.1 ST™ Satin, High Gloss Epoxy Mastic.	High solid, low VOC (2.1 lbs. /gal), polyamide epoxy mastic primer	Fac-Pac colors; LF-63225P White LF-63325P Shale Gray LF-Cirrus Gray LF-71125P Red Oxide LF-64025P Black VF-525 activator	1 Part Base 1 Part Activator reduces 5-15% for spray application	Apply by spray for Maximum Appearance.	Dry to touch 2-3 hours Dry to handle 4 hours Dry to recoat 3 hours

*Material losses during mixing and application will vary and must be taken into consideration when estimating job requirements.

**At 70°F and 50% R.H. Dry time will be longer at lower temperatures or higher humidity.

Note: High solids and high build characteristics of Axalta's rail coatings, combined with large target surfaces and the need for high minimum dry film thickness (DFT) make airless application equipment the best choice for rail applications. Air assisted airless and conventional spray equipment may be used but use of these technologies can result in increased production times and rough final appearance. Refer to individual product data sheets for specific equipment recommendations.

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TABLE III - PRODUCT DESCRIPTIONS
Topcoat & Clearcoat Rail Products

Product	Description	Components	Mix Ratio	Application	Dry Times @ 70°F
Imron® Industrial Strength Ultra Low VOC Polyurethane Enamel	Next generation polyurethane with **High Gloss**, 0.3 VOC, improved adhesion & productivity with outstanding gloss & color retention.	Imron 9TXX 9T00-A™ Activator	4 Parts 9TXX Color 1 Part 9T00-A™ Activator	Brush, roll or spray 3-5 mils wet 2-3 mils dry	Dry to touch 1 hr. Dry to handle 2 hr. Dry to Recoat 2 hr.
		See PDS for application thinner details.			
Imron® 1.2 HG™ Waterborne polyurethane copolymer topcoat	A high performance, low VOC, no HAPS, quick dry waterborne polyurethane copolymer topcoat.	Single component	No reduction required	Spray is preferred. 5-7 mils wet 2-3 mils dry	Dry to touch 20-30 min Dry to handle 1 hour Dry to recoat 30 minutes with itself; 1 hour with solvent borne
Imron® 2.1 HG™ + High Gloss Polyurethane	**New Imron® technology** delivering a high solids, **high gloss** two-package, 2.1 lbs/gal VOC, extremely durable finish with outstanding chemical resistance, abrasion resistance & flexibility as well as outstanding gloss & color retention.	Imron® 2.1 HG™ **+** Color 9T00-A™ Activator See PDS for application thinner details. Brush & Roll Additive: 9M05™	3 Parts Color 1 Part Activator 0 to 10% Reducer. Roll Additive 1 oz. 9M05™ per Ready to Spray Gallon	Apply by spray for Maximum Appearance. Brush & roll optional. Film Build: 2 - 3 mils wet 1.5 - 2.0 mils dry	Dry to touch: 3 hours Dry to handle: 7 hours Dry to recoat: 5 hours May be accelerated with VG-805™ *See product data sheet.
Imron® 2.1 HG-D™ + High Gloss DTM	**New Imron® technology DTM** high gloss, high build, two-package, low HAPS, acrylic polyurethane.	Imron® 2.1 HG-D™ **+** 9T00-A™ Activator	6 Parts Imron® 2.1 HG-D™ **+** 1 Part 9T00-A™ Activator	Brush, roll or spray 10 mils wet 5 mils dry	Dry to touch --- Dry to handle --- Dry to Recoat ---

*Material losses during mixing and application will vary and must be taken into consideration when estimating job requirements.

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Note: High solids and high build characteristics of Axalta's rail coatings, combined with large target surfaces and the need for high minimum dry film thickness (DFT) make airless application equipment the best choice for rail applications. Air assisted airless and conventional spray equipment may be used but use of these technologies can result in increased production times and rough final appearance. Refer to individual product data sheets for specific equipment recommendations.

