



TEST REPORT

Report No.: F9183.01-201-44

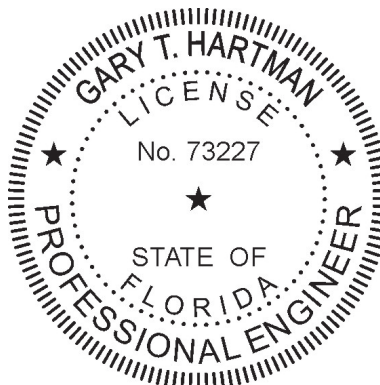
Rendered to:

MG McGRATH, INC.
Maplewood, Minnesota

PRODUCT TYPE: 22 gauge Steel Paneling
SERIES/MODEL: MG Hook Seam

This report contains in its entirety:

Cover Page: 1 page
Report Body: 11 pages
Drawing(s): 2 pages



Gary Hartman
Digitally Signed by: Gary Hartman

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Test Dates:	11/28/16
Through:	12/07/16
Report Date:	12/21/16
Report Revision Date:	07/27/17
Test Record Retention End Date:	12/07/20

1.0 Report Issued To: MG McGrath, Inc.
 1387 East Cope Avenue
 Maplewood, Minnesota 55109

2.0 Test Laboratory: Architectural Testing, Inc., an Intertek company ("Intertek-ATI")
 849 Western Avenue North
 St. Paul, Minnesota 55117
 651-636-3835

3.0 Project Summary:

3.1 Product Type: 22 gauge Steel Paneling

3.2 Series/Model: MG Hook Seam

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. The specimens tested met the performance requirements set forth in the referenced test procedures for a **± 3840 Pa (± 80.20 psf) Design Pressure** with missile impacts corresponding to **Missile Level D and Wind Zone 4.**

3.4 Test Dates: 11/28/16 – 12/07/16

3.5 Test Record Retention End Date: All test records for this report will be retained until December 7, 2020.

3.6 Test Location: Intertek-ATI test facility in St. Paul, Minnesota.

3.7 Test Specimen Source: The test specimens were provided by the client. Representative samples of the test specimens will be retained by Intertek-ATI for a minimum of four years from the test completion date.

3.8 Drawing Reference: The test specimen drawings have been reviewed by Intertek-ATI and are representative of the test specimens reported herein. Test specimen construction was verified by Intertek-ATI per the drawings located in Appendix A. Any deviations are documented herein or on the drawings.

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Katie Baldwin	MG McGrath, Inc.
Tony D. Gavin	Intertek-ATI
Steven V. Kenemer	Intertek-ATI
Karl A. Lips	Intertek-ATI
Eric J. Schoenthaler	Intertek-ATI

4.0 Test Specifications:

ASTM E330/E330M-14, *Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E1886-13a, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*

ASTM E1996-14a, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 8.8 m ² (95.1 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2972	117	2972	117
Individual panel sizes	679	26-3/4	527	20-3/4

5.2 Wall System: The wall system consisted 16 gauge galvanized steel horizontal hat channels mechanically fastened into the steel studs with two #12 x 3/4" tek screws at each stud location spaced 20-3/4" on center. A 16 gauge galvanized steel vertical hat channel was secured to the horizontal hat channels at each panel vertical seam location. A starter strip was mechanically secured on the left side and the bottom of the assembly. The MG Flat lock panels were slip-fit into the starter strips and secured on the right side of the panel with three #12 x 5/8" pancake head cutter screws. The panels were secured on the top of each panel with four #12 x 5/8" pancake head cutter screws. This pattern continued until the paneling is completed.

5.3 Test Wall Construction: The test wall was constructed of 16 gauge, 6" galvanized steel studs. The steel studs were spaced 16" on center inside a 2x10 wood buck. The wall panel system was installed directly onto the studs in a manner consistent with normal construction procedures for the system. The exterior of the test unit was sealed to the wood buck with silicone.

5.4 Installation: Installation of the tested product was performed by the client. The panels were installed in a bottom to top and left to right order. The wall assembly was sealed with silicone.

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

Title of Test	Results	Note
Uniform Load Deflection, per ASTM E330 Deflections taken at midspan of individual panel +3840 Pa (+80.20 psf) -3840 Pa (-80.20 psf)	5.8 mm (0.23") 7.1 mm (0.28")	1, 2
Uniform Load Structural, per ASTM E330 Permanent sets taken at midspan of individual panel +5760 Pa (+120.30 psf) -5760 Pa (-120.30 psf)	2.3 mm (0.09") 0.8 mm (0.03")	1, 2

Note 1: Loads were held for 10 seconds.

