

## Why and how to test your wood pellets



### Why test wood pellets?

Residential use of wood pellets has a large market share. To these customers a high quality fuel and confidence in the product matters. As regards large customers as e.g. heating plants, the quality needs not necessarily be high, but to be specified out of consideration for operational performance.

For producers and dealers it is a matter of monitoring the quality of the produced and traded wood pellets - to assure the customers' confidence in the product and to counter complaints. Large customers should perform quality control of deliveries, especially when buying pellets from new players in the market.

### What is a high quality wood pellets?

High quality wood pellets are pellets to use in both small and large boilers without problems and which only produce a minimum of ash. To meet these requirements pellets should be made from pure and untreated wood without bark and without use of additives.

The European and international standard EN ISO 17225-1 *Solid biofuels – Fuel specifications and classes – Part 1: General requirements*, describe the principles in general for the specification of solid biofuels regarding origin, form and properties. Regarding origin (source) the specification is on an up to 4-digit code; for instance means 1.2.1.4 chemically untreated coniferous wood residues without bark from wood processing industry.

In the associated product standard EN ISO 17225-2 *Solid biofuels – Fuel specifications and classes - Part 2: Graded wood pellets*, wood pellets are classified into 3 grades for residential applications and 3 grades for industrial use. A small extract of the specifications for residential applications is reproduced in the table overleaf – just to show the principle.

Property class	A1	A2	B
Origin (code cf. EN ISO 17225-1):	1.1.3 and 1.2.1	1.1.1, 1.1.3, 1.1.4 and 1.2.1	1.1, 1.2 and 1.3.1
Moisture, w-%:	Max. 10	Max. 10	Max. 10
Ash, w-% dry:	Max. 0,7	Max. 1,2	Max. 2,0
Sulfur, w-% dry:	Max. 0,04	Max. 0,05	Max. 0,05
Net calorific value, MJ/kg as received:	Min. 16,5	Min. 16,5	Min. 16,5
Mechanical durability, w-% (intact pellets):	Min. 97,5	Min. 97,5	Min. 96,5

*Some of the specifications given in DSI/EN ISO 17225-2*

### How to test the pellet quality

The product standard EN ISO 17225-2 lists the standards (or technical specifications) for the determination of the specified chemical and physical fuel properties. In order to compare different wood pellets offered on the market, it is important that specified values of fuel properties are comparable. For example, EN ISO 17225-2 specifies the method described in ISO 18122 for determination of ash. By this method the ash content is determined by heating a sample to 550 °C under specified conditions, and the obtained result is not necessarily comparable to results reached by other methods (as e.g. international or national coal standards using 815 °C in the heating process).

FORCE Technology's fuel laboratories offers to determine the properties of wood pellets according to the methods specified by EN ISO 17225-2, among others:

- Content of moisture and ash
- Gross and net calorific value
- Content of sulfur (S) and chlorine (Cl)
- Mechanical durability
- Bulk density

How many and what properties to be determined depend on the purpose of the testing. Even wood pellets that are believed to be of high quality may cause slagging problems in the boiler, e.g. due to contamination of the raw material. This may call for further investigation such as determination



*Sample preparation  
– an important step in testing*



*Preparing a sample of 1 g  
to determine calorific value*

of ash melting behavior and content of the different ash forming elements in the pellets.

FORCE Technology also offers services as e.g.:

- Determination of ash melting behavior according to the European specification, CEN/TS 15370-1.
- Determination of the content of major and minor elements by traditional wet chemical analysis.
- Screening by ED-XRF technique for contents of elements (from atomic number no. 11, Sodium).
- Consultancy by experienced specialists within fuel characterization and fuel utilization.

### Our competences

FORCE Technology is a member of the GTS – Advanced Technology Group, which is a grouping of Danish independent research and technology organizations, approved by the Danish Ministry of Science, Technology and Innovation. FORCE Technology has many years of experience and expertise within utilization and testing of solid fuels and accredited by the Danish Accreditation, DANAK, for the testing of solid mineral and solid biomass fuels. The laboratory is an active participant in the on-going international standardization work within the area of testing of solid biofuels (ISO/TC 238).

### Yderligere information

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