
 STATUTORY INSTRUMENTS

1990 No. 2626

WEIGHTS AND MEASURES
**The Weights and Measures (Local and Working Standard
Capacity Measures and Testing Equipment)
Regulations 1990**

<i>Made</i> - - - -	<i>20th December 1990</i>
<i>Laid before Parliament</i>	<i>27th December 1990</i>
<i>Coming into force</i>	<i>21st January 1991</i>

The Secretary of State, in exercise of his powers under sections 4(5) and (6), 5(9), 86(1) and 94(1) of the Weights and Measures Act 1985(a) and of all other powers enabling him in that behalf, hereby makes the following Regulations:—

PART I**GENERAL****Citation, commencement and revocation**

1.—(1) These Regulations may be cited as the Weights and Measures (Local and Working Standard Capacity Measures and Testing Equipment) Regulations 1990 and shall come into force on 21st January 1991.

(2) The Weights and Measures (Local and Working Standard Capacity Measures and Testing Equipment) Regulations 1987(b) are hereby revoked.

Interpretation

2.—(1) In these Regulations:—

“the Act” means the Weights and Measures Act 1985;

“differential pressure gauge” means an instrument used to determine the pressure loss across either a cold-water meter or a reference meter for water;

“discrimination threshold” means the smallest change which produces a perceptible change in the indication;

“linearity” means the horizontal band within which the graph of the meter error of a reference meter lies over the authorised range of flowrates;

“multifiller” means a device consisting of a number of calibrated measures, capable of dispensing simultaneously known quantities of water, used for the testing of capacity measures;

“piston prover” means a device which can deliver or accept water in quantities determined by the displacement of a piston in a cylinder;

“proving tank” does not include a proving tank for water;

“proving tank for water” means a local or working standard capacity measure which is used solely with water to test cold-water meters or reference meters for water;

“reference meter” means a meter for use in testing measuring equipment used for the measurement of liquid fuel delivered from road tankers;

(a) 1985 c.72.

(b) S.I. 1987/51.

“reference meter for water” means a meter for use in testing a metered cold potable water supply;

“repeatability” means the ability of weighing or measuring equipment to indicate, under defined conditions of use, closely similar quantities on repeated measurements, expressed as a 95 per cent confidence interval;

“suitable weighing machine” means a weighing machine having a discrimination threshold and a repeatability in grams not exceeding one fifth of the limit of error expressed in millilitres of the standard or equipment it is being used to test; and

“95 per cent confidence interval” means the range of values within which the true value may be expected to lie with a 0.95 level of probability.

(2) The abbreviations of, and symbols for, units of measurement used in these Regulations refer to the relevant units as follows:—

<i>Imperial System</i>		<i>Metric System</i>	
fluid ounce	fl oz	millilitre	ml
pint	pt	litre	l
gallon	gal		

PART II

WORKING STANDARD CAPACITY MEASURES

3.—(1) Working standard capacity measures made of glass and provided pursuant to section 5(1) of the Act for use by inspectors of weights and measures shall be tested by one of the following methods:—

Method 1

- (a) where the test relates to an indicated imperial measurement not exceeding 1 gal or an indicated metric measurement not exceeding 5 l, by transfer of water from an equivalent local standard capacity measure;
- (b) in any other case by transfer of water from a local standard capacity measure of maximum possible capacity in relation to the working standard used the requisite number of times;

Method 2

by pouring water of a known temperature into the measure under test, when the measure is resting on a horizontal surface—

- (a) where the nominal capacity of the measure is defined by a line, until the bottom of the meniscus coincides with the top of that line or with the top of any graduation line or tolerance mark being tested; or
- (b) where the nominal capacity of the measure is defined by its brim, until the surface of the water coincides with the brim;

and in either case determining the weight of the water on a suitable weighing machine and calculating therefrom the capacity of the measure in accordance with British Standard 1797: 1987(a) or British Standard 6696: 1986(b).

(2) Working standard capacity measures made of metal and provided pursuant to section 5(1) of the Act for use by inspectors of weights and measures shall if they are proving tanks or proving tanks for water be tested by Method 1 above or, if they are not proving tanks or proving tanks for water, either by Method 1 above or by pouring water of a known temperature into the measure under test, when the measure is resting on a horizontal surface—

- (a) where the nominal capacity of the measure is defined by a line, until the bottom of the meniscus coincides with the top of that line or with the top of any graduation line or tolerance mark being tested; or

(a) Tables for use in the calibration of Volumetric Glassware, ISBN 0 580 15952 3, published by the British Standards Institution on 23rd December 1987.

