Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (recast) (Text with EEA relevance)

ANNEX VIII

AUTOMATIC WEIGHING INSTRUMENTS (MI-006)

The relevant essential requirements of Annex I, the specific requirements of this Annex and the conformity assessment procedures listed in Chapter I of this Annex, apply to automatic weighing instruments defined below, intended to determine the mass of a body by using the action of gravity on that body.

DEFINITIONS

Automatic weighing instrument	An instrument that determines the mass of a product without the intervention of an operator and follows a predetermined programme of automatic processes characteristic of the instrument.
Automatic catchweigher	An automatic weighing instrument that determines the mass of pre-assembled discrete loads (for example prepackages) or single loads of loose material.
Automatic checkweigher	An automatic catchweigher that subdivides articles of different mass into two or more subgroups according to the value of the difference of their mass and a nominal set-point.
Weight labeller	An automatic catchweigher that labels individual articles with the weight value.
Weight/price labeller	An automatic catchweigher that labels individual articles with the weight value, and price information.
Automatic gravimetric filling instrument	An automatic weighing instrument that fills containers with a predetermined and virtually constant mass of product from bulk.
Discontinuous totaliser (totalising hopper weigher)	An automatic weighing instrument that determines the mass of a bulk product by dividing it into discrete loads. The mass of each discrete load is determined in sequence and summed. Each discrete load is then delivered to bulk.
Continuous totaliser	An automatic weighing instrument that continuously determines the mass of a bulk product on a conveyor belt, without systematic subdivision of the product and without interrupting the movement of the conveyor belt.
Rail-weighbridge	An automatic weighing instrument having a load receptor inclusive of rails for conveying railway vehicles.

SPECIFIC REQUIREMENTS

CHAPTER I

Requirements common to all types of automatic weighing instruments

1. **Rated Operating Conditions**

The manufacturer shall specify the rated operating conditions for the instrument as follows:

1.1. For the measurand:

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

1.2. For the electrical supply influence quantities:

In case of AC voltage supply	:	the nominal AC voltage supply, or the AC voltage limits.
In case of DC voltage supply	:	the nominal and minimum DC voltage supply, or the DC voltage limits.

1.3. For the mechanical and climatic influence quantities:

The minimum temperature range is 30 °C unless specified otherwise in the following chapters of this Annex.

The mechanical environment classes according to Annex I, point 1.3.2 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.

1.4. For other influence quantities (if applicable):

The rate(s) of operation.

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

2. **Permissible effect of disturbances — Electromagnetic environment**

The required performance and the critical change value are given in the relevant Chapter of this Annex for each type of instrument.

3. **Suitability**

3.1. 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.

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

3.3. Any operator control interface shall be clear and effective.

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

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

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

4. **Conformity assessment**

The conformity assessment procedures referred to in Article 17 that the manufacturer can choose between are:

For mechanical systems:

B + D or B + E or B + F or D1 or F1 or G or H1.

For electromechanical instruments:

B + D or B + E or B + F or G or H1.

For electronic systems or systems containing software:

B + D or B + F or G or H1.

CHAPTER II

Automatic Catchweighers

1. **Accuracy Classes**

1.1. Instruments are divided into primary categories designated by:

X or Y

as specified by the manufacturer.

1.2. These primary categories are further divided into four accuracy classes:
XI, XII, XIII & XIIII

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

which shall be specified by the manufacturer.

2. **Category X Instruments**

2.1. Category X applies to instruments used to check prepackages made up in accordance with the requirements of Council Directive 76/211/EEC of 20 January 1976 on the approximation of the laws of the Member States relating to the making-up by weight or by volume of certain prepackaged products[(1)] applicable to prepackages.

2.2. The accuracy classes are supplemented by a factor (x) that quantifies the maximum permissible standard deviation as specified in point 4.2.

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.

3. **Category Y Instruments**

Category Y applies to all other automatic catchweighers.

