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number 1273310

TEST REPORT

LFD018C880

ASTM C880- STANDARD TEST METHOD FOR FLEXURAL STRENGTH OF DIMENSION STONE

CLIENT	Namibia Marble and Granite (Pty) Ltd. P.O.Box 69 Karibib Namibia Tel +264 64 550201 (W)
PETROGRAPHIC NAME [ASTM C119]	Marble
TRADE NAME	White Rhino
SPECIMEN QUANTITIES	5 DRY 5 WET
SUMMARY OF TEST	MODULUS OF RUPTURE DRY: 7,1 MPa [1024 psi] WET: 7,9 MPa [1149 psi]
MINIMUM VALUE REQUIRED (ASTM C503 Standard Specification for Marble Dimension Stone)	6,9 MPa [1000 psi]

Test results dry page 1

Test results wet page 7

Carrara - January 25, 2019

Apparatus

The testing machine is a "servocontrolled" machine, controlled by a real time digital platform C-Rio with FPGA technology. The load is measured by a TCE load cell (5511 lbf of nominal load - linearity < 0.03%; hysteresis < 0.03%; repeatability < 0.01%). Load cell data acquisition (A/D) is performed by National Instruments NI 9237 24-Bit module. Sample frequency is 10 milliseconds.

Central point deflection is measured with two potentiometric position transducers,



Measuring instruments

Specimen size has been measured by a digital caliber "Mitutoyo Absolute" model CD-15PKX (serial no. 13185236) with a precision of 0.01 mm (0.39 mil). Measurements have been made using the international system of units (SI).

Conditioning

Dry conditions - before testing the specimens have been conditioned for 48 h at $140 \pm 4^\circ\text{F}$ [$60 \pm 2^\circ\text{C}$]. The temperature in the climatic chamber is controlled by a West 6500 temperature controller with PID logical and a PT100 temperature sensor. After dry periods the specimens are kept at room temperature in a desiccator.

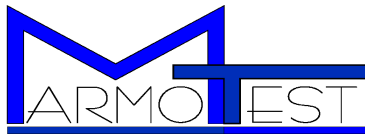
Wet conditions - before testing the specimens have been conditioned for 48 h at $72^\circ\text{F} \pm 4^\circ\text{F}$ [$22 \pm 2^\circ\text{C}$]

Load gradient

Strain gradient is kept under 600 psi/min [4 MPa/min] until specimen failure.

The laboratory technician
dott. Gabriele Pinelli

Marmo Test s.a.s.
di DAVIDE ROCCA & C.
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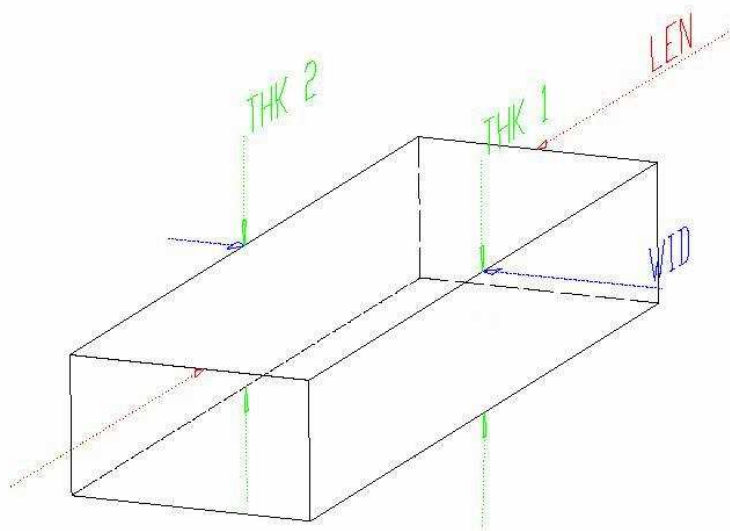
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membership number
1273310

C 880	DRY	NONE
Number of specimens	5	Conditioning operator 11
Date of conditioning	02/01/2019	Measurement operator 11
Date of measurement	04/01/2019	Test operator 11
Date of test	04/01/2019	



Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_01	13,780	1,183	1,144	1,163	3,94	741	11,811	1.233
LFD018C880D_02	13,780	1,174	1,168	1,171	3,93	522	11,811	859
LFD018C880D_03	13,780	1,174	1,180	1,177	3,93	540	11,811	878
LFD018C880D_04	13,780	1,175	1,143	1,159	3,95	650	11,811	1.087
LFD018C880D_05	13,780	1,144	1,177	1,160	3,94	637	11,811	1.065

σ average 1.024 psi **σ std. dev.** 156 psi

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	BRK LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_01	350,00	30,04	29,05	29,55	99,95	3.296	300,0	8,50
LFD018C880D_02	350,00	29,81	29,66	29,74	99,91	2.325	300,0	5,92
LFD018C880D_03	350,00	29,83	29,98	29,90	99,94	2.403	300,0	6,05
LFD018C880D_04	350,00	29,85	29,02	29,44	100,26	2.894	300,0	7,50
LFD018C880D_05	350,00	29,06	29,89	29,47	99,98	2.835	300,0	7,34

