



**ANSI C12.1-2024**

*American National Standard for Electric Meters—  
Code for Electricity Metering*

Secretariat:

**National Electrical Manufacturers Association**

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**American National Standards Institute, Inc.**

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**Foreword** (This foreword is not part of American National Standard C12.1-2024)

This American National Standard establishes acceptable performance criteria for electricity meters. Accuracy class designations, current class designations, voltage and frequency ratings, test current values, service connection arrangements, pertinent dimensions, form designations, and environmental tests are covered.

This version of C12.1 has been modified in several areas in an effort to respond to a changing industry and to improve the clarity of some of the tests. In the North American market, electromechanical meters are no longer manufactured, and tests related to them have been deprecated. Additional work in the field of electromagnetic compatibility and auxiliary communications device influence has also been included in this version. The content of another standard in this series, ANSI C12.20, has been merged into C12.1 so that there is now a singular document that covers the entire *Code for Electricity Metering*. Blondel and non-Blondel meters are both covered by this new version of C12.1. C12.20 will be withdrawn with the publication of this version of C12.1.

Most other specifications have been retained from the previous edition. The following is a brief summary of the main changes:

- Polyphase loading has been mandated for all type testing of polyphase meters
- Voltage tests for meters with wide input voltage ranges have been simplified
- Test No. 4: Effect of variation of power factor has been greatly simplified
- Test No. 7: Equality of current circuits has been simplified
- Test No. 9: Heat rise test has been modified
- Test No. 10: Effect of register friction has been deprecated
- Test No. 12: Effect of tilt has been deprecated
- Introduction of the Critical Change Value concept for certain External Influence tests
- Test No. 17: Effect of high-voltage line surges has been modernized
- Test No. 18: Effect of external magnetic field has been modernized
- Test No. 26: Effect of radio frequency interference has been modernized
- Test No. 28: Effect of electrostatic discharge (ESD) has been modernized
- Tests 39 through 44: Harmonic Influence have been carried over from C12.20
- Appendices A and B have been modernized
- A section on non-Blondel metering has been added to Appendix A

The *Code for Electricity Metering* is a body of work that originated over 110 years ago with the first edition released in 1910. Since then, a great many people have dedicated themselves to updating and modernizing this work. This latest edition is dedicated to all the past and present committee members who have demonstrated a passion for Electricity Metering standards development, and upon whose shoulders this latest version stands.

The Secretariat of the Accredited Standards Committee on Electricity Metering, C12, is held by the National Electrical Manufacturers Association (NEMA) and the National Institute of Standards and Technology (NIST). At the time this standard was processed and approved, the C12 Committee had the following members:

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**Contents**

<b>Section 1</b>	<b>Scope and references .....</b>	<b>1</b>
1.1	Scope .....	1
1.2	References .....	1
<b>Section 2</b>	<b>Definitions .....</b>	<b>3</b>
<b>Section 3</b>	<b>Standards and standardizing equipment .....</b>	<b>12</b>
3.1	General .....	12
3.2	Traceability paths to the International System of Units, SI .....	12
3.3	Meter laboratory .....	12
3.4	Meter shop .....	13
3.5	Laboratory standards .....	13
3.6	Periodic verification of reference standards .....	13
3.7	Portable/field/working standard watt-hour meters .....	13
3.8	Performance records .....	14
3.9	Performance requirements for standard watt-hour meters .....	14
<b>Section 4</b>	<b>Acceptable performance of new types of electricity meters and associated equipment .....</b>	<b>16</b>
4.1	General .....	16
4.2	Types of meters .....	17
4.3	Specifications for design and construction .....	17
4.4	Selection of meters for approval tests .....	18
4.5	Conditions of test .....	19
4.6	Rules governing the acceptance of types .....	24
4.7	Performance requirements .....	26
<b>Section 5</b>	<b>Standards for new and in-service performance .....</b>	<b>86</b>
5.0	General principles .....	86
5.1	Watt-hour meters .....	90
5.2	Instrument transformers, magnetic (external to meter) .....	92
5.3	Coupling capacitor voltage transformers (external to meter) .....	92
5.4	Integrated communication devices .....	92
5.5	Service switches (integrated and external to meter) .....	93
5.6	Demand and interval registers (integrated) .....	93
5.7	Other energy measurement devices not already listed (integrated and external to meter) .....	94
5.8	Other non-energy measurement devices in a metering device circuit (integrated and external to meter) .....	94
<b>Section 6</b>	<b>Auxiliary pulse devices for electricity metering .....</b>	<b>95</b>
6.1	General .....	95
6.2	Tests to be applied .....	95
6.3	Performance requirements .....	95
<b>Appendix A</b>	<b>Measurement of power, energy, and related quantities .....</b>	<b>100</b>
A.1	Measurement of power .....	100
A.2	Measurement of energy .....	102
A.3	Measurement of power factor .....	107
A.4	Measurement of reactive energy (varhours, quadergy) .....	108
A.5	Non-Blondel metering applications .....	109

