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§ 500.1 General

(a) All waterworks corporations under the jurisdiction of the Public Service Commission shall install approved meters and approved accessories, and before placing in service, test all water meters used for the purpose of billing customers, and shall adjust the same so that the registration on the meter dial shall indicate the quantity of water actually passing through the meter within the limits herein provided. However, meters and accessories placed in the field prior to the effective date of the approval regulations will be grandfathered, based on a review of the accuracy and reliability performance data supplied by waterworks corporations as directed by commission staff. Such application must be submitted within six months of the effective date of this section.

(b) (1) No waterworks corporation furnishing metered water service shall allow a meter to remain in service for a period longer than that specified in the following table without checking or testing said meter for accuracy and making the necessary readjustments if found to be incorrect beyond the limits herein provided.

Size of meter	Interval between test
5/8-inch, 3/4-inch	15 years
1-inch	5 years
1-1/2 inch, 2-inch	4 years
3-inch	3 years
4-inch	2 years
6-inch and larger	1 year

In the case of new model water meters, the company shall test a sample of the meters after they have been in service for five years. The size of the sample shall be 10 percent of the total meters of that model in service for five years or, alternatively, any percentage which the company can demonstrate is statistically valid. When the test results have proven satisfactory for three consecutive years, the sampling of these meters may be discontinued.

(2) Nor shall any meter be permitted to remain in service without similarly checking for accuracy and readjusting when its registration since the last test exceeds the following:

Size	Interval between test registration
5/8-inch	1,500,000 gallons
3/4-inch, 1-inch	2,000,000 gallons
1-1/2-inch	3,000,000 gallons
2-inch	7,000,000 gallons

provided, however, that such routine tests shall not be required more often than once a year.

(c) All water meters in service on or after April 1, 1932, for which there is no record of test within five years, shall be tested promptly thereafter, and in all cases within one year from said date; provided, however, that companies having over 5,000 meters will be allowed two years; but at least one half of the meters shall be tested during the first year.

(d) A complete record shall be kept by each waterworks corporation of all tests made by it to include:

- (1) owning or serving company's number;
- (2) manufacturer's name and number;
- (3) type and rated capacity;

(4) date of installation, removal, and test;

(5) reason for test;

(6) history of meter; to include date of purchase, various places of installation with dates of installation and removal and reason for such removal; and

(7) date of test; to include meter readings, measurement of water passed, method of measurement, location of test whether on premises of customer, in laboratory or shop or elsewhere, and any other pertinent information.

(e) On and after March 31, 1946, all waterworks corporations shall make report of water meter tests on Revised Form No. 2[1] and in accordance with the instructions attached thereto.

(f) In order to facilitate the testing of new or repaired meters, the commission may detail inspectors to make tests on the premises of water supply corporations or meter manufacturers or at meter repair shops, provided such premises are maintained and equipped as hereinafter provided.

(g) The name of the manufacturer and a serial number shall be plainly stamped on each meter.

(h) Upon placing or replacing a meter in service, unless the register is set at zero, the water company shall securely attach a tag stamped with figures indicating the date and meter dial reading at the time of setting. When removing a meter, or when a reading is taken for rendering a final bill, the consumer shall be given the reading at the time and shall be given the opportunity to read the meter if he so desires. [1] Revised Form No. 2 and its corresponding instructions are set out in Appendix 9-A.

§ 500.2 Types of meters

Service meters covered by this Part in use for measuring water delivered to consumers are divided into four general classes, as follows: displacement, current, compound, and fire-service.

(a) Displacement meters. Displacement meters are known by the motion of the piston, as reciprocating, rotary, oscillating, and mutating disc meters. These meters are positive in action and displace or carry over a fixed quantity for each stroke or revolution of the piston or disc.

(b) Current meters. Current meters are nonpositive in action, but record the flow by the number of revolutions of a water wheel or propeller, which is set in motion by the force of the flowing water coming in contact with the wheel or propeller blades.

(c) Compound meters. Compound meters consist of a combination of a main-line meter of the current or displacement type for measuring large flows and a small by-pass meter of the displacement type for measuring small flows, together with an automatic valve mechanism for diverting the small flows through the by-pass meter.

(d) Fire-service meters. Fire-service meters are compound meters consisting of a main-line meter of the proportional type for measuring large flows and a small by-pass meter of the displacement type for measuring small flows together with an automatic valve mechanism for diverting the small flows through the by-pass meter. The combination is designed to afford a clear passage through the meter when the valve is raised from its seat.

§ 500.3 Approval of meters and meter reading accessories

(a) Definitions. Unless the specific context otherwise requires, as used in this Part:

(1) Meter - any meter testing equipment or measurement device used for the determination of the units of water furnished.

(2) Accessory - any meter reading device attached to the meter used to display, transmit or adjust the reading of a meter index.

