

1970 No. 1714

WEIGHTS AND MEASURES**The Working Standards and Testing Equipment (Testing and Adjustment) Regulations 1970**

<i>Made - - - -</i>	<i>13th November 1970</i>
<i>Laid before Parliament</i>	<i>19th November 1970</i>
<i>Coming into Operation</i>	<i>20th November 1970</i>

The Secretary of State, in exercise of his powers under section 5(4) of the Weights and Measures Act 1963(a) (hereinafter called "the Act") and all other powers enabling him in that behalf, hereby makes the following regulations:—

General

1. These Regulations may be cited as the Working Standards and Testing Equipment (Testing and Adjustment) Regulations 1970, and shall come into operation on 20th November 1970.

2.—(1) The Interpretation Act 1889(b) shall apply to the interpretation of these Regulations as it applies to the interpretation of an Act of Parliament.

(2) In these Regulations the symbols and abbreviations employed to indicate units of weight and measure refer to the units in relation to which those symbols and abbreviations are set out in the Schedule hereto.

3. The Working Standards and Testing Equipment (Testing and Adjustment) Regulations 1967(c) are hereby revoked.

4. Working standards of the following classes provided pursuant to section 5(1) of the Act for use by inspectors of weights and measures, namely, linear measures, capacity measures and weights, and testing equipment of the following classes so provided, namely, beamscales, balances, test weights, egg grading machine test poises, displacement plungers and pipettes, shall be tested in accordance with the relevant provisions of the following Regulations—

- (a) at intervals of not more than six months; and
- (b) in the case of any standard or article of equipment which is thought not to be accurate within the relevant limit of error, before use.

Linear Measures

5.—(1) Working standard linear measures shall be tested by comparison with a local standard of equivalent length being either a separate standard or a standard marked by divisions on a longer local standard which has been certified under section 4 of the Act as being so marked.

(2) Where such a comparison reveals an error which exceeds the relevant limit specified in Table 1 in the Schedule the working standard shall not be further used until it has been so adjusted that any error is within that limit.

(a) 1963 c. 31.

(b) 1889 c. 63.

(c) S.I. 1967/1088 (1967 II, p. 3223).

Weights

6.—(1) Working standard weights shall be tested by comparison with an equivalent local standard weight.

(2) The comparison shall be made on a balance which complies with the requirements of Regulation 8 hereof and is such that the weight required to produce a displacement of one division of restpoint is less than the amount specified in Table 2 in the Schedule as the limit of error for the weight which is being tested.

(3) If the comparison reveals a difference which exceeds the relevant limit of error the weight which has been tested shall not be further used until it has been so adjusted that any error is within that limit.

Capacity Measures

7.—(1) In this Regulation, “working standard capacity measure” includes in the case of a multifiller measuring instrument every measure incorporated in that instrument.

(2) A working standard capacity measure shall be tested as a measure of the amount which it is intended to measure, or if it is subdivided to be a measure of more than one amount, as a measure of its maximum purported capacity and as a measure of at least one amount indicated by a subdivision.

(3) Such a measure shall be tested—

(a) where the test relates to an indicated imperial measurement not exceeding 1 gal or an indicated metric measurement not exceeding 5 l, by comparison with an equivalent local standard;

(b) in any other case by comparison with not more than two local standards of an equivalent total capacity or with a local standard of 1 gal or 5 l (used the requisite number of times).

(4) The accuracy of any tolerance marks adjacent to any graduation tested pursuant to paragraph (2) shall also be tested.

(5) Water shall be used for testing.

(6) Only local standards or working standards or articles of testing equipment tested in accordance with these Regulations shall be used for testing.

(7) Where testing reveals an error which exceeds the relevant limit specified in Table 3 in the Schedule, the tested measure shall not be further used until it has been so adjusted that any error is within that limit.

Balances and Beamscales

8.—(1) Balances and beamscales shall be tested by using local standard or working standard weights.