(b) British Standard Methods for use and testing of capacity volumetric glassware, ISBN 0 580 15076 3, published by the British Standards Institution on 28th February 1986.

(b) where the nominal capacity of the measure is defined by its brim, until the surface of the water coincides with the brim;
and in either case determining the weight of the water on a suitable weighing machine and calculating therefrom the capacity of the measure.

(3) A working standard capacity measure shall be tested as a measure of any amount in Schedule 3 to the Act which it is designed to measure and the accuracy of any tolerance marks adjacent to any graduation tested shall also be tested.

4. Every capacity measure—

- (a) which is made of glass shall have been tested—
 - (i) immediately before its first use,
 - (ii) immediately before its first use more than 12 months after such testing, and
 - (iii) within 24 months before any subsequent use; or
- (b) which is made of metal and
 - (i) is of 50 l or less or 10 gal or less shall have been tested within 6 months before use;
 - (ii) is of more than 50 l or more than 10 gal shall have been tested within 24 months before use.

PART III

TESTING EQUIPMENT

Reference meters

5.—(1) Reference meters shall be tested either—

- (a) by means of a local or working standard capacity measure which is of sufficient size to hold at least one minute's delivery of the meter under test; or
- (b) by means of a weighing machine, the repeatability of which shall be not more than 0.01 per cent of the weight of the liquid delivered by the water under test, and which can weigh at least one minute's delivery of the meter under test.

(2) The capacity measure or the weighing machine used to test a reference meter shall have a discrimination threshold of not more than 0.01 per cent of the quantity delivered by the meter under test.

In a test under sub-paragraph (1)(b) above, the density of the test liquid shall be determined to an accuracy of 0.01 per cent.

6. A reference meter shall have been tested over the range of flowrates and liquids for which it is intended to be used within 24 months before use, and the results of the test shall be such that—

- (a) the range of five consecutive tests with the same liquid at the same flowrate does not exceed 0.05 per cent of the quantity delivered on each test;
- (b) the linearity shall be such that the range of the means of any five consecutive tests with the same liquid within the flowrate range shall not exceed 0.1 per cent of the quantity delivered on each test; and
- (c) notwithstanding the application of corrections when a reference meter is used to test meter measuring systems in accordance with the Measuring Equipment (Liquid Fuel delivered from Road Tankers) Regulations 1983(a) or the Measuring Instruments (EEC Requirements) Regulations 1988(b), the relative error of the mean of any five consecutive tests shall not exceed 0.5 per cent of the quantity delivered on any test.

7. A reference meter shall have been tested at a single flowrate within 6 months before use, and the mean of five consecutive measurements at the same flowrate shall not differ by more than 0.05 per cent of the quantity delivered on each test from the mean quantity delivered at the same flowrate with liquid of the same viscosity when the meter was last tested in accordance with regulation 6 above.

(a) S.I. 1983/1390, amended by S.I. 1986/1210.

(b) S.I. 1988/186, amended by S.I. 1988/1128.

Reference meters for water

8.—(1) Reference meters for water shall be tested with water either—

- (a) by means of a proving tank for water which is of sufficient size to hold at least 10 l or one minute's delivery of the meter under test whichever is the greater; or
- (b) by means of a weighing machine, the repeatability of which shall be not more than 0.05 per cent of the weight of the water delivered by the meter under test, and which can weigh at least 10 kilograms or one minute's delivery of the meter under test whichever is the greater.

(2) The proving tank for water or the weighing machine used to test a reference meter for water shall have a discrimination threshold of not more than 0.05 per cent of the quantity delivered by the meter under test.

9. A reference meter for water shall have been tested over the range of flowrates for which it is intended to be used within 12 months before use, and the results of the test shall be such that—

- (a) the range of five consecutive tests at the same flowrate does not exceed 0.5 per cent of the quantity delivered on each test;
- (b) notwithstanding the application of corrections when a reference meter for water is used to test metered supplies the relative error, determined from the mean of five consecutive tests at any flowrate within the flowrate range, shall not exceed 2 per cent of the quantity delivered on any test.

Multifillers

10. Every measure in a multifiller shall be tested in the manner in which it is to be used by discharging water into a working standard capacity measure or into a container and determining the volume of water delivered on a suitable weighing machine.

11. Every multifiller shall have been tested within six months before use and shall have been adjusted so that the quantity delivered does not lie outside the limit of error permitted for a working standard capacity measure of the same nominal capacity.

Burettes and pipettes

12. Burettes and pipettes shall have been tested within 12 months before use and shall have been adjusted so that the error in volume does not exceed the limit of error permitted for a working standard capacity measure of the same nominal capacity.

