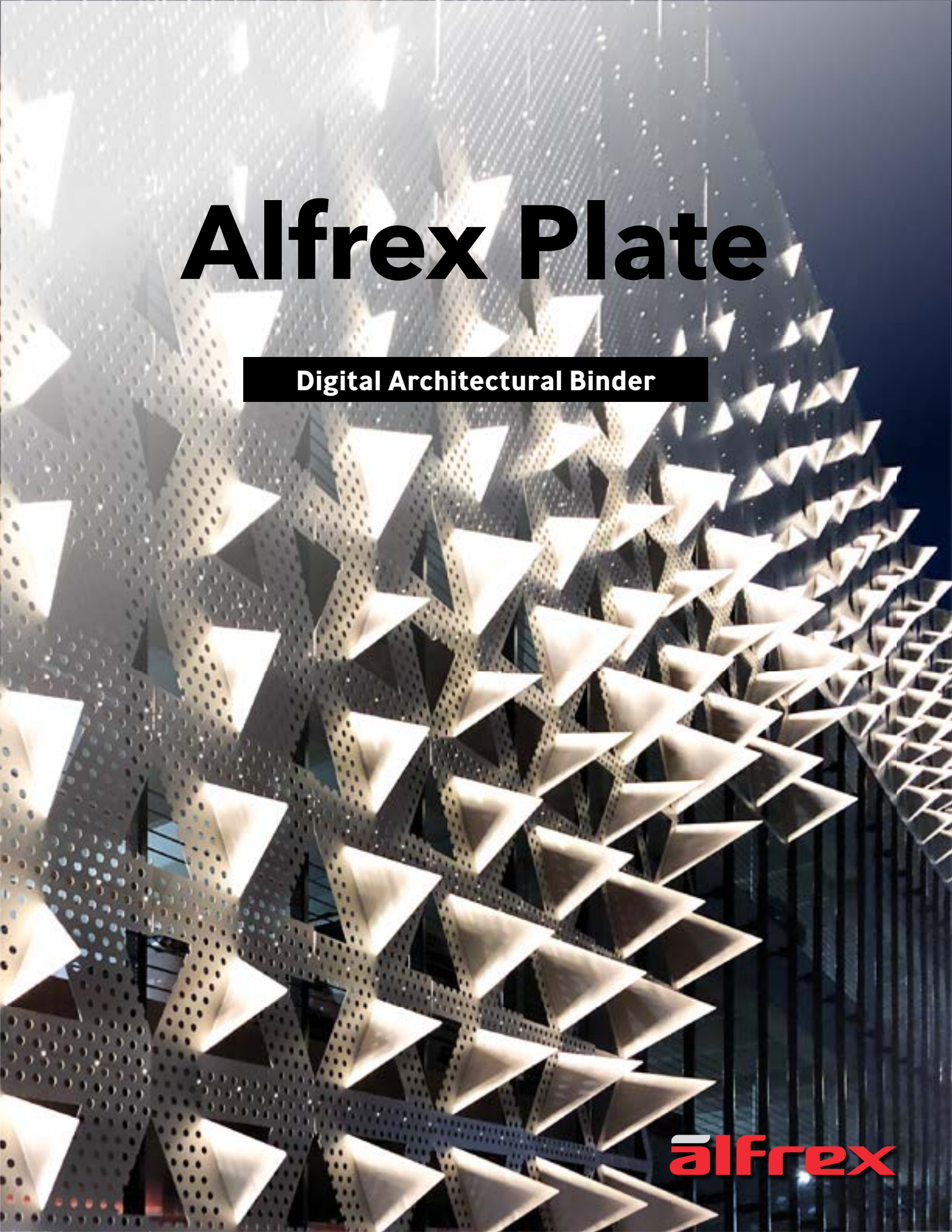




# Alfred Plate

Digital Architectural Binder

**alfrex**

# ALFREX OVERVIEW

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Alfred, Inc. is specialized in fire-resistant and non-combustible architectural metal wall cladding for the North American market. Its foundation as a manufacturer dates back to 2000 for fire-resistant compounds, coatings, and bonding materials; and back to 2008 as a global manufacturer of fire-resistant MCM. Its company history and highlights include:

- 2000** Parent company Unience, Ltd. founded manufacturing fire-resistant compounds
- 2008** Alfred FR Metal Composite Material launched with 2 manufacturing lines
- 2016** Alfred USA commercial offices opened
- 2017** Alfred Canada commercial offices opened
- 2019** Alfred Plate - coil coated architectural aluminum plate added to portfolio
- 2020** New FR-core only MCM manufacturing plant and global headquarters inaugurated in Buford, Georgia USA
- 2020** All required product testing and certifications for the USA and Canada completed for Alfred FR MCM and Alfred Plate

## PRODUCTS

Alfred FR MCM - Metal Composite Material Wall Panels  
Alfred Plate Pre-Finished Architectural Wall Panels  
Matching Flat Sheet and Trim Profiles









**alfrex**

# PRODUCT OVERVIEW

---

## **Alfred FR MCM** *Metal Composite Material Wall Panels*

Alfred FR is a continuous process manufactured metal composite material (MCM) consisting of an extruded fire-resistant core permanently bonded to pre-finished aluminum skins on each side. It is fully tested and compliant with building codes in both the USA and Canada - holding key certifications such as ICC ES Evaluation Report ESR-4566, ICC AC208, NFPA 285, CAN S134, Florida Product Approval for High Velocity Hurricane Zones, and many others.

## **Alfred Plate** *Pre-Finished Architectural Wall Panels*

Alfred Plate is a 100% solid aluminum, non-combustible wall cladding panel with a standard nominal thickness of 0.125" (3mm) by a maximum 62" width - allowing it to be fabricated and installed with the same methods and system assemblies utilized with MCM. Like MCM, it is pre-finished via coil coating lines - providing better color consistency and economics versus the post-painting of individual plate panels.

## **Matching Flat Sheet and Trim Profiles**

Alfred stocks tension leveled 0.040" (1mm) aluminum flat sheet in all MCM standard colors to address the challenge of coordinating color match between metal wall cladding products and sheet metal for trim and accessories. Matching flat sheet can also be made-to-order in 5 standard profiles commonly used for flashing applications.

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# ALFRED PLATE PRODUCT GUIDE

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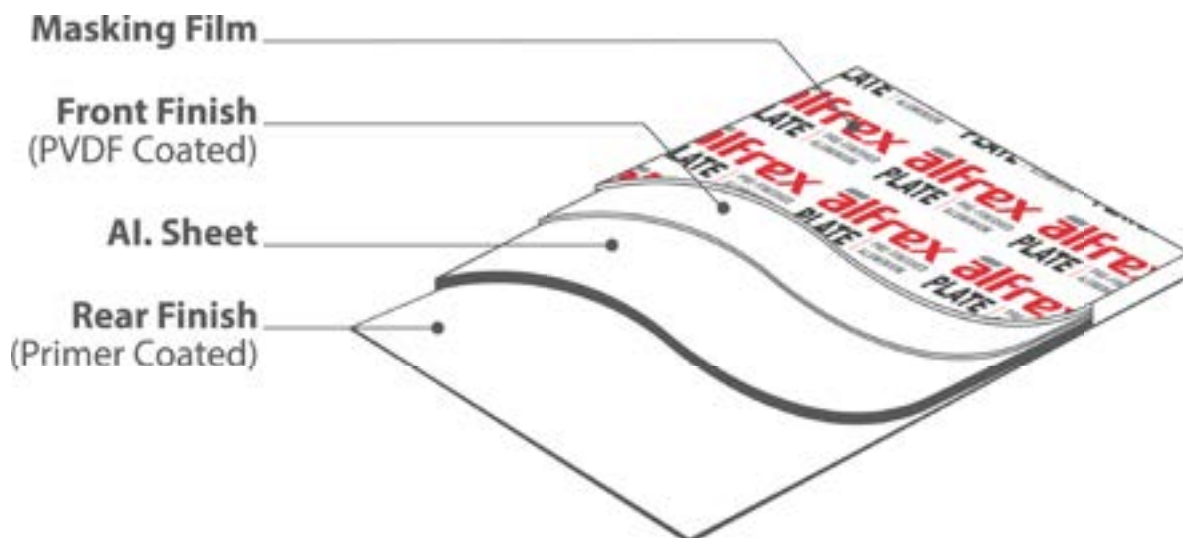




# INTRODUCTION

**ALFLEX PLATE** is a 100% solid aluminum, non-combustible wall cladding panel. With a standard thickness of 3mm (nominal 0.125" / 1/8") by a maximum 62" width, it is also available in 0.100" (2.5mm), 0.080" (2mm), 0.060" (1.5mm) thicknesses, as well as custom widths. It is pre-finished by coil coating lines specialized in handling heavier gauge solid aluminum coil, tension leveled, and cut to length per the requirements of each project. Its 70% PVDF Kynar resin paint system ensures color consistency and outstanding UV protection, and can be coated in coordination with Alfrex FR ACM standard or custom colors. The backside is primer coated to minimize oxidization and enable post-paint spray coating for small lot custom colors, where air dry or baked finishes are desired.

## ALFLEX PLATE COMPOSITION



# FEATURES

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## Non-Combustibility

Alfred Plate is non-combustible 100% solid aluminum, 3003-H14 alloy. For applications where meeting local building codes or satisfying owner preference is mandated, a non-combustible metal wall cladding option may be desired. Alfred Plate fits this requirement and much more.



## Coil Coated Aluminum Plate

Architectural quality coil coated finishes are rarely available on plate thickness greater than 0.080". With Alfred 3mm Plate, "Coil Coated" is the standard. Projects requiring a non-combustible solution with greater panel spans can count on Alfred 3mm Plate, coil coated with the same wide range of finishes and exterior coating performance warranties as Alfred FR MCM.



## Custom Colors

Alfred provides custom matching to transform your imagination into reality using the color or finish of your choice. Simply send us a color sample, coating manufacturer paint code, Pantone number, or PMS number and we will quickly turn around an accurate match that meets your project requirements.



## Small Lot Custom Colors

Alfred stocks 3mm thick aluminum plate in 62" wide x 165" and 196" long sheets with a primed back side. This enables the post-painting of sheets in either air dry or baked on spray finishes, eliminating the need for customers to source sheets from multiple sources. This capability also provides a more economical solution for small, custom color requirements where coil coating minimums cannot be met.



## Cut to Length for the Project

Alfred Plate is tension leveled and cut to length per the requirements of each individual project. With a minimum quantity of 20 sheets per length, customers can take off and optimize Alfred Plate in the same manner as Alfred FR MCM - reducing scrap and processing costs.



## Compatibility and Formability

Alfred Plate can be fabricated using proven methods such as: cutting, routing, shearing, bending, folding, and roll forming. It can be folded to a 2T bend naturally, and to 90 degrees when routed from the back side. This enables closer compatibility between Alfred Plate and popular MCM installation systems with only slight modifications.

# REFERENCE DATA

## STANDARD SIZES

| PROPERTY                                                            | 3mm Plate |       | 0.080" Plate |       | UNITS |
|---------------------------------------------------------------------|-----------|-------|--------------|-------|-------|
| Thicknesses (nominal)                                               | 0.125     |       | 0.080        |       | in    |
|                                                                     | 3         |       | 2            |       | mm    |
| Widths<br><i>*41.3in (1,050mm) width is available upon request.</i> | 62        | 50    | 62           | 50    | in    |
|                                                                     | 1,575     | 1,270 | 1,575        | 1,270 | mm    |
| Lengths                                                             | Max 196   |       |              |       | in    |
|                                                                     | Max 4,978 |       |              |       | mm    |

## TOLERANCES

| PROPERTY  | 3mm Plate   | UNITS |
|-----------|-------------|-------|
| Width     | + / - 0.080 | in    |
|           | 2.0         | mm    |
| Length    | + / - 0.157 | in    |
|           | 4.0         | mm    |
| Thickness | + / - 0.004 | in    |
|           | 0.1         | mm    |

## TECHNICAL PROPERTIES

| PROPERTY                   | STANDARD | 3mm Plate               | UNITS                 |
|----------------------------|----------|-------------------------|-----------------------|
| Aluminum Plate Alloy       | -        | 3003-H14                |                       |
| Panel Weight               | -        | 1.66                    | lb/ft <sup>2</sup>    |
|                            |          | 8.10                    | kg/m <sup>2</sup>     |
| Specific Gravity (Product) | -        | 2.72                    | g/cc                  |
| Coefficient of Expansion   | -        | 12.9 x 10 <sup>-6</sup> | in/in/°F (@ 68-212°F) |
| Modulus of Elasticity      | ASTM E8  | 10 x 10 <sup>6</sup>    | Psi                   |
|                            |          | 69.0 x 10 <sup>3</sup>  | Mpa                   |
| Moment of Inertia          | -        | 1.37 x 10 <sup>-4</sup> | in <sup>4</sup> /in   |
|                            |          | 5.7 x 10 <sup>-3</sup>  | cm <sup>4</sup> /m    |
| Section Modulus            | -        | 2.32 x 10 <sup>-3</sup> | in <sup>3</sup> /in   |
|                            |          | 38.0 x 10 <sup>-3</sup> | cm <sup>3</sup> /m    |
| Tensile Strength           | ASTM E8  | 20.3 x 10 <sup>3</sup>  | Psi                   |
|                            |          | 140.0                   | Mpa                   |
| Yield Strength             | ASTM E8  | 17.4 x 10 <sup>3</sup>  | Psi                   |
|                            |          | 120.0                   | Mpa                   |
| Elongation                 | ASTM E8  | 25                      | %                     |
| Thermal Conductivity       | C518     | 193                     | W/(m•K)               |

## FIRE PERFORMANCE

| TEST                                 | RESULT          |
|--------------------------------------|-----------------|
| ASTM E136                            | Non-Combustible |
| CAN/ULC-S135                         | Passed          |
| CAN/ULC-S114-2018                    | Passed          |
| FM 4473 "Modified" Impact Resistance | Passed          |

# ALFRED PLATE EXECUTIVE SUMAMRY

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# ALFLEX PLATE EXECUTIVE SUMMARY

Pre-Finished 3mm & 2mm Solid Aluminum Plate



Fire Resistant & Non-Combustible Cladding

## ALFLEX PLATE

- » Non-Combustible
- » 100% 3003-H14 aluminum
- » Pre-Finished Kynar PVDF Finishes
- » Coil coated for consistency
- » 20 Year Finish Warranty
- » Identical pricing for standard or custom color production orders subject to minimums
- » Primer coated backside for post-painting small customs
- » Printed production marking on backside for traceability
- » 5 Colors in 3mm Plate Finished Goods

## FABRICATION

- » Cutting & Routing
  - › Specialized CC router bits
  - › Laser cutting
  - › Shear press
  - › Saw cuts
- » Bending & Folding
  - › Brake press
  - › Route & return
- » Perforation
  - › Turret punch press recommended
  - › Perforated area < 30% of total surface area
  - › Minimum distance between perforated holes
    - 1.5x thickness of panel
    - 3mm Plate: 0.180in (4.5mm)
    - 2mm Plate: 0.120in (3mm)

## INSTALLATION SYSTEMS

- » With slight adaptations, compatible with MCM systems
- » Consult Alfrex for fabricators by region with tested installation systems for aluminum plate

## STANDARD COLOR FINISHED GOODS

- » 3mm Plate: 62in x 165in and 196in
- » Classic White (match to MCM & 0.040in flat sheet)
- » Bone White (match to MCM & 0.040in flat sheet)
- » Charcoal (match to MCM & 0.040in flat sheet)
- » Bronze (match to MCM & 0.040in flat sheet)
- » Black (match to MCM & 0.040in flat sheet)
- » Anodic Clear Mica (match to MCM & 0.040in flat sheet)



## DIMENSIONS

- » 2mm Plate: 0.080in x 62in & 50in wide
- » 3mm Plate: 0.125in (nominal) x 62in & 50in wide
- » Standard length: 165in
- » Max length: 196in
- » 20 Panel minimum per length
- » Tension leveling and cut to length line

## APPLICATIONS

- » Non-combustible wall cladding
- » Single skin aluminum plate
- » Smaller sized panel modules
- » High traffic areas
- » Perforated panels
- » Municipal building code compliance i.e: Toronto, New York City

## PRODUCT CERTIFICATIONS

### ALFLEX PLATE - FIRE PERFORMANCE

|                                      |                         |
|--------------------------------------|-------------------------|
| ASTM E136                            | Passed: Non-Combustible |
| CAN/ULC S114-2018                    | Passed                  |
| CAN/ULC S135                         | Passed                  |
| FM 4473 "Modified" Impact Resistance | Passed                  |

### LEED CERTIFICATION RECYCLED CONTENT MR CREDIT 4 - 91.05%

|                    |
|--------------------|
| LEED v3 : 2 Points |
| LEED v4 : 1 Point  |

### ALFLEX PLATE - BUILDING CODE

|                                              |
|----------------------------------------------|
| Florida Product Approval with HVHZ - FL39304 |
|----------------------------------------------|

## PRODUCTION ORDER MINIMUMS

|               | Economic Order Point | Premium Priced Production Order | Specialty Finishes (Wood, Metal Series) |
|---------------|----------------------|---------------------------------|-----------------------------------------|
| 3mm (0.120in) | 8,000 sf             | 1,000 sf                        | 22,000 sf                               |
| 2mm (0.080in) | 6,000 sf             | 1,000 sf                        | 22,000 sf                               |



# ALFRED PLATE SPECIFICATION COMPLIANCE CHECKLIST

---



PART 1: GENERAL

ASTM E330 Structural Performance

Perimeter Framing Deflection  $\leq L/175$   
Panel Deflection  $\leq L/60$

Panel Deflection - Compliant  
+100 psf / -90 psf, 20.0 psf water penetration per ASTM E330

|                 |             | Deflection (in) |                             | Permanent Set (in) |                             |
|-----------------|-------------|-----------------|-----------------------------|--------------------|-----------------------------|
|                 |             | Measured        | Allowed Per TAS 202 (L/333) | Measured           | Allowed Per TAS 202 (L/720) |
| Design Pressure | + 100.0/psf | 0.10            | 0.36                        | 0.02               | 0.17                        |
|                 | - 90.0/psf  | 0.20            | 0.36                        | < 0.01             | 0.17                        |
| Test Pressure   | + 150.0/psf | 0.16            | N/A                         | 0.03               | 0.17                        |
|                 | - 135.0/psf | 0.30            | N/A                         | 0.03               | 0.17                        |

Perimeter Framing Deflection - Compliant

|                 |             | Deflection (in) |                              | Permanent Set (in) |                              |
|-----------------|-------------|-----------------|------------------------------|--------------------|------------------------------|
|                 |             | Measured        | Allowed Per TAS 202 (L/1707) | Measured           | Allowed Per TAS 202 (L/3899) |
| Design Pressure | + 100.0/psf | 0.01            | 0.07                         | < 0.01             | 0.03                         |
|                 | - 90.0/psf  | 0.03            | 0.07                         | < 0.01             | 0.03                         |
| Test Pressure   | + 150.0/psf | 0.01            | N/A                          | 0.01               | 0.03                         |
|                 | - 135.0/psf | 0.03            | N/A                          | 0.01               | 0.03                         |

ASTM E283, Air Leakage

< 0.06 cfm per sf at 1.57 psf

|                                                                          |           |
|--------------------------------------------------------------------------|-----------|
| 0.02 cfm/ft <sup>2</sup> (0.10 L/s/m <sup>2</sup> ) at 1.57 psf (25 mph) | Compliant |
| 0.04 cfm/ft <sup>2</sup> (0.20 L/s/m <sup>2</sup> ) at 6.27 psf (50 mph) | Compliant |

ASTM E331, Water Penetration

No water infiltration at 6.24 psf (0.299 kPa)

|                                            |           |
|--------------------------------------------|-----------|
| No water infiltration at 20 psf (0.96 kPa) | Compliant |
|--------------------------------------------|-----------|

Fire Performance

Compliant with regulatory fire code testing

ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tub Furnace at 750°C

ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

CAN / ULC-S114-2018: Standard Method of Test for Determining Non-Combustibility in Building Materials

CAN / ULC-S135: Standard Test Method for the Determination of Combustibility Parameters of Building Materials

Non-Combustibility Classification  
USA: Satisfies classification requirements per International Building Code (IBC) Section 703.3.1

Canada: Satisfies classification requirements per the National Building Code of Canada 2020

Quality Assurance

Product Certifications & Test Report Compliance

|                                                                       |           |
|-----------------------------------------------------------------------|-----------|
| Florida Product Approval HVHZ - FL Building Commission No. FLI5337 R5 |           |
| FM 4473 "Modified" Impact Resistance Testing Results                  | Pass      |
| Aluminum Ingot Country of Origin                                      | Australia |
| Aluminum Ingot, Rolled Aluminum Coil, Coil Coated Plate               |           |
| » ISO 14001 Environmental Management System                           |           |
| » ISO 9001 Quality Management System                                  |           |

Warranty

|                                    |          |
|------------------------------------|----------|
| Finish Warranty                    | 20 Years |
| Perforated Product Finish Warranty | 10 Years |

PART 2: PRODUCT

Metal Plate Wall Panels

100% Solid Aluminum Plate Panels used for exterior wall cladding, parapets, fascia and soffits as the siding component of a rainscreen system that also includes a ventilated drainage plane and a vapor-permeable air barrier provided under separate sections and trade contracts.

Aluminum Alloy

|       |          |
|-------|----------|
| Alloy | 3003-H14 |
|-------|----------|

PART 2: PRODUCT (con't)

Panel Dimensions

|                    |                                        |
|--------------------|----------------------------------------|
| Standard Widths    | 62in (1575mm)                          |
|                    | 50in (1270mm)                          |
| Custom Width Range | 31.5in (800mm) min - 62in (1575mm) max |
| Lengths            | Made to order 48in min - 196in max     |

Thicknesses

|       |                             |
|-------|-----------------------------|
| 3mm   | 0.118 inches (1/8" nominal) |
| 2.5mm | 0.100 inches nominal        |
| 2mm   | 0.080 inches nominal        |
| 1.5mm | 0.063 inches nominal        |

Finishes

AAMA 2605 Compliant Coil Coated  
70% KYNAR® 500 based Polyvinylidene Fluoride (PVDF) finishes

| PROPERTY                                           | STANDARD     | COIL COATED ALUMINUM                                     |
|----------------------------------------------------|--------------|----------------------------------------------------------|
| Color Uniformity                                   | ASTM D2244   | Max. 2 Delta E                                           |
| Color Retention - Fade                             | ASTM D2244   | ≤ 5 Delta E units                                        |
| Chalk Rating                                       | ASTM D4214   | ≤ 8 units                                                |
| Specular Gloss                                     | ASTM D523    | ± 5 units                                                |
| Dry Film Hardness                                  | ASTM D3363   | F - 2H                                                   |
| Dry Adhesion                                       | ASTM D3359   | No coating removal                                       |
| Abrasion Resistance                                | ASTM D968    | Abrasion Coefficient Value ≥ 40                          |
| Reverse Impact                                     | ASTM D2794   | No coating removal                                       |
| Muriatic Acid Resistance (10% HCl, 15 min)         | ASTM D1308   | No blistering or visual change                           |
| Nitric Acid Resistance (HNO <sub>3</sub> , 30 min) | ASTM D1308   | ≤ 5 Delta E                                              |
| Alkali Mortar Resistance (10%, 25% NaOH, 60 min)   | ASTM D1308   | No removal<br>No loss of adhesion or visual change       |
| Flexibility                                        | ASTM D4145   | 2T - no pick off                                         |
| Humidity Resistance                                | ASTM D714    | 4000 hour exposure                                       |
|                                                    | ASTM D2247   | Less than "few" blisters Size No. 8                      |
| Cyclic Corrosion                                   | ASTM B117    | 2000 hour exposure<br>Min rating of 7 scribe or cut edge |
|                                                    | AAMA 2605-13 | Min. blister rating of 8                                 |

Panel Weight

|       |                          |
|-------|--------------------------|
| 3mm   | 1.66 lb/ft² (8.10 kg/m²) |
| 2.5mm | 1.33 lb/ft² (6.75 kg/m²) |
| 2mm   | 1.11 lb/ft² (5.40 kg/m²) |
| 1.5mm | 0.83 lb/ft² (4.05 kg/m²) |

Fire Performance

| Intertek Cerified Test | Results                                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| ASTM E136              | Base material standard for non-combustibility                                                                                              |
| ASTM E84               | Flame Spread Index Zero (0) - satisfies noncombustibilityclassification requirements per International Building Code (IBC) Section 703.3.1 |
| CAN/ULC S114-2018      | Pass - meets the specified performance req.                                                                                                |
| CAN/ULC S135           | Pass - no deviations to the ULC S135 standard                                                                                              |

Technical Properties Data Sheet

|                  |                      |
|------------------|----------------------|
| Alfred Plate 3mm | <a href="#">View</a> |
| Alfred Plate 2mm | <a href="#">View</a> |

Related Materials

Matching trim and accessories formed from sheet metal to match MCM panel finish.

Alfred Plate is stocked in 6 color finishes in 3mm x 62" x 196" sheets color coordinated with matching flat sheet stocked in 0.040" x 48" x 120" sheets.

# ALFRED PLATE COLOR OFFERING

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# 3MM PLATE FINISHES

Standard Stocking

3mm Plate Finished Goods Sheets In-Stock

0.080" Plate by Production Order Only

Production Orders for Custom Lengths

- 1,000 sf Production Order Minimum
- Subject to premium pricing and longer lead times.

## 2 COAT SOLIDS

▪ 20 Year Finish Warranty ▪ AAMA 2605

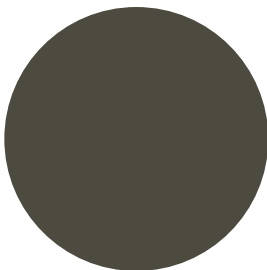
Matching 0.040" Flat Sheet in Inventory



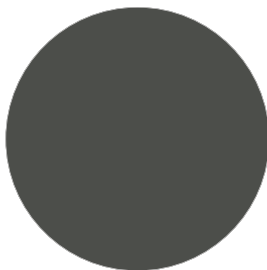
**Classic White**  
JY-5195



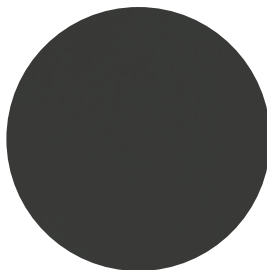
**Bone White**  
JY-5165



**Bronze**  
JY-6180



**Charcoal**  
JY-6150

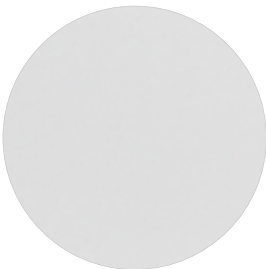


**Black**  
JY-6220

## 2 COAT MICAS

▪ 20 Year Finish Warranty ▪ AAMA 2605

Matching 0.040" Flat Sheet in Inventory



**Anodic Clear Mica**  
JY-2510

# FR MCM FINISHES **Standard Stocking**

Production Order Only - No Finished Goods

3mm Plate | 1,000 sf Production Order Minimum

0.080in Plate | 1,000 sf Production Order Minimum

Matching Finished Goods | Alfrex FR MCM & 0.040in Flat Sheet

Wood and Metal Series | Consult about availability and minimums for each finish

## 2 COAT SOLIDS ▪ 30 Year Finish Warranty ▪ AAMA 2605

*Matching 0.040" Flat Sheet in Inventory*



**Classic White**  
JY-5195



**Bone White**  
JY-5165



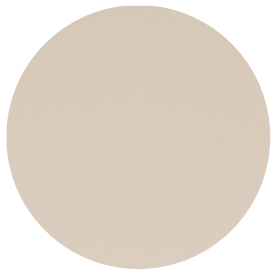
**Ascot White**  
JY-5110



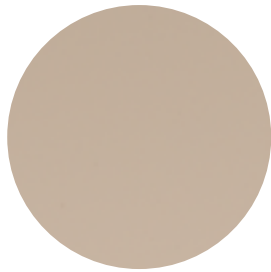
**Alabaster**  
JY-6165



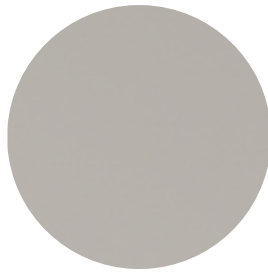
**Oyster**  
JY-5125



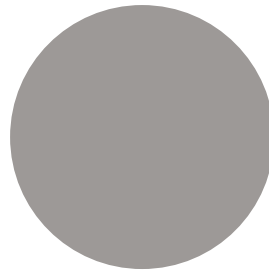
**Castle Gray**  
JY-6160



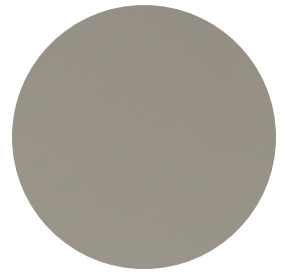
**Sea Wolf**  
JY-6175



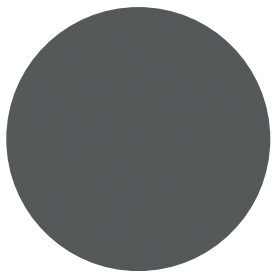
**Dove Gray**  
JY-6120



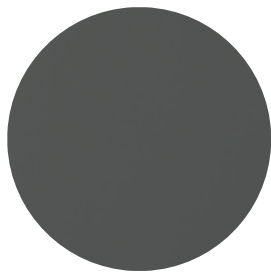
**Slate Gray**  
JY-6145



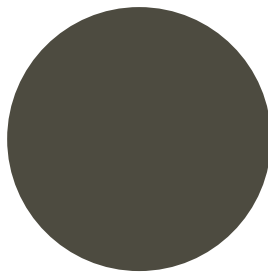
**Fashion Gray**  
JY-6130



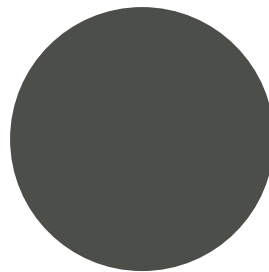
**Greyhound**  
JY-6155



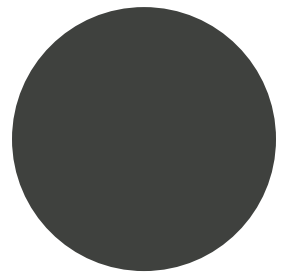
**Dark Gray**  
JY-6140



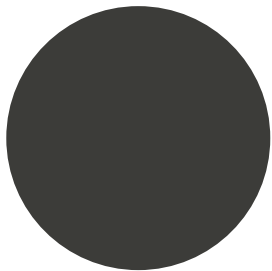
**Bronze**  
JY-6180



**Charcoal**  
JY-6150



**Black**  
JY-6220



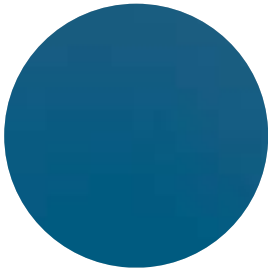
**Midnight Black**  
JY-6230



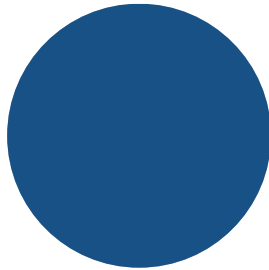
## VIVID SOLIDS\*

▪ 20 Year Limited Finish Warranty ▪ AAMA 2605

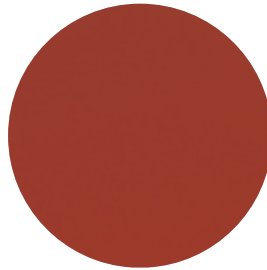
Matching 0.040" Flat Sheet in Inventory



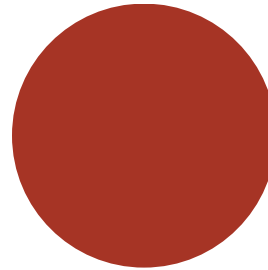
**Signal Blue**  
JY-7110 | 2 Coat Solid



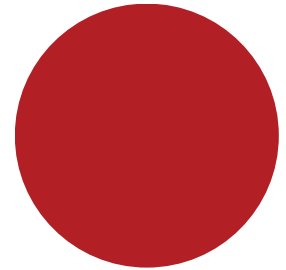
**Harmony Blue**  
JY-7115 | 2 Coat Solid



**Vibrant Red**  
JY-7120 | 3 Coat Solid



**Patriot Red**  
JY-7140 | 3 Coat Solid

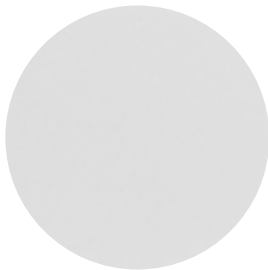


**Ron Red\***  
JY-7150 | 3 Coat Solid

## 2 COAT MICAS

▪ 30 Year Finish Warranty ▪ AAMA 2605

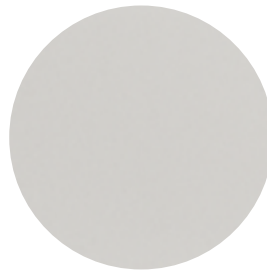
Matching 0.040" Flat Sheet in Inventory



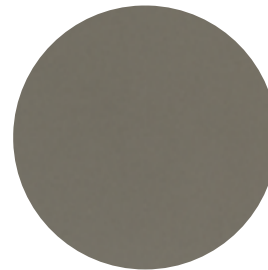
**Anodic Clear Mica**  
JY-2510



**Exotic Silver Mica**  
JY-2520



**Silversmith**  
JY-2515



**Gray Silver Mica**  
JY-2530



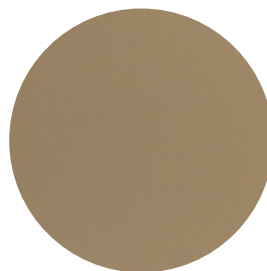
**Pewter Mica**  
JY-2540



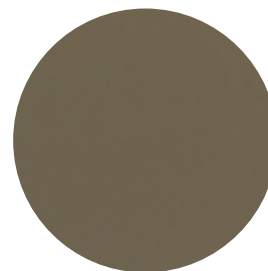
**MZG Gray Mica**  
JY-2535



**Champagne Mica**  
JY-2550



**Medium Bronze Mica**  
JY-2560



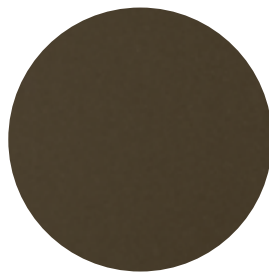
**Driftwood Mica**  
JY-2555



**Copper Penny Mica**  
JY-2570



**Hazelnut Mica**  
JY-2575



**New Age Dark Bronze Mica**  
JY-2580

*\*Please contact us for warranty details.*

Mica, Metallic, and Design Series Finishes are directional finishes - requiring special precautions during planning, purchasing, fabrication, and installation in order to minimize the chance of visual color differences due to color batch variation and metallic flop. It is highly recommended that all material for a single project be ordered at the same time. With these finishes, directional arrows on product protective film should always be installed in the same direction.

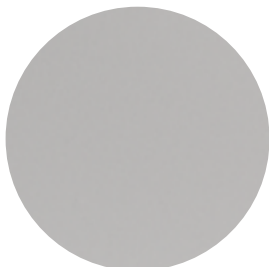
3 COAT METALLICS

▪ 30 Year Finish Warranty ▪ AAMA 2605

Matching 0.040" Flat Sheet in Inventory



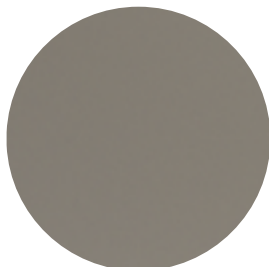
**Bright Silver Metallic**  
JY-3510



**Champagne Metallic**  
JY-3520



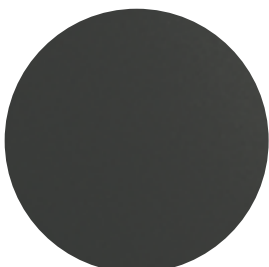
**PEX Pewter Metallic**  
JY-3540



**JLR Gray Metallic**  
JY-3550



**Anthracite Silver Metallic**  
JY-3560



**Graphite Metallic**  
JY-3530

METAL SERIES

▪ 20 Year Finish Warranty ▪ AAMA 2605

Matching 0.040" Flat Sheet in Inventory



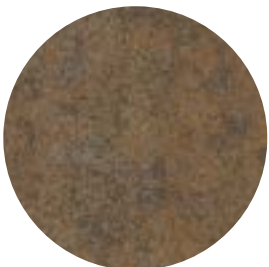
**Faux Zinc Lite**  
JY-MI30



**Faux Zinc**  
JY-MI20



**Faux Zinc Graphite**  
JY-MI10



**Tile Corten**  
JY-MI40

WOOD SERIES

▪ 20 Year Finish Warranty ▪ AAMA 2605

Matching 0.040" Flat Sheet in Inventory



**Teak**  
JY-WI20



**Golden Oak**  
JY-WI40



**Dark Walnut**  
JY-WI50

## NATURAL ZINC SERIES\*

\*Non-stocking item subject to minimum quantities. Bond integrity warranty only.



