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Gas Installation Standards AS/NZS 5601.1:2013 & AS/NZS 5601.2:2013

Introduction to AS/NZS5601

- AS/NZS 5601:2013 was published on the 16th September 2013 to replace the 2010 edition
- Consists of 2 Parts
  - AS/NZS 5601.1:2013 - General Gas Installations
  - AS/NZS 5601.2:2013 – LP Gas Installations In Caravans And Boats For Non Propulsive Purposes
- The standards are joint Australian and New Zealand standards.
- Each part is a stand alone standard.

Introduction to AS/NZS5601

- Parts 1 and 2 will be adopted in Victoria.
- Legislation is currently being amended with an anticipated implementation date of the 31st March 2014 (to be confirmed).
- Compliance with the new standard is expected.

Introduction to AS/NZS5601

Where can I purchase the 2013 edition and how much does it cost?

- The standards are available from SAI Global.
  - http://infostore.saiglobal.com/
  - AS/NZS5601.1 2013 — $285.63 (Hardcopy); $257.07 (PDF personal use)
  - AS/NZS5601.2 2013 — $194.66 (Hard copy); $175.19 (PDF personal use)

(Costs as of 30/1/14)

Summary of Significant Changes

- The revised 2013 standard includes a number of significant changes from the 2004 standard.
- This presentation provides guidance on a selection of significant changes.
- This presentation is not a complete list of every change in the standard.
- Gasfitters are responsible for ensuring familiarity with the 2013 standard.

Deletions from AS5601-2004

- First family gases (e.g. Towns, TLP) have been removed from the standard.
- Requirements for the installation of Natural Gas Vehicle Refuelling Appliances (VRAs) were removed from the 2010 edition.
- Requirements for CNG for appliances in marine craft were removed from the 2010 edition.

Changes Common To Both Parts

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- A contents listing has been reintroduced at the beginning of each section in both standards as was provided in the 2002 edition.
- An index has been reintroduced in both standards to assist practitioners (The index was removed in the 2010 edition of both standards).
- A conversion table for units of measurement has been introduced in both standards (e.g. multiply mbar by 0.1 to give kPa).

Changes Common To Both Parts

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OH&S (Clause 1.6)

- Practitioners installing gas appliances are to be aware of their responsibilities and be trained in local OH&S requirements.

COMPLIANCE (Clause 1.5)

- Both parts 1 and 2 apply to new installations, alterations and extensions commenced after adoption of these standards in Victoria.
- Both parts 1 and 2 **do not** apply retrospectively to existing installations but **do** apply to any repairs or modifications to existing installations.

Changes Common To Both Parts

Performance Based Requirements (Section 2)

- Both parts 1and 2 include a new section 2 with performance based requirements.
- Gas Technical Regulator should be consulted where gasfitting work is designed based upon performance based requirements.
- When based upon performance based requirements the level of safety, convenience and efficiency of operation for installations shall not be less than for those installations that comply with the prescribed means of compliance.

Changes Common To Both Parts

Performance Based Requirements (Section 2)

- Performance based designs shall be documented and the documentation shall be kept for 7 years.

Changes Common To Both Parts

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New informative appendices (part 1)

- The appendix (Appendix J) for LP Gas cylinder locations was changed from normative to informative as AS/NZS 1596 "*The storage and handling of LP Gas"* is the primary standard.
- "Gas in high rise buildings" (Appendix K).

New informative appendices (part 1 & 2)

- Diagrammatical representation of "outdoor areas" for installation of outdoor BBQs and radiant heaters (Appendix I part 1, Appendix L part 2).
- Informative appendices for 'gas appliance commissioning', 'gas control system diagrams' and a 'gas installation checklist' have been introduced.

