

CERTIFIKAT O KALIBRACIJI / CALIBRATION CERTIFICATE

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Št. certifikata / Certificate no. 13672-LTM-24

Naročnik
Applicant 5Labs d.o.o.
Legen 112
2380 SLOVENJ GRADEC

Instrument
Instrument Črtno merilo
Proizvajalec
Manufacturer MITUTOYO
Tip
Type (0-200/0,5) mm
Serijska številka
Serial no. 26036

Kalibracijska metoda
Calibration method Primerjava izmerjene vrednosti z dolžinskim etalonom - SOP 21

Pogoji okolja
Environmental conditions Temperatura ($20 \pm 0,1$) °C

Čas in mesto kalibracije
Calibration period Od 19. 11. 2024 do 19. 11. 2024 LTM Maribor

Rezultati
Results Rezultati kalibracije so podani na straneh 2 do 3

Negotovost
Uncertainty Razširjena negotovost meritve je podana kot standardna negotovost pomnožena s faktorjem $k = 2$, ki ustreza intervalu zaupanja 95 %.
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 %.
Pri meritvah so bili uporabljeni etaloni, ki so sledljivi na primarni etalon za dolžino.
The measurements have been executed using standards, which are traceable to primary standard of length.

Izvedel / Performed by

Odobril / Approved by

Datum / Date

22. 11. 2024

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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	10	10,00013	10	-0,13
3	20	20,00077	20	-0,77
4	30	30,00161	30	-1,61
5	40	40,00170	40	-1,70
6	50	50,00109	50	-1,09
7	60	60,00183	60	-1,83
8	70	70,00280	70	-2,80
9	80	80,00284	80	-2,84
10	90	90,00239	90	-2,39
11	100	100,00140	100	-1,40
12	110	110,00069	110	-0,69
13	120	120,00135	120	-1,35
14	130	130,00153	130	-1,53
15	140	140,00197	140	-1,97
16	150	150,00259	150	-2,59
17	160	160,00312	160	-3,12
18	170	170,00240	170	-2,40
19	180	180,00291	180	-2,91
20	190	190,00358	190	-3,58
21	200	200,00244	200	-2,44

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

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

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Uporabljeni etaloni in merilna oprema

Applied standards and measurement equipment

Etalon <i>Standard</i>	Proizvajalec <i>Manufacturer</i>	Tip <i>Type</i>	Oznaka <i>Identification</i>	Št. kalibracije <i>Calibration No.</i>
Laserski interferometer	HP	5528A	2532A02451	13555-LTM-24
Merilnik temperature	JENAer Meßtech.	TEMP 14	300430	LMK0723I856-860

Opomba

Remark