PV CALIBRATION LABORATORY PRIVATE LIMITED
16 SCP-3B, SECTOR-16A, VASUNDHARA, GHAZIABAD, (U.P.)-201012
PH.: 9899983640, 0120-4118183 EMAIL: PVCALLAB@GMAIL.COM

PV CAL LAB

CC-2276

CALIBRATION CERTIFICATE

ULR-CC227623000001075F

1) Service Request No. & Date : 2023/070 & 25/02/2023	2) Certificate No. : PV/2302/0273
3) Name & Address of Customer :	4) Calibration Date : 25/02/2023
Micro Advance Calibration Lab 524, Suresh Nager Morar Gwalior (Madhya Pradesh)-474006	5) Due Date (Requested, By Customer) : 24/02/2024
	6) Calibration Location : LAB
	7) Page No. : 1 of 2

8) CONDITION OF ITEM & DATE OF RECEIPT : OK & 25/02/2023

9) DESCRIPTION OF ITEM:

NAME :	ELECTRICAL SAFETY ANALYZER	MAKE/MODEL :	FLUKE /ESA612
Sr.No. :	5544503	Id No. :	MACL/ESA-01
RANGE :	AS PER INSTRUMENT	RESOLUTION :	AS PER RANGE
LOCATION :	--------	SPECIFIED ACCURACY :	-------

10) DETAILS OF CALIBRATION STANDARD USED:

NOMENCLATURE	MAKE & SR.NO.	CERTIFICATE NO.	CERTIFIED BY	CALIBRATION VALIDITY
M MULTI-PRODUCT CALIBRATOR WITH CURRENT COIL(50Trun)	FLUKE & 5144801	FL/C/ET/01122022-C001	FARE LABS	03/12/2023
6.5 PRECISION MULTIMETER	FLUKE & 3688005	FL/C/ET/16112022-C003	FARE LABS	19/11/2023
DECADE RESISTANCE BOX	MAS	PV/2301/0450	PV CALIBRATION	19/01/2024
STD RESISTANCE BOX	SIGMA	AACPL/13208F	AACPL	15/07/2023
THREE PHASE PORTABLE REFERENCE STANDARD METER	SONGYANG & 201905006	YMPL/336395/133802	YADAV MEASUREMENTS PVT LTD.	17/06/2023

11) ENVIRONMENTAL CONDITIONS:
AMBIENT TEMPERATURE : (25±4)°C
RELATIVE HUMIDITY : (50±10)% RH

12) CALIBRATION PROCEDURE NO. : WI(ET)/01, WI(ET)/02, WI(ET)/04

13) REFERENCE IS STANDARD : IS:1248(2003)

14) RESULTS:ELECTRO-TECHNICAL FIELD

(i) POINT TO POINT RESISTANCE MEASURMENT

RANGE	Applied Standard Value in (Ω)	Indicate Value On UUC in (Ω)	Measurement Error in (Ω)	Expanded Uncertainty (±)
0 - 2 Ω	1 m	0.001	0.000	0.68%
	10 m	0.010	0.000	0.80%
	100 m	0.102	0.002	0.80%
	1	1.003	-0.002	0.36%
	2	2.012		0.36%

(ii) POINT TO POINT LEAKAGE CURRENT MEASURMENT@50Hz

RANGE	Measured Standard Value in (A)	Indicate Value On UUC in (A)	Measurement Error in (A)	Expanded Uncertainty (±)
0 - 10 mA	1.00000 m	1002 µ	2 µ	1.1 %
	1.50000 m	1504 µ	4 µ	1.1 %
	2.00000 m	2.02 m	0.02 m	1.1 %
	5.0000 m	5.04 m	0.04 m	1.1 %
	10.0000 m	10.06 m	0.06 m	1.1 %

CALIBRATED BY

CALIBRATION ENGINEER

PV CAL LABORATORY PVT. LTD. GHAZIABAD

APPROVED BY

(VARUN KUMAR DUBEY)
TECHNICAL MANEGAR

PV CALIBRATION LABORATORY PRIVATE LIMITED
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PAGE NO.	2 of 2
CERTIFICATE NO:	PV/2302/0273
ULR NO:	CC227623000001075F