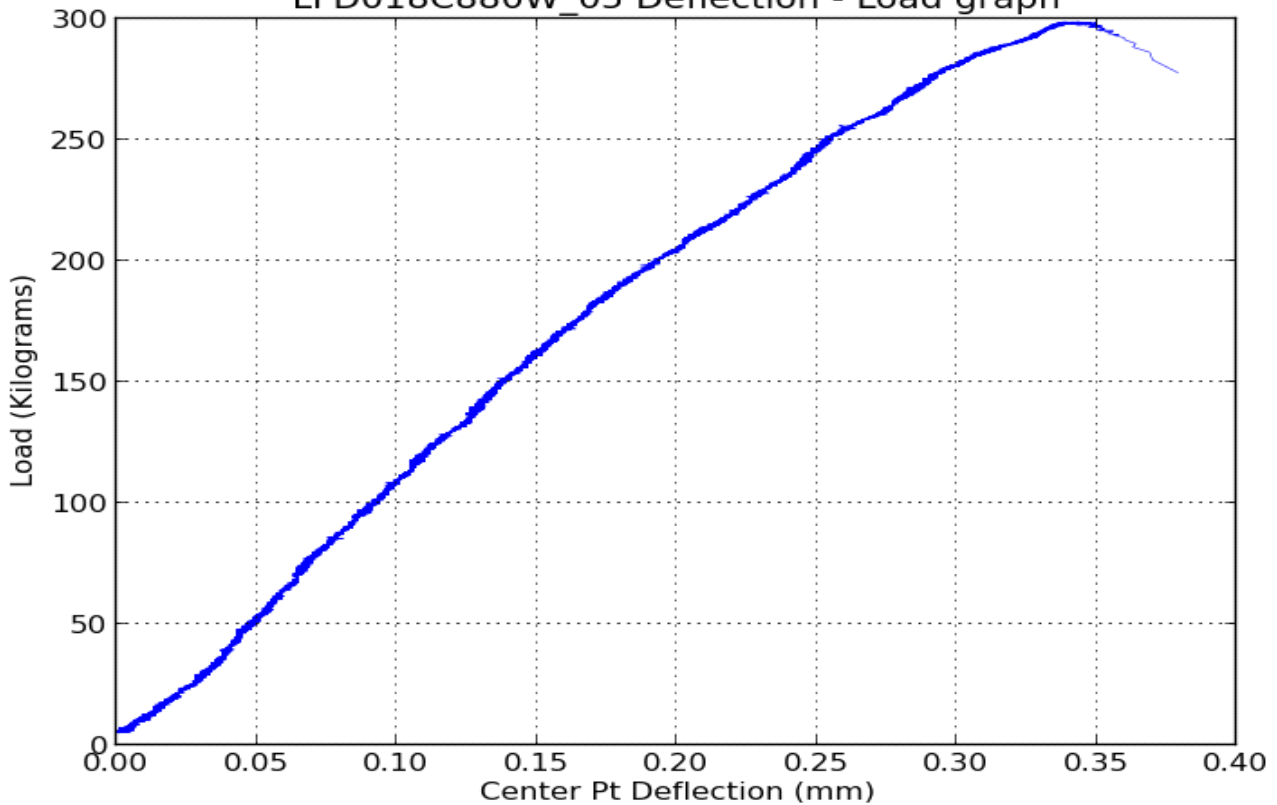
σ average 7,06 MPa **σ std. dev.** 1,08 MPa

NOTES

Specimen LFD018C880D_01 test result



LFD018C880W_05 Deflection - Load graph



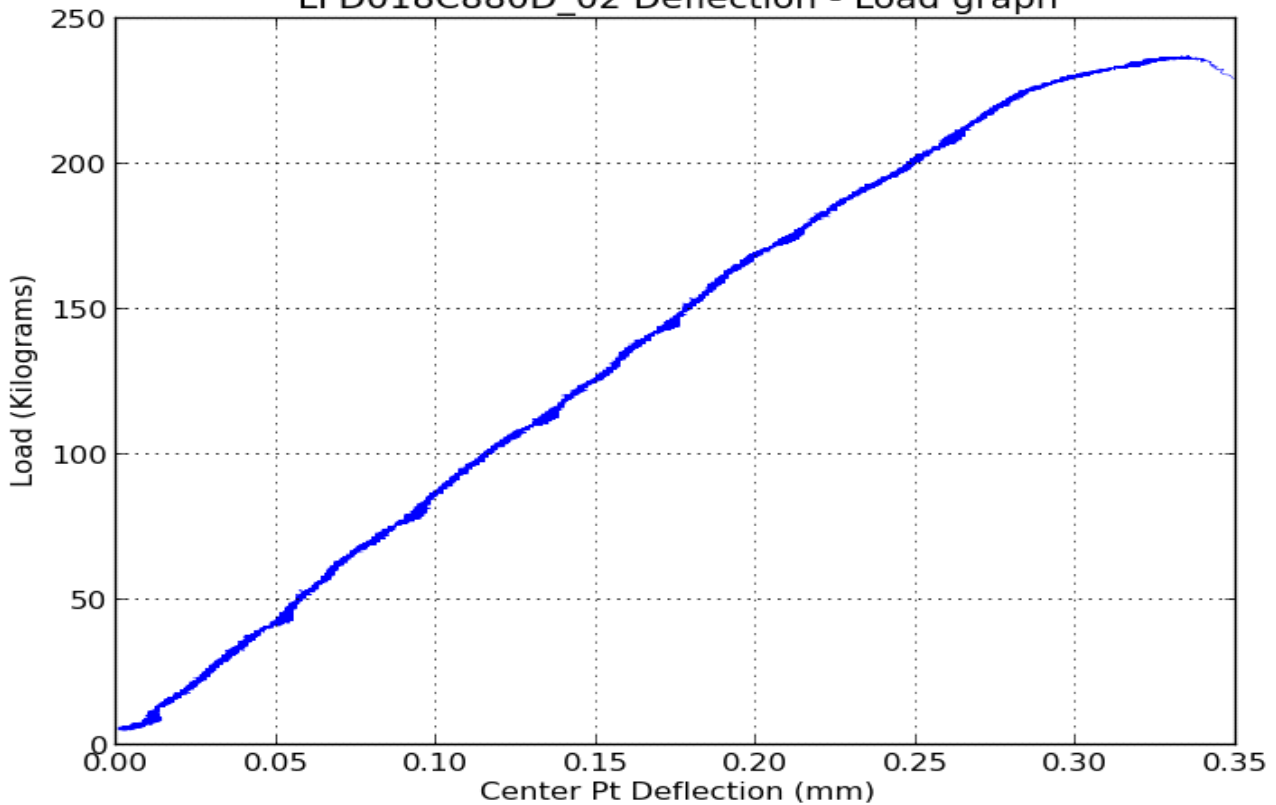
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_01	13,780	1,183	1,144	1,16	3,935	741	11,811	1.233

