Annex to declaration of accreditation (scope of accreditation)
Normative document: EN ISO/IEC 17025:2017
Registration number: **K 088**

of **Kalibra International B.V.**

This annex is valid from: **13-11-2024** to **01-03-2027** Replaces annex dated: **19-01-2023**

Location(s) where activities are performed under accreditation

Head Office
Delftechpark 19 2628 XJ Delft The Netherlands

Location	Abbreviation/ location code
Exportweg 1 9301 ZV Roden The Netherlands	RO
On-site	OS
Mobile laboratory	MO

HCS code	Measured quantity, Range	Frequency	CMC[1]	Remarks	Location
LF 0 0	DC/LF electricity				
LF 1 0	Direct voltage				
	< 330 mV		$3.5 \cdot 10^{-3} \cdot U$ + 5 µV	Generating	MO
	330 mV – 3.3 V		$7.6 \cdot 10^{-5} \cdot U$		
	3.3 V – 33 V		$7.6 \cdot 10^{-5} \cdot U$		
	33 V – 330 V		$8.2 \cdot 10^{-5} \cdot U$		
	330 V – 1,000 V		$6.9 \cdot 10^{-5} \cdot U$		
LF 1 0	< 10 mV		0.45 µV	Measuring	MO

This annex has been approved by the Board of the Dutch Accreditation Council. on its behalf.

J.A.W.M. de Haas

[1] Calibration and Measurement Capability (CMC): Demonstrated measurement uncertainty, with coverage probability of 95%, in a given measurement point or measurement range. Measurement uncertainty, *U,* is calculated according to EA-4/02 "*Evaluation* of the Uncertainty of Measurement in Calibration".

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HCS code	Measured quantity, Range	Frequency	CMC[1]	Remarks	Location
	10 mV – 100 mV		$4.6 \cdot 10^{-5} \cdot U$		
	100 mV – 1 V		$1.3 \cdot 10^{-5} \cdot U$		
	1 V – 10 V		$1.0 \cdot 10^{-5} \cdot U$		
	10 V – 100 V		$1.5 \cdot 10^{-5} \cdot U$		
	100 V – 1000 V		$1.4 \cdot 10^{-5} \cdot U$		
	330 mV – 33 V		$9.0 \cdot 10^{-5} \cdot U$	Generating	RO
	20 mV – 0.2 V		$1.2 \cdot 10^{-5} \cdot U$	Measuring	RO
	0,2 V – 20 V		$6.4 \cdot 10^{-6} \cdot U$		
LF 2 0	Direct current				
	1 µA – 330 µA		100 nA	Generating	MO
	330 µA – 3.3 mA		$3.3 \cdot 10^{-4} \cdot I$		
	3,3 mA – 33 mA		$2.0 \cdot 10^{-4} \cdot I$		
	33 mA – 330 mA		$2.3 \cdot 10^{-4} \cdot I$		
	330 mA – 2.2 A		$5.0 \cdot 10^{-4} \cdot I$		
	2.2 A – 11 A		$8.7 \cdot 10^{-4} \cdot I$		
	33,3 mA - 330 mA		$2.0 \cdot 10^{-4} \cdot I$	Generating	RO
	100 nA – 1 mA		$(3.5 \cdot 10^{-5} – 4.9 \cdot 10^{-4}) \cdot I$	Measuring	MO
	1 mA – 100 mA		$(3.5 \cdot 10^{-4} – 1.0 \cdot 10^{-4}) \cdot I$		
	100 mA – 1A		$(1.4 \cdot 10^{-4} – 2.4 \cdot 10^{-4}) \cdot I$		
	1 A – 3 A		$(1.3 \cdot 10^{-3} – 2.3 \cdot 10^{-3}) \cdot I$		
	0.2 mA - 20 mA		$1.1 \cdot 10^{-4} \cdot I$	Measuring	RO

