CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

HV Test S.A. de C.V. dba HV TEST
Eléctricos No. 103 y 105 Parque Industrial Chichimeco
Aguascalientes, México CP 20916

Fulfills the requirements of

ISO/IEC 17025:2017

In the fields of

CALIBRATION and **TESTING**

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 19 May 2027

Certificate Number: ACT-2982

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

HV Test S.A. de C.V. dba HV TEST

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CALIBRATION AND TESTING

Valid to: **May 19, 2027** Certificate Number: **ACT-2982**

CALIBRATION

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
HVDC Measuring Systems, Converting Devices, Test Sets	[1.0 - 6.5] kV [6.5 - 100.0] kV	0.30 % 0.60 %	PT-23 IEC 60060-2 Sec. 5 & 6 KVM100 + DMM Keysight 34465A (ID 810-0000 + 620-0000)
HVDC Measuring Systems, Converting Devices, Test Sets	[30 - 200] kV	0.60 %	PT-23 IEC 60060-2 Sec. 5 & 6 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
HVAC Measuring Systems, Converting Devices, Test Sets	[0.8 - 100.0] kV@ 60Hz	0.10 %	PT-24 IEC 60060-2 Sec. 5 & 7Reference Measuring SystemVettiner CG100 + MI2500A + IET1404-A + DMM Keysight 34465A(ID 861-0000 + 642-0000 + 857-0000 + 620-0000)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
HVAC Measuring Systems, Converting Devices, Test Sets	[20.0 - 400.0] kV @ 60Hz	0.30 %	PT-24 IEC 60060-2 Sec. 5 & 7 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
HVAC Measuring Systems, Converting Devices, Test Sets	[20 - 400] kV @ [16 - 850] Hz	0.75 %	PT-24 IEC 60060-2 Sec. 5 & 7 Reference Measuring SystemHigh Volt MCR 0.3757800-800/400 ref + RUAT(ID 849-0000)
HVAC Measuring Systems, Converting Devices, Test Sets	[>100 - 2000] kV @ [16 - 1000] Hz	3.0 %	PT-24 IEC 60060-2 Sec. 5 & 7 Linearity test IEC 60060-2 Sec. 5.3
Full Lightning Impulse Voltage Measuring Systems, Converting Devices, Test Sets	[10.0 - 500.0] kV	1.0 %	PT-25 IEC 60060-2 Sec. 5 & 8 Reference Measuring System BHT FYI + Haefely HiAS 743 (ID 170 + 111)
Full Lightning Impulse Voltage Measuring Systems, Converting Devices, Test Sets	[30.0 - 600.0] kV [600.0 - 800.0] kV	1.0 % 1.5 %	PT-25 IEC 60060-2 Sec. 5 & 8 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
Full Lightning Impulse Voltage Measuring Systems, Converting Devices, Test Sets	[>800 - 3600] kV	3.0 %	PT-25 IEC 60060-2 Sec. 5 & 8 Linearity test IEC 60060-2 Sec. 5.3

