

● Nature's Flame Pellet fire

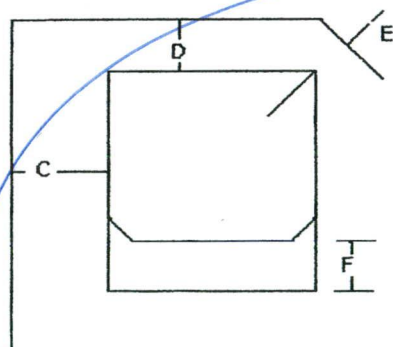
Specifications

EF2 and EF3 Pellet fires are available in free standing (EF), fireplace insert (FPI), and built-in heater (BIH) models.

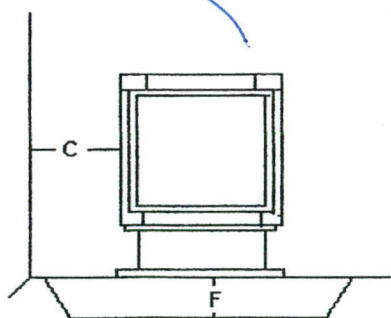
EF5 and Windsor are available in free standing only.

DIMENSIONS AT BACK OF UNIT

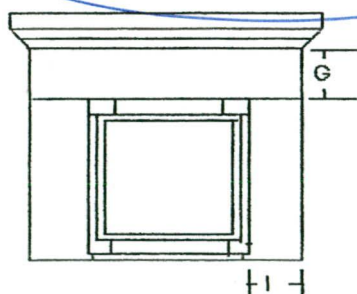
	Ef2/ef3	Ef5	Windsor
Width X depth	55x60cm	65x46cm	651x663mm
Height	76cm	85cm	69cm
A. Front of unit on hearth	325mm	n/a	n/a
B. Recess depth into fireplace	275mm	n/a	n/a
Standard Surround (H x W)	75x100cm	n/a	n/a
Oversized surround (H x W)	82.5x115cm	n/a	n/a
C. Side wall to unit	200mm	75mm	204mm
D. Back wall to unit	25mm	50mm	76mm
E. Wall to corner of unit	25mm	100mm	76mm
F. Floor protector (in front of unit)	150mm	n/a	150mm
G. Top of unit to mantle	200mm	n/a	n/a
H. Unit top to surround top	200mm	n/a	n/a
I. Unit to mantle pillar	150mm	n/a	n/a