13. A pipette shall be tested as a measure of its maximum purported capacity, and (if applicable) as a measure of at least one amount indicated by a subdivision, by filling it to the level of the graduation, discharging it, and weighing the water discharged using a suitable weighing machine.

14. A burette shall be tested as a measure of its maximum purported capacity, and (if applicable) as a measure of at least two amounts indicated by subdivisions, by filling it to the level of the graduation, discharging it, and weighing the water discharged using a suitable weighing machine.

Displacement plungers

15. A displacement plunger shall be tested either by measuring the volume or, using a suitable weighing machine, by measuring the weight of water displaced when the displacement plunger is immersed in water up to the line which indicates the nominal volume.

16. A displacement plunger shall have been tested within 12 months before use and shall have been adjusted so that the error in volume does not exceed the limit of error set out in Schedule 1 to these Regulations.

Differential pressure gauges

17.—(1) A differential pressure gauge shall have been tested over the range of pressures for which it is intended to be used within 12 months before use.

(2) The error on a differential pressure gauge shall not exceed the limits of error shown in Schedule 2 to these Regulations.

Piston provers

18.—(1) A piston prover shall have been tested over its full working range within 12 months before use.

(2) The error on a piston prover shall not exceed the limits of error shown in Schedule 2 to these Regulations.

PART IV**WORKING STANDARD CAPACITY MEASURES AND
TESTING EQUIPMENT**

19.—(1) Where an inspector has reasonable cause to believe that any working standard capacity measure or testing equipment referred to in these Regulations is not accurate within the relevant limits of error, he shall test it before use.

(2) Where testing reveals an error which exceeds the relevant limit shown in Schedule 1, 2 or 3 to these Regulations, the measure or testing equipment shall not be further used until it has been so adjusted that any error is within that limit.

PART V**LOCAL STANDARD CAPACITY MEASURES****Prescribed limits of error**

20. The error on local standard capacity measures shall not exceed the limits of error shown in Schedule 4 to these Regulations.

Periods of validity of certificates of fitness of local standard capacity measures

21. The periods prescribed in the case of local standard capacity measures for the purposes of section 4(6) of the Act (which relates to periods of validity of certificates of fitness of local standards) shall be:

- (a) ten years, in the case of a capacity measure up to and including 500 ml or 1 pint;
- (b) five years, in the case of a capacity measure over 500 ml or 1 pint.

20th December 1990

Edward Leigh
Parliamentary Under-Secretary of State,
Department of Trade and Industry

SCHEDULE 1
DISPLACEMENT PLUNGERS

Regulations 16 and 19

<i>Nominal volume</i>	<i>Limit of error</i>
not exceeding 2 ml	0.1 ml
over 2 ml but not exceeding 25 ml	0.2 ml
over 25 ml but not exceeding 50 ml	0.3 ml
over 50 ml but not exceeding 100 ml	0.4 ml
over 100 ml but not exceeding 125 ml	0.5 ml
over 125 ml but not exceeding 150 ml	0.6 ml
over 150 ml but not exceeding 175 ml	0.7 ml
over 175 ml but not exceeding 250 ml	0.8 ml
over 250 ml but not exceeding 500 ml	1.0 ml

SCHEDULE 2

Regulations 17, 18 and 19

DIFFERENTIAL PRESSURE GAUGES

The permitted limit of error on differential pressure gauges shall be 2.5 per cent of the nominal pressure differential.

PISTON PROVERS

The permitted limit of error on piston provers shall be 0.1 per cent of the nominal quantity delivered or accepted.

SCHEDULE 3

Regulation 19

**WORKING STANDARD CAPACITY MEASURES AND
TESTING EQUIPMENT**

(excluding proving tanks, proving tanks for water, graduated measuring cylinders, displacement plungers, reference meters, reference meters for water, differential pressure gauges and piston provers)

