

AS 1692—1989

Australian Standard®

**Tanks for flammable and
combustible liquids**

This Australian Standard was prepared by Committee ME/17, Flammable & Combustible Liquids. It was approved on behalf of the Council of Standards Australia on 29 June 1989 and published on 11 December 1989.

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Australian Institute of Petroleum
Australian Paint Manufacturers Federation
Board of Fire Commissioners New South Wales
Confederation of Australian Industry
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Australian Standard[®]

**Tanks for flammable and
combustible liquids**

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PREFACE

This Standard was prepared by the Standards Australia Committee on Flammable and Combustible Liquids, to supersede AS 1692–1983. The Standard was originally derived from AS CB5, *Oil fuel installations*, which was first issued in 1942. When AS 1940, *SAA Flammable and Combustible Liquids Code* was issued in 1976, the requirements for the construction of tanks, as distinct from their installation, were extracted to be dealt with in a separate reference standard.

At that time a decision was made to limit the Standard to steel tanks, largely as a matter of convenience and expediency, i.e. the framework already existed in AS CB5 and other Standards, and steel tanks were well understood and quite common, while requirements for other materials would have needed time to develop.

The 1983 edition extended the scope to include stainless steel tanks. Consideration was given to the inclusion of aluminium, but the very wide variety of alloys, with widely differing strengths and susceptibility to corrosion, made it difficult to recommend thicknesses with any degree of confidence. Since aluminium is not in widespread use, and is then mainly used in special cases where compatibility with the contents is a major consideration, it was decided to omit it from the Standard, and treat it under Clause 1.6.

Thicknesses for all materials were chosen on the same premise as before, i.e. the thickness for all tanks except Category 6 are empirical, being the result of experience rather than accurate stress calculations. It has been considered that stresses will be comparatively low and that the need for the tank to be reasonably sturdy for handling, or a need for corrosion allowance, and similar practical factors dictate the material thickness. Other limiting assumptions which have a bearing on the shell thickness are as follows:

- (a) Liquid levels after normal filling will not be substantially above the 'tank-full' condition. No allowance has been made for the effect of filling an extended pipe to a level substantially above the tank.
- (b) The vapour space pressure will not exceed 35 kPa.
- (c) The length/diameter ratio of an aboveground tank on two supports will not exceed 5.
- (d) Shells are not stiffened.
- (e) The material is commercial grade low-carbon steel.
- (f) The liquid being stored is not more corrosive than normal petroleum products.
- (g) The density of the liquid being stored will not exceed 1000 kg/m³.
- (h) The possibility of using thinner materials, compensating by special shaping, corrugating, bracing or stiffening, is recognized, especially for stainless steel. Any such alternatives may be admissible under Clause 1.6.

Outside these conditions, the assumptions and hence the requirements are no longer valid and specific approval may be necessary.

This Standard does not insist on compliance with any particular material Standards, or the use of specific grades of materials.

Tanks of glass-fibre reinforced plastics (GRP) are not covered in detail in this Standard although GRP is recognized as an alternative material. High cost has militated against widespread use, but construction is dealt with adequately in existing standards, except for underground service where some additional stiffening may be required.

The dimensional requirements of the first edition had been compared with British, American (UL), French, and German Standards to ensure that they were not inconsistent with general trends. The new dimensions for stainless steel were derived from AS 2809.2, *Tankers for flammable liquids*, in the absence of any other source.

The committee recognized that there are situations in which liquids other than petroleum derivatives are stored, and in which tank materials other than those covered may be suitable. However, it has not been possible to explore all the alternatives, and such special cases should be negotiated individually with the Authority.

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STANDARDS AUSTRALIA

Australian Standard
Tanks for flammable and combustible liquids

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies requirements for the design and construction of tanks for the storage of flammable and combustible liquids, together with certain accessories. It does not deal with their installation, nor does it deal with road, rail, or marine tankers, or with fuel tanks for vehicles. It is applicable only to the storage of materials that are liquid at normal temperatures and pressures.

NOTES:

1. This Standard is basically oriented towards cylindrical tanks of commercial grade low carbon steel for petroleum fuel storage, this being the most common application for tank storage, but it also provides for stainless steel tanks. Glass-fibre reinforced plastics are recognized alternative materials, but are dealt with in other Standards, notably BS 4994 and AS 2634. It is recognized that the storage of other types of liquid, or the use of other materials of construction, may render part or all of this Standard inappropriate; any such substitutions should be the subject of specific approval.
2. Attention is drawn to Appendix A, which sets out details of particular information that the purchaser needs to supply in order that the manufacturer can complete the tank.

1.2 CLASSIFICATION. Tanks within the scope of this Standard are classified as follows:

- (a) *Category 1*—tanks up to 1200 L capacity, for aboveground use, intended principally for the storage of oil fuel in domestic type applications.

NOTE: Category 1 tanks cannot be used for the storage of flammable liquids as they do not incorporate a liquid seal.

- (b) *Category 2*—vertical or horizontal cylindrical tanks up to 2500 L capacity, for aboveground use, intended principally for farms and similar open space locations.
- (c) *Category 3*—rectangular tanks and tanks of unconventional shapes, intended principally for industrial use aboveground as either head tanks or storage tanks.
- (d) *Category 4*—horizontal cylindrical tanks up to 150 m³ capacity, for underground or aboveground use, intended principally for industrial or service station use.
- (e) *Category 5*—vertical cylindrical tanks up to 150 m³ capacity, for aboveground use, intended for industrial use.
- (f) *Category 6*—vertical tanks up to any capacity, of a size and type that is usually erected on site.

1.3 APPLICATION. Tanks in Categories 1 to 5 shall comply with all the relevant requirements of Section 2 and the specific requirements of Section 3, as appropriate to the category. Tanks in Category 6 shall comply with Clause 3.6.

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

AS	
1020	The control of undesirable static electricity
1170	SAA Loading Code
1170.2	Part 2: Wind forces
1210	SAA Unfired Pressure Vessels Code
1250	SAA Steel Structures Code
1554	SAA Structural Steel Welding Code
1657	SAA Code for Fixed Platforms, Walkways, Stairways, and Ladders
1940	SAA Flammable and Combustible Liquids Code
2624	Steel plate and strip for the construction of welded steel tanks for oil storage
2634	Chemical plant equipment made from glass-fibre reinforced plastics (GRP) based on thermosetting resins
BS	
2654	Specification for the manufacture of vertical steel welded storage tanks with butt-welded shells for the petroleum industry
4994	Specification for the design and construction of vessels and tanks in reinforced plastics
5500	Specification for unfired fusion welded pressure vessels
API	
620	Recommended rules for design and construction of large, welded low-pressure storage tanks
650	Welded steel tanks for oil storage
ASTM	
D 5	Test method for penetration of bituminous materials.*

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

1.5.1 Approved (approval)—approved by (approval of) the authority concerned.

1.5.2 Authority, Authority having jurisdiction—the authority having statutory (legal) control of the installation which incorporates the tank.

1.5.3 Liquid (flammable, combustible)—a flammable liquid or a combustible liquid as defined in AS 1940.

1.5.4 Nominal thickness—the nominal thickness of material which is commercially available and to which specified manufacturing tolerances are applicable.

1.5.5 Domestic type—an application common to, but not necessarily restricted to, familiar dwellings.

* Identical with IP 49.



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