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SIST EN 45501:1995+AC:1996

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SIST EN 45501:1995

Metrological aspects of non-automatic weighing instruments - Amendment

Metrological aspects of non-automatic weighing instruments

Metrologische Aspekte nichtselbsttätiger Waagen

Aspects métrologiques des instruments de pesage à fonctionnement non-automatique
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Ta slovenski standard je istoveten z: EN 45501:1992/AC:1993

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ICS:

17.060	Merjenje prostornine, mase, gostote, viskoznosti	Measurement of volume, mass, density, viscosity
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EUROPEAN STANDARD

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Metrological aspects of
non-automatic weighing instruments

Aspects métrologiques des
instruments de pesage à fonctionnement
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This corrigendum becomes effective on **1993-08-31** for incorporation in the three official language versions of the EN.

CEN/CENELEC

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Ref. no. EN 45501:1992/AC:1993 E

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Bibliography

Foreword

This European Standard has been prepared by a Joint CEN/CENELEC Working Group on Non-automatic weighing instruments.

A Reference Document on "Metrological aspects of non-automatic weighing instruments", prepared by the Bureau International de Métrologie Légale (BIML) on basis of the Recommendation OIML R 76, edition 1988, was submitted to the common CEN/CENELEC PQ procedure from 1989-01-20 to 1989-04-20.

The above mentioned working group has prepared a draft European Standard in view of the results of the PQ procedures, which has been available to CEN/CENELEC for formal vote and has been accepted.

According to the CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Belgium, Denmark, Germany, Finland, France, Greece, Ireland, Iceland, Italy, Luxembourg, the Netherlands, Norway, Austria, Portugal, Sweden, Switzerland, Spain and United Kingdom.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1993, and conflicting national standards shall be withdrawn at the latest by April 1995.

iTeh STANDARD PREVIEW **INTRODUCTION** **(standards.iteh.ai)**

This European Standard has been adapted from the

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OIML-Recommendation R76-1, Edition 1992,
NON-AUTOMATIC WEIGHING INSTRUMENTS
Part 1: Metrological and technical requirements - Tests

by a Joint Working Group from CEN and CENELEC. It was elaborated following a standardization request from the Commission of the European Communities (CEC) and the Secretariat of the European Free Trade Association (EFTA) to CEN and CENELEC, to establish European Standard(s) related to Council Directive 90/384/EEC on Non-Automatic Weighing Instruments.

TERMINOLOGY

The vocabulary used in this European Standard conforms to the

"International Vocabulary
of Basic and General Terms
in Metrology"
(1984 edition)

published in the name of

BIPM	International Bureau of Weights and Measures
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
OIML	International Organization for Legal Metrology

and to the

"Vocabulary of Legal Metrology"
(1978 edition, as amended in 1987)

published by OIML.

Where these vocabularies do not adequately define terms specific to weighing instruments and where additional terms are required, the following definitions apply.

Wherever these terms appear in the text of this European Standard, they are identified by capital letters to draw attention to the definitions. An alphabetic list - see end of Terminology - helps to find the definitions.

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T.1 General definitions [fab078abd5f0/sist-en-45501-1995ac-1996](https://standards.iteh.ai/catalog/standards/sist/fc9ba239-0c69-45d3-8b45-fab078abd5f0/sist-en-45501-1995ac-1996)

T.1.1 Weighing instrument

Measuring instrument that serves to determine the mass of a body by using the action of gravity on this body.

The instrument may also be used to determine other quantities, magnitudes, parameters or characteristics related to mass.

According to its method of operation, a weighing instrument is classified as an automatic or non-automatic instrument.

T.1.2 Non-automatic weighing instrument

Instrument that requires the intervention of an operator during the weighing process, for example to deposit on or remove from the receptor the load to be measured and also to obtain the result.

The instrument permits direct observation of the weighing results, either displayed or printed; both possibilities are covered by the word "indication".

Note 1: Terms such as "indicate", "indicating component" and their derivatives, do not include printing.

A non-automatic weighing instrument may be:

- graduated or non-graduated,
- self-indicating, semi-self-indicating or non-self-indicating.

Note 2: In this European Standard a non-automatic weighing instrument is called an "instrument".

T.1.2.1 Graduated instrument

Instrument allowing the direct reading of the complete or partial weighing result.

T.1.2.2 Non-graduated instrument

Instrument not fitted with a scale numbered in units of mass.

T.1.2.3 Self-indicating instrument

Instrument in which the position of equilibrium is obtained without the intervention of an operator.

T.1.2.4 Semi-self-indicating instrument

Instrument with a self-indication weighing range, in which the operator intervenes to alter the limits of this range.