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TABLE IV
PRODUCT DESCRIPTIONS
Axalta | Transportation & Nason® Finishes

Product	Description	Components	Mix Ratio	Application	Dry Times @ 70°F
Imron® Elite SS™ High Performance Polyurethane Enamel Topcoat.	High performance, low VOC (<3.5 lbs. /gal), two component, polyurethane enamel topcoat.	Custom Color capable	3 Parts color 1 part 194S Activator No reduction required. Up to 2 Oz. 389s Accelerator to Improve pot life and dry times	Spray for best appearance. 1.8 – 2.2 Dry mils.	Dry to touch 1-2 hours with 389S Accelerator Tack free 2-4 hours Tape free 4-6 hours
Imron® Elite BC High Performance Polyurethane Enamel Basecoat.	High performance, two component, Low VOC (<3.5 lbs. /gal), polyurethane enamel basecoat.	Custom Color Capable	3 Parts color 1 part 194S Activator No reduction required. Up to 2 Oz. 389s Accelerator to Improve pot life and dry times	Spray only appearance 1.0 -1.5 Dry mils.	Dry to touch 1-2 hours with 389S Accelerator Tack free 2-4 hours Tape free 4-6 hours
Corlar® 934S™	Corlar® 934S™ provides excellent durability and corrosion resistance, especially when topcoated with Axalta High Solids Topcoats.	A high performance, low VOC (<3.5 lbs/gal RTS), epoxy polyamide primer-sealer. Corlar® 934S™ is a two-component, light gray primer-sealer that is lead and chromate free.	Five (5) parts Corlar® 934S™ Epoxy Primer-sealer with one (1) part Corlar® 936S™ Fast or 937S™ Slow Activator.	1.2 - 1.8 mil D.F.T.	Dry to Touch 30 minutes Tack Free 30 minutes Print Free 1 hr

TABLE IV
PRODUCT DESCRIPTIONS
Axalta | Transportation & Nason® Finishes (continued)

Ful-Poxy® HS 491-35™ Epoxy Primer Sealer	Low VOC (3.5 lbs. /gal), non-sanding epoxy primer-sealer.	491-35™ Ful-Poxy® 483-35 Fast activator 483-45 Slow activator	4 Parts base 1 part activator	Spray only 1.6 -1.8 Dry mils.	Dry to topcoat1 hour Dry to sand 16 hours
Ful-Thane® 3.5™ High Solids Urethane Topcoat	High performance, easy to apply, single-stage, low VOC (3.5 lbs. /gal), urethane topcoat	Custom Color Capable: 483-52™ Activator 483-54™ Accelerator	3 Parts color 1 Part activator Accelerator; 4ounces per mixed gallon	Spray only 1.8 -2.2 Dry mils	Tack free 4 hours Tape free16 hours
Imron® Elite 8840S™	A two-component, low VOC (<3.5 lbs/gal), low HAPS, polyurethane enamel clear coat, for use with Imron® Elite™ Basecoat and single stage color systems.	Clearcoat 8840S 194S Activator	3 parts Imron® Elite 8840S™ Low VOC, Low HAPS Clear with 1 part 194S™ Activator	Spray only 1.8 -2.2 Dry mils	Dry to touch 1-2 hours with 389S Accelerator Tack free 2-4 hours Tape free 4-6 hours

* Material losses during mixing and application will vary and must be taken into consideration when estimating job requirements.

**At 70°F and 50% R.H. Dry time will be longer at lower temperatures or higher humidity.

Note: High solids and high build characteristics of Axalta's rail coatings, combined with large target surfaces and the need for high minimum dry film thickness (DFT) make airless application equipment the best choice for rail applications. Air assisted airless and conventional spray equipment may be used but use of these technologies can result in increased production times and rough final appearance. Refer to individual product data sheets for specific equipment recommendations.

