

Australian Standard[®]

Steel tanks for flammable and combustible liquids



This Australian Standard® was prepared by Committee ME-017, Flammable and Combustible Liquids. It was approved on behalf of the Council of Standards Australia on 20 January 2006.

This Standard was published on 22 February 2006.

The following are represented on Committee ME-017:

- A.C.T. WorkCover
 - Australasian Fire Authorities Council
 - Australian Chamber of Commerce and Industry
 - Australian Industry Group
 - Australian Institute of Petroleum
 - Australian Paint Manufacturers Federation
 - Department for Administrative and Information Services, S.A.
 - Department of Consumer and Employment Protection, W.A.
 - Department of Defence
 - Department of Emergency Services, Queensland
 - Department of Infrastructure, Energy and Resources, Tas.
 - Plastics and Chemicals Industry Association
 - Victorian WorkCover Authority
-

This Standard was issued in draft form for comment as DR 05392.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

STANDARDS AUSTRALIA

RECONFIRMATION
OF
AS 1692—2006
Steel tanks for flammable and combustible liquids

RECONFIRMATION NOTICE

Technical Committee ME-017 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Reconfirmed documents cannot be amended, but may be formally revised and a new edition published.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 28 April 2016.

The following are represented on Technical Committee ME-017:

Australasian Fire and Emergency Service Authorities Council
Australasian Institute of Dangerous Goods Consultants
Australian Industry Group
Australian Institute of Petroleum
Australian Paint Manufacturers' Federation
Department of Defence (Australian Government)
Department of Justice (TAS)
Department of Mines and Petroleum (WA)
Engineers Australia
Fire Protection Association Australia
Insurance Council of Australia
Plastic & Chemicals Industries Association
SafeWork NSW
SafeWork SA
Workplace Health and Safety Queensland
Worksafe New Zealand
WorkSafe Victoria

NOTES

Australian Standard[®]

Steel tanks for flammable and combustible liquids

Originated as part of AS CB5—1942.
Previous edition AS 1692—1989.
Fourth edition 2006.
Reissued incorporating Amendment No. 1 (August 2006).

COPYRIGHT

© Standards Australia

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 7281 1

PREFACE

This Standard was prepared by Standards Australia Committee ME-017, *Flammable and Combustible Liquids* to supersede AS 1692—1989. This new edition has been revised to include new standards and designs to which tanks may be constructed and tested. References to ‘approvals’ by authorities have been removed, in line with current regulatory practices.

This Standard incorporates Amendment No. 1 (August 2006). 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 objective of this Standard is to provide requirements and recommendations for the design and construction of a range of types of steel tanks suitable for the storage of flammable and combustible liquids. This Standard is limited to tanks made of steel and stainless steel, and includes tanks with integral secondary containment.

Thicknesses of materials are based on empirical data, being the result of experience rather than stress calculations, the exception being tanks of Category 6 (e.g. those built to API 650).

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of the Standard.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	4
1.2 APPLICATION	4
1.3 CATEGORIES OF TANKS.....	5
1.4 REFERENCED DOCUMENTS	5
1.5 DEFINITIONS	5
 SECTION 2 GENERAL DESIGN AND CONSTRUCTION REQUIREMENTS FOR TANKS OF CATEGORIES 1 TO 5	
2.1 SCOPE OF SECTION	7
2.2 GENERAL REQUIREMENTS	7
2.3 LIQUID LEVEL INDICATION	8
2.4 FILLING PROVISIONS.....	9
2.5 DRAINING AND NORMAL DRAW-OFF	10
2.6 MANHOLES	10
2.7 TANK VENTS	11
2.8 TESTING	11
2.9 HANDLING AND TRANSPORT	13
2.10 TANKS WITH FIRE-RATED COVERINGS.....	13
 SECTION 3 REQUIREMENTS FOR SPECIFIC CATEGORIES OF TANKS	
3.1 SCOPE OF SECTION	14
3.2 CATEGORY 1 TANKS.....	14
3.3 CATEGORY 2 TANKS.....	14
3.4 CATEGORY 3 TANKS.....	14
3.5 CATEGORY 4 TANKS.....	15
3.6 CATEGORY 5 TANKS.....	16
3.7 CATEGORY 6 TANKS.....	18
 APPENDICES	
A INFORMATION TO BE PROVIDED BY THE PURCHASER.....	22
B REFERENCED DOCUMENTS	23

STANDARDS AUSTRALIA

Australian Standard

Steel tanks for flammable and combustible liquids

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the design and construction of steel tanks for the storage of flammable and combustible liquids. It sets out requirements for tank joints and accessories (e.g. vents, manholes, fill level indicators) and specifies tank testing requirements.

