Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

Locations where activities are performed under accreditation

Location	Abbreviation/ location code
Fluke Nederland B.V. Standaard Laboratorium Gebouw: 2, Science Park Eindhoven 5108 5692 EC Son The Netherlands	Laboratory 1
Fluke Nederland B.V. Standaard Laboratorium Gebouw: Novio Tech Campus, Transistorweg 5C 6534 AT Nijmegen The Netherlands	Laboratory 2

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
LF 0 0	DC/LF Quantities			Laboratory 1 & Laboratory 2
LF 1 0	DC Voltage			measuring and generating
	10 V		$5 \cdot 10^{-7} \cdot U$	zenerreferences
	1 V and 1.018 V		$2.3 \cdot 10^{-6} \cdot U$	zenerreferences
	0 μV to 10 μV		0.3 μV	
	10 μV to 200 mV		$3 \cdot 10^{-6} \cdot U$ + 0.2 μV	
	200 mV to 1 V		$3 \cdot 10^{-6} \cdot U$	
	1 V to 2 V		$2 \cdot 10^{-6} \cdot U$	
	2 V to 10 V		$1 \cdot 10^{-6} \cdot U$	
	10 V to 1000 V		$2 \cdot 10^{-6} \cdot U$	
	1000 V to 1100 V		$4 \cdot 10^{-6} \cdot U$	
	9 V to 16 V		3.4 mV	6)
	295 V to 400 V		70 mV	6)

This annex has been approved by:

Ir. J.C. van der Poel
Chief Executive

Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
LF 2 0	DC Current			measuring and generating
	1 μA to 10 μA		$3 \cdot 10^{-5} \cdot I$	
	10 μA to 20 A		$2 \cdot 10^{-5} \cdot I$	
	0,5 A to 5 A		2.5 mA	6)
LF 3 0	AC Voltage			measuring and generating
	100 mV to 220 mV	10 Hz to 20 Hz	$3 \cdot 10^{-4} \cdot U$	
		20 Hz to 40 Hz	$5 \cdot 10^{-5} \cdot U$	
		40 Hz to 20 kHz	$5 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$5 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$6 \cdot 10^{-5} \cdot U$	
		100 kHz to 200 kHz	$2 \cdot 10^{-4} \cdot U$	
		200 kHz to 500 kHz	$4 \cdot 10^{-4} \cdot U$	
		500 kHz to 1 MHz	$7 \cdot 10^{-4} \cdot U$	
	220 mV to 2.2 V	10 Hz to 20 Hz	$5 \cdot 10^{-5} \cdot U$	
		20 Hz to 40 Hz	$5 \cdot 10^{-5} \cdot U$	
		40 Hz to 20 kHz	$5 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$4 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$5 \cdot 10^{-5} \cdot U$	
		100 kHz to 200 kHz	$2 \cdot 10^{-4} \cdot U$	
		200 kHz to 500 kHz	$4 \cdot 10^{-4} \cdot U$	
		500 kHz to 1 MHz	$7 \cdot 10^{-4} \cdot U$	
	2.2 V to 22 V	10 Hz to 20 Hz	$5 \cdot 10^{-5} \cdot U$	
		20 Hz to 40 Hz	$4 \cdot 10^{-5} \cdot U$	
		40 Hz to 20 kHz	$4 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$4 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$5 \cdot 10^{-5} \cdot U$	
		100 kHz to 200 kHz	$2 \cdot 10^{-4} \cdot U$	
		200 kHz to 500 kHz	$4 \cdot 10^{-4} \cdot U$	
		500 kHz to 1 MHz	$8 \cdot 10^{-4} \cdot U$	

Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
	22 V to 220 V	10 Hz to 20 Hz	$6 \cdot 10^{-5} \cdot U$	
		20 Hz to 40 Hz	$5 \cdot 10^{-5} \cdot U$	
		40 Hz to 20 kHz	$5 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$5 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$2 \cdot 10^{-4} \cdot U$	
	220 V to 1000 V	10 Hz to 20 Hz	$5 \cdot 10^{-5} \cdot U$	
		20 Hz to 40 Hz	$5 \cdot 10^{-5} \cdot U$	
		40 Hz to 20 kHz	$5 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$7 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$4 \cdot 10^{-4} \cdot U$	
LF 3 3	Pulse Amplitude			
	1 mV to 25 mV	10 Hz to 10 kHz	$5 \cdot 10^{-3} \cdot U$	measuring
	25 mV to 110 mV	10 Hz to 10 kHz	$2.6 \cdot 10^{-4} \cdot U$	
	110 mV to 2.2 V	10 Hz to 10 kHz	$2.6 \cdot 10^{-4} \cdot U$	
	2.2 V to 11 V	10 Hz to 10 kHz	$2.6 \cdot 10^{-4} \cdot U$	
	11 V to 130 V	10 Hz to 10 kHz	$2.6 \cdot 10^{-4} \cdot U$	
	6 mV to 25 mV	10 Hz to 10 kHz	$1 \cdot 10^{-2} \cdot U$	generating
	25 mV to 110 mV	10 Hz to 10 kHz	$5 \cdot 10^{-3} \cdot U$	
	110 mV to 2.2 V	10 Hz to 10 kHz	$5 \cdot 10^{-3} \cdot U$	
	2.2 V to 11 V	10 Hz to 10 kHz	$5 \cdot 10^{-3} \cdot U$	
	11 V to 130 V	10 Hz to 10 kHz	$5 \cdot 10^{-3} \cdot U$	
LF 3 4	AC/DC Transfer			measuring and generating
	0.5 V to 50 V	40 Hz to 1 kHz	$5.6 \cdot 10^{-5} \cdot U$	
		1 kHz to 20 kHz	$5.1 \cdot 10^{-5} \cdot U$	
		20 kHz to 100 kHz	$6.1 \cdot 10^{-5} \cdot U$	
		100 kHz to 500 kHz	$2.5 \cdot 10^{-4} \cdot U$	

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
	0.5 V to 10 V	500 kHz to 1 MHz	$4.2 \cdot 10^{-4} \cdot U$	
	50 V to 100 V	40 Hz to 1 kHz	$4.5 \cdot 10^{-5} \cdot U$	
		1 kHz to 20 kHz	$4.5 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$5.1 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$5.6 \cdot 10^{-5} \cdot U$	
	100 V to 500 V	40 Hz to 1 kHz	$6.2 \cdot 10^{-5} \cdot U$	
		1 kHz to 20 kHz	$5.8 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$9.2 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$2.4 \cdot 10^{-4} \cdot U$	
	500 V to 1000 V	40 Hz to 20 kHz	$6.4 \cdot 10^{-5} \cdot U$	
		20 kHz to 50 kHz	$9.6 \cdot 10^{-5} \cdot U$	
		50 kHz to 100 kHz	$2.4 \cdot 10^{-4} \cdot U$	
LF 4 0	AC Current			measuring and generating
	100 µA to 1 mA	10 Hz to 1 kHz	$3.2 \cdot 10^{-4} \cdot I$	
		1 kHz to 5 kHz	$2.6 \cdot 10^{-4} \cdot I$	
		5 kHz to 10 kHz	$6.5 \cdot 10^{-4} \cdot I$	
		10 kHz to 20 kHz	$1.2 \cdot 10^{-3} \cdot I$	measuring only
	1 mA to 10 mA	10 Hz to 1 kHz	$2.3 \cdot 10^{-4} \cdot I$	
		1 kHz to 5 kHz	$1.7 \cdot 10^{-4} \cdot I$	
		5 kHz to 10 kHz	$4.3 \cdot 10^{-4} \cdot I$	
		10 kHz to 20 kHz	$6.7 \cdot 10^{-4} \cdot I$	measuring only
	10 mA to 1 A	10 Hz to 1 kHz	$2.4 \cdot 10^{-4} \cdot I$	
		1 kHz to 5 kHz	$2.1 \cdot 10^{-4} \cdot I$	
		5 kHz to 10 kHz	$4.9 \cdot 10^{-4} \cdot I$	
		10 kHz to 20 kHz	$8.2 \cdot 10^{-4} \cdot I$	measuring only
	1 A to 5 A	10 Hz to 1 kHz	$2.4 \cdot 10^{-4} \cdot I$	
		1 kHz to 5 kHz	$2.8 \cdot 10^{-4} \cdot I$	
		5 kHz to 10 kHz	$7.4 \cdot 10^{-4} \cdot I$	
		10 kHz to 20 kHz	$1.4 \cdot 10^{-3} \cdot I$	measuring only

