

Length, Croatia, HMI/FSB-LPMD (FSB - Laboratory for Precise Measurements of Length)

| Calibration or Measurement Service | | | Measurand Level or Range | | | Measurement Conditions/Independent Variable | | Expanded Uncertainty | | | | | NMI / Internal Service Identifier | Comments |
|------------------------------------|--|---|--------------------------|---------------|---------------|---|----------------|---|---------------|-----------------|---------------------|---|-----------------------------------|------------------------------|
| Class | Instrument or Artifact: Measurand | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | | |
| End standards | Gauge block: central length, L | Mechanical comparison, comparator | 0.5 | 100 | mm | | | $(0.05 + 1.1L)$, L in m | μm | 2 | 95% | No | 1 | Approved on 30 January 2009 |
| End standards | Long gauge block | Length measuring machine | 100 | 500 | mm | | | $(0.35 + 1.0L)$, L in m | μm | 2 | 95% | No | 2 | Approved on 30 January 2009 |
| End standards | Micrometer setting rod and length bar: central length, L | Length measuring machine | 0 | 500 | mm | | | $(0.6 + 11.5L)$, L in m | μm | 2 | 95% | No | 3 | Approved on 30 January 2009 |
| Diameter standards | External cylinder (plug): diameter, L | Length measuring machine | 0.1 | 100 | mm | | | 0.7 | μm | 2 | 95% | No | 4 | Approved on 03 November 2009 |
| Diameter standards | External cylinder (plug): diameter | Length measuring machine | 100 | 200 | mm | | | 1 | μm | 2 | 95% | No | 4 | Approved on 03 November 2009 |
| Diameter standards | Internal cylinder (ring): diameter, D | Length measuring machine | 8 | 150 | mm | | | $(0.6 + 0.7D)$, D in m | μm | 2 | 95% | No | 5 | Approved on 03 November 2009 |
| Roughness standards | Roughness standards (ISO 5436-1 type C, D) ISO roughness parameter | Roughness instrument | 0.02 | 30 | μm | Average parameter, R_a | ISO 4287 | $(12 + 38R_a)$, R_a in μm | nm | 2 | 95% | No | 8 | Approved on 03 November 2009 |
| Roughness standards | Roughness standards (ISO 5436-1 type C, D) ISO roughness parameter | Roughness instrument | 0.025 | 100 | μm | Peak parameter, R_z | ISO 4287 | $(22 + 46R_z)$, R_z in μm | nm | 2 | 95% | No | 8 | Approved on 03 November 2009 |
| Line standards | Precision line scale: line spacing L | Laser interferometer and CCD microscope | 0 | 300 | mm | | | $(150 + L)$, L in mm | nm | 2 | 95% | No | 9 | Approved on 03 August 2011 |

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| Class | Instrument or Artifact: Measurand | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | | |
| Laser radiations | Stabilized laser of the mise en pratique: vacuum wavelength | Optical beat frequency | 633 | 633 | nm | Temperature | (20 ± 5) °C | 0.04 | fm | 2 | 95% | No | 10 | Approved on 01 April 2010 |
| Laser radiations | Stabilized laser of the mise en pratique: absolute frequency | Optical beat frequency | 474 | 474 | THz | Temperature | (20 ± 5) °C | 24 | kHz | 2 | 95% | No | 10 | Approved on 01 April 2010 |
| Laser radiations | Other stabilised laser: vacuum wavelength | Optical beat frequency | 633 | 633 | nm | | | 1.0E-09 | | 2 | 95% | Yes | 11 | Approved on 01 April 2010 |
| End standards | Gauge block: central length L | Interferometry, exact fractions | 0.5 | 100 | mm | | | Q[30, 0.5L], L in mm | nm | 2 | 95% | No | 20 | Approved on 08 October 2012 |
| Roundness standards | External cylinder (plug): roundness, R | Form tester stylus instrument | 0 | 100 | µm | Diameter | 8 mm to 200 mm | Q[110, 20R], R in µm | nm | 2 | 95% | No | 12 | Approved on 08 October 2012 |
| Roundness standards | Internal cylinder (ring): roundness, R | Form tester stylus instrument | 0 | 100 | µm | Diameter | 8 mm to 200 mm | Q[110, 20R], R in µm | nm | 2 | 95% | No | 13 | Approved on 08 October 2012 |
| Roundness standards | Hemisphere: roundness, R | Form tester stylus instrument | 0 | 3 | µm | Diameter | 8 mm to 200 mm | Q[90, 20R], R in µm | nm | 2 | 95% | No | 14 | Approved on 08 October 2012 |
| Screw standards | Thread plugs, plain; simple pitch diameter | 3 wire method, length measuring machine | 1 | 60 | mm | Pitch | 0.25 mm to 6 mm | 3.0 | µm | 2 | 95% | No | 6 | Approved on 20 February 2013 |
| Screw standards | Thread rings, plain; simple pitch diameter | Two-ball stylus, length measuring machine | 4 | 60 | mm | Pitch | 0.6 mm to 6 mm | 3.0 | µm | 2 | 95% | No | 7 | Approved on 20 February 2013 |

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| Class | Instrument or Artifact: Measurand | Instrument Type or Method | Minimum value | Maximum value | Units | Parameter | Specifications | Value | Units | Coverage Factor | Level of Confidence | Is the expanded uncertainty a relative one? | | |
| Screw standards | Thread plug, plain; pitch diameter | 3 wire method, length measuring machine | 1 | 60 | mm | Pitch | 0.25 mm to 6 mm | 3.0 | µm | 2 | 95% | No | 21 | Approved on 12 September 2016 |
| Screw standards | Thread ring, plain; pitch diameter | Two-ball stylus, length measuring machine | 4 | 60 | mm | Pitch | 0.6 mm to 6 mm | 3.0 | µm | 2 | 95% | No | 22 | Approved on 12 September 2016 |
| Screw standards | Thread plug, plain; pitch | Optical, tool microscope | 0.25 | 6 | mm | | | 1.7 | µm | 2 | 95% | No | 23 | Approved on 12 September 2016 |
| Screw standards | Thread ring, plain; pitch | Length measuring machine | 0.6 | 6 | mm | | | 1.2 | µm | 2 | 95% | No | 24 | Approved on 12 September 2016 |