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_01	350,00	30,04	29,05	29,55	99,95	336	3.296	300,00	8,50

Specimen LFD018C880D_02 test result



LFD018C880D_02 Deflection - Load graph



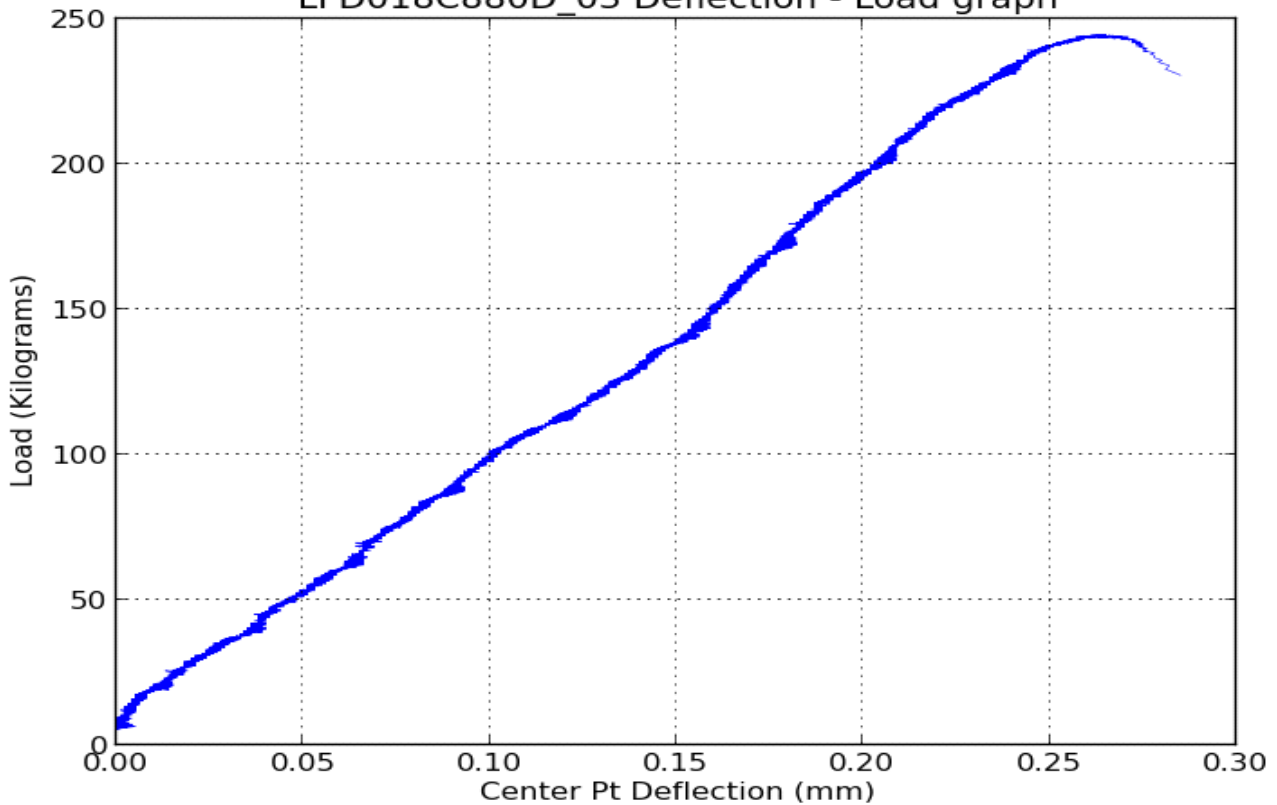
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_02	13,780	1,174	1,168	1,17	3,933	522	11,811	859

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_02	350,00	29,81	29,66	29,74	99,91	237	2.325	300,00	5,92