Major differences between Part 1 and AS 5601:2004

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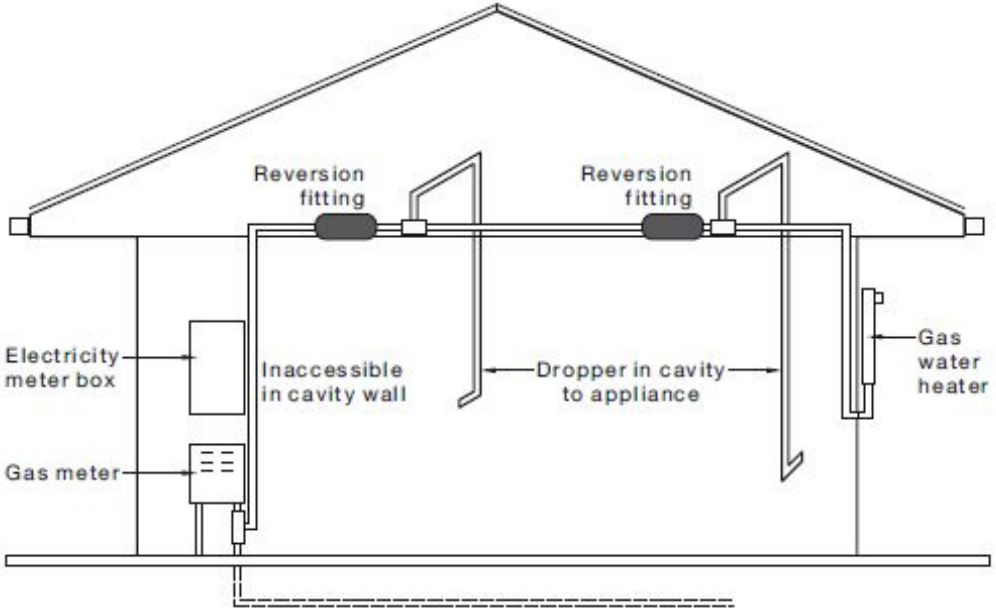
NEW DEFINITIONS

- Quasi-outdoor(s) (clause 1.8.93)
  - *"An outdoor area sufficiently weatherproofed to allow the installation of an appliance certified for indoors without affecting its safety, combustion or integrity."*
- Readily accessible (clause 1.7.1.1)

  (applies to emergency isolation valves)
  - *"Access can be gained without hazard, undue difficulty, or use of a tool."*
  - *(Accessible definition remains unchanged)*

Major differences between Part 1 and AS 5601:2004

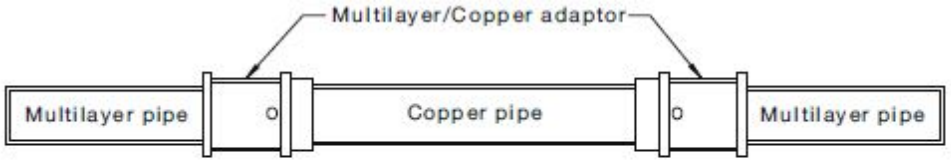
- Reversion fittings introduced to enable connection of proprietary multilayer piping to copper pipe or other proprietary systems (clause 5.2.13).



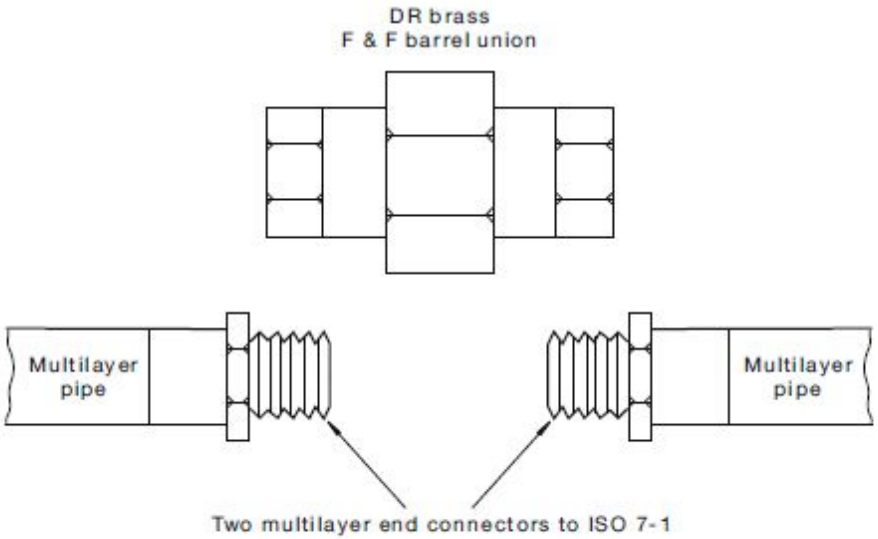
(a) Example of reversion fittings installed in a multilayer piping system (composite pipe)

Major differences between Part 1 and AS 5601:2004

Reversion fittings (Clause 5.2.13)



(b) Reversion to copper tube



(c) Reversion to standard thread

Major differences between Part 1 and AS 5601:2004

- Labelling adjacent to gas meters or LP gas tanks/cylinders to demonstrate the proprietary piping system installed (clause 4.5.4).

