



Certificate No. : LN2346-191024

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 (Chemical)
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 : N2346
Originally Accredited : December 29, 2010
Effective Period : December 29, 2015 to December 28, 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

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President, Taiwan Accreditation Foundation
Date: October 24, 2019

Accreditation Number : N2346

Laboratory Head : LIN, Tzeng-Yow

Chemical

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
KI1000 rotational viscometer	Viscosity standard liquid: CANNON /S3, S6, N10, S20, N35, S60, N100, S200, N350, S600, N1000, S2000, N4000, S8000, N15000, S30000, N62000	Instrument Calibration Technique for Rotational Viscometers (Document No.: 07-3-81-0063)	1	mPa·s	100	mPa·s		0.04	mPa·s
			>100	mPa·s	1000	mPa·s		0.9	mPa·s
			>1000	mPa·s	10000	mPa·s		9	mPa·s
			>10000	mPa·s	100000	mPa·s		97	mPa·s
			>100000	mPa·s	200000	mPa·s		2300	mPa·s
KI4000 NO, SO ₂ (Cylinder Gas)	Standard gas: NMIs /NO, SO ₂	Instrument Calibration Technique for Calibration of the Concentration of Gas Cylinder -Infrared Spectroscopy Method (Document No.: 07-3-A3-0205)	50	μmol /mol	2000	μmol /mol	NO/N ₂	0.89	μmol /mol
			50	μmol /mol	2000	μmol /mol	SO ₂ /N ₂	0.82	μmol /mol

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
KI4000 C ₂ H ₅ OH (Cylinder Gas)	Standard gas: NMIs /C ₂ H ₅ OH	Instrument Calibration Technique for the Component Concentration of Ethanol Gas Mixtures (Document No.: 07-3 -A2-0120)	137	μmol /mol	137	μmol /mol		1.7	μmol /mol
			301	μmol /mol	301	μmol /mol		3.2	μmol /mol
			547	μmol /mol	547	μmol /mol		4.3	μmol /mol
KI4000 CO, CO ₂ , CH ₄ , C ₃ H ₈ (Cylinder Gas)	Standard gas: NMIs /CO, CO ₂ , CH ₄ , C ₃ H ₈	Instrument Calibration Technique for the Component Concentration of Cylinder Gas - Gas Chromatography with Flame Ionization Detector (Document No.: 07-3 -A3-0079)	10	μmol /mol	1000	μmol /mol	CO	0.08	μmol /mol
			100	μmol /mol	1000	μmol /mol	CO ₂	1.1	μmol /mol
			100	μmol /mol	1000	μmol /mol	CH ₄	0.9	μmol /mol
			100	μmol /mol	1000	μmol /mol	C ₃ H ₈	1.0	μmol /mol

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
KI4000 CO, CO ₂ , CH ₄ , C ₃ H ₈ , CF ₄ , SF ₆ , NO, SO ₂ , O ₂ (Cylinder Gas)	Standard gas:NMIs /CO, CO ₂ , CH ₄ , C ₃ H ₈ , CF ₄ , SF ₆ , NO, SO ₂ , O ₂	Instrument Certification Technique for Filling Mass Cylinder Gases and Concentration of Gas Mixtures -Gravimetric Method (Document No.: 07-3 -A3-0179)	1	μmol /mol	100	μmol /mol	CO/N ₂	1.0	%
			> 0.1	μmol /mol	100	μmol /mol	CO/N ₂	0.2	%
			100	μmol /mol	1000	μmol /mol	CO ₂ /N ₂	0.2	%
			> 1	μmol /mol	160	μmol /mol	CO ₂ /N ₂	0.1	%
			100	μmol /mol	1000	μmol /mol	CH ₄ /N ₂	0.8	%
			> 1	μmol /mol	100	μmol /mol	CH ₄ /N ₂	0.1	%
			0.1	μmol /mol	50	μmol /mol	C ₃ H ₈ /N ₂	0.5	%
			100	μmol /mol	3000	μmol /mol	CF ₄ /N ₂	0.3	%
			10	μmol /mol	1000	μmol /mol	SF ₆ /N ₂	0.5	%
			50	μmol /mol	2000	μmol /mol	NO/N ₂	0.8	%
			50	μmol /mol	2000	μmol /mol	SO ₂ /N ₂	0.5	%
			1	μmol /mol	10	μmol /mol	O ₂ /N ₂	1.5	%
			1	μmol /mol	10	μmol /mol	O ₂ /N ₂	0.5	%
			> 10	μmol /mol	250	μmol /mol	O ₂ /N ₂	0.3	%
1	μmol /mol	20	μmol /mol	CH ₄ /air	0.3	%			

