

## **Regulation on requirements to instruments for automatic weighing of single quantities (catchweighers)**

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 automatic weighing of single quantities, hereafter called “catchweighers”, 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 10<sup>th</sup> 1995 no. 713 on electric equipment.

#### **§ 2. Definitions**

In this regulation, the following definitions apply:

- a) *Catchweigher*: An automatic weighing instrument which weighs single quantities. The single quantities may be pre-assembled discrete loads (for example prepackages) or be a part of a larger amount (bulk product). The weight can sort out or control single quantities based on preset values. “Catchweighers” usually carry out dynamic weighing. “Catchweigher” includes, among other things, automatic checkweighers, grading instruments, weigh-price labeler, weigh labeler, automatic postal scales and automatic weights installed on front-end loaders and vehicles.
- 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) *Direct sales*: A trading transaction is direct sales if:
  1. The measurement result serves as the basis for the price to pay,
  2. At least one of the parties involved in the transaction related to measurement is a consumer or any other party requiring a similar level of protection, and
  3. All the parties in the transaction accept the measurement result at that time and place.
- i) *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 catchweighers**

Catchweighers shall as a minimum fulfill the essential requirements established in chapter 2. Maximal permissible errors to catchweighers is established in § 31.

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

Catchweighers 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 catchweighers**

Catchweighers 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.

Catchweighers which are national type examined according to the general national regulation 14/96, 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 a catchweigher in service***

A catchweigher is subject to periodic surveillance, with a surveillance period of one year. The surveillance period for a catchweigher with an installed wheel loader and a catchweigher which is used in combination with a multi-dimensional instrument, is three years. Catchweighers which are used to measurements 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.

The catchweigher shall normally be tested with the products it usually uses to weigh and under normal operating conditions. Sufficient amount of test products, handling equipment, qualified personnel and necessary control instruments must be available nearby during the testing.

## **Chapter 2 - Requirements for catchweighers**

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

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

A catchweigher 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 catchweigher 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 section II.

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 catchweigher 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 catchweigher 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 catchweigher 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.
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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 catchweigher when that influence quantity is likely to occur.

#### **§ 13. Ambient humidity**

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

#### **§ 17. *Durability***

A catchweigher 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 catchweigher 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 catchweigher 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

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

When a catchweigher 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 catchweigher 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 catchweigher. 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 catchweigher**

A catchweigher shall bear the manufacturer's mark or name and information in respect of its accuracy. When applicable the catchweigher 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 catchweigher, 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  $1 \times 10^n$ ,  $2 \times 10^n$ , or  $5 \times 10^n$ , 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 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.

A catchweigher for direct sales trading transactions shall be designed to present the measurement result to both parties in the transaction when installed as intended. When critical in case of direct sales, any ticket provided to the consumer by an ancillary device not complying with the appropriate requirements of this regulation shall bear an appropriate restrictive information.

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

The catchweigher 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 catchweigher 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 catchweighers are divided into primary categories designated by X or Y as specified by the manufacturer. These primary categories are further divided into four accuracy classes: XI, XII, XIII and XIV and Y(I), Y(II), Y(a) and Y(b) which shall be specified by the manufacturer.

The following accuracy classes shall apply to the following types of weighing:

*Table 3*

XI	Used where very good accuracy is necessary.
XII	Used where good accuracy is necessary.
XIII	Used for weighing of processed products and similar trade transactions.
XIV	Will be considered by the Norwegian metrology service in the relevant case.
Y(I)	Used where very good accuracy is necessary.
Y(II)	Used where good accuracy is necessary.
Y(a)	Used for weighing of processed products and similar trade transactions, such as weigh labeler /weigh-price labeler.
Y(b)	Used for calculation of freight, tariff, etc. Additionally, they can be used for weighing of sand, shingle, ore, waste and other items of similar price, eg. waste truck weights and wheel load weights.

**§ 29. Category X catchweighers**

Category X applies to catchweigher used to check prepackages made up in accordance with regulation 21. December 2007 no. 1730 on requirements of the net content etc. of prepackages.

The accuracy classes are supplemented by a factor (x) that quantifies the maximum permissible standard deviation as specified in table 5. The manufacturer shall specify the factor (x), where (x) shall be  $\leq 2$  and in the form  $1 \times 10^k$ ,  $2 \times 10^k$  or  $5 \times 10^k$ , where k is a negative whole number or zero.

**§ 30. Category Y catchweighers**

Category Y applies to all other catchweighers for automatic weighing.

**§ 31. Maximum permissible errors**

Table 4 shows mean error category X and maximum permissible errors category Y.

