



METCUT RESEARCH, INC.
Structures Laboratory

TEST DATA REPORT ON
4818-102901
FIBRELITE TRENCH COVERS COMPRESSION TESTING

Purchase Order No. HQ-18-1848

Trenwa Inc.
1419 Alexandria Pike
Fort Thomas, KY 41075

Contact: George Schurr

Conducted By:
Metcut Research, Inc.

September 7, 2018

A handwritten signature in black ink, appearing to read "William T. Grieszmer", written over a horizontal line.

William T. Grieszmer
Chief Engineer & Laboratory Manager

A handwritten signature in black ink, appearing to read "Adam Eckstein", written over a horizontal line.

Adam Eckstein
Engineering Assistant

This test report will not be reproduced except in full without the written approval of Metcut Research.

Report prepared by: WTG

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All testing was conducted in accordance with customer specified instructions. Exceptions to these instructions, if any, are noted in the report.

Revision Control

Revision Number	Purpose / Changes	Author	Date
1	Initial issue	W grieszmer	9/7/18
2	Corrected trademark name spelling to Fibrelite	W grieszmer	9/10/18



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Project Scope:

Metcut was provided with (16) Fibrelite trench covers for the purpose of conducting three-point bending tests in accordance with AASHTO MM 306-10 (2015), H20 requirements. The testing was conducted specifically to Section 6.0 Proof Loading Testing. A 9" x 9" platen was utilized for imparting the load to the center of each trench cover. Additionally, a 1/2" thick Buna rubber sheet was placed between the load platen and the surface of the trench cover. The Buna rubber sheet was of a Durometer rating of 3000, which is "very soft" to compensate for variances in the two surfaces. The outer edges of the trench covers were supported on C-6 x 10.5 channels beams. The flange depth of this C channel is about 2" which was used to support the trench cover. The C channels were secured to each other by lengths of threaded rod, constrained to the trench cover span during loading.

The loading cycle consisted of an initial compression load of -300 lbs., ramped at a rate of 10,000 lbs. / minute to -40,000 lbs., held at -40,000 lbs. for 60 seconds, then returned to -300 lbs. The minimum load was held for approximately one minute to allow recovery of the trench cover from loading hysteresis, whereupon the final permanent displacement set was measured.

Test results are listed in Table I below. Each of the trench covers passed the requirements of the specification.



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Test Results

Table I



Procedure:

500.7

Structures Data Summary

Project: <u>4818-102901-28-280-01-02</u>	Test Temperature (°F): <u>75</u>
Material: <u>Fibrelite</u>	Waveform: <u>x</u>
Test Specification: <u>AASHTO M 306-2 / H20</u>	Frequency: <u>x</u>
Removal Point: <u>roof loading</u>	Stress Ratio: <u>x</u>

Test Order	Coupon ID	Technician	Test Log Number	Max Load (lbs)	Max	Post test	Result	Failure Location	Test Station
					Displacement (in)	displacement offset (in)			
7	LHF-26-60-1	ANE	283349	40000	0.574	0.032	Passed	N/A	60311
8	LHF-26-60-2	ANE	283350	40000	0.625	0.037	Passed	N/A	60311
5	LHF-30-60-1	ANE	283351	40000	0.692	0.041	Passed	N/A	60311
6	LHF-30-60-2	ANE	283352	40000	0.72	0.042	Passed	N/A	60311
3	LHF-36-30-1	ANE	283353	40000	0.836	0.067	Passed	N/A	60311
4	LHF-36-30-2	ANE	283354	40000	0.731	0.036	Passed	N/A	60311
1	LHF-36-60-1	ANE	283355	40000	0.850	0.102	Passed	N/A	60311
2	LHF-36-60-2	ANE	283356	40000	0.846	0.076	Passed	N/A	60311
9	LHF-46-20-1	ANE	283357	40000	1.006	0.030	Passed	N/A	60311
10	LHF-46-20-2	ANE	283358	40000	0.983	0.029	Passed	N/A	60311
11	LHF-46-30-1	ANE	283359	40000	0.918	0.030	Passed	N/A	60311
12	LHF-46-30-2	ANE	283360	40000	0.880	0.031	Passed	N/A	60311
15	LHF-54-20-1	ANE	283361	40000	1.397	0.044	Passed	N/A	60311
16	LHF-54-20-2	ANE	283362	40000	1.349	0.042	Passed	N/A	60311
	54-20-2 Ultimate	ANE		66000	2.320	0.101		N/A	60311
13	LHF-54-30-1	ANE	283364	40000	1.055	0.034	Passed	N/A	60311
14	LHF-54-30-2	ANE	283365	40000	1.091	0.036	Passed	N/A	60311