Major differences between Part 1 and AS 5601:2004

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Consumer piping and sizing

- 316 grade stainless steel, PVC-Hi and cross-linked polyethylene consumer piping introduced (Table 4.1).
- Consumer pipe sizing charts are now included along with pipe sizing tables (Appendix F).
- The tables and graphs cover Australian & NZ pipe sizing. N.B. Copper to AS1432 is measured O.D. while copper to NZS3501 is measured I.D.

Major differences between Part 1 and AS 5601:2004

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Consumer piping sizing

- Flow capacities are more conservative to account for pressure losses through fittings.
- Flow capacities can be increased by 20% where supply pressure is high enough to offset fitting losses (i.e. ≥1.5 kPa NG, ≥70 kPa LPG).
- Flow capacities shown with grey shading in the pipe sizing tables and above the dotted line in the graphs should not be used as the resultant velocities can result in noise and accelerated erosion of piping.

Major differences between Part 1 and AS 5601:2004

Pipe sizing chart

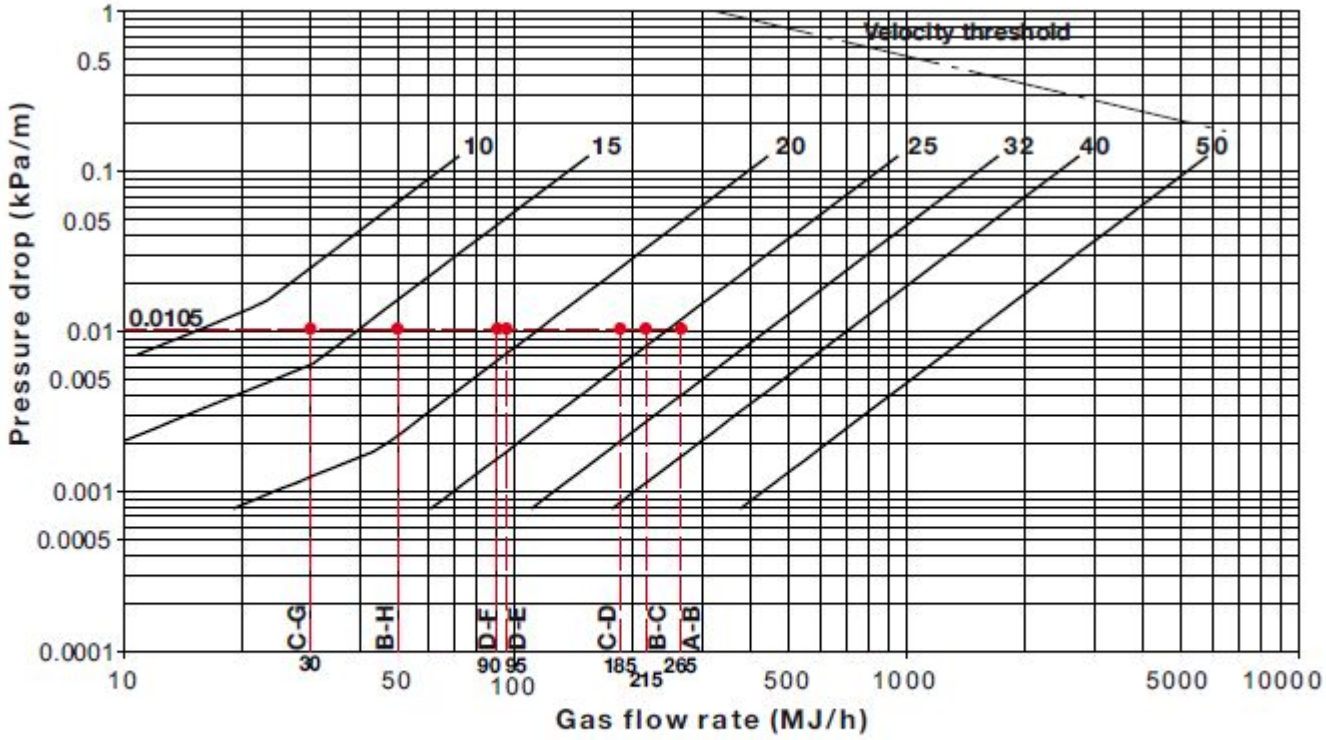

FIGURE F2.1 EXAMPLE 1—PIPE SIZING FOR NATURAL GAS IN COPPER PIPE TO NZS 3501

Major differences between Part 1 and AS 5601:2004

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Pipe sizing table

TABLE F6

NATURAL GAS—FLOW THROUGH—COPPER PIPE (AS 1432 TYPE B) (MJ/h)
(Pressure drop of 0.12 kPa; suitable for supply pressures around 1.25 kPa)

Nom. dia.	Length of straight pipe in metres								
DN	2	4	6	8	10	12	14	16	18
15	62	43	34	29	26	22	19	17	15
20	206	141	114	97	86	78	72	67	63
25	452	311	249	214	189	171	158	147	138
32	867	596	478	409	363	329	302	281	264
40	1459	1002	805	689	611	553	509	474	444
50	3356	2307	1852	1585	1405	1273	1171	1090	1022
65	6217	4273	3431	2937	2603	2358	2169	2018	1894
80	9884	6794	5455	4669	4138	3750	3450	3209	3011
	20	25	30	35	40	45	50	55	60
20	59	52	48	44	41	37	33	30	28
25	130	115	104	96	89	84	79	75	72
32	249	221	200	184	171	161	152	144	138
40	420	372	337	310	288	271	256	243	232
50	966	856	776	713	664	623	588	559	533
65	1789	1585	1436	1321	1229	1154	1090	1035	987
80	2844	2521	2284	2101	1955	1834	1732	1645	1570
100	6286	5571	5048	4644	4320	4054	3829	3637	3469
