**Emissions from pellet stoves: influence of pellet quality classes**

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Domestic pellet devices use as heating system strongly increased in Europe-28 in last years [1]. The big and quick growth of pellet market, especially in the domestic sector, caused the necessity to establish qualitative standard on raw material. In fact, low-quality solid biofuels can damage combustion equipment and produce slagging, corrosion, and poor process control [2]. High solid biofuel quality is required by pellet devices in order to obtain high efficiency and low emissions. [3]. Nowadays,pellet certification is based on qualitative standard on raw material and on pellet production and working processes.

Emissions from residential wood combustion can give an important contribution to ambient air pollution [4]. Indeed household air pollution from incomplete combustion contains health-damaging pollutants such as carbon monoxide (CO), particulate matter (PM) and polycyclic aromatic hydrocarbons (PAHs) [5]. Nevertheless, pellet certification does not take into consideration combustion emissions.

In this work, emission factors of a pellet stove were measured for pellets with different ash content, based on certification classes of ISO 17225-2 (A1, A2 and B).

Tests were performed by firing the stove with a commercial softwood pellet (A1), while for A2 and B classes, pellet was prepared ad hoc in the laboratory. For each class, two operating conditions were considered: partial load (around 50 % of the nominal power) (PL), and nominal load (NL). The flue gases composition was on-line monitored along the standard stack connected to the device. The total particulate emissions (TSP) were collected in a dilution tunnel, to take into account the condensable fraction. The PM characterization includes inorganic ions, PAHs and water soluble organic carbon (WSOC).

Emissions for lower quality class pellet are higher for CO, NO, TSP and for the most of the inorganic ions determined, i.e. chlorine, sulphates, potassium and nitrates. Even if CO emission factors are higher for lower quality pellet, other incomplete combustion products, i.e. WSOC and PAHs, show a different behavior. At PL, emissions factors are quite similar for all the pellet classes, while at NL, A2 and B pellets show lower emission factors, especially for WSOC.

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