VICTORIAN BUILDING AUTHORITY

PLUMBING PRACTICE NOTE

Mechanical Services | MS 07 | Split-System Air Conditioning

Audience

The audience/s for this Practice Note include/s:

☒ Architects/ Designers
☒ Builders
☒ Building Surveyors/ Inspectors
☒ Engineers
☒ Home Owners / Residential Tenants
☒ Owner Builders
☒ Plumbers
☒ Real estate management agents
☒ Trades and Maintenance (inc. Electricians)

Purpose

This Practice Note provides guidance on the requirements for the safe discharge of condensate drains from split system air-conditioners, and the secure fixing of outdoor components.

The content and figures below provide guidance on:

- Plumbing Regulations
- Condensate Drainage
- Outdoor components mounted on balconies
- Domestic size outdoor units mounted on a metal deck roof
- Securing condensing units
- Commissioning

For guidance on the plumbing regulatory framework refer to Plumbing Practice Note RF-01 Plumbing Regulatory Framework

Abbreviations & Definitions

The abbreviations and definitions set out below are for guidance only. They are not intended to vary those set out in the Building Act 1993, the Building Regulations 2018 or the National Construction Code.

- **Act –** Building Act 1993
- **AS/NZS** - Australian/ New Zealand Standard
- **NCC** – National Construction Code 2022
- **Regulations** – Plumbing Regulations 2018
- **Section** – Section of a referenced Australian Standard
- **HB** – Handbook

Prior to installing Split-system air conditioning units, you should reference NCC Volume One for Class 2 to 9 Buildings & NCC Volume Two for Class 1 and 10 Buildings as cross referencing all related NCC volumes applies in this case.

Plumbing Regulations

The Plumbing Code of Australia (PCA) is adopted by and forms part of the Plumbing Regulations 2018. Part C1 of the PCA specifies the objectives and performance requirements related to the installation of sanitary plumbing systems. *AS/NZS 3500.2*: Plumbing and drainage Part 2: Sanitary plumbing and drainage is a "deemed to satisfy" document listed in Part C1 of the PCA and contains a section on "Connection of tundishes".

The Plumbing Regulations 2018 states that, "Residential heating, cooling and air-conditioning equipment must be installed in accordance with HB 276: A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling & Air Conditioning Plant & Equipment.

Condensate Drainage

The material used for the drain must be suitable for the purpose and if a plastic material is used it must be of a type suitable for installation in direct sunlight. Location of drainage termination points must be safe, be discernible and avoid damage to buildings. One of the primary referenced handbooks HB276, provides guidance on the following:

- Discharge onto a garden bed, concrete or paved surface
- Discharge to a downpipe
- Discharge to a sanitary draining system via a tundish
- Discharge to a sanitary system using a self-sealing device
- Condensate drains
- Drain material
- Pumped condensate

General installation requirements

The prime areas of consideration when installing a heating and/or air conditioning appliance are as follows:

- Comfort for the occupants
- Indoor air quality
- Energy efficient design and installation
- Reduction of greenhouse gas emissions
- Occupational health and safety
- Noise level requirements of the relevant authority

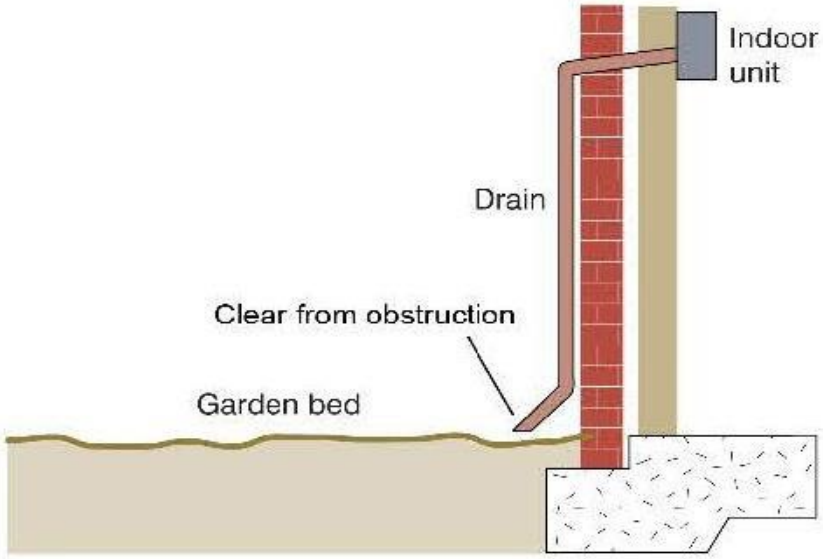

Figure 1 - Discharge on to a garden bed

Reproduced with permission of Standards Australia Limited. Copyright in HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

