



Specification Guide

Short Line Railroads



SPECIFICATION GUIDE SHORT LINE RAIL ROAD

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Introduction

We have prepared this specification guide for the Short Line Rail Road industry based on our analysis of your locomotive and railcar painting needs. In studying your industry, we found that you would prefer a simplified approach to painting. An approach that would keep your rail fleet in good condition, easy to clean and maintain, simplify your paint selection, minimize painting problems, and above all, give you the greatest value for your painting dollars.

Axalta's approach also addresses your health, safety, and environmental permitting needs. In addition to the systems mentioned in this guide, custom designed systems that meet and/or exceed your local air regulatory agency requirements are also available. Detailed information may be obtained by contacting your authorized Axalta Coating Systems distributor for evaluation. Your authorized Axalta Coating Systems distributor stands ready to work with you in handling all your paint and painting problems. If, however, you prefer to manage your own maintenance program, you can by following the information given in this guide.

The topics covered in this specification guide include selecting the right paint for each job, preparing surfaces for painting, simplified painting techniques and helpful ways to use color.

Copies of product literature for all the products specified in this guide are available from Axalta Coating Systems on our web site, axalta.us. This information, plus that given in Section II (Paint Selection), will help you in ordering the right products for your painting.

To use these specifications, simply refer to the appropriate Section. All information normally required for maintenance painting can be found there. Should you need further information, please contact your authorized Axalta Coating Systems Distributor, who is ready to assist you in all phases of your painting. The authorized Axalta Coating Systems distributor in your area can be found on our website, axalta.us or by calling toll-free:

1 855 6 AXALTA

****NOTE: The information contained in this guide supersedes any prior product recommendations.****

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Rail Products

Individual rail asset owners often specify the system for their fleet. The Axalta Coating Systems distributor often assists the rail fleet manager in this task. Very large railcar and locomotive fleets have color, and overall system specifications that are quite specific.

High solids 2.1 – 3.5 VOC Corlar® Epoxy / Imron® Polyurethane systems are often selected. High performance and VOC conforming specs are written and adhered to when selling this customer segment. Anti-Graffiti coatings like Imron® EZ-3460S clearcoat has come into popularity in recent years.

Corlar® Epoxy: Epoxies are generally two component products, which are used as primers, DTM's, and topcoats. Often used as primers each epoxy is formulated for specific environmental and commodity exposure. Amine cured epoxy such as Corlar® LV SG™ (formerly Corlar® 90P), form a hard, abrasion resistant DTM coating Corlar® 2.1 PR-P™ is used as primer under Imron® Industrial Strength, Imron® 2.1 HG™ + or Imron® 3.5 HG™+; or epoxy topcoats Corlar® 2.8 HG™ or Corlar® 2.1 ST™. To address the need for fast turnaround of equipment Axalta released Corlar® 2.1 PR-P™, the fastest dry to topcoat epoxy in the Axalta line.

Imron® Polyurethane: Polyurethane coatings are isocyanate-containing systems that react and are crosslinked creating a two-package paint. The Axalta Coating Systems family of Imron® polyurethane primers and topcoats offer patented compositions that result in a superior balance of properties. Axalta offers for select applications, non-isocyanate and pre-catalyzed urethanes under our Imron® copolymer brand.

Resin types listed above can be formulated in water or solvent formulations. Axalta products listed are designed to most current VOC levels of 3.5 lbs. /gal. or less.

Alkyd: Axalta offers a full line of Tufcote® alkyd products. Popular due to quick dry and low price the alkyd product platform has reached maturity and is increasing difficult to meet required long repaint cycles for exterior exposure, and more importantly the technology is becoming dated due increasingly strict VOC legislation. Tufcote® 3.5 HG-D™ is an excellent choice for coating engines and locomotive interiors.