(3) Acceptable devices - those types or models of meters or accessories, eligible to be submitted for approval, that conform to requirements intended to determine their reliability and acceptable accuracy insofar as they can be demonstrated by tests; the meter or accessory shall meet or exceed staff designated requirements.

(4) Approved devices - those types or models of meters or accessories which have been approved by the Commission for use in customer billing and in the general operations of a water utility plant.

(b) Selection of devices for testing. (1) One or more units of equipment covered by the application, as determined and selected by staff, shall be made available for testing and may be retained for such purpose by the commission. Such units will be intended for actual use and not include experimental models.

(c) Application of approval. (1) An application for approval shall be submitted by the first utility intending to use the meter or accessory in New York State. Three copies of such application shall be filed with the Secretary to* the Commission. * So in original. "to" should be "of".

(2) An application for approval shall contain:

- (i) name and address of applicant;
- (ii) name and address of manufacturer;
- (iii) manufacturer's type or model designation;
- (iv) complete technical description covering construction details and materials;
- (v) test data observed and/or prepared by the applicant;
- (vi) test data certified by the manufacturer;
- (vii) photographs (8" x 10" exploded view) and/or manufacturer's drawings;
- (viii) the general customer category or specific application for which the utility intends to use the meter or accessory;
- (ix) the approximate cost per unit; and
- (x) certification of correctness and completeness of application by an officer of the applicant.

(d) Modification of approved devices. (1) Permission to use an approved device is effective only for those types of models which are of the same design and construction as the type or model approved. If the manufacturer of an approved device changes its materials, construction, or design in a manner that may affect its operation, accuracy or safety, the sponsoring utility or the utility intending to use the modified device shall notify the Commission staff, specifying the changes.

(2) Department staff will evaluate the effects of the modification and determine whether the device remains acceptable, and if so, whether the existing approval is adequate or should be amended, and will so notify the utility.

(e) Strength and capacity of meters. (1) Strength. New meters shall be of sufficient strength to withstand without damage a working-pressure test of 150 pounds per square inch.

(2) Capacity. New meters shall show a loss of head not to exceed the following amounts when the rate of flow for delivery is that given in the following Table, viz.: for displacement and current meters, 15 pounds per square inch; for compound meters, 20 pounds per square inch; for fire-service meters, 4 pounds per square inch.

SIZE	DELIVERY: GALLONS PER MINUTE			
	DISPLACEMENT	CURRENT	COMPOUND	FIRE-SERVICE
INCHES				
1/2	15	.....	.....	.....
1/2 X 3/4	15	.....	.....	.....
5/8	20	.....	.....	.....
5/8 X 3/4	20	.....	.....	.....
3/4	30	.....	.....	.....
1	50	.....	.....	.....
1-1/2	100	100	100	.....
2	160	120	160	.....
3	315	300	320	400
4	500	600	500	700

6	1,000	1,350	1,000	1,600
8.....	.....	1,800	1,600	2,800
10 .....	.....	2,400	2,300	4,400
12 .....	.....	3,375	3,100	6,400

§ 500.4 Testing equipment

(a) Each water works corporation, unless specifically excused by the commission, shall provide for and have available such meter testing laboratory or shop, standard meters, instruments, and other facilities as may be deemed necessary by the commission properly to make the tests required herein. Such equipment and facilities shall be acceptable to the commission and shall be available at all reasonable times for inspection and use by authorized representatives of the commission. Water-works corporations may cooperate in arranging for meter testing facilities. Tests for accuracy of such equipment will be made at such intervals as the commission may deem necessary.

(b) Requests to be excused from the provisions of subdivision (a) of this section will be considered from water-works corporations having less than 100 meters in service when satisfactory arrangements are made for testing of meters at approved laboratories; or from companies which arrange for all facilities prescribed herein at approved locations elsewhere than on the premises of said company.

(c) The minimum equipment required for registration tests is as follows:

(1) A quick-acting valve on the discharge pipe through the use of which the flow can be started and stopped without appreciable loss of time.

(2) A valve and an orifice attachment on the outlet side of the meter, either of which can be used to establish the rate of flow desired.

(3) Pressure gauges connected on both the inlet and outlet of the meter to show whether any material change in pressure occurs during the period of test, which would affect the rate of flow. The outlet pipe is to have sufficient head on it so that the meter will always have pressure on its outlet end and preferably not less than five pounds per square inch.

(4) A measuring device which may be either of the volumetric or weighing type. Whichever is used, the accuracy of determination of the volume or weight of water discharged into the measuring device must be such as to bring the limit of error within one quarter of one percent.

(5) It is desirable to have available for testing meters a test table and appurtenances which are manufactured by several concerns. Such an outfit would include the equipment enumerated in the preceding four paragraphs.