Note 2: 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.

6.0 Test Results: (Continued)

ASTM E1886, Large Missile Impact

Conditioning Temperature: 20°C (68°F)

Missile Weight: 4082 g (9.0 lbs)

Missile Length: 2438 mm (96")

Muzzle Distance from Test Specimen: 5.2 m (17' 0")

Test Unit #1: Orientation within $\pm 5^\circ$ of horizontal

Impact #1: Missile Velocity: 15.1 m/s (49.6 fps)	
Impact Area:	Center of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Impact #2: Missile Velocity: 15.2 m/s (49.8 fps)	
Impact Area:	Upper right corner of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Impact #3: Missile Velocity: 15.2 m/s (49.9 fps)	
Impact Area:	Panel seam; joint between second and third row from the bottom, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Test Unit #2: Orientation within $\pm 5^\circ$ of horizontal

Impact #1: Missile Velocity: 15.2 m/s (49.8 fps)	
Impact Area:	Upper right corner of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Impact #2: Missile Velocity: 15.3 m/s (50.1 fps)	
Impact Area:	Center of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

6.0 Test Results: (Continued)

ASTM E1886, Large Missile Impact

Conditioning Temperature: 20°C (68°F)

Missile Weight: 4082 g (9.0 lbs)

Missile Length: 2438 mm (96")

Muzzle Distance from Test Specimen: 5.2 m (17' 0")

Test Unit #2: (Continued)

Impact #3: Missile Velocity: 15.2 m/s (49.8 fps)	
Impact Area:	Panel seam; joint between second and third row from the bottom, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Test Unit #3: Orientation within ±5° of horizontal

Impact #1: Missile Velocity: 15.1 m/s (49.6 fps)	
Impact Area:	Lower left corner of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Impact #2: Missile Velocity: 15.1 m/s (49.5 fps)	
Impact Area:	Center of panel; third row up, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

Impact #3: Missile Velocity: 15.1 m/s (49.6 fps)	
Impact Area:	Panel seam; joint between third and fourth row from the bottom, second panel from right
Observations:	Missile hit target area; dented panel, no penetration
Results:	Pass

6.0 Test Results: (Continued)

ASTM E1886, Air Pressure Cycling

Test Unit #1

Design Pressure: ± 3840 Pa (± 80.20 psf)

POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
770 to 1920 (16.0 to 40.0)	3500	2.43	No penetrations
0 to 2300 (0 to 48.0)	300	3.03	No penetrations
1920 to 3070 (40.0 to 64.0)	600	2.17	No penetrations
1150 to 3840 (24.0 to 80.0)	100	3.66	No penetrations

NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
1150 to 3840 (24.0 to 80.0)	50	3.00	No penetrations
1920 to 3070 (40.0 to 64.0)	1050	2.35	No penetrations
0 to 2300 (0 to 48.0)	50	2.67	No penetrations
770 to 1920 (16.0 to 40.0)	3350	2.06	No penetrations

Result: Pass

6.0 Test Results: (Continued)

ASTM E1886, Air Pressure Cycling

Test Unit #2

Design Pressure: ± 3840 Pa (± 80.20 psf)

POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
770 to 1920 (16.0 to 40.0)	3500	2.80	No penetrations
0 to 2300 (0 to 48.0)	300	3.10	No penetrations
1920 to 3070 (40.0 to 64.0)	600	2.80	No penetrations
1150 to 3840 (24.0 to 80.0)	100	3.60	No penetrations

NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
1150 to 3840 (24.0 to 80.0)	50	4.60	No penetrations
1920 to 3070 (40.0 to 64.0)	1050	3.00	No penetrations
0 to 2300 (0 to 48.0)	50	3.20	No penetrations
770 to 1920 (16.0 to 40.0)	3350	3.10	No penetrations

Result: Pass

Note: Test Specimens #2 and #3 were cycled in a common chamber.

