

**FRI**

Prosperity through research

# Fie Research Institute

22/44, Ganganagar P. O., ICHALKARANJI - 416 116.

(Dist.Kolhapur) Maharashtra State, INDIA.

● Phone : (0230) 2441475 ● Fax : (0230) 2440191

● E-mail : fri@dataone.in ● Website : www.fieresearchinstitute.com

**Accreditation No. NABL C0066**

## CALIBRATION CERTIFICATE OF FORCE MEASURING DEVICE

Date of calibration : 27/08/2014 Certificate No. : FRI/08/14/7119  
Next calibration due on : 27/10/2016 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. : Request Letter Dated 20/08/2014

Identification : Load cell make : ADI Artech  
Model : 20210  
Sr. No. : 699038  
Capacity : 10 kN  
Readout : ADI  
Model : LI - 5000  
Sr. No. : 2201  
Resolution : 1 N

Date of receipt : 20/08/2014

Mode of Calibration : Compression

Machine used for calibration : Dead Weight Force Calibration Machine (FIE-DWP-003)

Traceability : NPL,Cert.No.14070367/D5.05/C-253 valid up to 22/07/16

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 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.

U. V. Patil  
(Sc. Assistant)

R. V. Tambad  
(Sr. Engineer)

Dr. J. C. Padte  
(Director)

**FRI**

Prosperity through research

# Fie Research Institute

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

● Phone : (0230) 2441475 ● Fax : (0230) 2440191

● E-mail : fri@dataone.in ● Website : www.fieresearchinstitute.com

**Accreditation No. NABL C0066**

## CALIBRATION CERTIFICATE OF FORCE MEASURING DEVICE

Date of calibration : 27/08/2014 Certificate No. : FRI/08/14/7119  
Next calibration due on : 27/10/2016 Page No. : 2/2Identification : Load cell make : ADI Artech  
Sr. No. : 699038Calibration 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 (N)			
	Series 1 at 0°	Series 2 at 180°	Series 3 at 360°	Average
0.5	500	500	500	500
1.0	1002	1002	1001	1002
2.0	2007	2006	2006	2006
3.0	3007	3006	3006	3006
4.0	4008	4008	4007	4008
5.0	5007	5007	5006	5007
6.0	6003	6003	6002	6003
7.0	7006	7006	7005	7006
8.0	8005	8005	8004	8005
10.0	10009	10008	10009	10009

Polynomial Used :  $Y = -3.3281554961 + 1007.0094042279 * X - 1.4651819905 * X * X + 0.0886098154 * X * X * X$   
Where X = Force in kN, Y = Average reading in N

Class	Mode	From	To	Uncertainty of measurement
Class 0	Compression	10.0 kN	2.0 kN	± 0.060%
Class 1	Compression	10.0 kN	1.0 kN	± 0.120%
Class 2	Compression	10.0 kN	0.5 kN	± 0.240%

U. V. Patil  
(Sc. Assistant)R. V. Tambad  
(Sr. Engineer)Dr. J. C. Padte  
(Director)