
International Standard



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Concrete — Determination of air content of freshly mixed concrete — Pressure method

Béton — Détermination de la teneur en air du béton frais — Méthode de la compressibilité

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Foreword

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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.

International Standard ISO 4848 was developed by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, and was circulated to the member bodies in March 1978.

It has been approved by the member bodies of the following countries :

Australia	Germany, F.R.	Portugal
Austria	India	Romania
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Brazil	Israel	Spain
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No member body expressed disapproval of the document.

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Concrete — Determination of air content of freshly mixed concrete — Pressure method

1 Scope and field of application

This International Standard specifies a method for the determination of the air content of freshly mixed concrete from observation of the change in volume of concrete with a change in pressure.

This method is intended for use with concretes and mortars made with relatively dense aggregates for which the aggregate correction factor can be satisfactorily determined by the technique described in clause 5. It is not applicable to concretes made with lightweight aggregates, air-cooled blast-furnace slag, or aggregates of high porosity.

2 References

ISO 2736, *Concrete — Sampling, making and curing of test pieces*.¹⁾

ISO 4109, *Fresh concrete — Determination of the consistency — Slump test*.¹⁾

ISO 6276, *Concrete, compacted fresh — Determination of density*.¹⁾

3 Apparatus

3.1 Air meters

There are available satisfactory apparatus of two basic operational designs employing the principle of Boyle-Mariottes law. For purposes of reference herein these are designated meter type A and meter type B.

3.1.1 Meter type A, consisting of a measuring bowl and cover assembly (see figure 1) conforming to the requirements of 3.2 and 3.3. The operational principle of this meter consists of introducing water to a predetermined height above a sample of concrete of known volume, and the application of a predetermined air pressure over the water. The determination consists of the reduction in volume of the air in the concrete sample by observing the amount the water level is lowered under the applied pressure, the latter amount being calibrated in terms of percentage of air in the concrete sample.

3.1.2 Meter type B, consisting of a measuring bowl and cover assembly (see figure 2) conforming to the requirements of 3.2 and 3.3. The operational principle of this meter consists of equalizing a known volume of air at a known pressure in a sealed air chamber with the unknown volume of air in the concrete sample, the dial on the pressure gauge being calibrated in terms of percentage of air for the observed pressure at which equalization takes place. Working pressures of 50 to 200 kPa have been used satisfactorily.

3.2 Measuring bowl, essentially cylindrical in shape, made of steel or other hard metal not readily attacked by the cement paste, having a minimum diameter equal to 0,75 to 1,25 times the height, and a capacity of at least 5 l. It shall be flanged or otherwise constructed to provide for a pressure-tight fit between bowl and cover assembly. The interior surfaces of the bowl and surfaces of rims, flanges and other component fitted parts shall be machined smooth. The measuring bowl and cover assembly shall be sufficiently rigid to limit the expansion factor, D , of the apparatus assembly (see annex) to not more than 0,1 % of air content on the indicator scale when under normal operating pressure.

3.3 Cover assembly

3.3.1 The cover assembly shall be made of steel or other hard metal not readily attacked by the cement paste. It shall be flanged or otherwise constructed to provide for a pressure-tight fit between bowl and cover assembly and shall have machined smooth interior surfaces contoured to provide an air space above the level of the top of the measuring bowl. The cover shall be sufficiently rigid to limit the expansion factor of the apparatus assembly as prescribed in 3.2.

3.3.2 The cover assembly shall be fitted with a means of direct reading of the air content. The cover for the type A meter shall be fitted with a standpipe, which may be a graduated precision-bore glass tube or may be metal of uniform bore with a glass water gauge attached. In the type B meter, the dial of the pressure gauge shall be calibrated to indicate the percentage of air. Graduations shall be provided for a range in air content of at least 8 % as determined by the proper air pressure calibration test.

¹⁾ At present at the stage of draft.