Surface Preparation

Coating performance is dependent on adequate surface preparation as well as proper material application and inspection. Failure to consider these factors can seriously affect or compromise the protection expected from the coating. Coatings and linings will only adhere to surfaces that have been properly prepared. That preparation must be either mechanical (such as blasting) or chemical (such as a chemical etch). In either case, the surface must be clean and dry. Rust, flash rust, salts, oil and grease, old coatings and mill scale must be removed or early failure of the coating will occur.

Proper surface preparation provides the optimum balance between coatings durability, application costs, and operating area constraints. Once the surface preparation is selected, care should be taken to assure that it is done correctly. Depending on the method of surface preparation selected, it also may be necessary to remove surface contamination, weld splatter, burrs, and slivers by some other technique.

After preparing the surface, a primer, where specified, should be applied as soon as possible. For steel surfaces, or where contamination is likely, priming the same day the surface is prepared is mandatory.

This section will list surface preparation standards, as well as many other tools, charts, checklists, conversion tables and calculations. The intent of these pages will be to help the applicator, inspector, and specifier in gaining the most or their expenditure. Much of this information is available from the Steel Structures Painting Council (SSPC) and the National Association of Corrosion Engineers (NACE) as well as the Axalta Technical Service Center.

Before Surface Preparation

- Inspect for surface contamination prior to cleaning. Have method in place for proper removal of contaminants.
- Make sure car has been inspected for poor welds, or other type of defect in the steel, which will require repairing. Repair prior to blasting.
- Check grit, shot, or other abrasive for proper sizing.
- Inspect grit, shot, or other abrasive for contaminants.
- Inspect blast air supply for proper pressure and cleanliness.
- Inspect blast air supply for moisture.
- Check blast for conformance to cleanliness standard.
- Check depth of blast profile.
- Record the following:
  - Surface and Air Temperatures
  - Dew Point Factor
  - Depth of Blast Profile
  - Date and Time
  - Car Number

Steel Surface Preparation Specifications

- **SSPC-SP 1 – Solvent Cleaning**

  Solvent cleaning is a method of preparing steel surfaces by cleaning with solvent, vapor, alkali, emulsion or steam. Solvent cleaning removes visible soluble contaminants. Prior to solvent cleaning, remove heavy deposits of oil or grease with a scrapper. Next remove foreign matter by one or a combination of the following: brush with stiff fiber or wire brushes, abrade, scrape, or clean with solutions of appropriate cleaner, provided such cleaners are followed with a fresh water rinse. After solvent cleaning remove dirt, dust, and other contaminants by brushing, vacuuming, or blowing with clean, dry air.

- **SSPC-SP 2 – Hand Tool Cleaning**

  Hand tool cleaning is the process of using non-powered tools for preparing steel surfaces. Use hand tools such as scrappers, chisels, and wire brushes, to remove all loose mil scale, loose rust, loose paint and other detrimental foreign material. It is not intended that inherent mill scale, rust, weld slag, or paint be removed by this process. Mill scale, rust, weld slag, and old paint are considered adherent if using a dull putty knife cannot lift them. Edges of old paint should be sanded and feathered to provide a relatively smooth appearance to the repainted surface.

- **SSPC-SP 3 – Power Tool Cleaning**

  Power tool cleaning is the method of preparing steel surfaces with the use of power assisted hand tools. Using power tools all loose mill scale, loose rust, loose paint, and other detrimental foreign matter can be removed. Rotary or impact tools can be used to remove stratified rust and weld slag. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, weld slag, and old paint are considered adherent is using a dull putty knife cannot lift them. Edges of old paint should be sanded and feathered or provide a relatively smooth appearance to the repainted surface.

- **SSPC-SP 11 – Power Tool Cleaning to Bare Metal**

  Power tool cleaning to bare metal represents a degree of cleaning that is higher than SSPC-SP3 Power Tool Cleaning. It is designed to produce a surface profile. It is suitable where a roughened, clean, bare metal surface is required, but where abrasive blasting is not feasible or permitted.

