

# Accreditation Certificate

## Calibration Specialists Ltd

The National Technological Park, Castletroy, Limerick

### Calibration Laboratory

Registration number: 001C

is accredited by the Irish National Accreditation Board (INAB) to undertake calibration as detailed in the Schedule bearing the Registration Number detailed above, in compliance with the International Standard ISO/IEC 17025:2005 2<sup>nd</sup> Edition

*“General Requirements for the Competence of Testing and Calibration Laboratories”*

*(This Certificate must be read in conjunction with the annexed Schedule of Accreditation)*

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Date of award of accreditation: 24:12:2002

Date of last renewal of accreditation: 06:03:2008

Expiry date of this certificate of accreditation: 24:12:2012

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This Accreditation shall remain in force until further notice subject to continuing compliance with INAB accreditation criteria, ISO/IEC 17025 and any further requirements specified by the Irish National Accreditation Board.

**Manager:**  **Chairperson:**   
Dr Adrienne Duff Dr Máire Walsh

Issued on 07 August 2009

Organisations are subject to annual surveillance and are re-assessed every five years. The renewal date on this Certificate confirms the latest date of renewal of accreditation. To confirm the validity of this Certificate, please contact the Irish National Accreditation Board.

INAB is a signatory of the European co-operation for Accreditation (EA) Testing Multilateral Agreement (MLA) and the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement.

# Schedule of Accreditation



(Annex to Accreditation Certificate)

Permanent Laboratory:  
Category *A, B*

## CALIBRATION SPECIALISTS LTD

### Electrical and Dimensional Calibration Laboratory

*Initial Accreditation Date :* 10-March-1987 - Electrical Permanent Lab at Limerick  
17-December-1997 - Metrology Permanent Lab at Limerick

*Postal Address:*

The National Technology Park  
Castleroy  
Limerick

*Telephone:* +353 (61) 330333

*Fax:* +353 (61) 330452

*E-mail:* [sales@feasa.ie](mailto:sales@feasa.ie)

*Contact Name:* Mr T Davern

*Facilities:* **Public calibration service**

# Schedule of Accreditation



Permanent Laboratory:  
 Category A, B

THE IRISH NATIONAL ACCREDITATION BOARD (INAB) is the Irish body for the accreditation of organisations including laboratories.

Laboratory accreditation is available to testing and calibration facilities operated by manufacturing organisations, government departments, educational institutions and commercial testing/calibration services. Indeed, any organisation involved in testing, measurement or calibration in any area of technology can seek accreditation for the work it is undertaking.

Each accredited laboratory has been assessed by skilled specialist assessors and found to meet criteria which are in compliance with ISO/IEC 17025 or ISO/IEC 15189 (medical laboratories). Frequent audits, together with periodic inter-laboratory test programmes, ensure that these standards of operation are maintained.

## Calibration Categories:

- Category A:** Permanent calibration laboratory where the laboratory is erected on a fixed location for a period expected to be greater than three years.
- Category B:** Site calibration that is performed by staff sent out on site by a permanent laboratory that is accredited by the Irish National Accreditation Board.
- Category C:** Site calibration that is performed in a site/mobile laboratory or by staff sent out by such a laboratory, the operation of which is the responsibility of a permanent laboratory accredited by the Irish National Accreditation Board.
- Category D:** Site calibration that is performed on site by individuals and organisations that do not have a permanent calibration laboratory. Calibration may be performed using
- (a) portable test equipment
  - (b) a site laboratory
  - (c) a mobile laboratory or
  - (d) equipment from a mobile or site laboratory

## Standard Specification or Calibration Procedure Used:

The standard specification or calibration procedure that is accredited is the issue that is current on the date of the most recent visit, unless otherwise stated.

## Glossary of Terms

### Facilities:

- Public calibration service:** Commercial operations which actively seek work from others.
- Conditionally available for public calibration:** Established for another primary purpose but, more commonly than not, is available for outside work.
- Normally not available for public calibration:** Unavailable for public calibration more often than not.

Laboratory users wishing to obtain assurance that calibration results are reliable and carried out to the Irish National Accreditation Board criteria should insist on receiving an accredited calibration certificate.

