AkzoNobel

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Extrusion Coatings

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AkzoNobel

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This list is compiled for your communication convenience. Each category may have more than one contact person and should be contacted in the order shown. Our normal office hours are 8:00 a.m. to 4:30 p.m. (EST) Monday through Friday.

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AkzoNobel

Extrusion Coatings

TRINAR®
Color Palette

The TRINAR® family of high-performance architectural spray coatings

AkzoNobel
Tomorrow's Answers Today

TRINAR®
TRINAR® *ULTRA*

Standard Colors in a 2-Coat System

TRINAR® is available in a wide array of pre-formulated colors, including pearlescent and metallic finishes, that blend well with most collateral construction materials. And our batch-to-batch consistency is unparalleled. You can even request special color-matched formulations for a more exact match.

TRINAR® *ULTRA* is a more environmentally-friendly version that contains a lower level of VOC's. Durability and performance of TRINAR® *ULTRA* is the same as standard TRINAR®, easily meeting or exceeding the AAMA 2605 specification.

All color choices for standard TRINAR® systems are also available in eco-friendly *ULTRA* versions.

Requirements: TRINAR® primer and non-exotic, non-metallic topcoat color.

Hartford Green
KG3C22322

Interstate Green
KG3C25525

White Stone
KW3C22431

Surrey Beige
KH3C19141

TRI-Escent® II

Mica Colors in a 2-Coat System

TRI-Escent® II is a distinctive combination of ceramic and mica/pearlescent pigments, and AkzoNobel's proven 70% fluoropolymer TRINAR® resin system, which can give a striking dimension to architectural design. This two-coat process offers a unique substitute for both metallic and anodized finishes.

TRI-Escent® II subtly appears to change color as the angle of the sun changes, season after season, year after year. Whether your color design requirements call for a bold statement or a soft and subtle appearance, AkzoNobel's wide array of TRI-Escent® II colors should provide the desired effect.

Requirements: TRI-Escent® II color basecoat/primer and color coat.

Carbonite
KB2C22425P2

Midnight Blue
KL2C28618P1

Meteor Gray
KM2C22422P1

Silverado
KM2C22423P1

TRINAR® TEC

Exotic Colors in a 3-Coat System

TRINAR® TEC colors are available in a broad spectrum of vibrant, bright, and very clean colors. They lend themselves beautifully to applications requiring a striking accent or bold statement in design.

Requirements: TRINAR® primer, exotic color coat and clear topcoat.

Accent Red
KR3C31398-C

Cardinal Red
KR3C30844-C

TRINAR® TMC

Metallic Colors in a 3-Coat System

TRINAR® TMC metallic colors offer either a bright or subdued metal color, which is very popular throughout the architectural community.

Requirements: TRINAR® primer, metallic color coat and clear topcoat.

Pewter
KM3C21770-C

Dark Bronze
KS3C28612-C

Aged Copper
KG3C21651

Royal Blue
KL3C19138

Denim Blue
KL3C28620

Milano Blue
KL3C28621

Bone White
KW3C21349

Seal Brown
KN3C19148

Dark Bronze
KS3C19150

Brick Red
KR3C19142

River Rouge Red
KR3C84669

Boysenberry
KP3C84668

Midnight Patina
KG2C22427P2

Seafoam Green
KG2C24977P1

Weathered Copper
KG2C28760P1

Gold Nugget
KD2C28606PS

Copper
KR2C22424P2

Bright Silver
KM2C28605P1

Dark Bronze
KS2C28615P2

Medium Bronze
KS2C22421P2

Light Bronze
KS2C28603P2

Champagne Bronze
KS2C28673P1

BP Green
KG3C29699-C

Berkeley Blue
KL3C27120-C

Postal Blue
KL3C21248-C

Golden Rod
KY3C20626-C

Sunspot
KY3C31447-C

Medium Bronze
KS3C28671-C

Copper
KS3C28600-C

Champagne Gold
KS3C28599-C

Seafoam Green
KG3C28602-C

Silver
KM3C20413-C

The TRINAR® color chips in this guide are reproduced as closely as possible to the actual TRINAR® paint colors and are to be used only as a guide.

TRINAR®

A versatile high performance 70% PVDF spray coating for the architectural market

AkzoNobel

High performance coatings for architectural aluminum

The TRINAR family of coatings is the perfect product for the AAMA 2605 Superior Performance specification.

TRINAR is ideal for the monumental project as well as any residential or low rise project that requires lasting durability and beauty. One of the secrets of TRINAR's superior durability lies in the molecular structure of its 70% polyvinylidene fluoride (PVDF) resin. This unique carbon/fluorine bond is the key to it's unsurpassed thermal, chemical and ultraviolet resistance properties. When coupled with our proprietary acrylic resin and premium ceramic and select inorganic pigmentation, this system demonstrates remarkable resistance to weathering, fading, cracking and chalking.

TRINAR is available in a wide array of preformulated colors, including pearlescent and metallic finishes, that blend well with most collateral construction materials. You can even request special color-matched formulations for a more exact match.

The best coating for aluminum extrusions

TRINAR is considered by many to be the premiere architectural finish in the aluminum extrusion industry. It can be applied to any aluminum building component such as window and wall systems, aluminum extruded profiles, louvers, column covers and more.

Spray TRINAR exhibits excellent performance in all environmental conditions with superior color retention due to premium pigmentation. It's batch to batch consistency is unparalleled thanks to our extensive quality systems. This results in a product with reliable, hassle free application whether it is applied on a horizontal or vertical spray coating line.

Test specifications

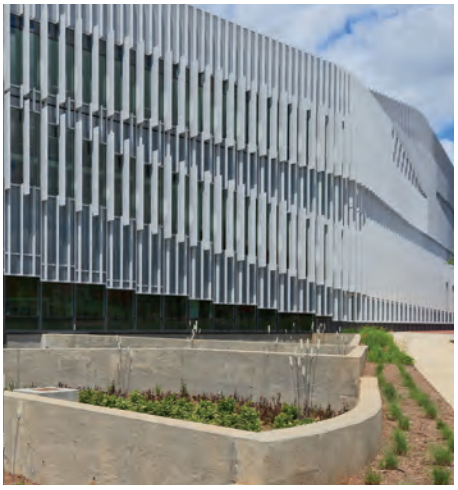
All TRINAR systems meet or exceed the requirements of AAMA 2605, the most recognized specification for fenstration coatings in the world. Only applicators which consistently meet stringent quality process parameters are approved to apply TRINAR.

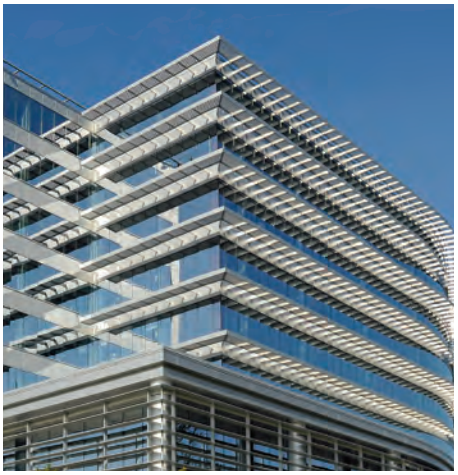
ULTRA versions - lower VOC's

Every TRINAR system except for TRINAR ADS is also available in *ULTRA* versions, which contain lower volatile organic compounds (VOC's). They have the same great performance as the standard versions with the added benefit of being more environmentally friendly.

COOL CHEMISTRY® Series

TRINAR coatings are also available in our COOL CHEMISTRY Series which contain infrared reflective pigments. This pigmentation increases solar reflectivity and helps reduce energy costs associated with cooling, especially when combined with cool metal roofing. TRINAR coatings are also ideally suited for application on louvers and other sun screens, which can be used to create shaded areas either inside or outside a building.



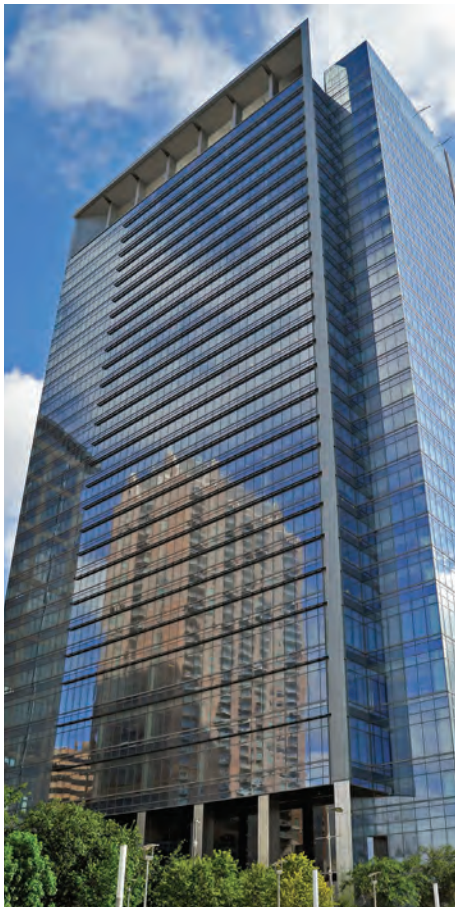


There's a TRINAR that's right for all your projects

TRINAR product comparison guide

PRODUCT NAME	RESIN PERCENTAGE	COST RATING	COLORS	GLOSS RANGE	DRY FILM THICKNESS	TOTAL DFT (MILS)
TRINAR	70% PVDF 30% Acrylic	$	Earth Tones	25-35	0.2-0.4 (Primer) 1.0-1.2 (Topcoat)	1.2-1.6
TRI-Escent II	70% PVDF 30% Acrylic	$$	Mica	15-25	0.3-0.5 (Primer) 1.1-1.3 (Topcoat)	1.4-1.8
TRINAR TMC	70% PVDF 30% Acrylic	$$$	Metallic	25-35	0.2-0.4 (Primer) 1.0-1.2 (Topcoat) 0.4-0.6 (Clear coat)	1.6-2.2
TRINAR TEC	70% PVDF 30% Acrylic	$$$	Bright	25-35	0.2-0.4 (Primer) 1.0-1.2 (Topcoat) 0.4-0.6 (Clear coat)	1.6-2.2
TRINAR ADS	70% PVDF 30% Acrylic	$$$$	Earth Tones Mica	25-35	0.1-0.3 (Primer) 1.0-1.2 (Topcoat)	1.1-1.5

ALL TRINAR PRODUCTS EXCEPT TRINAR ADS ARE ALSO AVAILABLE IN ECO-FRIENDLY *ULTRA* VERSIONS



TRINAR and TRINAR *ULTRA*

TRINAR is our finest and most versatile liquid spray extrusion coating. It is a two coat system which contains 70% PVDF resin. TRINAR provides long term beauty for a wide range of metal building components such as panel systems, curtain walls, window systems, louvers, canopies, mullions, store fronts and fascia.

TRINAR is also available in our TRINAR *ULTRA* product line, which has the same great performance as the standard version, but contains less VOC's for a more environmentally friendly product.

TRI-Escent II and TRI-Escent II *ULTRA*

TRI-Escent® II is a distinctive combination of ceramic and mica/pearlescent pigments and our proven 70% fluoropolymer TRINAR resin system, which offers a striking new dimension to architectural design. This two-coat process offers a unique substitute for both metallic and anodized finishes.

TRI-Escent II subtly appears to change color as the angle of the sun changes, season after season, year after year. Whether your color design requirements call for a bold statement or a soft and subtle appearance, our wide array of TRI-Escent II colors should provide the desired effect to make your projects stand out.

TRI-Escent II colors are also available in our TRI-Escent II *ULTRA* product line, with the same great performance but lower VOC's for a more environmentally friendly product.

TRINAR TMC and TRINAR TMC *ULTRA*

TRINAR TMC is a three coat system encompassing metallic colors and topped with a protective clear coat. TRINAR TMC is identified as a three coat system by the suffix TMC, which stands for TRINAR Metallic Clear. The colors available in this system offer either a bright or subdued metallic color which have become very popular and accepted throughout the architectural aluminum industry.

TRINAR TEC and TRINAR TEC *ULTRA*

Like TRINAR TMC, TRINAR TEC is also a three coat system. The suffix stands for TRINAR Exotic Clear, and as the name indicates the colors available in this system are bright, exotic colors topped with a protective clear coat. These colors are extremely vibrant, bright and clean, and lend themselves beautifully to applications requiring a striking accent or very bold statement in design.

TRINAR ADS

TRINAR ADS is an air dry formulation of our two coat TRINAR system. It contains the same durable formulation as our standard TRINAR system, with 70% PVDF resin. It is perfectly suited for touch-up applications and also for painting materials that will not tolerate the elevated bake temperatures required of our other spray TRINAR systems.

For more information

Please contact your salesman or one of our many global locations for color selections, pricing, warranty and technical information. We look forward to showing you how TRINAR can enhance your next project.

CERAM-A-STAR® E Color Palette

A durable and economical AAMA 2604 liquid spray finish for aluminum extrusion applications

AkzoNobel
Tomorrow's Answers Today

A new solution that stands the test of time

CERAM-A-STAR® E is an exciting new AAMA 2604 solution for aluminum extrusion applications, with proven durability at an economical applied cost.

A better choice for AAMA 2604

Designed for spray application to aluminum extrusions, CERAM-A-STAR E is a new solution with proven durability and ease of application that meets AAMA 2604 specifications. Designed for the high-end residential, storefront and monumental interiors market, this product offers a lower-cost alternative to 70 percent PVDF and super durable polyester powders. Further, as compared to anodized solutions, it offers better quality, more consistent color control, a larger color palette, chemical resistance and field repairability.

Available globally, CERAM-A-STAR E is the perfect choice for projects requiring an AAMA 2604 product. Designed to meet the global demand for a mid-level high performance system, CERAM-A-STAR E delivers significant advantages over other types of coatings systems.

Proven durability and performance

Built upon the strength of the CERAM-A-STAR family of coil coatings, with millions of square feet already installed in the field, you can rest assured CERAM-A-STAR E will stand up over time. Backing up this performance is over 15 years of South Florida real world weathering exposure data, something that most new coating solutions can't say.

CERAM-A-STAR E's performance comes from a proprietary resin formulation that has been proven through real-world testing and field installations. This unique resin system gives it vastly superior hardness and mar resistance over other AAMA 2604 products, which is a major benefit during installation and in aggressive environments. Combined with premium ceramic and inorganic pigments, it offers superior color stability, chalk resistance, fade resistance and gloss retention for the most durable AAMA 2604 finish available.

Significant coverage and cost advantages

In addition to its proven durability, CERAM-A-STAR E has a number of other benefits that customers will find very appealing. With CERAM-A-STAR E, volume solids are in the 48-54% range, as compared to much lower levels with alternatives such as PVDF coatings. This results in almost twice the coverage per gallon. While the long term superiority of AAMA 2605 coatings is not being questioned, these types of improvements will allow users of CERAM-A-STAR E to enjoy significant coverage advantages.

In the past coaters have only been able to choose between a lower percentage PVDF coating or a super-durable powder to meet AAMA 2604. With the introduction of CERAM-A-STAR E, they now have a superior choice with proven performance at a great price.

CERAM-A-STAR E is also a great fit for the just-in-time production environment of today. The ability to perform quick color changes during production is a big help in maintaining an optimal production schedule. It is also allows coaters to blend colors in-house, including mica metallics, which isn't possible with some other coating types.

				
Interstate Green XG3C55868	Aged Copper XG3C55869	Royal Blue XL3C55870	Denim Blue XL3C55871	Bone White XW3C55872
				
White Stone XW3C55873	Surrey Beige XH3C55874	Seal Brown XN3C55875	Dark Bronze XS3C55876	Brick Red XR3C55877
				
River Rouge Red XR3C55878	Boysenberry XP3C55879	Carbonite XB2C55880	Midnight Blue XL2C55881	Midnight Patina XG2C55883
				
Weathered Copper XG2C55884	Copper XR2C55885	Meteor Gray XM2C55886	Silverado XM2C55887	Dark Bronze XS2C55888
				
Medium Bronze XS2C55889	Light Bronze XS2C55890	Champagne Bronze XS2C55891	Pewter XM3C55892-C	Dark Bronze XS3C55893-C
				
Medium Bronze XS3C55894-C	Copper XS3C55895-C	Champagne Gold XS3C55896-C	Seafoam Green XG3C55897-C	Silver XM3C55898-C

The CERAM-A-STAR E color chips in this guide are reproduced as closely as possible to the actual paint colors and are to be used only as a guide.

AkzoNobel

Product Specifications

Extrusion Coatings

Product specifications of

TRINAR® *ULTRA*

Environmentally-friendly liquid spray 2-coat solid colors for architectural extrusion applications

AkzoNobel

All TRINAR *ULTRA* coatings are formulations of 70% polyvinylidene fluoride (PVDF) resin, which makes it the best choice for monumental or institutional projects.

Our history with this incredible technology dates back to the early 1970's.

Continually monitored AkzoNobel research and production quality assurance programs have produced years of actual 45° S. South Florida exposure data.

This data demonstrates TRINAR *ULTRA*'s remarkable resistance to exterior weathering such as fading, color change, chalking and cracking.

One of the secrets of TRINAR *ULTRA*'s superior durability lies in the molecular structure of the polyvinylidene fluoride resin. This unique carbon/fluorine bond is the key to unsurpassed thermal, chemical and ultraviolet resistance properties. When coupled with AkzoNobel developed premium ceramic and inorganic pigmentation, this system demonstrates remarkable resistance to weathering, fading, cracking and chalking. When properly applied, TRINAR *ULTRA* easily passes the rigorous testing requirements of the American Architectural Manufacturer's Association specification AAMA 2605.

To assure proper application, AkzoNobel utilizes a process of Applicator Certification. Only after meeting stringent repeatable quality standards is an applicator granted this approval. This helps protect the integrity of the finish for all parties concerned.

TRINAR *ULTRA* coatings provide long-term beauty for a wide range of metal building components such as panel systems, curtain-wall, window systems, louvers, canopies, mullions, store fronts and fascia.

If your specifications require a coating for several of these components on the same project, we have formulated TRINAR for both spray and coil coating applications using the same pigmentation. This ensures continuity of color throughout an entire project.

Why choose TRINAR *ULTRA*?

TRINAR *ULTRA* is the next generation of PVDF coatings. All finish types available in TRINAR are now available in TRINAR *ULTRA* (2-coat colors, TRI-Escent® II, TEC and TMC). All color choices from standard TRINAR systems are also available in the *ULTRA* series. TRINAR *ULTRA* is a more environmentally-friendly product, by containing a lower level of VOC's. Durability and performance of TRINAR *ULTRA* is the same as the standard version, easily meeting or exceeding the AAMA 2605 specification.

Disclaimer

TRINAR *ULTRA* product specifications

Product Type	70% polyvinylidene fluoride (PVDF) coating.
Specification	Meets or exceeds all AAMA 2605 specifications.
Primer	KY1C17839A
Percent Solids (Package)	Weight solids 49-53%, Volume solids 31-35%.
Percent Solids (Reduced)	Weight solids 38-40%, Volume solids 27-29%.
Reduction	Primer: 1-1 with Xylene. Topcoat: 25-35% by volume of Xylene/Butyl Carbitol blend then add Butyl Carbitol as needed for flow.
Viscosity	Primer: 20-25 seconds #3 Zahn @ 77° F (package), 16-18 seconds on Zahn #2 (reduced). Topcoat: 20-23 seconds #4 Zahn @ 77° F (package), 22-25 seconds on Zahn #2 (reduced).
Film Thickness	Primer: 1.0-2.0 wet mils, 0.2-0.4 mils dry. Topcoat: 2.5-4.0 wet mils, 1.0-1.2 mils dry. Total system: 1.2-1.6 mils dry.
Gloss Range	25 to 35% @ 60° angle.
Cure Schedule	Lab bake cycle 10 minutes @ 450° F. Production cure varies with line speed and oven temperature. Metal temperature must achieve 450° F and be maintained for 2 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.

AAMA 2605 specification

Test	Description	Coating Requirements	TRINAR *ULTRA* Performance
7.1	**Color Uniformity**	Visual Control	Instrument and visually controlled
7.2	**Specular gloss at 60º, ASTM D 523**	Medium and low gloss ranges	Controlled to custom spec ±5 units
7.3	**Dry film hardness, ASTM D 3363**	F minimum	H+
7.4	**Film adhesion (dry, wet and boiling water), crosshatch 1/16 inch squares**	No removal between scribed times	No removal
7.5	**Impact resistance (direct) 0.10 inch distortion**	No removal of film	No removal
7.7.1	**Chemical resistance (10% muriatric acid)**	15 minutes, no visual changes	Meets or exceeds spec
7.7.2	**Chemical resistance (mortar, alkali)**	24 hours, no visual changes	Meets or exceeds spec
7.7.3	**Resistance to acid pollutants (70% nitric acid)**	30 minutes, maximum 5ΔE NBS units color change	Meets or exceeds spec
7.7.4	**Detergent resistance**	72 hours, no effect	Meets or exceeds spec
7.8.1	**Humidity resistance, ASTM B 2247**	4,000 hours, few #8 blisters (maximum)	Meets or exceeds spec
7.8.2	**Salt spray resistance, ASTM B 117**	4,000 hours, minimum 7 rating on scribe and minimum blister rating of 8 (ASTM D 1654)	Meets or exceeds spec
7.9.1.2	**Weathering, color retention, ASTM D 2244**	10 years, 45º S. South Florida, max 5ΔE NBS units color change	Meets or exceeds spec
7.9.1.3	**Weathering, chalk resistance, ASTM D 4214**	10 years, 45º S. South Florida, max 8 rating for colors, 6 rating for whites	Meets or exceeds spec
7.9.1.4	**Gloss retention**	10 years, 50% minimum	Meets or exceeds spec
7.9.1.5	**Weathering, erosion resistance**	10 years, 45º S. South Florida, maximum 20% loss	Meets or exceeds spec

Product specifications of

TRI-Escent® II *ULTRA*

Environmentally-friendly liquid spray 2-coat mica colors for architectural extrusion applications

AkzoNobel

All TRI-Escent II *ULTRA* coatings are formulations of 70% polyvinylidene fluoride (PVDF) resin, which makes it the best choice for monumental or institutional projects.

Continually monitored AkzoNobel research and production quality assurance programs have produced years of actual 45º S. South Florida exposure data.

This data demonstrates TRI-Escent II *ULTRA*'s remarkable resistance to exterior weathering such as fading, color change, chalking and cracking.

TRI-Escent II *ULTRA* is a unique 2-coat process that offers an alternative to other metallic or anodized finishes. This blend of mica and ceramic and inorganic pigments creates subtle yet dazzling design characteristics with a unique richness that goes beyond standard metallic colors. This system is more chemical resistant than an anodized finish, can be field repaired, and has a tighter color range.

By combining the concept of barrier coat and primer into one, AkzoNobel's technical team has unlocked the secret to minimization of "metallic flop." This combination also eliminates a step in the application process required by metallic colors, while improving the quality and appearance of the finish.

When specifying TRI-Escent II *ULTRA*, refer to the code number of the color desired. The last two digits of the code will designate which basecoat/primer is to be used for that specific topcoat color.

Whether your color design requirements call for a bold statement or a soft and subtle appearance, AkzoNobel's wide array of TRI-Escent II *ULTRA* colors should provide the desired effects. Should you wish to match a color provided by another manufacturer, we will be happy to provide you with a corresponding match. Or, if you want something not found on a color card, we will assist you in the creation of a brand new color.