(iii) POINT TO POINT VOLTAGE MEASURMENT@50Hz

RANGE	Measured Standard Value in (V)	Indicate Value On UUC in (V)	Measurement Error in (V)	Expanded Uncertainty (±)
0 - 300 Volt	99.9852	100.0	0.0148	0.96 %
	149.632	150.0	0.368	0.64 %
	199.746	200.0	0.254	0.48 %
	249.635	250.0	0.365	0.38 %
	299.569	300.0	0.431	0.32 %

(iv) LOAD CURRENT MEASURMENT @50Hz

RANGE	Measured Standard Value in (A)	Indicate Value On UUC in (A)	Measurement Error in (A)	Expanded Uncertainty (±)
0 - 20 A	0.499856	0.501	0.001144	0.27 %
	0.997745	1.001	0.003255	0.27 %
	4.99323	4.99	-0.00323	0.27 %
	9.99746	9.98	-0.01746	0.27 %
	19.9971	19.80	-0.1971	0.25 %

INSULATION TEST(0-100 MΩ)

STD. READING IN (MΩ)	UUC READING IN (MΩ)	Deviation IN (MΩ)	Unc. Reported	STD. READING IN (MΩ)	UUC READING IN (MΩ)	Deviation IN (MΩ)	Unc. Reported
At 250 V				At 500 V			
2	2.1	0.1	±2.35%	2	2.1	0.1	±2.35%
20	19.9	-0.1	±2.35%	20	19.9	-0.1	±2.35%
100	100.3	0.3	±2.42%	100	100.3	0.3	±2.42%

15.CERTIFICATE ISSUE DATE: 28/02/2023

The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor k = 2,
which corresponds to a coverage probability of approximately 95.45% for a normal distribution.

CALIBRATED BY

CALIBRATION ENGINEER

GHAZIABAD

APPROVED BY

(VARUN KUMAR DUBEY)
TECHNICAL MANEGAR

****END OF CERTIFICATE****

Bhagwati Calibration Laboratory

CALIBRATION CERTIFICATE

CC-2464

ULR No. CC246423000000220F

Certificate Number	BCL / 2023 / 0220F	Page No	1	No. of Pages	2
SRF No & Date	2201.5 Date - 23.01.2023	Group	Speed	Field	Mech.
Company Name Address	M/S : Micro Advance Calibration Lab 524, Suresh Nagar Morar Gwalior	Calibration Date Calibration Due Dt Certificate Issue Dt. UUC Condition		23.01.2023 22.01.2024 25.01.2023 Good	

Calibration Instrument Detail

Sl	Instrument Name	Range	Least Count	Make / Model No. / Sl.No	Party ID / Location
1	Dig. Tachometer	60 to 50000 RPM	0.1/1 RPM	Systems / HTM-890 18-C99	MACL/TM-01 Lab

Standard Equipments Used (Traceable to National Standard)

Sl	Instrument Name	Make/Sl No	Calibrated By	Cal Certificate No	Due Date of Cal
1	Dig. Tachometer	Danger / S341976	AACPL	AACPL / 21775F	03.11.2023

Reference Standard	Calibration Purpose	Humidity	Temperature	Calibration Performed At
IS : 12508 : 2013	RPM Measurement	(50 ± 10)%RH	(23 ± 2)°C	Lab

Calibration Procedure : As per Calibration Procedure Manual BCL / CPM / 01, Section No : M/CP - 50

Uncertainty Measurement : at approx 95% confidence level and coverage factor k = 2 : ± 1.5 %

Calibration Result (in RPM) Non Contact Type

Sl	Selected Range	Calibration Gauge Value UUC (in RPM)	Master Guage Value (in RPM)	Deviation (in RPM)
1	60.0	60.2	60.0	0.2
2	100.0	100.4	100.1	0.3
3	500.0	500.1	500.1	0.0
4	900.0	900.7	900.2	0.5
5	2000	2005	2000	5
6	5000	5005	5002	3
7	10000	10013	10004	9
8	20000	20016	20007	9
9	30000	30017	30005	12

BHAGWATI CALIBRATION LABORATORY CALIBRATE

Calibration Engineer

(Santosh Kumar Kushwaha)
Tech. Manager

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Bhagwati Calibration Laboratory