<b>Appendix B</b>	<b>Standards and standardizing equipment .....</b>	<b>124</b>
B.1	General.....	124
B.2	Final authority.....	124
B.3	[This section has been removed] .....	125
B.4	Establishing a local reference standard of energy.....	125
B.5	Laboratory conditions.....	127
B.6	Laboratory reference standards .....	128
B.7	Laboratory secondary standards.....	131
B.8	Shop instruments .....	132
B.9	Performance records .....	133
B.10	Abnormal conditions .....	133
B.11	[This section has been removed] .....	133
B.12	Acceptable performance of standard watt-hour meters.....	133
<b>Appendix C</b>	<b>Registration and meter constants .....</b>	<b>136</b>
C.1	General.....	136
C.2	Symbols.....	136
C.3	Object of the test .....	136
C.4	Test procedure .....	136
C.5	Allowed effect.....	136
C.6	Mandatory testpoints.....	137
<b>Appendix D</b>	<b>Periodic testing schedule .....</b>	<b>138</b>
<b>Appendix E</b>	<b>Variable interval plan.....</b>	<b>139</b>
<b>Appendix F</b>	<b>90 degree phase fired waveform definitions.....</b>	<b>140</b>
F.1	Fourier construction of 90 degree phase fired current waveform with same peak as $I_{ref}$ .....	140
F.2	Sine construction of 90 degree phase fired current waveform with same peak as $I_{ref}$ .....	140
<b>Appendix G</b>	<b>Type B optical test output port (OTOP) .....</b>	<b>143</b>
G.0	Type B—separate port for OTOP.....	143
G.1	Physical specifications .....	143
G.2	Output optical characteristics .....	143
<b>Appendix H</b>	<b>Historical background .....</b>	<b>145</b>
H.1	Preface to the First Edition (1910).....	145
H.2	Preface to the Second Edition (1922) .....	146
H.3	Preface to the Third Edition (1928) .....	146
H.4	Preface to the Fourth Edition (1941) .....	147
H.5	Preface to the Fifth Edition (1965).....	148
H.6	Preface to the Sixth Edition (1975).....	149
H.7	Foreword to the Seventh Edition (1982) .....	151
H.8	Foreword to the Eighth Edition (1988) .....	152
H.9	Foreword to the Ninth Edition (1995) .....	155
H.10	Foreword to the Tenth Edition (2001) .....	156
H.11	Foreword to the Eleventh Edition (2008).....	158
H.12	Foreword to the Twelfth Edition (2014) .....	160

