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PRODUCT TEST REPORT
WATKINS COMMERCIAL BRACKET

Prepared For:



RP Watkins LLC
5516 West Memorial Road,
Oklahoma City, OK 73142

Attention: Mr. Michael Summers

Project Number: FC09744.001-470

Report Number: 1617A (Rev. 1)

October 27, 2021



Product Test Report
Vertical Load Testing
Watkins Commercial Bracket
CTL|T Project Number: FC09744.001-470

Per our agreement, product capacity testing was completed on the RP Watkins supplied commercial brackets precast in ICF concrete walls. At your request, the Commercial Brackets were tested in general accordance with ASTM D7147 (Standard Specification for Testing and Establishing Allowable Loads of Joist Hangers).

Test sample ICF sections were constructed by the client and shipped to our laboratory for testing. The concrete mix was reported to be a 2,500-psi design strength mix (Mix Number: RMT258N3). Actual concrete strength was unknown at the time of testing.

Products and testing included in this testing program include the following:

Manufacturer Identification	Test Type
Watkins Commercial Bracket	Vertical Load Test

We appreciate the opportunity to work with you on this project. If you have any questions regarding the information provided in this report, please do not hesitate to contact us.

Sincerely,
CTL|THOMPSON, INC.



Ryan S. Beck, P.E.
Associate Engineer
Accredited Laboratory Manager

Report Authorized for Release:

Revision Log

Date	Revision No.	Explanation	By
10.26.2021	0	Initial Issue	R. Beck, Manager
10.27.2021	1	Updated Shop Drawings	R. Beck, Manager



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SECTION 1:

GENERAL OVERVIEW

Product Descriptions

All products listed are for use in ICF (insulated concrete form) construction. Prior to concrete placement of an ICF wall, the hanger/bracket is either inserted through the insulation (foam form) or placed at the top of the wall. Reinforcing bars are added within the ICF wall section to secure the hanger/bracket in place. Concrete is then placed to complete the ICF section. See Shop Drawings for additional details. #3 Rebar was used through the bracket legs for testing.

Watkins Commercial Bracket

The Watkins Commercial Bracket is a bracket made from $\frac{1}{4}$ " plate and 4" x 4" angle iron. The bracket is designed to have an open web steel joist welded directly to the plate as a bearing ledge that is embedded into the ICF (Insulated Concrete Form) wall.

Test Sample Descriptions

Vertical Load Test

For the Watkins Commercial Bracket tests, each test sample consisted of two ICF wall sections (20" x 24" x 9" thick), each with a precast steel angle bracket installed. The wall sections were connected by (2) two 3" x 3" x $\frac{3}{8}$ " HSS tube steel (18" long) welded directly to the angle bracket on each side. See Figure 1 for Vertical Load Test setup.

