



Australian Government
**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Cancellation
General Certificate of Approval
No 4/8/0

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that the approval for use for trade granted in respect of the
pattern of

Brim Measures for the Determination of the Volume of Flowable Solids

has been cancelled in respect of new instruments as from 1 June 2012.

General Certificate of Approval No 4/8/0A first issued 19 September 2007 for
Brim Measures for the Determination of the Volume of Flowable Solids is still
valid for new instruments.

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
National Measurement Regulations 1999.

A handwritten signature in black ink, consisting of stylized cursive letters, positioned to the right of the signature text.

National Standards Commission



General Certificate of Approval

No 4/8/0

Issued under Regulation 9
of the
National Measurement (Patterns of Measuring Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of

Brim Measures for the Determination of the Volume of Flowable Solids

Signed and sealed by a person authorised
under Regulation 9 of the National
Measurement (Patterns of Measuring
Instruments) Regulations to exercise the
powers and functions of the Commission
under this Regulation.

A handwritten signature in black ink, appearing to be 'G. Berry', written in a cursive style.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/4/97.

Instruments purporting to comply with this approval shall be marked NSC No 4/8/0 and only by persons authorised by the manufacturer.

It is the manufacturer's responsibility to ensure that all instruments marked with this approval number are constructed as described in this Certificate of Approval and its Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act.

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval. —

DESCRIPTIVE ADVICE

Pattern: approved 1/4/92

- Brim measures of certain capacities for use in determining the volume of flowable solids such as sand, soil, gravel and agricultural materials.

Technical Schedule No 4/8/0 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

General Certificate of Approval No 4/8/0 dated 30/4/92
Technical Schedule No 4/8/0 dated 30/4/92 (incl. Test Procedure)
Figure 1 dated 30/4/92 —



National Standards Commission

TECHNICAL SCHEDULE No 4/8/0

Pattern: Brim Measures for the Determination of the Volume of Flowable Solids.

1. Description of Pattern

Brim measures of certain capacities for use in determining the volume of flowable solids such as sand, soil, gravel and agricultural materials. The measures are designed for use in association with lifting and tilting mechanisms mounted on a vehicle.

1.1 Approved Capacities

The pattern may be in any of the following capacities:

0.2 m³, 0.4 m³, 0.5 m³, 0.6 m³, 0.8 m³, 1.0 m³, 2.0 m³ and 5.0 m³.

1.2 Construction

The general arrangement of the measure, which may be of single or multiple parts, is shown in Figure 1. The measure is of welded metal plate construction, the plate being at least 5 mm thick.

The upper and lower sides of the measure are usually at an angle of between 45° and 90° to each other. The side plates are normal to the upper and lower sides and parallel to each other. The lower front edge of the measure, which comes in contact with the ground when filling, has a reinforcing toeplate of at least 15 mm thickness along its entire length.

With the exception of the toeplate, which may project by not more than 100 mm, no part of the measure projects beyond the plane formed by the upper and lower front edges and the side plates, giving a clear strikable brim.

Every measure shall be capable of being completely emptied in normal use.

1.3 Capacity Definition

The capacity of the measure is defined by the brim.

1.4 Verification/Certification Provision

Provision is made for a verification/certification mark to be applied adjacent to the capacity mark.

1.5 Marking

(a) Brim measures of the pattern shall be marked with the following data:

Manufacturer's identification
Capacity (refer para. (b) below)

(b) The capacity shall be clearly and permanently marked or moulded on the side of the measure, including the unit or its symbol, cubic metres (m³).

The capacity and its unit symbol shall be in the same alignment, in a position clearly visible when the measure is resting on the ground, on the nearside of the measure as it is, or is to be, mounted on a vehicle.

In the statement of capacity, all numbers and uppercase letters shall be at least 25 mm high and 10 mm wide; all lower case letters shall be at least 20 mm high and 8 mm wide.

TEST PROCEDURE

Maximum Permissible Errors

The maximum permissible errors applicable at verification/certification are:

-2% and +5%.

1. Testing by Measurement

Two methods of testing are available, other than by calculation. These relate to whether or not the measure is sealed and to its exact construction.

The measure is deemed to be horizontal when the lines joining the corners of the opening are horizontal, whether the edges forming the opening of the measure are straight or curved.

1.1 By Using Water

With the measure in a position such that the opening is horizontal, fill the measure with water either through a certified meter or by using certified measures.

If the measure is of two part construction, for example where the bottom of the measure is opened to discharge the contents, the measure should be lined with plastic and sealed with tape before water is added.

1.2 By Using a Dry Material

Allowing material to "hill" in the centre of the measure should be prevented.

For this test (dry) sand is preferred as it does not settle after loading and a density can be readily determined.

- (i) Place the measure in a position such that the opening is horizontal.
- (ii) Take an ordinary container (bucket), place this on a certified weighing instrument and tare off its mass.
- (iii) Fill the container with the test material and strike off the surface.
- (iv) Weigh the filled container and record this value and empty the container into the measure.
- (v) Repeat steps (iii) and (iv) until the measure is full.

Note: Care must be taken to minimise spillage, either by carefully distributing the test material over the volume of the measure or by collecting any spillage on a sheet, weighing the spillage and deducting this from the total.

