

ISSUE 654 **BULLETIN**



INSTALLATION AND MAINTENANCE OF SOLID FUEL APPLIANCES

October 2020

■ This bulletin outlines considerations for installation, use and maintenance of solid fuel appliances.

■ Solid fuel appliances, including flue pipes and chimneys, must be regularly cleaned and maintained.

■ This bulletin replaces Bulletin 306 *Inspection procedures for chimneys, fireplaces and solid fuel burning appliances.*

1 INTRODUCTION

1.0.1 Solid fuel-burning appliances can be free standing or built in. Terms used for built-in appliances include inbuilt heaters, fireplace heaters, inset or insert fires, slow combustion solid fuel stoves and solid fuel space heaters, which may be installed in an existing fireplace and/or chimney or in a new construction.

1.0.2 Damaging fire incidents involving solid fuel appliances are most often the result of:

- poor construction and/or installation practice
- defects associated with ageing and durability
- inappropriate use of materials
- inadequate maintenance.

1.0.3 Part 7 *Prevention of fire occurring* in New Zealand Building Code Acceptable Solutions C/AS1 and C/AS2 sets out the requirements for solid fuel appliances and flues and cites AS/NZS 2918:2001 *Domestic solid fuel burning appliances – Installation* as an Acceptable Solution for the installation of domestic solid fuel burning appliances and flue systems.

1.0.4 Manufacturers' instructions should be followed for all aspects of installation and use of solid fuel appliances and should not conflict with any Building Code requirements. Where alternative recommendations are made or modifications considered, supporting information such as test methods should be provided to the approving authority for consideration.

1.0.5 All installation of solid fuel appliances and related maintenance work should be carried out by competent tradespeople.

1.0.6 This bulletin replaces Bulletin 306 *Inspection procedures for chimneys, fireplaces and solid fuel burning appliances*.

2 FLUES

2.0.1 Flues should be constructed from stainless steel [type 304 or 316]. Galvanised steel is not acceptably durable for a flue, but the outer flue shield for a free-standing appliance may be galvanised steel.

2.1 BUILT-IN APPLIANCES

2.1.1 Ventilation of the chimney between flue and masonry should be provided for at the top of the flue system so there is a pathway for venting hot air to the outside without allowing rainwater or debris to enter [Figure 1]. Allowance should also be made for free expansion of the flue during usage.

2.1.2 Air inlets at lower levels allow for additional draught in carrying hot air out of the chimney cavity.

2.1.3 Insulation of the appliance or flue should only be on the manufacturer's recommendations. Improper use will lead to excessive heat build-up and may create a fire hazard through the direction of heat to combustibles or the premature failure of the flue. Single-skin flues need insulation [air or other] outside of the building only.