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TABLE I
PAINT SYSTEMS
Locomotive - Exterior

RATING	COATING SYSTEMS PRODUCTS (mil DFT*)	COMMENTS
Good	Primer: Tufcote® 3.3 PR™ (3-4) Topcoat: Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Fast Dry Alkyd Primer New High gloss polyurethane New High gloss polyurethane
Better	Primer: Corlar® 2.1 PR-P™ (3-4) Topcoat: Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Epoxy primer New High gloss polyurethane New High gloss polyurethane
Best	Primer: Corlar® 2.1 ST™ (3-4) Topcoat: Imron® Industrial Strength (2-3) Or Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3) Clearcoat: Imron® 3.5 HG-C™ (2-3) or Imron® EZ-3460S™ (2-3)	Fast Dry Smooth Epoxy Primer Ultra Low VOC High Gloss Polyurethane topcoat New High gloss polyurethane New High gloss polyurethane High gloss polyurethane clear High loss Anti-Graffiti Clear

*All DTM dry film thickness' reference film builds over blast profile.

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TABLE II PAINT SYSTEMS Locomotive - Interior

RATING	COATING SYSTEMS PRODUCTS (mil DFT*)	COMMENTS
Good	DTM: Tufcote® 3.5 HG-D™ (2-3)	Fast dry alkyd enamel
Best	Primer: Tufcote® 3.3 PR™ (2-3) Topcoat: Tufcote® 3.5 HG-D™ (2-3)	Fast dry alkyd primer Quick dry alkyd enamel
Waterborne	DTM: Tufcote® 1.9 HG-D™ (2-3)	Waterborne DTM acrylic enamel
Ultra Low VOC	Corlar® LVS (2-5)	High Build Epoxy Mastic

*All DTM dry film thickness' reference film builds over blast profile.

**These products are "Made to Order" (MTO) products.

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TABLE III
PAINT SYSTEMS
Hopper Cars - Exterior

RATING	COATING SYSTEMS PRODUCTS (mil DFT*)	COMMENTS
Good	DTM: Corlar® LVSG™ (8-10)	Epoxy DTM High gloss, high build
Better	Primer: Tufcote® 3.3 PR™ (3) Topcoat: Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Fast dry alkyd primer New High gloss polyurethane New High gloss polyurethane
Best	Primer: Corlar® 2.1 ST™ (3-4) Topcoat: Imron® Industrial Strength (2-3) or Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3) Clearcoat: Imron® 3.5 HG-C™ (2)	Epoxy primer Ultra Low VOC High Gloss Polyurethane topcoat New High gloss polyurethane New High gloss polyurethane High gloss polyurethane clear
Ultra Low VOC	Primer: Corlar® LVS (4-5) Topcoat: Imron® Industrial Strength (2-3)	High Build Epoxy Mastic Ultra Low High Gloss Polyurethane

*All DTM dry film thickness' reference film builds over blast profile.

**These products are "Made to Order" (MTO) products.

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TABLE IV PAINT SYSTEMS Tank Car - Exterior

RATING	COATING SYSTEMS PRODUCTS (mil DFT*)	COMMENTS
Good	DTM: Corlar® LVSG (8-10)	High Build Epoxy Mastic DTM
Better	Primer: Corlar® 2.1 PR-P™ (3-4) Topcoat: Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Fast Dry Smooth Epoxy Primer New High gloss polyurethane New High gloss polyurethane
Best	Primer: Corlar® 2.1 ST™ (3-4) Topcoat: Imron® Industrial Strength (2-3) or Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3) Clearcoat: Imron® 3.5 HG-C™ (2-3) or Imron® EZ-3460S™ (2-3)	Epoxy primer Ultra Low VOC High Gloss Polyurethane topcoat New High gloss polyurethane New High gloss polyurethane High gloss polyurethane clear High loss Anti-Graffiti Clear
Ultra Low VOC	Primer: Corlar® LVS (4-5) Topcoat: Imron® Industrial Strength (2-3)	High Build Epoxy Mastic Ultra Low High Gloss Polyurethane

*All DTM dry film thickness' reference film builds over blast profile.

