Certificate No. : LN0882-191024

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

National Measurement Laboratory, R. O. C.
National Measurement Laboratory
(Flow, Force and Mass, Pressure and Vacuum)
No.321, Kuang Fu Rd, Sec. 2 Hsinchu, Taiwan (R.O.C.)

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2017;CNS 17025:2018
Accreditation Number	:	N0882
Originally Accredited	:	January 01, 2002
Effective Period	:	January 01, 2016 to December 31, 2020
Accredited Scope	:	Calibration Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for National Metrology Institutes

Chung-Lin Wang
President, Taiwan Accreditation Foundation
Date: October 24, 2019

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix

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Chung-Lin Wang
President, Taiwan Accreditation Foundation
Date: October 24, 2019

Accreditation Number ：N0882

Laboratory Head ：LIN, Tzeng-Yow

Mass/Force

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KC1001 Weight	METTLER /119886	Instrument Calibration Technique for the Low-Capacity Mass Weighing System-Direct Comparison Method (Document No.: 07-3-A0-0756)	1	kg	1	kg		0.069	mg
			500	g	500	g		0.039	mg
			200	g	200	g		0.026	mg
			100	g	100	g		0.0099	mg
			50	g	50	g		0.0093	mg
			20	g	20	g		0.0093	mg
			10	g	10	g		0.0035	mg
			5	g	5	g		0.0035	mg
			2	g	2	g		0.0035	mg
			1	g	1	g		0.0012	mg
			500	mg	500	mg		0.0012	mg
			200	mg	200	mg		0.0012	mg
			100	mg	100	mg		0.0012	mg
			50	mg	50	mg		0.0006	mg
			20	mg	20	mg		0.0007	mg
			10	mg	10	mg		0.0006	mg
			5	mg	5	mg		0.0009	mg
			2	mg	2	mg		0.0007	mg
			1	mg	1	mg		0.0007	mg
KC1001 Weight	Johnson-Matthey Ltd./78	Instrument Calibration Technique for Weights with Prototype Balance (Document No.: 07-3-88-0031)	1	kg	1	kg		0.032	mg

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KC1001 Weight	Mettler 73512 Mettler 15852 Häfner 8517EJ	Instrument Calibration Technique for Weights by Using Sartorius CC50000S Mass Comparator (Document No.: 07-3 -88-0075)	10	kg	10	kg		5.2	mg
			20	kg	20	kg		8.4	mg
			50	kg	50	kg		21	mg
KC1001 Weight	Mettler 73220 Mettler 73512 Häfner 8307EJ	Instrument Calibration Technique for High -capacity Mass Weighing System -Sartorius CCE10000 U-L Mass Comparator (Document No.: 07-3 -A3-0249)	1	kg	1	kg		0.17	mg
			2	kg	2	kg		0.88	mg
			5	kg	5	kg		1.7	mg
			10	kg	10	kg		3.3	mg
KC1001 Weight	Mettler 73220, 9996, 15852; Häfner 8307EJ; Troemner 19142; CMS 50 kg, 250 kg	Instrument Calibration Technique for High -capacity Mass Weighing System-Mettler KC1000 Mass Comparator With ID5 Terminal (Document No.: 07-3 -85-0011)	50	kg	200	kg		1.1	g
			>200	kg	500	kg		1.6	g
			>500	kg	1000	kg		3.3	g

