

Certificate of Calibration

THIS IS TO CERTIFY THAT UNITED TESTING SYSTEMS CANADA LTD., HAS CALIBRATED
THE FOLLOWING DESCRIBED EQUIPMENT IN ACCORDANCE WITH
ASTM-E2428-XX AND UTS SOP-6168-Rev XX-XXXX.

CERTIFICATE NUMBER: CR#0007

CERTIFICATE ISSUED: June 5, 2019

CALIBRATION DATE: June 5, 2019

REQUESTED DUE DATE: June 5, 2020

CALIBRATION & CUSTOMER INFORMATION:

COMPANY: ANY COMPANY
ADDRESS: 123 ANY STREET
CITY/PROVINCE: ANY CITY, ANY PROVINCE
SYSTEM LOCATION: UTS CANADA LTD. FORCE LAB
SYSTEM CALIBRATED: AKO TSD TORQUE TESTING SYSTEM
LOAD CELL/TRANSDUCER: AKO TSD 111/050 S/N XXXXXX
ASSET NUMBER(S): BBBB
DIRECTION: CLOCKWISE
CALIBRATION RANGE(S): 600 lb-in
INDICATOR / RESOLUTION: AKO TSD6000-4 S/N XXXX / 0.05 lb-in
TEMPERATURE / HUMIDITY: 23.0 °C | 45%
METHOD: SET THE TORQUE
SYSTEM CONDITION: GOOD
READINGS AS FOUND: IN TOLERANCE
READINGS AS LEFT: IN TOLERANCE
CALIBRATION TECHNICIAN: TECHNICIAN

THE FOLLOWING NIST / PTB TRACEABLE STANDARDS WERE USED:

READOUT: N / A

STANDARD FILE:	Tn750dw	Ln270Nm ARM	HOBO-N
STANDARD S/N:	M30-39/U1-13/2319-D-033	UTS-TA-105-265	615410-286
MANUFACTURER:	RICE LAKE	UTS CANADA LTD.	HOBO
DATE DUE:	Month Day, Year	Month Day, Year	Month Day, Year
TRACEABILITY NO:	101298	120034	AC14081447
TYPE:	DEAD WEIGHTS	CMM	N / A
CAPACITY:	750 lbf	270 Nm	100 °C / 100 %RH
MODE:	UNIVERSAL	CW & CCW	UNCERTAINTY
CLASS A LIMIT:	0.5 lbf	0.2 Nm	0.16 °C / 2.3 %RH
CLASS AA LIMIT:	0.5 lbf	0.2 Nm	N / A

SECOND ORDER LEAST SQUARE RESULTS FOR THE DATA:

COEFFICIENTS:	A = 6.592170E-02	STD. DEVIATION:	0.034 lb-in
	B = 1.000155E+00	LOWER LIMIT FACTOR:	0.081 lb-in
	C = 4.399532E-07	CLASS A LIMIT:	60.00 lb-in

UNCERTAINTY:

THE EXPANDED UNCERTAINTY OF THE FORCE MEASUREMENTS IS CERTIFIED TO BE LESS
THAN 0.05% USING A COVERAGE FACTOR OF $k = 2$ FOR A CONFIDENCE LEVEL OF 95%.
EXPANDED UNCERTAINTIES ARE VALID FOR A TEMPERATURE RANGE OF 23°C +/- 0.5°C.

CALIBRATED BY

United Testing Systems Canada Limited

21 - 225 Bradwick Drive, Concord, Ontario L4K 1K7

Tel.: (905) 669-5327 Fax: (905) 738-5051

E-mail: service@utscanada.com

AUTHORIZED SIGNATORY

ISO/IEC 17025

ANSI/NCSL Z540-1-1994; Part 1

Accredited by:

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NVLAP Lab Code: 200311-0

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UNITED CALIBRATION GROUP

Calibration Report

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LOAD CELL/TRANSDUCER: AKO TSD 111/050 S/N XXXXXX

CALIBRATION RESULTS:

OBSERVED DATA: MULTIPLE RUNS ARE SHOWN SERIALLY. UNLESS OTHERWISE NOTED, THE DATA SHOWN IS 'AS FOUND / ASLEFT' WITH NO ADJUSTMENT MADE. COMPUTED FORCES HAVE BEEN TEMPERATURE CORRECTED AS NECESSARY.