Users should contact the laboratory directly to ensure that this schedule of accreditation is current. INAB will on request verify the status and scope.

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A, B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
D.C. Resistance Measure <i>Other Values</i> 0.1 Ω nominal 0.1 Ω to 12Ω 12 Ω to 120Ω 120 Ω to 1.2 kΩ 1.2 kΩ to 12 kΩ 12 kΩ to 120 kΩ 120 kΩ to 1.2 MΩ 1.2 MΩ to 12 MΩ 12 MΩ□ to 120 MΩ 120 MΩ□ to 1.2 GΩ		0.5 mΩ*** 32 μΩ to 0.25 mΩ 0.5 mΩ to 2 mΩ 1.8 mΩ to 15 mΩ 18 mΩ to 147 mΩ 0.2 mΩ to 1.5 Ω 3.4 Ω to 23 Ω 165 Ω to 748 Ω*** 8.2 kΩ to 73 kΩ*** 610 kΩ to 6 MΩ***	
Generate <i>Discrete Values</i> 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ 5 GΩ		0.65 mΩ*** 53 μΩ 0.29 mΩ 1.1 mΩ 0.11 Ω 1.1 Ω 1.5 Ω 30 Ω 590 Ω 55.6 kΩ 1.06 MΩ 13.3 MΩ	



# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1, 4 & 5
<p>D.C. Voltage</p> <p><i>Generate</i></p> <p>Up to 2V</p> <p>2 V to 20 V</p> <p>20 V to 200 V</p> <p>200 V to 1.2 kV</p>		<p>1.3 μV to 27 μV</p> <p>16 μV to 160 μV</p> <p>0.26 mV to 3 mV</p> <p>3 mV to 17 mV</p>	
<p><i>Measure</i></p> <p>1.2 mV to 120 mV</p> <p>120 mV to 1.2 V</p> <p>1.2 V to 12 V</p> <p>12 V to 120 V</p> <p>120 V to 1000</p> <p>1kV to 6kV</p> <p>6kV to 10kV</p>		<p>1.61 μV to 3 μV</p> <p>3 μV to 13.6 μV</p> <p>14.6 μV to 123 μV</p> <p>0.2 mV to 1.5 mV</p> <p>2.88 mV to 23.1 mV</p> <p>10 V to 60 V</p> <p>60 V to 100 V</p>	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
DC Current <i>Measure</i> 12 nA to 120 nA 120 nA to 1.2 µA 1.2 µA to 12 µA 12 µA to 120 µA 120 µA to 1.2 mA 1.2 mA to 12 mA 12 mA to 120 mA 120 mA to 1 A 1 A to 30 A 30 A to 100 A		0.05 nA 0.05 nA to 0.08 nA 0.2 nA to 0.4 nA 1.3 nA to 4 nA 9 nA to 35 nA 89 nA to 248 nA 0.06 µA to 5.0 µA 27.2 µA to 139 µA 0.4 mA to 9.1 mA 12 mA to 21 mA	
DC Current <i>Generate</i> 10 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2A		750 pA to 15 nA 13.6 nA to 136 nA 0.13 µA to 1.34 µA 1.3 µA to 13.4µA 26 µA to 0.26 mA	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
A.C. Voltage			
<i>Generate</i>			
0.09 mV to 2 mV	10 Hz to 40 Hz	5.9 µV to 11.8 µV	
2 mV to 20 mV		6.6 µV to 13.4 µV	
20 mV to 200 mV		10.8 µV to 55.8 µV	
200 mV to 2 V		44 µV to 0.44 mV	
2 V to 20 V		0.44 mV to 4.4 mV	
20 V to 200 V		4.4 mV to 44 mV	
0.09 mV to 2 mV	40 Hz to 10 kHz	6 µV to 98 µV	
2 mV to 20 mV		6.3 µV to 11.0 µV	
20 mV to 200 mV		96 µV to 44 µV	
200 mV to 2 V		26µV to 260 µV	
2 V to 20 V		0.26mV to 2.6 mV	
20 V to 200 V		2.8 mV to 28 mV	
200 V to 1 kV		56 mV to 0.28 V	
0.09 mV to 2 mV	10 kHz to 100 kHz	6.3 µV to 16 µV	
2 mV to 20 mV		7 µV to 17 µV	
20 mV to 200 mV		16.4 µV to 0.12 mV	
200 mV to 2 V		0.04 mV to 0.42 mV	
2 V to 20 V		0.44 mV to 4.4 mV	
20 V to 200 V		4.8 mV to 48 mV	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4	
A.C. Voltage	1 Hz to 40 Hz	3.3 µV to 6.6 µV		
	40 Hz to 1 kHz	1.3 µV to 3.5 µV		
	1 kHz to 20 kHz	1.4 µV to 4.7 µV		
<i>Measure</i> 1.0 mV to 12.0 mV	20 kHz to 50 kHz	2.1 µV to 13.1 µV		
	50 kHz to 100 kHz	6.1 µV to 61.1 µV		
	100 kHz to 300 kHz	42 µV to 0.5 µV		
<i>Measure</i> 12.0 mV to 120.0 mV	1 Hz to 40 Hz	4.8 µV to 12.9 µV		
	40 Hz to 1 kHz	4.8 µV to 12.9 µV		
	1kHz to 20 kHz	3.7 µV to 19.3 µV		
	20 kHz to 50 kHz	5.6 µV to 38 µV		
	50 kHz to 100 kHz	11.6 µV to 98 µV		
	100 kHz to 300 kHz	46 µV to 0.37 mV		
	300 kHz to 1 MHz	0.2 mV to 1.2 mV		
	1 MHz to 2 MHz	0.2 mV to 1.8 mV		
	<i>Measure</i> 120.0 mV to 1.2 V	1 Hz to 40 Hz	47 µV to 114 µV	
		40 Hz to 1 kHz	29 µV to 109 µV	
1 kHz to 20 kHz		37 µV to 193 µV		
20 kHz to 50 kHz		56 µV to 0.4 mV		
50 kHz to 100 kHz		0.12 mV to 1 mV		
100 kHz to 300 kHz		0.5 mV to 4 mV		
	300 kHz to 1 MHz	1.2 mV to 12.1 mV		
	1 MHz to 2 MHz	1.9mV to 18.1 mV		