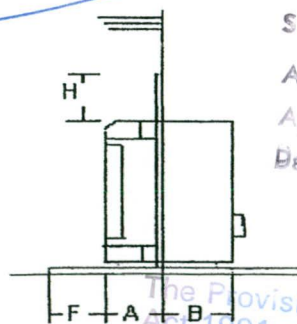
TOP VIEW FREE STANDING



FRONT VIEW FREE STANDING



FRONT VIEW INSERT



SIDE VIEW INSERT

SOUTHLAND DISTRICT COUNCIL

Appl. No. 2672701

Approved *[Signature]*

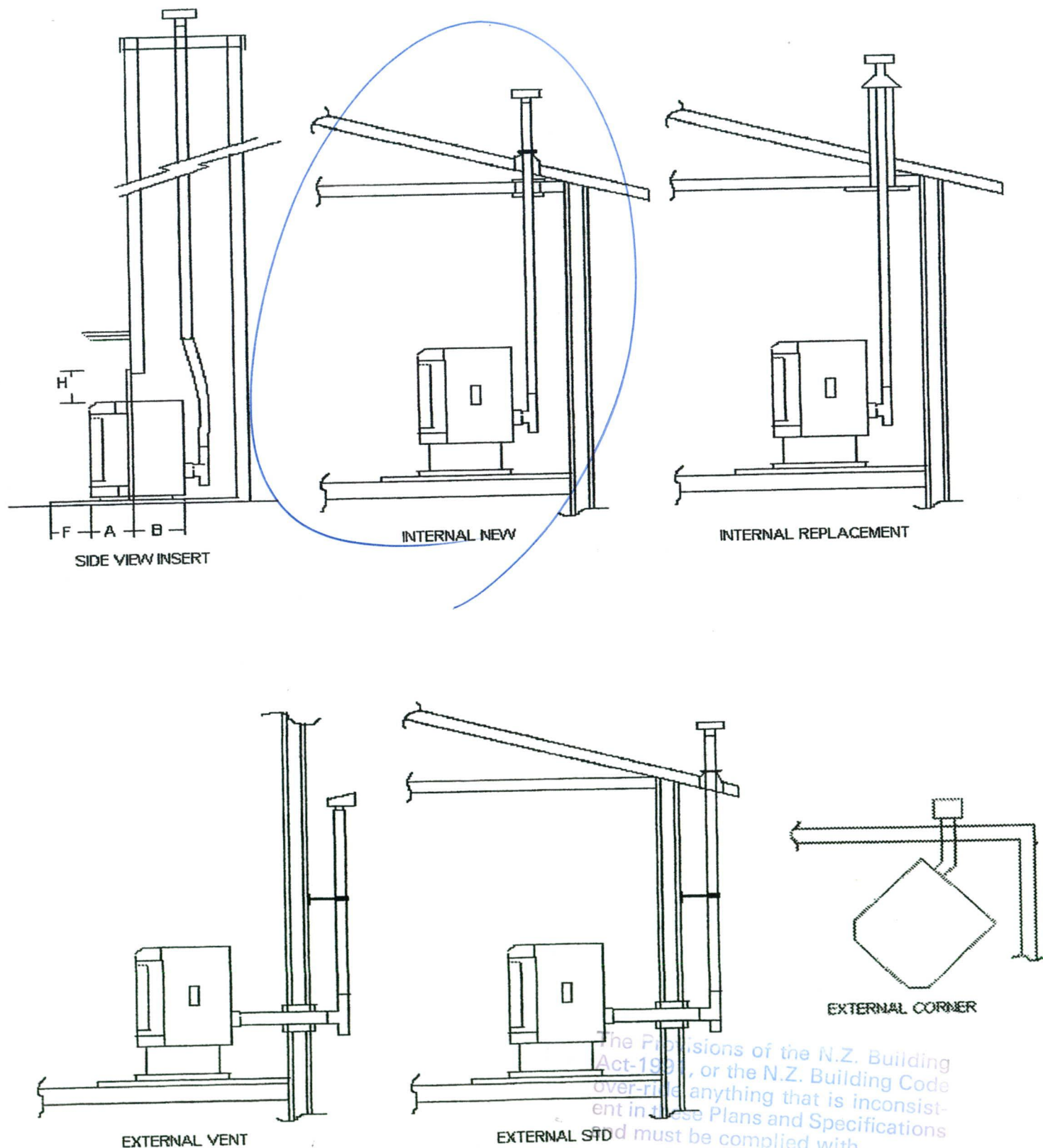
Date 19/5/04

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Fax 03 347 9916

The Provisions of the N.Z. Building Code Act 1991, or the N.Z. Building Code, shall apply to anything that is inconsistent in these Plans and Specifications and must be complied with.

Nature's Flame Pellet Fire Installation Type



The Provisions of the N.Z. Building Act-1991, or the N.Z. Building Code over-ride anything that is inconsistent in these Plans and Specifications and must be complied with.

7. PELLET APPLIANCE VENTING



7.1 Overview

Pellet burning appliances differ from most other woodburning appliances in that they do not rely on natural draft produced by a chimney. Instead, the flow of combustion air and exhaust gas is forced with a fan; pellet venting systems may operate under positive internal pressure, a condition that does not occur with natural draft systems. Another important difference is that the maximum exhaust temperature from pellet appliances is much lower than from cord wood burners. These two factors—forced draft and low exhaust temperature—mean that a pellet appliance venting system is very different from those used for wood stoves.

