

# Wood Fuels

## Minimum Requirements / Information

Specification Sheet 1010-d-1

A prerequisite for approval is of a fuel by Viessmann is the approval for the fuel by the responsible public authorities.  
**Warranty claims for Viessmann Biomass boilers are excluded if the following fuel conditions are not met.**

### 1) Allowed fuels

- **Forest wood and plantation wood (complete untreated trees and trunk wood)**  
Mature wood from trunks and branches, untreated, chopped to chips
- **Compressed wood, pellets (conforming to standards, such as / as per CAN/CSA-B366.1-M91:)**  
Untreated wood with limited bark content, compressed by machine and calibrated such as

Fuel	Minimal Diameter	Maximal Diameter
Pellets Small	-	10mm (3/8 in)
Pellets Medium	10mm (3/8 in)	20mm (3/4 in)
Briquettes (Pellets Large)	20mm (3/4 in)	60mm (2 1/2 in)

- **Wood with an increased proportion of bark, tree cuttings from roadside trees (untreated)**  
Wood remnants from the forestry and sawmill industries or from landscape conservation (likelihood of elevated ash content).
- **Remnants from derived timber products**  
Usually a mixture of untreated and treated wood in the form of shavings from processing machinery and chips from choppers.
- **Used wood**  
This is untreated wood that has been used prior to its energetic utilisation (e.g. pallets). It is reduced in size by shredders for thermal utilization. The metal parts have to be removed by magnetic separators.

### CAUTION:

Chips have to pass through a 25mm (1") sieve, additionally, a fraction of max. 5% of the fuel with a cross-section of max. 5 cm<sup>2</sup> (0.75 in<sup>2</sup>) up to a length of max. 16 cm (6.3") can be tolerated.

Consequence of overstepping particle size:

- Increased maintenance because of a substantially higher risk of malfunction
- Shortened service life of the conveyor augers and drives

The maximum allowable water content of the fuel is indicated on the boiler spec sheets. The water content impacts the maximum boiler output.

Non-wood fuels even if consisting of biomass, such as needles, foliage, grain, straw, fruit pits, etc, are unsuited as fuel for boiler operation and may not be used.

### 2) Content limits for non-combustible substances

No wood fuels may contain any foreign bodies, such as pieces of metal, stones, masonry remnants or plastics. The following limits (per kg/lb of dry fuel) of contained non-combustible substances apply (ash analyzed at a temperature of 815°C/1500°F):

Substance	Limit	Comparative value untreated forest wood
Chlorine (Cl)	max. 300 mg/kg (300 ppm)	10 mg/kg (10 ppm)
Sulphur (S)	max. 1000 mg/kg (1000 ppm)	120 mg/kg (120 ppm)
Total Cl, S	max. 1000 mg/kg (1000 ppm)	130 mg/kg (130 ppm)
Ash content, total	max. 15.0 g/kg (0.25 oz/lb)	5.0 g/kg (0.08 oz/lb)
Alkali oxides in the ash (K <sub>2</sub> O and Na <sub>2</sub> O)	max. 1.0 g/kg (0.016 oz/lb)	0.35 g/kg (0.006 oz/lb)
Sintering point of the ash	min. 1000°C (1800° F)	approx. 1200°C (2200° F)

If fuel does not comply with these limits (there is a risk of corrosion within the heat exchanger and early sintering and melting of the ash which leads to:

- Shortened service life of heat exchanger
- Increased maintenance costs (firing, boiler door)

The maintenance instructions need to be complied with in order to avoid a process, which will increasingly cause damage to the boiler. If maintenance instructions are not complied with the following process may occur:

→ Cinders change the airflow → Temperature peaks → More slag is produced → more cinder builds up and changes the airflow more → etc.

This process leads to damage by overheating and may affect refractory materials.

Additives in remnant and used wood have to be free of heavy metals and halogen compounds.

### 3) Limitation super fines & dust (wood particles smaller than 1.0 mm / 1/32")

Max. 10.0% of the total mass; If fuel does not comply with this limit the following process may occur:

Temperature peaks → Slag formation → Even higher temperature → This process leads to damage by overheating and can affect refractory materials

Elevated values are especially critical for remnant wood in combination with elevated values of Chlorine and Sulphur.

### 4) Other information

#### - Ash and cleaning

Untreated wood without bark produces less than 0.5% ash of the fuel mass supplied. All the specifications regarding cleaning are based on untreated wood with bark attached with an ash amount of 0.8% of the fuel mass. If the ash content is higher and/or the ash melting point is lower, increased maintenance and/or cleaning are required.

#### - Changing fuels

A substantial change in fuel quality, such as bulk density, water content, dust proportion or ash content might require a manual correction of the firing parameters necessary (see Operating Manual).