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KC1011 Weight	Mettler -(E1)	The Density Measurement Procedure for Weights by Using Sartorius CC500 Mass Comparator (Document No.: 07-3 -96-0071)	1	kg	1	kg		2.2	kg/m^3
			500	g	500	g		3.6	kg/m^3
			200	g	200	g		8.6	kg/m^3
			100	g	100	g		17	kg/m^3
KC2001 Proving ring	NML 500 N /DW Morehouse 5 kN/DW NML 50 kN /DW HBM 500 kN /UCM HBM 2 MN /UCM	ASTM E74, ISO 376	10	N	500	N	Compression	2.0E-05	
			0.5	kN	5	kN	Compression	2.0E-05	
			5	kN	50	kN	Compression	3.0E-05	
			50	kN	500	kN	Compression	3.0E-04	
			500	kN	2000	kN	Compression	5.0E-04	
KC2002 Force transducer Load cell	/NML 500 N /DW Morehouse 5 kN/DW NML 50 kN /DW HBM 500 kN /UCM HBM 2 MN /UCM	ASTM E74, ISO 376	10	N	500	N	Compression	2.0E-05	
			0.5	kN	5	kN	Compression	2.0E-05	
			5	kN	50	kN	Compression	3.0E-05	
			50	kN	500	kN	Compression	3.0E-04	
			500	kN	2000	kN	Compression	5.0E-04	
KC2002 Force transducer Load cell	NML 500 N /DW Morehouse 5 kN/DW NML 50 kN /DW HBM 500 kN /UCM	ASTM E74, ISO 376	10	N	500	N	Tension	2.0E-05	
			0.5	kN	5	kN	Tension	2.0E-05	
			5	kN	50	kN	Tension	3.0E-05	
			50	kN	200	kN	Tension	3.0E-04	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KC2003 Ring dynamo meter	NML 500 N /DW	ASTM E74, ISO 376	10	N	500	N	Compression	2.0E-05	
	Morehouse 5 kN/DW		0.5	kN	5	kN	Compression	2.0E-05	
	NML 50 kN /DW		5	kN	50	kN	Compression	3.0E-05	
	HBM 500 kN /UCM		50	kN	500	kN	Compression	3.0E-04	
	HBM 2 MN /UCM		500	kN	2000	kN	Compression	5.0E-04	
KC2003 Ring dynamo meter	NML 500 N /DW	ASTM E74, ISO 376	10	N	500	N	Tension	2.0E-05	
	Morehouse 5 kN/DW		0.5	kN	5	kN	Tension	2.0E-05	
	NML 50 kN /DW		5	kN	50	kN	Tension	3.0E-05	
	HBM 500 kN /UCM		50	kN	200	kN	Tension	3.0E-04	
KC2004 Force gauge	NML 500 N /DW	ASTM E74, ISO 376	10	N	500	N	Compression	2.0E-05	
	Morehouse 5 kN/DW		0.5	kN	5	kN	Compression	2.0E-05	
	NML 50 kN /DW		5	kN	50	kN	Compression	3.0E-05	
	HBM 500 kN /UCM		50	kN	500	kN	Compression	3.0E-04	
	HBM 2 MN /UCM		500	kN	2000	kN	Compression	5.0E-04	
KC2004 Force gauge	NML 500 N /DW	ASTM E74, ISO 376	10	N	500	N	Tension	2.0E-05	
	Morehouse 5 kN/DW		0.5	kN	5	kN	Tension	2.0E-05	
	NML 50 kN /DW		5	kN	50	kN	Tension	3.0E-05	
	HBM 500 kN /UCM		50	kN	200	kN	Tension	3.0E-04	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KC2007 Micro/nano mechanical properties specimen	MTS, Nano UTM	Instrument Calibration Technique for Micro/Nano Mechanical Properties Measurement System (Document no.: 07-3-99 -4218)	0.1	mm	50	mm	Displacement	3.1 (Young's modulus)	%
			10	mN	200	mN	Force	3.1 (Young's modulus)	%
KC5001 Rockwell hardness block	CMS /HRJ-150	ISO 6508-3	HRA					0.30	HRA
			HRB					0.40	HRB
			HRC					0.30	HRC
KC5001 Vickers hardness block	AKASHI /SHT-41	ISO 6507-3	100	HV	900	HV	HV2 to HV30	3.0	%
KC5001 Micro -Vickers hardness block	AKASHI /HM-124	ISO 6507-3	100	HV	900	HV	HV0.05	6.1	%
			100	HV	900	HV	HV0.1	5.3	%
			100	HV	900	HV	HV0.2	4.9	%
			100	HV	900	HV	HV0.3	4.7	%
			100	HV	900	HV	HV0.5	4.6	%
			100	HV	900	HV	HV1	4.5	%
KC5003 Nanoindentation specimen	Hysitron, TriboIndenter	Instrument Calibration Technique for Nanoindentaion System (Document no.: 07-3-93 -0242)	50	nm	300	mm	Displacement	2.7 (Indentation hardness)	%
			0.5	mN	10	mN	Force	2.7 (Indentation hardness)	%
			50	nm	300	mm	Displacement	3.1 (Reduced modulus)	%
			0.5	mN	10	mN	Force	3.1 (Reduced modulus)	%

