

Project: Webster Interdisciplinary Substitution Request Number: 23
Science Building From: Vogel Sheet Metal
To: _____ Date: June 16, 2016
Re: _____ Contract For: _____

Specification Title: Metal Composite Material Description: _____
Wall Panels Article: 2.2
Section: 074243 Page: 5 Article/Paragraph: Paragraph: Metal Composite Material
Wall Panels

Proposed Substitution: CMG System 2000 Attachment System
Trade Name: Alcoa Reynobond
Model No.: System 2000
Manufacturer: Coated Metals Group
Address: 300 Yard Drive
Verona, Wisconsin 53593
Phone: (800) 784-0356 Manufacturer Web Page: WWW.CMGMETALS.COM

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

Savings to Owner for accepting substitution: _____ (\$ 0)

Proposed substitution changes Contract Time: ☐ No ☒ Yes

PROPOSED FABRICATOR CAN MEET PROJECT SCHEDULE. BASIS
OF DESIGN MANUFACTURER CAN NOT MEET PROJECT SCHEDULE.

The Undersigned Bidding General Contractor/Coi

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified products.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Interdisciplinary Science Building
Webster University
Cannon Design Project No. 004561.01

- The following supporting data is attached to this request and verifies the above statements:

- ☒ Drawings
- ☒ Product Data
- ☐ Samples
- ☒ Tests
- ☐ Reports
- ☐ Other (explain) _____

Submitted by: Rick Sowa

Signed by: *Rick Sowa*

Contractor: Vogel Sheet Metal

Address: 1642 Manufacturers Dr.
Fenton, MO 63026

Phone: (314)-581-5975 Email: ricks@vogelheating.com

Review and Action

- ☐ Substitution approved – Make submittals in accordance with the Specifications.
- ☐ Substitution approved as noted – Make submittals in accordance with the Specifications.
- ☒ Substitution rejected – Use specified materials.
- ☐ Substitution received too late – Use specified materials.

Comments: **System does not meet the basis of design requirements. (It does not match the capabilities established by the Basis of Design system).**
System proposed is not non-progressive. Basis of Design product, Universe 2000R is a non-progressive system.
Performance indicated is not compared to Basis of Design product but does not appear to match standards of Basis of Design Product. eg Air Infiltration, Water Penetration.

Signed by: _____ Date: 06/24/16

Lynn Grossman 06.24.16



TEST REPORT

Report No.: D0934.01-602-44

Rendered to:

Coated Metals Group
Verona, Wisconsin

PRODUCT TYPE: ACM Rain Screen
SERIES/MODEL: System 2000

**AAMA 508-07, Voluntary Test Method and Specification for Pressure Equalized Rain
Screen Wall Cladding Systems.**

Test Dates: 09/18/13

Through: 10/01/13

Report Date: 11/08/13

Test Record Retention Date: 10/01/17

- 1.0 Report Issued To:** Coated Metals Group
300 Yard Drive
Verona, Wisconsin 53593
- 2.0 Test Laboratory:** Architectural Testing, Inc.
5906 Saxon Ave
Schofield, Wisconsin 54476
(715) 241-8624

3.0 Project Summary:

3.1 Product Type: ACM Rain Screen

3.2 Series/Model: System 2000

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. Test specimen description and results are reported herein.

3.4 Test Dates: 09/18/2013 - 10/01/2013

3.5 Test Location: Architectural Testing Inc. test facility in Schofield, Wisconsin.

3.6 Test Sample Source: The test specimen was provided by the client. Representative samples of the test specimen will be retained by Architectural Testing for a minimum of four years from the test completion date.

3.7 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix D. Any deviations are documented herein or on the drawings.

3.8 List of Official Observers:

<u>Name</u>	<u>Company</u>
Gary Woodward	Coated Metals Group
Scott Woodward	Coated Metals Group
Jeff Zibton	Architectural Testing, Inc.

4.0 Test Methods:

AAMA 508-07, *Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems*.

ASTM E 283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*. Testing was conducted at 75 Pa (1.57 psf) positive static air pressure difference.

ASTM E 1233-06 (Modified), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Static Air Pressure Differential*. Testing was conducted for 100, three-second cycles from 240 Pa (5.0 psf) to 1200 Pa (25.0 psf) to 240 Pa (5.0 psf).

ASTM E 331-00, *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference*. Testing was conducted at 720 Pa (15.04 psf) positive static air pressure difference for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/hr/ft².

AAMA 501.1-05, *Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure*. Testing was conducted with a dynamic pressure equivalent of 720 Pa (15.04 psf) for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/hr/ft².

ASTM E 330-02, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*.

