



CERTIFIKAT O KALIBRACIJI / CALIBRATION CERTIFICATE

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Št. certifikata / Certificate no. 12861-LTM-21

| | |
|--|--|
| Naročnik <i>Applicant</i> | 5Labs d.o.o. Legen 112 2380 SLOVENJ GRADEC |
| Instrument <i>Instrument</i> | Črtno merilo |
| Proizvajalec <i>Manufacturer</i> | MITUTOYO |
| Tip <i>Type</i> | (0-50/0,1) mm |
| Serijska številka <i>Serial no.</i> | 25921 |
| Kalibracijska metoda <i>Calibration method</i> | Primerjava izmerjene vrednosti z dolžinskim etalonom - SOP 21 |
| Pogoji okolja <i>Environmental conditions</i> | Temperatura (20 ± 0,1) °C |
| Čas in mesto kalibracije <i>Calibration period</i> | Od 22. 10. 2021 do 22. 10. 2021 LTM Maribor |
| Rezultati <i>Results</i> | Rezultati kalibracije so podani na strani 2 |
| Negotovost <i>Uncertainty</i> | <p>Razširjena negotovost meritve je podana kot standardna negotovost pomnožena s faktorjem $k = 2$, ki ustreza intervalu zaupanja 95 %.</p> <p><i>The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which corresponds to coverage probability approximately 95 %.</i></p> <p>Pri meritvah so bili uporabljeni etaloni, ki so sledljivi na primarni etalon za dolžino.</p> <p><i>The measurements have been executed using standards, which are traceable to primary standard of length.</i></p> |

Izvedel / Performed by


Digitally
signed by dr.
Rok Klobučar
dr. Rok Klobučar

Odobril / Approved by


Digitally
signed by
Bojan Ačko
prof. dr. Bojan Ačko

Datum / Date

2. 11. 2021

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Merilni rezultati

Measurement results

| Zap. št. | Nazivna dolžina / Nominal length L_n v mm | Razbirek na etalonu / Reference value L_e v mm | Razbirek na merilu / Instrument indication R v mm | Odstopanje / Deviation o v μm |
|----------|---|--|---|--|
| 1 | 0 | 0,00000 | 0 | 0,00 |
| 2 | 5 | 4,99951 | 5 | 0,49 |
| 3 | 10 | 9,99936 | 10 | 0,64 |
| 4 | 15 | 14,99948 | 15 | 0,52 |
| 5 | 20 | 19,99886 | 20 | 1,14 |
| 6 | 25 | 24,99846 | 25 | 1,54 |
| 7 | 30 | 29,99862 | 30 | 1,38 |
| 8 | 35 | 34,99920 | 35 | 0,80 |
| 9 | 40 | 39,99891 | 40 | 1,09 |
| 10 | 45 | 44,99884 | 45 | 1,16 |
| 11 | 50 | 49,99968 | 50 | 0,32 |

Izmerjene dolžine veljajo za temperaturo 20 °C in za stanje merila med kalibracijo. Za korekcijo merilnih rezultatov na temperaturo 20 °C je bila uporabljena temperaturna razteznost $\alpha = 6 \cdot 10^{-6} \text{ K}^{-1}$.

Measured lengths are valid for temperature 20 °C and for condition of gauge as it was during calibration. For the correction of the results to temp. 20 °C a temperature expansion coefficient $\alpha = 6 \cdot 10^{-6} \text{ K}^{-1}$ was used.

Razlaga rezultata

Results explanation

$$o = R - L_e$$

o – odstopanje / deviation

R – razbirek na merilu / instrument indication

L_e – razbirek na etalonu / reference value

Merilna negotovost

Uncertainty of measurement

$$U = 0,15 \mu\text{m} + 1,1 \cdot 10^{-6} \cdot L_n$$

Uporabljeni etaloni in merilna oprema

Applied standards and measurement equipment

| Etalon Standard | Proizvajalec Manufacturer | Tip Type | Oznaka Identification | Št. kalibracije Calibration No. |
|-------------------------|------------------------------|-------------|--------------------------|------------------------------------|
| Laserski interferometer | HP | 5528A | 2532A02451 | 12423-LTM-20 |

Opomba

Remark