For any given pellet appliance installation there are usually two or more optional configurations for the exhaust vent. In fact, there are far more venting configuration options for a given pellet appliance than for any other heating appliance category. Some installation configurations cost less in parts and labour and some options can be expected to deliver better performance. Your task is to guide the customer towards the design that delivers good performance, while keeping the installation cost reasonable.

7.2 Pellet Venting Equipment

The safety test standard for pellet vent is based on the tests for "L-vent" (Standard ULC S609), a vent designed for high efficiency oil furnaces. The interim pellet vent document, referred to as ULC C441, includes a positive pressure test and a simulated soot burn out test. Pellet vent is similar in structure to B-vent which is used for gas furnaces and fireplaces, but with three important differences needed to match the fuel's

special characteristics and to meet the certification requirements: first, pellet vent uses a stainless steel liner so it can tolerate the soot fires that can occur in poorly tuned, poorly maintained systems; second, its joints are gasketed to prevent exhaust leakage into living spaces when it operates under positive pressure; and third, the clearances for pellet vent are usually greater.

Unlike conventional venting systems using chimneys, pellet vent is exposed to positive exhaust pressure periodically, and in some installations, continuously during operation. Each joint and seam in the vent must be sealed to prevent leakage of exhaust gases into the home. Although fibre gaskets are factory installed in the female end of each section, it is strongly recommended that the installer provide additional sealing by applying silicone sealant or foil tape to each joint after installation.

The need to seal the joints in a pellet vent installation increases the importance of designing the vent so that it can be cleaned with little or no dismantling.

7.3 Vertical Installations

7.3.1 Pellet Vent Components and Uses

A vertical pellet vent installation is the preferred configuration because it usually delivers more consistent performance. The following quote is from the Hearth Products Association Pellet Steering Committee consensus statement agreed to and circulated in October 1995:

"Experience has shown that the optimum vent installation, one which minimizes potential problems related to venting, would be vertical, located within the heated house envelope and exit the building at or near the peak of the roof."



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cleaning, inspection and maintenance must be considered.

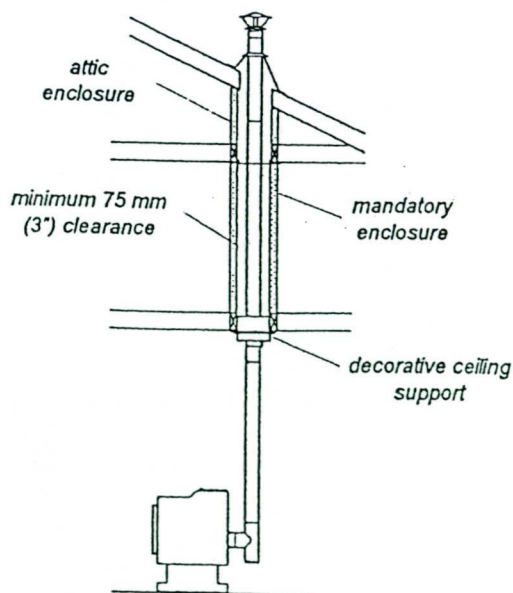
7.3.2 Venting Through Existing Chimneys

Pellet appliances may be vented through existing chimneys, provided the proper components are used and the system design results in effective venting. Some pellet vent manufacturers provide adaptors for various diameters of factory-built chimney and for connection to chimney relining systems where the appliance is to be vented into a masonry chimney. Check with the vent manufacturer for the appropriate adaptors and instructions for installation.

Unlike wood stove venting systems operating on natural draft in which the chimney diameter should match that of the appliance flue collar for

its entire length so that gas velocity and temperature are maintained, it is sometimes necessary to increase pellet vent diameter to achieve good performance.