Annex to ISO/IEC 17025:2005 declaration of
accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
	5 A to 20 A	10 Hz to 1 kHz	$3.3 \cdot 10^{-4} \cdot I$	
		1 kHz to 5 kHz	$3.8 \cdot 10^{-4} \cdot I$	
		5 kHz to 10 kHz	$7.8 \cdot 10^{-4} \cdot I$	
		10 kHz to 20 kHz	$1.4 \cdot 10^{-3} \cdot I$	measuring only
LF 6 2	DC Resistance			measuring and generating
	1 mΩ		$3 \cdot 10^{-5} \cdot R$	
	10 mΩ		$2 \cdot 10^{-5} \cdot R$	
	100 mΩ		$1 \cdot 10^{-5} \cdot R$	
	1 Ω		$3 \cdot 10^{-6} \cdot R$	
	10 Ω		$3 \cdot 10^{-6} \cdot R$	
	100 Ω		$3 \cdot 10^{-6} \cdot R$	
	1 kΩ		$3 \cdot 10^{-6} \cdot R$	
	10 kΩ		$2 \cdot 10^{-6} \cdot R$	
	100 kΩ		$3 \cdot 10^{-6} \cdot R$	
	1 MΩ		$3 \cdot 10^{-6} \cdot R$	
	10 MΩ		$5 \cdot 10^{-6} \cdot R$	
	100 MΩ		$2 \cdot 10^{-5} \cdot R$	
	1 GΩ		$6 \cdot 10^{-4} \cdot R$	
	1 mΩ to 10 mΩ		$9 \cdot 10^{-5} \cdot R$	
	10 mΩ to 100 mΩ		$3 \cdot 10^{-5} \cdot R$	
	100 mΩ to 1 Ω		$2 \cdot 10^{-5} \cdot R$	
	1 Ω to 10 MΩ		$5 \cdot 10^{-6} \cdot R$	
	10 MΩ to 100 MΩ		$2 \cdot 10^{-5} \cdot R$	
	100 MΩ to 1 GΩ		$6 \cdot 10^{-4} \cdot R$	

Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
LF 6 5	LF Capacitance			measuring and generating
	1 pF to 100 pF	1 kHz to 10 kHz	$3 \cdot 10^{-5} \cdot C$	
	100 pF to 1 nF	1 kHz to 5 kHz	$2 \cdot 10^{-5} \cdot C$	
	1 nF to 1 µF	1 kHz	$2 \cdot 10^{-4} \cdot C$	
	1 µF to 10 µF	100 Hz	$3 \cdot 10^{-4} \cdot C$	
	200 µF to 500 µF	DCV	$1.2 \cdot 10^{-3} \cdot C$	
	500 µF to 110 mF	DCV	$1 \cdot 10^{-3} \cdot C$	
RF 0 0	HIGH FREQUENCY QUANTITIES			
RF 1 0	CW Flatness			
	5 mV_{pp} to 200 mV_{pp}	50 kHz to 1100 MHz	$2.7 \cdot 10^{-2}$ related to 50 kHz/50 Ω	measuring
	200 mV_{pp} to 6 V_{pp}	50 kHz to 1100 MHz	$2.5 \cdot 10^{-2}$ related to 50 kHz/50 Ω	measuring
	5 mV_{pp} to 20 mV_{pp}	50 kHz to 1100 MHz	$9 \cdot 10^{-2}$ related to 50 kHz/50 Ω	generating VSWR scope ≤ 1.3
	20 mV_{pp} to 6 V_{pp}	50 kHz to 1100 MHz	$8 \cdot 10^{-2}$ related to 50 kHz/50 Ω	generating VSWR scope ≤ 1.3
TF 0 0	TIME & FREQUENCY			
TF 2 1	Frequency			measuring and generating
	10 MHz		$6 \cdot 10^{-11} \cdot f$	
	10 mHz to 1 MHz		$1 \cdot 10^{-10} \cdot f + T_e$	1)
	1 MHz to 300 MHz		$1 \cdot 10^{-10} \cdot f$	
	300 MHz to 1.1 GHz		$6 \cdot 10^{-9} \cdot f$	2)
TF 2 2	Time Interval			
	1 µs to 10 s		$5 \cdot 10^{-10} \cdot t$ + T.E.	measuring only 7)
	10 s to 10^5 s		$5 \cdot 10^{-10} \cdot t$ + 10 ns	measuring only

