



Residential wood pellet heating best practice standards

Why standards

Standards are used by a diverse range of organisations to ensure safe operation. As an industry group Bioenergy Association passionately support the goal to ensure that the products sold and installed in New Zealand and Australia are safe. We also support the goal of providing a meaningful and relevant framework for consenting authorities to be informed regarding the safety of wood pellet heaters.

A variety of forms of biomass can be used to produce energy for heating. In most cases, the conversion equipment (i.e., the burner) works most effectively with specified fuel suitable for that design of heater. For wood pellet fuel, as for any other major fuel, there can be major differences in heat performance according to the heating value and characteristics of the fuel used. Different grades of fuel will also produce different amounts of ash and particulate emissions to air. Moisture content of the fuel is critical to combustion as wet fuel will not combust fully resulting in large amounts of ash and smoke. Smoke is formed from particulates of un-combusted biomass. An attraction of using wood pellets as a fuel is their consistent quality and thus their predictable combustion characteristics. Pellets produces only small amounts of ash and near zero discharge of particulates (smoke). Pellets manufactured to inappropriate standards or are variable in quality could lead to blockages in the fuel feed line, inefficient combustion performance, fluctuation in air emissions, condensation in the flue, or automatic shut down of the equipment as it moves outside its design operating regime.

Standards are required for both combustion equipment as well as the pellet fuels. They are both vital if wood fuel is to become a mainstream commodity fuel that users can buy for confident and trouble free heating. The standards are to ensure reliable, efficient, trouble free operation of the heating equipment. This is one of wood pellets major attributes compared to solid wood fuel which is much less likely to have consistent fuel characteristics, particularly with regard to moisture content. Manufacturers of wood pellets have quality assurance systems and practices so as to ensure a consistent quality to ensure predictable and consistent air emissions. Bioenergy Association has a Wood Fuel Supplier Accreditation Scheme which provides for independent monitoring of suppliers so that purchasers of wood pellets can be assured that they are purchasing correctly specified product.

Regional Councils will have more confidence in wood fuel use in residential heating where the combustion characteristics of the fuel is predictable because of the use of standard specified grades of fuel. Consenting for installation of wood pellet heaters is not required in some regions as it is a permitted use. Consents will always be required for solid wood fires.

Pellet fuel standards

There are currently no formal wood pellet manufacturing standards in New Zealand and Australia. However, the Bioenergy Association has developed the [Technical Guide 01: Solid biofuel classification guidelines](#) as an industry best practice guide to standardise the classification of all wood fuels (including wood pellets) for sellers and buyers. It also provides an approved document for regulation.

Technical Guide 01 is to assist buyers and sellers to describe wood pellet fuel with common terminology and agreed parameters. This will assist wood pellets to be recognised as a mainstream energy source by providing confidence to buyers of fuel quality, and additional value to pellet fuel producers and sellers.

Wood pellet fuel classification

Technical Guide 01 sets out three grades of wood pellet:

Category A - premium pellets - for use in any residential heater or commercial boiler

Category B – large premium pellets - for use in selected boilers

Category C – industrial grade pellets for use in selected boilers subject to resource and boiler manufacturer consents.

Category ‘A’ wood pellets classification is based on the European Standard for Pellets - DIN EN ISO 17225-2 (replaces DIN EN 14961-2) - <http://www.beuth.de/en/standard/din-en-iso-17225-2/194926459?SearchID=833719863>.

Wood pellet fuel testing and certification

Wood pellet fuel manufacturers have internal quality assurance systems to ensure that all pellets are manufactured to the standard.

Bioenergy Association has an Accredited Wood Fuel Supplier Scheme that provides an independent method of monitoring and certifying that the pellet manufacturer’s internal quality assurance systems are accurate and that customers can be confident that the pellets they purchase from that manufacturer meet the standard.

Some pellet manufacturers use external parties to monitor their quality assurance system and performance. One such testing body is the Institute of DINPlus which can monitor and certify manufacturers compliance to the European wood pellet standard DIN EN ISO 17225-2. The certification process is carried out by the certification bodies who strictly follow all the standards as laid down by the DIN Certco. There are several controls which get placed to secure high quality of the wood pellets.