Specimen LFD018C880D_03 test result



LFD018C880D_03 Deflection - Load graph



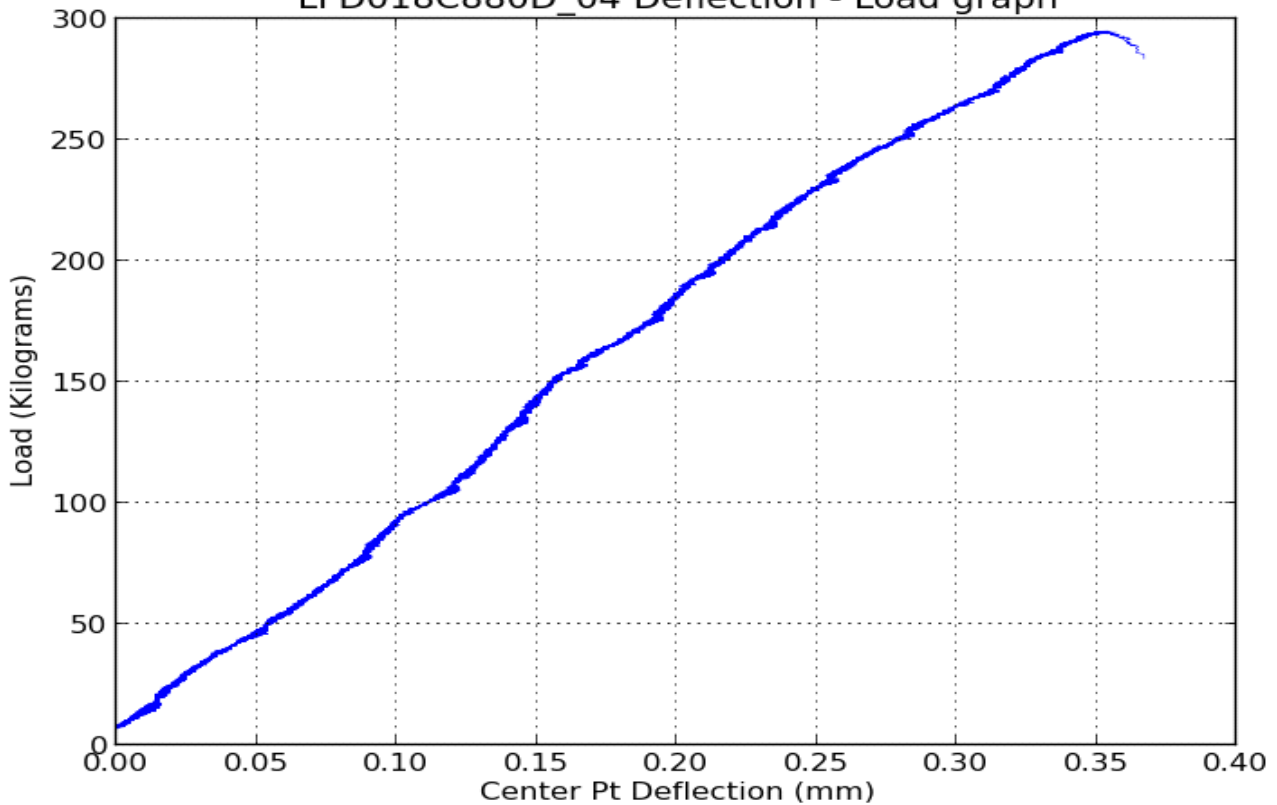
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_03	13,780	1,174	1,180	1,18	3,935	540	11,811	878

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_03	350,00	29,83	29,98	29,90	99,94	245	2.403	300,00	6,05

Specimen LFD018C880D_04 test result



LFD018C880D_04 Deflection - Load graph



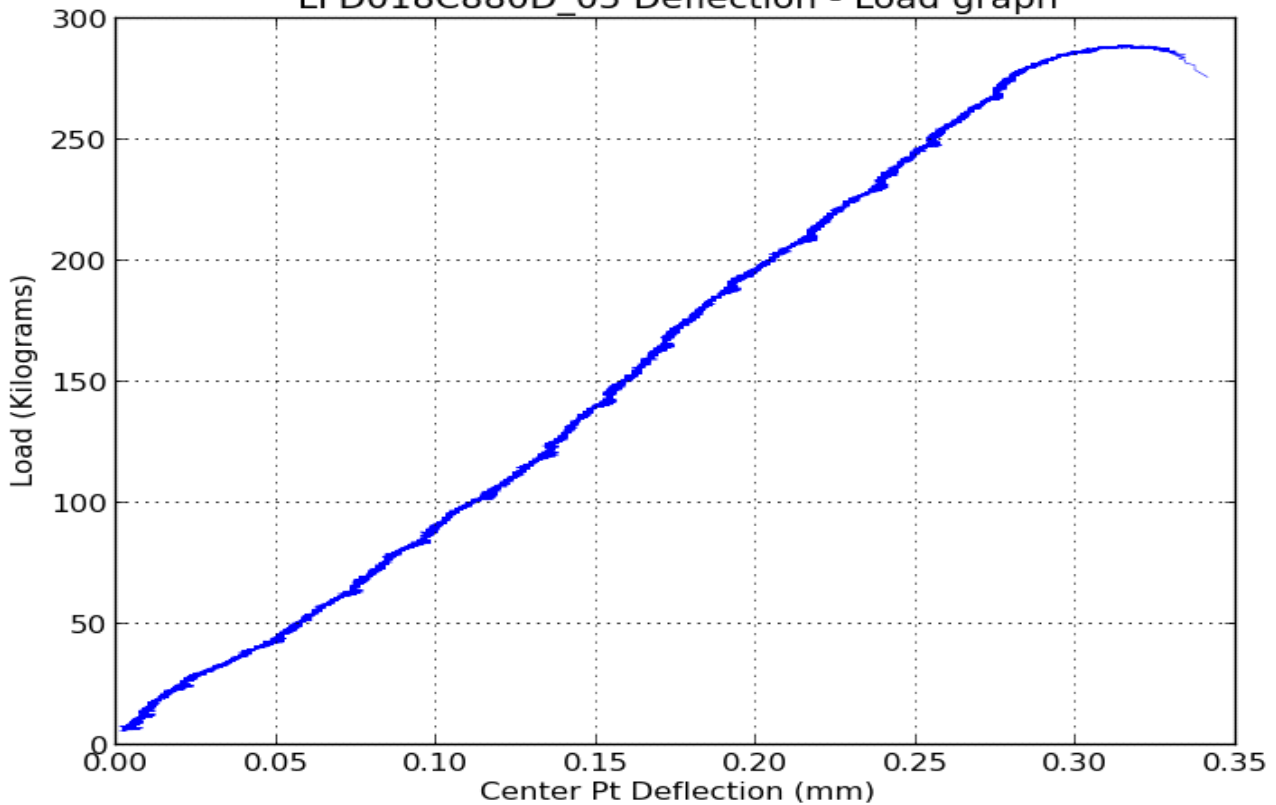
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_04	13,780	1,175	1,143	1,16	3,947	650	11,811	1.087