125	11520	10210	9251	8511	7918	7429	7017	6665	6358
150	18531	16423	14881	13690	12736	11950	11288	10720	10227
	65	70	75	80	85	90	100	120	140
25	69	66	64	61	59	58	54	46	39
32	132	127	122	118	114	111	104	95	87
40	222	213	205	198	192	186	176	159	146

Major differences between Part 1 and AS 5601:2004

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Press fit end connectors (table 4.1)

- Introduction of press fit end connectors for use with copper or stainless steel piping.
- Press fit end connectors must comply with AS3688 and the test requirements of DVGW VP614 or BS8537 or ANSI LC4.

Major differences between Part 1 and AS 5601:2004

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Press fit end connectors

- 70°C temperature limitation unless manufacturer's specification warrants higher.
- Yellow HNBR O-ring only suitable for gas. Black EPDM o-ring suitable for water.

GAS (HNBR)

WATER (EPDM)

Major differences between Part 1 and AS 5601:2004

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Gas supply isolation

- Emergency valves (e.g. for steam or hot water boilers) are to be *readily accessible* (i.e. no tools required)- (clause 5.2.12).
- Isolation for installations with multiple gas appliances without flame failure (e.g. school laboratories, home economic classes) must be *readily accessible* (i.e. no tools required)- (clause 5.2.11).
- Multiple occupancies within a building require a manual shut off valve to each occupancy (clause 5.2.9).

Major differences between Part 1 and AS 5601:2004

- Fan assisted appliances in covered areas (e.g. balconies) require either two open sides or one open side provided the flue terminal is within 500mm of opening and discharging in that direction (Clause 6.9.4(b)).
- Nomograms for determining maximum breather vent orifice size for regulators vented into a room have been replaced by tables (clause 5.11.5.7.1 and Appendix G).

Major differences between Part 1 and AS 5601:2004

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Ventilation and gas appliances

- Energy efficient homes and buildings have little or no ventilation to achieve high energy ratings.

- The lack of ventilation and the increased performance of rangehoods and bathroom exhaust fans is creating negative pressures in homes.

