



Fine (Mirashi) Calibration and Testing Laboratory LLP

Fine Manufacturing Industries, B-7/12, MIDC Area Miraj, Dist. Sangli, Maharashtra, India - 416 410.
 ☎: +91950387424 ✉: response@finemanufacturing.com



Calibration Certificate for Knoop Hardness Reference Block

Date of calibration	Date of issue	Page	Certificate number
08 April 2021	12 April 2021	1 of 2	ULR-CC442925000100083F

Customer details:	Fine (Mirashi) Calibration and Testing Laboratories LLP B-7/12, MIDC Area, Miraj, Dist. Sangli, Maharashtra 416 410
--------------------------	--

Reference Hardness Block Serial No:	K3758/2025
Hardness of reference block:	750.48 HK0.5
Make:	FMI
Type:	STEEL
Objective used for measurements:	50X
Total (approx.) System Magnification:	1530X

Reference Hardness Block Scale: HK 0.5

Reference Hardness Block Thickness: 10.80 mm

Shape: Circular

Temperature: (24.2 ± 1)° C

Humidity: (58 ± 10)%



Standard used and traceability:

The above Reference Hardness Block is calibrated on a standardising machine which is directly calibrated as per the requirements of ISO 4545-3 and ASTM E92 annex A2. The standardising machine is calibrated using devices traceable to the SI system of units and/or units of measurement realised at NPL-India, NPL-UK, IMGC, NIST or PTB either directly or through NABL, UKAS, NVALP or DAkkS accredited laboratories.

Validity:

ISO 4545-3 validity clause 11: The reference block is only valid for the scale for which it was calibrated. The calibration validity should be limited to a duration of five years. Attention is drawn to the fact that, for Al- and Cu-alloys, the calibration validity should be reduced to two to three years.

Calibration Method:

FMIC/SOP/Vickers and knoop test blocks, based on IS 6885 (Part 3): 2020, ISO 4545-3:2017 and ASTM E92/ASTM E384.

Results					
After the preliminary visual inspection of the test surface and supporting surface of the block, the hardness indentations were taken and measured at five different places uniformly distributed throughout the test surface of the block.					
Indents	1	*2	3	4	5
Diagonals in mm	0.098180	0.096240	0.096390	0.098100	0.097990
Hardness value in HK 0.5	738.12	768.18	765.79	739.33	740.99
Hardness test parameters:	Applied test force:			4.904 N	
	Dwell time of test force:			14.0 s	

*Diagonal of reference indentation d



Fine (Mirashi) Calibration and Testing Laboratory LLP

Fine Manufacturing Industries, B-7/12, MIDC Area Miraj,
Dist. Sangli, Maharashtra, India - 416 410.

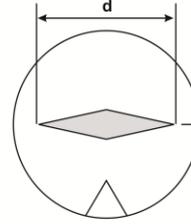
☎: +91950387424 ✉: response@finemanufacturing.com



Calibration Certificate for Knoop Hardness Reference Block

Date of calibration	Date of issue	Page	Certificate number
08 April 2021	12 April 2021	2 of 2	ULR-CC442925000100083F

*Orientation of the reference indentation on the block:
(Only on FMI make blocks. On other make blocks,
marked if customer has requested)



Mean value of the diagonals: 0.09738 mm

Non-uniformity of measured diagonals: 4.01% (HK) | 1.99% (d) | 1.9 μ m

maximum permissible non-uniformity: IS 6885 (Part 3)/ISO 4545-3: 6% (HK) or 1.0 μ m
ASTM E92 & E384: 2.0% (d) or 1.0 μ m

Hardness of the reference block: 750.48 HK 0.5

Expanded uncertainty of measurement: $\pm 4.00\%$ (HK) (k = 2.00)

Conformity Statement based on non-uniformity of the block	
As per IS 6885 (Part 3)/ISO 4545-3:	PASS
As per ASTM E92/ASTM E384:	PASS

Approved Signatory		
	A K Mirashi	K S Mirashi

Note:

- 1) The reported expanded uncertainty of calibration of hardness block includes the standard uncertainty due to the non-uniformity of the reference block and the CMC of the standardising machine. The reported expanded uncertainty is based on combined standard uncertainty multiplied by a coverage factor k (as reported above), providing a level of confidence of approximately 95%
- 2) This calibration certificate shall not be reproduced, except in full, unless prior written permission from the CEO, FMCTL.
- 3) This calibration certificate is invalid without signature.

---End Of Report---