

Packaging — Temperature and time-temperature indicators — Performance specification and reference testing

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee PKW/1, Packaging generalities, to Subcommittee PKW/1/8, Temperature and time-temperature indicators, upon which the following bodies were represented:

- Association of Drum Manufacturers
- British Adhesives and Sealants Association
- British Association for Chemical Specialities
- British Coatings Federation Ltd.
- British Fibreboard Packaging Association
- British Fruit and Vegetable Canners' Association
- British Glass Manufacturers' Confederation
- British Office Systems and Stationery Federation
- British Plastics Federation
- British Retail Consortium
- British Rubber Manufacturers' Association Ltd.
- Chemical Industries Association
- China Clay Association
- Department of Trade and Industry (Consumer Safety Unit, C A Division)
- Environmental and Technical Association for the Paper Sack Industry
- Metal Packaging Manufacturers' Association
- Ministry of Defence
- Pira International
- Road Haulage Association Ltd.
- Timber Packaging and Pallet Confederation

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Association of the British Pharmaceutical Industry
- Campden and Chorleywood Food Research Association
- Cold Storage and Distribution Federation
- Dairy Industry Federation
- Flexible Packaging Association
- Food and Drink Federation
- Ministry of Agriculture, Fisheries and Food
- Shipowners' Refrigerated Cargo Research Association

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Foreword

This British Standard has been prepared by Subcommittee PKW/1/8 and originates from a food industry specification: *Technical manual No. 35, A food industry specification for defining the technical standards and procedures for the evaluation of temperature and time temperature indicators*, published in February 1992, although it has subsequently undergone considerable development during committee discussions.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 9 and a back cover.

1 Scope

This British Standard specifies performance requirements for temperature and time-temperature indicators, as well as reference testing procedures for use in confirming the performance quality of delivered devices or as a means of third party testing. The standard applies to indicators which are to be used in the food, pharmaceutical and other associated sectors for products stored at frozen, chilled or ambient temperatures. The standard covers partial and full history time-temperature indicators.

The test procedures are not necessarily appropriate for quality release testing, due to the length of time required to complete individual tests.

2 Definitions

For the purpose of this standard the following definitions apply:

2.1

temperature indicator (TI)

a device which on activation exploits a physical property or physico-chemical reaction to produce an irreversible change once a predetermined threshold temperature has been reached

2.2

critical reference temperature (CRT)

a device which on activation exploits a temperature dependent physical property or physico-chemical reaction to produce an irreversible change, or predetermined end-point

2.3

full history time-temperature indicator (FHTTI)

a device which indicates the time-temperature history experienced from its point of initial activation

2.4

partial history time-temperature indicator (PHTTI)

a device which indicates the time-temperature history above a critical reference temperature (CRT), experienced from its point of initial activation

2.5

critical reference temperature (CRT)

lowest temperature within the operating range at which the indicator of a PHTTI device provides a visible response

2.6

activation

action of initiating the indicator to respond to temperature or time/temperature variables

NOTE This may be by mechanical means, or by removing the device from an inactivating cold temperature, or any other method specified by the manufacturer.

2.7

batch

quantity from which the test items are selected

NOTE If the testing is being done as part of manufacturing control this should be the manufactured batch. If the testing is being done after delivery, the batch should consist of the delivered quantity.

3 General

Operation of the device shall be irreversible and it shall not be re-usable. The end-point of the device shall be clearly visible to the naked eye and shall be either from light to dark or shall change from one colour to a distinctly different colour.

The manufacturer shall supply the customer with the following information:

- a) for TIs, the threshold temperature and its tolerance limits ($3 \times$ standard deviation) to be stated in °C, and a response time (inertia) in minutes;
- b) for TTI's, the maximum and minimum temperature limits in °C over which the device will function and the time to end-point with performance classification (Table 1) at sufficient numbers of temperatures throughout the range stated by the manufacturer (above the CRT in the case of PHTTIs). The number of temperatures and time to end-point combinations shall be not less than five. In the case of PHTTIs, the manufacturer should state the CRT in °C and its tolerance;
- c) for TIs or TTIs, the storage conditions and the time that the device can be stored without affecting its performance. In addition there shall either be a declaration that the performance of the device is not affected by conditions likely to be encountered during use other than temperature, or if the performance is affected by certain factors, the manufacturer shall state in what way;
- d) for all indicators, clear instruction for activation procedures.