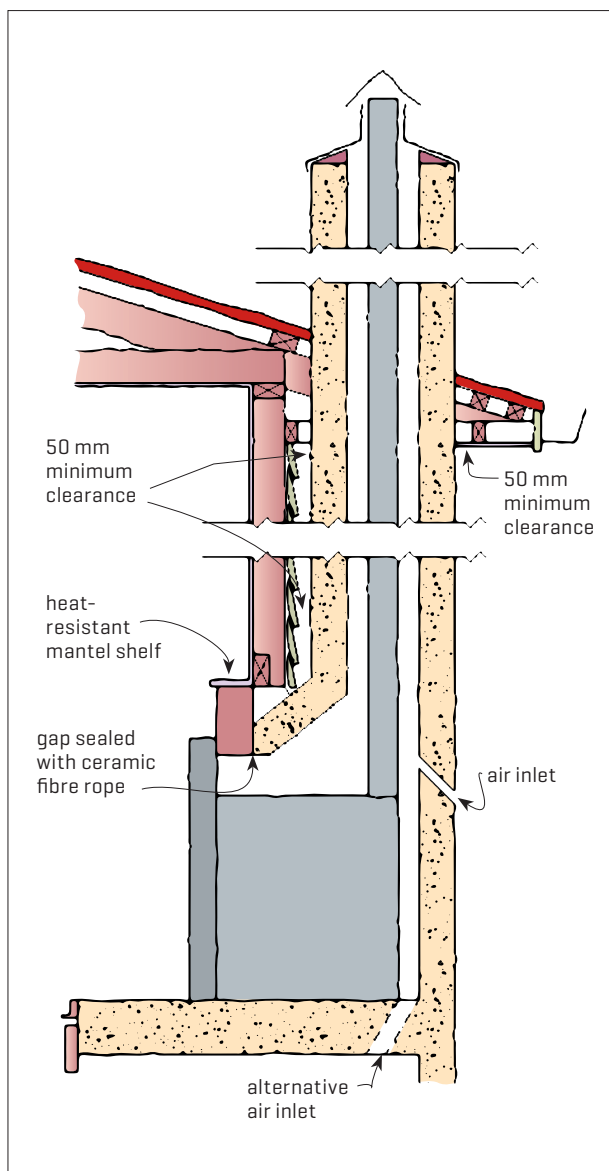


Figure 1. Installation inserted into existing fireplace.

2.1.4 Where flues are installed in enclosures such as chimneys, separation distances to heat-sensitive material must be maintained and the enclosure adequately ventilated [see Build 129 *Flue installations in enclosures* for more information].

2.1.5 Installation of a short flue pipe through a metal register plate to discharge smoke and gases into the existing chimney is not recommended due to difficulty in cleaning and maintenance of the chimney flue. Where this situation exists, the register plate should be removed and a continuous metal flue installed.

2.2 FREE-STANDING APPLIANCES

2.2.1 A flue shield is the protective metal sleeve surrounding the flue pipe where it passes through a ceiling or near to a wall. The flue should not be rigidly connected to the flue shield so that it can readily expand and contract [Figures 2 and 3].

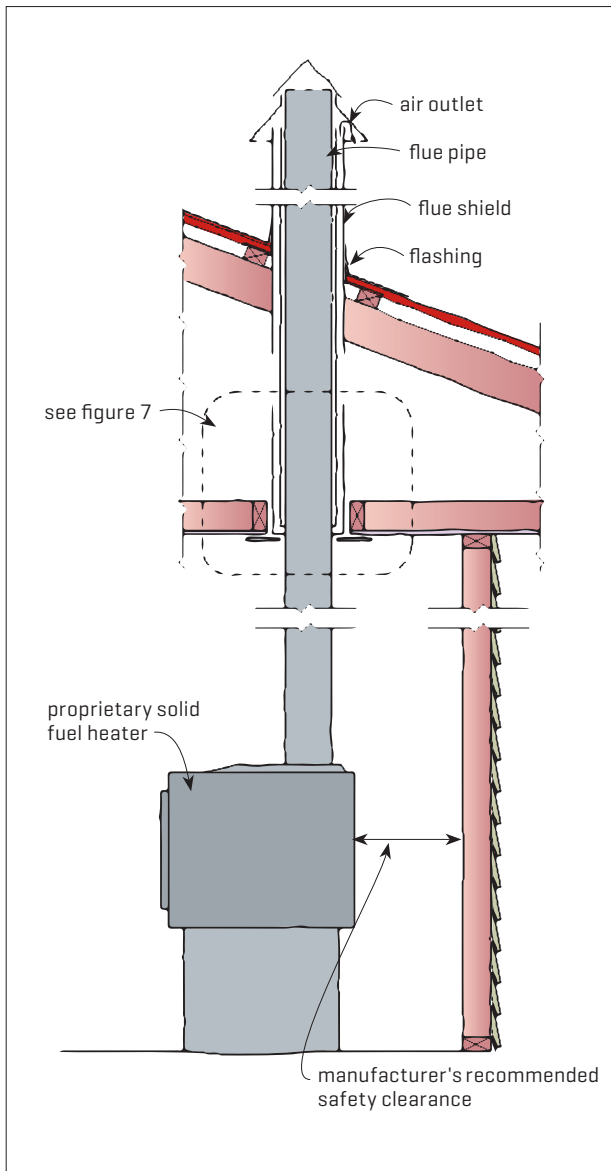


Figure 2. Free-standing installation.