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
A.C. Voltage  <i>Measure</i> 1.2 V to 12.0 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz	0.5 mV to 1.3 mV 0.3 mV to 1.1mV 0.4 mV to 2 mV 0.6 mV to 3.8 mV 1.2 mV to 10 mV 5 mV to 37 mV 13 mV to 121 mV 19 mV to 181 mV	
<i>Measure</i> 12.0 V to 120.0 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	6.4 mV to 28 mV 4.4 mV to 26 mV 4.4 mV to 26 mV 6.2 mV to 146 mV 6.4 mV to 146 mV	
<i>Measure</i> 120.0 V to 1000 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz	88 mV to 44 mV 68 mV to 42 mV 92 mV to 62 mV	44 mV to 88 mV 42 mV to 68 mV 620 mV to 92 mV
<i>Measure</i> 1 kV to 2 kV 2 kV to 7 kV	20 Hz to 100 Hz 20 Hz to 60 Hz	4.2 V to 8.4 V 54 V to 189 V	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
AC Current  <i>Generate</i> 10µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	40 Hz to 5 kHz	7.5 nA to 150 nA 130 nA to 1.3 µA 1.2 µA to 12.4 µA 12.6 µA to 126 µA 0.18 mA to 1.8 mA	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
Measure			
6.0 µA to 120.0 µA	45 Hz to 1 kHz	24 nA to 92 nA ***	
120.0 µA to 1.20 mA	45 Hz to 100 Hz	0.3 µA to 0.9 µA ***	
	100 Hz to 5 kHz	0.2 µA to 0.6 µA ***	
1.2 mA to 12.0 mA	45 Hz to 100 Hz	2.7 µA to 9.2 µA ***	
	100 Hz to 5 kHz	2.4 µA to 5.6 µA ***	
12.0 mA to 120.0 mA	45 Hz to 100 Hz	27 µA to 92 µA ***	
	100 Hz to 5 kHz	24 µA to 56 µA ***	
120.0 mA to 1.0 A	45 Hz to 100 Hz	0.3 mA to 1 mA ***	
	100 Hz to 5 kHz	0.3mA to 1.2 mA ***	
1.0 A to 10.0 A	50 Hz to 2 kHz	0.02 A to 0.12 mA ***	
		20 mA to 120 mA	
10.0 A to 30.0A	50 Hz to 60 Hz	6.6 mA to 18 mA ***	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
Frequency <i>Generate Discrete values</i>	1 MHz 5 MHz 10 MHz 0.2 Hz 0.5 Hz	2mHz 0.01 Hz 0.02 Hz 1.2 µHz 3.0 µHz ***	(With external reference (with internal reference)
1.0 Hz to 100 kHz (in discreet steps: 1,2,5 10 etc)		4 µHz to 4 Hz ***	
100 kHz to 10 MHz		0.07 Hz to 0.25 Hz ***	
10 MHz to 20 GHz		0.2 Hz to 2.4 KHz ***	(within 12 months of last calibration standard)