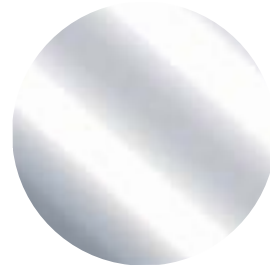
**Blue Grey**  
JY-ZI10



**Graphite Grey**  
JY-ZI00



**Hairline Clear**  
JY-HI00



**Mirror**  
JY-AI60

## CUSTOM COLORS

- Matching custom colors is part of our everyday business.
- To begin the process, send us either a physical color sample (preferred), a coating manufacturer paint code, or a color reference such as a Pantone number. Please also detail specified performance requirements.
  - *Subject to minimum order quantities, matching 0.040" flat sheet can be coated at the same time as coil for MCM or Plate.*
  - *Achieving perfect color matches may not be possible every time due to inherent differences in substrate types, paint systems, pigments, and application methods.*
  - *For more information, please contact us for specific details.*



**Metal Wall Panels / Curtain Wall**



**Color Swatches / Codes / Physical Samples**

⚠ All finishes shown are print reproductions and may differ slightly from actual product finishes. Product samples are available for color verification and approval. Please visit our website at [www.alfrexusa.com](http://www.alfrexusa.com) for sample requests. Alfrex, Inc. reserves the right to modify all contents herein without prior notice.

\*Please contact us for warranty details.

# ALFRED PLATE SPECIFICATION 07 42 13 METAL PLATE WALL PANELS

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**SECTION 07 42 13**  
**METAL PLATE WALL PANELS**

**PART 1: GENERAL**

**1.01 SCOPE**

- A. Section Includes
  - 1. Metal Plate Wall Panels.
  - 2. Panel systems requirements of aluminum plate panels including exterior and interior installation assemblies, components, and accessories.
- B. Related Sections: Section(s) related to this section include:
  - 1. Division 05 Metal Framing Sections
  - 2. Division 07 Air and Vapor Barrier
  - 3. Division 07 Flashing and Trim Sections
  - 4. Division 07 Joint Treatment Section
  - 5. Division 08 Aluminum Windows Section
  - 6. Division 08 Glass and Glazing Section
  - 7. Division 08 Curtain Wall Sections

**1.02 QUALITY ASSURANCE**

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed have either been identified by the International Building Code (IBC), local building code, or specific requirement for this building construction type.
- B. Aluminum Association (AA)
  - 1. Aluminum Design Manual
  - 2. AA-M12C22A41: Anodized - Clear Coating
  - 3. AA-M12C22A44: Anodized - Color Coating
- C. American Society for Testing and Materials (ASTM) International
  - 1. ASTM B209-10 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 2. ASTM E283 Test Method for Determining Rate of Airflow through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences Across the Specimen.
  - 3. ASTM E330 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.
  - 4. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.
- D. American Architectural Manufacturers Associations (AAMA)
  - 1. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  - 2. AAMA 509 Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.
  - 3. AAMA 611-14 Voluntary Specification for Anodized Architectural Aluminum.

**1.03 SYSTEM DESCRIPTION**

- A. Performance Requirements:
  - 1. Provide installed metal plate panel system designed to withstand specified loads while maintaining allowable deflection and thermal movement performance as defined by the Manufacturer.
- B. Deflection and Thermal Movement: Provide installed metal plate panel systems that have been designed to resist to wind loading, acting inward and outward.
  - 1. Perimeter Framing Deflection: Deflection of panel perimeter framing member shall not exceed  $L/175$  normal to plane of the wall where L is the unsupported span of the perimeter framing member.

2. Panel Deflection: Deflection of the panel face shall not exceed  $L/60$  at design load where  $L$  is the unsupported span of the panel.
3. Anchor Deflection: At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 0.0625in (1.6mm).
4. Thermal Movements: Allow for free and noiseless horizontal and vertical thermal movement due to expansion and contraction of component parts over a temperature range of  $-20^{\circ}\text{F}$  ( $-29^{\circ}\text{C}$ ) to  $+180^{\circ}\text{F}$  ( $82.2^{\circ}\text{C}$ ) at the material surface.
  - a. Buckling, opening of joints, undue stress on fasteners, failure of sealants, or any other detrimental effects of thermal movement will not be permitted.
  - b. Fabrication, assembly and erection procedures shall take into account the ambient temperature range at the time of the respective operation.

#### C. System Requirements

1. Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of [specify design pressure in psf (kPa)] and have been certified to be without permanent deformation or failures of structural members.
2. Drained and Back Ventilated Rainscreen System
  - a. Tested to AAMA 5209 Standard
    - 1) ASTM E283 Air Leakage: The air flow measurement across the metal plate panel rainscreen system (excluding jamb conditions) is measured to determine the V-axis classification on chart 1b from AAMA 509.
    - 2) ASTM E331 and AAMA 501.1 - Water Infiltration Measurement: At pressures of 6.24psf (300Pa) and 12.0psf (575Pa) for ASTM E331 and AAMA 501.1, the average water from the four (4) tests is collected, measured, and averaged to determine the W-axis classification.
      - a) The system will be classified when the V-axis classification number is greater than or equal to the W-axis, classification number as presented on the AAMA 509 Chart 1a or 1b. (i.e.  $V2/W2$  is acceptable,  $V1/W2$  is not acceptable)
    - 3) ASTM E330: The metal plate panel rainscreen system should be engineered to meet the project design loads. The metal plate panel system must meet or exceed the following criteria when tested to a minimum pressure of 30.0psf (1436Pa) with system joinery closed (taped or sealed) in order to produce prescribed static loads of the test.
      - a) Deflections should not exceed limitations defined within the section on Deflection and Thermal Movement.
3. Pressure Equalized Rainscreen System
  - a. Tested to AAMA 508
    - 1) AAMA 508 (modified ASTM E1233) Pressure Cycle Testing must yield results as follows:
      - a) The lag between the cavity and the cyclic wind pressure shall not exceed 0.08 seconds.
      - b) The maximum differential between the cavity and the cyclic wind pressure shall not exceed 50% that of the maximum test pressure.
    - 2) ASTM E331 Static Water Penetration: The metal plate panel rainscreen system must be tested under a static pressure at 12.0psf (575Pa) minimum over a 15 minute time period and yield results as follows:
      - a) All water that penetrates the exterior rainscreen cladding including condensation must be controlled and drained to the exterior.
      - b) Any droplets water that contacts the air/water barrier cannot exceed 5% of the air/water barrier surface.
      - c) Water will not produce any continuous stream of water on the air/water barrier.

- 3) AAMA 501.1 Dynamic Water Infiltration: The metal plate panel rainscreen system must be tested to a wall pressure equivalent 12.0psf (575PA) over a 15 minute time period and yield results as follows:
  - a) All water that penetrates the exterior rainscreen cladding including condensation must be controlled and drained to the exterior.
  - b) Any droplets water that contacts the air/water barrier cannot exceed 5% of the air/water barrier surface.
  - c) Water will not produce any continuous stream of water on the air/water barrier.
- 4) ASTM E330 The metal plate panel rainscreen system should be engineered to meet the project design loads. The metal plate panel rainscreen system must meet or exceed the following criteria when tested to a minimum pressure of 30.0psf (1436Pa) with system joinery closed (taped or sealed) in order to produce prescribed static loads of the test. The wall air and water barrier should not be submitted to loads during the test.
  - a) Deflections do not exceed limitations defined within the section on Deflection and Thermal Movement.

#### 1.04 SUBMITTALS

- A. Submit in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.
- B. Submit product data, including manufacturer's brochures and Spec-Data Sheets.
- C. Shop Drawings: Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.
- D. Samples: Submit selection and verification samples for finishes, colors, and textures.
  1. Selected Samples: Manufacturer's color charts of chips illustrating full range of colors, finishes and patterns available for composite metals panels with factory applied finishes.
  2. Verification Samples:
    - a. Panel System Assembly: Two samples of each assembly 12in x 12in (304mm x 304mm)
    - b. Two samples of each color in coil coated, or draw down samples on aluminum substrate, not less than 3in x 4in (76mm x 102mm).
- E. Quality Assurance Submittals (Submit the following):
  1. Product Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties, or a third-party listing documenting compliance to a comparable code section.
  2. Product Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.
  3. Product Literature
  4. Metal plate panel rainscreen system fabricator's field reports.
- F. Closeout Submittals (Submit the following):
  1. Warranty: Warranty documents specified.

#### 1.05 QUALITY ASSURANCE

- A. Metal Plate Panel Rainscreen System Fabricator Qualifications
  1. Metal plate panel rainscreen system fabricator will have at least (3) years of continuous documented experience fabricating either MCM or the solid metal plate panel material type specified.
  2. Metal plate panel rainscreen system fabricator will have been in business under its present name for at least five (5) years prior to the start of this project.
  3. Metal plate panel rainscreen system fabricator will be capable or providing field service representation during construction.



4. Metal plate panel rainscreen system fabricator will not have filed for protection from creditors under state or federal insolvency or debtor relief statutes or codes

**B. Metal Plate Panel Rainscreen System Installer Qualifications**

1. Metal plate panel rainscreen system installer will have been in business under its present name for at least five (5) years prior to the start of this project and have experience with similar sized projects in either MCM or solid metal plate.
2. Metal plate panel rainscreen system installer will be capable of providing field service representation during construction.
3. Metal plate panel rainscreen system installer must be an approved installer by the metal plate panel system fabricator for the installation of their metal plate panel system and have undergone proper training for the specified system.

**C. Mock-Up**

1. At location on building and to extent directed by Architect, install areas of specified wall panels, support framing, flashing, trim and accessories to show:
  - a. Substrate preparation
  - b. Support framing, furring, and flashing
  - c. Clearances and gaps between members
  - d. Fastening methods
  - e. Trim details
  - f. Joint protection
  - g. Workmanship
2. Prepare mock-up for Architect's approval before start of wall panel work. Prepare additional mock-ups, if required by Architect, until approved.
3. Maintain approved mock-up during construction to establish required standard of workmanship and basis of comparison for installation of wall panel work. Approved mock-up may remain as part of finished work.
4. For custom colors, primer coated metal plate wall panels may be provided for application of a representative spray-coat match to the specified coil coated finish, for evaluation of color appearance only. Color match approvals must be made with paint vendor draw-down matches as described in section 1.04:D:2:b

**D. Installation Documents On-Site**

1. Maintain copies of installation instructions, approved submittals and other execution related documents on-site; make available as need to confirm proper installation.

**E. [ \_\_\_\_ ]**

**1.06 DELIVERY, STORAGE & HANDLING**

- A. Adhere to manufacturer's ordering instructions and lead time requirements to avoid delays.
- B. Deliver materials to fabricator in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect finish of panels by applying heavy-duty removable plastic film during production.
- D. After fabrication, package composite wall panels for protection against transportation damage.
- E. Store material in accordance with manufacturer's guidelines.
  1. Exercise care unloading, storing and installing panels to prevent bending, warping, twisting and surface damage to the factory applied finish.
  2. Store materials protected from exposure to harmful weather conditions.
  3. Protect panels from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
  4. Slope panels to ensure positive drainage of any accumulated water.

5. Avoid contact with any other materials that might cause staining, denting or other surface damage to the factory applied finish.

#### 1.07 WARRANTY

- A. Manufacturer's Warranties: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.
- B. Warranty Periods:
  1. Panel Integrity: 5 Years commencing on Date of Substantial Completion.
  2. Painted Finish: 20 Years commencing on Date of Substantial Completion.
  3. Anodized Finish: 5 Years commencing on Date of Substantial Completion.

### PART 2: PRODUCTS

#### 2.01 METAL PLATE WALL PANELS

- A. Solid Aluminum Plate Wall Panel Provider
  1. Alfrex, Inc. 943 Gainesville Hwy. Bldg 100-4000, Buford, GA 30518  
Phone - (470) 589-7449  
Website - <http://alfrexusa.com>  
Email - [alfrex@alfrexusa.com](mailto:alfrex@alfrexusa.com)

#### 2.02 BASIS OF DESIGN

- A. Alfrex Plate - non-combustible solid aluminum plate wall panels
- B. Description: 100% Solid Aluminum Plate Panels used for exterior wall cladding, parapets, fascia and soffits as the siding component of a rainscreen system that also includes a ventilated drainage plane and a vapor-permeable air barrier provided under separate sections and trade contracts.
- C. Thickness:
  1. 3mm (0.125in nominal)
  2. 2.5mm (0.100in nominal)
  3. 2mm (0.080in nominal)
  4. 1.5mm (0.063in nominal)
- D. Aluminum Alloy: 3003-H14
- E. Alfrex Plate Weight:
  1. 3mm: 1.66lb/ft<sup>2</sup> (8.10kg/m<sup>2</sup>)
  2. 2.5mm: 1.33lb/ft<sup>2</sup> (6.75kg/m<sup>2</sup>)
  3. 2mm: 1.11lb/ft<sup>2</sup> (5.40kg/m<sup>2</sup>)
  4. 1.5mm: 0.83lb/ft<sup>2</sup> (4.05kg/m<sup>2</sup>)
- F. Finishes
  1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene - Alkyl Vinyl Ether (FEVE) resin in conformance with the following general requirements of AAMA 2605.
    - a. Color: (Select one of the following)
      - 1) Standard color as selected by the owner / architect / engineer from manufacturer's standard, color selection.
      - a) 2 Coat Solid
      - b) 2 Coat Mica
      - c) 3 Coat Metallic
      - d) [ \_\_\_\_ ]

- 2) Custom color to be matched by the panel supplier
  - a) 2 Coat Solid
  - b) 2 Coat Mica
  - c) 3 Coat Metallic
  - d) [ \_\_\_\_\_ ]
- b. Dry Film Thickness:
  - 1) 2 Coat: 1.0mil ( $\pm 0.2$ mil)
  - 2) 3 Coat: 1.0mil ( $\pm 0.2$ mil) + 0.50mil ( $\pm 0.05$ mil)
- c. Hardness: ASTM D3383; HB minimum using Eagle Turquoise Pencil
- d. Impact Resistance
  - 1) Test method: ASTM D2794; Gardner Variable Impact Tester with 5/8" mandrel
  - 2) Coating shall withstand reverse impact of 1.5in/lbs per mil substrate thickness
  - 3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
- e. Adhesion:
  - 1) Test Method: ASTM D3359: Coating shall not pick-off when subjected to an 11in x 11in x 1/16in grid and taped with #600 Scotch Tape.
- f. Humidity Resistance:
  - 1) Test Method: ASTM D2247
  - 2) No formation of blisters when subject to condensing water fog at 100% relative humidity and 100°F for 4000 hours.
- g. Salt Spray Resistance:
  - 1) Test Method: ASTM B117; Expose coating system to 4000 hours, using 5% NaCl solution.
  - 2) Corrosion creepage from scribe line: 1/16" max.
  - 3) Minimum blister rating of 8 within the test specimen field.
- h. Weather Exposure:
  - 1) Outdoor:
    - a) 10 Year exposure at 45° angle facing south Florida exposure.
    - b) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244
    - c) Minimum chalk rating of 8 in accordance with ASTM D4214
    - d) No checking, crazing, adhesion loss
- i. Chemical Resistance:
  - 1) ASTM D1308 utilizing 10% Muriatic Acid for an exposure time of 15 minutes. No loss of film adhesion or visual change when viewed by the unaided eye.
  - 2) ASTM D1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by they unaided eye.
  - 3) AAMA 2605 utilizing 70% reagent grade Nitric Acid vapor for an exposure time of 30 minutes. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244.

## 2.03 ALTERNATES

- A. Base Bid/Contract Manufacturer: [Specify base bid/contract manufacturer].
  1. Product: [Specify product base bid/contract brand/trade name with product attributes and characteristics].
- B. Alternate No. [Specify #]: [Specify alternate manufacturer].
  1. Product: [Specify product alternate brand/trade name with product attributes and characteristics].
- C. Alternate No. [Specify #]: [Specify alternate manufacturer].
  1. Product: [Specify product alternate brand/trade name with product attributes and characteristics].

## 2.04 PRODUCT PERFORMANCE

### A. Production Tolerances:

1. Width:  $\pm 2.0\text{mm}$
2. Length:  $\pm 2.0\text{mm}$
3. Thickness:  $\pm 0.001\text{in}$  (0.1mm)
4. Bow: Maximum 0.5% length or width

## 2.05 FABRICATION

### A. General: Shop fabricate to sizes and joint configurations indicated on drawings.

1. Fabricate panels to dimensions indicated on drawings.
2. Formed metal plate panel lines, breaks and angles to be sharp and true, with surfaces that are free from warp or buckle.

### B. Fabrication Tolerances: Shop-fabricate panels to sizes and joint configurations indicated on drawings.

1. Width:  $\pm 0.079\text{in}$  [ $\pm 2.0\text{mm}$ ] @ 70°F (21°C)
2. Length:  $\pm 0.079\text{in}$  [ $\pm 2.0\text{mm}$ ] @ 70°F (21°C)
3. Squareness:  $\pm 0.079\text{in}$  [ $\pm 2.0\text{mm}$ ] @ 70°F (21°C)

## PART 3: EXECUTION

### 3.01 METAL PLANT FABRICATOR AND INSTALLER INSTRUCTIONS

- #### A. Compliance: Comply with provide product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

### 3.02 EXAMINATION AND PREPARATION

- #### A. Verify that conditions of substrates previously installed under other sections or divisions are acceptable for metal plate panel rainscreen system installation. Documentation should be provided indicating any conditions detrimental to the performance or installation of the metal plate wall panel rainscreen system.

1. Notify [Architect] of unacceptable conditions once discovered.
2. Proceed with preparation and installation only after unacceptable conditions have been corrected.

#### B. Field Measurements

1. If required per project conditions, field measurements of the site condition are to be taken prior to beginning fabrication work and notification of any material modifications and resulting schedule adjustment shall be formally documented.
2. Field measurements are to be made once all substrate and adjacent materials are installed, verifying the locations of wall framing members and wall opening dimensions before commencement of installation. Indicate measurements on the "As Build Shop Drawings".

- #### C. Project Schedule: Provisions in the project schedule must accommodate the time interval between field measurements and fabrication/installation.

- #### D. Miscellaneous Framing: Install miscellaneous rainscreen system support member and anchorage according to metal plate panel rainscreen system written instructions and drawings supplied by the metal plate panel rainscreen system Fabricator.

### 3.03 INSTALLATION

#### A. General:

1. Install panels plumb, level and true in compliance with fabricator's recommendations.
2. Anchor panels securely in place in accordance with fabricator's approved shop drawings.
3. Comply with fabricator's instructions for installation of concealed fasteners and with provisions of Section 07 90 00 for installation of joint sealers.

4. Installation Tolerances: Maximum deviation from horizontal and vertical alignment of installed panels: 0.25in in 20ft (6.4mm in 6.1m), noncumulative.
5. Separate contact of dissimilar metals with bituminous paint, approved plastic shims, or other approved methods as defined within the Aluminum Design Manual (ASD). Use gasketed or approved coated fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

B. Related Products

1. General: Refer to other related sections in Related Sections paragraph specified herein for related materials, including cold-form metal framing, flashing and trim, joint sealants, aluminum windows, glass and glazing and curtain walls.

3.04 FIELD QUALITY REQUIREMENTS

- A. Field Quality Control: Comply with panel system fabricator's recommendations and guidelines for field forming of panels.
- B. Field Quality Control: When required by contract, mock-up shall be constructed and tested at the expense of the Architect/Owner/General Contractor.
- C. Testing Agency: If required, the Owner shall engage a qualified testing agency to perform tests and inspections.
- D. Fabricator's Field Services: Upon Owner's request, provide fabricator's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with fabricator's instructions.

3.05 ADJUSTING AND CLEANING

A. Adjusting

1. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement are the responsibility of the General Contractor.
2. Removal of panels damaged by other trades is the responsibility of the General Contractor.
3. Repair components of the metal plate panel rainscreen system that present with minor damage provided said repairs are not visibly apparent at a distance of 10ft (3m) from the surface at a 90° angle per AAMA 2605.
4. Remove and replace components of the metal plate panel rainscreen system damage beyond repair.
5. Remove protective film immediately after installation of metal plate panels and immediately prior to completion of the metal plate panel rainscreen system work. Protective film intentionally left in place after panel installation on any elevation at the direction of the General Contractor, is the responsibility of the General Contractor.
6. Any additional protection, after installation, is the responsibility of the General Contractor.
7. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
8. Promptly remove from the job site any damaged metal plate panels, protective film, and other debris attributable to metal plate panel rainscreen system and installation, and legally dispose of said materials.

B. Cleaning

1. After metal plate panel rainscreen system installation remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION

- A. Protect installed products from damage during subsequent construction work until final inspection and acceptance by Owner
- B. [ \_\_\_\_ ]

END OF SECTION

# ALFRED PLATE TECHNICAL DATA

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TECHNICAL DATA SHEET

Alfred Plate 3mm (0.125in)



Fire Resistant & Non-Combustible Cladding

| COMPOSITION          |           |       |
|----------------------|-----------|-------|
| PROPERTY             | 3mm Plate | UNITS |
| Aluminum Plate Alloy | 3003-H14  |       |

| STANDARD SIZES                        |                  |       |
|---------------------------------------|------------------|-------|
| PROPERTY                              | 3mm Plate        | UNITS |
| Standard Thickness (nominal)          | 0.125            | in    |
|                                       | 3.0              | mm    |
| Other Available Thicknesses (nominal) | 0.080            | in    |
|                                       | 2.0              | mm    |
| Standard Widths                       | 50      62       | in    |
|                                       | 1,270      1,575 | mm    |
| Custom Width Range                    | 31.5 - 62.0      | in    |
|                                       | 800 - 1600       | mm    |
| Standard Length                       | 165              | in    |
|                                       | 4191             | mm    |

| PRODUCTION TOLERANCES |             |       |
|-----------------------|-------------|-------|
| PROPERTY              | 3mm Plate   | UNITS |
| Width                 | + / - 0.080 | in    |
|                       | 2.0         | mm    |
| Length                | + / - 0.157 | in    |
|                       | 4.0         | mm    |
| Thickness             | + / - 0.004 | in    |
|                       | 0.10        | mm    |

| ASTM B209 COMPLIANCE : 3003-H14 |                 |         |
|---------------------------------|-----------------|---------|
| CHEMICAL COMPOSITION            |                 |         |
| ELEMENT                         | STANDARD        | RESULTS |
| Aluminum                        | Remainder       | 97.75%  |
| Copper                          | 0.05 - 0.2%     | 0.17%   |
| Iron                            | 0.0 - 0.7%      | 0.56%   |
| Manganese                       | 1.0 - 1.5%      | 1.19%   |
| Silicon                         | 0.0 - 0.6%      | 0.18%   |
| Zinc                            | 0.0 - 0.1%      | 0.00%   |
| Other Elements                  | 0.0 - 0.15%     | 0.15%   |
| MECHANICAL PROPERTY LIMITS      |                 |         |
| PROPERTY                        | STANDARD        | RESULTS |
| Tensile (ksi)                   | 20 min - 26 max | 21.4    |
| Yield Strength (ksi)            | 17 minimum      | 18.5    |
| Elongation                      | 2% minimum      | 25%     |

| FINISH WARRANTIES                                                       |              |          |
|-------------------------------------------------------------------------|--------------|----------|
| See warranty tables and sample warranties for conditions and exclusions |              |          |
| PVDF Coil Coated Finish                                                 | Alfred Plate | 20 Years |
| PVDF Coil Coated Finish (Perforated Panel)                              | Alfred Plate | 10 Years |

Alfred, Inc. endeavors to provide accurate and current technical information but cannot warrant or make any representations as to the accuracy or completeness of the information contained herein. All data is intended for informational purposes only and subject to change without notice. Please consult a licensed structural engineer for evaluations of structural soundness, specification, or final design.

| TECHNICAL PROPERTIES       |         |                         |                       |
|----------------------------|---------|-------------------------|-----------------------|
| PROPERTY                   |         | 3mm Plate               | UNITS                 |
| Panel Weight               |         | 1.66                    | lb/ft²                |
|                            |         | 8.10                    | kg/m²                 |
| Specific Gravity (Product) |         | 2.72                    | g/cc                  |
| Coefficient of Expansion   |         | 12.9 x 10 <sup>-6</sup> | in/in/°F (@ 68-212°F) |
| Modulus of Elasticity      | ASTM E8 | 10.0 x 10 <sup>6</sup>  | Psi                   |
|                            |         | 69.0 x 10 <sup>3</sup>  | Mpa                   |
| Moment of Inertia          |         | 1.37 x 10 <sup>-4</sup> | in⁴/in                |
|                            |         | 5.7 x 10 <sup>-3</sup>  | cm⁴/m                 |
| Section Modulus            |         | 2.32 x 10 <sup>-3</sup> | in³/in                |
|                            |         | 38.0 x 10 <sup>-3</sup> | cm³/m                 |
| Tensile Strength           | ASTM E8 | 20.3 x 10 <sup>3</sup>  | Psi                   |
|                            |         | 140.0                   | Mpa                   |
| Yield Strength             | ASTM E8 | 17.4 x 10 <sup>3</sup>  | Psi                   |
|                            |         | 120.0                   | Mpa                   |
| Elongation                 | ASTM E8 | 25.0                    | %                     |
| Thermal Conductivity       | C518    | 193.0                   | W/(m•K)               |

| ARCHITECTURAL COATING PROPERTIES                                                   |              |                                                                 |                                        |
|------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|----------------------------------------|
| 70% Kynar 500 / Hylar 5000 PVDF Resin Coatings<br>AAMA 2605-13 Standard Compliance |              |                                                                 |                                        |
| PROPERTY                                                                           | STANDARD     | REQUIREMENT                                                     | RESULTS                                |
| Dry Film Thickness                                                                 | ASTM D7091   | ≥ 23 microns                                                    | Pass - 32 microns                      |
| Color Uniformity                                                                   | ASTM D2244   | Max. 2 Delta E                                                  | Pass - < 2 units                       |
| Color Retention - Fade                                                             | ASTM D2244   | Delta E ≤ 5 units                                               | Pass - < 5 units                       |
| Chalk Rating                                                                       | ASTM D4214   | ≤ 8 units                                                       | Pass - < 8 units                       |
| Specular Gloss                                                                     | ASTM D523    | ± 5 units                                                       | Pass                                   |
| Dry Film Hardness                                                                  | ASTM D3363   | F - 2H                                                          | Pass - 3H                              |
| Dry Adhesion                                                                       | ASTM D3359   | No coating removal                                              | Pass - no removal                      |
| Abrasion Resistance                                                                | ASTM D968    | Abrasion Coefficient Value ≥ 40                                 | Pass - 51                              |
| Reverse Impact                                                                     | ASTM D2794   | No coating removal                                              | Pass - no removal                      |
| Muriatic Acid Resistance<br>(10% HCl, 15 mins)                                     | ASTM D1308   | No blistering or visual change                                  | Pass - no blistering or visual changes |
| Nitric Acid Resistance<br>(HNO <sub>3</sub> , 30 mins)                             | ASTM D1308   | ≤ 5 Delta E                                                     | Pass - 0.2                             |
| Alkali Mortar Resistance<br>(10%, 25% NaOH, 60 mins)                               | ASTM D1308   | No removal. No loss of adhesion or visual change                | Pass - no adhesion loss                |
| Flexibility                                                                        | ASTM D4145   | 2T - no pick off                                                | Pass - no pick off                     |
| Humidity Resistance                                                                | ASTM D714    | 4000 hour exposure                                              | Pass - No #8 blisters                  |
|                                                                                    | ASTM D2247   | Less than "few" blisters Size No. 8                             |                                        |
| Cyclic Corrosion                                                                   | ASTM B117    | 2000 hour exposure                                              | Pass - 10 rating                       |
|                                                                                    | AAMA 2605-13 | Min. rating of 7 scribe or cut edge<br>Min. blister rating of 8 |                                        |

| FIRE PERFORMANCE FOR NON-COMBUSTIBILITY |                                                                                                       |                                                     |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| TEST                                    | STANDARD                                                                                              | RESULTS                                             |
| ASTM E136                               | Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C | Pass - meets standard                               |
|                                         | Temperature rise < 30°C<br>No sustained flames after 30 sec of test                                   |                                                     |
| CAN / ULC-S114-2018                     | Standard Method of Test for Determining Non-Combustibility in Building Materials                      | Pass - meets the specified performance requirements |
|                                         | Max loss of mass ≤ 20%, mean of max temperature rise ≤ 36°C                                           |                                                     |
| CAN / ULC-S135                          | Standard Test Method for the Determination of Combustibility Parameters of Building Materials         | Pass - no deviations to the ULC S135 standard       |
|                                         | Total heat release ≤ 3 MJ/m², total smoke extinction area ≤ 1.0 m²                                    |                                                     |



TECHNICAL DATA SHEET

Alfred Plate 2mm (0.080in)



Fire Resistant & Non-Combustible Cladding

| COMPOSITION          |                    |       |
|----------------------|--------------------|-------|
| PROPERTY             | 0.080" / 2mm Plate | UNITS |
| Aluminum Plate Alloy | 3003-H14           |       |

| STANDARD SIZES                        |                    |       |
|---------------------------------------|--------------------|-------|
| PROPERTY                              | 0.080" / 2mm Plate | UNITS |
| Standard Thickness (nominal)          | 0.080              | in    |
|                                       | 2.0                | mm    |
| Other Available Thicknesses (nominal) | 0.098              | in    |
|                                       | 2.5                | mm    |
| Standard Widths                       | 50      62         | in    |
|                                       | 1,270    1,575     | mm    |
| Custom Width Range                    | 31.5 - 62.0        | in    |
|                                       | 800 - 1600         | mm    |
| Standard Length                       | 120                | in    |
|                                       | 3050               | mm    |

| PRODUCTION TOLERANCES |                    |       |
|-----------------------|--------------------|-------|
| PROPERTY              | 0.080" / 2mm Plate | UNITS |
| Width                 | + / - 0.080        | in    |
|                       | 2.0                | mm    |
| Length                | + / - 0.157        | in    |
|                       | 4.0                | mm    |
| Thickness             | + / - 0.004        | in    |
|                       | 0.10               | mm    |

| ASTM B209 COMPLIANCE : 3003-H14 |                 |         |
|---------------------------------|-----------------|---------|
| CHEMICAL COMPOSITION            |                 |         |
| ELEMENT                         | STANDARD        | RESULTS |
| Aluminum                        | Remainder       | 97.75%  |
| Copper                          | 0.05 - 0.2%     | 0.17%   |
| Iron                            | 0.0 - 0.7%      | 0.56%   |
| Manganese                       | 1.0 - 1.5%      | 1.19%   |
| Silicon                         | 0.0 - 0.6%      | 0.18%   |
| Zinc                            | 0.0 - 0.1%      | 0.00%   |
| Other Elements                  | 0.0 - 0.15%     | 0.15%   |
| MECHANICAL PROPERTY LIMITS      |                 |         |
| PROPERTY                        | STANDARD        | RESULTS |
| Tensile (ksi)                   | 20 min - 26 max | 21.4    |
| Yield Strength (ksi)            | 17 minimum      | 18.5    |
| Elongation                      | 2% minimum      | 25%     |

| FINISH WARRANTIES                                                       |              |          |
|-------------------------------------------------------------------------|--------------|----------|
| See warranty tables and sample warranties for conditions and exclusions |              |          |
| PVDF Coil Coated Finish                                                 | Alfred Plate | 20 Years |
| PVDF Coil Coated Finish (Perforated Panel)                              | Alfred Plate | 10 Years |

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| TECHNICAL PROPERTIES       |         |                         |                       |
|----------------------------|---------|-------------------------|-----------------------|
| PROPERTY                   |         | 0.080" / 2mm Plate      | UNITS                 |
| Panel Weight               |         | 1.11                    | lb/ft²                |
|                            |         | 5.40                    | kg/m²                 |
| Specific Gravity (Product) |         | 2.72                    | g/cc                  |
| Coefficient of Expansion   |         | 12.9 x 10 <sup>-6</sup> | in/in/°F (@ 68-212°F) |
| Modulus of Elasticity      | ASTM E8 | 10.0 x 10 <sup>6</sup>  | Psi                   |
|                            |         | 69.0 x 10 <sup>3</sup>  | Mpa                   |
| Moment of Inertia          |         | 4.27 x 10 <sup>-5</sup> | in⁴/in                |
|                            |         | 1.69 x 10 <sup>-5</sup> | cm⁴/m                 |
| Section Modulus            |         | 1.07 x 10 <sup>-3</sup> | in³/in                |
|                            |         | 1.69 x 10 <sup>-4</sup> | cm³/m                 |
| Tensile Strength           | ASTM E8 | 20.3 x 10 <sup>3</sup>  | Psi                   |
|                            |         | 140.0                   | Mpa                   |
| Yield Strength             | ASTM E8 | 17.4 x 10 <sup>3</sup>  | Psi                   |
|                            |         | 120.0                   | Mpa                   |
| Elongation                 | ASTM E8 | 25.0                    | %                     |
| Thermal Conductivity       | C518    | 193.0                   | W/(m•K)               |

| ARCHITECTURAL COATING PROPERTIES                                                   |              |                                                                 |                                        |
|------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|----------------------------------------|
| 70% Kynar 500 / Hylar 5000 PVDF Resin Coatings<br>AAMA 2605-13 Standard Compliance |              |                                                                 |                                        |
| PROPERTY                                                                           | STANDARD     | REQUIREMENT                                                     | RESULTS                                |
| Dry Film Thickness                                                                 | ASTM D7091   | ≥ 23 microns                                                    | Pass - 32 microns                      |
| Color Uniformity                                                                   | ASTM D2244   | Max. 2 Delta E                                                  | Pass - < 2 units                       |
| Color Retention - Fade                                                             | ASTM D2244   | Delta E ≤ 5 units                                               | Pass - < 5 units                       |
| Chalk Rating                                                                       | ASTM D4214   | ≤ 8 units                                                       | Pass - < 8 units                       |
| Specular Gloss                                                                     | ASTM D523    | ± 5 units                                                       | Pass                                   |
| Dry Film Hardness                                                                  | ASTM D3363   | F - 2H                                                          | Pass - 3H                              |
| Dry Adhesion                                                                       | ASTM D3359   | No coating removal                                              | Pass - no removal                      |
| Abrasion Resistance                                                                | ASTM D968    | Abrasion Coefficient Value ≥ 40                                 | Pass - 51                              |
| Reverse Impact                                                                     | ASTM D2794   | No coating removal                                              | Pass - no removal                      |
| Muriatic Acid Resistance<br>(10% HCl, 15 mins)                                     | ASTM D1308   | No blistering or visual change                                  | Pass - no blistering or visual changes |
| Nitric Acid Resistance<br>(HNO <sub>3</sub> , 30 mins)                             | ASTM D1308   | ≤ 5 Delta E                                                     | Pass - 0.2                             |
| Alkali Mortar Resistance<br>(10%, 25% NaOH, 60 mins)                               | ASTM D1308   | No removal. No loss of adhesion or visual change                | Pass - no adhesion loss                |
| Flexibility                                                                        | ASTM D4145   | 2T - no pick off                                                | Pass - no pick off                     |
| Humidity Resistance                                                                | ASTM D714    | 4000 hour exposure                                              | Pass - No #8 blisters                  |
|                                                                                    | ASTM D2247   | Less than "few" blisters Size No. 8                             |                                        |
| Cyclic Corrosion                                                                   | ASTM B117    | 2000 hour exposure                                              | Pass - 10 rating                       |
|                                                                                    | AAMA 2605-13 | Min. rating of 7 scribe or cut edge<br>Min. blister rating of 8 |                                        |

| FIRE PERFORMANCE FOR NON-COMBUSTIBILITY |                                                                                                                                                                             |                                                     |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| TEST                                    | STANDARD                                                                                                                                                                    | RESULTS                                             |
| ASTM E136                               | Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C<br>Temperature rise <30°C<br>No sustained flames after 30 sec of test | Pass - meets standard                               |
| CAN / ULC-S114-2018*                    | Standard Method of Test for Determining Non-Combustibility in Building Materials<br>Max loss of mass ≤ 20%, mean of max temperature rise ≤ 36°C                             | Pass - meets the specified performance requirements |
| CAN / ULC-S135*                         | Standard Test Method for the Determination of Combustibility Parameters of Building Materials<br>Total heat release ≤ 3 MJ/m², total smoke extinction area ≤ 1.0 m²         | Pass - no deviations to the ULC S135 standard       |