Pressure/Vacuum

calibration items	working standard		calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model		document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD1001 Gas lubricated piston pressure gauge	Gas lubricated piston gauge Ruska 2465 Gas lubricated piston gauge DHI PG7607		Instrument Calibration Technique for Gas Lubricated Piston Gauge (Cross-Float Method) (Document No.: 07-3 -90-0068)	5	kPa	175	kPa		3.4E-05 (gauge pressure)	
				175	kPa	700	kPa		2.6E-05 (gauge pressure)	
				700	kPa	7000	kPa		4.2E-05 (gauge pressure)	
KD1001 Gas lubricated piston pressure gauge	Laser interferomater mercury manometer ITRI-CMS HG1-120 -2004		Instrument Calibration Technique for the Laser Interferometer Mercury Manometer (Document No.: 07-3 -94-0018)	1	kPa	120	kPa		0.31 Pa to 2.3 Pa (absolute pressure)	
KD1001 Gas lubricated piston pressure gauge	Laser interferometer mercury manometer for low presssure standard ITRI-CMS LIML1-10-2005 Force balance piston gauge DHI FPG 8601		Instrument Calibration Technique for Laser Interferometer Mercury Manometer for Low Pressure Standard (Document No.: 07-3 -94-0181)	1	Pa	10	kPa		0.25 (gauge pressure)	Pa

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD1002 Oil lubricated piston pressure gauge	Oil lubricated piston gauge Ruska 2485	Instrument Calibration Technique for Oil Lubricated Piston Gauge (Cross-Float Method) (Document No.:07-3-90 -0069)	2.8	MPa	28	MPa		3.3E-05 (gauge pressure)	
			28	MPa	280	MPa		7.4E-05 (gauge pressure)	
KD1003 Mercury manometer	Pressure controller /Calibrator DHI PPC4	Instrument Calibration Technique for Pressure Controller /Calibrator (Document No.: 07-3 -98-4269)	1	kPa	700	kPa		0.032 (absolute pressure)	kPa
			1	kPa	700	kPa		0.032 (gauge pressure)	kPa
KD1004 Pressure gauge	Gas lubricated piston gauge DHI PG7607	Instrument Calibration Technique for Gas Lubricated Piston Gauge(DHI PG7607) (Document No.: 07-3 -A0-2378)	5	kPa	175	kPa		0.2 Pa + 1.3E-05 × p (absolute pressure, p in Pa)	
			5	kPa	175	kPa		4 (gauge pressure)	Pa
KD1004 Pressure gauge	Pressure controller Calibrator DHI PPC4	Instrument Calibration Technique for Pressure Controller /Calibrator (Document No.: 07-3 -98-4269)	1	kPa	700	kPa		0.032 (absolute pressure)	kPa
			1	kPa	700	kPa		0.032 (gauge pressure)	kPa