Steel Surface Preparation Specifications (Continued)

- **SSPC-SP 7/NACE 4/Sa 1 – Brush Off Blast Cleaning**

  Brush-off blast cleaning is a method of preparing steel surfaces by use of abrasive blasting. Using an abrasive along with compressed air, water, or both, brush-off blasting removes all dirt, dust, loose mill scale, loose rust and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.

- **SSPC-SP 10/NACE 2/Sa 2 1/2 – Near-White Blast Cleaning**

  Near-white blast cleaning is a method of preparing steel surfaces by use of abrasive blasting. Using an abrasive, along with compressed air, water, or both, near-white blast cleaning removes all dirt, dust, mill scale, rust and paint. Evenly dispersed, very light shadows, streaks or discolorations caused by stains of rust or previously applied paint may remain on no more than 5% of the surface.

- **SSPC-SP 5/NACE 1/Sa 3 -White Metal Blast Cleaning**

  White metal blast cleaning is a method of preparing steel surfaces by use of abrasive blasting. Using an abrasive, along with compressed air, water or both, white metal blasting removes all dirt, dust, mill scale, rust and paint. The completed surface shall be cleaned to a gray-white metallic color. Uniformity of color may be affected by the grade of the metal, original surface condition, or shadowing from blast cleaning patterns.

- **SSPC-SP6/NACE 3/Sa 2 – Commercial Blast Cleaning**

  Commercial blast cleaning is a method of preparing steel surfaces by use of abrasive blasting. Using an abrasive with compressed air, water or both remove all dirt, dust, mill scale, rust and paint. Evenly dispersed very light shadows, streaks or discolorations caused by stains of rust or stains of previously applied paint may remain on no more than 33% of each square inch of surface area.

Alternate Cleaning Methods

- **Water Blasting** (Hydroblasting) – this method uses large volumes of water at high pressures (up to 20,000 psi) to remove loose material. It can be used in the same situations that wet abrasive blasting is used, but because it does not use abrasives, it will not be as effective in preparing the surface.

- **Abrasive Blast Cleaning** – is part of several of the most commonly used steel surface preparation specifications. There are several methods of Abrasive Blast Cleaning:

    - Dry Abrasive Blast Cleaning using compressed air, blast nozzles and abrasive.
    - Closed Cycle Dry Abrasive Blast Cleaning using recirculating abrasives with compressed air, blast nozzles and abrasive, with or without vacuum for abrasive recovery.
    - Close Cycle Dry Abrasive Blast Cleaning using recirculating abrasives with centrifugal wheels with or without vacuum for abrasive recovery.
    - Wet Abrasive Blast Cleaning using compressed air, blast nozzles, water and abrasives followed by a fresh water rinse. The fresh water rinse usually contains a rust inhibitor.
      Wet abrasive blast cleaning is usually used where the job conditions or air pollution ordinances preclude the emission of dust particles. It is also effective in the cleaning of concrete.

Before blast cleaning, remove visible deposits of oil or grease by any of the methods outlined in SSPC-SP 1 solvent cleaning specifications.

- **If the surface was dry abrasive blast cleaned**, remove dust and loose residue. Acceptable methods include brushing, vacuuming and blowing with clean, dry air (use moisture and oil separators when using compressed air for blow-off to maintain a clean, dry air supply).
- **If the surface was wet abrasive blast cleaned,** rinse with fresh water which contains enough corrosion inhibitor to prevent rusting, or rinse with fresh water followed by a rust inhibitive treatment.

Alternate Cleaning Methods (Continued)

- **Phosphate Coatings**. Phosphate coatings which produce a definite phosphate film are considered chemical inorganic coatings that react chemically with a base metal surface. This reaction converts the metal surface into a corrosion resistant film which serves to improve paint adhesion, retard development and spread of corrosion, and facilitates mechanical deformation of metals. These conversion coatings are generally applied by dipping, brushing or spraying. Electrolytic methods are only rarely used on iron or steel parts.