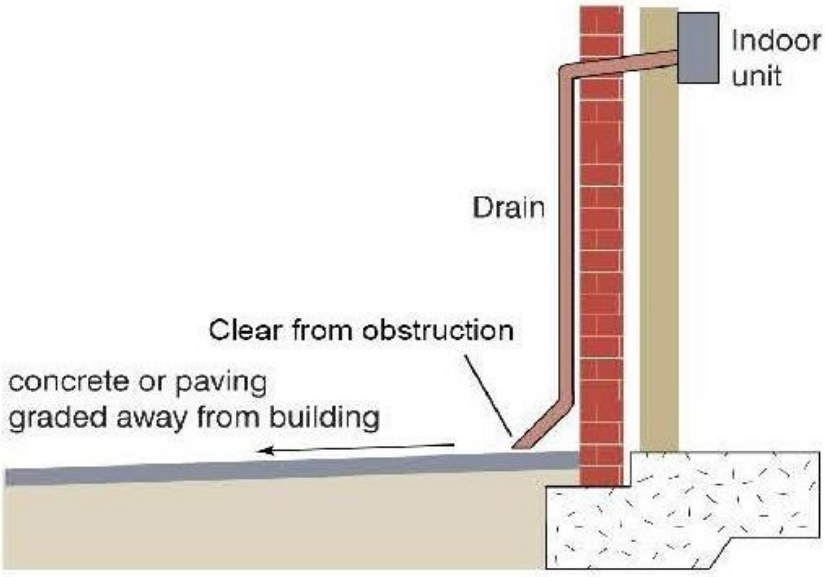

Figure 2 – Discharge onto a concrete or paved surface

Reproduced with permission of Standards Australia Limited. Copyright in HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

The surface must be graded away from the building so that ponding does not occur, and the discharge does not present a safety risk to pedestrians (e.g., across a footpath), nor cause damage to buildings by changing moisture conditions.

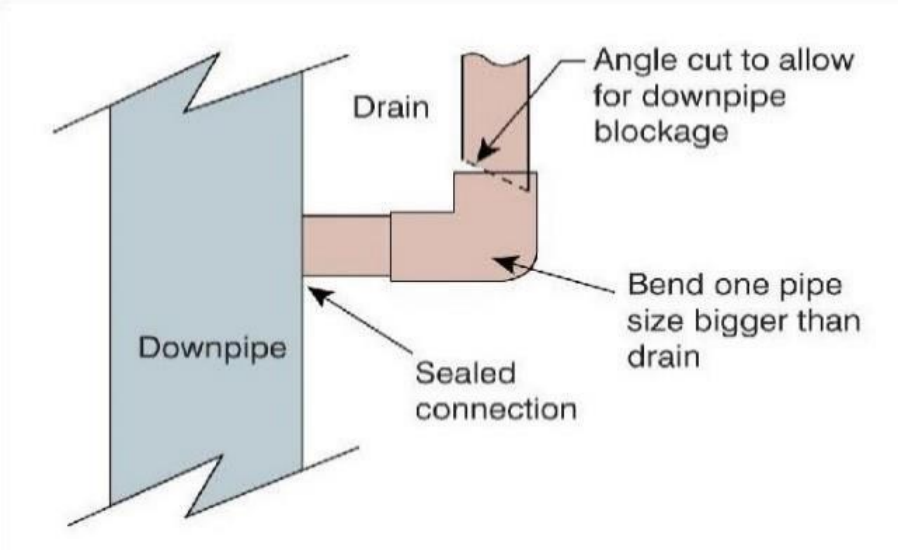

Figure 3 – Discharge to a downpipe

Reproduced with permission of Standards Australia Limited. Copyright in Fig.2 HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

Figures 3, 4 & 5 Requirements:

1. There is a form of disconnection to prevent leakage into the building from the indoor unit if there is blockage in the downpipe (see Figures 4 & 5); and

2. The connection to the downpipe is a minimum of 300mm below the drain outlet of the indoor unit (see Figures 3).

Caution must be heeded when connecting into a downpipe that the condensate drain does not cause an obstruction in the downpipe.