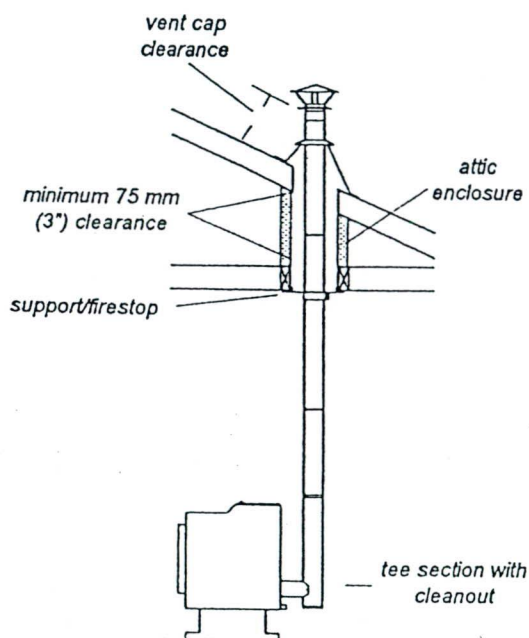
When the venting system is long and has several elbows, the flow resistance offered by a 3" system may overcome the exhaust fan's ability to move enough air through the system to maintain good combustion characteristics. The usual solution is to increase the vent diameter to reduce the flow resistance. Installations with a tee and elbows in a 3" system may offer enough resistance to gas flow to justify an increase in vent diameter. The question is, how do you know when to go to the next larger size?



VENT INSTALLATION THROUGH A LIVING SPACE
Where the pellet vent must pass through a living space above the room in which the heater is located, the vent must be enclosed. Light framing lumber and drywall are normally used for such chases.

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SIMPLE VERTICAL PELLET VENT INSTALLATION

Vertical pellet vent installations are similar to other chimney installations, except that the clearances differ and no single-wall flue pipe is used. The vent itself extends down to the appliance exhaust outlet. Provision must be made to keep attic insulation from coming into contact with the vent. This is usually accomplished by building a chase around the vent where it passes through the attic.

Experience has also shown that this type of installation is not always possible due to customer expectations, nor practical due to the location of the appliance or the design of the house."

There are two major advantages of vertical installations: first, most vertical installations operate under negative pressure once the flue has heated as natural draft assists and exceeds the flow pressure created by the exhaust fan, reducing the possibility of exhaust leakage into the room; and second, vertical installations are less susceptible to venting failure in strong winds.

Installing vertical pellet vent is similar to the installation of factory-built chimneys. Support systems, firestops, flashings, storm collars and caps are used in the same way for both types. There are some significant differences, however.

One difference is that pellet vent may require different clearances than chimneys, so the instructions for each model of pellet vent must be checked carefully; never assume that clearances are the same from product to product. Also, the top of the pellet vent may not need to extend as far above the roof surface as a chimney. Since pellet appliances do not rely exclusively on natural draft, there is less need to extend the vent above areas of air turbulence at the roof. Some models of pellet vent require the base of the vent cap to be at least 300 mm (12") from the roof surface, others require 450 mm (18") clearance from the roof to the cap base. The pellet vent and pellet appliance manufacturer's instructions should be the guide for precise requirements.

No flue pipe is used in pellet appliance installations. Instead, the pellet vent is connected to the appliance and runs up through the roof. Roof braces are required if the vent extends a significant amount above the roof. Check the vent manufacturer's instructions for the maximum unsupported height.

Vertical installations may also pass through an outside wall and up through the eave. It is strongly recommended that outside vertical installations of pellet vent be avoided. If such an installation cannot be avoided, the vent should be enclosed in a sealed and insulated chase to prevent excessive flue gas cooling and condensation problems. If a chase is used, provision for

7. PELLET APPLIANCE VENTING



7.4 Calculating the Correct Pellet Vent Diameter

The first step in assessing whether an increase in diameter is necessary is to calculate the equivalent length of the system. Underlying the equivalent length factors is the assumption that elbows offer more resistance than straight sections and that horizontal sections have more resistance than vertical sections. Here is a table of equivalent lengths for various system components.

