International Standard 4577

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Plastics — Polypropylene and propylene-copolymers — Determination of thermal oxidative stability in air — Oven method

Plastiques — Polypropylène et copolymères de propylène — Détermination de la stabilité à l'oxydation à chaud dans l'air — Méthode à l'étuve

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Foreword

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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 4577 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in May 1982.

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

Australia	Germany, F.R.	Romania
Austria	Hungary	South Africa, Rep. of
Belgium	Iran	Spain
Brazil	Israel	Sri Lanka
Canada	Italy	Sweden
China	Jamaica	Switzerland
Czechoslovakia	Japan	United Kingdom
Egypt, Arab Rep. of	Korea, Rep. of	USA
Finland	Netherlands	USSR
France	Poland	

The member body of the following country expressed disapproval of the document on technical grounds:

India

Printed in Switzerland

Plastics — Polypropylene and propylene-copolymers — Determination of thermal oxidative stability in air — Oven method

1 Scope and field of application

This International Standard specifies a method for the determination of the resistance of moulded test specimens of polypropylene and propylene-copolymers to accelerated ageing by heat in the presence of air using a forced draught oven.

The method represents an attempt to estimate the service life of parts fabricated from propylene plastics.

The stability determined by this method is not directly related to the suitability of the material for use when different environmental conditions prevail.

NOTE — The specified thermal levels are considered sufficiently severe to cause failure of commercial grades of heat-stable propylene plastics within a reasonable period of time. If desired, lower temperatures can be applied to estimate the performance of propylene plastics with lower heat stabilities.

2 References

ISO 291, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 1133, *Plastics — Determination of the melt flow rate of thermoplastics.*

ISO 1191, *Plastics — Polyethylenes and polypropylenes in dilute solution — Determination of viscosity number and of limiting viscosity number.*

ISO 1873, *Plastics — Polypropylene and propylene-copolymer thermoplastics —*

Part 1: Designation.

Part 2: Determination of properties. [1)]

3 Principle

Accelerated ageing of test specimens by heat in the presence of air using a forced draught oven. Visual examination and determination of the time to failure.

Under the severe conditions of this test, the specimens undergo degradation at a rate dependent upon the thermal endurance of the propylene plastic under examination.

For the purpose of this International Standard, the time to failure of the material is taken as the number of days after which the specimen shows localized crazing, crumbling and/or discoloration.

If a more reliable estimate of the life-temperature relationship of propylene plastics is required, the test may be conducted at several temperatures and the data interpreted through use of the Arrhenius relation, by plotting the logarithms of times to failure against the reciprocals of the temperatures in kelvins. Temperatures in the range from 100 to 150 °C, with intervals of 10 °C, are suggested for this purpose.

4 Apparatus

4.1 Oven, mechanical convection type, capable of controlled circulation of air, with adjustable air intake and exhaust, equipped with a specimen holder and a temperature control system capable of adjustment to meet the following conditions:

a) exhaust rate: at least one oven-chamber volume in 10 min;

b) air velocity: from 0,75 to 1 m/s at any oven position occupied by the test specimens;

c) temperature control: range up to 200 °C and with control throughout the working range to the nearest 1 °C. The temperature control shall include a device to prevent temperature overrides. It is recommended that a device be used for recording the temperature inside the oven.

1) At present at the stage of draft.