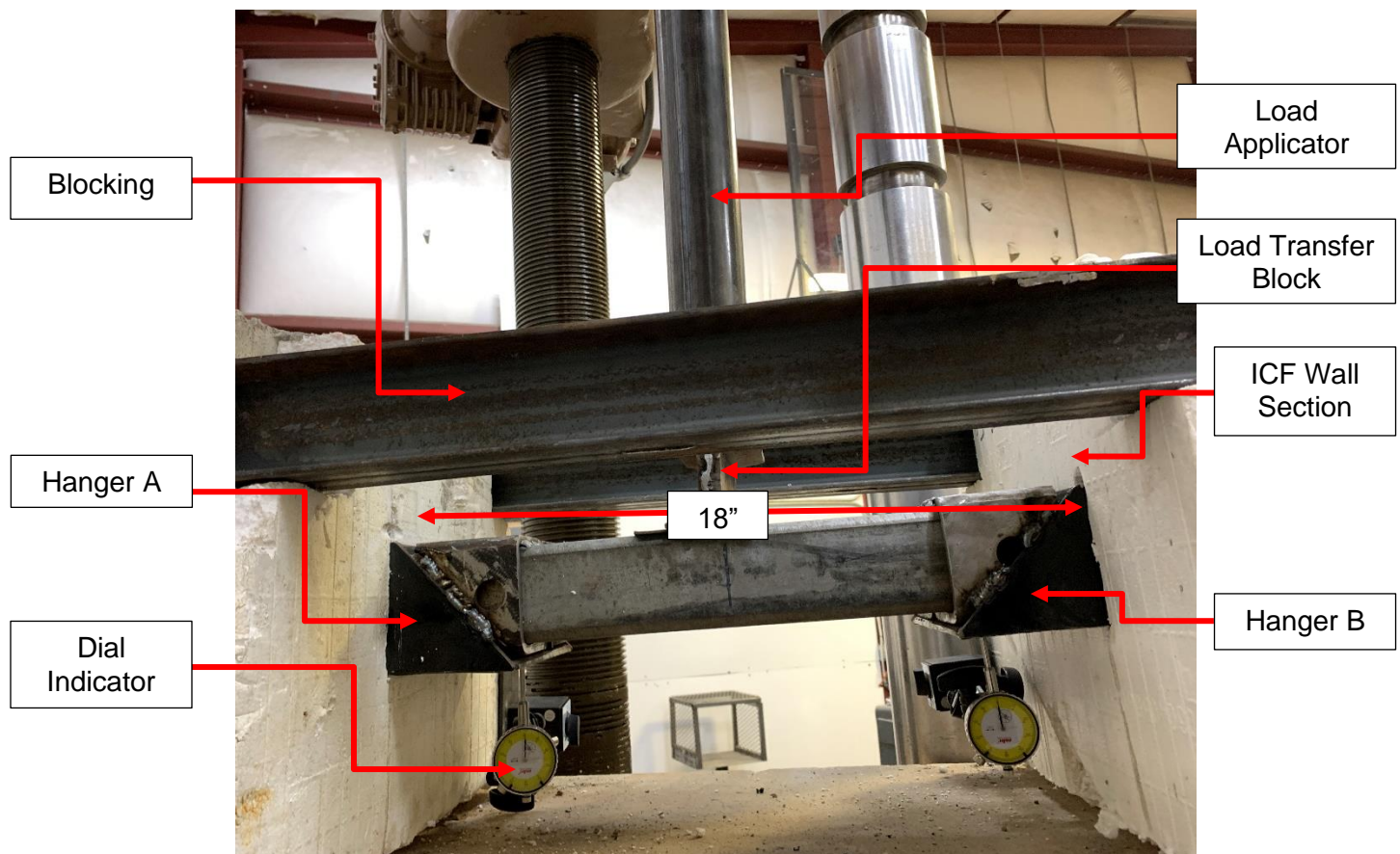


Figure 1. Vertical Load Test – Watkins Commercial Bracket

Testing Procedure Descriptions

The tests were conducted using a calibrated universal testing machine. Samples were tested per client's instructions and in general accordance with procedures outlined in ASTM D7147. A preload of 200 – 500 lbf was applied prior to testing. Testing was terminated when concrete failure, hanger/bracket pullout or failure occurred.

Vertical Load Test

For the Watkins Commercial Bracket, a constant load was then applied to the center of the HSS beam setup connecting the two ICF brackets. The load application was distributed using a load transfer block to not prematurely fail the beam member. The load was applied at a rate of 0.1 inches per minute.

Deviations from Standard Procedure

The testing requirements and procedures presented in ASTM D7147 were followed where possible. Deviations from the ASTM procedure include:

- No wood members were used for connecting the brackets.

Determination of Test Results

Vertical Load Test (Table 1)

Test Deflection Limit, P_{DL} : For the Watkins Commercial Bracket, the test deflection limit, specified in Section 13.4.1 of ASTM D7147 was used. The test deflection limit is the load at 0.125-inches of deflection recorded for each bracket.

Ultimate Load, P_{max} : In general, the ultimate load applied is the maximum recorded test load for test samples. The maximum recorded test load was achieved when failure within the system occurred.

Summary of Test Results

Table 1. Summary of Test Results – Watkins Commercial Bracket

Sample	Deflection Limit Load, Hanger A (lbs) ¹	Deflection Limit Load, Hanger B (lbs) ¹	Ultimate Test Load (lbs) ²	Ultimate Load Per Hanger (lbs) ³	Failure Mode
C1	20,182	18,367	25,133	12,567	Concrete Failure
C2	20,636	21,507	28,940	14,470	Concrete Failure
C3	28,522	25,882	37,238	18,619	Bracket Pullout
Average	22,516		30,437	15,219	

¹ Test deflection limit per ASTM D7147 13.4.1 is the load at 0.125-inches of deflection.

