

# INTERNATIONAL STANDARD

ISO  
7033

First edition  
1987-05-01



---

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

---

## **Fine and coarse aggregates for concrete — Determination of the particle mass-per-volume and water absorption — Pycnometer method**

*Granulats fins et gros pour béton — Détermination de la masse volumique réelle et de l'absorption d'eau — Méthode du pycnomètre*

Reference number  
ISO 7033 : 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 7033 was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*.

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.

# Fine and coarse aggregates for concrete — Determination of the particle mass-per-volume and water absorption — Pyknometer method

## 1 Scope and field of application

This International Standard specifies a method for the determination of the particle mass-per-volume and the water absorption of fine and coarse aggregates for concrete. The method is based on the use of a pyknometer for the determination of the volume of the aggregate particles.

For aggregates with a nominal particle size larger than 4 mm, the method indicated in this International Standard is an alternative to the hydrostatic balance method described in ISO 6783.

## 2 References

ISO 4847, *Concrete — Sampling of normal weight aggregates*.<sup>1)</sup>

ISO 6274, *Concrete — Sieve analysis of aggregates*.

ISO 6783, *Coarse aggregates for concrete — Determination of particle density and water absorption — Hydrostatic balance method*.

## 3 Definitions

**3.1 particle mass-per-volume** : Quotient of the mass of a sample of aggregate particles to the volume occupied by the particles, including adhering materials and both permeable and impermeable voids. Permeable (or open) voids are defined as voids which are water-filled when the particles are in a saturated and surface-dry condition.

The mass-per-volume is expressed as mass per unit volume of the aggregate, i.e. in kilograms per cubic metre.

**3.2 water absorption** : Increase in mass of a sample of dry aggregate particles due to the penetration of water into the permeable (open) voids of the aggregate particles.

It is expressed as a percentage of dry mass of the sample.

## 4 Apparatus and equipment

**4.1 Scale or balance**, of adequate capacity and accurate within  $\pm 0,1$  % of the mass of the sample to be weighed.

**4.2 Vessel or flask** of non-water-absorbing material, referred to henceforward as a pyknometer, into which the aggregate test sample can be readily inserted and in which the volume content can be reproduced within  $\pm 0,1$  %. The volume of the container filled to the mark shall be at least 50 %, but not more than 200 %, greater than the space required to accommodate the test sample.

**4.3 Well-ventilated oven**, thermostatically controlled to maintain a temperature of  $105 \pm 5$  °C.

**4.4 Metal container** of sufficient size to contain the sample and of such shape and dimensions that it will fit in the oven.

**4.5 Supply of water**, free from any impurity (e.g. dissolved air) that would significantly affect its density.

For fine aggregate testing, the following apparatus is necessary.

**4.6 Mould**, of non-water-absorbing material in the form of a frustum of a cone, with nominal dimensions 40 mm at the top, 90 mm at the bottom, and 75 mm high.

**4.7 Metal tamper**, having a mass of  $340 \pm 15$  g and a flat circular tamping face  $23 \pm 3$  mm in diameter.

**4.8 Shallow tray**, of non-water-absorbing material having a plane bottom of area not less than  $0,1 \text{ m}^2$  and an edge of not less than 50 mm height.

**4.9 Means of supplying a current of warm air**, such as a hair-drier.

For coarse aggregate testing, the following apparatus is necessary.

1) At present at the stage of draft.