  The commonly used types of coatings are zinc and iron phosphates. These coatings are applied from aqueous solutions, following a cleaning treatment as phosphate coating will not form on unclean metal. Those used for paint bonding are deposited in a coating weight range recommended by the supplier in milligrams per square foot of surface area, usually resulting in films of less than 1/10 of one mil in thickness. It is very desirable that coatings be finely crystalline in nature and strongly adherent to the surface to provide adequate corrosion resistance and economy of paint consumption. Mechanical action such as spraying, brushing or wiping promotes the formation of fine crystals. In case of immersion phosphating, activating pre-treatments are essential to the formation of uniform crystalline deposits. To obtain maximum corrosion resistance, the phosphating process may be followed with a sealing after-rinse. This is usually chromic acid or mixed chromic and phosphoric acids to reduce chromic acid staining.

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Profile Guide

The following chart is a guide to help determine the approximate abrasive sizes to use to obtain required anchor patterns as they relate to profile depth. The results will vary which is why this should be used as a guide only. While these comparisons can be used for centrifugal wheels as well as pressure blasting, hardness of the steel, mill scale thickness and degree of cleaning required can cause the profile depth to vary. These degrees of depth are an average so lower or higher depth may be obtainable.

To obtain 1.0 mill of profile
G-80 steel grit
S-110 steel shot
Clemtex #44
30/60 mesh silica sand**
To obtain 1.5 mills of profile
G-50 steel grit
S-170 steel shot
Clemet #3
16/35 mesh silica sand**
To obtain 2.0 mills of profile
G-40 steel grit
S-230 steel shot
Clemet #3
30/60 mesh silica sand**
Black Beauty BB-50 or BB 2040
To obtain 2.5 mills of profile
G-40 steel grit
S-280 steel shot
Clemet #2
8/35 mesh silica sand**
Black Beauty 400
To obtain 3.0 to 4.0 mills of profile
G-25 steel grit
S-330 steel shot
Clemet #2
8/20 mesh silica sand**
Black Beauty BB-40 or BB25

**proper safety precautions must be taken. Refer to supplier's safety instructions or Material Safety Data Sheet (MSDS)

Application

Proper application is an important part of an effective coating system. The surface can be well prepared and the best coating system selected but if not applied properly, premature failure can result.

The following paragraphs review general conditions which should be considered to assure proper application. Additional information may be found in the Steel Structures Painting Manual (Volume I – Good Painting Practice) published by the Steel Structures Painting Council.

Application Considerations

- Application Inspection. Application instruction printed on coating containers should be followed where compatible with the painting specifications. Sharp edges and corners should be spot primed prior to application of the regular prime coat. Alternate colors from coat to coat can be used as a visual check where practical. This guide coat practice helps to insure complete coverage of each coat.

- Chemical Atmospheres. To avoid chemical contamination between coats, the coating system should be complete within the shortest possible time consistent with the proper drying of each coat. If chemical contamination occurs between coats, it should be removed by washing with water or solvent, and the surfaces should be dried before applying the next coat.

- Dry Film Thickness (DFT). Proper dry film thickness is one of the most important requirements of a coating system. Minimum thickness standards should be followed to assure performance. Specifications should include dry film thickness requirements. Use of "number of coats" or wet film build is not a good substitute.

  Dry film thickness measurements on steel substrates can be made with various magnetic film thickness gauges. A number of readings should be made in order to determine, within practical limits, the minimum dry film thickness. When measuring the DFT on a "green" coating, use a plastic shim of known thickness (i.e. 10-20 mils) to avoid pressing the gauge into the film and obtaining a false reading.

  Another highly accurate method is to tape premeasured aluminum foil on the substrate and determine the thickness after point application by a micrometer. This method is accurate and works on all substrates but requires repair.