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
KI4000 CO, CO ₂ , CH ₄ , C ₃ H ₈ , O ₂ (Cylinder Gas)	Standard gas: NMIs /CO, CO ₂ , CH ₄ , C ₃ H ₈ , O ₂	Instrument Calibration Technique for the Component Concentration of Cylinder Gas -Gas Chromatography with Thermal Conductivity Detector (Document No.: 07-3-91-0035)	1000	μmol /mol	10000	μmol /mol	CO	9	μmol /mol
			>10000	μmol /mol	20000	μmol /mol	CO	90	μmol /mol
			1000	μmol /mol	10000	μmol /mol	CO ₂	12	μmol /mol
			>10000	μmol /mol	30000	μmol /mol	CO ₂	120	μmol /mol
			1000	μmol /mol	10000	μmol /mol	CH ₄	8	μmol /mol
			>10000	μmol /mol	10000	μmol /mol	CH ₄	80	μmol /mol
			1000	μmol /mol	10000	μmol /mol	C ₃ H ₈	6	μmol /mol
			>10000	μmol /mol	50000	μmol /mol	C ₃ H ₈	60	μmol /mol
			1000	μmol /mol	10000	μmol /mol	O ₂	12	μmol /mol
>10000	μmol /mol	25000	μmol /mol	O ₂	120	μmol /mol			
KI4000 Synthetic Natural Gas (Cylinder Gas)	Standard gas: NMIs /Synthetic Natural Gas	Instrument Calibration Technique for the Component Concentration of Natural Gas (Document No.: 07-3-A1-0028)	0.1	cmol /mol	95	cmol /mol	CH ₄	0.18	cmol /mol
			0.1	cmol /mol	10	cmol /mol	C ₂ H ₆	0.017	cmol /mol
			0.1	cmol /mol	10	cmol /mol	C ₃ H ₈	0.012	cmol /mol
			0.01	cmol /mol	1.0	cmol /mol	iso-C ₄ H ₁₀	0.0012	cmol /mol
			0.01	cmol /mol	1.0	cmol /mol	n-C ₄ H ₁₀	0.0012	cmol /mol
			0.01	cmol /mol	0.2	cmol /mol	neo-C ₅ H ₁₂	0.00013	cmol /mol
			0.01	cmol /mol	0.3	cmol /mol	iso-C ₅ H ₁₂	0.0005	cmol /mol
			0.01	cmol /mol	0.3	cmol /mol	n-C ₅ H ₁₂	0.0006	cmol /mol

