

# DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

## PUBLIC SERVICE COMMISSION

### TECHNICAL STANDARDS FOR ELECTRIC SERVICE

(By authority conferred on the public service commission by section 7 of 1909 PA 106, MCL 460.557, section 2 of 1909 PA 300, MCL 462.2, section 5 of 1919 PA 419, MCL 460.55, sections 4 and 6 of 1939 PA 3, MCL 460.4 and 460.6, and sections 3, 9, and 231 of the executive organization act of 1965, 1965 PA 380, MCL 16.103, 16.109, 16.331, and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445.2011, 445.2025, and 445.2030)

### PART 1. GENERAL PROVISIONS

#### **R 460.3101 Applicability; purpose; modification; adoption of rules and regulations by electric utility or cooperative.**

Rule 101. (1) These rules apply to electric utilities as that term is defined in section 2 of the electric transmission line certification act, 1995 PA 30, MCL 460.562, and cooperative electric utilities as that term is defined in section 2 of the electric cooperative member-regulation act, 2008 PA 167, MCL 460.32, that are subject to the jurisdiction of the public service commission.

(2) These rules are intended to promote safe and adequate service to the public and to provide standards for uniform and reasonable practices by electric utilities and cooperatives.

(3) These rules do not relieve an electric utility or cooperative from any of its duties under the laws of this state.

(4) An electric utility or cooperative may adopt reasonable rules and regulations governing its relations with customers that it finds necessary and that are not inconsistent with these rules for electric service. Adopted rules and regulations must be filed with, and approved by, the commission.

(5) An electric utility or cooperative may petition the commission for a permanent or temporary waiver or exception from these rules for good cause shown provided that the waiver or exception is consistent with the purpose of these rules.

History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

#### **R 460.3102 Definitions.**

Rule 102. As used in these rules:

- (a) "Approved by the commission" means that a commission order has been issued.
- (b) "Commission" means the Michigan public service commission.

(c) “Cooperative” or “cooperative electric utility” means that term as defined in section 2(c) of the electric cooperative member-regulation act, 2008 PA 167, MCL 460.32.

(d) “Customer” means an individual who is at least 18 years of age or an emancipated minor, who is an account holder, and who purchases electric service from an electric utility or cooperative.

(e) “Electric plant” means all real estate, fixtures, or property that are owned, controlled, operated, or managed in connection with, or to facilitate the production, transmission, and delivery of, electric energy.

(f) “Electric utility” means that term as defined in section 2 of the electric transmission line certification act, 1995 PA 30, MCL 460.562.

(g) “Electricity meter” means a device that measures and registers the integral of an electrical quantity with respect to time.

(h) “Electro-mechanical meter” means a meter in which currents in fixed coils react with the currents induced in the conducting moving element, generally a disk or disks, which causes their movement proportional to the energy to be measured. This meter may also be called an induction watt-hour meter.

(i) “File” means to deliver to the commission’s executive secretary.

(j) “Major interruption” means either of the following:

(i) For an electric utility or cooperative with greater than 1,000,000 customers, any weather condition that results in sustained service interruptions impacting 50,000 or more customers or an electrical system component failure that occurs under normal conditions, as defined in R 460.702, impacting 7,500 or more customers unless otherwise ordered by the commission.

(ii) For an electric utility or cooperative with less than 1,000,000 customers, any weather condition that results in sustained service interruptions impacting 5% or 2,000 or more customers, whichever is greater, or an electrical system component failure that occurs under normal conditions, as defined in R 460.702, impacting 3,000 or more customers unless otherwise ordered by the commission.

(k) “Meter” or “watt-hour meter” means an electricity meter that measures and registers the integral with respect to time of the active power of the circuit in which it is connected. The unit by which this integral is measured is usually the kilowatt-hour.

(l) “Meter creep” means a continuous apparent accumulation of energy in a meter with voltage applied and the load terminals open circuited.

(m) “Meter error” means a failure to accurately measure and record all of the electrical quantities used that are required by the applicable rate or rates.

(n) “Meter shop” means a shop where meters are inspected, repaired, and tested. A meter shop may be at a fixed location or may be mobile.

(o) “Planned interruption” means the loss of electric power to 1 or more customers that results from a planned outage.

(p) “Premises” means an undivided piece of land that is not separated by public roads, streets, or alleys.

(q) “Regional transmission organization” means a voluntary organization of electric transmission owners, transmission users, and other entities approved by the federal energy regulatory commission to efficiently coordinate electric transmission planning, operation, and use on a regional and interregional basis.

(r) “Serious injury” means any injury or illness to an employee, including contract employees, or a non-employee that results in inpatient hospitalization.

(s) “Service point” means the point of connection between the facilities of the serving electric utility or cooperative and the premises wiring.

(t) “Solid state meter” means a meter in which current and voltage act on electronic (solid state) elements to produce an output proportional to the energy to be measured.

(u) “Submit” means to deliver to the commission’s designated representative.

(v) “Sustained interruption” means any interruption that lasts more than 5 minutes and is not classified as a part of a momentary event. The duration of a customer’s interruption must be measured from the time that the electric utility or cooperative is notified or otherwise becomes aware of the full or partial loss of service to 1 or more customers for longer than 5 minutes.

History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3103 Rescission.**

Rule 103. R 460.501 to R 460.505 of the Michigan Administrative Code, appearing on pages 4695 to 4709 of the 1979 Michigan Administrative Code, are rescinded.

History: 1983 AACS.

**PART 2. RECORDS, REPORTS, AND OTHER INFORMATION**

**R 460.3201 Records; location; examination.**

Rule 201. Upon a request by the commission or its designated representative, records which are required by these rules or which are necessary for the administration of these rules shall be available within the state of Michigan for examination by the commission or its designated representative.

History: 1983 AACS; 1996 AACS.

**R 460.3202 Records; preservation.**

Rule 202. Unless otherwise specified in these rules, or by other order of the commission, all records that are required by these rules shall be preserved for the period of time specified in R 460.2501 et seq. of the Michigan Administrative Code.

History: 1983 AACS.

**R 460.3203 Documents and information; required submission.**

Rule 203. An electric utility or cooperative shall submit all of the following documents and information and maintain the documents and information in a current status:

(a) A copy of the electric utility's or cooperative's tariff.

(b) A copy of the electric utility's or cooperative's rules and standards that are made available to the public covering meter and service installation.

(c) A copy of each type of customer bill form.

(d) A list of the cities, villages, and townships that the electric utility or cooperative serves. Upon a request by the commission or its designated representative, the electric utility or cooperative shall also provide copies of the associated franchise information.

(e) The name, title, address, and telephone number of the persons to be contacted in connection with the following matters:

(i) General management duties.

(ii) Customer relations, including complaints.

(iii) Engineering operations.

(iv) Meter tests and repairs.

(v) Emergencies during non-office hours.

(f) An annual copy of the electric utility's or cooperative's construction budget, which must be updated for all major changes to generating and transmission facilities.

(g) An "Electric Service" monthly report, on forms suitable to the commission, that shows information concerning the electric utility's or cooperative's acquisition and disposition of electric energy and other information as required. The reports must be submitted by electric utilities or cooperatives within 50 days after the end of the quarter reported.

(h) A map or maps that show the electric utility's or cooperative's operating area within this state, including generating stations and transmission lines with their voltage designations. Upon a request by the commission or its designated representative, the electric utility or cooperative shall also make available a map or maps that show all of the following:

(i) Distribution lines with the number of phases designated.

(ii) State boundary crossings.

(iii) Service areas.

(i) For an electric utility with greater than 100,000 customers, a line clearing quarterly report, on forms suitable to the commission, that shows information concerning line clearing amounts spent, miles or units cleared, and progress toward achieving the targeted line clearing cycle.

(j) Unless provided through other written reporting to the commission, a solid state meter annual report, on forms suitable to the commission, that shows all of the following:

(i) Information the meter infrastructure is capable of collecting.