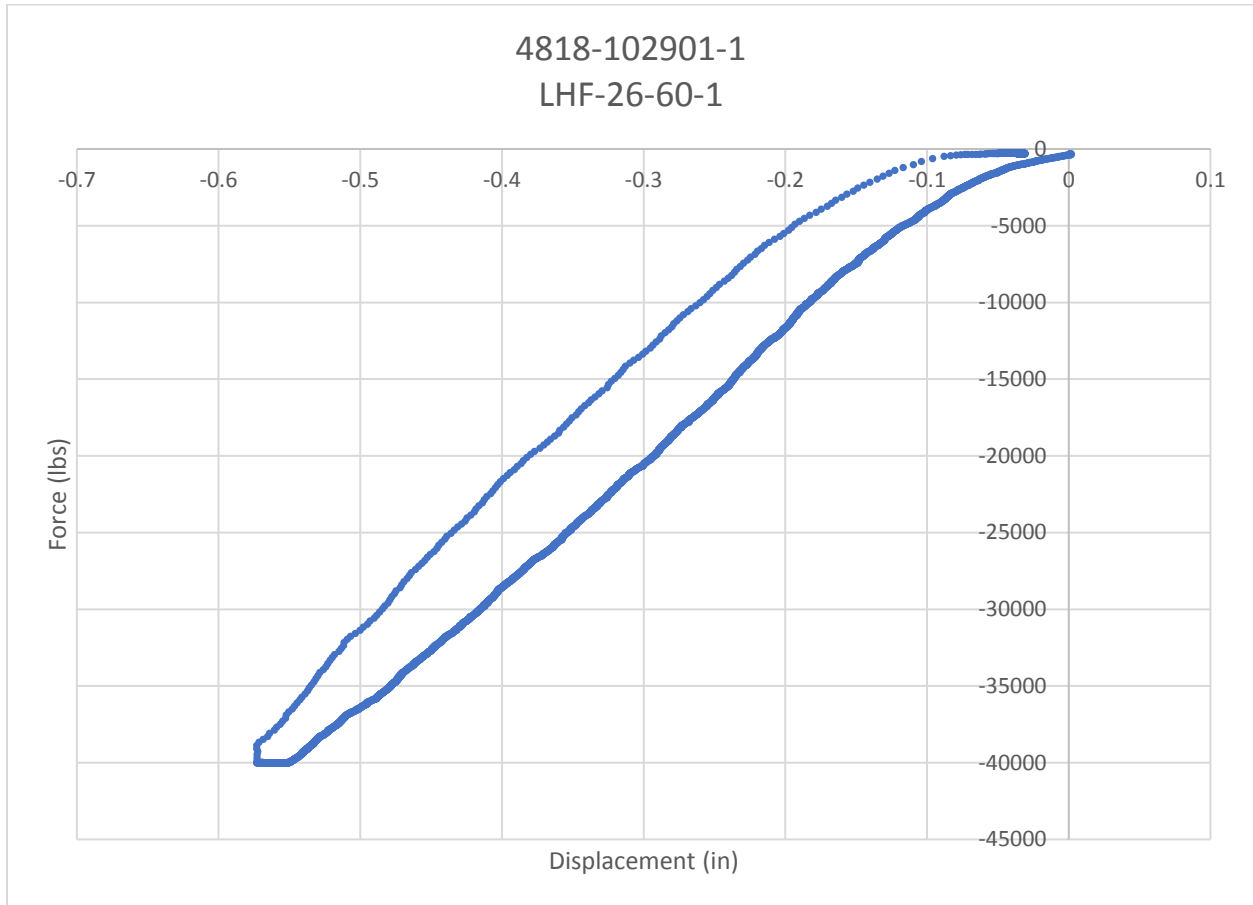
NOTE!: The peak displacment includes approximately 3/8" of the rubber sheet compression. The above data is not normalized for this compression.



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Typical Trench Cover Load / Displacement Response.





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Typical Trench Cover Test Assembly





Appendix A

Test Station Calibrations



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MTS Systems Corporation

Customer Address:
3980 Rosslyn Drive
Cincinnati, OH 45209-1196
US

14000 Technology Drive
Eden Prairie, MN 55344-2290

MTS Field Service



Certificate of Calibration

Customer	Name: Metcut Research	System: 12124	Page: 1 of 2
	System ID: 12124	Location: Structures	Certificate Number: 7096-2293
Equipment	Device Type: Force	Model: LCF_800	Site: 506626
	Controller/Conditioner Model: 494.26	Serial No.: 0002061014	Country Code: US
	Readout Device Model: 494.26	Serial No.: 0002061014	Channel: Force 12124

MTS Field Service is accredited by the American Association for Laboratory Accreditation (A2LA Cert. No. 1145.01). The basis for this accreditation is the international standard for calibration laboratories, ISO/IEC 17025 "General Requirements for the Competence of Calibration and Testing Laboratories". Defined and documented measurement assurance techniques or uncertainty analyses are used to verify the adequacy of the measurement processes.

Calibrations are performed with standards whose values and measurements are traceable to the National Institute of Standards and Technology.

