

## Regulation on requirements to continuous totalisers

Established by the Norwegian Metrology Service dd.dd.yyyy in accordance with the Units of measurement, measurement and standard time Act of 26 January 2007 no 4 § 35, cf. § 7 and § 10, and § 8, § 19, § 20 and § 30 and regulation December 20th 2007 no. 1723 on measuring units and measurements § 3-3, § 3-6, § 5-2 second subsection.

### Chapter 1 – Introductory provisions

#### § 1. Scope

The regulation applies to

- a) continuous totalisers which are sold or offered for sale, cf. regulation December 20<sup>th</sup> 2007 no. 1723 on measuring units and measurements § 3-1
- b) continuous totalisers when the measurement result will be used in economic transactions, cf. regulation December 20<sup>th</sup> 2007 no. 1723 on measuring units and measurements § 3-4.

The regulation does not apply to continuous totalisers which are installed on a mobil device which is used in economic transactions for crushing of mass from rocks and soil in the mineral industry, when the measurement result is used in economic transactions.

#### § 2. Definitions

In this regulation, the following definitions apply:

- a) *Continuous totalisers*: 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.
- b) *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
- c) *Measurand*: the particular quantity subject to measurement
- d) *Influence quantity*: A quantity that is not the measurand but that affects the result of measurement
- e) *Rated operating conditions*: The values for the measurand and influence quantities making up the normal working conditions of an instrument
- f) *Disturbance*: An influence quantity having a value within the limits specified in the appropriate requirement but outside the specified rated operating conditions of the measuring instrument. An influence quantity is a disturbance if for that influence quantity the rated operating conditions are not specified.
- g) *Critical change value*: The value at which the change in the measurement result is considered undesirable.

- h) *Climatic environments*: The conditions in which measuring instruments may be used. To cope with climatic differences between the Member States of the EEC, a range of temperature limits has been defined.

### **§ 3. Requirements to continuous totalisers**

Continuous totalisers shall as a minimum fulfill the essential requirements established in chapter 2. Maximal permissible errors on sale of continuous totalisers is established in § 30. Maximal permissible errors of continuous totalisers in service is established in § 31.

Continuous totalisers which have been national type examined during a former legislation, shall in service fulfill the requirements which applied when the continuous totaliser was national type examined, including the requirements for measurement accuracy in service.

Continuous totalisers which are not lawfully conformity marked or has a valid national type examination and national verification, is not allowed in service.

### **§ 4. Surveillance and approval of sale of continuous totalisers**

Continuous totalisers which are sold or offered for sale shall have a valid conformity assessment according to the provisions in regulation on measuring units and measurements chapter 4.

Continuous totalisers which are national type examined according to the general national regulation 03/96, can have a national verification according to this up to and including the year 2010. The national verification shall in such cases be carried out according to the rules about national conformity assessment in regulation on measuring units and measurements § 4-7 to § 4-9. This only applies if the national type examination for the relevant weight is maximum 10 years when the weight has a national verification.

### **§ 5. Surveillance of a continuous totaliser in service**

A continuous totaliser is subject to periodic surveillance. The surveillance period for a continuous totaliser with capacity up to and including 200 tons per hour, is one year. The surveillance period for a continuous totaliser with capacity over 200 tons, is three years. Continuous totalisers which are used for measurings in conjunction with production of prepacked products in fish landing facilities and weighing in fish landing facilities which receives more than 10 tons of fish per year (per fish landing facility), is not subject to a surveillance period.

Testing of continuous totalisers in conjunction with the surveillance shall be carried out according to relevant parts of the applicable OIML R50 and the procedures of the

Norwegian metrology service, unless the Norwegian metrology service considers that the testing should be carried out in a more appropriate and metrologically justifiable manner.

The continuous totaliser shall normally be tested with the products it usually uses to weigh and under normal operating conditions. The user shall make sure that the Norwegian metrology service has sufficient amount of test products, handling equipment and qualified personnel available during the testing.

A control instrument shall always be available close to the continuous totaliser which is tested. Storage and transport in conjunction with the testing shall be arranged so that the test products are not lost.

## **Chapter 2 Requirements to continuous totalisers**

### **Section I - General requirements**

#### **§ 6. *Metrological protection and level of quality***

A continuous totaliser shall provide a high level of metrological protection in order that any party affected can have confidence in the result of measurement, and shall be designed and manufactured to a high level of quality in respect of the measurement technology and security of the measurement data.

#### **§ 7. *Intended use and foreseeable misuse***

The solutions adopted in the pursuit of the requirements shall take account of the intended use of the continuous totaliser and any foreseeable misuse thereof.

