



Organisme belge d'Accréditation
Belgische Accreditatieinstelling
Belgische Akkreditierungsstelle
Belgian Accreditation Body

Signatory to EA, ILAC and IAF
Multilateral Agreements

Accreditation Certificate No. 004-CAL

In compliance with the provisions of the Royal Decree of 31 January 2006 setting up BELAC, the Accreditation Board hereby declares, that the calibration laboratory

TRESCAL NV
Vosstraat, 200
2600 BERCHEM - Belgium

has the competence to perform the calibrations as described in the annex which is an integral part of the present certificate, in accordance with the requirements of the standard EN ISO/IEC 17025:2005. The present accreditation is the subject of regular surveillance in order to confirm the compliance with the accreditation conditions.

The Chair of the Accreditation Board BELAC,

Nicole MEURÉE-VANLAETHEM

Issue date : **2018-10-11**

Validity date : **2023-04-21**

Original version of this certificate is in Dutch.



Bijlage bij accreditatie-certificaat
Annexe au certificat d'accréditation
Annex to the accreditation certificate
Beilage zur Akkreditierungszertifikat

004-CAL

EN ISO/IEC 17025:2005

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Nicole Meurée-Vanlaethem

Voorzitster van het Accreditatiebureau
La Présidente du Bureau d'Accréditation
Chair of the Accreditation Board
Vorsitzende des Akkreditierungsbüro

**De accreditatie werd uitgereikt aan/ L'accréditation est délivrée à/
The accreditation is granted to/ Die akkreditierung wurde erteilt für:**

**TRESCAL nv
Vosstraat, 200
2600 BERCHEM**

**Voor activiteiten uitgevoerd door/ Pour des activités exécutés par/
For activities performed by/ Die tätigkeiten werden durchgeführt von:**

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locatie 2	WELLIN	Rue Jean Meunier, 2 6920 Halma (Wellin)

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Accréditation B E L A C Accreditation

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Website: <http://economie.fgov.be>
Ondernemingsnummer: 0314.595.348

.be

DIMENSIONAL (Berchem)

1.5.2 Length gauges

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Central length steel	0,5 mm to 100 mm 0,02 inch to 4 inch	$0,060 \mu\text{m} + 0,90 \times 10^{-6} \times l$	fixed sizes
Central length tungsten carbide		$0,060 \mu\text{m} + 0,70 \times 10^{-6} \times l$	
Central length ceramic		$0,060 \mu\text{m} + 0,80 \times 10^{-6} \times l$	
Central length steel, tungsten carbide, ceramic	0,05 mm to 500 mm 0,005 inch to 20 inch	$0,060 \mu\text{m} + 1,2 \times 10^{-6} \times l$	reference steel
Lengthvariation steel, tungsten carbide, ceramic	0,5 mm to 100 mm 0,02 inch to 4 inch	$0,10 \mu\text{m} + 2,0 \times 10^{-6} \times l$	all sizes
Step gauge	to 1200 mm	$0,050 \mu\text{m}$	
		$0,80 \mu\text{m} + 3,0 \times 10^{-6} \times l$	

1.5.5 Clinometers

See 1.5.13

1.5.6 Line scales, distances

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Ruler (all models)	to 200 mm	$1,5 \mu\text{m} + 3,0 \times 10^{-6} \times l$	e.g. spring rule
	to 400 mm	$2,0 \mu\text{m} + 3,0 \times 10^{-6} \times l$	
	to 3000 mm	$12 \mu\text{m} + 3,0 \times 10^{-6} \times l$	
	to 100 m	$6,0 \mu\text{m} + 5,0 \times 10^{-6} \times l$	
Feeler gauges	to 5 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
Setting standard for external micrometers	to 300 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
	300 to 500 mm	$0,90 \mu\text{m} + 0,60 \times 10^{-6} \times l$	
	500 to 3000 mm	$3,0 \mu\text{m} + 3,0 \times 10^{-6} \times l$	
Other distance of 2 parallel planes	to 300 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
	300 to 500 mm	$0,90 \mu\text{m} + 0,60 \times 10^{-6} \times l$	
	500 to 3000 mm	$3,0 \mu\text{m} + 3,0 \times 10^{-6} \times l$	