(ii) Information the electric utility or cooperative is collecting from the meter infrastructure.

(iii) A description of the electric utility's or cooperative's current use of the information collected.

(iv) A description of the electric utility's or cooperative's future plans for information collection and use.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3204 Customer records; retention period; content.**

Rule 204. (1) An electric utility or cooperative shall retain, either within the electric utility or cooperative or as contracted through a third party with access by the electric utility or cooperative, customer records as necessary to comply with R 460.115a. An electric utility or cooperative shall retain the records for not less than 3 years.

(2) Records for customers must show, if applicable, all of the following information:

- (a) Kilowatt-hour meter reading.
- (b) Metered kilowatt-hour consumption.
- (c) Kilowatt, kilovolt ampere, and kilovar meter reading.
- (d) Kilowatt, kilovolt ampere, and kilovar measured demand.
- (e) Kilowatt, kilovolt ampere, and kilovar billing demand.
- (f) Total amount of bill.

History: 1983 AACS; 1996 AACS; 2008 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3205 Security reporting.**

Rule 205. (1) To inform the commission regarding matters that may affect the security or safety of persons or property, whether public or private, an electric utility or cooperative shall do both of the following:

(a) Provide a written or oral annual report, individually or jointly with other electric utilities or cooperatives, to designated members of the commission staff regarding the electric utility's or cooperative's cybersecurity program and related risk planning. This report on the threat assessment and preparedness strategy must contain all of the following information:

(i) An overview of the program describing the electric utility's or cooperative's approach to cybersecurity awareness and protection.

(ii) A description of cybersecurity awareness training efforts for the electric utility's or cooperative's staff members, specialized cybersecurity training for cybersecurity personnel, and participation by the electric utility's or cooperative's cybersecurity staff in emergency preparedness exercises in the previous calendar year.

(iii) An organizational diagram of the electric utility's or cooperative's cybersecurity organization, including positions and contact information for primary and secondary cybersecurity emergency contacts.

(iv) A description of the electric utility's or cooperative's communications plan regarding unauthorized actions that result in loss of service, financial harm, or breach of sensitive business or customer data, including the electric utility's or cooperative's plan for notifying the commission and customers.

(v) A redacted summary of any unauthorized actions that resulted in loss of service, financial harm, or breach of sensitive business or customer data, including the parties that were notified of the unauthorized action and any remedial actions undertaken.

(vi) A description of the risk assessment tools and methods used to evaluate, prioritize, and improve cybersecurity capabilities.

(vii) General information about current emergency response plans regarding cybersecurity incidents, domestic preparedness strategies, threat assessments, and vulnerability assessments.

(b) In addition to the information required under subdivision (a) of this subrule, an electric utility must include in its annual report to the commission an overview of major investments in cybersecurity during the previous calendar year and plans and rationale for major investments in cybersecurity anticipated for the next calendar year.

(2) As soon as reasonably practicable and before public notification, an electric utility or cooperative must orally report the confirmation of a cybersecurity incident to a designated member of the commission staff and to the Michigan intelligence operations center, unless prohibited by law or court order or instructed otherwise by official law enforcement personnel, if any of the following occurred:

(a) A person intentionally interrupted the production, transmission, or distribution of electricity.

(b) A person extorted money or other thing of value from the electric utility or cooperative through a cybersecurity attack.

(c) A person caused a denial of service in excess of 12 hours.

(d) A security breach, as that term is defined in section 3 of the identity theft protection act, 2004 PA 452, MCL 445.63, before public and customer notification.

(e) At the electric utility's or cooperative's discretion, any other cybersecurity incident, attack, or threat which the electric utility or cooperative deems notable, unusual, or significant.

(3) For purposes of subrule (2) of this rule, "person" means any individual, firm, corporation, educational institution, financial institution, governmental entity, or legal or other entity.

(4) For purposes of subrule (2)(c) of this rule, "denial of service" means, for an electric utility or cooperative, a successful attempt to prevent a legitimate user from accessing electronic information made accessible by the electric utility or cooperative or by another party on the behalf of the electric utility or cooperative.

History: 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

### **PART 3. METER REQUIREMENTS**

#### **R 460.3301 Metered measurement of electricity required; exceptions.**

Rule 301. (1) All electricity that is sold by an electric utility or cooperative must be on the basis of meter measurement, except where the consumption can be readily computed or except as provided for in the electric utility's or cooperative's filed rates.

(2) Where practicable, the consumption of electricity within an electric utility or cooperative or by administrative units associated with the electric utility or cooperative must be metered.

(3) Meters must comply with part 6 of these rules.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3302 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3303 Meter reading data.**

Rule 303. The meter reading data must include all of the following information:

- (a) A suitable designation identifying the customer.
- (b) An identifying number and description of the meter.
- (c) Meter readings or, if an electric utility or cooperative cannot obtain an actual meter reading, then the electric utility or cooperative shall maintain records of the efforts made to obtain a reading and its reasons for failing to obtain it.
- (d) Any applicable multiplier or constant.

History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3304 Meter data management system.**

Rule 304. A meter data management system that takes data from recording meters must indicate all of the following meter information:

- (a) The date of the record.
- (b) The equipment numbers.
- (c) A suitable designation identifying the customer.
- (d) The appropriate multipliers.

History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3305 Meter multiplier.**

Rule 305. If it is necessary to apply a multiplier to the meter registration, then the multiplier must be displayed on the meter.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3306 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3307 Rescinded.**



History: 1983 AACS; 1996 AACS.

**R 460.3308 Standards of good practice; adoption by reference.**

Rule 308. In the absence of specific rules of the commission, an electric utility or cooperative shall apply the provisions of the publications set forth in this rule as standards of accepted good practice. The following standards are available from the American National Standards Institute (ANSI), Customer Service, 25 West 43rd St., 4th floor, New York, New York, 10036, USA, telephone number: 1-212-642-4900 or via the internet at website: <http://webstore.ansi.org> at the cost listed below as of the time of adoption of these rules, plus a handling charge (for paper copies):

(a) American National Standards Institute standards for electricity meters ANSI C12.1-2014, cost \$362.00, C12.20-2015, cost \$125.00, and C12.22-2012, cost \$264.00.

(b) American National Standards Institute/American Society for Quality Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming (ANSI/ASQ Z1.9-2003(R2018)). Cost \$179.00.

(c) American National Standards Institute IEEE Standard Requirements for Instrument Transformers (IEEE C57.13-2016). Cost \$99.00.

(d) American National Standards Institute IEEE Standard for High Accuracy Instrument Transformers, IEEE Std. C57.13.6-2005. Cost \$50.00.

History: 1996 AACS; 2008 AACS; 2019 MR 1, Eff. Jan. 9, 2019; 2019 MR 13, Eff. July 16, 2019; 2023 MR 7, Eff. April 10, 2023.

**R 460.3309 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**PART 4. CUSTOMER RELATIONS**

**R 460.3401 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3402 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3403 Rescinded.**



History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3404 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3405 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3406 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3407 Rescinded.**

History: 1983 AACS; 1996 AACS; 2008 AACS.

**R 460.3408 Temporary service; cost of installing and removing equipment owned by**

an electric utility or cooperative.

Rule 408. If an electric utility or cooperative renders temporary service to a customer, it shall require that the customer bear the cost of installing and removing the electric utility- or cooperative-owned equipment in excess of any salvage realized.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3409 Protection of electric utility- or cooperative-owned equipment on customer's premises.**

Rule 409. (1) The customer shall use reasonable diligence to protect electric utility- or cooperative-owned equipment on the customer's premises and to prevent tampering or interference with the equipment. The electric utility or cooperative may shut off service pursuant to applicable rules of the commission if the metering or wiring on the customer's premises is unsafe, or has been tampered with or altered in any manner that allows unmetered or improperly metered energy to be used.

