SCHEDULE 1

PART 2

INSTRUMENT SPECIFIC REQUIREMENTS

Part D

Automatic Weighing Instruments

43. The relevant requirements of Part 1 and the specific requirements of this Part apply to the automatic weighing instruments set out below, intended to determine the mass of a body by using the action of gravity on that body.

Rated Operating Conditions

44. The manufacturer shall specify the rated operating conditions for the instrument as follows—

(a) For the measurand—

The measuring range in terms of its maximum and minimum capacity.

(b) For the electrical supply influence quantities—

(i) in case of AC voltage supply: the nominal AC voltage supply, or the AC voltage limits;

(ii) in case of DC voltage supply: the nominal and minimum DC voltage supply, or the DC voltage limits.

(c) For the mechanical and climatic influence quantities—

(i) the minimum temperature range is 30°C unless specified otherwise in this Part.

(ii) the mechanical environment classes according to Part 1, paragraph 3(5)(b) are not applicable. For instruments which are used under special mechanical strain, e.g. instruments incorporated into vehicles, the manufacturer shall define the mechanical conditions of use.

(d) For other influence quantities (if applicable)—

(i) the rate(s) of operation;

(ii) the characteristics of the product(s) to be weighed.

Suitability

45.—(1) Means shall be provided to limit the effects of tilt, loading and rate of operation such that maximum permissible errors (MPEs) are not exceeded in normal operation.

(2) Adequate material handling facilities shall be provided to enable the instrument to respect the MPEs during normal operation.

(3) Any operation control interface shall be clear and effective.

(4) The integrity of the display (where present) shall be verifiable by the operator.

(5) Adequate zero setting capability shall be provided to enable the instrument to respect the MPEs during normal operation.

(6) Any result outside the measurement range shall be identified as such, where a printout is possible.

Automatic Catchweighers

46.—(1) In addition to the requirements set out in paragraphs 44 and 45, the following specific requirements shall apply in relation to automatic catchweighers.

(2) Definitions—

"weight labeller" means an automatic catchweigher that labels individual articles with the weight value;

"weight/price labeller" means an automatic catchweigher that labels individual articles with the weight value, and price information.

(3) Accuracy Classes

(a) Instruments are divided into primary categories designated by X or Y as specified by the manufacturer.

(b) These categories are divided into four accuracy classes—

(i) XI, XII, XIII and XIV and

(ii) Y(I), Y(II), Y(a) and Y(b)

which shall be specified by the manufacturer.

(c) Category X applies to instruments used to check pre-packages made up in accordance with the requirements of Council Directive 75/106/EEC of 19 December 1974 on the approximation of the laws of the member States relating to the making-up by volume of certain pre-packaged liquids(**1**) and of Council Directive 76/211/EEC of 20th January 1976 on the approximation of the laws of the member States relating to the making-up by weight or by volume of certain pre-packaged products(**2**) applicable to pre-packages.

(d) The accuracy classes are supplemented by a factor (x) that qualifies the maximum permissible standard deviation as specified in sub-paragraph (3)(b).

(e) The manufacturer shall specify the factor (x), where (x) shall be ≤ 2 and in the form 1×10^k, 2×10^k or 5×10^k, where k is a negative whole number or zero.

(f) Category Y applies to all other automatic catchweighers.

(4) MPE

(a) Mean error Category X and MPE Category Y Instruments

Table 7

Net Load (m) in verification scale intervals (c)								Maximum permissible mean error	Maximum permissible error
XI	Y(1)	XII	Y(II)	XIII	Y(a)	XIV	Y(b)	X	Y
$0 < m \leq 50\ 000$		$0 < m \leq 5\ 000$		$0 < m \leq 500$		$0 < m \leq 50$		$\pm\ 0.5$ e	± 1 e
$50\ 000 < m \leq 200\ 000$		$5\ 000 < m \leq 20\ 000$		$500 < m \leq 2\ 000$		$50 < m \leq 200$		$\pm\ 1.0$ e	± 1.5 e
$200\ 000 < m$		$20\ 000 < m \leq 100\ 000$		$2\ 000 < m \leq 10\ 000$		$200 < m \leq 1\ 000$		$\pm\ 1.5$ e	$\pm\ 2$ e

(b) Standard deviation—

Maximum permissible value for the standard deviation of a class X (x) instrument is the result of the multiplication of the factor (x) by the value in Table 8 below.