This Standard applies only to tanks that are used to store substances that are liquid at normal temperatures and pressures.

The shell thicknesses of tanks specified in this Standard are based on the following assumptions:

- (a) Stresses on the tank will be comparatively low.
- (b) The liquid being stored is no more corrosive than normal petroleum products.
- (c) The density of the liquid being stored is not greater than 1000 kg/m³.
- (d) The tank needs to be reasonably sturdy for handling and any transport.
- (e) An allowance for corrosion needs to be made.
- (f) Liquid levels after normal filling will not be substantially above the 'tank full' level.
- (g) No allowance is made for the effect of filling an extended pipe to a level that is substantially above that of the tank.
- (h) The pressure in the vapour space will not exceed 35 kPa.
- (i) The length-to-diameter ratio of an above-ground tank on two supports does not exceed 5.
- (j) The tank shell is not stiffened.
- (k) The material of construction is commercial-grade, low-carbon steel.

The possibility of using thinner materials, compensating by shaping, corrugating, bracing or stiffening, is recognized, especially for stainless steel. In such cases the design will need to demonstrate mechanical properties that are at least equivalent to a similar size of tank built to this Standard if such a tank is to be used for flammable or combustible liquids.

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

1.2 APPLICATION

This Standard applies to the design and construction of tanks of commercial grade low carbon steel or stainless steel for the storage of flammable or combustible liquid. It also applies to tanks with integral secondary containment such as those approved by Underwriters Laboratories (UL) and having a fire-rated secondary containment.

This Standard does not apply to—

- (a) the installation of tanks;
- (b) road, rail or marine tankers; or
- (c) fuel tanks for vehicles or marine craft.

Alternative materials of construction (e.g. glass-fibre reinforced plastics (GRP), other plastics and aluminium and its alloys) are not covered by this Standard, although GRP is recognized as an alternative material for underground storage tanks.

1.3 CATEGORIES OF TANKS

Tanks covered by this Standard are classified as follows:

(a) *Category 1*

Tanks of up to 1200 L capacity, for above-ground use, and intended principally for the storage of fuel oil in domestic situations.

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 tanks of up to 2500 L capacity, for above-ground use, and intended principally for use on farms and other open space locations.

(c) *Category 3*

Rectangular tanks and tanks of unconventional shapes, for above-ground use, and intended principally for industrial use as either head tanks or storage tanks.

(d) *Category 4*

Horizontal cylindrical tanks of up to 150 m³ capacity, for above-ground or underground use, and intended principally for industrial or service station use.

(e) *Category 5*

Vertical cylindrical tanks of up to 150 m³ capacity, for above-ground use, and intended for industrial use.

(f) *Category 6*

Vertical tanks of any capacity, of a size and type that are usually erected on site.

Appendix A provides further information that needs to be provided by the purchaser to the manufacturer of the tank.

1.4 REFERENCED DOCUMENTS

A list of the documents referred to in this Standard is given in Appendix B.

1.5 DEFINITIONS

For the purposes of this Standard, the following definitions apply:

1.5.1 Capacity

The maximum volume or space within a container, i.e. the volume it can hold without overflow or leakage.

NOTE: The available capacity of a container is normally less than its full capacity, because of the need to provide an ullage space to allow for thermal expansion. A common practice is to allow 3% for ullage, but local regulations or factors such as tank size, sheltered locations or underground installation may all have a bearing on the ultimate figure used.

1.5.2 Combustible liquid

Any liquid, other than a flammable liquid, that has a flash point, and has a fire point that is less than its boiling point.

NOTE: The boiling point is that point at which it is no longer possible to achieve the rate of temperature rise required by ISO 2592 for the determination of fire point.

1.5.3 Flammable liquids

Liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (e.g. paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60.5°C, closed cup test, or not more than 65.6°C, open cup test, normally referred to as the flash point.

NOTE: Reference should be made to the ADG Code.

1.5.4 Liquid

A flammable or combustible liquid as defined above and in AS 1940.

1.5.5 Nominal thickness

The nominal thickness of a material that is commercially available and to which specified manufacturing tolerances apply.