

**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

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**Accreditation No. NABL C0066**

## CALIBRATION CERTIFICATE OF FORCE MEASURING DEVICE

Date of calibration : 22/08/2014  
Next calibration due on : 22/10/2016Certificate No : FRI/08/14/7121  
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Calibrated for

Krutam Enterprises  
64/B, G.I.D.C. Estate,  
Makarpura,  
Vadodara - 390 010.

Customer Reference No.

Request Letter Dated 20/08/2014

Details of instrument under calibration

Instrument : Proving Ring  
Id No. : 1000 kN.04.161  
Capacity : 1000 kN  
Type : Integral  
Dial Gauge Make : Baker  
1 Div : 0.002 mm  
Dial Gauge No. : VLN 574

Date of receipt

20/08/2014

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 22/07/16

Dial gauge setting

Large pointer at 12 O' Clock position  
Small pointer at 05 revolutions

Temperature

24°C

Correction of temperature variation

Apply  $\pm 0.027\%$  correction to each reading  
for each °C rise or fall of temperature.

Note

- 1) Compression test were made out by using compression pads provided with the force measuring device.
- 2) Prior to each reading, the dial gauge was lightly tapped on the center of the dial cover.
- 3) 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

Scientific Asst.

Sr. Engineer

Director

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Details of instrument under calibration Id No. 1000 kN.04.161

Calibration Method The Proving Ring is calibrated in compression as per FRI  
Calibration procedure No. FRICAL/CAL/01 based on  
IS: 4169-1988 and results are tabulated below

Results The Calibration Results are valid for specific force steps

Applied Force in kN	Dial Gauge Reading (Divisions)			
	Series1 at 0°	Series2 at 180°	Series3 at 360°	Average
100.000	62.8	62.8	62.8	62.8
200.000	126.4	126.4	126.4	126.4
300.000	189.6	189.8	189.8	189.7
400.000	253.8	253.8	253.6	253.7
500.000	317.0	317.0	316.8	316.9
600.000	379.4	379.4	379.2	379.3
700.000	441.8	441.6	441.6	441.7
800.000	504.6	504.4	504.4	504.5
900.000	567.4	567.2	567.2	567.3
1000.000	630.8	630.6	630.6	630.7

**Classification :** The Classification of force proving instrument is as follows:

Class	Mode	From	To	Uncertainty of measurement
Class 0	Compression	1000.000 kN	400.000 kN	± 0.08%
Class 1	Compression	1000.000 kN	200.000 kN	± 0.104%
Class 2	Compression	1000.000 kN	100.000 kN	± 0.190%

Scientific Asst

Sr. Engineer

Director