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 8.7 m ² (64.0 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2438	96	2438	96
Panel size	1200	47-1/4	1200	47-1/4

5.0 Test Specimen Description: (Continued)

5.2 Panel Construction: The panels consisted of aluminum composite material and featured 90° returns at the perimeter. Aluminum extrusions were applied with structural tape being utilized at both the main face (3/4" wide) and the return edge (1/4" wide). Silicone sealant was applied to the inside corner joint of the extrusions. Each panel contained two weep holes measuring 3/16" in diameter and spaced 8" from the panel corners. Each weep was baffled with reticulated foam blocks measuring 1/2" x 1/2" x 2-1/2" and held in place with silicone sealant.

5.3 Test Wall Construction: The 96" wide by 96" high test wall was constructed of 18 gauge, 6" galvanized steel studs. The steel studs were spaced 16" on center inside a 2x12 wood buck. The stud wall was covered with 1/4" thick clear lexan, sealed and secured to the exterior of the wall to simulate an air/water barrier. The wall panel system was then installed onto the clear polycarbonate in a manner consistent with normal construction procedures for the system. The clear lexan was calibrated to a pre-determined air leakage rate by drilling 1/8" diameter holes on the backside in a uniform pattern, making sure to create an even pressure drop and leakage rate across the wall and in each quadrant.

5.4 Reinforcement: No reinforcement was utilized.

5.5 Installation: Installation of the tested product was performed by the client.

An aluminum flashing was utilized at the sill. The flashing was sealed to the wood buck and the polycarbonate with silicone sealant. Four inch long extruded aluminum clips were fastened to the panel extrusions at jamb conditions with one #8 x 3/4" long self-drilling screw. The clips were fastened at 16" on center horizontally and 18" on center vertically. A continuous starter clip was secured to the stud wall at each stud. The first panel was installed utilizing two #14 x 1-1/2" long self-drilling stainless screws per clip and into the stud wall. A 4 mm spline was inserted into the panel extrusions. Panel installation continued progressively with panel extrusions being engaged into the spline and the extruded clips fastened. A 1/2" wide joint was maintained at all panel edges. The installation was finished with the head and jamb joints being silicone to the wood buck.

5.6 Cavity Depth: 51 mm (2 in)

5.7 Air Cavity Volume to Vent Area Ratio: 0.30 m³/ 0.018 m² (10.55 ft³/ 0.19 ft²)

6.0 Test Results: The temperature during testing was 20°C (68°F). The results are tabulated as follows:

Air Leakage (Infiltration per ASTM E 283)

Pressure	Results	Allowed	Note
75 Pa (1.57 psf)	0.6 L/s/m ² (0.12 cfm/ft ²)	0.6 L/s/m ² (0.11 cfm/ft ²) min. 0.7 L/s/m ² (0.13 cfm/ft ²) max.	1

Pressure Cycling (per ASTM E 1233)

100 cycles from 240 Pa (5 psf) to 1200 Pa (25 psf) to 240 Pa (5 psf)

	Results	Allowed	Note
Cycle Time Lag	<0.01 sec.	0.08 sec. max.	2, 3
Cycle Pressure Difference	38.78 Pa (0.81 psf)	600 Pa (12.5 psf) max.	
PASS / FAIL	PASS		

Static Water Penetration (per ASTM E 331)

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	0.21 m ² 2.27 ft ²	0.30 m ² (3.20 ft ²)	4, 6
PASS	PASS		

Dynamic Water Penetration (per AAMA 501.1)

Pressure	Results	Allowed	Note
480 Pa (10.03 psf)	0.09 m ² (0.94 ft ²)	0.30 m ² (3.20 ft ²)	5, 6
PASS	PASS		

6.0 Test Results: Optional Performance

Uniform Load Deflection (per ASTM E 330)

Pressure	Results	Allowed	Note
taken on horizontal center of bottom panel			7, 8
+2880 Pa (+60.15 psf)	22.1 mm (0.87")		
-2880 Pa (-60.15 psf)	20.1 mm (0.79")	Report Only	

Uniform Load Structural (per ASTM E 330)

Pressure	Results	Allowed	Note
taken on horizontal center of bottom panel			7, 8
+4320 Pa (+90.23 psf)	0.5 mm (0.02")		
-4320 Pa (-90.23 psf)	<0.3 mm (<0.01")	Report Only	

Note #1: The calibrated leakage was achieved with 55, 1/8" diameter holes were drilled through the polycarbonate. All holes were evenly distributed in each stud cavity and located 6" above the bottom and the midspan of the wall.

Note #2: Pressure tap was attached through the air barrier at a panel center point.

Note #3: Reference Pressure Cycling graph in Appendix A.

Note #4: Water misting was noted at the weep locations at the horizontal intermediate and along the sill weeps.

Note #5: Water misting was noted at the weep locations at the horizontal intermediate and along the lower vertical joint.

Note #6: Water on the polycarbonate air/water barrier surface was in the form of mist or droplets.

Note #7: Loads were held for 10 seconds.

