
**Rubber, raw — Determination of
the glass transition temperature by
differential scanning calorimetry (DSC)**

*Caoutchouc brut — Détermination de la température de transition
vitreuse par analyse calorimétrique différentielle (DSC)*



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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Apparatus and materials	2
6 Test specimen	2
7 Conditioning	2
8 Calibration	2
9 Procedure	2
9.1 Gas flow rate.....	2
9.2 Loading the test specimen.....	2
9.3 Temperature scan.....	3
10 Expression of results	3
11 Test report	4
12 Precision	5
Annex A (informative) Precision	6
Bibliography	9

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This second edition cancels and replaces the first edition (ISO 22768:2006), which has been technically revised with the following changes:

- additional description on placing an empty pan (crucible) as reference;
- general DSC thermogram inserted to show an inflection point which should be T_g ;
- move of the content of the clause on precision data to an informative [Annex A](#).

Rubber, raw — Determination of the glass transition temperature by differential scanning calorimetry (DSC)

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This document specifies a method using a differential scanning calorimeter to determine the glass transition temperature of raw rubber.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1407, *Rubber — Determination of solvent extract*

ISO 11357-1:2016, *Plastics — Differential scanning calorimetry (DSC) — Part 1: General principles*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11357-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

glass transition

reversible change in an amorphous polymer, or in amorphous regions of a partially crystalline polymer, from (or to) a rubbery or viscous condition to (or from) a glassy or hard condition

3.2

glass transition temperature

T_g

approximate midpoint of the temperature range over which the *glass transition* (3.1) takes place

Note 1 to entry: For the purposes of this document, the glass transition temperature is defined as the point of inflection of the DSC curve which has been obtained at a heating rate of 20 °C/min (see A.3).

4 Principle

The change in specific heat capacity of the rubber as a function of temperature under a specified inert atmosphere is measured using a differential scanning calorimeter (DSC). The glass transition temperature is determined from the curve thus produced.