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD1004 Pressure gauge	Oil lubricated piston gauge Ruska 2485	Instrument Calibration Technique for Oil Lubricated Piston Gauge (Comparison Method) (Document No.: 07-3 -90-0077)	2.8	MPa	28	MPa		3.3E-05 (gauge pressure)	
			28	MPa	280	MPa		7.4E-05 (gauge pressure)	
KD1004 Pressure gauge	Gas lubricated piston gauge Ruska 2465	Instrument Calibration Technique for Gas Lubricated Piston Gauge (Comparison Method) (Document No.: 07-3 -90-0066)	17	kPa	172	kPa		$(4.44E-01 + 8.16E-10 \times p^2)^{0.5}$ (absolute pressure, p in Pa)	Pa
			17	kPa	172	kPa		3.4E-05 (gauge pressure)	
			172	kPa	700	kPa		3.5E-05 (absolute pressure)	
			172	kPa	700	kPa		2.6E-05 (gauge pressure)	
			700	kPa	7000	kPa		4.2E-05 (absolute pressure)	
			700	kPa	7000	kPa		4.2E-05 (gauge pressure)	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD1005 Pressure transducer digital pressure gauge pressure calibrator barometer	Gas lubricated piston gauge DHI PG7607	Instrument Calibration Technique for Gas Lubricated Piston Gauge (DHI PG7607) (Document No.: 07-3 -A0-2378)	5	kPa	175	kPa		0.2 Pa + 1.3E-05 × p (absolute pressure, p in Pa)	
			5	kPa	175	kPa		4 (gauge pressure)	Pa
KD1005 Pressure transducer digital pressure gauge pressure calibrator barometer	Gas lubricated piston gauge Ruska 2465	Instrument Calibration Technique for Gas Lubricated Piston Gauge (Comparison Method) (Document No.: 07-3 -90-0066)	17	kpa	172	kpa		$(4.44E\text{-}01+8.16E\text{-}10 \times p^2)^{0.5}$ (absolute pressure, p in Pa)	Pa
			17	kpa	172	kpa		3.4E-05 (gauge pressure)	
			172	kpa	700	kpa		3.5E-05 (absolute pressure)	
			172	kpa	700	kpa		2.6E-05 (gauge pressure)	
			700	kpa	7000	kpa		4.2E-05 (absolute pressure)	
			700	kpa	7000	kpa		4.2E-05 (gauge pressure)	
KD1005 Pressure transducer digital pressure gauge pressure calibrator barometer	Pressure controller Calibrator DHI PPC4	Instrument Calibration Technique for Pressure Controller Calibrator (Document No.: 07-3 -98-4269)	1	kPa	700	kPa		0.032 (absolute pressure)	kPa
			1	kPa	700	kPa		0.032 (gauge pressure)	kPa
KD1005 Pressure transducer digital pressure gauge pressure calibrator barometer	Oil lubricated piston gauge Ruska 2485	Instrument Calibration Technique for Oil Lubricated Piston Gauge (Comparison Method) (Document No.: 07-3 -90-0077)	2.8	MPa	28	MPa		3.3E-05 (gauge pressure)	
			28	MPa	280	MPa		7.4E-05 (gauge pressure)	

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD1005 Pressure transducer digital pressure gauge pressure calibrator barometer	Laser interferometer mercury manometer for low presssure standard ITRI-CMS LIML1-10-2005 Force balance piston gauge DHI FPG 8601	Instrument Calibration Technique for Laser Interferometer Mercury Manometer for Low Pressure Standard (Document No.: 07-3 -94-0181)	1	Pa	10	kPa		0.25 (gauge pressure)	Pa
KD1007 Differential pressure gauge	Laser interferometer mercury manometer for low presssure standard ITRI-CMS LIML1-10 -2005 Force balance piston gauge DHI FPG 8601	Instrument Calibration Technique for Laser Interferometer Mercury Manometer for Low Pressure Standard (Document No.: 07-3 -94-0181)	1	Pa	10	kPa		0.25 (gauge pressure)	Pa
KD2001 Spinning rotor viscosity vacuum gauge	Spinning rotor viscosity vacuum gauge MKS SRG	Instrument Calibration Technique for Spinning Rotor Viscosity Gauge (Document No.: 07-3 -80-0079)	0.0006	Pa	1	Pa		0.029P (P in Pa)	Pa