Table of Equivalent Lengths
for Pellet Venting Components

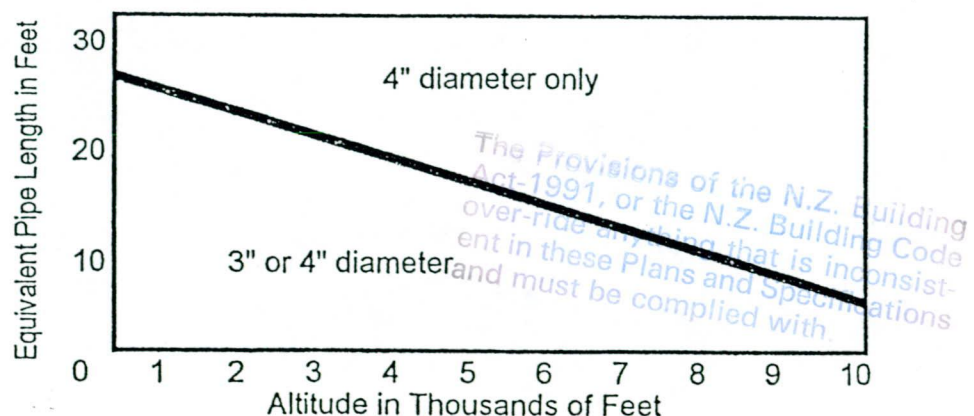
90° elbow or tee	5
45° elbow	3
horizontal pipe	1
vertical pipe	.5

To use this table, multiply the number of feet of vertical pipe, horizontal pipe, 90° elbows and 45° elbows by the appropriate value in the table. For example, multiply the number of 90° elbows by 5 and the number of feet of vertical pipe by .5.

You will also need to know at what equivalent length you should consider increasing to a larger vent size. The chart below provides this guidance.

On the vertical axis locate the position representing the total equivalent length of vent pipe. On the horizontal axis locate the position representing the approximate altitude above sea level. If the intersection of the horizontal and vertical positions is below the diagonal line, use either 3" or 4" pipe. If the intersection is above the diagonal line, use only 4" pipe. The transition to the larger size should be made at the appliance exhaust outlet.

Pipe Diameter Selection Chart





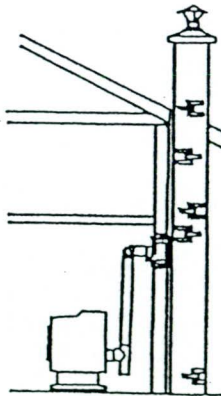
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Here are two sample calculations to illustrate the use of the sizing table and chart.

Example One

A pellet stove is to replace a wood stove in a basement family room and is to be vented through the existing outside masonry chimney. This means that the vent will rise from a tee section at the back of the pellet stove, through a 90° elbow and into the chimney breech where it will be connected to a new flex liner that will run to the top of the chimney. The house is located at an elevation of 2000 feet.

	#	Equiv.
90° elbows	3	15
45° elbows	0	0
Hor. Length	3	3
Vert. Length	20	10
Equiv. system length		28
Required vent diameter	4	

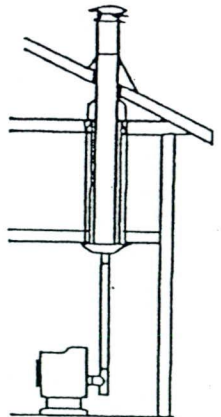


In this case it would be advisable to use 4" vent to avoid excessive resistance to exhaust flow in the system.

Example Two

A pellet stove is to be vented straight up into an existing 6" diameter 650°C chimney. The existing chimney will be relined to the same size as the pellet vent. The total system height is 25 feet and the elevation is 3500 feet above sea level.

	#	Equiv.
90° elbows	1	5
45° elbows	0	0
Hor. Length	0	0
Vert. Length	25	12.5
Equiv. system length		17.5
Required vent diameter	3	



In this case a 3" venting system would be adequate.

Because of the additional costs involved, vertical pellet vent installations are relatively uncommon, even though they consistently provide the most effective venting. The main issue to consider with vertical installations is the number of elbows in the system and the effect they will have on flow resistance.

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7.5 Horizontal Installations

7.5.1 Performance Problems

Even though they are inexpensive to install, horizontal vent installations are not recommended because they have been the source of too many performance problems. There are two ways in which horizontal installations can fail to vent exhaust gases: the first is related to the fact that horizontal vents produce no natural draft; and the second is caused by wind-induced pressure on the wall termination. There are, however, strategies that can be used to reduce the chances that venting failure will occur.