Note #8: Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

General Note: All testing was performed in accordance with the referenced standards. This report is not intended as a comprehensive evaluation of the system regarding performance and application to specific buildings.

7.0 Test Equipment:

- Computerized control panel to run positive pressures, cyclic pressures, and measure air leakage rates.
- Structural test chamber to mount the test wall, as to evaluate the performance of the wall panel system for static and cyclic pressures, as well as water penetration. The wall was situated such that the interior side of the test wall was accessible to observe air and water leakage.
- Dynamic wind generator to create a wind pressure to test the wall panel system for dynamic water penetration.
- Computerized data management equipment to read, log, and graph differential pressures.

The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, Inc.



Digitally Signed by: Jeffrey M. Zibton

Jeffrey M. Zibton
Project Manager

JMZ:jrb/asm



Digitally Signed by: John Bordagaray

John R. Bordagaray
Director - Regional Operations

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Graph (1)
- Appendix-B: Photographs (1)
- Appendix-C: Load Tables (2)
- Appendix-C: Drawings (8)

This report produced from controlled document template ATI 00521, issued 03/4/11.

PORSCHE

SYSTEM 2000

Rain Screen System

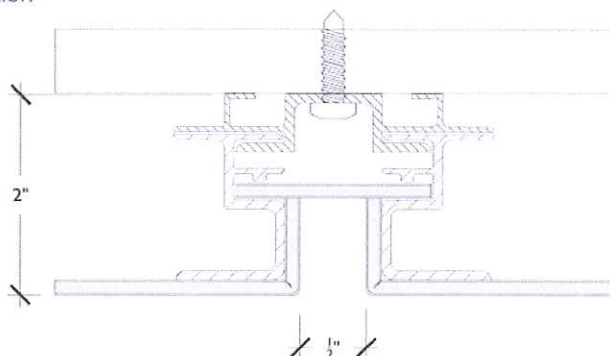
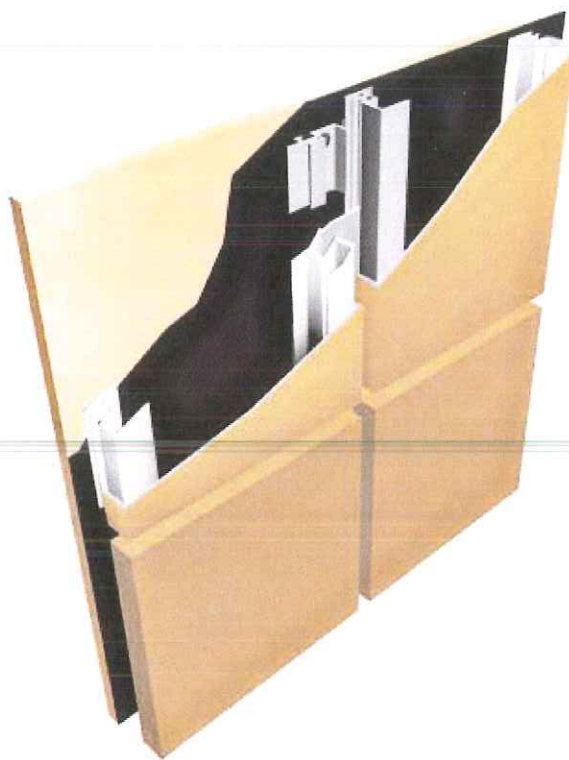
CMG System 2000 is the industry standard bearer for pressure-equalized, rear ventilated rain screen panel systems. The next generation of dry-joint panel system design, System 2000 introduces a proprietary joint design that eliminates virtually all exposed fasteners, resulting in the cleanest panel joint available for superior appearance. Tested to meet the industry's highest performance standards, System 2000 is the architect's choice for stunning design and unmatched performance.

Features

- Sequentially installed rear-ventilated rain screen system
- No exposed fasteners
- Proprietary extruded aluminum attachment system
- Unique design allowing for efficient installation

Tests

- ASTM E283
- ASTM E330
- ASTM E331
- AAMA 508



COATED METALS GROUP
WWW.CMGMETALS.COM

CMG ACM WALL PANEL SYSTEMS

CMG Aluminum Composite Wall Panel Systems offer incomparable design flexibility to achieve dramatic finished appearance and impact. Manufactured to exacting tolerances and standards using state-of-the-art computerized equipment, these systems meet the highest performance testing standards and requirements. A wide variety of available material sizes and finishes provides for an endless array of design options. Simplicity of design coupled with CMG's renowned attention to quality result in an unmatched finished product exceeding the expectation of designer, contractor and building owner alike.