2.2.2 The flue shield should extend to 100 mm below ceiling level to protect the ceiling lining from radiated heat. A single shield should not be longer than 4 m below the roofline penetration (or 2.4 m long if within 1.2 m of the appliance). There should be adequate spacing between the flue shield and the flue pipe to allow air to flow through and remove excessive heat.

2.2.3 A bare flue pipe should be at least 1.25 m from combustible materials unless otherwise tested and specified by the manufacturer. A single flue shield should be at least 25 mm away, and a double flue shield may be in point or line contact with the ceiling framing at not more than four points around its perimeter. A heat screen should go the full height of any wall opposite a bare flue section.

2.2.4 There are no requirements specified in AS/NZS 2918:2001 for horizontal flue pipes penetrating a wall. A minimum fall of 1 in 12 towards the appliance is recommended for nominally horizontal sections of flue

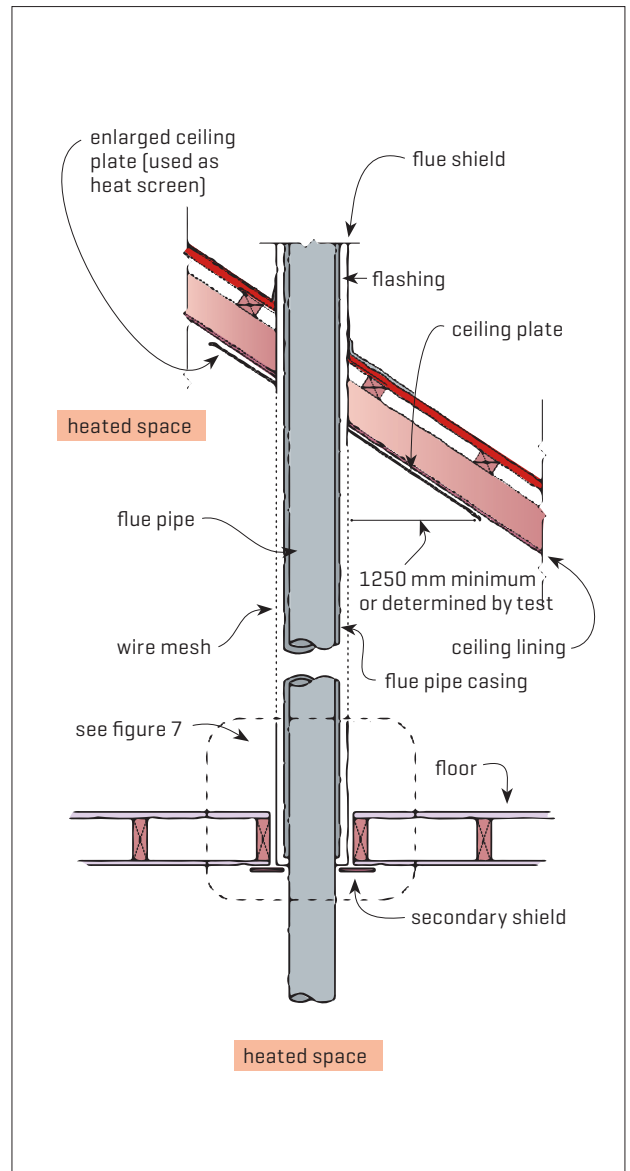


Figure 3. Interrupted shield and sloped ceiling penetration.

pipe. It is recommended that only short sections of pipe be installed in this way, for example, in passing from the appliance through a wall. Shielding requirements apply to flue pipes passing through a wall.

2.2.5 Flues should not be enclosed within cupboards. This restricts free ventilation around the flue and increases the radiation hazard to combustibles

3 CLEARANCES

3.0.1 Manufacturers' installation instructions should provide minimum distances from walls, framing timber and other combustible materials. These instructions should be strictly followed to ensure the materials are not overheated, causing them to ignite. Clearances can vary depending on appliance model, installation method and flue and/or chimney construction.