**Tables**

Table 1	Maximum percent errors at reference conditions .....	15
Table 2	Maximum percent errors with variation of voltage and current .....	15
Table 3	Current classes and test amperes.....	20
Table 4	Typical Blondel meter form designations .....	21
Table 5	Typical non-Blondel meter forms.....	22
Table 6	Table of failures based on the number of meters tested .....	25
Table 7	Polyphase service loading for use on accuracy tests.....	27
Table 8	ABC phase sequence, current and voltage phase angles stated relative to $V_A$ .....	28
Table 9	CBA phase sequence, current and voltage phase angles stated relative to $V_A$ .....	28
Table 10	List of type tests .....	30
Table 11	Starting load test .....	32
Table 12	Load performance test.....	33
Table 13	ACD extreme state load performance test.....	34
Table 14	Effect of variation of power factor performance test .....	36
Table 15	Effect of variation of voltage .....	37
Table 16	Effect of variation of voltage on solid state auxiliary devices .....	39
Table 17	Effects of variation of frequency .....	39
Table 18	Equality of current circuits for multi-current circuit meters.....	40
Table 19	Temperature-rise test specifications .....	41
Table 20	Effect of internal heating for current classes 2, 10, and 20 .....	46
Table 21	Effect of internal heating for current classes 100, 200, and 320 .....	47
Table 22	Limits for stability of performance.....	48
Table 23	Limits for phase sequence reversal.....	48
Table 24	Selected coupling modes for power line surge testing .....	52
Table 25	Effect of external magnetic field .....	54
Table 26	Effect of variation of ambient temperature .....	56
Table 27	Effect of variation of ambient temperature for temperatures $> +50^{\circ}\text{C}$ and $< -20^{\circ}\text{C}$ .....	57
Table 28	Effect of variation of temperature on solid state auxiliary devices .....	58
Table 29	Effect of temporary overloads on accuracy.....	58
Table 30	Effect of current surge in ground conductor.....	59
Table 31	Test modes, voltage, and application for each external connection group, oscillatory test.....	62
Table 32	Maximum difference in energy accumulation, radiated interference .....	63
Table 33	Maximum difference in energy accumulation, conducted interference.....	64
Table 34	Current test values for $I_{ref}$ .....	74
Table 35	Effect of harmonic influence: 90 degree phase fired current waveform performance requirements .....	75
Table 36	Quadriform waveform .....	76
Table 37	Effect of harmonic influence: Quadriform waveform performance requirements .....	77
Table 38	Peaked waveform .....	78
Table 39	Effect of harmonic influence: peaked waveform performance requirements .....	79
Table 40	Pulse waveform.....	80
Table 41	Effect of harmonic influence: pulse waveform performance requirements.....	81
Table 42	Multiple zero crossing current waveform .....	82
Table 43	Effect of harmonic influence: multiple zero crossing current waveform performance requirements .....	83
Table 44	Multiple zero crossing voltage waveform .....	84

Table 45	Effect of harmonic influence: multiple zero crossing voltage waveform .....	85
Table 46	Performance test, pulse devices .....	96
Table 47	Common non-Blondel applications .....	110
Table 48	Errors under various 2s application conditions .....	114
Table 49	Errors under various 4-wire wye non-Blondel applications .....	119
Table 50	Errors under various 4-wire delta non-Blondel applications .....	122
Table 51	Periodic testing schedule .....	138
Table 52	Variable interval plan .....	139
Table 53	90 degree phase fired waveform .....	142
Table 54	Type B transmitter performance .....	143

