

SCHEDULE 1

Regulations 2(1) and 14(a)

ESSENTIAL REQUIREMENTS

1. The essential requirements are the relevant requirements relating to automatic rail-weighbridges contained in Annex I and Annex MI-006, set out in this Schedule.

Definitions

2. In this Schedule—

“climatic environments” means the conditions in which automatic rail-weighbridges may be used;

“critical change value” means the value at which the change in the measurement result is considered undesirable;

“disturbance” means an influence quantity having a value within the limits specified in the appropriate requirement but outside the specified rated operating conditions of the instrument. An influence quantity is a disturbance if for that influence quantity the rated operating conditions are not specified;

“influence quantity” means a quantity that is not the measurand but that affects the result of measurement;

“measurand” means the particular quantity subject to measurement; and

“rated operating conditions” means the values for the measurand and influence quantities making up the normal working conditions of an instrument.

Allowable Errors

3.—(1) Under rated operating conditions and in the absence of a disturbance, the error of measurement shall not exceed the maximum permissible error (MPE) value set out in paragraph 17.

(2) MPE is expressed as a bilateral value of the deviation from the true measurement value.

(3) Under rated operating conditions and in the presence of a disturbance, the performance requirement shall be as set out in paragraph 20.

(4) Where the automatic rail-weighbridge is intended to be used in a specified permanent continuous electromagnetic field the permitted performance during the radiated electromagnetic field-amplitude modulated test shall be within MPE.

(5) The manufacturer shall specify the climatic and electromagnetic environments in which the instrument is intended to be used, power supply and other influence quantities likely to affect its accuracy, taking account of the requirements in this Schedule.

(a) Climatic environments—

The manufacturer shall specify the temperature range of the automatic rail-weighbridge. The minimum temperature range is 30°C and shall be within the upper temperature limit of 70°C and the lower temperature limit of -40°C. The manufacturer shall indicate whether the instrument is designed for condensing or non-condensing humidity as well as the intended location for the instrument, i.e. open or closed.

(b) Electromagnetic environments—

(i) Electromagnetic environments are classified into classes E1 and E2 as follows—

E1: This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in residential, commercial and light industrial buildings.

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- E2: This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.
- (ii) The following influence quantities shall be considered in relation with electromagnetic environments—
 - (aa) voltage interruptions;
 - (bb) short voltage reductions;
 - (cc) voltage transients on supply lines and/or signal lines;
 - (dd) electrostatic discharges;
 - (ee) radio frequency electromagnetic fields;
 - (ff) conducted radio frequency electromagnetic fields on supply lines and/or signal lines;
 - (gg) surges on supply lines and/or signal lines.
 - (6) Other influence quantities to be considered, where appropriate, are—
 - (a) voltage variation;
 - (b) mains frequency variation;
 - (c) power frequency magnetic fields;
 - (d) any other quantity likely to influence in a significant way the accuracy of the instrument.
 - (7) When carrying out the tests as envisaged in these Regulations, the following paragraphs apply—
 - (a) Basic rules for testing and the determination of errors—
 - (i) Essential requirements specified in sub-paragraphs (1) to (4) shall be verified for each relevant influence quantity. These essential requirements apply when each influence quantity is applied and its effect evaluated separately, all other influence quantities being kept relatively constant at their reference value.
 - (ii) Metrological tests shall be carried out during or after the application of the influence quantity, whichever condition corresponds to the normal operational status of the instrument when that influence quantity is likely to occur.
 - (b) Ambient humidity—
 - (i) According to the climatic operating environment in which the automatic rail-weighbridge is intended to be used either the damp heat-steady state (non-condensing) or damp heat cyclic (condensing) test may be appropriate.
 - (ii) The damp heat cyclic test is appropriate where condensation is important or when penetration of vapour will be accelerated by the effect of breathing. In conditions where non-condensing humidity is a factor the damp-heat steady state is appropriate.

Reproducibility

4. The application of the same measurand in a different location or by a different user, all other conditions being the same, shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

Repeatability

5. The application of the same measurand under the same conditions of measurement shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

Discrimination and Sensitivity

6. An automatic rail-weighbridge shall be sufficiently sensitive and the discrimination threshold shall be sufficiently low for the intended measurement task.

Durability

7. An automatic rail-weighbridge shall be designed to maintain an adequate stability of its metrological characteristics over a period of time estimated by the manufacturer, provided that it is properly installed, maintained and used according to the manufacturer's instruction when in the environmental conditions for which it is intended.

Reliability

8. An automatic rail-weighbridge shall be designed to reduce as far as possible the effect of a defect that would lead to an inaccurate measurement result, unless the presence of such a defect is obvious.

Suitability

9.—(1) An automatic rail-weighbridge shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.

(2) An automatic rail-weighbridge shall be suitable for its intended use taking account of the practical working conditions and shall not require unreasonable demands of the user in order to obtain a correct measurement result.

(3) Where an automatic rail-weighbridge is designed for the measurement of values of the measurand that are constant over time, the instrument shall be insensitive to small fluctuations of the value of the measurand, or shall take appropriate action.

(4) An automatic rail-weighbridge shall be robust and its materials of construction shall be suitable for the conditions in which it is intended to be used.

(5) An automatic rail-weighbridge shall be designed so as to allow the control of the measuring tasks after the instrument has been placed on the market and put into use. If necessary, special equipment or software for this control shall be part of the instrument. The test procedure shall be described in the operation manual.

