

Australian Standard[®]

Indirect gas-fired ducted air heaters



This Australian Standard® was prepared by Committee AG-001, Gas Appliances. It was approved on behalf of the Council of Standards Australia on 8 April 2011. This Standard was published on 3 June 2011.

The following are represented on Committee AG-001:

- Appliance and Component Testing
 - Association of Accredited Certification Bodies
 - Australian Gas Association
 - Consumers Federation of Australia
 - Department of the Environment, Water, Heritage and the Arts
 - Energy Networks Association
 - Gas Appliance Manufacturers Association of Australia
 - Gas Technical Regulators Committee
 - LPG Australia
-

This Standard was issued in draft form for comment as DR AS 4556.

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Standards may also be withdrawn.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

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.

Australian Standard[®]

Indirect gas-fired ducted air heaters

Originated as AG 106—1977.
Previous edition AS 4556/AG 106—2000.
Second edition 2011.

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.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 0 7337 9861 0

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AG-001, Gas Appliances to supersede AS 4556—2000/AG 106—2000, *Indirect gas fired ducted air heaters*. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to retain this Standard as an Australian Standard rather than develop it as an Australian/New Zealand Standard.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with uniform minimum requirements for the safety, performance and use of indirect gas-fired ducted air heaters. This Standard should not be regarded as a design specification or as an instruction manual.

In this Standard's preparation, consideration has been given to—

- (a) continuity of satisfactory operation;
- (b) the prevention of fire hazards and explosions;
- (c) the prevention of injury to persons or property;
- (d) gas rules and regulations now in force; and
- (e) relevant international standards.

AS/NZS 5601 provides essential requirements and basic standards for gas installations.

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 and footnotes to tables and figures are deemed to be requirements of this Standard.

The relevant Australian technical regulators agree that this Standard includes appropriate requirements for particular appliances or components to be certified.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	5
1.2 REFERENCED DOCUMENTS	5
1.3 DEFINITIONS	6
SECTION 2 DESIGN AND CONSTRUCTION	
2.1 GENERAL	17
2.2 MATERIALS	19
2.3 ELECTRICAL SYSTEMS	20
2.4 INSTALLATION REQUIREMENTS	21
2.5 MAINTENANCE REQUIREMENTS	21
2.6 PRESSURE REGULATORS.....	22
2.7 GAS CONTROLS AND SAFETY SHUT-OFF SYSTEMS	22
2.8 COMBUSTION AIR SUPPLY AND CONTROLS.....	23
2.9 IGNITION, PILOTS AND MAIN BURNERS	24
2.10 FLUEING REQUIREMENTS.....	25
2.11 MARKINGS AND LABELS.....	26
2.12 INSTRUCTIONS	28
SECTION 3 PRELIMINARY TESTS—LINE GASES	
3.1 GENERAL REQUIREMENTS	31
3.2 PREPARATION FOR TESTING	31
3.3 GAS LEAKAGE	32
3.4 GAS CONSUMPTION	33
3.5 GAS PRESSURE REGULATORS	33
3.6 IGNITION AND SAFETY SHUT-OFF SYSTEMS	33
SECTION 4 LIMIT GAS TESTS	
4.1 GENERAL	37
4.2 CO/CO ₂ RATIO LIMITS FOR ANY INDEPENDENT BURNER—OVERLOAD... 37	37
4.3 CO/CO ₂ RATIO LIMITS FOR PERMANENT PILOTS—OVERLOAD	37
4.4 FLAME ABNORMALITY.....	37
4.5 BURNER IGNITION AT MAXIMUM AND MINIMUM LIMITING CONDITIONS.....	38
4.6 FLAME STABILITY TO DRAUGHT	38
4.7 NOISE OF EXTINCTION.....	38
4.8 BURNER STABILITY WHEN CHANGING SETTING	38
4.9 PILOT IGNITION AND STABILITY AT MAXIMUM AND MINIMUM LIMITING CONDITIONS	39
4.10 EFFECT OF OPENING AND CLOSING DOORS AT TURNDOWN CONDITION	39
4.11 UNBURNT GAS RELEASE FROM BURNER SYSTEM.....	39
4.12 BURNER INTERFERENCE AT IGNITION OR DURING COMBUSTION.....	39
4.13 CASE PRESSURE	39