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD2002 Ionization vacuum gauge	Hot cuthode ionisation vacuum gauge Leybold IM 520	Instrument Calibration Technique for Hot Cathode Ionization Gauge (Document No.: 07-3 -80-0077)	5E-06	Pa	0.0001	Pa		0.074P (P in Pa)	Pa
			0.0001	Pa	0.008	Pa		0.069P (P in Pa)	Pa
KD2003 Capacitance diaphragm vacuum gauge	Capacitance diaphragm vacuum gauge MKS 390HA -01000, MKS 390HA -00010SP05	Instrument Calibration Technique for Capacitance Diaphragm Gauge (Document No.: 07-3 -80-0078)	0.1	Pa	100	kPa		0.018P (P in Pa)	Pa
KD2005 Thermo couple vacuum gauge	Capacitance diaphragm vacuum gauge MKS 390HA -01000, MKS 390HA -00010SP05	Instrument Calibration Technique for Vacuum Gauge in the Medium and Low Vacuum range (Document No.: 07-3 -91-0044)	0.1	Pa	100	kPa		0.018P (P in Pa)	Pa

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KD2006 Vacuum gauge	Capacitance diaphragm vacuum gauge MKS 390HA-01000, MKS 390HA-00010SP05	Instrument Calibration Technique for Vacuum Gauge in the Medium and Low Vacuum range (Document No.: 07-3-91-0044)	0.1	Pa	100	kPa		0.018P (P in Pa)	Pa