MTS Reference Force Transducers are calibrated in compliance with ASTM E74.

The results of this calibration relate only to the items calibrated.

When parameter(s) are certified to be within specified tolerance(s), the measured value(s) shall fall within the appropriate specification limit and the uncertainty of the measured value(s) shall be stated and provided to the customer for evaluation.

CALIBRATION INFORMATION

As Found:	In Tolerance	Max. Error As Found:	0.71 %	Calibration Date:	11-Aug-17
As Left:	In Tolerance	Max. Error As Left:	0.71 %	Calibration Due:	11-Aug-18
Tolerance: +/- 1.0% of Applied Force					
Calibration Procedure:		FS-CA 2122 Rev. C	ASTM E4-16		
Full Scale Ranges:		100 kip			
Note:					

STANDARDS USED FOR CALIBRATION

MTS Asset Number	Manufacturer	Model Number	Description	Cal. Date	Cal. Due
23153	Interface Inc.	9840	m/V/V Indicator	11-May-17	11-May-18
19941	Fluke	189	DMM	22-Nov-16	22-Nov-17
23424	Fluke	80T-150UA	Temperature Probe	22-Nov-16	22-Nov-17
23168	Interface	CX-0220-1	Standardizer	11-May-17	11-May-18
20936	INTERFACE	1232AJM-100K	100 KIP FORCE STD	17-May-17	16-Nov-18

Certified by: *Ch. Rojas* Issued on: 11-Aug-17

ACS Version: 10.26

ACSRepRevAS



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LVDT CALIBRATION

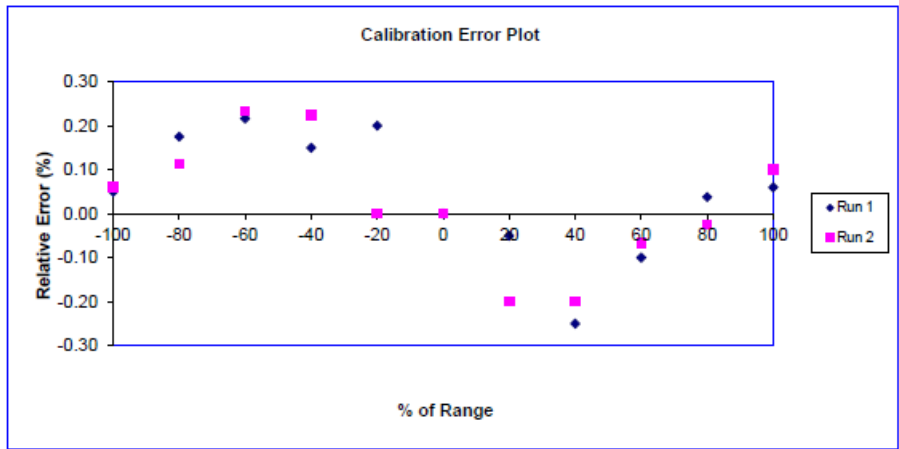
ASTM E2309-11 Class C Calibration
Displacement Input

LVDT Asset No.:	27453
Operator:	JAB
Test Station:	60309
Date:	4/26/2018
Current Lab Temp *F:	75
LVDT Full Scale (in):	20.000
Calibration Stand:	Tape
Strain / DUC Card:	S2-J2A
DVM:	INT
Checker:	

Calibration Reference Values	
Calibration Type:	Gain DeltaK
PreAmp:	0.9025
PostAmp:	1.118
Total Gain:	1.009
DeltaK:	1
Excitation:	10.6
Excitation Freq.:	
Phase(deg):	

Linearization Data	

Comments: ±125" FS on .SCF



Class Limit =+/- .005" Class Limit =+/- 1.0%

Nom Disp. (in)
10.000
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
-6.000
-8.000
-10.000

Actual Displacement (in)		Fixed Error (in)		Relative Error (%)	
Run 1	Run 2	Run 1	Run 2	Run 1	Run 2
10.0060	10.0100	0.0060	0.0100	0.06	0.10
8.0030	7.9980	0.0030	-0.0020	0.04	-0.02
5.9940	5.9960	-0.0060	-0.0040	-0.10	-0.07
3.9900	3.9920	-0.0100	-0.0080	-0.25	-0.20
1.9990	1.9960	-0.0010	-0.0040	-0.05	-0.20
0.0000	0.0000	0.0000	0.0000	0.00	0.00
-2.0040	-2.0000	-0.0040	0.0000	0.20	0.00
-4.0060	-4.0090	-0.0060	-0.0090	0.15	0.23
-6.0130	-6.0140	-0.0130	-0.0140	0.22	0.23
-8.0140	-8.0090	-0.0140	-0.0090	0.17	0.11
-10.0050	-10.0060	-0.0050	-0.0060	0.05	0.06

Red highlighted cells are out of spec. data

Form No. 65-28-11

4-28-18_20in string pot



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End of Report