Major differences between Part 1 and AS 5601:2004

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Ventilation and gas appliances

- The operation of open flued gas appliances is being compromised by the lack of ventilation and negative pressures.

- The death of the two Robinson boys in May 2010 from CO poisoning caused by a faulty heater and a lack of ventilation prompted a review of ventilation requirements in AS/NZS 5601.

Major differences between Part 1 and AS 5601:2004

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Ventilation and gas appliances (Compliance)

- New ventilation requirements apply to new gas appliance installations in buildings approved for construction after the adoption of AS/NZS5601.1:2013 (clause 6.4.5.1).

- New ventilation requirements apply to Australia only and not New Zealand (clause 6.4.5.1).

Major differences between Part 1 and AS 5601:2004

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Ventilation and gas appliances (clause 6.4.5 and table 6.2)

- 0.4 MJ/h/m^3 rule applies to flued appliances to determine if permanent ventilation is required.
- Current 3 MJ/h/m^3 rule still applies for flueless appliances (e.g. cookers) other than flueless space heaters to determine if permanent ventilation is required.
- Where a flued appliance and flueless appliance other than a flueless space heater share the same space, the required ventilation will depend on whether the 0.4 MJ/h/m^3 or the 3MJ/h/m^3 limit is exceeded.

Major differences between Part 1 and AS 5601:2004

Ventilation and gas appliances

- New ventilation requirements for flued appliances (cont.)
  - Worked examples for calculation of required ventilation provided (clause 6.4.5.3).
  - Normative appendix for combustion spillage testing of flued appliances with extraction fans operating (Appendix R).
  - Table 6.2 with schematic diagrams of ventilation applicable to different installations provided.

Major differences between Part 1 and AS 5601:2004

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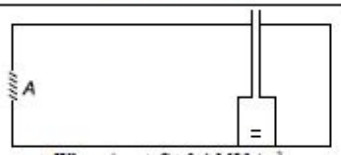
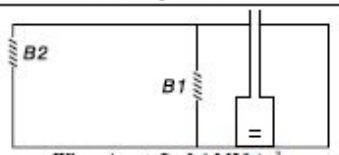
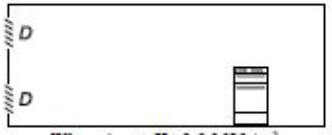
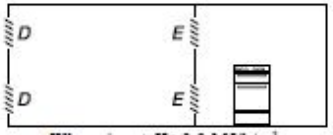
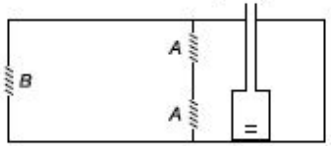
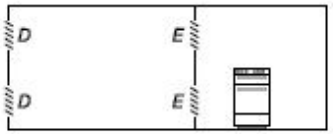
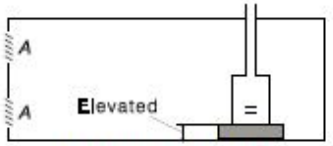
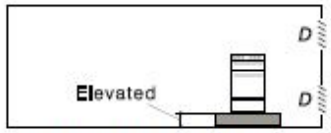
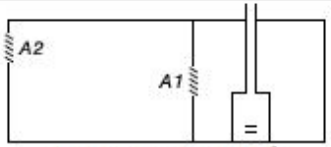
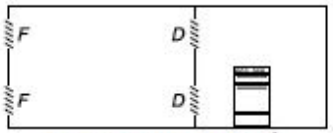
TABLE 6.2
NATURAL VENTILATION FOR GAS APPLIANCES