(2) Testing shall be carried out by determining—

(a) the weight required to be added to the balance or beamscale when fully loaded in order to produce one division change of restpoint;

(b) the discrepancy between the restpoint with the balance or beamscale unloaded and the mean value of the restpoints obtained before and after the interchange of loads equivalent to the full capacity, that is to say, the length of arm error; and

(c) twelve successive restpoints with the balance or beamscale fully loaded (the load being removed or replaced between the determination of each restpoint) and calculating the range of each three successive determinations.

(3) Where—

(a) the weight required to be added as aforesaid exceeds the relevant amount specified in Table 4 or Table 5 in the Schedule; or

(b) the said discrepancy exceeds 2 divisions of the scale in the case of a balance or 1 division in the case of a beamscale, or

(c) the average of the four ranges determined in accordance with paragraph 2(c) exceeds two divisions of the scale in the case of a balance or beamscale of a capacity of not less than 56 lb (imperial) or 25 kg (metric) or one division in any other case,

the relevant balance or beamscale shall not be further used as testing equipment until it has been so adjusted as to eliminate the excess.

Test Weights

9.—(1) Test weights exceeding 56 lb (imperial) or 20 kg (metric) shall be tested—

(a) by comparison on a beamscale which complies with the requirements of the Weights and Measures Regulations 1963(a) for a Class B beamscale of that capacity for use for trade; or

(b) by the method of substitution on a platform machine which complies with paragraph (4) of this Regulation.

(2) All other test weights shall be tested by the method described in head (a) of the preceding paragraph or by comparison on a beamscale which complies with the requirements of Regulation 8 hereof.

(3) Local standard weights or working standard weights or test weights of 56 lb or less (imperial) or 20 kg or less (metric) shall be used for testing test weights described in paragraph (1). Only local standard weights or working standard weights shall be used for testing other test weights.

(4) Any platform machine used for testing test weights pursuant to paragraph (1)(b) shall be such that—

(i) the indicator moves at least 3mm when, with the machine fully loaded, there is added to the load a weight of the amount specified in relation to a machine of that capacity in the second column of Table 6 in the Schedule; and

(ii) five successive tests with a load equivalent to its full capacity (the load being removed between tests) do not produce a variation in result in excess of the amount so specified in the third column of that Table.

(5) Where a test reveals an error exceeding the relevant limit specified in Table 7 in the Schedule the tested weight shall not be further used until it has been so adjusted that any error is within that limit.

Egg grading machine test poises

10.—(1) Egg grading machine test poises shall be tested by the use of a balance of a capacity not exceeding 1 lb (imperial) or 200g (metric).

(2) Where a test reveals that a poise is more than 0.75 grains too heavy or more than 0.25 grains too light it shall not be further used until it has been so adjusted that any error is within those limits.

(a) S.I. 1963/1710 (1963 III, p. 3286).

Pipettes and displacement plungers

11.—(1) Pipettes and displacement plungers shall be tested with water, the temperature of which is as near as practicable to 20° centigrade. For the purposes of any test of imperial equipment, one fluid ounce of water shall be deemed to weigh 28.3g and for the purposes of any test of metric equipment, 10 ml of water to weigh 9.97g.

(2) A pipette shall be tested as a measure of its maximum purported capacity and 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.

(3) A displacement plunger shall be tested by weighing the amount of water it displaces from a displacement vessel.

(4) The limit of error as respects a pipette shall be the relevant weight indicated in column 2 of Table 8 in relation to its maximum purported capacity.

(5) The limit of error as respects a displacement plunger shall be the relevant weight indicated in column 2 of Table 9.

(6) Where testing reveals an error which exceeds the relevant limit, the pipette or displacement plunger in question shall not be further used until it has been so adjusted that any error is within that limit.

Anthony Grant,

Parliamentary Under Secretary of State,
Department of Trade and Industry.

13th November 1970.

SCHEDULE

Symbols, abbreviations and interpretation

Symbols and abbreviations refer to units of weight and measurement as follows:—

<i>Imperial</i>	<i>Metric</i>
footft	metrem
gallongal	millimetremm
pintpt	litrel
fluid ouncefl. oz	millilitreml
poundlb	kilogrammekg
ounceoz	grammeg
graingr	milligrammemg
	carat (metric)C.M.;

and except as otherwise provided the limits of error specified in the following Tables are limits in excess or deficiency.