\* Test Conducted on 3mm Plate

|                                        |                                                                                                                                                                                                         |                                                                                               |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Wall Panel Assembly                    | Alfred Plate 3mm with ACCU-TRAC AP DS Pressure Equalized Rainscreen System<br>Courtesy of Altech Panel Systems                                                                                          |                                                                                               |
| Testing Protocols                      | Florida Building Code / Miami-Dade County Requirements<br>TAS 201-94: Large Missile Impact Test, Level D, Wind Zone 4<br>TAS 202-94: Uniform Static Air Pressure<br>TAS 203-94: Cyclic Pressure Loading | ASTM Standards Equivalents<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1996<br>ASTM E1886 |
| Florida Product Approval               | FL39304                                                                                                                                                                                                 |                                                                                               |
| Panel Size Referenced                  | 120 in wide x 60 in high                                                                                                                                                                                |                                                                                               |
| Engineering Evaluation Report Download | <a href="#">Report No.: 514846</a>                                                                                                                                                                      |                                                                                               |

ASTM E330 - Structural Performance

Panel Deflection

| Deflection Criteria | Deflection Inches |                 |               | Deflection (in) |                             | Permanent Set (in) |                             |
|---------------------|-------------------|-----------------|---------------|-----------------|-----------------------------|--------------------|-----------------------------|
|                     |                   |                 |               | Measured        | Allowed Per TAS 202 (L/250) | Measured           | Allowed Per TAS 202 (L/720) |
| L/360               | 0.33              | Design Pressure | + 100.0 / psf | 0.10            | 0.36                        | 0.02               | 0.17                        |
| TAS 202 L/333       | 0.36              |                 | - 90.0 / psf  | 0.20            | 0.36                        | < 0.01             | 0.17                        |
| L/240               | 0.50              | Test Pressure   | + 150.0 / psf | 0.16            | N/A                         | 0.03               | 0.17                        |
| L/180               | 0.67              |                 | - 135.0 / psf | 0.30            | N/A                         | 0.03               | 0.17                        |
| L/90                | 1.33              |                 |               |                 |                             |                    |                             |
| L/60                | 2.00              |                 |               |                 |                             |                    |                             |

Perimeter Framing Deflection

| Deflection Criteria | Deflection Inches |                 |               | Deflection (in) |                              | Permanent Set (in) |                              |
|---------------------|-------------------|-----------------|---------------|-----------------|------------------------------|--------------------|------------------------------|
|                     |                   |                 |               | Measured        | Allowed Per TAS 202 (L/1333) | Measured           | Allowed Per TAS 202 (L/3899) |
| TAS 202 L/1707      | 0.07              | Design Pressure | + 100.0 / psf | 0.01            | 0.07                         | < 0.01             | 0.03                         |
| L/720               | 0.17              |                 | - 90.0 / psf  | 0.03            | 0.07                         | < 0.01             | 0.03                         |
| L/360               | 0.33              | Test Pressure   | + 150.0 / psf | 0.01            | N/A                          | 0.01               | 0.03                         |
| L/240               | 0.50              |                 | - 135.0 / psf | 0.03            | N/A                          | 0.01               | 0.03                         |
| L/175               | 0.69              |                 |               |                 |                              |                    |                              |

ASTM 283 - Air Infiltration

|                                | Results                      | Allowed per TAS 202          |
|--------------------------------|------------------------------|------------------------------|
| Air Leakage: 1.57 psf (25 mph) | 0.02 cfm / ft² (0.10 L/s/m²) | 0.06 cfm / ft² (0.30 L/s/m²) |
| Air Leakage: 6.27 psf (50 mph) | 0.04 cfm / ft² (0.20 L/s/m²) | 0.06 cfm / ft² (0.30 L/s/m²) |

ASTM E331 - Water Penetration

|                                                   | Results | Allowed per TAS 202 |
|---------------------------------------------------|---------|---------------------|
| 20 psf: 15% of Positive Design Pressure at 960 Pa | Pass    | No Leakage          |

FLORIDA PRODUCT APPROVAL COMPLIANCE SUMMARY

Alfred Plate 3mm



Fire Resistant & Non-Combustible Cladding

| Florida Product Approval No.      |                                                                                                                             | Florida Building Commission No. FL39304                                  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| System                            |                                                                                                                             | Accu-Trac AP DS Pressure Equalized Rainscreen<br>by Altech Panel Systems |
| Joint Condition                   |                                                                                                                             | Rainscreen Spline                                                        |
| HVHZ High Velocity Hurricane Zone |                                                                                                                             | Approved                                                                 |
| Design Pressure Rating            |                                                                                                                             | + 100 / - 90 psf*                                                        |
| Wall Design Allowable Pressure    |                                                                                                                             | ± 150 psf                                                                |
| Max Panel Size                    |                                                                                                                             | 60" x 120"                                                               |
| ASTM E283                         | 1.57 psf (25 mph)                                                                                                           | Pass                                                                     |
| Air Infiltration                  | 6.27 psf (50 mph)                                                                                                           | Pass                                                                     |
| ASTM E330                         | +100 psf, -90 psf, 20.0 psf                                                                                                 |                                                                          |
| Structural Performance            | Water penetration                                                                                                           |                                                                          |
| ASTM E331                         | 20 psf                                                                                                                      |                                                                          |
| Water Penetration                 |                                                                                                                             |                                                                          |
| TAS 201 - ASTM E1996 & E1886      | Large Missile Impact Test, Level D, Wind Zone 4.                                                                            |                                                                          |
| Impact Testing                    | No signs of penetration, rupture, or opening.<br>Meets requirements of section 1626 of the Florida Building Code, Building. |                                                                          |
| TAS 202                           | No signs of penetration, rupture, or opening.                                                                               |                                                                          |
| Uniform Static Pressure           | Meets requirements of section 1620 of the Florida Building Code, Building.                                                  |                                                                          |
| TAS 203                           | No signs of penetration, rupture, or opening.                                                                               |                                                                          |
| Cyclic Wind Pressure Loading      | Meets requirements of section 1625 of the Florida Building Code, Building.                                                  |                                                                          |
| Testing Protocols                 |                                                                                                                             | Florida Building Code<br>Miami - Dade County<br>ASTM Standards           |
| Testing Documents                 |                                                                                                                             | <a href="#">Florida Building Commission No. FL39304</a>                  |
| Evaluation Report                 |                                                                                                                             | -                                                                        |
| Notes                             |                                                                                                                             | * Stiffeners required 4" O.C.                                            |

LEED is a world-renowned green building rating system that serves as an important tool in the building and construction industry. LEED certifications signify that buildings minimize their lifestyle impact on the environment through the compounded benefits of product selection, construction practices, performance, and recycling. The tables that follow summarize the direct and indirect benefits of Alfrex FR Metal Composite Material wall panels. Alfrex FR MCM can contribute to LEED® points under both versions 3 and 4 under the following areas:

#### MATERIALS & RESOURCES : Recycled Content MR Credit 4

|             |                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calculation | 100% Post-Consumer Recycled Content + 50% Pre-Consumer Content                                                                                                |
| LEED v3     | Use of recycled content constitutes at least 10% of the total value of materials in the project.<br>1 Point is awarded for 10%; 2 points are awarded for 20%. |
| LEED v4     | Use of recycled content constitutes at least 25% of the total value of permanently installed materials in the project.<br>1 Point is awarded.                 |

| PRODUCT      | THICKNESS    | WEIGHT      | POST-CONSUMER RECYCLED % | PRE-CONSUMER RECYCLED % | LEED CONTRIBUTION |
|--------------|--------------|-------------|--------------------------|-------------------------|-------------------|
| Alfrex Plate | 3mm          | 1.66 lbs/SF | 90.55%                   | 1%                      | 91.05%            |
| Alfrex Plate | 0.080" / 2mm | 1.11 lbs/SF | 90.55%                   | 1%                      | 91.05%            |
| Alfrex Plate | 0.040" / 1mm | 0.56 lbs/SF | 90.55%                   | 1%                      | 91.05%            |

#### MATERIALS & RESOURCES : Regional Materials MR Credit 5

It is not possible to identify nor quantify a contribution to the Regional Materials MR Credit 5.

SECTION 1: PRODUCT IDENTIFICATION

|                                      |                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------------|
| A. Product Name                      | Alfred Plate                                                                                             |
| B. Recommended Use                   | Building Wall Cladding Material                                                                          |
| C. Restriction on Use                | None                                                                                                     |
| D. Manufacturer/Importer/Distributor | <b>Alfred, Inc.</b><br>943 Gainesville Hwy.<br>Bldg. 100-4000<br>Buford, GA 30518 USA<br>+1.470.589.7449 |
| E. Emergency Phone Number            | Chemtrec 1-800-424-9300                                                                                  |
| F. Website                           | www.alfredusa.com                                                                                        |
| G. Initial Release Date              | 19-April-2019                                                                                            |
| H. Revision Date                     | 01-July-2020                                                                                             |
| I. Version Number                    | 2.0                                                                                                      |

SECTION 2: HAZARD IDENTIFICATION

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Classification | <p>Alfred Plate is defined under OSHA Hazard Communications standard 29 CFR 1910.1200 as an "article". As such, it is a manufactured item other than a fluid or particle, formed to a specific design during manufacture with end functions dependent in whole or in part upon its' shape or design use during end use, and which under normal conditions of use does not release, or otherwise result in exposure to hazardous chemicals, nor pose a physical hazard or health risk to employees. Unless indicated otherwise, all classification information contained in this document regarding potential health, fire, or explosion hazards is in reference to hazardous elements that may be released during processing the product including, but not limited to, dust, fumes, chips, and fines.</p> <p>Specific target organ toxicity (repeated exposure): Category 2</p> <p>Chronic aquatic environment hazard: Category 1</p> |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                               |                                                                                      |
|-------------------------------|--------------------------------------------------------------------------------------|
| B. GHS Label Elements Symbols |  |
|-------------------------------|--------------------------------------------------------------------------------------|

|                                 |                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C. Signal Word Hazard Statement | <p>Warning</p> <p>H302 Harmful if swallowed.</p> <p>H360 May damage fertility or the unborn child.</p> <p>H373 May cause damage to organs.</p> <p>H411 Toxic to aquatic life with long lasting effects.</p> |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

D. Precautionary Statement

|              |             |                                                                                                 |
|--------------|-------------|-------------------------------------------------------------------------------------------------|
| - Prevention | P201        | Obtain special instructions before use.                                                         |
|              | P202        | DO not handle until all safety precautions have been read and understood.                       |
|              | P210        | Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. |
|              | P222        | Do not allow contact with air.                                                                  |
|              | P231 + P232 | Handle under inert gas. Protect from moisture.                                                  |
|              | P240        | Ground/bond container and receiving equipment.                                                  |
|              | P241        | Use explosion-proof electrical/ventilating/lighting/... /equipment.                             |
|              | P260        | Do not breathe dust/fume/gas/mist/vapors/spray.                                                 |
|              | P264        | Wash... Thoroughly after handling.                                                              |
|              | P270        | Do not eat, drink, or smoke when using this product.                                            |
|              | P271        | Use only outdoors or in a well-ventilated area.                                                 |
|              | P273        | Avoid release to the environment.                                                               |
|              | P280        | Wear protective gloves/protective clothing/eye protection/face protection.                      |
| - Response   | P308 + P313 | IF exposed or concerned: Get medical advice/attention.                                          |
|              | P312        | Call a POISON CENTER/doctor/... /if you feel unwell.                                            |
|              | P314        | Get medical advice/attention if you feel unwell.                                                |
|              | P321        | Specific treatment.                                                                             |
|              | P330        | Rinse mouth.                                                                                    |
|              | P335 + P334 | Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.                |
|              | P370 + P378 | In case of fire: Use... To extinguish.                                                          |
| - Storage    | P391        | Collect spillage.                                                                               |
|              | P402        | Store in a dry place.                                                                           |
| - Disposal   | P407        | Maintain air gap between stacks/pallets.                                                        |
|              | P501        | Dispose of contents/container in accordance with local regulation.                              |

E. Hazards Not Otherwise Classified (NEPA)

|            |               |
|------------|---------------|
| Copper     |               |
| Health     | 2             |
| Fire       | Not Available |
| Reactivity | 0             |
| Manganese  |               |
| Health     | 0             |
| Fire       | Not Available |
| Reactivity | 1             |
| Silicon    |               |
| Health     | Not Available |
| Fire       | 2             |
| Reactivity | Not Available |

|            |               |
|------------|---------------|
| Aluminum   |               |
| Health     | 0             |
| Fire       | Not Available |
| Reactivity | 1             |
| Iron       |               |
| Health     | 2             |
| Fire       | Not Available |
| Reactivity | Not Available |
| Zinc       |               |
| Health     | 0             |
| Fire       | Not Available |
| Reactivity | 1             |

SECTION 3: COMPOSITE/INFORMATION ON INGREDIENTS

| Components | CAS Number | Percentages % |
|------------|------------|---------------|
| Aluminum   | 7429-90-5  | 97.49 max     |
| Copper     | 7440-50-8  | 0.20 max      |
| Manganese  | 7439-96-5  | 1.50 max      |
| Iron       | 7439-89-6  | 0.70 max      |
| Silicon    | 7440-21-3  | 0.60 max      |
| Zinc       | 7440-66-6  | 0.10 max      |
| Others     | -          | 0.06 max      |

This product is a solidified product, which is not exposed to chemicals contained in the product. However, it may be partially exposed in the molten condition such as cutting or melting.

SECTION 4: FIRST-AID MEASURES

|                                                                            |                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Eye Contact                                                             | Dust from processing. Rinse eyes with water or saline solution for at least 15 minutes. Seek medical attention from a physician.                                                                                                                                                                                          |
| B. Skin Contact                                                            | Dust from processing. Wash skin with soap and water for at least 20 minutes while removing contaminated clothing and shoes. Seek medical attention from a physician. In the case of burns, immediately cool the affected area for as long as possible by cold water, and do not remove any clothing adhering to the skin. |
| C. Inhalation                                                              | Dust from processing. Move to fresh air. Seek medical attention from a physician.                                                                                                                                                                                                                                         |
| D. Ingestion                                                               | Not inspected due to composition and form of product. If dust or fines are ingested, rinse mouth with water in case of more ingestion of dust or fines. Seek medical attention from a physician.                                                                                                                          |
| E. Most Important Symptoms & Effects                                       | Prolonged exposure to dust and fumes may aggravate pre-existing chronic conditions of the skin or respiratory system.                                                                                                                                                                                                     |
| F. Indication if Immediate Medical Attention and Special Treatment Needed. | Notify medical personnel of any situation and avoid overexposure to irritants.                                                                                                                                                                                                                                            |

SECTION 5: FIRE FIGHTING MEASURES

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Suitable Extinguishing Media | Use Class D extinguishing agents on fines or molten metal. Do not use halogenated extinguishing agents on small chips, fines, or dust.                                                                                                                                                                                                                                                                                   |
| B. Specific Hazards             | Dust from Processing. Wash skin with soap and water for at least 20 minutes while removing contaminated clothing and shoes. Seek medical attention from a physician. When burned, dust may emit corrosive or toxic smoke, fumes, or vapors may be emitted. Substances are not easily ignited; they may be burned via direct flame application. Substances may be explosively decomposed in case of fire or over-heating. |

C. Hazardous Combustion

Dust or fines dispersed in the air can be explosive. Even minor dust clouds are potentially dangerous. Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas in a confined space or poorly ventilated space could present an explosion hazard. Fines and dust in contact with certain metal oxides (i.e. rust). Thermite reactions can be initiated easily by weak ignition sources. Molten metal in contact with water/moisture or other metal oxides. Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction.

D. Special PPE and Precautions for Firefighters

NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

SECTION 6: ACCIDENTAL RELEASE MEASURES

A. Personal & Environmental Precautions

Avoid contact with sharp edges or heated metal. Wear protective gloves. No special environmental precautions are required.

B. Method and Materials for Containment and Cleaning

Clean releases or dust by sweeping the area and depositing in a closed container. Take measures to block dust from reaching surface water or grassy areas.

SECTION 7: HANDLING AND STORAGE

A. Precautions for Safe Handling

Avoid generating dust. Avoid contact with sharp edges or heated metal. There is no visual difference between hot and cold aluminum. Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides. Avoid all ignition sources and maintain good housekeeping practices. Do not use compressed air to remove material from floors and other surfaces.

B. Conditions for Safe Storage

No special storage precautions noted.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

A. OSHA Permissible Exposure Limit

|           |                                                               |
|-----------|---------------------------------------------------------------|
| Aluminum  | 15mg/m <sup>3</sup> (Total), 10mg/m <sup>3</sup> (Respirable) |
| Manganese | 5mg/m <sup>3</sup> (Respirable Fume)                          |

B. Appropriate Engineering Controls

A system of local and/or general exhaust is recommended to keep employee exposures below the Exposure Limits. If engineering controls fail to mitigate exposure to limits listed, use NIOSH approved respiratory protection.



C. Individual Protection Measures (PPE)

- Eye & Face Protection  
Wear primary eye protection such as tight-fitting safety goggles with a secondary protection face shield.
- Respiratory Protection  
Use an approved respirator designed for the specific hazards where concentrations exceed exposure limits.
- Skin & Body Protection  
Wear cut resistant gloves and avoid contact with sharp edged objects and materials.
- Thermal Protection  
When handling heated materials, wear gloves and proper clothing to cover exposed areas and protect against thermal burns.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

|                                                   |                                         |
|---------------------------------------------------|-----------------------------------------|
| A. Appearance                                     | Solid, Various Colors                   |
| B. Odor                                           | Odorless                                |
| C. Odor Threshold                                 | Not Applicable                          |
| D. pH                                             | Not Applicable                          |
| E. Melting Point / Freezing Point                 | Aluminum 482°C - 660°C (900°F - 1221°F) |
| F. Flash Point                                    | Not Applicable                          |
| G. Evaporation Rate                               | Not Applicable                          |
| H. Flammability (Solid, Gas)                      | Not Applicable                          |
| I. Upper / Lower Flammability or Explosive Limits | Not Applicable                          |
| J. Solubility                                     | Insoluble                               |
| K. Vapor Density                                  | Not Applicable                          |
| L. Specific Gravity                               | 2.7g/cm³                                |
| M. Partition Coefficient: n-Octanol/water         | Not Applicable                          |
| N. Auto Ignition Temperature                      | 590°C (1,094°F)                         |
| O. Decomposition Temperature                      | Not Applicable                          |
| P. Viscosity                                      | Not Applicable                          |
| Q. Molecular Weight                               | Not Applicable                          |

SECTION 10: STABILITY AND REACTIVITY

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Chemical Stability                                          | Stable under recommended storage and handling conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| B. Possibility of Hazardous Reactivity and Conditions to Avoid | Dust formation. Heat, flames and sparks. Protect from water. Aluminum fines are attached by strong acids and alkalis and by some halogenated organic compounds especially at elevated temperatures. Operations generating aluminum fines may produce hydrogen gas when exposed to moisture. Hydrogen gas is highly flammable and can accumulate in poorly ventilated areas. Liberates flammable hydrogen gas on contact with water, alcohols, acidic or basic materials, and metals or metallic compounds. |

C. Incompatible Materials

Acids. Alkalis. Water. Halogenated compounds. Metal oxides.  
Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 800°C (1470°F).

D. Hazardous Decomposition Products

Nickel oxides. Cadmium compounds. Fumes of aluminum or aluminum oxide. Welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, and nitrogen oxides. Lead oxides. Lead and chromium compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

A. Acute Toxicity

|           |                                         |
|-----------|-----------------------------------------|
| Copper    | LD50 481mg/kg Rat (OECD TG 401, GLP)    |
| Aluminum  | LD50 > 15900mg/kg Rat (OECD TG 401)     |
| Manganese | LD50 > 2000mg/kg Rat (OECD TG 420, GLP) |
| Iron      | LD50 98.6mg/kg Rat (OECD TG 401, male)  |
| Silicon   | LD50 3160mg/kg Rat                      |
| Zinc      | LD50 > 2000mg/kg Rat (OECD TG 420, GLP) |

B. Carcinogenicity

Not classified as a carcinogen. Trace elements used in the paint coatings for this product may be known cancer causing agents.

C. Inhalation

Airborne particles of aluminum and/or product materials may irritate the eyes and respiratory tract.

D. Skin Corrosion Property/Stimulateness

The product is not known to cause human skin or respiratory sensitization. Contact with dust can cause mechanical irritation or drying of the skin.

E. Ingestion

Not Applicable

F. Germ Cell Mutagenicity

Aluminum - The in-vitro DNA damage test shows that the negative similar substance of AlCl<sub>3</sub> obtained from Sigma when there is no metabolic activity. The chromosome abnormality test by using the myelocyte for the mammal shows that the negative similar substance or AlCl<sub>3</sub> obtained from Sigma OECD TG 475 when there is no metabolic activity.

G. Reproductive Toxicity

Product not classified and dust from processing does not present any reproductive hazards. Elevated temperature processing with manganese compounds, such as welding, can present reproductive hazards for males.

H. Specific Organ Toxicity

Single Exposure, Product - the classification criteria are not met. For dusts, may cause damage to organs (kidneys, respiratory system).

Repeated Exposure - May cause damage to organs through prolonged exposure (respiratory system). May cause allergic reactions in very susceptible persons, cause chronic effects, cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects. Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemoglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

I. Eyes Critical Damage/Stimulativeness

Dust particles, chips or fines contact with the eyes can lead to mechanical irritation.

SECTION 12: ECOLOGICAL INFORMATION

A. Ecotoxicity (Fish)

Not expected to be harmful to aquatic organisms.

|           |                                                                                                                              |
|-----------|------------------------------------------------------------------------------------------------------------------------------|
| Copper    | LC50 0.286mg/L 96hr Oncorhynchus mykiss<br>(LC50 = 0.28640% sewage treatment plant effluent,<br>0.164 river water mg/L 96hr) |
| Manganese | LC50 > 3.6mg/L 96hr Oncorhynchus mykiss (OECD TG 203, GLP)                                                                   |
| Zinc      | LC50 0.439mg/L 96hr others (test specie: Cottus bairdii)                                                                     |

B. Persistence and Degradability

The product contains inorganic compounds which are not biodegradable.

C. Bio-accumulative Potential

The product is not bioaccumulative.

D. Soil Mobility

Not considered mobile

|           |            |                                                                                                |
|-----------|------------|------------------------------------------------------------------------------------------------|
| Copper    | Fish       | Oncorhynchus mykiss: NOEC = 11.4µg/L 45d                                                       |
|           | Crustacean | Ceriodaphnia sp.: NOEC = 122µg/L mortality,<br>31.6µg/L reproduction OECD TG 21                |
|           | Algae      | Chlamydomonas reinhardtii: NOEC = 22µg/L growth rate<br>10d OECD TG 201                        |
| Aluminum  | Crustacean | Daphnia magna: NOEC = 0.076mg/L reproduction,<br>0.137µg/L immobilization 21d OECD TG 211, GLP |
| Manganese | Fish       | Oncorhynchus mykiss: NOEC = 0.77mg/L 100d                                                      |
|           | Crustacean | Ceriodaphnia dubia: NOEC = 1.7mg/L 8d OECD TG 211,<br>GLP                                      |
|           | Algae      | Ditylum brightwellii: EC50 = 1.5mg/L 5d                                                        |
| Zinc      | Fish       | Cottus bairdii: NOEC = 0.169 - 0.172mg/L 30d                                                   |
|           | Crustacean | Daphnia magna: NOEC = 0.048 - 0.156mg/L 21d                                                    |
|           | Bird       | Ceranium tenuicore: NOEC = 7.2 - 18µg/L 7d                                                     |

E. Other Adverse Effects

SECTION 13: DISPOSAL INFORMATION

Disposal must be in accordance with current applicable laws and regulations and material characteristics at time of disposal. Recover and reclaim or recycle, if practical. Aluminum in the form of particle may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.

SECTION 14: TRANSPORTATION

|                            |                                      |
|----------------------------|--------------------------------------|
| A. UN Number               | Product: Does not require regulation |
| B. UN Proper Shipping Name | Product: Does not require regulation |
| C. Transport Hazard Class  | Product: Does not require regulation |
| D. Packing Group           | Product: Does not require regulation |
| E. Environmental Hazards   | Product: Does not require regulation |

SECTION 15: REGULATORY INFORMATION

OSHA: NOT classified as hazardous under the criteria in 29 CFR 1910.1200, Hazard Communication.

U.S. SARA REPORTING REQUIREMENTS: The product components are not subject to the reporting requirements of Sections 302, and 304 of Title III of the Superfund Amendments and Reauthorization Act.  
Section 313 (TRI) reporting: Aluminum (CAS 7429-90-5) > 80% by weight, Manganese (CAS 7439-96-5) < 4% by weight.

U.S. TSCA INVENTORY STATUS: The components of this product are listed in the TSCA Inventory.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): There may be elements present in the dust generated from the processing of this product, trace amounts, that are on the California Proposition 65 list. Warning! This product contains chemicals known to the State of California to cause cancer.

CANADIAN DSL/NDL INVENTORY STATUS: The components of this product are on the DSL Inventory, or are exempted from listing.  
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Not Applicable.

SECTION 16: OTHER INFORMATION

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|                 |               |
|-----------------|---------------|
| Initial Release | 14-April-2019 |
| Revision Date   | 01-July-2020  |
| Revision Number | 2.0           |

# ALFRED PLATE FABRICATION RECOMMENDATIONS

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# INTRODUCTION

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Alfrex Plate is a 100% solid aluminum architectural sheet pre-finished on a high-quality coil coating line specifically designed for heavier metal gauges. It features a KYNAR® / PVDF fluoropolymer-based paint system that offers a wide range of colors and finishes with the consistency and economics of coil coating. More importantly though, with minor adaptations, it enables the use of many of the same fabrication techniques and installation systems used with Alfrex FR Metal Composite Sheets (MCM).

The Alfrex Plate Fabrication and Technical Recommendations Manual has been developed specifically for fabricators experienced in fabricating MCM sheets who need additional information when adapting to fabricate 3mm thick Alfrex aluminum plate. It also serves to highlight important differences and considerations between both product lines which affect commercial project development, purchasing, and other business processes. Though 0.080" (2mm) thick Alfrex Plate is mentioned, it is not covered by this manual in detail.

This manual is not a "how-to", nor does it represent a guarantee of any kind. Rather, it is a collection of recommendations and information from others who have successfully adapted to the fabrication of aluminum plate while achieving processing speeds and efficiencies close to that of MCM sheets.

Alfrex strongly recommends that each fabricator utilize their expertise and know-how to find their "sweet spot" for processing aluminum plate. Differences in machinery, tooling, and other factors inherent to each individual company create variability and issues that can only be resolved through fabrication testing and process refinement. This critical step must be taken before producing materials for commercial projects.

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# PRODUCT OVERVIEW

|                      |                                                                                                                                            |        |        |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Product              | Alfred Plate pre-finished 100% solid aluminum, non-combustible architectural wall sheet                                                    |        |        |
| Standard Thickness   | 3.0mm (0.120")                                                                                                                             |        |        |
| Standard Width       | 62" (1,575mm), 50" (1,270mm)                                                                                                               |        |        |
| Weight               |                                                                                                                                            | lbs/sf | kg/sqm |
|                      | 3mm Plate                                                                                                                                  | 1.66   | 8.11   |
|                      | 0.080" (2mm) Plate                                                                                                                         | 1.11   | 5.40   |
|                      | 4mm FR MCM                                                                                                                                 | 1.51   | 7.37   |
| Aluminum Alloy       | 3003-H14 alloy sourced from Alcoa Australia                                                                                                |        |        |
| Rolling & Coating    | Rolled and Coil Coated exclusively at a state-of-the-art facility in South Korea                                                           |        |        |
| Pre-treatments       | Chromate based                                                                                                                             |        |        |
| Top Side Coating     | PPG Fluoropolymer Duranar, 70% KYNAR® resin paint system. AAMA 2605 compliant                                                              |        |        |
| Bottom Side Coating  | Post-paintable epoxy primer protective coating                                                                                             |        |        |
| Coating Manufacturer | PPG Industries Korea, Inc                                                                                                                  |        |        |
| Tension Leveling     | Performed in line before cut-to-length process                                                                                             |        |        |
| Protective Film      | 100-micron thick protective masking film                                                                                                   |        |        |
| Cut-to-Length        | In-line shear, max 196", 20 sheets per length minimum                                                                                      |        |        |
| Sheet Identification | Batch identification code and directional arrows laser jet ink printed 0.39" (10mm) in height onto the backside of each sheet (Figure 1.2) |        |        |
| Technical Data       | Consult the Technical Data Sheet of this document for Technical Properties, Production Tolerances, and Coating Performance Data etc        |        |        |

FIGURE 1.1

ALFLEX PLATE COMPOSITION

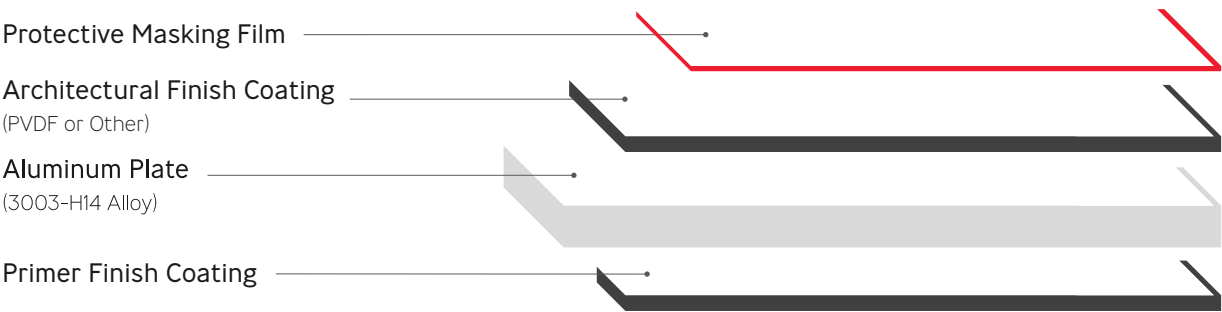
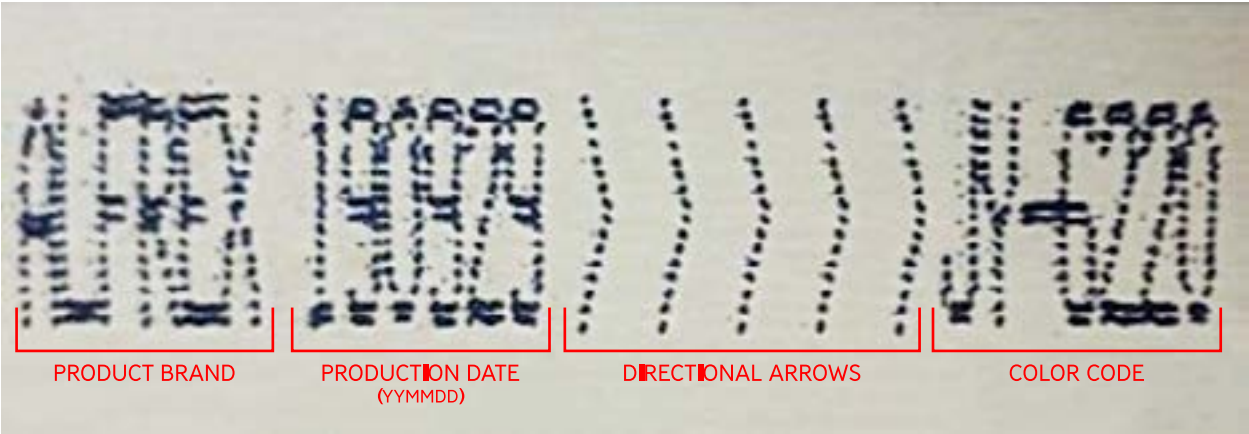


FIGURE 1.2

SHEET IDENTIFICATION

|         |                                                                                            |
|---------|--------------------------------------------------------------------------------------------|
| Format  | Product Brand + Production Date (YYMMDD) + Directional Arrows + Color Code                 |
| Example | Alfred + Produced in 2019 on the 29 <sup>th</sup> of September + >>>> + Color Code JY-6220 |





# CONSIDERATIONS FOR AN MCM FABRICATOR

## PAINT FINISHES AND BUSINESS PROCESSES

### Coating Aluminum for Plate vs. Aluminum for MCM

Alfred 3mm Plate is pre-finished via continuous process offset roll coating on a high-quality coil coating line specialized in heavier metal gauges. Though the coating process for Alfred Plate and Alfred MCM are the same, there are four major differences that MCM fabricators need to keep in mind when pursuing projects with pre-finished Alfred Plate since they drive the considerations detailed in this section.

FIGURE 1.3

#### THE 4 KEY DIFFERENCES COATING ALUMINUM FOR ALFRED PLATE VS ALUMINUM FOR MCM

1. 3mm thick aluminum cannot be coated on the same coil coating line used for coating 0.020" (0.5mm) thick aluminum for MCM
2. Paint formulations and primers will differ between thicker and thinner gauge aluminum due to differences in substrate temperature profiles, curing oven types, line speeds, quenching, and other coil coating process specifics.
3. Paint formulations often differ slightly between different coating lines, even when coating the same color.
4. Paint formulations may differ between PPG North America and PPG Korea due to raw material supply chain sources used.

### All Colors Have to be Matched Specifically for Aluminum for Plate

Any color finish, be it a standard or custom, PPG or Sherwin Williams, Akzo Nobel or Beckers, spray applied or coil coated, will have to be matched and specially formulated for the production of Alfred Plate due to the 4 key differences detailed in Figure 1.3.

### Color Matches for Alfred Plate May Differ Slightly

Achieving a near perfect color match for a substrate different than the control sample can sometimes be flawless, while at other times a challenge due the 4 differences previously noted. These are the same challenges encountered when matching a steel roofing color for aluminum, or a metallic spray coating for a coil coated version.

When matching an existing MCM color from any manufacturer, the match for Alfred Plate may differ slightly. Variations may be more noticeable for mica and metallic finishes due to light reflectivity and metallic flop. Even when matching a preformulated PPG North America color at PPG Korea, slight color differences may exist due to the combination of differences in pigments and resins used at each location, compounded by the adaptation in color formulation required for the thicker aluminum plate substrate.

For planning purposes, it must be assumed that when installing Alfred Plate next to other products on the same plane and elevation, there may be a slight difference when compared to the product to which it was matched. It is important to communicate these expectations up front when starting the color matching process and when presenting color matches for approval.

### Minimum Order Quantities

Pre-finished aluminum coil for the manufacture of MCM standard color sheets is typically ordered in larger quantities and held in inventory until needed. Custom color coils for MCM are ordered in specific quantities required for the production of that specific color.

Alfred Plate is made-to-order in a singular production run regardless of the color, or its classification as standard or custom. Minimum production order quantities for Alfred Plate are listed in Figure 1.4. Quantities less than the minimum production quantity are available and priced at a premium to account for increased scrap and other factors. It is the standard practice at Alfred to price material at an all-inclusive unit price per square foot or square meter, with no hidden fees or set-up charges. Please contact your local Alfred sales representative for pricing.

Available Color Finishes

Please consult the Alfred Plate color offering chart for a list of our standard stocking and preformulated colors including Solid, Mica, and Metallic finishes. Please consult for specific specialty finish availability.

Color Matching and Production Lead Times

Please allow ample lead time for both color matching and ordering of materials. Alfred will communicate production lead times as accurately as possible based on a variety of factors. Lead times can vary from 10 weeks to 20 weeks and should always be confirmed in advance of purchase order placement.

Price Sensitivity of 100% Solid Plate vs MCM

Prices for aluminum plate are much more sensitive to raw material price fluctuations than MCM due to the much higher percentage of aluminum in the product. For this reason, it is recommended that fabricators accommodate for potential price escalations in their business endeavors and consult periodically with Alfred to confirm pricing.

**MANAGING COLOR PRODUCTION LOTS**

It is recommended that orders for singular projects be made at one time, in full, so that all sheets are coil coated and manufactured from one production lot regardless if they are solid, mica, or metallic colors. Alfred Plate is made-to-order with each production run subject to the coil coater’s allowable color tolerance of 1.2 Delta-E between production lots.

Some color measurement device manufacturers state that an untrained human eye does not readily pick up differences in color less than values of 3 Delta-E or less. However, architects and those in the coatings, metal wall sheet, and metal roofing industries are readily able to perceive color differences down to a value of 1 Delta-E. With mica and metallic finishes any differences may be more pronounced.