TRI-Escent II *ULTRA* has become a very popular coating for factory application on aluminum as well as galvanized metal roofing and zinc/aluminum coated steel substrates. TRI-Escent II *ULTRA* coatings provide long-term beauty for a wide range of metal building components such as panel systems, curtain-wall, window systems, louvers, canopies, mullions, store fronts and fascia.

If your specifications require a coating for several of these components on the same project, we have formulated TRI-Escent II *ULTRA* for both spray and coil coating applications using the same pigmentation. This ensures continuity of color throughout an entire project.

Why choose TRI-Escent II *ULTRA*?

TRI-Escent II *ULTRA* is the next generation of PVDF coatings. All finish types and color choices available in TRI-Escent II are now available in TRI-Escent II *ULTRA*. TRI-Escent II *ULTRA* is a more environmentally-friendly product, by containing a lower level of VOC's. Durability and performance of TRI-Escent II *ULTRA* is the same as the standard version, easily meeting or exceeding the AAMA 2605 specification.

Disclaimer

TRI-Escent II *ULTRA* product specifications

Product Type	70% polyvinylidene fluoride (PVDF) coating.
Specification	Meets or exceeds all AAMA 2605 specifications.
Primer	KY1C17839A, KA1C22454(P1) or KN1C22296(P2)
Percent Solids (Package)	Weight solids 49-53%, Volume solids 31-35%.
Percent Solids (Reduced)	Weight solids 38-40%, Volume solids 27-29%.
Reduction	Primer: 1-1 with Xylene. Topcoat: 15-25% by volume of Xylene/Butyl Carbitol blend then add Butyl Carbitol as needed for flow.
Viscosity	Primer: 20-23 seconds #4 Zahn @ 77° F (package), 16-18 seconds on Zahn #2 (reduced). Topcoat: 20-23 seconds #4 Zahn @ 77° F (package), 22-25 seconds on Zahn #2 (reduced).
Film Thickness	Primer: 1.5-2.5 wet mils, 0.3-0.5 mils dry. Topcoat: 3.0-4.5 wet mils, 1.1-1.3 mils dry. Total system: 1.4-1.8 mils dry.
Gloss Range	15 to 25% @ 60° angle.
Cure Schedule	Lab bake cycle 10 minutes @ 450° F. Production cure varies with line speed and oven temperature. Metal temperature must achieve 450° F and be maintained for 2 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.
Note	To help facilitate color uniformity, a special primer (P1 or P2) may be required. Please see Product Data Sheet.

AAMA 2605 specification

Test	Description	Coating Requirements	TRI-Escent II *ULTRA* Performance
7.1	**Color Uniformity**	Visual Control	Instrument and visually controlled
7.2	**Specular gloss at 60º, ASTM D 523**	Medium and low gloss ranges	Controlled to custom spec ±5 units
7.3	**Dry film hardness, ASTM D 3363**	F minimum	H+
7.4	**Film adhesion (dry, wet and boiling water), crosshatch 1/16 inch squares**	No removal between scribed times	No removal
7.5	**Impact resistance (direct) 0.10 inch distortion**	No removal of film	No removal
7.7.1	**Chemical resistance (10% muriatic acid)**	15 minutes, no visual changes	Meets or exceeds spec
7.7.2	**Chemical resistance (mortar, alkali)**	24 hours, no visual changes	Meets or exceeds spec
7.7.3	**Resistance to acid pollutants (70% nitric acid)**	30 minutes, maximum 5ΔE NBS units color change	Meets or exceeds spec
7.7.4	**Detergent resistance**	72 hours, no effect	Meets or exceeds spec
7.8.1	**Humidity resistance, ASTM B 2247**	4,000 hours, few #8 blisters (maximum)	Meets or exceeds spec
7.8.2	**Salt spray resistance, ASTM B 117**	4,000 hours, minimum 7 rating on scribe and minimum blister rating of 8 (ASTM D 1654)	Meets or exceeds spec
7.9.1.2	**Weathering, color retention, ASTM D 2244**	10 years, 45º S. South Florida, max 5ΔE NBS units color change	Meets or exceeds spec
7.9.1.3	**Weathering, chalk resistance, ASTM D 4214**	10 years, 45º S. South Florida, max 8 rating for colors, 6 rating for whites	Meets or exceeds spec
7.9.1.4	**Gloss retention**	10 years, 50% minimum	Meets or exceeds spec
7.9.1.5	**Weathering, erosion resistance**	10 years, 45º S. South Florida, maximum 20% loss	Meets or exceeds spec

Product specifications of

TRINAR® *ULTRA* TEC / TMC

Environmentally-friendly liquid spray 3-coat exotic and metallic colors for architectural extrusion applications

AkzoNobel

All TRINAR *ULTRA* TEC and TMC coatings are formulations of 70% polyvinylidene fluoride (PVDF) resin, which makes it the best choice for monumental or institutional projects.

Continually monitored AkzoNobel research and production quality assurance programs have produced years of actual 45º S. South Florida exposure data.

This data demonstrates TRINAR *ULTRA* TEC and TMC's remarkable resistance to exterior weathering such as fading, color change, chalking and cracking.

Both TRINAR *ULTRA* TEC and TMC are applied in a 3-coat process and have the unparalleled durability that only a 70% PVDF coating can provide.

TRINAR *ULTRA* TEC is available in a broad spectrum of vibrant, bright, and very clean colors. They lend themselves beautifully to applications requiring a striking accent or bold statement in design. TRINAR *ULTRA* TMC metallic colors offer either a bright or subdued metal color which is very popular throughout the architectural community.

When specifying TRINAR *ULTRA* TEC or TMC colors, it is helpful to include the appropriate suffix (TEC or TMC). This helps to distinguish the color as a 3-coat process, and minimizes any possibility for confusion during the specification process. The TEC stands for TRINAR Exotic Clear, and the TMC stands for TRINAR Metallic Clear.

Whether your color design requirements call for a bold statement or a soft and subtle appearance, AkzoNobel's wide array of TRINAR *ULTRA* TEC and TMC colors will provide the desired effects. Should you wish to match a color provided by another manufacturer, our computer-aided technicians will be happy to provide you with a corresponding match. Or, if you want something not found on a color card, we will assist you in the creation of a brand new color.

TRINAR *ULTRA* TEC and TMC have become very popular coatings for factory application on aluminum as well as galvanized metal roofing and zinc/aluminum coated steel substrates. TRINAR *ULTRA* TEC and TMC coatings provide long-term beauty for a wide range of metal building components such as panel systems, curtain-wall, window systems, louvers, canopies, mullions, store fronts and fascia.

Why choose TRINAR *ULTRA*?

TRINAR *ULTRA* is the next generation of PVDF coatings. All finish types available in TRINAR are now available in TRINAR *ULTRA* (2-coat colors, TRI-Escent® II, TEC and TMC). All color choices from standard TRINAR systems are also available in the *ULTRA* series. The main benefit of using TRINAR *ULTRA* is a more environmentally friendly product with less VOC's. Durability and performance of TRINAR *ULTRA* is still the same, easily meeting and exceeding the AAMA 2605 specification.

Disclaimer

TRINAR *ULTRA* TEC and TMC product specifications

Product Type	70% polyvinylidene fluoride (PVDF) coating.
Specification	Meets or exceeds all AAMA 2605 specifications.
Primer	KY1C17839A, KA1C22454(P1) or KN1C22296(P2)
Percent Solids (Package)	Weight solids 49-53%, Volume solids 31-35%.
Percent Solids (Reduced)	Weight solids 38-40%, Volume solids 27-29%.
Reduction	Primer: 1-1 with Xylene. Color coat and Clear coat: 20-30% by volume of Xylene/Butyl Carbitol blend then add Butyl Carbitol as needed for flow.
Viscosity	Primer: 20-25 seconds #3 Zahn @ 77° F (package), 16-18 seconds on Zahn #2 @ 77° F (reduced). Topcoat: 20-23 seconds #4 Zahn @ 77° F (package), 22-25 seconds on Zahn #2 @ 77° F (reduced). Clear coat: 20-23 seconds #4 Zahn @ 77° F (package), 18-22 seconds on Zahn #2 @ 77° F (reduced).
Film Thickness	Primer: 1.0-2.0 wet mils, 0.2-0.4 mils dry. Color coat: 2.5-4.0 mils wet, 1.0-1.2 mils dry. Clear coat: 2.0-3.0 mils wet, 0.4-0.6 mils dry. Total system: 1.6-2.2 mils dry.
Gloss Range	25 to 35% @ 60° angle.
Cure Schedule	Lab bake cycle 10 minutes @ 450° F. Production cure varies with line speed and oven temperature. Metal temperature must achieve 450° F and be maintained for 2 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.
Note	To help facilitate color uniformity, a special primer (P1 or P2) may be required. Please see Product Data Sheet.

AAMA 2605 specification

Test	Description	Coating Requirements	TRINAR *ULTRA* TEC and TMC Performance
7.1	**Color Uniformity**	Visual Control	Instrument and visually controlled
7.2	**Specular gloss at 60º, ASTM D 523**	Medium and low gloss ranges	Controlled to custom spec ±5 units
7.3	**Dry film hardness, ASTM D 3363**	F minimum	H+
7.4	**Film adhesion (dry, wet and boiling water), crosshatch 1/16 inch squares**	No removal between scribed times	No removal
7.5	**Impact resistance (direct) 0.10 inch distortion**	No removal of film	No removal
7.7.1	**Chemical resistance (10% muriatic acid)**	15 minutes, no visual changes	Meets or exceeds spec
7.7.2	**Chemical resistance (mortar, alkali)**	24 hours, no visual changes	Meets or exceeds spec
7.7.3	**Resistance to acid pollutants (70% nitric acid)**	30 minutes, maximum 5ΔE NBS units color change	Meets or exceeds spec
7.7.4	**Detergent resistance**	72 hours, no effect	Meets or exceeds spec
7.8.1	**Humidity resistance, ASTM B 2247**	4,000 hours, few #8 blisters (maximum)	Meets or exceeds spec
7.8.2	**Salt spray resistance, ASTM B 117**	4,000 hours, minimum 7 rating on scribe and minimum blister rating of 8 (ASTM D 1654)	Meets or exceeds spec
7.9.1.2	**Weathering, color retention, ASTM D 2244**	10 years, 45º S. South Florida, max 5ΔE NBS units color change	Meets or exceeds spec
7.9.1.3	**Weathering, chalk resistance, ASTM D 4214**	10 years, 45º S. South Florida, max 8 rating for colors, 6 rating for whites	Meets or exceeds spec
7.9.1.4	**Gloss retention**	10 years, 50% minimum	Meets or exceeds spec
7.9.1.5	**Weathering, erosion resistance**	10 years, 45º S. South Florida, maximum 20% loss	Meets or exceeds spec

Product specifications of

CERAM-A-STAR® E

Solid color liquid spray exterior finish for aluminum extrusion applications

AkzoNobel

CERAM-A-STAR E is an exciting new solution for aluminum extrusion applications, with proven durability and ease of application.

Available globally, CERAM-A-STAR E is the perfect choice for use in all environments that require an AAMA 2604 product.

Designed to meet the global demand for a mid-level high performance system, CERAM-A-STAR E delivers significant performance improvements over other AAMA 2604 products.

CERAM-A-STAR E is a new product designed for spray application to aluminum, meeting all the specs of AAMA 2604. Based on a proven coil coating technology, it brings a new level of durability to the mid-level market segment, at an economical price.

CERAM-A-STAR E takes the exceptional performance of CERAM-A-STAR 1050, a market-leading SMP coil coating, and adapts it to the high-performance / AAMA 2604 market segment. CERAM-A-STAR 1050 is the coil coating industry's benchmark silicone-modified polyester, with unmatched chalk and fade resistance and exceptional hardness for long-term durability.

CERAM-A-STAR E's performance comes from a proprietary resin formulation that has been proven through real-world testing and field installations for over 15 years. This unique resin system gives it vastly superior hardness and mar resistance over other AAMA 2604 products, which is a major benefit during installation and aggressive environments.

CERAM-A-STAR E has 15 years of South Florida real world weathering exposure data, something that most new coating solutions can't say. Since it's based on an already proven product with millions of square feet already installed in the field, you can rest assured its performance will stand up over time.

To assure proper application, AkzoNobel utilizes a process of Applicator Certification. Only after meeting stringent repeatable quality standards is an applicator granted this approval. This helps protect the integrity of the finish for all parties concerned.

Field Performance

When applied in accordance to specifications the following field performance can be expected from CERAM-A-STAR E.

Film Integrity	10 years
Chalk	Colors: no more than #8 for 10 years Whites: no more than #6 for 10 years
Fade	No more than 5 ΔE Hunter units for 10 years

Disclaimer

CERAM-A-STAR E product specifications for aluminum

Product Type	Silicone-modified polyester coating.
Specification	Meets or exceeds all AAMA 2604 specifications.
Primer	Optional. Recommended in aggressive environments.
Percent Solids (Package)	Weight solids 48-60%, Volume solids 37-45%.
Percent Solids (Reduced)	Weight solids 40-53%, Volume solids 30-34%.
Reduction	15-25% by volume of Xylene/Butyl Carbitol blend then add Butyl Carbitol as needed for flow.
Viscosity	17-19 seconds #3 Zahn @ 77° F (package), 22-25 seconds on Zahn #2 (reduced).
Film Thickness	2.4-4.0 wet mils, 1.0-1.2 mils dry.
Gloss Range	25 to 35% @ 60° angle.
Cure Schedule (Aluminum)	Lab bake cycle 10 minutes @ 350° F. Production cure varies with line speed and oven temperature. Metal temperature must achieve 350° F and be maintained for 2 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.

AAMA 2604 specification

Test	Description	Coating Requirements	CERAM-A-STAR E Performance
7.1	**Color Uniformity**	Visual Control	Instrument and visually controlled
7.2	**Specular gloss at 60º, ASTM D 523**	Medium and low gloss ranges	Controlled to custom spec ±5 units
7.3	**Dry film hardness,**	F minimum	H+
7.4	**Film adhesion (dry, wet and boiling water), crosshatch 1/16 inch squares**	No removal between scribed times	No removal
7.5	**Impact resistance (direct) 0.10 inch distortion**	No removal of film	No removal
7.6	**Abrasion resistance, ASTM D 968**	Abrasion coefficient value, 20 minimum	Exceeds spec
7.7.1	**Chemical resistance (10% muriatic acid)**	15 minutes, no visual changes	Meets or exceeds spec
7.7.2	**Chemical resistance (mortar, alkali)**	24 hours, no visual changes	Meets or exceeds spec
7.7.3	**Resistance to acid pollutants (70% nitric acid)**	30 minutes, maximum 5ΔE NBS units color change	Meets or exceeds spec
7.7.4	**Detergent resistance**	72 hours, no effect	Meets or exceeds spec
7.7.5	**Window cleaner resistance**	24 hours, no visual change	Meets or exceeds spec
7.8.1	**Humidity resistance, ASTM D 2247**	3,000 hours, few #8 blisters (maximum)	Meets or exceeds spec
7.8.2	**Salt spray resistance, ASTM B 117**	3,000 hours, minimum 7 rating on scribe and minimum blister rating of 8 in field	Meets or exceeds spec
7.9.1.2	**Weathering, color retention, ASTM D 2244**	5 years, 45º S. South Florida, max 5ΔE NBS units color change	Meets or exceeds spec
7.9.1.3	**Weathering, chalk resistance, ASTM D 659**	5 years, 45º S. South Florida, max 8 rating for colors, 6 rating for whites	Meets or exceeds spec
7.9.1.5	**Weathering, erosion resistance**	5 years, 45º S. South Florida, maximum 20% loss	Meets or exceeds spec

Product specifications of

ACRA-BOND® *ULTRA*

A versatile, environmentally-friendly conventional solids acrylic coating for the residential/light commercial market

AkzoNobel

Architects and specifiers will find ACRA-BOND *ULTRA* is an excellent finish for a variety of interior metal surfaces and residential window and door systems.

After many years of successful application with the original ACRA-BOND, our research and development group has released a product that is superior to current AAMA 2603 technologies.

Test data show it to be the finest conventional solids polyester on the market today.

Why was there a need to completely re-engineer such a workhorse product like the original ACRA-BOND? The answer was in the voice of our customers. Since the trend to return to conventional solids acrylic technology is growing with the increase in installations of VOC abatement equipment, we believe that this technology will be the coating of choice for residential and light commercial use for quite some time.

What are the features and benefits of this new system?

- Better coverage in difficult to reach areas.
- Painting the most difficult shapes beautifully the first time rather than having to depend on a second run for customer satisfaction.
- Better mileage per gallon for the applicator and therefore a lower applied cost.
- Savings in energy consumption with lower curing temperatures.
- Better flexibility with improved hardness.
- Vastly improved resistance to metal marking.
- Larger windows of forgiveness in application without sags, solvent blisters, or "pull-away" from edges.
- Excellent surface clarity.
- Greatly improved exterior durability.

To make our vision of the future complete, we offer ACRA-BOND *ULTRA* in our EXPRESS Intermix system for exact quantity needs and exact color matching. This on-site and on-demand ability eliminates waste and reduces costs by recycling overages into new colors.

Architects and specifiers will find ACRA-BOND *ULTRA* to be an excellent finish for a variety of interior metal surfaces and residential window and door systems.

Disclaimer

ACRA-BOND *ULTRA* product specifications

Product Type	Acrylic baked enamel.
Specification	Meets or exceeds all AAMA 2603 specifications.
Primer	None
Percent Solids (Package)	Weight solids 48-64%, Volume solids 37-45%.
Percent Solids (Reduced)	Weight solids 40-53%, Volume solids 30-34%.
Reduction	15-25% by volume of Xylene/ Butyl Carbitol blend then add Butyl Carbitol as needed for flow.
Viscosity	17-19 seconds #3 Zahn @ 77° F (package), 20-25 seconds on Zahn #2 (reduced).
Film Thickness	Standard: 2.4 to 4.0 wet mils, 0.8 - 1.2 mils dry. Coastal: 3.5 to 5.0 wet mils, 1.2-1.4 mils dry.
Gloss Range	25 to 35% @ 60° angle.
Cure Schedule	Lab bake cycle 6 minutes @ 350° F. Production cure varies with the speed, oven temperature and metal mass being painted. Temperature must achieve 350° F and be maintained for 4 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.

AAMA 2603 specification

The following is part of the AAMA 2603 Specification. ACRA-BOND *ULTRA* has physical properties which more than qualify it for extrusion application.

6.4.1.1	**Dry Adhesion**	No pick-off
6.4.1.2	**Wet Adhesion**	No pick-off
6.5.1	**Direct Impact**	No pick-off
6.6.1.1	**Chemical Resistance**	Excellent
6.6.2.1	**Mortar Resistance**	Pass - little or no staining
6.6.3.1	**Detergent Resistance**	Excellent
6.7.1.1	**1500 Hour Humidity Resistance**	Pass
6.7.2.1	**1500 Hour Salt Spray Resistance**	Pass
6.8.1.1	**1000 Hour Accelerated Weathering**	Pass
6.8.2.1	**1 Year Outdoor Exposure**	Pass
N/A	**Pencil Hardness**	H - 3H

Product specifications of

POLYDURE® E

A versatile, environmentally-friendly high solids polyester coating for the residential market

AkzoNobel

An enhanced version of POLYDURE E is the newest member of the AkzoNobel family of fine finishes for the aluminum extrusion industry.

After many years of successful application with the original POLYDURE E, our research and development group has released an improved version that is superior to current AAMA 2603 technologies.

Test data show it to be the finest high solids polyester on the market today.

Why was there a need to completely re-engineer POLYDURE E, which had a great track record of worry-free application? The answer was in the voice of our customers. Since the trend to return to high solids polyester technology continues to be strong with increased VOC and HAPS restrictions, we believe that this technology will be the coating of choice for residential and light commercial use for quite some time.

What are the features and benefits of this new system?

- Better coverage in difficult to reach areas.
- Painting the most difficult shapes beautifully the first time rather than having to depend on a second run for customer satisfaction.
- Better mileage per gallon for the applicator and therefore a lower applied cost.
- Better flexibility with improved hardness.
- Vastly improved resistance to metal marking.
- Larger windows of forgiveness in application without sags, solvent blisters, or "pull-away" from edges.
- Excellent surface clarity.
- Greatly improved exterior durability.

To make our vision of the future complete, we offer POLYDURE E in our EXPRESS Intermix system for exact quantity needs and exact color matching. This on-site and on-demand ability eliminates waste and reduces costs by recycling overages into new colors.

Architects and specifiers will find POLYDURE E to be an excellent finish for a variety of interior metal surfaces and residential window and door systems.

Disclaimer

POLYDURE E
product specifications

Product Type	High solids polyester baked enamel.
Specification	Meets or exceeds all AAMA 2603 specifications.
Primer	None
Percent Solids (Package)	Weight solids 65-83%, Volume solids 57-68%.
Percent Solids (Application)	Reduce with heat only.
VOC	Less than 3.0 #'s / gallon.
VHAP	Less than 1.5 #'s / gallon.
HAP	Less than 1.0 #'s / gallon.
Reduction	Heat only unless Butyl Carbitol is needed for smoother appearance.
Viscosity	13-23 seconds #3 Zahn @ 77° F.
Film Thickness	1.3-2.3 wet mils, 0.8 - 1.2 mils dry.
Gloss Range	5 to 85% @ 60° angle available, Intermix bases are 25-35% @ 60° angle.
Cure Schedule	Lab bake cycle 6 minutes @ 350° F. Production cure varies with the speed, oven temperature and metal mass being painted. Temperature must achieve 350° F and be maintained for 4 minutes minimum.
Cure	H+ pencil hardness and 50 MEK double rubs.

AAMA 2603 specification

The following is part of the AAMA 2603 Specification. POLYDURE E has physical properties which more than qualify it for extrusion application.

6.4.1.1	**Dry Adhesion**	No pick-off
6.4.1.2	**Wet Adhesion**	No pick-off
6.5.1	**Direct Impact**	No pick-off
6.6.1.1	**Chemical Resistance**	Excellent
6.6.2.1	**Mortar Resistance**	Pass - little or no staining
6.6.3.1	**Detergent Resistance**	Excellent
6.7.1.1	**1500 Hour Humidity Resistance**	Pass
6.7.2.1	**1500 Hour Salt Spray Resistance**	Pass
6.8.1.1	**1000 Hour Accelerated Weathering**	Pass
6.8.2.1	**1 Year Outdoor Exposure**	Pass
N/A	**Pencil Hardness**	H - 3H

AkzoNobel

Extrusion Coatings

TRINAR® AQUA

Water-based air-dry fluoropolymer system

AkzoNobel

Application guidelines for TRINAR AQUA, which is for use over primed, prepainted metal substrates and primed metal substrates.

For professional use only.

These guidelines are offered as a method to optimize the performance of the TRINAR AQUA repaint finish. TRINAR AQUA coating system is used both for touch-up and also for painting materials that will not tolerate the elevated bake temperatures required of Spray TRINAR. The coating is comprised of a fluoropolymer-acrylic resin system, intended for use as a two-coat material.

TRINAR AQUA is not designed to be used as a one-coat over bare metal, or on non-metal substrates such as wood, glass or plastics. TRINAR AQUA coating is not recommended for application to masonry, PVC, fiberglass, concrete block, wood, and all other non-metallic substrates.

Surface preparation for bare metal substrates

Bare iron and steel: Minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i]. Remove all oils and grease from the surface by Solvent Cleaning per SSPC-SP1[iii] and apply a primer specifically designed to protect metal substrate from corrosion[1]. Test for adequate adhesion per Appendix A.