(2) If an electric utility or cooperative shuts off service for unauthorized use of service, then both of the following provisions apply:

(a) The electric utility or cooperative may bill the customer for the unmetered energy used and any damages that have been caused to electric utility- or cooperative-owned equipment.

(b) The electric utility or cooperative is not required to restore service until the customer does all of the following:

(i) Makes reasonable arrangements for payment of the charges in subdivision (a) of this subrule.

(ii) Agrees to pay the approved reconnection charges.

(iii) Agrees to make provisions and pay charges for relocating electric utility- or cooperative-owned equipment or making other reasonable changes that may be requested by the electric utility or cooperative to provide better protection for its equipment.

(iv) Provides the electric utility or cooperative with reasonable assurance of the customer's compliance with the electric utility's or cooperative's approved standard rules and regulations.

(3) Failure to comply with the terms of an agreement to restore service after service has been shut off pursuant to subrule (1) of this rule is cause to shut off service pursuant to the rules of the electric utility or cooperative and the commission.

(4) If service is shut off pursuant to subrule (3) of this rule and the electric utility or cooperative must incur extraordinary expenses to prevent the unauthorized restoration of service, the electric utility or cooperative may bill the customer for the expenses, in addition to all other charges that may apply under this rule, and may require that the expenses and other charges be paid before restoring service. A reasonable effort must be made to notify the customer at the time of shutoff that additional charges may apply if an attempt is made to restore service that has been shut off.

(5) The customer of record who benefits from the unauthorized use is responsible for payment to the electric utility or cooperative for the energy consumed.

(6) The electric utility or cooperative may bill the customer for the reasonable actual cost of the tampering investigation.

History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

#### **R 460.3410 Extension of facilities plan.**

Rule 410. An electric utility or cooperative shall develop a plan, approved by the commission, for the extensions of facilities where the investment is in excess of that included in the regular rates for service and for which the customer is required to pay all or part of the cost.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

#### **R 460.3411 Extension of electric service in areas served by 2 or more electric utilities or cooperatives.**

Rule 411. (1) As used in this rule:

(a) "Customer" means the buildings and facilities served rather than the individual, association, partnership, or corporation served.

(b) "Distances" means measurements that are determined by direct measurement from the closest point of an electric utility's or cooperative's existing distribution

facilities to the customer's meter location and that are not determined by the circuit feet involved in any extension.

(c) "Distribution facilities" means single-phase, V-phase, and 3-phase facilities and does not include service drops.

(2) Existing customers shall not transfer from 1 electric utility or cooperative to another.

(3) Prospective customers for single-phase service that are located within 300 feet of the distribution facilities of 2 or more electric utilities or cooperatives shall have the service of their choice.

(4) Prospective customers for single-phase service that are located more than 300 feet, but within 2,640 feet, from the distribution facilities of 1 or more electric utilities or cooperatives shall be served by the closest electric utility or cooperative.

(5) Prospective customers for single-phase service that are located more than 2,640 feet from the distribution facilities of any electric utility or cooperative shall have the service of their choice, subject to the provisions of subrule (10) of this rule.

(6) Prospective customers for 3-phase service that are located within 300 feet of the 3-phase distribution facilities of 2 or more electric utilities or cooperatives shall have the service of their choice.

(7) Prospective customers for 3-phase service that are located more than 300 feet, but within 2,640 feet, from the 3-phase distribution facilities of 1 or more electric utilities or cooperatives shall be served by the closest electric utility or cooperative.

(8) Prospective customers for 3-phase service that are located more than 2,640 feet from the 3-phase distribution facilities of any electric utility or cooperative shall have the service of their choice, subject to the provisions of subrule (10) of this rule.

(9) Regardless of any other provisions in these rules, a prospective industrial customer, as defined under the industrial classification manual, division D, manufacturing, for 3-phase service that will have a connected load of more than 500 kilowatts shall have its choice of service from any nearby electric utility or cooperative that is willing to construct the necessary facilities. The facilities that are constructed to serve an industrial customer that would otherwise have been served by another electric utility or cooperative shall not qualify as a measuring point in determining which electric utility or cooperative will serve new customers in the future.

(10) The extension of distribution facilities, except as provided in subrules (3), (4), (6), and (7) of this rule, where an extension will be located within 1 mile of another electric utility's or cooperative's distribution facilities, shall not be made by an electric utility or cooperative without first giving the commission and any affected electric utility or cooperative 10 days' notice of its intention by submitting a map showing the location of the proposed new distribution facilities, the location of the prospective customers, and the location of the facilities of any other electric utility or cooperative in the area. If no objections to the proposed extension of distribution facilities are received by the commission within the 10-day notice period, the electric utility or cooperative may proceed to construct the facilities. If objections are received, the determination of which electric utility or cooperative will extend service may be made the subject of a public hearing and a determination by the commission, upon proper application by any affected party.

(11) The first electric utility or cooperative serving a customer pursuant to these rules is entitled to serve the entire electric load on the premises of that customer even if another electric utility or cooperative is closer to a portion of the customer's load.

(12) An electric utility or cooperative may waive its rights to serve a customer or group of customers if another electric utility or cooperative is willing and able to provide the required service and if the commission is notified and has no objections.

(13) Nothing contained in these rules shall be construed to circumvent the requirements of the certificate of convenience and necessity, 1929 PA 69, MCL 460.501 to 460.506, or to authorize an electric utility or cooperative to extend its service into a municipality then being served by another electric utility or cooperative without complying with the provisions of 1929 PA 69, MCL 460.501 to 460.506.

(14) Regardless of other provisions of this rule, except subrule (9) of this rule, an electric utility or cooperative shall not extend service to a new customer in a manner that will duplicate the existing electric distribution facilities of another electric utility or cooperative, except where both electric utilities or cooperatives are within 300 feet of the prospective customer. Three-phase service does not duplicate single-phase service when extended to serve a 3-phase customer.

(15) The first electric utility or cooperative to serve a customer in a new subdivision under the other provisions of this rule has the right to serve the entire subdivision. In extending service to reach the subdivision, the electric utility or cooperative shall not duplicate the existing facilities of another electric utility or cooperative.

(16) An existing industrial customer that meets the criteria in subdivision (a) of this subrule and that desires to change electric providers is entitled to a 1-hour meeting as set forth in subdivision (b) of this subrule.

(a) The existing industrial customer shall comply with all of the following:

(i) Meet the characteristics of the industrial classification manual, division D, manufacturing.

(ii) Have a connected load of more than 500 kilowatts.

(iii) Be served with 3-phase electric service.

(iv) Be located within 5 miles of any 3-phase facilities owned and operated by the non-incumbent electric utility or cooperative.

(b) The 1-hour meeting must comply with all of the following:

(i) Occur within 60 days of the customer's request for the meeting.

(ii) Include in attendance the customer, the electric utility or cooperative currently serving the customer, and the electric utility or cooperative from whom the customer proposes to take service.

(iii) Include a discussion of the customer's proposal to switch providers.

(c) If all attendees agree, the meeting may take place via telecommunications.

(d) The customer or group of customers are entitled to not less than 1 meeting in a 3-year period. Additional meeting requests during the 3-year period may be approved or denied by the incumbent electric utility or cooperative, the non-incumbent electric utility or cooperative, or both.

(17) An incumbent electric utility or cooperative may waive its right to serve a customer or group of customers pursuant to subrule (12) of this rule. The incumbent electric utility's or cooperative's decision must be provided in writing to the customer within 60 days of the meeting described in subrule (16)(b) of this rule. Any facilities that

are constructed to serve an existing industrial customer that has switched providers do not qualify as a measuring point in determining which electric utility or cooperative will serve new customers in the future.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

## **PART 5. ENGINEERING**

### **R 460.3501 Electric plant; construction, installation, maintenance, and operation pursuant to good engineering practice required.**

Rule 501. The electric plant of an electric utility or cooperative must be constructed, installed, maintained, and operated pursuant to accepted good engineering practice in the electric industry to ensure, as far as reasonably possible, continuity of service, uniformity in the quality of service furnished, and the safety of persons and property.