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TABLE V PAINT SYSTEMS

Open Hopper Cars, Gondolas, Flat Cars, Auto Racks, Refrigerator Cars and Box Cars - Exterior

RATING	COATING SYSTEMS PRODUCTS (mil DFT*)	COMMENTS
Good	Primer: Tufcote® 3.3 PR™ (3) Topcoat: Imron® 2.1 HG™ + (2-3)	Fast dry alkyd primer New High gloss polyurethane
Better	Primer: Corlar® 2.1 PR-P™ (3-4) Topcoat: Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Productive epoxy primer New High gloss polyurethane New High gloss polyurethane
Best	Primer: Corlar® 2.1 PR-P™ (3-4) Topcoat: Imron® Industrial Strength (2-3) or Imron® 2.1 HG™ + (2-3) or Imron® 3.5 HG™ + (2-3)	Fast Dry Smooth Epoxy Primer Ultra Low VOC High Gloss Polyurethane topcoat New High gloss polyurethane New High gloss polyurethane
Ultra Low VOC	Primer: Corlar® LVS (4-5) Topcoat: Imron® Industrial Strength (2-3)	High Build Epoxy Mastic Ultra Low High Gloss Polyurethane

*All DTM dry film thickness' reference film builds over blast profile.

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TABLE VI PAINT SYSTEMS Box Cars - Interior

RATING	COATING SYSTEMS PRODUCTS (DFT*)	COMMENTS
Good	Primer: Corlar® 2.8 HG-D™ (4-6)	High build epoxy DTM
Waterborne	DTM: Tufcote® 1.9 HG-D™ (2-3)	Waterborne DTM acrylic enamel
Best	DTM: Imron® 2.1 HG-D™ + (5-6)	New High gloss, high build DTM urethane

*All DTM dry film thickness' reference film builds over blast profile.

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TABLE VII

High Performance Railroad Coatings
Product Descriptions

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 See PDS for application thinner details.	4 : 1	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.
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 10% Reducer. Roll Additive 1 oz. 9M05™ per RTS 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 ---
Imron® 3.5 HG™ + High Gloss Polyurethane	New Imron® technology delivering a high solids two-package, high gloss , 3.5 lbs/gal VOC with low HAPS polyurethane enamel. Extremely durable finish delivers outstanding chemical resistance, abrasion resistance & flexibility with outstanding gloss & color retention.	Imron® 3.5 HG™ + Color 9T00-A™ Activator See PDS for application thinner details. Brush & Roll Additive: 9M05™	4 Parts Color 1 Part Activator 0 to 5% Reducer Roll Additive 1 oz. 9M05™ per RTS Gallon	Apply by spray for Maximum Appearance. Brush & roll optional. Film Build: 3 - 5 mils wet 2 - 3 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® 3.5 HG-C™ Polyurethane clearcoat VOC: 3.5 lbs. /gal. Vol. Solids: 52%	Clearcoat: High solids, extremely durable clearcoat with outstanding gloss retention.	Imron® 3.5 HG-C VGY-611 Activator	3 : 1	3.5-4 mil wet 2 mil dry	Dry to touch 1-2 hours Dry to handle 2-4 hours
Imron® 2.1 PR™ Polyurethane primer VOC : 2.1 lbs. /gal. Vol. Solids: 51%	Primer. Low VOC, low HAPS sandable primer that will produce a smooth surface for maximum appearance.	Imron® 2.1 PR™ 162-1632 White 162-1060 ANSI 70 Grey 162-1072 ANSI 61 Grey 162-711 Red Oxide FG-082 Activator *Call Customer Service for colors.	4 : 1	6 mil wet 3 mil dry	Dry to touch 2 hours Dry to handle 4 hours Dry to recoat 4 hours

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TABLE VII High Performance Railroad Coatings (Continued) Product Descriptions