STANDARD I.D.	STANDARD lb-in	READING lb-in	INDICATED lb-in	ERROR lb-in	ERROR %	Un (k=2) %
FIRST RUN (0 DEGREES ROTATION) CLOCKWISE						
Tn750dw	59.9882	60.10	60.0232	0.0350	0.06	0.10
Tn750dw	119.9764	120.10	120.0091	0.0327	0.03	0.061
Tn750dw	179.9646	180.10	179.9918	0.0272	0.02	0.052
Tn750dw	239.9529	240.10	239.9714	0.0185	0.01	0.048
Tn750dw	299.9411	300.10	299.9479	0.0068	0.00	0.046
Tn750dw	359.9293	360.15	359.9711	0.0418	0.01	0.047
Tn750dw	419.9175	420.15	419.9412	0.0237	0.01	0.044
Tn750dw	479.9057	480.15	479.9081	0.0024	0.00	0.044
Tn750dw	539.8939	540.15	539.8719	-0.0220	0.00	0.045
Tn750dw	599.8820	600.25	599.9325	0.0505	0.01	0.045
SECOND RUN (900 DEGREES ROTATION) CLOCKWISE						
Tn750dw	59.9882	60.05	59.9732	-0.0150	-0.03	0.10
Tn750dw	119.9764	120.05	119.9591	-0.0173	-0.01	0.061
Tn750dw	179.9646	180.05	179.9419	-0.0227	-0.01	0.052
Tn750dw	239.9529	240.05	239.9215	-0.0314	-0.01	0.048
Tn750dw	299.9411	300.05	299.8979	-0.0432	-0.01	0.046
Tn750dw	359.9293	360.10	359.9211	-0.0082	0.00	0.047
Tn750dw	419.9175	420.10	419.8912	-0.0263	-0.01	0.044
Tn750dw	479.9057	480.10	479.8582	-0.0475	-0.01	0.044
Tn750dw	539.8939	540.10	539.8219	-0.0720	-0.01	0.045
Tn750dw	599.8820	600.15	599.8325	-0.0495	-0.01	0.045

NOTES: FIRST RUN ZERO: BEGIN = 0.00 lb-in, END = 0.05 lb-in.
SECOND RUN ZERO: BEGIN = 0.00 lb-in, END = 0.10 lb-in.
THIRD RUN ZERO: BEGIN = 0.00 lb-in, END = 0.05 lb-in.

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LOAD CELL/TRANSDUCER: AKO TSD 111/050 S/N XXXXXX

CALIBRATION RESULTS:

OBSERVED DATA: MULTIPLE RUNS ARE SHOWN SERIALLY. UNLESS OTHERWISE NOTED, THE DATA SHOWN IS 'AS FOUND / ASLEFT' WITH NO ADJUSTMENT MADE. COMPUTED FORCES HAVE BEEN TEMPERATURE CORRECTED AS NECESSARY.

STANDARD I.D.	STANDARD lb-in	READING lb-in	INDICATED lb-in	ERROR lb-in	ERROR %	Un (k=2) %
THIRD RUN (270 DEGREES ROTATION) CLOCKWISE						
Tn750dw	59.9882	60.05	59.9732	-0.0150	-0.03	0.10
Tn750dw	119.9764	120.05	119.9591	-0.0173	-0.01	0.061
Tn750dw	179.9646	180.05	179.9419	-0.0227	-0.01	0.052
Tn750dw	239.9529	240.10	239.9714	0.0185	0.01	0.048
Tn750dw	299.9411	300.10	299.9479	0.0068	0.00	0.046
Tn750dw	359.9293	360.15	359.9711	0.0418	0.01	0.047
Tn750dw	419.9175	420.15	419.9412	0.0237	0.01	0.044
Tn750dw	479.9057	480.15	479.9081	0.0024	0.00	0.044
Tn750dw	539.8939	540.20	539.9219	0.0280	0.01	0.045
Tn750dw	599.8820	600.25	599.9325	0.0505	0.01	0.045

NOTES: FIRST RUN ZERO: BEGIN = 0.00 lb-in, END = 0.05 lb-in.
SECOND RUN ZERO: BEGIN = 0.00 lb-in, END = 0.10 lb-in.
THIRD RUN ZERO: BEGIN = 0.00 lb-in, END = 0.05 lb-in.

