Instituto Português da Qualidade

PORTUGUESE INSTITUTE FOR QUALITY

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Length Laboratory

Available Calibration Services

Length and Dimensional metrology

EQUIPMENT	METHOD	RANGE	UNCERTAINTY	RECOGNITION
Stabilized laser of the mise en pratique: vacuum wavelength/ absolute frequency	Optical beat frequency	633 nm / 474 THz	$1 \times 10^{-8}\ \lambda_0$	
Other stabilized laser: vacuum wavelength	Optical beat frequency	633 nm	1×10^{-11}	
Laser Interferometer system: error of indicated displacement	Comparison to master length interferometer	(0 to 3000) mm	Q[0,3;4,6E02*L*] µm	
Depth standard (ISO 5436-1 type A2): Parameter: depth *d*	Stylus instrument	0,1 µm to 10 µm	(60 + 2*d*) nm *d* em µm	
Roughness standard (ISO 5436-1 type C): ISO roughness parameters: *Ra* *Rz*, *Rp*, *Rv*, *Rt*	Stylus instrument	0,1 µm to 10 µm 0,1 µm to 20 µm	Q[50,30*Ra*] nm Q[50,30*Rz*] nm	
Roughness standard (ISO 5436-1 type D): ISO roughness parameters: *Ra* *Rz*, *Rp*, *Rv*, *Rt*	Stylus instrument	0,1 µm to 10 µm 0,1 µm to 20 µm	Q[50,30*Ra*] nm Q[50,40*Rz*] nm	
Gauge block: central length L	Interferometry, exact fractions	(0,5 to 100) mm	Q[52;0,56*L*] nm	
Gauge block: central length L	Interferometry, exact fractions	(100 to 300) mm	Q[26;0,4*L*] nm	
Laser Interferometer system: error of indicated displacement	Comparison to master length interferometer	(0 to 10 000) mm	$(1{,}3 + 1{,}6 \times 10^{-4}\ L)$ µm	
Scales	3 m bench and laser interferometer	to 500 mm	$(2{,}9 + 2{,}4{\times}10^{5} \times L)$ µm	
Material measures of length for general use	12 m bench	10 m, 20 m e 30 m	0,6 mm	

with *L* in mm $Q[a,bL] = \sqrt{a^2 + (bL)^2}$

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Angle

EQUIPMENT	METHOD	RANGE	UNCERTAINTY	RECOGNITION
Angle block: included angle	Index table and autocollimator	0° to 90°	1,0”	CIPM MRA
Optical polygon: face angle	Cross calibration versus index table and autocollimator	4 to 24 faces		
Index table: index angle		(0° to 360°) step size: 30°, 40° or 60°		
Optical Square (pentaprism)	2-mirror method	90°	0,5”	
Autocollimator	Angle comparator	error of indicated angle in "	0,3”	
Interferometer optical angular	Comparison with index table	N/A	0,50 µm	

Legal Metrological Control

EQUIPMENTS	TESTS	LEGISLATION
Material measures of length for general use	Periodical Verification Extraordinary Verification	Decree-Law n.º 45/2017 of April 27 Ordinance n.º 321/2019 of September 19