OVERALL PANEL SYSTEM FEATURES

- Superior flatness and design flexibility
- Available in a variety of thicknesses
- Available in a variety of high performance finishes
- Curved and complex panel shapes available
- Finish warranties available up to 30 years
- Up to 5' x 16' panel sizes

Over 30 Years of Experience

High Quality Products at Competitive Prices

Who We Are

Simply put, CMG manufactures the highest quality architectural building products available at extremely competitive prices. Whether it is slit coil, flat sheets, pre-formed panel systems or rainware, CMG products are manufactured to exacting standards. All CMG steel is produced domestically and specified to tight tolerances resulting in uncommon uniformity. Our wide selection of finishes are produced from coatings that are the very best available. We back this claim with the most comprehensive finish warranty in the industry.

CMG Denver

2525 West Barberry Place
Denver, CO 80204
Phone: 303-623-5333
Fax: 303-623-3738
Toll-Free: 877-623-5333

CMG Indianapolis

455 Rawles Court
Indianapolis, IN 46229
Phone: 317-890-1999
Fax: 317-890-0950
Toll-Free: 866-694-1999

CMG Minneapolis

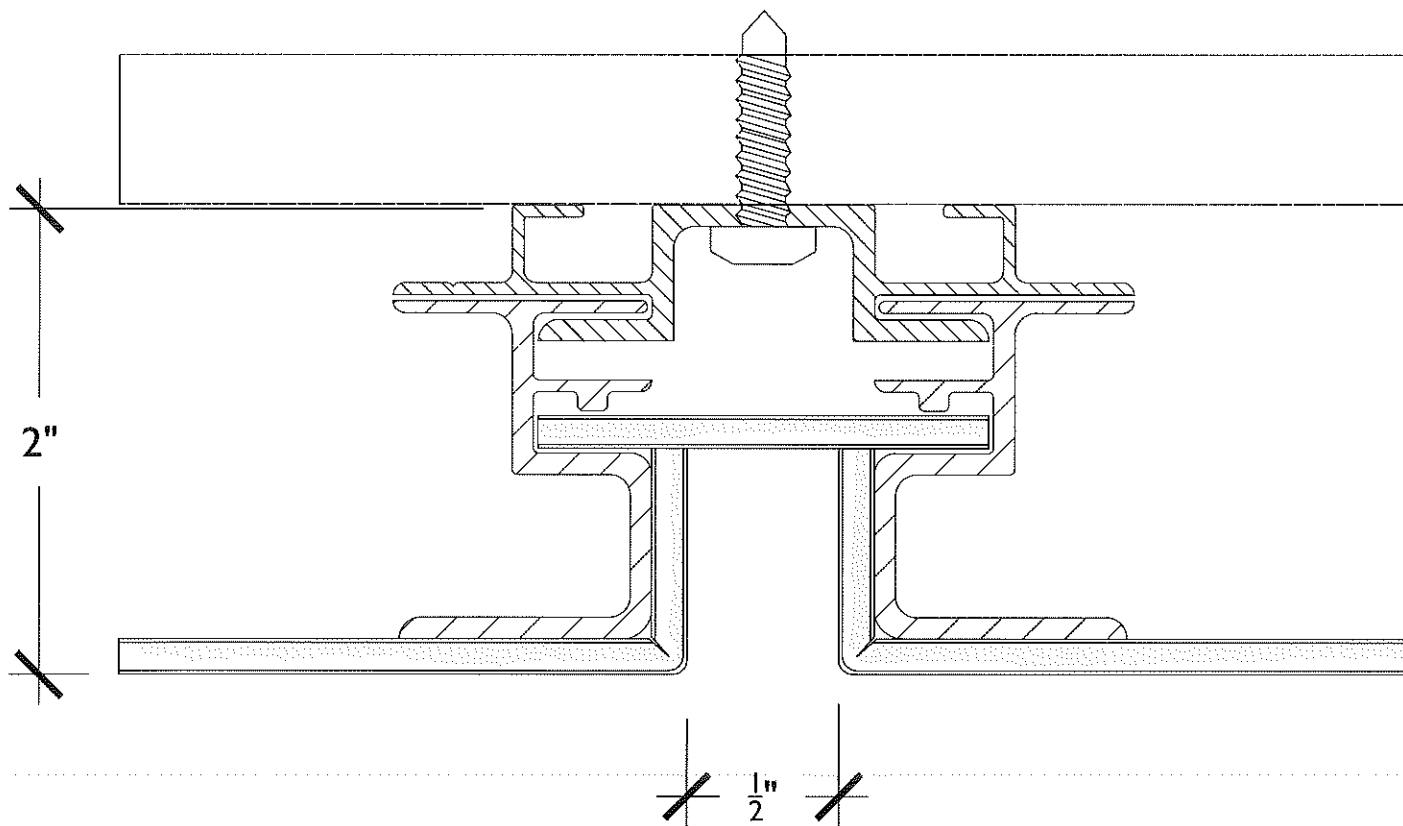
6801 Shingle Creek Parkway
Suite 1000
Brooklyn Center, MN 55430
Phone: 763-561-5000
Fax: 763-561-5001
Toll-Free: 855-561-5160