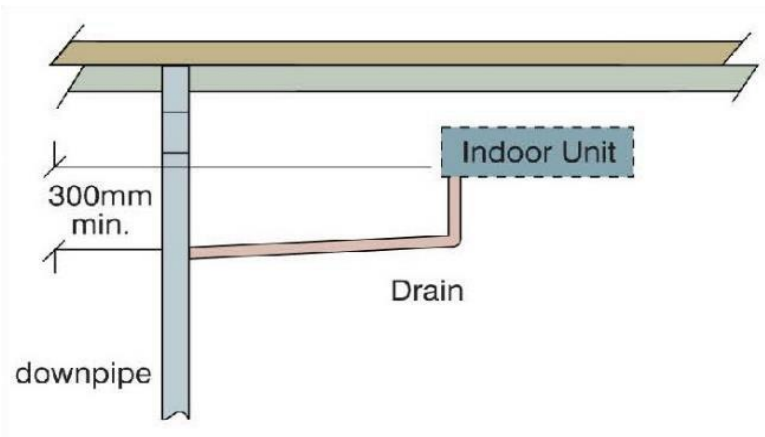

Figure 4 – Discharge to a downpipe

Reproduced with permission of Standards Australia Limited. Copyright in Fig.1 HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

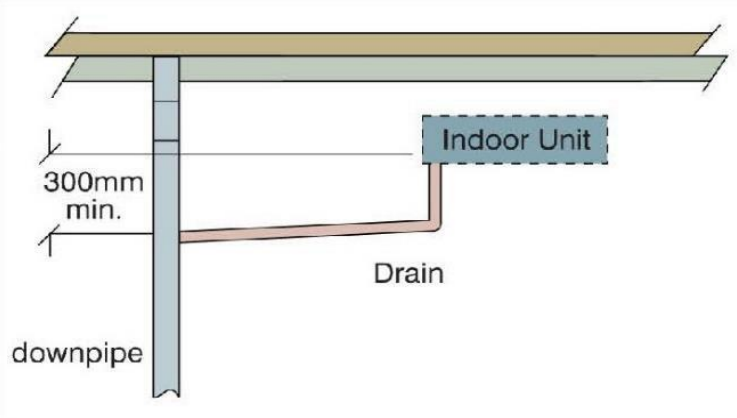

Figure 5 – Discharge to a downpipe
Reproduced with permission of Standards Australia Limited. Copyright in Fig.3 HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

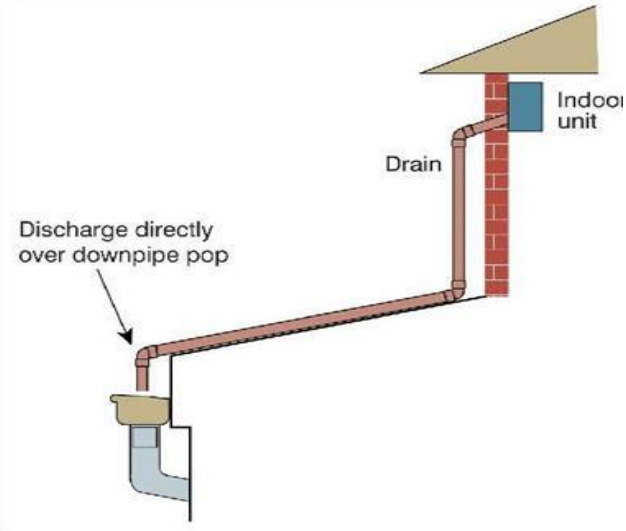

Figure 6 – Discharge to a downpipe via a lower metal roof
Reproduced with permission of Standards Australia Limited. Copyright in Fig.4 HB276-2004 vests in Standards Australia Limited and Standards New Zealand

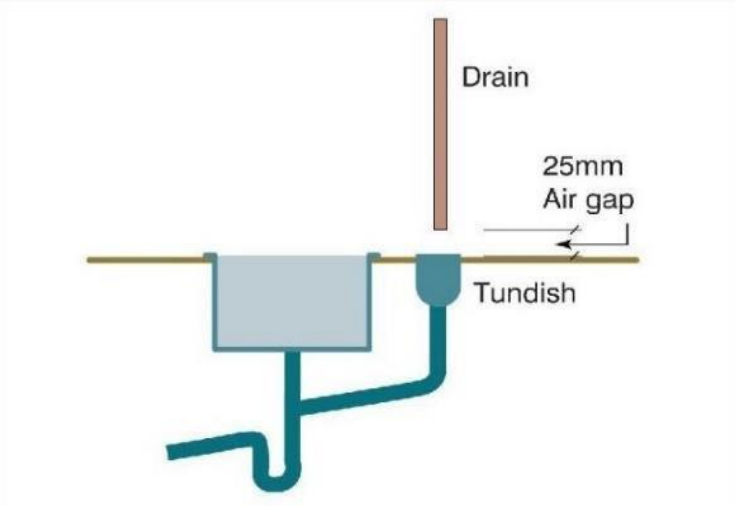

Figure 7 – Discharge to a sanitary drainage system via a tundish to fixture trap
Reproduced with permission of Standards Australia Limited. Copyright in Fig 5(a) HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