- (vi) Determine the average density (d) of the test material by weighing samples of known volume (v) at the beginning, middle and end of the test to obtain the mass (m) of each sample.

Find the density of the test material from the equation $d = m/v$.

- (vii) Find the volume of the measure (V) from the equation $V = M/d$, where M = total mass of test material as measured, and d = average density as determined above.

1.3 Analysis of Results

Filling of the measure with water should stop as soon as water commences to flow out of the measure. When using a dry solid, the surface in the measure should be levelled by striking off using a straight object (screed).

This represents the minimum volume which is taken to be the capacity.

2. Testing by Calculation

When testing by calculation based on the internal measurements of the measure, rather than by transfer, the following formula may be used to calculate the capacity of the measure from the dimensions defined in Figure 1:

$$\begin{aligned} \text{Capacity} = & F\left\{ \frac{E}{2} \sqrt{G^2 - \left[\frac{G^2 + E^2 - (A + E - D)^2}{2E} \right]^2} \right\} - \\ & F\left\{ \frac{(E - D)}{2} \sqrt{C^2 - \left[\frac{C^2}{(2E - 2D)} \right]^2} \right\} + \\ & F\left\{ \frac{(BH - C \sqrt{B^2 - C^2/4})}{2} \right\} \end{aligned}$$

NOTE: All measurements should be internal, so allowance may need to be made for the wall thickness of the measure.

The following procedures may be used to find the various dimensions used above:

- (a) Lay the bucket on a flat surface so that side of length D is in contact with the surface over its whole length.
- (b) **TO FIND LENGTH E:** With a string line or long straight object, find the apex of the triangle, as defined by the extensions of sides A and D in Figure 1, by laying the string or object along the side length A until it just touches the ground. With a string line, anchor the end at the front of the bucket and gradually lower the free end until the string just touches the side A; extend the string till it just touches the ground. This locates the apex from which length E can be measured.
- (c) Radius B may be approximated using a flexible or rigid measure.

National Standards Commission



NOTIFICATION OF CHANGE

GENERAL CERTIFICATE OF APPROVAL No 4/8/0

CHANGE No 1

The following changes are made to the approval documentation for

Brim Measures for the Determination of the Volume of Flowable Solids

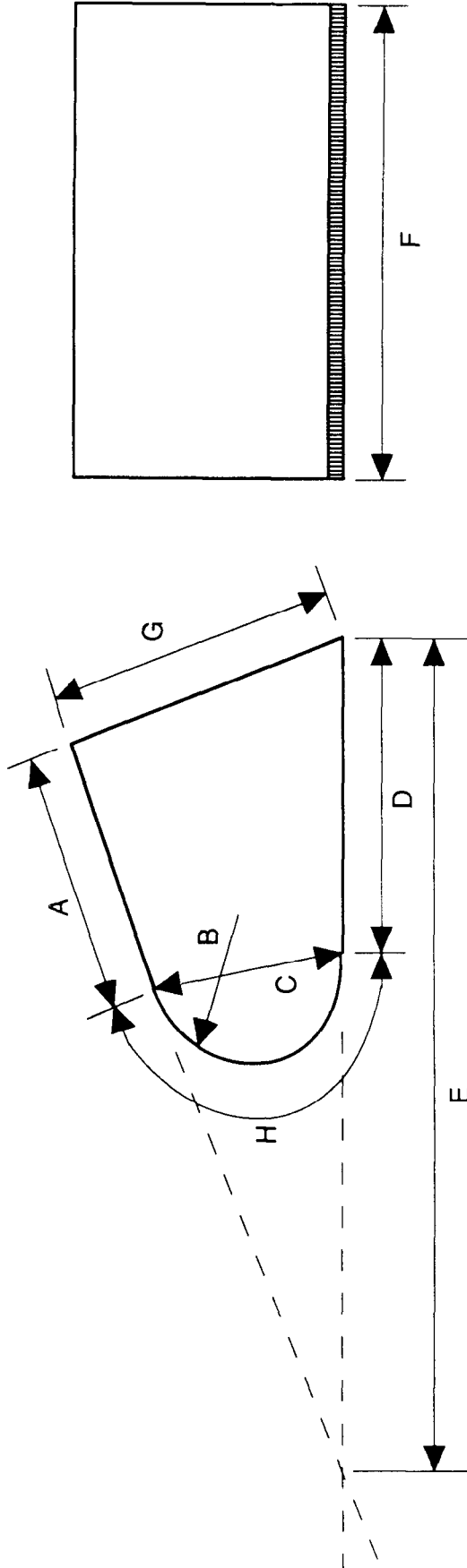
In Technical Schedule No 4/8/0 dated 30/4/92, cl. 1.1 **Approved Capacities** should be amended by adding certain capacities between 1.00 m³ and 5.00 m³, so that the list of approved capacities will now read:

"0.20 m³, 0.40 m³, 0.50 m³, 0.60 m³, 0.80 m³, 1.00 m³, 1.25 m³, 1.50 m³, 1.75 m³, 2.00 m³, 2.25 m³, 2.50 m³, 2.75 m³, 3.00 m³, 3.50 m³, 4.00 m³, 4.50 m³ and 5.00 m³."

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

A handwritten signature in black ink, appearing to read 'J. Burch', is written over a faint circular stamp.

FIGURE 4/8/0 - 1



Schematic Diagram of a Typical Measure