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
Measure 0.1 Hz to 1 Hz 1 Hz to 10 Hz 10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 1.2 GHz		50 µHz to 500 µHz 50 µHz to 500 µHz 52 µHz to 0.52 mHz 6.2 µHz to 0.62 mHz 0.21 mHz to 252 Hz	See Note 2
Period <i>Generate</i> 10.0 Ns to 1.0 S 2.0 S 5.0 S		0.004 pS to 4 µS 8.0 µS 30 µS	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work:  $23 \pm 5^\circ\text{C}$ ; Relative Humidity  $50\% \pm 25\%$ )

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty *	Method and remarks Notes 1, 3 & 4
Risetime/Falltime <i>Generate</i>  Nominal risetime <200 ps into 50 $\Omega$		77 pS	

# Scope of Accreditation



## Calibration Technology

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
302 .01 .02 .03	<b>Resistors, resistance boxes and potential dividers</b>	Precision resistors, resistance boxes and conductance boxes Volt ratio boxes and potential dividers DC Shunts
307 .11	<b>Voltage Standards</b>	Electronic e.m.f. reference devices
309 .01 .02 .03 .04 .51	<b>Instrument Calibrators</b>	DC voltage AC voltage DC voltage AC current Resistance
310 .01 .02 .03 .04 .09 .81 .82	<b>Indicating and recording instruments</b>	DC voltmeters AC voltmeters DC ammeters AC ammeters Ohmmeters Graphic recording instruments Digital storage recorders

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
311 .01 .02	Bridges, potentiometers, test sets	DC bridges DC potentiometers
312 .01 .02 .11 .12 .14 .21	Frequency and time measuring instruments and standards	Frequency meters Counters Time interval meters Stroboscopes (Electrical) Frequency standards
313 .01 .02 .03 .99	Waveform measuring instruments	Frequency characteristics Input characteristics Timing characteristics Other characteristics: Transition time
321 .01 .02	Power supplies and stabilizers	Power supplies Stabilizers

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
322	Signal sources	
.01		Frequency characteristics
.04		Sweep characteristics
326	Electronic equipment	
.10		Transducer indicators and calibrators
503	Calibration of ancillary	Heat & Temperature measurement

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)	Instrument
.01 temperature measuring instruments	Electrical Simulation
.02	Portable potentiometers
.03	Digital voltmeters
.04	Resistance bridges
.05	Indicators, recorders and controllers
	Transmitters

