AS 4566—2005

Australian Standard™

Flue cowls—Gas appliances

STANDARDS AUSTRALIA

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The following are represented on Committee AG-006:

AGA Certification Services
Australian Liquefied Petroleum Gas Association
Energy Networks Association
Gas Appliance Manufacturers Association of Australia
Gas Technical Regulators Committee

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Australian Standard™

Flue cowls—Gas appliances

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PREFACE

This Standard was reviewed by the Standards Australia Committee, AG-006, Gas Installation Committee, to supersede AG 604—1987, *Approval Requirements For Flue Cowls*. The Standard is republished without technical alterations.

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 flue cowls.

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.

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 the 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

STANDARDS AUSTRALIA

Australian Standard
Flue cowls—Gas appliances

SECTION 1 SCOPE AND DEFINTIONS

1.1 SCOPE

The requirements cover all external flue cowls attached to flue terminals of gas appliances with draught diverters operating under natural draught.

1.2 DEFINITIONS

1.2.1 Approved

Acceptable to, and meeting the prescribed standards of, the authority having jurisdiction.

1.2.2 Authority

The authority having jurisdiction or such authority as delegated. (Technical regulator).

1.2.3 Certified

Assessed by a certifying body and having a certificate number to demonstrate compliance with a Standard.

1.2.4 Certifying body

A body acceptable to the technical regulator that provides assurance of compliance of appliances and components with nominated Standards and other accepted safety criteria.

1.2.5 Combustible construction

Materials made of or surfaced with wood, compressed paper, plant fibres or other materials that will ignite and burn.

1.2.6 Draught diverter

A device, without moving parts, fitted in the flue of an appliance for isolating the combustion system from the effects of pressure changes in the secondary flue.

1.2.7 Flue

The passage through which flue gases are conveyed from an appliance to a discharge point, excluding draught diverter, barometric device, fan or similar part.

1.2.8 Flue cowl

A fitting placed at the flue terminal, designed to prevent the entry of rain or the disturbing effect of wind while not interfering with the discharge of flue gases.

1.2.9 Flue gases

Combustion products plus all diluents and contaminants intermixed with the combustion products. These include, where applicable, excess air, dilution air, process air, and waste products from the process.

1.2.10 Flue terminal

The point at which flue products discharge from a flue. It is the point where a flue system discharges into a flue cowl (if fitted).

1.2.11 Natural draught flue

A flue which is operated only by the buoyancy effect of the hot gases in it.

1.2.12 Secondary flue

That portion of the flue system conveying flue products from the draught diverter, barometric device, fan or similar part to the flue terminal.

1.2.13 Technical regulator

The Government appointed person, body or authority that has jurisdiction over gas safety legislation (or other entity authorized by that person, body or authority).

SECTION 2 DESIGN AND CONSTRUCTION

2.1 GENERAL

A flue cowl shall be made of non-combustible corrosion resistant material. Metals shall not be used in combinations such as to cause detrimental galvanic action, which will adversely affect any part of the assembly.

2.2 DESIGN

2.2.1 Attachment without alteration

Flue cowls shall be designed for ready attachment to the flue terminal without requiring alteration, cutting, threading, drilling, and welding or similar tasks by the installer.

2.2.2 Free from obstruction

Flue cowls shall be designed such that, when installed, it is not possible for any part of the flue or cowl to be obstructed in a manner that could adversely affect the intended operation of the flue.

2.2.3 Rain and debris entry

Flue cowls shall be designed—

(a) to prevent the entrance of debris and excess rain into the flue; and

(b) so that leaves and debris falling or blown onto it are not likely to be retained and hence obstruct flue gas passages.

2.2.4 Opening size

In order to ensure against the entry of birds no opening shall permit the entry of a ball of 16 mm diameter.

2.2.5 Fit to standard flue pipes

Flue cowls shall be sized to fit readily onto standard size flue pipes. In particular, for single wall metal flue pipe, the diameter of the flue cowl socket shall conform to Table 2.1.