HCS code	Measured quantity, Range	Frequency	CMC[1]	Remarks	Location
LF 3 0	Alternating voltage				
	33 mV – 330 mV	10 Hz – 500 kHz	$(6.5 \cdot 10^{-4} – 2.0 \cdot 10^{-2}) \cdot U$	Generating	MO
	330 mV – 3.3 V	10 Hz – 500 kHz	$(3.8 \cdot 10^{-4} – 1.7 \cdot 10^{-2}) \cdot U$		
	3.3 V – 33 V	10 Hz – 100 kHz	$(4.8 \cdot 10^{-4} – 8.7 \cdot 10^{-3}) \cdot U$		
	33 V – 330 V	45 Hz – 20 kHz	$(6.0 \cdot 10^{-4} – 2.2 \cdot 10^{-3}) \cdot U$		
	330 V – 1000 V	45 Hz – 10 kHz	$(7.0 \cdot 10^{-4} – 4.1 \cdot 10^{-3}) \cdot U$		
	10 mV – 10 V	40 Hz – 1 MHz	$(3.6 \cdot 10^{-4} – 2.9 \cdot 10^{-1}) \cdot U$	Measuring	MO
	10 V – 100 V	30 kHz – 100 kHz	$(4.6 \cdot 10^{-4} – 1.6 \cdot 10^{-2}) \cdot U$		
	100 V – 500 V	40 Hz – 20 kHz	$(1.2 \cdot 10^{-3} – 7.0 \cdot 10^{-2}) \cdot U$		
LF 4 0	Alternating current				
	30 µA – 330 µA	10 Hz – 10 kHz	$(2.0 \cdot 10^{-3} – 2.0 \cdot 10^{-2}) \cdot I$	Generating	MO
	330 µA – 330 mA	10 Hz – 10 kHz	$(2.0 \cdot 10^{-4} – 9.7 \cdot 10^{-3}) \cdot I$		
	330 mA – 2.2 A	10 Hz – 5 kHz	$(1.4 \cdot 10^{-3} – 9.7 \cdot 10^{-3}) \cdot I$		
	2.2 A – 11 A	45 Hz – 1 kHz	$(9.7 \cdot 10^{-4} – 4.9 \cdot 10^{-3}) \cdot I$		
	10 µA – 100 µA	20 Hz – 5 kHz	$(1.2 \cdot 10^{-3} – 5.2 \cdot 10^{-3}) \cdot I$	Measuring	MO
	100 µA – 100 mA	20 Hz – 20 kHz	$(7.6 \cdot 10^{-4} – 4.1 \cdot 10^{-3}) \cdot I$		
	100 mA – 1 A	20 Hz – 20 kHz	$(1.3 \cdot 10^{-3} – 5.9 \cdot 10^{-3}) \cdot I$		
	1 A – 3 A	20 Hz – 5 kHz	$(1.6 \cdot 10^{-3} – 2.5 \cdot 10^{-3}) \cdot I$		
LF 6 0	Impedance (DC/LF)				
LF 6 2	DC resistance				
	0,1 Ω - 10 Ω		$2{,}2 \cdot 10^{-4} \cdot R$	Measuring	
	10 Ω - 100 Ω		$1 \cdot 10^{-3} \cdot R$		
	100 Ω - 1 MΩ		$5{,}1 \cdot 10^{-5} \cdot R$		
	1 MΩ - 10 MΩ		$1{,}8 \cdot 10^{-4} \cdot R$		