HCS code	**Measured quantity, Range**	**Frequency**	**CMC***	**Remarks**
TF 2 3	Phase Angle			
	0 ° to 180 °	10 Hz to 50 Hz	0.05 °	at equal input voltages 100 mV < U_i < 300 V generate up to 120 V
		50 Hz to 1 kHz	0.08 °	
		1 kHz to 5 kHz	0.18 °	
		5 kHz to 10 kHz	0.35 °	
		10 kHz to 30 kHz	0.75 °	
	0 ° to 180 °	50 Hz	0.10 °	un equal input voltages 100 mV < U_i < 300 V ratio 1:100
		50 Hz to 1 kHz	0.25 °	
		1 kHz to 5 kHz	0.40 °	
		5 kHz to 10 kHz	1.0 °	
		10 kHz to 30 kHz	1.8 °	
TF 2 4	Rise time			
	70 ps to 1000 ps	pulse repeat ≤1 MHz	20 ps	180 mV_{pp} to 300 mV_{pp} in 50 Ω measuring only

Annex to ISO/IEC 17025:2005 declaration of
accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	Measured quantity, Instrument, Measure	Range	CMC *	Remarks
PV 0 0	Pressure			Laboratory 1
PV 1 1	Absolute pressure	10 kPa to 210 kPa	$4 \cdot 10^{-5} \cdot p + 9$ Pa	nitrogen, measuring and generating
		210 kPa to 700 kPa	$3.5 \cdot 10^{-5} \cdot p + 11$ Pa	
		700 kPa to 10 MPa	$3 \cdot 10^{-5} \cdot p + 200$ Pa	
PV 1 2	Gauge pressure	0 kPa to 210 kPa	$4 \cdot 10^{-5} \cdot p_e + 5$ Pa	nitrogen, measuring and generating
		210 kPa to 700 kPa	$3 \cdot 10^{-5} \cdot p_e + 8$ Pa	
		700 kPa to 10 MPa	$3 \cdot 10^{-5} \cdot p_e + 150$ Pa	
TQ 0 0	Torque	0.45 to 5.6 Nm	$2 \cdot 10^{-2} \cdot M + 0.069$ Nm	Setting Torque Tools (wrenches and drivers)
		5.6 to 41 Nm	$1.5 \cdot 10^{-2} \cdot M + 0.53$ Nm	
		41 to 113 Nm	$7 \cdot 10^{-3} \cdot M + 0.86$ Nm	
		113 to 339 Nm	$6 \cdot 10^{-3} \cdot M + 1.06$ Nm	

Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	Measured quantity, Instrument, Measure	Range	CMC *	Remarks
TE 0 0	TEMPERATURE, HUMIDITY, THERMOPHYSICAL PROPERTIES			Laboratory 1
TE 1 0	Resistance thermometers			also for indicators and recorder with resistance thermometers
	5 °C to 15 °C		0.11 °C	measurements in climate chamber
	15 °C to 24 °C		0.045 °C	measurements in climate chamber
	24 °C to 65 °C		0.045 °C to 0.15 °C	measurements in climate chamber
	0.01 °C		0.0059 °C	triple point of water
	29.7646 °C		0.0068 °C	fixed point gallium
	419.527 °C		0.010 °C	fixed point zinc
	660.323 °C		0.014 °C	fixed point aluminium
	-80 °C to 125 °C		0.085 °C	5)
	-80 °C to 248 °C		0.014 °C	
	248 °C to 500 °C		0.021 °C	
	500 °C to 660 °C		0.053 °C	
TE 3 0	Thermocouples			also for indicators and recorders with thermocouples
	0 °C to 26 °C		0.022 °C	thermocouple Type-E
	-30 °C to 200 °C		0.16 °C	5)
	-80 °C to 660 °C		0.10 °C	
	660 °C to 1000 °C		0.80 °C	
	35 °C to 500 °C		0.5 °C to 1.8 °C	surface thermometers and surface calibrators
TE 4 2	Liquid-in-Glass thermometer			
	-20 °C to 60 °C		0.026 °C	
	60 °C to 205 °C		0.039 °C	

