

Australian Standard®

AS 1141.2:2015

Methods for sampling and testing aggregates
Method 2: Basic testing equipment

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PREFACE

To provide general information on the requirements of standard pieces of equipment used throughout the AS 1141 series for the testing of aggregate and rock for engineering purposes.

This Standard incorporates Amendment No. 1 (December 2018). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The purpose of Amendment 1:2018 is to shift conformance requirements for test sieves in AS 1141 series test methods from withdrawn Standard AS 1152, *Specification for test sieves*, to ISO 3310-1, *Test sieves — Technical requirements and testing, Part 1: Test sieves with metal wire cloth*, and ISO 3310-2, *Test sieves — Technical requirements and testing, Part 2: Test sieves of perforated metal plate*. This will be achieved by amending AS 1141 series test methods to refer to this Standard (Part 2) rather than AS 1152. Amendment 1:2018 makes reference to the ISO standards. The aperture provisions of this Standard have not altered from those required in AS 1152. Provisions relating to continuing calibrations and other matters explicit AS 1152 have been added as requirements.

1 SCOPE

This Standard sets out requirements for basic equipment used in the performance of tests of the AS 1141 (AS/NZS 1141) series. Calibration and maintenance requirements for equipment are included in this Standard, which are intended to apply to the equipment listed in this Method and to equipment required in other parts of the AS 1141 (AS/NZS 1141) series.

NOTE: Requirements for specialized testing equipment, specific to each test, are included in the appropriate test methods.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

1006 Solid-stem general purpose thermometers

1141 Methods for sampling and testing aggregates

1141.24 Method 24: Aggregate soundness—Evaluation by exposure to sodium sulphate solution

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	3310 Test sieves — Technical requirements and testing
	3310-1 Part 1: Test sieves of metal wire cloth
	3310-2 Part 2: Test sieves of perforated metal plate

3 EQUIPMENT

3.1 General

Standard items of laboratory equipment in everyday use, such as test tubes, Petri dishes, beakers, mechanical stirrers, mortar and pestles, stirring rods, mixing apparatus, dishes and trays, spatulas, and similar items are not described in this Standard. Similarly, tools such as shovels or trowels, ancillary equipment such as barrows or trolleys, and miscellaneous items such as brooms, bags and brushes are not described. These and similar aids, need to be of good commercial quality to ensure successful sampling and testing.

3.2 Equipment calibration

Prior to commissioning any item of test equipment, it shall be established that the equipment is capable of meeting any performance requirements or other conformance criteria, such as dimensional tolerances, which are listed within this series of Standards for the applicable equipment category. This will normally entail formal calibration by a recognized calibration authority, or an equivalent process, to ensure that equipment compliance is established in a way that is traceable to Australian, or international, measurement standards, where available.

A program for ongoing assurance of equipment capability shall be established for each equipment item to ensure that the performance is not compromised in any way due to wear or deterioration resulting from usage, aging or possible mishandling of the equipment. This will require the operators of such equipment to define the intervals for equipment recalibration. In establishing the recalibration intervals, the equipment operator may take into account any schedule of equipment checks designed to identify drift or other loss of performance capability (i.e. between successive recalibrations) that would then trigger an unscheduled recalibration.

Establishing an effective equipment assurance program will involve consideration of how effectively the measurement uncertainty is being controlled for individual equipment items. In the absence of such supporting analysis, suggested intervals for laboratory test equipment checks and calibrations are available from the publications of some laboratory accreditation bodies.

NOTE: In Australia, the responsible authority for laboratory accreditation is the National Association of Testing Authorities (NATA).

4 MAINTENANCE

All items used in sampling and testing shall be maintained so that they comply with the specified requirements.

Before use, equipment shall be examined for signs of excessive wear or damage. No equipment that appears to have been excessively worn or damaged shall be used for testing until it has been checked and, if necessary, repaired.

Equipment that is—

- (a) used to determine test parameters;
- (b) used to establish test environments; or
- (c) toleranced in this Standard or any relevant test method,

shall not be used after repair until it has been recalibrated.

5 BASIC EQUIPMENT REQUIRED

5.1 Balances

Balances shall comply with the limit of performance specified in the individual test methods (see Note 1).

NOTES:

- 1 For a balance, the limit of performance ($\pm F$) means that there is not more than five chances in one hundred that the measured mass will be outside ($\pm F$) of the true value.
- 2 The limit of performance is applied where no calibration corrections are used in the normal operations of weighing on the balance.

Accredited balance calibrators are usually required to test and report on balances in accordance with NMI Monograph 4.

5.2 Drying ovens

Drying ovens shall comply with the following:

- (a) A temperature-sensing device shall be mounted in the oven so that it accurately indicates the temperature of the oven enclosure. The temperature indicator shall be located so that it can be observed from the working space in front of the cabinet, and shall be readable to 0.5°C. Additional sensors may be included in the oven design, in which case the temperature indicator may also show an average oven temperature.

