

# ACTS CONSTRUCTION, LLC TEST REPORT

**SCOPE OF WORK**

ASTM E2634 MATERIAL PROPERTY (ASTM D638 TENSILE STRENGTH AND ASTM D732 SHEAR STRENGTH) EVALUATION OF CROWN ICF 7-INCH PLASTIC CROSS TIES

**REPORT NUMBER**

M1593.01-106-31 R0

**TEST DATE**

04/21/21

**ISSUE DATE**

05/04/21

**RECORD RETENTION END DATE**

04/21/25

**PAGES**

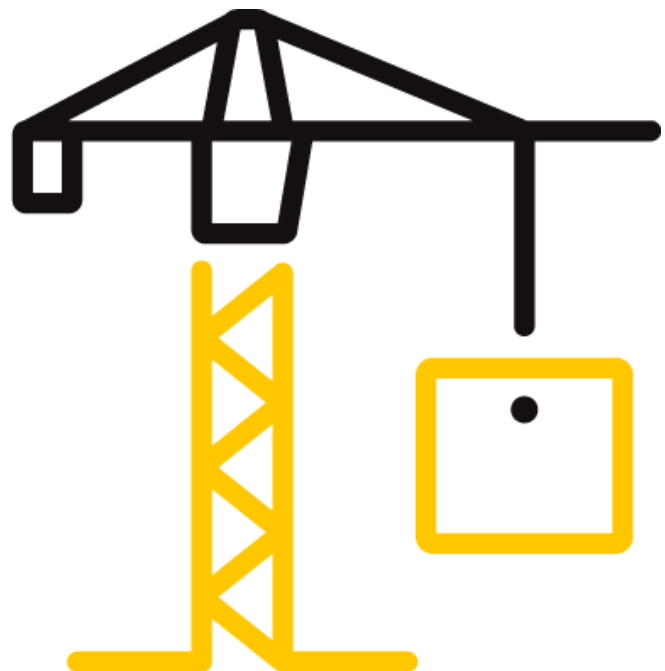
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**DOCUMENT CONTROL NUMBER**

ATI 00231 (09/05/17)

RT-R-AMER-Test-2827

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## TEST REPORT FOR ACTS CONSTRUCTION, LLC

Report No.: M1593.01-106-31 R0

Date: 05/04/21

### REPORT ISSUED TO

#### ACTS CONSTRUCTION, LLC

7816 113th Avenue

Pleasant Prairie, Wisconsin 53158

### SECTION 1

#### SCOPE

**Product:** Crown ICF 7-inch Plastic Cross Ties

Intertek Building & Construction (B&C) was contracted by Acts Construction, LLC to evaluate Crown ICF 7-inch plastic cross ties for compliance to ASTM E2634 for ICF Systems, in accordance with ASTM D638 for Tensile Properties and ASTM D732 for Shear Strength. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

<b>COMPLETED BY:</b>	Joshua A. Kennedy	<b>REVIEWED BY:</b>	Joseph M. Brickner
<b>TITLE:</b>	Technician III Materials Laboratory	<b>TITLE:</b>	Laboratory Supervisor Materials Laboratory
<b>SIGNATURE:</b>		<b>SIGNATURE:</b>	
<b>DATE:</b>	05/04/21	<b>DATE:</b>	05/04/21

JAK:jmb/als

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### SECTION 2

#### SUMMARY OF TEST RESULTS

PROCEDURE	PROPERTY	REQUIRED	RESULT	OUTCOME
ASTM D638	Tensile Load	2.67 kN	3.05 kN	Pass
ASTM D732	Shear Strength	2.47 MPa	21.6 MPa	Pass

### SECTION 3

#### TEST METHODS

The specimens were evaluated in accordance with the following:

**ASTM D638-14**, *Standard Test Method for Tensile Properties of Plastics*

**ASTM D732-17**, *Standard Test Method for Shear Strength of Plastics by Punch Tool*

For compliance to **ASTM E2634-18**, *Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems*

### SECTION 4

#### MATERIAL SOURCE

The Crown ICF plastic cross tie materials were provided by Acts Construction, LLC. The following were received in acceptable condition on 4/5/2021:

- Thirty-two (32), nominally 14.75-inch long by 10.25-inch wide by 1.5-inch thick black plastic cross ties

Refer to the product description photos in Section 10. The material was tested as received with the exception of preparing the smaller test specimens from the materials. Representative materials/test specimens will be retained by Intertek B&C for a minimum of four years from the test completion date.