1.5.7 Length measuring instruments

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Hand held tools for external measurements	0 mm to 200 mm	$0,45 \mu\text{m} + 0,50 \times R + 25 \times 10^{-6} \times l$	(1) e.g. vernier, micrometer, ...
	200 mm to 3000 mm	$4,0 \mu\text{m} + 0,50 \times R + 5,0 \times 10^{-6} \times l$	
Hand held tools for internal measurements			(1) e.g. internal micrometers
2-point	0 mm to 200 mm	$0,70 \mu\text{m} + 0,50 \times R + 25 \times 10^{-6} \times l$	
	200 mm to 400 mm	$5,0 \mu\text{m} + 0,50 \times R + 4,0 \times 10^{-6} \times l$	
2- and 3-point	0 mm to 250 mm	$1,5 \mu\text{m} + 0,50 \times R + 25 \times 10^{-6} \times l$	
Hand held tools for height and depth measurements	0 mm to 500 mm	$0,70 \mu\text{m} + 0,50 \times R + 25 \times 10^{-6} \times l$	(1)
Linear displacement sensor	to 200 mm	$0,050 \mu\text{m} + 2,5 \times 10^{-6} \times l + 0,80 \times R$	to 50 mm (1)
Height gauge	to 1500 mm	$0,80 \mu\text{m} + 0,70 \times R + 2,5 \times 10^{-6} \times l$	(1)
Film thickness gauge	to 2 mm	$1,0 \mu\text{m} + 2,0 \times 10^{-3} \times l$	(1)
Laser distance meter	to 25 m	$0,50 \text{ mm} + 40 \times 10^{-6} \times l + 0,60 \times R$	

1.5.8 Diameter

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Setting rings and ring gauges	Ø 1 mm to Ø 250 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
Cylindrical setting pins	to 200 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	
Plain plug gauges	to 200 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	
Thread wires	to 20 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	
Radius gauge	to Ø 200 mm	$3,0 \mu\text{m} + 5,0 \times 10^{-6} \times l$	
Other internal diameters	Ø 1 mm to Ø 250 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
Other external diameters	Ø 0,05 mm to Ø 300 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	
	Ø 300 mm to Ø 500 mm	$0,90 \mu\text{m} + 0,60 \times 10^{-6} \times l$	

Form error

1.5.9	Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
	Knife edge straight edge	to 300 mm	0,30 μm	
	Straight edge	to 6000 mm	$0,50 \mu\text{m} + 0,50 \times 10^{-6} \times l$	(1)
	Surface plate	to 6 000 mm x 10 000 mm	$0,30 \mu\text{m} + 1,6 \times 10^{-6} \times l$	(1) l = longest side of the surface plate
	Roundness tester	to 300 μm	$0,050 \mu\text{m} + 0,50 \times R$	(1)
	Roundness standard	to \varnothing 300 mm	$0,050 \mu\text{m} + 0,020 \times A$	A = measured roundness
	Flick standard (roundness standard)	to 1 mm	0,25 μm	

1.5.10 Roughness

	Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
	Surface texture measuring instruments	Ra: 0,05 μm to 5 μm	$0,040 \times A + 0,50 \times R$ (minimum 0,030 μm)	(1) A = Ra-value of reference
		Rz: 0,1 μm to 10 μm	$0,060 \times A + 0,50 \times R$ (minimum 0,050 μm)	(1) A = Rz-value of reference
		Rmax: 0,1 μm to 10 μm	$0,060 \times A + 0,50 \times R$ (minimum 0,050 μm)	(1) A = Rmax-value of reference
	Roughness standards	Ra: to 10 μm	$0,025 \mu\text{m} + 0,060 \times A$	A = measured Ra-value
		Rz: to 15 μm	$0,030 \mu\text{m} + 0,090 \times A$	A = measured Rz-value
		Rmax: to 15 μm	$0,030 \mu\text{m} + 0,090 \times A$	A = measured Rmax-value