CALIBRATION CERTIFICATE

CC-2464

ULR No. CC246423000000222F

Certificate Number	BCL / 2023 / 0222F	Page No	1	No. of Pages	1
SRF No & Date	2201.5 Date - 23.01.2023	Group	Mass	Field	Mech.
Company Name Address	M/S : Micro Advance Calibration Lab 524, Suresh Nagar Morar Gwalior	Calibration Date Calibration Due Dt Certificate Issue Dt. UUC Condition		23.01.2023 22.01.2024 25.01.2023 Good	

Calibration Instrument Detail

Sl	Instrument Name	Weight	Least Count	Make / Sl.No	Party ID / Location
1	Weight Box	1mg to 200g	N/A	Bullion	MACL/WB-01 Lab

Standard Equipments Used (Traceable to National Standard)

Sl	Instrument Name	Make/Sl No/ID	Calibrated By	Cal Certificate No	Due Date of Cal
1	Std Weights Set	Weightronics	Bluebox Techno	BBT/104/JAN/21	05.02.2023
2	Dig. Weighing Balance	Radwag/BCL/WB-01	AACPL	AACPL / 22148F	10.11.2023

Reference Standard	Calibration Purpose	Humidity	Temperature	Calibration Performed At
OIML - R111: 2004	Weight Measurement	(50 ± 10)%RH	(23 ± 2)°C	Laboratory

Calibration Procedure : As per Calibration Procedure Manual BCL/CPM / 01, Section No : M/CP - 52

Assume Density : (7950 ± 140) kg/m^3 ; (k = 2) for Stainless Steel, (2700 ± 130) kg/m3 ; (k = 2) for Aluminum

Uncertainty Measurement : at approx 95% confidence level and coverage factor k = 2

Calibration Result

Nominal Value (in g)	Observed Mass Value (in g)	Deviation (in g)	Uncertainty K = 2 (in mg)	Nominal Value (in g)	Observed Mass Value (in g)	Deviation (in g)	Uncertainty K = 2 (in mg)
0.001	0.00112	-0.00012	0.060	1	1.00034	-0.00034	0.30
0.002	0.00216	-0.00016	0.060	2	2.00036	-0.00036	0.40
0.002 *	0.00185	0.00015	0.060	2 *	2.00037	-0.00037	0.40
0.005	0.00517	-0.00017	0.060	5	5.00045	-0.00045	0.50
0.01	0.01012	-0.00012	0.080	10	10.00025	-0.00025	0.60
0.02	0.02015	-0.00015	0.100	20	19.99968	0.00032	0.80
0.02 *	0.01992	0.00008	0.100	20 *	19.99957	0.00043	0.80
0.05	0.05014	-0.00014	0.120	50	50.00034	-0.00034	0.35
0.1	0.10016	-0.00016	0.160	100	100.0026	-0.0026	0.35
0.2	0.20018	-0.00018	0.200	200	200.0044	-0.0044	3.00
0.2 *	0.19983	0.00017	0.200	200 *	200.0046	-0.0046	3.00
0.5	0.50012	-0.00012	0.060				

Note

1 The calibration results reported in this calibration certificate are valid at the time of & under stated condition
2 This certificate cannot be reproduced except in full without our prior permission in writing
3 This certificate refers only to the particular item(s) submitted for calibration
4 UUC - Unit under calibration
5 Calibration certificate of equipment covered by Legal Metrology Acts & Weight & Measure Act is for Scientific purpose only and should not be used for trade/commerical/other use.

Calibration Engineer

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Bhagwati Calibration Laboratory

CALIBRATION CERTIFICATE

CC-2464

ULR No. CC246423000000223F

Certificate Number	BCL / 2023 / 0223F	Page No	1	No. of Pages	1
SRF No & Date	2201.5 Date - 23.01.2023	Group	Mass	Field	Mech.
Company Name	M/S : Micro Advance Calibration Lab	Calibration Date		23.01.2023	
Address	524, Suresh Nagar Morar Gwalior	Calibration Due Dt		22.01.2024	
		Certificate Issue Dt.		25.01.2023	
		UUC Condition		Good	

