



Azeus Machinery Co.ltd

Email: info@azeuspelletmill.com

Website: www.azeuspelletmill.com

Add: SOKEYUFA Building, NO.26 Jingliu Road,Zhengzhou,CHINA

keywords

home heating stove pellets, pellet quality standards, pellet density, DIN plus pellet,ash content, pellet buring

Abstract

Know clearly about the pellet quality standards in the world and facors affecting wood pellet quality can contribute to making high quality pellets with Azeus pellet mill. Due to its low moisture content, regular shape and size and high bulk density, pellet is easy to handle, store, utilize. What's more, it's also very convenient and cost-efficient make your own pellet at home, and our company provide the whole set of machines for you.

Quality Standards for Home Heating Stove Pellets

The Popularity of Fuel Pellet

For most countries in the world, the winter is so cold that people need heating stoves to get through the long winter. While realizing the limitations and shortages for the finite fossil fuel, people began to find a sustainable and alternative fuel sources. Pellet fuel is a good choice. Quality pellets are essential to ensure clean combustion and

trouble-free operation of your appliance. No matter buying pellets or making pellets by own, understanding the pellet fuel standards and performance can help us with efficiency combustion and timely maintenance for stoves.

Two Main Properties Determining Ppellet Quality

The quality of fuel pellet is usually assessed based on its density and durability. High density of pellet represents higher energy per unit volume of material, while durability is the resistance of pellets to withstand shear and impact forces applied during handing and transportation. Low durability of pellets results in problems like disturbance within pellet feeding systems, dust emissions and an increased risk of fire and explosions during.

The Existing Standards in the World

There are a lot standards for biomass pellets. In the US and Canada, the existing national and international certification systems is PFI PELLET FUEL STANDARDS contributed a lot to quality assurance. The Pellet Fuel Institute is a North American trade association promoting energy independence through the efficient use of clean, renewable biomass fuel. It have developed standards for residential and commercial fuel.

PFI standards establish two grades of fuel, premium and standard. The table below indicates that the only difference between the two grades is inorganic ash content.(figure 1) The premium grade is less than 1% while the standard grade is less than 3%. The lower the ash content, the higher of pellet calorific value. Higher ash content reduces the calorific value of pellet and requires appliance to be cleaned more frequently.

<i>Criteria</i>	<i>Premium Grade</i>	<i>Standard Grade</i>
<i>1. Bulk density/cu. ft.</i>	<i>Not less than 40 lbs.</i>	<i>Not less than 40 lbs.</i>
<i>2. Dimensions</i>	<i>Diameter 1/4-5/16"</i>	<i>Diameter 1/4-5/16"</i>
<i>3. Fines</i>	<i>Not more than .5% by weight shall pass 1/8" screen</i>	<i>Not more than .5% by weight shall pass 1/8" screen</i>
<i>4. Sodium (salts)</i>	<i>Less than 300 parts per million</i>	<i>Less than 300 parts per million</i>
<i>5. Inorganic ash</i>	<i>Less than 1%</i>	<i>Less than 3%</i>
<i>6. Length</i>	<i>Maximum 1 1/2"</i>	<i>Maximum 1 1/2"</i>

In Europe, there are various pellet quality standards currently in operation, you may see it on the packaging if you buy pellets. Some of the more common standards are DINplus(Germany), NF Granules Biocombustibles(France) and Pellet Gold(Italy), among these standards, DINplus contributed a lot to the promotion of the residential pellet market in Europe and today, it is the most important quality label for high quality wood pellets worldwide. In Europe, from the first quarter of 2010 has

introduced a new standard for pellets ENplus everyday and EN-V for "industrial" pellets used in industrial and utility boilers. Initiated the development of new standards were held by Germany. The introduction of a single quality standard for residential and industrial pellets will keep a clear account of consumption and control the quality of products.