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_04	350,00	29,85	29,02	29,44	100,26	295	2.894	300,00	7,50

Specimen LFD018C880D_05 test result

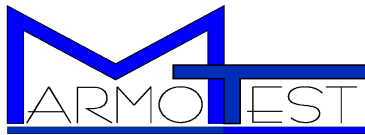


LFD018C880D_05 Deflection - Load graph



Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880D_05	13,780	1,144	1,177	1,16	3,936	637	11,811	1.065

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880D_05	350,00	29,06	29,89	29,47	99,98	289	2.835	300,00	7,34



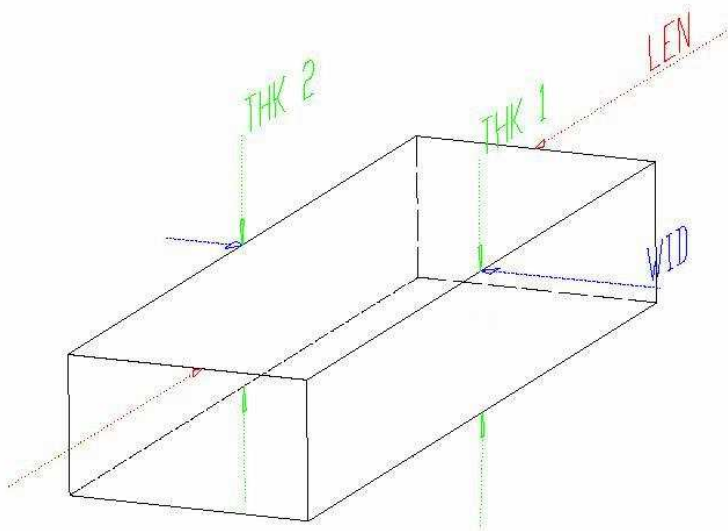
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C 880	WET	NONE
Number of specimens	5	Conditioning operator 11
Date of conditioning	02/01/2019	Measurement operator 11
Date of measurement	04/01/2019	Test operator 11
Date of test	04/01/2019	



Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_01	13,780	1,142	1,176	1,159	3,93	686	11,811	1.150
LFD018C880W_02	13,780	1,141	1,172	1,157	3,95	840	11,811	1.408
LFD018C880W_03	13,780	1,179	1,157	1,168	3,93	739	11,811	1.220
LFD018C880W_04	13,780	1,176	1,193	1,185	3,93	545	11,811	875
LFD018C880W_05	13,780	1,179	1,148	1,164	3,95	659	11,811	1.093

σ average 1.149 psi **σ std. dev.** 194 psi

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	BRK LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_01	350,00	29,00	29,86	29,43	99,92	3.051	300,0	7,93
LFD018C880W_02	350,00	28,99	29,78	29,39	100,31	3.738	300,0	9,71
LFD018C880W_03	350,00	29,95	29,39	29,67	99,89	3.286	300,0	8,41
LFD018C880W_04	350,00	29,88	30,30	30,09	99,82	2.423	300,0	6,03
LFD018C880W_05	350,00	29,95	29,16	29,56	100,22	2.933	300,0	7,54

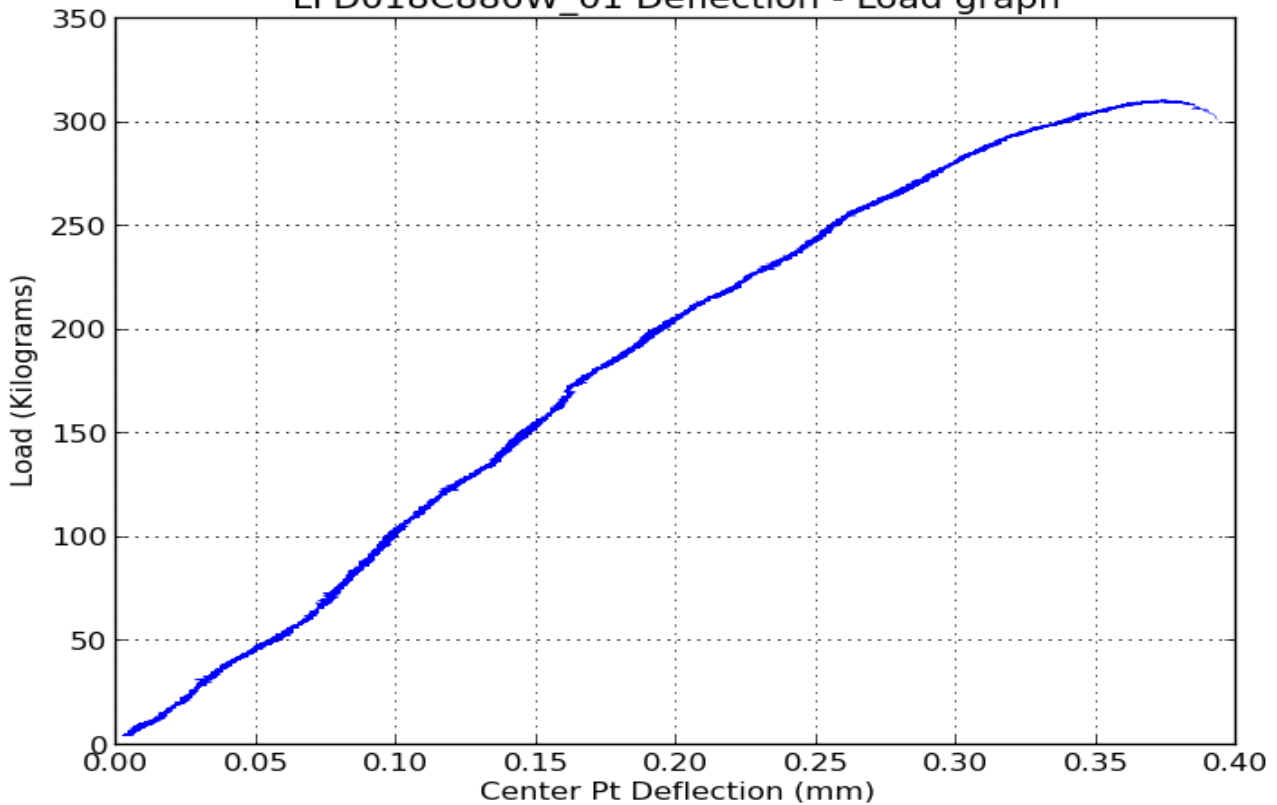
σ average 7,92 MPa **σ std. dev.** 1,34 MPa

