

**FRI**

Prosperity through research

Fie Research Institute

22/44, Ganganagar P. O., ICHALKARANJI - 416 116.
(Dist.Kolhapur) Maharashtra State, INDIA.

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Accreditation No. NABL C0066

CALIBRATION CERTIFICATE OF FORCE MEASURING DEVICE

Date of calibration	: 12/01/2014	Certificate No. :	FRI/01/14/6609
Next calibration due on	: 12/03/2016	Page No.	: 1/2

Calibrated for : Krutam Techno Solutions Pvt.Ltd.
64/B, G.I.D.C, Makarpura Industrial Estate,
Behind Fire Brigade Station, Vadodara - 390 010

Customer Reference No. : D.C.No. 01 Dated on 10/01/2014

Identification : Load cell make : ADI Artech
Model : 20210
Sr. No. : 624120 (Id.No. KTPL/F/006)
Capacity : 200 kN
Readout : Nisan
Model : LC-0204
Sr. No. : 624120
Resolution : 0.05 kN

Date of receipt : 11/01/2014

Mode of Calibration : Tension

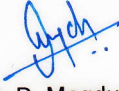
Machine used for calibration : Hydraulic Multiplication System (NPL-FIE-001)


Traceability : NPL,Cert.No.12031657/D5.05/C-085 valid up to 07/07/14

Read out setting : NIL

Temperature : 24°C

Note : 1) Tension test were made out by using self-aligning Tension shackles provided with the force - measuring device.
2) Readout with load cell warmed up for 30 min. before calibration.
3) Calibration is done as per IS:4169-1988.
4) The reported uncertainty is at coverage factor k=2 which corresponds to a Coverage probability of approximately 95% for normal distribution, considering the relative error of different components such as zero, Resolution, Repeatability, Interpolation and combining the uncertainty of applied force.


D. D. Magdum
(Sc. Assistant)


R. V. Tambad
(Sr. Engineer)


Dr. J. C. Padte
(Director)



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Identification : Load cell make : ADI Artech
Sr. No. : 624120 (Id.No. KTPL/F/006)

Calibration method : The Load cell is calibrated in Tension as per FRI Calibration procedure No. FRICAL/CAL/02 based on IS:4169-1988

Results : The calibration results are valid for specific force steps/ interpolation

Applied force (kN)	Deflection (kN)			
	Series 1 at 0°	Series 2 at 180°	Series 3 at 360°	Average
20	19.55	19.55	19.50	19.53
40	39.50	39.50	39.50	39.50
60	59.50	59.50	59.50	59.50
80	79.50	79.50	79.50	79.50
100	99.45	99.45	99.45	99.45
120	119.50	119.45	119.45	119.47
140	139.45	139.40	139.40	139.42
160	159.45	159.45	159.45	159.45
180	179.45	179.45	179.40	179.43
200	199.40	199.40	199.40	199.40

Polynomial Used : $Y = -0.4461111111 + 0.9987459531 * X + 0.0000052205 * X * X - 0.000000013 * X * X * X$

Where X = Force in kN, Y = Average reading in kN

Class	Mode	From	To	Uncertainty of measurement
Class 0	Tension	200 kN	120 kN	± 0.080%
Class 1	Tension	200 kN	60 kN	± 0.120%
Class 2	Tension	200 kN	20 kN	± 0.240%

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