### SECTION 5

#### LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Joshua A. Kennedy	Intertek B&C
Joseph M. Brickner	Intertek B&C

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### SECTION 6

#### TEST PROCEDURES

All conditioning of test specimens and test conditions were at standard laboratory conditions unless otherwise reported. Refer to the test photos in Section 10 and datasheets in Section 11. Calibration certificates available upon request.

#### **ASTM D638 - Tensile Strength (Modified by ASTM E2634)**

The tensile strength of the plastic cross tie material was determined utilizing an Instron Model 3369 UTM (ICN: 005740) equipped with a 10-kN load cell (ICN: 005965) and operating at a crosshead speed of 25.0 mm/min. Each side of the cross tie was held in steel grips at a grip separation of 179.13 mm and pulled in tension until a failure mode occurred. Dimensions were measured with a Fowler digital caliper (ICN: INT01066). The Minimum Web Cross Section Area (WCSA) is 67.25 mm<sup>2</sup>. The wall surface area is 825.8 cm<sup>2</sup> (0.889 ft<sup>2</sup>) as referenced in Test Plan Report G104501129MID-001.

#### **ASTM D732 - Shear Strength (Modified by ASTM E2634)**

The shear strength of the plastic cross tie material was determined utilizing an Instron Model 3369 UTM (ICN: 005740) equipped with a 50-kN load cell (ICN: INT01425) and operating at a crosshead speed of 1.27 mm/min. Each specimen had 10.5-mm hole drilled in the center and stabilized with a 25.35-mm diameter steel punch and spacer bolted through the hole. The specimens were secured in a steel fixture with a 25.4-mm hole and a compressive force was loaded onto the punch until a failure mode occurred. Dimensions were measured with a Fowler digital caliper (ICN: INT01066). The Web Tributary Area (WTA) is 825.8 cm<sup>2</sup> (0.889 ft<sup>2</sup>) as referenced in Test Plan Report G104501129MID-001.

### SECTION 7

#### TEST SPECIMEN DESCRIPTIONS

TEST PROCEDURE	NUMBER OF SPECIMENS	NOMINAL SPECIMEN DIMENSIONS	VISUAL CHARACTERISTICS
ASTM D638	5	15 x 10 x 1.5 inch	Black
ASTM D732		2 x 1.5 x 0.23 inch	

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**SECTION 8**

**TEST RESULTS**

**ASTM D638 - Tensile Strength (Modified by ASTM E2634)**

SPECIMEN	CROSS-SECTION AREA (mm <sup>2</sup> )	MAXIMUM LOAD (N)	TENSILE STRENGTH (kN/m <sup>2</sup> )	ELASTIC MODULUS (MPa)
1	67.93	3,110	45,800	1,383
2	67.38	3,020	44,800	1,321
3	68.09	3,000	44,000	1,346
4	68.26	3,030	44,300	1,363
5	67.25	3,090	46,000	1,444
<b>Average</b>	<b>67.78</b>	<b>3,050</b>	<b>45,000</b>	<b>1,372</b>
Std. Dev.	0.44	49.8	874	46.7

**ASTM D732 - Shear Strength (Modified by ASTM E2634)**

SPECIMEN	THICKNESS (mm)	MAXIMUM LOAD (N)	SHEAR STRENGTH (MPa)	SHEAR MODULUS (MPa)
1	5.87	10,100	21.7	94.1
2	5.98	10,300	21.7	128
3	5.85	9,580	20.6	83.6
4	5.92	10,400	22.2	117
5	5.95	10,300	21.8	126
<b>Average</b>	<b>5.91</b>	<b>10,200</b>	<b>21.6</b>	<b>110</b>
Std. Dev.	0.05	348	0.60	19.9

**SECTION 9**

**CONCLUSION**

The Crown ICF 7-inch plastic cross tie product met the specified performance requirements of ASTM E2634 for Section 6.2.5 Cross Tie Tensile Strength and Section 6.2.6 Cross Tie Shear Strength.