Application (Continued)

- Wet Film Thickness (WFT). If the substrate is smooth, this is easily determined and valuable in estimating DFT.

  Wet film thickness readings can be an excellent aid to uniform paint application and can be helpful in estimating dry film thickness if used properly. When a film is applied with no solvent loss to a perfectly smooth panel, then the wet film thickness multiplied by the volumetric solids will give the dry film thickness. However, many variables such as dry time, temperature, wind, and humidity will affect this on the job site.

Application Inspection

Proper application is an important part of an effective coating system. The surface can be well prepared and the best coating system selected but if the product is not applied properly, premature failure can result. The information below reviews general application and inspection procedures that should be followed to assure the best chances of successful coatings application and longevity of the coating. Other information on good painting practices can be found in NACE and SSPC coating guides.

The following are general conditions which affect most coatings application and need to be monitored and inspected for:

- **Temperature**
  The optimum temperature range for coatings application is 60°F to 90°F (15-32°C). Coatings should not be applied if atmospheric or substrate temperatures are below 40°F (4°C) or above 110°F (43° C) at the time of application. Surface temperatures above 90°F may cause the film to dry too rapidly resulting in pinholes or holidays. Surface temperatures below 40°F for single package products (alkyds) or 50°F for activated products (epoxies and urethanes) may cause slow or incomplete cures.

- **Humidity**
  Coatings should not be applied unless the temperature of the surface being coated is and remains at least 5°F (2.7°C) above the dew point. If less than 5°F (2.7°C) exists between the dew point and the temperature of the substrate, condensation may occur on the surface and impair adhesion or appearance. Slow drying materials spray applied do not have much effect on substrate temperatures. However, quick-drying coatings containing fast drying solvents may reduce the surface temperature considerably. This 5°F above the dew point may be ignored if the atmospheric temperature is rising. Humidity also affects the drying time of coatings. High humidity generally retards the evaporation of solvents. If applied during conditions of high humidity, the drying time for coatings which "cure" by solvent evaporation will be lengthened. The drying time for most coatings that "cure" by chemical cure will be relatively unaffected except for the drying time for inorganic zinc which will be shortened because it requires moisture to cure.

- **Precipitation**

Coatings should not be applied outdoors or applied to a railcar and moved outdoors before dry if any form of precipitation is imminent. Precipitation in the form of rain, dew, fog or frost may cause poor adhesion, wash off freshly applied coatings, deposit chemical contamination, cause unsightly spotting or cause poor film properties.

Color

Putting Color to Work For You

To get the most of color in your facility, remember that it is now possible, to select from either factory packaged colors or custom colors that may be developed to match your company standards.

The proper use of color will help you in many ways, such as improving plant working conditions, lifting employee morale, increasing productivity, reducing glare and eyestrain and eliminating many unsafe working conditions.

The "Axalta OSHA Safety Colors" may be used in improving identification of your equipment (especially mechanical equipment and apparatus) and in spotlighting potential safety hazards at your facility site.

Your Axalta Representative is trained to help you in selecting the color schemes for your facility. However, if you wish to select your own colors, you can be sure that the colors offered represent the latest thinking in color technology.