(6) When an instrument has associated software which provides other functions besides the measuring function, the software that is critical for the metrological characteristics shall be identifiable and shall not be inadmissibly influenced by the associated software.

(7) 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.

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

(9) Any operator control interface shall be clear and effective.

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

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

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

Protection against corruption

10.—(1) The metrological characteristics of an automatic rail-weighbridge shall not be influenced in any inadmissible way by the connection to it of another device, by any feature of the connected device itself or by any remote device that communicates with the instrument.

(2) A hardware component that is critical for metrological characteristics shall be designed so that it can be secured. Security measures foreseen shall provide for evidence of an intervention.

(3) Software that is critical for metrological characteristics shall be identified as such and shall be secured.

(4) Software identification shall be easily provided by the instrument.

(5) Evidence of a software intervention shall be available for a reasonable period of time.

(6) Measurement data, software that is critical for measurement characteristics and metrologically important parameters stored or transmitted shall be adequately protected against accidental or intentional corruption.

Information to be borne by and to accompany the instrument

11.—(1) An automatic rail-weighbridge shall bear the following inscriptions—

- (a) manufacturer's mark or name;
- (b) information in respect of its accuracy,

plus, when applicable—

- (c) information in respect of the conditions of use;
- (d) measuring capacity;
- (e) measuring range;
- (f) identity marking;
- (g) number of the EC-type examination certificate or the EC design examination certificate;
- (h) information whether or not additional devices providing metrological results comply with these Regulations.

(2) The automatic rail-weighbridge shall be accompanied by information on its operation, unless the simplicity of the instrument makes this unnecessary. Information shall be easily understandable and shall include where relevant—

- (a) rated operating conditions;
- (b) electromagnetic environment classes;
- (c) the upper and lower temperature limit, whether condensation is possible or not, open or closed location;
- (d) instructions for installation, maintenance, repairs, permissible adjustments;
- (e) instructions for correct operation and any special conditions of use; and
- (f) conditions for compatibility with interfaces or other measuring instruments.

(3) Groups of identical automatic rail-weighbridges used in the same location do not necessarily require individual instruction manuals.

(4) The scale interval for a measured value shall be in the form 1×10^n , 2×10^n or 5×10^n , where n is any integer or zero. The unit of measurement or its symbol shall be shown close to the numerical value.

(5) The units of measurement used and their symbols shall be in accordance with the provisions of Community legislation on units of measurement and their symbols.

(6) All marks and inscriptions required under any requirement shall be clear, non-erasable, unambiguous and non-transferable.

Indication of result

12.—(1) Indication of the result shall be by means of a display or hard copy.

(2) The indication of any result shall be clear and unambiguous and accompanied by such marks and inscriptions necessary to inform the user of the significance of the result. Easy reading of the presented result shall be permitted under normal conditions of use. Additional indications may be shown provided they cannot be confused with the metrologically controlled indications.

(3) In the case of hard copy the print or record shall also be easily legible and non-erasable.

Further processing of data to conclude the trading transaction

13.—(1) An automatic rail-weighbridge shall record by a durable means the measurement result accompanied by information to identify the particular transaction, when—

(a) the measurement is non-repeatable; and

(b) the instrument is normally intended for use in the absence of one of the trading parties.

(2) Additionally, a durable proof of the measurement result and the information to identify the transaction shall be available on request at the time the measurement is concluded.

Conformity evaluation

14. An automatic rail-weighbridge shall be designed so as to allow ready evaluation of its conformity with the appropriate requirements of these Regulations.

Rated Operating Conditions

15. 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 influence quantities—

where the instrument is 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.

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Accuracy classes

16. Automatic rail-weighbridges are divided into four accuracy classes as follows—

- (a) 0.2;
- (b) 0.5;
- (c) 1; and
- (d) 2.

MPE

17.—(1) The MPEs for weighing-in-motion of a single wagon or a total train are shown in Table 1.

Table 1

<i>Accuracy class</i>	<i>MPE</i>
0.2	± 0.1%
0.5	± 0.25%
1	± 0.5%
2	± 1.0%

(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—

- (a) the value calculated according to Table 1, rounded to the nearest scale interval;
- (b) the value calculated according to Table 1, rounded to the nearest scale interval for a weight equal to 35% of the maximum wagon weight (as inscribed on the descriptive markings);
- (c) one scale interval (d).

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

- (a) the value calculated according to Table 1, rounded to the nearest scale interval;
- (b) the value calculated according to Table 1, 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;
- (c) one scale interval (d) for each wagon in the train, but not exceeding 10 d.

(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 sub-paragraph (2), but shall not exceed twice the MPE.

Scale interval (d)

18. The relationship between the accuracy class and the scale interval shall be as specified in Table 2.

Table 2

<i>Accuracy class</i>	<i>Scale interval (d)</i>
0.2	d ≤ 50 kg

<i>Accuracy class</i>	<i>Scale interval (d)</i>
0.5	$d \leq 100 \text{ kg}$
1	$d \leq 200 \text{ kg}$
2	$d \leq 500 \text{ kg}$

Measurement range

19.—(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.

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

Performance under influence factor and electromagnetic disturbance

20.—(1) The MPE due to an influence factor shall be as specified in Table 3.

Table 3

<i>Load (m) in verification scale intervals (d)</i>	<i>MPE</i>
$0 < m \leq 500$	$\leq 0.5 \text{ d}$
$500 < m \leq 2000$	$\leq 1.0 \text{ d}$
$2000 < m \leq 10000$	$\leq 1.5 \text{ d}$

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