HCS code	Measured quantity, Range	Frequency	CMC[1]	Remarks	Location
	10 MΩ - 100 MΩ		$7 \cdot 10^{-4} \cdot R$		
	100 MΩ - 1 GΩ		$6 \cdot 10^{-3} \cdot R$		
	0,1 Ω - 1,1 Ω		10 mΩ	Generating	MO
	1,1 Ω - 33 Ω		$(6{,}7 \cdot 10^{-4} – 8{,}6 \cdot 10^{-3}) \cdot R$		
	33 Ω - 11 MΩ		$(1{,}3 \cdot 10^{-4} – 8{,}9 \cdot 10^{-4}) \cdot R$		
	11 MΩ - 330 MΩ		$(1{,}2 \cdot 10^{-3} – 6{,}0 \cdot 10^{-3}) \cdot R$		
LF 6 5	Capacity				
	0.33 nF - 11 µF		$(3.9 \cdot 10^{-3} – 4.1 \cdot 10^{-2}) \cdot C$	Generating	MO
	110 µF – 1.1 mF		$(9.1 \cdot 10^{-3} – 1.3 \cdot 10^{-2}) \cdot C$		
TF 0 0	Time and frequency				
TF 2 1	Frequency				
	0.1 Hz < f < 500 Hz		0.015 Hz (1 rpm)	Revolution counter and optical sensors	MO
	0,01 Hz - 2 MHz		$1{,}2 \cdot 10^{-1} \cdot f$ - $3{,}9 \cdot 10^{-5}\ f$	Generating	MO
	0,01 Hz – 120 Hz		$(4 \cdot 10^{-5} \cdot f$ + 1 mHz	Measuring/Generating	RO
	120 Hz – 20 kHz		$4 \cdot 10^{-5} \cdot f$		

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
DM 1 0	Length				MO
DM 1 2	Length gauges				
	Setting foils	≤ 2 mm	0.6 µm	Using an ULM	
	Feeler gauges	≤ 5 mm	3 µm	Using outside micrometer	
	Length gauges, steel and ceramics	<= 25 mm	$0.55\ \mu m + 3.2 \cdot 10^{-6} \cdot l$	Using an ULM	
		(25 - <=100) mm	$0.84\ \mu m + 4.9 \cdot 10^{-6} \cdot l$	Using an ULM	
	Length gauges, steel	(100 - <=500) mm	$0.28\ \mu m + 1.1 \cdot 10^{-5} \cdot l$	Using an ULM	
		(500 - <= 600) mm	$0.52\ \mu m + 1.0 \cdot 10^{-5} \cdot l$	Using an ULM	
	Internal set gauges	≤ 100 mm	$0.9\ \mu m + 5.3 \cdot 10^{-6} \cdot l$	Using an ULM	
		100 – 600 mm	$0.6\ \mu m + 9.9 \cdot 10^{-6} \cdot l$	Using an ULM	
		≤ 150 mm	$2.6\ \mu m + 2.0 \cdot 10^{-5} \cdot l$	Using outside micrometer	
DM 1 4	Line scales, distances				MO
	Line scales and measuring tapes	≤ 3 m	0.35 mm		
		≤ 6 m	0,45 mm		
		≤ 9 m	0,55 mm		
	Outline scales	≤ 315 mm	0.07 mm	Graduation diameter	
		≤ 1000 mm	0.25 mm	Graduation outline	
DM 1 5	Length measurement instruments, Level gauge	10 mm to 50 m	1 mm		MO
	Dial Gauge	≤ 15 mm	0.6 µm	DIN 878, 879, 2270 (using an ULM)	
		(15 – 100) mm	$0.8\ \mu m + 1.1 \cdot 10^{-5} \cdot l$		

