

AUTHORISATION PROCEDURE FOR FUNCTIONALLY EQUIVALENT METHODS

1. SCOPE

Authorisation of appliances that burn solid fuel or wood pellets (Solid fuel burners) that are specifically excluded from being tested using the *AS/NZS 4012:1999 and 4013:1999* standard test methods for batch fed domestic solid fuel burning appliances or *as an alternative to AS/NZS 5078:2007, AS/NZS 4014.6:2007 and AS/NZS4886:2007* for automatic continuous feed domestic wood pellet burning appliances for determining appliance efficiency and flue gas emissions. (Regulations 23 and 24 of the National Environmental Standards (NES) for air quality and specific rules in regional air plans state that domestic heating appliances that burn wood may be authorised using a functionally equivalent test method.)

Appliances that are **covered** by the functionally equivalent authorisation process include:

1. *Site-built masonry appliances*
2. *Central heating appliances* – a heating appliance which has a maximum heat output rate greater than 25kW as measured for a period of not less than six minutes under high burn conditions, or a combustion unit which is intended for installation outside the living area, and includes a means of transferring heat to the living area by hot air, hot water or other fluid.
3. *Cooking appliances* – a solid fuel burning appliance which incorporates at least one cooking hot plate and an oven with a volume of not less than 28 litres.
4. *Appliances intended solely for water heating*
5. *Appliances intended solely to distribute convective heat via ducting to locations remote from the appliance*
6. *Appliances that when fired at the high burn rate prescribed in AS/NZS 4013:1999 have a maximum carbon dioxide output from the combustion chamber of less than 5% by volume with any optional doors fitted and closed*
7. *Appliances with volumetric flow rates through the combustion chamber which are too high to allow for total smoke capture by the method described in AS/NZS 4013:1999.*
8. *Wood pellet fired domestic appliances (as an alternative to testing to AS/NZS 5078:2007, AS/NZS 4014 4014.6:2007 and AS/NZS 4886:2007.*

Note: The method used for calculation of emissions and efficiency must be on the same basis as used in the AS/NZS standards.

Appliances that are **not** covered by the functionally equivalent authorisation process include all domestic solid fuel burning appliances that are able to be tested using *AS/NZS 4012:1999 and AS/NZS 4013:1999*.

2. NEW APPLICATION

A. Application

Application for authorisation must be made on and in accordance with the Environment Canterbury Regional Council (ECan) or Nelson City Council (NCC) Application Forms.

(Note that ECan normally authorise appliances that have emissions of 1g/kg of fuel burned or less, and NCC those that have emissions of more than 1g/kg up to 1.5g/kg.

A copy of the following documentation must be included with this application form:

1. Laboratory test report for emissions and efficiency that must include the following information:
 - a. A reference to show that the laboratory is accredited at least by its national accreditation authority to carry out the testing
 - b. A description of the appliance tested that is sufficient to uniquely define the appliance at the design level tested.
 - c. Test results that cover the functional equivalence criteria outlined in Appendix 1 (A and B)
 - d. Results in values that reflect the units specified in the NES (ie, emissions - g/kg of wood burnt and efficiency - %) Note: Efficiency is as defined in AS/NZS 4012:1999 and is based on the Gross Calorific Value (GCV) of the fuel.
2. Appliance drawings and detailed description of the appliance that include sufficient information to uniquely define the appliance, including but not being limited to the information detailed in Appendix 3.
3. Sales brochure/manual
4. Current installation and operating instructions
5. Proposed authorisation label and a photograph of the appliance (Please refer to Appendix 4).
6. Advice as to where a fully representative example of the appliance for which authorisation is being sought can be examined in Christchurch.

