



Organisme belge d'Accréditation  
Belgische Accreditatieinstelling  
Belgische Akkreditierungsstelle  
Belgian Accreditation Body

Signatory to EA, ILAC and IAF  
Multilateral Agreements

## Accreditation Certificate No. 004-CAL

In compliance with the provisions of the Royal Decree of 31 January 2006 setting up BELAC, the Accreditation Board hereby declares, that the calibration laboratory

**TRESCAL NV**  
**Vosstraat, 200**  
**2600 BERCHEM - Belgium**

has the competence to perform the calibrations as described in the annex which is an integral part of the present certificate, in accordance with the requirements of the standard EN ISO/IEC 17025:2005. The present accreditation is the subject of regular surveillance in order to confirm the compliance with the accreditation conditions.

The Chair of the Accreditation Board BELAC,

Nicole MEURÉE-VANLAETHEM

Issue date : **2018-10-11**

Validity date : **2023-04-21**

Original version of this certificate is in Dutch.



Bijlage bij accreditatie-certificaat  
Annexe au certificat d'accréditation  
Annex to the accreditation certificate  
Beilage zur Akkreditierungszertifikat

**004-CAL**

EN ISO/IEC 17025:2005

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**Nicole Meurée-Vanlaethem**

Voorzitster van het Accreditatiebureau  
La Présidente du Bureau d'Accréditation  
Chair of the Accreditation Board  
Vorsitzende des Akkreditierungsbüro

**De accreditatie werd uitgereikt aan/ L'accréditation est délivrée à/  
The accreditation is granted to/ Die akkreditierung wurde erteilt für:**

**TRESCAL nv  
Vosstraat, 200  
2600 BERCHEM**

**Voor activiteiten uitgevoerd door/ Pour des activités exécutés par/  
For activities performed by/ Die tätigkeiten werden durchgeführt von:**

locatie 1	<b>BERCHEM</b>	<b>Vosstraat, 200 2600 Berchem</b>
locatie 2	<b>WELLIN</b>	<b>Rue Jean Meunier, 2 6920 Halma (Wellin)</b>

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Numéro d'entreprise: 0314.595.348

**Accréditation B E L A C Accreditation**

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Website: <http://economie.fgov.be>  
Ondernemingsnummer: 0314.595.348

**.be**

BELAC  
6-017  
code

ELEKTRICAL (Wellin, In House or In Situ)

### 1.1.1 Direct voltage

#### Measure

Measuring range or point	Frequency	CMC (95%)	Remark
0 mV to 200 mV	DC	$8,0 \times 10^{-6} \times U$ or $0,12 \mu V^1$	<ul style="list-style-type: none"> <li>• measure</li> <li>• positive / negative</li> </ul>
0,2 V to 2 V	DC	$10 \times 10^{-6} \times U$	
2 V to 20 V	DC	$7,0 \times 10^{-6} \times U$	
20 V to 200 V	DC	$5,0 \times 10^{-6} \times U$	
200 V to 1000 V	DC	$5,0 \times 10^{-6} \times U$	
<sup>1</sup> Whichever is greater			

#### Generate

Generating range or point	Frequency	CMC (95%)	Remark
0 V	DC	$0,5 \mu V$	<ul style="list-style-type: none"> <li>• generate</li> <li>• positive / negative</li> </ul>
0 mV to 220 mV	DC	$13 \times 10^{-6} \times U$ or $1,0 \mu V^1$	
220 V to 2,2 V	DC	$4,0 \times 10^{-6} \times U$	
2,2 V to 22 V	DC	$4,0 \times 10^{-6} \times U$	
22 V to 220 V	DC	$7,0 \times 10^{-6} \times U$	
220 V to 1100 V	DC	$7,0 \times 10^{-6} \times U$	
<sup>1</sup> Whichever is greater			

### 1.1.2 Direct current

#### Measure

Measuring range or point	Frequency	CMC (95%)	Remark
0 $\mu A$ to 200 $\mu A$	DC	$20 \times 10^{-6} \times I$ or $0,5 \text{ nA}^1$	<ul style="list-style-type: none"> <li>• measure</li> <li>• in the lowest possible range</li> <li>• positive / negative</li> </ul>
0,2 mA to 2,0 mA	DC	$10 \times 10^{-6} \times I$	
2,0 mA to 20 mA	DC	$10 \times 10^{-6} \times I$	
20 mA to 200 mA	DC	$10 \times 10^{-6} \times I$	
0,2 A to 2 A	DC	$60 \times 10^{-6} \times I$	
2 A to 20 A	DC	$200 \times 10^{-6} \times I$	
20 A to 100 A	DC	$1,5 \times 10^{-4} \times I$ or $2,0 \text{ mA}^1$	
<sup>1</sup> Whichever is greater			

