

International Standard



4440

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Polyethylene (PE) pipes and fittings — Determination of melt flow rate

Tubes et raccords en polyéthylène (PE) — Détermination de l'indice de fluidité à chaud

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 4440 was developed by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, and was circulated to the member bodies in January 1978.

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

Australia	France	Norway
Austria	Germany, F.R.	Poland
Belgium	Greece	Romania
Brazil	Ireland	South Africa, Rep. of
Bulgaria	Israel	Spain
Canada	Italy	Sweden
Czechoslovakia	Japan	Turkey
Denmark	Mexico	United Kingdom
Egypt, Arab Rep. of	Netherlands	USSR
Finland	New Zealand	Yugoslavia

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

USA

Polyethylene (PE) pipes and fittings — Determination of melt flow rate

0 Introduction

The melt flow rate is only to be used to designate polyethylenes intended for use in the manufacture of pipes and fittings, it is not proposed to specify the values for this property.

1 Scope

This International Standard specifies a method for the determination of the melt flow rate of polyethylene (PE) made into pipes or fittings.

2 Field of application

This International Standard is applicable to all polyethylene (PE) pipes and fittings irrespective of the type of material used in their manufacture and their end use.

3 Reference

ISO 1133, *Thermoplastics — Determination of melt flow rate*.¹⁾

4 Test samples

Granules in the approximate form of 3 mm cubes produced by cutting or disintegrating a piece of the pipe or fitting for which it is intended to measure the melt flow rate.

5 Method of test

5.1 Principle

Measurement of the mass of polyethylene passing through a die under the action of a defined pressure, in a given time, at a temperature of 190 °C.

5.2 Apparatus

Extrusion plastometer, as defined in ISO 1133.

5.3 Procedure

Use the procedure as described in ISO 1133, with a die having a *k*-factor of 464, condition 4, (die diameter 2,090 to 2,100 mm — temperature 190 °C — reference time 600 s — load 2,160 kg).

NOTE — For the specific example indicated in note 1 of clause 5.4, use a die with a *k* factor of 1075, condition 5 (die diameter, 2,090 to 2,100 mm — temperature 190 °C — reference time 150 s — load 5 kg).

5.4 Expression of results

The melt flow rate is given, by the formula

$$\text{MFR } 190.2 = \frac{600 \times m}{t}$$

where

MFR is the melt flow rate;

190 is the test temperature, in degrees Celsius;

2 is the nominal load, in decanewtons, used for the determination;

600 is the reference time, in seconds;

m is the average mass of the cut-offs, in grams;

t is the time-interval between two cuts of the extrudate, in seconds.

Express the results to two significant figures.

NOTES

1 If for a higher density polyethylene the indicated value obtained by this method is less than 0,1, the test shall be repeated using a nominal load of 5 kg and the results calculated using a reference time of 150 s.

2 If it is required to compare materials at least one of which has a melt flow rate less than 0,1, it is recommended that a nominal load of 5 kg is used for all the determinations.

1) At present at the stage of draft. (Revision of ISO/R 1133-1969.)

5.5 Test report

The test report shall include the following particulars :

- a) reference to this International Standard;
- b) complete identification of the pipe or fitting in question;
- c) nature and physical form of the material with which the cylinder is charged;
- d) details of conditioning;
- e) diameter of die, temperature and load used to carry out the test;
- f) melt flow rate;
- g) any unusual behaviour of the test specimen, such as decomposition, sticking, extrudate distortion, or unexpected variation in melt flow rate.

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