Appliance	Flued appliances, gas input limit = 0.4 MJ/h/m³ (without additional ventilation openings)		Flueless appliances other than flueless space heaters, gas input limit = 3 MJ/h/m³ (without additional ventilation openings)	
	Direct to outside	Via an adjacent room	Direct to outside	Via an adjacent room
In a room	 Where input G >0.4 MJ/h/m³, $A = T \times 450$ (mm²)	 Where input G >0.4 MJ/h/m³, $B1 = B2 = T \times 650$ (mm²)	 Where input H >3.0 MJ/h/m³, $D = T \times 300$ (mm²)	 Where input H >3.0 MJ/h/m³, $D = T \times 300$ (mm²), $E = T \times 600$ (mm²)
In an *enclosure*	 Where input G >0.4 MJ/h/m³ two vents at high and low levels, $A = T \times 450$ (mm²)	 Where input G >0.4MJ/h/m³, two vents to adjacent space, high and low levels, one vent in adjacent space to outside, $A = T \times 450$ (mm²), $B = T \times 650$ (mm²)	 Where input H >3.0 MJ/h/m³, $D = T \times 300$ (mm²)	 Where input H >3.0 MJ/h/m³, $D = T \times 300$ (mm²), $E = T \times 600$ (mm²)
In a *residential* garage	 Two vents, $T \times 450$ (mm²) *Appliance* to be elevated in accordance with Clause 6.3.10. No Allowance for natural ventilation (see Clause 6.4.7)	Not permitted	 Two vents, $D = T \times 300$ (mm²) *Appliance* to be elevated in accordance with Clause 6.3.10. No Allowance for natural ventilation (see Clause 6.4.7)	Not permitted
In a *plant room*	 Where input G >0.4 MJ/h/m³, $C = T \times 325$ (mm²)	 Where input G >0.4 MJ/h/m³, $A1 = A2 = T \times 450$ (mm²)	 Where input H >3.0 MJ/h/m³, $F = T \times 150$ (mm²)	 Where input H >3.0 MJ/h/m³, $D = T \times 300$ (mm²), $F = T \times 150$ (mm²)

NOTE: See next page for Notes to this Table.

T = Total *gas consumption* of all applicable *appliances*, in MJ/h.

Major differences between Part 1 and AS 5601:2004

Ventilation and gas appliances

- Single Vent (450 x T) required in some open flued installations (table 6.2).
- High and Low level vents (2 x 300 x T) for flueless appliances other than flueless space heaters (table 6.2).
- Interlocks for mechanical air supply to gas appliances now include air dampers that must be open for the appliance to operate in addition to types that sense air movement (clause 6.4.9).

Major differences between both parts and AS 5601:2004 (Appliances)

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Electrical isolation (part 1 & 2)

- A plug to an electrical socket for a gas appliance can be in an inaccessible position, but must be connected to a double pole isolation switch in an accessible position that isolates both active and neutral conductors (clause 6.2.8.2(b) part 1), (clause 6.8.2(b) part 2).

Major differences between both parts and AS 5601:2004 (Appliances)

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Domestic cooking appliances (Part 1 & 2)

(clause 6.10.1.2 part 1), (clause 6.10.2 part 2)

- 5mm toughened glass splashbacks, if marked accordingly, accepted for installation directly over 10 mm gypsum based wall board or 6mm fibre cement board when adjacent to gas hotplates.
- 0.4mm stainless steel splashbacks accepted for installation directly over 12mm fibre cement board or 6mm fibre cement board over 10mm gypsum wall board.

Major differences between both parts and AS 5601:2004 (Appliances)

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Domestic cooking appliances (part 1 & 2)

- Rangehood overhead clearance is now taken from the top of the highest burner and not the hob (clause 6.10.1.1 part 1, clause 6.10.1 part 2).

Commercial catering appliances (part 1)

- Overhead clearances from grease filters now include clearances from kebab cookers (table 6.9) in line with AS1668.2 *Mechanical ventilation in buildings*.

Major differences between Part 1 and AS 5601:2004 (Appliances)

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Overhead radiant heaters

- Overhead radiant heaters can now be mounted 1.8m above floor level if in quasi-outdoor areas and are wall mounted, otherwise clearance must be 2.5m (clause 6.10.7.2).

Overhead radiant **tube** heaters

- Overhead radiant **tube** heaters now have a specific clearance requirement of 3.5m from floor level unless a variation is approved by the Technical Regulator (clause 6.10.13.1)

Changes Applicable to Part 2 only

NEW DEFINITIONS

- Readily accessible (applies to access to flexible hoses and shut off valves) (clause 1.7.1.1)
  - *"Access can be gained without hazard, undue difficulty, or use of a tool."*
- Cylinder compartment (clause 1.7.16)
  - *"A compartment, an enclosed area or a partitioned-off space primarily used for the installing of a gas cylinder, pressure regulator and other associated equipment."*

Major differences between Part 2 and AS 5601:2004

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Consumer piping

- Gas piping leakage testing at 14kPa between the regulator outlet and the appliance valves. (Appendix F). (Soapy water leak test at operating pressure of any connection made afterwards is still expected)

- Revision of the pipe sizing appendix including the introduction of pipe sizing charts in addition to pipe sizing tables (Appendix F).

