AS 1141.3.1—2012
(Incorporating Amendment No. 1)

Australian Standard®

Methods for sampling and testing aggregates
Method 3.1: Sampling—Aggregates

This Standard incorporates Amendment No. 1 (April 2016). 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.

1 SCOPE

This Standard defines requirements and specifies methods for taking samples of aggregates and sands, for subdividing samples and for packing and forwarding samples for examination and testing. This Standard is limited to aggregate and rock products with a nominal size of 63 mm or less. The Standard may be applied to non-stabilized soil product or soil and rock blends, again provided that the maximum particle size is less than 75 mm. For rock, aggregate and soil products larger than these sizes AS 1141.3.2 applies.

NOTE: Provided that care is taken in adapting them, the procedures described in this Standard may be used for sampling other materials such as compacted layers of soil in earthworks construction, or asphaltic concrete prior to compaction. This Standard is referenced by the various AS 1289 sampling methods in relation to soil sampling.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS		
1141	Methods for sampling and testing aggregates	
1141.1	Method 1:	Definitions
1141.2	Method 2:	Basic testing equipment
1141.3.2	Method 3.2:	Sampling—Rock spalls and boulders
1289	Methods of testing soils for engineering purposes	
1289.1.4.1	Method 1.4.1:	Sampling and preparation of soils—Selection of sampling or test sites—Random number method
1289.1.4.2	Method 1.4.2:	Sampling and preparation of soils—Selection of sampling or test sites—Stratified random number method
4433	Guide to the sampling of particulate materials	
4433.1	Part 1:	Sampling procedures
4433.6	Part 6:	Inspection of mechanical sampling systems

3 DEFINITIONS

For the purpose of this Standard the definitions in AS 1141.1 and those below apply.

3.1 Competent personnel

Personnel suitably qualified and experienced in the principles of sampling aggregates and with the requirements of this Standard.

3.2 Lot

A discrete and defined quantity of material produced by a consistent process. The lot is the fundamental division of a body of aggregate for which material properties are determined. A lot consists of a homogeneous product and may be further defined by the length of the production run or by mass.

A1 **3.3 'Text deleted'**

3.4 'Text deleted'

3.5 'Text deleted'

3.6 Sampling scheme

Set of documented instructions that, as a minimum, establishes the following for each sample:

(a) Material to be sampled and the size of sample required.

(b) Purpose for obtaining the sample.

(c) Size and description of the lot(s) if applicable.

(d) Sampling procedure to be used.

(e) Sampling location.

(f) Location of sampling increments for each sample.

(g) Testing required on the sample collected.

(h) Details of sample dispatch.

NOTE: Further information on sampling schemes is contained in Appendix A.

3.7 Section

Part of the main body of material, the main body being regarded as divided into sections of about equal volume.

3.8 Stockpile

Heap or stack of material held in stock for future use.

3.9 Stratified random sampling

The taking of increments whereby the material being sampled is divided into strata, one increment being taken at random within each strata.

NOTE: See AS 1289.1.4.2 and Figure A6 of this document for further explanation of stratified random sampling.

3.10 Sub-lot

Approximately equal parts of a lot based on intervals of time, mass or space. A sub-lot is a subdivision of the lot which is used in stratified sampling schemes to ensure that samples are reasonably evenly distributed throughout the lot, rather than being concentrated in one area.

A1 **3.11 'Text deleted'**

3.12 Test fraction

Material derived from the sample, or a sub-sample either in the field or at the testing laboratory, by a process of screening. Except for some physical properties that are tested by fraction size, the test fraction ceases to be representative of the sample or sub-sample.

A1 **3.13 'Text deleted'**

3.14 Windrow

A linear body of material of triangular cross-section usually formed by blading with a grader.

4 APPARATUS

The following apparatus is required.

4.1 Sampling containers

To prevent loss of fines or to minimize the loss of moisture.

4.2 Bag ties, labels and marking pens

4.3 Shovel or suitable scoop

With sides sufficiently high to avoid loss of material from the sides.

4.4 Power equipment

This includes front-end loaders, backhoes and excavators with a minimum bucket capacity of 1 m^3.

NOTE: Power equipment is required in Clause 9.

