SCHEDULE 4

Amendment of the Measuring Container Bottles (EEC Requirements) Regulations 1977

Insertion of Schedules 2 and 3

11. After Schedule 1, insert—

"SCHEDULE 2 Regulations 2(1A), 5, 7A

(Annex I to the Directive)

1. Measuring container bottles shall be characterized by the following capacities which are always specified for a temperature of 20C:

1.1. the nominal capacity Vn is the volume which is marked on the bottle; it is the volume of liquid which the latter is deemed to contain when it is filled in the conditions of use for which it is intended;

1.2. the brim capacity of a bottle is the volume of liquid it contains when filled to the brim;

1.3. the actual capacity of a bottle is the volume of liquid it in fact contains when it is filled exactly under the conditions corresponding theoretically to the nominal capacity;

2. There are two methods of filling measuring container bottles:

(1) to a constant level,

(2) to a constant vacuity.

The distance between the theoretical filling level for the nominal capacity and the brim level and the difference between the brim capacity and the nominal capacity, known as the volume of expansion or vacuity, shall be perceptibly constant for all bottles of the same type, that is, for all bottles made to the same design.

3. The maximum permissible errors (positive or negative) in the capacity of a measuring container bottle, i.e. the greatest differences permitted (positive or negative) at a temperature of 20°C and under the control conditions laid down in Schedule 3, between the actual capacity and the nominal capacity Vn shall be in accordance with the following table:

Normal capacity V_n in millilitres	*Maximum permissible errors*	
	as a % of V_n	in millilitres
from 50 to 100	—	3
from 100 to 200	3	—
from 200 to 300	—	6
from 300 to 500	2	—
from 500 to 1 000	—	10
from 1 000 to 5 000	1	—

The maximum permissible error in the brim capacity shall be the same as the maximum permissible error in the corresponding nominal capacity.

The systematic exploitation of tolerances shall be prohibited.

4. In practice, the actual capacity of a measuring container bottle shall be checked by determining the quantity of water at 20°C which the bottle actually contains when filled to the level theoretically corresponding to the nominal capacity. It may also be checked indirectly by a method of equivalent accuracy.

5. A measuring container bottle shall bear the following indelible, easily legible and visible indications :

5.1. on its side, on the bottom rim or on the bottom:

5.1.1. an indication of its nominal capacity in litres, centilitres or millilitres in figures at least 6 mm high, if the nominal capacity is greater than 100 cl, 4 mm high if it is from 100 cl down to but not including 20 cl and 3 mm high if it is not more than 20 cl, followed by the symbol for the unit of measurement used or, where appropriate, by the name of the unit in accordance with the Units of Measurement Regulations 1986(**1**);

5.1.2. the manufacturer's identification mark referred to in regulation 6;

5.1.3. the UK marking;

5.2. On the bottom or on the bottom rim, in such a manner as to avoid confusion with the previous indication, in figures of the same minimum height as those expressing the corresponding nominal capacity, according to the method or methods of filling for which the bottle is intended:

5.2.1. an indication of the brim capacity expressed in centilitres and not followed by the symbol cl, and/or

5.2.2 an indication of the distance in millimetres from the brim level to the filling level corresponding to the nominal capacity, followed by the symbol mm.

5.3. Other indications may appear on the bottle provided they do not give rise to confusion with the compulsory indications.

SCHEDULE 3

Regulation 2(1A)

(Annex II to the Directive)

1. METHOD OF SAMPLING

1. A sample of measuring container bottles of the same design and the same manufacture shall be drawn from a batch corresponding, in principle, to an hour's production.

If the result of the check on a batch corresponding to an hour's production is not satisfactory, a second test can be carried out, based either on another sample from a batch corresponding to a longer period of production or, where production has been subject to a check recognized by the Secretary of State, on the results recorded on the manufacturers' check-cards.

The number of measuring container bottles constituting the sample shall be 35 or 40 as determined by an inspector.

2. MEASURING THE CAPACITY OF THE MEASURING CONTAINER BOTTLES CONSTITUTING THE SAMPLE

2. The measuring container bottles shall be weighed empty.

(**1**) S.I. 1986/1082 as amended by S.I. 1994/2867, S.I. 1995/1804, S.I. 2001/55 and S.I. 2009/3046.

They shall be filled with water at 20C of a known density, up to the filling level appropriate to the method of checking used.

They shall then be weighed in full.