CMG Madison Headquarters

300 Yard Drive
Verona, WI 53593
Phone: 608-826-0356
Fax: 608-826-4264
Toll-Free: 800-784-0356

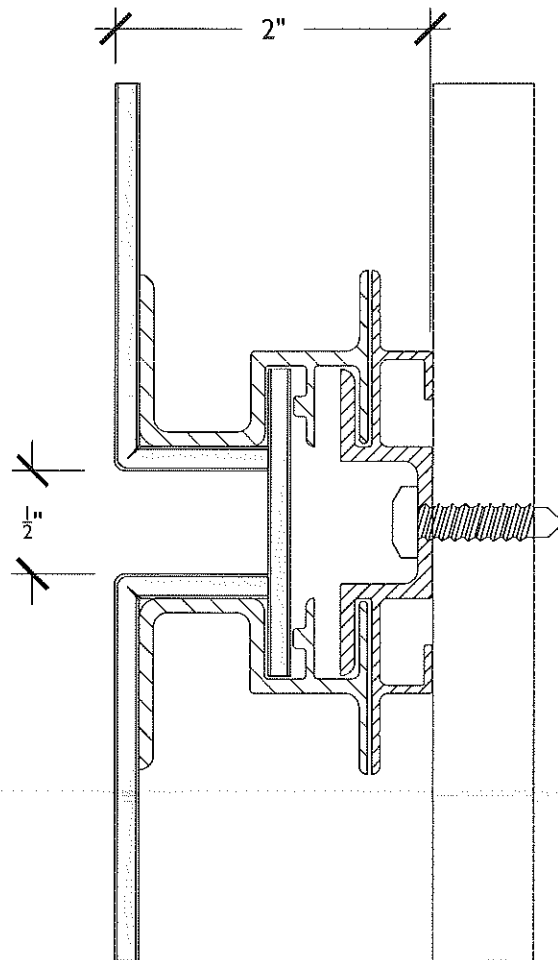


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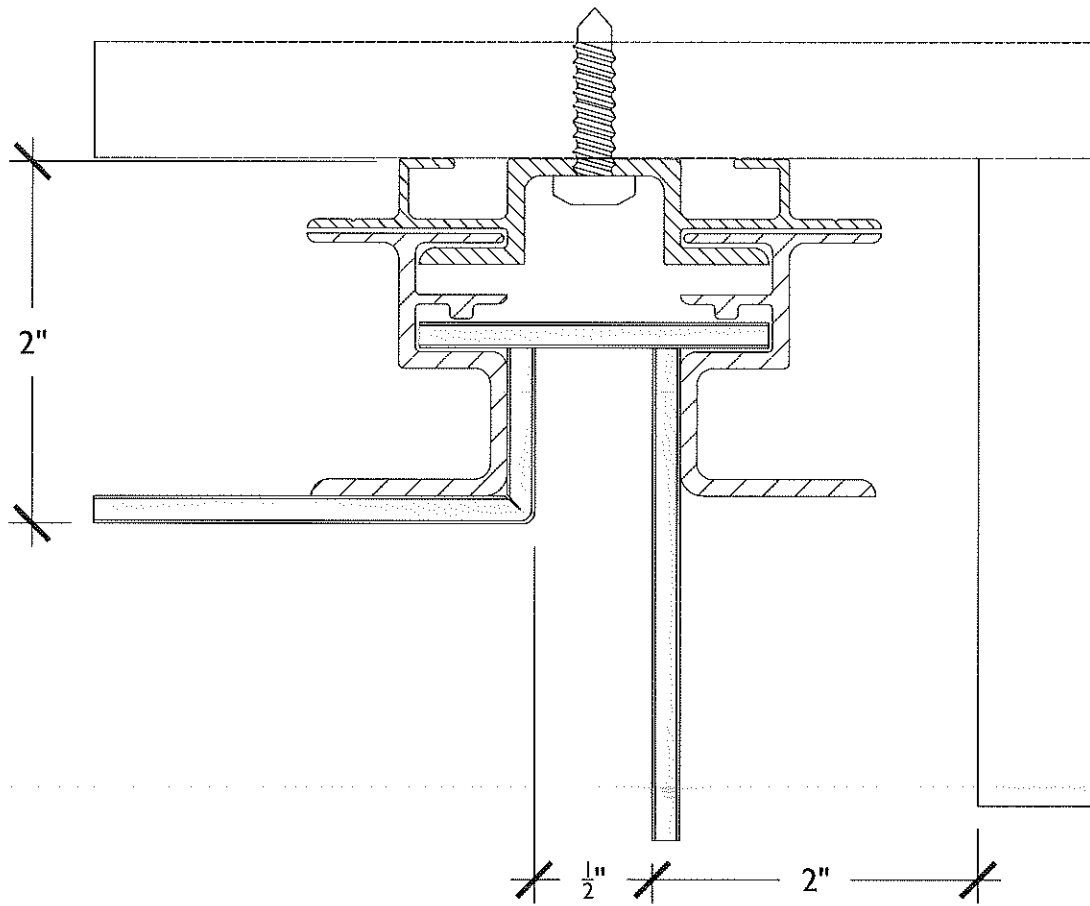
1