4. **MPE**

4.1. *Mean error Category X/MPE Category Y instruments*

TABLE 1

Net Load (m) in verification scale intervals (e)								**Maximum permissible mean error**	**Maximum permissible error**
XI	**Y(I)**	**XII**	**Y(II)**	**XIII**	**Y(a)**	**XIIII**	**Y(b)**	**X**	**Y**
0 < m ≤ 50 000		0 < m ≤ 5 000		0 < m ≤ 500		0 < m ≤ 50		± 0,5 e	± 1 e
50 000 < m ≤ 200 000		5 000 < m ≤ 20 000		500 < m ≤ 2 000		50 < m ≤ 200		± 1,0 e	± 1,5 e
200 000 < m		20 000 < m ≤ 100 000		2 000 < m ≤ 10 000		200 < m ≤ 1 000		± 1,5 e	± 2 e

4.2. *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 2 below.

TABLE 2

Net Load (m)	**Maximum permissible standard deviation for class X(1)**
m ≤ 50 g	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 %
500 g < 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 XIIII (x) shall be greater than 1.

4.3. *Verification scale interval — single interval instruments*

TABLE 3

Accuracy classes	**Verification scale interval**	**Number of verification scale intervals**

			$n = \text{Max} / e$	
			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
XIIII	Y(b)	5 g ≤ e	100	1 000

4.4. *Verification scale interval — multi-interval instruments*

TABLE 4

Accuracy classes		**Verification scale interval**	**Number of verification scale intervals** $n = \text{Max} / e$	
			Minimum value[a] $n = \text{Max}_i / e_{(i+1)}$	**Maximum value** $n = \text{Max}_i / e_i$
XI	Y(I)	0,001 g ≤ e_i	50 000	—
XII	Y(II)	0,001 g ≤ e_i ≤ 0,05 g	5 000	100 000
		0,1 g ≤ e_i	5 000	100 000
XIII	Y(a)	0,1 g ≤ e_i	500	10 000
XIIII	Y(b)	5 g ≤ e_i	50	1 000

a For i = r the corresponding column of Table 3 applies with e replaced by e_r.

Where:

i = 1, 2, … r
i = partial weighing range
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:

class Y(I)	:	100 e
class Y(II)	:	20 e for 0,001 g ≤ e ≤ 0,05 g, and 50 e for 0,1 g ≤ e
class Y(a)	:	20 e

class Y(b)	:	10 e
Scales used for grading, e.g. postal scales and garbage weighers	:	5 e

6. **Dynamic Setting**

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

6.2. 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**

7.1. The MPEs due to influence factors are:

7.1.1. For category X instruments:
— For automatic operation; as specified in Tables 1 and 2,
— For static weighing in non-automatic operation; as specified in Table 1.

7.1.2. For category Y instruments
— For each load in automatic operation; as specified in Table 1,
— For static weighing in non-automatic operation; as specified for category X in Table 1.

7.2. The critical change value due to a disturbance is one verification scale interval.

7.3. Temperature range:
— For class XI and Y(I) the minimum range is 5 °C,
— For class XII and Y(II) the minimum range is 15 °C.

CHAPTER III

Automatic Gravimetric Filling Instruments

1. **Accuracy classes**

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

1.2. 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 instruments are designated 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 ≤ 2, and in the form 1×10^k, 2×10^k or 5×10^k where k is a negative whole number or zero.

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

1.4. 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 point 2.2.

2. **MPE**

2.1. *Static weighing error*

2.1.1. 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 5; multiplied by the class designation factor (x).

2.1.2. 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 point 2.2 (i.e. not the sum of the maximum permissible deviation for the individual loads).

2.2. *Deviation from average fill*

TABLE 5

Value of the mass, m (g), of the fills	**Maximum permissible deviation of each fill from the average for class X(1)**
$m \leq 50$	7,2 %
$50 < m \leq 100$	3,6 g
$100 < m \leq 200$	3,6 %
$200 < m \leq 300$	7,2 g
$300 < m \leq 500$	2,4 %
$500 < m \leq 1\,000$	12 g
$1\,000 < m \leq 10\,000$	1,2 %
$10\,000 < m \leq 15\,000$	120 g
$15\,000 < m$	0,8 %

Note:

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

2.3. *Error relative to pre-set value (setting error)*

For 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 5.

3. **Performance Under Influence Factor And Electromagnetic Disturbance**

3.1. The MPE due to influence factors shall be as specified in point 2.1.

3.2. The critical change value due to a disturbance is a change of the static weight indication equal to the MPE as specified in point 2.1 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).