Even when ordering standard color Alfred Plate sheets from inventory, it is important to indicate if the sheets will be used with those from a previous order so that the production lots can be checked. In cases where sheets from different batches must be purchased, the same precautions taken with mica and metal finished MCM must be taken. *(i.e. avoiding the side by side installation of sheets from different production lots on the same plane.)*

Extra care must be taken in the planning stages to order sufficient quantities for the project and account for unforeseen scrap, potential expansion in scope, or other situations.

FIGURE 1.4

**ALFREX PLATE PRODUCTION ORDER MINIMUMS**

|                                 | Alfred Plate 2mm<br>(0.080") | Alfred Plate 3mm       |
|---------------------------------|------------------------------|------------------------|
| Minimum production order        | 10,000 sf                    | 15,500 sf              |
| Premium Priced Production Order | ≤ 3,000 sf ≤ 9,999 sf        | ≥ 4,000 sf ≥ 15,499 sf |

---

## ADAPTING FABRICATION PROCESSES

Many MCM fabricators have successfully incorporated the fabrication of pre-finished aluminum plate using adapted techniques and tooling, and even achieved processing speeds and efficiencies close to those of MCM sheets. For the MCM fabricator new to 3mm pre-finished plate, it is critical that one utilize their expertise and know-how to find your “sweet spot” for processing aluminum plate.

Differences in machinery, tooling, and other factors inherent to each individual company create variability and issues that can only be resolved through planned and thorough fabrication testing, equipment modifications, and process refinement. Alfrex highly recommends that this critical step be taken before taking on commercial projects. There will be a learning curve, and our intention with this manual is to provide information to assist in that process. This subject is covered in greater depth in the Fabrication Section of this manual in the sub-section, “Establish Your Best Practices and Production Parameters.”

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## ADAPTING MCM INSTALLATION SYSTEMS FOR ALFREX PLATE

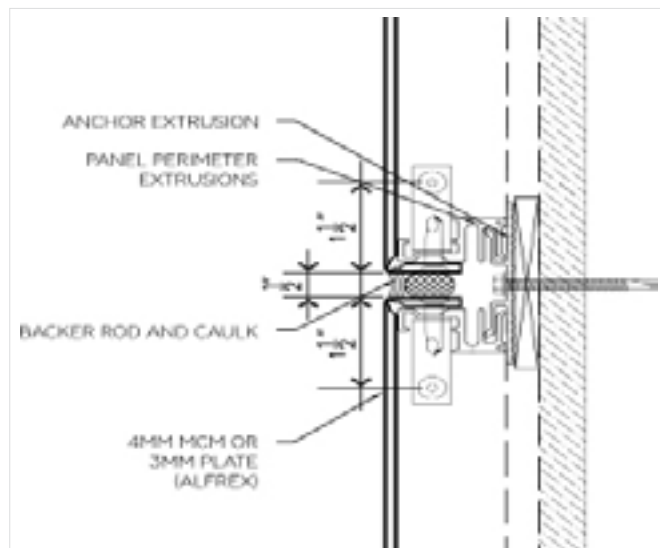
Alfrex Plate 3mm can be installed in the same manner as 4mm MCM albeit with slight modifications.

FIGURE 1.5

### GENERIC RAINSCREEN SYSTEM

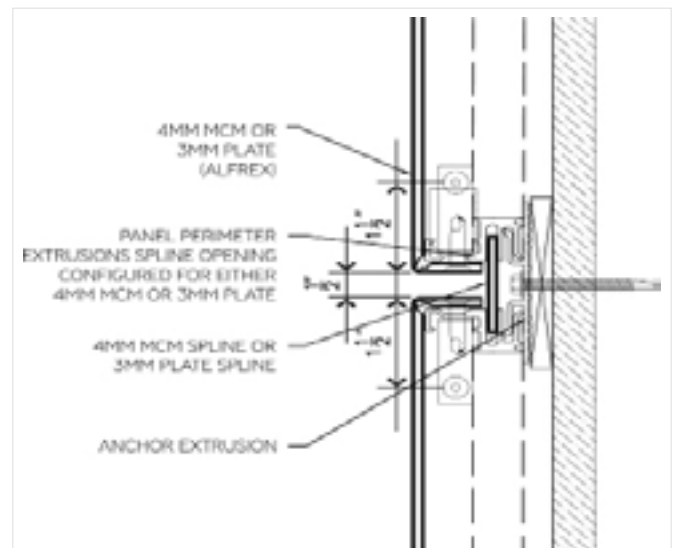
#### ROUTE & RETURN WET SEAL SYSTEMS

The only adaptations needed for transitioning from 4mm MCM to 3mm Plate is accommodating for the 0.040” (1mm) difference in the sheet material thickness via standard industry practices. The figure below shows a simplified generic system horizontal detail with where either 4mm MCM or 3mm Plate can be used with no adaptations to the extrusions.



#### RAINSCREEN INSTALLATION SYSTEMS

For rainscreen systems, extrusions will need to be adapted to accommodate for the thinner spline in the joint as well as any other particularities dependent upon the system design and manufacturer. The figure below shows a simplified generic system horizontal detail highlighting how the only adaption required is configuring the Panel Perimeter Extrusion to accept either a 4mm ACM or 3mm Plate spline.



# FABRICATOR RECOMMENDATIONS

## GENERAL FABRICATION AND PROCESSING

Alfred Plate 3mm can be fabricated and processed using methods and techniques familiar to MCM fabricator with minor adaptations to processing and tooling.

FIGURE 2.1

### GENERAL FABRICATION AND PROCESSING

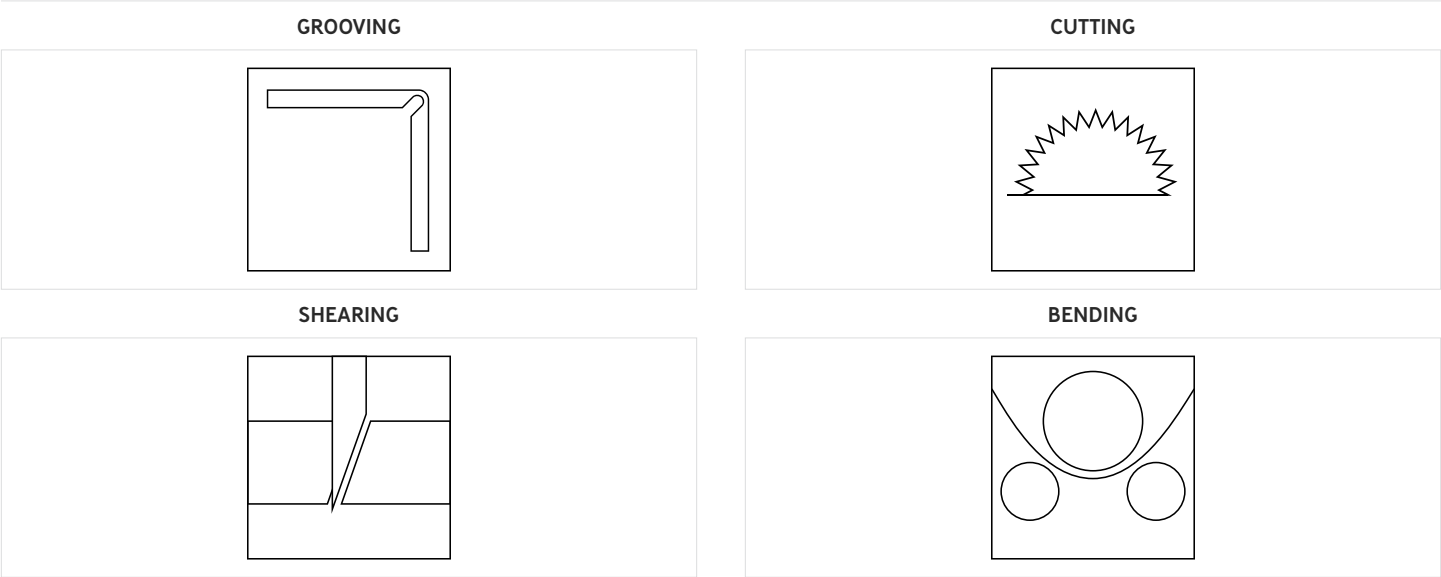
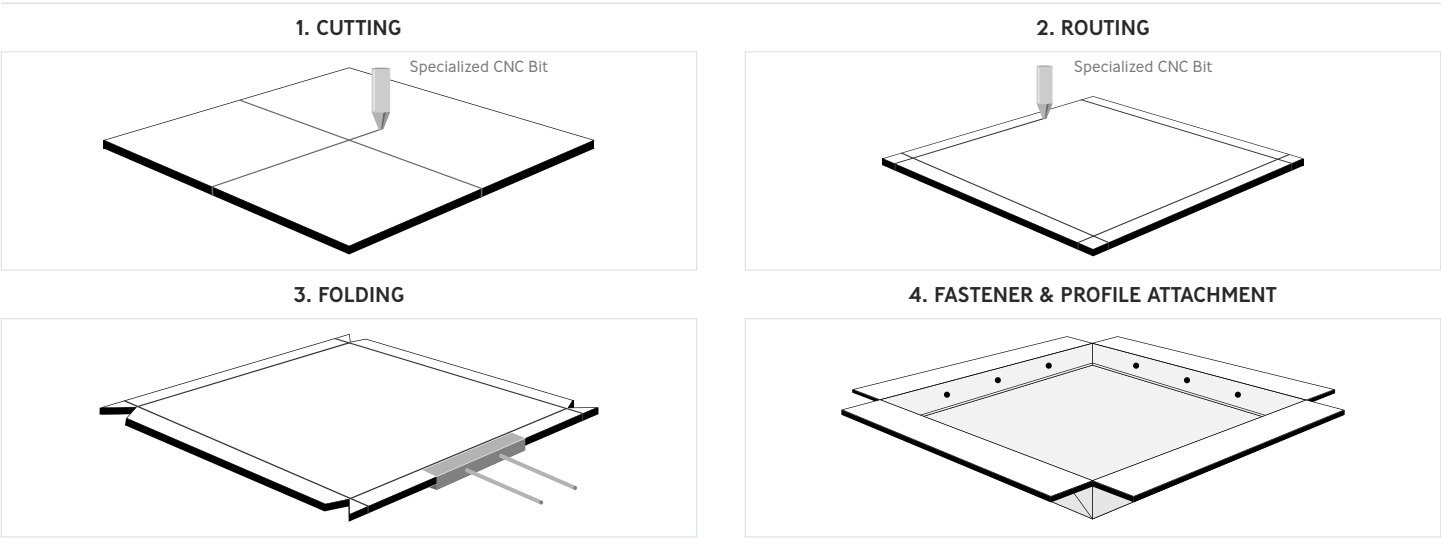


FIGURE 2.2

### GENERAL PROCESSING STEPS



## ESTABLISH YOUR BEST PRACTICES AND PRODUCTION PARAMETERS

As mentioned before, each MCM fabricator new to 3mm pre-finished plate must conduct tests to determine their “sweet spot” for production parameters and setups to successfully fabricate 3mm thick aluminum plate. Please refer to the document “Product Fabrication Quick Reference Data” in the Technical Data section for side by side comparisons of Alfrex Plate 3mm vs Alfrex FR MCM with respect to the most commonly used fabrication parameters and machinery settings. The reference data will serve as an excellent starting point for determining what works best for your setup.

### Perform Tests to Determine Ideal RPM, Feed Rates, and Cooling Lubricant Application

In order to find the optimum cutting and routing conditions for Alfrex Plate, it is recommended that a series of tests be conducted on the same sheet at varying RPM and feed rates until ideal production parameters and results are achieved. Optimum production parameters will vary according to the machinery and other factors. Successful fabricators of plate recommend that the use of a cooling lubricant for routing is a “must”, and not an option. Of typical note is that during fabrication tests, the cleanliness of routed cuts is typically determined by the amount of coolant used during the fabrication. Ideal routes should contain no burrs in the channel if done correctly.

The importance of conducting tests can be seen in Figure 2.4-5 showing excerpts from fabrication tests used to achieve commercial levels of production.

FIGURE 2.3

#### EXAMPLE OF A CLEANLY ROUTED V-GROOVE CHANNEL



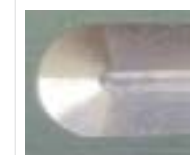
FIGURE 2.4

#### EXAMPLE OF ALFREX PLATE FABRICATION TESTS 1

|                                        |
|----------------------------------------|
| 10,000 RPM > 3.28 Ft / min. (with oil) |
| 10,000 RPM > 8.20 Ft / min. (with oil) |
| 15,000 RPM > 3.28 Ft / min. (with oil) |
| 15,000 RPM > 6.56 Ft / min. (with oil) |
| 20,000 RPM > 3.28 Ft/min. (with oil)   |
| 20,000 RPM > 6.56 Ft/min. (with oil)   |
| 20,000 RPM > 8.20 Ft/min. (with oil)   |
| 20,000 RPM > 9.84 Ft/min. (with oil)   |

FIGURE 2.5

#### EXAMPLE OF ALFREX PLATE FABRICATION TESTS 2

|                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 10,000 RPM<br>1.0m/min, with Oil                                                    | 10,000 RPM<br>2.5m/min, with Oil                                                    | 15,000 RPM<br>1.0m/min, with Oil                                                    | 15,000 RPM<br>2.0m/min, with Oil                                                     | 20,000 RPM<br>2.5m/min, with Oil                                                      | 20,000 RPM<br>3.0m/min, with Oil                                                      |
|  |  |  |  |  |  |

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## CNC MACHINE SETUP TIPS

### Cooling Lubricant Application

A coolant mister delivery and applicator system will need to be set up for proper use. CNC machinery manufacturers or certain coolant manufacturers like UNIST, Inc. should be contacted for specific equipment recommendations.

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FIGURE 2.7

### **CNC TOOL HEAD COVER CASE**



### Floating CNC Tool Head

Use of floating CNC tool heads is a common practice that can accommodate for slight bowing across sections of sheets. Rotation speeds for floating heads have worked successfully at 18,000 RPM however, the ideal "sweet spot" for each machine should be determined through trial and error.

### Vacuum System Performance & Efficiency Improvements

Investing in a more powerful vacuum system can be an effective improvement to a CNC table's performance with Alfrex Plate 3mm. However, other methods may increase the effectiveness of the system.

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FIGURE 2.6

### **ROUTING WITH COOLING LUBRICANT APPLICATION**



### Tool Head Cover Case

The installation of a casing around the tool head and applicator nozzles to create a "vacuum cage" will assist in controlling the spray of the coolant, removal of aluminum particulate and cooling lubricant, and help prevent excess buildup of aluminum burrs on the bed of the CNC and sheet.

### Lifted Sheet Edges on the CNC Table

Alfrex Plate 3mm is tension leveled for flatness. Nevertheless, MCM fabricators have to, on occasion, deal with minor shape issues with MCM and Plate sheet. This can occur when sheets are cut into smaller shapes, releasing stresses from tension leveling, and resulting in a slight lifting of the sheet at the edges of the length dimension. With incremental improvements to the CNC vacuum system and in other areas, sheets can be firmly adhered to the table for successful cutting and routing operations.

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FIGURE 2.8

### **ATEMAG SOFTOUCH FLOATING HEAD**



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## COOLING LUBRICANTS

It is highly recommended that lubrication be used in a continuously applied method to enable optimal results while avoiding increased heat buildup on the sheet and damage through to the finished surface. Successful fabricators of plate recommend that the use of a cooling lubricant for routing is a “must”, and not an option. Either ethanol or cutting oil-based products are suitable. The following have already been successfully used by fabricators and are available in North America.

UNIST Coolube® 2210 AL

UNIST Coolube® 2210

Tectyl Super Green 100A

Castrol Hysol® X

The determination of which cooling lubricant, applicator system, and methodology to use should be determined through direct contact with product and machinery manufacturers. Some CNC machinery manufacturers and coolant manufacturers like UNIST, Inc. sell applicator systems and can make specific recommendations.

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## CUTTING

Alfred recommends that cutting of Alfred 3mm Plate be performed either with shear presses, CNC equipment, or other high-quality machinery such as water jets. The use of hand tools or other machinery that may create excessive buildup of heat or unclear cuts is discouraged. Recommendations for rotation speeds, feed rates, and other information shown should be used as a starting point for determining your ideal parameters for cutting.

### Shearing

Cutting Alfred Plate to size on shear presses is an effective method for making larger cuts. Fabrication testing should be conducted first to make any necessary adjustments in order to achieve optimal results without excessive edge bending or damage to the coated surface. Successful shearing has been done on a 1.4” (6.3 mm) Power Shear, with a Rake Angle of 0.25” per foot (21 mm per meter), and a 1 degree relief angle.

### Non-Router Cutting

When shear presses or CNC tables cannot be used, successful cutting of Alfred 3mm Plate has been achieved with 9” diameter (229 mm), carbide tipped, 68 tooth aluminum cutting blades with a 1” arbor. A maximum 3,200 RPM and feed rate of 40” - 80” (1,000-2,032 mm) / minute is recommended as a starting point. Application of blade wax or a cooling lubricant is recommended to prevent overheating and gumming of aluminum fines on the cutting blade.

### Cutting with CNC Routers

Cutting with CNC routers utilizes the same bits as for routing MCM however, rotation speeds and feed rates will have to be modified. Successful cutting on CNC routers has been accomplished with Belin 108° folding bits at approximately 16,000 RPM with feed rates between 40” - 80” (1,000 - 2,032 mm) / minute. Cutting can also be accomplished using the (PCD) twisted helical end mill bits mentioned in the next section. As with all operations, it is critical to conduct tests to determine which parameters are ideal for the tooling and machinery utilized.



## ROUTING

Alfrex Plate 3mm is a product that can be easily routed in both V-Groove and U-Groove configurations using an industrial or commercial grade router with poly-crystalline diamond (PCD) twisted helical end bits at 90° or 110°. The diameter of the end-mill tool should be between 0.315" to 0.47" (8 mm to 12 mm). Belin 108° carbide folding bits have also been used successfully at rotations speeds of 16,000 RPM and feed rates between 40" - 80" (1,000 - 2,032 mm) / minute. Please consult Alfrex for more details on custom designed router bits that have been used in Australia and other markets.

### Routing Groove Channel Depth

The recommended routed groove channel depth for Alfrex Plate 3mm sheets is 0.090" (2.3mm), which not only ensures a crisp radius edge like 4mm MCM, but also ensures strength in the plate substrate at the folded edge.

### Rotation and Feed Rates

Successful results have been achieved employing rotation speeds between 15,000 - 20,000 RPM, with tool head feed rates between 40" - 118" (1,000 - 3,000mm) / minute. When routing grooves, the bottom of the groove should never reach the back of the aluminum sheet, with an ideal 0.0275" (0.7mm) of material left intact. Caution must be taken when securing sheets before routing operations begin to avoid any potential surface damage to the product. It is recommended that fabricators conducting

FIGURE 2.9

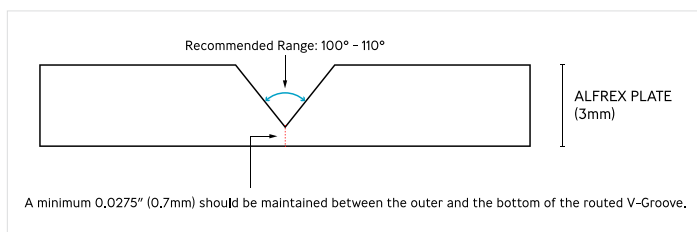
### PCD HELICAL END MILL ROUTER BIT



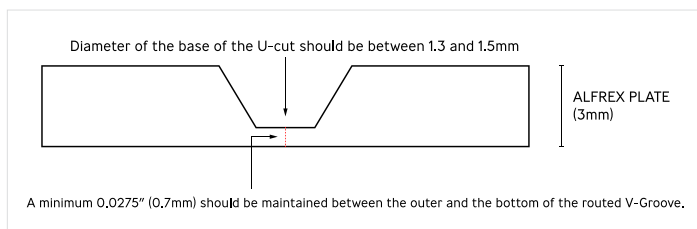
FIGURE 2.10

### ROUTING GROOVE CHANNEL DEPTH

#### ROUTING (V-GROOVE)



#### ROUTING (U-GROOVE)



initial tests with Alfrex Plate 3mm begin with a minimum feed rate of 8.2 linear feet (2.5 meters) per minute, and gradually increase speeds after acceptable results are achieved. These recommendations are starting points and it must be emphasized that a misted cooling lubricant be used in order to obtain acceptable results.



**BENDING AND FORMING**

Alfred Plate 3mm can be bent and formed in the same way as MCM with minor differences and limitations.

Route & Return Leg Edge Radius

Traditional post-painted aluminum plate with formed return legs has a rounded radius since the sheet back side is not routed. Alfred Plate 3mm, when routed and folded, will hold an identical edge radius as 4mm MCM 0.080" (2mm), since they both leave nearly identical amounts of material between the finished side and the bottom of the routed groove.

FIGURE 2.11

**COMPARISON OF ALFRED PLATE 3mm RETURN EDGE vs ALFRED FR MCM 4mm**

Alfred Plate 3mm Return Edge



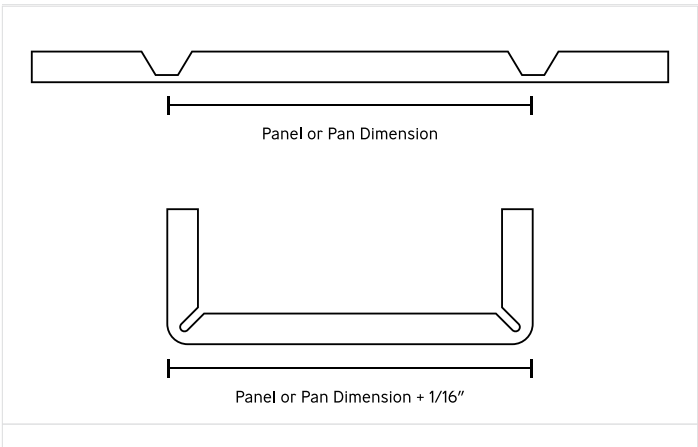
Alfred FR MCM 4mm Return Edge



As with 4mm MCM, the edge radius created by 3mm Plate at the bent edges will increase the sheet face between 0.03125" to 0.0625" (0.79mm to 1.59mm) when routed to the recommended channel depth. It is important to conduct trials before commercial production to verify the actual range and make any necessary adjustments in fabrication or layout dimensions.

FIGURE 2.12

**INCREASE IN SHEET FACE WITH BEND EDGE RADIUS**



Bent Edge Radius Appearance and Router Depth

The bent edge radius of Alfrex Plate changes depending on the type of routing (V-Groove vs U-Groove), as well as the routed channel depth. The following examples show how the depth of the routed groove channel affects the appearance of the bent edge.

FIGURE 2.13

**BEND EDGE RADIUS PROGRESSION**

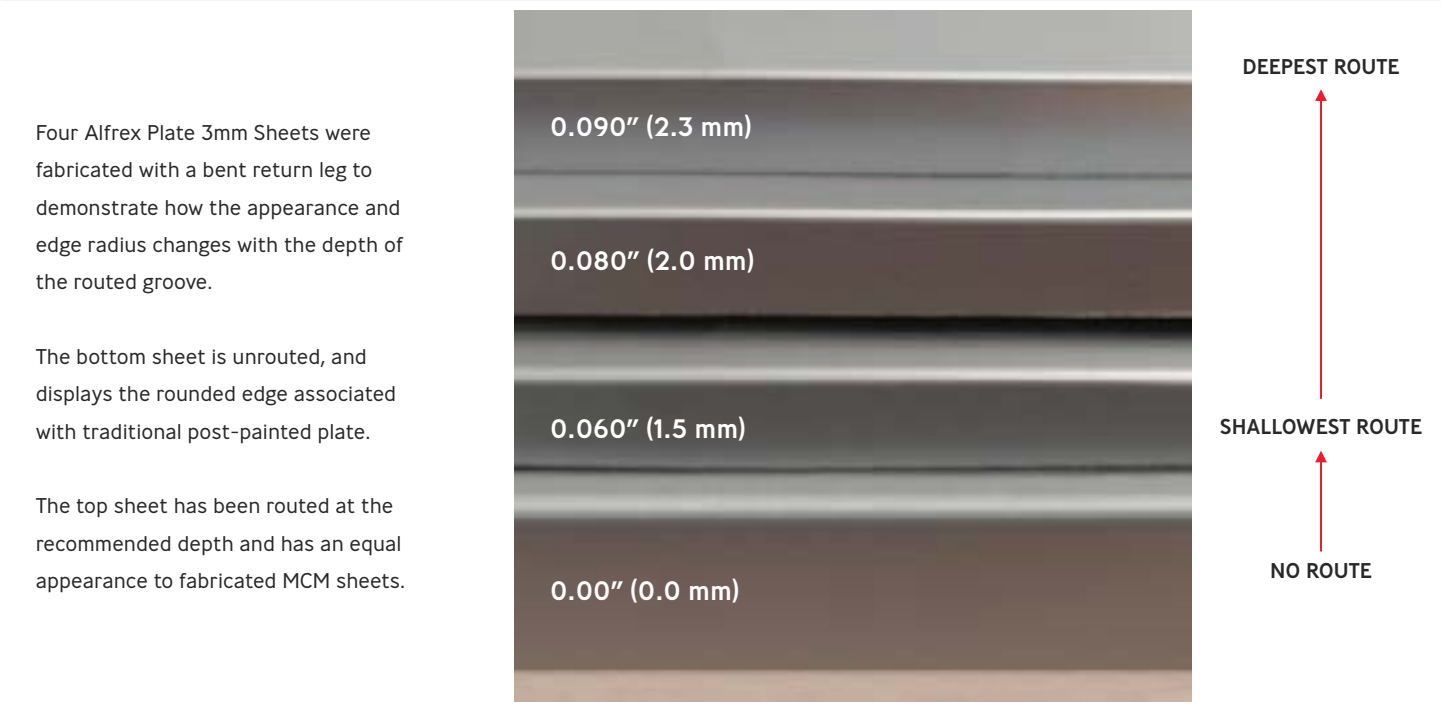


FIGURE 2.14

**U-GROOVE BULLNOSE EDGE**

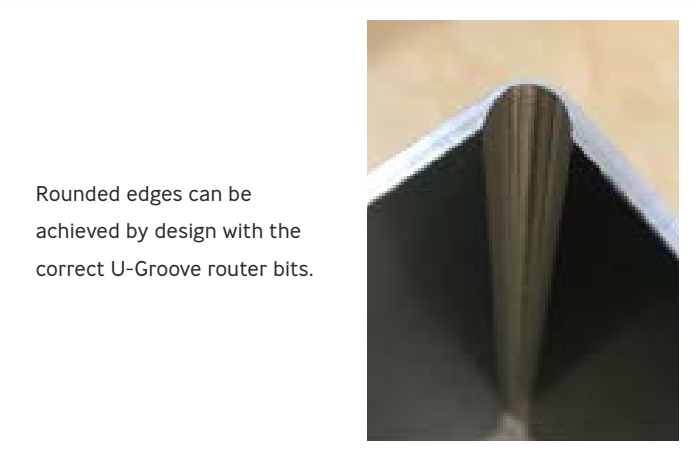


FIGURE 2.15

**V-GROOVE WITH PARALLEL CHANNELS**

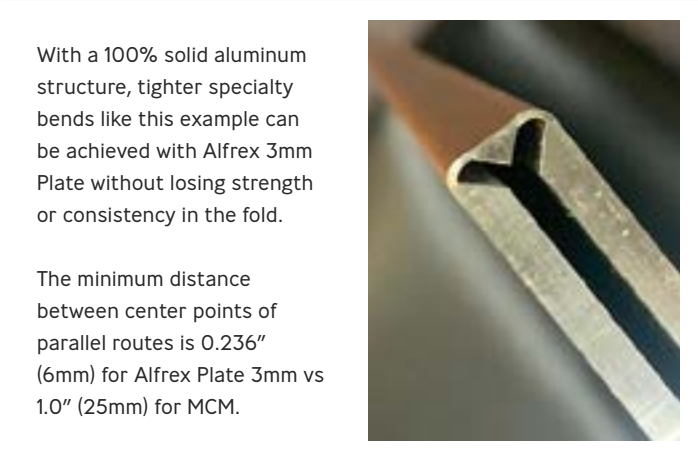


FIGURE 2.16

**TIGHT FOLDED CORNERS 1**

When fabricated correctly and prepared for installation, the radius edges and corner conditions of Alfrex Plate cassette modules appear as tight and crisp as MCM sheets.



FIGURE 2.17

**TIGHT FOLDED CORNERS 2**



Roll Forming

Alfred Plate 3mm may be roll formed using the same processes as those used for MCM however, the minimum bend radius without routing is larger than that of 4mm FR MCM.

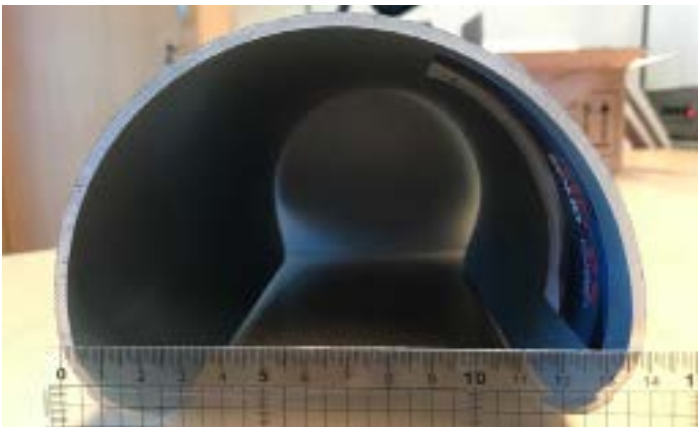
FIGURE 2.19

MINIMUM BEND RADIUS COMPARISON (UNROUTED SHEET)

|                  |              |
|------------------|--------------|
| Alfred Plate 3mm | 5.5" (140mm) |
| MCM 4mm FR       | 4.0" (102mm) |
| MCM 6mm FR       | 5.5" (140mm) |

FIGURE 2.18

MINIMUM BEND RADIUS (UNROUTED SHEET)



PERFORATION AND FACE FASTENING

Perforation and Open Areas with Exposed Edges

Alfred Plate may be perforated or fabricated with exposed areas on the sheet for design purposes however, special care and precautions must be followed in order to ensure proper performance of the coating finish when unfinished edges are exposed to the environment. Perforated and Exposed Edge applications refer to fabricated sheet edges and open areas located on the sheet surface are visibly exposed to open atmospheres, and do not serve as a terminated edge of the sheet.

All perforation and related operations should be carried out using turret press, punch press, tooled break press, tri-axis water jet processing machines. Laser Jet or CNC fabrication of the sheet are not recommended as they can cause heat damage to the top paint layer, leaving exposed aluminum vulnerable to oxidization.

The total perforated or open area of any individual sheet should not exceed 30% of total area of the sheet. The minimum distance between each perforated hole or open area is 1.5 x the thickness of the sheet, equating to 0.177" (4.5mm) for 3mm thick Alfred Plate. All perforated and other open areas with exposed edges must be located greater than or equal to 1.25" (32mm) from the terminating edge of the sheet.

It is important to note that when perforating or cutting open areas into sheets, the rigidity of the sheet will naturally decrease. It is not uncommon for Plate, like MCM, to bow after perforation due to the release of internal stresses in the sheet. For this reason, it is recommended that route and return installation solutions are utilized where sheets are formed into sheet modules (cassettes) like MCM.

FIGURE 2.21

PERFORATED PLATE



### Face Fastened Sheet Applications

Some requirements dictate the face fastening of Alfrex Plate sheets. In these applications it is critical that the following measures be taken in order to prevent bimetallic or galvanic corrosion between Alfrex Plate sheets and attachment materials:

1. Only stainless-steel screws may be used.
2. Spacers must be installed between Alfrex Plate and z-girts or hat channels.

Where perforated Alfrex Plate sheets are to be face fastened, extra measures should be taken to stiffen sheets to ensure that they meet the flatness criteria of the design.

### Limited Finish Warranty for Perforated and Face Fastened Sheets

In cases where Alfrex Plate will be fabricated with perforations and open areas with exposed edges, or face fastened, a maximum 10-year limited paint finish warranty is available depending on the paint finish used. Conditions and limitations of the finish warranty for all perforated and exposed edge applications are listed in the Alfrex Plate Perforated Limited 10 Year Finish Warranty. Important highlights include:

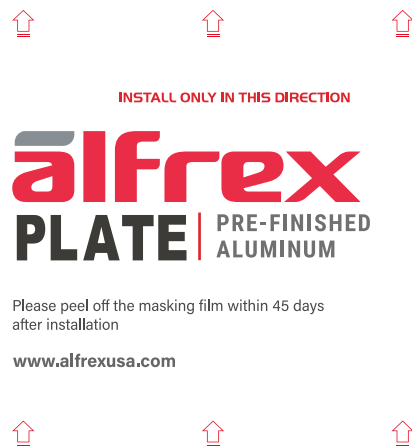
1. The maximum finish warranty for Alfrex Plate sheets with perforations or exposed edge conditions is 10 Years regardless of the paint system used.
2. All perforated and exposed edge conditions, fabrication processes, and equipment to be used for perforation and exposed edge area fabrication should be approved in advance by Alfrex in order to avoid nullification of the finish warranty.
3. Warranties will be issued only for installations located greater than or equal to 1mile (1.6km) from any coastline, saltwater, or brackish saltwater.
4. All perforated and exposed edge applications exposed to salt spray or within 1.5miles (2.4km) of salt-water or industrial atmospheres, as well as areas unwashed by rain exposure, must be maintained by washing with fresh tap water once every 6 months and documentation of this maintenance provided upon request.

### **PROTECTIVE FILM AND INSTALLATION DIRECTION**

Alfrex Plate is protected with the same type of protective film used on Alfrex FR MCM and most other brands. It protects the pre-finished surface of the product from dirt, scratches and tool marks that may potentially arise during the fabrication, handling, storage and transport of the product. The protective film is not intended to protect against corrosion, humidity or contact with any chemical products. It should be removed with 45 days following completion of fabrication and installation.

FIGURE 2.22

#### **ALFREX PLATE PROTECTIVE FILM**



The protective film for Alfrex Plate is printed with directional arrows to assist in properly orienting sheets during fabrication and installation. As with MCM, it is an absolute requirement that arrows be installed in the same direction when Alfrex Plate is pre-finished in directional finishes such as mica, metallic, metal series, wood series, and other specialty pattern finishes.

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## STORAGE AND HANDLING

Alfrex Plate sheets are cut to length and packaged in cushioned, reinforced skids to prevent excessive sagging of the skid when lifting and moving via fork trucks. Pallets of Alfrex Plate should always be stored horizontally on flat surfaces that prevent sagging or shifting. Do not stack pallets higher than six skids high. Storage should be in a cool, dry area with stable temperatures to prevent formation of condensation. Sheets should not be stored where they can be exposed to moisture which may cause permanent surface damage.

Care should be taken when handling individual sheets during fabrication. When lifted from each end, individual sheets will sag in the center as they are moved. Sagging should be minimized by having additional support in the center. Care must be taken to lift sheets high enough so that the sagging center sheet edge does not damage the surface of the sheet directly underneath as it is moved.

Alfrex Plate sheets may be temporarily staged in “A-frame” racks commonly used with MCM sheets. It is not recommended that Alfrex Plate sheets be transferred to other pallets not supplied by Alfrex as they may sag excessively - inducing permanent set in the solid aluminum plate sheets which will manifest in sheet bowing when placed on CNC tables.