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### SECTION 10 PHOTOGRAPHS



**Photo No. 1**  
**Typical Cross Tie Product, As Received**

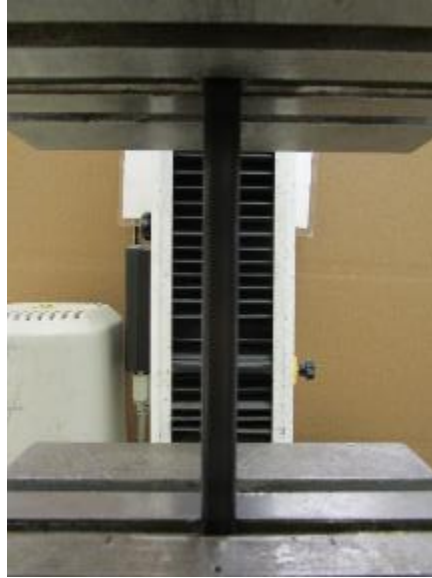


**Photo No. 2**  
**Typical Tensile Test Setup Detail**

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**Photo No. 3**

**Typical Tensile Test In-Progress Detail**



**Photo No. 4**

**Typical Tensile Failure Mode Detail**

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**Photo No. 5**  
**Typical Shear Specimen Detail**



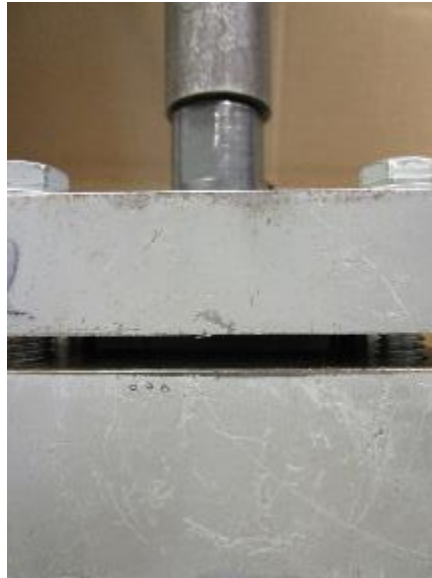
**Photo No. 6**  
**Typical Shear Test Setup Detail**



**TEST REPORT FOR ACTS CONSTRUCTION, LLC**

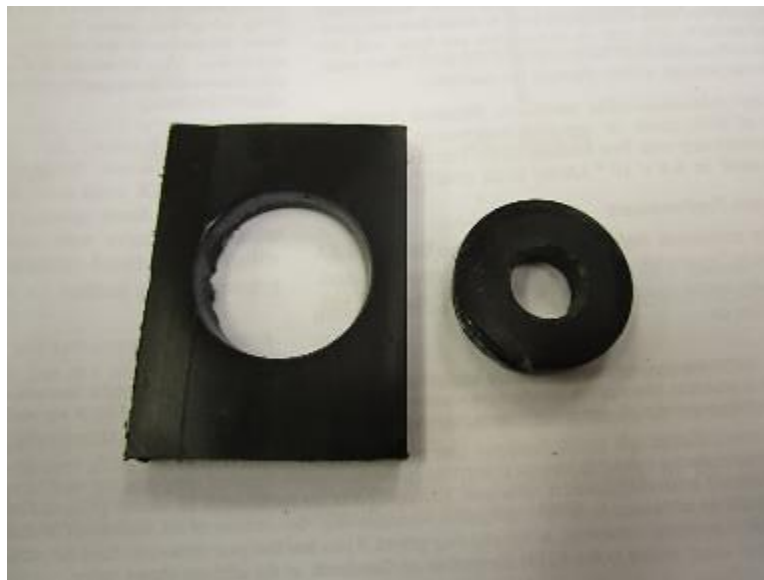
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**Photo No. 7**