Table 8

Net Load (m)	Maximum permissible standard deviation for class X(1)
m ≤ 50g	0.48%
50 g < m ≤ 100 g	0.24 g
100 g < m ≤ 200 g	0.24 %
200 g < m ≤ 300 g	0.48 g
300 g < m ≤ 500 g	0.16 %
500g < m ≤ 1 000 g	0.8 g
1 000 g < m ≤ 10 000 g	0.08 %
10 000 g < m ≤ 15 000 g	8 g
15 000 g < m	0.053 %

For class XI and XII (x) shall be less than 1.

For class XIII (x) shall be not greater than 1.

For class XIV (x) shall be greater than 1.

(c) Verification scale interval – single interval instruments

Table 9

Accuracy classes		Verification scale interval	Number of verification scale intervals n= Max/e	
			Minimum	Maximum
XI	Y(I)	0.001 g ≤ e	50 000	–
XII	Y(II)	0.001 g ≤ e ≤ 0.05 g	100	100 000
		0.1 g ≤ e	5 000	100 000
XIII	Y(a)	0.1 g ≤ e ≤ 2 g	100	10 000
		5 g ≤ e	500	10 000
XIV	Y(b)	5 g ≤ e	100	1 000

(d) Verification scale interval – multi-interval instruments

Table 10

Accuracy classes		Verification scale interval	Number of verification scale intervals n=Max/e	
			Minimum value[1] $n = Max_i/e_{(i+1)}$	Maximum $n=Max_i/e_i$
XI	Y(I)	$0.001 \text{ g} \leq e_i$	50 000	–
XII	Y(II)	$0.001 \text{ g} \leq e_i$	5 000	100 000
		0.05 g		
		$0.1 \text{ g} \leq e_i$	5 000	100 000
XIII	Y(a)	$0.1 \text{ g} \leq e_i$	500	10 000
XIV	Y(b)	$5 \text{ g} \leq e_i$	50	1 000

(1) For i = r the corresponding column of Table 9 applies with e replaced by e_r.

Where:

(i) i= 1, 2, …r

(ii) i = partial weighing range

(iii) r = total number of partial ranges

(5) Measurement Range

In specifying the measurement range for class Y instruments the manufacturer shall take account that the minimum capacity shall not be less than:

(a) class Y(I): 100 e

(b) class Y(II): 20 e for $0.001 \text{ g} \leq e \leq 0.05 \text{ g}$, and 50 e for $0.1 \text{ g} \leq e$

(c) class Y(a): 20 e

(d) class Y(b): 10 e

(e) Scales used for grading, e.g. postal scales and garbage weighers: 5 e

(6) Dynamic setting

(a) The dynamic setting facility shall operate within a load range specified by the manufacturer.

(b) When fitted, a dynamic setting facility that compensates for the dynamic effects of the load in motion shall be inhibited from operating outside the load range, and shall be capable of being secured.

(7) Performance under influence factors and electromagnetic disturbances

(a) The MPEs due to influence factors are—

(i) For category X instruments—

(aa) for automatic operation, as specified in Tables 7 and 8;

(bb) for static weighing in non-automatic operation, as specified in Table 7.

(ii) For category Y instruments—

(aa) for each load in automatic operation, as specified in Table 7;

(bb) for static weighing in non-automatic operation, as specified in category X in Table 7.

(b) The critical change value due to a disturbance is one verification scale interval.

(c) Temperature range

(i) For class XI and Y(I) the minimum range is 5° C.

(ii) For class XII and Y(II) the minimum range is 15° C.

Automatic gravimetric filling instruments

47.—(1) In addition to the requirements set out in paragraphs 44 and 45, the following specific requirements shall apply in relation to automatic gravimetric filling instruments.

(2) Accuracy classes

(a) The manufacturer shall specify both the reference accuracy class Ref(x), and the operational accuracy class(es) X(x).

(b) An instrument type is designated a reference accuracy class Ref(x), corresponding to the best possible accuracy for instruments of the type. After installation, individual automatic gravimetric filling instruments are designed for one or more operational accuracy classes, X(x), having taken account of the specific products to be weighed. The class designation factor (x) shall be $\leq$, and in the form 1×10^k, 2×10^k or 5×10^k where k is a negative whole number or zero.

