

Australian Standard®

Methods of testing portland and blended cements

Method 12: Preparation of a standard mortar and moulding of specimens

1 SCOPE This Standard sets out the method for the preparation of a standard mortar and the moulding of specimens for testing of portland and blended cements, under precisely defined conditions.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

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| 1100 | Technical drawing |
| 1100.201 | Part 201: Mechanical engineering drawing |
| 2350 | Methods of testing portland and blended cements |
| 2350.11 | Method 11: Compressive strength of portland and blended cements |

EN

- | | |
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| 196 | Methods of testing cement |
| 196.1 | Part 1: Determination of strength |

3 PRINCIPLE The mortar is prepared by mechanical mixing of plastic mortar containing one part by mass of cement and three parts by mass of standard sand with a water:cement ratio of 0.50. Standard sands from various sources and countries may be used provided that they meet the requirements of EN 196.1.

4 APPARATUS AND RELATED CONDITIONS

4.1 Laboratory and storage facility conditions The air within the laboratory where preparation of specimens takes place shall be maintained at a temperature of $23 \pm 2^\circ\text{C}$ and a relative humidity of not less than 50%. The humidity controlled room or cabinet for storage of the specimens in the mould shall be continuously maintained at a temperature of $23 \pm 2^\circ\text{C}$ and a relative humidity of not less than 90%.

4.2 General requirements for equipment Tolerances shown on the drawings are important for correct operation of the equipment in the test procedure. When regular control measurements show that tolerances are not met, the equipment shall be rejected, adjusted or repaired where possible. Records of control measurements shall be kept.

Acceptance measurements on new equipment shall cover mass, volume and dimensions to the extent that these are indicated in this Standard, particular attention being paid to those critical dimensions for which tolerances are specified.

In those cases where the material of the equipment can influence the results, the material is specified and shall be used.

4.3 Mortar preparation

4.3.1 Mixer The mixer shall consist of the following:

- (a) A stainless steel mixing bowl with a capacity of approximately 5 L and of the general shape and size shown in Figure 1, provided with means by which it can be fixed securely to the mixer frame during mixing and by which the height of the bowl in relation to the mixer blade, and to some extent the gap between blade and bowl, can be finely adjusted and fixed.
- (b) A stainless steel blade of the general shape, size and tolerances shown in Figure 1, revolving about its own axis as it is driven in a planetary movement around the axis of the bowl by an electric motor at controlled speeds. The two directions of rotation shall be opposite.

The gap between blade and bowl shown in Figure 1 shall be checked and recorded every month.

The mixer shall operate at the appropriate speed given in Table 1.

TABLE 1
SPEEDS OF MIXER BLADE

Speed setting	Mixer blade r/min	Planetary movement r/min
Low speed	140 \pm 5	62 \pm 5
High speed	285 \pm 10	125 \pm 10

4.3.2 Scraper The scraper shall be a semi-rigid rubber or suitable plastic blade attached to a handle about 150 mm long. The blade shall be about 75 mm long, 50 mm wide and tapered to a thin edge about 1.5 mm thick.

4.3.3 Balance The balance shall have a capacity appropriate to the weighing required and shall have an accuracy of at least 0.5 g in the range used.