NOTES

Specimen LFD018C880W_01 test result



LFD018C880W_01 Deflection - Load graph



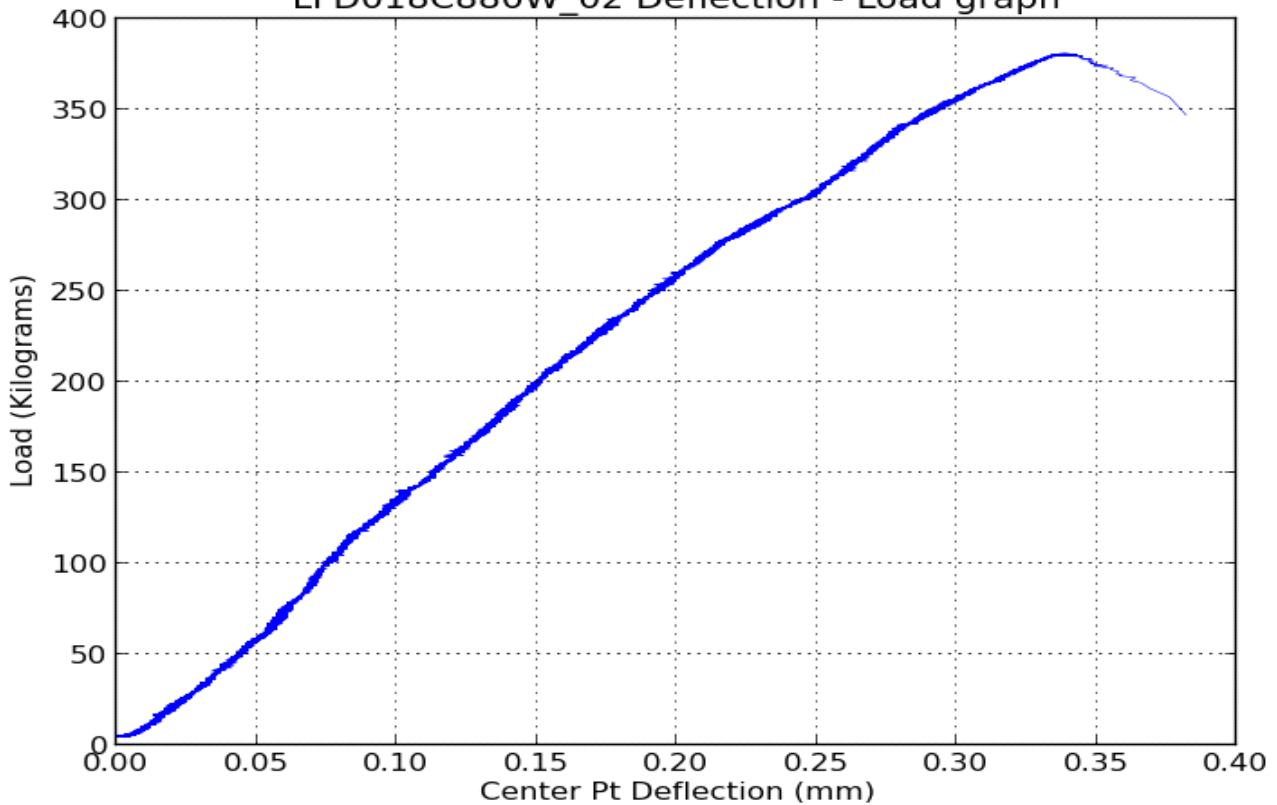
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_01	13,780	1,142	1,176	1,16	3,934	686	11,811	1.150

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_01	350,00	29,00	29,86	29,43	99,92	311	3.051	300,00	7,93