3.0.2 The hearth must provide protection to the floor from the physical hazard of falling embers as well as

downward radiation from the appliance. The fixing and materials of the hearth should be strictly as advised by the manufacturer, as well as the position of a mantel shelf if applicable.

3.1 BUILT-IN APPLIANCES

3.1.1 Combustible materials such as wall and roof framing and linings and weatherboards should be inspected to ensure 50 mm clearances for both new and existing construction. This may involve partial removal of linings, drilling of holes and use of a boroscope and the removal of plaster in the case of weatherboards [Figures 4 and 5].

3.2 FREE-STANDING APPLIANCES

3.2.1 The distance the appliance is to be kept clear of a wall is designed to take account of both short-term and long-term temperature effects [Figures 6 and 7].

3.2.2 Furniture and other combustibles should be no closer to the appliance than 1.25 m. This distance may only be reduced by use of a heatscreen between the appliance and the wall. Materials for heatscreens include sheetmetal, bricks, suitable mineral board or a tested combination of these. If a new heatscreen is to be installed, use a metal or metal-faced one or refer to AS/NZS 2918:2001 Table 3.1. If not listed in Table 3.1, the screen will require testing as described in AS/NZS 2918:2001.

3.2.3 There must be a gap at the top and bottom of the screen to allow free air circulation behind it [Figure 8].

3.2.4 Solid fuel zero-clearance or through-wall heaters have special installation requirements as discussed in AS/NZS 2918:2001. They should only be installed at zero clearance to combustibles where evidence has been provided of testing to Appendix E of AS/NZS 2918:2001.

4 VENTILATION

4.0.1 It is important to provide sufficient ventilation for the appliance to function correctly. With new building designs resulting in more airtight buildings and new equipment such as exhaust fans and heat transfer systems, it may be necessary to provide additional inlet vents for outside air. This can be grilles in the floor or wall adjacent to the appliance.

4.0.2 The recommended ventilation size is half the cross-sectional area of the flue. For a 150 mm diameter flue, this is an area of about 100 x 90 mm but does not take into account the effects of other exhaust systems in the building. Each situation must be evaluated by the installer on a case-by-case basis.

5 STRUCTURAL STABILITY

5.0.1 Appliances should be restrained by bolting them to the hearth [Figure 9]. Manufacturers should ensure a

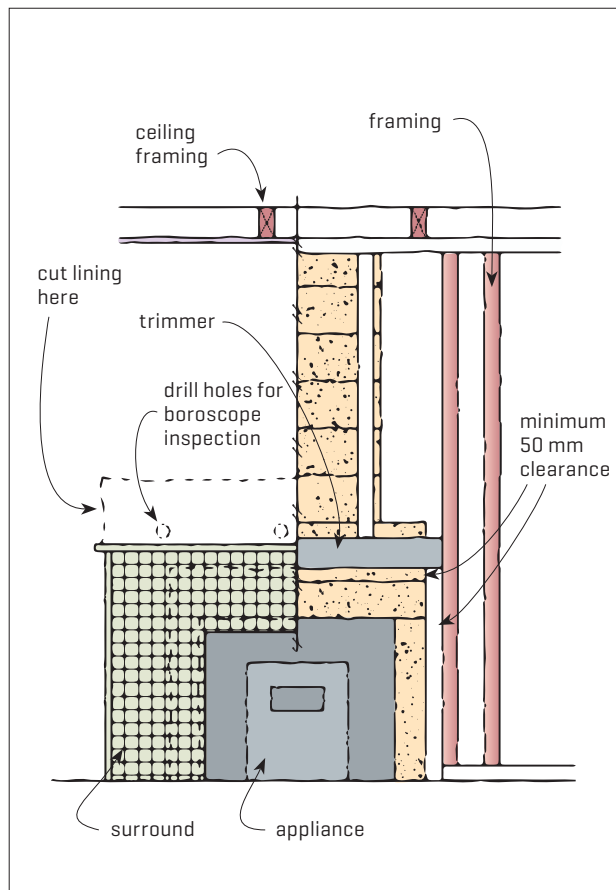


Figure 4. Cutaway view of chimney and appliance.