#### Calibration of current clamps

Measuring range or point	Frequency	CMC (95%)	Remark
20 A to 500 A	DC	$10 \times 10^{-3} \times I$	• with current coils

#### Generate

Generating range or point	Frequency	CMC (95%)	Remark
0 $\mu A$ to 220 mA	DC	$40 \times 10^{-6} \times I$ or $1,0 \text{ nA}^1$	<ul style="list-style-type: none"> <li>• generate</li> <li>• positive / negative</li> </ul>
220 mA to 2,2 A	DC	$1,0 \times 10^{-4} \times I$	
2,2 A to 11 A	DC	$2,0 \times 10^{-4} \times I$	
11 A to 100 A	DC	$10 \times 10^{-4} \times I$	
<sup>1</sup> Whichever is greater			

1.1.3 Alternating voltage

Measure

Measuring range or point	Frequency	CMC (95%)	Remark
0,7 mV to 2,2 mV	10 Hz to 20 Hz	$17 \times 10^{-4} \times U + 1,3 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$7,4 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	40 Hz to 20 kHz	$4,2 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	20 kHz to 50 kHz	$8,2 \times 10^{-4} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$12 \times 10^{-4} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$23 \times 10^{-4} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$26 \times 10^{-4} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$50 \times 10^{-4} \times U + 8 \mu\text{V}$	
2 mV to 7 mV	10 Hz to 20 Hz	$8,5 \times 10^{-4} \times U + 1,3 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$3,7 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	40 Hz to 20 kHz	$2,1 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	20 kHz to 50 kHz	$4,1 \times 10^{-4} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$6,1 \times 10^{-4} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$12 \times 10^{-4} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$14 \times 10^{-4} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$36 \times 10^{-4} \times U + 8 \mu\text{V}$	
7 mV to 22 mV	10 Hz to 20 Hz	$2,9 \times 10^{-4} \times U + 1,3 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$1,9 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	40 Hz to 20 kHz	$1,1 \times 10^{-4} \times U + 1,3 \mu\text{V}$	
	20 kHz to 50 kHz	$2,1 \times 10^{-4} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$3,1 \times 10^{-4} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$8,2 \times 10^{-4} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$10 \times 10^{-4} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$26 \times 10^{-4} \times U + 8 \mu\text{V}$	
22 mV to 70 mV	10 Hz to 20 Hz	$2,4 \times 10^{-4} \times U + 1,5 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$1,3 \times 10^{-4} \times U + 1,5 \mu\text{V}$	
	40 Hz to 20 kHz	$0,69 \times 10^{-4} \times U + 1,5 \mu\text{V}$	
	20 kHz to 50 kHz	$1,3 \times 10^{-4} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$2,6 \times 10^{-4} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$5,3 \times 10^{-4} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$6,8 \times 10^{-4} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$13 \times 10^{-4} \times U + 8 \mu\text{V}$	
70 mV to 220 mV	10 Hz to 20 Hz	$21 \times 10^{-5} \times U + 1,5 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$8,7 \times 10^{-5} \times U + 1,5 \mu\text{V}$	
	40 Hz to 20 kHz	$4,3 \times 10^{-5} \times U + 1,5 \mu\text{V}$	
	20 kHz to 50 kHz	$7,3 \times 10^{-5} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$16 \times 10^{-5} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$28 \times 10^{-5} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$40 \times 10^{-5} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$120 \times 10^{-5} \times U + 8 \mu\text{V}$	
220 mV to 700 mV	10 Hz to 20 Hz	$21 \times 10^{-5} \times U + 1,5 \mu\text{V}$	• measure
	20 Hz to 40 Hz	$8,7 \times 10^{-5} \times U + 1,5 \mu\text{V}$	
	40 Hz to 20 kHz	$3,8 \times 10^{-5} \times U + 1,5 \mu\text{V}$	
	20 kHz to 50 kHz	$5,6 \times 10^{-5} \times U + 2 \mu\text{V}$	
	50 kHz to 100 kHz	$8,4 \times 10^{-5} \times U + 2,5 \mu\text{V}$	
	100 kHz to 300 kHz	$21 \times 10^{-5} \times U + 4 \mu\text{V}$	
	300 kHz to 500 kHz	$34 \times 10^{-5} \times U + 8 \mu\text{V}$	
	500 kHz to 1 MHz	$120 \times 10^{-5} \times U + 8 \mu\text{V}$	