TABLE 2.1

FLUE COWL SIZING—SINGLE WALL METAL FLUE PIPE

Nominal pipe size mm	Socket diameter (internal) mm
75	$78\ ^{+3}_{-0}$
100	$104\ ^{+3}_{-0}$
125	$129\ ^{+3}_{-0}$
150	$153\ ^{+3}_{-0}$

2.3 ASSEMBLY

2.3.1 Use of screws

If screws are employed to join the flue cowl to the flue terminal, the latter shall readily receive screws without being punched or drilled. If cement is employed for this purpose, the cement shall be a quick-setting type.

2.3.2 Joints

A joint shall—

(a) be a good fit when made up in accordance with the manufacturer's instructions; and

(b) not materially reduce the capacity of the flue.

2.4 PERFORMANCE

2.4.1 Flue pressure differential

A flue cowl for direct attachment to a flue terminal shall not produce a static pressure differential exceeding 8.5 Pa when the air velocity in the flue pipe is 3 m/s. In the case of rectangular flue pipes equivalent diameter for the purpose of air velocity calculation shall be obtained from Table A1.

2.4.2 Flue pressure differential in wind

A flue cowl for direct attachment to a flue terminal shall not produce a static pressure differential exceeding 17 Pa positive when the air velocity in the flue pipe is 3 m/s and winds up to a maximum of 65 km/h are directed against it from any angle. In the case of rectangular flue pipes equivalent diameter for the purpose of air velocity calculation shall be obtained from Table A1.

2.4.3 Flue cowl static pressure

A flue cowl for direct attachment to a flue terminal shall produce a negative static pressure of no less than 8.5 Pa with no flow in the flue and winds ranging from 32-65 km/h directed against it from any angle.

2.4.4 Strength of flue cowl

A flue cowl shall resist, without damage or permanent distortion, a wind of 95 km/h from any direction.

2.4.5 Rain resistance of cowl

The quantity of rainwater entering the flue with the flue cowl in place shall not exceed 2% of that which would enter the flue if unprotected by a flue cowl.

2.5 INSTRUCTIONS

Installation instructions shall be provided by the manufacturer for all flue cowls.

These shall contain description of the parts required and the step-by-step process of installing the flue cowl, its methods of support if required and the manufacturer's name and address.

The distances and clearances shall be as required by the authority but in any case shall be no less than those given in AS 5601.

2.6 MARKINGS

Each individual flue cowl shall be permanently marked with the manufacturer's identification and model number as well as the certificate of compliance number obtained from a certifying body.

2.7 TESTING

One sample of each size shall be submitted for testing. Full specifications shall accompany the application for test.

APPENDIX A

TABLES AND FIGURES

(Normative)

Table/ Figure	Description
Table A1	Diameter of circular flues that have the same capacity as various rectangular flues
Figure A1	Wind machine
Figure A2	Rain test spray head pipe rack
Figure A3	Detail of rain test spray head

TABLE A1

DIAMETER OF CIRCULAR FLUES THAT HAVE THE SAME CAPACITY AS VARIOUS RECTANGULAR FLUES

One side of rectangular duct mm	One side of rectangular duct: mm											
	50	75	88	100	113	125	138	150	175	200	225	250
100		97		112								
125		107		125	132	140						
138			117	130	137	145	152					
150		117	127	135	142	152	160	168				
175		125	135	145	155	163	173	180	196			
200	107	132	145	155	165	175	183	191	208	224		
225	112		147	163	175	185	193	203	218	236	252	
250	117				183	193	203	213	231	249	264	277
275						203	213	224	241	259	274	287
300					211	221	231	252	272	287	302	
325						229	241	262	282	300	315	
350							249	272	292	310	328	
375								279	300	320	338	
400									310	330	348	