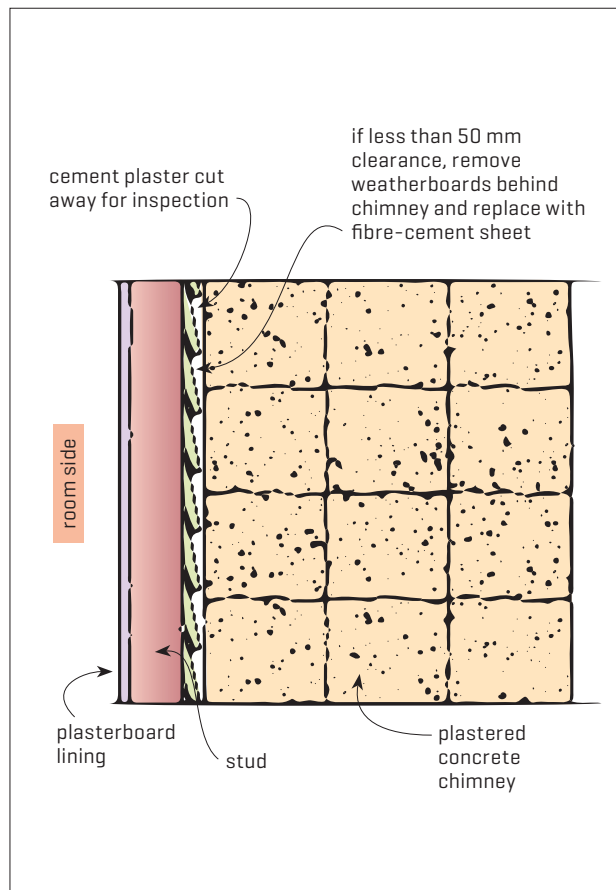


Figure 5. Inspection of wall cladding clearance.

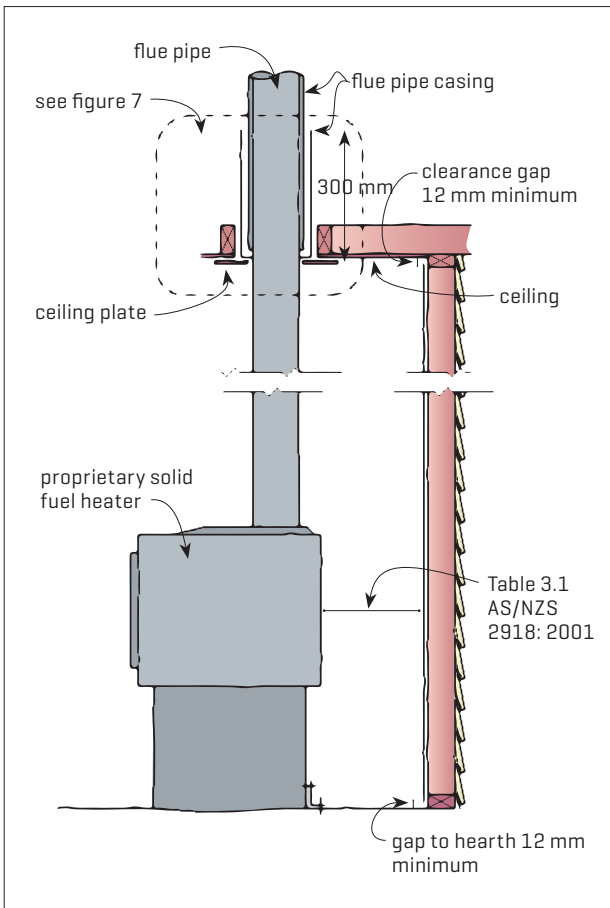


Figure 6. Free-standing installation with sheet material heatscreen.