**Typical Shear Test In-Progress Detail**



**Photo No. 8**

**Typical Post-Test Shear Specimen Detail**



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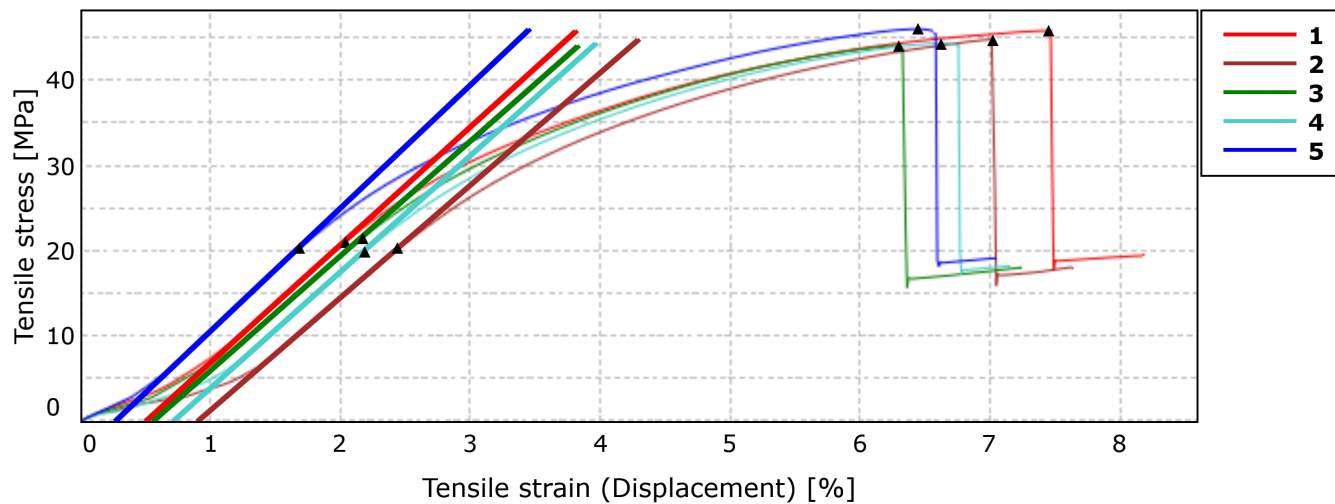
**SECTION 11**

**DATA SHEETS**

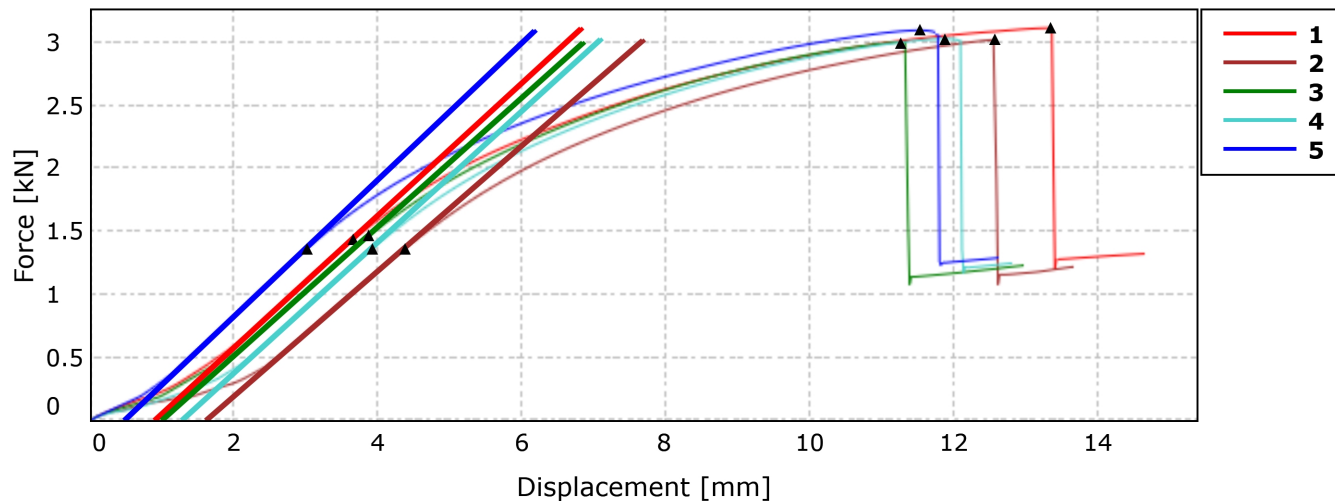
ASTM D638, Standard Test Method for Tensile Properties of Plastics

Intertek-ATI Job #	M1593.01-106-31
Client Name	Acts Construction, LLC
Sample Description	Crown ICF Plastic Cross Ties
Rate 1	25.00 mm/min
Initial Grip Separation (mm)	179.13 mm
Load Cell Capacity / ICN	10 kN / 005965
Load Cell Calibration Due Date	10/2021
Frame / ICN	Instron 3369 / 005740
Frame Calibration Due Date	10/2021
Lab Conditions	69.6°F / 40.1% RH
User	Josh K.

