

CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

PJB CONTRACTING CC
Co. Reg. No.: 1993/011192/23
TRADING AS
CALIBRATE @ PJB

Accreditation Number: **118**

is a South African National Accreditation System accredited Calibration laboratory
provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying scope of accreditation
Annexure "A", bearing the above accreditation number for

DC LOW FREQUENCY METROLOGY

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a
laboratory quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the
relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr R Josias
Chief Executive Officer

Effective Date: 24 October 2019
Certificate Expires: 23 October 2024

ANNEXURE A

SCOPE OF ACCREDITATION

DC LOW FREQUENCY METROLOGY

Facility Number: 118

Permanent Address of Laboratory: PJB Contracting CC 5 Platberg Avenue Van Riebeeck Park Kempton Park 1619 Postal Address: P O Box 9314 Edleen 1625 Tel: (011) 972-3798 Fax: 086 674 9980 E-mail: info@calibratepjb.co.za		Technical Signatory: Mr DJ van Rooyen Nominated Representative: Mr PH Burmeister Issue No.: 05 Date of Issue: 12 December 2019 Expiry Date: 23 October 2024		
ITEM	MEASURED QUANTITY OR TYPE OF GAUGE OR INSTRUMENT	NOMINAL FREQUENCY	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	METHOD/PROCEDURE
1	DC Voltage (up to 1 100 V for higher voltages see 8.1)			
1.1	DC voltage sources			
1.1.2	Low values (≤ 10 V)			
	0 mV to 100 mV	DC	$4 \cdot 10^{-3} \cdot U$	Direct comparison with a DC voltage reference standard
	100 mV to 10 V	DC	$1 \cdot 10^{-4} \cdot U$	
1.1.3	Intermediate values (> 10 V to 1 100 V)			
	10 V to 100 V	DC	$1 \cdot 10^{-2} \cdot U$	Direct comparison with a DC voltage source or multi function calibrator
	100 V to 1 000 V	DC	$2 \cdot 10^{-4} \cdot U$	
1.2	DC voltage meters			
1.2.1	Very low values (≤ 1 mV)			
	0 V to 1 mV	DC	$1 \cdot 10^{-4} \cdot U + 3 \mu\text{V}$	Direct measurement or comparison with DC voltage source and short
1.2.2	Intermediate values (> 1 mV to 1 100 V)			
	1 mV to 330 mV	DC	$1 \cdot 10^{-4} \cdot U + 3 \mu\text{V}$	Direct measurement or comparison with a DC voltage source or multi function calibrator
	330 mV to 1000 V	DC	$6 \cdot 10^{-5} \cdot U$	
2.	DC resistance			
2.1	DC resistance standards and sources			
2.1.1	Low values ($\leq 1 \Omega$)			
	0 Ω to 1 Ω	DC	$5 \cdot 10^{-3} \cdot R$	Direct, substitution or current volt drop method

Original Date of Accreditation: 04 November 2015

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The CMC, expressed as an expanded uncertainty of measurement, is stated as the standard uncertainty of measurement multiplied by a coverage factor $k = 2$, corresponding to a confidence level of approximately 95%