#### **§ 8. *Allowable errors***

Under rated operating conditions and in the absence of a disturbance, the error of measurement shall not exceed the maximum permissible error value as laid down in § 30 and § 31.

Unless stated otherwise in subsection II, the maximum permissible error is expressed as a bilateral value of the deviation from the true measurement value.

Under rated operating conditions and in the presence of a disturbance, the performance requirement shall be as laid down in subsection II.

Where the continuous totaliser 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 the maximum permissible error.

#### **§ 9. *Influence quantities***

The manufacturer shall specify the climatic and electromagnetic environments in which the continuous totaliser is intended to be used, power supply and other influence quantities likely to affect its accuracy, taking account of the requirements laid down in section II.

**§ 10. Climatic environments**

The manufacturer shall specify the upper temperature limit and the lower temperature limit from any of the values in Table 1, and indicate whether the continuous totaliser is designed for condensing or non-condensing humidity as well as the intended location for the instrument is open or closed.

Table 1

Upper temperature limit	30 °C	40 °C	55 °C	70 °C
Lower temperature limit	5 °C	-10 °C	-25 °C	-40 °C

**§ 11. Electromagnetic environments**

Unless otherwise laid down in subsection II, electromagnetic environments are classified into the following classes:

Table 2

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.
E2	This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.
E3	This class applies to instruments supplied by the battery of a vehicle. Such instruments shall comply with the requirements of E2 and the following additional requirements:  voltage reductions caused by energising the starter-motor circuits of internal combustion engines, and load dump transients occurring in the event of a discharged battery being disconnected while the engine is running.

The following influence quantities shall be considered in relation with electromagnetic environments:

- a) Voltage interruptions
- b) Short voltage reductions
- c) Voltage transients on supply lines and/or signal lines, electrostatic discharges,
- d) Radio frequency electromagnetic fields
- e) Conducted radio frequency electromagnetic fields on supply lines and/or signal lines
- f) Surges on supply lines and/or signal lines.

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.

#### **§ 12. Basic rules for testing and the determination of errors**

Essential requirements specified in § 8 shall be verified for each relevant influence quantity. Unless otherwise specified in subsection II, 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.

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 continuous totaliser when that influence quantity is likely to occur.

#### **§ 13. Ambient humidity**

According to the climatic operating environment in which the continuous totaliser is intended to be used either the damp heat-steady state (non-condensing) or damp heat cyclic (condensing) test may be appropriate.

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.

#### **§ 14. Reproducibility**

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 maximum permissible error.

#### **§15. Repeatability**

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 maximum permissible error.

#### **§ 16. Discrimination and sensitivity**

A continuous totaliser shall be sufficiently sensitive and the discrimination threshold shall be sufficiently low for the intended measurement task.

#### **§ 17. Durability**

A continuous totaliser 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

#### **§ 18. Reliability**

A continuous totaliser 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.

#### **§ 19. Suitability**

A continuous totaliser shall be:

- a) 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.
- b) Robust and its materials of construction shall be suitable for the conditions in which it is intended to be used.
- c) 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 continuous totaliser. The test procedure shall be described in the operation manual.
- d) Insensitive to small fluctuations of the value of the measurand, or it shall take appropriate action, when the measuring instrument is designed for measurement of values of measurand that are constant over time

A continuous totaliser shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.

When a continuous totaliser 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.

#### **§ 20. Protection against corruption**

If the continuous totaliser gets connected to another device, direct or by any remote device that communicates with it, shall its metrological characteristics not be influenced in any inadmissible way. The hardware components that are critical for metrological characteristics shall be designed so that they can be secured. Security measures foreseen shall provide for evidence of an intervention.

Software that is critical for metrological characteristics shall be identified as such and shall be secured. Software identification shall be easily provided by the continuous totaliser. Evidence of an intervention shall be available for a reasonable period of time.

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.

#### **§ 21. Information to be borne by and to accompany the continuous totaliser**

A continuous totaliser shall bear the manufacturer's mark or name and information in respect of its accuracy. When applicable the continuous totaliser shall also bear the following information:

- a) relevant information in respect of the conditions of use
- b) measuring capacity
- c) measuring range;
- d) identity marking;
- e) number of the EC-type examination certificate or the EC design examination certificate;
- f) information whether or not additional devices providing metrological results comply with the regulations on legal metrological control.

Information on its operation shall accompanied the continuous totaliser, 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
- c) the upper and lower temperature limit, if 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;
- f) conditions for compatibility with interfaces, sub-assemblies or measuring instruments.