Aluminum: Because of the variety of aluminum compositions and treatments (e.g., alodine and anodizing) available, users must test for adhesion on their substrate before using. See Appendix A. The surface must be prepared by sanding with GRAY (not green) 3M Synthetic Steel Wood pad or 220-grit sandpaper. Wipe with clean solvent, using xylene, toluene, M.I.B.K. or M.E.K. If the surface is polished or anodized it must be scuffed until rough to assure adhesion. If the surface has been properly treated with a chrome conversion pretreatment sanding is not required.

GRIP-GARD® Washprimer is recommended when coating over cleaned and properly prepared aluminum. This requires 0.15 ± 0.05 mils dry film thickness that must be a smooth and continuous film This two-component system requires a 1:1 mix with GRIP-GARD Washprimer Hardener. This primer must be topcoated after 15 minutes and before 4 hours after the application of the primer.

TRINAR AQUA application guidelines

Surface preparation for prepainted metal substrates

Before priming your factory-finished building panels, great care must be taken to prepare the surface to be painted, and to carefully assess the adhesion of this AkzoNobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of biodegradable cleaner or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

a.) One cup of Simple Green®, or other common non-toxic biodegradable cleaners, which contain less than 0.5% phosphate, dissolved into two gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleansers or detergents with bleach.

b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, or brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent-containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined above, household bleach mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of a mild soap (e.g., Ivory®) to aid wetting, is recommended.

Heavier dirt accumulations, which must be addressed prior to repainting, may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.5% phosphate is recommended only as a preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface imperfections

Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed metal and rust

Exposed metal minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i] and use of a primer specifically designed to protect any exposed galvanized steel metal from corrosion[1]. Care must be taken, however, not to destroy the galvanized surface. Before priming the metal building panel, test for adequate intercoat adhesion (see Appendix A). Allow sufficient time for the primer to dry before applying the topcoat.

For severely rusted building panels the recommended preparation is SSPC-SP7[ii] – Brush-Off Blast Cleaning. AkzoNobel's Water-Based Epoxy Maintenance Coat, or a maintenance primer designed for use on hot-dipped galvanize steel, is recommended to protect the metal building panel from further rusting.

4.) Additional preparation required for new building panels

There may still be a layer of factory-applied wax on the surface of the factory applied coating garage door if it has been installed within the last two years. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green!) 3M Synthetic Steel Wool pad (equivalent to "000" steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

It is recommended that a tiecoat be used when coating over previously painted materials. The recommended tiecoat is AkzoNobel's VA0C31630 Gray Tiecoat and UC0C31631 catalyst. See the application guidelines, Gray Tiecoat VA0C31630 / UC0C31631 for complete instructions on use and application. Once this procedure is completed, perform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4.

It is imperative, of course, that the factory finish itself not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed! Contact your builder immediately.

TRINAR AQUA preparation

Mix coating thoroughly before using. A mechanical mixer should be used. Improper mixing (such as hand mixing or stirring with a stick or spatula) may lead to improper color or gloss. TRINAR AQUA may be sprayed as supplied. If reduction is required for spray application, approximately one gallon of TRINAR AQUA can be reduced with 8 ounces of water. More reduction will change the reology of the coating and change the flow characteristics. For brush or roller application, reduction is generally not needed. Please note however that this coating is not well-suited for brush or roller application.

TRINAR AQUA application

After mixing thoroughly, the material is ready to apply. For airless spray application, a 0.015" tip and 1,500 psi have been found to give a uniform wet film. Depending upon color and application conditions, two complete coats may be required in order to achieve uniform color and gloss. Apply to a uniform dry film thickness of 1.2 mils, minimum.

Application precautions

Apply only when air, surface and product temperatures are above 60ºF (13ºC) and surface temperature is at least 5ºF (3ºC) above the dew point. Application temperatures below 60˚F (13˚C) will cause poor adhesion and lengthen the drying and curing time. Application temperatures above 95˚F (35˚C) may cause dry spray, uneven sheen appearance and poor adhesion. Do not apply to surfaces at temperatures of 100˚F (38˚C) or higher.

Perform no painting when the relative humidity is above 85% for 24 hours before, during, and after paint application. Ambient and substrate temperatures must be maintained for 24 hours before, during, and after paint application. Avoid exterior painting late in the day when dew or condensations are likely to form or when rain is threatening. During the early stages of drying, the coating is sensitive to rain, dew, high humidity and moisture condensation. Plan painting schedules to avoid these conditions during the first 24 hours of curing.

Recoat

TRINAR AQUA is recoatable after approximately 4 hours. Apply all coats within one month.

Handling

Although it is not recommended, TRINAR AQUA can be handled after 48 hours. However, full cure requires a minimum of two weeks to air-dry. A longer period of time may be required if the ambient temperatures are below 70˚F (21˚C). Because it is not fully cured (depending on ambient temperature) for approximately two weeks, any handling or packing of TRINAR AQUA coated metal may result in damage to the film if done before being properly cured. As a final test, pencil hardness should be an F-2H per ASTM D 3363, to assure a full cure. Force drying can be used to shorten the cure time. A maximum of 140˚F (60˚C) is recommended.

Clean up

Use water or a water/butyl cellosolve blend to clean equipment.

U.S. EPA regulations

TRINAR AQUA as supplied meets or exceeds the U.S. Environmental Protection Agency established limits for volatile organic compounds in extreme high durability architectural coatings.

V.O.C. limit

140 grams per liter (0.3 pounds per gallon).

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "x" cut, the intercoat adhesion is inadequate.

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[1] AkzoNobel's Water-Based Epoxy Maintenance Coat, WA9C32800 / GW9C32796 or equivalent primer designed for adhesion to galvanized steel.

[i] SSPC-SP2 – Hand Tool Cleaning

Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[iii]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2

[ii] SSPC-SP7 - Brush-Off Blast Cleaning

A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[iii] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

[iii] SSPC-SP1 – Solvent Cleaning

Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 1.

TRINAR® AQUA 2K

Two component water-based air-dry fluoropolymer system

AkzoNobel

Application guidelines for TRINAR AQUA 2K, which is for use over primed metal, prepainted metal substrates,fiberglass, and some plastic substrates.

For professional use only.

These guidelines are offered as a method to optimize the performance of the TRINAR AQUA 2K repaint finish. TRINAR AQUA 2K coating system is used both for touch-up and also for painting materials that will not tolerate the elevated bake temperatures required of Spray or Coil coated TRINAR. The coating is comprised of a fluoropolymer-acrylic resin system and catalyst, intended for use as a two-coat material.

TRINAR AQUA 2K is not designed to be used as a one-coat over bare metal, or on non-metal substrates such as wood or glass. TRINAR AQUA 2K coating is not recommended for application to masonry, PVC, concrete block, wood and certain plastics.

Surface preparation for bare metal substrates

Bare iron and steel: Minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[1]. Remove all oils and grease from the surface by Solvent Cleaning per SSPC-SP1[3] and apply a primer specifically designed to protect metal substrate from corrosion[4]. Test for adequate adhesion per Appendix A.

Aluminum: Because of the variety of aluminium compositions and treatments (e.g., alodine and anodizing) available, users must test for adhesion on their substrate before using. See Appendix A. The surface must be prepared by sanding with GRAY (not green) 3M Synthetic Steel Wool pad or 220-grit sandpaper. Wipe with clean solvent, using xylene, toluene, M.I.B.K. or M.E.K. If the surface is polished or anodized it must be scuffed until rough to assure adhesion. If the surface has been properly treated with a chrome conversion pretreatment sanding is not required.

GRIP-GARD® Washprimer 1K CF is recommended when coating over cleaned and properly prepared aluminium. This requires 0.40 ± 0.10 mils dry film thickness that must be a smooth and continuous film. This two-component system requires a 2:1 mix with GRIP-GARD Washprimer Reducer, (CFEXP02697). This primer must be top coated after 15 minutes and before 24 hours after the application of the primer. See GRIP-GARD Washprimer 1K CF guide for additional information.

TRINAR AQUA application guidelines

Surface preparation for prepainted metal substrates

Before priming your factory-finished panels, great care must be taken to prepare the surface to be painted and to carefully assess the adhesion of this Akzo Nobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of biodegradable cleaner or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

a.) One cup of Simple Green®, or other common non-toxic biodegradable cleaners, which contain less than 0.5% phosphate, dissolved into two gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleansers or detergents with bleach.

b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, or brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined above, household bleach mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of mild soap (e.g. Ivory®) to aid wetting, is recommended.

Heavier dirt accumulations, which must be addressed prior to repainting, may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.50% phosphate is recommended only as preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface imperfections

Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed metal and rust

Exposed metal minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[1] and use of a primer specifically designed to protect any exposed galvanized steel from corrosion. Care must be taken not to destroy the galvanized surface. Before priming the metal building panel, test for adequate intercoat adhesion (see Appendix A). Allow sufficient time for the primer to dry before applying the TRINAR AQUA 2K.

For severely rusted building panels the recommended preparation is SSPC-SP7[2] - Brush-Off Blast Cleaning. Akzo Nobel's Water-Based Epoxy Maintenance Coat[4], or a maintenance primer designed for use on hot-dipped galvanize steel is recommended to protect the exposed metal from further rusting.

4.) Additional preparation required for new building panels

There may still be a layer of factory applied wax on the surface of the factory applied coating if it has been installed within the last two years. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green!) 3M Synthetic Steel Wool pad (equivalent to "000" steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

It is recommended that a tiecoat be used when coating over previously painted materials. The recommend tiecoat is Akzo Nobel's CVA0C31630, Gray Tiecoat. See the application guidelines, Gray Tiecoat CVA0C31630 / CUC0C31631 for complete instruction on use and application. Once this procedure is completed, preform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4.

It is imperative, that the factory finish not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed. Contact your builder immediately.

Surface preparation for small scratches and nicks

For the occurrences of small scratches or nicks in factory applied finishes the following is a recommendation for repairing. Sealing the damage area will prolong the life of the factory applied coating by preventing the moisture and environmental contaminates from reaching the metal substrate.

The areas to be touched up must be lightly scuffed to promote good adhesion of the TRINAR AQUA 2K finish. A fine grit sandpaper of at least 220 grit is recommended. Lightly scuff the area and wipe with a clean

cloth to remove any dust or environmental contamination. A small, fine brush can be used to apply the TRINAR AQUA 2K to the damaged area. Blend in the coating with the surrounding area. For small scratches and nicks, the TRINAR AQUA 2K can be used without the addition of the catalyst. This will extent the air dry time.

TRINAR AQUA 2K preparation

Mix coating thoroughly before using. A mechanical mixer should be used. Improper mixing (such as hand mixing or stirring with a stick or spatula) may lead to improper color and gloss. If reduction is required for spray application, approximately one gallon of TRINAR AQUA 2K and CATALYST can be reduced with 8 ounces of distilled water, more reduction will change the rheology of the coating and change the flow characteristics. For brush or roller application, reduction is generally not needed. Please note however that this coating is not well suited for brush or roller application.

MIX RATIO: TRINAR AQUA 2K and CATALYST

MIX 14 parts by volume TRINAR AQUA 2K to 1 part by volume CUC3C54117, TRINAR AQUA Catalyst.

To achieve a uniform blend, we recommend that the catalyst be added to the TRINAR AQUA 2K under agitation. Mechanical mixing is recommended, sufficient mixing must occur for the catalyst to be activated.

TRINAR AQUA 2K application

After mixing thoroughly, the material has a **3 hour working potlife**. After 3 hours the condition of blended material will have changed sufficiently to cause application issue. Additional reduction with water will not offset the increase in viscosity without destroying the rheology profile of the coating.

For airless spray application, a 0.015 tip and 1,500 psi have been found to give a uniform wet film. Depending upon color and application conditions, two complete coats maybe required in order to achieve uniform color and gloss. Apply to a uniform dry film thickness of 1.2 mils.

For HVLP application, the mix coating maybe reduced with up to 8% distilled water by volume to reduce the viscosity. Further reduction will dramatically effect the rheology and may lead to runs and sags in the applied film.

Application precautions

Apply only when air, surface and product temperatures are above 60ºF (13ºC) and surface temperature is at least 5ºF (3ºC) above the dew point. Application temperatures below 60ºF (13ºC) will cause poor adhesion and lengthen the drying and curing time. Application temperatures above 95ºF (35ºC) may cause dry spray, uneven sheen appearance and poor adhesion. Do not apply to surfaces with temperatures of 100ºF (38ºC) or higher.

Perform no painting when the relative humidity is above 85% for 24 hours before, during and after paint application. Ambient and substrate temperatures must be maintained for 24 hours before, during and after paint application. Avoid exterior painting late in the day when dew or condensations are likely to form or when rain is threatening. During the early stages of drying, the coating is sensitive to rain, dew, high humidity and moisture condensation. Plan painting schedules to avoid these conditions during the first 24 hours of curing.

Recoat

TRINAR AQUA 2K is recoatable after approximately 4 hours. Apply all coats within one week.

Handling

Although it is not recommended, TRINAR AQUA 2K can be handled after 48 hours. However, full cure requires a minimum of two weeks to air-dry. A longer period of time may be required if the ambient temperatures are below 70˚F (21˚C). Because it is not fully cured (depending on ambient temperature) for approximately two weeks, any handling or packing of TRINAR AQUA 2K coated metal may result in damage to the film if done before being properly cured. As a final test, pencil hardness should be an F-2H per ASTM D 3363, to assure a full cure. Force drying can be used to shorten the cure time. A maximum of 180˚F (82˚C) is recommended.

Clean up

Use water or a water/butyl cellosolve blend to clean equipment.

U.S. EPA regulations

TRINAR AQUA 2K as supplied meets or exceeds the U.S. Environmental Protection Agency established limits for volatile organic compounds in extreme high durability architectural coatings.

V.O.C. limit

140 grams per liter (0.3 pounds per gallon).

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "X" cut, the intercoat adhesion is inadequate.

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[4] AkzoNobel's Water-Based Epoxy Maintenance Coat, CWA9C32800 / CGW9C32796 or equivalent primer designed for adhesion to galvanized steel.

[1] SSPC-SP2 – Hand Tool Cleaning

Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[3]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2.

[2] SSPC-SP7 - Brush-Off Blast Cleaning

A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[3] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

CERAM-A-CRYL® II

Silicone-modified acrylic repaint finish

AkzoNobel

Application guidelines for CERAM-A-CRYL II, which is designed for use over primed, prepainted metal substrates and primed metal substrates.

For professional use only.

These guidelines are offered as a method to optimize the performance of the CERAM-A-CRYL II repaint finish. CERAM-A-CRYL II is recommended for repainting non-corroded, weathered metal building panels. The coating system is comprised of a Silicone-modified Acrylic coating, intended for use as two-coat material applied over factory prepainted panels.

CERAM-A-CRYL II is not designed to be used as a one-coat over bare metal, or on non-metal substrates such as wood, glass or plastics.

CERAM-A-CRYL II Coating is not recommended for application to masonry, PVC, fiberglass, concrete block, wood, and all other non-metallic substrates.

Surface preparation for bare metal substrates

Bare iron and steel: Minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i]. Remove all oils and grease from the surface by Solvent Cleaning per SSPC-SP1[iii]. Test for adequate adhesion per Appendix A.

Galvanized metal: Allow to weather a minimum of 6 months prior to coating. Solvent clean per SSPC-SP1[iii]. When weathering is not possible or the surface has been treated with chromates or silicates, first solvent clean and apply the coating to a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7[ii] is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2[i]. Test for adequate adhesion per Appendix A.

Aluminum: Because of the variety of aluminum compositions and treatments (e.g., alodine and anodizing) available, users must test for adhesion on their substrate before using. See Appendix A.

Surface preparation for prepainted metal substrates

Before painting your factory-finished building panels, great care must be taken to prepare the surface to be painted, and to carefully assess the adhesion of this AkzoNobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and Mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of detergents or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

CERAM-A-CRYL II application guidelines

a.) One cup of Tide, or other common household laundry detergents, which contain less than 0.5% phosphate, dissolved into five gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleansers or detergents with bleach.
b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, or brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent-containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined above, household bleach-mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of a mild soap (e.g., Ivory®) to aid wetting, is recommended.

Heavier dirt accumulations which must be addressed prior to repainting may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.5% phosphate is recommended only as a preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface Imperfections

Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed Metal and Rust

Exposed metal minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i] and use of a primer specifically designed to protect any exposed galvanized steel metal from corrosion[1]. Care must be taken, however, not to destroy the galvanized surface. Before priming the metal building panel, test for adequate intercoat adhesion (see Appendix A). Allow sufficient time for the primer to dry before applying the topcoat.

For severely rusted building panels the recommended preparation is SSPC-SP7[ii] – Brush-Off Blast Cleaning. AkzoNobel's Water-Based Epoxy Maintenance Coat, or a maintenance primer designed for use on hot-dipped galvanize steel, is recommended to protect the metal building panel from further rusting.

4.) Additional Preparation Required for New Building Panels

There may still be a layer of factory-applied wax on the surface of the building if it has been installed within the last two years. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green) 3M Synthetic Steel Wool pad (equivalent to "000" steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

Once this procedure is completed, perform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4.

It is imperative, of course, that the factory finish itself not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed! Contact your builder immediately.

CERAM-A-CRYL II preparation

Mix coating thoroughly before using. A mechanical mixer should be used. Improper mixing (such as hand mixing or stirring with a stick or spatula) may lead too improper color or gloss. To reduce for spray, add approximately one gallon of EXP5050 Reducing Solvent (or parachlorobenzotrifluoride solvent) per three gallons of CERAM-A-CRYL II. More solvent may be needed, depending upon temperature and application equipment. For brush or roller application, reduction generally is not needed. NOTE: This coating is not well suited for brush or roller application.

CERAM-A-CRYL II application

After mixing thoroughly, the material is ready to apply. For airless spray application, a 0.015" tip and 1,500 psi have been found to give a uniform wet film. Apply a uniform coat of 1.2 mils dry film thickness, minimum. Depending upon color and application conditions, two complete coats may be required in order to achieve uniform color and gloss.

Application precautions:

Apply only when air, surface and product temperatures are above 50ºF (10ºC) and surface temperature is at least 5ºF (3ºC) above the dew point. Application temperatures below 50ºF (10ºC) may cause poor adhesion and lengthen the drying and curing time. Application temperatures above 95ºF (35ºC) may cause dry spray, uneven appearance and poor adhesion. Do not apply to surfaces at temperatures of 120ºF (71ºC) or higher.

Avoid exterior painting late in the day when dew or condensation are likely to form or when rain is threatening. During the early stages of drying, the coating is sensitive to rain, dew, high humidity and moisture condensation. Plan painting schedules to avoid these conditions during the first 16-24 hours of curing.

Recoat
CERAM-A-CRYL II is recoatable after approximately 4 hours. Apply all coats within one month.

Clean-up
Use EXP5050 Reducing Solvent to clean equipment.

U.S. EPA regulations
CERAM-A-CRYL II as supplied and reduced with the recommended EXP5050 Reducing Solvent meets or exceeds the U.S. Environmental Protection Agency established limits for volatile organic compounds in architectural coatings.

V.O.C. limit
420 grams per liter (3.5 pounds per gallon).

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "x" cut, the intercoat adhesion is inadequate.

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[1] AkzoNobel's Water-Based Epoxy Maintenance Coat, WA9C32800 / GW9C32796 or equivalent primer designed for adhesion to galvanized steel.

[i] SSPC-SP2 – Hand Tool Cleaning
Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[iii]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2

[ii] SSPC-SP7 - Brush-Off Blast Cleaning
A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[iii] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

[iii] SSPC-SP1 – Solvent Cleaning
Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 1.

CERAM-A-CRYL® III

Silicone-modified acrylic repaint finish

AkzoNobel

Application guidelines for CERAM-A-CRYL III, which is designed for use over primed, prepainted metal substrates and primed metal substrates.

For professional use only.

These guidelines are offered as a method to optimize the performance of the CERAM-A-CRYL III repaint finish. CERAM-A-CRYL III is recommended for repainting non-corroded, weathered metal building panels. The coating system is comprised of a Silicone-modified Acrylic coating, intended for use as two-coat material applied over factory prepainted panels.

CERAM-A-CRYL III is not designed to be used as a one-coat over bare metal, or on non-metal substrates such as wood, glass or plastics.

CERAM-A-CRYL III Coating is not recommended for application to masonry, PVC, fiberglass, concrete block, wood, and all other non-metallic substrates.

Surface preparation for bare metal substrates

Bare iron and steel: Minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i]. Remove all oils and grease from the surface by Solvent Cleaning per SSPC-SP1[iii]. Test for adequate adhesion per Appendix A.

Galvanized metal: Allow to weather a minimum of 6 months prior to coating. Solvent clean per SSPC-SP1[iii]. When weathering is not possible or the surface has been treated with chromates or silicates, first solvent clean and apply the coating to a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7[ii] is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2[i]. Test for adequate adhesion per Appendix A.

Aluminum: Because of the variety of aluminum compositions and treatments (e.g., alodine and anodizing) available, users must test for adhesion on their substrate before using. See Appendix A.

Surface preparation for prepainted metal substrates

Before painting your factory-finished building panels, great care must be taken to prepare the surface to be painted, and to carefully assess the adhesion of this AkzoNobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and Mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of detergents or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

CERAM-A-CRYL III application guidelines

a.) One cup of Tide, or other common household laundry detergents, which contain less than 0.5% phosphate, dissolved into five gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleansers or detergents with bleach.
b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, or brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent-containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined above, household bleach-mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of a mild soap (e.g., Ivory®) to aid wetting, is recommended.

Heavier dirt accumulations which must be addressed prior to repainting may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.5% phosphate is recommended only as a preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface Imperfections

Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed Metal and Rust

Exposed metal minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i] and use of a primer specifically designed to protect any exposed galvanized steel metal from corrosion[1]. Care must be taken, however, not to destroy the galvanized surface. Before priming the metal building panel, test for adequate intercoat adhesion (see Appendix A). Allow sufficient time for the primer to dry before applying the topcoat.

For severely rusted building panels the recommended preparation is SSPC-SP7[ii] – Brush-Off Blast Cleaning. AkzoNobel's Water-Based Epoxy Maintenance Coat, or a maintenance primer designed for use on hot-dipped galvanize steel, is recommended to protect the metal building panel from further rusting.

4.) Additional Preparation Required for New Building Panels

There may still be a layer of factory-applied wax on the surface of the building if it has been installed within the last two years. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green) 3M Synthetic Steel Wool pad (equivalent to "000" steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

Once this procedure is completed, perform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4.

It is imperative, of course, that the factory finish itself not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed! Contact your builder immediately.

CERAM-A-CRYL III preparation

Mix coating thoroughly before using. A mechanical mixer should be used. Improper mixing (such as hand mixing or stirring with a stick or spatula) may lead too improper color or gloss. To reduce for spray, add approximately one gallon of Xylene or Methyl Ethyl Ketone per two gallons of CERAM-A-CRYL III. More solvent may be needed, depending upon temperature and application equipment. For brush or roller application, reduction generally is not needed. NOTE: This coating is not well suited for brush or roller application.

CERAM-A-CRYL III application

After mixing thoroughly, the material is ready to apply. For airless spray application, a 0.015" tip and 1,500 psi have been found to give a uniform wet film. Apply a uniform coat of 1.2 mils dry film thickness, minimum. Depending upon color and application conditions, two complete coats may be required in order to achieve uniform color and gloss.