Wood pellets with the DINplus mark meet the requirements of the European Standard and are a sign of high quality fuel.

http://www.dincertco.de/en/dincertco/produkte_leistungen/zertifizierung_produkte/brennstoffe/holzpellets_heizkessel/holzpellets_heizkessel.html

The Bioenergy Association accepts DINplus certification in accrediting wood fuel suppliers.

Remember – Purchase only from Accredited Wood Fuel Suppliers

Your appliance will work best when you use correctly specified fuel.

Pellet heater standards

Safety

The electrical safety is a significant component of the risk factors with regard to Wood Pellet heaters. These electronic controls equally are a major factor in the safety of pellet fires compared with other forms of Solid Fuel burners.

All current New Zealand wood pellet heaters have an electrical connection and thus many of the risk factors are related to this electrical connection and fail safes are covered by electrical safety testing,

The relevant electrical standards are below.

- Electrical (Safety) Regulations 2010, as at April 4, 2016:
 - Gas, oil, and solid-fuel burning appliances with electrical connections Standard B, in conjunction with IEC 60335-2-102 Ed 1.1 as modified by Annex ZZ of AS/NZS 60335.2.102:2004, including Amendments 1 and 2
 - standard B means IEC 60335-1 Ed 5.0 as modified by AS/NZS 60335.1:2011
- EMC Requirements for Australia and New Zealand:
 - Electrical motor-operated & thermal appliances, electrical tools & similar apparatus EN The Electrical (Safety) Testing is largely covered by European and International testing and this is recognised in New Zealand. The industry would like to improve the credibility of Wood Pellet heater technology by ensuring any Standard references the Electrical (Safety) Requirements.

Flue installation

The dominant flue designs have a 75mm flue with a 100mm flue casing. This flue design has been tested to the principles of AS/NZS 2918 by ARS Limited in report 05/1185 dated September 5, 2005.

This test covered the use of internal and external flue kits (with a triple skinned through wall thimble). In New Zealand, these designs with 75mm flue and 100mm flue casing is industry best practice. There have been some flues that have used tested 100mm flue and 150mm flue casing (Metro fires) but this is the minority.

The industry standard has venting between the flue and flue casing of 3436.12mm²

The typical wood pellet heater flue designs are double skinned and not triple skinned but require an air gap of 25mm at the ceiling and roof penetration.

Wood pellet heaters do not produce fly ash and hence the requirements for heat protection at the top of a chimney chase should be considered in relation to the risk of pellet fires.

Testing

All testing should be conducted and reported by laboratories with NATA or IANZ accreditation to the relevant appendix of the standard.

Most wood pellet heaters are imported and tested by accredited Laboratories under ILAC.

Most if not all wood pPellet heaters in New Zealand are imported and rigorously tested for product safety by their manufacturers to the European standards. Where product is manufactured in New Zealand detailed testing would be required to ensure that product is safe.

Wood pellet heater performance testing standards

The following standards (tests) relating to wood pellets currently exist in New Zealand. Go to Standards New Zealand website for more information: (<https://shop.standards.govt.nz/search/ed?q=wood+pellets>)

- [S/NZS 4014.6:2007](#) - Specifies test methods for assessing pellet test fuels used when determining the power output efficiency and particulate emission of domestic solid fuel appliances.
- [AS/NZS 4886:2007](#) – Specifies a test method for determining the rate of particulate emission from domestic pellet burning appliances and the associated particulate emission acceptance criteria.
- [AS/NZS 5078:2007](#) – Specifies a method for the determination of the average efficiency and average thermal power output from automatic feed, pellet fuel-burning room heaters, that are intended to burn wood pellets or other suitable solid fuel.

NOTE: Pellet burners are not included in the National Environmental Standard as they cannot be tested in accordance with the method due to their automatic feed mechanism.

