Transport
Roads & Maritime
Services

Test Method T368

Dressing of voids in concrete specimens and unit mass adjustment for embedded steel

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	May 1999
		Date on Test Method Revised to Agree with Date on Revision Summary	D.Dash	Feb 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	October 2012
Ed 2/ Rev 1	All	Better integration with R83 Edition 3, Removed filler density requirement, Minor anomaly in final calculation amended. Title amended	G Vorobieff	January 2014

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test Method T368 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

This test method is used by R83 to assist in the determination of the unit mass of concrete cores in test method AS 1012.12.2. Refer to Clause 5.2.4 Within-core Variability and 7.2 Unit Mass of Cylinders and Cores for more information.

Related documents to this test method are:

a) AS 1012.12 Section 2: Method 2 - "Hardened concrete (water displacement method)", which states in part: "Where appropriate, surface voids indicative of poor compaction should be sealed or wrapped to ensure account is taken of their effect."

b) Concrete Society Technical Report No 11 - "Concrete core testing for strength", London 1976.

Test Method T368

Dressing of voids in concrete specimens and unit mass adjustment for embedded steel

1. Scope

(a) This test method sets out procedures for:

- Dressing (i.e. filling and/or sealing) voids in concrete test specimens, in preparation for density testing (i.e. the mass per unit volume test) when using the water displacement method.
- Adjustment of the unit mass (or density) of a concrete test specimen for the presence of embedded reinforcing steel.

(b) The method of filling voids may be applied to the regular faces (flat or circular) of test specimens (or portions of specimens), such as cylinders, cores, cubes, and beams. It cannot be applied to irregular or fractured faces.

(c) The purpose of filling voids is to ensure that the void is measured as part of the volume of the specimen, but the mass of the filler must be excluded.

(d) Surface sealing can be applied to all specimen faces (both regular and irregular) as long as excess sealing material is removed to yield a specimen which is consistent in volume and shape to that which would have been produced with full compaction free of entrapped air voids beyond those accepted under Clause 2. Sealing may be used after filling. The purpose of sealing is to prevent water ingress into internal entrapped voids which cannot be filled under (b).

2. Requirements

(a) Filling of moulded specimens (e.g. cylinders, beams) except no fines concrete

- Voids with a maximum dimension less than 5 mm need not be filled.
- All voids measuring more than 15 mm in any direction must be filled.
- Voids measuring 5 - 15 mm in any direction must be filled if there are more than ten of these voids on the surface of the specimen.

(b) Filling of no fines concrete moulded specimens and all core specimens

- Fill all voids measuring 5 mm or more in any direction, including depth.

(c) Sealing

- Seal any specimen by immersion in wax if there is any indication that filling has not effectively sealed all inter-connected voids.

3. Equipment and filler

(a) A filler material which:

- Does not absorb water or change shape when immersed in water
- Will be stiff enough for shaping and contouring.

(b) A surface sealer such as wax which will prevent water absorption during the determination of specimen volume. Any bath/immersion apparatus should have sufficient depth to facilitate submersion of at least half the maximum core length plus 10%.

(c) Shaped cutters to match the contours of specimen surfaces, such as:

- A flat scraper
- Hollow circular scrapers, matching cylindrical specimens to radius ±5%
- A knife for trimming filler on irregular or fractured faces.

4. Procedure

(a) Filling

(i) Apply the filler to appropriate voids either:

- By manually filling discrete voids
- Or by immersing the specimen in appropriate filler material (wax).

Use a method and filler which completely fills all visible voids.

(ii) Shape the filler to match the specimen's contour, as if full compaction of the concrete had been achieved.

(iii) Remove any excess filler from the specimen by scraping with a shaped cutter.

(iv) Where voids exist in an irregular or fractured face (which, under clause 1(b), must not be filled), consider the alternative of trimming the face by sawcutting, if this is possible without significantly changing the unit mass of the specimen.

(v) If steel reinforcement is embedded in the surface of a core, and it is possible to remove the steel without damaging the core, then remove it and fill any voids adjoining the resulting cavity. Do not fill the cavity left by the steel bar itself. In filling voids adjoining the cavity, a smooth circular surface may be provided, ignoring any potential imprints from deformations on the steel bar.

(b) Sealing

(i) Seal all remaining voids in the specimen by total immersion in the sealer.

(ii) Scrape the specimen with a shaped cutter to remove all surface sealer and to replicate the finished surface which would have been produced through full compaction of the concrete.

(c) If embedded steel reinforcement cannot be readily removed, fill any surrounding voids. After measurement of the total mass and volume of the specimen, remove the steel bar by breaking the specimen. Then measure the mass and volume of the steel bar, using the water displacement method to measure volume. Finally determine the unit mass of the concrete, minus the steel, using the following equation.

5. Adjustment for Steel Reinforcement

For a specimen containing steel reinforcement, adjust the unit mass to a ‘without steel’ value, as follows:

$$\rho_a = \frac{m_1 - m_{s1}}{v_t - v_s}$$

Where:

ρ_a is the adjusted core unit mass after correction for steel (kg/m^3)

m_1 is the initial core mass, in SSD condition, including steel but prior to dressing (kg)

m_2 is the core mass in water at 23°C including steel and dressing (kg)

m_3 is the core mass, in SSD condition, including steel and dressing (kg)

v_t is the core volume including steel and dressing (m^3), given by

$$v_t = \frac{(m_3 - m_2)}{997.5} \quad (\text{m}^3)$$

- v_s is the volume of steel (m^3), given by

$$v_s = \frac{(m_{s1} - m_{s2})}{997.5}$$

- m_{s1} is the mass of steel in air (kg)
- m_{s2} is the mass of steel in water (kg)