Product	Description	Components	Mix Ratio	Application	Dry Times @ 70°F
Imron® EZ-3460S™ Clearcoat High gloss polyurethane clear	A high-performance, air-dry clear Excellent cleaning properties (resist dirt, road tar and tree sap). Delivers excellent durability and chemical resistance	Imron® EZ-3460S™ Clear coat Imron® EZ-3461S™ Activator	3 Parts Imron® EZ-3460S™ 1 Part EZ-3461S™ Activator	Spray Only One cross-coat 1.8 - 2.2 mils dry	Dry to touch: 4-6 hours Dry to handle: 72 hours Note: Up to 2 oz of 389S™ accelerator can be used for faster dry times.
Corlar® LV SG™ Very HS Epoxy Prime/DTM VOC: 0.71 lbs. /gal. Vol. Solids: 90%	Primer / DTM: High build, 0.71 / gal VOC, amido amine cured epoxy technology.	Primer: LF064090P Black LF63290P White Call Customer Service for colors. Activator: FG0-90	2 : 1	8 mils wet 7-8 mils dry Airless, Conventional Brush Touch-up	To touch 4 hours To recoat 8 hours Full cure 24 hours Refer to product data sheet for detail.
Corlar® 2.1 PR-P™ Epoxy modified polyamide	Primer: A two package smooth epoxy primer easily applied without dry overspray. Mix 2:1 with your choice of 5 activators. No induction times and long pot life.	Corlar® 2.1 PR-P™ FG-040 Activator 525-882 Buff 525-885 ANSI 61 Grey 525-886 Black (MTO) 525-971 ANSI 70 Grey Thinners T-1025or T-1021 5% max	2 : 1	Apply by spray only 6 mils wet 3 mils dry No reduction is necessary	Dust free 1 hour Tack free 2-3 hours To touch 1 hour To recoat 2-3 hours Hand dry 4 hours
Corlar® 2.8 HG-D™ High build epoxy DTM VOC: 2.8 lbs. /gal. Vol. Solids: 62%	DTM: Durable, easy to use, two part high gloss, high build epoxy	Corlar® 2.8 HG-D™ VG-026 Activator	1 : 1 1 hour induction	8 mils wet 4-6 mils dry	To touch 3 hours To handle 16 hours To recoat 16 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 app	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 VII
High Performance Railroad Coatings
Product Descriptions (Continued)

Product	Description	Components	Mix Ratio	Application	Dry Times @ 70°F
Tufcote® 1.9 HG-D™ Waterborne DTM Acrylic Enamel VOC: 1.9 lbs. /gal. Vol. Solids: 35.5%	DTM: Fast dry, low VOC self-priming acrylic enamel. Extremely low odor.	Single component	No reduction required	5-6 mil wet 2-3 mil dry	Dry to touch 1 hour Dry to handle 3 hours Dry to recoat 1 hour
Tufcote® 3.3 PR™ Fast dry alkyd primer VOC: 3.3 lbs. /gal. Vol. Solids: 51.3%	Primer: Fast drying shop or production primer. Can be topcoated with a variety of products.	Single Component	Up to 20% 1852S for over spray	6 mil wet 3 mil dry	Dry to touch 30 minutes Dry to handle 2 hours Dry to recoat 2 hours
Tufcote® 3.5 HG-D™ Quick Dry Alkyd Enamel VOC: 3.5 lbs. /gal. Vol. Solids: 47%	DTM: Alkyd enamel with quick dry properties and exceptionally tough film.	Single component or FG-034 activator	Activated: 8 : 1 FG-034	10 mil wet 5-6 mil dry Spray is preferred	Dry to touch 20 minutes Dry to handle 1 hour Dry to recoat 30-120 minutes

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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Surface Preparation

Coating performance is dependent on adequate surface preparation as well as proper material application and inspection. Failure to consider these factors can compromise the protection expected from the coating. Coatings 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. Abrasive blast should provide a 1.5 - 2.0 mil anchor profile.

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.

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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 scappers, chisels, and wire brushes, to remove all loose mill 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 if 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.

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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 discoloration 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.

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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.

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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.

$$\text{WFT} \times \% \text{ Solids} \simeq \text{DFT}$$

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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 that 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.

- **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.