Table 4

Net load (m) in verification scale intervals (e)								Maximum permissible mean error for class X		Maximum permissible error for class Y	
XI	Y(I)	XII	Y(II)	XIII	Y(a)	XIV	Y(b)	When sold or reverification	Ordinary surveillance in service	When sold or reverification	Ordinary surveillance in service
0 < m ≤ 50 000		0 < m ≤ 5 000		0 < m ≤ 500		0 < m ≤ 50		± 0,5 e	± 1,0 e	± 1 e	± 2 e
50 000 < m ≤ 200 000		5 000 < m ≤ 20 000		500 < m ≤ 2 000		50 < m ≤ 20 000		± 1,0 e	± 2,0 e	± 1,5 e	± 3 e
200 000 < m		20 000 < m ≤ 100 000		2 000 < m ≤ 10 000		20 000 < m ≤ 1 000		± 1,5 e	± 3,0 e	± 2 e	± 4 e

Maximum permissible value for the standard deviation of a class X (x) catchweigher is the result of the multiplication of the factor (x) by the value in Table 5 below.

Table 5

<b>Maximum permissible standard deviation for class X(I)</b>
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<b>Net load (m)</b>	<b>When sold or reverification</b>	<b>Ordinary surveillance in service</b>
$m \leq 50 \text{ g}$	0,48 %	0,6 %
$50 \text{ g} < m \leq 100 \text{ g}$	0,24 g	0,3 g
$100 \text{ g} < m \leq 200 \text{ g}$	0,24 %	0,3 %
$200 \text{ g} < m \leq 300 \text{ g}$	0,48 g	0,6 g
$300 \text{ g} < m \leq 500 \text{ g}$	0,16 %	0,2 %
$500 \text{ g} < m \leq 1\,000 \text{ g}$	0,8 g	1,0 g
$1\,000 \text{ g} < m \leq 10\,000 \text{ g}$	0,08 %	0,1 %
$10\,000 \text{ g} < m \leq 15\,000 \text{ g}$	8 g	10 g
$15\,000 \text{ g} < m$	0,053 %	0,067 %

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.

Table 6 shows verification scale intervals - single interval instruments.

<b>Number of verification scale intervals <math>n = \text{Max}/e</math></b>				
<b>Accuracy classes</b>		<b>Verification scale interval</b>	<b>Minimum <math>n = \text{Maks}_i / e_{(i+1)}</math></b>	<b>Maximum <math>n = \text{Maks}_i / e_i</math></b>
XI	Y(I)	$0,001 \text{ g} \leq e_i$	50 000	-
XII	Y(II)	$0,001 \text{ g} \leq e_i \leq 0,05 \text{ g}$	100	100 000
XII	Y(II)	$0,1 \text{ g} \leq e_i$	5 000	100 000
XIII	Y(a)	$0,1 \text{ g} \leq e \leq 2 \text{ g}$	100	10 000
XIII	Y(a)	$5 \text{ g} \leq e$	500	10 000

XIV	Y(b)	$5 \text{ g} \leq e$	100	
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Table 7 shows verification scale intervals – multi-interval instruments, where  $i=1, 2, \dots, r$ ,  $i$  = partial weighing range and  $r$  = total number of partial ranges. For minimum value, the corresponding column of table 6 applies, with  $e$  substituted with  $e_r$ , for  $i = r$ .

Table 7

Number of verification scale intervals $n = \text{Max}/e$				
Accuracy classes		Verification scale interval	Minimum $n = \text{Maks}_i / e_{(i+1)}$	Maximum $n = \text{Maks}_i / e_i$
XI	Y(I)	$0,001 \text{ g} \leq e_i$	50 000	-
XII	Y(II)	$0,001 \text{ g} \leq e_i \leq 0,05 \text{ g}$	5 000	100 000
XII	Y(II)	$0,1 \text{ g} \leq e_i$	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	

### § 32. 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 given in table 8.

Table 8

class Y(I)	100 e
class Y(II)	20 e for $0,001 \text{ g} \leq e \leq 0,05 \text{ g}$ , og 50 e for $0,1 \text{ g} \leq e$
class Y(a):	20 e

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

**§ 33. Dynamic Setting**

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

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.

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

The maximum permissible errors due to influence factors are:

a) For category X catchweighers:

1. For automatic operation; as specified in Tables 4, and 5,
2. For static weighing in non-automatic operation; as specified in Table 4.

b) For category Y catchweigher:

1. For each load in automatic operation; as specified in Table 4,
2. For static weighing in non-automatic operation; as specified for category X in Table 4.

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

The temperature range for class XI and Y(I) is minimum range 5° C, and for class XII and Y(II) the minimum range is 15° C.

**§ 34 a. Additional requirements for catchweighers used when landing fish**

*Catchweighers 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 weight 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 weight 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**

#### **§ 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 01.02.2020.