INTERNATIONAL STANDARD

ISO
7884-2
First edition
1987-12-15

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

Glass — Viscosity and viscometric fixed points —

Part 2 :
Determination of viscosity by rotation viscometers

Reference number
ISO 7884-2 : 1987 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7884-2 was prepared by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Printed in Switzerland

Glass — Viscosity and viscometric fixed points —

Part 2 : Determination of viscosity by rotation viscometers

0 Introduction

International Standard ISO 7884, *Glass — Viscosity and viscometric fixed points*, consists of the following separate parts:

Part 1: Principles for determining viscosity and viscometric fixed points.

Part 2: Determination of viscosity by rotation viscometers.

Part 3: Determination of viscosity by fibre elongation viscometer.

Part 4: Determination of viscosity by beam bending.

Part 5: Determination of working point by sinking bar viscometer.

Part 6: Determination of softening point.

Part 7: Determination of annealing point and strain point by beam bending.

Part 8: Determination of (dilatometric) transformation temperature.

1 Scope and field of application

This part of ISO 7884 specifies a method of determining, by means of rotation viscometers, the dynamic viscosity of glass and, in particular, the viscosity-temperature relationship at any temperature or viscosity within the range of measurement. This covers the ranges of viscosity for melting, refining and working of glass.

This method allows for continuous measurements and for measurements under various shearing stresses (i.e. for the determination of flow curves) in order to check whether or not the glass behaves as a Newtonian liquid.

Dependent on the particular viscosity-temperature relationship of the glass tested, the viscosity range covered by this method extends approximately from 10 to 10^8 dPa·s* in the temperature range from about 1 600 to 600 °C, the torque necessary ranging from 0,1 to 20 N·mm according to the construction of the apparatus. The method is applicable if the rotational frequency does not exceed 8 s^{-1}; however, at rotational frequencies above 1 s^{-1} it should be ascertained that inertia forces are negligible.

* 1 dPa·s = $1 \frac{dN \cdot s}{m^2}$ = 1 P
(P is the symbol for poise)

2 Reference

IEC Publication 584-1, *Thermocouples — Part 1: Reference tables.*

3 Definitions

For the purposes of this part of ISO 7884, the following definitions apply.

3.1 Field of flow, crucible and plunger

3.1.1 field of flow: The whole gap filled by the molten glass sample and the spatial distribution of the flow velocities within it, including its boundaries.

3.1.2 crucible: The outer boundary of the molten glass sample corresponding to the inner surface of the crucible up to the level of the melt.

3.1.3 plunger: The inner boundary of the molten glass sample corresponding to the outer surface of the plunger up to the level of the melt.

3.2 Flow field coefficient and instrument constant

3.2.1 Rotation viscometers are either of the Searle type or of the Couette type, both of which allow the determination of the viscosity according to basic equation (1):

$$\eta = f\frac{T}{n} \qquad \ldots (1)$$

where

η is the viscosity;