

Australian Standard<sup>®</sup>

**Fixed fire protection installations—  
Pumpset systems**

**STANDARDS**  
Australia



This Australian Standard® was prepared by Committee FP-008, Fire Service Pumps. It was approved on behalf of the Council of Standards Australia on 11 October 2013. This Standard was published on 18 November 2013.

---

The following are represented on Committee FP-008:

- Association of Hydraulic Services Consultants Australia
  - Australasian Fire and Emergency Service Authorities Council
  - Australian Chamber of Commerce and Industry
  - Fire Protection Association Australia
  - Insurance Council of Australia
  - Pump Industry Australia
- 

This Standard was issued in draft form for comment as **DRAFT 2013.1**.

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.

---

#### **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Standards may also be withdrawn.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](http://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](mailto:mail@standards.org.au), or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

---

Australian Standard<sup>®</sup>

**Fixed fire protection installations—  
Pumpset systems**

Originated as AS 2941—1987.  
Previous edition 2008.  
First edition 2013.

**COPYRIGHT**

© Standards Australia Limited

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, unless otherwise permitted under the Copyright Act 1968.

ISBN 978 1 74342 625 8

## PREFACE

This Standard was prepared by the Standards Australia Committee FP-008, Fire Service Pumps, to supersede AS 2941—2008.

Maintenance requirements for fire pumpsets are given in AS 1851, *Routine service of fire protection systems and equipment*.

The symbols used in this Standard comply with those given in HB 20, *Graphical symbols for fire protection drawings*, and have been developed from ISO Standards. The typical illustrations are in diagrammatic form only.

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.

The use of Notes in this Standard is of an advisory nature only. They provide explanations and guidance on recommended design considerations or technical procedures, as well as informative cross-references to other documents or publications.

*This Standard incorporates a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by 'C' preceding the clause number, and is printed in italics in a box. The commentary is for information and guidance.*

## CONTENTS

	<i>Page</i>
FOREWORD.....	6
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE.....	7
1.2 OBJECTIVE .....	7
1.3 NORMATIVE REFERENCES .....	7
1.4 DEFINITIONS.....	7
SECTION 2 WATER SUPPLIES	
2.1 GENERAL.....	12
2.2 ACCEPTABLE SOURCES OF SUPPLY .....	12
2.3 QUALITY OF WATER.....	12
2.4 FLOODED SUCTION.....	12
2.5 SUCTION.....	12
2.6 SUPPLY FROM NATURAL SOURCES .....	13
SECTION 3 GENERAL REQUIREMENTS FOR FIRE PROTECTION PUMPSETS	
3.1 PERFORMANCE CHARACTERISTICS.....	18
3.2 PUMP TYPES .....	21
3.3 TYPES OF DRIVERS .....	23
3.4 PUMP/DRIVER CONNECTION .....	23
3.5 BASEPLATE.....	23
3.6 PIPEWORK.....	24
3.7 VALVES .....	25
3.8 VISIBILITY OF DISCHARGE.....	28
3.9 PRESSURE GAUGES.....	28
3.10 FLOW-MEASURING DEVICES.....	29
3.11 STARTING AND CONTROL.....	29
3.12 ELECTRICAL REQUIREMENTS .....	29
3.13 MARKING .....	33
3.14 PUMPSET PAINTING .....	35
3.15 PUMPSET MANUALS .....	35
3.16 PUMPSET CONFIGURATIONS .....	35
3.17 PUMP HOUSES AND PUMP ROOMS .....	40
SECTION 4 SPECIFIC REQUIREMENTS FOR FIRE PROTECTION PUMPS	
4.1 GENERAL.....	41
4.2 END-SUCTION PUMPS.....	43
4.3 AXIALLY SPLIT CASE PUMPS (HORIZONTAL OR VERTICAL SHAFT) .....	43
4.4 MULTISTAGE CENTRIFUGAL PUMPS .....	44
4.5 TURBINE TYPE CENTRIFUGAL PUMPS (VERTICAL SHAFT).....	44
4.6 DRIVERS FOR VERTICAL TURBINE PUMPS.....	46
4.7 POSITIVE DISPLACEMENT PUMPS FOR FIRE PROTECTION APPLICATIONS .....	47
SECTION 5 REQUIREMENTS FOR PRESSURE MAINTENANCE PUMPS	
5.1 GENERAL.....	49
5.2 GENERAL REQUIREMENTS FOR JOCKEY PUMPS.....	49
5.3 GENERAL REQUIREMENTS FOR JACKING PUMPS.....	50