Flow

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1001 Sonic nozzle	gyroscopic scale (WOHWA /9631)	Instrument Calibration Techniques for Primary Calibration System of High Pressure Gas Flow-Gravimetric Method (Document No.: 07-3-83-0042)	18	kg/h	14000	kg/h		0.12	%
			15	m^3/h	12000	m^3/h		0.12	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1001 Sonic nozzle, laminar, differential -pressure meter	constant volume tank (CMS/500 L, CMS/30 L, CMS/2 L)	Instrument Calibration Technique for Gas Meter by Low Pressure Gas Flow Calibration System (PVTt) -Primary Method (Document No.: 07-3 -A2-0284)	0.01	L/min	300	L/min		0.10	%
			0.2	mg/s	6000	mg/s		0.10	%
KH1001 Sonic nozzle, laminar, Coriolis, thermal-mass, differential -pressure, turbine, ultrasonic, vortex flowmeters	sonic nozzle (HIRAI/-)	Instrument Calibration Techniques for High Pressure Air-Flow Primary Calibration System-Comparison Method (Document No.: 07-3 -86-0115)	18	kg/h	14000	kg/h		0.19	%
			15	m^3/h	12000	m^3/h		0.19	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1001 Sonic nozzle, thermal-mass, differential -pressure, laminar, bubble, variable-area, piston -prover flowmeters	laminar flowmeter (DHI /MOLBLOC, DHI /MOLBOX1)	Instrument Calibration Technique for Low Pressure Gas Flow Calibration System (F06) - Comparison Method /MOLBLOC (Document No.:07-3 -89-0126)	0.04	mg/s	480	mg/s		0.13	%
			0.002	L/min	24	L/min		0.13	%
KH1001 Sonic nozzle, thermal-mass, differential -pressure, laminar, bubble, variable-area, piston-prover flowmeters	sonic nozzle (FLOW SYSTEMS /d=0.204, d=0.100, d=0.049, d=0.024)	Instrument Calibration Technique for Gas Meter by Low Pressure Gas Calibration System - Master Meter Method (Document No.:07-3-A0 -2020)	0.13	g/s	2	g/s		0.18	%
			6.5	L/min	100	L/min		0.18	%
			2	g/s	20	g/s		0.14	%
			100	L/min	1000	L/min		0.14	%
KH1001 Sonic nozzle, thermal-mass, differential -pressure, laminar, variable-area flowmeters	sonic nozzle (CMS/SN0583, CMS/SN0836, CMS/SN1190, CMS/SN1757, CMS/-, CMS/-, CMS/-, CMS/-, HIRAI/SN003, HIRAI/SN005, HIRAI/SN008, HIRAI/SN010, HIRAI/SN015, HIRAI/SN020, HIRAI/SN030, HIRAI/SN040, HIRAI/SN060)	Instrument Calibration Technique for Gas Meter by Low Pressure Gas Flow Calibration System (PVTt) - Master Meter Method (Document No.: 07-3-A2 -0261)	0.8	mg/s	6000	mg/s		0.13	%
			0.04	L/min	300	L/min		0.13	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1001 Sonic nozzle, thermal-mass, differential -pressure, laminar, variable-area flowmeters	sonic nozzle (HIRAI/SN003, HIRAI/SN005, HIRAI/SN008, HIRAI/SN010, HIRAI/SN015, HIRAI/SN020, HIRAI/SN030, HIRAI/SN040, HIRAI/SN060, HIRAI/SN085, HIRAI/SN120, HIRAI/SN170, HIRAI/SN240)	Instrument Calibration Technique for Gas Meter by Low Pressure Gas Flow Calibration System (PVTt) - Master Meter Method (Document No.: 07-3-A2 -0261)	0.8	mg/s	6000	mg/s		0.11	%
			0.04	L/min	300	L/min		0.12	%
KH1001 Sonic nozzle, thermal-mass, laminar, piston-prover, differential -pressure, variable-area flowmeters	bell prover (Brooks/1093)	Instrument Calibration Techniques for Low Pressure Gas Flow Calibration System -Bell 1093 Calibrating Meter (Document No.:07-3-76 -0010)	0.4	g/s	20	g/s		0.12	%
			20	L/min	1000	L/min		0.12	%
KH1001 Sonic nozzle, thermal-mass, laminar, piston-prover, differential -pressure, variable-area flowmeters	bell prover (Brooks/1090)	Instrument Calibration Technique for Low Pressure Gas Flow Calibration System -Bell 1090 Calibrating Meter (Document No.:07-3-76 -0011)	0.08	g/s	2	g/s		0.16	%
			4	L/min	100	L/min		0.16	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1001 Sonic nozzle, thermal-mass, laminar, piston-prover, differential -pressure, variable-area flowmeters	piston prover (Brooks/1050-5)	Instrument Calibration Techniques for Low Pressure Gas Flow Calibration System - Piston Prover Calibrating Meter (Document No.:07-3-76 -0012)	0.04	mg/s	480	mg/s		0.11	%
			0.002	L/min	24	L/min		0.11	%
KH1002 Coriolis, positive -displacement, differential -pressure, turbine, ultrasonic, vortex, electro magnetic, variable-area flowmeters	weighing scale (Mettler Toledo /KES1500, Mettler Toledo /KG6000)	Instrument Calibration Techniques for Large Water Flow Calibration System -Weighing Method (Document No.: 07-3-84 -0002)	1.67	kg/s	133	kg/s		0.05	%
			6	m^3/h	480	m^3/h		0.05	%
KH1002 Coriolis, positive-displacement, differential -pressure, turbine, ultrasonic, vortex, electro magnetic, variable-area flowmeters	weighing scale (Mettler Toledo /KCS600)	Instrument Calibration Techniques for Small Water Flow Calibration System -Weighing Method (Document No.: 07-3-85 -0092)	0.16	kg/s	11.67	kg/s		0.04	%
			0.6	m^3/h	42	m^3/h		0.04	%
			0.033	kg/s	0.16	kg/s		0.06	%
			0.12	m^3/h	0.6	m^3/h		0.06	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH1002 Thermal-mass, differential-pressure, Coriolis, variable-area, time-of-flight flowmeters, liquid metering pump	weighing scale (Mettler Toledo /AX205)	Instrument Calibration Techniques for Micro Flow Calibration System - Weighing Method (Document No.: 07-3-94-0095)	0.1	mm^3/min	1	mm^3/min		2.0	%