The connection is above the level of the water seal and the top of the tundish is above the overflow level of the fixture. **Shall be installed in accordance with AS/NZS 3500.2**

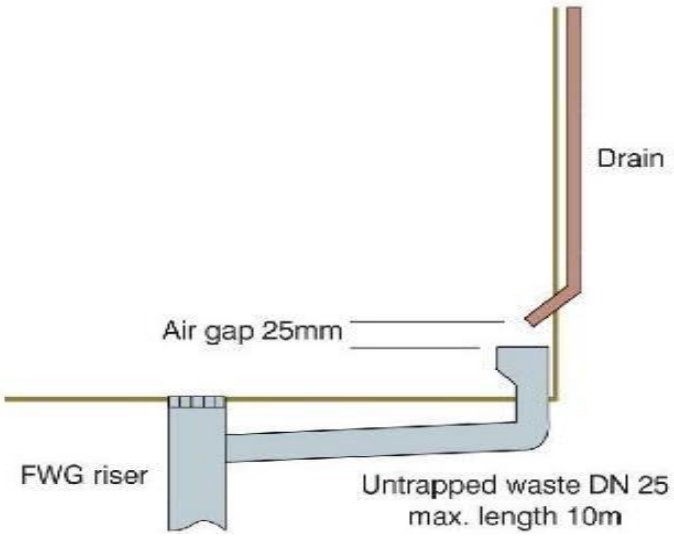

Figure 8 - Discharge to sanitary drainage system via a tundish to a floor waste gully
Reproduced with permission of Standards Australia Limited. Copyright in Fig 5(b) HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

S**hall be installed in accordance with AS/NZS 3500.2**

Condensing units mounted on balconies

Where the condensing unit is mounted on the balcony of an apartment building or other location where the discharge from the defrost cycle is likely to cause a nuisance, provide a drained safe tray to collect the removed ice build-up on the outdoor coil. An additional requirement is in relation to the installation of external condensing units installed on balconies, patios, decking, or roofs. All these installations require adequate drainage. Of particular concern is the Installation of external units on balconies in high rise apartment buildings.

It is not acceptable to discharge the drain over the edge of the balcony where it will cause a nuisance; it must be run to the sanitary or stormwater system in accordance with the above provisions and/or Figure 9 below.

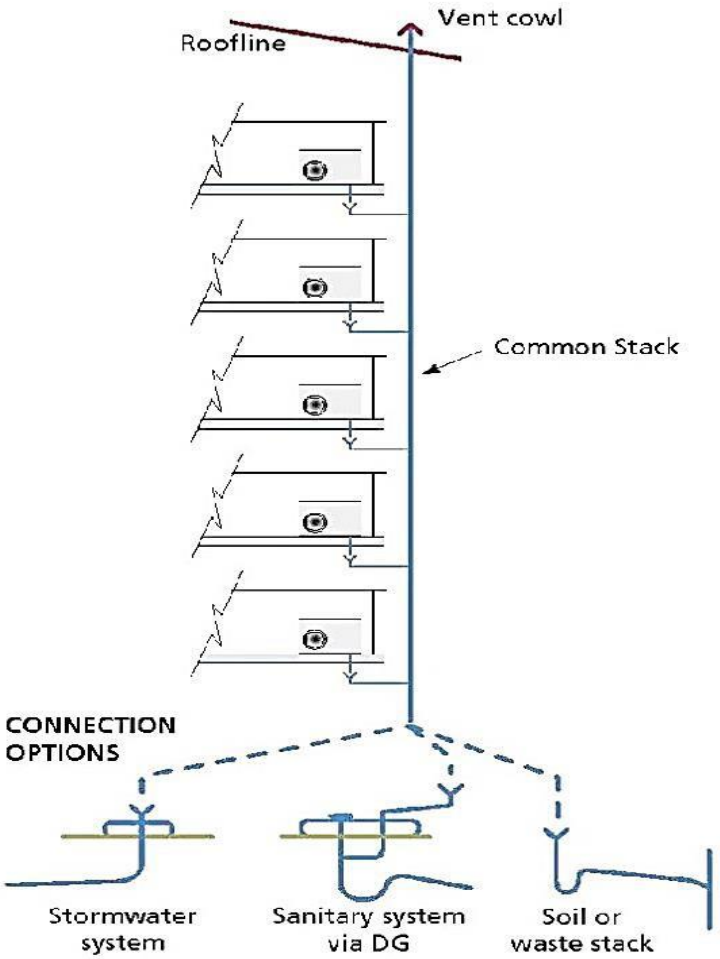

Figure 9 – Example of balcony condensate drains

Reproduced with permission of Standards Australia Limited. Copyright in HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

