Australian Standard®

Loads on bulk solids containers

This Australian Standard was prepared by Committee BD/65, Loads on Bulk Solids Containers. It was approved on behalf of the Council of Standards Australia on 30 August 1996 and published on 5 October 1996.

The following interests are represented on Committee BD/65:

Bureau of Steel Manufacturers of Australia

CSIRO, Division of Building, Construction and Engineering

Institution of Engineers Australia

Swinburne University of Technology

University of Melbourne

University of Sydney

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PREFACE

This Standard was prepared by the Standards Australia Committee BD/65 on Loads on Bulk Solids Containers.

This Standard is based on *Guidelines for the assessment of loads on bulk solids containers* (first edition, 1986) prepared by a working party on bins and silos of the National Committee of Structural Engineering, The Institution of Engineers Australia.

The principal objective of the Standard is to provide users with nationally acceptable unified rules for the determination of loads for the design of containment structures, including bins, silos, bunkers, and dump hoppers, for the mass storage of granular bulk solids.

An amendment was approved by the Committee to take account of the 1993 publication of AS 1170.4, *Minimum design loads on structures (known as the SAA Loading Code)*, Part 4: *Earthquake loads*, and incorporate additional improvements to the clarity and intent of particular requirements, based on user comments. Other technical changes covered by the amendment are principally those initiated by comments from users of the Standard and relate to particular clauses in Sections 4, 6 and 7. The Committee recommended that, rather than issuing an amendment, a second edition of the Standard be published which incorporated the approved amendment.

Appropriate amendments to the relevant clauses in the Commentary on the Standard (AS 3774 Supplement 1) are issued concurrently with this second edition of AS 3774.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

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STANDARDS AUSTRALIA

Australian Standard

Loads on bulk solids containers

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements for the determination of loads for the design of containment structures, including bins, silos, bunkers, and dump hoppers, for the mass storage of granular bulk solids.

This Standard does not apply to containers for the storage of silage or containers with parameters not complying with Section 2.

NOTE: A typical bulk solids container specification data sheet is shown in Appendix A.

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

AS
1170 Minimum design loads on structures (known as the SAA Loading Code)
1170.1 Part 1: Dead and live loads and load combinations
1170.2 Part 2: Wind loads
1170.4 Part 4: Earthquake loads
1250 The use of steel in structures (known as the SAA Steel Structures Code)
1657 Fixed platforms, walkways, stairways and ladders—Design, construction and installation

1.3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.3.1 Angle of repose—the angle between the surface of a piled-up bulk solid and the horizontal plane.

1.3.2 Axisymmetric flow—a flow pattern formed during the discharge from a container of a bulk solid and characterized by particle trajectories that are symmetrical about the vertical axis of the container.

1.3.3 Bulk solids container—a generic name for all types of structures for containment of granular bulk solids, generally equipped with discharge outlets and capable of being emptied by gravity or by mechanical or pneumatic means.

1.3.4 Coefficient of wall friction—the ratio of the frictional traction to lateral wall pressure at any point on the container wall.

1.3.5 Coefficient of variation—the standard deviation expressed as a percentage of the mean value.

1.3.6 Cone—a conical hopper.

1.3.7 Cylinder—the vertical part of a circular container.

1.3.8 Dead zone—a zone of material that cannot be discharged by gravity.

1.3.9 Eccentric flow—a flow pattern in which the vertical centre-line of the flow channel does not coincide with the vertical centre-line of the container.