



PENNSYLVANIA FUELS FOR SCHOOLS AND COMMUNITIES

Promoting the use of local, sustainable biomass for heat and power projects

Wood Chips as a Biomass Fuel

Wood chips from forest harvest are the most widely used biomass fuel for commercial biomass combustors in Pennsylvania. They are a common byproduct of the wood products industry, and are also a regular commodity in the pulp and paper industry. Wood chips are relatively low cost, readily available, and easy to incorporate into a biomass combustor's automated feed system. However, care should be taken because poor quality wood chips can lead to maintenance issues or even damage to your combustor. Biomass combustors are normally trouble-free and easy to use. However, if problems arise, they can often be traced back to poor quality fuel.

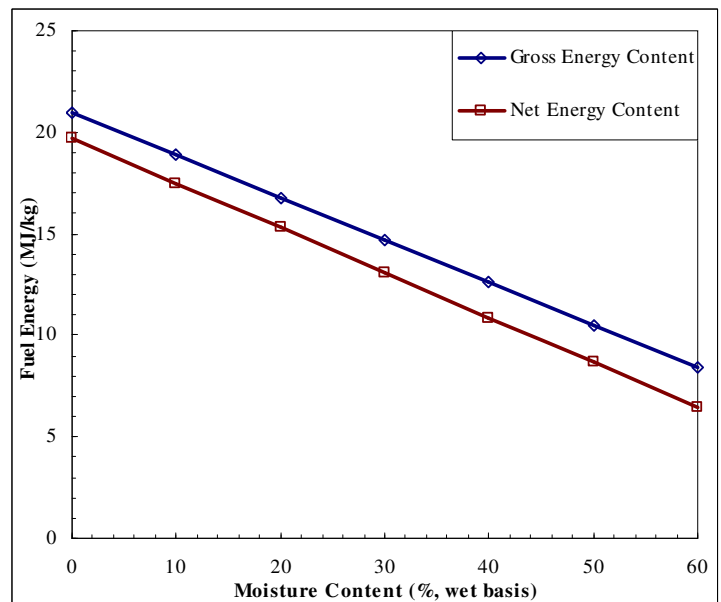
The ideal characteristics of a wood fuel chip are as follows:

Size:

Wood chips can vary in size, but are typically 2-3" long. Wood chips for fuel should be uniform in size, and should not include any large pieces ("overs") that might jam the feed system. Also, it is good for the fuel to have a minimum of dust ("fines"), which can build up and jam equipment, or even be an explosion hazard in extreme conditions.

Composition:

The ideal wood chip is uniform and "clean" – that is, all wood with no twigs, leaves, needles or bark. Bark and leaves have a lower energy content than wood, and can be more abrasive to handling equipment than clean wood. They also have a fairly high ash content, and can cause "clinkering and fouling" – the formation of hard ash deposits inside the boiler. Not all combustors are able to handle high ash fuel – consult your combustor manufacturer first if you are tempted to utilize fuel that is not exclusively wood. Fuel should never include any dirt, stones, nails, or other foreign matter. These contaminants can jam the fuel delivery system or contribute to clinkering and fouling. Painted or pressure-treated wood should never be accepted as a fuel, because of the potential for toxic gases in the exhaust. The species of the wood has a surprisingly small impact on its heat content, and it is often not practical to specify this parameter beyond selecting "hardwood" or "softwood" chips. Softwood chips are generally less desirable because they are less dense, and tend to have a higher moisture content than hardwood chips.



Moisture Content:

Wood chips are usually delivered “green” – that is, without any drying. Depending on the season, species, and processing methods, the moisture content for green chips is usually from 25 – 50% (wet basis) – most combustors are designed to accommodate this. Dried wood chips burn more readily, and have a higher energy content per unit mass. However, dry chips are more costly and they can contribute to dusty conditions in the facility. If your fuel storage bin is prone to freezing temperatures, you may need to specify a dried fuel in order to prevent frozen clumps from forming and damaging your fuel supply equipment.

Contracting for Fuel:

When contracting for your fuel supply, it is vital to spell out IN WRITING the required properties of the fuel, as well as the frequency of delivery. Many suppliers are not familiar with the needs of biomass combustors, and will not automatically know what you need or when. A written “fuel spec” will also provide a measure of protection in the case of unscrupulous or incapable suppliers.

It is imperative that the fuel you use be compatible with the combustion equipment you install – work closely with your equipment supplier to make sure that your fuel specification falls within the range of acceptable parameters for the equipment. The minimum information for a fuel spec includes the following:

Type of fuel (i.e. hardwood or softwood, green or dried)

Properties (i.e. clean, free of dirt, rocks, barn, twigs, leaves, uniform size no greater than XXX, moisture level between XX% and XX%)

Delivery Details (expected amount per year, peak winter weekly amount, delivery truck size and type, unloading time)

Because of the impact of moisture content on energy content, some buyers contract their fuel on a “sliding scale”, where drier fuel is priced higher per ton than wetter fuel. Most users of biomass fuel contract with one supplier, although it is not uncommon to utilize multiple suppliers, especially if the reliability of supply is an issue. If you are uncertain about the availability of fuel in your area, you can consult the Pennsylvania Fuels for Schools and Beyond Website for a list of known fuel suppliers in Pennsylvania.

Note that there are restrictions on the movement of wood chips from counties under quarantine for Emerald Ash Borer (EAB). Woodchips from quarantined counties may be moved from the county only if they are officially certified by USDA or the PA Department of Agriculture. Fuel buyers should make sure their fuel specification explicitly requires that wood fuel meets all requirements for Emerald Ash Borer quarantine and is certified as per state requirements.

In conclusion, wood chips are an excellent fuel for biomass heating applications; provided you follow a few steps to ensure that the fuel properties are appropriate the needs of your facility.