The check shall be carried out by means of a legal measuring instrument, suitable for effecting the necessary operations.

Error in measuring the capacity shall not be greater than one-fifth of the maximum permissible error corresponding to the nominal capacity of the measuring container bottle.

3 APPLICATION OF THE RESULTS

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3.1. Use of the standard deviation method

The number of measuring container bottles in the sample is 35.

3.1.1 Calculate as follows (see 3.1.4.):

3.1.1.1. the average $\bar{x}$ of the actual capacities X_i of the bottles in the sample,

3.1.1.2. estimated standard deviation s of the actual capacities X_i of the bottles in the batch.

3.1.2. Calculate as follows:

3.1.2.1. The upper limit T_s : the sum of the indicated capacity (see Schedule 2 paragraph 5) and of the maximum permissible error corresponding to this capacity.

3.1.2.1. The lower limit T_i : the difference between the indicated capacity (see Schedule 2 paragraph 5) and the maximum permissible error corresponding to this capacity.

3.1.3. Acceptance criteria:

The batch shall be declared to comply with the Regulations if the numbers $\bar{x}$ and s verify simultaneously the following three inequations:

$$\bar{x} + k \cdot s \leq T_s$$

$$\bar{x} - k \cdot s \geq T_i$$

$$s \leq F\left(T_s - T_i\right)$$

where k = 1·57

and F = 0·266

3.1.4. Calculation of the mean value $\bar{x}$ and the estimated standard deviation s of the batch.

Calculate as follows:

— the sum of the 35 actual capacity measurements

$$x_{.} = \sum x_i$$

— the mean value of the 35 measurements

$$\bar{x} = \frac{\sum x_i}{35}$$

— the sum of the squares of the 35 measurements

$$\sum x_i^2$$

— the square of the sum of the 35 measurements

$$(\sum x_i)^2 \text{, then } \frac{(\sum x_i)^2}{35}$$

— the corrected sum:

$$SC = \sum x_i^2 - \frac{1}{35}(\sum x_i)^2$$

— the estimated variance:

$$v = \frac{SC}{34}$$

Hence the estimated standard deviation:

$$s = \sqrt{v}$$

3.2. Use of the average range method

The number of measuring container bottles in the sample is 40.

3.2.1. Calculate as follows (see 3.2.4):

3.2.1.1. the average $\bar{x}$ of the actual capacities x of the bottles in the sample,

3.2.1.2. the average range value $\bar{R}$ of the actual capacities X_i of the bottles in the sample.

3.2.2. Calculate as follows:

3.2.2.1. The upper limit T_s : the sum of the indicated capacity (see Schedule 2 paragraph 5) and of the maximum permissible error corresponding to this capacity.

3.2.2.2. The lower limit T_i : the difference between the indicated capacity (see Schedule 2 paragraph 5) and the maximum permissible error corresponding to this capacity.

3.2.3. Acceptance criterion:

The batch shall be declared to comply with the Regulations if the numbers $\bar{x}$ and $\bar{R}$ verify simultaneously the following three inequations:

$$\bar{x} + k' \cdot \bar{R} \leq T_s$$

$$\bar{x} + k' \cdot \bar{R} \geq T_i$$

$$\bar{R} \leq F' (T_s - T_i)$$

where $k' = 0{\cdot}668$,

and $F' = 0{\cdot}628$.

3.2.4. Calculation of the mean value $\bar{x}$ and of the average range $\bar{R}$ of the 40 measuring container bottles in the sample.

3.2.4.1. to obtain $\bar{x}$, calculate as follows:

— the sum of the 40 actual capacity measurements X_i:

$$\sum x_i$$

— the mean value of these 40 measurements of the 40 actual capacity measurements:

$$\bar{x} = \frac{\sum x_i}{40}$$

3.2.4.2. To obtain $\bar{R}$:

Divide the sample, in chronological order of selection, into eight sub-samples of five measuring container bottles each.

Calculate as follows:

— the range of each of the sub-samples, i.e. the difference between the actual capacity of the largest and the smallest of the five bottles in the sub-sample; eight ranges are thus obtained: R_1 ; R_2 ; . . . . . R_8

— the sum of the ranges of the eight sub-samples:

$$\sum R_i = R_1 + \bar{R}_2 + \ldots\ldots\ldots\ldots + R_8$$

The average range $\bar{R}$ is therefore:

$$\bar{R} = \frac{\sum R_i}{8}$$