SECTION 5 PERFORMANCE TESTS

5.1	GENERAL	40
5.2	FLUE OPERATION	40
5.3	THERMAL EFFICIENCY	41
5.4	FLUE GAS TEMPERATURE	41
5.5	CONDENSATION	41
5.6	COMBUSTION AIR SUPPLY	41
5.7	INTERLOCK SYSTEMS	42
5.8	TEMPERATURE HAZARDS	43
5.9	HEAT RESISTANCE.....	44
5.10	DURABILITY OF HEAT EXCHANGERS.....	45
5.11	WIND TEST.....	46
5.12	FAN PERFORMANCE	47
5.13	LINTING TESTS	48
5.14	RAIN TEST.....	48
5.15	STRENGTH	48
5.16	SPECIFICATIONS.....	48
5.17	ENERGY LABELLING	49
APPENDICES		
A	FIGURES A1 TO A12.....	50
B	METHODS OF TEST.....	62
C	GUIDELINES ON PROVIDING WRITTEN APPLIANCE SPECIFICATIONS	119
D	METER VOLUME CORRECTION FACTORS	121
E	FLUE GAS SAMPLING AND TEMPERATURE MEASUREMENT	123
F	FLUE SAMPLING METHOD FOR SMALL FLUES	130
G	DESIGN OF DUCTS AND PLENUMS FOR APPLIANCES	133
H	TYPICAL OPERATING SEQUENCE FOR AUTOMATIC BURNERS	136
I	INDIRECT GAS-FIRED DUCTED AIR HEATER ENERGY LABELLING	137

STANDARDS AUSTRALIA

Australian Standard
Indirect gas-fired ducted air heaters

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for indirect gas-fired ducted air heaters with natural draught or fan-assisted combustion systems intended for use with NG, town gas, liquefied petroleum gas (LP Gas) and tempered liquefied petroleum gas (TLP) with gas consumptions not exceeding 500 MJ/h.

NOTE: Other statutory and regulatory requirements may be applicable to the product(s) that fall within the scope of this Standard. It is the manufacturer's, importer's or distributor's responsibility (as appropriate) to ensure that products comply with such requirements.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- | | |
|--------|---|
| 1375 | Industrial fuel-fired appliances (known as the SAA Industrial Fuel-Fired Appliances Code) |
| 1722 | Pipe threads of Whitworth form |
| 1722.2 | Part 2: Fastening pipe threads |
| 1881 | Zinc alloys—Casting ingots and castings—Quality requirements |
| 4617 | Manual shut-off gas valves |
| 4620 | Thermoelectric flame safeguards |
| 4625 | Electronic flame safeguards and flame detectors |
| 4629 | Automatic shut-off valves and vent valves |
| 4646 | Gas appliance standards—Definitions and calculations |

AS/NZS

- | | |
|--------|--|
| 3500 | Plumbing and drainage |
| 3500.0 | Part 0: Glossary of terms |
| 3820 | Essential safety requirements for electrical equipment |
| 5601 | Gas installations |
| 5601.1 | Part 1: General installations |
| 5601.2 | Part 2: LP Gas installations in caravans and boats for non-propulsive purposes |

AS ISO

- | | |
|-----|--|
| 7.1 | Pipe threads where pressure-tight joints are made on the threads
Part 1: Dimensions, tolerances and designation |
|-----|--|

ISO

- | | |
|------|---|
| 6976 | Natural gas—Calculation of calorific values, density, relative density and Wobbe index from composition |
|------|---|

EN

- | | |
|-----|--|
| 298 | Automatic gas burner control systems for gas burners and gas burning appliances with or without fans |
|-----|--|