T.1.2.5 Non-self-indicating instrument

Instrument in which the position of equilibrium is obtained entirely by the operator.

T.1.2.6 Electronic instrument

Instrument equipped with electronic devices.

T.1.2.7 Instrument with price scales

Instrument that indicates the price to pay by means of price charts or scales related to a range of unit prices.

T.1.2.8 Price-computing instrument

Instrument that calculates the price to pay on the basis of the indicated mass and the unit price.

T.1.2.9 Price-labelling instrument

Price-computing instrument that prints the weight value, unit price and price to pay for prepackages.

T.1.2.10 Self-service instrument

Instrument that is intended to be operated by the customer

T.1.3 Indications provided by an instrument

T.1.3.1 Primary indications

Indications, signals and symbols that are subject to requirements of this European Standard.

T.1.3.2 Secondary indications

Indications, signals and symbols that are not primary indications.

T.2 Construction of an instrument

In this European Standard the term "device" is used for any means by which a specific function is performed, irrespective of the physical realization, e.g. by a mechanism or a key initiating an operation; the device may be a small part or a major portion of an instrument.

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T.2.1 Main devices

T.2.1.1 Load receptor

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Part of the instrument intended to receive the load.

T.2.1.2 Load-transmitting device

Part of the instrument for transmitting the force produced by the load acting on the load receptor, to the load-measuring device.

T.2.1.3 Load-measuring device

Part of the instrument for measuring the mass of the load by means of an equilibrium device for balancing the force coming from the load-transmitting device, and an indicating or printing device.

T.2.2 Module

Part of an instrument which performs a specific function, can be examined separately and is subject to specified partial error limits.

T.2.3 Electronic parts

T.2.3.1 Electronic device

A device employing electronic sub-assemblies and performing a specific function. An electronic device is usually manufactured as a separate unit and can be independently tested.

Note: An electronic device, as defined above, may be a complete instrument (e.g., instrument for direct sales to the public) or part of an instrument (e.g., printer, indicator ...).

T.2.3.2 Electronic sub-assembly

A part of an electronic device, employing electronic components and having a recognizable function of its own.

Examples: A/D converter, display matrix,...

T.2.3.3 Electronic component

The smallest physical entity that uses electron or hole conduction in semi-conductors, gases or in a vacuum.

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T.2.4 Indicating device (of a weighing instrument) (standards.iteh.ai)

Part of the load-measuring device on which the direct reading of the result is obtained.

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T.2.4.1 Indicating component

Component indicating the equilibrium and/or the result.

On an instrument with one position of equilibrium it indicates only the equilibrium (so-called zero).

On an instrument with several positions of equilibrium it indicates both the equilibrium and the result. On an electronic instrument, this is the display.

T.2.4.2 Scale mark

A line or other mark on an indicating component corresponding to a specified value of mass.

T.2.4.3 Scale base

An imaginary line through the centres of all the shortest scale marks.

T.2.5 Auxiliary indicating devices

T.2.5.1 Rider

Detachable poise of small mass that may be placed and moved either on a graduated bar integral with the beam or on the beam itself.

T.2.5.2 Device for interpolation of reading (vernier or nonius)

Device connected to the indicating element and sub-dividing the scale of an instrument, without special adjustment.

T.2.5.3 Complementary indicating device

Adjustable device by means of which it is possible to estimate, in units of mass, the value corresponding to the distance between a scale mark and the indicating component.

T.2.5.4 Indicating device with a differentiated scale division

Digital indicating device of which the last figure after the decimal marker is clearly differentiated from other figures.

T.2.6 Extended indicating device

A device temporarily changing the actual scale interval (d) to a value less than the verification scale interval (e) following a manual command.

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T.2.7 Supplementary devices

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T.2.7.1 Levelling device

Device for setting an instrument to its reference position.

T.2.7.2 Zero-setting device

Device for setting the indication to zero when there is no load on the load receptor.

T.2.7.2.1 Non-automatic zero-setting device

Device for setting the indication to zero by an operator.

T.2.7.2.2 Semi-automatic zero-setting device

Device for setting the indication to zero automatically following a manual command.

T.2.7.2.3 Automatic zero-setting device

Device for setting the indication to zero automatically without the intervention of an operator.

T.2.7.2.4 Initial zero-setting device

Device for setting the indication to zero automatically at the time the instrument is switched on and before it is ready for use.

T.2.7.3 Zero-tracking device

Device for maintaining the zero indication within certain limits automatically.