4.5 Samples divided and weighed in the field

The following apparatus may be required depending on the procedure used and whether samples are divided and weighed in the field:

(a) Balance or scale to determine the mass of samples.

NOTES:

1 The scale or balance used to assess the mass of samples or sample increments need not be calibrated but should be checked with known masses annually.

2 Normally, the masses of sample increments or of samples are not checked in the field and containers or bags which have a known capacity are used. Regular checks of the amount of material collected should be made.

(b) Sample divider (riffle splitter) complying with the requirements of AS 1141.2.

(c) Sealable containers.

(d) A robust rectangular sampling frame for use in sampling from a conveyor belt. The cross-section of the frame shall be sufficient to enclose the full cross-section of material on the belt and the bottom edges of the frame shall fit the troughing of the belt. The frame shall be strong enough to withstand, without damage, being forced through the material on a stationary belt. The frame may be provided with lifting lugs or similar devices to facilitate handling. A type of sampling frame is illustrated in Figure 1.

(e) Sampling tube; two types which may be used are illustrated in Figure 2(a) and (b).

(f) Face sampling shield or board, as shown in Figure 3 (photo).

4.6 Optional equipment

The following equipment may be useful but is not required:

(a) *Mechanical sampler* A device designed to obtain a representative increment by cutting the flow of material at a plant transfer point or by cutting the full width of material on a conveyor belt in motion. Any such device shall conform to the requirements given in AS 4433.6.

(b) *Rotary sample divider* A rotary sample divider comprises a number of sector shaped canisters positioned on a platform, and a feeding device. The uniform material stream flows to a hopper spout and, by relative rotation of these two components, the flow is intercepted by the top edge of the sector shaped canisters, dividing the sample into representative parts.

5 CONSIDERATIONS

5.1 General considerations

All samples shall be taken in a safe manner and in accordance with a documented sampling scheme for the site or project as defined in Clause 3.6. Sampling shall be carried out with the utmost care and integrity by competent personnel, otherwise test results obtained from the samples may misrepresent the characteristics of the material.

The procedures to be followed are necessarily dependent on the purpose of sampling. Common purposes include—

(a) the determination of the average properties of the body being sampled; and

(b) the determination of the average properties and variation in properties within the body being sampled.

Sampling shall be conducted by means that ensure that the samples represent, as far as practicable, the true nature of the lot or the section of the main body of material from which they were drawn. The procedures in this Standard are designed to achieve this objective, with particular emphasis on avoiding segregation of the sampled material due to the effects of the sampling techniques. Samples not taken in accordance with this method are more likely to give non-representative test results.

NOTE: Further information on the causes and effects of segregation within bodies of aggregate is given in Appendix A.

The lot of material to be sampled may be aggregates or sand in a stockpile, a bin, a conveyor belt, delivery vehicles or a roadbed or earthworks structure.

The end result of the sampling operation is a quantity of material derived from a sample and upon which testing or examination is carried out. The sample is obtained by combining a number of sample increments taken directly from the lot of material. The masses of samples and sample increments shall be adjusted as necessary to suit the purposes of sampling.

5.2 Particular considerations

The procedures in this Standard are generally written to describe sampling to determine the average properties of a body of material and the appropriate methods of obtaining individual sample increments. The locations of sample increments may need to be adjusted according to the purpose of sampling. The general principles to be adhered to in making those adjustments are described below.

Where it is intended that testing is to provide only a measure of the average value of some property of the material, the sample increments shall be taken essentially at random locations through each section or sub-lot.

Where it is intended that testing is to provide a measure of the average value and variability of some property of the material, the sample increments shall be taken in close proximity within each section or sub-lot. In this case no fewer than five samples shall be taken essentially at random within the main body or lot of material. This procedure is not recommended for quantities of less than 250 t of aggregates and sand.

NOTE: During production of aggregates, single sample increments may be regarded as a sample for testing to provide an indication of production quality, usually as part of an ongoing quality control process.

Where it is intended that testing is to provide a measure of some property or contamination in a particular area in the main body of material, that area shall be defined and the total quantity of material which is considered to be at variance to the main body shall be identified. The total quantity of identified material shall be subjected to the appropriate sampling procedure described in this Standard. The relevance of this result to the whole body of material or lot shall be considered carefully.

NOTE: Further information on sampling is contained in the guide in Appendix A.