When installing air-conditioner condenser units on upper-storey balconies in residential buildings it is essential to consider their placement in relation to the balcony barrier (balustrade). If installed close to a balustrade, they can provide a climbing point for children who could fall over the barrier with tragic consequences.

Condensate drainage using a self-sealing device

A self-sealing device is, in effect, a waterless trap which is designed to close after waste discharge and prevent the admittance of foul air into the building. It offers the advantage, in the case of condensate drainage, of continuing to prevent foul air entry during times of little or no flow when a conventional water trap seal may evaporate.

The device is designed for 40mm upvc pipe and be installed in the vertical or on grade position but must be within a building, accessible and out of direct sunlight. An adaptor fitting (available from the manufacturer, or regular fittings) may be required for the upstream end of the valve to provide for the connection of 40mm pipe or tundish.

(Whilst this method of connection is approved, the 40mm discharge pipe and the self-sealing device it connects to must be installed by an appropriately licensed sanitary plumber).

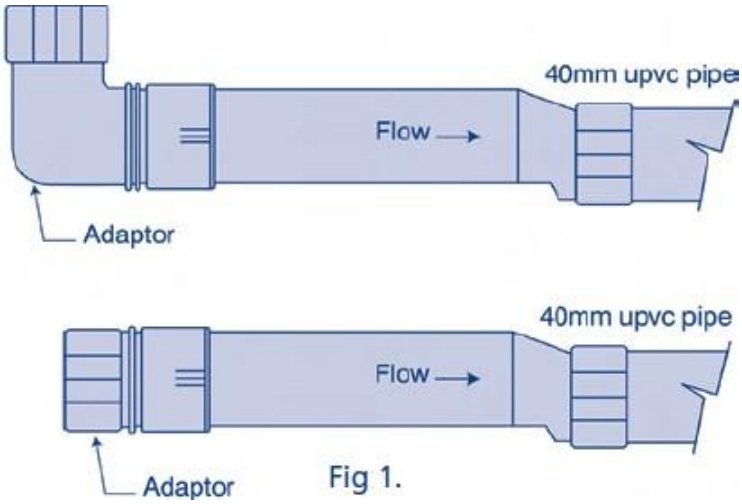

Figure 10 – Condensate drainage using a self-sealing device

Reproduced with permission of Standards Australia Limited. Copyright in HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

Permitted locations

The discharge pipe beneath a sink, trough, or vanity basin

A junction and device are installed by the sanitary plumber in the vertical section of discharge pipe (50mm or 40mm) below the trap seal of the fixture and the self-sealing device is installed in the vertical position as high as is practical to the underside of the benchtop. The discharge pipe, device and condensate drain must be adequately supported. A tundish is required on the top of the device to provide a physical air gap (20mm) in the condensate drain

A dishwasher connection point on a DN 50mm fixture trap

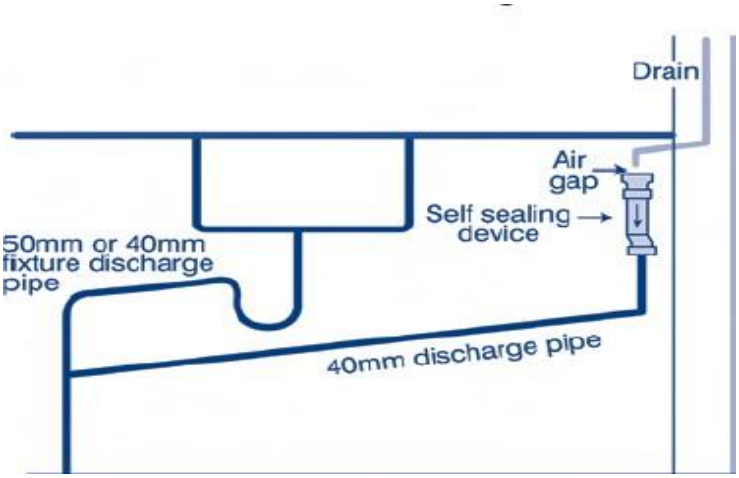

Figure 11 – Discharge pipe beneath a sink, trough, or vanity basin

Reproduced with permission of Standards Australia Limited. Copyright in Fig. 2 HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

Alternatively, the drain may discharge to the dishwasher connection point on a 50mm fixture trap using appropriate flexible hose and fittings providing all the conditions described in (1) can be met.