7.5.2 Electrical Power Failure

With no vertical rise, the vent develops no natural draft to assist in the expelling exhaust gases. This is not a problem as long as the appliance

exhaust fan is operating, but when the fan stops, such as during an electrical power failure, the smoke from the fuel remaining in the combustion chamber may not vent and may leak into the room through gaps in gaskets or through the fuel hopper lid. Two options are available to overcome this problem.

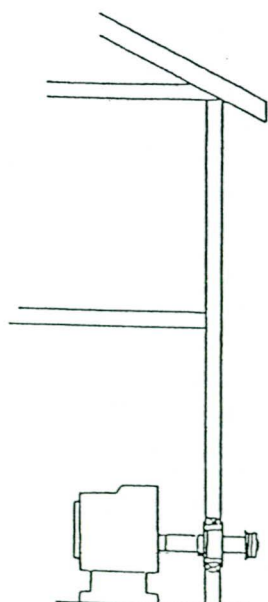
Battery Back Up

One option is to install a battery back-up system that will take over automatically if electrical power fails, powering at least the exhaust fan long enough to ensure that the fuel left in the combustion chamber burns completely. Battery back up systems are effective, but costly.

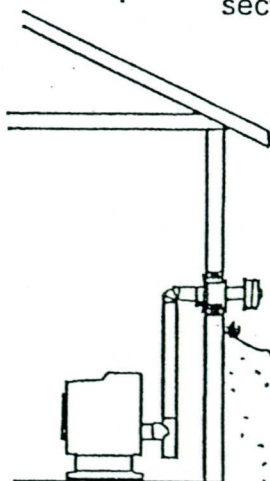
Add a Vertical Section

The other, more common approach, is to install a vertical section of vent so that some natural draft is produced. During operation, the hot exhaust gases rising in the vent produce draft, which, depending on the length of the rising

section, reduces or neutralizes the positive pressure in the vent produced by the exhaust fan. Reducing positive pressure is an advantage because it decreases the chance that exhaust will be forced into the room through small leaks in vent joints or gaps in sealant. A significant benefit from natural draft begins to occur at a rise of about 1.2 m (4'). It is preferable to locate the rising section inside the building because, if it is outside, heat loss from



HORIZONTAL PELLET VENT INSTALLATION
This type of installation permits smoke to enter the room if there is an electrical power interruption. Venting failure can also occur if high winds create a strong positive pressure on the wall where the termination is located.
NOT RECOMMENDED

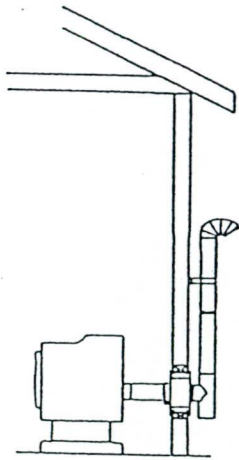


INTERIOR RISER
A vertical section, preferably located inside the dwelling, provides natural draft.
RECOMMENDED



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uninsulated pellet vent during cold weather would reduce temperature difference and, therefore, draft.



EXTERIOR RISER
A vertical section outside the dwelling will provide adequate natural draft in most conditions, but condensation and minimal draft may occur in cold weather.

The importance of taking care in designing and installing side-wall vented systems is reflected in the 1995 Hearth Products Association of Canada consensus pellet statements:

"While [horizontal venting] has been successful in many parts of the country, in extreme adverse conditions (often a combination of high winds and power failure) the products of combustion may enter the home. For that reason, it is recommended that horizontal venting only be used by individuals and companies with experience, training (completion of the WETT

Pellet Technology Course), in combination with rigorous on-site evaluation to confirm suitability and provide for a successful horizontal installation."

"Pellet appliances installed with a section of vertical vent, typically 3' to 5', located inside the heated envelope of the home will have a greater potential for venting the products of combustion by utilizing the natural draft provided by the hot flue gases exiting the system."