(c) The reference accuracy class, Ref(x) is applicable for static loads.

(d) For the operational accuracy class X(x), X is a regime relating accuracy to load weight and (x) is a multiplier for the limits of error specified for class X(1) in sub-paragraph 3(b)

(3) MPE

(a) Static weighing error

(i) For static loads under rated operating conditions, the MPE for reference accuracy class Ref(x), shall be 0.312 of the maximum permissible deviation of each fill from the average: as specified in Table 11; multiplied by the class designation factor (x).

(ii) For instruments where the fill may be made up from more than one load (e.g. cumulative or selective combination weighers) the MPE for static loads shall be the accuracy required for the fill as specified in sub-paragraph (3)(b) (i.e. not the sum of the maximum permissible deviation for the individual loads).

(b) Deviation from average fill

Table 11

Value of the mass of the fills (m) in grams	Maximum permissible deviation of each fill from the average for class X(1)
m ≤ 50	7.2%
50 < m ≤ 100	3.6 grams
100 < m ≤ 200	3.6 %
200 < m ≤ 300	7.2 grams
300 < m ≤ 500	2.4 %

Value of the mass of the fills (m) in grams	Maximum permissible deviation of each fill from the average for class X(1)
500 < m ≤ 1 000	12 grams
1 000 < m ≤ 10 000	1.2 %
10 000 < m ≤ 15 000	120 grams
15 000 < m	0.8 %

Note: The calculated deviation of each fill from the average may be adjusted to take account of the effect of material particle size

    (c) Error relative to pre-set value (setting errors)

        For automatic gravimetric filling instruments where it is possible to pre-set a fill weight, the maximum difference between the pre-set value and the average mass of the fills shall not exceed 0.312 of the maximum permissible deviation of each fill from the average, as specified in Table 11.

(4) Performance Under Influence Factor and Electromagnetic Disturbance

    (a) The MPE due to influence factors shall be as specified in sub-paragraph (3)(a).

    (b) The critical change value due to a disturbance is a change of the static weight indication equal to the MPE as specified in sub-paragraph (3)(a) calculated for the rated minimum fill, or a change that would give equivalent effect on the fill in the case of instruments where the fill consists of multiple loads. The calculated critical change value shall be rounded to the next higher scale interval (d).

    (c) The manufacturer shall specify the value of the rated minimum fill.

Discontinuous Totalisers

    48.—(1) In addition to the requirements set out in paragraphs 44 and 45, the following specific requirements shall apply in relation to discontinuous totalisers.

(2) Accuracy Classes

Discontinuous totalisers are divided into four accuracy classes, as follows—

        (i) 0.2;

        (ii) 0.5;

        (iii) 1; and

        (iv) 2.

(3) MPE

Table 12

Accuracy class	MPE of Totalised load
0.2	± %
0.5	± %
1	± %
2	± %

(4) Totalisation scale interval

The totalisation scale interval (d_t) shall be in the range:

$$0.01 \% \text{ Max} \leq d_t \leq \% \text{ Max}$$

(5) Minimum Totalised Load (Σ_{min})

The minimum totalised load (Σ_{min}) shall be not less than the load at which the MPE is equal to the totalisation scale interval (d_t) and not less than the minimum load as specified by the manufacturer.

(6) Zero Setting

Instruments that do not tare weigh after each discharge shall have a zero setting device. Automatic operation shall be inhibited if zero indication varies by—

(a) 1 d_t on instruments with automatic zero setting device; or

(b) 0.5 d_t on instruments with a semi-automatic, or non-automatic, zero setting device.

(7) Operator Interface

Operator adjustments and reset function shall be inhibited during automatic operation.

(8) Printout

On instruments equipped with a printing device, the reset of the total shall be inhibited until the total is printed. The printout of the total shall occur if automatic operation is interrupted.

(9) Performance under influence factors and electromagnetic disturbances

(a) The MPE due to influence factors shall be as specified in Table 13.

Table 13

Load (m) in totalisation scale intervals d_t	MPE
$0 < m \leq 500$	$\pm d_t$
$500 < m \leq 2\ 000$	$\pm d_t$
$2\ 000 < m \leq 10\ 000$	$\pm d_t$

(b) The critical change value due to a disturbance is one totalisation scale interval for any weight indication and any stored total.