1.5.11 Thread quantities

Thread external				
	Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
	Pitch	to 10 mm	2 μm	
	Profile angle	to 180°	$(0,50 + 12/l)$ bgmin	l = leg length in mm
	Simple pitch diameter	\varnothing 1 mm to \varnothing 300 mm	$\alpha = 30^\circ$: (6,0 μm to 9,7 μm)	Acc. to Euramet/CG-10, method 1a or 1b
			$\alpha = 60^\circ$: (3,2 μm to 5,9 μm)	
			$\alpha = 90^\circ$: (2,6 μm to 5,5 μm)	
Thread internal				
	Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
	Pitch	to 10 mm	2 μm	
	Profile angle	to 180°	$(0,50 + 12/l)$ bgmin	l = leg length in mm
	Simple pitch diameter	\varnothing 4 mm to \varnothing 300 mm	$\alpha = 30^\circ$: (9,0 μm to 14,0 μm)	Acc. to Euramet/CG-10, method 1a or 1b
			$\alpha = 60^\circ$: (3,6 μm to 7,0 μm)	
			$\alpha = 90^\circ$: (3,1 μm to 6,2 μm)	

1.5.12 Coordinate measuring machines

	Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
	Deviation of nominal displacement	to 20 m	$0,15 \mu\text{m} + 0,70 \times R + 1,0 \times 10^{-6} \times l$	e.g. 1D/2D/3D Measuring machine with: Zerodur scales; (1)
			$0,15 \mu\text{m} + 0,70 \times R + 1,3 \times 10^{-6} \times l$	Glass scales; (1)
			$0,15 \mu\text{m} + 0,70 \times R + 1,6 \times 10^{-6} \times l$	Steel scales; (1)
		to 400 mm	$0,30 \mu\text{m} + 2,3 \times 10^{-6} \times l$	using reference glass scale; (1)
	Deviations transverse to the translation directions	to 0,5 mm	$0,30 \mu\text{m} + 3,0 \times 10^{-6} \times l + 5,0 \times 10^{-3} \times A$	A = measured deviation Measuring length to 3000 mm; (1)
	Rotational deviations around the translation direction	to 400 as	$0,50 \text{ as} + 3,5 \times 10^{-3} \times A$	A = measured angle; horizontal translation only; (1)

Other rotational deviations	to 7200 as	$0,50 \text{ as} + 1,6 \times 10^{-3} \times A$	A = measured angle; measured length to 4500 mm; (1)
as = arcsecond			

1.5.3 Angle gauges

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Angle gauge block	to 180°	$0,000 28^\circ + 10 \times 10^{-6} \times A$	A = measured angle
		$1,0^\circ + 10 \times 10^{-6} \times A$	
Cylindrical square	to Ø 300 mm to height 300 mm	$0,30 \mu\text{m} + 2,0 \times 10^{-6} \times l$	Squareness
Square	to 300 mm leg length	$0,30 \mu\text{m} + 2,0 \times 10^{-6} \times l$	Squareness
Angle plate	90°	0,50 as	
Polygon	to 360 °	0,50 as	
Pentagonprism	90 °	0,50 as	
as = arcsecond			

1.5.13 Angle (measuring instruments)

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Spirit level	to 12,5 mm/m	$0,50 \mu\text{m}/\text{m} + 1,0 \times 10^{-3} \times A + 0,7 \times R$	A = set angle
	to 2600 as	$0,10 \text{ as} + 1,0 \times 10^{-3} \times A + 0,70 \times R$	
Autocollimator	to 12,5 mm/m	$0,50 \mu\text{m}/\text{m} + 1,0 \times 10^{-3} \times A + 0,70 \times R$	A = set angle
	to 2600 as	$0,10 \text{ as} + 1,0 \times 10^{-3} \times A + 0,70 \times R$	
Angle meters	0° - 360°	0,50 amin	e.g. protractor; (1)
Angle sensor	0° - 360°	2,0 as	e.g. protractor; (1)
Clinometers	0° - 360°	2,0 as	
Theodolites	180°	3,0 as	Rotation around vertical axis
	180°	1,5 as	Defining horizontal plane
	180°	1,8 as	Deviation of crosshairs to rotations
as = arcsecond amin = arcminute			