On receipt of this information, the following is checked before receipting:

1. Unique name of the appliance
2. All information has been supplied

B. Technical Audit & Report

The following is carried out on satisfactory receipt of the application:

1. Check that summary results in the test report accurately reflect the results recorded in the test runs raw data.
2. Check that the results show that both the NES (if applicable) and regional air plan rule performance requirements are met.
3. Check that all evidence provided to establish functional equivalency of testing protocols align with identified equivalency criteria.
4. Check that the dimensional information and description provided in the test report is consistent with that shown on the drawings.
5. Carry out a dimensional check of the representative appliance to ensure that the unit is consistent with both the drawings and what was tested

Depending on the technical audit, there may be further information required from the applicant or clarification on some points. There is no template for this – contact is ad hoc and carried out by email, fax, phone and is application specific.

Compile a technical report based on the above.

C Report to Authorising Committee/Delegated Officer

1. The technical report is reviewed and a recommendation including proposed conditions of authorisation prepared.
2. Reports forwarded to the Authorising Committee/Delegated Officer for consideration/decision

D Authorising Committee/Delegated Officer consideration and issue of decision

The Authorising Committee/Delegated Officer may either decline or pass the application for authorisation.

Decline:

- The applicant is advised of the result and why, and depending on the 'why', may be asked to supply further information or an additional technical report.

Passed:

- A decision is forwarded to the applicant that includes conditions of authorisation.
- The conditions will include that the appliance is subject to a physical audit of a production model not less than once every five years to determine whether the unit is consistent with the drawings supplied and what was tested for the authorisation test.
- The ECan/NCC/Ministry for the Environment (MfE) Authorised Solid Fuel Burners websites are updated
- Other relevant parties are notified.

E Period of Authorisation

Unless restricted by a condition of authorisation, there shall be no limit to the period of authorisation. However, authorisation may be withdrawn under any of the following circumstances:

- a) The holder of the authorisation advises either ECan or NCC that the model has been withdrawn from the market; or
- b) A compliance check of a production model carried out for or by ECan, NCC or MfE shows that the model no longer complies with the requirements for authorisation.

3. COMPLIANCE CHECK OF PRODUCTION SOLID FUEL BURNER

A Procedure

- 1 Solid Fuel burners that have been authorised through the use of a functionally equivalent method may be checked at any time, but generally after a period of five years from authorisation and every five years thereafter. This is to ensure continued compliance of the appliances with the original authorisation.

- 2 The compliance check will also verify that any additional laboratory tests that have been undertaken, for whatever reason, indicate continued compliance with the appropriate activity rule and the National Environmental Standards.
- 3 ECan, NCC or MfE will assess burners through liaising with the manufacturer who in keeping good faith is expected to ensure that there is no variation between the model supplied for testing and the model produced and sold.
- 4 The timing of any compliance check is to be random but it is not intended that this should occur more than once every five years unless deficiencies are identified.
- 5 The compliance check shall be carried out on a current production example of the burner.
 - (i) For the purposes of the check, the authorisation holder shall, on request, provide a copy of the current installation and operating instructions.
 - (ii) The authorisation holder will cooperate to provide access to a randomly selected production burner for the purposes of the audit.
 - (iii) The compliance check will verify that the design, materials and manufacture has not materially changed from the appliance that underwent the efficiency and emissions laboratory testing.
 - (iv) The burner will be compared with the laboratory test report and appliance drawings, as supplied at the time of authorisation. Construction details will be measured and assessed against the dimensions recorded in the laboratory test report and in the drawings supplied. The tolerances in MfE *Domestic Solid Fuel Burner Authorisation Manual*, and any up-dates, are proposed as a guideline in determining compliance with the original authorised design.
 - (v) Particular emphasis will be placed on those aspects that may affect performance.
- 6 The person undertaking the compliance check shall be suitably skilled and experienced to undertake such checking and be authorised by ECan, NCC or MfE for this work.

B Report

Following the compliance check, a report will be prepared describing any discrepancies between the appliance checked, the operating manual and the drawings of the appliance originally authorised. The report will also include comment, where appropriate, on the original authorisation, and the “tamperability” of the appliances. The audit report will be provided to the council Authorising Committee/Delegated Officer and to the authorisation holder. The audit report shall recommend whether the appliance complies or not.