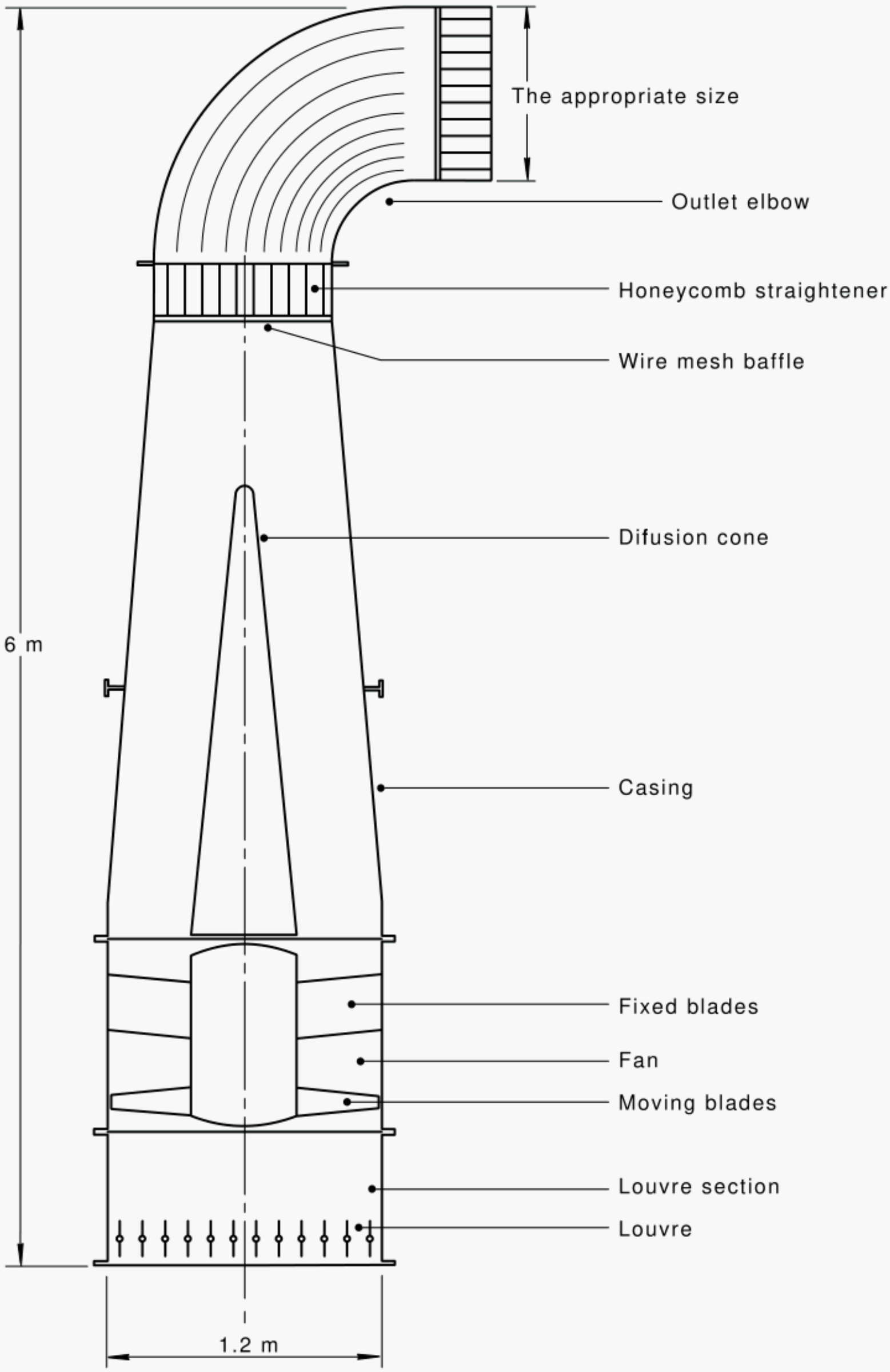

FIGURE A1 WIND MACHINE

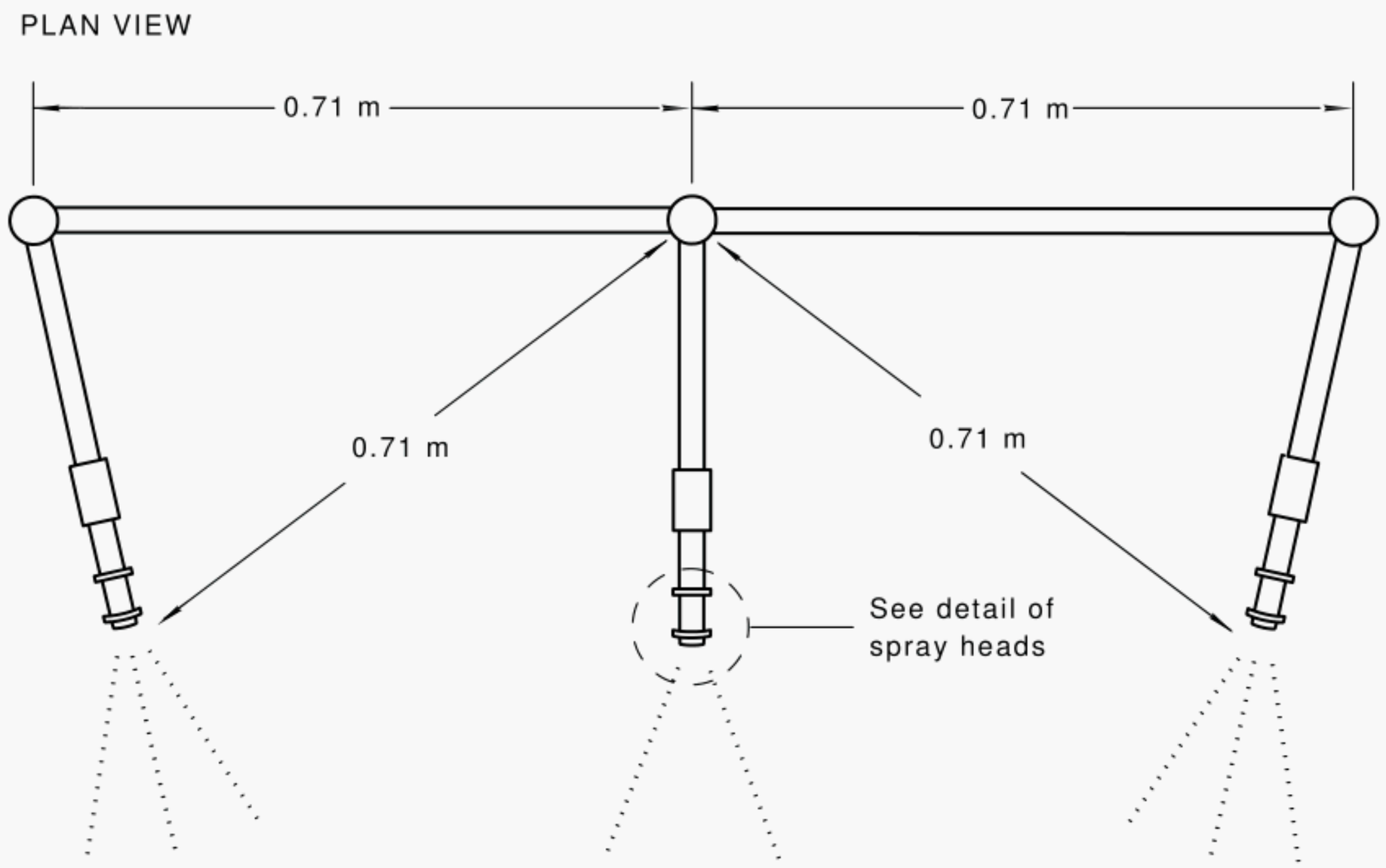

FIGURE A2 RAIN TEST SPRAY HEAD PIPE RACK

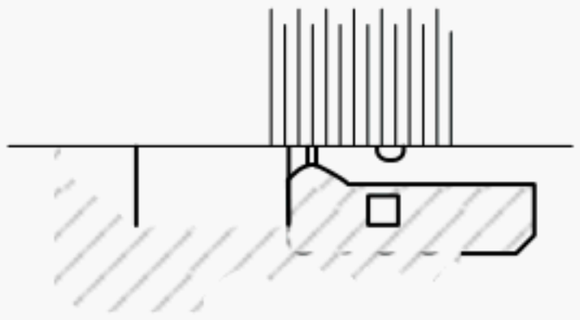

FIGURE A3 DETAIL OF RAIN TEST SPRAY HEAD

APPENDIX B
METHODS OF TEST
(Normative)

B1 M.O.T. 2.4.1 – 84 FLUE PRESSURE DIFFERENTIAL

B1.1 SCOPE

This test applies to all flue cowls.

B1.2 METHOD

The pressure drop across the cowl, relative to that across the appropriate flue without a cowl is measured with a standard flow through the system.

B1.3 APPARATUS

1 Source of low pressure air.

2 Flowrator or similar flow measuring device of an appropriate capacity.

3 Length of flue of a size appropriate to the cowl under test with a pressure tapping 5 diameters from the outlet and at least 10 diameters from the inlet.

4 An accurate differential manometer calibrated in Pa.

B1.4 PREPARATION OF APPARATUS

1 Connect the air supply to the length of flue through the flowrator.

2 Connect the manometer to the test point on the flue, the other side being open to atmosphere.