- Multilayer composite pipe not to be used (clause 5.1.4.4).

Major differences between Part 2 and AS 5601:2004

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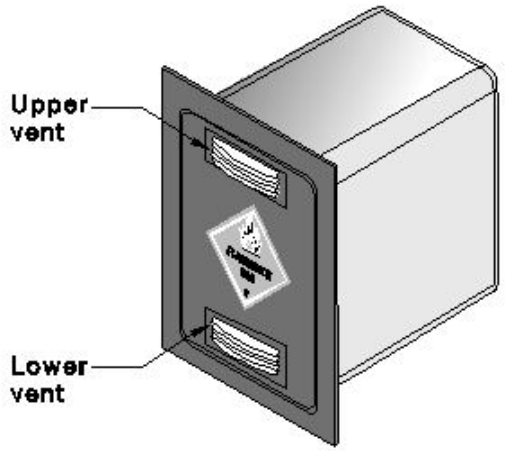
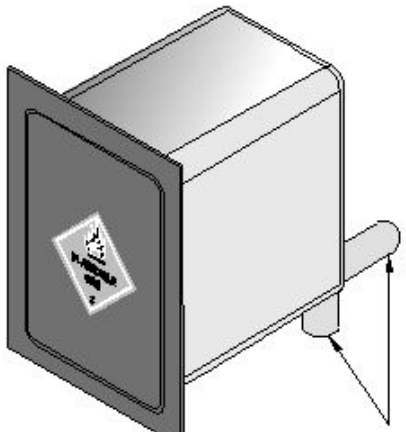
LPG Cylinder compartments and lockers for caravans (clause 3.4.1(f))

- Diagrams for venting and drainage of cylinder compartments and LP gas lockers for caravans introduced with the lower vent or drain to be within 25mm of the compartment base.
- Drains to have an area of 500mm^2 in lieu of a Ø25mm hole.





Option 1 or option 2, min. 500mm^2 drain

Major differences between Part 2 and AS 5601:2004

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LPG Cylinder compartments and lockers for boats (clause 3.4.3(h) and figure 3.2)

- The drain in the base of a cylinder compartment for a boat shall not be less than 19mm diameter. (AS5601:2004 required a minimum diameter of 25mm).
- The 19mm diameter drain is a requirement of the maritime authorities.

Major differences between Part 2 and AS 5601:2004

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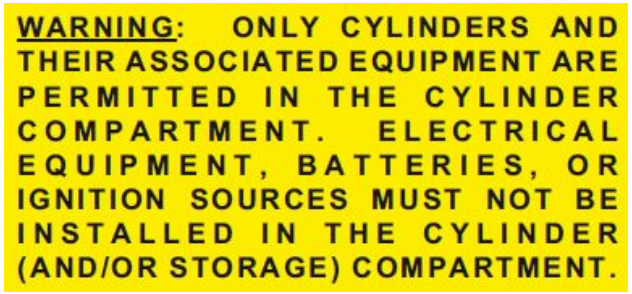
LPG Cylinder compartments and lockers

- New signage for caravans and boats to be displayed in or on the cylinder compartment, warning that only cylinders and their associated equipment are permitted within the compartment (clauses 3.4.1(h) and 3.4.3(j)).



- Vertical divider introduced to separate a cylinder compartment from a general storage area in a combined storage compartment locker for caravans (clause 3.4.2).

Major differences between Part 2 and AS 5601:2004 (Appliances)

- All appliances burners must now be fitted with a flame safeguard (clause 6.3).
- Open flued water heaters and space heaters are not permitted inside (must be room sealed) (clause 2.9.1(b)).
- An informative note has been added to clarify that a cooking appliance installed beneath an aftermarket lid is considered a stowed appliance (clause 6.2).