<i>(a) Imperial</i>		<i>(b) Metric</i>	
<i>Indicated capacity of or tolerance mark relating to—</i>	<i>Limit of error</i>	<i>Indicated capacity of or tolerance mark relating to—</i>	<i>Limit of error</i>
$\frac{1}{4}$ gill or less	0.2 ml	1 ml or 2 ml	0.1 ml
$\frac{1}{2}$ gill	0.3 ml	5 ml or 10 ml	0.2 ml
$\frac{2}{3}$ gill or $\frac{1}{2}$ gill	0.4 ml	20 ml or 25 ml	0.2 ml
4 fl oz	0.5 ml	50 ml	0.3 ml
1 gill (5 fl oz)	0.6 ml	100 ml	0.4 ml
6 fl oz	0.7 ml	125 ml	0.5 ml
$\frac{1}{2}$ pt, 8 fl oz or $\frac{1}{2}$ pt	0.8 ml	150 ml	0.6 ml
1 pt	1.0 ml	175 ml	0.7 ml
1 quart or $\frac{1}{2}$ gal	2.0 ml	200 ml or 250 ml	0.8 ml
1 gal	5.0 ml	500 ml	1.0 ml
2 gal	10.0 ml	1 l or 2 l	2.0 ml
3 gal	15.0 ml	2.5 l	2.5 ml
4 gal	20.0 ml	5 l	5.0 ml
5 gal	20.0 ml	10 l	10.0 ml
more than 5 gal	0.1 per cent	more than 10 l	0.1 per cent

PROVING TANKS

The permitted limit of error on proving tanks shall be 0.02 per cent of the nominal capacity.

PROVING TANKS FOR WATER

The permitted limit of error on proving tanks for water shall be 0.1 per cent of the nominal capacity.

GRADUATED MEASURING CYLINDERS

<i>Nominal Capacity Metric</i>	<i>Limit of error</i>
5 ml	0.2 ml
10 ml	0.2 ml
25 ml	0.25 ml
50 ml	0.5 ml
100 ml	0.8 ml
250 ml	1.5 ml
500 ml	2.0 ml
1000 ml	4.0 ml
2000 ml	8.0 ml
<i>Imperial</i>	
$\frac{1}{4}$ gal	4.0 ml
$\frac{1}{2}$ gal	8.0 ml

Regulation 20

SCHEDULE 4

LOCAL STANDARD CAPACITY MEASURES

(excluding proving tanks and proving tanks for water)

<i>(a) Imperial</i>		<i>(b) Metric</i>	
<i>Local Standard of—</i>	<i>Limit of Error</i>	<i>Local Standard of—</i>	<i>Limit of Error</i>
$\frac{1}{6}$, $\frac{1}{5}$ or $\frac{1}{4}$ gill	0.12 ml	1 or 2 ml	0.04 ml
$\frac{1}{3}$ gill	0.15 ml	5 ml	0.06 ml
$\frac{2}{5}$ or $\frac{1}{2}$ gill	0.20 ml	10 ml	0.08 ml
4 fl oz	0.25 ml	20 or 25 ml	0.12 ml
1 gill	0.30 ml	50 ml	0.15 ml
6 fl oz	0.35 ml	100 ml	0.20 ml
$\frac{1}{3}$ pt, 8 fl oz or $\frac{1}{2}$ pt	0.4 ml	125 ml	0.25 ml
1 pt	0.5 ml	150 ml	0.30 ml
1 quart or $\frac{1}{2}$ gal	1.0 ml	175 ml	0.35 ml
1 gal	2.5 ml	200 or 250 ml	0.4 ml
more than 1 gal	0.02 per cent of the nominal capacity	500 ml	0.5 ml
		1 l or 2 l	1.0 ml
		2.5 l	1.2 ml
		5 l	2.5 ml
		10 l	5 ml
		more than 10 l	0.02 per cent of the nominal capacity

PROVING TANKS

The permitted limit of error on proving tanks shall be 0.02 per cent of the nominal capacity.

PROVING TANKS FOR WATER

The permitted limit of error on proving tanks for water shall be 0.1 per cent of the nominal capacity.

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations revoke and replace the Weights and Measures (Local and Working Standard Capacity Measures and Testing Equipment) Regulations 1987.

They prescribe the methods of testing and adjusting, and the limits of error for, working standard capacity measures and testing equipment used for measuring by inspectors of weights and measures. They also make provision for limits of error for local standard capacity measures and for the periods of validity of certificates of fitness of these local standards.

The Regulations make the following changes of substance:

- (a) separate testing requirements for working standard capacity measures made of glass and of metal (including proving tanks and proving tanks for water) are specified (regulation 3(1) and (2));
- (b) testing requirements and limits of error are introduced for reference meters for water, differential pressure gauges and piston provers (regulations 8, 9, 17 and 18 and Schedule 2); and
- (c) limits of error are provided for working and local standard proving tanks for water (regulations 19 and 20 and Schedules 3 and 4).

Copies of British Standards (see regulation 3(1)) can be obtained from any of the sales outlets operated by the British Standards Institution (BSI) or by post from the BSI at Linford Wood, Milton Keynes, MK14 6LE.