Calibration Instrument Detail

Sl	Instrument Name	Weight	Least Count	Make / Model No. / Sl.No	Party ID / Location
1	Weight	500 gm, 1/2/5/ 10/20 kg	N/A	Bullion	MACL/W-01 Lab

Standard Equipments Used (Traceable to National Standard)

Sl	Instrument Name	Make/Sl No/ID	Calibrated By	Cal Certificate No	Due Date of Cal
1	Std. Weights	Weightronics	Weightronics	WMCL/F/2022-09/2045	15.09.2024
2	Dig. Weighing Balance	Denvar / BCL/DWB-06	AACPL	AACPL / 18938F	15.09.2023
3	Dig. Weighing Balance	Denvar / BCL/DWB-07	AACPL	AACPL / 18939F	15.09.2023

Reference Standard	Calibration Purpose	Humidity	Temperature	Calibration Performed At
OIML - R111: 2004	Weight Measurement	(50 ± 10)%RH	(23 ± 2)°C	Laboratory

Calibration Procedure : As per Calibration Procedure Manual BCL/CPM / 01, Section No : M/CP - 52

Assume Density : (7950 ± 140) kg/m^3 ; (k = 2) for Stainless Steel, (2700 ± 130) kg/m3 ; (k = 2) for Aluminum

Uncertainty Measurement : at approx 95% confidence level and coverage factor k = 2

Calibration Result

Sl. No.	NominalValue (in g)	Observed Mass Average Value (in g)	Deviation (in g)	Uncertainty K = 2 (in g) ±
1	500	499.89	0.11	0.016
2	1000	999.89	0.11	0.016
3	2000	1999.79	0.21	0.03
4	5000	5000.1	-0.1	1.1
5	10000	10000.2	-0.2	2.1
6	20000	20000.3	-0.3	2.1

Note

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2 As per Mpe weight in M2 Class
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5 UUC - Unit under calibration Result As Per IS ok
6 Calibration certificate of equipment covered by Legal Metrology Acts & Weight & Measure Act is for Scientific purpose only and should not be used for trade/commerical/other use

CALIBRATE

Calibration Engineer

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Bhagwati Calibration Laboratory

CALIBRATION CERTIFICATE

CC-2464

ULR No. CC246423000000221F

Certificate Number	BCL / 2023 / 0221F	Page No	1	No. of Pages	1
SRF No & Date	2201.5 Date - 23.01.2023	Group	Mass	Field	Mech.
Company Name	M/S : Micro Advance Calibration Lab	Calibration Date		23.01.2023	
Address	524, Suresh Nagar Morar Gwalior	Calibration Due Dt		22.01.2024	
		Certificate Issue Dt.		25.01.2023	
		UUC Condition		Good	

Calibration Instrument Detail

Sl	Instrument Name	Range	Least Count	Make / Model No. / Sl.No	Party ID / Location
1	Weighing Machine (Pocket Scale)	0 - 200 gm	0.01 gm	MH Series Pocket Scale	MACL/WM-01 Lab

Standard Equipments Used (Traceable to National Standard)

Sl	Instrument Name	Make/Sl No/ID	Calibrated By	Cal Certificate No	Due Date of Cal
1	Std. Weight Box	Weightronics	Bluebox Techno	BBT/104/JAN/21	05.02.2023

Reference Standard	Calibration Purpose	Humidity	Temperature	Calibration Performed At
IS : 9281	Weight Measurement	(50 ± 20)%RH	(25 ± 10)°C	Site

Calibration Procedure : As per Calibration Procedure Manual BCL / CPM / 01, Section No : M/CP - 53

Uncertainty Measurement : at approx 95% confidence level and coverage factor k = 2 is : ± 13 mg

A - Linearty Test

Calibration Result

Sl No.	Nominal Value Standard	Measured Value UUC (in g)
1	100 mg	0.10
2	200 mg	0.20
3	500 mg	0.50
4	1 g	1.00
5	5 g	5.00
6	10 g	10.00
7	20 g	20.00
8	50 g	49.99
9	100 g	99.97
10	200 g	199.95

B - Repeatability Test

The Standard Deviation of the balance at

Full Load ± 0.01 g

Half Load ± 0.01 g

C - Eccentricity Test

The Eccentricity error (off centre) at 100 g = ± 0.01 g

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