6.0 Test Results: (Continued)

ASTM E1886, Air Pressure Cycling

Test Unit #3

Design Pressure: ± 3840 Pa (± 80.20 psf)

POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
770 to 1920 (16.0 to 40.0)	3500	2.80	No penetrations
0 to 2300 (0 to 48.0)	300	3.10	No penetrations
1920 to 3070 (40.0 to 64.0)	600	2.80	No penetrations
1150 to 3840 (24.0 to 80.0)	100	3.60	No penetrations

NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
1150 to 3840 (24.0 to 80.0)	50	4.60	No penetrations
1920 to 3070 (40.0 to 64.0)	1050	3.00	No penetrations
0 to 2300 (0 to 48.0)	50	3.20	No penetrations
770 to 1920 (16.0 to 40.0)	3350	3.10	No penetrations

Result: Pass

Note: Test Specimens #2 and #3 were cycled in a common chamber.

General Note: Upon completion of testing, the specimens met the requirements of Section 7 of ASTM E1996.

7.0 Test Equipment:

Cannon: Constructed from steel piping utilizing compressed air to propel the missile

Missile: 2x4 Southern Pine

Timing Device: Electronic Beam Type

Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring device

Deflection Measuring Device: Linear transducers

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.

Intertek-ATI will service this report for the entire test record retention period. Test records such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period.

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 specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For ARCHITECTURAL TESTING, INC.:



Digitally Signed by: Eric Schoenthaler

Eric J. Schoenthaler
Project Manager



Digitally Signed by: Gary Hartman

Gary T. Hartman, P.E.
Laboratory Support Engineer

EJS/jb

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

Appendix A: Drawings (2)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	12/21/16	N/A	Original report issue.
1	07/27/17	Cover, 10	Included PE seal and signature.



Test Report No.: F9183.01-201-44

Report Date: 12/21/16

Report Revision Date: 07/27/17

Appendix A

Drawings

METAL PANEL SHOP DRAWINGS

M. G. McGrath, Inc.
1387 East Cope Avenue
Maplewood, MN 55109
(651)704-0300
Fax(651)704-9989



MG McGrath
ARCHITECTURAL SURFACES

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NOTE:
M.G. McGRATH TO FIELD VERIFY
ALL DIMENSIONS & CONDITIONS



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# F9183
Date 6-1-17 Tech 10

ABBREVIATIONS

ALUM.	ALUMINUM
AMG	AMG ARCHITECTURAL GLASS AND GLAZING
APPROX.	APPROXIMATELY
ARCH.	ARCHITECT
B.M.	BRAKE METAL
C.L. OR C	CENTERLINE
CONT.	CONTINUOUS
DIA.	DIAMETER
D.L.	DEAD LOAD
D.L.O.	DAYLIGHT OPENING
D.O.	DOOR OPENING
F.S.	FRAME SIZE
F.V.	FIELD VERIFY
G.S.	GLASS SIZE
GYP.	GYPSUM BOARD
HORIZ.	HORIZONTAL
I.D.	INSIDE DIAMETER
MAX.	MAXIMUM
MGM	M. G. McGRATH, INC.
MIN.	MINIMUM
N.B. AMG	NOT BY AMG
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.A.	OVERALL
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.H.	OPPOSITE HAND
OPP.	OPPOSITE
PERF.	PERFORATED / PERFORATION
P.S.	PANEL SIZE
PTD.	PAINTED
REF.	REFERENCE
REQ'D	REQUIRED
R.O.	ROUGH OPENING
SIM.	SIMILAR
S.J.	SPLICE JOINT
S.P.	SPLICE PLATE
T.B.D.	TO BE DETERMINED
T.O.	TOP OF
T.O.P.	TOP OF PANEL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
V.B.A.	VERIFY BY ARCHITECT
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
W.P.	WORK POINT

PROJECT NOTES

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- PRECAUTIONS MUST BE MADE FOR MATERIAL FINISHES, TO PREVENT STAINING AND / OR SCRATCHES WHICH DAMAGE THE FINISH, RESULTING FROM BUT NO LIMITED TO: WET CARDBOARD, ALKALIS AND SAND FROM CONCRETE, STUCCO FINISH, PLASTER OR WELDING PRODUCTS. SUCH AN OCCURRENCE SHALL NOT BE THE RESPONSIBILITY OF M. G. McGRATH, INC.

- M. G. McGRATH, INC. HAS NO RESPONSIBILITY FOR LATENT DEFECTS OF OTHERS.