Specimen LFD018C880W_02 test result



LFD018C880W_02 Deflection - Load graph



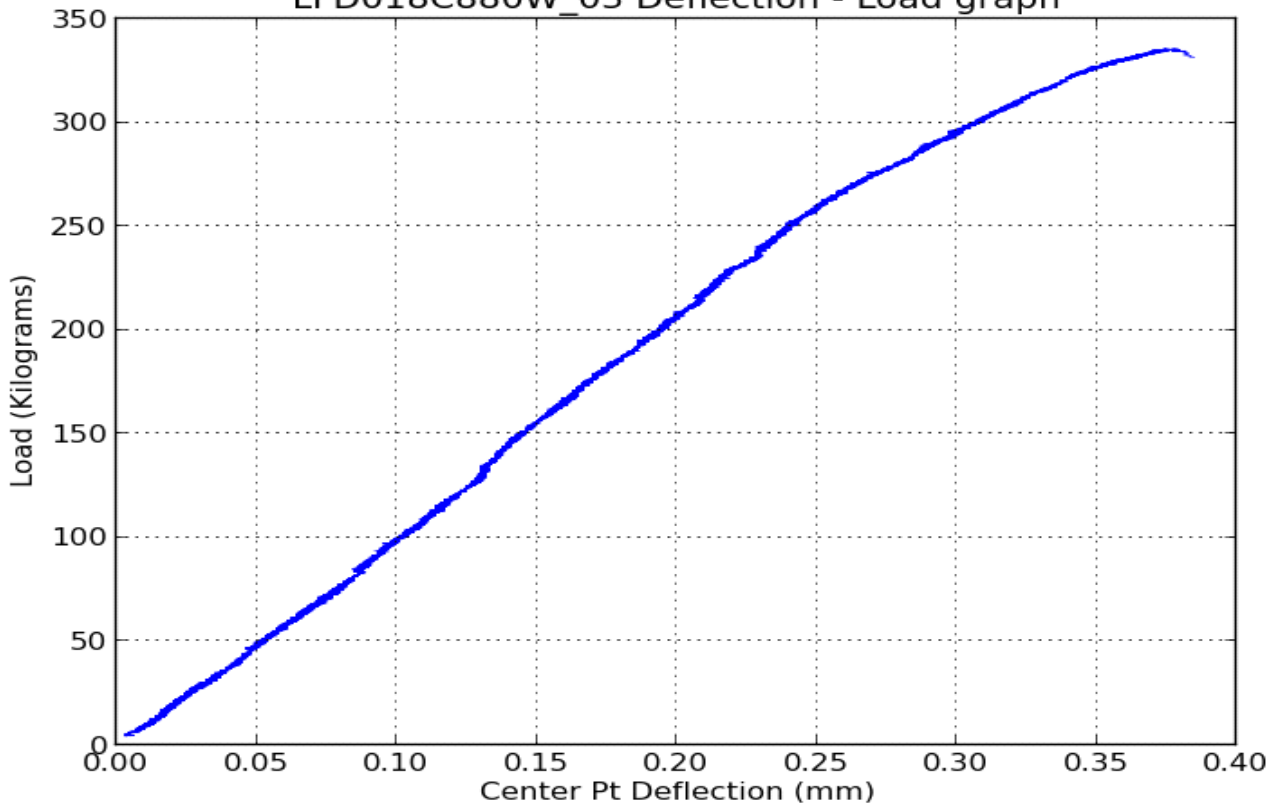
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_02	13,780	1,141	1,172	1,16	3,949	840	11,811	1.408

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_02	350,00	28,99	29,78	29,39	100,31	381	3.738	300,00	9,71

Specimen LFD018C880W_03 test result



LFD018C880W_03 Deflection - Load graph



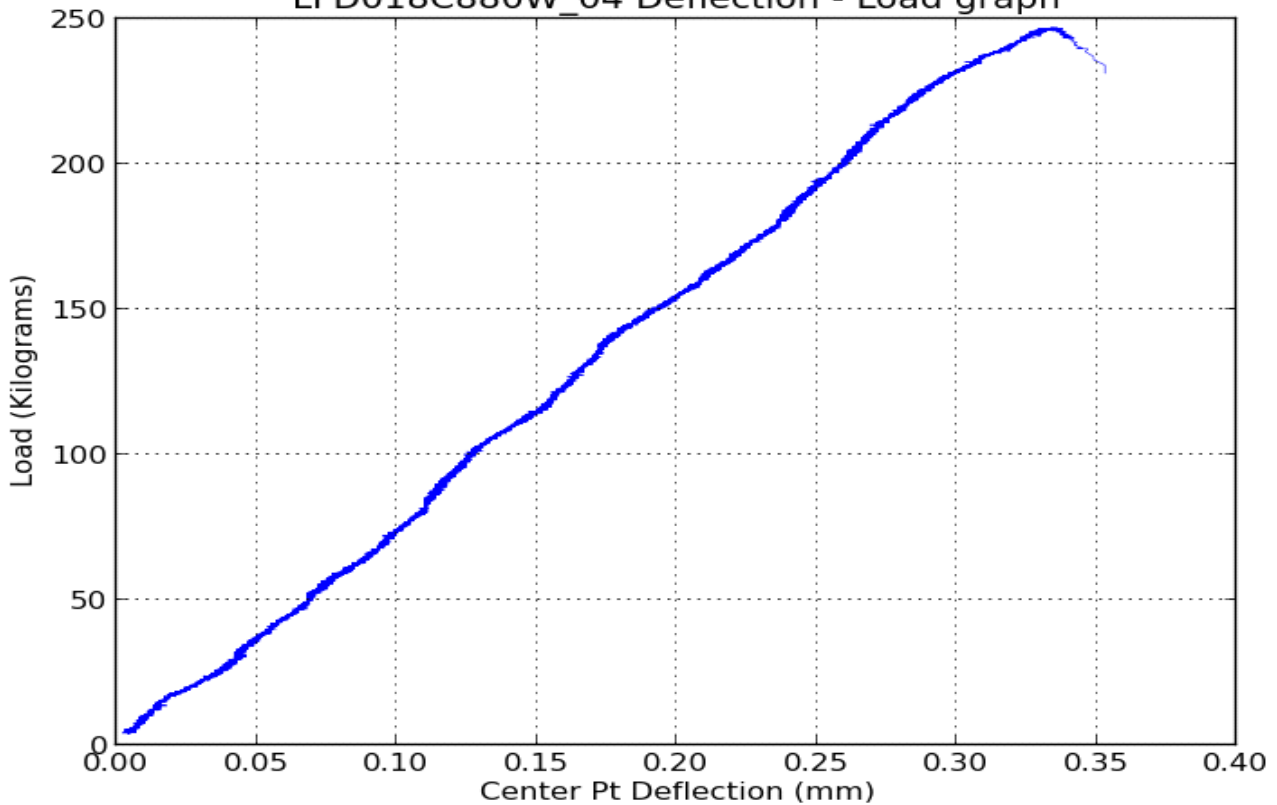
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_03	13,780	1,179	1,157	1,17	3,933	739	11,811	1.220