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A, B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
D.C. Resistance Measure <i>Other Values</i> 0.1 Ω nominal 0.1Ω to 12Ω 12 Ω to 120Ω 120 Ω to 1.2 kΩ 1.2 kΩ to 12 kΩ 12 kΩ to 120 kΩ 120 kΩ to 1.2 MΩ 1.2 MΩ to 12 MΩ 12 MΩ to 120 MΩ 120 MΩ to 1.2 GΩ		0.5 mΩ*** 32 μΩ to 0.25 mΩ 0.5 mΩ to 2 mΩ 1.8 mΩ to 15 mΩ 18 mΩ to 147 mΩ 0.2 mΩ to 1.5 Ω 3.4 Ω to 23 Ω 165 Ω to 748 Ω*** 8.2 kΩ to 73 kΩ*** 610 kΩ to 6 MΩ***	
Generate <i>Discrete Values</i> 0.1 Ω 1 Ω 10Ω 100Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ 5 GΩ		0.65 mΩ*** 53 μΩ 0.29 mΩ 1.1 mΩ 0.01 Ω 1.11 Ω 1.5 Ω 30 Ω 590 Ω 55.6 kΩ 1.06 MΩ 13.3 MΩ	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
D.C. Voltage <i>Generate</i> Up to 2V 2 V to 20 V 20 V to 200 V 200 V to 1.2 kV		1.3 µV to 27 µV 16 µV to 160 µV 0.26 mV to 3 mV 3 mV to 17 mV	For a zero offset measurement, a copper sheet is used with uncertainties not greater than 1 µV
<i>Measure</i> 1.2 mV to 120 mV 120 mV to 1.2 V 1.2 V to 12 V 12 V to 120 V 120 V to 1000V 1kV to 6 kV 6 kV to 10 kV		1.61 µV to 3 µV 3 µV to 13.6 µV 14.6 µV to 123 µV 0.2 mV to 1.5 mV 2.88 mV to 23.1 mV 10 V to 60 V 60 V to 100 V	For a zero offset measurement, a copper sheet is used with uncertainties not greater than 1 µV

