Ver. 13 (2024)

CLASS

Consultative Committee for Length – CCL

Working Group on the MRA – WG-MRA

CCL Length Services Classification (DimVIM)

CCL Service Category	English Language Approved Terms: Instrument or Artifact	Measurand(s)
1 Radiations of the Mise en Pratique		
1.1 Laser Radiations		
1.1.1	frequency stabilized laser.	vacuum wavelength; optical frequency.
1.2 Lamp Radiations		
1.2.1	spectral lamp.	vacuum wavelength.
2 Linear Dimensions		
2.1 Length Instruments		
2.1.1	(laser, length) interferometer (system, optics, refractometer).	error of indicated displacement; wavelength compensation.
2.1.2	EDM instrument.	error of indicated distance.
2.1.3	1-D measuring machine.	error of indicated [size; displacement].
2.1.4	height measuring instrument.	error of indicated [vertical size; displacement].
2.1.5	1-D displacement [transducer, actuator] (LVDT, PZT,…)	error of indicated displacement.
2.1.6	gauge block comparators	error of indicated displacement.
2.1.7	dial-indicator tester.	error of indicated displacement.
2.2 End Standards		
2.2.1	gauge block.	central length; variation in length; thermal expansivity; length difference of gauge block pairs.
2.2.2	length bar (long gauge block).	central length; variation in length; thermal expansivity.
2.2.3	[plane, thread] micrometer setting rod.	length.
2.2.4	step gauge.	face spacing.
2.2.5	gap gauge.	face spacing.
2.2.6	feeler (thickness) gauge.	thickness.
2.3 Line Standards		
2.3.1	precision line scale.	line spacing.
2.3.2	stage micrometer.	line spacing.
2.3.3	grid plate.	grid point coordinates.
2.3.4	1-D grating.	pitch.
2.3.5	2-D grating.	pitch; orthogonality.
2.3.6	linewidth standard.	linewidth, spacewidth, pitch.
2.3.7	(surveyor, engineer, pi) tape, (geodetic) wire.	line spacing.
2.3.8	surveyor leveling rod.	line spacing.
2.3.9	engineer or machinist scale, steel.	line spacing.
2.4 Diameter Standards		
2.4.1	external cylinder (plug, piston, pin, wire).	diameter.
2.4.2	internal cylinder (ring).	diameter.
2.4.3	sphere (ball).	diameter.
2.5 Standards of 1D Dimensions		
2.5.1	Standard of 1D point-to-point dimensions	sizes, distances.
3 Angle		
3.1 Angle by Circle Dividers		
3.1.1	optical polygon.	face angle; pyramid error; face flatness.
3.1.2	index table.	index angle.
3.1.3	rotary table, rotary encoder scale.	position angle.
3.2 Small-Angle Generators		
3.2.1	sine (bar, table).	cylinder spacing; angle.
3.3 Angle Instruments		
3.3.1	autocollimator.	error of indicated angle; axes orthogonality; error of indicated angle (x-and y-components of spatial angles).
3.3.2	electronic level.	error of indicated inclination angle.
3.3.3	clinometer.	error of indicated inclination angle.
3.3.4	spirit (bubble) level.	error of indicated inclination angle.
3.3.5	theodolite.	error of indicated angle; axes orthogonality.
3.3.6	(bevel) protractor.	error of indicated angle.
3.3.7	squareness tester.	error of indicated [squareness; straightness].
3.3.8	angular interferometer.	error of indicated angle; [effective] retro-reflector spacing; [effective] beam spacing