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_03	350,00	29,95	29,39	29,67	99,89	335	3.286	300,00	8,41

Specimen LFD018C880W_04 test result



LFD018C880W_04 Deflection - Load graph



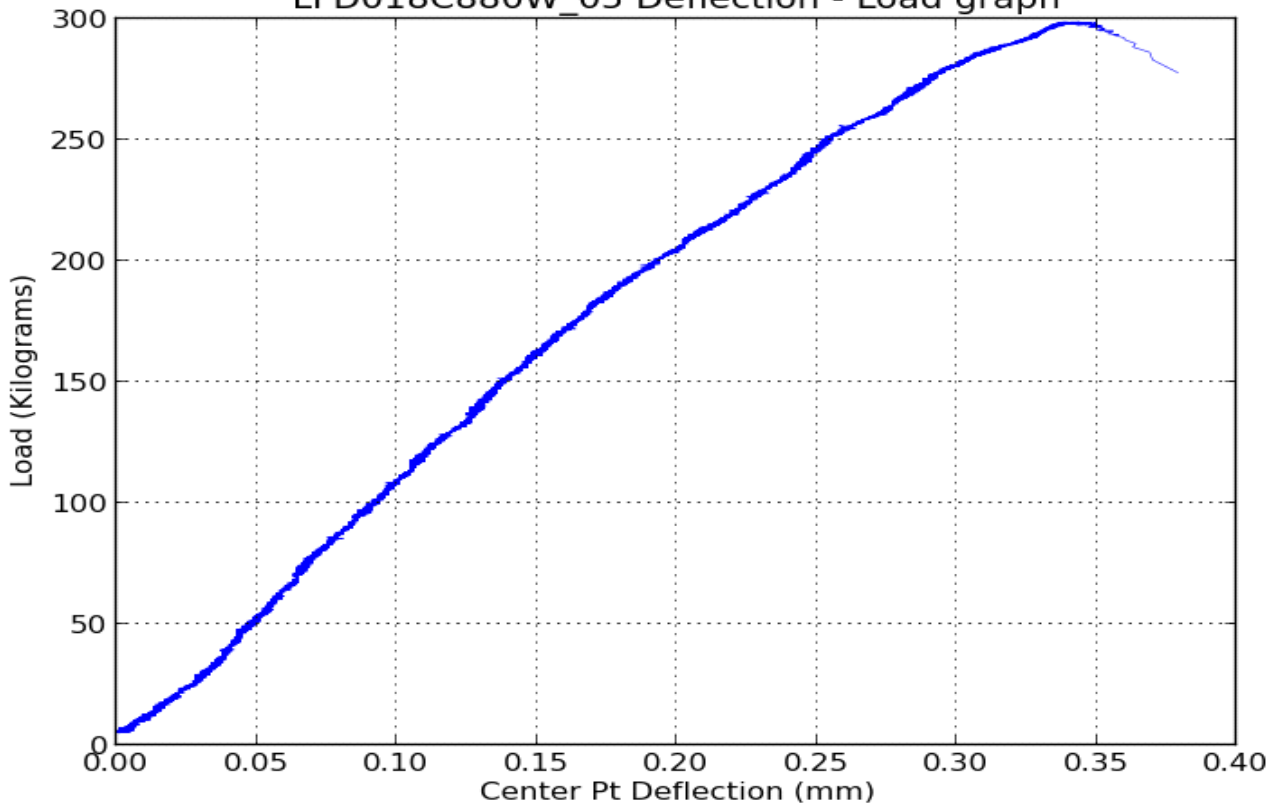
Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_04	13,780	1,176	1,193	1,18	3,930	545	11,811	875

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_04	350,00	29,88	30,30	30,09	99,82	247	2.423	300,00	6,03

Specimen LFD018C880W_05 test result



LFD018C880W_05 Deflection - Load graph



Name	LEN [in]	THK1 [in]	THK2 [in]	THK AVG [in]	WID [in]	BRK LOAD [lbf]	SPAN [in]	σ [psi]
LFD018C880W_05	13,780	1,179	1,148	1,16	3,946	659	11,811	1.093

Name	LEN [mm]	THK1 [mm]	THK2 [mm]	THK AVG [mm]	WID [mm]	LOAD [Kg]	LOAD [N]	SPAN [mm]	σ [MPa]
LFD018C880W_05	350,00	29,95	29,16	29,56	100,22	299	2.933	300,00	7,54