Groups of identical continuous totalisers do not require individual instruction manuals. All marks and inscriptions required shall be clear, unambiguous, non-erasable and non-transferable.

#### **§ 22. *Specification of measured value***

Unless specified in section II, the scale interval for a measured value shall be in the form  $1 \times 10n$ ,  $2 \times 10n$ , or  $5 \times 10n$ , where  $n$  is any integer or zero. The unit of measurement or its symbol shall be shown close to the numerical value.

The units of measurement and symbols used shall be in accordance with regulations on measuring units and measurements.

#### **§ 23. *Indication of result***

Indication of the result shall be by means of a display or hard copy. In the case of hard copy the print or record shall also be easily legible and non-erasable.

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.

#### **§ 24. *Further processing of data to conclude the trading transaction***

The continuous totaliser shall record by a durable means the measurement result accompanied by information to identify the particular transaction, when the measurement is non-repeatable and the measuring instrument is normally intended for use in the absence of one of the trading parties.

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.

#### **§ 25. *Conformity evaluation***

A continuous totaliser shall be designed so as to allow ready evaluation of its conformity with the appropriate requirements of this regulation.

## **Section II - Specific requirements**

### **§ 26. Rated Operating Conditions**

The manufacturer shall specify the nominal operating conditions as follows:

- a) For the measurand: The measuring range in terms of its maximum and minimum capacity.
- b) For the electrical supply influence quantities:
  - 1) In case of AC voltage supply: the nominal AC voltage supply, or the AC voltage limits.
  - 2) 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: The minimum temperature range is 30 °C. For measuring 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):
  - 1) The rate(s) of operation.
  - 2) The characteristics of the product(s) to be weighed.

### **§ 27. Suitability**

Means shall be provided to limit the effects of tilt, loading and rate of operation such that maximum permissible errors are not exceeded in normal operation. Adequate material handling facilities and adequate zero setting capability shall be provided to enable the instrument to respect the maximum permissible errors during normal operation.

The operator control interface shall be clear and effective. The integrity of the display (where present) shall be verifiable by the operator. Any result outside the measurement range shall be identified as such, where a printout is possible.

### **§ 28. Accuracy classes**

The continuous totalisers are divided into three accuracy classes. Table 3 shows the accuracy classes and area of application relative to type of weighing.

*Table 3*

Accuracy class 0,5:	Used for weighing of processed products and similar trade transactions.
Accuracy class 1:	Used for weighing of sand, shingle, ore and landing of fish.
Accuracy class 2:	Used for calculation of freight, tariff etc. The weights can also be used for weighing of sand, shingle and ore, but this will be assessed in the relevant case.

For weighing of other products than mentioned above, the Norwegian metrology service will decide individually which accuracy class the continuous totaliser shall belong.

#### § 29. Measurement range

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.

The minimum totalised load  $\Sigma_{min}$  shall not be less than

- a) 800 d for class 0,5,
- b) 400 d for class 1,
- c) 200 d for class 2.

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

#### § 30. Maximum permissible errors for continuous totalisers which are sold or offered for sale

Table 4

<b>Accuracy class</b>	<b>Permissible errors for totalised load expressed as percentage</b>
0,5	± 0,25%
1	± 0,50%
2	± 1,00%

**§ 31. Maximum permissible errors for continuous totalisers in service**

Table 5

<b>Accuracy class</b>	<b>Permissible errors for totalised load expressed as percentage</b>	
	<i>During periodic surveillance</i>	<i>During reverification</i>
0,5	± 0,50%	± 0,25%
1	± 1,00%	± 0,50%
2	± 2,00%	± 1,00%

**§ 32. 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.

**§ 33. General totalisation device**

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

**§ 34. Performance under influence factors and electromagnetic disturbances**

The maximum permissible errors due to influence factor, for a load not less than the  $\Sigma_{min}$ , shall be 0,7 times the appropriate value specified in tables 4 and 5, rounded to the nearest totalisation scale interval (d).

The critical change value due to a disturbance shall be 0,7 times the appropriate value specified in tables 4 and 5, for a load equal to  $\Sigma_{min}$ , for the designated class of the beltweigher; rounded up to the next higher totalisation scale interval (d).

**Chapter 3 - Concluding provisions**

**§ 35. Infringement penalty**

Violation of the provisions of this regulation may lead to order of infringement penalty, determined by the provisions of regulation on measuring units and measurements chapter 7.

**§ 36.** *Entry into force*

This regulation enters into force on xx.