TABLE 1
LINEAR MEASURES

(a) *Imperial*

Working Standard of—	Limit of error, in inches
10 ft or more ...	0.2
less than 10 ft but more than 3 ft ...	0.04
3 ft or less ...	0.02

(b) *Metric*

Working Standard of—	Limit of error, in millimetres
50m	10.0
30m or 20m	7.5
10m	5.0
5m	2.5
3m	1.5
2m or 1.5m	1.0
1m or less	0.5

TABLE 2
WORKING STANDARD WEIGHTS

*Imperial System**(a) Avoirdupois weights*

Working Standard of—	Limit of error, in grains
56 lb	5.0
50 lb	4.0
28 lb	3.0
20 or 14 lb	2.0
10 lb	1.6
7, 5 or 4 lb	1.0
2 lb	0.6
1 lb, 8 or 4 oz	0.4
2 or 1 oz	0.2
8 drams or less	0.1

(b) Grain weights

Working Standard of—grains	Limit of error, in grains
20 or more	0.02
10, 5, 3, 2, 1 or 0.5	0.012
0.3	0.008
0.2	0.004
0.1	0.002
0.05 or 0.03	0.0012
0.02	0.001
0.01	0.0005

(c) Troy Weights

Working Standard of—ounces troy	Limit of error, in grains
300 or more	1.6
200 or 100	1.2
50 or 40	0.8
30 or 20	0.4
10	0.2
5, 4 or 3	0.12
2 or 1	0.08
0.5, 0.4 or 0.3	0.04
0.2, 0.1, 0.05 or 0.04... ..	0.02
0.03 or less	0.012

*Metric System**(a) Metric weights other than carat (metric) weights**(b) Carat (metric) weights*

Working Standard of—	Limit of error, in milligrammes	Working Standard of— C.M.	Limit of error, in milligrammes
20 kg	300	500 or 200	2.0
10 kg	200	100 or 50	0.8
5 kg	100	20, 10, 5, 2 or 1 ...	0.4
2 kg	60	0.5, 0.25 or 0.2 ...	0.2
1 kg	40	0.1 or less	0.08
500 or 200 g ...	20		
100 g	8		
50 g	6		
20 or 15 g	4		
10, 5, 4, 3, or 2 g;	2		
1 g, 500, 400, 300, 200, 150, 100 or 50 mg	0.8		
20 mg	0.4		
10 mg	0.2		
5 or 2 mg	0.08		
1 mg	0.04		

TABLE 3
CAPACITY MEASURES

(a) *Imperial*(b) *Metric*

Indicated capacity of, or tolerance mark relating to—	Limit of error, in millilitres	Indicated capacity of, or tolerance mark relating to—	Limit of error, in millilitres
5 gal	18.0	20 l	20.0
4 gal	15.0	10 l	12.0
3 gal	12.0	5 l	6.0
2 gal	8.0	2.5 l	5.0
1 gal	5.0	2 l	4.0
$\frac{1}{2}$ gal	4.0	1 l	2.5
1 quart	3.0	500 ml	1.5
1 pt	2.0	250 ml	1.0
$\frac{1}{2}$ pt, 8 fl. oz, $\frac{1}{3}$ pt or 6 fl. oz	1.0	200 ml	0.7
1 gill (5 fl. oz) ...	0.5	100 ml	0.4
4 fl. oz or $\frac{1}{2}$ gill ...	0.4	50 ml	0.3
$\frac{3}{4}$ gill or $\frac{1}{3}$ gill ...	0.35	25 ml	0.25
$\frac{1}{4}$ gill	0.30	20 or 10 ml... ..	0.20
$\frac{1}{8}$ gill or less ...	0.20	5 ml	0.15
		2 or 1 ml	0.10