Accreditation Manager

ANNEXURE A

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2.	DC resistance			
2.1	DC resistance standards and sources			
2.1.2	1 Ω to 1 M Ω	DC	$2 \cdot 10^{-4} \cdot R$	Direct substitution or current volt drop method
2.1.3	1 Ω to 10 M Ω 10 M Ω to 100 M Ω	DC DC	$5 \cdot 10^{-4} \cdot R$ $1 \cdot 10^{-2} \cdot R$	Direct or substitution method
2.2	DC resistance meters			
2.2.1	Low values ($\leq 1 \text{ G}\Omega$)			
	0 Ω to 1 Ω	DC	$2 \cdot 10^{-4} \cdot R + 8 \text{ m}\Omega$	Direct or substitution method
2.2.2	Intermediate values ($> 1 \Omega$ to 1 GΩ)			
	1 Ω to 11 Ω	DC	$2 \cdot 10^{-4} \cdot R + 8 \text{ m}\Omega$	Direct or substitution method
	11 Ω to 330 Ω	DC	$2 \cdot 10^{-4} \cdot R + 15 \text{ m}\Omega$	
	330 Ω to 3,3 M Ω	DC	$4 \cdot 10^{-4} \cdot R$	
	3,3 M Ω to 11 M Ω	DC	$1 \cdot 10^{-3} \cdot R$	
	11 M Ω to 330 M Ω	DC	$6 \cdot 10^{-3} \cdot R$	
3	DC current (up to 100 A)			
3.1	DC current sources			
3.1.2	Intermediate values ($> 0,1 \text{ mA}$ to 20 A)			
	0,1 mA to 1 mA	DC	$3 \cdot 10^{-3} \cdot I$	Direct or current volt drop method
	1 mA to 100 mA	DC	$1 \cdot 10^{-3} \cdot I$	
	100 mA to 3 A	DC	$2 \cdot 10^{-3} \cdot I$	
	10 A to 20 A	DC	$1 \cdot 10^{-1} \cdot I$	
3.1.3	High values ($> 20 \text{ A}$ to 100 A)			
	20 A to 100 A	DC	$3 \cdot 10^{-2} \cdot I$	Direct or current volt drop method
3.2	DC current meters			
3.2.1	Low values ($\leq 0,1 \text{ mA}$)			
	1 μA to 0,1 mA	DC	$3 \cdot 10^{-4} \cdot I + 50 \text{ nA}$	Direct measurement
3.2.2	Intermediate values ($> 0,1 \text{ mA}$ to 20 A)			
	0,1 mA to 330 mA	DC	$3 \cdot 10^{-4} \cdot I + 50 \text{ nA}$	Direct measurement
	330 mA to 11 A	DC	$1 \cdot 10^{-3} \cdot I$	
	11 A to 20 A	DC	$3 \cdot 10^{-2} \cdot I$	
3.2.3	High Values ($> 20 \text{ A}$ to 100 A)			
	20 A to 100 A	DC	$3 \cdot 10^{-2} \cdot I$	Direct measurement or volt drop method

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4	Impedence (up to 200 kHz range)			
4.2	Capacitance			
4.2.1	Capacitance and dissipation factor			
	100 pF	1 kHz	$1 \cdot 10^{-3} \cdot C$	Direct measurement or substitution method
	1 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	10 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	100 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	1 μ F	1 kHz	$2 \cdot 10^{-3} \cdot C$	
4.2.4	Meters, capacitance bridge, LCR meters			
	100 pF	1 kHz	$1 \cdot 10^{-3} \cdot C$	Direct measurement or substitution method
	1 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	10 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	100 nF	1 kHz	$1 \cdot 10^{-3} \cdot C$	
	1 μ F	1 kHz	$2 \cdot 10^{-3} \cdot C$	
5	AC voltage (up to the MHz range)			
5.2	AC voltage up to 1 000 V			
5.2.1	Sources			
	1 mV to 100 mV	50 Hz	$5 \cdot 10^{-2} \cdot U$	Direct measurement
	100 mV to 750 V	50 Hz	$4 \cdot 10^{-3} \cdot U$	
5.2.2	Meters			
	1 mV to 33 mV	50 Hz	$2 \cdot 10^{-3} \cdot U + 20 \mu V$	Direct measurement
	33 mV to 1 000 V	50 Hz	$1 \cdot 10^{-3} \cdot U$	
6	AC current			
6.2	AC current up to 100A (for high current see 8.6)			
6.2.1	Sources			
	0 A to 1 A	50 Hz	$2 \cdot 10^{-3} \cdot I + 0,4 \text{ mA}$	Direct measurement or volt drop method
	1 A to 3 A	50 Hz	$4 \cdot 10^{-3} \cdot I$	
	10 A to 100 A	50 Hz	$3 \cdot 10^{-2} \cdot I$	
6.2.2	Meters			
	29 μ A to 330 μ A	50 Hz	$2 \cdot 10^{-3} \cdot I + 0,25 \mu A$	Direct measurement or volt drop method
	330 μ A to 11 A	50 Hz	$2 \cdot 10^{-3} \cdot I$	
	10 A to 100 A	50 Hz	$3 \cdot 10^{-2} \cdot I$	
8	High voltage and current			
8.6	High AC current and current transformers (for currents ≥ 100 A)			
8.6.2	Meters			
	100 A to 500 A	50 Hz	$3 \cdot 10^{-2} \cdot I$	Direct measurement or ratio method
8.7	High DC current (for currents ≥ 100 A)			
	100 A to 500 A	DC	$3 \cdot 10^{-2} \cdot I$	Direct measurement or ratio method
17	Frequency Meters			
17.1	Frequency			
	1 Hz to 100 kHz	1 V to 3 V	$3 \cdot 10^{-5} \cdot f + 1 \text{ mHz}$	Direct measurement of frequency source

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ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Accreditation Manager