² Ultimate Test Load is the maximum recorded test load for each test

³ Ultimate Load Per Hanger is the ultimate test load divided by two.

SECTION 2:

VERTICAL LOAD TEST DATA



WATKINS COMMERCIAL BRACKET

	ACCREDITED TESTING GROUP REPORT CTL Thompson, Inc. – Fort Collins		Issue Date: 10.27.2021	Rev: 0
	Title: VERTICAL LOAD TEST		Report No. 1617A	Page #: 1 of 4

Client:	RP Watkins LLC
Job Number:	FC09744.001
Product:	Watkins Commercial Bracket

Reference Method

Tests were conducted according to client's instructions and in general accordance with ASTM D7147.

Deviations from Standard Procedure

Test samples were arranged and connected per client's instructions. No wood members were used to connect each bracket.

Standard Procedure

The Watkins Commercial Bracket is a bracket made from 1/4" plate and 4" x 4" angle iron. The bracket is designed to have an open web steel joist welded directly to the plate as a bearing ledge that is embedded into the ICF (Insulated Concrete Form) wall. Product dimensions were verified to design drawings for all specimens. Individual specimens were joined with a built-up section consisting of 3" x 3" x 3/8" HSS tubes. The HSS tubes were then welded directly to each bracket (see Figure 1 above). Both applied load and resulting deflection at each hanger were recorded. Load was applied at a uniform rate of 0.1 inches per minute. Testing was terminated concrete failure, bracket pullout or bracket failure occurred.

Summary of Results

Sample	Deflection Limit Load, Hanger A (lbs) ¹	Deflection Limit Load, Hanger B (lbs) ¹	Ultimate Test Load (lbs) ²	Ultimate Load Per Hanger (lbs) ³	Failure Mode
C1	20,182	18,367	25,133	12,567	Concrete Failure
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C3	28,522	25,882	37,238	18,619	Bracket Pullout
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¹ Test deflection limit per ASTM D7147 13.4.1 is the load at 0.125-inches of deflection.

² Ultimate Test Load is the maximum recorded test load for each test

³ Ultimate Load Per Hanger is the ultimate test load divided by two.