0,7 V to 2,2 V	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	• measure
	20 Hz to 40 Hz	$6,9 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$2,9 \times 10^{-5} \times U$	
	20 kHz to 50 kHz	$5,2 \times 10^{-5} \times U$	
	50 kHz to 100 kHz	$7,6 \times 10^{-5} \times U$	
	100 kHz to 300 kHz	$20 \times 10^{-5} \times U$	
	300 kHz to 500 kHz	$31 \times 10^{-5} \times U$	
2,2 V to 7 V	500 kHz to 1 MHz	$120 \times 10^{-5} \times U$	• measure
	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	
	20 Hz to 40 Hz	$7,0 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$2,9 \times 10^{-5} \times U$	
	20 kHz to 50 kHz	$5,3 \times 10^{-5} \times U$	
	50 kHz to 100 kHz	$8,8 \times 10^{-5} \times U$	
	100 kHz to 300 kHz	$22 \times 10^{-5} \times U$	
7 V to 22 V	300 kHz to 500 kHz	$47 \times 10^{-5} \times U$	• measure
	500 kHz to 1 MHz	$150 \times 10^{-5} \times U$	
	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	
	20 Hz to 40 Hz	$7,0 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$3,1 \times 10^{-5} \times U$	
	20 kHz to 50 kHz	$5,3 \times 10^{-5} \times U$	
	50 kHz to 100 kHz	$8,5 \times 10^{-5} \times U$	
22 V to 70 V	100 kHz to 300 kHz	$22 \times 10^{-5} \times U$	• measure
	300 kHz to 500 kHz	$47 \times 10^{-5} \times U$	
	500 kHz to 1 MHz	$150 \times 10^{-5} \times U$	
	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	
	20 Hz to 40 Hz	$7,2 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$3,9 \times 10^{-5} \times U$	
	20 kHz to 50 kHz	$6,3 \times 10^{-5} \times U$	
70 V to 220 V	50 kHz to 100 kHz	$11 \times 10^{-5} \times U$	• measure
	100 kHz to 300 kHz	$22 \times 10^{-5} \times U$	
	300 kHz to 500 kHz	$51 \times 10^{-5} \times U$	
	500 kHz to 1 MHz	$150 \times 10^{-5} \times U$	
	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	
	20 Hz to 40 Hz	$7,2 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$3,8 \times 10^{-5} \times U$	
220 to 700 V	20 kHz to 50 kHz	$7,7 \times 10^{-5} \times U$	• measure
	50 kHz to 100 kHz	$11 \times 10^{-5} \times U$	
	100 kHz to 300 kHz	$26 \times 10^{-5} \times U$	
	300 kHz to 500 kHz	$70 \times 10^{-5} \times U$	
	500 kHz to 1 MHz	$150 \times 10^{-5} \times U$	
700 V to 1000 V	10 Hz to 20 Hz	$20 \times 10^{-5} \times U$	• measure
	20 Hz to 40 Hz	$11 \times 10^{-5} \times U$	
	40 Hz to 20 kHz	$4,4 \times 10^{-5} \times U$	
	20 kHz to 50 kHz	$15 \times 10^{-5} \times U$	
	50 kHz to 100 kHz	$85 \times 10^{-5} \times U$	

Generate			
Generating range or point	Frequency	CMC (95%)	Remark
2,2 mV to 22 mV	20 Hz to 20 kHz	$4,0 \times 10^{-4} \times U$	• generate
	20 kHz to 100 kHz	$11 \times 10^{-4} \times U$	
22 mV to 220 mV	20 Hz to 20 kHz	$0,5 \times 10^{-4} \times U$	• generate
	20 kHz to 100 kHz	$23 \times 10^{-4} \times U$	
0,22 V to 2,2 V	20 Hz to 20 kHz	$0,5 \times 10^{-4} \times U$	• generate
	20 kHz to 100 kHz	$20 \times 10^{-4} \times U$	
2,2 V to 22 V	40 Hz to 20 kHz	$0,5 \times 10^{-4} \times U$	• generate
	20 kHz to 100 kHz	$1,0 \times 10^{-4} \times U$	
22 V to 220 V	40 Hz to 20 kHz	$0,6 \times 10^{-4} \times U$	• generate
	20 kHz to 100 kHz	$6,0 \times 10^{-4} \times U$	
220 V to 1000 V	50 Hz to 20 kHz	$0,6 \times 10^{-4} \times U$	• generate

#### 1.1.4 Alternating current

##### Measure

Measuring range or point	Frequency	CMC (95%)	Remark
10 $\mu$ A to 200 $\mu$ A	55 Hz to 5 kHz	$2,0 \times 10^{-4} \times I$	• measure
0,2 mA to 2 mA	55 Hz to 5 kHz	$1,0 \times 10^{-4} \times I$	
2 mA to 20 mA	55 Hz to 5 kHz	$2,0 \times 10^{-4} \times I$	
20 mA to 200 mA	55 Hz to 5 kHz	$1,0 \times 10^{-4} \times I$	
0,2 A to 2 A	55 Hz to 1 kHz	$3,0 \times 10^{-4} \times I$	
	1 kHz to 5 kHz	$8,0 \times 10^{-4} \times I$	
2 A to 20 A	55 Hz to 1 kHz	$40 \times 10^{-4} \times I$	