## Figures

Figure 1	Diagram of quadrants .....	35
Figure 2	Location of temperature detectors.....	42
Figure 3	Dimensions for jumper bars of simulated meter temperature-rise test for single-phase and polyphase meters (maximum rating 100 A).....	43
Figure 4	Dimensions for jumper bars of simulated meter temperature-rise test for single-phase and polyphase meters (maximum rating 101 – 200 A).....	44
Figure 5	Dimensions for jumper bars of simulated meter temperature-rise test for single-phase and polyphase meters (maximum rating 201 – 320 A).....	45
Figure 6	Magnetic field orientations 1, 2, and 3 .....	54
Figure 7	Test No. 25 electrical fast transient/burst direct connection .....	61
Figure 8	Test No. 25 electrical fast transient/burst capacitive clamp connection .....	61
Figure 9	Typical test layout for Test 26a—effect of radio frequency radiated interference, reference Section 4.7.3.12.1 .....	64
Figure 10	Typical wiring diagram for Test 26b—conducted interference .....	65
Figure 11	Typical test layout for Test 27—radiated and conducted emissions, reference Section 4.7.3.13.....	66
Figure 12	Typical wiring detail for self-contained meters for Test 27—radiated and conducted emissions, reference Section 4.7.3.13 .....	67
Figure 13	Typical wiring detail for transformer rated meters for Test 27—radiated and conducted emissions, reference Section 4.7.3.13 .....	68
Figure 14	Typical GTEM test layout for radiated interference Test 26a, reference Section 4.7.3.12.....	69
Figure 15	90 degree phase fired waveform .....	74
Figure 16	Quadriform waveform .....	76
Figure 17	Peaked waveform .....	78
Figure 18	Pulse waveform.....	81
Figure 19	Multiple zero crossing current waveform .....	82
Figure 20	Multiple zero crossing voltage waveform .....	84
Figure 21	Sunlight interference test .....	98
Figure 22	Variable angles sunlight interference test .....	99
Figure 23	2S meter connections .....	111
Figure 24	2S meter application .....	111
Figure 25	Single-phase, 3-wire vector diagrams.....	112
Figure 26	2S errors at PF=1.0.....	116
Figure 27	5S metering application .....	117
Figure 28	6S metering application .....	118
Figure 29	5S metering application .....	120
Figure 30	8S metering application .....	121
Figure 31	Traceability path diagram .....	126
Figure 32	90 degree phase fired waveform.....	141
Figure 33	Type B transmitter performance.....	144

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## Section 1 Scope and references

### 1.1 Scope

This standard establishes acceptable performance criteria for new types of AC watthour meters, demand meters, demand registers, pulse devices, and auxiliary devices. It also describes acceptable in-service performance levels for meters and devices used in revenue metering. It also includes information on related subjects, such as recommended measurement standards, installation requirements, test methods, and test schedules. This *Code for Electricity Metering* is designed as a reference for those concerned with the art of electricity metering, such as utilities, manufacturers, and regulatory bodies.

Where differences exist between the requirements of this standard and the most current version of ANSI C12.10, the requirements of this standard shall prevail.

### 1.2 References

The following publications shall be used in conjunction with this standard. When they are superseded by an approved revision, the latest approved revision shall apply:

ANSI C12.7-2022 *Requirements for Watthour Meter Sockets*

ANSI C12.10-2011 (R2021) *Physical Aspects of Watthour Meters—Safety Standard*

ANSI C12.18-2006 (R2024) *Protocol Specification for ANSI Type 2 Optical Port*

ANSI/ASQ Z1.4-2003 (R2018) *Sampling Procedures and Tables for Inspection by Attributes*

ANSI/ASQ Z1.9-2003 (R2018) *Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming*

ANSI/IEEE C63.4-2014 *Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz*

ASTM B117-2019 *Standard Practice for Operating Salt Spray (Fog) Apparatus*

ASTM G155-2021 *Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials*

Code of Federal Regulations (Telecommunication) CFR 47, Part 15—*Radio Frequency Devices, Subparts A—General and B—Unintentional Radiators*

Chapter 19, “The Customers’ Premises, Service and Installations,” *Handbook for Electricity Metering*, 11th Edition, Washington, D.C.: Edison Electric Institute, 2014

IEC 61000-4-3:2020 *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-6:2013 *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields*

IEEE 1-2000 *IEEE Recommended Practice - General Principles for Temperature Limits in the Rating of Electrical Equipment and for the Evaluation of Electrical Insulation*

IEEE C37.90.1-2012 *IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus*

IEEE C57.13-2016 *IEEE Standard Requirements for Instrument Transformers*