SECTION 6 FIRE HOSE REEL PUMPSETS	
6.1	GENERAL..... 53
6.2	ELECTRIC-MOTOR DRIVEN FIRE HOSE REEL PUMPSETS ..... 53
6.3	COMPRESSION-IGNITION DRIVEN FIRE HOSE REEL PUMPSETS ..... 53
6.4	TYPES..... 54
6.5	OPERATION..... 54
6.6	ELECTRICAL WIRING..... 54
6.7	VALVES ..... 54
6.8	UNIONS ..... 54
6.9	MAXIMUM ALLOWABLE WORKING PRESSURE..... 55
6.10	MARKING ..... 55
SECTION 7 RESIDENTIAL SPRINKLER PUMPSETS	
7.1	GENERAL..... 57
7.2	PUMPSET TYPE..... 57
7.3	OPERATION..... 57
7.4	ELECTRICAL ..... 57
7.5	VALVES ..... 58
7.6	UNIONS ..... 58
7.7	MARKING ..... 58
SECTION 8 ELECTRIC DRIVERS AND CONTROLLERS	
8.1	ELECTRIC DRIVERS..... 60
8.2	ELECTRIC CONTROLLERS ..... 61
SECTION 9 COMPRESSION-IGNITION DRIVERS AND CONTROLLERS	
9.1	DRIVER TYPE..... 67
9.2	DRIVER PERFORMANCE..... 67
9.3	DRIVER SYSTEMS..... 68
9.4	COMPRESSION-IGNITION DRIVER CONTROLLERS..... 74
9.5	ELECTRICAL CONNECTION ON ENGINE..... 80
9.6	SPARE PARTS..... 80
SECTION 10 SHOP TESTING AND CONFORMANCE	
10.1	GENERAL..... 83
10.2	HYDROSTATIC TESTS ..... 83
10.3	PERFORMANCE TESTS..... 83
10.4	CONFORMANCE ..... 85
SECTION 11 SITING AND INSTALLATION	
11.1	GENERAL..... 86
11.2	TEMPERATURE ..... 86
11.3	LOCATION..... 86
11.4	LIGHTING ..... 86
11.5	VENTILATION..... 86
11.6	DRAINAGE ..... 86
11.7	PLINTHS..... 87
11.8	PROTECTION OF THE OVERALL SYSTEM AGAINST DAMAGE DUE TO MOVEMENT OR PRESSURE..... 87
11.9	IDENTIFICATION OF PIPEWORK..... 87

	<i>Page</i>
SECTION 12 COMMISSIONING TESTING	
12.1 GENERAL.....	88
12.2 ELECTRIC MOTOR PUMPSETS.....	88
12.3 COMPRESSION-IGNITION ENGINE DRIVEN PUMPSETS .....	89
12.4 AUTOMATIC PRESSURE MAINTENANCE (JOCKEY) PUMPSETS.....	91
APPENDICES	
A GUIDELINES FOR THE SELECTION OF DRIVERS .....	92
B OPERATIONAL WARNING SIGNS (TYPICAL).....	94
C WIRING SYSTEMS RATING .....	95
D THE PUMP HOUSE OR PUMP ROOM .....	97
E GUIDE TO EXHAUST SYSTEM SIZE SELECTION.....	100
F TYPICAL PERFORMANCE TEST DATA SHEETS.....	102
G TYPICAL PUMP START ARRANGEMENTS.....	110
BIBLIOGRAPHY.....	112

## FOREWORD

This Standard sets out requirements for pumpset systems to suit various types of fire protection systems such that a reasonable degree of protection for life and property from fire may be achieved. These requirements are based on sound engineering principles, test data and field experience.