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3.4 Angle Artifacts		
3.4.1	angle block.	included angle; pyramid error; face flatness.
3.4.2	90° (steel, granite, try) square.	squareness.
3.4.3	90° cylinder square.	squareness.
3.4.4	cone (taper) gauge.	cone angle; diameter.
3.5 Angle Prisms		
3.5.1	optical square (pentaprism).	deviation angle.
3.5.2	retroreflection (cube-corner, cat-eye) prism.	deviation angle.
4 Form		
4.1 Flatness Standards		
4.1.1	optical flat.	flatness.
4.1.2	optical (parallel, wedge).	parallelism; wedge angle.
4.1.3	surface plate.	flatness.
4.2 Roundness Standards		
4.2.1	external cylinder.	roundness.
4.2.2	internal cylinder.	roundness.
4.2.3	sphere (hemisphere).	roundness.
4.2.4	magnification standard (e.g. flick standard).	roundness; amplitude & phase harmonic content.
4.3 Straightness Standards		
4.3.1	straight edge.	straightness.
4.3.2	cylindrical straightness standard.	straightness.
4.3.3	straightness of guideway.	straightness.
4.4 Cylindricity Standards		
4.4.1	external cylinder.	cylindricity.
4.4.2	internal cylinder.	cylindricity.
4.5 Optical Standards		
4.5.1	lens, radius standards.	focal length, radius of curvature.
5 Complex Geometry		
5.1 Surface Texture Standards		
5.1.1	(groove) depth (step height) standard (eg. ISO 5436-1 Type A).	step height; (groove) depth.
5.1.2	tip-condition standard (eg. ISO 5436-1 Type B).	radii, angle.
5.1.3	spacing standard (eg. ISO 5436-1 Type C).	[amplitude; wavelength] parameters.
5.1.4	roughness standard (eg. ISO 5436-1 Type D).	ISO roughness parameters.
5.1.5	profile coordinate standard (eg. ISO 5436-1 Type E).	profile coordinates.
5.1.6	softgauge (reference software data set, eg. ISO 5436-2 Type F1)	error in calculated [dimensions; parameters].
5.2 Screw Standards		
5.2.1	thread plug, plain.	[simple] pitch diameter; pitch; flank angle.
5.2.2	thread plug, tapered.	[simple] pitch diameter; pitch; flank angle; taper angle.
5.2.3	thread ring, plain.	[simple] pitch diameter; pitch; flank angle.
5.2.4	thread ring, tapered.	[simple] pitch diameter; pitch; flank angle; taper angle.
5.2.5	internal API screw thread gauge.	API thread parameters.
5.2.6	external API screw thread gauge.	API thread parameters.
5.3 Gear Standards		
5.3.1	Involute gear.	profile slope [form, total] deviation, helix slope [form, total] deviation, single [cumulative] pitch deviation
5.3.2	bevel gear.	pitch; involute; bevel angle.
5.3.3	gear pitch master	total cumulative pitch deviation.
5.3.4	gear lead master	[total cumulative, single] pitch deviation.
5.3.5	gear involute master	involute profile [slope, form] deviation.
5.4 CMM Artifacts		
5.4.1	ball (hole, bore) plate.	[ball; hole] center coordinates.
5.4.2	ball bar.	ball spacing.
5.4.3	large CMM artifact.	interval distances.
5.4.4	reference software.	error in calculated [dimensions; parameters; features].
5.4.5	test circle for imaging probing systems.	diameter; roundness.
5.5 2-D, 3-D Instruments		
5.5.1	measuring projector.	error of indicated [size; location; shape].
5.5.2	measuring microscope.	error of indicated [size; location; shape].
5.5.3	CMM.	error of indicated [size; location; shape].
5.5.4	laser tracking measuring system.	error of indicated [size; location; shape].
5.5.5	motion (translation, angle) stage.	error in prescribed [translation; angular] motion.
5.5.6	profile instruments.	error of indicated [form, shape, size, surface texture parameters].
5.5.7	(flatness, wavefront) interferometer.	error of indicated [flatness; wavefront] deviation.
5.5.8	form-measuring machine.	error of indicated form [roundness, straightness,..] deviation.
5.6 Hardness		
5.6.1	hardness indenter [Rockwell, Vickers].	tip [size, shape]

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6 Various Dimensional		
6.1 Hand Instruments		
6.1.1	external micrometer.	error of indicated size.
6.1.2	micrometer head.	error of indicated displacement.
6.1.3	depth micrometer.	error of indicated depth.
6.1.4	caliper.	error of indicated size.
6.1.5	depth gauge.	error of indicated depth.
6.1.6	internal two-point (bore) micrometer.	error of indicated diameter.
6.1.7	internal three-point (bore) micrometer.	error of indicated diameter.
6.1.8	dial gauge.	error of indicated displacement.
6.1.9	snap gauge (internal, external)	error of indicated size.
6.2 Pressure Artifacts		
6.2.1	piston/cylinder assembly.	3-D size, shape.
6.3 Thermal Expansivity		
6.3.1	thermal expansion artifact.	thermal expansion coefficient.
6.4 Long Distance		
6.4.1	geodetic baseline.	interval distances.
6.5 Reference Materials		
6.5.1	standard particle.	particle size; shape.
6.5.2	[sieve, mesh] opening.	aperture [size, shape]
6.6 Layer thickness		
6.6.1	layer thickness standard.	layer thickness