

00-06: The use of wood pellets for energy...

In modern applications, wood in the form of pellets is often used to replace the more bulky and soiled firewood handling. Wood pellets can be produced from saw dust in direct connection to saw mills or from shavings but it can also be produced directly from round wood. Even when saw dust or shavings are available will the material need further milling before it can be pressed to pellets.

The powdered material is fed to a pellet press where it is exposed to an extremely high pressure, about 700 bar. The compression will heat up the material to more than 100 °C and it will make resins and lignin plastic so that they can form a binder phase. Thus, wood pellets shall consist of clean wood with no additives. The pellets may contain a fraction of bark giving a brown colour, but if produced from clean stem wood they should be beige to yellow in colour and with a blank and smooth surface.

The main advantages of wood pellets as a fuel are the high bulk density which provides for a good transport economy, the low moisture content that facilitates a good combustion performance and high energy content and the uniformity that facilitates automatic feeding and firing also in small-scale units.

Wood pellets are today international trading goods. The total world production exceeds 10 Mton/year and is rapidly expanding. The main exporter is Canada while the main consumption is in northern Europe.

Good quality pellets are sufficiently sturdy to stand transport and handling, loading/unloading operations, without producing too much of a fine fraction. High quality pellets are also characterized by low ash content, typically less than 1 %. Mixing the raw material with bark or using contaminated material will increase the ash content and may also lower the ash melting temperature, causing problems in the combustion equipment.

Pellets are manufactured in different sizes with diameters 6, 8, 10 or 12 mm, the smaller sizes being the most common.

Crucial for the use of pellets is the uniformity and the quality – both determined by the manufacturer:

- The moisture content in pellets should be 10-15 %.
- The ash content in pellets should be less than 1 %.
- The ash melting temperature should exceed 1000 °C.
- The bulk density should exceed 650 kg/m³.
- The total amount of fines with a pellet delivery should not exceed 5 % by weight.
- The length/diameter ratio should be 2-5.

Cost structure

Wood pellets, as well as wood briquettes, should be regarded as side products from saw-mill industry and planing mills. Hence, the cost for the production should be calculated including the capital cost for the additional milling and for the pressing, cooling and packaging. The saving introduced by pellet or briquette production is the alternate cost to get rid of the wastes in case they are not upgraded. In some cases may saw-dust and shavings have found an alternate market as beddings or as a raw material for the board industry and this will affect the cost structure and the economy of pellet production.

The production of wood pellets or briquettes from virgin round wood will have to carry the full cost for harvesting, transport, drying, milling, pressing, cooling and packaging and will usually lead to far too high prices to be competitive.

Relevant standards

Due to the current expansion of the use of wood pellets, new standards are coming into effect (see the Forest StandardGuide) and the most relevant standards are EN 14961-2 for wood pellets, EN 14961-6 for non-woody pellets, EN 15210-1:2009, EN 16126/16127 for determination of quality and EN 15234-2/15234-6 for quality assurance.