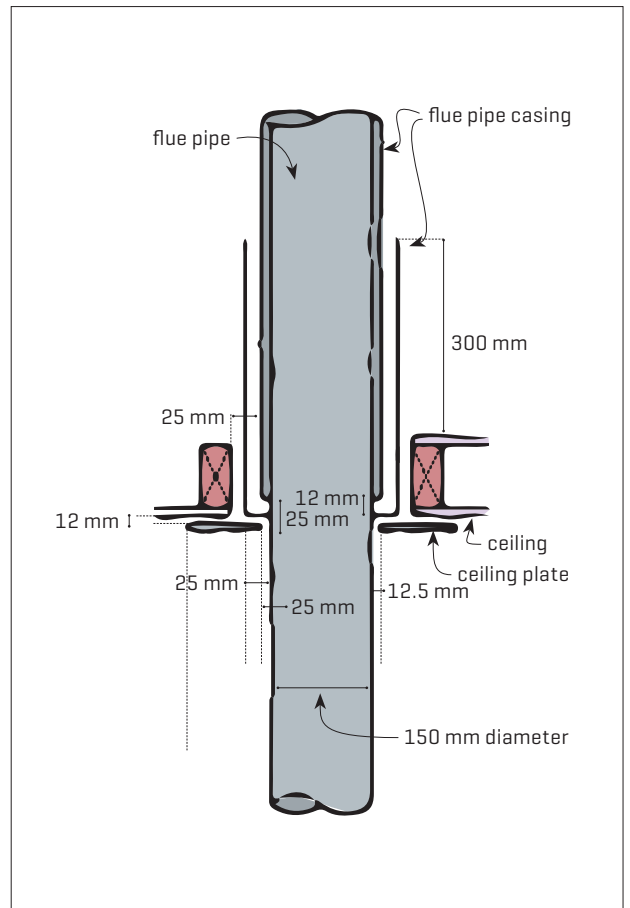


Figure 7. Typical ceiling penetration for a tested flue.