Application precautions:

Apply only when air, surface and product temperatures are above 50ºF (10ºC) and surface temperature is at least 5ºF (3ºC) above the dew point. Application temperatures below 50ºF (10ºC) may cause poor adhesion and lengthen the drying and curing time. Application temperatures above 95ºF (35ºC) may cause dry spray, uneven appearance and poor adhesion. Do not apply to surfaces at temperatures of 120ºF (71ºC) or higher.

Avoid exterior painting late in the day when dew or condensation are likely to form or when rain is threatening. During the early stages of drying, the coating is sensitive to rain, dew, high humidity and moisture condensation. Plan painting schedules to avoid these conditions during the first 16-24 hours of curing.

Recoat
CERAM-A-CRYL III is recoatable after approximately 4 hours. Apply all coats within one month.

Clean-up
Use Xylene or Methyl Ethyl Ketone solvent to clean equipment.

V.O.C. limit
600 grams per liter (5.0 pounds per gallon).

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "x" cut, the intercoat adhesion is inadequate.

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[1] AkzoNobel's Water-Based Epoxy Maintenance Coat, CWA9C32800 / CGW9C32796 or equivalent primer designed for adhesion to galvanized steel.

[i] SSPC-SP2 – Hand Tool Cleaning
Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[iii]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2

[ii] SSPC-SP7 - Brush-Off Blast Cleaning
A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[iii] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

[iii] SSPC-SP1 – Solvent Cleaning
Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 1.

GRIP-GARD® Washprimer

Two part etching and passivating primer

AkzoNobel

Suitable for most substrates, especially steel and aluminum, GRIP-GARD Washprimer offers excellent protection against corrosion.

For professional use only.

These guidelines are offered as a method to optimize the performance of GRIP-GARD Washprimer. GRIP-GARD is recommended for priming degreased and sanded old finishes, steel, aluminum and galvanized steel. It is a two-part self etching primer that has excellent adhesive properties when used on a variety of metal substrates, even those still coated with old finishes.

GRIP-GARD is the most widely used primer in the sign industry today, and it's excellent protective qualities make it a natural fit for use with either TRINAR® AQUA or CERAM-A-CRYL® topcoats. It provides the type of protection against rust and corrosion needed to guarantee your building will look great for years to come.

Product and additives

The main product is GRIP-GARD Washprimer (2AFY31284), and the additive is GRIP-GARD Washprimer Hardener (10AFK31285).

Basic raw materials

The basic raw materials used in GRIP-GARD Washprimer are polyvinyl butyral resin, pigments and solvent. The raw materials used in GRIP-GARD Washprimer Hardener are phosphoric acid and solvents.

Application

1.) Personal protective equipment

GRIP-GARD contains polyvinyl butyral resin, pigments and solvent. When mixed, it also contains phosphoric acid. Use of a NIOSH-approved respirator and protective gloves is required.

2.) Surface preparation

For steel surfaces, degrease and sand using #80 grit paper dry. Remove any mill scale by sandblasting if necessary. For galvanized steel surfaces degrease and sand using #180 grit dry. For aluminum surfaces degrease and use #120 - #180 grit dry. Degreasing can be accomplished with any commercially available wax and grease remover. Change cleaning and degreasing cloths often to insure contaminants are not reapplied to the surface to be painted.

3.) Mixing ratio, reaction time and pot life

Prepare GRIP-GARD by mixing in a 1:1 ratio of equal parts GRIP-GARD Washprimer and GRIP-GARD Washprimer Hardener. After mixing the material may be applied immediately with no reaction time required. Once the components have been mixed, the pot life is 3 days if in a plastic container. If it is mixed and stored in a metal container the pot life is 8 hours.

Spraying viscosity
21 - 23 second #2 ZAHN at 70º F (20º C). Achieved by using measuring stick #104. If additional reduction is necessaary to accommodate spray equipment, add 5 - 10% maximum of either Standard Reducer (10AHY31372) or Very Slow Reducer (10AHY32177). Do not add additional GRIP-GARD Washprimer Hardener for thinning.

Application
Apply in 2 single coats, flash off 5 minutes between coats at 70º F (20º C). Allow second coat to dry for 30 minutes at 70º F (20º C) before applying top coat of TRINAR AQUA or CERAM-A-CRYL. GRIP-GARD Washprimer can be applied up to a relative humidity of 90 percent.

Sanding of GRIP-GARD Washprimer once applied is not recommended. Dry sanding, grinding, abrading, flame cutting and/or welding of the dry paint film will produce hazardous dust and/or fumes. If sanding is necessary, wear suitable NIOSH/MSHA approved respirator to avoid inhalation. Avoid all contact with airborne particles.

Film thickness and cover rate
Approximately 0.5 dry mil per single coat, with 1.0 dry mil required for both coats. When mixed and ready to spray GRIP-GARD Washprimer will cover 140 sq. ft. (35% T.E.) by conventional spray, and 255 sq. ft. (65% T.E.) by HVLP.

Cleaning of equipment
Lacquer thinner can be used for all clean up of GRIP-GARD Washprimer.

Storage
GRIP-GARD Washprimer and Washprimer Hardener are beige in color, and available in one gallon containers. The shelf life of both is one year if stored unopened at room temperature.

Safety notice
Do not handle until Material Safety Data Sheets have been read and understood. Regulations require that all employees be trained on Material Safety Data Sheets for all chemicals with which they come in contact. The manufacturer recommends the use of an air-supplied respirator equipped with a HEPA filter or air supplied respirator when exposed to vapors, spray mist, or sanding dust.

Disclaimer
The technical information and suggestions for use made herein are based on Akzo Nobel Coatings Inc. research and experience and are believed to be reliable, but such information does not constitute a warranty.

Since Akzo Nobel Coatings Inc. has no control over the conditions under which this product is transported, stored, handled, used or applied, buyers must determine for themselves, by preliminary tests or otherwise the suitability of the products for their purpose.

For more information, please contact:

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AkzoNobel

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AkzoNobel is a leading global paints and coatings company and a major producer of specialty chemicals. We supply industries and consumers worldwide with innovative products and are passionate about developing sustainable answers for our customers. Our portfolio includes well-known brands such as Dulux, Sikkens, International and Eka. Headquartered in Amsterdam, the Netherlands, we are consistently ranked as one of the leaders in the area of sustainability. With operations in more than 80 countries, our 50,000 people around the world are committed to delivering leading products and technologies to meet the growing demands of our fast-changing world.

Revision Date: September 2014

01792_220409

GRIP-GARD®
Washprimer 1K CF

Two part etching and passivating primer

AkzoNobel

Suitable for most substrates, especially steel and aluminum, GRIP-GARD Washprimer 1K CF offers excellent protection against corrosion.

For professional use only.

These guidelines are offered as a method to optimize the performance of GRIP-GARD Washprimer 1K CF. GRIP-GARD is recommended for priming degreased and sanded old finishes, steel, aluminum and galvanized steel. It is a two-part self etching primer that has excellent adhesive properties when used on a variety of metal substrates, even those still coated with old finishes.

GRIP-GARD is the most widely used primer in the sign industry today, and it's excellent protective qualities make it a natural fit for use with either TRINAR® AQUA or CERAM-A-CRYL® topcoats. It provides the type of protection against rust and corrosion needed to guarantee your building will look great for years to come.

Product and additives

The main product is GRIP-GARD Washprimer 1K CF (2AFY31284), and the additive is GRIP-GARD Washprimer Hardener (EXP2697).

Basic raw materials

The basic raw materials used in GRIP-GARD Washprimer 1K CF are polyvinyl butyral resin, pigments and solvent. The raw materials used in GRIP-GARD Washprimer Hardener are phosphoric acid and solvents.

Application

1.) Personal protective equipment

GRIP-GARD contains polyvinyl butyral resin, pigments and solvent. When mixed, it also contains phosphoric acid. Use of a NIOSH-approved respirator and protective gloves is required.

2.) Surface preparation

For steel surfaces, degrease and sand using #80 grit paper dry. Remove any mill scale by sandblasting if necessary. For galvanized steel surfaces degrease and sand using #180 grit dry. For aluminum surfaces degrease and use #120 - #180 grit dry. Degreasing can be accomplished with any commercially available wax and grease remover. Change cleaning and degreasing cloths often to insure contaminants are not reapplied to the surface to be painted.

3.) Mixing ratio, reaction time and pot life

Prepare GRIP-GARD by mixing in a 1:1 ratio of equal parts GRIP-GARD Washprimer 1K CF and GRIP-GARD Washprimer Hardener. After mixing the material may be applied immediately with no reaction time required.

Spraying viscosity
21 - 23 second #2 ZAHN at 70º F (20º C). Achieved by using measuring stick #104. If additional reduction is necessaary to accommodate spray equipment, add 5 - 10% maximum GRIP-GARD Washprimer Hardener (EXP2697) for thinning.

Application
Apply in 2 single coats, flash off 5 minutes between coats at 70º F (20º C). Allow second coat to dry for 30 minutes at 70º F (20º C) before applying top coat of TRINAR AQUA or CERAM-A-CRYL. GRIP-GARD Washprimer 1K CF can be applied up to a relative humidity of 90 percent.

Sanding of GRIP-GARD Washprimer 1K CF once applied is not recommended. Dry sanding, grinding, abrading, flame cutting and/or welding of the dry paint film will produce hazardous dust and/or fumes. If sanding is necessary, wear suitable NIOSH/MSHA approved respirator to avoid inhalation. Avoid all contact with airborne particles.

Film thickness and cover rate
Approximately 0.5 dry mil per single coat, with 1.0 dry mil required for both coats. When mixed and ready to spray GRIP-GARD Washprimer 1K CF will cover 140 sq. ft. (35% T.E.) by conventional spray, and 255 sq. ft. (65% T.E.) by HVLP.

Cleaning of equipment
Lacquer thinner can be used for all clean up of GRIP-GARD Washprimer 1K CF.

Storage
GRIP-GARD Washprimer 1K CF and Washprimer Hardener are beige in color, and available in one gallon containers. The shelf life of both is one year if stored unopened at room temperature.

Safety notice
Do not handle until Material Safety Data Sheets have been read and understood. Regulations require that all employees be trained on Material Safety Data Sheets for all chemicals with which they come in contact. The manufacturer recommends the use of an air-supplied respirator equipped with a HEPA filter or air supplied respirator when exposed to vapors, spray mist, or sanding dust.

Disclaimer
The technical information and suggestions for use made herein are based on Akzo Nobel Coatings Inc. research and experience and are believed to be reliable, but such information does not constitute a warranty.

Since Akzo Nobel Coatings Inc. has no control over the conditions under which this product is transported, stored, handled, used or applied, buyers must determine for themselves, by preliminary tests or otherwise the suitability of the products for their purpose.

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AkzoNobel

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AkzoNobel is a leading global paints and coatings company and a major producer of specialty chemicals. We supply industries and consumers worldwide with innovative products and are passionate about developing sustainable answers for our customers. Our portfolio includes well-known brands such as Dulux, Sikkens, International and Eka. Headquartered in Amsterdam, the Netherlands, we are consistently ranked as one of the leaders in the area of sustainability. With operations in more than 80 countries, our 50,000 people around the world are committed to delivering leading products and technologies to meet the growing demands of our fast-changing world.

Revision Date: September 2014

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Gray Tiecoat

VA0C31630 and UC0C31631S - two component system for application over pre-painted and bare metal substrates

AkzoNobel

Application guidelines for Gray Tiecoat VA0C31630 and its catalyst, UC0C31631, which are designed to provide optimal adhesion for TRINAR® AQUA and CERAM-A-CRYL® II.

For professional use only.

These guidelines are offered as a method to optimize the performance of the Gray Tiecoat. VA0C31630 Gray Tiecoat and its catalyst, UC0C31631, are designed to provide optimum adhesion to newly erected metal building panels, and are intended to be topcoated with AkzoNobel's TRINAR AQUA or CERAM-A-CRYL topcoats.

Certain factory-applied fluorocarbon finishes, such as AkzoNobel's TRINAR and silicone-polyester finishes, such as CERAM-A-STAR® 950 and 1050, are difficult to repaint successfully, especially when newly-erected. Should you feel the need to repaint your building panels, great care must be taken to prepare the factory-applied surface and to carefully assess the adhesion between this well-prepared surface and the repaint coating.

These products are not intended for use over non-metal substrates such as wood, glass, and plastics.

Surface preparation for prepainted metal substrates

Before applying the Gray Tiecoat to your factory-finished building panels, great care must be taken to prepare the surface to be painted, and to carefully assess the adhesion of this AkzoNobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of biodegradable cleaners or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

a.) One cup of Simple Green®, or other common non-toxic, biodegradable cleaners, which contain less than 0.5% phosphate, dissolved into two gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleaners or detergents with bleach.

b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent-containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined

Gray Tiecoat application guidelines

above, household bleach-mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of a mild soap (e.g., Ivory) to aid wetting, is recommended.

Heavier dirt accumulations, which must be addressed prior to repainting may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.5% phosphate is recommended only as a preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface imperfections
Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed metal and rust
Exposed metal minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i] and use of a primer specifically designed to protect any exposed galvanized steel metal from corrosion.1 Care must be taken, however, not to destroy the galvanized surface. Allow sufficient time for the primer to dry before applying the topcoat.

For severely rusted building panels the recommended preparation is SSPC-SP7[ii] – Brush-Off Blast Cleaning. AkzoNobel's Water-Based Epoxy Maintenance Coat, or a maintenance primer designed for use on hot-dipped galvanize steel, is recommended to protect the metal building panel from further rusting.

4.) Additional preparation required for new building panels
There may still be a layer of factory-applied wax on the surface of the factory-applied finish if it has been installed within the last two year. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green!) 3M Synthetic Steel Wool pad (equivalent to "000" steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

Once this procedure is completed, perform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4. It is imperative, of course, that the factory finish itself not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed! Contact your builder immediately.

Gray Tiecoat VA0C31630 preparation

After the building has been properly prepared, it must be coated within 24 hours with AkzoNobel's VA0C31630 and UC0C31631 Gray Tiecoat. The paint must be thoroughly mixed before using. Mechanical mixing is recommended to assure that no settling remains on the bottom of the container. To reduce the material for application: add one part (by volume) UC0C31631 CATALYST to four parts (by volume) of VA0C31630 GRAY TIECOAT, and mix thoroughly. This blend should then be reduced to spray application with either EXP5050 Reducing Solvent[2] or Acetone.

EXP5050 Reducing Solvent must be added under agitation. Failure to do so will result in possible gellation of the paint.

Acetone is not recommended if the air temperature is higher than 70ºF (21ºC) or the metal surface temperature is greater than 80ºF (27ºC). The reduction is approximately two parts (by volume) Tiecoat mixture to one part (by volume) EXP5050 for spray application.

Tiecoat application
The surface must be completely dry prior to painting. Painting should not be done in the early morning when dew is present. Avoid painting at temperatures below 50ºF (10ºC). Apply a uniform coat of 0.25 mils dry film thickness. Note: Due to the very thin films required, under normal conditions the Tiecoat does not provide complete hiding of the surface. Excessive film thickness can result in runs and sags in the finish, and will affect the final appearance and adhesion. Allow a MINIMUM of two hours before painting over the Tiecoat.

Note: After the Gray Tiecoat and the Catalyst are mixed, the Tiecoat has a usable pot life of eight hours. After eight hours, the mixture is still a thin liquid, but the reactivity has diminished and will negatively affect adhesion. Do not use material more than eight hours old.

Application precautions
Application temperatures below 50ºF (10ºC) may cause poor adhesion and lengthen the drying and curing time. Application temperatures above 95ºF (35ºC) may cause dry spray, uneven appearance and poor adhesion. Avoid painting in direct sunlight on days when the air temperature exceeds 90ºF (32ºC). Do not apply to surfaces at temperatures of 120ºF (71ºC) or higher.

The Gray Tiecoat is recoatable after approximately 2 hours. Apply all coats within one week.

Coverage
Proper application of 0.25 mils dry film will result in approximately 650-700 square feet per gallon coverage, assuming no application loss. Coating loss up to 50% can result with some spray application equipment and methods, and must be taken into consideration when calculating the amount of Tiecoat needed for the job.

Clean-up
Use EXP5050 Reducing Solvent blended with acetone or other ketone solvents to clean all equipment. EXP5050 Reducing Solvent is not recommended as the sole cleaning solvent.

U.S. EPA regulations
VA0C31630 Gray Tiecoat and UC0C31631 Catalyst, when mixed per the label instructions and thinned to the manufacturer's maximum recommendation with nothing other than the recommended EXP5050 Reducing Solvent or Acetone, meets the Environmental Protection Agency established limits for volatile organic compounds in architectural coatings.

V.O.C. limit
450 grams per liter (3.8 pounds per gallon).

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "x" cut, the intercoat adhesion is inadequate.

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[1] AkzoNobel's Water-Based Epoxy Maintenance Coat, WA9C32800 / GW9C32796 or equivalent primer designed for adhesion to galvanized steel.

[2] EXP5050 parachlorobenzotrifluoride.

[i] SSPC-SP2 – Hand Tool Cleaning
Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[iii]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2

[ii] SSPC-SP7 - Brush-Off Blast Cleaning
A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[iii] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

[iii] SSPC-SP1 – Solvent Cleaning
Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 1.

Water-Based Epoxy Maintenance Coating

A two-component system for application over pre-painted and bare metal substrates

AkzoNobel

Application guidelines for the Water-Based Epoxy Maintenance Coating, which is comprised of WA9C32800 and GW9C32796.

For professional use only.

The following guidelines are offered as a method to optimize the performance of the Water-Based Epoxy Maintenance Coating. This material may only be used as a primer, and is intended to be recoated with AkzoNobel TRINAR® AQUA and CERAM-A-CRYL® topcoats.

This system is designed for use as a primer over prepainted metal substrates and bare metal substrates. This product is not intended for use over non-metal substrates (e.g., wood, glass, and plastics).

Surface preparation for bare metal substrates

Bare iron and steel: Minimum surface preparation is Hand Tool Cleaning per SSPC-SP2[i]. Remove all oils and grease from the surface by Solvent Cleaning per SSPC-SP1[iii]. Test for adequate adhesion per Appendix A.

Galvanized metal: Allow to weather a minimum of 6 months prior to coating. Solvent clean per SSPC-SP1[iii]. When weathering is not possible or the surface has been treated with chromates or silicates, first solvent clean and apply the coating to a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7[ii] is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2[i]. Test for adequate adhesion per Appendix A.

Aluminum: Because of the variety of aluminum compositions and treatments (e.g., alodine and anodizing) available, users must test for adhesion on their substrate before using. See Appendix A.

Non-metal Substrates: This Water-Based Epoxy Maintenance Coating is not recommended for application to masonry, PVC, fiberglass, concrete block, wood, and all other non-metallic substrates.

Surface preparation for prepainted metal substrates

Before priming your factory-finished building panels, great care must be taken to prepare the surface to be painted, and to carefully assess the adhesion of this AkzoNobel coating. The following four problem areas must be addressed before the repainting process can begin:

1.) Dirt and Mildew

Dirt, loose chalk and mildew must be removed before repainting can begin. Mild solutions of detergents or household ammonia will aid in the removal of most dirt, and the following are recommended levels:

a.) One cup of Tide®, or other common household laundry detergents, which contain less than 0.5% phosphate, dissolved into five gallons of warm water. NOTE: The use of detergents containing greater than 0.5% phosphate is not recommended for use in general cleaning. Never blend cleansers or detergents with bleach.

Maintenance Coating application guidelines

b.) One cup of household ammonia dissolved into five gallons of water (room temperature).

Use a well-soaked cloth, sponge, or brush (with very soft bristles). A low-pressure spray washer may also be used. We do not recommend the use of scouring powders or industrial solvents since these agents may damage the film. Solvent-containing cleaners such as Fantastic®, however, are very effective and can be used without concern. If mildew or other fungal growth is a problem and cannot be removed as outlined above, household bleach-mixed at a concentration of one cup of bleach to five gallons of water, along with one cup of a mild soap (e.g., Ivory®) to aid wetting, is recommended.

Heavier dirt accumulations which must be addressed prior to repainting may necessitate the use of a dilute solution of Spic and Span® (1 cup into 5 gallons of warm water). NOTE: Detergent containing greater than 0.5% phosphate is recommended only as a preparation prior to repainting. Do not use such detergents for routine cleaning. Always rinse the surface thoroughly to remove any of the agents used in the cleaning procedure. Residual cleaners left on the surface will damage the adhesion of the newly applied paint system.

2.) Surface Imperfections

Minor scratches, which have not left the metal substrate exposed, can be lightly sanded or buffed to create a smoother surface. Care must be taken, however, not to expose the metal substrate. Once this exposed condition exists, the likelihood for rusting is greatly increased. Should the metal substrate be observed during this operation, see the following paragraph.

3.) Exposed Metal and Rust

Exposed metal must be treated to prevent rust from forming. To do so, sand the general area lightly and use the AkzoNobel Water-Based Maintenance Coating to protect any exposed substrate from corrosion. Before priming the entire building, however, test for adequate intercoat adhesion (see Appendix A). If either red or white rust is evident, scrape or brush away as much rust as possible and then sand lightly, removing ALL rust before priming. Care must be taken, however, not to remove the protective metallic layer.

4.) Additional Preparation Required for New Building Panels

There may still be a layer of factory-applied wax on the surface of the building panels if they have been installed within the last year. This material is used to protect the panels during fabrication and transit, and failure to remove this material will result in poor intercoat adhesion with resultant peeling or flaking of the new coating. To remove this wax, it will be necessary to lightly scuff the surface with a GRAY (not green) 3M Synthetic Steel Wool pad (equivalent to “000” steel wool) saturated with soapy water. A final wipe and rinse should be done with clean water only, to remove any loose dust or soap film.

Once this procedure is completed, perform the adhesion test in Appendix A to assure that acceptable adhesion is evident. If poor adhesion is still observed, repeat step #4.

It is imperative, of course, that the factory finish itself not be removed during this process. It is necessary to once again test the intercoat adhesion according to Appendix A. If the test results still indicate poor intercoat adhesion, do not proceed! Contact your builder immediately.

Maintenance Coating preparation

Mix components thoroughly before blending. Due to the high viscosity of both components, a mechanical mixer should be used. Improper mixing (such as hand mixing or stirring with a stick or spatula) may lead to improper cure.

The Water-Based Epoxy Maintenance Coating (WA9C32800 and GW9C32796) is a two-component system. To achieve the dry film properties of this system the WA9C32800 Epoxy Maintenance Coating must be mixed four-to-one by volume with the GW9C32796 Epoxy Catalyst. The two components must be thoroughly mixed to a uniform consistency. After mixing, the mixture may be used immediately. Material below 60 ºF (16 ºC) will require a one hour induction time.

Maintenance Coating application

At the end of the appropriate induction time the material is ready to apply. The mixture may be applied by brush without further reduction. For spray application, a reduction of 12 parts of the Maintenance Coating mixture with one part water by volume has been found to give acceptable atomization with airless spray equipment. Excessive reduction of material can affect film build, appearance, and adhesion. As a starting point for airless spray application, a 0.015” tip and 1,500 p.s.i. has been found to give a uniform wet film.

Uniform dry films of 1.0 to 1.5 mils (wet films of 3.0 to 4.5 mils) give excellent coverage of smooth, bare metal substrates and prepainted metal substrates. Metal substrates that have been blast cleaned may require a heavier coating to cover the metal surface profile. For surfaces that have been blast cleaned, the maintenance coat must extend 1.0 mil above the metal profile. The application of heavy films must be controlled closely.