B1.5 PROCEDURE

1 Turn on air supply and adjust flow to give a velocity of 3 m/s in the flue.

2 Read pressure drop from test point on the manometer.

3 Turn off air, and fit test cowl to the outlet of the flue.

4 Turn on air supply and readjust to velocity of 3 m/s in the flue.

5 Read new pressure drop on manometer.

B1.6 CALCULATIONS

Subtract pressure drop obtained in Step 2 of B1.5 from that obtained in Step 5 of B1.5.

B1.7 RESULT

The cowl meets the requirement of Clause 2.4.1 if the difference in pressure drops does not exceed 8.5 Pa.

B2 M.O.T. 2.4.2 – 84 FLUE PRESSURE DIFFERENTIAL IN WIND

B2.1 SCOPE

This test applies to all flue cowls.

B2.2 METHOD

The pressure drop across the cowl is measured with a standard flow through the system whilst winds are directed at the terminal from a range of angles over a range of speeds.

B2.3 APPARATUS

1 Source of low pressure air.

2 Flowrator or similar flow measuring device to an appropriate capacity.

3 Length of flue of a size appropriate to the cowl under test with a pressure tapping 5 diameters from the outlet and at least 10 diameters from the inlet.

4 An accurate differential manometer calibrated in Pa.

5 Wind machine capable of supplying winds of up to 65 km/h over a wind front of at least 1.0 m^2. A suitable wind machine is shown in Figure A1.

B2.4 PREPARATION OF APPARATUS

1 Locate flue so that terminal will be situated at centre of rotation of the wind machine.

2 Connect the air supply to the length of flue through the flowrator.

3 Connect the manometer to the test point on the flue, the other side being open to atmosphere.

B2.5 PROCEDURE

1 Turn on air supply and adjust flow to give a velocity of 3 m/s in the flue.

2 Read pressure drop from test point on manometer.

3 Fit test cowl to the outlet of the flue and locate cowl at centre of rotation of the wind machine.

4 Turn on air supply and adjust to 3 m/s in the flue.

5 Direct wind at the terminal over a range of angles from directly down on to the top of the cowl through 135° and over a range of wind speeds from zero to a maximum of 65 km/h.