FIGURE 2.23

### ALFREX PLATE 3mm SHEET STORAGE

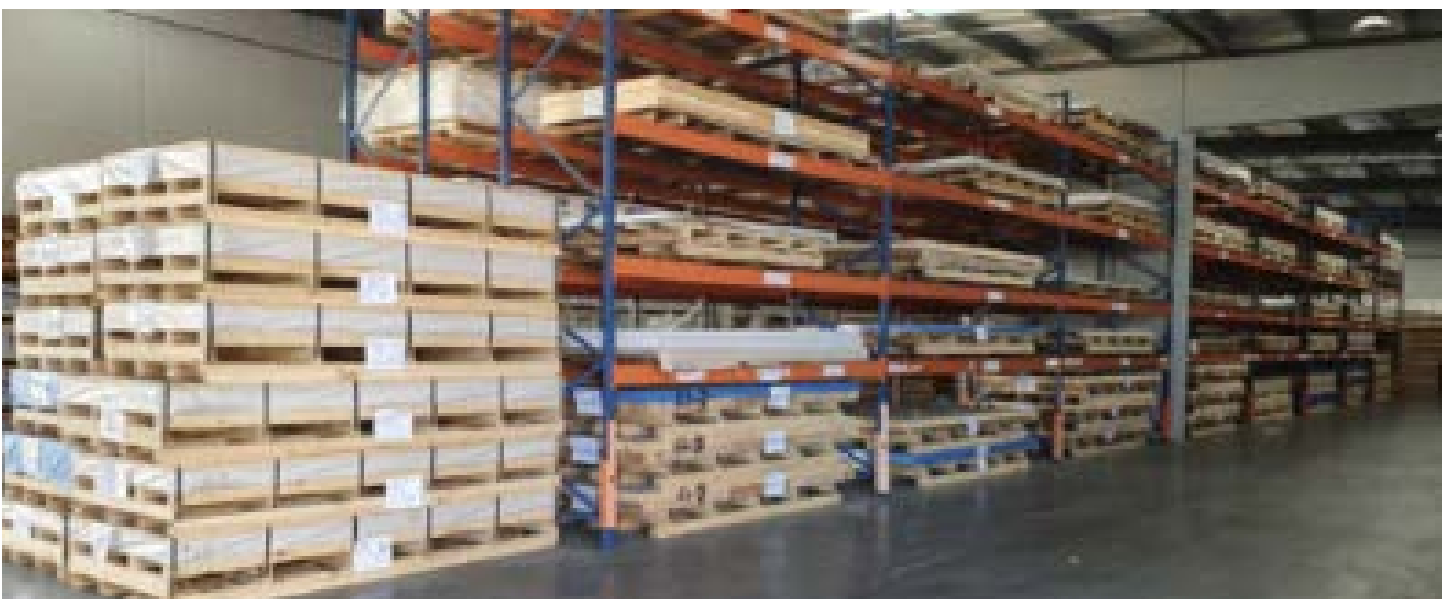


FIGURE 2.24

**ALFREX PRODUCT WEIGHT AND PACKAGING LIMITS**

|                  | Unit Weight                            | Typical Sheet Size             | Sheet Weight      | Max Sheets per Skid <i>4100 lb (1860 kg)</i> |
|------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------------|
| Alfrex Plate 3mm | 1.66 lbs/sf (8.10 kg/m <sup>2</sup> )  | 62" x 196" (1575 mm x 4978 mm) | 140 lbs (63.5 kg) | 23 sheets                                    |
| Alfrex 4mm FR    | 1.51 lbs/sf (7.37 kg/m <sup>2</sup> )  | 62" x 196" (1575 mm x 4978 mm) | 127 lbs (53.5 kg) | 25 sheets                                    |
| Alfrex 6mm FR    | 2.13 lbs/sf (10.40 kg/m <sup>2</sup> ) | 62" x 196" (1575 mm x 4978 mm) | 118 lbs (81.5 kg) | 16 sheets                                    |

**CLEANING AND MAINTENANCE**

Alfrex recommends that installed panels be cleaned on a regular basis in order to maintain their aesthetic appearance and to prevent the accumulation of dirt and particulate present in the local environment. The frequency and degree of cleaning is dependent upon several factor including the building location proximity to bodies of fresh water on the ocean, local climate, pollution levels, proximity to heavy industry, and overall air quality. A general practice is to clean panels at the same time a building's windows are cleaned. For detailed information, please consult the Alfrex Cleaning and Maintenance Recommendations document in the Appendices of this manual.

**TOUCH UP PAINTING**

Crosslink Paints of Dallas, Texas manufactures touch up paint and applicator products specifically for the metal wall sheet and roofing industry in a number of paint systems including air-dry PVDF / KYNAR® resin paint. They should be contacted directly for purchase of their products which include touch up pens, liquid bottle & brush kits, aerosol spray cans, and paint cans of matched finishes.

**CROSSLINK PAINTS**

Phone: 972-364-7839

Email: Sales@crosslinkpaints.com

Website: <https://www.crosslinkpaints.com>

**POST-PAINTING**

Alfrex Plate is a coil coated metal wall cladding sheet top side coated with a 70% PVDF / KYNAR® resin finish, and bottom side coated with an epoxy finish which can be post-painted utilizing both air dry and baked-on finishes. Post-painting should only be performed by experienced applicators in the proper preparation of architectural wall sheets and application of coating systems for exterior applications.

Alfrex does not offer finish warranties for post-painted finishes. All warranties must be provided by the finish applicator directly to the warrantee. For detailed information, please consult the Alfrex Post-Painting Recommendations document in the Appendices of this manual.

PRODUCT FABRICATION QUICK REFERENCE DATA

Alfred FR Metal Composite Material and Alfred Plate



Fire Resistant & Non-Combustible Cladding

| SECTION           | SUB-SECTION                        | DESCRIPTION                      | ALFREX FR MCM                               |                |                |                | ALFREX PLATE 3mm                                                                                |
|-------------------|------------------------------------|----------------------------------|---------------------------------------------|----------------|----------------|----------------|-------------------------------------------------------------------------------------------------|
| CUTTING           | Circular Saw<br>Vertical Panel Saw | Blade Type                       | Carbide tipped blades suitable for aluminum |                |                |                | Carbide tipped blades suitable for aluminum                                                     |
|                   |                                    | Blade Diameter                   | 80"<br>(200mm)                              | 10"<br>(250mm) | 12"<br>(300mm) | 14"<br>(350mm) | 9" (229mm) with 1" arbor                                                                        |
|                   |                                    | Blade Teeth                      | 60 tooth or greater, extra fine             |                |                |                | 68 tooth or greater, extra fine                                                                 |
|                   |                                    | Max Cutting Speed                | 5,500 RPM                                   |                |                |                | 3,200 RPM                                                                                       |
|                   |                                    | Feed Rate                        | ≤ 16" (405mm) per second                    |                |                |                | 40" - 80" (1000-2032mm) / minute                                                                |
|                   | Shear Press                        | Clearance                        | 4mm FR : 0.002" (0.05mm)                    |                |                |                | 1/4" (6.3mm) Power Shear with Rake Angle of 0.25" per foot (21mm per meter) and 1° relief angle |
|                   |                                    |                                  | 6mm FR : 0.008" (0.20mm)                    |                |                |                |                                                                                                 |
|                   |                                    | Rake Angle                       | 4mm FR : 1° 30'                             |                |                |                |                                                                                                 |
|                   |                                    |                                  | 6mm FR : 2° 30'                             |                |                |                |                                                                                                 |
| CUTTING & ROUTING | Routing Saw Blade                  | Blade Type                       | Carbide tipped blades suitable for aluminum |                |                |                | See Circular Saw / Vertical Panel Saw Information<br>Lubrication May be Required                |
|                   |                                    | Teeth                            | 8 teeth for grooving                        |                |                |                |                                                                                                 |
|                   |                                    | Estimated Lifespan               | -                                           |                |                |                |                                                                                                 |
|                   |                                    | Blade Diameter                   | 12", (-305mm)                               |                |                |                |                                                                                                 |
|                   |                                    | Blade Tip Width V-Groove         | 0.063" - 0.080" (1.6mm - 2mm)               |                |                |                |                                                                                                 |
|                   |                                    | Blade Tip Width U-Groove         | 0.551" (14mm)                               |                |                |                |                                                                                                 |
|                   |                                    | Blade Tip Angle                  | 95° or 110°                                 |                |                |                |                                                                                                 |
|                   |                                    | Recommended Route Depth          | 0.122" (3.1mm)                              |                |                |                |                                                                                                 |
|                   |                                    | Route Depth from Outer Skin Side | 0.035" (0.9mm)                              |                |                |                |                                                                                                 |
|                   |                                    | Rotation Speed                   | 3,000 - 5,000 RPM                           |                |                |                |                                                                                                 |
|                   |                                    | Feed Rate                        | ≤192" (4876mm) / min                        |                |                |                |                                                                                                 |
|                   |                                    | Bit Lubrication                  | Not Required                                |                |                |                |                                                                                                 |



PRODUCT FABRICATION QUICK REFERENCE DATA

Alfred FR Metal Composite Material and Alfred Plate



Fire Resistant & Non-Combustible Cladding

| SECTION           | SUB-SECTION         | DESCRIPTION                                                          | ALFREX FR MCM                      | ALFREX PLATE 3mm                                                         |
|-------------------|---------------------|----------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------|
| CUTTING & ROUTING | V-Groove Router Bit | Router Bit Type                                                      | Carbide Router Bits                | Poly-Crystalline Diamond (PCD) Helical End Mill Bits                     |
|                   |                     |                                                                      |                                    | Belin Carbide Router Bit                                                 |
|                   |                     | Teeth                                                                | 2 to 4 Teeth                       | Not Applicable                                                           |
|                   |                     | Estimated Lifespan                                                   | -                                  | 54,000 - 64,500sqft (5,000 and 6,000sqm)                                 |
|                   |                     | Router Bit Diameter                                                  | -                                  | >0.315" <0.47" ( >8mm <12mm)                                             |
|                   |                     | Router Bit Tip Diameter                                              | 0.063" - 0.080" (1.6mm - 2mm)      | 0.0480" - 0.0591" (1.22mm - 1.50mm)                                      |
|                   |                     | Bit Angle                                                            | 95° or 110°                        | 95° or 110°                                                              |
|                   |                     |                                                                      |                                    | 108°                                                                     |
|                   |                     | Recommended Router Depth                                             | 0.122" (3.1mm)                     | 0.090" (2.3mm)                                                           |
|                   |                     | Route Depth from Outer Skin Side                                     | 0.035" (0.9mm)                     | 0.0275" (0.7mm)                                                          |
|                   |                     | Double Parallel Routes - minimum distance centerpoint to centerpoint | 1.0" (25mm)                        | 0.236" (6mm)                                                             |
|                   |                     | Rotation Speed                                                       | 20,000 - 30,000 RPM                | 15,000 - 20,000 RPM                                                      |
|                   |                     |                                                                      |                                    | 16,000 RPM                                                               |
|                   |                     | Feed Rate                                                            | 120" - 192" (3,100 - 4876mm) / min | 40" - 118" (1,000 - 3,000mm) / minute                                    |
|                   |                     |                                                                      |                                    | 40" - 80" (1000 - 2032mm) / minute                                       |
|                   |                     | Bit Lubrication                                                      | Not Required                       | Ethanol or cutting oil based applied continuously to the router bit tip. |
|                   | U-Groove Router Bit | Router Bit Type                                                      | Carbide Router Bits                | Please refer to above V-Groove Router Bit Information                    |
|                   |                     | Teeth                                                                | 2 to 4 Teeth                       |                                                                          |
|                   |                     | Router Bit Tip Diameter                                              | 0.551" (14mm)                      |                                                                          |
|                   |                     | Bit Angle                                                            | 95° or 110°                        |                                                                          |
|                   |                     | Recommended Router Depth                                             | 0.098" (2.5mm)                     |                                                                          |
|                   |                     | Route Depth from Outer Skin Side                                     | 0.060" (1.5mm)                     |                                                                          |
|                   |                     | Rotation Speed                                                       | 20,000 - 30,000 RPM                |                                                                          |
|                   |                     | Feed Rate                                                            | 120" - 192" (3100 - 4876mm) / min  |                                                                          |
|                   |                     | Bit Lubrication                                                      | Not Required                       |                                                                          |
| FOLDING           |                     | Routed Panel Minimum Bend Radius                                     | 0.080" (2mm)                       | 0.080" (2mm)                                                             |
|                   |                     | Non-Routed Minimum Bend Radius                                       | Not Applicable                     | 3mm Plate: 0.30" (7.5mm)                                                 |

PRODUCT FABRICATION QUICK REFERENCE DATA

Alfred FR Metal Composite Material and Alfred Plate



Fire Resistant & Non-Combustible Cladding

| SECTION                         | SUB-SECTION                         | DESCRIPTION                                     | ALFREX FR MCM                                                                                                                                                                                                      | ALFREX PLATE 3mm                                                                                                                                                                                                                                                                                                        |
|---------------------------------|-------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CURVING                         | Press<br>Break<br>Pyramid<br>Roller | Minimum Bend Radius<br>(No Routing)             | 4mm FR : 4.0" (102mm)                                                                                                                                                                                              | 5.5" (140mm)                                                                                                                                                                                                                                                                                                            |
|                                 |                                     |                                                 | 6mm FR : 5.5" (140mm)                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                         |
| DRILLING                        |                                     | Drill Bit Type                                  | High speed steel, twist drill bits                                                                                                                                                                                 | High speed steel, twist drill bits                                                                                                                                                                                                                                                                                      |
|                                 |                                     | Tip Angle                                       | 100° to 140° or a counter-bore grind with a centering tip                                                                                                                                                          | 100° to 140° or a counter-bore grind with a centering tip                                                                                                                                                                                                                                                               |
|                                 |                                     | Rotation Speed                                  | 165-980 RPM                                                                                                                                                                                                        | 165-980 RPM                                                                                                                                                                                                                                                                                                             |
| PUNCHING                        |                                     | Punch Die Clearance                             | 4mm FR : 0.008" (0.2mm)                                                                                                                                                                                            | 0.012" (0.3mm)                                                                                                                                                                                                                                                                                                          |
|                                 |                                     |                                                 | 6mm FR : 0.012" (0.3mm)                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                         |
| PERFORATING                     |                                     | General                                         | Only with approved machinery and methods                                                                                                                                                                           | Only with approved machinery and methods                                                                                                                                                                                                                                                                                |
|                                 |                                     | Panel Reaction                                  | MCM Panels can bow slightly after perforation                                                                                                                                                                      | Better solution for perforated panel applications                                                                                                                                                                                                                                                                       |
|                                 |                                     | Total Perforated Area                           | Less than or equal to 45% of total panel surface area                                                                                                                                                              | Less than or equal to 30% of total panel surface area                                                                                                                                                                                                                                                                   |
|                                 |                                     | Distance between Perforations<br>(Edge to Edge) | 1.5 x Panel Thickness                                                                                                                                                                                              | 1.5 x Panel Thickness<br>0.177" (4.5mm)                                                                                                                                                                                                                                                                                 |
|                                 |                                     |                                                 | 4mm FR : 0.236" (6mm)                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                         |
|                                 |                                     |                                                 | 6mm FR : 0.354" (9mm)                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                         |
|                                 |                                     | Minimum Distance from Perimeter Edge            | 1.25" (32mm)                                                                                                                                                                                                       | 1.25" (32mm)                                                                                                                                                                                                                                                                                                            |
|                                 |                                     | Maximum Finish Warranty                         | Not Available                                                                                                                                                                                                      | 10 Years maximum with perforated panels                                                                                                                                                                                                                                                                                 |
|                                 |                                     | Recommended Machinery / Process                 | Turrent punch press only                                                                                                                                                                                           | Turret punch press, punch press, tooled brake press, pre-approved water jet                                                                                                                                                                                                                                             |
| JOINING, FASTENING,<br>RIVETING |                                     | Non-Recommended Methods                         | Operations which can cause heat damage to the top paint layer, leaving exposed aluminum vulnerable to oxidation. Consult Alfred for more specifics.                                                                | Operations which can cause heat damage to the top paint layer, leaving exposed aluminum vulnerable to oxidation. Consult Alfred for more specifics.                                                                                                                                                                     |
|                                 |                                     |                                                 | Only utilize Aluminum, Stainless Steel or steel materials coated or plated with zinc or aluminum. Do NOT use materials which will result in electrolysis including iron, uncoated steel, copper, brass, or bronze. | Only utilize Aluminum, Stainless Steel, or steel materials coated or plated with zinc or aluminum. Do NOT use materials which will result in electrolysis including iron, uncoated steel, copper, brass, or bronze. Only utilize aluminum rivets suitable for use with structural loads and high external temperatures. |
| WELDING                         |                                     |                                                 | Not recommended as it will damage the panel and void all warranties                                                                                                                                                | Not recommended for coil coated plate as it will damage the paint coating and void the finish warranty                                                                                                                                                                                                                  |

Alfred Plate is a coil coated metal wall cladding sheet top side coated with a 70% pvdf / kynar resin finish. For situations requiring smaller quantities of a custom color, post-painting may be the only economically viable option. Post-painting should only be done by experience applicators with experience in proper preparation of architectural wall panels and application of coating systems for exterior applications.

## General Recommendations

- It is important to confirm with Alfred in advance if sheets are to be post-painted and properly identify the type of coatings present. Alfred Plate is bottom side coated with an epoxy finish which can be post-painted utilizing both air dry and baked-on finishes. The backside epoxy coating must be properly prepared before post-painting to ensure proper finish adhesion and long-term performance.
- Before painting, it is highly recommended that spot testing be done on small sample sheet, or in a small inconspicuous area to confirm if the preparation procedures and paint application achieve the desired color and adhesion levels required for long term exterior exposure.
- The epoxy coating must be lightly abraded utilizing fine grade sandpaper or similar products. Special care must be taken to abrade the surface uniformly across the entire panel substrate without significantly decreasing its dry film thickness.
- After abrasion, the sheet surface should be thoroughly wiped clean to remove dust and other surface contaminants. Utilize soft cloth and epoxy resin compatible, solvent based cleaners. Surfaces must be properly prepared before post-painting and should be degreased, clean, dry, and free of dust, dirt, oils, or any other surface contaminants.
- Only use cleaning solvents, primer coatings, and finish coatings approved by the post-painter.
- Though the abraded epoxy primer can serve as a post-paint primer, it is recommended that the sheet surface be primer coated again. This is especially important for exterior applications where longer term UV performance, film integrity, and coating warranties extended by the post-painter are required.
- Alfred Plate may be coated with air-dry and baked-on finishes. Both should be spray applied by an experienced professional applicator.
- It is recommended that the finish applicator be informed in advance of material, process, and compatibility concerns.
- For the post-painting of Alfred FR MCM, please consult the recommendations for that specific product since only air-dry finishes may be used with heat limitations that should not exceed 140 °F (60 °C).

Exclusions

- 1. For any post-painted Alfred Plate or Alfred MCM product, all finish warranties for the top side coating are null and void. All other warranties, representations or guarantees, express or implied, written or oral, by operation of law or otherwise, including without limitation, the implied warranties of merchantability and fitness for a particular purpose are excluded.
- 2. Alfred does not offer finish warranties for post-painted finishes. All warranties must be provided by the finish applicator directly to the warrantee.
- 3. All sales of Alfred products are subject to its General Terms and Conditions which may be found at [www.alfrexusa.com](http://www.alfrexusa.com) in the downloads section.

| EPOXY COATING PROPERTIES |                               |
|--------------------------|-------------------------------|
| PROPERTY                 | RESULT                        |
| Color                    | Light Gray                    |
| Particle Size            | Max 25µm                      |
| Gloss at 60 °            | 30 ± 5                        |
| Viscosity (sec)          | 100 ± 20 (F.C#4/25°C)         |
| Density                  | 1.3 ± 0.05                    |
| NVM (%)                  | 62 ± 3                        |
| MEK Rubbing              | Min 50                        |
| Flexibility              | 2T                            |
| Pencil Hardness          | 2H                            |
| Acid Resistance          | No Blisters                   |
| Alkali Resistance        | No Blisters                   |
| Boiling Water Resistance | No Blisters                   |
| S.S.T 200hrs             | Plain Surface : No Blisters   |
|                          | Cross Hatch Surface : Max 2mm |

# ALFRED PLATE CERTIFICATIONS & COMPLIANCE REPORTS

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# SOUTHWEST RESEARCH INSTITUTE®

6220 CULBERTSON RD. 78238-5196 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 884-5111 • WWW.SWRI.ORG  
CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
FIRE TECHNOLOGY DEPARTMENT  
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## FIRE PERFORMANCE EVALUATION TESTED IN ACCORDANCE WITH ASTM E 136-11, *STANDARD TEST METHOD FOR BEHAVIOR OF MATERIALS IN A VERTICAL TUBE FURNACE AT 750 °C*

MATERIAL ID AND TRADE NAME: **3003**

**FINAL REPORT**  
Consisting of 5 Pages

SwRI® Project No. 01.16052.01.620a  
Test Dates: March 18 and 24, 2011  
Report Date: April 14, 2011

Prepared for:

The Aluminum Association, Inc.  
1525 Wilson Blvd., Suite 600  
Arlington, VA 22209

Prepared by: Cory Harper, Technician  
*CH*

Submitted by:

*Christina Gomez*  
Christina Gomez  
Research Engineer  
Material Flammability Section

Approved by:

*Matthew S. Blais*  
Matthew S. Blais, Ph.D.  
Director  
Fire Technology Department

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## 1.0 INTRODUCTION

This report describes a small-scale fire test conducted on a material identified as 3003 in accordance with ASTM E 136-11, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 °C*, for The Aluminum Association, Inc., located in Arlington, Virginia. Testing was conducted March 18 and 24, 2011, at the Fire Technology Department of Southwest Research Institute (SwRI), located in San Antonio, Texas.

This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.

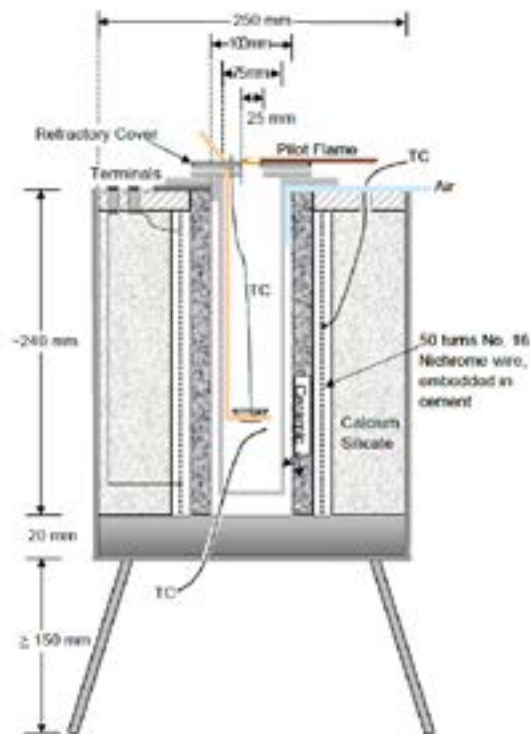
The results presented in this report apply specifically to the specimens tested, in the manner tested, and not to the entire production of these or similar materials, nor to the performance when used in combination with other materials.

## 2.0 DESCRIPTION OF TEST APPARATUS AND PROCEDURE

The ASTM E 136-11 hot-air ignition furnace consists primarily of an electrical heating unit and specimen holder. The furnace tube is a vertical tube, with an inside diameter of  $100 \pm 5$  mm and a length of  $230 \pm 20$  mm, made of ceramic that will withstand at least 750 °C. The inner ceramic tube, with an inside diameter of  $75 \pm 5$  mm, a length of  $230 \pm 20$  mm, and a thickness of approximately 3 mm, is placed inside the furnace tube and positioned  $20 \pm 2$  mm above the furnace floor on spacer blocks. The test apparatus is shown in Figure 1.

The air temperature inside the furnace is stabilized to 750 °C prior to testing. Sheathed thermocouples are used to measure the temperature of the furnace air ( $T_f$ ), specimen surface ( $T_s$ ), and specimen interior ( $T_c$ ). The duration of flaming is recorded during the test, and specimen mass loss is determined based on weight measurements before and after testing. ASTM E 136-11 requires that a series of four tests be conducted for each sample.





**Figure 1. Schematic of SwRI's Hot-Air Furnace.**

A material passes if at least three of the four specimens tested meet the following criteria (The three specimens do not need to meet the same condition.):

1. When the weight loss is 50% or less:
  - a. The surface and interior thermocouples cannot have a temperature rise of more than 30 °C from the stabilized temperature measured by the interior thermocouple before testing.
  - b. No sustained flaming after the first 30 s of the test.
2. When the weight loss is 50% or more:
  - a. The surface and interior thermocouples cannot exhibit any temperature rise from the stabilized temperature measured by the interior thermocouple before testing.
  - b. No flaming at any time during the test.

### **3.0 DESCRIPTION OF TEST SPECIMENS**

The Aluminum Association, Inc., provided six specimens of the material, identified as 3003. The samples measured approximately 38 × 38 × 51 mm and were received by SwRI on February 28, 2011. A description of the material provided by the client can be found in Table 1. The samples were placed in a controlled environment maintained at 23 °C ± 2 °C (73 °F ± 5 °F) and 50% ± 5% relative humidity on March 5, 2011. Prior to testing, the specimens were placed in an oven at 60 °C for 24 hr, then placed in a desiccator to cool at room temperature. Due to the nature of the material, at the 750° C heat exposure from this test, the solid block changed phase to a liquid pool. To



avoid furnace damage from molten material, the specimens were slightly trimmed and placed in an open-top vessel as described in section 6.2.1 of the ASTM E136-11 standard.

**Table 1. Test Sample Description Provided by the Client.**

| <b>Material ID</b> | <b>Description of Material</b> | <b>Composition</b>                           | <b>Nominal Thickness</b> | <b>Nominal Density</b>                                   | <b>Color</b>                           |
|--------------------|--------------------------------|----------------------------------------------|--------------------------|----------------------------------------------------------|----------------------------------------|
| 3003               | 3003 Test Block                | Nominal w/o – 1.25 Mn – 0.12 Cu – Al Balance | 2.0 in.<br>(50.9 mm*)    | 0.099 lbs/in. <sup>3</sup><br>(2730 kg/m <sup>3</sup> *) | Aluminum<br>(silver like)<br>(Silver*) |

\* Measured by SwRI personnel.

#### **4.0 TEST RESULTS**

Testing was conducted on March 18 and 24, 2011. During testing, flaming was not observed in any of the four test runs. Tabular test data and graphs of the measured temperatures plotted with respect to time are presented on page 5.

#### **5.0 CONCLUSIONS**

The material identified as *3003* **meets** the performance criteria presented in ASTM E 136-11.

**SOUTHWEST RESEARCH INSTITUTE**  
**ASTM E 136 TEST DATA SHEET**

Client: The Aluminum Association, Inc.  
 Operator: Z. Holt  
 Test Date(s): March 18 and 24, 2011  
 Material ID\*: 3003  
 Trade Name\*: 3003  
 Description\*: 3003 Test Block

Receipt Date: February 28, 2011  
 Date Prepared by SwRI: Prepared on test date  
 Color: Silver  
 Original Thickness: 50 mm  
 Test Sample Thickness: 50 mm  
 Average Sample Mass: 195.43 g

\* Information/Instructions provided by the Client

**RESULTS**

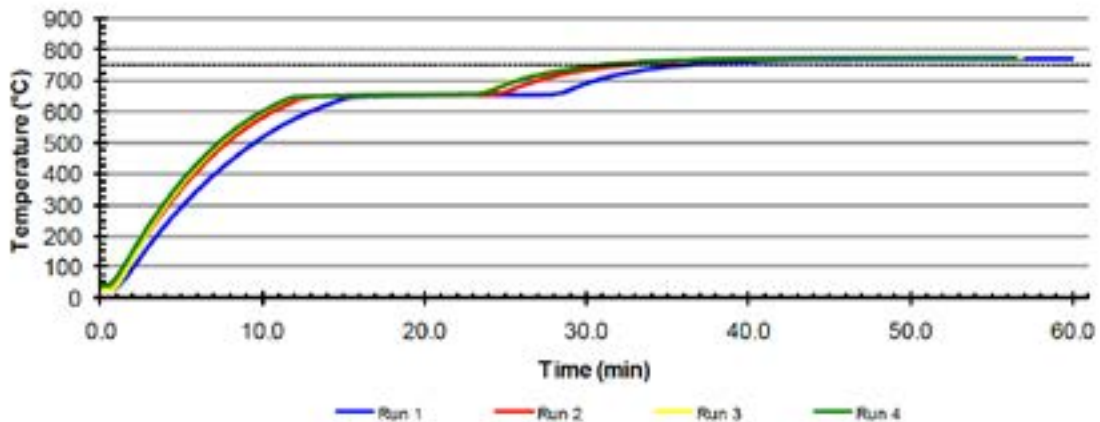
| Run | Initial Mass (g) | Final Mass (g) | Percent Mass Loss | Specimen Center |              |         |                      | Specimen Surface |              |         |                      |
|-----|------------------|----------------|-------------------|-----------------|--------------|---------|----------------------|------------------|--------------|---------|----------------------|
|     |                  |                |                   | Stabilized (°C) | Maximum (°C) | ΔT (°C) | Criteria* ΔT < 30 °C | Stabilized (°C)  | Maximum (°C) | ΔT (°C) | Criteria* ΔT < 30 °C |
| 1   | 184.51           | 184.55         | 0%                | 751             | 770          | 19      | Pass                 | 751              | 774          | 23      | Pass                 |
| 2   | 198.93           | 198.79         | 0%                | 752             | 777          | 26      | Pass                 | 752              | 777          | 25      | Pass                 |
| 3   | 199.45           | 199.35         | 0%                | 750             | 775          | 25      | Pass                 | 750              | 773          | 23      | Pass                 |
| 4   | 198.73           | 198.70         | 0%                | 752             | 776          | 24      | Pass                 | 752              | 774          | 22      | Pass                 |

\*Criteria for which percent mass loss < 50%

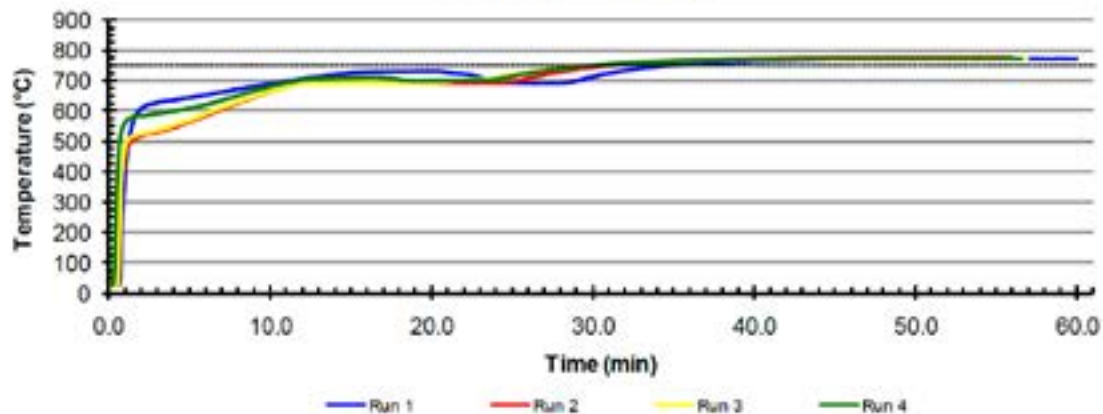
**TEST OBSERVATIONS**

|   | Insertion Time (s) | Ignition Time (mins) | Flameout (mins) | Duration of flaming (mins) | Criteria: No flaming after first 30 s | Observed Smoke (mins) | Observed Soot (mins) | Total Test Time (s) |
|---|--------------------|----------------------|-----------------|----------------------------|---------------------------------------|-----------------------|----------------------|---------------------|
| 1 | 45                 | N/A                  | N/A             | 0:00                       | Pass                                  | None                  | None                 | 3554                |
| 2 | 40                 | N/A                  | N/A             | 0:00                       | Pass                                  | None                  | None                 | 3314                |
| 3 | 39                 | N/A                  | N/A             | 0:00                       | Pass                                  | None                  | None                 | 3373                |
| 4 | 32                 | N/A                  | N/A             | 0:00                       | Pass                                  | None                  | None                 | 3358                |

**Center Temperature Graph**



**Surface Temperature Graph**



# ALFREX, LLC

## LETTER REPORT

### SCOPE OF WORK

CAN/ULC-S114-2018; STANDARD METHOD OF TEST FOR DETERMINING NON-COMBUSTIBILITY IN BUILDING MATERIALS ON ALFREX PLATE.

### REPORT NUMBER

104403237MID-001A

### TEST DATE(S)

08/25/20

### ISSUE DATE

09/14/20

### [REVISED DATE]

NA

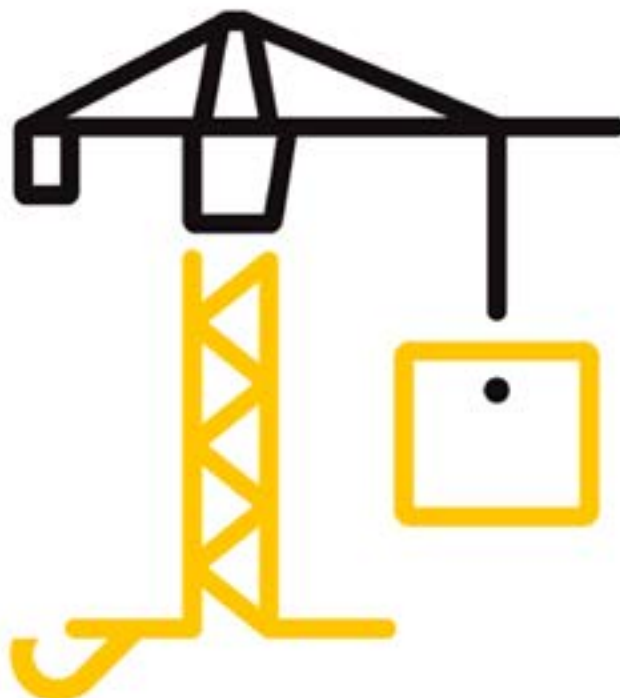
### PAGES

4

### DOCUMENT CONTROL NUMBER

GFT-OP-10a (21-June-2019)

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**LETTER REPORT FOR ALFEX LLC**

Report No.: 104375589MID-001A

Date: 08/13/20

**REPORT ISSUED TO**

**ALFEX, LLC**

943 Gainesville Hwy.  
Building 100-4000  
Buford, GA 30518

**Subject:** Summary letter report for full report 104403237MID-001 on Alfex Plate.

Dear Julia Jun,

This letter report summarizes the results of our evaluation of Alfex Plate to the requirements contained in the following standards:

The specimens were evaluated in accordance with the following:

**ULC-S114:2018**, *Standard Method of Test for Determining Non-Combustibility in Building Materials*

**SUMMARY**

Intertek Building & Construction (B&C) was contracted by Alfex, LLC to perform testing in accordance with ULC S114, *Standard Method of Test for Determining Non-Combustibility in Building Materials*, on their Alfex Plate. Results obtained are tested values and were secured by using the designated test method. Testing was conducted at Intertek test facility in Middleton, WI.

Intertek B&C will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens (where required by Certification or Accreditation bodies), or other pertinent project documentation, will be retained for the entire test record retention period.

**SECTION 1  
TESTING**

Client provided 68 squares of Alfex Plate described by the client as Aluminum Plate. The provided squares were metallic/aluminum in color without an outside surface layer measuring approximately 38 mm by 38 mm by 3.02 mm thick. Seventeen squares were stacked by Intertek to generate specimens approximately 50 mm in height.

---

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**LETTER REPORT FOR ALFREX LLC**

Report No.: 104375589MID-001A

Date: 08/13/20

**SECTION 2**  
**CONCLUSION**

The maximum loss of mass of any specimen did not exceed 20%. The mean of the maximum temperature rise of the specimens did not exceed 36°C. There was no flaming from the test specimens during the last 14min and 30s of the test.

Alfrex Plate met the specified performance requirements.

There were no deviations to the ULC S114 standard.

For INTERTEK B&C:

**COMPLETED BY:** Joel Zumwalt  
**TITLE:** Lab Technician III  
**SIGNATURE:**   
**DATE:** 09/14/20

**REVIEWED BY:** Sandy Osborne  
**TITLE:** Lab Technician I  
**SIGNATURE:**   
**DATE:** 09/14/20

Please note: this Letter Report does not represent authorization for the use of any Intertek certification marks.

**SECTION 3**  
**REVISION LOG**

| REVISION # | DATE       | PAGES | REVISION |
|------------|------------|-------|----------|
| 0          | 09/14/2020 | 3     |          |

# ALFREX, LLC

## LETTER REPORT

### SCOPE OF WORK

ULC-S135:2004-(REAFFIRMED 2016), STANDARD TEST METHOD FOR THE DETERMINATION OF COMBUSTIBILITY PARAMETERS OF BUILDING MATERIALS USING AN OXYGEN CONSUMPTION CALORIMETER (CONE CALORIMETER) ON ALFREX PLATE

### REPORT NUMBER

104375589MID-001A

### TEST DATE(S)

08/13/20

### ISSUE DATE

09/01/20

### [REVISED DATE]

NA

### PAGES

4

### DOCUMENT CONTROL NUMBER

GFT-OP-10a (21-June-2019)

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**LETTER REPORT FOR ALFEX LLC**

Report No.: 104375589MID-001A

Date: 08/13/20

**REPORT ISSUED TO**

**ALFEX, LLC**

943 Gainesville Hwy.  
Building 100-4000  
Buford, GA 30518

**Subject:** Summary letter report for full report 104375589MID-001 on Alfex Plate.

Dear Julia Jun,

This letter report summarizes the results of our evaluation of Alfex Plate to the requirements contained in the following standards:

The specimens were evaluated in accordance with the following:

**ULC-S135:2004-(REAFFIRMED 2016)**, *Standard Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)*; Underwriters Laboratories of Canada.

