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#### § 400.1 Definitions

- (a) A complaint test is a test of a meter, made by a utility as a result of a complaint made to the utility by a customer.
- (b) A periodic test is a scheduled test of a meter, made by a utility at fixed intervals, in accordance with the meter testing schedule contained herein.
- (c) An office test is a test of a meter, made by a utility at the direction of an officer or employee of the utility.
- (d) A referee test is a test of a meter, made or witnessed by a representative of the commission as a result of a complaint made to the commission by a customer.
- (e) The term meter, when used with respect to a steam flow meter of the velocity type in conjunction with a main line orifice or to a steam flow meter of the head type, refers to the secondary element (flow mechanism).

#### § 400.2 General

- (a) The rules and regulations contained herein are promulgated to establish minimum requirements for the guidance of utilities in controlling operating conditions and in instituting practices in connection with the installation, testing and maintenance of steam meters and steam service equipment.
- (b) For the purpose of these rules and regulations, the term utilities shall include all corporations which distribute steam under the jurisdiction of the commission and which have 1,000 or more meters installed on customers' premises.
- (c) Each utility shall provide adequate meter testing facilities and shall have all meters, used or intended to be used for the purpose of billing customers, tested as required by the rules and regulations contained herein.
- (d) No utility shall use for the purpose of billing customers any steam meter or accessory equipment which affects or determines the measurement of the quantity of steam furnished to or for the use of any customer, the type of which shall not have been approved by the commission.
- (e) Application for approval by the commission of a type of steam meter, including any accessory equipment which affects or determines the measurement of the quantity of steam furnished to or for the use of any customer, shall be submitted by a utility by whom such meter is intended to be used.
- (f) Provision shall be made to insure that a condensate type meter will in no case operate under pressure.
- (g) The installation of a head type flow meter shall conform with the applicable provisions set forth in the American Society of Mechanical Engineers Standards covering flow measurement (presently designated as PTC 19.5; 4-1959), in effect at the time of meter installation.
- (h) Each utility shall maintain its equipment in customers' premises in good condition.
- (i) Each utility shall keep a record of the average pressure which exists each month at pressure recording stations throughout its system.
- (j) Each steam meter in service shall have affixed thereto, in a permanent manner, an identifying number or designation.

§ 400.3 Reference standards

(a) Tests to determine the effective area of all orifice plates used in testing steam meters shall be made at least once each six months, and a record of these tests shall be retained for a period of two years.

(b) The gauges, scales, thermometers, etc., used in making tests shall be calibrated at intervals consistent with good laboratory practice.

§ 400.4 Referee tests

(a) In a referee test, a representative of the commission will seal the meter or meter device involved, and will notify the utility within 24 hours that such meter or device has been sealed.

(b) In a referee test, the seals for the meter or the meter device involved shall be opened only in the presence of a representative of the commission. The meter or meter device shall be tested under the direction of a representative of the commission.

(c) When, in a referee test, the percentage registration of a meter is found to be more than 102 percent, no charge shall be made for such test. If, however, as a result of such test, the percentage registration of the meter is found to be 102 percent or less, a charge shall be made to the customer by the utility based on the following schedule:

Type of Meter	Capacity or Size	Fee
Condensate	3000 lbs. per hr. or less	\$ 25.00
Condensate	Over 3000 lbs. per hr	50.00
Area	1 in	25.00
Area	1 1/2 in	25.00
Area	2 in.	50.00
Area	3 in	75.00
Area	4 in.	100.00
Area	6 in	150.00
Area	8 in	300.00
Velocity	1 in	25.00
Velocity	2 in.	25.00
Velocity	3 in.	50.00
Velocity	4 in	50.00
Head	All	100.00

§ 400.5 Meter records

(a) For all steam meters installed on customers' premises records shall be maintained which identify the year purchased, the manufacturer, the type, the identifying number, the nameplate data relative to the rating of the meter, the location, and the date of last test. Such records shall be sufficient to identify all associated meters and accessory equipment affecting the accuracy of the billing.

(b) The test record of each meter and meter device installed on customers' premises shall be retained until a superseding test is made, but for a period of not less than two years.