			1	mm^3/min	10	mm^3/min		0.7	%
			10	mm^3/min	100	mm^3/min		0.4	%
			0.1	cm^3/min	1	cm^3/min		0.2	%
			1	cm^3/min	10	cm^3/min		0.3	%
			0.1	mg/min	1	mg/min		2.0	%
			1	mg/min	10	mg/min		0.7	%
			10	mg/min	100	mg/min		0.4	%
			0.1	g/min	1	g/min		0.2	%
			1	g/min	10	g/min		0.3	%
KH2001 Positive-displacement, Coriolis, thermal, turbine, ultrasonic, vortex flowmeters	sonic nozzle (HIRAI/-)	Instrument Calibration Techniques for High Pressure Air-Flow Primary Calibration System -Comparison Method (Document No.: 07-3-86-0115)	< 200	m^3	< 200	m^3	@ (15 to 12000) m^3/h	0.19	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	mini mum value	units	maxi mum value	units	explanation	value	units
KH2001 Positive -displacement flowmeters	laminar flowmeter (DHI /MOLBLOC, DHI /MOLBOX1)	Instrument Calibration Technique for Low Pressure Gas Flow Calibration System (F06) - Comparison Method/MOL BLOC (Document No.:07-3-89 -0126)	< 500	L	< 500	L	@ (0.002 to 24) L/min	0.14	%
KH2001 Positive -displacement flowmeters	bell prover (Brooks/109 0)	Instrument Calibration Technique for Low Pressure Gas Flow Calibration System -Bell 1090 Calibrating Meter (Document No.:07-3-76 -0011)	< 60	L	< 60	L	@ (4 to 100) L/min	0.17	%
KH2001 Positive -displacement flowmeters	sonic nozzle (FLOW SYSTEMS /d=0.204, d=0.100, d=0.049, d=0.024)	Instrument Calibration Technique for Gas Meter by Low Pressure Gas Calibration System - Master Meter Method (Document No.:07-3-A0 -2020)	< 1000	L	< 1000	L	@ (6.5 to 100) L/min	0.18	%
			< 10000	L	< 10000	L	@ (100 to 1000) L/min	0.14	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH2001 Positive -displacement flowmeters	bell prover (Brooks /1093)	Instrument Calibration Techniques for Low Pressure Gas Flow Calibration System -Bell 1093 Calibrating Meter (Document No.:07-3-76 -0010)	< 600	L	< 600	L	@ (20 to 1000) L/min	0.13	%
KH2001 Turbine, ultrasonic, rotary flowmeters	gyroscopic scale (WOHWA /9631)	Instrument Calibration Techniques for Primary Calibration System of High Pressure Gas Flow -Gravimetric Method (Document No.: 07-3-83 -0042)	< 200	m^3/h	< 200	m^3/h	@ (15 to 12000) m^3/h	0.12	%
KH2002 Coriolis, positive -displacement, turbine, ultrasonic, vortex, electromagnetic flowmeters	weighing scale (Mettler Toledo /KES1500, Mettler Toledo /KG6000)	Instrument Calibration Techniques for Large Water Flow Calibration System - Weighing Method (Document No.: 07-3-84 -0002)	375	kg	6000	kg	@ (1.67 to 133) kg/s	0.04	%
			0.375	m^3	6	m^3	@ (6 to 480) m^3/h	0.04	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	mini mum value	units	maxi mum value	units	explanation	value	units
KH2002 Coriolis, positive -displacement, turbine, ultrasonic, vortex, electro magnetic flowmeters	weighing scale (Mettler Toledo /KCS600)	Instrument Calibration Techniques for Small Water Flow Calibration System -Weighing Method (Document No.: 07-3 -85-0092)	60	kg	600	kg	@ (0.16 to 11.67) kg/s	0.03	%
			60	L	600	L	@ (0.6 to 42) m^3/h	0.03	%
			20	kg	60	kg	@ (0.033 to 0.16) kg/s	0.06	%
			20	L	60	L	@ (0.12 to 0.6) m^3/h	0.06	%
KH2002 Coriolis flowmeter, liquid metering pump	weighing scale (Mettler Toledo /AX205)	Instrument Calibration Techniques for Micro Flow Calibration System -Weighing Method (Document No.: 07-3 -94-0095)	0.025	cm^3	0.25	cm^3	@ (0.1 to 1) mm^3/min	2.0	%
			0.2	cm^3	2	cm^3	@ (1 to 10) mm^3/min	0.7	%
			0.35	cm^3	3.5	cm^3	@ (10 to 100) mm^3/min	0.4	%
			8.1	cm^3	81	cm^3	@ (0.1 to 1) cm^3/min	0.2	%
			55	cm^3	100	cm^3	@ (1 to 10) cm^3/min	0.3	%
			0.025	g	0.25	g	@ (0.1 to 1) mg/min	2.0	%
			0.2	g	2	g	@ (1 to 10) mg/min	0.7	%
			0.35	g	3.5	g	@ (10 to 100) mg/min	0.4	%
			8.1	g	81	g	@ (0.1 to 1) g/min	0.2	%
			55	g	100	g	@ (1 to 10) g/min	0.3	%
KH2003 Positive -displacement, turbine, Coriolis, ultrasonic flowmeters	weighing scale (Mettler Toledo /KES3000, Mettler Toledo /KG6000)	Instrument Calibration Technique for Low Viscosity Oil Flow System -Weighing Method (Document No.: 07-3-83 -0058)	0.47	m^3	7.4	m^3	@ (3.6 to 360) m^3/h	0.05	%
			375	kg	6000	kg	@ (50 to 1800) kg/min	0.04	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	minimum value	units	maximum value	units	explanation	value	units
KH2003 Positive -displacement, turbine, Coriolis flowmeters	weighing scale (Mettler Toledo /KES3000, Mettler Toledo /KG6000)	Instrument Calibration Technique for High Viscosity Oil Flow System -Weighing Method (Document No.: 07-3-86 -0087)	0.43	m^3	6.9	m^3	@(3.6 to 360) m^3/h	0.05	%
			375	kg	6000	kg	@ (50 to 1800) kg/min	0.04	%
KH3001 Thermal, ultrasonic, differential -pressure, vane, Laser -Doppler anemometer	laser Doppler velocimeter (DANTEC /Fiber Flow)	Instrument Calibration Techniques for Air Speed Calibration System - LDV Method (Document No.: 07-3-93 -0130)	0.2	m/s	25	m/s		0.52	%
KH3002 Ultrasonic flowmeter	weighing scale (Mettler Toledo/KES1500, Mettler Toledo/KG6000)	Instrument Calibration Techniques for Large Water Flow Calibration System - Weighing Method (Document No.: 07-3-84 -0002)	0.1	m/s	10	m/s		0.5	%