Major differences between Part 2 and AS 5601:2004 (Appliances)

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Domestic cooking appliances

- Rangehood clearance can be reduced to 450mm if rangehood is non combustible, is suitable for that clearance (e.g. Certified) and cooker is certified as a caravan/marine type at that clearance (clause 6.10.1(a)).
- Side clearances in accordance with manufacturer's instructions. In the absence of instructions clearances must be as specified in the standard (clause 6.10.1).

Major differences between Part 2 and AS 5601:2004 (Appliances)

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Refrigerators

- Ventilation for refrigerator performance shall be provided in accordance with the refrigerator manufacturer's instructions (clause 6.11.4).
- In the absence of manufacturer's instructions the ventilation shall consist of both high and low level openings with the vent area and vent location as prescribed in the standard (clause 6.11.4).
- Refrigerators must be installed in a sealed recess (clause 6.11.3).

Major differences between Part 2 and AS 5601:2004 (Components)

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- No restriction on hose assembly length, however hose must be as short as practicable to restrict kinking and damage (clause 2.11.2).
- Hose assemblies can be used from the regulator to rigid piping and from rigid piping to an appliance. In addition hose assemblies can be used from the rigid piping of a caravan to the rigid piping of a caravan slide out section used for additional living space (clause 2.11.2).
- Automatic shut off valves must comply with the class 1 requirements of AS4629 (clause 5.2.7.2).

Major differences between Part 2 and AS 5601:2004 (Components)

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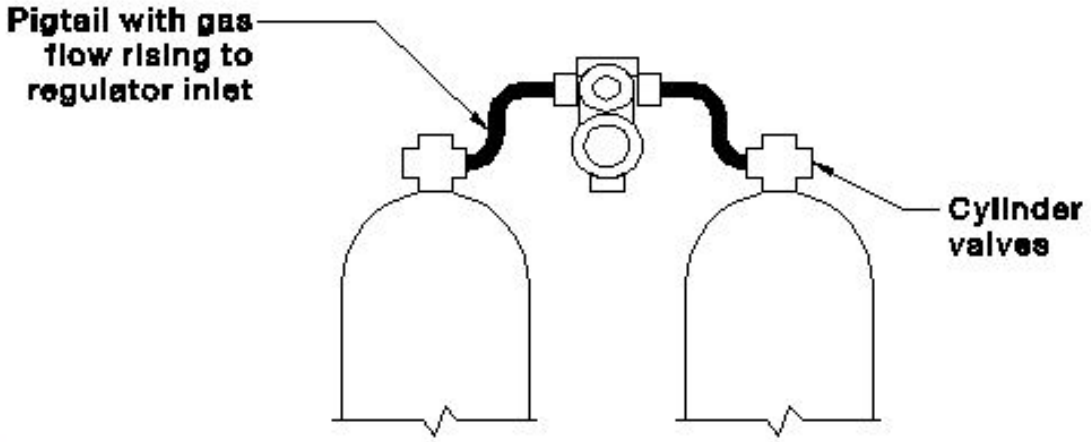
Regulators

- Regulators are to be *certified* to AS4621 or UL144 (clause 4.1).
- Gas pressure regulators to be mounted to permit the drainage of liquid back into the cylinders (clause 4.3(d) and figure H1).



NOTES:

1 Only copper *pigtails* or flexible hoses with low extractable content should be used.

2 The regulator should be located to permit drainage of any liquid back into the *cylinder*.

Major differences between Part 2 and AS 5601:2004

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Ventilation (clause 7.3)

- New method for calculating the size of ventilation openings in caravans and boats which considers:
  1. number of sleeping spaces
  2. total gas consumption of all gas appliances other than room sealed appliances.

- Ventilation applies to the space in which gas appliances are installed and which may be temporarily divided by curtains or doors.

Major differences between Part 2 and AS 5601:2004

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Ventilation

- Mesh permitted over vents in caravans with new labelling adjacent to both high and low level vents to keep vents open, clean and unrestricted (clause 7.3.1).

- Guidance on the amount of additional ventilation to be included when mesh is used is provided.

Major differences between Part 2 and AS 5601:2004

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FLUEING

- Flue terminals are not to be located within 300mm of an opening (e.g. window), ventilator or hatch (clause 8.4.1).

- Requirements for termination of flues beneath covers (e.g. annexes) introduced (clause 8.4.2).

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Questions ?

Helpline (1800 652 563)