T.2.7.4 Tare device

Device for setting the indication to zero when a load is on the load receptor:

- without altering the weighing range for net loads (additive tare device) or
- reducing the weighing range for net loads (subtractive tare device).

It may function as:

- a non-automatic device (load balanced by an operator),
- a semi-automatic device (load balanced automatically following a single manual command),
- an automatic device (load balanced automatically without the intervention of an operator).

T.2.7.4.1 Tare-balancing device

Tare device without indication of the tare value when the instrument is loaded.

T.2.7.4.2 Tare-weighing device

Tare device that stores the tare value and is capable of indicating or printing it whether or not the instrument is loaded.

T.2.7.5 Preset tare device

Device for subtracting a preset tare value from a gross or net weight value and indicating the result of the calculation. The weighing range for net loads is reduced accordingly.

T.2.7.6 Locking device

Device for immobilizing all or part of the mechanism of an instrument.

T.2.7.7 Auxiliary verification device

Device permitting separate verification of one or more main devices of an instrument.

T.2.7.8 Selection device for load receptors and load-measuring devices

Device for attaching one or more load receptors to one or more load-measuring devices, whatever intermediate load-transmitting devices are used.

T.2.7.9 Indication stabilizing device

Device for maintaining a stable indication under given conditions.

T.3 Metrological characteristics of an instrument**T.3.1 Weighing capacity****T.3.1.1 Maximum capacity (Max)**

Maximum weighing capacity, not taking into account the additive tare capacity.

T.3.1.2 Minimum capacity (Min)

Value of the load below which the weighing results may be subject to an excessive relative error.

T.3.1.3 Self-indication capacity

Weighing capacity within which equilibrium is obtained without the intervention of an operator.

T.3.1.4 Weighing range

Range between the minimum and maximum capacities.

T.3.1.5 Extension interval of self-indication

Value by which it is possible to extend the range of self-indication within the weighing range.

T.3.1.6 Maximum tare effect (T + , T -)

Maximum capacity of the additive tare device or the subtractive tare device.

T.3.1.7 Maximum safe load (Lim)

Maximum static load that can be carried by the instrument without permanently altering its metrological qualities.

T.3.2 Scale divisions

T.3.2.1 Scale spacing (instrument with analogue indication)

Distance between any two consecutive scale marks, measured along the scale base.

T.3.2.2 Actual scale interval (d)

Value expressed in units of mass of:

- the difference between the values corresponding to two consecutive scale marks, for analogue indication, or
- the difference between two consecutive indicated values, for digital indication.

T.3.2.3 Verification scale interval (e)

Value, expressed in units of mass, used for the classification and verification of an instrument.

T.3.2.4 Scale interval of numbering

Value of the difference between two consecutive numbered scale marks.

T.3.2.5 Number of verification scale intervals (single-interval instrument)

Quotient of the MAXIMUM CAPACITY and the VERIFICATION SCALE INTERVAL:

$$n = \text{Max}/e$$

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T.3.2.6 Multi-interval instrument

Instrument having one weighing range which is divided into partial weighing ranges each with different scale intervals, with the weighing range determined automatically according to the load applied, both on increasing and decreasing load.

T.3.2.7 Multiple range instrument

Instrument having two or more weighing ranges with different maximum capacities and different scale intervals for the same load receptor, each range extending from zero to its maximum capacity.

T.3.3 Reduction ratio R

The reduction ratio of a load-transmitting device is

$$R = \text{FM}/\text{FL}$$

FM: force acting on the load-measuring device
FL: force acting on the load receptor

T.4 Metrological properties of an instrument

T.4.1 Sensitivity

For a given value of the measured mass, the quotient of the change of the observed variable I and the corresponding change of the measured mass M :

$$k = \Delta I / \Delta M$$

T.4.2 Discrimination

Ability of an instrument to react to small variations of load.

The discrimination threshold, for a given load, is the value of the smallest additional load that, when gently deposited on or removed from the load receptor, causes a perceptible change in the indication.

T.4.3 Repeatability

Ability of an instrument to provide results that agree one with the other when the same load is deposited several times and in a practically identical way on the load receptor under reasonably constant test conditions.

T.4.4 Durability

The capability of an instrument to maintain its performance characteristics over a period of use.

T.4.5 Warm-up time

The time between the moment power is applied to an instrument and the moment at which the instrument is capable of complying with the requirements.

T.5 Indications and errors

T.5.1 Methods of indication

T.5.1.1 Balancing by weights

Value of metrologically controlled weights that balance the load (taking into account the reduction ratio of the load).

T.5.1.2 Analogue indication

Indication enabling the evaluation of the equilibrium position to a fraction of the scale interval.