MGM D-SET PANEL

- MATERIAL SUPPLIER - M.G. McGRATH, INC.
- MATERIAL MANUFACTURER - M.G. McGRATH, INC.
- MATERIAL INSTALLER - M.G. McGRATH, INC.
- MATERIAL TYPE - 4mm COMPOSITE MATERIAL D-SET
- AVB TYPE - GRACE PERM-A-BARRIER
- FURRING - 16 GA. $\frac{7}{8}$ GAL CHANNEL
- SUBFRAMING - 16 GA. 2"X6" COLD FORM STUDS FRAMING

MGM FLUSH SEAM PANEL

- MATERIAL SUPPLIER - M.G. McGRATH, INC.
- MATERIAL MANUFACTURER - M.G. McGRATH, INC.
- MATERIAL INSTALLER - M.G. McGRATH, INC.
- MATERIAL TYPE - 22 GA. MGM F-SEAM
- AVB TYPE - GRACE PERM-A-BARRIER
- FURRING - 16 GA. $\frac{7}{8}$ HAT CHANNEL
- SUBFRAMING - 16 GA. 2"X6" COLD FORM STUDS FRAMING

MGM HOOK SEAM PANEL

- MATERIAL SUPPLIER - M.G. McGRATH, INC.
- MATERIAL MANUFACTURER - M.G. McGRATH, INC.
- MATERIAL INSTALLER - M.G. McGRATH, INC.
- MATERIAL TYPE - 22 GA. MGM H-SEAM
- AVB TYPE - GRACE PERM-A-BARRIER
- FURRING - 16 GA. $\frac{7}{8}$ HAT CHANNEL
- SUBFRAMING - 16 GA. 2"X6" COLD STUDS FORM FRAMING

REVISIONS

REVISIONS					
NO.	DATE	REVISED	BY	CHECKED BY	RESULT

PROJECT INFORMATION:

PROJECT TITLE:

SECTION #:

ARCHITECT:

GENERAL CONTRACTOR:

ENGINEERING CONSULTANT:

PROJECT MANAGER:

G PROJECT ESTIMATOR:

PROJECT SUPERINTENDENT:

DRAWING INFORMATION:

DRAWING TITLE:

PANEL SYSTEMS

SUBMITTAL DATE:	PLDT DATE:
DRAFTED BY:	APPROVED BY:
MB	
PROJECT NUMBER:	SHEET NUMBER:



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M. G. McGRATH, INC. WHICH IS PROJECT DESIGN AND SHALL
NOT BE USED FOR ANY OTHER PURPOSE.



Test sample complies with these details.
Deviations are noted.

Report# F9183
Date 6-1-17

Tech JD

REVISIONS				
NO.	DATE	REVISED	BY	DATE

PROJECT INFORMATION:

PROJECT TITLE:

SECTION #:

ARCHITECT:

GENERAL CONTRACTOR:

ENGINEERING CONSULTANT:

PROJECT MANAGER:

PROJECT ESTIMATOR:

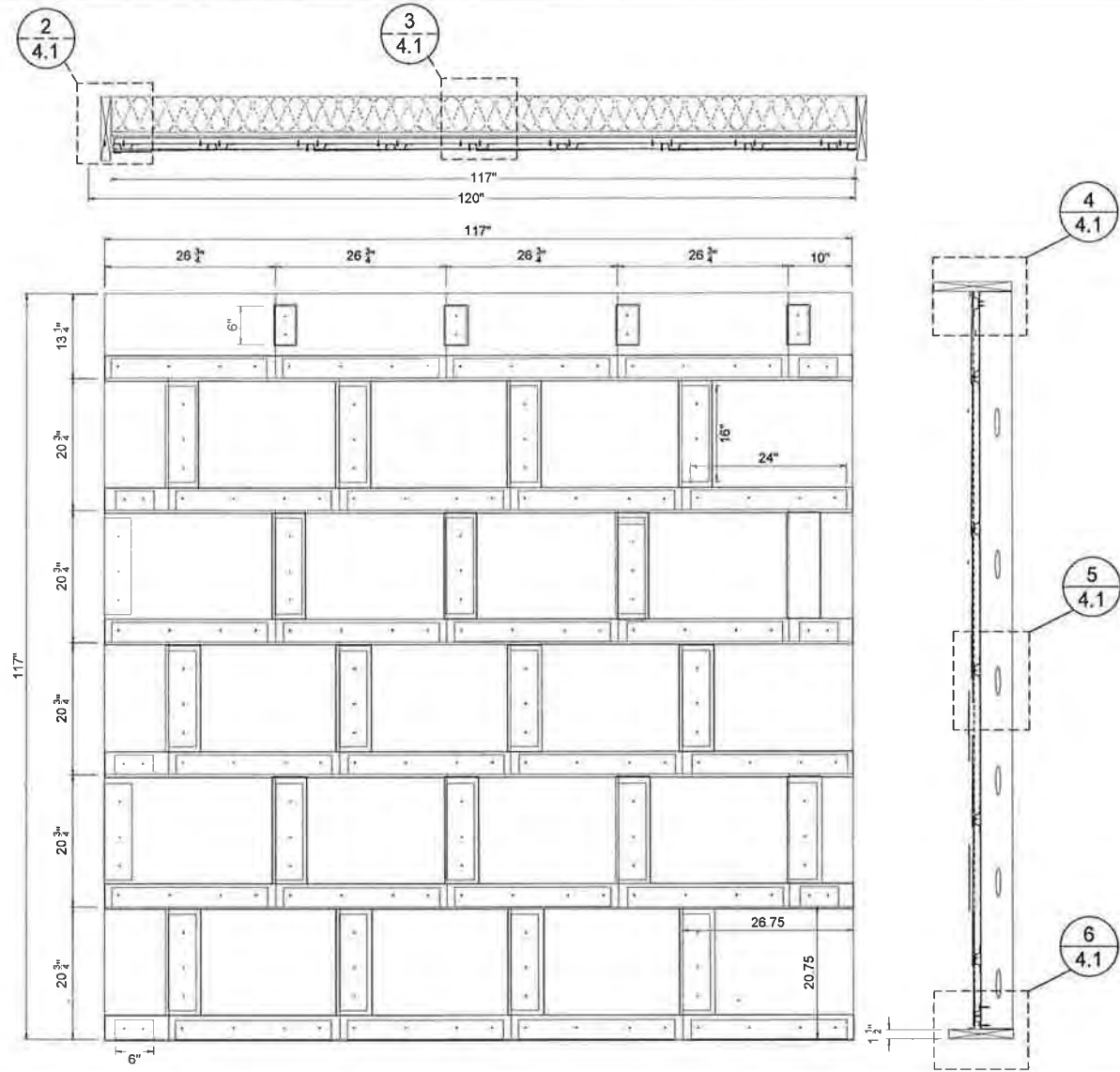
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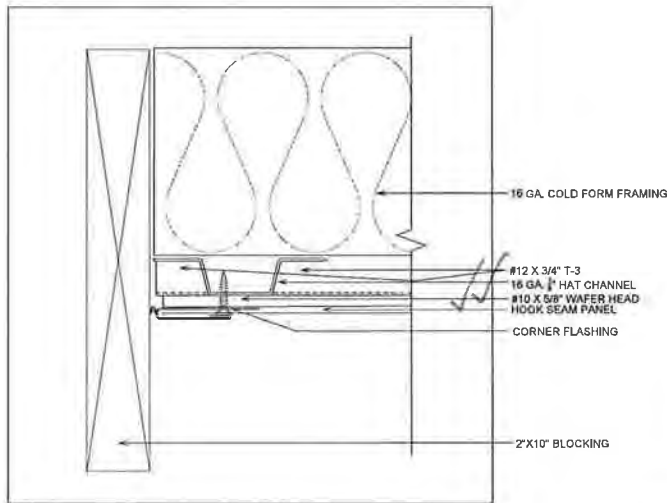
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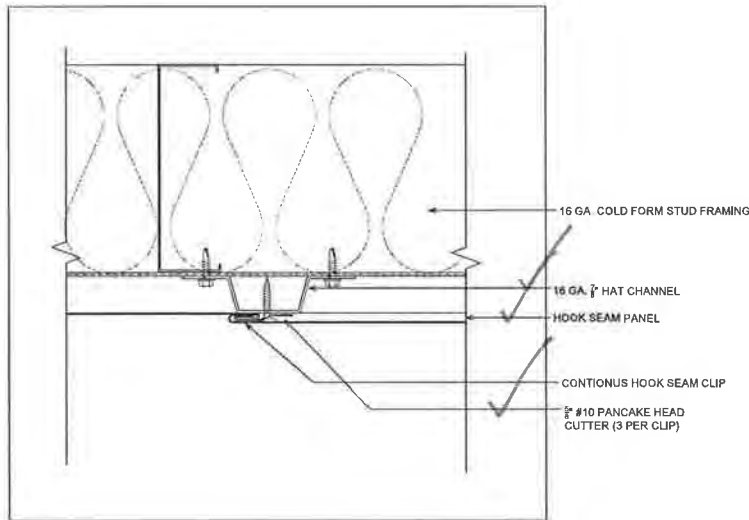
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MB	
PROJECT NUMBER:	SHEET NUMBER:
	1.2



