
**Plastics piping and ducting systems —
Injection-moulded thermoplastics
fittings — Methods for visually assessing
the effects of heating**

*Systèmes de canalisations et de gaines en plastiques — Raccords
thermoplastiques moulés par injection — Méthodes d'essai pour
estimer visuellement les effets de la chaleur*

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 580 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

This third edition cancels and replaces the second edition (ISO 580:1990), which has been technically revised.

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Introduction

The test for determination of the resistance to heat according to the two test methods specified in this International Standard is applicable for distinguishing between properly and improperly moulded thermoplastics pipe fittings.

It can be used to

- determine whether cold slugs (pieces of material that enter the mould at a temperature significantly lower than the rest of the mass) or unfused areas are present,
- reveal cavities and porosity,
- determine the amount of moulded-in stress produced by the moulding process,
- reveal contamination, and
- show the integrity of the fusion line.

A stress-free part will generally have better properties and higher strength than parts with a higher degree of residual stress and will generally be less reactive when exposed to chemicals. By placing moulded fittings in a heated medium (air or liquid) at elevated temperature for a period of time dependant on their wall thickness, it is possible to detect internal stress.

Since the stresses start to be released as soon as the material passes to the rubbery state, it is only necessary to maintain the moulded pieces at a higher temperature for a defined period of time.

NOTE Injection-moulded fittings can be made by a number of techniques, whereby the material is injected into the mould cavity. These include single- or multi-point injection, diaphragm gating and ring gating. The technique used in the manufacture of mouldings will affect the way in which they are assessed.

Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating

1 Scope

This International Standard specifies two methods for assessing the effects of heating on injection-moulded thermoplastics pipe fittings — method A, using an air oven, and method B, using a liquid bath. In case of disagreement, method A is the reference method.

This International Standard is applicable to cement-welded fittings as well as to flanged fittings and fittings incorporating elastomeric seals and to fittings consisting of the assembly of several moulded parts (e.g. union connectors). It is applicable to both pressure and non-pressure fittings.

2 Principle

Complete mouldings are subjected to an elevated specified temperature in an air-circulating oven or a liquid bath for a given period of time, depending upon the wall thickness of the fitting and the material being moulded.

The surfaces of the moulding are examined before and after heating, and any cracks, blisters, delaminations or opening of fusion lines are measured and expressed as a percentage of the wall thickness.

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3 Test parameters

The following test parameters are specified by the subclauses referenced as follows and in Table 1 for the particular material used in the manufacturer of the fitting, unless the referring standard (a standard making reference to this International Standard in its own provisions) or regulations specify otherwise:

- a) the test temperature, T (see 4.1.1 and 4.3);
- b) the number of test pieces (see 4.2.2);
- c) the heating time, t (see 4.3.3);
- d) the test method to be used and, for method B (liquid bath) only, the test liquid.
- e) the acceptable limits for the occurrence or dimensions of any cracks or other features found (see 4.3.6).

Unless otherwise specified in the referring standard or regulations, the test parameters shall be in accordance with Table 1.

Table 1 — Test parameters to be used in absence of guidance in the referring standard

Material	Temperature T ± 2 °C	Heating time	
		Mean wall thickness e_m mm	Duration t min
ABS	150	$e_m \leq 3$	15
PE	110	$3 < e_m \leq 10$	30
PP	150	$10 < e_m \leq 20$	60
PVC-U		$20 < e_m \leq 30$	140
PVC-C		$30 < e_m \leq 40$	220
SAN+PVC		$40 < e_m$	240

4 Method A

4.1 Apparatus

4.1.1 Air-circulating oven, thermostatically controlled, equipped with a thermostat so that the temperature of the working zone can be maintained at the prescribed test temperature throughout the test and of sufficient heating capacity to enable the test temperature to be regained within 15 min of insertion of the test pieces.

4.1.2 Thermometer, graduated in 0,5 °C. Or a type “T” **thermocouple** with a resolution of 0,1 °C and an accuracy of at least $\pm 0,8$ °C.

4.2 Test pieces

4.2.1 Preparation

After removing any runners, take the complete mouldings as test pieces. If the fitting incorporates an elastomeric sealing ring, remove the ring before testing.

In the case of fittings assembled from more than one element, separate the components and test them out of contact with each other.

4.2.2 Number

The number of test pieces shall be as specified in the product standard. In the absence of any information on the number of test pieces, use at least three pieces.

4.3 Procedure

4.3.1 Set the oven temperature (4.1.1) at the test temperature ($T \pm 2$) °C in accordance with the product standard or Table 1.

4.3.2 Put the test pieces in the oven and arrange them so that they are standing on one side of their sockets wherever possible, avoiding contact with another test piece or the sides of the oven.