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Front time & Time to half value Measuring Systems, Converting Devices, Test Sets	[0.84 - 1.56] µs [40 - 60] µs	3.1 % 2.8 %	PT-25 IEC 60060-2 Sec. 5.11, 8 & B.3 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
Switching Impulse Voltage Measuring Systems, Converting Devices, Test Sets	[50.0 - 500.0] kV [500.0 - 700.0] kV	1.0 % 1.5 %	PT-25 IEC 60060-2 Sec. 5 & 8 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
Switching Impulse Voltage Measuring Systems, Converting Devices, Test Sets	[>700 - 2500] kV	2.5 %	PT-25 IEC 60060-2 Sec. 5 & 8 Linearity test IEC 60060-2 Sec. 5.3
Time to peak & Time to half value Measuring Systems, Converting Devices, Test Sets	[200 - 300] µs [1000 - 4000] µs	2.4 % 2.8 %	PT-25 IEC 60060-2 Sec. 5.11, 8 & B.3 Reference Measuring System High Volt MCR 0.3757800-800/400 ref + RUAT (ID 849-0000)
Full Lightning Impulse Voltage Instruments and Software used in High-Voltage Impulse Test	[100 - 1600] V	1.0 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Front time & Time to half value Instruments and Software used in High-Voltage Impulse Test	0.84 µs 60 µs	3.0 % 3.0 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)
Chopped Impulse Voltage Instruments and Software used in High-Voltage Impulse Test	[400 - 1250] V	1.5 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)
Time to Chopped Instruments and Software used in High-Voltage Impulse Test	0.5 µs	3.5 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)
Switching Impulse Voltage Instruments and Software used in High-Voltage Impulse Test	[100 - 1600] V	1.0 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)
Time to peak & Time to half value Instruments and Software used in High-Voltage Impulse Test	20 µs 4000 µs	3.0 % 3.0 %	PT-33 IEC 61083-1 Sec. 2 Reference Impulse Calibrator Heafely RIC 422 (ID 120)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance High Voltage Capacitance and tanδ Measuring Systems	100 pF @ 1kV/60Hz	0.20 %	PT-36 Standard Capacitor Tettex 3320/100 (ID 408)
Capacitance High Voltage Capacitance and tanδ Measuring Systems	1000 pF @ 1kV/60Hz	0.20 %	PT-36 Standard Capacitor Tettex 3320/1000AU (ID 407)
Capacitance High Voltage Capacitance and tanδ Measuring Systems	100 pF @ [5 to 100]kV/60Hz	0.61 %	PT-36 Standard Capacitor SAMGOR YL-100-100 (ID 401)
Capacitance High Voltage Capacitance and tanδ Measuring Systems	10000 pF @ 1kV/60Hz	0.20 %	PT-36 Standard Capacitor Tettex 3320/10000 (ID 406)
Dissipation Factor (tanδ) High Voltage Capacitance and tanδ Measuring Systems	0.01 % @ 1 kV, 60 Hz 0.05 % @ 1 kV, 60 Hz 0.1 % @ 1 kV, 60 Hz	0.0032 % 0.0032 % 0.0032 %	PT-36 Standard Capacitor Tettex 3320/1000AU (ID 407 + 407.1)
Dissipation Factor (tanδ) High Voltage Capacitance and tanδ Measuring Systems	0.01 % @ 1 kV, 60 Hz 0.1 % @ 1 kV, 60 Hz 0.5 % @ 1 kV, 60 Hz 1 % @ 1 kV, 60 Hz 5 % @ 1 kV, 60 Hz 10 % @ 1 kV, 60 Hz	0.0066 % 0.0075 % 0.013 % 0.018 % 0.07 % 0.14 %	PT-36 Standard Capacitor PRESCO AG TG-CAL (ID 403)
Capacitance High Voltage Capacitance	10 pF @ 1kV/60Hz 20 pF @ 1kV/60Hz 50 pF @ 1kV/60Hz 100 pF @ 1kV/60Hz 1 nF @ 1kV/60Hz 10 nF @ 1kV/60Hz	0.25 % 0.22 % 0.21 % 0.21 % 0.20 % 0.20 %	PT-37 EURAMET.EM-S34 Standard Capacitor Tettex 3320/100 Measuring Bridge Tettex 2840 (ID 421 + 453)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Dissipation Factor (tanδ) High Voltage Capacitance	0.01% @ 3.8mA ; 60Hz 0.05% @ 3.8mA ; 60Hz 0.1% @ 3.8mA ; 60Hz 0.5% @ 3.8mA ; 60Hz 1% @ 3.8mA ; 60Hz 5% @ 3.8mA ; 60Hz 10% @ 3.8mA ; 60Hz 20% @ 3.8mA ; 60Hz 50% @ 3.8mA ; 60Hz 100% @ 3.8mA ; 60Hz	0.0027 % 0.0028 % 0.0030 % 0.0047 % 0.0074 % 0.031 % 0.059 % 0.12 % 0.30 % 0.60 %	PT-37 EURAMET.EM-S34 Standard Capacitor Tettex 3320/100 Measuring Bridge Tettex 2840 (ID 421 + 453)
Ratio Error Current Instrument Transformer	± [0 a 2.5] % Ip : Is [5 a 1000] A : 1A @ 120% Ip @ 100% Ip @ 20% Ip @ 5% Ip @ 1% Ip 2000 A : 1A @ 50% Ip @ 20% Ip @ 5% Ip @ 1% Ip	 0.0050 % 0.0050 % 0.0050 % 0.011 % 0.011 % 0.0080 % 0.0080 % 0.011 % 0.011 %	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer Tettex 4764 + Tettex 2767 (ID 532 + 505)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Displacement Current Instrument Transformer	± [0 a 10] min Ip : Is [5 a 1000] A : 1A @ 120% Ip @ 100% Ip @ 20% Ip @ 5% Ip @ 1% Ip 2000 A : 1A @ 50% Ip @ 20% Ip @ 5% Ip @ 1% Ip	 0.30 min 0.30 min 0.30 min 0.40 min 0.40 min 0.30 min 0.30 min 0.40 min 0.40 min	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer Tettex 4764 + Tettex 2767 (ID 532 + 505)
Ratio Error Current Instrument Transformer	± [0 a 2.5] % Ip : Is [10 a 20] A : 1A @ 100% Ip @ 50% Ip @ 20% Ip [50 a 2000] A : 1A @ 100% Ip @ 50% Ip @ 20% Ip	 0.0040 % 0.0040 % 0.0040 % 0.0020 % 0.0020 % 0.0020 %	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer EPRO NCD 5000 dg + ZERA WM3000I (ID 635-0000 + 851-0000)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Displacement Current Instrument Transformer	± [0 a 10] min Ip : Is [10 a 20] A : 1A @ 100% Ip @ 50% Ip @ 20% Ip [50 a 2000] A : 1A @ 100% Ip @ 50% Ip @ 20% Ip	 0.14 min 0.14 min 0.14 min 0.070 min 0.070 min 0.070 min	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer EPRO NCD 5000 dg + ZERA WM3000I (ID 635-0000 + 851-0000)