History: 1983 AACS; 2023 MR 7, Eff. April 10, 2023.

### **R 460.3502 Standards of good practice; adoption by reference.**

Rule 502. In the absence of specific rules of the commission, an electric utility or cooperative shall apply the standards of accepted good practice that are adopted by reference in R 460.811.

History: 1983 AACS; 1988 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

### **R 460.3503 Electric utility or cooperative plant capacity.**

Rule 503. The electric capacity regularly available from all sources must be large enough to meet all normal demands for service and to provide a reasonable reserve for emergencies.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

### **R 460.3504 Electric plant inspection program.**

Rule 504. An electric utility or cooperative shall adopt a program of inspection of its electric plant to ensure safe and reliable operation. The frequency of the various inspections must be based on the electric utility's or cooperative's experience and accepted good practice. Each electric utility or cooperative shall keep sufficient records to verify compliance with its inspection program.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3505 Electric utility or cooperative line clearance program.**

Rule 505. An electric utility or cooperative shall adopt and implement a program of maintaining adequate line clearance through the use of industry-recognized guidelines. A line clearance program must do all of the following:

(a) Recognize the national electric safety code standards that are adopted by reference in R 460.813.

(b) Ensure safety and reliability.

(c) Include tree trimming.

(d) Provide customer and property owner notifications not less than 3 days and no more than 90 days before planned maintenance tree trimming. Emergent and emergency tree trimming are exempt. Customer and property owner notifications must include all of the following:

(i) A customer service phone number.

(ii) Personal contact with the customer that includes 1 or more of the following:

(A) An in-person visit to the customer's premises with a door hanger.

(B) A phone call.

(C) Written notification to persons residing within the target area.

(iii) Personal contact or written notification to local government officials within the target area.

(e) Statistically relevant representative inspection after line clearing.

History: 1996 AACs; 2023 MR 7, Eff. April 10, 2023.

**R 460.3506 Cybersecurity program.**

Rule 506. (1) An electric utility or cooperative shall develop, implement, and maintain a cybersecurity program. At a minimum, the cybersecurity program must include procedures to do all of the following:

(a) Protect against the unauthorized acquisition, access, use, or disclosure of customer, electric utility, or cooperative information.

(b) Protect against the unauthorized destruction, degradation, or disruption of electric utility or cooperative information or communication systems, networks, or infrastructure.

(c) Identify and mitigate software vulnerabilities.

(d) Implement a least-privileged electronic access approach to electric utility or cooperative assets and information.

(e) Manage cybersecurity risks relating to vendors and suppliers.

(f) Respond to and recover from a cybersecurity incident as detailed in a cybersecurity incident response plan.

(g) Determine appropriate training requirements for cybersecurity staff and ensure they are met.

(h) Inventory the electric utility's or cooperative's information technology and operations technology hardware and software assets.

(2) In addition to the requirements under subrule (1) of this rule, an electric utility or cooperative shall do all of the following:

(a) Conduct annual assessments of the cybersecurity program using the United States National Institute of Standards and Technology Cybersecurity Framework, the Department of Energy Cybersecurity Capability Maturity Model, or a similar tool.

(b) Conduct an annual exercise to test the procedures to ensure the effectiveness of the program.

(c) At least quarterly, conduct cyber threat simulations, such as phishing, to test employee awareness and responsiveness to cyber threats.

(d) At least annually, conduct cybersecurity awareness and procedure training.

(3) By March 31 of each year, on forms suitable to the commission, an electric utility or cooperative shall file with the commission a written attestation, signed by an officer of the electric utility or cooperative who is authorized to manage the operations of the cybersecurity program, that the electric utility or cooperative maintains a cybersecurity program in compliance with this rule.

History: 2023 MR 7, Eff. April 10, 2023.

## **PART 6. METERING EQUIPMENT INSPECTIONS AND TESTS**

### **R 460.3601 Customer-requested meter tests.**

Rule 601. (1) Upon request by a customer to an electric utility or cooperative, an electric utility or cooperative shall make a test of the meter serving the customer if the customer does not request more than 1 test in any 12-month period. Any charge to the customer must conform with the electric utility's or cooperative's filed and approved tariff rates and rules.

(2) The customer, or his or her representative, may be present when his or her meter is tested.

(3) A report of the results of the test must be made to the customer within a reasonable time after the completion of the test, and a record of the report, together with a complete record of each test, must be kept on file at the office of the electric utility or cooperative.

History: 1983 AACS; 2023 MR 7, Eff. April 10, 2023.

### **R 460.3602 Meter and associated device inspections and tests; certification of accuracy.**

Rule 602. Every meter must be inspected and tested, and associated devices must be inspected, in the meter shop of the electric utility or cooperative, or a meter testing facility certified by the electric utility or cooperative, before being placed in service. The accuracy of each meter must be certified to be within the tolerances permitted by these rules, except that the electric utility or cooperative may rely on the certification of accuracy by the manufacturer on all new meters.

History: 1983 AACS; 2008 AACS; 2023 MR 7, Eff. April 10, 2023.



**R 460.3603 Meters with transformers; post-installation inspection; exception.**

Rule 603. Meters with associated instrument transformers must be inspected to determine the proper operation and wiring connections. Inspections must be made within 60 days after installation by a qualified person who, when possible, should be someone other than the original installer. Socket-type meter exchanges are excluded from post-installation inspections, except that the original installation must be inspected when the meter is installed.

History: 1983 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3604 Meters and associated devices; removal tests.**

Rule 604. All meters and associated devices shall be tested after they are removed from service unless they are retired because of obsolescence.

History: 1983 AACS; 1995 AACS.

**R 460.3605 Metering electrical quantities.**

Rule 605. (1) All electrical quantities that are to be metered as provided in R 460.3301 must be metered by commercially acceptable instruments which are owned and maintained by the electric utility or cooperative.

(2) Every reasonable effort must be made to measure at 1 point all the electrical quantities necessary for billing a customer under a given rate.

(3) For electro-mechanical meters, metering facilities located at any point where energy may flow in either direction and where the quantities measured are used for billing purposes must consist of meters equipped with ratchets or other devices to prevent reverse registration and must be so connected as to separately meter the energy flow in each direction, unless used to implement an electric utility or cooperative tariff approved by the commission for service provided under a net metering program.

(4) For electro-mechanical meters, an electric utility or cooperative shall not employ reactive metering for determining the average power factor for billing purposes where energy may flow in either direction or where the customer may generate an appreciable amount of his or her energy requirements at any time, unless suitable directional relays and ratchets are installed to obtain correct registration under all conditions of operation.

(5) For electro-mechanical meters, all electric service of the same type rendered by an electric utility or cooperative under the same rate schedule must be metered with instruments having like characteristics, except that the commission may be requested to approve the use of instruments of different types if their use does not result in unreasonable discrimination. Either all of the reactive meters which may run backwards or none of the reactive meters used for measuring reactive power under 1 schedule must be ratcheted. This rule is only applicable to equipment owned by the electric utility or cooperative.

History: 1983 AACS; 2008 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3606 Meters operating from instrument transformers; marking of multiplier on instruments; watthour constants.**

Rule 606. (1) Meters operating from instrument transformers must have the multiplier plainly marked on the nameplate of the instrument or otherwise suitably marked.

(2) The watthour constant (K sub h) for the meter itself must be displayed on the watthour meter nameplate.

History: 1983 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3607 Watt-hour meter requirements.**

Rule 607. (1) Watthour meters that are used for measuring electrical quantities supplied must conform to ANSI C12.1 or C12.20 specifications and meet all of the following requirements:

(a) Be of proper design for the circuit on which the meters are used; be in good mechanical and electrical condition; and have adequate insulation, correct internal connections, and correct register.