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RAL COLORS / POPULAR RAIL COLOR*

Color Name	Axalta Color
Silver	333MAG009
Flame Red	N3761
White	333M24861
U.P. Armour Yellow	12S
U.P. Harbour Mist Gray	11S
Black	333M24926
Amtrak Blue	30460
Amtrak Silver	333M24926
Amtrak Gray	30461
Shippers Gray (FS595-26493)	1119
Suede Gray	25W
Dulux Gold	3292
Pullman Green	1548
BN Fawn Beige	26N
BN Jaguar Green (Dk. Green)	44Q
PATH Green	418956
PATH Blue	766900
RAL 9016 Traffic White	1604
RAL 7035 Gray	Q1067
RAL 9001 Beige White	747054
RAL 7006 Brown	M1094
RAL 9005 Black	1640
RAL 5013 Blue	782657
RAL 2008 Orange	782649
RAL 1023 Yellow	782658
RAL 9006 Silver	333MAG009
RAL 9003 White	782648

***Call 1 855 6 AXALTA for additional color information.**

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RAL COLORS / POPULAR RAIL COLOR*

Color Name	Axalta Color	Color Name	Axalta Color
		Metra Blue	42P-99T
ATSF Red	42P-58Q	Metra Orange	42P-98T
ATSF Yellow	42P-57Q	Metra Clean White	42P-022
ATSF Red	42P-58Q	Metra Silver (FACPAC)	333MAG009
ATSF Blue	42P-19V	Metra Black (FACPAC)	333M24926
B & A Blue	42P-3X5	Missouri Pacific Eagle Blue	42P-05R
B & A Red	42P-1497	New York Central Gray	42P-4Y1
B & A Yellow	42P-4X3	New York Central Gray	42P-71U
B & A Gray	42P-51Y	Nittany and Bald Eagle Blue	42P-33S
BNSF Orange	42P-6V7	Ohio Central Smoke Blue	42P-6Z9
BNSF Green	42P-6V8	Ohio Central Yellow	42P-35V
BNSF Yellow	42P-57Q	Ohio Central Maroon	42P-83H
BN Fawn Beige	42P-26N	Pennsylvania Railroad Tuscan Red	42P-N6124
BN Jaguar Green (Dk. Green)	42P-44Q	Pennsylvania Railroad Loco Green	42P-N5710
Canadian National Gray CNR	42P-N5298	Pennsylvania Railroad Gold	42P-N6508
Canadian National Dk Gray	42P-N5297	Providence and Worcester Red Orange	42P-73T
C&NW Green	42P-4W9	Providence and Worcester Dark Brown	42P-74T
CSX Loco Gray	42P-04N	Old Pullman Green	42P-1547
CSX Loco Blue	42P-06N	Pullman Green	42P-1550
CSX Loco Yellow	42P-05N	New Pullman Green	42P-1548
CSX New Loco Blue	42P-C5967	Union Pacific Harbor Mist Gray	42P-11S
Delaware and Hudson Gray	42P-4Y1	Railcar Black	333-M-24926
Delaware Valley Railway Red	42P-5Z8	Railcar Silver	333MAG009
Delaware Valley Railway Yellow	42P-29R	Railcar White	333-M-24861
Axalta Railcar White	333M24160	Rock Island Old Red	42P-58Q
Denver and Rio Grande Sierra Gold	42P-33U	Rock Island Maroon	42P-1534
Ft. Worth & Western Yellow	42P-82546	Southern Pacific Scarlet	42P-82U
Ft. Worth & Western Blue	42P-13594	Southern Railroad Lt. Gray	42P-1331
E.M.D Demo Blue	42P-65U	Southern Railroad Dk. Green	42P-42N
Kansas City Southern Gray	42P-51Y	St. Louis and San Francisco Yellow	42P-N1346
Kansas City Southern Red	42P-06Q	St. Louis and Southwestern Yellow	42P-1663
Louisville & Nashville Gold	42P-N6508	Union Pacific Armour Yellow	42P-12S
Louisville & Nashville Yellow	42P-57Q	Union Pacific Harbour Mist Gray	42P-11S
Union Pacific Suede Gray	42P-25W	Union Pacific Eagle Blue	42P-05R

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