Typical Vertical Joint



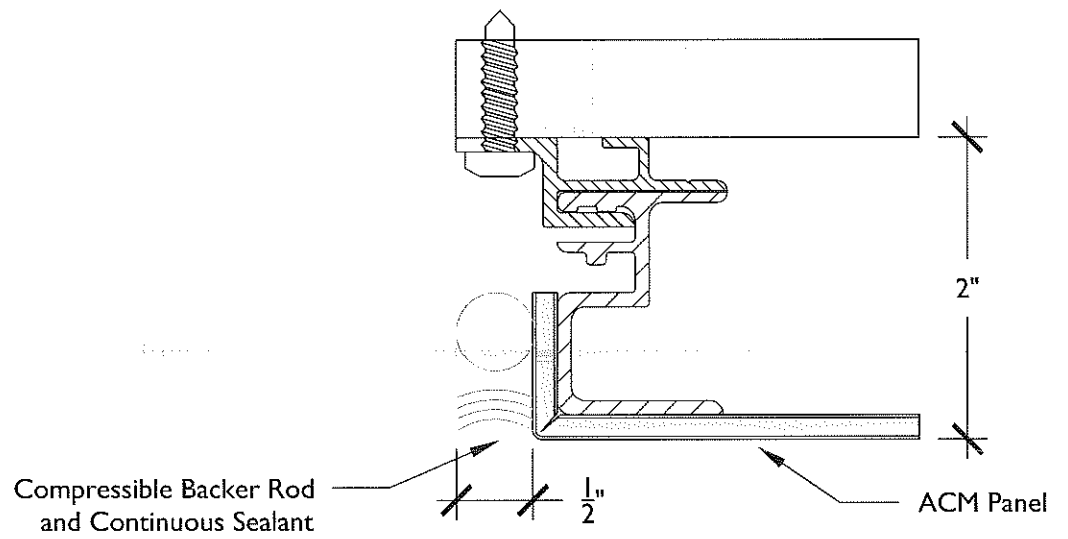
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Typical Horizontal Joint