(b) For electro-mechanical meters, not creep at no load with all load wires disconnected at a rate of 1 complete revolution of the moving element in 10 minutes when potential is impressed.

(c) Be accurate to within plus or minus 1% for electro-mechanical meters and 0.8% for solid state meters, referred to the portable standard watthour meter as a base, at 2 unity power factor loads: light load (l.l.) and full load (f.l.).

Meter Class	Light Load Test Amperes	Full Load Test Amperes
Inductive Load 50% Lagging Power Factor	50% Rated Test Amperes of Meter	100% Rated Test Amperes of Meter
Self-Contained	10%	100% Rated Test Amperes of Meter
Transformer-rated	10%	100% Rated Test Amperes of Meter

(d) Be accurate to within plus or minus 2% for electro-mechanical meters and 1.6% for solid state meters, referred to the portable standard watthour meter as a base, at inductive load (i.l.).

(2) Polyphase meters must have their elements in balance within 2% for electro-mechanical meters and 1.6% for solid state meters at rated test amperes at unity power factor and at approximately 50% lagging power factor.

History: 1983 AACS; 2008 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3608 Rescinded.**

History: 1983 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3609 Instrument transformers used in conjunction with metering equipment; requirements.**

Rule 609. (1) Instrument transformers used in conjunction with metering equipment to measure a customer's service must meet both of the following requirements:

(a) Be in proper mechanical condition and have satisfactory electrical insulation for the service on which used.

(b) Meet minimum metering accuracy class 0.3 as defined in IEEE/ANSI C57.13-2016 or accuracy class 0.15 as defined in IEEE C57.13.6-2005.

(2) The results of tests of instrument transformers must be kept on record and available for use.

History: 1983 AACS; 2008 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3610 Portable indicating voltmeters; accuracy.**

Rule 610. All portable indicating voltmeters that are used for determining the quality of service voltage to customers must be checked against a suitable secondary reference standard at least once every 6 months for electro-mechanical voltmeters, and once every 12 months for solid state voltmeters. The accuracy of these voltmeters must be rated so that the error of the indication is not more than plus or minus 1% of full scale. If the portable indicating voltmeter is found to be in error by more than the rated accuracy at commonly used scale deflections, it must be adjusted.

History: 1983 AACS; 2008 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3611 Meter testing equipment; availability; provision and use of primary standards.**

Rule 611. (1) An electric utility or cooperative shall maintain sufficient laboratories, meter testing shops, secondary standards, instruments, and facilities to determine the accuracy of all types of meters and measuring devices used by the electric utility or cooperative. The electric utility or cooperative may, if necessary and with commission approval, have all or part of the required tests made, or its portable testing equipment checked, by another electric utility or cooperative or agency that uses standards with traceable accuracies to the United States National Institute of Standards and Technology (NIST) or National Research Council (NRC) Canada and that has adequate and sufficient testing equipment to comply with these rules.

(2) At a minimum, an electric utility or cooperative shall keep all of the following testing equipment available:

(a) One or more portable standard watt-hour meters that has a capacity and voltage range that is adequate to test all watt-hour meters used by the electric utility or cooperative.

(b) Portable indicating instruments that are necessary to determine the accuracy of all instruments used by the electric utility or cooperative.

(c) One or more secondary standards to check each of the various types of portable standard watt-hour meters used for testing watt-hour meters. Each secondary standard must consist of an approved portable standard watt-hour meter that is kept permanently at 1 point and that is not used for fieldwork. Standards must be well-compensated for both classes of temperature errors, practically free from errors due to ordinary voltage variations, and free from erratic registration due to any cause.

(d) Suitable standards, which are not used for fieldwork, to check portable instruments used in testing.

(3) An electric utility or cooperative shall provide and use primary standards that have accuracies that are traceable to the United States National Institute of Standards and Technology (NIST) or National Research Council (NRC) Canada.

History: 1983 AACS; 1995 AACS; 2023 MR 7, Eff. April 10, 2023.

#### **R 460.3612 Test standards; accuracy.**

Rule 612. (1) The accuracies of all primary reference standards must be certified as traceable to the National Institute of Standards and Technology (NIST) or National Research Council (NRC) Canada, either directly or through other recognized standards laboratories. These standards must have their accuracy certified at the time of purchase. Standard cells must be intercompared regularly and at least 1 standard cell be checked by a standardizing laboratory at intervals of not more than 2 years. Reference standards of resistance, potentiometers, and volt boxes must be checked at intervals of not more than 3 years.

(2) Secondary watt-hour meter standards must not be in error by more than plus or minus 0.3% at loads and voltages at which they are to be used, and must not be used to check or calibrate working standards, unless the secondary standard has been checked and adjusted, if necessary, within the preceding 6 months. Each secondary standard watt-hour meter must have calibration data available and have a history card.

(3) Secondary standards indicating instruments must not be in error by more than plus or minus 0.5% of indication at commonly used scale deflection and must not be used to check or calibrate portable indicating instruments, unless the secondary standard has been checked and adjusted, if necessary, within the preceding 12 months. A calibration record must be maintained for each standard.

(4) Regularly used working portable standard watt-hour meters must be compared with a secondary standard at least once every 6 months. Infrequently used working standards must be compared with a secondary standard before they are used.

(5) Working portable standard watt-hour meters must be adjusted so that their percent registration is within 99.7% and 100.3% at 100% power factor and within 99.5% and 100.5% at 50% lagging power factor at all voltages and loads at which the standard may be used. A history and calibration record must be kept for each working standard.

(6) The meter accuracies required in this rule for all primary, secondary, and working standards must be referred to 100%. Service measuring equipment must be adjusted to within the accuracies required assuming the portable test equipment to be 100% accurate with the calibration correction taken into consideration.

History: 1983 AACS; 1995 AACS; 2008 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3613 Solid state meter and metering equipment testing requirements.**

Rule 613. (1) The testing of any unit of metering equipment must consist of a comparison of its accuracy with a standard of known accuracy. Units that are not properly connected or that do not meet the accuracy or other requirements of these meter and metering equipment rules at the time of testing must be reconnected or discontinued.

(2) All solid state single-phase, 3-phase, network, self-contained, and transformer-rated meters must comply with both of the following requirements:

(a) Be checked for accuracy as provided for in R 460.3602.

(b) Notwithstanding the provisions of subdivision (a) of this subrule, the testing of solid state meters in service must be governed by a quality control plan that must test meters for accuracy or rejection pursuant to normal inspection as set forth in subrule (3) of this rule, tightened inspection as set forth in subrule (4) of this rule, or reduced inspection as set forth in subrule (5) of this rule, as applicable.

(3) Normal inspection of in-service solid state meters must include all of the following:

(a) Meters must be divided into homogenous groups by manufacturers' types, and certain manufacturers' types must be further subdivided into separate groups by manufacturers' serial numbers.

(b) The meters in each homogeneous group must then be further subdivided into lots of not less than 301, and not more than 35,000, meters each, except that meters of the most recent design may be combined into lots regardless of manufacturers' type, except that where the number of meters of a single type is 8,001 or more, that number of meters must be segregated by types for the formation of lots.

(c) From each assembled lot, a sample of the size specified in table A-2, ANSI/ASQ Z1.9-2003(R2018) using general inspection level II, must be drawn annually. The sample must be drawn at random.

(d) The meters in each sample must be tested for accuracy as follows:

(i) The test criteria for acceptance or rejection of each lot must be based on the test of the sample at heavy load only and must be that designated for double specification limits and an acceptable quality level (AQL) that is not higher than 2.50 (normal inspection) as set forth in table B-3, ANSI/ASQC Z1.9-2003(R2018).

(ii) The necessary calculations must be made pursuant to Example B-3 of ANSI/ASQC Z1.9. The upper and lower specification limits, U and L, must be 102% and 98%, respectively.

