International wood fuel standard

The International Organisation for Standardisation (ISO) has prepared almost 60 standards for solid biofuels. In Europe these standards supersede EN-standards, in particular EN14961-2. Under ISO 17225-series there are standards for pellets: ISO 17225-1 (general requirements for all kind of pellets), ISO 17225-2 (graded pellets for household and commercial applications and for industrial use) and ISO 17225-6 (non-woody graded pellets for household and commercial applications).

Commercial applications means facilities that utilise solid biofuel burning appliances or equipment that have the similar fuel requirements as residential appliances.

General requirements – ISO 17225-1

This ISO standard includes the raw material classification of solid biofuels, which is based on their origin and source. Stating origin and source is mandatory for all biofuels. ISO 17225-1 includes the following raw materials:

1. Woody biomass
2. Herbaceous biomass
3. Fruit biomass
4. Aquatic biomass
5. Blends and mixtures.

Chemically treated wood (e.g. glued, lacquered, painted) shall not include halogenated organic compounds or heavy metals at levels higher than those in typical virgin material values or higher than typical values of the country of origin.

The property classes of these bio-pellets made from different kinds of raw materials are not bound together, meaning each class can be identified individually. Mandatory property classes are:

- Diameter (D)
- Length (L)
- Moisture (M on wet basis, w-%)
- Ash (A, on dry basis w-&, ashing temperature 550°C)
- Mechanical durability (DU, w-% pellets after drum testing)
- Amount of fines (< 3.15mm)
- Bulk density (BD)
- Net calorific value as received (Q).

If the raw material includes chemically treated biomass, then also nitrogen, sulphur and chlorine content have to be stated. It also has additional properties like fixed carbon and volatile matter, which are specified only for thermally treated biomass such as torrefied pellets.

Graded wood pellets – ISO 17225-2

This standard includes pellets for household and commercial application and industrial use like cofiring in power stations. Bio-pellets in ISO 17225-1 and industrial wood pellets in ISO 17225-2 also include an additional class for particle size distribution for disintegrated pellets.

Wood pellets for household and commercial application can be stated in three different classes A1, A2 and B. The property class A1 for wood pellets represents virgin woods and chemically untreated wood residues low in ash and nitrogen content. Fuels with slightly higher ash content and nitrogen content fall within A2. In property class B, forest residues, bark, chemically untreated industrial wood by-products and residues, and chemically untreated used wood is also allowed.

Torrefied pellets are excluded from the scope of this standard and are instead included in ISO 17225-1. ISO member countries has also agreed to start prepare a product standard for graded thermally treated densified biomass ISO 17225-8.

Graded non-woody pellets – ISO 17225-6

Non-woody pellets include those made from blends and mixtures, including herbaceous, fruit or aquatic biomass. Blends and mixtures can also include woody biomass. ISO 17225-6 includes two classification tables:

1. A and B class pellets produced from herbaceous and fruit biomass and blends and mixtures
2. Those made from straw, miscanthus and reed canary grass pellets.

Non-woody pellets have high ash, chlorine, nitrogen and sulphur contents, as well as major element contents, so non-woody pellets are recommended to be used in appliances which are specially designed or adjusted for this kind of pellets.

When using non-woody materials for combustion, special attention should be paid to the risk of corrosion in small- and medium-scale boilers and flue gas systems. Herbaceous or fruit biomass may influence the fuel ash composition differently depending on growth and soil conditions. The content of chlorine, phosphate and potassium in the material may form chlorides and phosphates and other chemical compounds resulting in high hydrochloric emissions and chemically active ash with low melting temperature, causing corrosion.

In general, non-woody biomass materials have higher content of ash-forming elements and produces ashes with lower melting temperature compared to most woody biomass. This may result in fouling, slagging and corrosion inside boilers. These problems are especially related to materials that contain high contents of potassium and silicate and low levels of calcium.