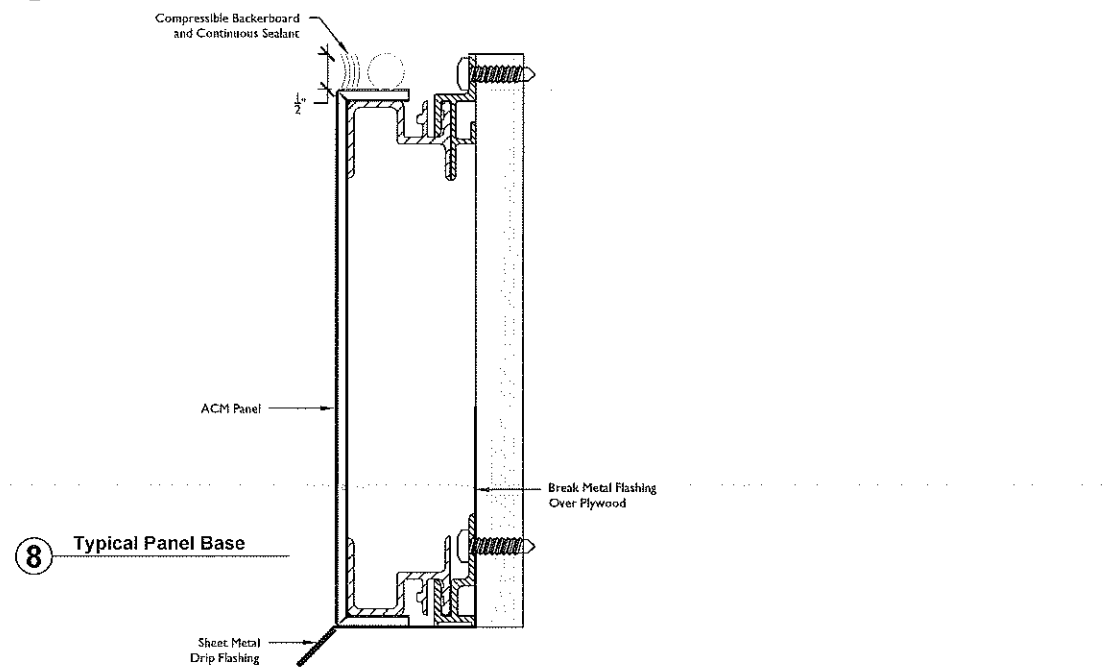
3

Typical Inside Corner

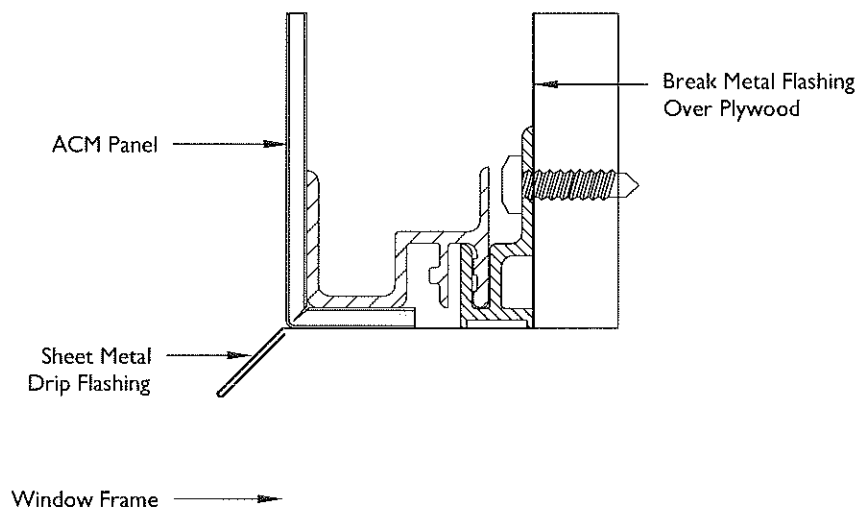


6 Typical Window Jamb

7 Typical Window Sill



8 Typical Panel Base



9 Typical Window Head

Gates, Devin

From: Szachnieski, Jason
Sent: Friday, June 17, 2016 4:15 PM
To: Gates, Devin
Subject: FW: Webster - Substitution Form
Attachments: Universe System Qualifications.pdf

From: Rick Sowa [<mailto:ricks@vogelheating.com>]
Sent: Thursday, June 16, 2016 5:52 PM
To: Szachnieski, Jason
Cc: Gates, Devin
Subject: FW: Webster - Substitution Form

Please see attached detail referencing a minimum of 8 rivets per panel securing stiffener angle to the corners of the panels. This contradicts the requirement for non-exposed fasteners. The CMG 2000 however, does not require these rivets. The specification only directs that the fasteners attaching the panel to the structure be non-exposed (See 074213.23-5 2.2 A. Last Sentence). Both the CMG System and Universe System have non-exposed fasteners for the panel to the structure when the systems are completely installed.

The panels being provided may be removed and replaced if damaged (Vogel has done this in the past).

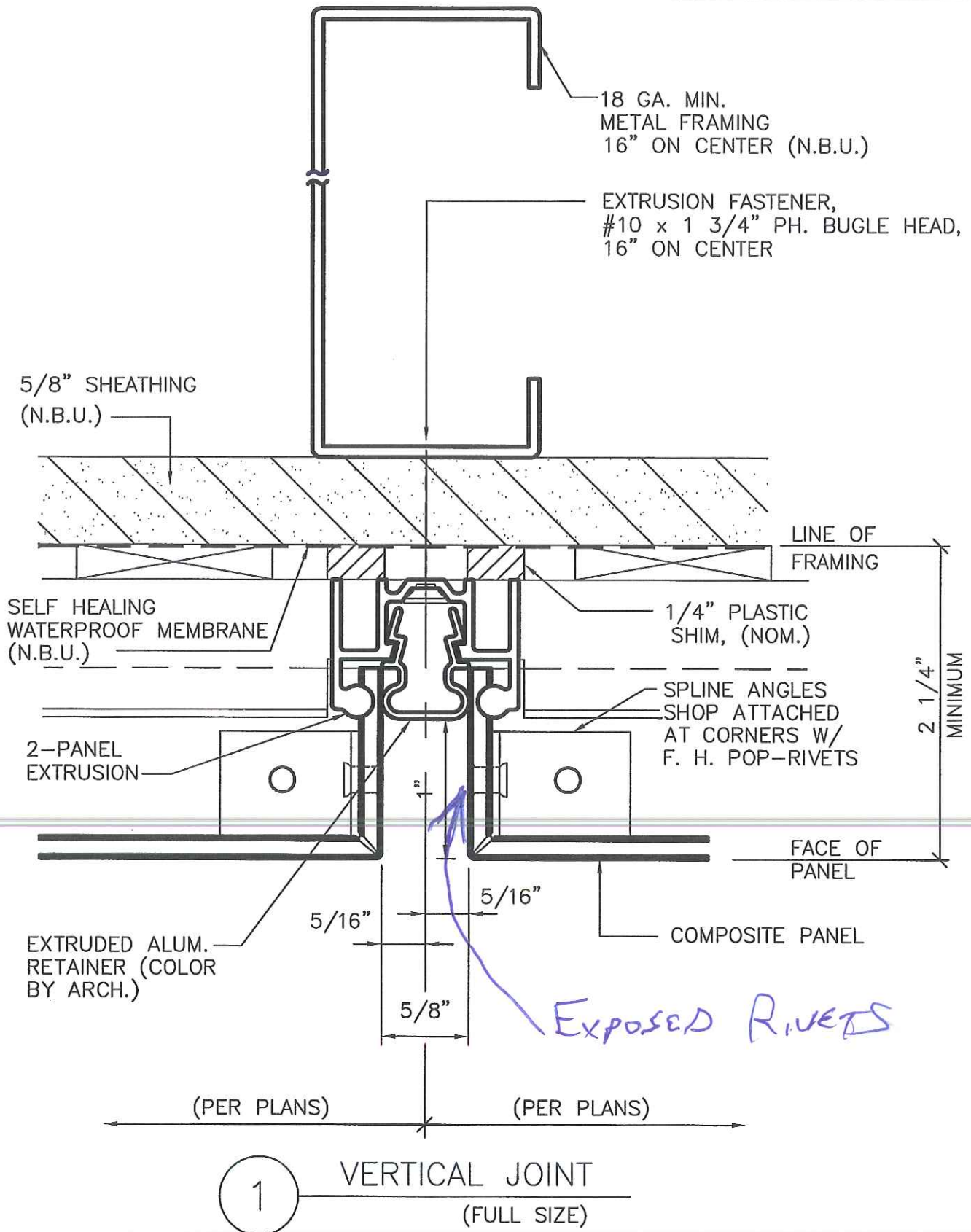
(Vogel)- We can and have removed these panels on this this system and the Universe system without removing panels adjacent to the one being removed.