1.5.15 Product measurement

Measured quantity, instrument or gauge	Range	CMC (95%)	Remarks
Form			
Surface profile	to 10 mm × 100 mm	$1,0 \mu\text{m} + 0,010 \times A$	A = measured profile height
Roughness value	Ra: to 10 μm	$0,025 \mu\text{m} + 0,060 \times A$	A = measured Ra-value
	Rz: to 15 μm	$0,030 \mu\text{m} + 0,090 \times A$	A = measured Rz-value
	Rmax: to 15 μm	$0,030 \mu\text{m} + 0,090 \times A$	A = measured Rmax-value
Straightness	to 10 mm × 100 mm	$1,0 \mu\text{m} + 0,010 \times A$	A = measured profile height
	to 300 mm	0,30 μm	
	to 6000 mm	$0,50 \mu\text{m} + 0,50 \times 10^{-6} \times L$	(1)
Roundness			
Roundness external	to \varnothing 300 mm	$0,050 \mu\text{m} + 0,020 \times A$	A = measured roundness
Roundness internal	\varnothing 0,7 mm to \varnothing 300 mm	$0,050 \mu\text{m} + 0,020 \times A$	A = measured roundness
Cilindricity			
Cilindricity external	to \varnothing 300 mm to height 300 mm	$0,40 \mu\text{m} + 0,040 \times A$	A = measured cilindricity
Cilindricity internal	\varnothing 0,7 mm to \varnothing 300 mm to height 300 mm	$0,40 \mu\text{m} + 0,040 \times A$	A = measured cilindricity
Coaxiality and concentricity	\varnothing 0,7 mm to \varnothing 300 mm to height 300 mm	$0,10 \mu\text{m} + 0,040 \times A$	A = measured coaxiality / concentricity
Planes or sides			
Flatness	to \varnothing 55 mm	0,050 μm	
	to \varnothing 150 mm	0,060 μm	
	to \varnothing 290 mm	0,15 μm	
	to 6 000 mm × 10 000 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	l = longest side of surface plate; (1)
Angle between sides or planes	to 180°	$(0,50 + 12/l) \text{ amin}$	l = leg length in mm; leg length to 200 mm
		3,0 as	optical surfaces
Squareness	to 1200 × 550 mm	$2,1 \mu\text{m} + 4,0 \times 10^{-6} \times l$	l = leg length ratio leg length : reference length = 1 : 1
Parallelism	to 1200 mm	$1,0 \mu\text{m} + 2,0 \times 10^{-6} \times l$	l = leg length
Diameter			
External	\varnothing 0,05 mm to \varnothing 300 mm	$0,50 \mu\text{m} + 1,5 \times 10^{-6} \times l$	
	\varnothing 300 mm to \varnothing 500 mm	$0,90 \mu\text{m} + 0,60 \times 10^{-6} \times l$	
	\varnothing 500 mm to \varnothing 3000 mm	$0,40 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
Internal	\varnothing 1 mm to \varnothing 250 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
Distance of 2 parallel surfaces			
External	to 200 mm	$0,50 \mu\text{m} + 2,0 \times 10^{-6} \times l$	
	to 3000 mm	$0,40 \mu\text{m} + 4,0 \times 10^{-6} \times l$	
Internal	to 1200 mm	$1,2 \mu\text{m} + 4,0 \times 10^{-6} \times l$	

Thread external			
Pitch	to 10 mm	2,0 µm	
Profile angle	to 180°	$(0,50 + 12 / l)$ bgmin	l = leg length in mm
Simple pitch diameter	Ø 1 mm to Ø 300 mm	$\alpha = 30^\circ$: (6,0 µm to 9,7 µm)	Acc. to Euramet/CG-10, method 1a or 1b
		$\alpha = 60^\circ$: (3,2 µm to 5,9 µm)	
		$\alpha = 90^\circ$: (2,6 µm to 5,5 µm)	
Thread internal			
Pitch	to 10 mm	2,0 µm	
Profile angle	to 180°	$(0,50 + 12 / l)$ bgmin	l = leg length in mm
Simple pitch diameter	Ø 4 mm to Ø 300 mm	$\alpha = 30^\circ$: (9,0 µm to 14,0 µm)	Acc. to Euramet/CG-10, method 1a or 1b
		$\alpha = 60^\circ$: (3,6 µm to 7,0 µm)	
		$\alpha = 90^\circ$: (3,1 µm to 6,2 µm)	
(1): also on site, the CMC can be bigger on site			
R: resolution of the instrument ; l : measured length			