# Fine (Mirashi) Calibration and Testing Laboratory LLP

Fine Manufacturing Industries, B-7/12, MIDC Area Miraj, Dist. Sangli, Maharashtra, India - 416 410.
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CC-4429

## Calibration Certificate for Vickers Hardness Reference Block

| Date of calibration | Date of issue | Page | Certificate number |
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| 17 July 2025 | 21 July 2025 | 1 of 2 | ULR-CC442925000100146F |

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

| | |
|---|---|
| **Reference Hardness Block** | V3821/2025 |
| **Hardness of reference block:** | 220.73 HV 1 |
| **Make:** | FMI |
| **Type:** | STEEL |
| **Objective used for measurements:** | 50X |
| **Total (approx.) System Magnification:** | 1530X |

| | |
|---|---|
| **Reference Hardness Block Scale:** | HV 1 |
| **Reference Hardness Block Thickness:** | 10.87 mm |
| **Shape:** | Circular |
| **Temperature:** | (23.8 ± 1)° C |
| **Humidity:** | (54 ± 10)% |

**Standard used and traceability:** The above Reference Hardness Block is calibrated on a standardising machine at FMCTL. The standardising machine is directy calibrated as per the requirements of ISO 6507-3 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 6507-3 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:** FMCTL/SOP/Vickers test blocks, based on IS 1501 (Part 3): 2020, ISO 6507-3:2018 and ASTM E92-23/ASTM E384-22.

**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 | *2d1 | *2d2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Diagonals in mm | 0.090796 | 0.092143 | 0.093021 | 0.092112 | 0.091423 | 0.091422 |
| Hardness value in HV 1 | 224.96 | 216.36 | | 218.57 | 221.88 | 221.88 |
| Hardness test parameters: | Applied test force: | | | 9.807 N | | |
| | Dwell time of test force: | | | 14.0 s | | |

*Diagonals of reference indentation

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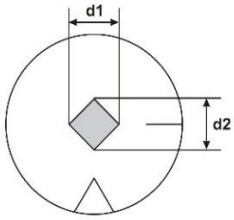
*Orientation of the reference indentation on the block:
(Only on FMI make blocks. On other make blocks, marked if customer has requested)




Mean value of the diagonals: 0.09167 mm

Non-uniformity of measured diagonals: 3.90% (HV) | 1.95% (d) | 1.8 µm

Maximum permissible non-uniformity: IS 1501 (Part 3)/ISO 6507-3: 6% (HV)
ASTM E92 & E384: 7.0% (d) or 1.0 µm

**Hardness of the reference block: 220.73 HV 1**

**Expanded uncertainty of measurment: ± 2.57% (HV) (k = 2.00)**

| Conformity Statement based on non-uniformity of the block | |
|---|---|
| As per IS 1501 (Part 3) & ISO 6507-3: | 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 calibraation certificate is invalid without signature.

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