Ratio Error Current Instrument Transformer	± [0 a 2.5] % Ip : Is 5 [VA]; cosβ = 1 [1 a 5000] A : [1, 5] A @ 120% Ip @ 100% Ip @ 20% Ip @ 5% Ip @ 1% Ip	 0.014 % 0.014 % 0.014 % 0.016 % 0.018 %	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer EPRO NCD 5000 dg + ZERA WM3000I (ID 635-0000 + 851-0000)
Displacement Current Instrument Transformer	± [0 a 10] min Ip : Is 5 [VA]; cosβ = 1 [1 a 5000] A : [1, 5] A @ 120% Ip @ 100% Ip @ 20% Ip @ 5% Ip @ 1% Ip	 0.80 min 0.80 min 0.80 min 1.0 min 1.0 min	PT-38 IEC 61869-2; IEEE C57.13; EURAMET Project 1187 Standard instrument current transformer EPRO NCD 5000 dg + ZERA WM3000I (ID 635-0000 + 851-0000)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Ratio Error Voltage Instrument Transformer	± [0 a 5.0] % Vp : Vs [100 a 500] V : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp	 0.025 % 0.025 % 0.025 % 0.025 %	PT-39 IEC 61869-3; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Tettex 4861 + ZERA WM3000U (ID 455 + 510)
Ratio Error Voltage Instrument Transformer	± [0 a 5.0] % Vp : Vs 1 kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp [2 a 20] kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp [50 a 100] kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp	 0.025 % 0.025 % 0.025 % 0.025 % 0.020 % 0.020 % 0.025 % 0.025 % 0.020 % 0.020 % 0.020 % 0.020 %	PT-39 IEC 61869-2; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Tettex 3380/100/100 + 3330/10000 + Tettex 4861 + ZERA WM3000U (ID 453 + 454 + 455 + 510)
Displacement Voltage Instrument Transformer	± [0 a 20] min Vp : Vs [100 a 500] V : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp	 1.2 min 1.2 min 1.2 min 1.2 min	PT-39 IEC 61869-3; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Tettex 4861 + ZERA WM3000U (ID 455 + 510)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Displacement Voltage Instrument Transformer	± [0 a 20] min Vp : Vs 1 kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp [2 a 20] kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp [50 a 100] kV : 100 V @ 100% Vp @ 80% Vp @ 50% Vp @ 20% Vp	 1.2 min 1.2 min 1.2 min 1.2 min 0.60 min 0.60 min 1.2 min 1.2 min 0.60 min 0.60 min 0.60 min 0.60 min	PT-39 IEC 61869-2; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Tettex 3380/100/100 + 3330/10000 + Tettex 4861 + ZERA WM3000U (ID 453 + 454 + 455 + 510)
Ratio Error Voltage Instrument Transformer	± [0 a 5.0] % Vp : Vs [2 a 100] kV : 100 V @ 100% Vp @ 40% Vp	 0.0080 % 0.0080 %	PT-39 IEC 61869-2; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Vettiner CG100 + MI2500A + IET 1404-A + ZERA WM3000U (ID 861-0000 + 642-0000 + 857-0000 + 850-0000)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Displacement Voltage Instrument Transformer	± [0 a 20] min Vp : Vs [2 a 100] kV : 100 V @ 100% Vp @ 40% Vp	 0.20 min 0.20 min	PT-39 IEC 61869-3; IEEE C57.13; EURAMET Project 1492 Standard instrument voltage transformer Vettiner CG100 + MI2500A + IET 1404-A + ZERA WM3000U (ID 861-0000 + 642-0000 + 857-0000 + 850-0000)
Active Power Power Meter	[16 to 121] W @ p.f.=1. [8 to 60.5] W @ p.f.=0.5i [1.6 to 12.1] W @ p.f.=0.1i [0.8 to 6.0] W @ p.f.=0.05i [0.3 to 2.4] W @ p.f=0.02i [0.2 to 1.2] W @ p.f.=0.01i @ [40-110] V & [0.4-1.1] A	0.035 % 0.040% 0.25% 0.45% 0.60% 3.4%	PT-40 NBS: Technical note 1204 Electrical Power Quality Calibrator Fluke 6100B (ID 509)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Active Power Power Meter	[8 to 100]W @p.f.=1.0 [4 to 50]W @p.f.=0.5i [0.4 to 5.0]W @p.f.=0.05i [0.2 to 2.0]W @p.f.=0.02i [0.1 to 1.0]W @p.f.=0.01i [0.01 to 0.10]W @p.f.=0.001i @ [40 a 100] V & [0.2 a 1.0] A	0.010 % 0.020 % 0.20 % 0.50 % 1.0 % 10 %	PT-40 NBS: Technical note 1204 Analizer power meter + Power & Energy Calibrator Yokogawa WT3000 + Meatest M133C 3F (ID 634-0000 + 663-0000)
Active Power Transformer Loss Measurement System (TLMS)	[16W a 250kW] @ cosδ = 1.0 [8W a 125kW] @ cosδ = 0.5 ind [1.6W a 25kW] @ cosδ = 0.1 ind [0.8W a 12.5kW] @ cosδ = 0.05 ind [0.32W a 5.0kW] @ cosδ = 0.02 ind [0.16W a 2.5kW] @ cosδ = 0.01 ind @ [0.1 a 5.0]kV:100V & [1 a 50]A:1A	0.08 % 0.15 % 0.50 % 1.0 % 2.0 % 4.6 %	PT-41 IEC-TC-60076-19 AC Power Standard for TLMS Tettex 3380/100/100 + 3330/10000 + Tettex 4861 + Tettex 4764 + Yokogawa WT3000 (ID 453 + 454 + 455 + 532 + 515)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Active Power Transformer Loss Measurement System (TLMS)	[1.6kW a 2MW] @ cosδ = 1.0	0.027 %	PT-41 IEC-TC-60076-19 17NRM01 TrafoLoss AC Power Standard for TLMS EPRO NCD 5000 dg + Vettiner CG100 + MI2500A + IET 1404-A + Yokogawa WT3000 (ID 635-0000 + 861-0000 + 642-0000 + 857-0000 + 634-0000)
	[0.8kW a 1MW] @ cosδ = 0.5 ind	0.050 %	
	[80W a 100kW] @ cosδ = 0.05 ind	0.41 %	
	[32W a 40kW] @ cosδ = 0.02 ind	1.0 %	
	[16W a 20kW] @ cosδ = 0.01 ind	2.0 %	
	[1.6W a 2kW] @ cosδ = 0.001 ind	20 %	
	@ [2 a 100.0]kV:100V & [10 a 20]A:1A		