National Building Code Canada 2015 Volume 1 Noncombustible Material Section 3.3.5.1:

- 1)** Except as permitted by Sentences (2) to (4) and Articles 3.1.5.2. to 3.1.5.24., 3.1.13.4. and 3.2.2.16., a building or part of a building required to be of *noncombustible construction* shall be constructed with *noncombustible materials*. (See also Subsection 3.1.13. for the requirements regarding the *flame-spread rating* of interior finishes.)
- 2)** Notwithstanding the definition of *noncombustible materials* stated in Article 1.4.1.2. of Division A, a material is permitted to be used in *noncombustible construction* provided that, when tested in accordance with ULC-S135, "Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)," at a heat flux of 50 kW/m<sup>2</sup>,
  - a) its average total heat release is not more than 3 MJ/m<sup>2</sup>,
  - b) its average total smoke extinction area is not more than 1.0 m<sup>2</sup>, and
  - c) the test duration is extended beyond the time stipulated in the referenced standard until it is clear that there is no further release of heat or smoke.
- 3)** If a material referred to in Sentence (2) consists of a number of discrete layers and testing reveals that the surface layer or layers protect the underlying layers such that complete combustion of the underlying layers does not occur, the test shall be repeated by removing the outer layers sequentially until all layers have been exposed during testing, or until complete combustion has occurred.
- 4)** The acceptance criteria for a material tested in accordance with Sentence (3) shall be based on the cumulative emissions from all layers, which must not exceed the criteria stated in Clauses (2)(a) and (b).

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## LETTER REPORT FOR ALFLEX LLC

Report No.: 104375589MID-001A

Date: 08/13/20

### SUMMARY

Intertek Building & Construction (B&C) was contracted by Alflex, LLC to perform testing in accordance with ULC S135, *Standard Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)*, on their Alflex Plate. Results obtained are tested values and were secured by using the designated test method. Testing was conducted at Intertek test facility in Middleton, WI.

Intertek B&C will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens (where required by Certification or Accreditation bodies), or other pertinent project documentation, will be retained for the entire test record retention period.

### SECTION 1 TESTING

The pre-painted aluminium panels with black on one surface and gray on the other surface were cut to 100 x 100 mm by the client. The black surface was the exposed surface that was tested. Specimens were conditioned to moisture equilibrium (constant mass) at an ambient temperature of  $23 \pm 3^{\circ}\text{C}$  and a relative humidity of  $50 \pm 5\%$ . The cone calorimeter test was run as written in ULC S135 section 8 – Procedure. The cone calorimeter calculations were performed as written in ULC S135 section 10 – Calculations.

### SECTION 2 CONCLUSION

The black painted surface of the material passed the National Building Code Canada 2015 Volume 1 for noncombustible material section 3.3.5.1. The materials' total heat release was not more than  $3 \text{ MJ/m}^2$ , with an average value of  $0.7 \text{ MJ/m}^2$ . The materials' average total smoke extinction area was not more than  $1.0 \text{ m}^2$ , with an average value of  $0.3 \text{ m}^2$ .

There were no deviations to the ULC S135 standard.

For INTERTEK B&C:

**COMPLETED BY:** Bryan Bowman

**TITLE:** Chemist

**SIGNATURE:**

**DATE:** 09/01/20



**REVIEWED BY:** Mark Crawford

**TITLE:** Engineering Team Lead

**SIGNATURE:**

**DATE:** 09/01/20



Please note: this Letter Report does not represent authorization for the use of any Intertek certification marks.



**LETTER REPORT FOR ALFREX LLC**

Report No.: 104375589MID-001A

Date: 08/13/20

**SECTION 3**

**REVISION LOG**

| REVISION # | DATE       | PAGES | REVISION |
|------------|------------|-------|----------|
| 0          | 09/01/2020 | 4     |          |

# ALFRED PLATE WARRANTIES

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GENERAL PAINT FINISH WARRANTY (SAMPLE)



Alfred FR Aluminum Composite Material and Alfred Plate

Fire Resistant & Non-Combustible Cladding

This Sample Limited Warranty ("Limited Warranty") is a facsimile of the Limited Warranty to be provided by Alfred® Inc. ("Company") to the property owner ("Owner") which will relate to the ("Products") installed at the ("Property") at the ("Property Address") identified therein. The sample version of a Limited Warranty for a specific product and finish combination may be provided upon request.

|                                |               |  |             |                            |  |                 |  |
|--------------------------------|---------------|--|-------------|----------------------------|--|-----------------|--|
| Property Name                  |               |  |             | Property Owner             |  |                 |  |
| Property Address               |               |  |             |                            |  |                 |  |
| City                           |               |  |             | State or Province          |  | Zip Code        |  |
| Date of Substantial Completion |               |  |             | Warranty Commencement Date |  |                 |  |
| Issuance Date                  |               |  |             |                            |  |                 |  |
| Customer Name                  |               |  |             |                            |  |                 |  |
| Customer Address               |               |  |             |                            |  |                 |  |
| City                           |               |  |             | State or Province          |  | Zip Code        |  |
| Product(s)                     | Alfred FR ACM |  |             | Alfred Plate               |  |                 |  |
| Finish(es)                     | 2 Coat Solid  |  | 2 Coat Mica | 3 Coat Solid               |  | 3 Coat Metallic |  |
|                                | Other         |  |             |                            |  |                 |  |
| Additional Descriptions        |               |  |             |                            |  |                 |  |

Warranty Number \_\_\_\_\_

The "Company" will provide warranty coverage subject to the definitions, terms, conditions, limitations, and remedies stated therein. All of the following conditions and additional conditions constitute material terms of the limited warranty and failure to satisfy any one or more are of the conditions and additional conditions by owner or their agents or representatives shall render the limited warranty null and void and release Alfred, Inc. from its obligations thereunder.

- Company will warrant that the painted finish on the Product(s) listed therein will retain their Film integrity, Color and Chalk, as defined in a number of years after the installation of the coil coated ACM or PLATE consistent with the tables attached to the specific warranty and per the location and environmental conditions detailed therein.
- The Warranty period starts on the Warranty Commencement Date as written in the issued Warranty and will be determined as either the date of substantial completion (default), or 6 months from the date of shipment as defined by the commercial invoice date.
- Film Integrity shall be defined as the absence of peeling, checking, chipping or cracking, except for such crazing or slight cracking as may occur on tightly roll formed edges or brake bends at the time of forming the pre-painted sheet.
- Color Change shall be defined as freedom from fade or change as warranted in ΔE units calculated in accordance with ASTM D2244-02, paragraph 6.2.2 CIE L\*a\*b\*, IOO Observer, specular included. Color Change is measured on an exposed painted surface that has been cleaned of surface soils and chalk and then compared to corresponding values measured on the original or unexposed coated surface.
- Chalk or Oxidation shall be defined as a numerical rating as warranted when measured in accordance with the standard procedures specified in ASTM D4214-98.
- Non-uniform color changes that result from unequal exposure to sunlight and/or the elements are not covered by the Limited Warranty.

# GENERAL PAINT FINISH WARRANTY (SAMPLE)

Alfred FR Aluminum Composite Material and Alfred Plate



Fire Resistant & Non-Combustible Cladding

7. Applications exposed to salt spray, or located within paint finish warranty specific distances of salt-water or industrial atmospheres, must be maintained by washing with fresh tap water (in accordance with AAMA 610.1-1979) at least annually and documentation of the maintenance provided upon request (Copy of 610.1 provided on request). It is acknowledged that fading or color changes may not be uniform if the surfaces are not equally exposed to the sun and elements.
8. The Limited Warranty will not extend to, or cover: (a) damage to the Product occasioned by improper storage of the coated metal prior to installation or moisture or other contamination detrimental to the Product because of improper packaging, handling, shipping, processing and/ or installation; or (b) damage to the Product which suffers from improper forming, fabrication, cut edge exposure, corrosion of the substrate or any other condition between the substrate and coating which causes coating degradation or delamination; or (c) Forming Product at temperatures below an ambient temperature of 60°F (16°C) which may adversely affect the appearance and performance of the finish coating; (d) any external contaminant or condition which causes coating degradation or delamination; (f) other exclusions included in the Limited Warranty for a specific paint finish – provided upon request.
9. The Limited Warranty will not extend to, or cover any failure caused by perforation processes which (a) may cause potential heat damage to the top paint layer, (b) leave exposed aluminum vulnerable to oxidation, paint degradation, or delamination, (c) are not specifically approved by Alfred prior to issuance of the warranty.
10. The Limited Warranty will not cover damage or failure of Product which damage or failure is attributable to acts of God, falling objects, external forces, explosions, fire, terrorism, or other such similar or dissimilar occurrences.
11. Owner's sole and exclusive remedy, and Alfred, Inc.'s liability under the Limited Warranty will be limited, at Alfred, Inc.'s option, to recoating or replacing the coil coated Product claimed to be defective. Under no circumstances will Alfred, Inc. be held liable for any incidental, special, punitive or consequential damages.
12. Alfred, Inc. shall be given a reasonable opportunity to inspect the Product claimed to be defective. If after inspection of the product, Alfred, Inc. determines that the claimed defect is covered by the warranty, Alfred, Inc. as its sole option, shall refinish, repair, or replace, the defective Product without charge to the owner.
13. Alfred, Inc. must approve any recoating of the metal substrate through submission of three (3) estimates that each includes the name of the coating products to be used, labor and material costs as well as any other costs associated with the work for refinishing or replacing the metal substrate. Alfred, Inc. reserves the right to approve or negotiate the contract for such recoating or replacement work if the initial estimate is unacceptable to Alfred, Inc.
14. All warranty work will be performed by Alfred, Inc. or by a company, customer, contractor, applicator, or distributor selected by Alfred, Inc. At no time does this warranty confer upon the claiming party or any other party the right to proceed with repair, replacement or restoration without written notice and agreement by a duly authorized officer of Alfred, Inc. Any such work undertaken by the claiming party or any other party shall be for the claiming party's own account and shall result in this warranty becoming null and void. As color variances may occur between replacement or refinished product in comparison with the originally installed product due to normal weathering and aging of the originally installed product, this condition will not be indicative of a defect in either the replacement product or the originally installed product.
15. The warranty for any refinished or replaced metal substrate shall be only for the remainder of the original warranty period applicable to the original coated metal substrate.
16. In no event will the original applicable warranty period set forth in the warranty table be extended by a warranty claim.
17. In the event of any subsequent failure of any recoated or replaced coil coated Product, the Owner shall first make any claims against the supplier of those replacement materials.
18. The applicable warranty period shall be limited to, and shall in no event extend beyond, the warranty period as set forth in the warranty table for the specific finish and product.
19. The Limited Warranty is given solely to the Owner and is non-transferable and non-assignable.
20. All claims must be submitted in writing to Alfred, Inc. in 943 Gainesville Hwy. Bldg. 100-4000, Buford, GA 30518. All claims must be accompanied by this certificate, fully completed and signed by the customer that furnished the product to the owner. In order to qualify for warranty coverage, all claims must be submitted within thirty days from the date the damage is first discovered or could have been discovered. No claims can be submitted 30 days after expiration of the warranty period.
21. In no event does Alfred, Inc. cover the cost of labor or sundry materials required to remove and/or replace any defective product.
22. Alfred, Inc. reserves the right to discontinue or modify its products lines and coating colors. If the original product or coating color is no longer available, Alfred, Inc. agrees to use commercially reasonable efforts to substitute a comparable product.
23. The warranty is subject to, enforced by, and construed according to the laws of the State of Georgia. Any legal action to enforce or construe any

GENERAL PAINT FINISH WARRANTY (SAMPLE)



Alfred FR Aluminum Composite Material and Alfred Plate

Fire Resistant & Non-Combustible Cladding

- portion of this warranty shall be brought in a Court of Company's choice in Georgia.
- 24. Any attempt to construe the warranty, be it by law or other legal means, that ultimately leads to any court of competent jurisdiction stating any provision herein as invalid or unenforceable the remainder of the provisions following shall come into effect. These provisions shall come into effect as though the prior provisions had not been contained herein.
  - 25. The United Nations Convention on Contracts for the International Sale of Goods is expressly disclaimed and does not apply to the sale of Seller products. Any and all disputes between the parties that may arise pursuant to the order will be heard and determined before an appropriate arbitrator, federal or state court located in Atlanta, Georgia. The owner hereto acknowledges such court has the jurisdiction to interpret and enforce the provisions herein and/ or an arbitrator's judgment, and the owner and the Customer waives any and all objections that they may have as to personal jurisdiction or venue in any of the above courts.
  - 26. Company has the right to termination of the warranty at any time if a (30) day notice is given to the Customer prior to Rights accruing to Customer are not lost prior to termination.
  - 27. All information hereto shall be adhered to by both parties and shall not extend beyond the directives made therein. No modification shall be made without the understanding, consent, and signing by both Customer and Company of a contract explicitly stating this or any warranty's subsequent modification.
  - 28. EXCEPT AS SET FORTH HEREIN, ALFREX, INC. MAKES NO OTHER EXPRESS WARRANTIES AND DISCLAIMS ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, WITH RESPECT TO ANY OF THE PRODUCTS.
  - 29. IT IS UNDERSTOOD AND AGREED THAT THE REMEDIES PROVIDED FOR HEREIN FOR THE FINISH OF THE PRODUCT DESCRIBED ARE EXCLUSIVE WHETHER FOR BREACH OF EXPRESS WARRANTIES OR OTHERWISE AND SHALL CONSTITUTE THE OWNER'S EXCLUSIVE REMEDY AND ALFREX, INC.'S EXCLUSIVE LIABILITY. IN NO EVENT SHALL ALFREX, INC. BE LIABLE FOR LABOR COSTS, DIRECT, INDIRECT, INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES FOR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTIES IN CONNECTION WITH THE PRODUCT.
  - 30. THE WARRANTY IS THE ONLY EXPRESS WARRANTY EXTENDED BY ALFREX, INC. IN CONNECTION WITH THE PRODUCT, OTHER THAN ALFREX, INC.'S STANDARD COATING WARRANTY, IF ANY, AND THE LIMITED WARRANTY SET OUT IN ALFREX, INC.'S SALES TERMS AND CONDITIONS, FOR THE PRODUCT, AND IT EXCLUDES ALL OTHER WARRANTIES, REPRESENTATIONS OR GUARANTEES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ALFREX, INC.'S AGGREGATE TOTAL CUMULATIVE LIABILITY UNDER THE WARRANTY IS LIMITED TO THE DOLLAR AMOUNT OF THE PURCHASE PRICE.
  - 31. Owner is solely responsible for proper selection and installation of Alfred, Inc.'s products. Owner agrees that it will use Alfred, Inc. products only for their intended uses and according to the specifications and limitations established by Alfred, Inc. from time to time. Owner shall indemnify, defend and hold Alfred, Inc. harmless from and against any and all damages arising out of or relating to improper product selection, application, use, misuse, neglect, abuse of products or improper installation or incorporation of products.

Accepted By:  
Alfred, Inc.  
943 Gainesville Hwy.  
Building 100-4000  
Buford, GA 30518  
Phone: 470.589.7449

Authorized By \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

GENERAL PAINT FINISH WARRANTY (SAMPLE)

Alfred FR Aluminum Composite Material and Alfred Plate



Fire Resistant & Non-Combustible Cladding

WARRANTY TABLES

| WARRANTY                        | ALFREX FR MCM | ALFREX PLATE | TYPE    |
|---------------------------------|---------------|--------------|---------|
| 2 Coat Solid/ 2 Coat Mica       | 30 Years      | 20 Years     | Finish  |
| 3 Coat Metallic                 | 30 Years      | 20 Years     | Finish  |
| 3 Coat Vivid Solid              | 20 Years      | 20 Years     | Finish  |
| Design Series - Wood & Metal    | 20 Years      | 20 Years     | Finish  |
| Hairline Aluminum               | 10 Years      | N/A          | Finish  |
| Mirror                          | 10 Years      | N/A          | Finish  |
| Highly Durable Polyester 3-Coat | 20 Years      | N/A          | Finish  |
| Highly Durable Polyester        | 10 Years      | N/A          | Finish  |
| Perforation                     | N/A           | 10 Years     | Finish  |
| Bond Integrity                  | 10 Years      | N/A          | Product |

# ALFRED PLATE PROJECT REFERENCES

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# 799 BROADWAY



|                        |                                          |
|------------------------|------------------------------------------|
| Location               | New York, USA                            |
| Finish(es)             | Bone White, Sunstorm Moondust, Driftwood |
| Architect / Specifier  | Perkins + Will                           |
| Installer / Contractor | Island Exterior Fabricators              |
| Size                   | 98,000 sqft                              |

# PIAZZA TERMINAL



|                               |                                   |
|-------------------------------|-----------------------------------|
| <b>Location</b>               | Pennsylvania, USA                 |
| <b>Finish(es)</b>             | Custom Tile Corten                |
| <b>Architect / Specifier</b>  | BKV Group                         |
| <b>Installer / Contractor</b> | Architectural Metal Designs, Inc. |
| <b>Size</b>                   | 80,000 sqft                       |



# GATEWAY CENTER



|                        |                     |
|------------------------|---------------------|
| Location               | New Jersey, USA     |
| Finish(es)             | Custom Black Corten |
| Architect / Specifier  | Gensler             |
| Installer / Contractor | Bamco, Inc.         |
| Size                   | 22,100 sqft         |

# 2 PENN PLAZA RENOVATION



|                               |                                               |
|-------------------------------|-----------------------------------------------|
| <b>Location</b>               | New York, USA                                 |
| <b>Finish(es)</b>             | Custom Black Anodized (BLKADZ), Classic White |
| <b>Architect / Specifier</b>  | Charles Luckman Associates                    |
| <b>Installer / Contractor</b> | Bamco, Inc. / IDA Exterior Systems            |
| <b>Size</b>                   | 145,000 sqft                                  |



# 100 QUEENS QUAY



|                               |                     |
|-------------------------------|---------------------|
| <b>Location</b>               | Ontario, Canada     |
| <b>Finish(es)</b>             | Dusty Charcoal      |
| <b>Architect / Specifier</b>  | B+H Architects      |
| <b>Installer / Contractor</b> | Riverside Group LTD |
| <b>Size</b>                   | 63,500 sqft         |

# THE ONE



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**Location**

Ontario, Canada

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**Finish(es)**

Crystal Silver

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**Architect / Specifier**

Foster and Partners Core Architects

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**Installer / Contractor**

Riverside Group LTD

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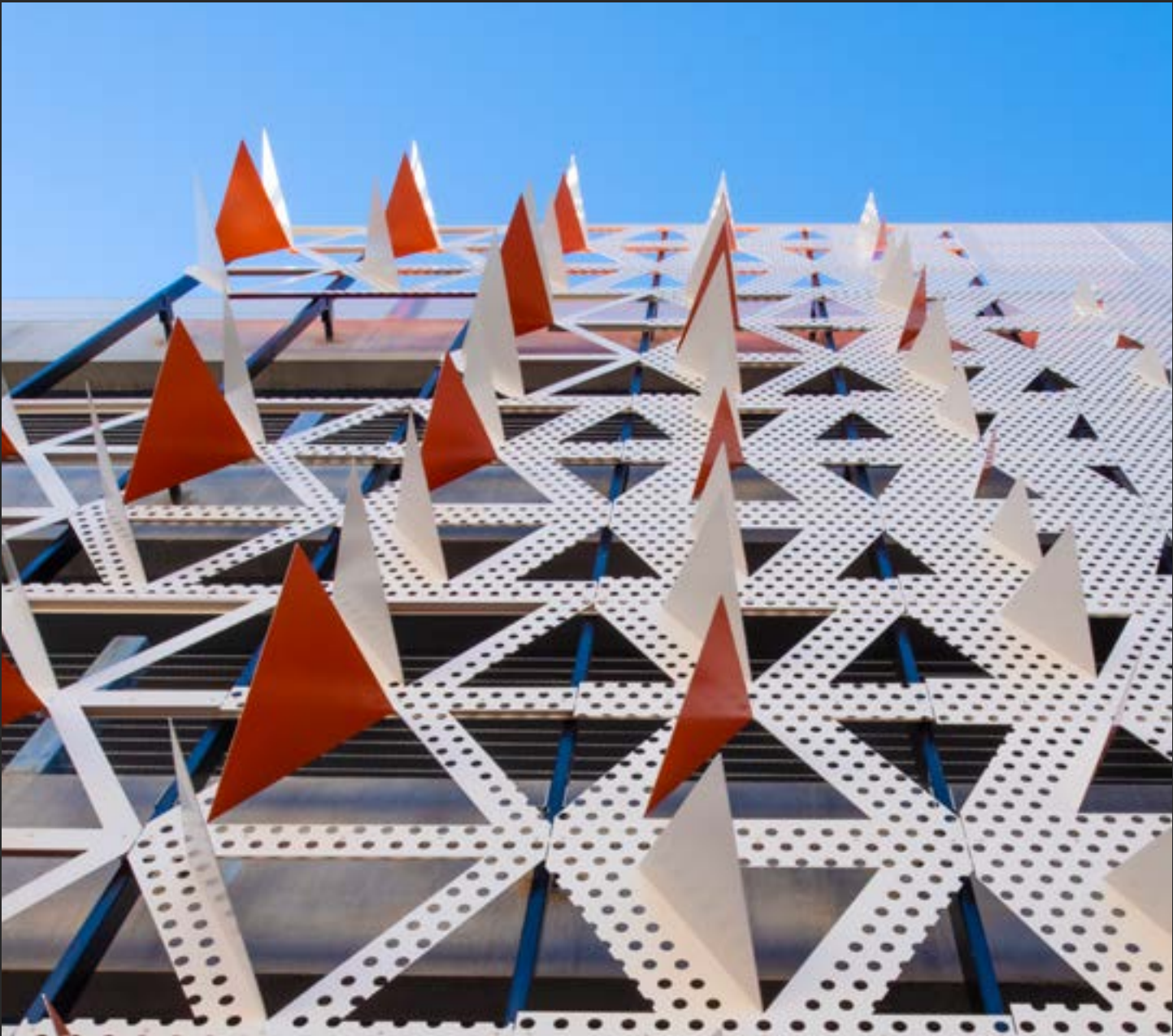
**Size**

237,000 sqft

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# THE WORKS



|                        |                                                                  |
|------------------------|------------------------------------------------------------------|
| Location               | Georgia, USA                                                     |
| Finish(es)             | Pacer White & Hearty Orange (Double-Sided)                       |
| Architect / Specifier  | Smith Dalia Architects                                           |
| Installer / Contractor | The Miller Clapperton Partnership, Inc. / Dakota Contrators, LLC |
| Size                   | 16,800 sqft                                                      |



# T3 WEST MIDTOWN BUILDING



|                        |                                  |
|------------------------|----------------------------------|
| Location               | Georgia, USA                     |
| Finish(es)             | Custom Black                     |
| Architect / Specifier  | Hartshorne Plunkard Architecture |
| Installer / Contractor | Peachtree Protective Covers      |
| Size                   | 35,300 sqft                      |

# KENNESAW STATE UNIVERSITY ACADEMIC LEARNING CENTER



|                        |                                               |
|------------------------|-----------------------------------------------|
| Location               | Georgia, USA                                  |
| Finish(es)             | Monument, Pure Silver / Dove Gray, Bone White |
| Architect / Specifier  | HOK                                           |
| Installer / Contractor | Altech (SECO Architectural Systems)           |
| Size                   | 5,150 sqft                                    |

# WATERSTONE OF WESTCHESTER



---

**Location**

New York, USA

---

**Finish(es)**

Bone White

---

**Architect / Specifier**

National Development

---

**Installer / Contractor**

Fantin Supply

---

**Size**

2,350 sqft

---



# UC DAVIS HEALTH PARKING



|                        |                           |
|------------------------|---------------------------|
| Location               | California, USA           |
| Finish(es)             | Bone White (Double-Sided) |
| Architect / Specifier  | Dreyfuss + Blackford      |
| Installer / Contractor | Clark Pacific             |
| Size                   | 15,600 sqft               |

# NEW VALLEY HOSPITAL



|                        |                                         |
|------------------------|-----------------------------------------|
| Location               | New Jersey, USA                         |
| Finish(es)             | Custom Silver Smith, Custom Regal White |
| Architect / Specifier  | HDR                                     |
| Installer / Contractor | EDA Contractors                         |
| Size                   | 36,000 sqft                             |



# 5 RIVER PARK COBBLE HILL



---

**Location**

New York, USA

---

**Finish(es)**

Sunstorm Fawn Mica

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**Architect / Specifier**

Romnes Architecture PLLC

---

**Installer / Contractor**

Island Exterior

---

**Size**

41,500 sqft

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# 400 SUMMER



|                        |                         |
|------------------------|-------------------------|
| Location               | Massachusetts, USA      |
| Finish(es)             | Sunstorm Graphite Gray  |
| Architect / Specifier  | Morris Adjmi Architects |
| Installer / Contractor | Island Exterior         |
| Size                   | 44,000 sqft             |



# UPMC MERCY VISION AND REHABILITATION HOSPITAL



|                        |                          |
|------------------------|--------------------------|
| Location               | Pennsylvania, USA        |
| Finish(es)             | Custom Silversmith       |
| Architect / Specifier  | HOK                      |
| Installer / Contractor | East Coast Metal Systems |
| Size                   | 69,000 sqft              |

# WALMART HQ



|                               |                              |
|-------------------------------|------------------------------|
| <b>Location</b>               | Arkansas, USA                |
| <b>Finish(es)</b>             | Silver Shadow, Custom Pewter |
| <b>Architect / Specifier</b>  | Gensler                      |
| <b>Installer / Contractor</b> | Island Exterior              |
| <b>Size</b>                   | 159,000 sqft                 |



# NORTHEASTERN UNIVERSITY



|                        |                      |
|------------------------|----------------------|
| Location               | Massachusetts, USA   |
| Finish(es)             | Umbra Gray UC I30669 |
| Architect / Specifier  | Payette              |
| Installer / Contractor | Suffolk Construction |
| Size                   | 122,300 sqft         |

# MERCEDES BENZ AUTOHAUS



|                        |                                           |
|------------------------|-------------------------------------------|
| Location               | Queensland, Australia                     |
| Finish(es)             | Black, White, Anthracite, Silver Metallic |
| Architect / Specifier  | Cottee Parker                             |
| Installer / Contractor | A-Clad                                    |
| Size                   | 86,200 sqft                               |



# BMW SHOWROOM



|                        |                     |
|------------------------|---------------------|
| Location               | Victoria, Australia |
| Finish(es)             | Pure Silver         |
| Architect / Specifier  | -                   |
| Installer / Contractor | Cladding Systems    |
| Size                   | 22,500 sqft         |



# CALVARY ADELAIDE HOSPITAL



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**Location**

South Australia, Australia

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**Finish(es)**

Charcoal, White

---

**Architect / Specifier**

Silver Thomas Hanley (STH)

---

**Installer / Contractor**

Asurco

---

**Size**

22,400 sqft

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# CASEY HOSPITAL



|                        |                            |
|------------------------|----------------------------|
| Location               | Victoria, Australia        |
| Finish(es)             | Pure Silver                |
| Architect / Specifier  | Silver Thomas Hanley (STH) |
| Installer / Contractor | Asurco                     |
| Size                   | 54,000 sqft                |

# MANTRA EPPING HOTEL



|                               |                     |
|-------------------------------|---------------------|
| <b>Location</b>               | Victoria, Australia |
| <b>Finish(es)</b>             | Black               |
| <b>Architect / Specifier</b>  | -                   |
| <b>Installer / Contractor</b> | -                   |
| <b>Size</b>                   | 6,500 sqft          |

# ICCONS DANDENONG SOUTH



|                        |                      |
|------------------------|----------------------|
| Location               | Victoria, Australia  |
| Finish(es)             | Monument, Red        |
| Architect / Specifier  | RPC Architects       |
| Installer / Contractor | Alclad Architectural |
| Size                   | -                    |



# SWINBURNE UNIVERSITY OF TECHNOLOGY



|                               |                              |
|-------------------------------|------------------------------|
| <b>Location</b>               | Victoria, Australia          |
| <b>Finish(es)</b>             | Red                          |
| <b>Architect / Specifier</b>  | Design Worldwide Partnership |
| <b>Installer / Contractor</b> | A Class Cladding             |
| <b>Size</b>                   | -                            |



# MELBOURNE GIRL'S COLLEGE



|                        |                     |
|------------------------|---------------------|
| Location               | Victoria, Australia |
| Finish(es)             | Pure Silver         |
| Architect / Specifier  | -                   |
| Installer / Contractor | Askin               |
| Size                   | -                   |

NORTH AMERICAN PROJECTS

| PROJECT NAME                                           | LOCATION         | ARCHITECT                           |
|--------------------------------------------------------|------------------|-------------------------------------|
| Waterstone at White Plain IndependentW Living Facility | New York         | Elkus Manfredi Architects           |
| WEXFORD DREXEL ACADEMIC TOWER                          | Pennsylvania     | Ballinger                           |
| 799 Broadway                                           | New York         | Perkins + Will                      |
| 80I Church                                             | Tennessee        | Goettsch Partners                   |
| Piazza Terminal                                        | Pennsylvania     | BKV Group                           |
| 100 Queen's Quay                                       | Ontario          | B+H Architects                      |
| 5 River Park Cobble Hill                               | New York         | ROMINES ARCHITECTURE PLLC           |
| 540 Fulton Street                                      | New York         | Marvel Architects                   |
| 55 Mercer                                              | Ontario          | IBI Group                           |
| Concord Galleria                                       | British Columbia | GBL Architects, IBI Group           |
| Darthmouth Hitchcock Medical Center (DHMC)             | New Hampshire    | HDR                                 |
| Herbert Hoover HS                                      | West Virginia    | Williamson Shriver Architects Inc   |
| MSG Sphere                                             | Nevada           | Populous                            |
| One Time Square                                        | New York         | SLCE Architects, LLP                |
| The New Valley Hospital                                | New Jersey       | HDR                                 |
| The One                                                | Ontario          | Foster and Partners Core Architects |
| The Works                                              | Georgia          | Smith Dalia Architects              |
| UPMC Mercy Vision and Rehabilitation Hospital          | Pennsylvania     | HOK                                 |
| Walmart Headquarters                                   | Arkansas         | Gensler                             |
| Kennesaw State University Academic Learning Center     | Georgia          | HOK                                 |
| Northeastern University EXP Research Center            | Massachusetts    | Payette                             |
| The Dorian Hotel                                       | Alberta          | Gibbs Gage Architects               |
| Aequitas Community Justice Campus                      | Indiana          | CSO Architects, Inc.                |
| ALFIE Dentistry                                        | Ontario          | Vanessa Fong Architect              |
| Brock University                                       | Ontario          | TBA                                 |
| Desa Glass                                             | Alberta          | TBA                                 |
| Guillevin International                                | Alberta          | TBA                                 |

PROJECT REFERENCES

Alfred Plate



Fire Resistant & Non-Combustible Cladding

| PROJECT NAME                      | LOCATION         | ARCHITECT                            |
|-----------------------------------|------------------|--------------------------------------|
| MNP Tower                         | Alberta          | Kohn Pedersen Fox                    |
| Nancy Greene Way Residence        | British Columbia | M Plus Architecture                  |
| Red Stone Strip Mall              | Alberta          | TBA                                  |
| Sidaway                           | British Columbia | TBA                                  |
| Steel Craft Expansion             | Alberta          | Hodgson Schilf Evans Architects Inc. |
| TD Chinook                        | Alberta          | TBA                                  |
| The Intersection - Adidas Village | Oregon           | Hacker Architects                    |
| Vanderbilt Grad Housing           | Tennessee        | Valerio Dewalt Train                 |
| Vegreville                        | Alberta          | TBA                                  |

GLOBAL PROJECTS

| LOCATION                   | PROJECT NAME                       | SIZE (SQFT) | ARCHITECTURAL FIRM         |
|----------------------------|------------------------------------|-------------|----------------------------|
| Victoria, Australia        | Melbourne International Airport T2 | 150,694     | N/A - Retrofit Application |
| Queensland, Australia      | 333 Ann Street                     | 89,964      | N/A - Retrofit Application |
| Queensland, Australia      | Mercedes-Benz Autohaus             | 86,111      | Cottee Parker              |
| Victoria, Australia        | Deakin Uni                         | 75,347      | N/A - Retrofit Application |
| Victoria, Australia        | Plummer Street Apartments          | 67,392      | Elenberg Fraser            |
| Victoria, Australia        | Casey Hospital                     | 53,819      | N/A - Retrofit Application |
| Victoria, Australia        | Upwey High School                  | 49,600      | N/A - Retrofit Application |
| Victoria, Australia        | Midtown                            | 30,677      | Fender Katsalidis          |
| Queensland, Australia      | 119 Charlotte Street               | 29,471      | N/A - Retrofit Application |
| Victoria, Australia        | Shepparton Hospital                | 26,995      | N/A - Retrofit Application |
| Victoria Australia         | Crowne Plaza Hotel                 | 24,046      | BPSM Architects            |
| Victoria, Australia        | BMW Showroom                       | 22,475      | N/A - Retrofit Application |
| South Australia, Australia | Calvary Hospital                   | 22,356      | Silver Thomas Hanley       |
| Victoria, Australia        | Vibe Hotel                         | 12,916      | Caydon                     |

## ALFREX PLATE HARNESSES CONTRASTS IN COLOR, SHAPE, AND LIGHT ON THE WORKS PROJECT



|                           |                                                                    |
|---------------------------|--------------------------------------------------------------------|
| <b>Project Name</b>       | The Works Parking Garage                                           |
| <b>Location</b>           | Atlanta, Georgia USA                                               |
| <b>Developer</b>          | Selig Developments, a subsidiary of Selig Enterprises, Inc.        |
| <b>Architect</b>          | Smith Dalia Architects - Atlanta, GA                               |
| <b>General Contractor</b> | Dakota Contractors, LLC                                            |
| <b>Fabricator</b>         | MillerClapperton Inc.                                              |
| <b>Installer</b>          | MillerClapperton Inc.                                              |
| <b>Alfred Product</b>     | Alfred Plate - 3mm Pre-finished Solid Aluminum Plate               |
| <b>Product Finish</b>     | (Double Sided Finish)<br>PVDF Custom White over PVDF Custom Orange |

Anchoring this transformation is The Works, an expansive 80-acre mixed use development blending office space, residential living, retail, and dining - while preserving the district's historical industrial character. Guided by the vision of Selig Developments and designed by Smith Dalia Architects, the completion of Phase One showcases a parking garage remarkable for its unique design and complexity. Canvassing the garage is 13,025 square feet of 3mm thick Alfred Pre-Finished Solid Aluminum Plate from Alfred, LLC of Buford, Georgia USA. Fabricated and installed by MillerClapperton Inc. of Austell, Georgia, the façade is intricately designed to harness contrasts in color, shape, depth, and light to create stunning views both day and night.

### The Challenge

MillerClapperton recognized early on that this complex project would require custom solutions on all facets of execution from product choice, engineering, fabrication, and installation. Façade panel design called for a product that could be perforated in large areas, folded into geometrical shapes, coated orange and white on opposite sides, and capable of sustaining structural loads. This semi-transparent façade assembly then had to be attached to existing blue colored vertical steel beams in a manner that did not interfere with the architect's design vision. A significant research effort was undertaken to develop a simplified sub-structure for wall panel installation that would create an interplay between the exterior façade without distracting from the design in an array of lighting conditions.

### Product Choice - Alfred Plate

Alfred Pre-Finished Solid Aluminum Plate in a 1/8" thickness was chosen due to its ability to meet the diverse aesthetical, structural, and economical requirements. Alfred Plate is coil coated on a high-speed paint line designed specifically for heavier gauge metals. As such, it was very efficient to manufacture sheets double coated with a custom white paired opposite a custom orange. This enabled sheets to be custom fabricated, folded, and oriented to create color contrasts using the same panel without welding or additional field painting. Further savings were realized through scrap reduction as Alfred Plate sheets were manufactured in a custom width and provided in numerous custom lengths via its integrated coil coating, tension leveling, and cut-to-length process.



## CASE STUDY

### Sheet Fabrication and Engineering

For the large number of perforated panels, custom tooling was developed to punch press perforated sheets of Alfrex Plate with 1.5" diameter openings. Sheets were then cut to size and back routed to enable folding into 3-dimensional geometrical shapes. As a prefinished product, Alfrex Plate was able to be cut, routed, and formed much like MCM panels without additional steps or danger of paint finish crazing. For panel installation though, a wall façade with large perforated areas and openings presented both an engineering and aesthetical challenge requiring a unique solution.