§ 400.6 Schedule of testing steam meters

(a) Each steam meter shall be tested prior to installation at a location or within 30 days after initially being placed in service at that location.

(b) All steam meters installed upon customers' premises shall be tested in accordance with the following schedule:

(1) Meters of the condensate type--at least 25 percent of the total number of meters of such type in service shall be tested in each calendar year, the required number of meters to be tested being selected from those longest without test.

(2) Meters of the area type shall be tested at least once every five years.

(3) Meters of the velocity type--at least 20 percent of the total number of meters of such type in service shall be tested in each calendar year, the required number of meters to be tested being selected from those longest without test.

(4) Meters of the head type shall be tested at least once every year.

#### § 400.7 Rules for testing steam meters

(a) All meters shall be adjusted to register accurately with a tolerance of not more than two percent.

(b) Steam flow meters--area and velocity types. (1) Steam flow meters of the area and velocity types shall be tested using air or steam as the testing medium except as provided in section 400.4(b) of this Part.

(2) In tests employing steam as the testing medium, the steam used shall in no case contain more than one percent moisture and may be slightly superheated.

(3) In tests employing either air or steam as the testing medium and flow tubes with orifices as the reference standards, the test equipment and test procedure shall conform with the applicable provisions set forth in the American Society of Mechanical Engineers Standards, covering flow measurement (presently designated PTC 19.5; 4-1959), in effect at the time of test.

(4) In tests conducted in accordance with paragraph (3) of this subdivision, meters shall be tested at the load points specified below:

(i) Area type meters. One test shall be made at each of six load points starting at approximately one-sixth load and continuing in equal steps to 100 percent of meter rating.

(ii) Velocity type meters. Two tests shall be made at each of three load points approximately equal to 50 percent, 60 percent and 70 percent of meter rating.

(5) In tests employing steam as the testing medium and a condensate weighing scale as the reference standard, meters shall be tested at the load points specified below:

(i) Area type meters. Two tests shall be made at each of six load points starting at approximately one-sixth load and continuing in equal steps to 100 percent of meter rating.

(ii) Velocity type meters. Two tests shall be made at each of three load points approximately equal to 50 percent, 75 percent and 100 percent of meter rating.

(6) Each main line metering orifice plate used in conjunction with a steam flow meter of the velocity type shall be inspected and its diameter measured for conformity with the original installation at least once every five years.

(7) The diameter of each main line metering orifice plate removed from service shall be measured and entered on a record which shall be retained for a period of at least one year.

(c) Steam flow meters--head type. (1) The test made in accordance with section 400.6(a) of this part of steam flow meters of the head type shall consist of the following:

(i) Certification of the primary element, including the orifice plate, for conformance with the applicable provisions set forth in the American Society of Mechanical Engineers Standards, covering flow measurement (presently designated PTC 19.5; 4-1959), in effect at the time of the test.

(ii) Verification of the correctness of the meter constant.

(iii) The test of the secondary element (flow mechanism) shall be made in place on the customer's premises at each of five load points approximately equal to 20 percent, 40 percent, 60 percent, 80 percent and 100 percent of meter rating.

(2) On subsequent tests, the procedure in subparagraph (1) (iii) of this subdivision shall be followed.

(3) Each metering orifice plate shall be inspected and its diameter measured for conformity with the original installation at least once every five years.

(4) The diameter of each metering orifice plate removed from service shall be measured and entered on a record which shall be retained for a period of at least one year.

(d) Steam condensate meters. (1) Steam condensate meters shall be tested using water as the testing medium.

(2) Two tests shall be made at each of two load points with the meter passing a known quantity of water at rates of flow approximately equal to first, 100 percent and second, 50 percent of meter rating.

#### § 400.8 Determination of steam meter performance

(a) When the results of two tests at a given load fail to agree within two percent, additional tests up to a total of four, shall be made at that load until agreement within two percent is obtained on any two tests. If such agreement is not obtained the meter registration shall be reported as "Indeterminate".