Specimen 1 to 5



Specimen 1 to 5





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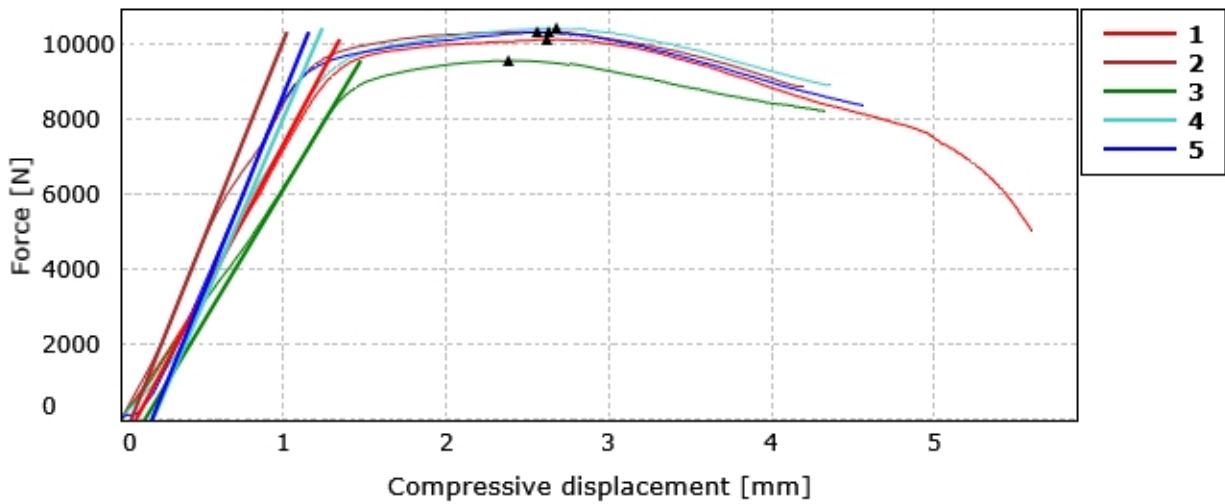
	Minimum Area [mm <sup>2</sup> ]	Initial Gauge Length [mm]	Final Gauge Length [mm]	Failure Mode
1	67.93	179.13	192.51	Broke within gage marks
2	67.38	179.13	191.71	Broke within gage marks
3	68.09	179.13	190.49	Broke within gage marks
4	68.26	179.13	191.01	Broke within gage marks
5	67.25	179.13	190.67	Broke within gage marks
Mean	67.78	179.13	191.28	
Std. Dev	0.443	0.000	0.832	

	Maximum Load [N]	Tensile Strength [kPa]	Yield Stress [MPa]	Modulus of Elasticity [MPa]	Percent Elongation (%)	Yield Elongation (%)
1	3110	45800	21.0	1383	7.5	2.0
2	3020	44800	20.2	1321	7.0	2.4
3	3000	44000	21.5	1346	6.3	2.2
4	3030	44300	20.0	1363	6.6	2.2
5	3090	46000	20.2	1444	6.4	1.7
Mean	3050	45000	20.6	1372	6.8	2.1
Std. Dev	49.776	874.021	0.646	46.690	0.471	0.279

ASTM D732-17, Standard Test Method for Shear Strength of Plastics by Punch Tool

Intertek-ATI Job #:	M1593.01-106-31
Client Name:	Acts Construction, LLC
Sample description	Crown ICF Plastic Cross Ties
Test Speed:	1.27 mm/min
Punch Diameter	25.35 mm
Test Frame / ICN:	Instron 3369 / 005740
Load Cell Capacity / ICN:	50kN / INT01425
Lab Conditions:	70.2°F / 43.1% RH
User:	Josh K.

Specimen 1 to 5



	Thickness [mm]	Maximum Shear Load [N]	Shear Strength [MPa]	Shear Modulus [MPa]	Yield Load [N]
1	5.87	10100	21.7	94.1	8860
2	5.98	10300	21.7	128	6270
3	5.85	9580	20.6	83.6	8730
4	5.92	10400	22.2	117	6870
5	5.95	10300	21.8	126	8940
Mean	5.91	10200	21.6	110	7940
Std. Dev.	0.05	348.33	0.60	19.93	1264.80



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#### REVISION LOG

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0	05/04/21	N/A	Original Report Issue