(iii) A lot must be rejected if the total estimated percent defective (p) exceeds the appropriate maximum allowable percent defective (M) as determined from table B-3 as specified in paragraph (i) of this subdivision.

(iv) All meters in a rejected lot must be tested within a maximum period of 60 months and comply with the provisions of R 460.3607 or be replaced with meters that comply with the requirements of R 460.3607.

(v) During each calendar year, new meter samples must be drawn as specified in this subrule from all meters in service, with the exception that lots that have been rejected must be excluded from the sampling procedure until all meters included in the rejected lots have been tested.

(e) The electric utility or cooperative shall complete normal inspection before implementing tightened inspection or reduced inspection.

(4) Tightened inspection of in-service meters may be adopted and must include all of the following:

(a) The meters in rejected lots from the previous year must be tested as follows:

(i) From rejected lots, a sample of the lot size specified in table A-2, ANSI/ASQ Z1.9-2003(R2018) using general inspection level III, must be drawn at random.

(ii) The test criteria for acceptance or rejection of each lot must be based on the test at heavy load and must be that designated for double specification limits and an acceptable quality level (AQL) that is not higher than 2.50 (tightened inspection) as set forth in table B-3 of ANSI/ASQ Z1.9-2003(R2018).

(iii) The necessary calculations must be made pursuant to Example B-3 of ANSI/ASQ Z1.9-2003(R2018). The upper and lower specification limits, U and L, must be 102% and 98% respectively.

(b) A lot must be rejected if the total estimated percent defective (p) exceeds the appropriate maximum allowable percent defective (M) as determined from table B-3 specified in paragraph (ii) of subdivision (a).

(c) If the acceptability criteria of the sampling plan are met, then the lot is considered acceptable and must be returned to the variables sampling plan the following year as required by R 460.3613(3). If the acceptability criteria of the sampling plan are not met, then the electric utility or cooperative shall reject that lot and all meters in that lot must be tested and adjusted or replaced within a maximum period of 48 months after the second rejection.

(5) Reduced inspection of in-service meters may be adopted and must include all of the following:

(a) All meters must be divided into homogenous groups by manufacturers' types, and certain manufacturers' types must be further subdivided into separate groups by manufacturers' serial numbers.

(b) The meters in each homogeneous group must then be further subdivided into lots of not less than 301, and not more than 35,000, meters each, except that meters of the most recent design may be combined into lots regardless of manufacturers' type, except that where the number of meters of a single type is 8,001 or more, that number of meters must be segregated by types for the formation of lots.

(c) From each assembled lot, a sample of the lot size specified in table A-2, ANSI/ASQ Z1.9-2003(R2018) using general inspection level I, must be drawn annually. The sample must be drawn at random.

(d) The meters in each sample must be tested for accuracy as follows:

(i) The test criteria for acceptance or rejection of each lot must be based on the test of the sample at heavy load only and must be that designated for double specification



limits and an acceptable quality level (AQL) that is not higher than 2.50 (reduced inspection) as set forth in table B-4, ANSI/ASQ Z1.9-2003(R2018).

(ii) The necessary calculations must be made pursuant to Example B-3 of ANSI/ASQ Z1.9-2003(R2018). The upper and lower specification limits, U and L, must be 102% and 98%, respectively.

(iii) A lot must be rejected if the total estimated percent defective (p) exceeds the appropriate maximum allowable percent defective (M) as determined from table B-4 as specified in subrule (5)(d)(i).

(e) When reduced inspection is in effect, the electric utility or cooperative shall return to normal inspection if a lot is rejected and shall adhere to the quality control plan as set forth in subrule (3).

(f) Normal or reduced inspection shall continue unchanged except where the above switching procedures require change.

(g) The electric utility or cooperative may adopt reduced inspection of meters if normal inspection, as set forth in subrule (3) of this rule, has been in effect for the preceding 3 years and all lots of same manufacturer meter type have been accepted on normal inspection in preceding 3 years.

(6) The quality control plan set forth in subrules (3), (4), and (5) of this rule does not alter the rules under which customers may request special tests of meters.

(7) All solid-state meters must comply with all of the following requirements:

(a) Be checked for accuracy in all of the following situations:

(i) When a meter is suspected of being inaccurate or damaged.

(ii) When the accuracy of a meter is questioned by a customer under R 460.3601.

(b) Be inspected for electrical faults when the accuracy of the device is checked.

(c) Have the connections to the customer's circuits checked when the meter is tested on the premises or when removed for testing.

(d) A meter need not be tested or checked for any reason if the device was tested and checked within the previous 12 months except when a complaint is received.

(8) All transformer-rated solid state meters must comply with all of the following requirements:

(a) Be checked for accuracy at unity and 50% power factor on the customer's premises within 60 days after installation, unless the transformers comply with the specifications outlined in the American National Standards Institute standard ANSI C-57.13.

(b) Have the connections to the customer's circuits and multipliers checked when the equipment is tested for accuracy on the premises, when removed for testing, or when instrument transformers are changed.

History: 1983 AACS; 1995 AACS; 2008 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3613a Electro-mechanical meter and metering equipment testing requirements.**

Rule 613a. (1) The testing of any unit of metering equipment must consist of a comparison of its accuracy with a standard of known accuracy. Units that are not



properly connected or that do not meet the accuracy or other requirements of these meter and metering equipment rules at the time of testing must be reconnected or rebuilt to meet these requirements and must be adjusted to within the required accuracy and as close to zero error as practicable or must be discontinued.

(2) Self-contained, electro-mechanical, combination electro-mechanical and solid state, single-phase, and network meters must comply with all of the following requirements:

(a) Be checked for accuracy as provided for in R 460.3602.

(b) Notwithstanding the provisions of subdivision (a) of this subrule, the testing of self-contained, electro-mechanical, combination electro-mechanical and solid state, single-phase, and network meters in service must be governed by a quality control plan that complies with all of the following:

(i) Meters must be divided into homogenous groups by manufacturers' types, and certain manufacturers' types must be further subdivided into separate groups by manufacturers' serial numbers.

(ii) The meters in each homogeneous group must then be further subdivided into lots of not less than 301, and not more than 35,000, meters each, except that meters of the most recent design may be combined into lots regardless of manufacturers' type, except that where the number of meters of a single type is 8,001 or more, that number of meters must be segregated by types for the formation of lots.

(iii) From each assembled lot, a sample of the size specified in table A-2, ANSI/ASQ Z1.9-2003(R2018), must be drawn annually. The sample must be drawn at random.

(iv) The meters in each sample must be tested for accuracy pursuant to paragraphs (v) to (xi) of this subdivision.

(v) The test criteria for acceptance or rejection of each lot must be based on the test at heavy load only and must be that designated for double specification limits and an acceptable quality level (AQL) that is not higher than 2.50 (normal inspection) as set forth in table B-3, ANSI/ASQ Z1.9-2003(R2018).

(vi) The necessary calculations must be made pursuant to Example B-3 of ANSI/ASQ Z1.9-2003(R2018). The upper and lower specification limits, U and L, must be 102% and 98%, respectively.

(vii) A lot must be rejected if the total estimated percent defective (p) exceeds the appropriate maximum allowable percent defective (M) as determined from table B-3 as specified in paragraph (v) of this subdivision.

(viii) All meters in a rejected lot must be tested within a maximum period of 60 months and be adjusted pursuant to the provisions of R 460.3607 or be replaced with meters that comply with the requirements of R 460.3607.

(ix) During each calendar year, new meter samples must be drawn as specified in this subdivision from all meters in service, with the exception that lots that have been rejected must be excluded from the sampling procedure until all meters included in the rejected lots have been tested.