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
KI4000 Synthetic Natural Gas (Cylinder Gas)	Standard gas: NMIs /Synthetic Natural Gas	Instrument Calibration Technique for the Component Concentration of Natural Gas (Document No.: 07-3-A1-0028)	0.01	cmol /mol	0.1	cmol /mol	n-C ₆ H ₁₄	0.00031	cmol /mol
			0.01	cmol /mol	50	cmol /mol	N ₂	0.0038	cmol /mol
			0.01	cmol /mol	20	cmol /mol	CO ₂	0.008	cmol /mol
KI6000 Gas Monitor, Gas Alarm, Gas Detector	Standard gas: NMIs /CO, CO ₂ , CH ₄ , C ₃ H ₈	Instrument Calibration Technique for Gas Measurement System -Gas Monitor (Document No.: 07-3-91-0072)	0.0	mol /mol	0.1	mol /mol	CO	2	μmol /mol
			0	mol /mol	1	mol /mol	CO ₂	6	μmol /mol
			0.00 (0)	mol /mol (%LEL)	0.05 (100)	mol /mol (%LEL)	CH ₄	59 (0.1)	μmol /mol (%LEL)
			0.00 (0)	mol /mol (%LEL)	0.02 (100)	mol /mol (%LEL)	C ₃ H ₈	26 (0.1)	μmol /mol (%LEL)
KI6000 Gas Divider (CO, CO ₂ , CH ₄ , C ₃ H ₈)	Standard gas: NMIs / CO, CO ₂ , CH ₄ , C ₃ H ₈	Instrument Calibration Technique for Gas Measurement System - Gas Monitor (Document No.:07-3-91-0070)	0	%	100	%		0.5	%

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
KI6000 Gas Concentration Analysis Equipment (C ₂ H ₅ OH)	Standard gas:NMIs /C ₂ H ₅ OH	Instrument Calibration Technique for Preparation and Concentration Calibration of Gaseous Ethanol (Document No.: 07-3 -A3-0197)	0	μmol /mol	1200	μmol /mol		3	μmol /mol
KI6000 Gas Concentration Dilution Device (CO, CO ₂ , CH ₄)	Standard gas: NMIs /CO, CO ₂ , CH ₄	Instrument Calibration Technique for the Concentration Calibration of Gas Dilutor-Gas Chromatography (Document No.:07-3 -A3-0185)	0	%	100	%	CO ₂ /N ₂ @ (50 to 500) μmol/mol	0.03	%
			0	%	100	%	CO/N ₂ @ (1 to 100) μmol/mol	0.02	%
			0	%	100	%	CH ₄ /air@ (1000 to 20000) μmol/mol	0.15	%
KI7000 Gas Analyzer	Standard gas: NMIs / CO, CO ₂ , CH ₄ , C ₃ H ₈	Instrument Calibration Technique for Gas Measurement System - Gas Monitor (Document No.: 07-3 -91-0072)	0.0	mol /mol	0.1	mol /mol	CO	2	μmol /mol
			0	mol /mol	1	mol /mol	CO ₂	6	μmol /mol
			0.00 (0)	mol /mol (%LEL)	0.05 (100)	mol /mol (%LEL)	CH ₄	59 (0.1)	μmol /mol (%LEL)
			0.00 (0)	mol /mol (%LEL)	0.02 (100)	mol /mol (%LEL)	C ₃ H ₈	26 (0.1)	μmol /mol (%LEL)

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
KI7000 Gas Analyzer (C ₂ H ₅ OH)	Standard gas: NMIs /C ₂ H ₅ OH	Instrument Calibration Technique for Preparation and Concentration Calibration of Gaseous Ethanol (Document No.: 07-3-A3-0197)	0	μmol /mol	1200	μmol /mol		3	μmol /mol
KI7000 Gas Concentration Dilution Device (CO, CO ₂ , CH ₄)	Standard gas: NMIs /CO, CO ₂ , CH ₄	Instrument Calibration Technique for the Concentration Calibration of Gas Dilutor-Gas Chromatography (Document No.: 07-3-A3-0185)	0	%	100	%	CO ₂ /N ₂ @ (50 to 500) μmol/mol	0.03	%
			0	%	100	%	CO/N ₂ @ (1 to 100) μmol/mol	0.02	%
			0	%	100	%	CH ₄ /air @ (1000 to 20000) μmol/mol	0.15	%

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

Approval Signatory

Approval Signatory	Scope
LIN, Tsai-Yin	KI1000, KI4000, KI6000, KI7000
HUANG, Chiung-Kun	KI1000, KI4000, KI6000, KI7000

(Null Below)