Annex to ISO/IEC 17025:2005 declaration of accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

HCS code	Measured quantity, Instrument, Measure	Range	CMC *	Remarks
TE 6 2	Radiation (infrared)			pyrometers and black body sources
	-35 °C to 550 °C		0.20 °C to 0.55 °C	
	550 °C to 1000 °C		3.5 °C	
TE 9 0	Simulators/Display units			
	-200 °C to 850 °C		0.006 °C to 0.009 °C	3), 5) based on Pt100
	0 °C to 26 °C		0.025 °C	4) thermocouple type E
	-250 °C to -200 °C		0.38 °C	4), 5)
	-200 °C to -100 °C		0.25 °C	4), 5)
	-100 °C to -25 °C		0.14 °C	4), 5)
	-25 °C to 120 °C		0.12 °C	4), 5)
	120 °C to 1000 °C		0.19 °C	4), 5)
	1000 °C to 1372 °C		0.30 °C	4), 5)
	1372 °C to 1767 °C		0.34 °C	4), 5)
TE 10 0	Calibration baths and furnaces			
	-80 °C to 500 °C		0.0003 °C	5) only stability uncertainty, not valid for accuracy uncertainty
	500 °C to 660 °C		0.0014 °C	5) only stability uncertainty, not valid for accuracy uncertainty
	-80 °C to 140°C		0.033 °C	5)
	140 °C to 660 °C		0.033 °C to 0.053 °C	5)
	660 °C to 1000 °C		0.56 °C	only for furnaces
	1000 °C to 1200 °C		2.2 °C	only for furnaces
RH 0 0	Relative Humidity			
	10 % rh to 70 % rh		0.37 % rh	15 °C to 50 °C
	70 % rh to 95 % rh		0.46 % rh	15 °C to 50 °C

Annex to ISO/IEC 17025:2005 declaration of
accreditation for registration number: **K 013**

of **Fluke Nederland B.V.**
Standaard Laboratorium

This annex is valid from: **17-08-2015** to **01-10-2019** Replaces annex dated: **27-05-2015**

CMC*: 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 "Expression of the Uncertainty of Measurement in Calibration".

Remarks:

- The calibrations inside the pressure laboratory are carried out at an ambient temperature of nominal (20 ± 2) °C, with a relative humidity of nominal (45 ± 20) %.
- The calibrations inside the electrical laboratory are carried out at an ambient temperature of nominal (23 ± 1) °C, with a relative humidity of nominal (45 ± 10) %.
- The calibrations outside the electrical laboratory in Son & Nijmegen are carried out at an ambient temperature of nominal (23 ± 3) °C, with a relative humidity of nominal (45 ± 20) %.
- Calibrations performed in accredited laboratory 2, are preformed under the responsibility of Laboratory 1.
  Measurement uncertainties are related to equipment used and the behavior of the unit under test, these are published in the certificates after calibration. Quality and technical requirements are audited by RvA in combination with the Eindhoven (Son) laboratory audit.

1) T_e = Trigger error for sine wave signals = $(4/f)\cdot 10^{-5}\cdot f$ (f = measured frequency).
2) Generate at T_a = (23 ± 3) °C.
3) Resistance Thermometers based on a Pt100. Others e.g. thermistors which actually measure resistance, see best measurement capabilities for electricity.
4) Thermocouple with internal reference junction compensation. Without, or with switched off reference junction compensation, which actually measures voltage, see best measurement capabilities for electricity.
5) Also on site; all other calibrations refers to calibrations carried out in a fixed laboratory. Best measurement capability: the highest achievable accuracy for a given measuring point or measuring range, expressed as the total positive and negative measurement uncertainty.
6) Measuring on-site only.
7) T.E. = trigger error related to number of 10 MHz pulses counting during start/stop.