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Active Power Transformer Loss Measurement System (TLMS)	[8kW a 200MW] @ cosδ = 1.0 [4kW a 100MW] @ cosδ = 0.5 ind [400W a 10MW] @ cosδ = 0.05 ind [160W a 4MW] @ cosδ = 0.02 ind [80W a 2MW] @ cosδ = 0.01 ind [8W a 200kW] @ cosδ = 0.001 ind @ [2 a 100.0]kV:100V & [50 a 2000]A:1A	0.020 % 0.044 % 0.37 % 0.90 % 1.8 % 18 %	PT-41 IEC-TC-60076-19 17NRM01 TrafoLoss AC Power Standard for TLMS EPRO NCD 5000 dg + Vettiner CG100 + MI2500A + IET 1404-A + Yokogawa WT3000 (ID 635-0000 + 861-0000 + 642-0000 + 857-0000 + 634-0000)
AC Voltage Ratio Meter and Test Sets (TTR meters)	1 a 150 >150 a 300 >300 a 400 >400 a 1500 @ 10V	0.033 % 0.030 % 0.045 % 0.15 %	PT-42 Precision AC Ratio Transformer Standards TEGAM 1011A (ID 602)
Resistance Meters	0.1 mΩ @ (10 to 50) A	0.14%	PT-43 Standard Resistance Tettex 3200/BL (ID 712)
Resistance Meters	1.0 mΩ @ (10 to 30) A	0.065%	PT-43 Standard Resistance Tettex 3201/BB (ID 713)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Meters	10 mΩ @ (1 to 10) A	0.040%	PT-43 Standard Resistance Tettex 3202/BT (ID 714)
Resistance Meters	100 mΩ @ (1 to 3) A	0.030%	PT-43 Standard Resistance Tettex 3203/BL (ID 715)
Resistance Meters	10 Ω @ 10mA	0.025%	PT-43 Standard Resistance Tettex 3205/BC (ID 716)
Resistance Meters	100 Ω @ 1mA	0.025%	PT-43 Standard Resistance Tettex 3206/BB (ID 717)
Resistance Meters	1000 Ω @ 1mA	0.025%	PT-43 Standard Resistance Tettex 3207/BB (ID 718)
Resistance Meters	0.1 mΩ @ (10 to 50) A	0.14%	PT-43 Standard Resistance IET Labs Inc. DCCS-0.0001 (ID 701)
Resistance Meters	1.0 mΩ @ (5 to 25) A	0.065%	PT-43 Standard Resistance IET Labs Inc. DCCS-0.001 (ID 702)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Meters	10 mΩ @ (0.25 to 10) A	0.040%	PT-43 Standard Resistance IET Labs Inc. DCCS-0.01 (ID 703)
Resistance Meters	100 mΩ @ (0.25 to 2.5) A	0.030%	PT-43 Standard Resistance IET Labs Inc. DCCS-0.1 (ID 704)
Resistance Meters	1.0 Ω @ (0.1 to 1.0) A	0.025%	PT-43 Standard Resistance IET Labs Inc. DCCS-1.0 (ID 705)
Resistance Meters	10 Ω @ 500mA	0.025%	PT-43 Standard Resistance IET Labs Inc. DCCS-10 (ID 706)
Resistance Meters	100 Ω @ 50mA	0.025%	PT-43 Standard Resistance IET Labs Inc. DCCS-100 (ID 707)
Resistance Meters	1.0 kΩ @ 5mA	0.025%	PT-43 Standard Resistance IET Labs Inc. DCCS-1k (ID 708)