(b) The percentage registration shall be reported as "Indeterminate" when for any reason there is doubt as to whether the accuracy of registration can be determined. See subdivision (c) of this section.

(c) The percentage registration shall be reported as "Non-registering" if for any reason a meter is found not registering at the specified test points. See subdivision (b) of this section.

(d) The percentage registration of the meter shall be determined by arithmetically averaging the results obtained at the specified test points, except that for condensate meters the percentage registration shall be obtained by multiplying the average of the test results at 50 percent of meter rating by two, adding the average of the test results of 100 percent of meter rating and dividing the total by three.

#### § 400.9 Reporting of tests of steam meters

(a) Reports of complaint, periodic and office tests of steam meters shall be made each month and filed with the commission not later than the 15th day of the following month on forms 8 1/2 x 11 inches in size as shown in section 400.10 of this Part.

(b) If no complaint, periodic or office tests are made, the form shown in section 400.10 of this Part shall be filed regularly bearing the statement "NO TESTS MADE".

#### § 400.10 Form for reporting complaint, periodic and office tests

The reports of complaint, periodic and office tests of steam meter shall be made in the form designated "Complaint, Periodic and Office Tests." (See Appendix 8-A.)

#### § 400.11 Quality of steam

(a) The quality of steam furnished to the customer shall not fall below 95 percent (steam shall not contain more than five percent condensate by weight) except under abnormal conditions that cannot be foreseen nor guarded against.

(b) A test to determine the quality of steam supplied at a customer's premises shall be made by the utility when requested by the commission.

(c) Tests of steam quality shall be made by a throttling type or a separating type of calorimeter in conformance with the applicable provisions set forth in the American Society of Mechanical Engineers Standards, covering quality of steam in effect at the time the test is made (presently designated at PTC 19.11-1959). The utility shall record the findings of such test on the form hereinafter prescribed.

(d) When a throttling calorimeter is used, three tests shall be made at intervals of not less than 15 minutes. When a separating calorimeter is used, two runs of 10 minutes each, spaced not less than 15 minutes apart shall be made.

(e) Calorimeter sets to be used in steam quality tests shall be calibrated within 48 hours prior to such tests.

(f) Reports of steam quality tests shall be made on forms 8 1/2 x 11 inches in size as shown in section 400.12 of this Part.

§ 400.12 Form for reporting steam quality tests

The report of steam quality tests shall be made in the form designated "Steam Quality Test Record". (See Appendix 8-B.)

§ 400.13 Schedule for testing of pressure compensated counters

Counters of the pressure compensated type are to be tested before being placed in service and at least once each year thereafter.

§ 400.14 Testing of pressure compensated counters

(a) The counter shall be tested by applying pressure to the compensating mechanism and rotating the "following" magnet a fixed number of turns as shown in the following table with two readings being taken at each of the test pressures. Should the results of the two tests at any of the test pressures, one taken with the pressure being increased to the test point and the other with the pressure being decreased, vary by more than one percent, additional pairs of tests shall be taken until such agreement is reached. The average of the readings obtained shall be deemed to be the condition of the counter.

(b) If more than four additional pairs of tests are required, the test shall be considered "indeterminate".

(c) The accuracy at each test point shall be determined by the following formula:

$$\text{Percent Registration} = \frac{\text{Observed Revs. of Counter} \times 100}{4}$$

Pressure in Psig	No. of Magnet Turns	Correct No. of Counter Turns
87 1/2	29	4
125	25	4
186	21	4

§ 400.15 Referee tests of pressure compensated counters

Pressure compensated counters shall not be removed from Shuntflo meters undergoing referee tests and shall be tested in the presence and under the direction of a representative of the commission.

§ 400.16 Adjustments on pressure compensated counters

Counters found to be registering with an error exceeding plus or minus one percent shall be adjusted to register accurately with a tolerance of plus or minus one percent.

§ 400.17 Reports of tests of pressure compensated counters

A report of all installation tests, office tests, periodic tests, and complaint tests made during each year shall be prepared as of December 31st of that year. Such report shall be made in a form satisfactory to the commission and shall be filed with the commission not later than January 31st following the date of the report.