§ 500.5 Tests of meters

(a) Tests to be made on meters may be considered in two classes, viz.: routine tests as hereinbefore required and tests required upon complaint of consumers or for other special purposes.

(b) The volume of water passed must be sufficient to cause at least one revolution of the pointer on the initial dial except for sensitivity test at "minimum test flow" rate when the said rate shall be maintained for at least five minutes during which time the pointer on the initial dial shall show a steady uniform movement.

(c) Tests of meters over two inches in size may be made in place on the premises by means of an accurately calibrated test-meter of suitable size or by some other reliable apparatus approved by the commission.

(d) Displacement type. (1) All routine tests of displacement type meters shall be conducted by testing for accuracy of registration at not less than two rates of flow within "normal test flow limits", one rate to be approximately that at which the percentage of accuracy is a maximum and the other at approximately the high rate of flow, or in the case of large meters tested in place on premises, at as high a rate as practicable.

(2) All tests made upon complaint of consumers or for other special purposes shall be conducted by testing for accuracy of registration at not less than three rates, namely, at the two rates stipulated above for routine tests and also at approximately the low rate of flow.

(e) Current type. All routine and complaint tests of current meters shall be made within and as near as practicable to the low and high rates given under "normal test flow limits" and, if required, at intermediate rates.

(f) Compound and fire-service types. The accuracy of compound and fire-service meters should be determined by making a sufficient number of tests at different rates of flow between the high and low rates given under "normal test flow limits" to permit the construction of a representative accuracy curve; the tests should be of such scope that the rates of flow at the beginning and end of the "change-over" and the maximum error in registration can readily be determined.

§ 500.6 Registration of meters

(a) Displacement type. The registration on the meter dial shall indicate the quantity recorded to be not less than 98.5 percent nor more than 101.5 percent of the water actually passed through the meter while it is being tested at any rate of flow within the limits specified herein under "normal test flow limits". At the "minimum test-flow" rate to the lowest normal test flow rate as set forth in the following table, the meter shall register not less than 95 percent and not more than 101 percent of the water that actually passes through it. The meter shall show proper sensitivity when tested at the rate of flow set forth under "minimum test flow" as provided in Section 500.5.

Size (inches)	Normal test flow limits (gallons per minute)	Minimum test flow (gallons per minute)
1/2	1 to 15	1/4
1/2 x 3/4	1 to 15	1/4
5/8	1 to 20	1/4
5/8 x 3/4	1 to 20	1/4
3/4	2 to 30	1/2
1	3 to 50	3/4
1-1/2	5 to 100	1-1/2
2	8 to 160	2
3	16 to 315	4
4	28 to 500	7
6	48 to 1,000	12

(b) Current type. The registration on the meter dial shall indicate the quantity recorded to be not less than 98 percent nor more than 102 percent of the water actually passed through the meter while it is being tested at any rate of flow within the limits specified herein under "normal test flow limits". The meter shall show proper sensitivity when tested at the rate of flow set forth under "minimum test flow" as provided in section 500.5.

Size (inches)	Normal test flow limits (gallons per minute)	Minimum test flow (gallons per minute)
1-1/2	12 to 100	1 1/2
2	35 to 100	30
3	40 to 250	35
4	50 to 500	45
5	75 to 90	70
6	90 to 1,200	85
8	100 to 1,500	90
10	125 to 2,000	110
12	150 to 2,800	140

(c) Compound type. (1) The registration on the meter dials shall indicate the quantity recorded to be not less than 97 percent nor more than 103 percent of the water actually passed through the meter while it is being tested at any rate of flow within the limits specified under "normal test flow limits", except in the registration of flows within the "changeover" from by-pass meter to mainline meter. The registration at these rates of flow shall be not less than 90 percent and not more than 103 percent. The difference in the rate of flow at the beginning and at the end of the "changeover" shall not exceed the figures given in the following table:

Gallons

Size (inches)	per minute
1-1/2	20
2	20
3	30
4	30
6	40
8	75
10	100
12	620

(2) The beginning of the "changeover" is when the accuracy of registration falls below 97 percent, due to the automatic valve mechanism, and the end of the "changeover" is when the accuracy of registration again reaches 97 percent.

(3) The meter shall show proper sensitivity when tested at the rate of flow set forth under "minimum test flow" as provided in section 500.5.