The orientation of the surface may require the use of two coats of the Maintenance Primer. A 24-hour drying period is recommended before application of a second coat. No painting should be done immediately after a rain or during foggy weather.

Potlife caution:
Discard the material six hours after the two components have been blended. Beyond six hours, film hardness will be adversely affected.

Application precautions:
Apply only when air, surface and product temperatures are above 50 ºF (10 ºC), and surface temperature is at least 5 ºF (3 ºC) above the dew point. Application temperatures below 50 ºF may cause poor adhesion and lengthen the drying and curing time. Application temperature above 95 ºF may cause dry spray, uneven sheen and poor adhesion. Relative Humidity in excess of 80% will lengthen the drying time.

Avoid exterior painting late in the day when dew or condensation is likely to form, or when rain is threatening. During the early stages of drying, the coating is sensitive to rain, dew, high humidity, and condensation. If possible, plan painting schedules to avoid these influences during the first 16-24 hours of curing. Protect from freezing.

Recoat
Water-Based Epoxy Maintenance Coating (WA9C32800 and GW9C32796) is the approved coating for AkzoNobel's TRINAR AQUA and CERAM-A-CRYL repaint finish systems. A minimum four hours air dry time is required before the application of the TRINAR AQUA or CERAM-A-CRYL finishes. Cold temperatures, minimal air movement, and high humidity will extend the air dry time required prior to recoating.

The recoat time for Water-Based Epoxy Maintenance Coating is from one to seven days. After seven days, the Maintenance Coating will require cleaning and a second coat of Maintenance Coating before application of a finish coating.

Appendix A - evaluating intercoat adhesion

1.) After properly cleaning the surface to be repainted, paint a 4" x 4" area with the repaint material according to the manufacturer's instruction. Allow to dry completely before proceeding.
2.) Use a utility knife to cut a two inch "X" into the repaint coating.
3.) Place a three inch strip of Scotch® 610 tape over the "X" and rub 10 times with heavy pressure leaving a half inch of tape free for removal.
4.) Pull the tape back over itself at a 180º angle.
5.) Examine the tape and the building panel for any signs of paint removal.

If the tape removes more than 1/16" of the repaint material from the "x" cut, the intercoat adhesion is inadequate.

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[i] SSPC-SP2 – Hand Tool Cleaning
Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1[iii]. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 2

[ii] SSPC-SP7 - Brush-Off Blast Cleaning
A Brush-Off Blast Cleaned surface when examined without magnification, shall be free of all visible oil, grease, 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 coating are considered adherent if they cannot be removed by lifting with a dull putty knife. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1[iii] or other agreed upon methods. For complete instructions, refer to Joint Surface Preparation Standard SSPC-SP7/NACE NO. 4.

[iii] SSPC-SP1 – Solvent Cleaning
Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. For complete instructions, refer to Steel Structures Paint Council Surface Preparation Specification No. 1.

AkzoNobel

Extrusion Coatings

Finished Product Code Reference Chart

AkzoNobel

FIRST CHARACTER - is the technology
C – Coil and Extrusion

SECOND CHARACTER - Resin System
A – Acrylic
K – Fluoropolymer
P – Oil Free Polyester
R – Flex Polyester
S – Silicone Polyester
T – Silicone Acrylic
U – Urethane
V – Vinyl
W – Emulsion

THIRD CHARACTER - Color
A – Gray
B – Black
C – Clear
D – Gold
E – Orange or “E” in EXP Codes
G – Green
H – Cream, Beige, Ivory
K – Wrinkle
L – Blue, Turquoise
M – Silver Metallic
N – Brown
P – Maroon, Purple
R – Red
S – Bronze
T – Tan, Almond, Toast
W – White
Y – Yellow, Wheat
Z – Miscellaneous Color

FOURTH CHARACTER - Nominal Gloss Value
0 – 0 to 9 gloss
1 – 10 to 19 gloss
2 – 20 to 29 gloss
3 – 30 to 39 gloss
4 – 40 to 49 gloss
5 – 50 to 59 gloss
6 – 60 to 69 gloss
7 – 70 to 79 gloss
8 – 80 + gloss
9 – NO SPECIFIED GLOSS RANGE
X – EXP Codes only

FIFTH CHARACTER - Application/Description
A – Airless Spray
C – Conventional Spray
Q – ALUM-A-STAR® 50
S – Special
X – Extrusion Clear Coat required
T – Turbodisc
N – Non Warranted

NOTE: This information is furnished to assist in the identification of Extrusion products produced in Columbus, OH facility of AkzoNobel Coatings Inc.

AAMA Testing Request Form

AkzoNobel

All applicator information must be provided along with a written request for warranty if a warranty is required. A minimum of eight painted pieces must be submitted for testing. Each piece should be 6" to 12" in length. Samples can be either cut from production material or must be pretreated and painted with the job on line.

Please send this completed form, plus testing parts, to:

ATTN: Extrusion AAMA Testing
Akzo Nobel Coatings Inc.
1313 Windsor Ave.
Columbus, OH 43211-2898

Phone: 614.294.336

Testing standard: ❑ 2603 ❑ 2604 ❑ 2605

Quarterly samples: ❑ March 15 ❑ June 15 ❑ September 15 ❑ December 15

Applicator: _____ Contact: _____

Address: _____

Product name: _____

Product code: _____ Batch number: _____

Primer code: _____ Batch number: _____

Clear code: _____ Batch number: _____

Application date: _____

Pretreatment: Chrome: _____ Chrome free: _____

Cure time: _____ Cure temp: _____

Customer and job name: _____

Address: _____

Notes / comments: _____

_____

A complete AAMA testing report will be returned upon completion of testing along with a copy of this request.

❑ Return tested parts to applicator ❑ Discard

AkzoNobel Use Only

Salesman: _____

Date received: _____

Date completed: _____

LWR Number:

Initiation review by: _____ on _____ (date)

Assigned to: _____ on _____ (date)

Completion review by: _____ on _____ (date)

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Extrusion Color Panel Request Form

AkzoNobel

Please send this completed form, plus color samples, to:

ATTN: Extrusion Group
Akzo Nobel Coatings Inc.
1313 Windsor Ave.
Columbus, OH 43211-2898

Phone: 614.294.3361

If you have any questions, please contact your Sales Representative or the Extrusion Group at 614.294.3361

Customer: _____

Address: _____

City: _____ State: _____ Zip: _____

Requested by: _____ Phone number: _____

Color code #: _____ Number of samples requested: _____

Color code #: _____ Number of samples requested: _____

Color code #: _____ Number of samples requested: _____

Color code #: _____ Number of samples requested: _____

Color code #: _____ Number of samples requested: _____

End customer: _____ Date: _____

Notes / comments: _____

_____

_____

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Extrusion Color Match Request Form

AkzoNobel

Please send this completed form, plus color samples, to:

ATTN: Extrusion Group
Akzo Nobel Coatings Inc.
1313 Windsor Ave.
Columbus, OH 43211-2898
Phone: 614.294.3361

If you have any questions, please contact your Sales Representative or the Extrusion Group at 614.294.3361

Customer / Coater: _____

Address: _____

Requested by: _____

Phone number: _____ Fax Number: _____

E-mail:_____

Project name:_____

Product type:

AAMA 2605 (70% PVDF)

- ❑ Standard formulation (most common)
- ❑ *ULTRA* formulation (lower VOC level - may be required by coater)
- ❑ TRINAR® (2-coat solid colors)
- ❑ TRI-Escent® II (2-coat pearlescents)
- ❑ TRINAR TEC (3-coat exotic colors with clear coat)
- ❑ TRINAR TMC (3-coat metallic colors with clear coat)
- ❑ TRINAR AQUA (air dry system)

AAMA 2604 (50% PVDF)

- ❑ ALUM*A*STAR® 50 (2-coat solid colors)
- ❑ ALUM*A*Escent® 50 (2-coat pearlescents)
- ❑ CERAM-A-STAR® E (2-coat solid colors)

AAMA 2603

- ❑ ACRA-BOND® *ULTRA* (acrylic)
- ❑ POLYDURE® E (high soilds polyester)

❑ Other: _____

Quantity (gallons): ❑ 1-15 ❑ 16-250 ❑ 251+

Specifications

Color name: _____ Number of samples requested: _____

Color match to: ❑ Attached sample

❑ Chip in existing color book or product line:

Manufacturer / Supplier name: _____

Color name / code #: _____

❑ Other: _____

Gloss range: _____

❑ Add KC3C50795 Bright Sparkle Clear Coat - mica clear for use over solid color TRINAR finishes

After match: ❑ Return standard ❑ Return 1/2 standard ❑ Keep standard

Also need: ❑ Product Data Sheet ❑ Pricing ❑ See attachments

Send additional samples to: _____

_____

Additional information: _____

_____

02299_050809

Cleaning and Maintenance

of spray applied factory finished aluminum extrusions, panels and building products

AkzoNobel

Guidelines for keeping your painted aluminum surfaces clean and enhancing the longevity of the finish.

Introduction
This information is specifically intended for maintenance of finishes applied to curtainwall, panels, storefronts, louvers, windows, doors and other miscellaneous aluminum building components.

AkzoNobel places an extreme level of importance on the proper care and cleaning of all finishes. It is in the best interest of the entire building industry that not only the initial cleaning after installation, but all subsequent cleaning is done in a way which does not damage the finishes applied.

Whether the coating is TRINAR®, our 70% PVDF Superior Performance system or any of the other fine AkzoNobel bake finishes the unpredictability of the environment or building service conditions generally make periodic cleaning necessary and desirable.

Using the procedures outlined in this guide will enhance the aesthetic appearance and service life of the coatings. It is important to read this brochure thoroughly and completely before attempting to clean factory painted aluminum extrusions or panels.

Cleaning Painted Surfaces

Note: It is always recommended that you "test clean" a small "least conspicuous" area to ensure successful cleaning before proceeding on a large scale.

While factory-applied finishes for extrusions and curtainwall are so durable that they will last many years longer than ordinary paints, it is desirable to clean them thoroughly on a routine basis. Over time, dirt-laden atmospheres or slight chalking, which is normal, may cause painted surfaces to appear dull or discolored. A good cleaning will generally restore the appearance and render any other remedial action unnecessary.

Every 18 months, washing with a mild detergent as explained below, maintains the original appearance of the factory-applied coating. Mild solutions of household soap and water will usually produce the desired results. Either of the following two solutions is recommended:

A. One cup of Tide®, or other common non-abrasive detergent that contains less than 0.5% phosphate, dissolved into five gallons of warm water.
B. One cup of household ammonia dissolved into five gallons of room temperature water.

Note: The use of detergents containing greater than 0.5% phosphate is not recommended for general cleaning of painted metal surfaces. NEVER BLEND STRONG CLEANSERS AND BLEACH.

AkzoNobel does not recommend the use of solvents, although solvents may be required at times to remove material that is not soluble in water, such as grease, tar, oil, paint or other materials. Because these can affect the sealant and chalking, they should be used with caution to avoid staining of the painted surface and detrimental effects to the sealant or chalking.

These are the preferred solvents to use when all other measures fail, and fall into the following two categories:

Aliphatic solvents
Mineral Spirits
VM&P Naphtha
Kerosene
Turpentine

Alcohols
Isopropyl (rubbing alcohol)
Denatured alcohol (ethanol)
Methanol (wood alcohol)

All precautions on the appropriate Material Safety Data Sheets must be followed for the use of these solvents. Check for other recommendations from AkzoNobel or from the metal supplier before proceeding with other solvents to clean the surface of the coating.

Concrete spillage that has dried on the painted surface may be difficult to remove. Any spillage must be removed within 24 hours; special measures or cleaners may be required to accomplish this task. Diluted solutions of muriatic acid may aid in this task. The muriatic acid (37% hydrochloric acid) must be diluted with a minimum of ten parts of water. This gives a solution of less than 4% hydrochloric acid.

Proper handling techniques must be followed when using this solution. This must not be allowed to dry on the painted surface. Large quantities of clean water are required to rinse this solution completely from the painted surface. A test area should always be done first before cleaning any of the painted surfaces by any of the above chemical-cleaning agents.

Note: Neither the metal supplier nor the coating manufacturer are responsible for any damage that may be caused as a result of contact with the concrete, or as a result of the subsequent cleaning that is required.

Work from top to bottom of the metal surface. Use a well-soaked soft cloth, sponge, very soft bristle brush or low pressure spray washer using ambient temperature water. Do not use scouring powders or industrial strength cleaners or solvents, since these chemical agents may damage the film. However, household cleaners containing small amounts of solvent, such as Fantastic®, may often be used successfully.

If mildew or other fungal growth is observed and cannot be removed with a soap solution as above, mix one gallon of household bleach in five gallons of water along with one cup of mild soap (e.g. Ivory® liquid) to aid wetting. Do not allow the cleaning solution to dry on the surface being cleaned, since this may result in damage to the surface of the coating.

The final step of any cleaning procedure is a thorough clear water rinse to remove dirt and/or cleaning residue. **SUCH RESIDUES MAY DAMAGE THE PAINT FINISH.** The damage may not be readily apparent and can take months or years to show.

It is recommended that you "test clean" a small area to be certain that satisfactory results are achieved with whatever solutions and procedures you have chosen before starting on the entire area or building.

In areas where relatively low amounts of airborne dirt and contamination exist, it is acceptable to simply perform the final step listed above by using a properly adjusted power washer (non-heated) and clean water only. This will usually remove the majority of surface contaminations, but will not "clean" the painted surface as effectively as mild soap solutions described above.

This "water-wash only" type of cleaning must be performed at least every 12 months and recorded. If good records are kept by the building Maintenance Manager or Owner and made available to AkzoNobel upon request, this will serve to fulfill the Cleaning requirements of the AkzoNobel Warranty for Spray Applied TRINAR installations. The absence of such records will void the Warranty.

Summary of General Cleaning Tips

A. Perform test cleaning on small area before full-scale cleaning begins.
B. Over-cleaning or excessive rubbing can damage the coating.
C. Solvents or cleaners can be too strong and may damage the surface. These can also affect the long-term durability, so the damage may not be readily or immediately apparent.
D. Do not use any abrasive cleaners, brushes, soiled cloths, soiled sponges, steel wool, etc. since these can wear and harm the finishes.
E. Avoid run-down, drips or splashes of the cleaners as much as possible. Rinse these off as quickly as possible! Never allow any solutions to dry on the painted surface.
F. Avoid temperature extremes during cleaning. Heat accelerates chemical reactions as well as evaporates water faster. Extremely low temperatures may make the solutions less effective.
G. Do not use industrial strength cleaners or higher concentrations of the recommended cleaners.
H. Never use paint removers, aggressive alkaline, acid or abrasive cleaners. Never use trisodium phosphate or cleaners that are highly alkaline or acidic. Always check a small test surface in a remote area of the project to determine satisfactory results before proceeding with the complete job.
I. Consult with your metal supplier or the coating manufacturer before using solutions or cleaners not recommended in this document. Some products that look fine when checked with a spot test might adversely affect long-term durability that will not be evident for months or years.
J. Consider the effect of any run-off of the cleaners on shrubbery, equipment or nearby personnel.
K. Keep all cloths, brushes and sponges free of any grit. Rinse these frequently while cleaning.

AkzoNobel

www.akzonobel.com/ccna

AkzoNobel is a leading global paints and coatings company and a major producer of specialty chemicals. We supply industries and consumers worldwide with innovative products and are passionate about developing sustainable answers for our customers. Our portfolio includes well-known brands such as Dulux, Sikkens, International and Eka. Headquartered in Amsterdam, the Netherlands, we are consistently ranked as one of the leaders in the area of sustainability. With operations in more than 80 countries, our 50,000 people around the world are committed to delivering leading products and technologies to meet the growing demands of our fast-changing world.

TRINAR is a registered trademark of an AkzoNobel company.
Revision Date: June 2014

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AMERICAN ARCHITECTURAL

AAMA 2605-13

Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)

AAMA

MANUFACTURERS ASSOCIATION

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

AAMA DOCUMENT ERRATA

DATE: **March 12, 2014**

CODE: **2605-13**

TITLE: **Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)**

This document contains an incorrect reference in Section 8.9.1.3.1.

The requirement currently reads:

8.9.1.3.1 Performance
Chalking shall be **no more than** that represented by a No. 8 rating for colors, No. 6 for whites based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure…

The requirement shall be corrected to read:

8.9.1.3.1 Performance
Chalk rating shall be **greater than or equal to** that represented by a No. 8 rating for colors or No. 6 for whites based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure…

RATIONAL:

This change is being made to reflect the minimum rating requirement as it was intended. Concern is ambiguity of current wording as to if "no more than" reflected the rating or level of chalking. Chalking rating system in ASTM D4214 states that a lower number indicates higher chalking.

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PREFACE

For years, the architectural community has recognized the following standards for testing and performance of organic coatings on architectural aluminum extrusions and panels:

AAMA 2603, "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2604, "Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2605, "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."

1.0 SCOPE

1.1 This specification describes test procedures and performance requirements for superior performing organic coatings applied to aluminum extrusions and panels for architectural products.

1.2 This specification covers factory-applied organic coatings only.

1.3 The primary units of measure in this document are metric. The values stated in SI units are to be regarded as the standard. The values given in parentheses are for reference only.

1.4 This document was developed in an open and consensus process and is maintained by representative members of AAMA as advisory information.

2.0 PURPOSE

The specification will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings, which will provide and maintain a superior level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

3.0 REFERENCED STANDARDS

3.1 References to the standards listed below shall be to the edition indicated. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as to referring to the latest edition of that code or standard.

3.2 American Architectural Manufacturers Association (AAMA)

AAMA 800-10, Voluntary Specifications and Test Methods for Sealants

AAMA 2603-13 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels

AAMA 2604-13, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

AAMA AG-12, AAMA Glossary

3.3 ASTM International (ASTM)

ASTM B244-09, Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments

ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes

ASTM D523-08, Standard Test Method for Specular Gloss

ASTM D714-02(2009), Standard Test Method for Evaluating Degree of Blistering of Paints

ASTM D968-05(2010), Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

ASTM D1654-08, Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D2244-11, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

ASTM D2247-11, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D2248-01a(2007), Standard Practice for Detergent Resistance of Organic Finishes

ASTM D3359-09e2, Standard Test Methods for Measuring Adhesion by Tape Test

ASTM D3363-05(2011)e2, Standard Test Method for Film Hardness by Pencil Test

ASTM D4145-10, Standard Test Method for Coating Flexibility of Prepainted Sheet

ASTM D4214-07, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

ASTM D4585-07, Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation

ASTM D5723-95(2010), Standard Practice for Determination of Chromium Treatment Weight on Metal Substrates by X-Ray Fluorescence

ASTM D7091-12, Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

ASTM G7/G7M-13, Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetalic Materials

ASTM G85-11, Standard Practice for Modified Salt Spray (Fog) Testing

4.0 DEFINITIONS

4.1 Please refer to AAMA Glossary (AG-12) for all definitions except for those appearing below (which apply only to this specification).

4.1.1 COIL-APPLIED COATING: The process of applying a resinous coating onto a coil of aluminum, and curing it into a continuous film, prior to the fabrication process.

4.2 The terms "film" and "coating" are used interchangeably in this specification and are defined as meaning the layer of organic material applied to the surface of the aluminum.

5.0 GENERAL

5.1 To qualify as meeting this specification, products tested shall meet all requirements as specified herein.

5.2 Coatings shall be visibly free from flow lines, streaks, blisters or other surface imperfections in the dry-film state on exposed surfaces when observed at a distance of 3 m (10 ft) from the metal surface and inspected at an angle of 90 degrees to the surface.

5.3 The total dry-film thickness shall be assessed utilizing the ASTM D7091 method. Eighty percent of measurements on primary exposed surfaces shall meet or exceed 30 microns (1.2 mil) total film thickness. Paint process capability may result in readings below 25 microns (1.0 mil). No more than 5% of the total readings, on primary exposed surfaces, shall be below 25 microns (1.0 mil) (or, 85% of film thickness specified), assuming appropriate color and hide. Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

NOTE 1: *Due to the complexities of extrusion dies and limitations of application equipment, it may not be possible to achieve minimum recommended dry film thickness on all areas of an extrusion, such as inside corners and channels. For details of these affected areas, contact the coating applicator prior to painting.*

5.4 Cleaning and metal preparation shall be in compliance with Section 7.0 of this specification.

5.5 Minor scratches and blemishes shall be repairable with the coating manufacturer's recommended product or system. Such repairs shall match the original finish for color and gloss and shall adhere to the original finish when tested as outlined in Sections 8.4.1.1 and 8.4.1.2. After application, allow the repair coating to dry for at least 72 hours at 18°C to 27°C (65°F to 80°F) before conducting the film adhesion test.

NOTE 2: *The size and number of touch-up repairs should be kept to a minimum.*

5.6 Sealant used in contact with an organic coating shall be compatible with the organic coating and meet the performance requirements of AAMA 800 sealant specification. There shall be no evidence of deleterious effects in the organic coating such as staining, coating separation, lifting, discoloration or loss of adhesion of the coating from the substrate.

NOTE 3: *It is strongly recommended that the fabricator of the finished products consult with the sealant manufacturer in the selection of the appropriate sealant. Peel adhesion testing as described in AAMA 800 is suggested. It is important to understand that the AAMA 800 sealant specification does not ensure adhesion to a specific coating. The best way to ensure adhesion is to submit panel specimens of the specific coating to the sealant manufacturer or an AAMA accredited independent laboratory for tests and recommendations.*

6.0 TEST SPECIMENS

Test specimens shall consist of finished panels or extrusions representative of the production coated aluminum. A sufficient number of specimens on which to conduct instrument measurements with flat coated surfaces of at least 150 mm (6 in) long and 75 mm (3 in) wide, shall be submitted to the testing laboratory. The coating applicator or fabricator shall indicate exposed surfaces or submit drawings. Tests shall be performed on exposed areas as indicated on drawings or as marked on test specimens.

7.0 METAL PREPARATION AND PRE-TREATMENT

NOTE 4: *A multi-stage cleaning and pre-treatment system is required to remove organic and inorganic surface soils, remove residual oxides, and apply a chemical conversion coating to which organic coatings will firmly adhere.*

7.1 The pre-treatment when used in conjunction with a baked organic coating shall produce a total finishing system capable of meeting impact, adhesion, detergent, humidity and salt spray performance as specified in the appropriate test method.

7.2 CHEMICAL CONVERSION COATING WEIGHT

7.2.1 Procedure
Measure in accordance with the latest issue of ASTM D5723 using x-ray fluorescence or other standard methods for determining coating weights.

7.2.2 Performance
Chromium chromate or chromium phosphate coating weights should be a minimum of 431 mg/m^2 (40 mg/ft^2). Alternative chrome and/or non-chrome conversion coating weights should be maintained according to supplier's recommendations.

NOTE 5: *Frequent in-plant testing and control of pretreatment is required to insure satisfactory performance of the coating system.*

8.0 TESTS

8.1 COLOR UNIFORMITY

8.1.1 Procedure
Check random samples visually under a uniform light source. Viewing should be done at multiple angles. In conjunction, instrumental methods are imperative.

8.1.2 Performance
Color uniformity shall be consistent with the color range or numerical value established between the approval source and the applicator. Suggested maximum deviation is 2ΔE per ASTM D2244, Appendix X1.1, from agreed upon color standard.

NOTE 6: *Color and finish appearance may vary upon factory application due to differences in spray equipment, line conditions or day-to-day process variations. It is strongly recommended that final color approval be made with actual production line samples or mock-ups, not laboratory prepared panels*

Pearlescent mica and metallic flakes reflect and scatter light in random patterns; therefore, exact color uniformity should not be expected. Slight color shifting should also be expected when viewing from varying angles and distances. Equipment considerations affect color and are especially critical with multiple applicators.