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HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
		(0 – 25) mm	3.0 µm	Using a dial gauge tester	
	Internal micrometer	≤ 100 mm	1.5 µm + $7.4 \cdot 10^{-6} \cdot l$	DIN 863-4	
		(100 – 600) mm	1.0 µm + $1.5 \cdot 10^{-6} \cdot l$		
	Micrometer calliper-heads and dial gauge testers	≤ 50 mm	1.2 µm		
	Vernier callipers	≤ 1500 mm	14 µm + $2.1 \cdot 10^{-5} \cdot l$	DIN 862	
	Height callipers	≤ 600 mm	0,013 mm + $1,4 \cdot 10^{-5} \cdot l$	DIN 862	
	Depth callipers	(0 – ≤ 300) mm	0,012 mm + $1,2 \cdot 10^{-5} \cdot l$	DIN 862	
		(300 – 400) mm	0,023 mm + $3,9 \cdot 10^{-7} \cdot l$	DIN 862	
	Outside micrometers	≤ 100 mm	1.7 µm + $2.8 \cdot 10^{-6} \cdot l$	DIN 863-1/ DIN 863-3	
		(100 – 600) mm	5,4 µm + $4,7 \cdot 10^{-5} \cdot l$		
	Depth micrometers	≤ 50 mm	4 µm	DIN 863-2	
	3-point internal micrometers	(6 – 30) mm	1,9 µm		
		(30 – 125) mm	2,8 µm		
	2-point internal micrometers	(6 – 30) mm	2,6 µm		
		(30 – 125) mm	3,3 µm		
DM 2 0	Diameter				MO
	Plug gauges	≤ 30 mm	0.93 µm		
		(30 – 100) mm	0.84 µm + $1.1 \cdot 10^{-5} \cdot l$		
		(100 – 400) mm	0.68 µm + $1.5 \cdot 10^{-5} \cdot l$		
	Ring gauges	(16 – 125) mm	1.8 µm + $1.0 \cdot 10^{-5} \cdot l$		
		(126 – 225) mm	1.2 µm + $1.7 \cdot 10^{-5} \cdot l$		

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
	Plug gauges	≤ 5 mm	4.0 µm	Using a dial gauge tester	
	Internal diameter	4 m ≤ d ≤ 80 m	0.01 %	(circumference) using a measuring tape	
	Internal diameter	4 m ≤ d < 6 m	0.07 %	(circumference) using the EODR-inside tankmeasurment[1]	
		6 m ≤ d < 10 m	0.05 %		
		10 m ≤ d < 16 m	0.03 %		
		d ≥ 16 m	0.02 %		
	Internal diameter	4 m ≤ d < 6 m	0.05 %	(circumference) using the EODR-outside tankmeasurement[2]	
		d ≥ 6 m	0.025 %		
DM 3 0	Form error				MO
	Straight-edge	≤ 1,000 mm	0.03 mm	Using feeler gauges	
	Square	90°	0.03 mm	Leg length ≤ 300 mm	
	Surface plate	5 x 5 m	1.5 µm +$((1 \cdot 10^{-8}\ l^2) \cdot / \cdot d)$		OS
DM 8 0	Volume (geometric)				OS
DM 8 1	Volume of ship tanks	0.8 < V ≤ 2.2 m^3	0.5 %		
		2,2 m^3 < V ≤ 5 m^3	0.3 %		
		5 m^3 < V ≤ 1000 m^3	0.2 %		
		V > 1000 m^3	0.1 %		

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
DM 8 2	Volume of garbage containers, loadspaces of tilting trucks	$1 m^3 < V < 100 m^3$	3 – 65 litre	Using measuring tape	
DM 8 3	Storage tanks				
	Arbitrary shape	V > 0,1 m3	1·10-3·*V*	Volumetric water draw	OS
	Arbitrary shape	V > 5 m3	2·10-3·*V*	Using measuring tape	OS
	Arbitrary shape	V > 1000 m3	1·10-3·*V*	Using measuring tape	OS
	Spherical shape	D > 4 m	3·10-3·*V*	Strapping, EODR	OS
	Spherical shape	D > 6 m	2·10-3·*V*	Strapping, EODR	OS
	Spherical shape	D > 8 m	1·10-3·*V*	Strapping, EODR	OS
	Horizontal cylindrical	D > 2 m	2·10-3·*V*	Strapping, EODR	OS
	Vertical cylindrical	D > 0,5 m	1·10-3·*V*	Strapping	OS
	Vertical cylindrical	D > 1 m	2·10-4·*V*	Strapping	OS
	Vertical cylindrical	D > 4 m	1·10-3·*V*	Strapping, EODR	OS
	Vertical cylindrical	D > 6 m	6·10-4·*V*	Strapping, EODR	OS
	Vertical cylindrical	D > 8 m	4·10-3·*V*	Strapping, EODR	OS
DM 8 4	Roof survey	litres	0.2 %		
DM 8 5	Bottom survey	d > 1 m	0.3 %	- Liquid height >262 mm - Using rotating laser en measuring rod	
DM 8 5	Bottom survey	D > 1 m	$1 \cdot 10^{-3} \cdot V$	Volumetric water draw	OS
DM 8 5	Bottom survey	D > 4 m	$3 \cdot 10^{-3} \cdot V$	Geometric	OS
MW 0 0	Mass and weight				