Size, main meter (inches)	Normal test flow limits (gallons per minute)	Minimum test flow (gallons per minute)
1-1/2	2 to 100	1-1/2
2	2 to 160	1/2
3	4 to 320	1
4	6 to 500	1-1/2
6	10 to 1,000	3
8	16 to 1,600	4
10	32 to 2,300	8
12	32 to 3,100	14

(d) Fire-service type. (1) Registration on the meter dials shall indicate the quantity recorded to be not less than 97 percent nor more than 103 percent of the water actually passed through the meter while it is being tested at any rate of flow within the limits specified under "normal test flow limits", except in the registration of flows within the "changeover" from by-pass meter to the mainline meter. The registration at these rates of flow shall be not less than 85 percent. The difference in the rate of flow at the beginning and at the end of the "changeover" shall not exceed the figures given in the following table:

Size (inches)	Gallons per minute
3	40
4	60
6	130
8	210
10	300
12	620

(2) The beginning of the "changeover" is when the accuracy of registration falls below 97 percent due to the automatic valve mechanism, and the end of the "changeover" is when the accuracy of registration again reaches 97 percent.

(3) The meter shall show proper sensitivity when tested at the rate of flow under "minimum test flow" as provided in section 500.5 of this Part.

Size, main meter (inches)	Normal test flow limits (gallons per minute)	Minimum test flow (gallons per minute)
3	8 to 400	2
4	8 to 700	2
6	16 to 1,600	4
8	28 to 2,800	7
10	48 to 4,400	12
12	48 to 4,400	12

§ 500.7 Complaint tests

(a) (1) If any consumer owning a meter or to whom a meter has been furnished shall request the Public Service Commission to test such meter, a test will be made by a duly authorized representative of the commission. Such test may be made by means of a test meter or other approved device on the premises of the complainant or in the meter laboratory of either the company or the commission as may be determined by the commission. The water company and the complainant will be notified when said test is to be made, and each may have a representative present to witness the test.

(2) The water company shall render the representative of the commission all necessary assistance in making said test or in removing the meter from the premises of the consumer to such place as the commission may designate for tests.

(3) If such meter on being tested shall be found to be incorrect beyond the limits prescribed, the meter shall forthwith be adjusted by the water company as provided herein or another meter, which has been tested and properly adjusted, shall be installed in place of the meter complained of.

§ 500.8 Adjustment of bills due to over-registration of meter

(a) Displacement meters. (1) If upon test of displacement meters upon complaint (except as herein provided for meters tested in place), it be found that the weighted average percentage of accuracy of the meter, determined as hereinafter specified, exceeds 100 percent, the bills of the consumer shall be adjusted to the extent of such excess for one-half of the quantity registered since the last test unless it can be shown that the error is due to an accident or other cause, the approximate date of which can be determined, in which case it shall be figured back to such date; or unless the consumer has suffered no damage from said error by virtue of the fact that the meter has registered a quantity of water less than that allowed for the minimum rate of the applicable rate schedule.

(2) For the purpose of adjustment of consumers' bills, the weighted average percentage of accuracy of a displacement meter, except as herein provided for meters tested in place, shall be determined by giving a weight of two to the percentage at the rate at which the percentage of accuracy is a maximum and a weight of unity to each of the percentages at approximately the low and high rates of flow within "normal test flow limits".

(b) Meters other than displacement type. The adjustment of bills, upon complaint of consumers, where current, compound, and fire-service meters, or meters of all types tested in place on premises are involved, will be determined from an accuracy curve, developed from tests of the meter in question, properly averaged. If the average percentage of accuracy so determined exceeds 100 percent, the bills of the consumer shall be adjusted in the manner hereinbefore provided for displacement meters.

§ 500.9 Percentage of accuracy

The percentage of accuracy of a meter is the ratio (expressed in percentage) of its registration in a given time to the actual amount of water passed through the meter in the same time.

§ 500.10 Percentage error

The percentage error of a meter is the difference between its percentage of accuracy and 100 percent. A meter whose percentage of accuracy is 95 percent is said to be 5 percent slow, or its error is minus 5 percent. A meter whose percentage of accuracy is 105 percent is said to be 5 percent fast, or its error is plus 5 percent.

§ 500.11 Nonregistering meters

(a) The reading of a duly installed meter showing the amount of water consumed shall be used for all metered billing purposes except where it appears that the meter has ceased to register or has registered inaccurately.

(b) In all cases where a meter is found to be defective, it shall be immediately replaced by a meter that has been tested and properly adjusted.

(c) In cases where it is found that a meter has ceased to register or has registered inaccurately and it cannot be determined by reasonable test the percentage of inaccuracy, an estimated bill for the billing period immediately preceding the date when such meter was found defective and for the period from said date to the date of replacement of the meter, may be rendered the consumer but the right to render an estimated bill is strictly limited to such periods and for all other periods the bill shall be the minimum rate provided in the applicable rate schedule. The estimated bill shall be based upon the amount of water consumed in the corresponding period in prior years, except where it appears that there has been a change in the occupancy of the premises or in the use of water, in which case an equitable adjustment shall be made. This subdivision does not apply to residential customers of any waterworks corporation that is covered by Part 14 of this Title.