To achieve this dual requirement, custom 1.5" Z-Girts were fabricated from Alfrex 3mm Plate and attached horizontally to the garage's vertical beams. This provided not only a structurally sound means for installation, but also an aesthetical solution by capitalizing on the double side coated Alfrex Plate sheets to integrate seamlessly into the façade's color and design scheme.

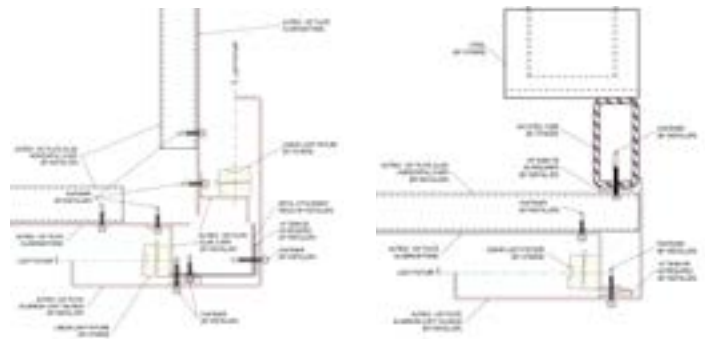


### Custom Light Valences

Considerable effort was put into the design and integration of custom light valences manufactured from Alfrex Plate. The light valences are effortlessly integrated into the façade design and accentuate nighttime views of the building.

### The Result

The Parking Garage at The Works stands out as an interconnected part of a broad development project thanks to its unique design and choice of materials. "I'm thrilled with the outcome of the project – the rigorous design process with the client, design team, and fabrication team paid dividends in the cohesive manner that everything that came together", said Nicole Seekely, the Project Architect. "The color of the panels provides an added level of artistic expression to the façade, particularly on a sunny day when the light casts shadows on the panels." The flexibility of pre-finished Alfrex solid aluminum plate enabled fabrication and installation much like MCM metal composite material, cutting down on waste, fabrication time, and an efficient means of color coating.



Alfrex specializes in fire-resistant and non-combustible architectural metal wall cladding with a portfolio including Alfrex Pre-Finished Solid Aluminum Plate, Alfrex FR Metal Composite Material, and Matching 0.040" flat sheet. Its parent company, Unience, Co Ltd., began operation in 2000 as a manufacturer of specialty fire-resistant coatings, bonding materials, and pelletized mineral filled FR core compound for globally recognized MCM manufacturers. In 2008, Unience launched Alfrex in South Korea with a multi-line MCM production facility dedicated to the exclusive production of FR core MCM utilizing in-house, fire-resistant core technology. Today, both Unience and Alfrex are headquartered in Buford, Georgia USA, with a new state of the art FR core MCM production plant complimented by a commercial branch in Toronto, Ontario Canada.





# ALFRED PLATE INSTALLATION DETAILS

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THE ARCHITECTURAL DETAILS CONTAINED ARE PROVIDED FOR CONCEPTUAL PURPOSES ONLY. ALFEX ONLY MANUFACTURES MCM PANELS. PANEL SYSTEMS AND ASSEMBLY DESIGN, FABRICATION, AND INSTALLATION ARE PROVIDED BY QUALIFIED FABRICATORS AND INSTALLERS. ALFEX, LLC DOES NOT MAKE ANY WARRANTIES, EXPRESS OR IMPLIED INCLUDING MERCHANTABILITY AND FITNESS FOR PURPOSE. PLEASE CONSULT ALFEX, LLC FOR RECOMMENDATIONS OF TESTED SYSTEMS AVAILABLE IN THE MARKET.

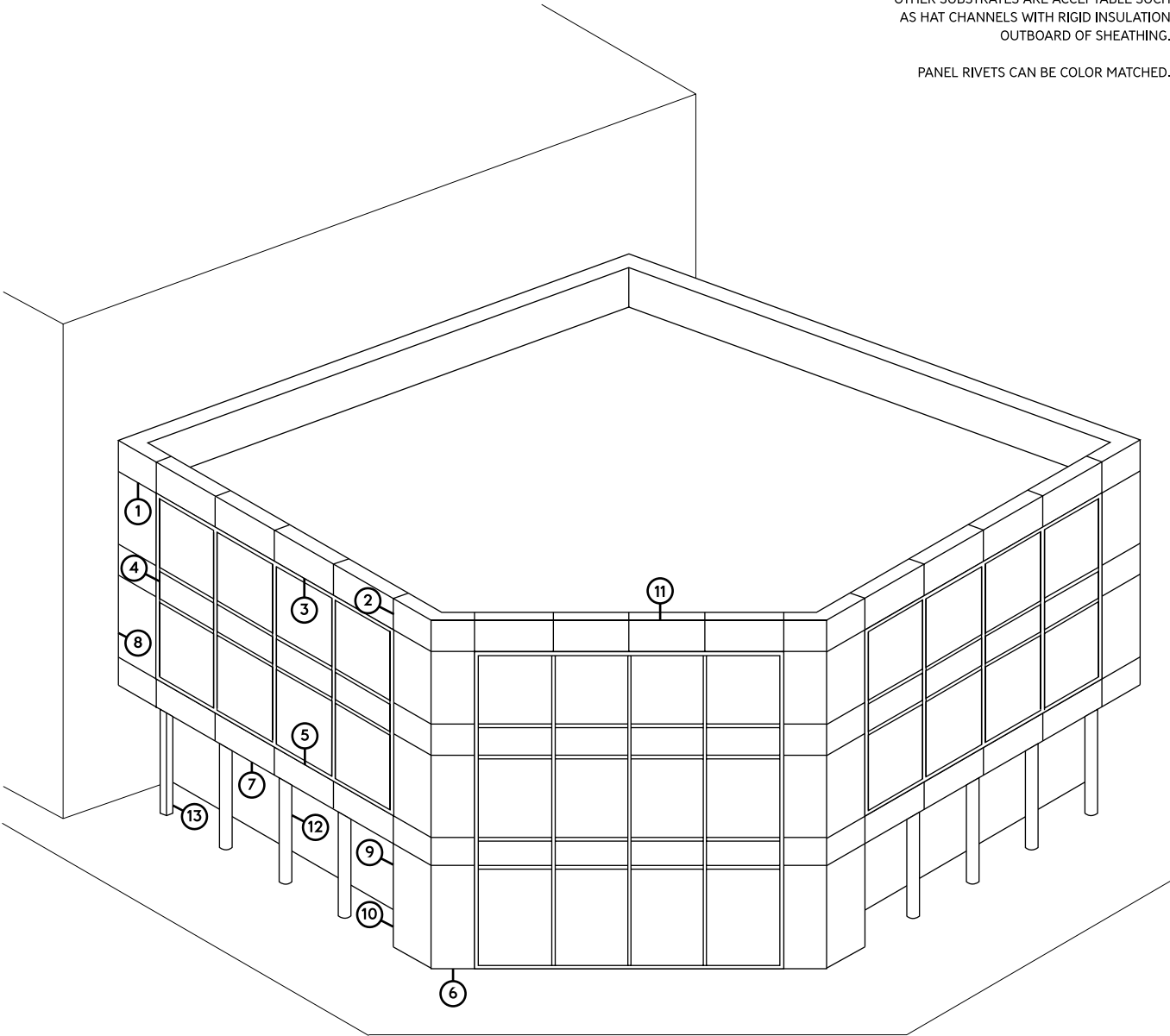
ARCH / FABRICATOR NOTES:

MAX PANEL SIZE IS 60" IN EITHER DIRECTION.

MICA / METALLIC FINISHES ARE DIRECTIONAL FINISHES AND MUST BE INSTALLED IN THE SAME DIRECTION FOR CONSISTENT COLOR.

DETAILS SHOWN ARE IN A RAINSCREEN APPLICATION ON EXTERIOR GWB SHEATHING WITH COMMERCIAL TYVEK (OR SIMILAR). OTHER SUBSTRATES ARE ACCEPTABLE SUCH AS HAT CHANNELS WITH RIGID INSULATION OUTBOARD OF SHEATHING.

PANEL RIVETS CAN BE COLOR MATCHED.

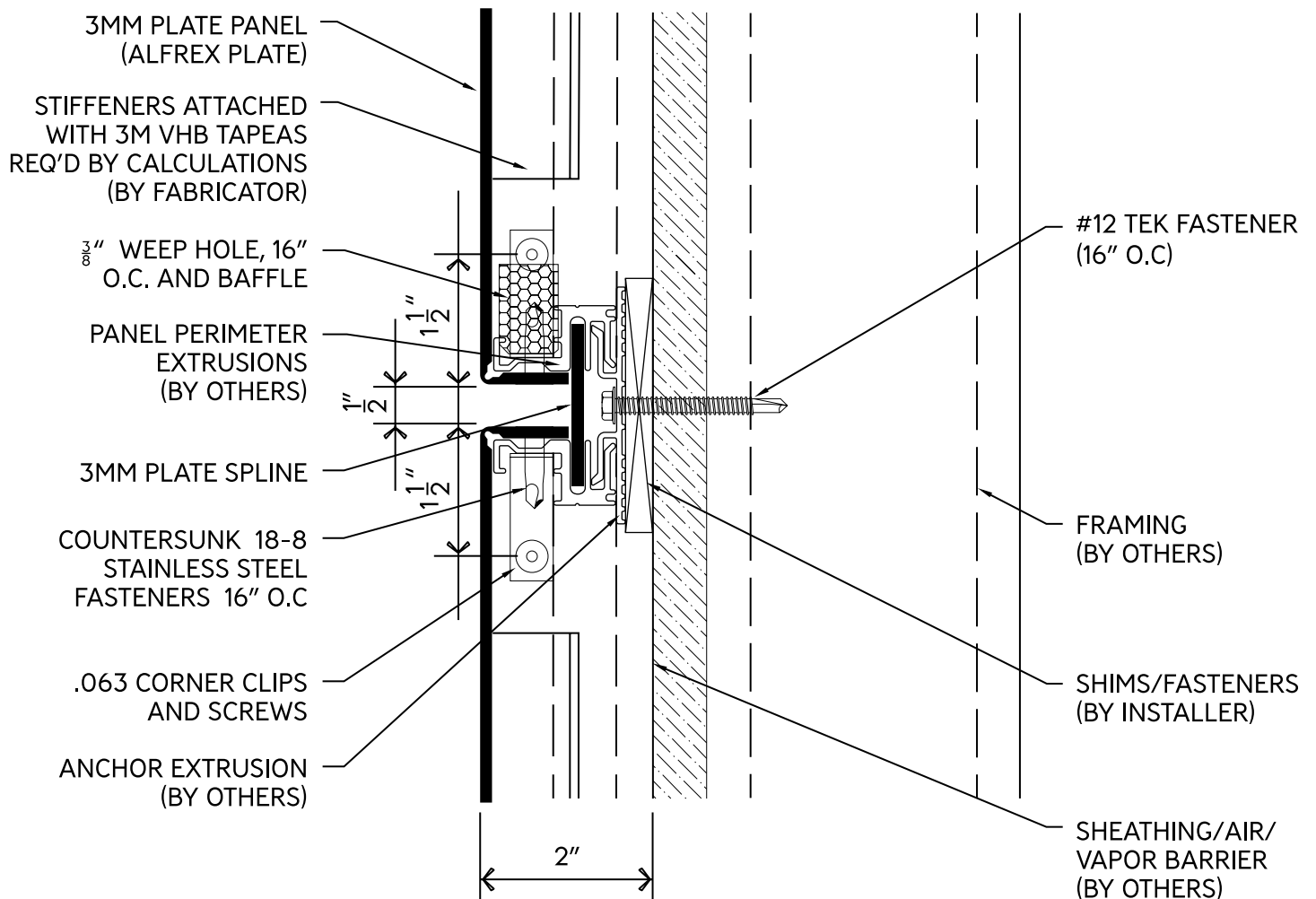


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**GENERIC RAINSCREEN  
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HORIZONTAL JOINT

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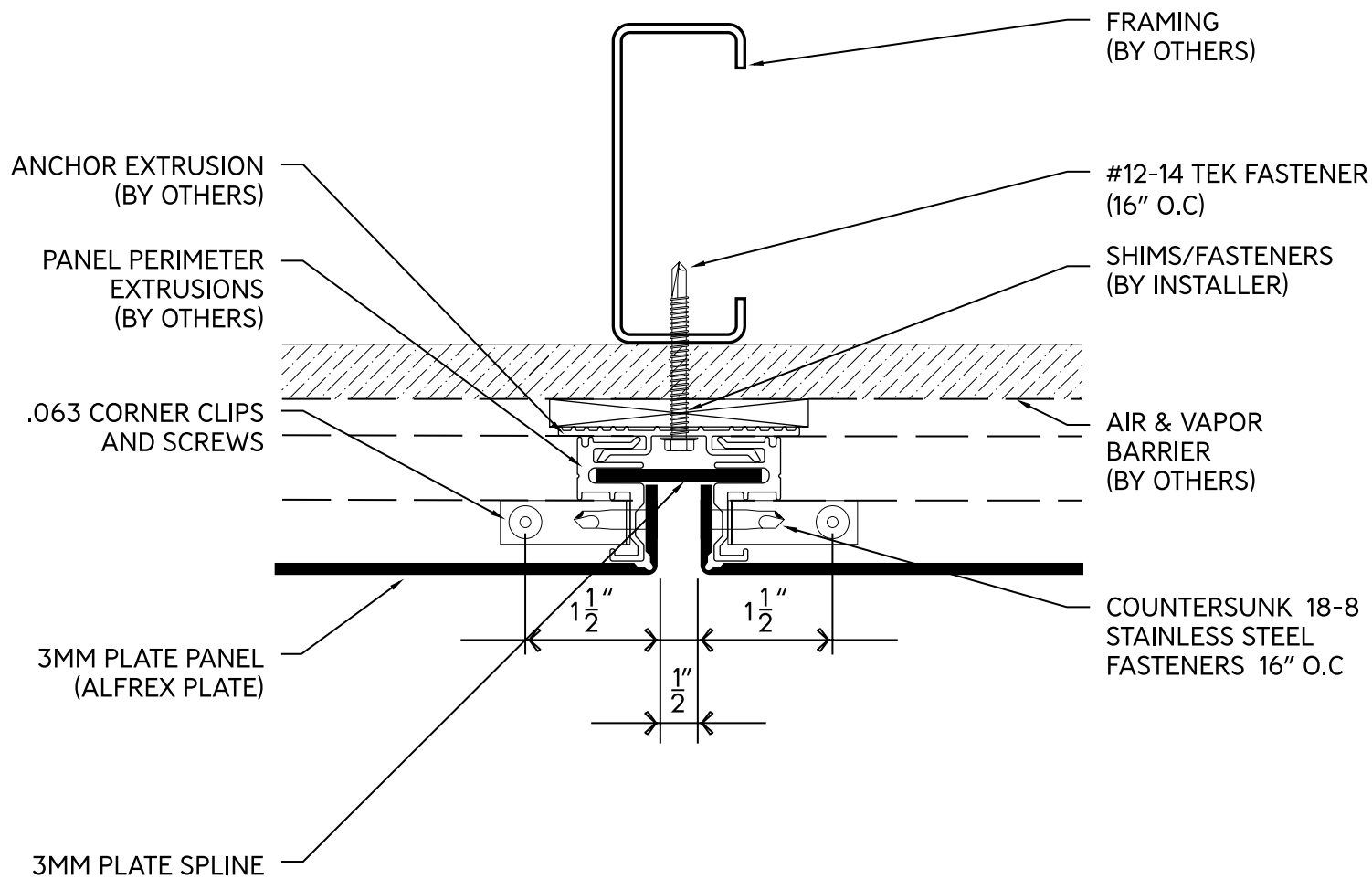
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VERTICAL JOINT

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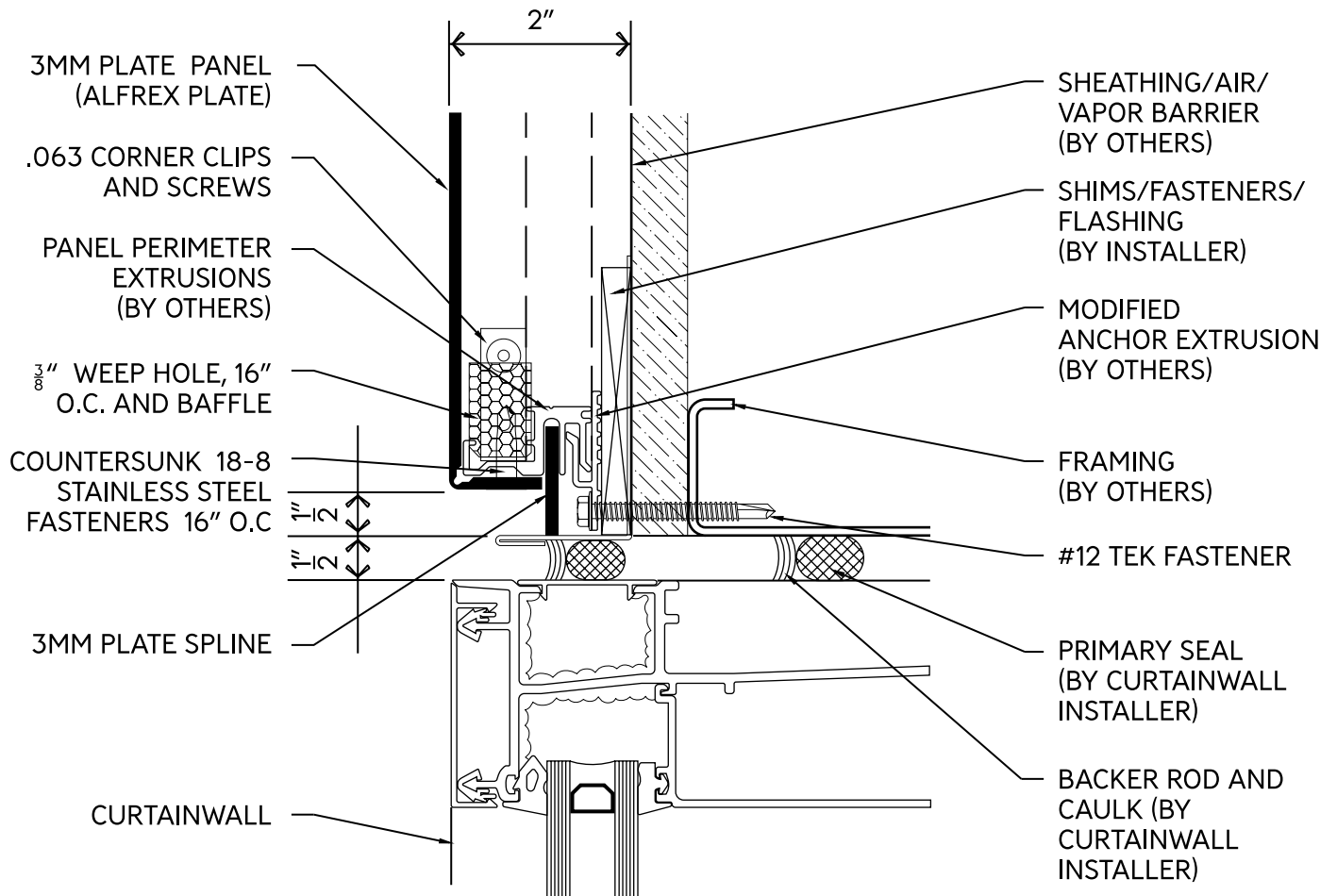
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HEAD

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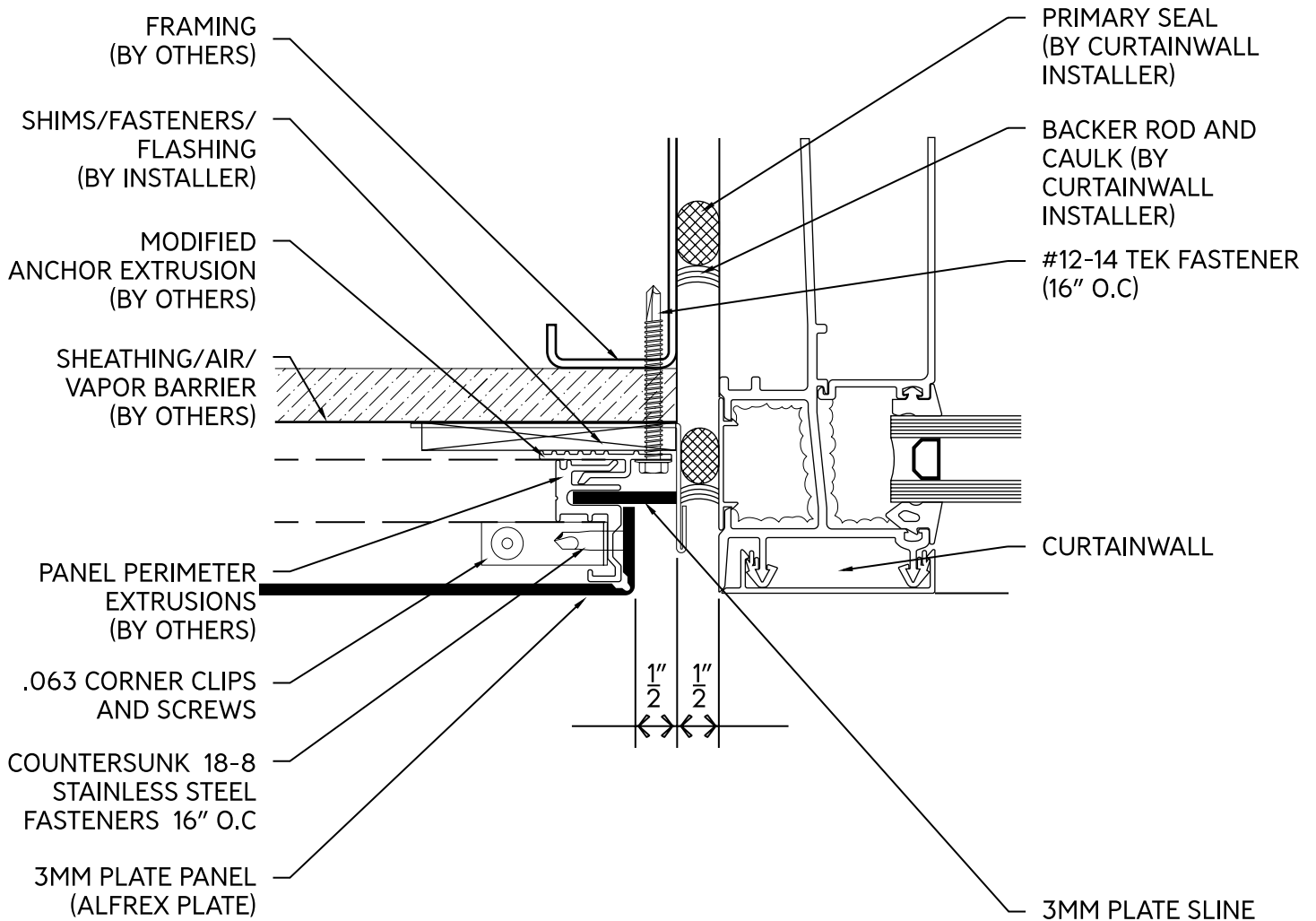
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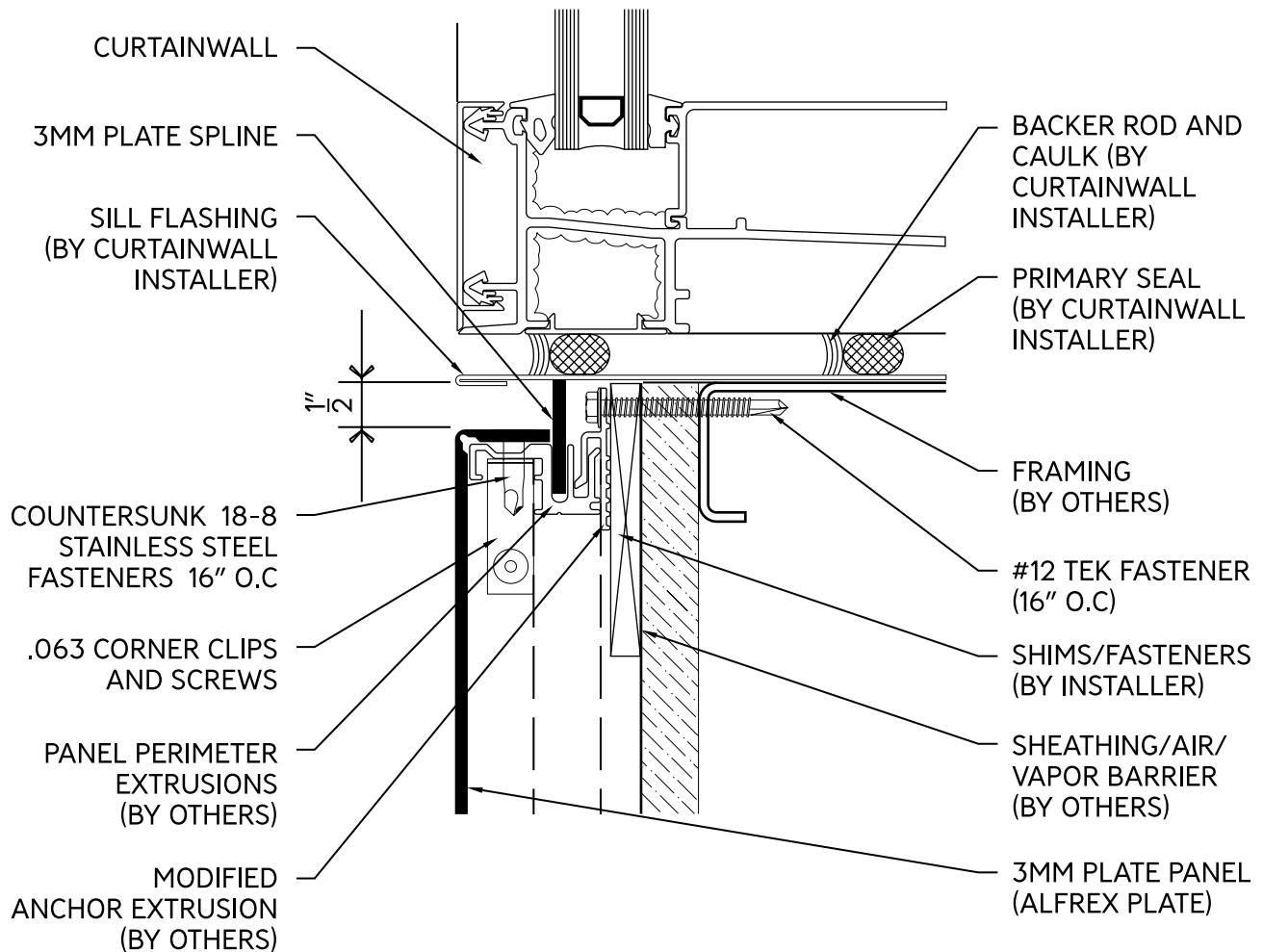
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SILL

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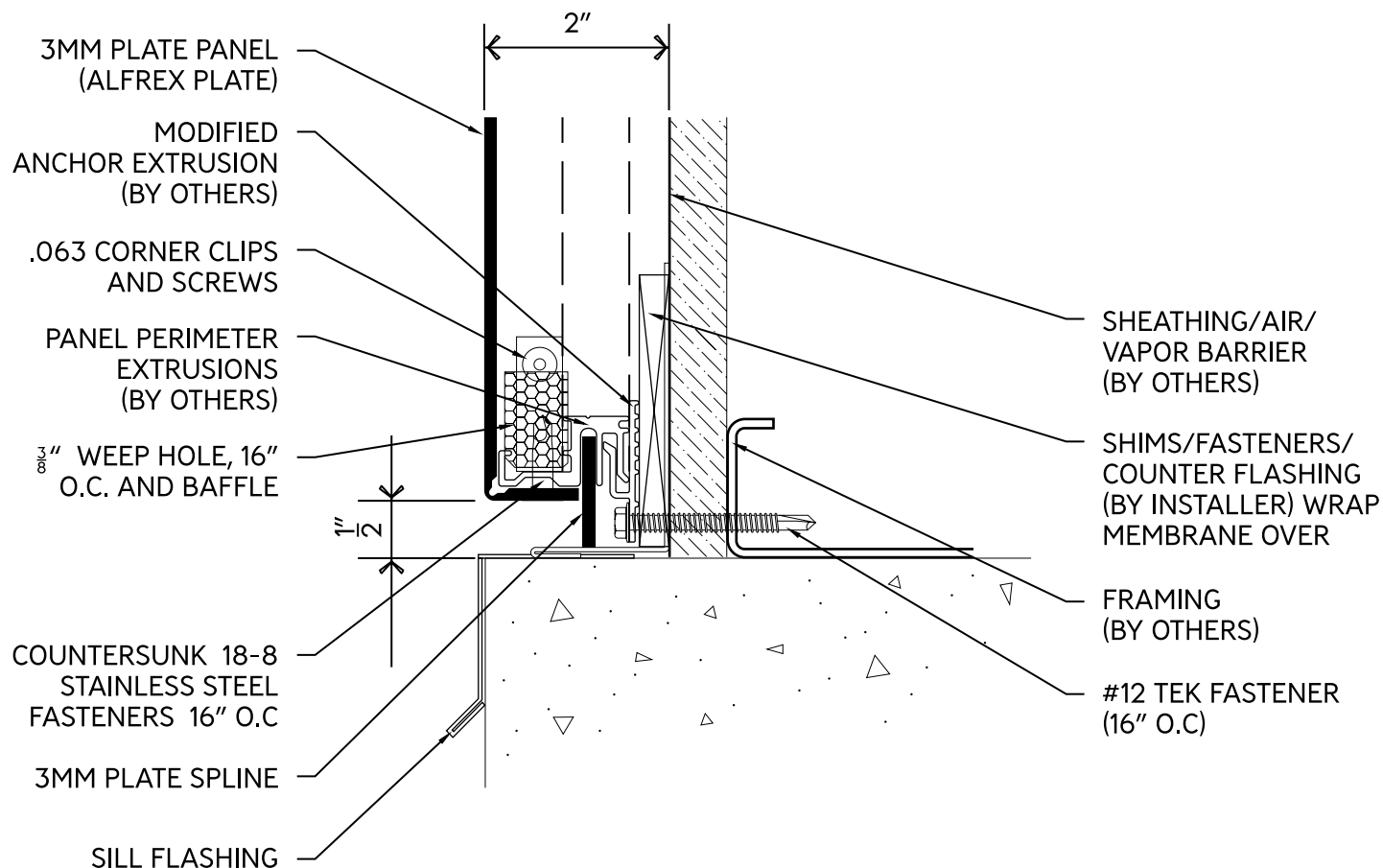
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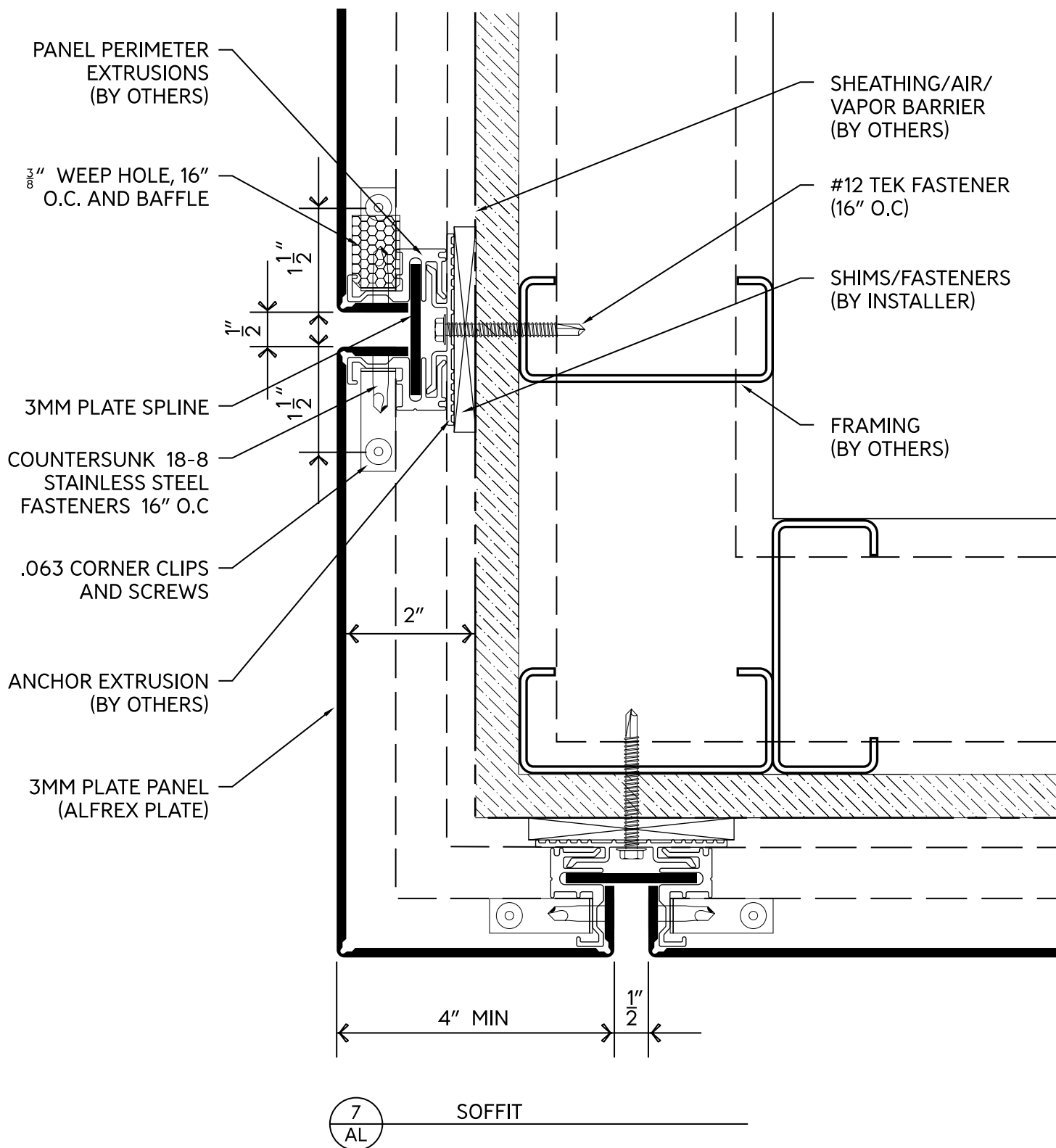
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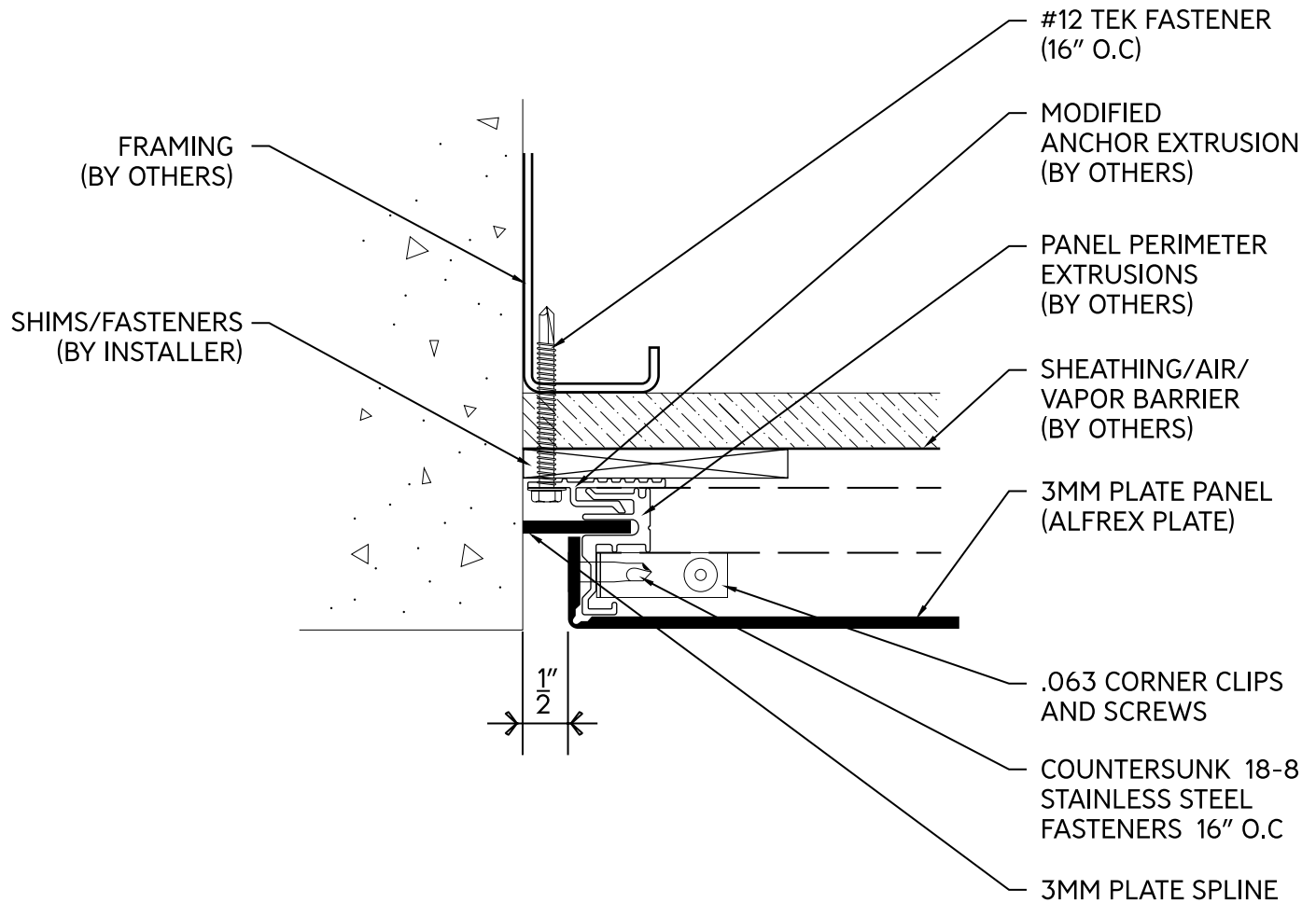
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TERMINATION

