

Regulation on requirements to discontinuous totalisers (totalising hopper weighers)

Established by the Norwegian Metrology Service 21.12.2007 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 § 5-2 second subsection.

Chapter 1 – Introductory provisions

§ 1. Scope

The regulation prescribes the requirements which applies to totalising hopper weighers, cf. regulation December 20th 2007 no. 1723 on measuring units and measurements chapter 3 and supplementary provisions on control and approval in service.

The requirements of this regulation applies when

- a) such weights are sold or offered for sale, cf. regulation on measuring units and measurements § 3-1 and when
- b) the measurement result of such weights will be used in economic transactions , cf. regulation on measuring units and measurements § 3-4.

This regulation does not prescribe requirements to electromagnetic disturbance. Electromagnetic disturbance is regulated by regulation August 10th 1995 no. 713 on electric equipment.

§ 2. Definitions

In this regulation, the following definitions apply:

- a) *Automatic 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.
- 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 totalising hopper weighers

Totalising hopper weighers shall as a minimum fulfill the essential requirements established in chapter 2. Maximal permissible errors to totalising hopper weighers for sale is established in § 29. Maximal permissible errors to totalising hopper weighers in service is established in § 30.

Totalising hopper weighers which have been national type examined during a former legislation, shall in service fulfill the requirements which applied when the totalising hopper weighers was national type examined, including the requirements for measurement accuracy in service.

Totalising hopper weighers 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 totalising hopper weighers

Totalising hopper weighers 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.

Totalising hopper weighers which are national type examined according to the technical instruction TI 014, can have a national verification according to this up to and including the year 2011. 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 totalising hopper weighers in service

A totalising hopper weigher is subject to periodic surveillance, with a surveillance period of one year. Totalising hopper weighers which are used to measurings in conjunction with the 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 periodic surveillance.

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

Chapter 2 - Requirements to totalising hopper weighers

Section I - General requirements

§ 6. *Metrological protection and level of quality*

A totalising hopper weigher 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 totalising hopper weigher 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 § 29 and § 30. Unless stated otherwise in section 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 section II.

Where the totalising hopper weigher 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, mechanical and electromagnetic environments in which the totalising hopper weigher 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 totalising hopper weigher 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 section 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 section 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 totalising hopper weigher when that influence quantity is likely to occur.

§ 13. Ambient humidity

According to the climatic operating environment in which the totalising hopper weigher 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 totalising hopper weigher shall be sufficiently sensitive and the discrimination threshold shall be sufficiently low for the intended measurement task.

§ 17. Durability

A totalising hopper weigher 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 totalising hopper weigher 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 totalising hopper weigher 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 totalising hopper weigher. 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 totalising hopper weigher shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.

When a totalising hopper weigher 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 totalising hopper weigher 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 totalising hopper weigher. 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 totalising hopper weigher

A totalising hopper weigher shall bear the manufacturer's mark or name and information in respect of its accuracy. When applicable the totalising hopper weigher 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 accompany the totalising hopper weigher, 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.

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 1×10^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.

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

§ 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.

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

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

The totalising hopper weigher 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 totalising hopper weigher 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 totalising hopper weighers are divided into four accuracy classes. Table 3 shows the accuracy classes and area of application relative to type of weighing.

Table 3

Accuracy class 0,2	Used for weighing of processed products and similar trade transactions.
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.

§ 29. *Maximum permissible errors for totalising hopper weighers when sold or offered for sale*

Table 4

Accuracy class	Maximum permissible errors in per cent of the totalised load
0,2	± 0,10 %
0,5	± 0,25 %
1	± 0,50 %
2	± 1,00 %

§ 30. *Maximum permissible errors for totalising hopper weighers in service*

Table 5

Accuracy class	Maximum permissible errors in per cent of the totalised load	
	<i>Ordinary surveillance</i>	<i>Reverification</i>
0,2	± 0,20 %	± 0,10 %

0,5	± 0,50 %	± 0,25 %
1	± 1,00%	± 0,5 %
2	± 2,0 %	± 1,0 %

§ 31. Totalisation scale interval

The totalisation scale interval (d_t), shall be in the range: $0,01 \% \text{ Max.} \leq d_t \leq 0,2 \% \text{ Max.}$

§ 32. Minimum Totalised Load (Σ_{min})

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

§ 33. Zero Setting

Totalising hopper weighers 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;
- b) $0,5 d_t$ on instruments with a semi-automatic, or non-automatic, zero setting device.

§ 34. Operator Interface

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

§ 35. Printout

On totalising hopper weighers 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.

§ 36. Performance under influence factors and electromagnetic disturbances

The maximum permissible errors due to influence factors shall be as specified in table 6.

Table 6

<i>Load (m) in totalization scale intervals (d_t)</i>	<i>Maximum permissible error</i>
$0 < m \leq 500$	$\pm 0,5 d_t$
$500 < m \leq 2\ 000$	$\pm 1,0 d_t$

2 000 < m ≤ 10 000	± 1,5 d _t
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The critical change value due to a disturbance is one totalisation scale interval for any weight indication and any stored total.

§ 36 a. Additional requirements to discontinuous totalisers used for landing fish

Discontinuous totalisers used for landing fish must have a display or other clear reading option placed in or by the weighing instrument.

The measured quantity must be able to read continuously. When the weighing instrument is in use, the weighted quantity must be able to read directly.

The weighing instrument must have at least one additional display that repeats the display of the weighing result from the main display. The additional display must not have functions that can affect the weighing result. The additional display must have the same division as the main display.

The weighing instrument must have more than one counter, one being a continuous counter that runs continuously and which cannot be reset without breaking seals. The total counter shall have the same division as the basic counter.

Chapter 3 - Concluding provisions

§ 37. 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.

§ 38. Entry into force

This regulation enters into force on 01.02.2020.

