

BURMON BUILDING PRODUCTS TEST REPORT

SCOPE OF WORK

LOAD TESTING OF ICF JOIST HANGER AND WOOD LEDGER CONNECTOR

REPORT NUMBER

K9541.01-119-42 R0

TEST DATES

12/15/20 - 12/22/20

ISSUE DATE

02/04/21

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TEST REPORT FOR BURMON BUILDING PRODUCTS

Report No.: K9541.01-119-42 R0

Date: 02/04/21

REPORT ISSUED TO

BURMON BUILDING PRODUCTS

10 Eliot Drive

Stapylton, Queensland 4207

Australia

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Burmon Building Products to perform load testing in accordance with ASTM D7147 on their ICF Joist Hanger and ICF Wood Ledger Connector assemblies. Results obtained are tested values and were secured by using the designated test method. Testing was conducted at the Intertek B&C test facility in York, PA.

Intertek B&C in York, Pennsylvania has demonstrated compliance with ISO/IEC International Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. (IAS).

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. 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, or other pertinent project documentation, will be retained for the entire test record retention period.

For INTERTEK B&C:

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TITLE:	Project Engineer
SIGNATURE:	
DATE:	02/04/21

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TITLE:	Senior Staff Engineer
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DATE:	02/04/21

STG:vtm/aas

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SECTION 2

SUMMARY OF TEST RESULTS

ICF JOIST HANGER ^{1,2}	Direct Vertical Load (Downward): Average Load at 1/8 in Displacement - 6584 lbf Average Ultimate Load - 12202 lbf
ICF WOOD LEDGER ^{1,2}	Direct Vertical Load (Downward): Average Load at 1/8 in Displacement - 6677 lbf Average Ultimate Load - 17688 lbf

¹ Test/Ultimate loads are for a two-bracket assembly. Noted values shall be divided by 2 to determine the load applied to a single bracket.

² Test/Ultimate loads should not be used as design loads or safe working loads.

SECTION 3

TEST METHODS

The specimens were evaluated in accordance with the following:

ASTM D7147-11 (Reapproved 2018), *Standard Specification for Testing and Establishing Allowable Loads of Joist Hangers*

SECTION 4

MATERIAL SOURCE/INSTALLATION

All components used for the testing reported herein were supplied by Burmon Building Products and were not independently sampled or selected by a third-party inspection agency. Specimens were assembled by an Intertek technician.

SECTION 5

LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Robert G. Spayd	Intertek B&C
Kevin J. Eichelberger	Intertek B&C
Scott T. Gladfelter	Intertek B&C

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SECTION 6**TEST SPECIMEN DESCRIPTION**

The ICF Joist Hanger assembly was comprised of two 18 gauge, 6-7/8 in wide by 8-1/8 in tall by 3-3/16 in deep Burmon ICF IH 3-1/2 galvanized steel joist hangers, two 24 in wide by 31-1/2 in tall by 9 in deep poured concrete ICFs, and two 1-13/16 in wide by 11-3/4 in deep by 24 in long pieces of laminated veneer lumber (LVL) joists. One joist hanger was centered on each ICF and separated by a double piece of LVL joist. The parts were secured as noted in the Fastening Schedule below.

The ICF Wood Ledger assembly was comprised of four 14 gauge, 3-3/4 in wide by 8-1/2 in tall by 2-3/4 in deep Simpson HUC410 steel joist hangers, two 4-11/16 in wide by 9-15/16 in tall by 2 in deep ledger brackets, two 24 in wide by 31-1/2 in tall by 9 in deep poured concrete ICFs, two 1-13/16 in wide by 11-3/4 in deep by 24 in long laminated veneer lumber (LVL) ledgers, and four 1-13/16 in wide by 11-3/4 in deep by 24 in long pieces of laminated veneer lumber (LVL) joists. One LVL ledger was centered on each ICF and secured to the ledger bracket. Two joist hangers were secured to the LVL ledger and were separated by a double piece of LVL joist. The parts were secured as noted in the Fastening Schedule below.

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Fastening Schedule

The following fastening schedule was used during the connection portion of the test program.