ASTM D2244 no longer recommends the Hunter scale except for legacy users. However due to the large amount of valuable historical color data in the Hunter scale, AAMA recommends continued use of the Hunter scale now referenced in Appendix X1.1 in ASTM D2244. Other color systems may be used as outlined in ASTM D2244. As stated in ASTM D2244, CIELAB has found wide acceptance in the coatings, plastics, textiles and related industries. CMC may be another alternative to evaluating color as it is based on the more intuitive perceptual variables of lightness, chroma and hue and more closely relates to how the human eye perceives color. No color tolerances for measurements in the CMC color space are recommended in this specification.

8.2 SPECULAR GLOSS

8.2.1 Procedure
Measure in accordance with the latest issue of ASTM D523 using a 60 degree gloss meter. Samples must meet minimum dry film thickness requirements.

8.2.2 Performance
Gloss values shall be within ± 5 units of the manufacturer's specification.

EXAMPLE: *If coatings manufacturer's specification is a range of 25-35, the ± 5 allowance would permit 20-40 off the production line.*

NOTE 7: *Standard gloss range reference values are:*

Gloss Colors	*Specular Gloss Value*
High	*80-Over*
Medium	*20-79*
Low	*19 or less*

8.3 DRY FILM HARDNESS

8.3.1 Procedure
Strip the wood from a Berol Eagle Turquoise pencil or equivalent, grade F minimum hardness, leaving a full diameter of lead exposed to a length of 6 mm (1/4 in) minimum to 10 mm (3/8 in) maximum. Flatten the end of the lead 90 degrees to the pencil axis using fine-grit sand or emery paper. Hold the pencil at a 45 degree angle to the film surface and push forward about 6 mm (1/4 in) using as much downward pressure as can be applied without breaking the lead. Reference ASTM D3363.

8.3.2 Performance
No rupture of film per ASTM D3363.

8.4 FILM ADHESION

8.4.1 Procedure

8.4.1.1 Dry Adhesion
Make 11 parallel cuts, 1 mm (1/16 in) apart through the film. Make 11 similar cuts at 90 degrees to and crossing the first 11 cuts.

8.4.1.2 Tape Pull-Off
Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of cuts by pressing down firmly against the coating to eliminate voids and air pockets. Sharply pull the tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature [approximately 18°C to 27°C (65°F to 80°F)].

8.4.1.3 Wet Adhesion
Immerse the sample in distilled or deionized water at 38°C (100°F) for 24 hours. Remove and wipe the sample dry. Repeat the test specified in Section 8.4.1.2 within five minutes.

8.4.1.4 Boiling Water Adhesion
Immerse the sample in boiling distilled or deionized water 99°C to 100°C (210°F to 212°F) for 20 minutes. The water shall remain boiling throughout the test. Remove the sample and wipe it dry. Repeat the test specified in Section 8.4.1.2 within five minutes.

8.4.2 Performance
No removal of film under the tape within or outside of the cross-hatched area or blistering anywhere on the test specimen. Report loss of adhesion as a percentage of squares affected, (i.e., 10 squares lifted is 10% failure).

8.5 IMPACT RESISTANCE

8.5.1 Procedure
Using a 16 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range such as a Gardner impact tester, apply a load directly to the coated surface of sufficient force to deform the test sample a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in). Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of deformation by pressing down firmly against coating to eliminate voids and air pockets. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature approximately 18°C to 27°C (65°F to 80°F).

8.5.2 Performance
No removal of film from substrate.

NOTE 8: *Minute cracking at the perimeter of the concave area of the test panel is permissible but no coating pick-off should be apparent.*

8.6 ABRASION RESISTANCE

8.6.1 Procedure
Using the falling sand test method, ASTM D968, the Abrasion Coefficient shall be calculated according to the formula which follows.

ABRASION COEFFICIENT - LITERS PER MIL = V/T

where: V = volume of sand used in liters
T = thickness of coating in mils

8.6.2 Performance
The Abrasion Coefficient Value of the coating shall be 40 minimum.

8.7 CHEMICAL RESISTANCE

8.7.1 Muriatic Acid Resistance (15-Minute Spot Test)

8.7.1.1 Procedure
Apply 10 drops of 10% (by volume) solution of muriatic acid (37% commercial grade hydrochloric acid) in tap water and cover it with a watch glass, convex side up. The acid solution and test shall be conducted at 18°C to 27°C (65°F to 80°F). After a 15-minute exposure, wash off with running tap water.

8.7.1.2 Performance
No blistering and no visual change in appearance when examined by the unaided eye.

8.7.2 Mortar Resistance (24-Hour Pat Test)

8.7.2.1 Procedure
Prepare mortar by mixing 75 g (2.6 oz) of building lime (conforming to ASTM C207) and 225 g (7.9 oz) of dry sand, both passing through a 10-mesh wire screen with sufficient water, approximately 100 g (3.5 oz), to make a soft paste. Immediately apply wet pats of mortar about 1300 mm^2 (2 in^2) in area and 12 mm (1/2 in) in thickness to coated aluminum specimens which have been aged at least 24 hours after coating. Immediately expose test sections for 24 hours to 100% relative humidity at 38°C (100°F).

8.7.2.2 Performance
Mortar shall dislodge easily from the painted surface, and any residue shall be removable with a damp cloth. Any lime residue should be easily removed with the 10% muriatic acid solution described in Section 8.7.1.1. There shall be no loss of film adhesion or visual change in appearance when examined by the unaided eye.

NOTE 9: *A slight staining or discoloration may be apparent on orange, yellow or metallic coatings. This should be discussed with the specifying source prior to selection of color.*

8.7.3 Nitric Acid Resistance

8.7.3.1 Procedure
Fill a 237 ml (8 oz) wide-mouth bottle one-half full of nitric acid, 70% ACS reagent grade[1]. Place the test panel completely over the mouth of the bottle painted side down, for 30 minutes. The acid solution and test shall be conducted at 18°C to 27°C (65°F to 80°F) with a relative humidity of <50%. Rinse the sample with tap water, wipe it dry, and measure any color change after a one-hour recovery period.

8.7.3.2 Performance
Not more than 5ΔE Units (Hunter) of color change, calculated in accordance with ASTM D2244, when comparing measurements on the acid-exposed painted surface and the unexposed surface.

8.7.4 Detergent Resistance

8.7.4.1 Procedure
Prepare a 3% (by weight) solution of detergent as prescribed in ASTM D2248, and distilled water. Immerse at least two test specimens in the detergent solution at 38°C (100°F) for 72 hours. Remove and wipe the samples dry. Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide by pressing down firmly against the coating to eliminate voids and air pockets. Place the tape longitudinally along the entire length of the test specimens. If blisters are visible, then the blistered area must be taped and rated. Sharply pull off at a right angle to the plane of the surface being tested, per ASTM D3359. A typical solid detergent composition is as follows:

[1] *The assay of the nitric acid (HNO_3) should be Fisher A-200 or equivalent; minimum 69.0%, maximum 71.0%.*

	Parts by Weight
Tetrasodium pyrophosphate ($Na_4P_2O_7$) anhydrous	53.0
Sodium sulfate (Na_2SO_4), anhydrous	19.0
Sodium metasilicate (Na_2SiO_3), anhydrous	7.0
Sodium carbonate (Na_2CO_3), anhydrous	1.0
Sodium salt of a linear alkylarylsulfonate (90% flake grade)	20.0
TOTAL	100.0

8.7.4.2 Performance
No loss of adhesion of the film to the metal. No blistering and no significant visual change in appearance when examined by the unaided eye.

8.7.5 Window Cleaner Resistance

8.7.5.1 Procedure
Prepare a solution of glass cleaner. Apply 10 drops of the window cleaner to the painted surface and immediately cover it with a watch glass, convex side up. Let the test sit for 24 hours, then rinse the specimen with running tap water. Record visual appearance. Let the specimen sit for four hours before conducting the dry adhesion test outlined in Sections 8.4.1.1 and 8.4.1.2.

All purpose glass cleaner composition is as follows:

Raw Materials	% By Weight
Dowanol PM*	5
Propylene glycol	5
Isopropanol	35
Water	55
*Dow Chemical, propylene glycol methyl ether	

The solution and test should be conducted at 18°C to 27°C (65°F to 80°F).

8.7.5.2 Performance
There shall be no blistering or noticeable change in appearance when examined by the unaided eye and no removal of film under the tape within or outside of the cross-hatched area.

8.8 CORROSION RESISTANCE

NOTE 10: *In highly corrosive and high humidity environments such as, but not limited to, seacoast or industrial environments, performance may be diminished.*

8.8.1 Humidity Resistance

8.8.1.1 Procedure
Expose the sample in a controlled heat-and-humidity cabinet for 4,000 hours at 38°C (100°F) and 100% RH with the cabinet operated in accordance with ASTM D2247 or ASTM D4585.

8.8.1.2 Performance
No formation of blisters to extent greater than "Few" blisters Size No. 8, as shown in Figure No. 4, ASTM D714.

8.8.2 Cyclic Corrosion Testing

NOTE 11: *Section 8.8.2 previously addressed Salt Spray Resistance requirements. This section has been updated to use the ASTM G85, Annex A5 test instead of the B117 test.*

8.8.2.1 Procedure

Score the film sufficiently deep to expose the base metal using a sharp knife or blade instrument. Expose the sample for 2,000 hours according to ASTM G85, Annex A5, dilute electrolyte cyclic fog/dry test. Remove and wipe sample dry.

Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over scored area by pressing down firmly against the coating to eliminate voids and air pockets. Sharply pull the tape off at a right angle to the plane of the surface being tested.

8.8.2.2 Performance

Minimum rating of 7 on scribe or cut edges, and a minimum blister rating of 8 within the test specimen field, in accordance with the following Table 1 and Table 2 (Reference ASTM D1654).

Representative Mean Creepage From Scribe		
Millimeters	Inches (Approx.)	Rating Number
Zero	0	10
Over 0 to 0.5	0 to 1/64	9
Over 0.5 to 1.0	1/64 to 1/32	8
Over 1.0 to 2.0	1/32 to 1/16	7
Over 2.0 to 3.0	1/16 to 1/8	6
Over 3.0 to 5.0	1/8 to 3/16	5
Over 5.0 to 7.0	3/16 to 1/4	4
Over 7.0 to 10.0	1/4 to 3/8	3
Over 10.0 to 13.0	3/8 to 1/2	2
Over 13.0 to 16.0	1/2 to 5/8	1
Over 16.0	Over 5/8	0

TABLE 1: Rating of Failure at Scribe (Procedure A)

Area Failed, %	Rating Number
No Failure	10
0 to 1	9
2 to 3	8
4 to 6	7
7 to 10	6
11 to 20	5
21 to 30	4
31 to 40	3
41 to 55	2
56 to 75	1
Over 75	0

TABLE 2: Rating of Unscribed Areas (Procedure B)

NOTE 12: *The use of a ruled plastic grid is recommended as an aid in evaluating this type of failure. A 6 mm (1/4 in) grid is suggested as most practical for the usual specimen. In using the grid, the number of squares in which one or more points of failure are found is related to the total number of squares covering the significant area of the specimen to get a percentage figure as used in the tabulation. In some instances, the rating numbers may be used as factors with exposure time intervals related thereto, to produce a performance index number which very accurately indicates relative quality.*

8.9 WEATHERING

8.9.1 South Florida Exposure

The coating shall maintain its film integrity and at a minimum meet the following color retention, chalk resistance, gloss retention and erosion resistance properties. The architect, owner or contractor should request data relative to the long-term durability of the color(s) selected. Access to exposure panels must be made available to the architect and/or owner upon request.

8.9.1.1 Test Site and Duration

Test sites for on-fence testing are acceptable as follows: Florida exposure South of latitude 27 degrees North at a 45 degree angle facing South for a minimum of 10 years, maintained and operated in accordance with ASTM G7. Time elapsed when the coating is off the test fence for evaluation, or other purposes, shall not be counted as part of the 10-year exposure minimum.

8.9.1.2 Color Retention

8.9.1.2.1 Performance

Maximum of 5ΔE Units (Hunter) of color change as calculated in accordance with ASTM D2244, Appendixes X1.1 after the minimum 10-year exposure test per Section 8.9.1.1. Color change shall be measured on the exposed painted surface which has been cleaned of external deposits with clear water and a soft cloth and corresponding values shall be measured on the original retained panel or the unexposed flap area of the panel. A portion of the exposed panel may be washed lightly to remove surface dirt only. Heavy scrubbing or any polishing to remove chalk formation or restore the surface is not permitted where color measurements are made. New colors, whether formulated by a paint manufacturer or blended by an applicator according to a paint manufacturer's specifications, may be qualified without the exposure test per Section 8.9.1.1, provided that they are produced with the same pigments in the same coating resin system as a color on which acceptable 10 year test data is available and which is within the ±10 Hunter Units in lightness (L).

8.9.1.3 Chalk Resistance

8.9.1.3.1 Performance

Chalking shall be no more than that represented by a No. 8 rating for colors, No. 6 for whites, based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure (per Section 8.9.1.1) for 10 years. Chalking shall be measured on an exposed, unwashed painted surface.

8.9.1.4 Gloss Retention

8.9.1.4.1 Procedure

After weathering exposure (per Section 8.9.1.1), measure 60 degree gloss of exposed and unexposed areas of a test site exposure panel following ASTM D523. The exposure panel may be washed lightly with clear water and a soft cloth to remove loose surface dirt. Heavy scrubbing or any polishing to restore the surface is not permitted where gloss measurements are made.

8.9.1.4.2 Performance

Gloss retention shall be a minimum of 50% after the 10 year exposure test per Section 8.9.1.1 expressed as:

$$\% \text{ Retention} = \left[\left(\frac{60° \text{ Gloss Exposed}}{60° \text{ Gloss Unexposed}}\right) \times 100\%\right]$$

8.9.1.5 Resistance to Erosion

8.9.1.5.1 Procedure

After weathering exposure (per Section 8.9.1.1), measure dry film thickness of exposed and adjacent unexposed areas of exposure panels using an Eddy Current Meter as defined in ASTM B244 or other instrumental methods of equal precision.

8.9.1.5.2 Performance

Less than 10 percent film loss after the exposure test per Section 8.9.1.1 expressed as a percent loss of total film:

$$\text{Loss} = 100\% - \left[\left(\frac{\text{Dry Film Thickness Exposed}}{\text{Dry Film Thickness Unexposed}}\right) \times 100\%\right]$$

9.0 TEST REPORTS

9.1 Test reports on file with the applicator shall include the following information:

9.1.1 Date when tests were performed and date of issue of report.

9.1.2 Identification of organic coating and/or coating system tested, including production date, batch or lot number, cure conditions, pre-treatment data, manufacturer's name and name of company submitting coated samples used in test.

9.1.3 Copy of drawings submitted showing exposed surfaces.

9.1.4 Test results.

9.1.5 A statement indicating that the organic coating and/or coating system tested passed all tests or failed one or more.

9.1.6 In the case of a failure, which test(s) and a description of the failure(s).

9.1.7 Statement that all tests were conducted in accordance with this standard.

9.1.8 Name and address of the laboratory which conducted tests and issued the report.

APPENDIX FOR COIL COATING

A1.0 SCOPE

A1.1 This appendix describes differences in test procedures and performance requirements for AAMA 2605 for superior performing organic coatings, applied on a coil coating line, to aluminum architectural products.

A1.2 This appendix covers factory-applied coil coatings.

A2.0 PURPOSE

This appendix to AAMA 2605 will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings, which will provide and maintain a superior level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

This appendix speaks specifically to modifications of the AAMA 2605 specification based upon the differences between spray-applied and coil-applied coatings. Unless otherwise modified by this addendum, the AAMA 2605 specification applies in its entirety.

A3.0 GENERAL

A3.1 The total dry-film thickness shall be assessed utilizing the ASTM D7091 method.

A3.2 Eighty percent (80%) of measurements on primary exposed surfaces shall meet or exceed 23 microns (0.9 mil) total film thickness.

A3.3 Paint process capability may result in readings below 19 microns (0.75 mil). No more than 5% of the total readings, on primary exposed surfaces, shall be below 19 microns (0.75 mil) (or, 83% of film thickness specified), assuming appropriate color and hide.

A3.4 Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

A4.0 METAL PREPARATION AND PRE-TREATMENT

A4.1 PERFORMANCE

The cleaning/pre-treatment process and coating weights shall be within the performance range approved by the cleaning and pre-treatment chemical supplier.

A4.2 QUALITY ASSURANCE

The in-plant testing and control of cleaning and pretreatment shall meet or exceed the minimum requirements established by the cleaning and pretreatment chemical manufacturers.

A5.0 TESTS

A5.1 T-BEND TEST FOR COATING FLEXIBILITY

A5.1.1 Procedure

A5.1.1.1 Using the T-bend test method (in accordance with ASTM D4145), the coated sample shall be at least 51 mm (2 in) across the bend direction, by 152 mm (6 in).

A5.1.1.2 The test specimen temperature shall be 18º to 27ºC (65º to 80ºF).

A5.1.1.3 Secure approximately 13 to 19 mm (½ to ¾ in) of the sample in the jaws of a bench vise or holding jig. Bend the free end of the specimen 90 degrees in a smooth and uniform manner so that the coating is on the outside of the specimen after it is bent. Continue bending so the metal is completely bent upon itself, forming a 180-degree arc. This is a 0-T bend.

NOTE A1: *If needed, the vise can be used to help flatten the metal upon itself so that the apex of the bend is as flat as can be reasonably achieved.*

A5.1.1.4 Secure the bent end of the specimen in the vise and bend the free end 90 degrees. Continue to bend the free end around the first (0-T) bend to complete a 180-degree bend; this forms a 1-T bend. Continue to bend the free end around the first (0-T) bend to form a 90-degree bend; this forms a 2-T bend.

A5.1.1.5 After each bend has been completed, apply 19 mm (3/4 in.) wide pressure-sensitive tape (tape specified per ASTM D3359) along the bend. Rub the tape flat; then, holding the specimen firmly, remove the tape with a rapid movement at an angle of 180 degrees to the bend surface. Examine the tape for coating removed from the surface of the specimen (called pick-off).

A5.1.2 Performance
Minimum of 2-T flexibility with no pick-off at the area of the bend. Express the T-bend to no pick-off as the number of thicknesses around which the metal is being bent. For example, if no pick-off occurs when the metal is bent back upon itself once, the paint would take a 0-T bend.

NOTE A2: *Minute cracking at the edge of the bent area of the test panel is permissible but no paint pick-off shall be apparent. The test is valid to the point of substrate rupture.*

A5.2 IMPACT RESISTANCE

A5.2.1 Direct Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range, such as a Gardner impact tester, apply a load directly to the coated surface which creates a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in) deformation . After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) of sufficient size to cover the test area to the front of the coating by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

A5.2.1.1 Performance
There shall be no removal of film to substrate.

A5.2.2 Reverse Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range, such as a BYK-Gardner impact tester, apply a load to the back side the coated surface which creates a deformation which is three times the thickness of the metal (see formula in Example below). After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) of sufficient size to cover the test area to the front of the coating by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

EXAMPLE: *If the aluminum thickness is 0.70 mm (0.0276 in), multiply the metal thickness by 0.45 (1000) to obtain a load in m-kg (in-lbs).*

0.70 x 0.45 = 0.315 m-kg required
Drop a 1 kg weight a distance of 0.315 m

(0.0276 x 1000 = 27.6 in-lbs required)
(Drop a 2 lb weight a distance of 13.8 in)

NOTE A3: *The industry standard for impact resistance uses a factor of 0.45 (1000) for aluminum. Higher performance is possible. Deformation depth will differ according to the yield strength of the aluminum.*

A5.2.2.1 Performance
There shall be no removal of film to substrate.

NOTE A4: *Minute cracking at the perimeter of the convex area of the test panel is permissible but no paint pick-off should be apparent. Test is valid to the point of substrate rupture.*

Changes from AAMA 2605-11 to AAMA 2605-13

- Various editorial changes were made
- Added new Section 1.4
- Added requirement repair scratches per Section 8.4.1.2 in Section 5.5
- Changed language in Section 7.2.2 to reference “chromium chromate or chromium phosphate”
- Range of 2ΔE in Section 8.1.2 was made a maximum deviation
- Added language about ASTM D2244 no longer recommending the Hunter scale in NOTE 6
- Changed reference from “Permacel 99 or equivalent” tape to “tape specified per ASTM D3359” in Sections 8.4.1.2, 8.5.1, 8.7.4.1, 8.8.2.1, A5.1.1.5, A5.2.1, A5.2.2
- Added reference to Section 8.4.1.2 in Section 8.7.5.1
- Added new NOTE 10 & NOTE 11
- Added requirement to utilize ASTM G7 in Section 8.9.1.1
- Changed Section A5.1.1.4 to better define a 2-T bend
- Updated EXAMPLE in Section A5.2.2

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AMERICAN ARCHITECTURAL

AAMA 2604-13

Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)

AAMA

MANUFACTURERS ASSOCIATION

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

AAMA DOCUMENT ERRATA

DATE: **March 12, 2014**

CODE: **2604-13**

TITLE: **Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)**

This document contains an incorrect reference in Section 8.9.1.3.1.

The requirement currently reads:

8.9.1.3.1 Performance
Chalking shall be **no more than** that represented by a No. 8 rating for colors, No. 6 for whites based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure…

The requirement shall be corrected to read:

8.9.1.3.1 Performance
Chalk rating shall be **greater than or equal to** that represented by a No. 8 rating for colors or No. 6 for whites based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure…

RATIONAL:

This change is being made to reflect the minimum rating requirement as it was intended. Concern is ambiguity of current wording as to if "no more than" reflected the rating or level of chalking. Chalking rating system in ASTM D4214 states that a lower number indicates higher chalking.

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PREFACE

For years, the architectural community has recognized the following standards for testing and performance of organic coatings on architectural aluminum extrusions and panels:

AAMA 2603, "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2604, "Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2605, "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"

1.0 SCOPE

1.1 This specification describes test procedures and performance requirements for high performance organic coatings applied to aluminum extrusions and panels for architectural products.

1.2 This specification covers factory-applied organic coatings only.

1.3 The primary units of measure in this document are metric. The values stated in SI units are to be regarded as the standard. The values given in parentheses are for reference only.

1.4 This document was developed in an open and consensus process and is maintained by representative members of AAMA as advisory information.

2.0 PURPOSE

The specification will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings which will provide and maintain a high level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

3.0 REFERENCED STANDARDS

3.1 References to the standards listed below shall be to the edition indicated. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as to referring to the latest edition of that code or standard.

3.2 American Architectural Manufacturers Association (AAMA)

AAMA 800-10, Voluntary Specifications and Test Methods for Sealants

AAMA 2603-13, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels

AAMA 2605-13, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels

AAMA AG-12, AAMA Glossary

3.3 ASTM International (ASTM)

ASTM B117-11, Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM B244-09, Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments

ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes

ASTM D523-08, Standard Test Method for Specular Gloss

ASTM D714-02(2009), Standard Test Method for Evaluating Degree of Blistering of Paints

ASTM D968-05(2010), Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

ASTM D1654-08, Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D2244-11, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

ASTM D2247-11, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D2248-01a(2007), Standard Practice for Detergent Resistance of Organic Finishes

ASTM D3359-09e2, Standard Test Methods for Measuring Adhesion by Tape Test

ASTM D3363-05(2011)e2, Standard Test Method for Film Hardness by Pencil Test

ASTM D4145-10, Standard Test Method for Coating Flexibility of Prepainted Sheet

ASTM D4214-07, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

ASTM D4585-07, Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation

ASTM D5723-95(2010), Standard Practice for Determination of Chromium Treatment Weight on Metal Substrates by X-Ray Fluorescence

ASTM D7091-12, Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

ASTM G7/G7M-13, Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetalic Materials

4.0 DEFINITIONS

4.1 Please refer to AAMA Glossary (AG-12) for all definitions except for those appearing below (which apply only to this specification).