Appendix 1. Functional Equivalence Criteria

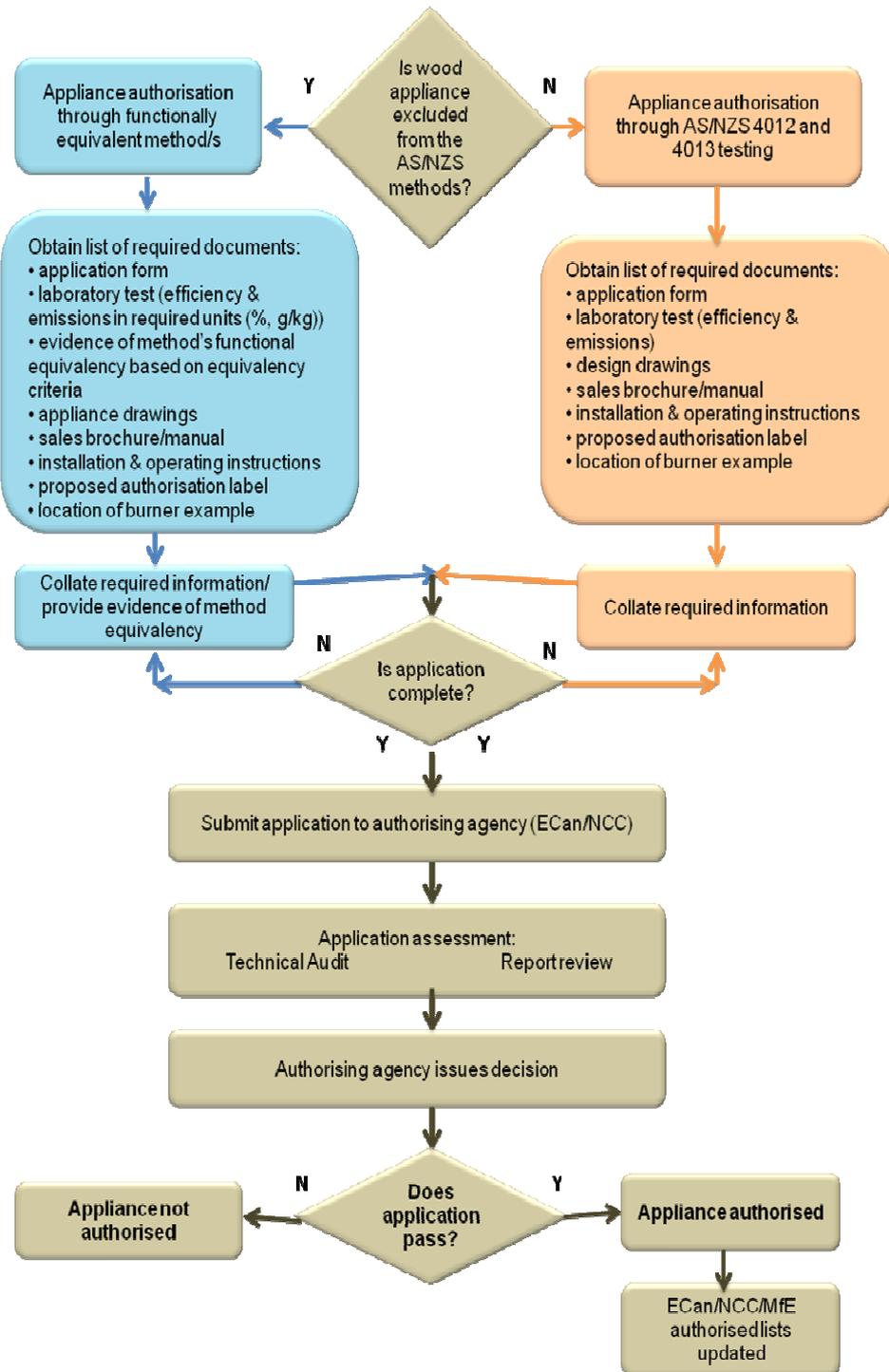
A) AS/NZS 4012:1999 Domestic solid fuel burning appliances – Method for determination of power output and efficiency or AS/NZS 5078:2007 Domestic solid fuel burning appliances – Pellet heaters – Method for determination of power output and efficiency