calibration items	working standard	calibration method	measurand level or range				measurement conditions /independent variable	smallest uncertainty	
	brand /model	document name /no.	mini mum value	units	maxi mum value	units	explanation	value	units
KH3002 Ultrasonic flowmeter	weighing scale (Mettler Toledo /KCS600)	Instrument Calibration Techniques for Small Water Flow Calibration System - Weighing Method (Document No.: 07-3-85 -0092)	0.1	m/s	10	m/s		1.0	%

Note: Smallest uncertainty represents an expanded uncertainty using a coverage factor approximately 95 % level of confidence.

Approval Signatory

Approval Signatory	Scope
HO, Yi-Lin	KH1001, KH1002, KH2001, KH2002, KH2003, KH3001, KH3002
LIN, Win-Ti	KH1001, KH1002, KH2001, KH2002, KH2003, KH3001, KH3002
CHEN, Sheng-Jui	KC1001, KC1011, KC2001, KC2002, KC2003, KC2004, KC2007, KC5001, KC5003, KD1001, KD1002, KD1003, KD1004, KD1005, KD1007, KD2001, KD2002, KD2003, KD2005, KD2006
FU, Wei-En	KC1001, KC1011, KC2001, KC2002, KC2003, KC2004, KC2007, KC5001, KC5003, KD1001, KD1002, KD1003, KD1004, KD1005, KD1007, KD2001, KD2002, KD2003, KD2005, KD2006
PAN, Sheau-Shi	KC1001, KC1011, KC2001, KC2002, KC2003, KC2004, KC2007, KC5001, KC5003, KD1001, KD1002, KD1003, KD1004, KD1005, KD1007, KD2001, KD2002, KD2003, KD2005, KD2006

(Null Below)