TABLE 4

MINIMUM SENSITIVENESS OF BALANCES

Capacity of Balance	Maximum weight value per division change of restpoint
<i>(a) Imperial</i>	
56 lb	0.8 gr
Less than 56 lb but not less than 7 lb	0.24 gr
" " 7 lb " " " " 1 lb	0.04 gr
" " 1 lb " " " " 1 oz	0.004 gr
" " 1 oz	0.0004 gr
<i>(b) Metric</i>	
25 kg	15 mg
5 kg	4 mg
200 g	0.5 mg
20 g	0.025 mg

TABLE 5

MINIMUM SENSITIVENESS OF BEAMSCALES

Capacity of beamscale	Maximum weight value per division change of restpoint
<i>(a) Imperial</i>	
56 lb	8 gr
Less than 56 lb but not less than 20 lb	4 gr
" " 20 lb " " " " 14 lb	3 gr
" " 14 lb " " " " 7 lb	2.5 gr
" " 7 lb " " " " 4 lb	1.6 gr
" " 4 lb " " " " 2 lb	0.8 gr
" " 2 lb " " " " 1 lb	0.4 gr
" " 1 lb " " " " 8 oz	0.3 gr
" " 8 oz " " " " 4 oz	0.2 gr
" " 4 oz " " " " 2 oz	0.12 gr
" " 2 oz " " " " 1 oz	0.08 gr
" " 1 oz	0.04 gr
<i>(b) Metric</i>	
25 kg	500 mg
5 kg	150 mg
200 g	15 mg
20 g	2.5 mg

TABLE 6
PLATFORM MACHINES FOR TESTING TEST WEIGHTS

Capacity	Sensitiveness	Maximum variation
<i>(a) Imperial</i>		
1 ton	1 oz	1 oz
10 cwt	$\frac{1}{2}$ oz	$\frac{1}{2}$ oz
5 cwt	$\frac{1}{4}$ oz	$\frac{1}{4}$ oz
<i>(b) metric</i>		
1000 kg	28 g	28 g
500 kg	14 g	14 g
250 kg	7 g	7 g

TABLE 7
TEST WEIGHTS

Weight	Limit of Error	Weight	Limit of Error
<i>(a) Imperial</i>		<i>(b) Metric</i>	
20 cwt	3 oz*	1000 kg... ..	75 g*
10 or 9 cwt	2 oz*	500 kg	50 g*
5 or 4 cwt	1 oz*	250 or 200 kg	25 g*
2 or 1 cwt	$\frac{1}{2}$ oz*	100 or 50 kg	15 g*
56 lb	25 gr	20 kg	1.5 g
50 lb	20 gr	10 kg	1 g
28 lb	15 gr	5 kg	500 mg
20 or 14 lb	10 gr	2 kg	300 mg
10 lb	8 gr	1 kg	200 mg
7, 5 or 4 lb	5 gr	500 g	100 mg
2 lb	3 gr	200 g	50 mg
1 lb or less	2 gr	100 g	20 mg

*In excess only

TABLE 8
PIPETTES

Maximum purported capacity	Limit of error, in milligrammes (any test)
(a) <i>Imperial, fl. oz</i>	
1... ..	100
$\frac{1}{4}$ or $\frac{1}{8}$	60
(b) <i>Metric, ml</i>	
25	120
10	80
5... ..	60
2 or 1	40

TABLE 9
DISPLACEMENT PLUNGERS

Size of plunger, in fluid ounces—	Limit of error, in milligrammes
1, $\frac{1}{2}$ or $\frac{3}{8}$...	200
$\frac{1}{4}$	150

EXPLANATORY NOTE

(This Note is not part of the Regulations.)

These Regulations prescribe the methods of testing and adjusting, and the limits of error for, the working standards and testing equipment used by inspectors of weights and measures.

They replace the Working Standards and Testing Equipment (Testing and Adjustment) Regulations 1967 (S.I. 1967/1088).

Limits of error are now prescribed in relation to working standards of certain new metric weights and measures the use of which is authorised by the Weights and Measures Act (Amendment of Schedules 1 and 3) Order 1970 (S.I. 1970/1709) and some changes are made in the methods of testing various standards and items of testing equipment.

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