CONNECTION	NUMBER AND TYPE OF FASTENERS
ICF Joist Hanger Bracket to ICF	Two 1 in diameter by 6-3/8 in long anchors with threaded inserts were inserted into the concrete ICF. A 1/2-13 by 3/4" Grade 5 hex bolt with accompanying 1-3/8 in wide by 2-3/8 in high by 0.117 in thick steel washer was installed into the threaded insert of each anchor
ICF Joist Hanger Bracket to LVL Joist	Twenty-two (eleven in each side) 10d by 1-1/2" hot-dipped galvanized steel nails
LVL Joist to LVL Joist	Six #10-9 by 2-1/2" (0.130 in minor diameter) flat undercut head, square drive, red-coated steel screws
ICF Wood Ledger Bracket to ICF	Two 1 in diameter by 6-3/8 in long anchors were inserted into the concrete ICF, a threaded insert was installed into each of the anchors; two #10-9 by 1-1/2" (0.130 in minor diameter) flat undercut head, square drive, red-coated steel screws were also utilized
LVL Ledger to ICF Wood Ledger Bracket to Anchor	Two 1/2-13 x 2-1/2" Grade 5 hex bolts with accompanying washers
Joist Hanger to LVL Ledger	Fourteen #10-9 by 2-1/2" (0.130 in minor diameter) flat undercut head, square drive, silver-coated steel screws
Joist Hanger to LVL Joist	Ten (five in each side) 1/4-13 by 1-3/8" (0.169 in minor diameter) hex washer head, self-drilling screws

Photographs are included in Section 9 and drawings are included in Section 10 to verify the overall dimensions and other pertinent information of the tested product, its components, and any constructed assemblies.

SECTION 7

TEST PROCEDURE

Specimens were mounted in a computer-monitored and -controlled INSTRON, Model 5989 Universal Testing Machine for testing. Vertical load was applied to the bearing block through a load cell attached to the testing machine crosshead. Test speed was 0.100 in/min. Displacement was taken with two dial indicators, attached to the ICF wall panels, which were zeroed at zero load. Ultimate load was the maximum load the test assembly could carry. See photographs in Section 9 for typical test set-up.

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SECTION 8**TEST RESULTS**

The purpose of this testing was to determine the direct vertical downward load capacity of the joist connection in accordance with ASTM D7147.

Test Series No. 1 - ICF Joist Hanger

Test/Ultimate loads noted below are for two-bracket assemblies. Noted values shall be divided by 2 to determine the load applied to a single bracket. Test/Ultimate loads should not be used as design loads or safe working loads.

Specimen No. 1**Test Date: 12/15/20**

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
	DEFLECTION (in)		
1010	0.020	0.010	0.015
1710	0.040	0.015	0.028
2775	0.060	0.033	0.047
3880	0.080	0.052	0.066
4917	0.100	0.071	0.086
5888	0.120	0.091	0.106
7001	0.140	0.108	0.124
7700	0.160	0.125	0.143
8361	0.180	0.143	0.162
8884	0.200	0.157	0.179

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Specimen No. 2

Test Date: 12/16/20

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
	DEFLECTION (in)		
1010	0.020	0.020	0.020
1521	0.040	0.037	0.039
2248	0.060	0.055	0.058
3433	0.080	0.074	0.077
4362	0.100	0.100	0.100
5298	0.120	0.147	0.134
5995	0.140	0.210	0.175
6701	0.160	0.275	0.218
7658	0.180	0.320	0.250
8514	0.200	0.347	0.274