Electrical - DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Meters Insulation Meters	1 kΩ @ <20 V 10 kΩ @ <20 V 100 kΩ @ <20 V 1 MΩ @ 500 V 10 MΩ @ (0.1 a 5) kV 100 MΩ @ (1 a 5) kV 1 GΩ @ (1 a 5) kV 10 GΩ @ (1 a 5) kV 100 GΩ @ (1 a 5) kV 1 TΩ @ (1 a 5) kV	0.0060 % 0.0080 % 0.0080 % 0.12 % 0.12 % 0.12 % 0.8 % 0.8 % 1 % 2.2 %	PT-43 Standard Resistance IET VRS-100-10-1K-BP (ID 847-0000)
Partial Discharge Measuring Systems	± (1.0 to 20.0) pC	6.5%	PT-44 IEC 62478 Reference PD Calibrator Power Diagnostics CAL2A (ID 614-0000)
Partial Discharge Measuring Systems	± (20 to 2000) pC	3.0%	PT-44 IEC 60270 Reference PD Calibrator Power Diagnostics CAL1G (ID 613-0000)
Partial Discharge Calibrators	± (1.0 to 2000) pC	2.5%	PT-45 IEC 60270. Annex A. Alternative Method Picoscope 2207B + DMM Keysight 34465A (ID 633-0000 + 620-0000)
High Current Measuring Systems, Converting Devices, Test Sets	2A to 2000A @ 60Hz	0.19 %	PT-48 IEC 62475 Reference Measuring System EPRO NCD 5000 dg + DMM Keysight 34465A (ID 635-0000 + 620-0000)

