

New Wood Heater Emission Standard

From John Todd, the CASANZ representative on the technical committee reviewing the standards

The Australian and New Zealand Standards Organizations have recently published substantially revised standards for emission and efficiency testing of wood heaters. AS/NZS 4012: 2014 specifies fuel and operating conditions for test purposes and provides a method for heat output and efficiency testing including a new minimum efficiency limit. AS/NZS 4013: 2014 provides a method for measuring particulate emissions and sets revised (lower) maximum emission factor limits. The revised standards replace the 1999 editions of the standards. They are available for purchase on the Standards Australia website.

There are some significant changes to both standards although the underlying test methods and appliance operating procedures remain the same. The changes to the standards will have only minor effect in New Zealand where regional and national air quality regulations have required tougher emission and efficiency limits for all new wood burners for more than a decade. From an air quality perspective in Australia, the revised standards set an emission factor for new heaters that is 38% lower than the existing 4g/kg (2.5g/kg effective 1 year from the date of publication) dropping a further 40% to 1.5g/kg (effective 5 years from the date of publication). AS/NZS 4012:2014 includes a new requirement for compliance with the standard; heaters must achieve an overall efficiency of 55% (effective 1 year from the date of publication) increasing to

60% (effective 5 years from the date of publication). Previously no minimum efficiency limit was set in the standard. For Australian wood heaters that comply with the standards (1.5g/kg and 60% efficiency) it is anticipated that emissions will be reduced to roughly one-third of current models. This estimate is based on limited real-world emission measurements in New Zealand (Kelly et al. 2007) but obviously requires field studies in Australia to verify such gains because firewood species are different and operating practices may be different. Numerous other less obvious changes have been made to the standards. An anomaly whereby heat extracted for water heating was not included in efficiency calculations has been fixed. Large heater models (greater than 25kW peak power) are no longer exempt from emission testing. The requirements for operation of convection fans (if fitted to heaters) during testing has been made more realistic which will probably mean some automatic controls will be required (incorrect use of wood heater fans in people's homes is a surprisingly large contributor to excessive smoke). Other minor changes have been included to clarify certain testing requirements.

Wood smoke from residential heating is recognised as a serious air pollutant contributing to adverse health effects in Australia and New Zealand. The revision of the emission and efficiency standards is a useful step towards the long term improvement of air quality. A review of these standards was triggered by a request from the Australian Home Heating Association indicating this industry body's desire to see lower emission wood heaters on the Australian market. But the revised standards will only be effective if there is independent auditing of heater models offered for sale with appropriate penalties for selling non-compliant models (there has only been one audit in Australia in 2004 which found 58% of popular models did not comply). The lack of a national regulation governing new wood heater models in Australia is a serious drawback because individual states must call up the revised standards in their air quality regulations before they can be enforced. This may take many years if the slow uptake of the first emission standard for wood heaters is any indication – for example, the original 1992 standard and the 1999 revision have still not made their way into South Australian legislation. Even if full compliance for all new wood heater models sold in Australia is achieved we still have a long way to go to clear the air. The emission standard assumes the heater is correctly operated with good, dry firewood. Field surveys have shown that the majority of households do not operate their heaters 'correctly' so real-world emissions are much higher than the laboratory tests. Also, with roughly one million serviceable wood heaters in people's homes in Australia, an increasing population and a 20 to 30 year working life for the heaters, it will be a very gradual improvement at best.