Pellet burners are however, extremely efficient and clean burning. Further information on the National Environmental Standard for air quality is available from the Ministry for the Environment website or on the Bioenergy Association's Wood Energy website here <http://www.usewoodfuel.org.nz/emissions>

Approved heaters

Approved wood pellet burners for installation in new Zealand are listed <http://www.mfe.govt.nz/air/home-heating-and-authorised-wood-burners/burners>

Air emissions

One of the key advantages of wood pellets is the significantly reduced emissions to air on burning. With poor air quality in a number of New Zealand cities, the clean burn solution that pellets and pellet appliances offer is a major advantage. The National Environmental Standards (NES) for air quality requires that all wood burners installed on properties less than 2 hectares must have a discharge of less than 1.5 grams of particles for each kilogram of dry wood burnt, and a thermal efficiency at least 65%.

Wood pellet fuelled heaters use manufactured low moisture fuel with combustion controlled by the speed of the electrically controlled feed auger. This means that there is very good combustion of the fuel producing maximum heat and with little ash remaining and few discharge of particulates to air which cause smoke. Solid wood fires however may be fed high moisture wood fuel which has incomplete combustion with a high discharge of particulates in the form of smoke and a lot of ash remaining.

Council approved pellet burners

The Ministry for the Environment has produced a list of pellet burners approved by Environment Canterbury (ECAN) and Nelson Council. Details on emissions from these burners are noted (if they have been tested) at their website. The following Councils in New Zealand and Australia have released details on consented and approved pellet burners (as well as wood burners) available:

- [Environment Canterbury Regional Council - Approved burners](#): Ecan tests burners to make sure they pass an emissions test before authorising them for use based on their factory settings. If you are installing a burner within a Canterbury Clean Air Zone, you must follow these home heating rules and register your burner via the ECAN database.
- [Nelson City Council - Approved Burners](#): If you have an existing lawfully established (consented) wood burner or solid fuel enclosed burner, you can replace it with any one of the solid fuel burners listed. These have been authorised to be installed under rule AQR.25 of the Council's Air Quality Plan.
Also see the [Nelson City Council - Air Quality Plan](#): The Nelson Regional Air Quality Plan promotes the sustainable management of Nelson's air resource. It is a regional plan required by the Nelson City Council under its regional responsibilities in terms of section 30 of the Resource Management Act 1991 (RMA).
- [Otago Regional Council - Approved burner list](#): This list shows domestic heating appliances (other than woodburners and pellet burners) with an emission standard of less than 1.5 g/kg and a thermal efficiency standard of 65% or more. A domestic heating appliance must have a heat generation capacity of 50 kW or less, otherwise it is classified as fuel burning equipment and is covered by different rules under the Air Plan. These appliances are not authorised for use if tampered with or modified, or if operated in a way not in accordance with manufacturers' instructions or not used with a manufacturer's recommended fuel.
- [Tasman District Council - Woodburners and solid fuel heaters](#): On the Tasman District Council's (TDC) website you will find information about TDC's requirements for woodburners and how to apply for a woodburner building consent (sometimes known as a fire permit). All wood burners installed indoors after 1 September 2005, on a property less than 2 hectares anywhere in the District, must comply with the Ministry for the Environment's National Environment Standards for Air Quality (NES). This NES requires woodburners to meet an emission limit of less than 1.5 g/kg (grams of particulate per kilogram of wood burnt) and an efficiency of greater than 65 percent.

Installation standards

Regional regulatory requirements

There are currently no national standards for installation of heaters in New Zealand or Australia. Currently the Environment Canterbury and Nelson City Council requirements are used by a number of other consenting authorities.

Installation standard

Wood pellet heaters are substantively different in nature of operation and risk to other Solid Fuel burners. Solid wood fires must be installed in New Zealand and Australia to AS/NZS 2918 *Domestic solid fuel burning appliances - Installation*. The current revision of this standard excludes wood pellet heaters.

A new standard AS/NZS 5148 *Domestic solid fuel burning appliances—Pellet heaters—Installation* is under development to cover wood pellet heater installation.

Installation Guidelines

Bioenergy Association is developing a Technical Guide for the Installation of residential wood pellet heaters. For details contact executive@bioenergy.org.nz