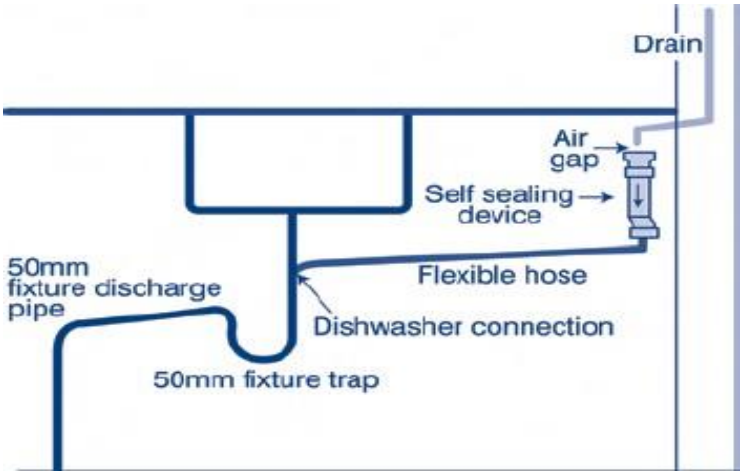

Figure 12 – Discharge via a dishwasher connection point on a DN 50mm fixture trap
Reproduced with permission of Standards Australia Limited. Copyright in Fig 3. HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

Waste or vent in a roof/ceiling space

The condensate drainage from an air conditioning or heating appliance may be discharged to a vent pipe via a self-sealing device located in a ceiling or roof space. The junction and device are to be installed by the sanitary plumber and must be supported in accordance with AS3500. It is preferable for the device to be installed in the vertical position with an air gap provided over a tundish. (See Figure 13 below)

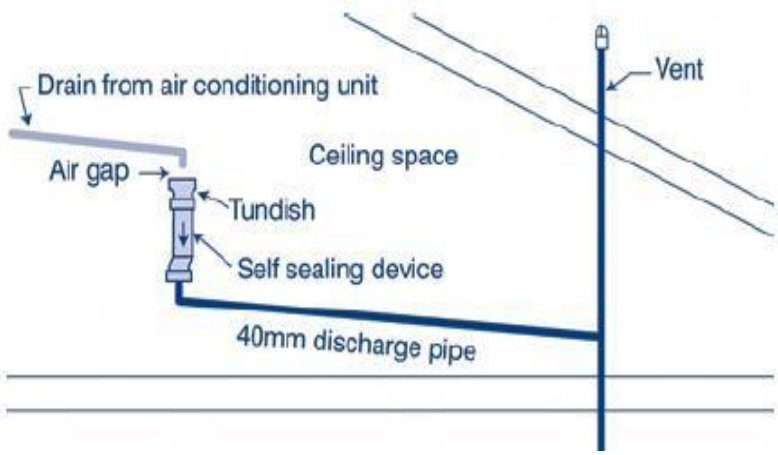

Figure 13 – Waste or vent in a roof/ceiling space
Reproduced with permission of Standards Australia Limited. Copyright in Fig 3. HB276-2004 vests in Standards Australia Limited and Standards New Zealand.

If it is not practical to install the device in the vertical position, it is acceptable in an on-grade position if a tundish incorporating an air gap is provided.

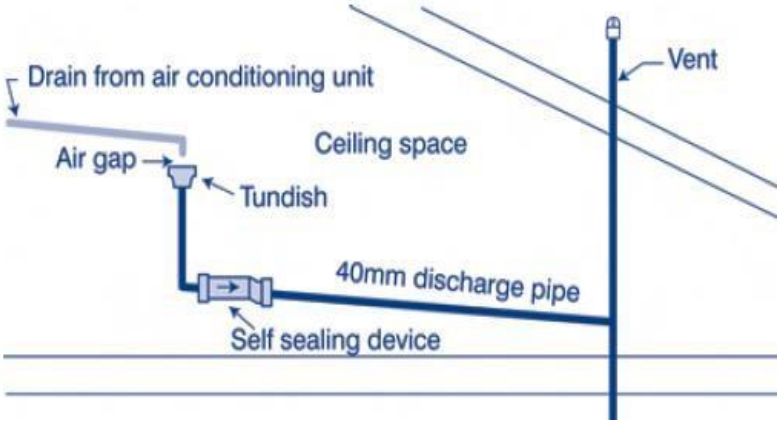

Figure 14 – Waste or vent in a roof/ceiling space on-grade

Reproduced with permission of Standards Australia Limited. Copyright in Fig 3. HB276-2004 vests in Standards Australia Limited and Standards New Zealand

Domestic size outdoor units mounted on a metal deck roof

The following provides guidance for the installation of small domestic size outdoor units on a metal deck roof.