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
MW 1 0	Mass pieces with density of 2,700 – 8,800 kg/m³	(0.001 – 10) g	(0.03 – 0.20) mg		OS
		(10 – 200) g	0.13 mg + $6 \cdot 10^{-6} \cdot m$		
		(0.2 – 25) kg	10 mg + $6.0 \cdot 10^{-6} \cdot m$		
		(25 – 1,000) kg	65 g		
		(1,000 – 3,000) kg	85 g		
		(3,000 – 5,000) kg	120 g		
MW 2 0	Weighing instruments	($0 \le m \le 64$) kg	0,03 mg + $5 \cdot 10^{-6} \cdot m$		OS
		($64 < m \le 300$) kg	1 g + $6 \cdot 10^{-5} \cdot m$		
		($300 < m \le 20.000$) kg	0,1 kg + $6 \cdot 10^{-5} \cdot m$		
		($20.000 < m \le 100.000$) kg	1 kg + $6 \cdot 10^{-5} \cdot m$		
		($100.000 < m \le 200.000$) kg	10 kg + $6 \cdot 10^{-5} \cdot m$		
	Weighing tanks	> 30 kg	$1.3 \cdot 10^{-3} \cdot m$		

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
PV 0 0	Pressure and vacuum				
PV 1 1	Absolute pressure			Air / Nitrogen	
		(0 – 350) kPa	47 Pa	Air / Nitrogen	MO, OS
		(350 – 900) kPa	0,11 kPa	Air	MO, OS
		(0,9 – 9.9) MPa	0,8 kPa	Air	MO, OS
		(0 – 500) kPa	80 Pa	Lucht	RO
		(500 – 1000) kPa	200 Pa	Nitrogen	RO
		(1000 – 3500) kPa	400 Pa	Nitrogen	RO
		(3,500 – 9,900) MPa	0.8 kPa	Nitrogen	RO
PV 1 2	Over atmospheric pressure				
		(-100 – 250) kPa	31 Pa	Air / Nitrogen	MO, OS
		(0,25 – 1000) kPa	0,12 kPa	Nitrogen	MO, OS
		(1 – 10) MPa	0,8 kPa	Nitrogen	MO, OS
		(0 – 7) MPa	3,9 kPa	Oil	MO, OS
		(7 – 70) MPa	33 kPa	Oil	MO, OS
		(-100 – 3500) kPa	72 Pa	Air / Nitrogen	RO
		(3,5 – 10) MPa	0,8 kPa	Nitrogen	RO
TQ 0 0	Torque				
TQ 1 1	Torque wrench	≤ 10 Nm	$37 \cdot 10^{-2}$ Nm + $1,5 \cdot 10^{-2} \cdot M$		MO
		≤ 25 Nm	$5,9 \cdot 10^{-2}$ Nm + $1,6 \cdot 10^{-2} \cdot M$		
		≤ 50 Nm	0,11 Nm + $1,6 \cdot 10^{-2} \cdot M$		
		≤ 100 Nm	0,37 Nm + $1,5 \cdot 10^{-2} \cdot M$		