(x) The electric utility or cooperative may elect to adopt the following sample plan for lots that have been rejected the previous year:

(A) From each rejected lot, a sample of the lot size specified in table A-2, ANSI/ASQ Z1.9-2003(R2018) using general inspection level III, must be drawn at random.

(B) The test criteria for acceptance or rejection of each lot must be based on the test at heavy load and must be that designated for double specification limits and an acceptable quality level (AQL) that is not higher than 2.50 (tightened inspection) as set forth in table B-3 of ANSI/ASQ Z1.9-2003(R2018).

(C) The necessary calculations must be made pursuant to Example B-3 of ANSI/ASQ Z1.9-2003(R2018). The upper and lower specification limits, U and L, must be 102% and 98% respectively.

(D) A lot must be rejected if the total estimated percent defective (p) exceeds the appropriate maximum allowable percent defective (M) as determined from table B-3 specified in paragraph (B) of this subdivision. If the acceptability criteria of the sampling plan are met, then the lot is considered acceptable and must be returned to the variables sampling plan the following year. If the acceptability criteria of the sampling plan are not met, then the electric utility or cooperative shall reject that lot and all meters in that lot must be tested and adjusted or replaced within a maximum period of 48 months after the second rejection.

(xi) The plan specified in paragraph (x) of this subdivision does not alter the rules under which customers may request special tests of meters.

(c) Be checked for accuracy in both of the following situations:

(i) When a meter is suspected of being inaccurate or damaged.

(ii) When the accuracy of a meter is questioned by a customer under R 460.3601.

(d) Be inspected for mechanical and electrical faults when the accuracy of the device is checked.

(e) Have the register and the internal connections checked before the meter is first placed in service and when the meter is repaired.

(f) Have the connections to the customer's circuits checked when the meter is tested on the premises or when removed for testing.

(g) A meter may not be tested or checked for any reason if the device was tested, checked, and adjusted within the previous 12 months except when a complaint is received.

(3) All single-phase transformer-rated electro-mechanical meters must comply with all of the following requirements:

(a) Be checked for accuracy at unity power factor at the point where a meter is installed, at a central testing point, or in a mobile testing laboratory when any of the following occurs:

(i) Not later than 9 months after 144 months of service for a surge-resistant meter and not later than 9 months after 96 months of service for a non-surge-resistant meter.

(ii) When a meter is suspected of being inaccurate or damaged.

(iii) When the accuracy of a meter is questioned by a customer under R 460.3601.

(iv) Before use when a meter has been inactive for more than 1 year after having been in service.

(b) Be inspected for mechanical and electrical faults when the accuracy of the device is checked.

(c) Have the register and the internal connections checked before the meter is first placed in service and when the meter is repaired.

(d) Have the connections to the customer's circuits checked when the meter is tested on the premises or when removed for testing.

(e) Be checked for accuracy at 50% power factor when purchased and after rebuilding.

(f) A meter may not be tested or checked for any reason if the device was tested, checked, and adjusted within the previous 12 months except when a complaint is received.

(4) All self-contained electro-mechanical, combination electro-mechanical meters, solid-state 3-phase meters, and associated equipment must comply with all of the following requirements:

(a) Be tested for accuracy at unity and 50% power factor when any of the following occur:

(i) Before being placed in service.

(ii) Not later than 9 months after 120 months of service.

(iii) When a meter is suspected of being inaccurate or damaged.

(iv) When the accuracy of a meter is questioned by a customer under R 460.3601.

(v) When a meter is removed and put back in service.

(b) Be inspected for mechanical and electrical faults when the accuracy is checked.

(c) Have the register and internal connections checked before the meter is first installed, when repaired, and when the register is changed.

(d) Have the connections to the customer's circuits and multipliers checked when the equipment is tested for accuracy on the customer's premises.

(5) An electric utility or cooperative may elect to include self-contained solid state 3-phase meters in service in its quality control plan as provided for in subrule (2)(b) of this rule. An electric utility or cooperative may be exempt from the periodic meter test requirements as provided in subdivision (a)(ii) of subrule (4).

(6) All transformer-rated electro-mechanical 3-phase meters, all combination electro-mechanical and solid state 3-phase meters, and associated equipment must comply with all of the following requirements. However, an electric utility or cooperative may elect to include transformer-rated solid state 3-phase meters in service in its quality control plan as set forth in subrule (2)(b) of this rule. Therefore, an electric utility or cooperative may be exempt from the periodic meter test requirements as provided in subdivision (a)(iii) of this subrule.

(a) Be checked for accuracy at unity and 50% power factor when any of the following occur:

(i) Before being placed in service.

(ii) On the customer's premises within 60 days after installation, unless the transformers comply with the specifications outlined in the American National Standards Institute standard ANSI C-57.13, and unless the meter adjustment limits do not exceed plus or minus 1.5% at 50% power factor.

(iii) Not later than 9 months after 72 months of service.

(iv) When a meter is suspected of being inaccurate or damaged.

(v) When the accuracy is questioned by a customer under R 460.3601.

(vi) When a meter is removed and put back in service.

- (b) Be inspected for mechanical and electrical faults when the accuracy is checked.
- (c) Have the register and internal connections checked before the meter is first placed in service and when the meter is repaired.
- (d) Have the connections to the customer's circuits and multipliers checked when the equipment is tested for accuracy on the premises, when removed for testing, or when instrument transformers are changed.
- (e) Be checked for accuracy at 50% power factor when purchased and after rebuilding.

History: 2023 MR 7, Eff. April 10, 2023.

**R 460.3614 Standards check by the commission.**

Rule 614. (1) Upon request of the commission, an electric utility or cooperative shall submit 1 of its portable standard watthour meters and 1 portable indicating voltmeter, ammeter, and wattmeter to a commission-approved standards laboratory for checking of their accuracy.

(2) An electric utility or cooperative shall normally check its own working portable standard watthour meters or instruments against primary or secondary standards and shall calibrate these working standards or instruments before they are submitted with a record of such calibration attached to each of the working standards or instruments.

History: 1983 AACCS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3615 Metering equipment records.**

Rule 615. (1) An electric utility or cooperative shall maintain a complete record of the most recent test of all metering equipment. The record must show all of the following information:

- (a) Identification and location of unit.
  - (b) Equipment with which the device is associated.
  - (c) The date of test.
  - (d) Reason for the test.
  - (e) Readings before and after the test.
  - (f) For electro-mechanical meters, a statement as to whether or not the meter creeps and, in case of creeping, the rate.
  - (g) A statement of meter accuracies before and after adjustment sufficiently complete to permit checking of the calculations employed.
  - (h) Indications showing that all required checks have been made.
  - (i) A statement of repairs made, if any.
  - (j) Identification of the testing standard and the person making the test.
  - (k) Communications type.
  - (l) Firmware.
- (2) The electric utility or cooperative shall also keep a record of each unit of metering equipment which shows all of the following information:
- (a) When the unit was purchased.

- (b) The unit's cost.
- (c) The company's identification.
- (d) Associated equipment.
- (e) Essential nameplate data.
- (f) The date of the last test. The record must also show either the present service location with the date of installation or, if removed from service, the service location from which the unit was removed with the date of removal.

(3) An electric utility or cooperative shall maintain records of the necessary calculations made pursuant to Example B-3 of ANSI/ASQ Z1.9 for each sample or resample drawn. In addition to the actual computation, the data must include all of the following:

- (a) The type of meter.
- (b) The number of meters in the lot.
- (c) The meter numbers of sample meters.
- (d) The actual prior-to-adjustment test data of each meter tested.
- (e) The number of months since the last test for each meter in the sample.

History: 1983 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

#### **R 460.3616 Average meter error; determination.**

Rule 616. If a metering installation is found upon any test to be in error by more than 2% at any test load, the average error shall be determined in 1 of the following ways:

(a) If the metering installation is used to measure a load which has practically constant characteristics, such as a streetlighting load, the meter shall be tested under similar conditions of load and the accuracy of the meter "as found" shall be considered as the average accuracy.