Continuous Totalisers

49.—(1) In addition to the requirements set out in paragraphs 44 and 45, the following specific requirements shall apply in relation to continuous totalisers.

(2) Accuracy Classes

Continuous totalisers are divided into three accuracy classes, as follows—

(a) 0.5;

(b) 1; and

(c) 2.

(3) Measurement Range

(a) The manufacturer shall specify the measurement range, the ratio between the minimum net load on the weighing unit and the maximum capacity, and the minimum totalised load.

(b) The minimum totalised load Σ_{min} shall not be less than—

(i) 800 d for class 0.5,

(ii) 400 d for class 1,

(iii) 200 d for class 2,

where d is the totalisation scale interval of the general totalisation device.

(4) MPE

Table 14

Accuracy class	MPE for totalised load
0.5	± 0.25%
1	± 0.5%
2	± 1.0%

(5) Speed of the Belt

The speed of the belt shall be specified by the manufacturer. For single-speed beltweighers, and variable-speed beltweighers having a manual speed setting control, the speed shall not vary by more than 5% of the nominal value. The product shall not have a different speed than the speed of the belt.

(6) General Totalisation Device

It shall not be possible to reset the general totalisation device to zero.

(7) Performance under influence factor and electromagnetic disturbance

(a) The MPE due to influence factor, for a load not less than Σ_{min}, shall be 0.7 times the appropriate value specified in Table 14, rounded to the nearest totalisation scale interval (d).

(b) The critical change value due to a disturbance shall be 0.7 times the appropriate value specified in Table 14, for a load equal to Σ_{min}, for the designated class of beltweigher, rounded up to the next higher totalisation scale interval (d).

Automatic Rail-weighbridges

50.—(1) In addition to the requirements set out in paragraphs 44 and 45, the following specific requirements shall apply in relation to automatic rail-weighbridges.

(2) Accuracy classes

Automatic rail-weighbridges are divided into four accuracy classes as follows:

(i) 0.2;

(ii) 0.5;

(iii) 1; and

(iv) 2.

(3) MPE

(a) The MPEs for weighing-in-motion of a single wagon or a total train are shown in Table 15.

Table 15

Accuracy class	MPE
0.2	± 0.1 %
0.5	± 0.25 %

Accuracy class	MPE
1	± 0.5 %
2	± 1.0 %

(b) The MPEs for the weight of coupled or uncoupled wagons weighing-in-motion shall be one of the following values, whichever is the greatest:

    (i) the value calculated according to Table 15, rounded to the nearest scale interval;

    (ii) the value calculated according to Table 15, rounded to the nearest scale interval for a weight equal to 35% of the maximum wagon weight (as inscribed on the descriptive markings);

    (iii) one scale interval (d).

(c) The MPEs for the weight of train weighing-in-motion shall be one of the following values, whichever is the greatest:

    (i) the value calculated according to Table 15, rounded to the nearest scale interval;

    (ii) the value calculated according to Table 15, for the weight of a single wagon equal to 35% of the maximum wagon weight (as inscribed on the descriptive markings) multiplied by the number of reference wagons (not exceeding 10) in the train, and rounded to the nearest scale interval;

    (iii) one scale interval (d) for each wagon in the train, but not exceeding 10 d.

(d) When weighing coupled wagons; the errors of not more than 10% of the weighing results taken from one or more passes of the train may exceed the appropriate MPE given in paragraph 3(b), but shall not exceed twice the MPE.

(4) Scale interval (d)

The relationship between the accuracy class and the scale interval shall be as specified in Table 16.

Table 16

Accuracy class	Scale interval (d)
0.2	d ≤ 50 kg
0.5	d ≤ 100 kg
1	d ≤ 200 kg
5	d ≤ 500 kg

(5) Measurement range

(a) The minimum capacity shall not be less than 1 t, and not greater than the value of the result of the minimum wagon weight divided by the number of partial weighings.

(b) The minimum wagon weight shall not be less than 50 d.

(6) Performance under influence factor and electromagnetic disturbance

(a) The MPE due to an influence factor shall be as specified in Table 17.

Table 17

Load (m) in verification scale intervals (d)	MPE
0 < m ≤ 500	± 0.5 d

Load (m) in verification scale intervals (d)	MPE
500 < m ≤ 2 000	± 1.0 d
2 000 < m ≤ 10 000	± 1.5 d

(b) The critical change value due to a disturbance is one scale interval.