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
		≤ 200 Nm	0,51 Nm + $1,6 \cdot 10^{-2} \cdot M$		
		≤ 400 Nm	0,86 Nm + $1,6 \cdot 10^{-2} \cdot M$		
		≤ 500 Nm	1,1 Nm + $1,6 \cdot 10^{-2} \cdot M$		
		≤ 1000 Nm	3,2 Nm + $1,5 \cdot 10^{-2} \cdot M$		
		≤ 1100 Nm	3,3 Nm + $1,5 \cdot 10^{-2} \cdot M$		

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HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
TE 0 0	Temperature				
TE 1 0	Resistance thermometers	-30 °C to 120 °C	0.20 °C	Pt100 in thermostat	MO
TE 4 1	Temperature sensors with display unit	-196 °C to 200 °C	0.3 °C	Thermometers in an *isotherm space*	OS
		200 °C to 350 °C	1.0 °C		
		350 °C to 600 °C	4.5 °C		
		600 °C to 1000 °C	4,5 °C		
	Temperature sensors with display unit	-30 °C to 120 °C	0.10 °C	Concerning thermometers. calibrated in a thermostat	MO
	Temperature sensors with display unit	-30 to 220 °C	0.3 °C	Concerning thermometers, calibrated in a thermostat	OS
		220 to 400 °C	1.5 °C		
	Temperature sensors with display unit	0 °C to 50 °C	0.04 °C		RO
TE 9 0	Simulators / indicators				
TE 9 2	For the purpose of thermocouples	According to normalized type range	0.1 °C	Measuring / generating for Type JKTENSRB with or without switched CJC	MO
			0.2 °C	Measuring / generating for Type JKTEN with switched CJC	
			0.4 °C	Measuring / generating for Type SRB with switched CJC	

HCS code	Measured quantity, Instrument, Measure	Range	CMC[2]	Remarks	Location
RH 0 0	Humidity				
RH 1 0	Hydrometers	(30 – 95) %rv	3.5 %rv	Concerning hydrometers placed in a conditioned room at temperatures between 15 °C and 40 °C	OS
VL 0 0	Volume of liquids				OS
VL 1 0	Capacity measures				
VL 1 1	Flask	(1 – 60) l	$3 \cdot 10^{-4} \cdot V$	Using weighing	
		> 60 l	$1.3 \cdot 10^{-3} \cdot V$	Using master meter	
VL 1 2	Measuring container	(100 – 10 000) l	$1 \cdot 10^{-3} \cdot V$		
VL 1 2	Volume of measuring containers	100 ≤ V ≤ 300 l	0.5 %	Using liquids	
		300 ≤ V ≤ 1000 l	0.3 %		
		V > 1000 l	0,1 %		
FL 0 0	Volume flow rate				
FL 2 0	Flow meters	≤ 2 m^3/h	$4,0 \cdot 10^{-2}$ %	Using weighing	OS
		(1 – 40) m^3/h	$4,0 \cdot 10^{-2}$ %	Using weighing (external)	
		(1 – 2) m^3/h	$1,7 \cdot 10^{-1}$ %	Using flask	
		(8 – 800) m^3/h	$8,0 \cdot 10^{-2}$ %	Using flask (external)	
		(1 – 40) m^3/h	$1,4 \cdot 10^{-1}$ %	Using master meter	
		(40 – 180) m^3/h	$1,4 \cdot 10^{-1}$ %	Using master meter	

Remarks:

PV 1 1, PV 1 2 and PV 2 2 $p_e = p - p_{amb}$ with p_e: over atmospheric pressure; p_{amb}: ambient pressure

MW 1 0 The conventional mass is determined. This means that the value of a mass with a density of 8,000 kg/m^3 at weighing at 20 °C in air with a density of 1.2 kg/m^3 will be in equilibrium with the mass.

MW 1 2 Range (0 – 64 kg): The claimed CMC is only feasible when using a vibration-free setup in a conditioned room which meets the following demands:

- Air density between 1.15 kg/m^3 and 1.24 kg/m^3
- Temperature (20 ± 2)°C
- Air pressure (1013 ± 35) mbar