##### Calibration of current clamps

Measuring range or point	Frequency	CMC (95%)	Remark
20 A to 500 A	45 Hz to 100 Hz	$10 \times 10^{-3} \times I$	• with current coils
20 A to 500 A	100 Hz to 440 Hz	$15 \times 10^{-3} \times I$	• with current coils

##### Generate

Generating range or point	Frequency	CMC (95%)	Remark
10 $\mu$ A to 2,2 A	40 Hz to 1 kHz	$2,0 \times 10^{-4} \times I$	• generate
2,2 A to 10 A	20 Hz to 1 kHz	$6,0 \times 10^{-4} \times I$	

#### 1.1.6 Impedance (DC/LF)

##### Measure

Measuring range or point	Frequency	CMC (95%)	Remark
0 $\Omega$ to 2 $\Omega$	DC	$30 \times 10^{-6} \times R$ or $70 \mu\Omega^1$	• measure • 4-wire resistance measurement • negligible dissipated power
2 $\Omega$ to 20 $\Omega$	DC	$10 \times 10^{-6} \times R$	
20 $\Omega$ to 200 $\Omega$	DC	$11 \times 10^{-6} \times R$	
0,2 k $\Omega$ to 200 k $\Omega$	DC	$10 \times 10^{-6} \times R$	
0,2 M $\Omega$ to 2 M $\Omega$	DC	$40 \times 10^{-6} \times R$	
2 M $\Omega$ to 20 M $\Omega$	DC	$80 \times 10^{-6} \times R$	
20 M $\Omega$ to 200 M $\Omega$	DC	$40 \times 10^{-6} \times R$	
200 M $\Omega$ to 2 G $\Omega$	DC	$1,0 \times 10^{-3} \times R$	

<sup>1</sup> Whichever is greater

Generate			
Generating range or point	Frequency	CMC (95%)	Remark
0 Ω	DC	1 mΩ	<ul style="list-style-type: none"> <li>• generate</li> <li>• fixed points</li> <li>• 2-wire resistance</li> </ul>
1 Ω	DC	$100 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
1,9 Ω	DC	$100 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
10 Ω	DC	$30 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
19 Ω	DC	$30 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
100 Ω	DC	$20 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
190 Ω	DC	$20 \times 10^{-6} \times R + 8 \text{ m}\Omega$	
1,0 kΩ	DC	$15 \times 10^{-6} \times R + 20 \text{ m}\Omega$	
1,9 kΩ	DC	$15 \times 10^{-6} \times R + 20 \text{ m}\Omega$	
10 kΩ	DC	$15 \times 10^{-6} \times R + 100 \text{ m}\Omega$	
19 kΩ	DC	$15 \times 10^{-6} \times R + 100 \text{ m}\Omega$	
100 kΩ	DC	$20 \times 10^{-6} \times R + 100 \text{ m}\Omega$	
190 kΩ	DC	$20 \times 10^{-6} \times R + 100 \text{ m}\Omega$	
1 MΩ	DC	$25 \times 10^{-6} \times R$	
1,9 MΩ	DC	$30 \times 10^{-6} \times R$	
10 MΩ	DC	$50 \times 10^{-6} \times R$	
19 MΩ	DC	$60 \times 10^{-6} \times R$	
100 MΩ	DC	$140 \times 10^{-6} \times R$	
0 Ω	DC	100 μΩ	
1 Ω, 1,9 Ω, 10 Ω, 19 Ω, 100 Ω, 190 Ω	DC	$30 \times 10^{-6} \times R$	
1 kΩ, 1,9 kΩ, 10 kΩ, 19 kΩ, 100 kΩ, 190 kΩ	DC	$10 \times 10^{-6} \times R$	
1 MΩ, 1,9 MΩ	DC	$18 \times 10^{-6} \times R$	
1,9 MΩ	DC	$40 \times 10^{-6} \times R$	
10 MΩ	DC	$60 \times 10^{-6} \times R$	
19 MΩ	DC	$250 \times 10^{-6} \times R$	

Calibration of resistor / insulation meters

Measuring range or point	Frequency	CMC (95%)	Remark
50 V to 250 V	10 kΩ to 40 MΩ	$1,0 \times 10^{-4} \times R$	
	40 MΩ to 200 MΩ	$5,0 \times 10^{-4} \times R$	
250 V to 1000 V	100 kΩ to 200 MΩ	$1,0 \times 10^{-4} \times R$	
	200 MΩ to 1000 MΩ	$3,0 \times 10^{-4} \times R$	