ICF Vertical Load Test

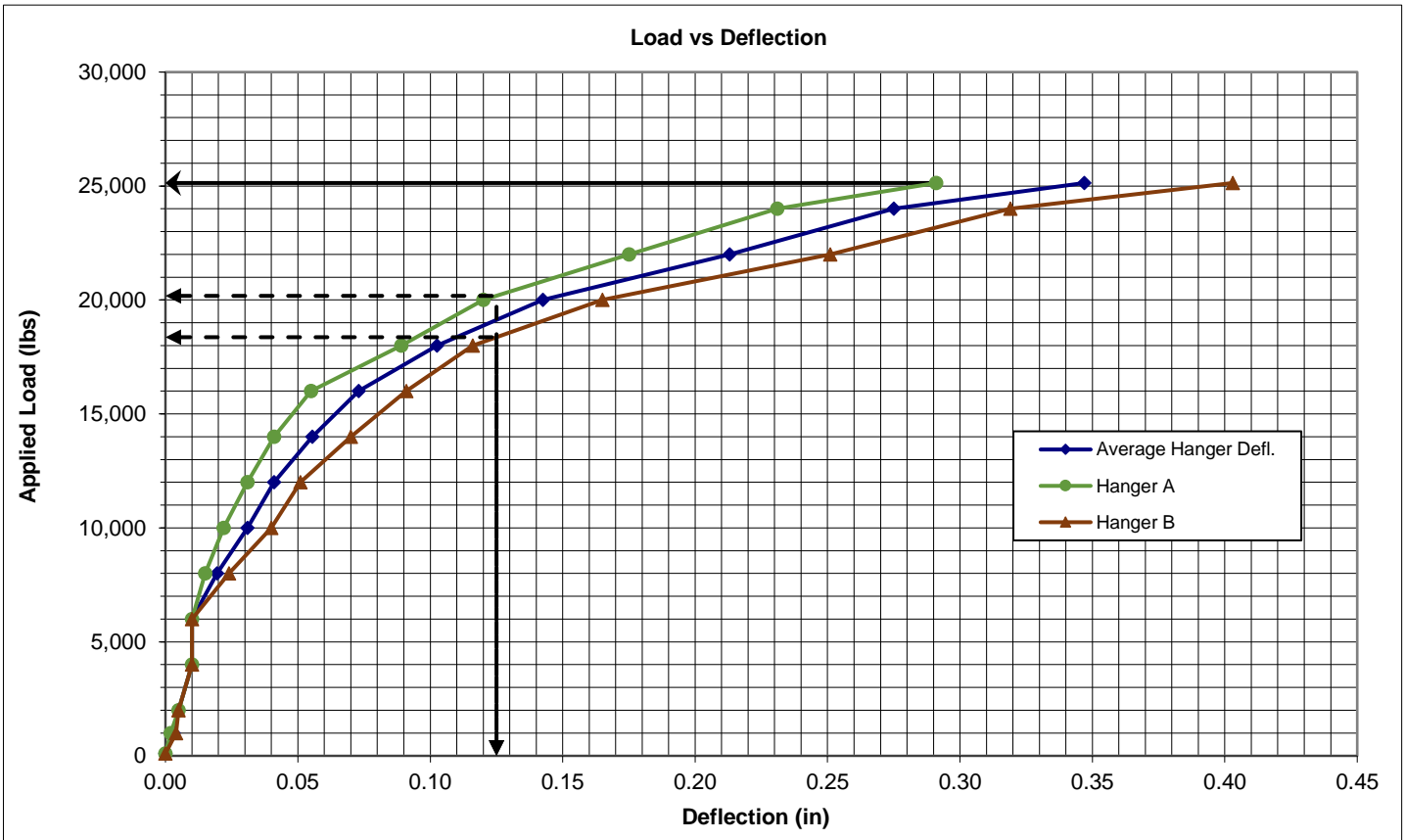
Client:	RP Watkins, LLC
Job Number :	FC09744.001
Date Tested :	10.01.2021
Technician:	Ryan Beck
Load Device:	UTM 400K
Load Frame ID:	2563114
Calibration Date:	05.26.2021

Specimen Specification

Specimen Number:	C1
Product Type:	Commerical Bracket
Joist Length to Applied Load (in)*:	3
Applied Load Rate (in/min):	0.1



Sample



Failure Mode:	Concrete Failure
Deflection Limit Load Hanger A, P_{DL} (lbs) ¹ :	20,182
Deflection Limit Load Hanger B, P_{DL} (lbs) ¹ :	18,367
Ultimate Load, P_{max} (lbs) ² :	25,133

Notes:

1. Test Deflection Limit per ASTM D7147 Section 13.4.1 is the load at 0.125-inches of deflection
2. Maximum recorded test load.

ICF Vertical Load Test

Client: RP Watkins, LLC
Job Number : FC09744.001
Date Tested : 10.01.2021
Technician: Ryan Beck