- You must ensure that the weight of the unit is not excessive for the design of the roof structure. Larger units may require engineering computations to ensure adequate strength of the roof structure.
- If timber is to be used as a support material on a metal roof it should be red gum to minimise the possibility of staining the roof as it weathers.

The red gum can be painted if necessary to further protect the timber and the roof.

It is not permitted to install timber bearers in the tray section of a metal deck roof as support for an outdoor unit, because the flow of water in the tray is impeded (see Figure 15).

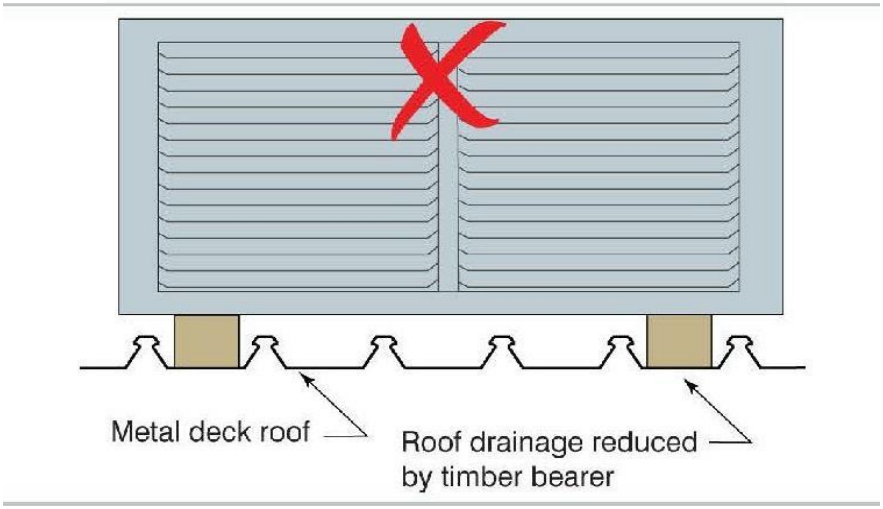

Figure 15 - Example of an outdoor unit on a deck roof

Reproduced with permission of Standards Australia Limited. Copyright in <HB276-2004 Diagram 1> vests in Standards Australia Limited and Standards New Zealand

If timber bearers are to be used as a support, ensure they are placed on top of the ribs and insulated from the metal by a suitable material (e.g., rubber waffle pads) to prevent corrosion occurring and to assist in the reduction of noise transmission. The unit should also be restrained from movement by brackets and / or stays (see Figure 16).

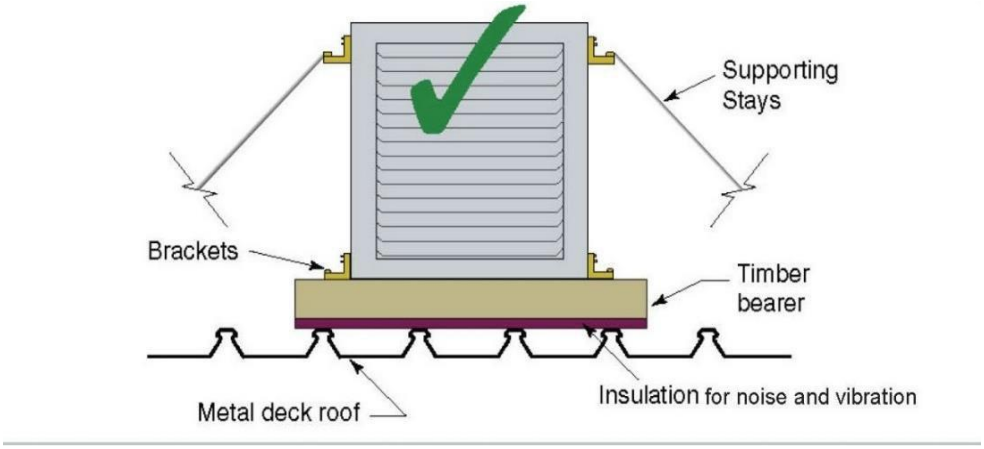

Figure 16 – An outdoor unit on a deck roof that is appropriately supported

Reproduced with permission of Standards Australia Limited. Copyright in <HB276-2004 Diagram 2> vests in Standards Australia Limited and Standards New Zealand

Securing condensing units

Condensing units whether wall mounted on brackets or at ground level on an appropriate support base should be installed to prevent the transmission of vibration to the adjacent building structure and secured appropriately to the bracket or base. Outdoor units should be mounted level on an appropriate wall bracket or support base and restrained from movement by means of suitable fixings, at the base and to the adjacent wall if required. Always follow the manufacturer's instructions to ensure there is an adequate space between the back of the unit and the wall for ventilation (see Figure 17).

