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Methods of test for density and
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Foreword

This Japanese Industrial Standard has been revised by the Minister of Land, Infrastructure, Transport and Tourism through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Concrete Institute (JCI) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS A 1109**:2006), which has been technically revised.

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NOTE Based on Article 9 of the Supplementary Provisions to the Unfair Competition Prevention Act etc., any submission of proposal, or employment of procedures such as deliberation by the Japanese Industrial Standards Committee under the previous Industrial Standardization Act shall be deemed to have been conducted pursuant to the provision of Article 12, paragraph (1) of the revised Industrial Standardization Act.

Methods of test for density and water absorption of fine aggregates

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 7033:1987**, Edition 1, with some modifications of the technical contents.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex JB.

1 Scope

This Standard specifies a method for the determination of the density and the water absorption of fine aggregates. The test method for lightweight fine aggregates for structural concrete where aggregates in oven-dry condition are immersed in water for 24 h is specified in **JIS A 1134**.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 7033:1987 *Fine and coarse aggregates for concrete—Determination of the particle mass-per-volume and water absorption—Pycnometer method (MOD)*

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS A 1134 Methods of test for particle density and water absorption of lightweight fine aggregates for structural concrete

JIS A 1158 Method for reducing samples of aggregate to testing size

3 Apparatus and equipment

The apparatus and following equipment shall be used.

3.1 Scale or balance, with a weighing capacity of 2 kg or more and a scale interval of 0.1 g or smaller.

3.2 Pycnometer A flask or other suitable vessel of non-water-absorbing material, referred to henceforward as a pycnometer, into which the aggregate test sample can be readily inserted and in which the volume content can be reproduced within ± 0.1 %. The

volume of the container filled to its calibrated capacity shall be at least 50 %, but not more than 200 %, greater than the space required to accommodate the test sample.

NOTE The calibrated capacity is most typically 500 ml. In the case of lightweight aggregate, the capacity of the pycnometer should be 700 ml or more. For testing lightweight aggregate that floats in water, a pycnometer with a cover should be used.

3.3 Mould, of non-water-absorbing material made in the form of a cone for the purpose of testing the saturated surface-dry condition of fine aggregate, with nominal dimensions $40 \text{ mm} \pm 3 \text{ mm}$ at the top, $90 \text{ mm} \pm 3 \text{ mm}$ at the bottom, $75 \text{ mm} \pm 3 \text{ mm}$ high and 4 mm or more thick.

3.4 Tamping rod, having a mass of $340 \text{ g} \pm 15 \text{ g}$ and a flat circular tamping face $23 \text{ mm} \pm 3 \text{ mm}$ in diameter.

3.5 Oven, provided with an exhaust vent, and thermostatically controlled to maintain a temperature of $105 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$.

4 Sample

Sampling and preparation of sample shall be as follows.

- a) Obtain sample so as to represent the aggregate under test and reduce it in accordance with **JIS A 1158** to a mass of about 2 kg. Divide this reduced sample into two portions of about 1 kg each.
- b) Immerse the sample in water for 24 h, keeping the water at a temperature of $20 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ for at least 20 h during the 24-h immersion.
- c) Spread the sample obtained according to **b)** in a uniform layer over a flat surface. Then expose the aggregate to a gentle current of warm air to gradually evaporate surface moisture and stir it occasionally to ensure uniform drying.
- d) While the surface of aggregate is still slightly wet, fill the mould loosely with part of the sample, level the top smoothly, and lightly tamp the top layer with a tamping rod 25 times, adding no extra force than the weight of the tamping rod. Do not fill the space created by compaction with new portion of sample. Gently lift the mould in the vertical direction.
- e) If the aggregate cone does not collapse, then continue drying and repeat the cone test in **d)** just until the collapse situation occurs at mould removal. Take this sample as now-saturated surface-dried aggregate.
- f) If the aggregate cone collapsed in the first try, regarding this aggregate as having passed the saturated surface-dry condition, add a small volume of water to the aggregate, mix well, put a cover over it, leave for about 30 min, and then perform the procedures in **d)** and **e)** again.
- g) Divide each of the two samples obtained according to **e)** further into two portions, and use each of these divided portions for one density/water absorption test.