The performance characteristics for pumpsets have been aligned to be the same for hydrant systems, sprinkler systems and combined sprinkler and hydrant systems. The committee considered the use of pressure-relief valves and concluded that these are not an acceptable way to limit system pressures in cases where substantial variations to suction pressures are encountered. The use of variable speed drives is preferred where pressure-relief valves are installed as a fail-safe measure. Bore pumps are no longer considered acceptable as primary fire fighting water supplies; however, they are still acceptable water sources for suction tanks. The maximum water velocity in pipework has been aligned with other fire protection standards.

The electrical feed requirements for all fire system pumpsets have been revised in conjunction with the AS/NZS 3000 (Wiring Rules) committee, and will be aligned when the next revision is published. The main switch/circuit breaker for electric driven fire pumpsets is now required to be located in the electric fire pump controller. The requirements for batteries (starting, control and back up) and their respective battery chargers have been revised to ensure appropriate compatibility. Jockey and jacking pumps are now required to have their own independent limited functionality controllers. Specific requirements have been included for cases where a diesel-driven hose reel pumpset is provided as the sole source of fire protection for a building.

The emergency dual manual start solenoids for non-compression-ignition driven pumpsets are no longer required to be located on the diesel engine. Provision has been made for new technology LCD and plasma screens and indicators for pumpset controllers. The requirement for dual ECMs for electronically managed compression-ignition engines has been relaxed. The cooling system components and arrangement on compression-ignition engines has been clarified, along with fuel line and fuel tank requirements. As air-powered starting arrangements are very rarely required, reference to them has been removed from the Standard.

The conditions and procedure for shop testing and commissioning testing of pumpsets have been clarified, and additional examples of performance test data sheets provided.

NOTE: See Appendix F.

The section on siting and location of pumpsets (Section 11) has been enhanced to take into consideration health and safety requirements. For installations that require a pump house or pump room, a normative appendix (Appendix D) has been provided, with requirements that satisfy the Australasian Fire and Emergency Service Authorities Council (AFAC).

## STANDARDS AUSTRALIA

## Australian Standard

## Fixed fire protection installations—Pumpset systems

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE**

This Standard specifies requirements for totally independent pumpset systems for use with fixed fire protection installations, such as sprinkler, hydrant, water spray, and hose reel systems. It covers water supplies, pumps, drivers, fire pump controllers, and auxiliary equipment. Requirements for siting, installation and commissioning testing, including acceptance testing of electrical and compression-ignition drivers, are also included.

## NOTES:

- 1 Some special fire pump installations (e.g. at petrochemical and petroleum plants and small rural installations) may require variations from the requirements of this Standard.
- 2 Examples of typical pumps covered by this Standard are shown in Figure 3.5.

**1.2 OBJECTIVE**

The objective of this Standard is to provide designers, manufacturers, installers and testers with minimum requirements for the design, manufacture, installation and commissioning testing of fire pumpsets.

**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	
1319	Safety signs for the occupational environment
1345	Identification of the contents of pipes, conduits and ducts
1349	Bourdon tube pressure and vacuum gauges
1359	Rotating electrical machines—General requirements
1359.30	Part 30: Preferred outputs and frame sizes
1359.101	Part 101: Rating and performance
1692	Steel tanks for flammable and combustible liquids
1722	Pipe threads of Whitworth form
1722.2	Part 2: Fastening pipe threads
21.8	Automatic fire sprinkler systems (series)
2.29	Flanges for pipes, valves and fittings
2293	Emergency escape lighting and exit signs for buildings
2293.1	Part 1: System design, installation and operation
2304	Water storage tanks for fire protection systems
2417	Rotodynamic pumps—Hydraulic performance acceptance tests—Grades 1 and 2