4.4 Moulding of specimens

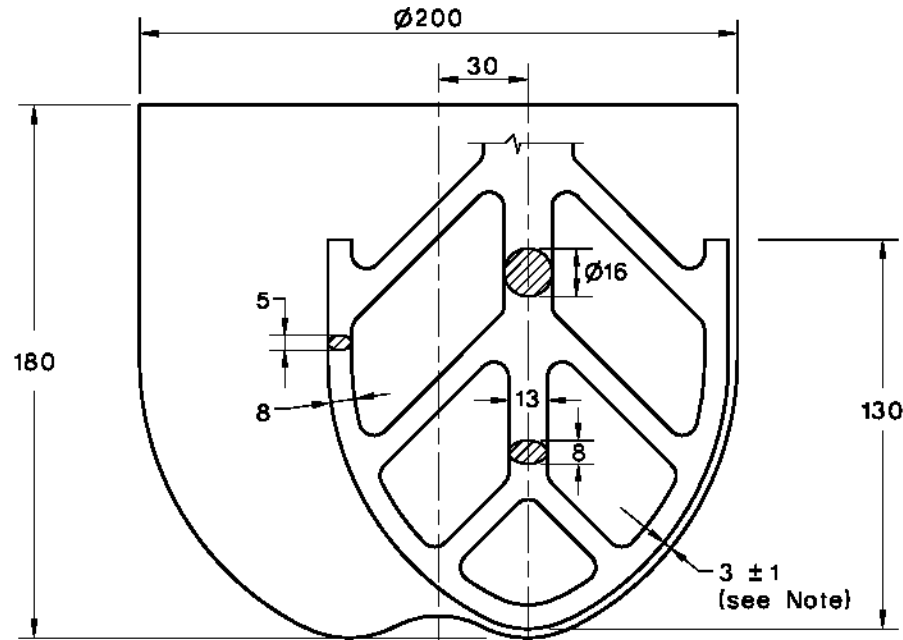
4.4.1 Mould The mould shall consist of three horizontal compartments so that three prismatic specimens can be prepared simultaneously. Depending upon the test to be performed on the specimens, the appropriate internal dimensions and tolerances of the mould compartments will be given in the relevant method of test in AS 2350.

The mould shall be made of steel with walls of nominal 10 mm thickness.

The mould shall be constructed in a way that will facilitate the removal of moulded specimens without damage. Each mould shall be provided with a machined steel or cast-iron baseplate. The mould, when assembled, shall be positively and rigidly held together and fixed to the baseplate. The assembly shall be such that there is no distortion or leakage. The baseplate shall make adequate contact with the table of the compacting apparatus and be rigid enough not to induce secondary vibrations.

NOTES:

- 1 Recommended surface hardness of each internal side face is at least of HV 200 Vickers hardness.
- 2 Each part of the mould should be stamped with identifying marks to facilitate assembly and to ensure compliance with the specified tolerances. Similar parts of separate mould assemblies should not be interchanged.



NOTE: The gap indicated on Figure 1 (3.0 ± 1.0 mm) refers to the situation when the mixer blade in the empty bowl is brought as close as possible to the wall. Simple tolerance gauges, e.g. a wedge gauge of flexible material (see Figure 2) or short cylinders of 2.0 mm and 4.0 mm diameter, are useful where direct measurement is difficult.

FIGURE 1 MIXING BOWL AND MIXER BLADE

The assembled mould shall comply with the following requirements:

- (a) Internal tolerances of each mould compartment shall be as follows:

Length: ± 0.8 mm

Width: ± 0.2 mm

Depth: ± 0.1 mm

NOTE: A special mould gauge is most helpful for routine checks. Figure 3 shows mould gauge used in AS 2350.11 for 40 mm \times 40 mm \times 160 mm specimens.

- (b) The flatness tolerance over the whole of each internal side face shall be ± 0.03 mm. (See AS 1100.201.)
- (c) The perpendicularity tolerance for each internal face with respect to the bottom surface of the mould and the adjacent internal face as datum faces shall be ± 0.2 mm. (See AS 1100.201.)
- (d) The surface texture of each internal side face shall be not rougher than N8. (See AS 1100.201.)

Moulds shall be repaired or replaced when any one of the specified tolerances is exceeded.

The mass of the assembled mould and baseplate shall be $10\,000 \pm 500$ g.

In assembling the cleaned mould ready for use, a sealing material shall be used to coat the outer joints of the mould. The interior surfaces of the mould shall be covered with a release agent. A release agent will be acceptable if it serves as a parting agent without affecting the setting of the cement and without leaving on the specimen any residue that will inhibit the penetration of aqueous solution into the specimen.