3.3. The manufacturer shall specify the value of the rated minimum fill.

CHAPTER IV

Discontinuous Totalisers

1. Accuracy Classes

Instruments are divided into four accuracy classes as follows: 0,2; 0,5; 1; 2.

2. MPEs

TABLE 6

Accuracy class	MPE of totalised load
0,2	± 0,10 %
0,5	± 0,25 %
1	± 0,50 %
2	± 1,00 %

3. Totalisation scale interval

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

0,01 % Max ≤ d_t ≤ 0,2 % Max

4. 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.

5. 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:

— 1 d_t on instruments with automatic zero setting device;

— 0,5 d_t on instruments with a semi-automatic, or non-automatic, zero setting device.

6. Operator Interface

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

7. 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.

8. Performance under influence factors and electromagnetic disturbances

8.1. The MPEs due to influence factors shall be as specified in Table 7.

Table 7

Load (m) in totalisation scale intervals (d_t)	MPE

Table 7	
$0 < m \leq 500$	$\pm 0{,}5\ d_t$
$500 < m \leq 2\ 000$	$\pm 1{,}0\ d_t$
$2\ 000 < m \leq 10\ 000$	$\pm 1{,}5\ d_t$

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

CHAPTER V

Continuous Totalisers

1. Accuracy classes

Instruments are divided into three accuracy classes as follows: 0,5; 1; 2.

2. Measurement Range

2.1. 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.

2.2. The minimum totalised load Σ_{min} shall not be less than
800 d for class 0.5,
400 d for class 1,
200 d for class 2.

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

3. MPE

TABLE 8

Accuracy class	MPE for totalised load
0,5	± 0,25 %
1	± 0,5 %
2	± 1,0 %

4. 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.

5. General Totalisation Device

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

6. **Performance under influence factors and electromagnetic disturbances**

6.1. The MPE due to influence factor, for a load not less than the Σ_{min}, shall be 0,7 times the appropriate value specified in Table 8, rounded to the nearest totalisation scale interval (d).

6.2. The critical change value due to a disturbance shall be 0,7 times the appropriate value specified in Table 8, for a load equal to Σ_{min}, for the designated class of the beltweigher; rounded up to the next higher totalisation scale interval (d).

CHAPTER VI

Automatic Rail Weighbridges

1. **Accuracy classes**

Instruments are divided into four accuracy classes as follows:

0,2; 0,5; 1; 2.

2. **MPE**

2.1. The MPEs for weighing-in-motion of a single wagon or a total train are shown in Table 9.

Table 9

Accuracy class	**MPE**
0,2	± 0,1 %
0,5	± 0,25 %
1	± 0,5 %
2	± 1,0 %

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

— the value calculated according to Table 9, rounded to the nearest scale interval;

— the value calculated according to Table 9, rounded to the nearest scale interval for a weight equal to 35 % of the maximum wagon weight (as inscribed on the descriptive markings);

— one scale interval (d).

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

— the value calculated according to Table 9, rounded to the nearest scale interval;

— the value calculated according to Table 9, 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;

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

2.4. 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 point 2.2, but shall not exceed twice the MPE.

3. **Scale interval (d)**

The relationship between the accuracy class and the scale interval shall be as specified in Table 10.

TABLE 10

Accuracy class	**Scale interval (d)**
0,2	$d \leq 50$ kg
0,5	$d \leq 100$ kg
1	$d \leq 200$ kg
2	$d \leq 500$ kg

4. **Measurement range**

4.1. 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.

4.2. The minimum wagon weight shall not be less than 50 d.

5. **Performance under influence factor and electromagnetic disturbance**

5.1. The MPE due to an influence factor shall be as specified in Table 11.

Table 11

Load (m) in verification scale intervals (d)	**MPE**
$0 < m \leq 500$	± 0,5 d
$500 < m \leq 2\,000$	± 1,0 d
$2\,000 < m \leq 10\,000$	± 1,5 d

5.2. The critical change value due to a disturbance is one scale interval.

(**1**) OJ L 46, 21.2.1976, p. 1.