1. The energy input is calculated by multiplying the oven dried mass of the fuel added in the burn cycles by the gross calorific value (GCV) of the fuel (oven-dry basis). Applicant needs to provide a calculation with the appropriate adjustments if the alternative method used the net calorific value in calculating energy input.
2. Any alternative method should cover the normal operating regime of the appliance. In the event that the appliance normally has just a high or nominal output operating point plus an idle point, it should be tested at both. If the appliance can be modulated over a range, it should be tested at the maximum, the minimum and at least one intermediate point and the values obtained averaged.
3. Where an appliance is manually fed with incremental quantities of fuel, at least two output cycles should be measured at each operating point and averaged. If the results of each run differ by more than 2.5% on efficiency, a third run should be carried out.
4. Where an appliance is continuously and automatically fed with fuel, at least two periods of not less than one hour of operation shall be measured. If the results of each run differ by more than 2.5% on efficiency, a third run should be carried out.
5. Efficiency is determined by dividing the heat output by the energy input based on GCV and must be expressed as a percentage (%).

B) AS/NZS 4013:1999 Domestic solid fuel burning appliances – Method for determination of flue gas emissions or AS/NZS 4886:2007 Domestic solid fuel burning appliance - Pellet heaters – Determination of flue gas emission

1. The alternative testing method should cover the whole of the normal operating regime of the appliance. In the event that the appliance normally has a high or nominal output operating point plus an idle point, it should be tested at both. If the appliance can be modulated and operated at any set output, it should be tested at the maximum, the minimum and at least one intermediate point and the values obtained averaged.
2. The alternative method must measure emissions from a dilution tunnel. If it does not, the applicant must provide a conversion of emissions to take into account condensable particulate matter (CPM) to calculate total particulates. Under poor combustion conditions, the ratio of CPM to solid particulates (SP) can be as high as 10:1 but is typically around 5:1. The total particulates are the sum of the SP and the CPM. Applicants must include this conversion in their application.
3. The unit for emissions must be grams of particulates per kilogram of wood burnt (g/kg). Applicants must provide conversion calculations for other emission units.

Appendix 2 Flow diagram of the two wood burner authorisation streams



Appendix 3 Appliance Drawings

Applications for authorisation shall include appliance drawings which as a minimum shall include all of the following, including tolerances:

- Overall dimensions
- Firebox dimensions (main combustion chamber)
- Combustion air inlet dimensions
- Combustion air fan specifications (if fitted)
- Exhaust discharge dimensions
- Combustion control methodology
- Draught operating range
- Heat transfer configuration and dimensions
- Air circulation fan specifications (if fitted)

Appendix 4 Compliance label template

This is a suggested format for the authorisation label. It is not necessary to follow this exactly, but all of the information shown must be included. The names and numbers shown are samples only. Other information may be included at the manufacturer's discretion. Note that there may be other labelling requirements if the manufacturer claims that the appliance complies with any particular testing standard. The label shall be permanent and attached to the appliance in a position that is readily visible after installation.

Manufactured by:	
The Zippo Heater Company	
PO Box XYZ, Wellington, NZ	
Model:	<i>Dunstan Classic</i>
Serial Number:	<i>GIS73/02</i>
Test Report Number:	<i>ARS 12/345</i>
ECAN (or Nelson CC) Authorisation number: 246810	
APPROVED FUEL:	
Burn only Softwood with a moisture content of less than 25% (dry basis)	
AVERAGE PARTICULATE EMISSION RATE:	<i>0.6g/kg</i>
AVERAGE EMISSION FACTOR:	<i>39mg/MJ</i>
AVERAGE THERMAL EFFICIENCY:	<i>76%</i>
RANGE OF HEAT OUTPUTS TESTED:	<i>4.8 to 11.6kW</i>
<i>Performance may vary from test values depending on the actual operating conditions</i>	
DATE OF INSTALLATION:	<i>3 February 2012</i>