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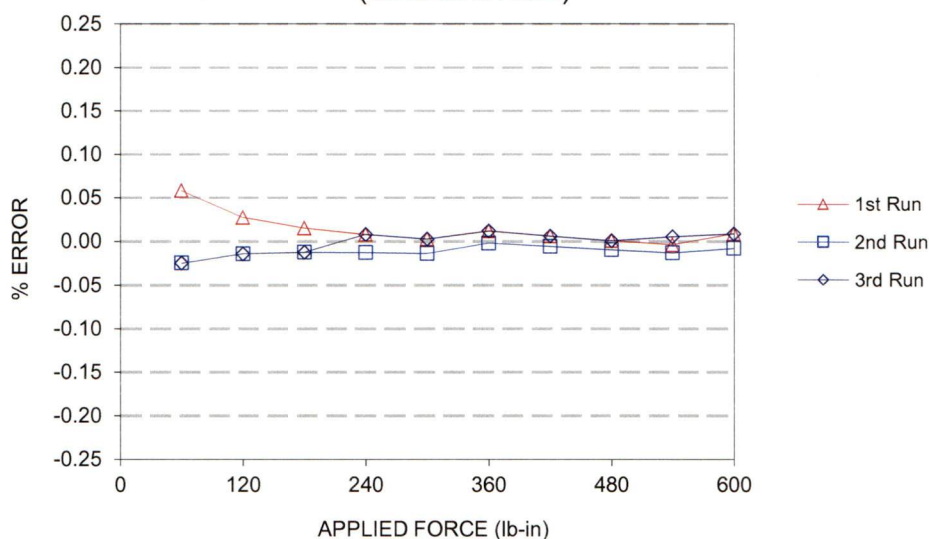
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SYSTEM CALIBRATED:	AKO TSD TORQUE TESTING SYSTEM
LOAD CELL/TRANSDUCER:	AKO TSD 111/050 S/N XXXXXX

CALIBRATION RESULTS:

DEVIATION OF CALIBRATION RUNS
(CLOCKWISE)



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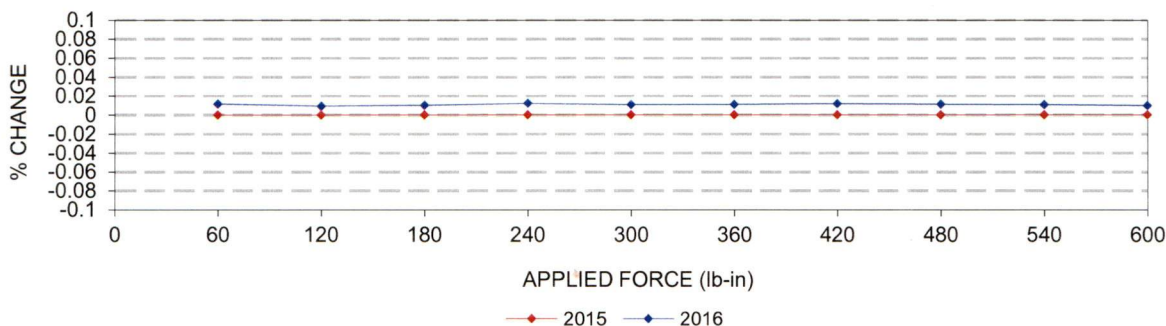
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CALIBRATION RESULTS:

NOMINAL VALUE lb-in	PREVIOUS PREDICTED RESPONSE (2018)	CURRENT PREDICTED RESPONSE (2019)	CHANGE lb-in	CHANGE %
60	60.07	60.08	0.01	0.011
120	120.08	120.09	0.01	0.009
180	180.09	180.11	0.02	0.010
240	240.10	240.13	0.03	0.012
300	300.12	300.15	0.03	0.011
360	360.14	360.18	0.04	0.011
420	420.16	420.21	0.05	0.012
480	480.19	480.24	0.05	0.011
540	540.22	540.28	0.06	0.011
600	600.26	600.32	0.06	0.010



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