4.2 The terms "film" and "coating" are used interchangeably in this specification and are defined as meaning the layer of organic material applied to the surface of the aluminum.

5.0 GENERAL

5.1 To qualify as meeting this specification, products tested shall meet all requirements as specified herein.

5.2 Coatings shall be visibly free from flow lines, streaks, blisters or other surface imperfections in the dry-film state on exposed surfaces when observed at a distance of 3 m (10 ft) from the metal surface and inspected at an angle of 90 degrees to the surface.

5.3 The total dry-film thickness shall be assessed utilizing the ASTM D7091 method. Eighty percent of measurements on primary exposed surfaces shall meet or exceed 30 microns (1.2 mil) total film thickness. Paint process capability may result in readings below 25 microns (1.0 mil). No more than 5% of the total readings, on primary exposed surfaces, shall be below 25 microns (1.0 mil) (or, 85% of film thickness specified), assuming appropriate color and hide. Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

NOTE 1: *Due to the complexities of extrusion dies and limitations of application equipment, it may not be possible to achieve minimum recommended dry film thickness on all areas of an extrusion, such as inside corners and channels. For details of these affected areas, contact the coating applicator prior to painting.*

5.4 Cleaning and metal preparation shall be in compliance with Section 7.0 of this specification.

5.5 Minor scratches and blemishes shall be repairable with the coating manufacturer's recommended product or system. Such repairs shall match the original finish for color and gloss and shall adhere to the original finish when tested as outlined in Sections 8.4.1.1 and 8.4.1.2. After application, allow the repair coating to dry for at least 72 hours at 18°C to 27°C (65°F to 80°F) before conducting the film adhesion test.

NOTE 2: *The size and number of touch-up repairs should be kept to a minimum.*

5.6 Sealant used in contact with an organic coating shall be compatible with the organic coating and meet the performance requirements of AAMA 800 sealant specification. There shall be no evidence of deleterious effects in the organic coating such as staining, coating separation, lifting, discoloration or loss of adhesion of the coating from the substrate.

NOTE 3: *It is strongly recommended that the fabricator of the finished products consult with the sealant manufacturer in the selection of the appropriate sealant. Peel adhesion testing as described in AAMA 800 is suggested. It is important to understand that the AAMA 800 sealant specification does not ensure adhesion to a specific coating. The best way to ensure adhesion is to submit panel specimens of the specific coating to the sealant manufacturer or an AAMA accredited independent laboratory for tests and recommendations.*

6.0 TEST SPECIMENS

Test specimens shall consist of finished panels or extrusions representative of the production coated aluminum. A sufficient number of specimens on which to conduct instrument measurements with flat coated surfaces of at least 150 mm (6 in) long and 75 mm (3 in) wide, shall be submitted to the testing laboratory. The coating applicator or fabricator shall indicate exposed surfaces or submit drawings. Tests shall be performed on exposed areas as indicated on drawings or as marked on test specimens.

7.0 METAL PREPARATION AND PRE-TREATMENT

NOTE 4: *A multi-stage cleaning and pre-treatment system is required to remove organic and inorganic surface soils, remove residual oxides, and apply a chemical conversion coating to which organic coatings will firmly adhere.*

7.1 The pre-treatment when used in conjunction with a baked organic coating shall produce a total finishing system capable of meeting impact, adhesion, detergent, humidity and salt spray performance as specified in the appropriate test method.

7.2 CHEMICAL CONVERSION COATING WEIGHT

7.2.1 Procedure
Measure in accordance with the latest issue of ASTM D5723, using x-ray fluorescence or other standard methods for determining coating weights.

7.2.2 Performance
Chromium chromate or chromium phosphate coating weights should be a minimum of 323 mg/m^2 (30 mg/ft^2).

Alternative chrome and/or non-chrome conversion coating weights should be maintained according to supplier’s recommendations.

NOTE 5: *Frequent in-plant testing and control of pre-treatment is required to insure satisfactory performance of the coating system.*

8.0 TESTS

8.1 COLOR UNIFORMITY

8.1.1 Procedure
Check random samples visually under a uniform light source. Viewing should be done at multiple angles. In conjunction, instrumental methods are imperative.

8.1.2 Performance
Color uniformity shall be consistent with the color range or numerical value established between the approval source and the applicator. Suggested maximum deviation is 2ΔE per ASTM D2244, Appendixes X1.1, from agreed upon color standard.

NOTE 6: *Color and finish appearance may vary upon factory application due to differences in spray equipment, line conditions or day-to-day process variations. It is strongly recommended that final color approval be made with actual production line samples or mock-ups, not laboratory prepared panels.*

Pearlescent mica and metallic flakes reflect and scatter light in random patterns; therefore, exact color uniformity should not be expected. Slight color shifting should also be expected when viewing from varying angles and distances. Equipment considerations affect color and are especially critical with multiple applicators.

ASTM D2244 no longer recommends the Hunter scale except for legacy users. However due to the large amount of valuable historical color data in the Hunter scale, AAMA recommends continued use of the Hunter scale now referenced in Appendix X1.1 in ASTM D2244. Other color systems may be used as outlined in ASTM D2244. As stated in ASTM D2244, CIELAB has found wide acceptance in the coatings, plastics, textiles and related industries. CMC may be another alternative to evaluating color as it is based on the more intuitive perceptual variables of lightness, chroma and hue and more closely relates to how the human eye perceives color. No color tolerances for measurements in the CMC color space are recommended in this specification.

8.2 SPECULAR GLOSS

8.2.1 Procedure
Measure in accordance with the latest issue of ASTM D523 using a 60 degree gloss meter. Samples must meet minimum dry film thickness requirements.

8.2.2 Performance
Gloss values shall be within ± 5 units of the manufacturer's specification.

EXAMPLE: *If coatings manufacturer's specification is a range of 25-35, the ± 5 allowance would permit 20-40 off the production line.*

NOTE 7: *Standard gloss range reference values are:*

Gloss Colors	*Specular Gloss Value*
High	*80-Over*
Medium	*20-79*
Low	*19 or less*

8.3 DRY FILM HARDNESS

8.3.1 Procedure
Strip the wood from a Berol Eagle Turquoise pencil or equivalent, grade F minimum hardness, leaving a full diameter of lead exposed to a length of 6 mm (1/4 in) minimum to 10 mm (3/8 in) maximum. Flatten the end of the lead 90 degrees to the pencil axis using fine-grit sand or emery paper. Hold the pencil at a 45 degree angle to the film surface and push forward about 6 mm (1/4 in) using as much downward pressure as can be applied without breaking the lead. Reference ASTM D3363.

8.3.2 Performance
No rupture of film per ASTM D3363.

8.4 FILM ADHESION

8.4.1 Procedure

8.4.1.1 Dry Adhesion
Make 11 parallel cuts, 1 mm (1/16 in) apart through the film. Make 11 similar cuts at 90 degrees to and crossing the first 11 cuts.

8.4.1.2 Tape Pull-Off
Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of cuts by pressing down firmly against the coating to eliminate voids and air pockets. Sharply pull the tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature [approximately 18°C to 27°C (65°F to 80°F)].

8.4.1.3 Wet Adhesion
Immerse the sample in distilled or deionized water at 38°C (100°F) for 24 hours. Remove and wipe the sample dry. Repeat the test specified in Section 8.4.1.2 within five minutes.

8.4.1.4 Boiling Water Adhesion
Immerse the sample in boiling distilled or deionized water 99°C to 100°C (210°F to 212°F) for 20 minutes. The water shall remain boiling throughout the test. Remove the sample and wipe it dry. Repeat the test specified in Section 8.4.1.2 within five minutes.

8.4.2 Performance
No removal of film under the tape within or outside of the crosshatched area or blistering anywhere on the test specimen. Report loss of adhesion as a percentage of squares affected (i.e., 10 squares lifted is 10% failure).

8.5 IMPACT RESISTANCE

8.5.1 Procedure
Using a 16 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range, such as a Gardner impact tester, apply a load directly to the coated surface of sufficient force to deform the test sample a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in). Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of deformation by pressing down firmly against coating to eliminate voids and air pockets. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature approximately 18°C to 27°C (65°F to 80°F).

8.5.2 Performance
No removal of film from substrate.

NOTE 8: *Minute cracking at the perimeter of the concave area of the test panel is permissible but no coating pick-off should be apparent.*

8.6 ABRASION RESISTANCE

8.6.1 Procedure
Using the falling sand test method, ASTM D968, the Abrasion Coefficient shall be calculated according to the formula which follows:

ABRASION COEFFICIENT - LITERS PER MIL = V/T

where: V = volume of sand used in liters
T = thickness of coating in mils

8.6.2 Performance
The Abrasion Coefficient Value of the coating shall be 20 minimum.

8.7 CHEMICAL RESISTANCE

8.7.1 Muriatic Acid Resistance (15-Minute Spot Test)

8.7.1.1 Procedure
Apply 10 drops of 10% (by volume) solution of muriatic acid (37% commercial grade hydrochloric acid) in tap water and cover it with a watch glass, convex side up. The acid solution and test shall be conducted at 18°C to 27°C (65°F to 80°F). After a 15-minute exposure, wash off with running tap water.

8.7.1.2 Performance
No blistering and no visual change in appearance when examined by the unaided eye.

8.7.2 Mortar Resistance (24-Hour Pat Test)

8.7.2.1 Procedure
Prepare mortar by mixing 75 g (2.6 oz) of building lime (conforming to ASTM C207) and 225 g (7.9 oz) of dry sand, both passing through a 10-mesh wire screen with sufficient water, approximately 100 g (3.5 oz), to make a soft paste. Immediately apply wet pats of mortar about 1300 mm^2 (2 in^2) in area and 12 mm (1/2 in) in thickness to coated aluminum specimens, which have been aged at least 24 hours after coating. Immediately expose test sections for 24 hours to 100% relative humidity at 38°C (100°F).

8.7.2.2 Performance
Mortar shall dislodge easily from the painted surface, and any residue shall be removable with a damp cloth. Any lime residue should be easily removed with the 10% muriatic acid solution described in Section 8.7.1.1. There shall be no loss of film adhesion or visual change in appearance when examined by the unaided eye.

NOTE 9: *A slight staining or discoloration may be apparent on orange, yellow or metallic coatings. This should be discussed with the specifying source prior to selection of color.*

8.7.3 Nitric Acid Resistance

8.7.3.1 Procedure
Fill a 237 ml (8 oz) wide-mouth bottle one-half full of nitric acid, 70% ACS reagent grade[1]. Place the test panel completely over the mouth of the bottle painted side down, for 30 minutes. Rinse the sample with tap water, wipe it dry, and measure any color change after a one-hour recovery period.

8.7.3.2 Performance
Not more than 5ΔE Units (Hunter) of color change, calculated in accordance with ASTM D2244, when comparing measurements on the acid-exposed painted surface and the unexposed surface.

8.7.4 Detergent Resistance

8.7.4.1 Procedure
Prepare a 3% (by weight) solution of detergent as prescribed in ASTM D2248, and distilled water. Immerse at least two test specimens in the detergent solution at 38°C (100°F) for 72 hours. Remove and wipe the samples dry. Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide by pressing down firmly against the coating to eliminate voids and air pockets. Place the tape longitudinally along the entire length of the test specimens. If blisters are visible, then the blistered area must be taped and rated. Sharply pull off at a right angle to the plane of the surface being tested, per ASTM D3359. A typical solid detergent composition is as follows:

[1] *The assay of the nitric acid (HNO_3) should be Fisher A-200 or equivalent; minimum 69.0%, maximum 71.0%.*

	Parts by Weight
Tetrasodium pyrophosphate ($Na_4P_2O_7$) anhydrous	53.0
Sodium sulfate (Na_2SO_4), anhydrous	19.0
Sodium metasilicate (Na_2SiO_3), anhydrous	7.0
Sodium carbonate (Na_2CO_3), anhydrous	1.0
Sodium salt of a linear alkylarylsulfonate (90% flake grade)	20.0
TOTAL	100.0

8.7.4.2 Performance
No loss of adhesion of the film to the metal. No blistering and no significant visual change in appearance when examined by the unaided eye.

8.7.5 Window Cleaner Resistance

8.7.5.1 Procedure
Prepare a solution of glass cleaner. Apply 10 drops of the window cleaner to the painted surface and immediately cover it with a watch glass, convex side up. Let the test sit for 24 hours, then rinse the specimen with running tap water. Record visual appearance. Let the specimen sit for four hours before conducting the dry adhesion tests outlined in Sections 8.4.1.1 and 8.4.1.2.

All purpose glass cleaner composition as follows:

Raw Materials	% By Weight
Dowanol PM*	5
Propylene glycol	5
Isopropanol	35
Water	55
*Dow Chemical, propylene glycol methyl ether	

The solution and test should be conducted at 18°C to 27°C (65°F to 80°F).

8.7.5.2 Performance
There shall be no blistering or noticeable change in appearance when examined by the unaided eye and no removal of film under the tape within or outside of the cross-hatched area.

8.8 CORROSION RESISTANCE

8.8.1 Humidity Resistance

8.8.1.1 Procedure
Expose the sample in a controlled heat-and-humidity cabinet for 3,000 hours at 38°C (100°F) and 100% RH with the cabinet operated in accordance with ASTM D2247 or ASTM D4585.

8.8.1.2 Performance
No formation of blisters to extent greater than "Few" blisters Size No. 8, as shown in Figure No. 4, ASTM D714.

8.8.2 Salt Spray Resistance

8.8.2.1 Procedure
Score the film sufficiently deep to expose the base metal using a sharp knife or blade instrument. Expose the sample for 3,000 hours according to ASTM B117 using a 5% salt solution. Remove and wipe sample dry.

Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over scored area by pressing down firmly against the coating to eliminate voids and air pockets. Sharply pull the tape off at a right angle to the plane of the surface being tested.

8.8.2.2 Performance
Minimum rating of seven on scribe or cut edges, and a minimum blister rating of eight within the test specimen field, in accordance with the following Table 1 and Table 2 (Reference ASTM D1654).

Representative Mean Creepage From Scribe		
Millimeters	Inches (Approx.)	Rating Number
Zero	0	10
Over 0 to 0.5	0 to 1/64	9
Over 0.5 to 1.0	1/64 to 1/32	8
Over 1.0 to 2.0	1/32 to 1/16	7
Over 2.0 to 3.0	1/16 to 1/8	6
Over 3.0 to 5.0	1/8 to 3/16	5
Over 5.0 to 7.0	3/16 to 1/4	4
Over 7.0 to 10.0	1/4 to 3/8	3
Over 10.0 to 13.0	3/8 to 1/2	2
Over 13.0 to 16.0	1/2 to 5/8	1
Over 16.0	Over 5/8	0

TABLE 1: Rating of Failure at Scribe (Procedure A)

Area Failed, %	Rating Number
No Failure	10
0 to 1	9
2 to 3	8
4 to 6	7
7 to 10	6
11 to 20	5
21 to 30	4
31 to 40	3
41 to 55	2
56 to 75	1
Over 75	0

TABLE 2: Rating of Unscribed Areas (Procedure B)

NOTE 10: *The use of a ruled plastic grid is recommended as an aid in evaluating this type of failure. A 6 mm (1/4 in) grid is suggested as most practical for the usual specimen. In using the grid, the number of squares in which one or more points of failure are found is related to the total number of squares covering the significant area of the specimen to get a percentage figure as used in the tabulation. In some instances, the rating numbers may be used as factors with exposure time intervals related thereto, to produce a performance index number which very accurately indicates relative quality.*

8.9 WEATHERING

8.9.1 South Florida Exposure
The coating shall maintain its film integrity and at a minimum meet the following color retention, chalk resistance, gloss retention and erosion resistance properties. The architect, owner or contractor should request data relative to the long-term durability of the color(s) selected. Access to exposure panels must be made available to the architect and/or owner upon request.

8.9.1.1 Test Site and Duration
Test sites for on-fence testing are acceptable as follows: Florida exposure South of latitude 27 degrees North at a 45 degree angle facing South for a minimum of five years, maintained and operated in accordance with ASTM G7. Time elapsed when the coating is off the test fence for evaluation, or other purposes, shall not be counted as part of the five-year exposure minimum.

8.9.1.2 Color Retention

8.9.1.2.1 Performance
Maximum of 5ΔE Units (Hunter) of color change as calculated in accordance with ASTM D2244, Appendixes X1.1 after the exposure test per Section 8.9.1.1. Color change shall be measured on the exposed painted surface which has been cleaned of external deposits with clear water and a soft cloth and corresponding values shall be measured on the original retained panel or the unexposed flap area of the panel. A portion of the exposed panel may be washed lightly to remove surface dirt only. Heavy scrubbing or any polishing to remove chalk formation or restore the surface is not permitted where color measurements are made. New colors, whether formulated by a paint manufacturer or blended by an applicator according to a paint manufacturer's specifications, may be qualified without the exposure test per Section 8.9.1.1 provided that they are produced with the same pigments in the same coating resin system as a color on which acceptable five-year test data is available and which is within ± 10 Hunter Units in lightness (L).

8.9.1.3 Chalk Resistance

8.9.1.3.1 Performance
Chalking shall be no more than that represented by a No. 8 rating based on ASTM D4214, Test Method A (Method D 659) after test site (weathering) exposure (per Section 8.9.1.1). Chalking shall be measured on an exposed, unwashed painted surface.

8.9.1.4 Gloss Retention

8.9.1.4.1 Procedure
After weathering exposure (per Section 8.9.1.1), measure 60 degree gloss of exposed and unexposed areas of a test site exposure panel following ASTM D523. The exposure panel may be washed lightly with clear water and a soft cloth to remove loose surface dirt. Heavy scrubbing or any polishing to restore the surface is not permitted where gloss measurements are made.

8.9.1.4.2 Performance
Gloss retention shall be a minimum of 30% after the exposure test per Section 8.9.1.1 expressed as:

$$\% \text{ Retention} = \left[\left(\frac{60° \text{ Gloss Exposed}}{60° \text{ Gloss Unexposed}}\right) \text{ x } 100\%\right]$$

8.9.1.5 Resistance to Erosion

8.9.1.5.1 Procedure
After weathering exposure (per Section 8.9.1.1), measure dry film thickness of exposed and adjacent unexposed areas of exposure panels using an Eddy Current Meter as defined in ASTM B244 or other instrumental methods of equal precision.

8.9.1.5.2 Performance
Less than 10 percent film loss after the exposure test per Section 8.9.1.1 expressed as a percent loss of total film:

$$\text{Loss} = 100\% - \left[\left(\frac{\text{Dry Film Thickness Exposed}}{\text{Dry Film Thickness Unexposed}}\right) \text{ x } 100\%\right]$$

9.0 TEST REPORTS

9.1 Test reports on file with the applicator shall include the following information:

9.1.1 Date when tests were performed and date of issue of report.

9.1.2 Identification of organic coating and/or coating system tested, including production date, batch or lot number, cure conditions, pre-treatment data, manufacturer's name and name of company submitting coated samples used in test.

9.1.3 Copy of drawings submitted showing exposed surfaces.

9.1.4 Test results.

9.1.5 A statement indicating that the organic coating and/or coating system tested passed all tests or failed one or more.

9.1.6 In the case of a failure, which test(s) and a description of the failure(s).

9.1.7 Statement that all tests were conducted in accordance with this standard.

9.1.8 Name and address of the laboratory which conducted tests and issued the report.

APPENDIX FOR COIL COATING

A1.0 SCOPE

A1.1 This appendix describes differences in test procedures and performance requirements for AAMA 2604 for high performing organic coatings, applied on a coil coating line, to aluminum architectural products.

A1.2 This appendix covers factory-applied coil coatings.

A2.0 PURPOSE

This appendix to AAMA 2604 will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings, which will provide and maintain a high level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

This appendix speaks specifically to modifications of the AAMA 2604 specification based upon the differences between spray-applied and coil-applied coatings. Unless otherwise modified by this addendum, the AAMA 2604 specification applies in its entirety.

A3.0 GENERAL

A3.1 The total dry-film thickness shall be assessed utilizing the ASTM D7091 method.

A3.2 Eighty percent (80%) of measurements on primary exposed surfaces shall meet or exceed 23 microns (0.9 mil) total film thickness.

A3.3 Paint process capability may result in readings below 19 microns (0.75 mil). No more than 5% of the total readings, on primary exposed surfaces, shall be below 19 microns (0.75 mil) (or, 83% of film thickness specified), assuming appropriate color and hide.

A3.4 Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

A4.0 METAL PREPARATION AND PRE-TREATMENT

A4.1 PERFORMANCE

The cleaning/pretreatment process and coating weights shall be within the performance range approved by the cleaning and pre-treatment chemical supplier.

A4.2 QUALITY ASSURANCE

The in plant testing and control of cleaning and pretreatment shall meet or exceed the minimum requirements established by the cleaning and pretreatment chemical manufacturers.

A5.0 TESTS

A5.1 T-BEND TEST FOR COATING FLEXIBILITY

A5.1.1 Procedure

A5.1.1.1 Using the T-bend test method, in accordance with ASTM D4145, the coated sample shall be at least 51 mm (2 in) across the bend direction, by 152 mm (6 in).

A5.1.1.2 The test specimen temperature shall be 18° to 27°C (65° to 80°F).

A5.1.1.3 Secure approximately 13 to 19 mm (½ to ¾ in) of the sample in the jaws of a bench vise or holding jig. Bend the free end of the specimen 90 degrees in a smooth and uniform manner so that the coating is on the outside of the specimen after it is bent. Continue bending so the metal is completely bent upon itself, forming a 180-degree arc. This is a 0-T bend.

NOTE A1: *If needed, the vise can be used to help flatten the metal upon itself so that the apex of the bend is as flat as can be reasonably achieved.*

A5.1.1.4 Secure the bent end of the specimen in the vise and bend the free end 90 degrees. Continue to bend the free end around the first (0-T) bend to complete a 180-degree bend. This forms a 1-T bend. Continue to bend the free end around the first (0-T) bend to form a 90-degree bend; this forms a 2-T bend..

A5.1.1.5 After each bend has been completed, apply 19 mm (3/4 in.) wide pressure-sensitive tape (tape specified per ASTM D3359) along the bend. Rub the tape flat; then, holding the specimen firmly, remove the tape with a rapid movement at an angle of 180 degrees to the bend surface. Examine the tape for coating removed from the surface of the specimen (called pick-off).

A5.1.2 Performance
Minimum of 2-T flexibility with no pick-off at the area of the bend. Express the T-bend to no pick-off as the number of thicknesses around which the metal is being bent. For example, if no pick-off occurs when the metal is bent back upon itself once, the paint would take a 0-T bend.

NOTE A2: *Minute cracking at the edge of the bent area of the test panel is permissible but no paint pick-off shall be apparent. The test is valid to the point of substrate rupture.*

A5.2 IMPACT RESISTANCE

A5.2.1 Direct Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range, such as a Gardner impact tester, apply a load directly to the coated surface which creates a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in) deformation. After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) to the front of the coating of sufficient size to cover the test area by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

A5.2.1.1 Performance
There shall be no removal of film to substrate.