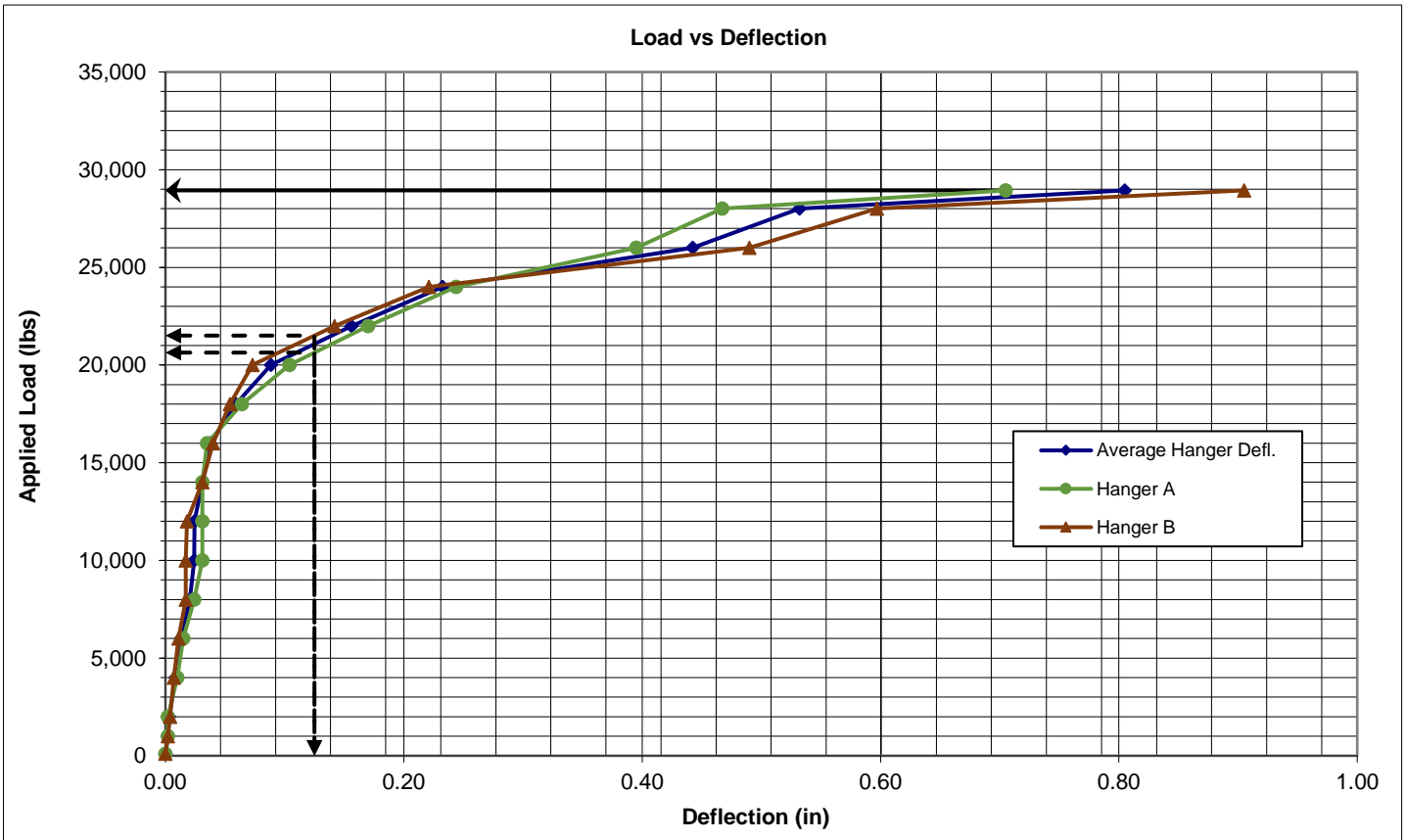
Load Device: UTM 400K
Load Frame ID: 2563114
Calibration Date: 05.26.2021

Specimen Specification

Specimen Number: C2
Product Type: Commerical Bracket
Joist Length to Applied Load (in)*: 3
Applied Load Rate (in/min): 0.1



Sample



Failure Mode:

Deflection Limit Load Hanger A, P_{DL} (lbs)¹:

Deflection Limit Load Hanger B, P_{DL} (lbs)¹:

Ultimate Load, P_{max} (lbs)²:

Concrete Failure	
Deflection Limit Load Hanger A, P_{DL} (lbs) ¹	20,636
Deflection Limit Load Hanger B, P_{DL} (lbs) ¹	21,507
Ultimate Load, P_{max} (lbs) ²	28,940

Notes:

1. Test Deflection Limit per ASTM D7147 Section 13.4.1 is the load at 0.125-inches of deflection
2. Maximum recorded test load.