- (b) The oven shall be fitted with an adjustable, automatic control device for maintaining the oven temperature within the range of $\pm 2^\circ\text{C}$ of the indicated oven temperature when empty and with the vents open and with the oven operating at the temperature settings used in the laboratory.

- (c) Forced air ventilation shall be provided to assist escape of moisture-laden air.

NOTE: For older ovens where forced air ventilation is not provided, records should be maintained which demonstrate the capability of the oven to achieve a minimum average evaporation rate of 15 g/h and not less than 10 g/h from each measured location in the oven, when measured by the procedures given in AS 1141.24.

- (d) The maximum temperature at any point shall not exceed the indicated temperature by more than $\pm 5^\circ\text{C}$ and shall be determined by placing temperature measuring devices, readable to 0.5°C, at the centre and eight corners of the oven. The temperature measuring devices shall not be placed within 50 mm of the walls, floor or ceiling of the oven. Readings shall be determined after a minimum of 12 h of continuous operation with the oven empty, the vents open, any forced ventilation system in operation and the door closed.

- (e) Special requirements for sodium sulfate soundness test drying ovens that require higher than normal evaporation rates are specified in AS 1141.24.

5.3 Sieves

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Test sieves of woven wire cloth shall conform to the requirements of ISO 3310, Part 1. Test sieves of perforated plate shall conform to the requirements of ISO 3310, Part 2. All sieves shall conform with the following as relevant:

- (a) Woven wire sieves shall only be used in nominal aperture sizes between 16 mm and 75 μm inclusive.
- (b) All woven wire sieves shall be of simple weave. Twilled weave sieves shall not be used for tests in the AS 1141 series.
- (c) Perforated metal plate sieves may be used for all nominal apertures greater than 4.0 mm.
- (d) Perforated plate sieves shall have square apertures. Round aperture perforated plate sieves shall not be used.

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- (e) All woven wire sieves of diameter 300 mm or 450 mm (these are not standard in ISO 3310-1) shall be manufactured of sufficient height to retain the full load of particles expected to be used on the sieve without loss of material during the sieving operation.
 - (f) All woven wire sieves of diameter 300 mm or 450 mm and with a mesh of 600 µm or finer shall have a support mesh (known as a spider) of coarser aperture below the sieving media, strong enough to prevent distortion of the sieving media when fully loaded with the test material.
 - (g) The results of test sample(s) tested on working sieves or sieve sets shall be compared against the same sample(s) tested on calibrated sieves or sieve sets retained and used only for the purpose of checking (known as master sieves). The frequency of this testing, checking for the continued compliance of the sieves or sieve sets, shall be dependent on the amount of use of the working sieves. The basis of rejection or continued use of the sieves shall be to ensure reasonable concurrence between the results.

NOTE: Criteria to determine concurrence and the frequency of checking should be decided by the users of the sieves usually in discussion with relevant authorities.
 - (h) All sieves used in AS 1141 methods shall be calibrated in accordance with ISO 3310-1 or ISO 3310-2 and the users of the sieves shall retain original calibration documents and records of all checking of working sieves against master sieves.
 - (i) Sieves shall be discarded when damage to the sieve frame or the seal between sieves in a nested set could lead to loss of sample.
 - (j) Sieves shall be discarded when there is any visible damage to the woven wire mesh or the edges of the perforated plate apertures.

5.4 Thermometers and other temperature measuring devices

All temperature measuring devices shall comply with the relevant requirements of AS 1006 or other appropriate Standards.

5.5 Glassware

Broken, chipped or cracked glassware shall not be used. Glassware used for volumetric measurement shall be treated and cared for in accordance with good laboratory practice.

5.6 Sample divider

An effective sample divider may be required for laboratory operations. If the laboratory is engaged in handling a range of sizes of sample, a corresponding series of sample dividers may be required. The essential requirement of a sample divider shall be that, at each pass of material, representative subsamples are obtained.

The width of the divider slots shall be at least 10% larger than the maximum size of particle in the material being split. The width shall be not greater than twice the maximum particle size except for nominal 5 mm material or finer when the maximum width shall be 10 mm.

There shall be an equal number of riffle slots to each material receiver and all slots shall be of approximately equal dimensions.

NOTE: The length of the divider slot should be at least 1.4 times the width of the slot, which would reduce the possibility of particles bridging the exit from the sample divider. Typical dimensions are given in Figure 1.

As an alternative to or in addition to the riffle splitters described above, a suitable, mechanized rotary cone splitter may be used, provided the design of the device prevents bridging of material across the openings of collection containers, and ensures that all subsamples collected are representative of the parent material.