

# Temperature recorders for the transport, storage and distribution of chilled, frozen, deep- frozen/quick-frozen food and ice cream — Tests, performance and suitability

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ICS 17.200.20

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# National foreword

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## Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 21 and a back cover.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 December 1999

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ISBN 0 580 32860 0

## Amendments issued since publication

| Amd. No. | Date | Comments |
|----------|------|----------|
|          |      |          |
|          |      |          |
|          |      |          |
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English version

Temperature recorders for the transport, storage and distribution  
of chilled, frozen, deep-frozen/quick-frozen food and ice cream  
— Tests, performance, suitability

Enregistreurs de température pour le transport,  
l'entreposage et la distribution de denrées alimentaires  
réfrigérées, congelées, surgelées et des crèmes glacées —  
Essais, performance, aptitude à l'emploi

Temperaturregistriergeräte für den Transport, die Lagerung  
und die Verteilung von gekühlten, gefrorenen,  
tiefgefrorenen Lebensmitteln und Eiskrem —  
Prüfungen, Leistung, Gebrauchstauglichkeit

This European Standard was approved by CEN on 4 June 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 141, Pressure gauges - Thermometers - Means of measuring and/or recording temperature in the cold chain, the Secretariat of which is held by AFNOR.

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 January 2000, and conflicting national standards shall be withdrawn at the latest by January 2000.

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

This European Standard is a document meeting the objectives of directives :

- 92/1/EEC of January 13, 1992 of the Commission on the monitoring of temperatures in the means of transport, warehousing and storage of quick-frozen foodstuffs intended for human consumption ;
- 93/43/EEC of June 14, 1993 of the Council of the hygiene of foodstuffs and in particular on "temperature control criteria".

## 1 Scope

This European Standard specifies the technical and functional characteristics of air temperature recorders for equipping the means used for the transport, storage and distribution of chilled, frozen and deep-frozen/quick-frozen food and ice cream.

It specifies the test methods which allow the determination of the equipment's conformity to suitability and performance requirements.

It applies to the whole recorder-temperature sensor(s). The temperature sensor(s) may be integrated into the recorder or remote from it [external sensor(s)].

It does not define the location of the recorder and its sensors with respect to types of usage such as transport, storage and distribution.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 13486, *Temperature recorders and thermometers for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice-cream – Periodic verification*

EN 50081-1, *Electromagnetic compatibility - Generic emission standard - Part 1: Residential, commercial and light industry.*

EN 50082-1, *Electromagnetic compatibility - Generic immunity standard - Part 1: Residential, commercial and light industry.*

EN 60068-2-27, *Basic environmental testing procedures - Part 2: Tests - Test Ea and guidance : Shock. (IEC 60068-2-27:1987)*

EN 60529, *Degrees of protection provided by enclosures (IP Code). (IEC 60529:1989)*

EN 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements. (IEC 61010-1:1990+A1:1992, modified)*

## 3 Definitions

For the purposes of this European Standard, the following definitions apply:

### 3.1

#### **(measurable) quantity**

attribute of a phenomenon, body or substance that may be distinguished qualitatively and determined quantitatively<sup>1)</sup>

EXAMPLE: Temperature.

### 3.2

#### **unit (of measurement)**

particular quantity, defined and adopted by convention, with which other quantities of the same kind are compared in order to express their magnitudes relative to that quantity<sup>1)</sup>

EXAMPLE: The unit of temperature used in this standard is "degree Celsius".

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<sup>1)</sup> Definition taken from VIM2 (see Annex B).

### 3.3

#### **symbol of a unit**

conventional sign designating a unit of measurement<sup>1)</sup>

EXAMPLE : °C is the symbol of "degree Celsius".

### 3.4

#### **value (of a quantity)**

magnitude of a particular quantity generally expressed as a unit of measurement multiplied by a number<sup>1)</sup>

EXAMPLE: 15 °C.

### 3.5

#### **true value (of a quantity)**

value consistent with the definition of a given particular quantity<sup>1)</sup>

NOTE This is a value that would be obtained by a perfect measurement.

### 3.6

#### **measurement**

set of operations having the object of determining a value of a quantity<sup>1)</sup>

### 3.7

#### **measurand**

particular quantity subject to a measurement<sup>1)</sup>

EXAMPLE: Temperature.

### 3.8

#### **influence quantity**

quantity that is not the measurand but that affects the result of the measurement<sup>1)</sup>

### 3.9

#### **indication** (of a measuring instrument)

value of a quantity provided by a measuring instrument<sup>1)</sup>

### 3.10

#### **accuracy of measurement**

closeness of the agreement between the result of a measurement and a true value of the measurand<sup>1)</sup>

### 3.11

**maximum permissible errors** (of a measuring instrument); **limits of permissible error** (of a measuring instrument)

extreme values of an error permitted by specifications, regulations, etc. for a given measuring instrument<sup>1)</sup>

### 3.12

#### **uncertainty of measurement**

parameter, associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand<sup>1)</sup>

### 3.13

#### **error** (of measurement)

result of a measurement minus a true value of the measurand<sup>1)</sup>

### 3.14

#### **relative error**

error of a measurement divided by a true value of the measurand<sup>1)</sup>

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<sup>1)</sup> Definition taken from VIM2 (see Annex B).

### 3.15

#### **measuring instrument**

device intended to be used to make measurements, alone or in conjunction with supplementary device(s)<sup>1)</sup>

### 3.16

#### **recording (measuring) instrument**

measuring instrument that provides a record of the indication<sup>1)</sup>

### 3.17

#### **displaying device ; indicating device**

part of a measuring instrument that displays an indication<sup>1)</sup>

### 3.18

#### **recording device**

part of a measuring instrument that provides a record of an indication<sup>1)</sup>

### 3.19

#### **temperature sensor**

element of a measuring instrument or measuring chain that is directly affected by the temperature

### 3.20

#### **scale (of a measuring instrument)**

ordered set of marks, together with any numbering, forming part of a displaying device of a measuring instrument<sup>1)</sup>

### 3.21

#### **scale division**

part of a scale between two successive scale marks<sup>1)</sup>

### 3.22

#### **gauging (of a measuring instrument)**

operation of fixing the positions of the scale marks of a measuring instrument (in some cases of certain principal marks only), in relation to the corresponding values of the measurands<sup>1)</sup>

### 3.23

#### **adjustment (of a measuring instrument)**

operation of bringing a measuring instrument into a state of performance suitable for its use<sup>1)</sup>

### 3.24

#### **user adjustment (of a measuring instrument)**

adjustment employing the means at the disposal of the user<sup>1)</sup>

### 3.25

#### **span**

modulus of the difference between the two limits of a nominal range<sup>1)</sup>

EXAMPLE: For a nominal range of  $-35\text{ }^{\circ}\text{C}$  to  $+25\text{ }^{\circ}\text{C}$ , the span is 60 K.

### 3.26

#### **measuring range ; working range**

set of values for which the error of a measuring instruments is intended to lie within specified limits<sup>1)</sup>

### 3.27

#### **rated operating conditions**

conditions of use for which specified metrological characteristics of a measuring instrument are intended to lie within given limits<sup>1)</sup>

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<sup>1)</sup> Definition taken from VIM2 (see Annex B).