AS 2304—2011

Australian Standard®

Water storage tanks for fire protection systems

This Australian Standard® was prepared by Committee FP-008, Fire Pumps and Fire Tanks.
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The following are represented on Committee FP-008:

- Association of Hydraulic Services Consultants Australia
- Australasian Fire and Emergency Service Authorities Council
- Australian Canvas and Synthetic Products Association
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Consult Australia
- Consumers Federation of Australia
- Engineers Australia
- Fire Protection Association Australia
- Insurance Council of Australia
- Pump Industry Australia

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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 the public comment period.

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PREFACE

This Australian Standard was prepared by Standards Australia Committee FP-008, Fire Pumpsets and Fire Tanks.

Technical Sub-committee FP-008-02, Fire Tanks, provided invaluable assistance in the development of this Standard, especially in the sections relating to design action (loads), tank design and tank foundations.

This Standard was developed taking into consideration local and international Standards.

Maintenance of water storage tanks for fire protection purposes is covered in Section 11 of this Standard, but will be removed by amendment when the same requirements are published in Australian Standard titled, *Routine servicing of fire protection systems and equipment*, currently under development (see Note to Clause 1.1).

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

This Standard incorporates commentary on some of the clauses. The commentary directly follows the relevant Clause shown in italic font-type and enclosed in a panel. The commentary is for information only and does not need to be followed for compliance with the Standard. Commentaries explain the purpose of a Clause and give, in some cases, background information.

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FOREWORD

This Standard has been developed to provide reliable water storage for fire protection purposes. Water storage tanks that are not designed correctly nor adequately maintained are prone to failure.

Design provisions for bolted steel tanks are covered in this Standard. Design provisions for tanks made from other materials are not covered by this Standard and may be included in future editions.

This Standard applies to suction tanks for sprinkler, hydrant and hose reel systems as well as for break tanks and dual-use fire protection storage tanks.

Steel tanks consist of a floor (either steel, concrete or liner), cylindrical or rectangular shell fabricated from steel plates joined together, and a roof, all of which rest upon a foundation. Tanks are filled with water from an outside source. Water is withdrawn in emergency situations through piping connected to a pump. Accessory items are provided to fill and drain the tank, monitor the water level, gain access for inspection and repair, provide means for accessing the water and to prevent positive or negative pressures, etc.

For tanks manufactured from materials other than bolted steel and bolted cast iron, the accessories and maintenance provisions of this Standard apply.

STANDARDS AUSTRALIA

Australian Standard
Water storage tanks for fire protection systems

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out the minimum requirements for the design, construction, installation, commissioning and maintenance of bolted steel circular and rectangular water tanks for the storage of water for fire protection systems. This Standard also provides guidance on water sources and qualities that influence tank design and construction, together with water conservation measures.

NOTE: 'Maintenance' will be removed by amendment when the second edition of AS 1851 is published.

This Standard is limited to—

(a) the tank structure;

(b) the tank foundation; and

(c) tank penetrations and related accessories.

The requirements cover—

(i) bolted steel and bolted cast iron tanks with and without liners.

(ii) all other fire service tanks' accessories (Section 7).

This Standard applies to the following systems, where applicable:

(A) Automatic fire sprinkler systems to AS 2118.1.

(B) Fire hydrant systems to AS 2419.1.

(C) Fire hose reel systems to AS/NZS 1221.

(D) Combined sprinkler and hydrant systems in multistorey buildings to AS 2118.6.

(E) Residential sprinkler systems to AS 2118.4.

(F) Fire pumpsets to AS 2941.

This Standard does not apply to the design and application of the following:

(1) Plastic tanks.

(2) Fibreglass tanks.

(3) Agricultural and rainwater tanks.

(4) Drinking water tanks.

(5) Wooden tanks.

(6) Non-ferrous metal tanks.

(7) Bladder tanks.

(8) Welded steel tanks.

(9) Concrete tanks.

1.2 OBJECTIVE

The objective of this Standard is to provide a reliable and durable structure for the storage of water for fire protection purposes, to ensure the structure remains functional throughout the service life of the building and the installed fire protection systems (typically 25 to 30 years).

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard.

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

1110 ISO metric hexagon bolts and screws—Product grades A and B
1110.1 Part 1: Bolts

1111 ISO metric hexagon bolts and screws—Product grade C
1111.1 Part 1: Bolts

1170 Structural design actions
1170.4 Part 4: Earthquake actions in Australia

1397 Steel sheet and strip—Hot-dip zinc-coated or aluminium/zinc–coated

1579 Arc-welded steel pipes and fittings for water and waste-water

1657 Fixed platforms, walkways, stairways and ladders—Design, construction and installation

1722 Pipe threads of Whitworth form
1722.2 Part 2: Fastening pipe threads

1726 Geotechnical site investigations

1830 Grey cast iron

2001 Methods of test for textiles
2001.2.3.1 Part 2.3.1: Physical tests—Determination of maximum force and elongation at maximum force using the strip method
2001.2.3.2 Part 2.3.2: Physical tests—Determination of maximum force using the grab method (ISO 13934-2:1999, MOD)

2074 Cast steels

2118 Automatic fire sprinkler systems
2118.1 Part 1: General systems
2118.4 Part 4: Residential
2118.6 Part 6: Combined sprinkler and hydrant

2419 Fire hydrant installations
2419.1 Part 1: System design, installation and commissioning

2870 Residential slabs and footings

2941 Fixed fire protection installations—Pumpset systems

3566 Self-drilling screws for the building and construction industries
3566.1 Part 1: General requirements and mechanical properties

3600 Concrete structures

3798 Guidelines on earthworks for commercial and residential developments

4087 Metallic flanges for waterworks purposes

4100 Steel structures

AS/NZS	
1170	Structural design actions
1170.0	Part 0: General principles
1170.1	Part 1: Permanent, imposed and other actions
1170.2	Part 2: Wind actions
1170.3	Part 3: Snow and ice actions
1221	Fire hose reels
1252	High strength steel bolts with associated nuts and washers for structural engineering
1594	Hot-rolled steel flat products
2865	Safe working in a confined space
3500	Plumbing and drainage
3500.1	Part 1: Water services
3679	Structural steel
3679.1	Part 1: Hot–rolled bars and sections
4600	Cold-formed steel structures
4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

1.4 APPLICATION

This Standard is intended for the following end users:

(a) Fire system designers.

(b) Tank designers.

(c) Tank installers.

(d) Tank manufacturers.

(e) Maintenance contractors.

(f) Fire consultants.

(g) Fire engineers.

(h) Hydraulics engineers.

(i) Civil engineers.

(j) Structural engineers.

(k) Plumbers.

(l) Fire brigades.

(m) Water authorities.

(n) Building owners/occupiers.

(o) Insurers.

(p) Property developers.

(q) Building consultants and architects.