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# International Standard



# 584

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## Plastics — Unsaturated polyester resins — Determination of reactivity at 80 °C (conventional method)

*Plastiques — Résines de polyesters non saturés — Détermination conventionnelle de la réactivité à 80 °C*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 584 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in July 1980.

It has been approved by the member bodies of the following countries :

Australia	Hungary	New Zealand
Austria	India	Poland
Canada	Iran	Romania
China	Ireland	South Africa, Rep. of
Czechoslovakia	Israel	Spain
Egypt, Arab Rep. of	Italy	Sweden
Finland	Japan	USA
France	Korea, Rep. of	USSR
Germany, F. R.	Netherlands	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium  
United Kingdom

This International Standard cancels and replaces ISO Recommendation R 584-1967 of which it constitutes a technical revision.

# Plastics — Unsaturated polyester resins — Determination of reactivity at 80 °C (conventional method)

## 0 Introduction

The processing of unsaturated polyester resins depends on their reactivity, i.e., their rate of polymerization in the presence of a catalyst. The evaluation of their reactivity can be carried out by various methods. This International Standard is limited to measuring certain characteristics relating to the change in temperature as a function of time of a resin-catalyst mix. Using arbitrarily standardized test conditions, these characteristics allow comparison of similar types of unsaturated polyester resins.

The results obtained in this test are dependent upon the following test conditions :

- a) quantity and spatial parameters of the test portion examined (test-tube diameter, height of resin in the tube);
- b) speed of heating the test portion placed in a temperature controlled bath. For example, the replacement of water in the bath by another fluid with a lower heat capacity (glycol, oil, etc.) leads to slower heating;
- c) type of temperature measuring element placed in the test portion and its ability to respond to rapid changes in temperature. Thermometers with a slow response and thermocouples with large junctions between the resistance leads are unsatisfactory;
- d) accurate centring of the thermocouple in the test portion, both in height and in line with the axis.

These conditions which are mandatory are specified in the text of this International Standard.

## 1 Scope and field of application

This International Standard specifies a method for the determination of the reactivity of unsaturated polyester resins as characterized by the maximum temperature reached by a solution of unsaturated polyester resin and catalyst when heated in a water-bath at 80 °C, by the time taken for the temperature of

the mixture to rise from 65 °C to this maximum temperature, and also, if the maximum temperature exceeds 90 °C, by the time taken for the temperature to rise from 65 to 90 °C.

These characteristics give an indication of the processing behaviour of unsaturated polyester resins and can be used to compare resins of similar type. As the test results depend very much on the conditions under which the test is carried out, these conditions are described in detail.

## NOTES

- 1 If the method is used to test commercial benzoyl peroxide catalyst, the results should be compared with those obtained for the same resin using pure benzoyl peroxide.
- 2 By agreement between the interested parties, certain test conditions can be modified : such as the test temperature (temperature of the thermostatically controlled bath) and the quantity and type of catalyst system (mixtures of catalysts, combinations of catalysts and accelerators).

## 2 Principle

Placing of a mixture of 100 parts of resin with 1 part of catalyst in a test-tube of defined size. Heating of the test-tube and its contents in a water-bath at 80 °C for the duration of the reaction, and noting (or recording) the rise in temperature with time.

## 3 Reagent

During the analysis, use only reagents of recognized analytical grade.

**Benzoyl peroxide, catalyst.**

**WARNING — Attention is drawn to the dangers involved in handling pure benzoyl peroxide.**

A mixture of 50 % (*m/m*) of benzoyl peroxide catalyst in dibutyl phthalate having an active oxygen content between 3,25 and 3,33 % (*m/m*), as measured by known analytical methods.