AS 4643—2007

Australian Standard®

Overhead radiant tube gas heaters

This Australian Standard® was prepared by Committee AG-001, Gas Appliances. It was approved on behalf of the Council of Standards Australia on 21 February 2007.
This Standard was published on 29 March 2007.

The following are represented on Committee AG-001:

- AGA (Network Operators)
- AGA Certification Services
- Appliance and Component Testing
- Australian Liquefied Petroleum Gas Association
- CSIRO Energy Technology
- Committee AG-001-03
- Consumers' Federation of Australia
- Energy Retailers Association of Australia
- Gas Appliance Manufacturers Association of Australia
- Gas Technical Regulators Committee

This Standard was issued in draft form for comment as DR 04158.

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Standards may also be withdrawn.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.

Australian Standard®

Overhead radiant tube gas heaters

Originated as AG 115—1985.
Previous edition AG 403—1986.
Revised and redesignated AS 4643—2007.

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

ISBN 0 7337 8135 7

PREFACE

This Standard was prepared by the Standards Australia Committee AG-001 Gas Appliances to supersede AG 403—1986, *Overhead radiant tube gas heaters.*

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 overhead radiant tube gas heaters.

This Standard should not be regarded as a design specification or as an instruction manual.

In its 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 5601, *Gas Installations* provides essential requirements and basic standards for gas installations.

The principal differences between this edition and AG 403—1986, are:

- Inclusion of all amendments in Australian Gas Association Technical Bulletins 86 to 104.
- Inclusion of tests on 'Z' gas.
- Updating of temperature hazard tests.
- Rearrangement of a number of Appendices, and transfer of some requirements previously in Appendices to the body of the Standard.

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

CONTENTS

Page

SECTION 1 SCOPE AND DEFNINTIONS
1.1 SCOPE 5
1.2 DEFINITIONS 5

SECTION 2 DESIGN AND CONSTRUCTION
2.1 GENERAL 13
2.2 MATERIALS AND STANDARDS 14
2.3 ELECTRICAL SYSTEMS 16
2.4 INSTALLATION REQUIREMENTS 17
2.5 MAINTENANCE REQUIREMENTS 17
2.6 PRESSURE REGULATORS 19
2.7 GAS CONTROLS AND FLAME SAFEGUARDS 19
2.8 COMBUSTION AIR SUPPLY AND CONTROLS 19
2.9 IGNITION, PILOTS AND MAIN BURNERS 20
2.10 FLUEING REQUIREMENTS 20
2.11 MARKINGS 21
2.12 INSTRUCTIONS 23

SECTION 3 PRELIMINARY TESTS - LINE GASES
3.1 GENERAL REQUIREMENTS 25
3.2 PREPARATION FOR TESTING 25
3.3 GAS LEAKAGE 26
3.4 GAS CONSUMPTION 27
3.5 GAS PRESSURE REGULATORS 27
3.6 IGNITION AND FLAME SAFEGUARD SYSTEMS 27

SECTION 4 TESTS USING LIMIT PRESSURES
4.1 GENERAL 32
4.2 CO/CO_2 RATIO LIMITS OF ANY INDEPENDENT SURFACE COMBUSTION BURNER—UNDERLOAD 32
4.3 CO/CO_2 RATIO LIMITS OF ANY INDEPENDENT BURNER—OVERLOAD 32
4.4 CO/CO_2 RATIO OF PERMANENT PILOTS—OVERLOAD 32
4.5 CO/CO_2 RATIO FLUE BACK PRESSURE AND BLOCKED FLUE 33
4.6 FLAME ABNORMALITY 33
4.7 BURNER IGNITION AT MAXIMUM AND MINIMUM LIMITING CONDITIONS 33
4.8 DELAYED IGNITION AT MAXIMUM AND MINIMUM LIMITING CONDITIONS 33
4.9 BURNER REIGNITION UNDER DRAUGHT CONDITIONS 33
4.10 BURNER INTERFERENCE AT IGNITION OR DURING COMBUSTION 33

SECTION 5 PERFORMANCE TESTS
5.1 FLUE OPERATION 34
5.2 THERMAL EFFICIENCY 34
5.3 FLUE GAS TEMPERATURES 34
5.4 NOISE OF OPERATION 34
5.5 CONDENSATION 35
5.6 COMBUSTION AIR SUPPLY AND CONTROLS 35
5.7 SHUTDOWN 35

5.8 TEMPERATURE HAZARDS 36
5.9 HEAT RESISTANCE 38
5.10 EXPLOSION RESISTANCE 38
5.11 STRENGTH AND STABILITY 38
5.12 NOISE OF EXTINCTION 38
5.13 BURNER STABILITY WHEN CHANGING SETTINGS 39

APPENDICES
A FIGURES A1 TO A3 40
B METHODS OF TEST 45
C GUIDELINES FOR SERVICING INSTRUCTIONS 88
D METER VOLUME CORRECTION FACTORS 89
E FLUE GAS SAMPLING AND TEMPERATURE MEASUREMENT 91
F TYPICAL OPERATING SEQUENCE FOR AUTOMATIC BURNERS 94
G LIST OF REFERENCED DOCUMENTS 95

STANDARDS AUSTRALIA

Australian Standard
Overhead radiant tube gas heaters

S E C T I O N 1 S C O P E A N D D E F N I N T I O N S

1.1 SCOPE

These requirements apply to overhead radiant tube heaters intended for use with natural gas, town gas, liquefied petroleum gas and tempered liquefied petroleum gas 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 these requirements.

1.2 DEFINITIONS

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

1.2.1 Appliance regulator

A device fitted to an appliance to control the gas pressure or gas volume delivered to that appliance.

1.2.2 Atmospheric burner

A burner system where all the air for combustion is introduced by the inspirating effect of a gas injector and/or by the natural draught in the combustion chamber without mechanical assistance.

1.2.3 Authority

Means the authority having jurisdiction or such authority as delegated. (Technical Regulator).

1.2.4 Automatic burner

A burner system which, on starting, follows a self-acting sequence that has been manually or automatically initiated, to provide gas and ignition to the burner without any intermediate manual operation.

1.2.5 Automatic ignition

The lighting of gas at a burner without a manual operation whenever gas flows from the burner.

1.2.6 Automatic operation

The use of a sequence of operations, which once initiated, does not require any intermediate manual operation.

1.2.7 Automatic shut off valve

An automatic valve used to shut off gas supply to an appliance when a signal is generated indicating that a dangerous condition has developed.

1.2.8 Available gas (Line gas)

Readily available gas with similar characteristics to the reference test gas.