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RIGHT-OF-WAY EQUIPMENT

Piping & Equipment Color Code

Color	Axalta Ordering No.	Use
Yellow	1663 Safety Yellow	Gas lines, safety guards, yellow & black stripes for moving machinery
Orange	1662 Safety Orange	Oil lines, grease fittings, inside cover of electrical switch boxes
Red Pressure	1664 Safety Red	Fire protection equipment, high-pressure sprinkler valves and lines
Blue Breakers	1665 Safety Blue	Electrical switch boxes, controls breakers
Green	1666 Safety Green	Water lines
Black	1640 Black	Drain lines, waste water
White	1632 White	Electrical conduit, beams and hanger rods
Medium Gray	1633 Shale Gray	Walls and columns
Light Gray motors, fans	1637 Cirrus Gray	Machinery-compressors, pumps, motors
Light Brown	1635 Clay Tan	Low pressure air line 40 psi or less
Dark Blue	1014 Dark Blue	Hot water and boiler feed water line
Dark Brown	1288 Bark Brown	High-pressure air lines over 40 psi
Light Green	1062 Spotlight Green	Chilled water lines
Medium Green	1642 Meadow Green	Control cabinets and panels
Light Blue	1638 Falls Blue	Cooling water lines
Aluminum	6AL25P Aluminum	Steam and condensate lines, hot surfaces, boilers, stacks, cooling fins on air compressors, hot equipment to 500°F

Popular Rail Color Codes*

Color	Imron® 2.8 HG™	Imron® 3.5 HG™	Imron® 5000™	909 Line	917 Line	610 Line	Tufcote® 1.9 HG-D™
BNSF Orange	6V7-40P	6V7-42P	N6323				
BNSF Green	6V8-40P	6V8-42P	N6277				
BNSF Yellow	57Q-40P	57Q-42P	N5146				
Silver		333-M-AG009	N0315				
Flame Red	N3761-40P	N3761-42P	N3761				
White	333-67632	333-M-24861	N3136	909-68461	917-43241	610-P-12074	72P-1632
U.P. Armour Yellow	12S-40P	12S-42P	N5597	909-M-24842		610-P-12030	
U.P. Harbour Mist Gray	11S-40P	11S-42P	N5598		917-M-29012	610-P-12031	
CSX Loco Gray		42P-04N				610-H-22410	
CSX Loco Blue		42P-06N				610-H-22412	
CSX Loco Yellow		42P-05N				610-H-22411	
CSX Freight Car Blue				909-12141			
CSX Beige (Cab Interior)				909-68431			72P-1748
TTX Yellow				909-24563			
Black	333-67640	333-M-24926	N0001	909-H-77461	917-M-23874	610-H-28906	72P-1640
Amtrak Blue		30460-42P				610-H-30460	
Amtrak Silver		333-M-24926				610-H-30463	
Amtrak Gray		30461-42P				610-H-30461	
Shippers Gray (FS595-26493)		42P-1119					
Suede Gray	40P-25W	42P-25W		909-M-24847	917-43094		
KCS Gray		51Y-42P	N0428				
Freight Car Red/Brown				909-M-24502			
Conn-DOT Orange			N1185			610-H-34065	
Dulux Gold		42P-3292				610-H-30706	
Mow Orange (FS595-12473)	40P-49N			909-M-22473			
Pullman Green	1548-40P	1548-42P					
Wisconsin Central Maroon	40P-10S	42P-77R		909-12129			
PRR Tuscan Red			N6124				
CSX Loco Blue (New)		42P-C5967	N5967			610-H-30705	
Caboose Red (N&W)	40P-1332						
BN Fawn Beige		26N-42P	N4133				
BN Jaguar Green (Dk. Green)		44Q-42P	N4149				

* Call 1 855 6 AXALTA for additional color information.

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RIGHT-OF-WAY EQUIPMENT

Aerosol Availability

For small touch ups, Axalta offers aerosols - Tufcote® SC™ - in the colors listed below. Tufcote® SC™ is sold by the case which contains 12 aerosol cans of one color.

Axalta Ordering Number	Color
900P	White
901P	Black
902P	Flat Black
904P	Fire Protection Red
905P	Precaution Blue
906P	Hi Visibility Yellow
907P	Alert Orange
908P	Safety Green
912P	Machine Gray
914P	Red Oxide Primer
915P	Clear
916P	High Heat Black
917P	Silver
920P	Gray Primer
922P	Cirrus Gray
923P	Shale Gray
924P	Inorganic Zinc Primer

In the United States:
1.855.6.AXALTA
axalta.us

In Canada:
1.800.668.6945
axalta.ca