In conclusion, the CMG 2000 System meets and exceeds the specifications as written. Should you have any other questions, concerns or need additional information please let me know.

Thank you
Bret Miller
MILO Architectural Solutions, Inc.
1025 Highway Y
Foley, Missouri 63347
Phone 636-668-8213
Cell 314-956-0399
Fax 636-668-8214
website: www.miloas.com

Thanks,
Rick Sowa
C. 314-581-5975
Vogel Sheet Metal

— UNIVERSE[®] 2000R —



- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: not less than 15 lbf/sq. ft. and not more than 12 lbf/sq. ft..
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METAL COMPOSITE MATERIAL WALL PANELS

- A. Metal Composite Material Wall Panel Systems - Extruded Thermoplastic Core: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components[, **panel stiffeners**], and accessories required for weathertight system. Provide system where panels anchored to supporting construction without exposed fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3A Composites USA, Inc.; Alucobond.
 - b. Alcoa Inc.; Reynobond PE.
 - c. ALPOLIC, Division of Mitsubishi Chemical America, Inc.; ALPOLIC
 - 2. Fabricators: Basis-of-Design Fabricator: Subject to compliance with the requirements, provide Universe Corporation 2000r "rainscreen" Attachement System.
 - 3. Aluminum-Faced Composite Wall Panels : Formed with 0.020-inch- thick, coil-coated aluminum sheet facings.
 - a. Panel Thickness: 0.157 inch .
 - b. Core: Standard.
 - c. Exterior Finish: Three-coat custom metallic fluoropolymer .
 - 1) Color: Two custom colors as selected by Architect.
 - 4. Attachment Assembly Components: Formed from extruded aluminum.
 - 5. Attachment Assembly: Manufacturer's standard rainscreen principle system.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.
 - 1. Rain Screen Wall Assemblies: Provide complete support framing and attachment system for installation of rain screen wall assemblies resulting in continuous insulated wall assembly when combined with insulation and cladding that is thermally isolated from structural wall framing by thermal spacers. Include consideration for drainage requirements of compartments for pressure-equalized rain screen assembly.
 - 2. Thermal Spacers: Refer to Section 074800 - Cladding Support Systems for thermal spacers.

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- B. Field Measurements: Take field measurements prior to completion of shop fabrication of metal composite material wall panels. Coordinate panel fabrication schedule with construction progress schedule as established by Contractor to avoid delay of construction.
- C. Field Modification: Metal composite material wall panels may be modified in field as required to ensure proper fit as acceptable to panel manufacturer and Architect. Keep field modifications to absolute minimum, ensuring majority of fabrication accomplished under manufacturer and fabricator controlled conditions.

1.9 COORDINATION

- A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, coping system, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- B. Coordinate metal composite material panel system installation in manner to ensure integrity of air barrier system is not disrupted. Provide monitoring and inspection of metal composite material panel system installation by air barrier system installer and manufacturer's representative.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

MEET ALL REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 10 lbf/sq. ft..