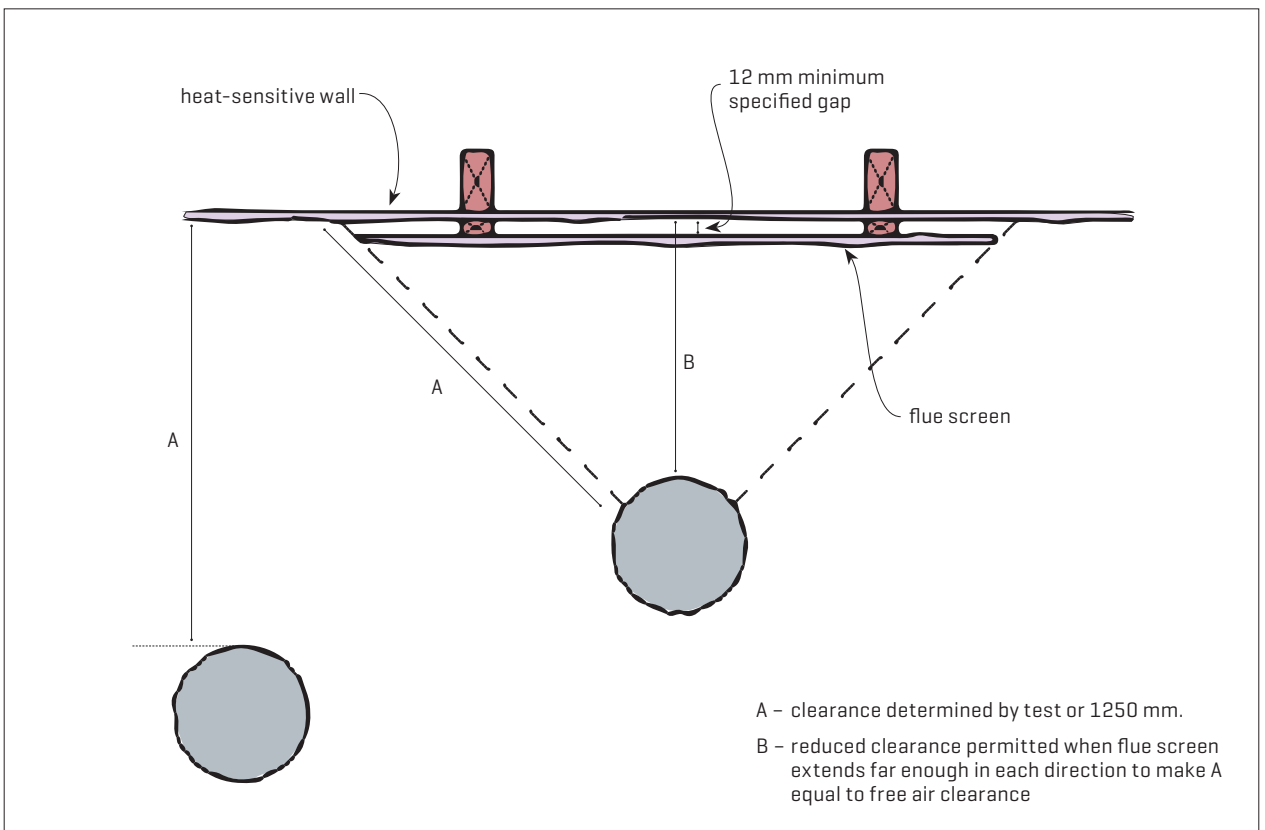


Figure 8. Heat screen clearance.