Specimen No. 3

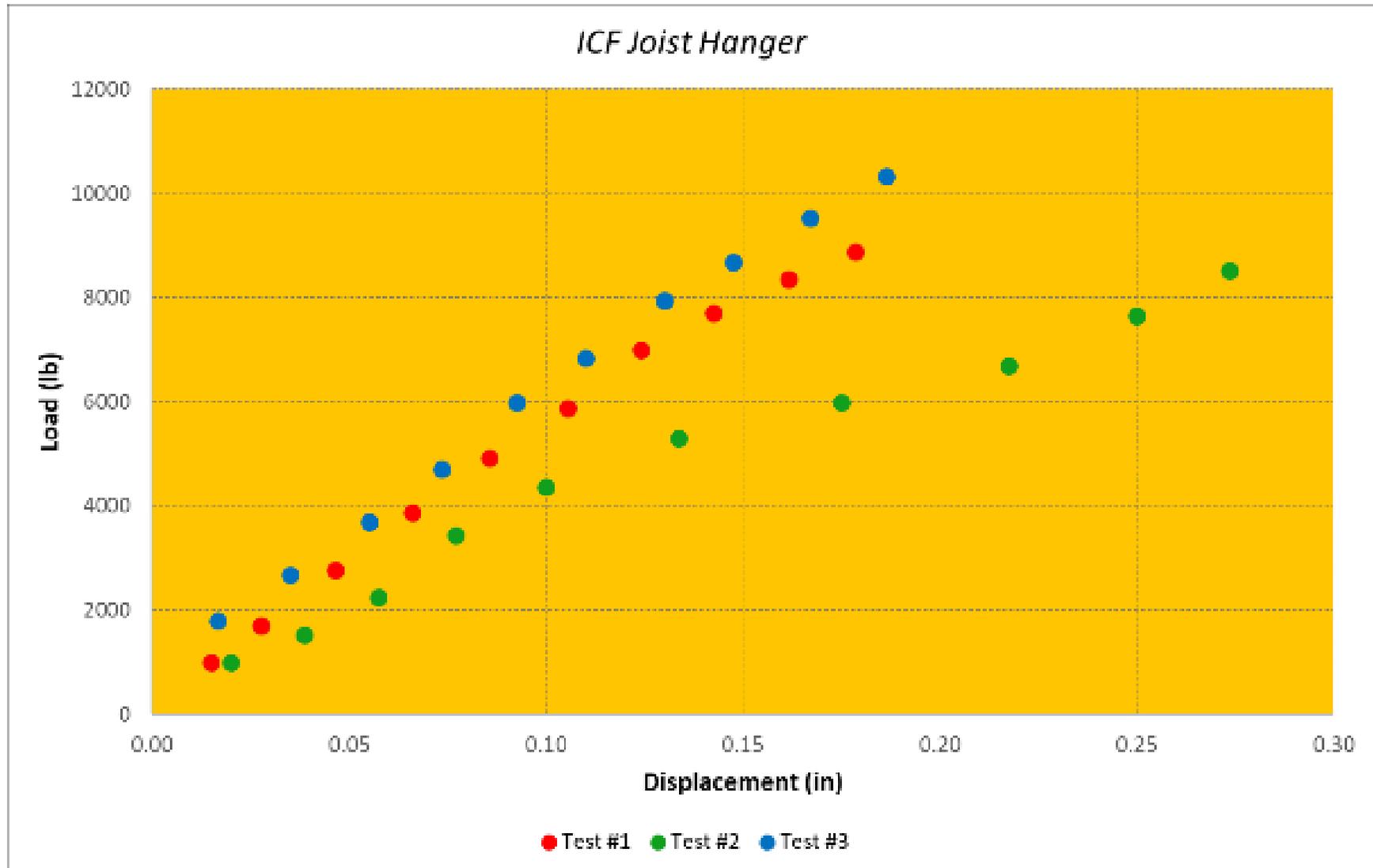
Test Date: 12/16/20

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
	DEFLECTION (in)		
1788	0.020	0.013	0.017
2681	0.040	0.030	0.035
3691	0.060	0.050	0.055
4698	0.080	0.067	0.074
5984	0.100	0.085	0.093
6836	0.120	0.100	0.110
7940	0.140	0.120	0.130
8684	0.160	0.135	0.148
9535	0.180	0.154	0.167
10327	0.200	0.173	0.187

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Test Summary

SPECIMEN NO.	ULTIMATE LOAD (lbf)	DEVIATION FROM AVERAGE	LOAD @ 1/8 in DISPLACEMENT (lb)	MODE OF FAILURE
1	12415	1.7%	7038	Shear failure of the bracket material
2	11536	-5.5%	5050	
3	12654	3.7%	7664	
Average:	12202	Average:	6584	
		Standard Deviation:	1365	
		Coefficient of Variation:	21%	

Test Series No. 2 - ICF Wood Ledger

Test/Ultimate loads noted below are for two-bracket assemblies. Noted values shall be divided by 2 to determine the load applied to a single bracket. Test/Ultimate loads should not be used as design loads or safe working loads.

Specimen No. 1

Test Date: 12/21/20

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
DEFLECTION (in)			
2044	0.020	0.017	0.019
3005	0.040	0.039	0.040
3917	0.060	0.063	0.062
4902	0.080	0.085	0.083
5833	0.100	0.110	0.105
6930	0.120	0.135	0.128
7791	0.140	0.160	0.150
8573	0.160	0.185	0.173
9253	0.180	0.212	0.196
9737	0.200	0.245	0.223

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Specimen No. 2**Test Date: 12/21/20**

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
	DEFLECTION (in)		
1751	0.020	0.020	0.020
2818	0.040	0.045	0.043
3793	0.060	0.070	0.065
4877	0.080	0.090	0.085
5960	0.100	0.111	0.106
6968	0.120	0.130	0.125
7959	0.140	0.147	0.144
8780	0.160	0.163	0.162
9513	0.180	0.178	0.179
10089	0.200	0.197	0.199