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
DC Current <i>Measure</i> 12 nA to 120 nA 120 nA to 1.2 µA 1.2 µA to 12 µA 12 µA to 120 µA 120 µA to 1.2 mA 1.2 mA to 12 mA 12 mA to 120 mA 120 mA to 1 A 1 A to 30 A 30 A to 100 A		0.05 nA 0.05 nA to 0.08 nA 0.2 nA to 0.4 nA 1.3 nA to 4 nA 9 nA to 35 nA 89 nA to 248 nA 0.06 µA to 5.0 µA 27.2 µA to 139 µA 0.4 mA to 9.1 mA 12 mA to 21 mA	
<i>Generate</i> 10 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A		750 pA to 15 nA 13.6 nA to 136 nA 0.13 µA to 1.34 µA 1.3 µA to 13.4 µA 26 µA to 0.26 mA	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
<b>AC Voltage</b> <i>Generate</i> 0.09 mV to 2 mV 2 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V	10 Hz to 40 Hz	5.9 µV to 11.8 µV 6.6 µV to 13.4 µV 10.8 µV to 55.8 µV 44 µV to 0.44 mV 0.44 mV to 4.4 mV 4.4 mV to 44 mV	
0.09 mV to 2 mV 2 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1 kV	40 Hz to 10 kHz	6 µV to 98 µV 6.3 µV to 11.0 µV 96 µV to 44 µV 26 µV to 260 µV 0.26mV to 2.6 mV 2.8 mV to 28 mV 56 mV to 0.28 V	
0.09 mV to 2 mV 2 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V	10 kHz to 100 kHz	6.3 µV to 16 µV 7 µV to 17 µV 106 µV to 0.12 mV 0.04 mV to 0.42 m V 0.44 mV to 4.4 mV 4.8 mV to 48 mV	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
AC Voltage Measure 1.0 mV to 12.0 mV	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	3.3 µV to 6.6 µV 1.3 µV to 3.5 µV 1.4 µV to 4.7 µV 2.1 µV to 13.1 µV 6.1 µV to 61.1 µV 42 µV to 0.5 µV	
12.0 mV to 120.0 mV	1 Hz to 40 Hz 40 Hz to 1 kHz 1kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz	4.8 µV to 12.9 µV 4.8 µV to 12.9 µV 3.7 µV to 19.3 µV 5.6 µV to 38 µV 11.6 µV to 98 µV 46 µV to 0.37 mV 0.2 mV to 1.2 mV 0.2 mV to 1.8 mV	
120.0 mV to 1.2 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz	47 µV to 114 µV 29 µV to 109 µV 37 µV to 193 µV 56 µV to 0.4 mV 0.12 mV to 1 mV 0.5 mV to 4 mV 1.2 mV to 12.1 mV 1.9 mV to 18.1 mV	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
AC Voltage Measure 1.2 V to 12.0 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz 1 MHz to 2 MHz	0.5 mV to 1.3 mV 0.3 mV to 1.1mV 0.4 mV to 2 mV 0.6 mV to 3.8 mV 1.2 mV to 10 mV 5 mV to 37 mV 13 mV to 121 mV 19 mV to 181 mV	
12.0 V to 120.0 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	6.4 mV to 28 mV 4.4 mV to 26 mV 4.4 mV to 26 mV 6.2 mV to 146 mV 16.4 mV to 146 mV	
120.0 V to 1000 V	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz	88 mV to 44mV 68 mV to 42mV 92 mV to 62mV	44 mV to 88 mV 42 mV to 68 mV 620 mV to 92 mV
1 kV to 2 kV 2 kV to 7 k	20 Hz to 100 Hz 20 Hz to 60 Hz	4.2 V to 8.4 V 54 V to 189 V	
AC Current Generate 10µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A	40 Hz to 5 kHz	7.5 nA to 150 nA 130 nA to 1.3 µA 1.2 µA to 12.4 µA 12.6 µA to 126 µA 0.18 mA to 1.8 mA	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
<i>Measure</i>			
6.0 µA to 120.0 µA	45 Hz to 1 kHz	24 nA to 92 nA ***	
120.0 µA to 1.20 mA	45 Hz to 100 Hz	0.3 µA to 0.9 µA ***	
	100 Hz to 5 kHz	0.2 µA to 0.6 µA ***	
1.2 mA to 12.0 mA	45 Hz to 100 Hz	2.7 µA to 9.2 µA ***	
	100 Hz to 5 kHz	2.4 µA to 5.6 µA ***	
12.0 mA to 120.0 mA	45 Hz to 100 Hz	27 µA to 92 µA ***	
	100 Hz to 5 kHz	24 µA to 56 µA ***	
120.0 mA to 1.0 A	45 Hz to 100 Hz	0.3 mA to 1 mA ***	
	100 Hz to 5 kHz	0.3mA to 1.2 mA ***	
1.0 A to 10.0 A	50 Hz to 2 kHz	0.02 A to 0.12 mA ***	
		20 mA to 120 mA	
10.0 A to 30.0A	50 Hz to 60 Hz	6.6 mA to 18 mA ***	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5°C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
<b>Frequency</b>			(With external reference (with internal reference)
<i>Generate Discrete Values</i>	1 MHz	2mHz	
	5 MHz	0.01 Hz	
	10 MHz	0.02 Hz	
	0.2 Hz	1.2 µHz	
	0.5 Hz	3.0 µHz	
		***	
2.0 Hz to 100 kHz (in discreet steps: 1,2,5 10 etc)		4 µHz to 4 Hz ***	
	100 kHz to 10 MHz	0.07 Hz to 0.25 Hz ***	(within 12 months of last calibration standard)
	10 MHz to 20 GHz	1.2 Hz to 2.4 KHz ***	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work: 23±5° C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Frequency range	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
<i>Measure</i> 0.1 Hz to 1 Hz 1 Hz to 10 Hz 10 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 1.2 GHz		50 µHz to 500 µHz 50 µHz to 500 µHz 52 µHz to 0.52 mHz 6.2 µHz to 0.62 mHz 0.21 mHz to 252 Hz	See Note 2
<b>Period</b> <i>Generate</i> 10.0 nS to 1.0 S 2.0 S 5.0 S		0.004 pS to 4.5 µS 8.0 µS 30 µS	

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

## Electrical Calibration Laboratory-Limerick

(Nominal temperature for calibration work:  $23 \pm 5^\circ\text{C}$ ; Relative Humidity  $50\% \pm 25\%$ )

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks Notes 1 & 4
Risetime/Falltime <i>Generate</i> Nominal risetime <200 ps into 50 $\Omega$		77 pS	See Note 3

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
-302	Resistors, resistance boxes and potential dividers	Precision resistors, resistance boxes and conductance boxes Voltage ratio boxes and potential dividers DC Shunts
307	Voltage standards	Electronic emf reference devices
309	Instrument calibrators	DC voltage AC voltage DC voltage AC current Resistance
310	Indicating and recording instruments	DC voltmeters AC voltmeters DC ammeters AC ammeters Ohmmeters Graphic recording instruments Digital storage recorders