7.5.3 Wind-induced venting failure

The other problem with horizontal installations is their vulnerability to venting failure when strong winds create a high pressure zone on the wall where the vent is located. Pellet appliance exhaust fans do not pump air through the system, but rather move air by the aerodynamic effects created by their impeller vanes. Wind can produce pressures powerful enough to stop flow even though the fan continues to spin; when flow stops, smoke may be forced out of the stove into the room.

The addition of a vertical section of pellet vent to create natural draft will not protect the system from wind-induced failure. To avoid exposure to wind pressure against a wall, the vent must run up through the roof. This strategy was addressed by the HPAC Pellet Steering Committee's recommendations:

"Chimney [pellet] vents that terminate above the roof are less prone to the problems associated with severe wind conditions."

Most houses are sheltered to some extent from wind or are located in areas where high winds are uncommon. However, problems have been experienced, notably in open areas and with water-front houses that are exposed regularly to high winds.

It is your job to assess the local conditions and make recommendations to the purchaser as to the vent configuration that will provide the safest and most consistent performance. If you think that high winds might affect venting performance, you should warn the customer and recommend a full vertical vent terminating above the roof.

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7. PELLET APPLIANCE VENTING



7.5.4 Sidewall Vent Termination Requirements

A number of requirements exist for sidewall vent terminations. The rules are intended to:

- prevent exhaust gases from being reintroduced to the living space,
- prevent injury from hot surfaces, and
- prohibit close proximity to gas meters.

In addition to these mandatory requirements, you should also consider the potential for staining of exterior wall coverings by the exhaust. This is a particular problem for houses with light coloured siding. Vent terminations that release the exhaust at least 300 mm (12") beyond the wall and direct the exhaust away from the wall are used to avoid staining. To meet these objectives and to provide a simple, trouble-free

termination, many experienced installers use a standard 45° elbow to direct the exhaust down and away from the building. The end of the elbow is typically screened to prevent the entry of potential blockages or combustible material.

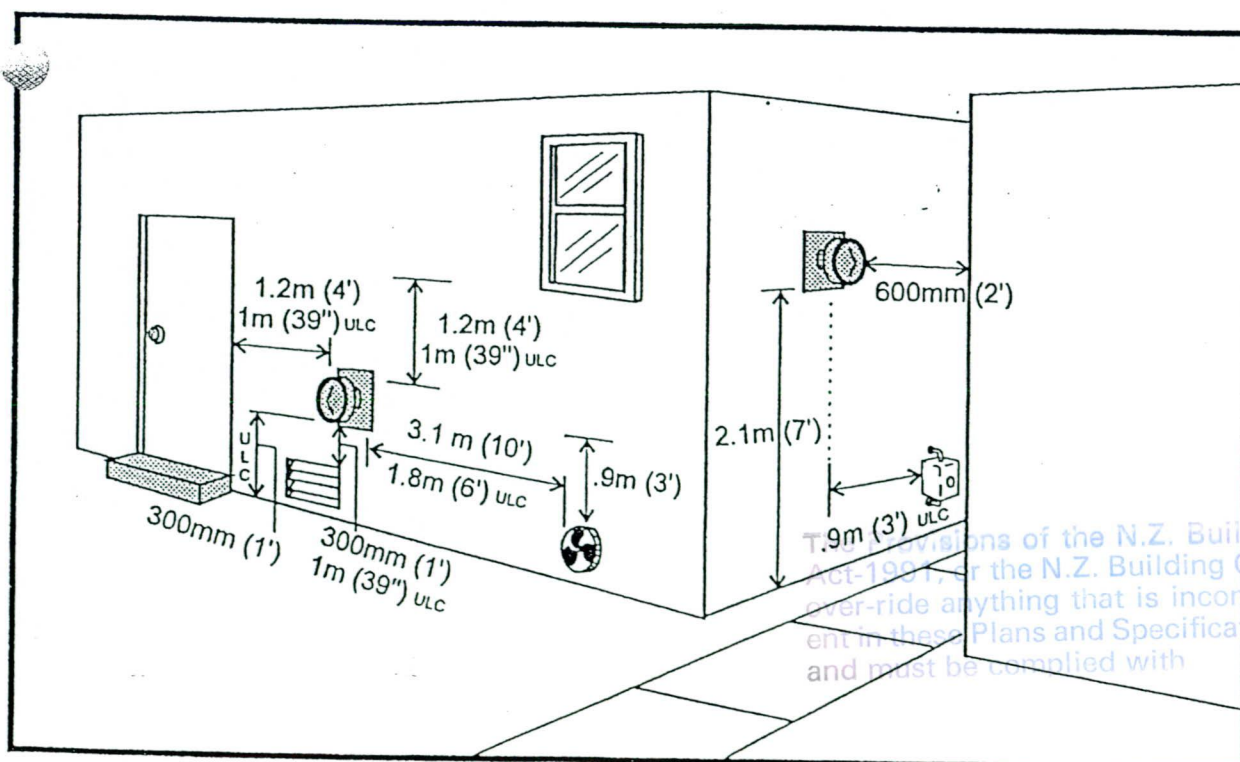
You may encounter differences in pellet vent termination requirements depending on the source. Following are the two most common set of requirements.