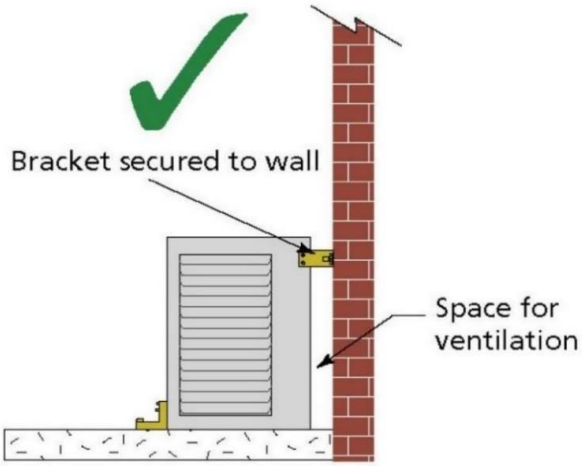

Figure 17 – Bracket secured to a wall

Reproduced with permission of Standards Australia Limited. Copyright in <HB276-2004 Diagram 3> vests in Standards Australia Limited and Standards New Zealand

Condensate drains

Condensate drains are to be connected to all condensates drain outlets from split system fan coil units. Where required, a 'P-trap' must be installed to assist in the draining of the condensate collection tray under the cooling coil within the fan coil unit.

Drain material

The material used for the drain must be suitable for the purpose and if a plastic is used it must be of type suitable for installation in direct sunlight.

Pumped condensate

If condensate from an indoor unit must be pumped to its drainage termination point it is essential that the pump is installed in an accessible position for service/maintenance purposes.

Testing and commissioning

Once the installation is complete, tests must be carried out to check for any leaks in the refrigeration piping system and the correct operation of the condensate drain.

Commissioning checklist

- Check that all electrical work is complete, and the power is connected to the system
- Check that all refrigerant pipework is complete and that the pipe insulation totally encloses the associated pipe
- Commission the air conditioning unit according to the manufacturer's instructions, including verification of the required refrigerant pressures.
- Check that the condensate drain allows a free flow of water and does not hold water at any point, apart from any 'P-trap' installed.
- Instruct the consumer in the operation of the air conditioning equipment

All electrical work must be carried out by a licensed electrician.

Related Documentation

- Building Act 1993
- Building Regulations 2018
- Plumbing Regulations 2018
- NCC Volume One for Class 2 to 9 Buildings
- NCC Volume Two for Class 1 and 10 Buildings
- National Construction Code 2022 Volume Three
- AS/NZS 3500.2: Plumbing and drainage Part 2: Sanitary plumbing and drainage
- HB 276: A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling & Air Conditioning Plant & Equipment

List of Amendments

- Condensate drainage using a self-sealing device
- Drain requirements
- Commissioning

Document history

Sector	Plumbing
Category	Mechanical Services
Topic	Split system air conditioning
Document number	07
Version	1.0
Superseded	• Technical Solution Sheet 7.08
Published	29 August 2024

Contact Us

If you have a technical enquiry, please email plumbingtechnicaladvice@vba.vic.gov.au or call 1300 815 127.

Victorian Building Authority
Goods Shed North
733 Bourke Street
Docklands VIC 3008

www.vba.vic.gov.au

Copyright and Disclaimer

Copyright

Disclaimer

The information set out in the VBA's resources is for general information purposes and guidance only. It is a reader's responsibility to obtain independent advice in respect of the application of legislation, a technical instruction or industry standard relevant to their circumstances. A person's use of the VBA's resources is not a substitute for obtaining independent advice. While we have made every attempt to ensure our resources contain correct information at the date of publication, the VBA makes no warranty or representation that its resources are error free. To the extent permitted by applicable laws, the VBA, its employees, agents and consultants exclude any and all liability whatsoever for any direct, indirect, incidental, special or consequential loss or damage a person may suffer arising out of or in connection with the access and use of the VBA's resources' (including any third-party material included in these resources).'