(b) If a single-phase metering installation is used on a varying load, the average error shall be the weighted algebraic average of the error at light load and the error at heavy load, the latter being given a weighting of 4 times the former.

(c) If a polyphase metering installation is used on a varying load, the average error shall be the weighted algebraic average of its error at light load given a weighting of 1, its error at heavy load and 100% power factor given a weighting of 4, and at heavy load and 50% lagging powerfactor given a weighting of 2.

(d) If a load, other than the light, heavy, and low power factor load specified for routine testing, is more representative of the customary use of the metering equipment, its error at that load shall also be determined. In this case, the average error shall be computed by giving the error at such load and power factor a weighting of 3 and each of the errors at the other loads (light, heavy, and 50% lagging power factor) a weighting of 1. Each error shall be assigned its proper sign.

History: 1983 AACS.

#### **R 460.3617 Reports to be filed with the commission.**

Rule 617. An electric utility or cooperative shall file, with the commission, on or before April 1 of each year, all of the following information covering the 12-month period ending December 31:

(a) A statement from an officer of the electric utility or cooperative or from the vendor, supplier, or contractor who provides the metering equipment that certifies that the metering equipment complies with the requirements set forth in the rules relating to meter standardizing equipment.

(b) A meter test report summarizing all rejected lots tested as part of the sampling plan during the preceding calendar year. The report must include all of the following information for each rejected lot:

- (i) Meter manufacturer.
- (ii) Meter type.
- (iii) Average months in service since the last test.
- (iv) Meter lots in tightened inspection.

(c) A meter test report summarizing all rejected lots not tested as part of the sampling plan during the preceding calendar year. The report must include all of the following information for each rejected lot:

- (i) Meter manufacturer.
- (ii) Meter type.
- (iii) Purchase year.
- (iv) As found accuracy or accuracy range.

History: 1983 AACS; 1995 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3618 Generating and interchange station meter tests; schedule; accuracy limits.**

Rule 618. (1) Generating and interchange station and watt-hour meters shall be tested in conjunction with their associated equipment as follows:

- (a) At least once every 24 months for generating station meters.
- (b) At least once every 12 months for interchange meters.

(2) The accuracy limits for any particular device shall not be greater than the accuracy limits required elsewhere in these rules.

History: 1983 AACS.

## **PART 7. STANDARDS OF QUALITY OF SERVICES**

**R 460.3701 Alternating current systems; standard frequency.**

Rule 701. The standard frequency for alternating current systems is 60 hertz. The frequency must be maintained within limits as administered by the regional transmission organization.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3702 Standard nominal service voltage; limits; exceptions.**

Rule 702. (1) Each electric utility or cooperative shall adopt and submit standard nominal service voltages.

(2) With respect to secondary voltages, the following provisions shall apply:

(a) For all retail service, the variations of voltage must not be more than 5% above or below the standard nominal voltage as submitted pursuant to subrule (1) of this rule, except as noted in subrule (4) of this rule.

(b) Where 3-phase service is provided, the electric utility or cooperative shall exercise reasonable care to ensure that the phase voltages are balanced within practical tolerances.

(3) With respect to primary voltages, the following provisions apply:

(a) For service rendered principally for industrial or power purposes, the voltage variation must not be more than 5% above or below the standard nominal voltages as submitted pursuant to subrule (1) of this rule, except as noted in subrule (4) of this rule.

(b) The limitations in subdivision (a) of this subrule do not apply to special contracts in which the customer specifically agrees to accept service with unregulated voltage.

(4) Voltages above or below the limits specified in subrules (2) and (3) of this rule may not be considered a violation if the variations are infrequent fluctuations or occur from adverse weather conditions, service interruptions, causes beyond the control of the electric utility or cooperative, or voltage reductions that are required to reduce system load at times of supply deficiency or loss of supply.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3703 Voltage measurements and records.**

Rule 703. (1) An electric utility or cooperative shall make voltage measurements at the electric utility's or cooperative's substation service terminals and, where permissible, at the electric utility's or cooperative's service points.

(2) Each electric utility or cooperative shall make a sufficient number of voltage measurements, using recording voltmeters, to determine if voltages comply with the requirements stated in R 460.3702. For installations in which the meter measures voltage, measurements using recording voltmeters are not necessary unless records of the measurements through the meter are not available.

(3) All records obtained under subrule (2) of this rule must be retained by the electric utility or cooperative for not less than 2 years and must be available for inspection by the commission's representatives. The records must indicate all of the following information:

(a) The location where the voltage was measured.

(b) The time and date of the measurement.

(c) For installations without meters that measure voltage variations, the results of the comparison with an indicating voltmeter at the time a recording meter is set.

(d) Number of customers impacted.



History: 1983 AACS; 1996 AACS; 2019 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3704 Voltage measurements; required equipment; periodic checks; certificate or calibration card for standards.**

Rule 704. (1) An electric utility or cooperative shall have access to at least 1 indicating voltmeter that has a stated accuracy within 0.25% of full scale. The instrument must be maintained within its stated accuracy.

(2) Each electric utility or cooperative shall have not less than 2 indicating voltmeters that have a stated accuracy within 1% of full scale.

(3) Each electric utility or cooperative shall have not less than 2 portable recording voltmeters, or their electronic equivalent, with a stated accuracy within 1.5% of full scale.

(4) Standards must be checked pursuant to R 460.3612.

(5) Working instruments must be checked pursuant to R 460.3610.

(6) Each standard must be accompanied at all times by a certificate or calibration card, duly signed and dated, on which the corrections required to compensate for errors found at the customary test points at the time of the last test are recorded.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3705 Interruptions of service; records; planned interruption; notice to commission.**

Rule 705. (1) An electric utility or cooperative shall make a reasonable effort to avoid interruptions of service. When interruptions occur, service must be restored within the shortest time practical, consistent with safety.

(2) An electric utility or cooperative shall keep records of sustained interruptions of service to its customers and make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of the interruptions. The records must include the following information concerning the interruptions:

(a) Cause.

(b) Date and time.

(c) Duration.

(3) Planned interruptions must be made at a time that will not cause unreasonable inconvenience to customers and be preceded, if feasible, by adequate notice to persons who will be affected.

(4) An electric utility or cooperative shall promptly notify the commission of any major interruption of service to its customers.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**PART 8. SAFETY**

**R 460.3801 Protective measures.**

Rule 801. An electric utility or cooperative shall exercise reasonable care to reduce the hazards to which its employees, its customers, and the general public may be subjected.

History: 1983 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3802 Safety program.**

Rule 802. An electric utility or cooperative shall comply with the provisions of the occupational safety and health act, 29 USC 1970, and the Michigan occupational safety and health act, 1974 PA 154, MCL 408.1001 to 408.1094, and shall operate under applicable federal and state health and safety laws and regulations.

History: 1983 AACS; 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3803 Energizing services.**

Rule 803. When energizing services, an electric utility or cooperative shall comply with the provisions of all applicable codes and statutory requirements, unless otherwise specified by the commission. The electric utility or cooperative may refuse to energize a service if an unsafe condition is observed.

History: 1983 AACS; 1996 AAC; 2023 MR 7, Eff. April 10, 2023.

**R 460.3804 Accidents; notice to commission.**

Rule 804. An electric utility or cooperative shall promptly notify the commission of fatalities and serious injuries that are substantially related to the facilities or operations of the facilities.

History: 1996 AACS; 2023 MR 7, Eff. April 10, 2023.

**R 460.3901 Rescinded.**

History: 1983 AACS; 1989 AACS; 1996 AACS.

**R 460.3902 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3903 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3904 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3905 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3906 Rescinded.**

History: 1983 AACS; 1996 AACS.

**R 460.3907 Rescinded.**

History: 1996 AACS.

**R 460.3908 Rescinded.**

History: 1996 AACS.