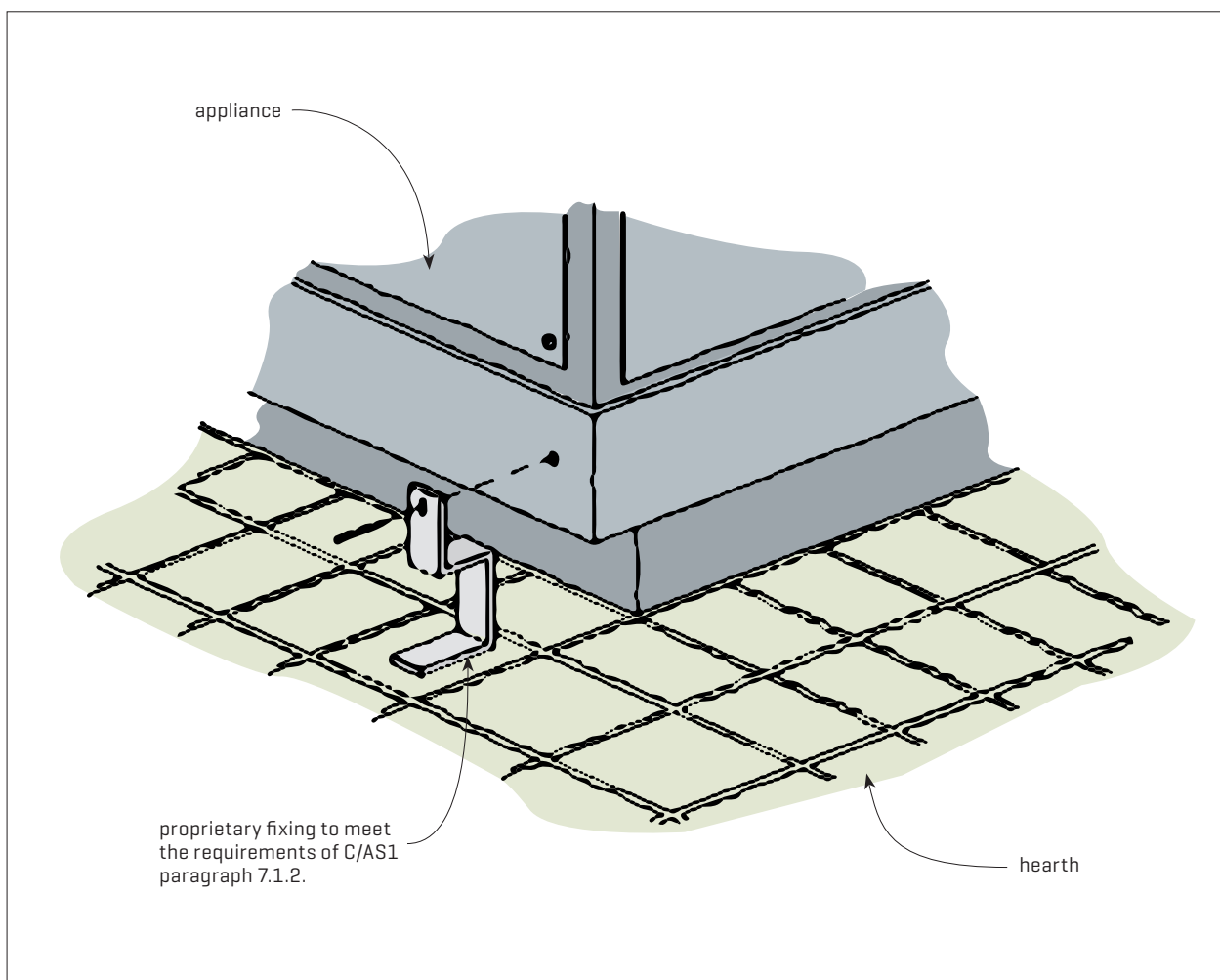


Figure 9. One method of securing appliance to hearth.

practicable means of restraint is advised and provided for their appliance.

5.0.2 Chimneys and fireplaces should be tied in to the framing and/or foundations to counter any wind and seismic loading.

6 USE, CLEANING AND MAINTENANCE

6.0.1 Appliances must only be used with the fuel they were designed for. Do not burn driftwood or treated timber as the salts present may quickly corrode the metal of the appliance and the flue, and the ashes of treated timber may be poisonous. Plastic materials from household refuse should not be burned as they produce poisonous and corrosive fumes.

6.0.2 Use only dry wood and only turn down the heater when the fire is well alight. When adding large pieces of wood, run at fully open for 5 minutes before turning down. More advice can be found on the New Zealand Home Heating Association (NZHHA) website. www.nzhha.co.nz/how-to-use-your-wood-burner.

6.0.3 Coal should not be used in a wood burning appliance and should only be used in appliances specifically designed for the purpose. If coal is used in a

wood burning appliance, it can damage the fire box and flue and reduce their durability.

6.0.4 A metal flue should never be allowed to become red hot during use as it is likely to corrode or deteriorate at a much faster rate than is usual. The intense radiation produced could also ignite the structure of a building.

6.0.5 The presence of creosote [a tar-like substance] on the outside of the flue indicates a build-up inside that requires inspection and cleaning if necessary. Creosote production can be minimised by running the appliance at optimum efficiency and obtaining as complete a level of combustion as is possible.

6.0.6 Failure to maintain a clean flue can result in the emission of toxic gases into the dwelling or structural damage from possible chimney fires. Flue pipes should be routinely cleaned by an experienced chimney sweep at least once per year, but more often if necessary. If slow smouldering fires are burned, creosote is more likely to form, and this should be removed before building up to thicknesses that, in the event of ignition, could fuel a severe chimney fire. Manual or mechanical cleaning methods are preferred to chemical ones and should always be used if the creosote layer has built up to more than about 2 mm thick.

6.0.7 Also check flues and flue shields for signs of rusting or cracking, paying particular attention to seams and other areas where joins, swages or offsets occur.

6.0.8 The surface of heatscreens should be checked regularly for damage or distortion. The wall surface behind the screen should also be examined. A screen may be refaced with metal, and other finishes or adhesives ought to be able to withstand temperatures up to 200°C. If the unprotected wall adjacent to the screen shows signs of heat damage, the screen needs to be extended.

6.0.9 Cracks and other damaged areas of existing fireplaces should be raked clean and filled with mortar [as dry as possible] or fire cement [in the fire chamber and lower end of the chimney].

6.0.10 Chimney structures should be checked regularly. Repair may involve cutting out and replacing brickwork or raking out mortar joints and repointing.



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ISSN 1178-4725 (Print) 2537-7310 (Online)

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