A5.2.2 Reverse Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range – such as a BYK-Gardner impact tester, apply a load to the back side the coated surface which creates a deformation which is three times the thickness of the metal (see formula in Example below). After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) to the front of the coating of sufficient size to cover the test area by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

EXAMPLE: *If the aluminum thickness is 0.70 mm (0.0276 in), multiply the metal thickness by 0.45 (1000) to obtain a load in m-kg (in-lbs).*

0.70 x 0.45 = 0.315 m-kg required
Drop a 1 kg weight a distance of 0.315 m

(0.0276 x 1000 = 27.6 in-lbs required)
(Drop a 2 lb weight a distance of 13.8 in)

NOTE A3: *The industry standard for impact resistance uses a factor of 0.45 (1000) for aluminum. Higher performance is possible. Deformation depth will differ according to the yield strength of the aluminum.*

A5.2.2.1 Performance
There shall be no removal of film to substrate.

NOTE A4: *Minute cracking at the perimeter of the convex area of the test panel is permissible but no paint pick-off should be apparent. Test is valid to the point of substrate rupture.*

Changes from AAMA 2604-10 to AAMA 2604-13

- Various editorial changes were made
- Added new Section 1.4
- Changed reference from ASTM D1400 to ASTM D7091 in Section 5.3
- Added requirement repair scratches per Section 8.4.1.2 in Section 5.5
- Changed language in Section 7.2.2 to reference “chromium chromate or chromium phosphate”
- Range of 2ΔE in Section 8.1.2 was made a maximum deviation
- Added language about ASTM D2244 no longer recommending the Hunter scale in NOTE 6
- Changed reference from “Permacel 99 or equivalent” tape to “tape specified per ASTM D3359” in Sections 8.4.1.2, 8.5.1, 8.7.4.1 & 8.8.2.1
- Added Footnote 1 about the assay of the nitric acid to Section 8.7.4.1
- Added reference to Section 8.4.1.2 in Section 8.7.5.1
- Added requirement to utilize ASTM G7 in Section 8.9.1.1
- Added new “Appendix for Coil Coating”

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AMERICAN ARCHITECTURAL

AAMA 2603-13

Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)

MANUFACTURERS ASSOCIATION

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PREFACE

For years, the architectural community has recognized the following standards for testing and performance of organic coatings on architectural aluminum extrusions and panels:

AAMA 2603, "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2604, "Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels;"

AAMA 2605, "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"

1.0 SCOPE

1.1 This specification describes test procedures and performance requirements for pigmented organic coatings applied to aluminum extrusions and panels.

1.2 This specification covers factory-applied organic coatings only.

1.3 The primary units of measure in this document are metric. The values stated in SI units are to be regarded as the standard. The values given in parentheses are for reference only.

1.4 This document was developed in an open and consensus process and is maintained by representative members of AAMA as advisory information.

2.0 PURPOSE

The specification will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings which will provide a good level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

3.0 REFERENCED STANDARDS

3.1 References to the standards listed below shall be to the edition indicated. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as to referring to the latest edition of that code or standard.

3.2 American Architectural Manufacturers Association (AAMA)

AAMA 800-10, Voluntary Specifications and Test Methods for Sealants

AAMA 2604-13 Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

AAMA 2605-13, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels

AAMA AG-12, AAMA Glossary

3.3 ASTM International (ASTM)

ASTM B117-11, Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes

ASTM D523-08, Standard Test Method for Specular Gloss

ASTM D714-02(2009), Standard Test Method for Evaluating Degree of Blistering of Paints

ASTM D1654-08, Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D2247-11, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D2248-01a(2007), Standard Practice for Detergent Resistance of Organic Finishes

ASTM D3359-09e2, Standard Test Methods for Measuring Adhesion by Tape Test

ASTM D3363-05(2011)e2, Standard Test Method for Film Hardness by Pencil Test

ASTM D4145-10, Standard Test Method for Coating Flexibility of Prepainted Sheet

ASTM D4585-07, Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation

ASTM D7091-12, Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

ASTM G7/G7M-13, Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetalic Materials

4.0 DEFINITIONS

4.1 Please refer to AAMA Glossary (AG-12) for all definitions except for those appearing below (which apply only to this specification).

4.1.1 EXPOSED SURFACES: Those surfaces which are visible when the coated product is installed. These may include both closed and open positions of operating sash, ventilators, doors or panels.

4.1.2 SPRAY COATING: The process of applying a resinous coating by atomizing it into a spray or mist, and curing it into a continuous film.

4.2 The terms "film" and "coating" are used interchangeably in this specification and are defined as meaning the layer of pigmented organic material applied to the surface of the aluminum.

5.0 GENERAL

5.1 To qualify as meeting this specification, products tested shall meet all requirements as specified herein.

5.2 Coatings shall be visibly free from flow lines, streaks, blisters or other surface imperfections in the dry-film state on exposed surfaces when observed at a distance of 3 m (10 ft) from the metal surface and inspected at an angle of 90 degrees to the surface.

5.3 The total dry-film thickness utilizing the ASTM D7091 method shall be calculated to be a minimum of 20 microns (0.8 mil) on significant exposed surfaces. Eighty percent of the measurements shall meet or exceed 20 microns (0.8 mil) total film thickness. In no case shall measurements be below 17 microns (0.68 mil) or 85% of the film thickness specified. Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

NOTE 1: *Due to the complexities of extrusion dies and limitations of application equipment, it may not be possible to achieve minimum recommended dry film thickness on all areas of an extrusion, such as inside corners and channels. For details of these affected areas, contact the coating applicator prior to painting.*

5.4 A multi-stage cleaning and pre-treatment system is required to remove organic and inorganic surface soils, remove residual oxides, and apply a chemical conversion coating to which organic coatings will firmly adhere. The pre-treatment when used in conjunction with a baked organic coating shall produce a total finishing system capable of meeting impact, adhesion, detergent, humidity and salt spray performance as specified in the appropriate test method.

5.5 Minor scratches and blemishes shall be repairable with the coating manufacturer's recommended product or system. Such repairs shall match the original finish for color and gloss and shall adhere to the original finish when tested as outlined in Section 7.4.1.2, Tape Pull-Off. After application, allow repair coating to dry for 72 hours at 18°C to 27°C (65°F to 80°F), before conducting the film adhesion test.

NOTE 2: *The size and number of touch-up repairs should be kept to a minimum.*

5.6 Sealant used in contact with an organic coating shall be compatible with the organic coating and meet the performance requirements of AAMA 800 sealant specification. There shall be no evidence of deleterious effects in the organic coating such as staining, coating separation, lifting, discoloration or loss of adhesion of the coating from the substrate.

NOTE 3: *It is strongly recommended that the fabricator of the finished products consult with the sealant manufacturer in the selection of the appropriate sealant. Pell adhesion testing as described in AAMA 800 is suggested. It is important to understand that the AAMA 800 sealant specification does not ensure adhesion to a specific coating. The best way to ensure adhesion is to submit panel specimens of the specific coating to the sealant manufacturer or an AAMA accredited independent laboratory for tests and recommendations.*

6.0 TEST SPECIMENS

Test specimens shall consist of finished panels or extrusions representative of the production coated aluminum. A sufficient number of specimens on which to conduct instrument measurements with flat coated surfaces of at least 150 mm (6 in) long and 75 mm (3 in) wide, shall be submitted to the testing laboratory. The coating applicator or fabricator shall indicate exposed surfaces or submit drawings. Tests shall be performed on exposed areas as indicated on drawings or as marked on test specimens.

7.0 TESTS

7.1 COLOR UNIFORMITY

7.1.1 Procedure
Check random samples visually under a uniform light source such as a Macbeth Daylight lamp or the North daylight sky. Samples must have a dry film thickness within specified range.

7.1.2 Performance
Color uniformity shall be consistent with the color range or numerical value as established between the approval source and the applicator.

NOTE 4: *Color and finish appearance may vary upon factory application due to differences in spray equipment, line conditions or day-to-day process variations. It is strongly recommended that final color approval limits be made with actual production line samples or mock-ups, not laboratory prepared color panels. Since flake orientation contributes to color uniformity, pearlescent, mica and metallic flake colors do present the need for more stringent control in application and consideration during project design and installation.*

7.2 SPECULAR GLOSS

7.2.1 Procedure
Measure in accordance with the latest issue of ASTM D523 using a 60 degree gloss meter. Samples must meet minimum dry film thickness requirements.

7.2.2 Performance
Gloss values shall be within ± 5 units of the manufacturer's specification.

EXAMPLE: *If coatings manufacturer's specification is a range of 25-35, the ± 5 allowance would permit 20-40 off the production line.*

NOTE 5: *Standard Gloss Range Reference Values are:*

Gloss Colors	*Specular Gloss Value*
High	*80-Over*
Medium	*20-79*
Low	*19 or less*

7.3 DRY FILM HARDNESS

7.3.1 Procedure
Strip the wood from a Berol Eagle Turquoise Pencil or equivalent, grade H minimum hardness leaving a full diameter of lead exposed to a length of 6 mm (1/4 in) minimum to 10 mm (3/8 in) maximum. Flatten the end of the lead 90 degrees to the pencil axis using fine-grit sand or emery paper. Hold the pencil at a 45 degree angle to film surface and push forward about 6 mm (1/4 in) using as much downward pressure as can be applied without breaking lead. Reference ASTM D3363.

7.3.2 Performance
No rupture of film per ASTM D3363.

7.4 FILM ADHESION

7.4.1 Procedure

7.4.1.1 Dry Adhesion
Make 11 parallel cuts, 1 mm (1/16 in) apart through the film. Make 11 similar cuts at 90 degrees to and crossing the first 11 cuts.

7.4.1.2 Tape Pull-Off
Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of cuts by pressing down firmly against coating to eliminate voids and air pockets. Sharply pull the tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature [approximately 18°C to 27°C (65°F to 80°F)].

7.4.1.3 Wet Adhesion
Immerse the sample in distilled or deionized water at 38°C (100°F) for 24 hours. Remove and wipe the sample dry. Repeat the test specified in Section 7.4.1.2 within five minutes.

7.4.2 Performance
No removal of film under the tape within or outside of the cross-hatched area or blistering anywhere on test specimen. Report loss of adhesion as a percentage of squares affected (i.e., 10 squares lifted is 10% failure).

7.5 IMPACT RESISTANCE

7.5.1 Procedure
Using a 16 mm (5/8 in) diameter round-nosed impact tester, 18 N-m (160 in-lb) range, such as a Gardner impact tester, apply a load directly to the coated surface of sufficient force to deform the test sample a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in). Apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over area of deformation by pressing down firmly against coating to eliminate voids and air pockets. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature approximately 18°C to 27°C (65°F to 80°F).

7.5.2 Performance
No removal of film from substrate.

NOTE 6: *Minute cracking at the perimeter of the concave area of test panel is permissible, but no coating pick-off should be apparent.*

7.6 CHEMICAL RESISTANCE

7.6.1 Muriatic Acid Resistance (15-Minute Spot Test)

7.6.1.1 Procedure
Apply 10 drops of 10% (by volume) solution of muriatic acid (37% commercial grade hydrochloric acid) in tap water and cover it with a watch glass, convex side up. The acid solution and test shall be conducted at 18°C to 27°C (65°F to 80°F). After a 15-minute exposure, wash off running tap water.

7.6.1.2 Performance
No blistering and no visual change in appearance when examined by the unaided eye.

7.6.2 Mortar Resistance (24-Hour Pat Test)

7.6.2.1 Procedure
Prepare mortar by mixing 75 g (2.6 oz) of building lime (conforming to ASTM C207) and 225 g (7.9 oz) of dry sand, both passing through a 10-mesh wire screen with sufficient water, approximately 100 g (3.5 oz), to make a soft paste. Immediately apply wet pats of mortar about 1300 mm^2 (2 in^2) in area and 12 mm (1/2 in) in thickness to coated aluminum specimens which have been aged at least 24 hours after coating. Immediately expose test sections for 24 hours to 100% relative humidity at 38°C (100°F).

7.6.2.2 Performance
Mortar shall dislodge easily from the painted surface, and any residue shall be removable with a damp cloth. Any lime residue should be easily removed with the 10% muriatic acid solution described in Section 7.6.1.1. There shall be no loss of film adhesion or visual change in appearance when examined by the unaided eye.

NOTE 7: *A slight staining or discoloration may be apparent on orange, yellow or metallic coatings. This should be discussed with the specifying source prior to selection of color.*

7.6.3 Detergent Resistance

7.6.3.1 Procedure
Prepare a 3% (by weight) solution of detergent as prescribed in ASTM D2248, and distilled water. Immerse at least two test specimens in the detergent solution at 38°C (100°F) for 72 hours. Remove and wipe the samples dry. Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide by pressing down firmly against the coating to eliminate voids and air pockets. Place the tape longitudinally along the entire length of the test specimen. If blisters are visible, then the blistered area must be taped and rated. Sharply pull off at a right angle to the plane of the surface being tested per ASTM D3359. A typical solid detergent composition is as follows:

	Parts by Weight
Tetrasodium pyrophosphate ($Na_4P_2O_7$) anhydrous	53.0
Sodium sulfate (Na_2SO_4), anhydrous	19.0
Sodium metasilicate (Na_2SiO_3), anhydrous	7.0
Sodium carbonate (Na_2CO_3), anhydrous	1.0
Sodium salt of a linear alkylarylsulfonate (90% flake grade)	20.0
TOTAL	100.0

7.6.3.2 Performance
No loss of adhesion of the film to the metal. No blistering and no significant visual change in appearance when examined by the unaided eye.

7.7 CORROSION RESISTANCE

7.7.1 Humidity Resistance

7.7.1.1 Procedure
Expose the sample in a controlled heat-and-humidity cabinet for 1,500 hours at 38°C (100°F) and 100% RH with the cabinet operated in accordance with ASTM D2247 or ASTM D4585.

7.7.1.2 Performance
No formation of blisters to extent greater than "Few" blisters Size No. 8, as shown in Figure No. 4, ASTM D714.

7.7.2 Salt Spray Resistance

7.7.2.1 Procedure
Score the film sufficiently deep to expose the base metal using a sharp knife or blade instrument. Expose the sample for 1,500 hours according to ASTM B117 using a 5% salt solution. Remove and wipe sample dry.

Immediately apply tape (tape specified per ASTM D3359) 20 mm (3/4 in) wide over scored area by pressing down firmly against coating to eliminate void and air pockets. Sharply pull tape off at a right angle to plane of the surface being tested.

7.7.2.2 Performance
Minimum rating of seven on scribe or cut edges and a minimum blister rating of eight within the test specimen field, in accordance with the following Table 1 and Table 2 (Reference ASTM D1654).

Representative Mean Creepage from Scribe		
Millimeters	Inches (Approx.)	Rating Number
Zero	0	10
Over 0 to 0.5	0 to 1/64	9
Over 0.5 to 1.0	1/64 to 1/32	8
Over 1.0 to 2.0	1/32 to 1/16	7
Over 2.0 to 3.0	1/16 to 1/8	6
Over 3.0 to 5.0	1/8 to 3/16	5
Over 5.0 to 7.0	3/16 to 1/4	4
Over 7.0 to 10.0	1/4 to 3/8	3
Over 10.0 to 13.0	3/8 to 1/2	2
Over 13.0 to 16.0	1/2 to 5/8	1
Over 16.0	Over 5/8	0

TABLE 1: Rating of Failure at Scribe (Procedure A)

Area Failed	Rating Number
No Failure	10
0 to 1	9
2 to 3	8
4 to 6	7
7 to 10	6
11 to 20	5
21 to 30	4
31 to 40	3
41 to 55	2
56 to 75	1
Over 75	0

TABLE 2: Rating of Unscribed Areas (Procedure B)

NOTE 8: *The use of a ruled plastic grid is recommended as an aid in evaluating this type of failure. A 6 mm (1/4 in) grid is suggested as most practical for the usual specimen. In using the grid, the number of squares in which one or more points of failure are found is related to the total number of squares covering the significant area of the specimen to get a percentage figure as used in the tabulation. In some instances, the rating numbers may be used as factors with exposure time intervals related thereto, to produce a performance index number which very accurately indicates relative quality.*

7.8 WEATHER EXPOSURE

7.8.1 Outdoor Exposure

7.8.1.1 Procedure
Expose six samples representing typical products on an exposure rack for one year in Southern Florida at a 45 degree angle facing South, maintained and operated in accordance with ASTM G7. Exposure site should be inland at least 3.2 km (2 miles).

7.8.1.2 Performance
No checking, crazing or loss of adhesion after taping and only a slight chalking and slight fading.

NOTE 9: *Film approval is not dependent on Outdoor Exposure Test, but failure of a color should be reported to the coating supplier and a revision of the coating process requested prior to additional shipments.*

8.0 TEST REPORTS

8.1 Test reports on file with the applicator shall include the following information:

8.1.1 Date when tests were performed and date of issue of report.

8.1.2 Identification of organic coating and/or coating system tested, including production date, batch or lot number, cure conditions, pretreatment data, manufacturer's name and name of company submitting coated samples used in test.

8.1.3 Copy of drawings submitted showing exposed surfaces.

8.1.4 Test results.

8.1.5 A statement indicating that the organic coating and/or coating system tested passed all tests or failed one or more.

8.1.6 In the case of a failure, which test(s) and a description of the failure(s).

8.1.7 Statement that all tests were conducted in accordance with this standard.

8.1.8 Name and address of the laboratory which conducted tests and issued the report.

APPENDIX FOR COIL COATING

A1.0 SCOPE

A1.1 This appendix describes differences in test procedures and performance requirements for AAMA 2603 for organic coatings, applied on a coil coating line, to aluminum architectural products.

A1.2 This appendix covers factory-applied coil coatings.

A2.0 PURPOSE

This appendix to AAMA 2603 will assist the architect, owner and contractor to specify and obtain factory-applied organic coatings, which will provide and maintain a good level of performance in terms of film integrity, exterior weatherability and general appearance over a period of many years.

This appendix speaks specifically to modifications of the AAMA 2603 specification based upon the differences between spray-applied and coil-applied coatings. Unless otherwise modified by this addendum, the AAMA 2603 specification applies in its entirety.

A3.0 GENERAL

A3.1 The total dry-film thickness shall be assessed utilizing the ASTM D7091 method.

A3.2 Eighty percent (80%) of measurements on primary exposed surfaces shall meet or exceed 23 microns (0.9 mil) total film thickness.

A3.3 Paint process capability may result in readings below 19 microns (0.75 mil). No more than 5% of the total readings, on primary exposed surfaces, shall be below 19 microns (0.75 mil) (or, 83% of film thickness specified), assuming appropriate color and hide.

A3.4 Film thickness specified may be increased to be consistent with color selection and type of coating as recommended by the coating manufacturer.

A4.0 METAL PREPARATION AND PRE-TREATMENT

A4.1 PERFORMANCE

The cleaning/pretreatment process and coating weights shall be within the performance range approved by the cleaning and pre-treatment chemical supplier.

A4.2 QUALITY ASSURANCE

The in plant testing and control of cleaning and pretreatment shall meet or exceed the minimum requirements established by the cleaning and pretreatment chemical manufacturers.

A5.0 TESTS

A5.1 T-BEND TEST FOR COATING FLEXIBILITY

A5.1.1 Procedure

A5.1.1.1 Using the T-bend test method (in accordance with ASTM D4145), the coated sample shall be at least 51 mm (2 in) across the bend direction, by 152 mm (6 in).

A5.1.1.2 The test specimen temperature shall be 18º to 27ºC (65º to 80ºF).

A5.1.1.3 Secure approximately 13 to 19 mm (½ to ¾ in) of the sample in the jaws of a bench vise or holding jig. Bend the free end of the specimen 90 degrees in a smooth and uniform manner so that the coating is on the outside of the specimen after it is bent. Continue bending so the metal is completely bent upon itself, forming a 180-degree arc. This is a 0-T bend.

NOTE A1: *If needed, the vise can be used to help flatten the metal upon itself so that the apex of the bend is as flat as can be reasonably achieved.*

A5.1.1.4 Secure the bent end of the specimen in the vise and bend the free end 90 degrees. Continue to bend the free end around the first (0-T) bend to complete a 180-degree bend. This forms a 1-T bend. Continue to bend the free end around the first (0-T) bend to form a 90-degree bend; this forms a 2-T bend.

A5.1.1.5 After each bend has been completed, apply 19 mm (3/4 in) wide pressure-sensitive tape (tape specified per ASTM D3359) along the bend. Rub the tape flat; then, holding the specimen firmly, remove the tape with a rapid movement at an angle of 180 degrees to the bend surface. Examine the tape for coating removed from the surface of the specimen (called pick-off).

A5.1.2 Performance
Minimum of 2-T flexibility with no pick-off at the area of the bend. Express the T-bend to no pick-off as the number of thicknesses around which the metal is being bent. For example, if no pick-off occurs when the metal is bent back upon itself once, the paint would take a 0-T bend.

NOTE A2: *Minute cracking at the edge of the bent area of the test panel is permissible but no paint pick-off shall be apparent. The test is valid to the point of substrate rupture.*

A5.2 IMPACT RESISTANCE

A5.2.1 Direct Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range, such as a Gardner impact tester, apply a load directly to the coated surface which creates a minimum of 3 mm ± 0.3 mm (0.10 in ± 0.01 in) deformation. After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) of sufficient size to cover the test area to the front of the coating by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

A5.2.1.1 Performance
There shall be no removal of film to substrate.

A5.2.2 Reverse Impact
Using a 15 mm (5/8 in) diameter round-nosed impact tester 18 N-m (160 in-lb) range – such as a BYK-Gardner impact tester, apply a load to the back side the coated surface which creates a deformation which is three times the thickness of the metal (see formula in Example below). After deformation, apply 20 mm (3/4 in) wide tape (tape specified per ASTM D3359) of sufficient size to cover the test area to the front of the coating by pressing down firmly against the coating to eliminate voids and air pockets under the tape. Sharply pull tape off at a right angle to the plane of the surface being tested. Test pieces should be at ambient temperature, approximately 18ºC to 27ºC (65ºF to 80ºF).

EXAMPLE: *If the aluminum thickness is 0.70 mm (0.0276 in), multiply the metal thickness by 0.45 (1000) to obtain a load in m-kg (in-lbs).*

0.70 x 0.45 = 0.315 m-kg required
Drop a 1 kg weight a distance of 0.315 m

(0.0276 x 1000 = 27.6 in-lbs required)
(Drop a 2 lb weight a distance of 13.8 in)

NOTE A3: *The industry standard for impact resistance uses a factor of 0.45 (1000) for aluminum. Higher performance is possible. Deformation depth will differ according to the yield strength of the aluminum.*

A5.2.2.1 Performance
There shall be no removal of film to substrate.

NOTE A4: *Minute cracking at the perimeter of the convex area of the test panel is permissible but no paint pick-off should be apparent. Test is valid to the point of substrate rupture.*

Changes from AAMA 2603-02 to AAMA 2603-13

- Various editorial changes were made
- Added new Section 1.4
- Changed reference from ASTM D1400 to ASTM D7091 in Section 5.3
- Changed reference from “Permacel 99 or equivalent” tape to “tape specified per ASTM D3359” in Sections 7.4.1.2, 7.5.1, 7.6.3.1 & 7.7.2.1
- Removed old Section 6.8.1, “Accelerated Exposure”
- Added requirement to utilize ASTM G7 in Section 7.8.1.1
- Added new “Appendix for Coil Coating”

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