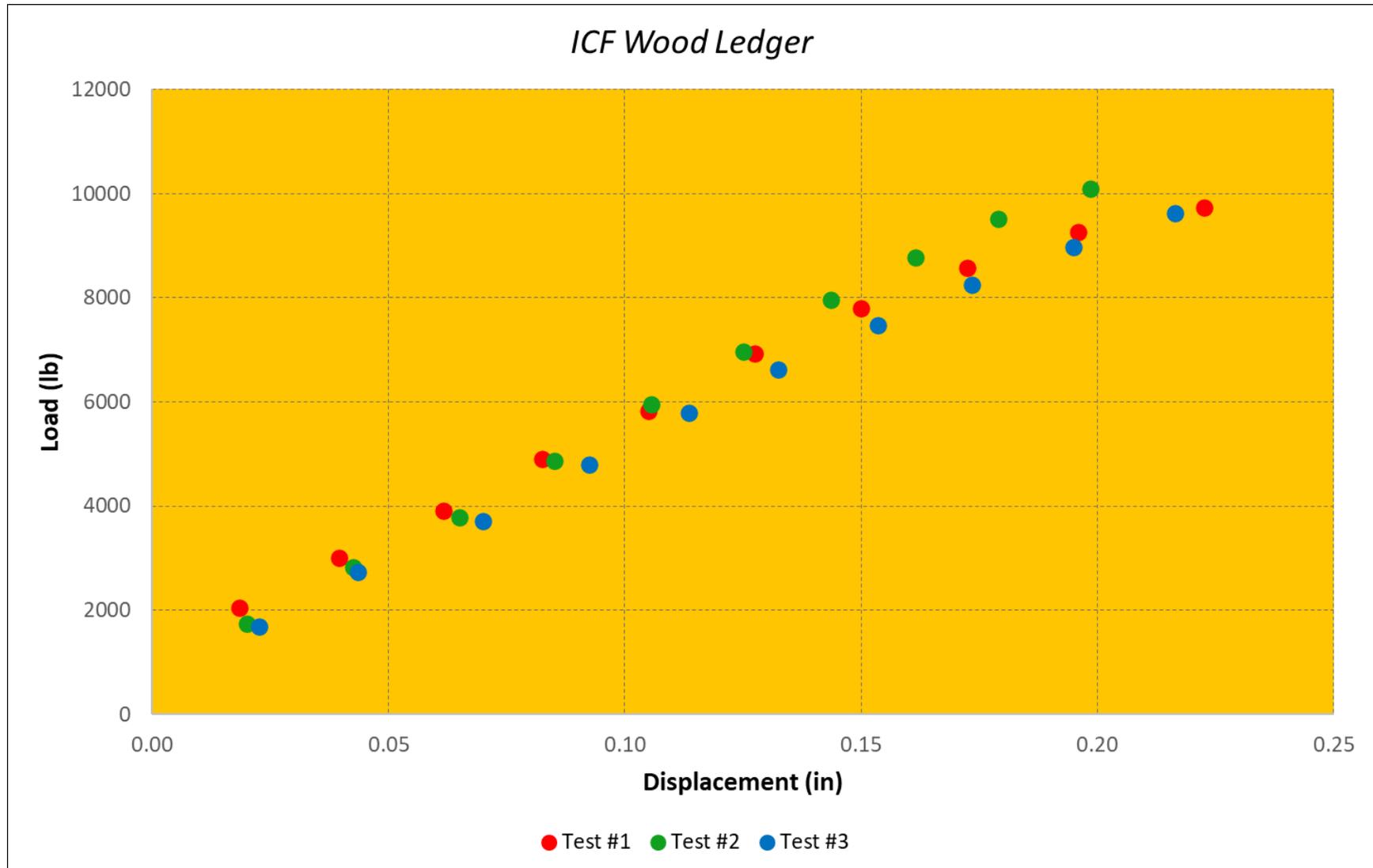
Specimen No. 3**Test Date: 12/22/20**

LOAD (lbs)	INDICATOR NO.		
	A	B	AVERAGE
	DEFLECTION (in)		
1695	0.020	0.025	0.023
2743	0.040	0.047	0.044
3717	0.060	0.080	0.070
4802	0.080	0.105	0.093
5792	0.100	0.127	0.114
6628	0.120	0.145	0.133
7480	0.140	0.167	0.154
8248	0.160	0.187	0.174
8970	0.180	0.210	0.195
9627	0.200	0.233	0.217