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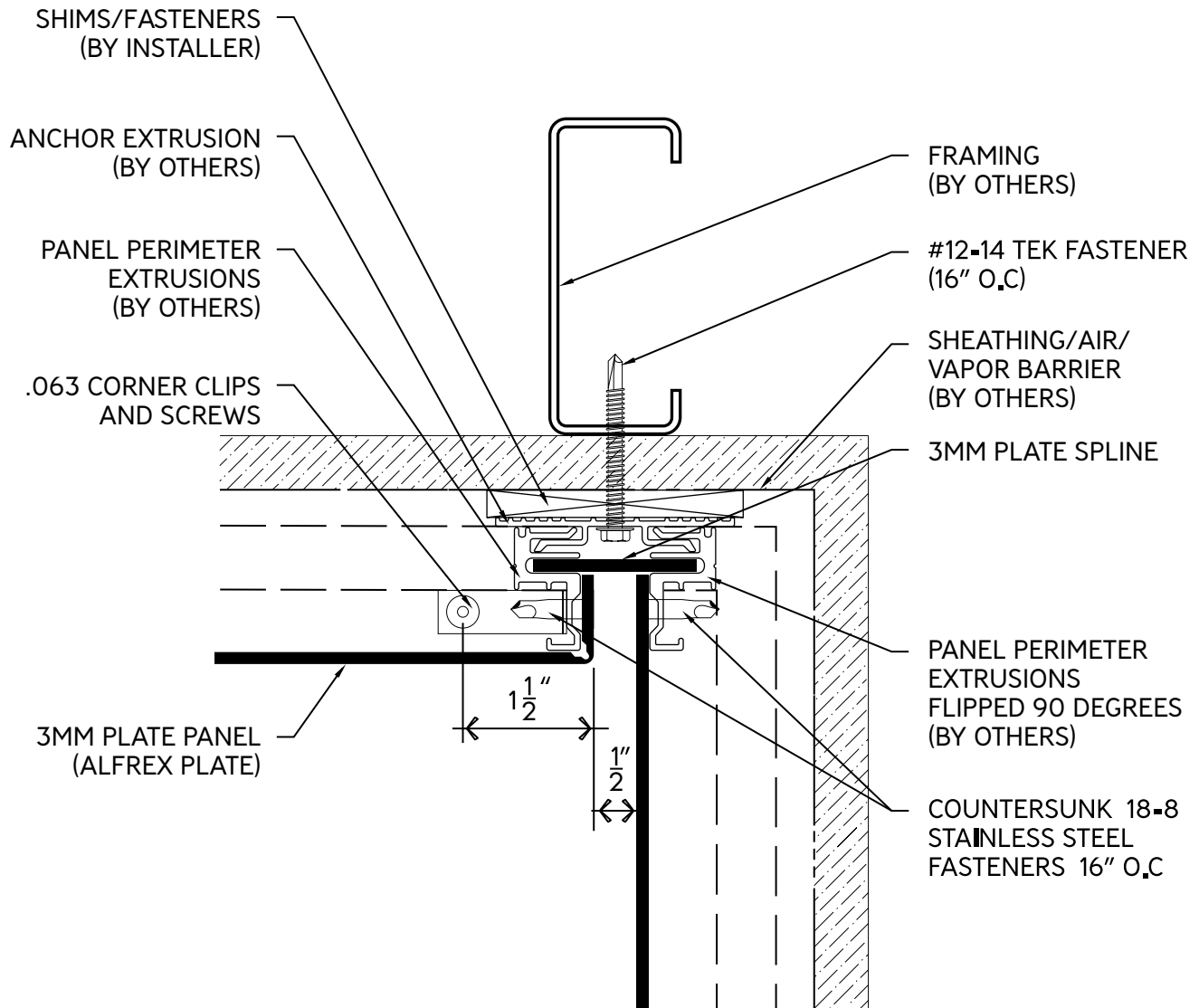
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INSIDE CORNER

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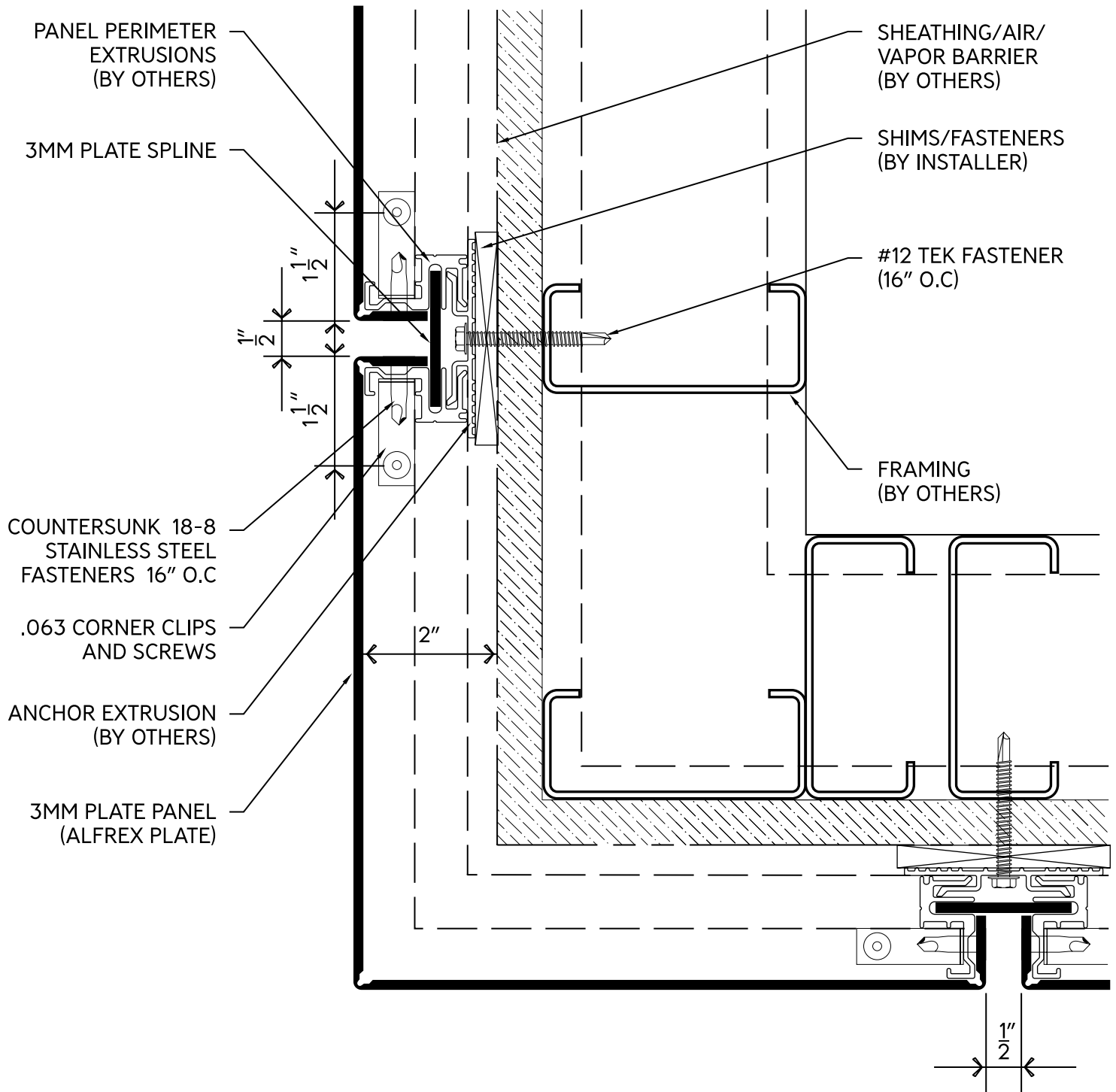
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OUTSIDE CORNER

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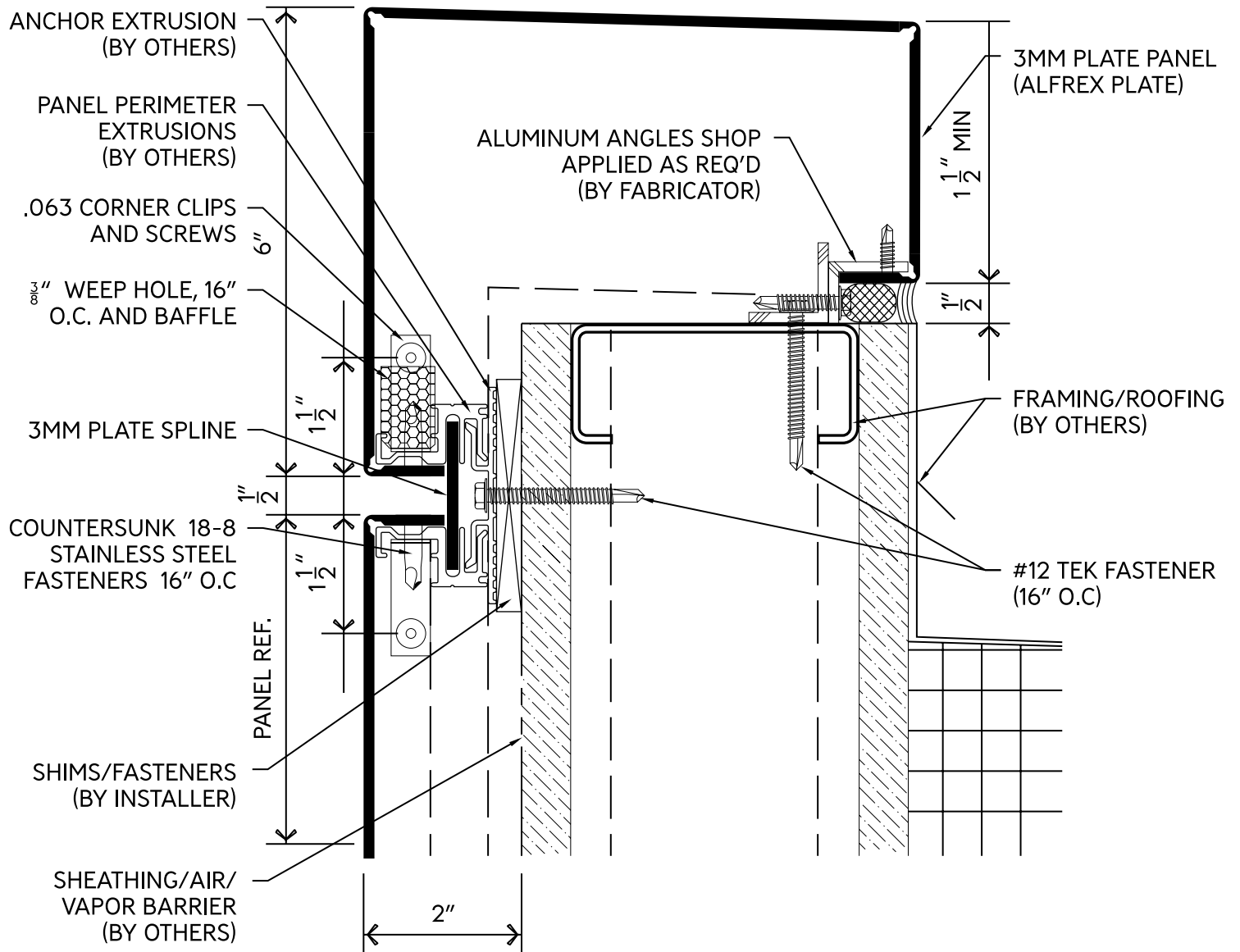
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PARAPET OPTION 2

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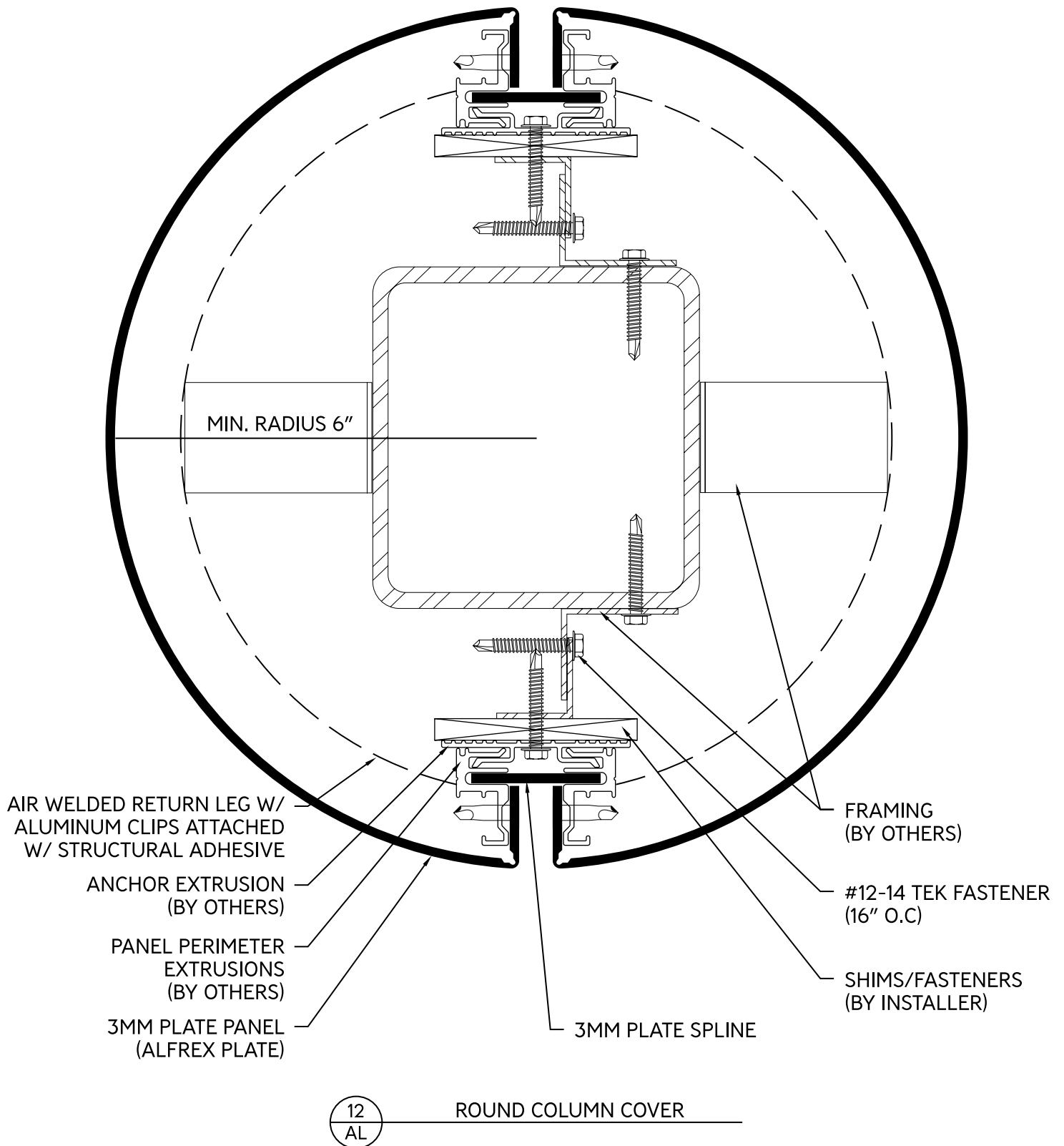
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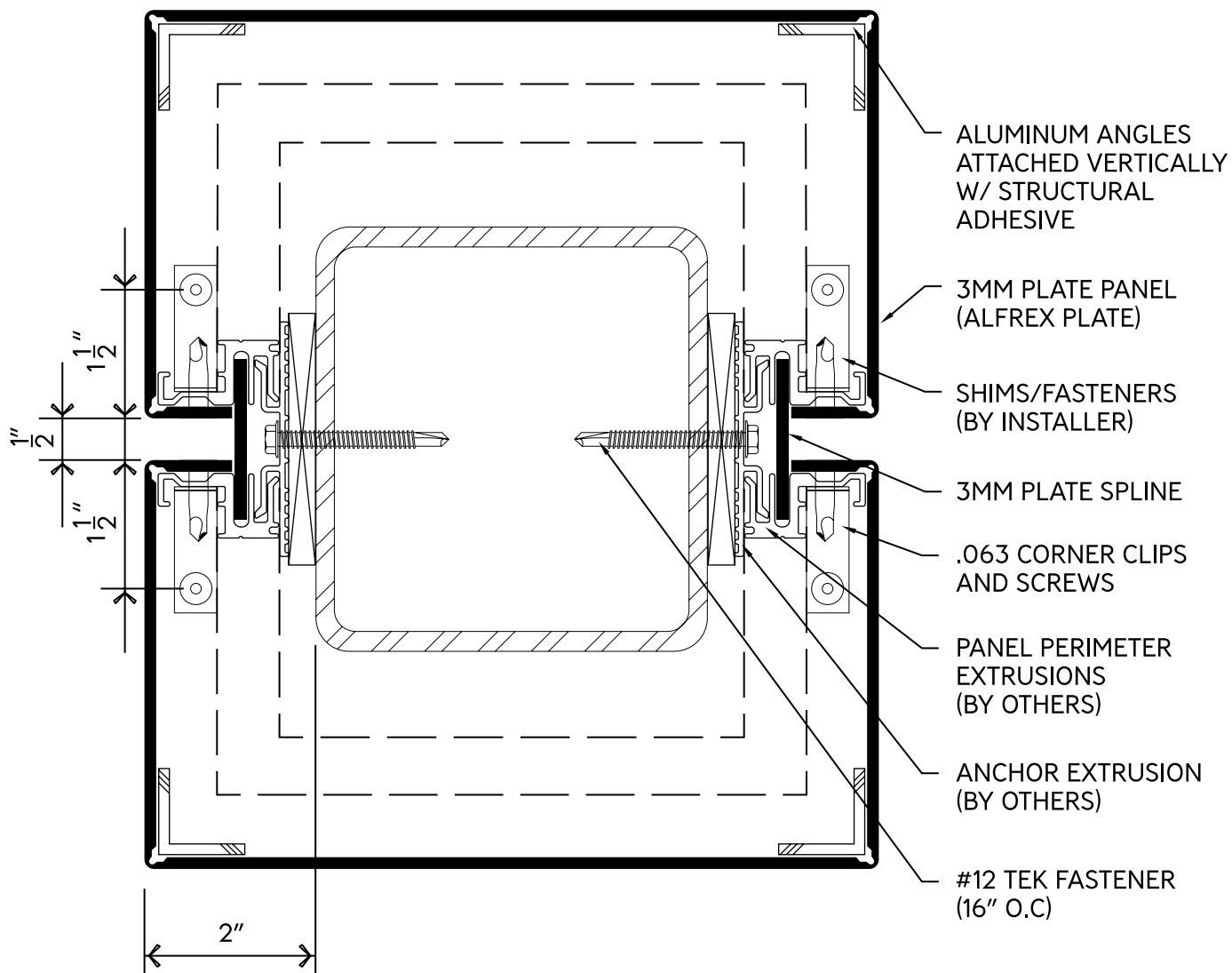


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SQUARE COLUMN COVER

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**GENERIC RAINSCREEN  
SYSTEM APPLICATION**

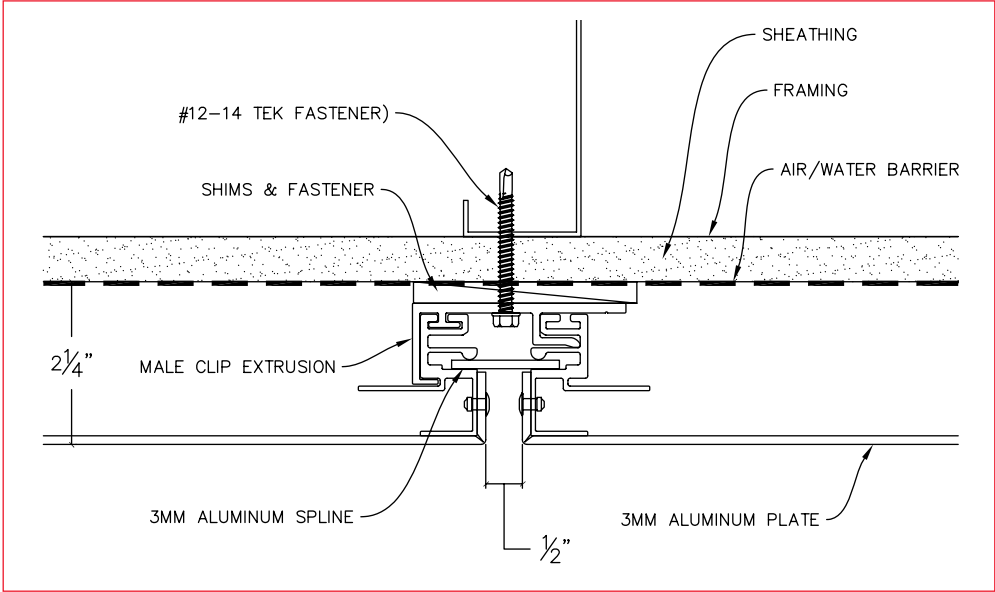
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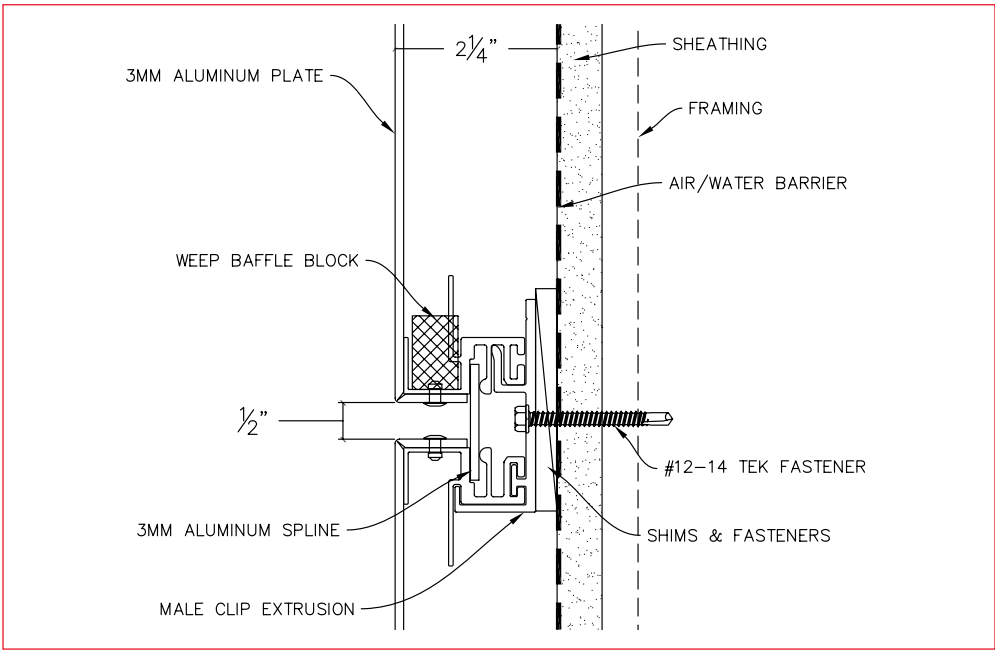
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ACCU-TRAC® 3mm DS  
 Pressure Equalized Rainscreen System  
 Typical Vertical Joint



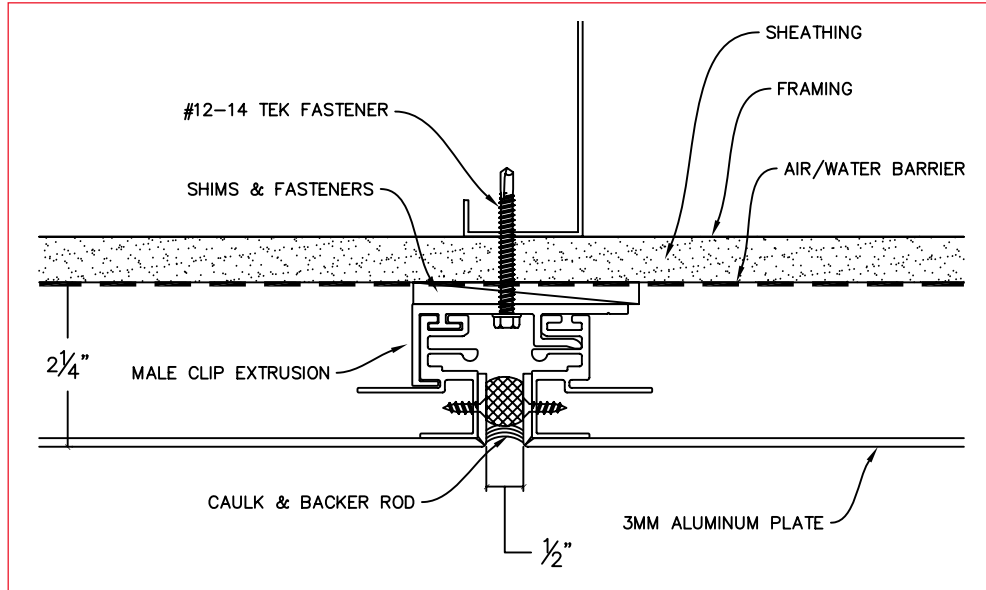
ACCU-TRAC® 3mm DS  
 Pressure Equalized Rainscreen System  
 Typical Horizontal Joint



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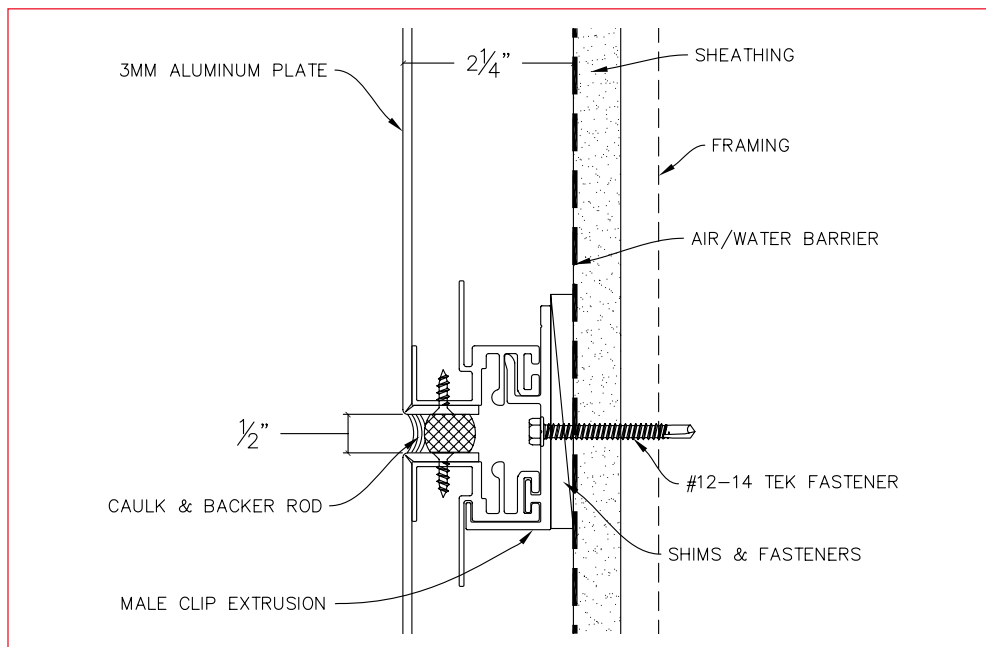
## ACCU-TRAC® 3mm ES

Route & Return Exposed Sealant System  
Typical Vertical Joint



## ACCU-TRAC® 3mm ES

Route & Return Exposed Sealant System  
Typical Horizontal Joint



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# ALFRED PLATE SUPPORT DOCUMENTATION

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Alfred, Inc. (Alfred) Alfred FR aluminum composite and Alfred Plate panels are manufactured utilizing aluminum coils painted on continuous process coil coating lines. The high-quality architectural coatings used contain combinations of UV resistant resins, organic pigments, inorganic pigments, and protective clear coats engineered for long term exterior exposure in the elements and minimal maintenance.

Alfred recommends that panels be cleaned on a regular basis in order to maintain their aesthetic appearance and to prevent the accumulation of dirt and particulate present in the local environment. The frequency and degree of cleaning is dependent upon several factors including the building location, proximity to bodies of fresh water or the ocean, local climate, pollution levels, proximity to heavy industry, and overall air quality. A general practice is to clean panels at the same time a building's windows are cleaned.

## General Recommendations

- Always avoid the use of abrasive materials that pose a potential to scratch or degrade the painted surface of panels including, but not limited to, steel wool, wire brushes, metal scrapers, abrasive sponges, powder abrasives, and chemical abrasives.
- Commence cleaning at the bottom of building walls and progress upwards, working in the opposite direction of window cleaning, which traditionally progresses from top to bottom.
- To avoid streaking, cleaning should be done either on a cloudy day, or when areas of the building to be cleaned are shaded from direct sunlight.
- Regardless of the cleaning method used, the methods and materials should be first tested on either a product sample, or on a small, inconspicuous section of the building.
- Always start with a freshwater rinse and progress to the other cleaning methods from mildest to strongest as needed.
- It is recommended that more frequent cleaning intervals utilizing freshwater and mild detergents be employed as opposed to less frequent intervals which may require the use of harsher chemicals, solvents, and mild abrasive methods.
- NEVER use Acetone or Paint Removers on any painted product surface.
- Utilize personal protection equipment and proper safety precautions when handling solvents and other chemical agents to prevent chemical irritation or burns to the eyes, skin, or lungs.
- Follow closely cleaning product or chemical manufacturer recommendations regarding the mixing of certain chemicals in order to avoid the production of toxic gases or explosive chemical reactions.
- Only apply cleaning solutions, chemicals, or solvent solutions in conditions where panels can be rinsed with freshwater before the cleaning solution can dry. NEVER allow cleaning solutions to dry on the panels.

## Freshwater Rinse

- Frequent freshwater rinsing of panel surfaces is ideal for the removal of water-soluble dirt, residues, and other organic material deposits. Mechanical pressure washers should not be used as this may damage panels, coated surfaces, or components critical for the function of the panel assembly.
- Annual freshwater rinses may be mandatory as stipulated in finish warranties under certain environmental conditions, such as proximity to salt-water and ocean mist. Please consult warranties for specific details.
- If surface contaminants or stains persist after freshwater rinsing, then the utilization of mild detergents is recommended.

## Mild Detergent Cleaning

- For more persistent areas requiring deeper cleaning, Alfred recommends that a 5% mild detergent solution diluted with freshwater be used and applied directly to the area using non-abrasive cloth, sponges, or soft bristle brushes.
- Mild detergents may be classified as those used in residential applications, commonly under popular brand names, which do not pose risks of irritation when coming in direct contact with exposed skin.

## Intense Cleaning

- More intense cleaning methods may be required when mild detergent solutions are not successful in the removal of stubborn stains, or areas where non water-soluble contaminants such as paint, oils, tar, dirt, graffiti, silicone, or other sealing compounds are present.
- Alfred recommends that a solution of Mirachem® 500 diluted to a 10% to 30% concentration be used before other common solvents or chemicals. Follow the manufacturer guidelines as well as the same processes detailed above in the general recommendations, always followed by a freshwater rinse.
- Solvents that may be used include alcohol solvents (ethanol, isopropyl alcohol, methanol), petroleum solvents (Turpentine, mineral spirits), aromatic solvents (xylene, toluene), ketones (MEK, MIBK), and esters (ethyl acetate, lacquer thinner). NEVER use acetones or paint removers.

# STORAGE AND HANDLING RECOMMENDATIONS



*Alfrex FR MCM - Alfrex Plate - Alfrex 0.040" Matching Flat Sheet*

Fire Resistant & Non-Combustible Cladding

- Alfrex FR MCM, Alfrex Plate, and Alfrex 0.040" Matching Flat Sheet are cut to length and packaged in cushioned, reinforced pallets (skids) to prevent excessive sagging of the skid when lifting and moving via fork trucks.
- Pallets of Alfrex product should always be stored horizontally on flat surfaces that prevent sagging or shifting. Do not stack skids of MCM or Plate product higher than six skids high. Care should be taken not to stack multiple skids of heavier material on top of pallets containing only 0.040" flat sheet.
- Storage should be in a cool, dry area with stable temperatures to prevent formation of condensation. Sheets should not be stored where they can be exposed to moisture which may cause permanent surface damage. Situations where sheets may be subjected to standing water conditions should be avoided.
- Care should be taken when handling individual sheets during sheet fabrication. When lifted from each end, individual sheets will sag in the center as they are moved. Sagging should be minimized by having additional support in the center. Care must be taken to lift sheets high enough so that the sagging center sheet edge does not damage the surface of the sheet directly underneath as it is moved.
- Sheets of Alfrex product may be temporarily staged in "A-frame" racks commonly used with MCM and Plate sheets. It is not recommended that Alfrex product be transferred to other pallets not-supplied by Alfrex as they may sag excessively - inducing permanent set in the solid aluminum plate sheets which will manifest in sheet bowing when placed on CNC tables.



Alfred Plate may be perforated, or face fastened for design purposes however, special care and precautions must be followed in order to ensure proper performance of the coating finish when unfinished edges are exposed to the environment.

## Definition

Perforated and Exposed Edge applications refer to fabricated sheet edges and open areas located on the panel surface, are visibly exposed to open atmospheres, and do not serve as a terminating edge of the sheet.

## Perforation and Open Areas with Exposed Edges

- All perforation and related operations should be carried out using turret press, punch press, tooled break press, tri-axis water jet processing machines. Laser Jet or CNC fabrication of the sheet are not recommended as they can cause heat damage to the top paint layer, leaving exposed aluminum vulnerable to oxidization.
- The total perforated or open area of any individual sheet should not exceed 30% of total area of the sheet.
- The minimum distance between each perforated hole or open area is 1.5 x the thickness of the sheet, equating to 0.177" (4.5mm) for 3mm thick Alfred Plate, and 0.120" (3mm) for 2mm thick Alfred Plate.
- All perforated and other open areas with exposed edges must be located greater than or equal to 1.25" (32 mm) from the terminating edge of the sheet.

## Face Fastened Panel Installation

- The following measures should be taken in order to prevent any bimetallic or galvanic corrosion between Alfred Plate panels and the face fixing method:
- Only stainless-steel screws should be used.
- Spacers must be installed between Alfred Plate and z-girts or hat channels.

## Limited Finish Warranty

In cases where Alfred Plate will be fabricated with perforations and open areas with exposed edges, a maximum 10-year limited paint finish warranty is available depending on the paint finish used. Conditions and limitations of the finish warranty for all perforated and exposed edge applications are listed in the Alfred Plate Perforated Limited 10 Year Finish Warranty. Important highlights include:

1. The maximum finish warranty for face fastened Alfred Plate sheet is 10 years regardless of the paint system used.
2. All perforated and exposed edge condition, fabrication processes, and equipment to be used for perforation and exposed edge area fabrication should be approved in advance by Alfred in order to avoid nullification of the finish warranty.
3. Warranties will be issued only for installations located greater than or equal to 1 mile (1.6 km) from any coastline, saltwater, or brackish saltwater.
4. All perforated and exposed edge applications exposed to salt spray or within 1.5 miles (2.4 km) of salt-water or industrial atmospheres, as well as areas unwashed by rain exposure, must be maintained by washing with fresh tap water once every 6 months and documentation of this maintenance provided upon request.

# alfrex

Fire Resistant & Non-Combustible Cladding



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