Underwriters' Laboratories of Canada

The certification standard for pellet vent requires that the following be included in the manufacturer's installation instructions.

The vent termination shall not be located:

1. Within 1.8m (6') of a mechanical air supply inlet to a building



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2. Above a gas meter/regulator within 900mm (3') horizontally of the vertical centre line of the regulator
3. Within 1.8m (6') of a gas service regulator vent outlet
4. Within 1m (39") of a building opening or air inlet of another appliance

The National Fire Protection Association (NFPA) Requirements

The exit termination shall be located in accordance with the following:

1. Not less than 900mm (3') above any forced air inlet located within 3m (10').
2. Not less than 1.2m (4') below, 1.2m (4') horizontally from, or 300mm (1') above any door, window, or gravity air inlet into any building.
3. Not less than 600mm (2') from an adjacent building and not less than 2.1m (7') above grade when located adjacent to public walkways.

7.5.5 Diagnosing Pellet Venting Problems

When a pellet system fails to vent the exhaust gases properly, the smell of the gases can be detected in the home. Although the result of venting failure in pellet systems is the same as for conventional woodburning systems operating on natural draft (i.e. smoke in the house), the causes and corrective measures are very different.

Leaking Vent Joints

Most pellet appliance venting systems operate under positive pressure at least part of the time because the exhaust is being forced through the vent by a fan. If there is not a complete seal at each of the vent joints, exhaust gases will leak

from the vent. Leaking vent joints is the most common cause of pellet appliance venting failure.

Restrictive Design

Gas leakage is more likely where the system design or other problems cause high pressure in the vent. Short vent systems may produce low pressures and less likelihood of leakage. One of the most restrictive aspects of a pellet venting system is a horizontal section. Horizontal runs of pellet vent should never exceed 1.2 m (4'). Where the vent system incorporates several elbows or is very long, it may be advisable to increase the vent diameter to the next size larger. The larger vent will allow the same volume of gas to flow, but at a lower pressure. Keep in mind, also, that a relatively long system that is all vertical may not be restrictive because of the assistance of natural draft.

Vent Blockage

Fly ash build-up at elbows or at the base of vertical sections can lead to high pressures in the vent. Regular maintenance is necessary to prevent flyash build-up from interfering with successful venting.

Power Failures

In horizontal pellet vent installations, there is no vertical rise in the vent and therefore no possibility of natural draft assisting the fan-forced venting. If an electrical power failure occurs, exhaust gases are trapped in the system and may leak from imperfectly sealed vent joints, from gasketed joints in the appliance itself, or back through the fuel hopper. To resolve this problem, manufacturers and experienced installers recommend that a vertical section be added to the horizontal pellet vent to provide a small amount of natural draft.

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