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
311 .01 .02	Bridges, potentiometers, test sets	DC bridges DC potentiometers
312 .01 .02 .11 .12 .14 .21	Frequency and time measuring instruments and standards	Frequency meters Wavemeters Counters Time interval meters Stroboscopes (Electrical) Frequency standards
313 .01 .02 .03 .99	Waveform measuring instruments	Frequency characteristics Input characteristics Timing characteristics Other characteristics: Transition time
321 .01 .02	Power supplies and stabilizers	Power supplies Stabilizers

# Scope of Accreditation



## Calibration Specialists Ltd

Permanent Laboratory:  
Category A,B

### Electrical Calibration Laboratory-Limerick

The following types of instrument can be calibrated in accordance with the scheduled measured quantities and ranges. An uncertainty reported on an INAB certificate will be that for the instrument itself during calibration plus the appropriate measurement capability of the laboratory for the quantities and ranges concerned.

INAB Classification number (P9)		Instrument
322	Signal sources	
.01		Frequency characteristics
.04		Sweep characteristics
326	Electronic equipment	
.10		Transducer indicators and calibrators
503	Calibration of ancillary temperature measuring instruments	Heat & Temperature Measurement
.01		Electrical Simulation
.02		Portable potentiometers
.03		Digital voltmeters
.04		Resistance bridges
.05		Indicators, recorders and controllers
		Transmitters

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A

## Metrology Laboratory - Limerick

(Nominal temperature for calibration work: 20±1 °C; Relative Humidity 50% ± 25%)

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks
103 Engineering Metrology Equipment .07 Engineers parallels	5 to 50 x 100 x 400 mm	Dependent on condition and size From 1.5 up to 5 dependent on length	To BS 906 Parts 1 & 2: 1972
.22 External micrometers and Setting Rods	0 to 100 mm	Heads: 2.0 microns between any two points. Setting & extension rods. [1 + ( 8 X length in m)	To BS 870: 2008
.23 Internal micrometers (including stick mics) and Extension Rods	0 to 1 m		To BS 959: 2008
.24 Micrometer height and depth guages and Extension Rods	0 to 150 mm		To BS 6468: 2008
.27 Electric, dial and vernier callipers	0 to 300 mm	Overall performance 10 +(30 x length in m)	To BS 887: 2008
152 Torque measuring devices Torque tools	1 N.m to 50 N.m 50 N.m to 600 N.m 600 N.m to 1000 N.m (Excludes torque screwdrivers)	0.62% 0.84% 1.0%	ISO 6789:2003(E)

# Scope of Accreditation



Calibration Specialists Ltd

Permanent Laboratory:  
Category A

## Metrology Laboratory - Limerick

(Nominal temperature for calibration work:  $20 \pm 1^\circ\text{C}$ ; Relative Humidity  $50\% \pm 25\%$ )

INAB Classification number (P9) Measured quantity	Range of measurement	Calibration & Measurement Capability expressed as an uncertainty	Method and remarks
<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>* See Note 1.</li> <li>** The Uncertainty is given with a 95% confidence level with a t-distribution and a modified coverage factor, <math>k_p = 2.15</math></li> <li>*** These Uncertainties are dominated by the accuracy of the reference standard for which a rectangular distribution has been assumed with a coverage factor, <math>k = \sqrt{3}</math>.</li> </ul> <ol style="list-style-type: none"> <li>1 The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor <math>k = 2</math>, which for a normal distribution corresponds to a coverage probability of approximately 95% except where there is an asterisk.</li> <li>2 For a characteristic signal of 20 mV (p-p) with a 10mV(p-p) signal noise level. Input impedance <math>1\text{M}\Omega/35\text{ pf}</math>.</li> <li>3 For scopes set to 50 <math>\Omega</math> coupling and does not include cursor, visual, timebase and bandwidth errors due to the oscilloscope.</li> <li>4 Best measurement capability expressed as an uncertainty (<math>\pm</math>) to be reported in compliance to clause 6.3 of EA 4/02 "Expression of the Uncertainty of Measurement in Calibration".</li> <li>5 For a zero offset measurement, a copper short is used with uncertainties not greater the <math>\pm 1\ \mu\text{V}</math>.</li> </ol>			