6 Note pressure differential at each test condition after checking that airflow is 3 m/s or readjusting if necessary.

B2.6 CALCULATION

Deduct pressure difference obtained without cowl fitted as obtained in Step 2 of B2.5 from all readings.

B2.7 RESULT

The cowl meets the requirements of Clause 2.4.2 if the calculated pressure drop does not exceed 17 Pa.

B3 M.O.T. 2.4.3 – 84 FLUE COWL STATIC PRESSURE

B3.1 SCOPE

This test applies to all flue cowls.

B3.2 METHOD

The static pressure in a flue connected to the cowl is measured at a number of wind angles over a range of wind speeds.

B3.3 APPARATUS

1 A length of flue of a size appropriate to the cowl under test, with the lower end closed off, and fitted with a static pressure tapping.

2 A wind machine capable of supplying winds of up to 65 km/h over a wind front of at least 1.0 m^2.

3 An accurate differential manometer.

B3.4 PREPARATION OF APPARATUS

1 Fit the cowl on top of the flue so that it is situated at the centre of rotation of the wind machine.

2 Connect the manometer to the pressure tapping in the flue.

B3.5 PROCEDURE

1 Direct winds at the terminal over a range of wind angles varying from directly down on to the top of the cowl through 135°, and over a range of wind speeds from a minimum of 32 km/h to a maximum of 65 km/h.

2 Observe the static pressure recording on the manometer at each test condition.

B3.6 RESULT

The cowl meets the requirements of Clause 2.4.3 if the static pressure recording at every test condition specified is negative and at least 8.5 Pa negative.

B4 M.O.T. 2.4.4 – 84 STRENGTH OF FLUE COWL

B4.1 SCOPE

This test applies to all flue cowls.

B4.2 METHOD

A wind of 95 km/h is directed at the cowl, and the cowl is observed for any sign of damage or distortion.

B4.3 APPARATUS

A wind machine capable of supplying winds of 95 km/h over a wind front of at least 1.0 m^2.

B4.4 PROCEDURE

1 Install the cowl on a length of appropriately sized flue so that it is situated at the centre of rotation of the wind machine.

2 Direct winds of 95 km/h at the terminal from all possible wind angles.

3 Observe the cowl for any sign of damage or distortion.

B4.5 RESULT

The cowl meets the requirements of Clause 2.4.4 if at the end of the test there is no sign of damage or permanent distortion.

B5 M.O.T. 2.4.5-84 RAIN RESISTANCE OF COWL

B5.1 SCOPE

This test applies to all cowls.

B5.2 METHOD

Water is sprayed at the cowl from a standard rain test apparatus, and the amount of water entering is compared with that entering an unprotected flue.

B5.3 APPARATUS

1 Standard rain test apparatus as shown in Figure A2 and A3.

2 Flue pipe to fit the cowl with drain point at base.

3 Measuring cylinder of 2 L capacity.

B5.4 PROCEDURE

1 Set up cowl on length of appropriately sized flue pipe so that it is situated at the focus of the spray heads of the rain test apparatus.

2 Operate the rain test apparatus for 30 min.

3 Collect the water which has entered the flue (if any) in the measuring cylinder and note its volume.

4 Remove the cowl and repeat Steps 2 and 3 of the procedure.

B5.5 RESULT

The cowl meets the requirements of Clause 2.4.5 if the volume of water entering the flue with the cowl in place does not exceed 2% of that which enters the flue when no cowl is fitted.

APPENDIX C

LIST OF REFERENCED DOCUMENTS

(Normative)

AS	
5601	Gas installations

NOTES

NOTES

Standards Australia

Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body. For further information on Standards Australia visit us at

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Standards Australia is responsible for ensuring that the Australian viewpoint is considered in the formulation of international Standards and that the latest international experience is incorporated in national Standards. This role is vital in assisting local industry to compete in international markets. Standards Australia represents Australia at both ISO (The International Organization for Standardization) and the International Electrotechnical Commission (IEC).

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