



NABL : C-0066

FRI

Prosperity through research

Fie Research Institute

22/44, Ganganagar P. O., ICHALKARANJI - 416 11

(Dist.Kolhapur) Maharashtra State, INDIA

● Phone : (0230) 2441475 ● Fax : (0230) 244019

● E-mail : fri@dataone.in ● Website : www.fri-cal.co

Accreditation No. NABL C0066

CALIBRATION CERTIFICATE

OF FORCE MEASURING DEVICE

Date of Calibration : 17/03/2015
Next Calibration due on : 17/05/2017

Certificate No. : FRI/03/15/7524
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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. 334/14-15 Dated 11/03/2015

Identification : Load Cell Make : ADI Artech
Model : 90310
Sr. No. : 587506 (NS/1004/LC/400)
Capacity : 450 kN
Readout : Nisan
Model : LC-0204
Sr. No. : NS/1004/P/400
Resolution : 0.01 kN

Date of receipt : 13/03/2015

Mode of calibration : Compression

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

Traceability : NPL, Cert.No. 14070367/D5.05/C-254 valid upto 22/07/15

Read out setting : Nil

Temperature : 24°C

Note : 1) Compression test were made out by using self-aligning Compression pads provided with the force - measuring device.
2) Readout with load cell was warmed up for 30 min.before calibration.
3) The 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 a normal distribution, considering the relative error of different components such as Zero, Resolution, Repeatability, Interpolation and combining the uncertainty of Applied force.



U. V. Patil
(Sc. Assistant)

R.V. Tambad
(Sr. Engineer)

Dr. J. C. Padte
(Director)

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CALIBRATION CERTIFICATE OF FORCE MEASURING DEVICE

Date of calibration : 17/03/2015 Certificate No. : FRI/03/15/7524
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Identification : Load cell make : ADI Artech
Sr. No. : 587506 (NS/1004/LC/400)

Calibration method : The Load cell is calibrated in Compression 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	19.87	19.87	19.86	19.87
30	29.83	29.83	29.82	29.83
40	39.82	39.82	39.81	39.82
50	49.81	49.81	49.80	49.81
100	100.32	100.29	100.28	100.30
150	150.11	150.14	150.16	150.14
200	199.75	199.72	199.78	199.75
250	249.34	249.32	249.36	249.34
300	299.21	299.21	299.18	299.20
350	348.96	348.94	348.97	348.96
360	358.92	358.91	358.92	358.92
400	398.85	398.86	398.82	398.84
450	448.10	448.19	448.12	448.14

Polynomial Used : $Y = -0.3435487512 + 1.007797691 \times X - 0.0000429806 \times X^2 + 0.0000000421 \times X^3$
Where X = Force in kN, Y = Average reading in kN

Class	Mode	From	To	Uncertainty of measurement
Class 0	Compression	450 kN	30 kN	± 0.080%
Class 1	Compression	450 kN	20 kN	± 0.120%




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