

CERTIFICATE OF CALIBRATION

Certificate No: RVTM/2024-01/0002/001-02

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Date of Calibration: 01.01.2024

Calibration Certificate issue date: 04.01.2024

Recommended Due date for next calibration: 31.12.2024

ULR No.: CC285824000000002F

Customer's Name

M/s MRF Limited,
Post Box 2, PO Vadavathoor,
Kottayam, 686010 Kerala.

Calibration site Name & Address

-- As above --

CRF No & Order No

2400291542

Condition of UUC

: Satisfactory

Equipment details:

Name of the Equipment

: **Universal Testing Machine**

Equipment ID

: --

Model

: Inspek 5 table

Make

: Hegewald & Peschke

Sr no

: 10061903

Type of the machine

: Ball Screw driven

Year of manufacturing

: 2019

Machine Maximum capacity

: $\pm 5\text{kN}$

Location of the Machine

: Tube plant-Technical
Lab

Load Cell Sr no

: 04636135

Load Range

: 0 - 500N

Room Temperature

: 26.1°C

Relative Humidity

: 50 %

Calibration parameters

: Force

Method of verification

Indicated force method as per IS 1828 (part1):2022 IS 7500-1-2018

Master Equipments used for calibration:

Sr.No	Equipment used for calibration	Certificate No	Valid up to	UOM	Class
1.	500N Load cell With digital Indicator	FRI/02/22/14216	15.04.2024	T \pm 0.08%	0.5
		FRI/02/22/14215		C \pm 0.09%	0.5

Used equipments are Traceable to National /International standard through ISO/IEC 17025 Accredited lab and NPL , New Delhi

Calibrated By
K.Ravichandran
(CEO)Verified by
M.Kannathal
(Sales Co-Ordinator & Service Dept.)Authorised signatory
K. Ravichandran
(Quality Manager)

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Verification of Force: (Tension Mode): (Results as found / ~~Error Correction Applied~~)

Results The above machine is calibrated as per IS 1828 (part1):2022 and results are tabulated below

Applied force (N)	Std. Reading (N)	Observed Readings (N)			Mean Error q (%)	Repeatability (b)%	Load Resolution (N)
		Series 1 Pos 0°	Series 2 Pos 120°	Series 3 Pos 240°			
25	25.16	25.11	25.13	25.13	-0.146	0.079	0.01
50	50.04	49.98	49.97	49.99	-0.120	0.040	0.01
100	99.93	99.94	99.98	99.96	0.030	0.040	0.01
200	199.80	199.44	199.48	199.43	-0.175	0.025	0.01
300	299.72	299.28	299.26	299.27	-0.150	0.007	0.01
400	399.92	400.38	400.39	400.39	0.117	0.003	0.01
500	499.61	500.87	500.89	500.87	0.254	0.004	0.01

Uncertainty of measurement at 95% confidence level & Coverage factor k=2

± 0.18 %

Estimated mean error E = q ± U

0.25 ± 0.18 %

Acceptance Criteria for force verification

As per IS 1828 (part1):2022, the maximum permissible values are	Maximum Permissible Value in %				Class of machine
	Relative error of				
	Accuracy (q)	Repeatability (b)	Zero (f0)	Resolution (a)	
	± 1.0	1.0	± 0.1	0.5	
Observed value (Tension)	0.25	0.07	0.05	0.04	1.0

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Verification of Force: (Compression Mode): (Results as found / ~~Error Correction Applied~~)

Results The above machine is calibrated as per IS 1828 (part1):2022 and results are tabulated below

Applied force (N)	Std. Reading (N)	Observed Readings (N)			Mean Error q (%)	Repeatability (b)%	Load Resolution (N)
		Series 1 Pos 0°	Series 2 Pos 120°	Series 3 Pos 240°			
25	25.15	25.17	25.16	25.16	0.053	0.040	0.01
50	49.98	50.01	50.02	50.02	0.073	0.020	0.01
100	99.93	100.08	100.11	100.09	0.163	0.030	0.01
200	199.62	199.91	199.92	199.91	0.147	0.005	0.01
300	299.75	300.07	300.09	300.07	0.109	0.007	0.01
400	399.61	400.12	400.17	400.13	0.133	0.013	0.01
500	499.37	500.54	500.44	500.41	0.219	0.026	0.01

Uncertainty of measurement at 95% confidence level & Coverage factor k=2

± 0.13 %

Estimated mean error E = q ±U

0.21± 0.13 %

Acceptance Criteria for force verification

As per IS 1828 (part1):2022, the maximum permissible values are	Maximum Permissible Value in %				Class of machine
	Relative error of				
	Accuracy (q)	Repeatability (b)	Zero (f0)	Resolution (a)	
	± 1.0	1.0	± 0.1	0.5	
Observed value (Compression)	0.21	0.04	0.04	0.04	1.0

*****End of the Calibration Certificate*****

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