ICF Vertical Load Test

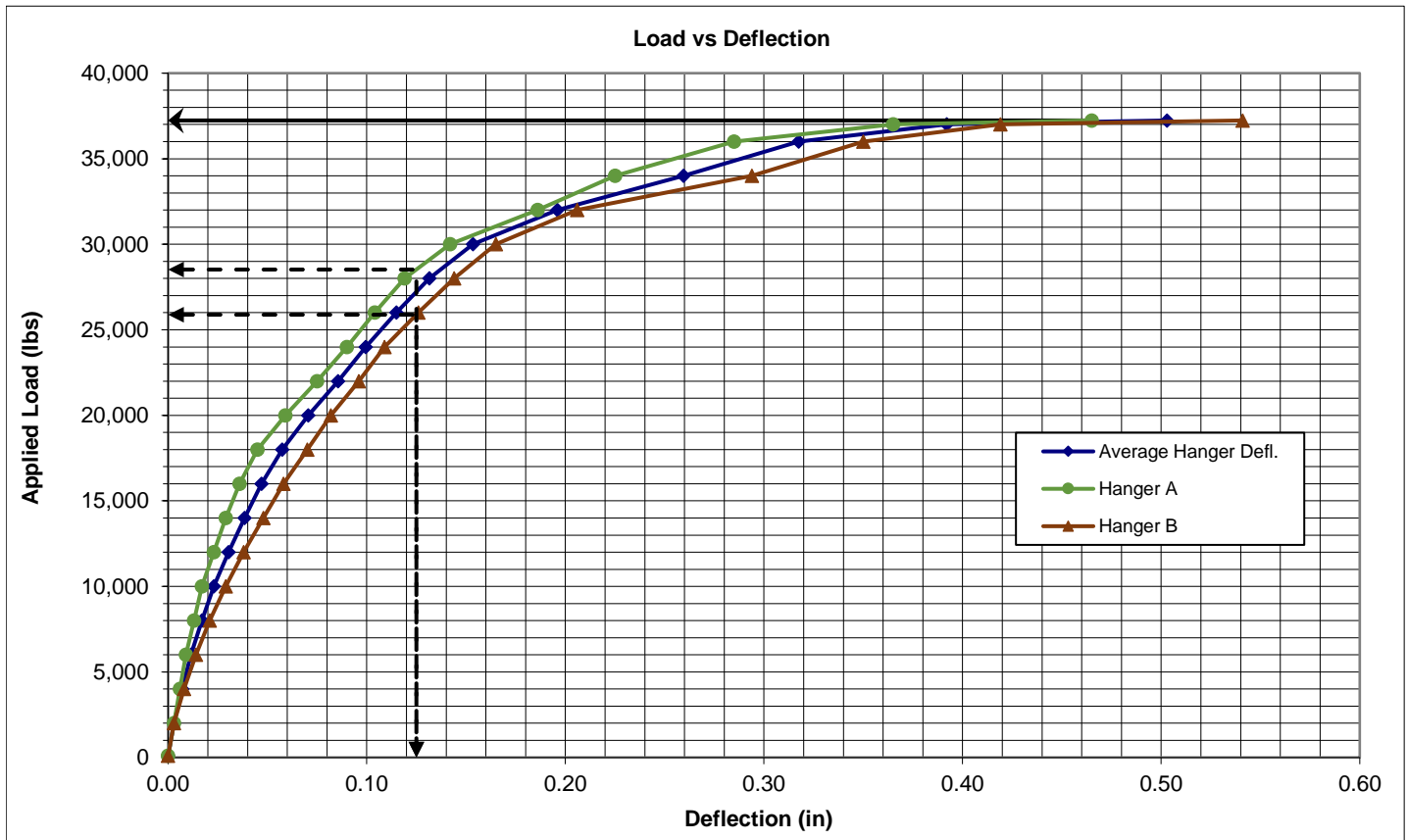
Client:	RP Watkins, LLC
Job Number :	FC09744.001
Date Tested :	10.01.2021
Technician:	Ryan Beck
Load Device:	UTM 400K
Load Frame ID:	2563114
Calibration Date:	05.26.2021

Specimen Specification

Specimen Number:	C3
Product Type:	Commerical Bracket
Joist Length to Applied Load (in)*:	3
Applied Load Rate (in/min):	0.1



Sample



Failure Mode:

Deflection Limit Load Hanger A, P_{DL} (lbs)¹:

Deflection Limit Load Hanger B, P_{DL} (lbs)¹:

Ultimate Load, P_{max} (lbs)²:

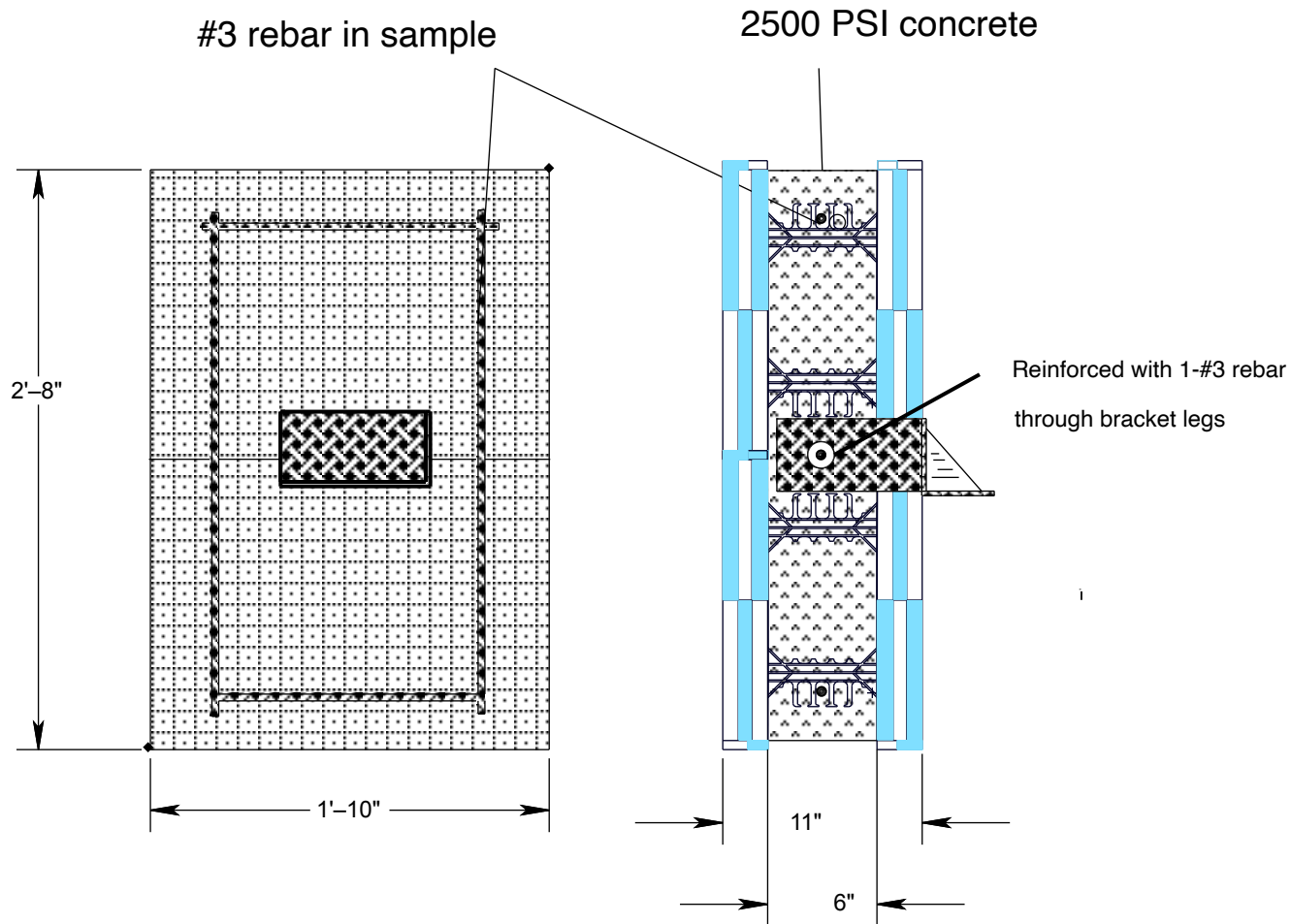
Bracket Pullout	
	28,522
	25,882
	37,238

Notes:

1. Test Deflection Limit per ASTM D7147 Section 13.4.1 is the load at 0.125-inches of deflection
2. Maximum recorded test load.

APPENDIX A:

SHOP DRAWINGS



General Notes

Commercial Bracket load Test Sample Detail

No.	Revision/Issue	Date

Print Name and Address

RP Watkins LLC

405-664-0010

www.geometricbuildings.com

Project Name and Address

Project	Sheet
Date	
Scale	