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Test Summary

SPECIMEN NO.	ULTIMATE LOAD (lbf)	DEVIATION FROM AVERAGE	LOAD @ 1/8 in DISPLACEMENT (lb)	MODE OF FAILURE
1	20224	14.3%	6787	Yielded to load
2	15124	-14.5%	6968	
3	17715	0.2%	6276	
Average:	17688	Average:	6677	
		Standard Deviation:	359	
		Coefficient of Variation:	5%	

SECTION 9 PHOTOGRAPHS



Photo No. 1
ICF Joist Hanger

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Photo No. 2
ICF Wood Ledger with Joist Hangers Attached



Photo No. 3
Typical Test Setup

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Photo No. 4
Typical ICF Joist Hanger Failure



Photo No. 5
Typical ICF Wood Ledger Failure

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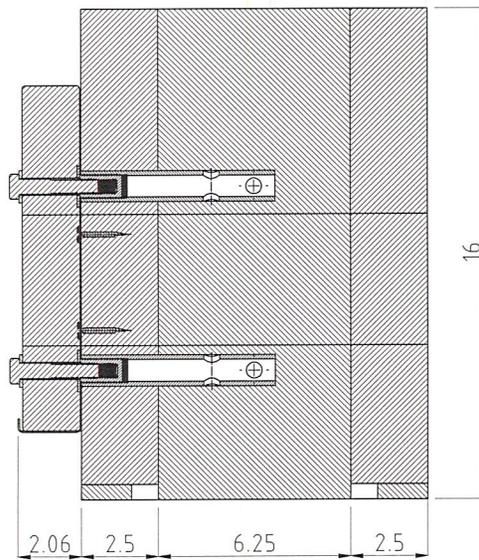
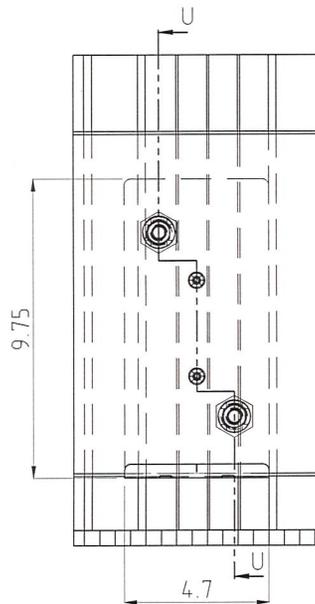
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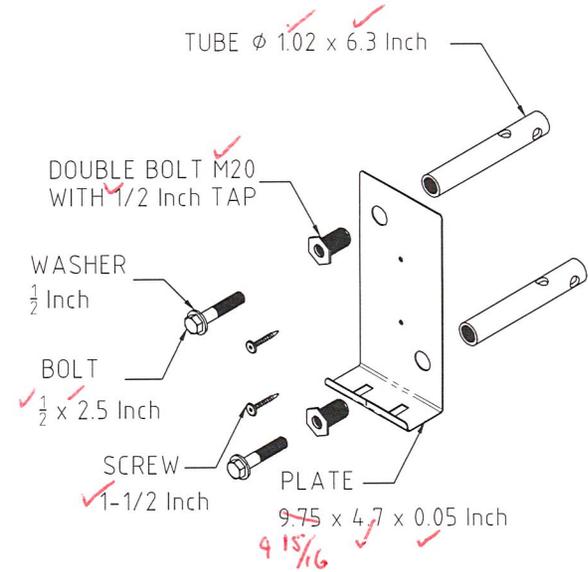
Photo No. 6
Fasteners

SECTION 10 **DRAWINGS**

The "As-Built" drawings for the ICF Joist Hanger and ICF Wood Ledger, which follow, have been reviewed by Intertek B&C and are representative of the project reported herein. Project construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.



SECTION U-U



intertek

Test sample complies with these details.
Deviations are noted.

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Date 1/22/21 Tech STG

		<small>UNLESS OTHERWISE SPECIFIED, STANDARD PROCESSING CHECKS APPLY</small> <small>TOLERANCES</small> <small>LINEAR DIM'S MORE THAN 118 INCH +0/-0.04</small> <small>LINEAR DIM'S LESS THAN 118 INCH +0/-0.02</small> <small>ANGULAR DIMENSIONS +0.02°</small> <small>HOLE PUNCHING +0.02</small>		<p style="text-align: center;">Burmon-ICFWL connected to Wood Ledger</p>	
		CUSTOMER APPROVED	DATE		
-		-		DRAWN	-
-		-		CHK'D	-
MATERIAL SPEC		-		TITLE	-
-		-		WEIGHT -grams	-
-		-		PART / DRAWING NO.	-
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SECTION 11

REVISION LOG

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0	02/04/21	N/A	Original Report Issue