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

TESTING

Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Withstand Voltage Test (WT)	PT-02 IEC 62271-203 Sec 10.2.101	Gas-insulated Substations	Resonant Test System
Impulse test	PT-03 IEC 61869-2 (2012) Sec 7.2.3 IEC 61869-3 (2011-09) Sec 7.2.3 IEC 61869-4 (2013-11) CLAUSE 7.2.3 IEC 61869-5 (2011-07) CLAUSE 7.2.3 IEEE Std. C57.13 (2016) Sec 4.5 ANSI C93.1 Sec. 6.2.1.4 (K3411108)	Transformers	Impulse Approved Measuring System
Measurement of Partial Discharges	PT-05 IEC 60270 IEC TS 62478 IEC 400.3 IEC 400.4	Medium Voltage, High Voltage, Extra High Voltage Cable Systems Gas-insulated Substations	Partial Discharge Monitoring System
Assessment of Electrical Insulation Condition:Withstand Voltage Test (WT)Tangent Delta (TD)	PT-08 IEEE 400.2 Sec. C.5.1, 5.3, 5.4 & 5.5CIGRE Tech. Brochure 502	Shielded Power Cable Systems	Universal VLF & DCHV Test SystemDamped Alternating Current (DAC)Test Sets
Withstand Voltage Test (WT)	PT-12 IEC 60840 Sec. 16.3 & IEC 62067 Sec. 16.3	High Voltage Cable System, Extra High Voltage Cable Systems	Resonant Test System

Electrical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
DC Voltage test of the over sheath	PT-14 IEC 60229 CFE E0000-28 Sec 9.1.4.2	Medium Voltage, High Voltage & Extra High Voltage Cables	DC Voltage Cable Test System

Notes:

1. On-site calibration & Testing service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope
2. The Ratio range and uncertainty values are expressed in % absolute units, and not as % of reading.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. ACT-2982.

Jason Stine, Vice President