New European standards for wood pellets in comparison with the German standard DIN plus

Quality standards	DIN plus	EN plus-A1	EN plus-A2	EN-B
Diameter (mm)	4 月 10 日	6 (± 1)	6 (± 1)	6 (± 1)
Length (mm)	≤ 5 x D	3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40	3,15 ≤ L ≤ 40
Bulk density (kg/m ³)	-----	≥ 600	≥ 600	≥ 600
The heat of combustion (MJ / kg)	≥ 18	≥ 16,5	≥ 16,5	≥ 16,0
Moisture (%)	≤ 10	≤ 10	≤ 10	≤ 10
Abrasion / dust (%)	≤ 1	≤ 1	≤ 1	≤ 1
Hardness (%)	≥ 97,7	≥ 97,5	≥ 97,5	≥ 97,5
Ash (%)	≤ 0,5	≤ 0,7	≤ 1,0	≤ 3,0
Ash melting temperature (≥ C)	-----	≥ 1200	≥ 1100	≥ 1100
Chlorine (mg / kg)	≤ 0,02	≤ 0,02	≤ 0,03	≤ 0,03
Sulphur (mg / kg)	≤ 0,04	≤ 0,05	≤ 0,05	≤ 0,05
Nitrogen (mg / kg)	≤ 0,3	≤ 0,3	≤ 0,5	≤ 1,0
Lead (mg / kg)	-----	≤ 10	≤ 10	≤ 10
Chromium (mg / kg)	-----	≤ 10	≤ 10	≤ 10
Arsenic (mg / kg)	-----	≤ 1	≤ 1	≤ 1
Cadmium (mg / kg)	-----	≤ 0,5	≤ 0,5	≤ 0,5
Mercury (mg / kg)	-----	≤ 0,1	≤ 0,1	≤ 0,1

Copper (mg / kg)	-----	≤ 10	≤ 10	≤ 10
Nickel (mg / kg)	-----	≤ 10	≤ 10	≤ 10
Zinc (mg / kg)	-----	≤ 100	≤ 100	≤ 100



Factors Influence Wood Pellet Quality

Moisture Content

Fuel moisture content has a dramatic effect on efficiency. Wood at 50% moisture has a heating value of 4000 Btu/lb, at 20% the heating value is 6200Btu/lb, and oven dry wood delivers up to 8600Btu/lb. One of the advantages of the pellet fuel is its high Btu content(about 8000 Btu/lb). Therefore, the [drying process](#) is very necessary before pelletizing when you make your own pellets at home.

Bulk density .

Bulk density is the ratio between the weight of the pellets and the amount of space they take up. A good quality [pellet will](#) have a density of 650kg per m³ . It reflects the amount of solid material packed into the pellet and therefore has a relationship to the heat content of the fuel. In the same number of auger turns, higher density fuel delivers more Btu content than a low density fuel. Additionally, lower density fuel burns faster and may affect burn settings.

Dimensions

Pellet diameter is another factor that affects stove performance. The 1/4-5/16 inch standard reflects the common die size for residential fuel in the Americas. Industrial pellets can ranges as large as 1/2" in diameter and are unacceptable in residential appliances. The most common size is 1/4". It is important to know whether your stove

specifies the size of pellets to be used in a specific appliance.

Fines

Fines are the smallest, dust-like particles produced in the [pelleting process](#). They also occur in breakdown during shipping and handling. Excessive fines represent loss of usable fuel and cause performance and maintenance problems. The fines are less likely to burn because they are easily blown away from the flame by combustion air. Fines cause performance problems and increase the need for maintenance by filling ash traps and by jamming augers.

Ash

Ash is the term for the various noncombustible minerals that remain after combustion. Ash content is the basis for determining fuel grade since all other criteria are identical for both premium and standard grade. On one hand, ash can block combustion air inlets and affect performance adversely. On the other, fly ash that is blown from the fire chamber can accumulate on heat exchangers and in the venting system with problematic results. Raw materials containing large amount of bark or herbaceous raw materials have higher ash content and therefore cause higher emission. Ash content is the main factor determining the frequency of appliance maintenance.

Length

Excessively long pellets can make the pellets getting stuck across the fuel delivery entrance of the hopper. Long pellets may also cause auger jams and deliver inconsistent amounts of fuel. so the pellet can not be too long. The PFI standards call for maximum pellet length of 1 1/2 inches.

Besides the above, there are also other factors affect the quality of pellets like additives which are used to improve the stability of pellets, if manufactured correctly, and of a sufficiently low moisture content, quality pellets will require no additives. Nitrogen and sulphur occur only in very small quantities in wood, low content of them indicates that the pellets were made from pure sawdust. High levels of nitrogen and sulphur in the fuel gas emissions can give rise to corrosion. Pay attention to these factors can help you get quality pellets.

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