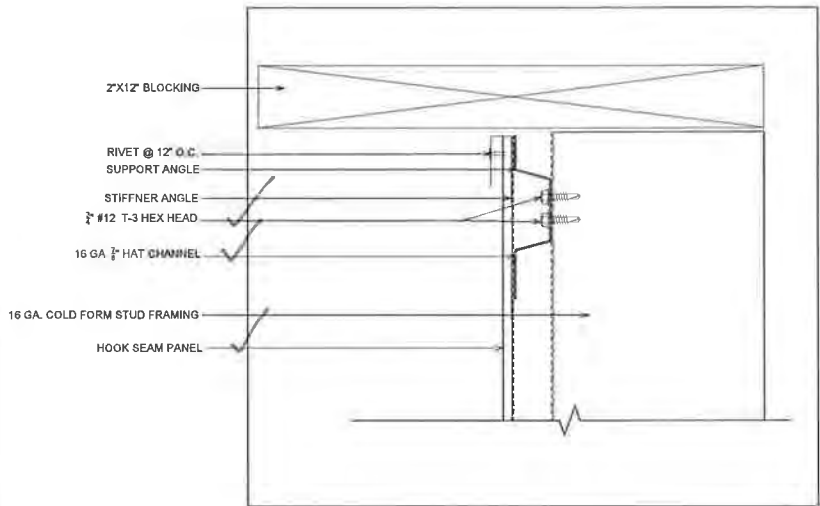
1 D-SET ELEVATION
1" = 1'-0"



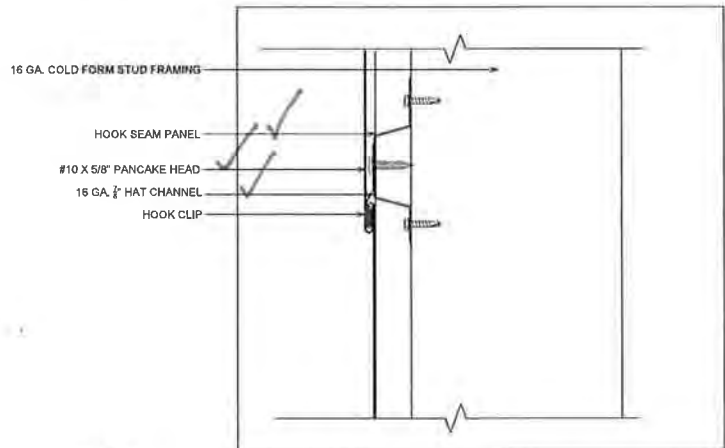
2 HOOK SEAM PLAN EDGE DETAIL
6" = 1'-0"



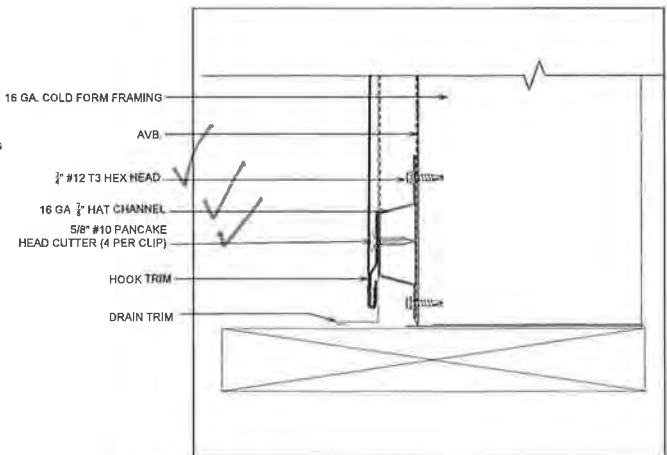
3 HOOK SEAM PLAN JOINT
6" = 1'-0"



4 HOOK SEAM SECTION TOP
6" = 1'-0"



5 HOOK SEAM SECTION JOINT
6" = 1'-0"



7 HOOK SEAM SECTION SILL
6" = 1'-0"