Ag Decision Maker

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Biomass Measurements and Conversions

Biomass measurements and conversions

- 1 pound of switchgrass = 7,341 Btu
- 1 pound of bagasse = 6,065 Btu
- 1 pound of rice hulls = 6,575 Btu
- 1 pound of poultry litter = 6,187 Btu
- 1 cord of stacked wood = 4 feet x 4 feet x 8 feet
- 1 cord of stacked wood = 128 cubic feet
- 1 cord of stacked wood weighs about 1.2 short tons
- 1 cord of stacked wood weighs about 1,090 kilograms
- 1 metric ton of wood = 1.4 cubic meters (solid wood)
- 1 ton of wood fuel (bone dry) = 18 to 22 gigajoules HHV *
- 1 pound of wood fuel (bone dry) = 7,600 to 9,600 Btu HHV *
- 1 ton of wood fuel (air dry 20% moist.) = about 15 gigajoules
- 1 pound of wood fuel (air dry 20% moist.) = about 6,400 Btu
- 1 ton of agricultural residue (varying moist.) = 10 to 17 gigajoules
- 1 pound of agricultural residue (varying moist.) = 4,300 to 7,300 Btu
- 1 metric ton of charcoal = 30 gigajoules
- 1 pound of charcoal = 12,800 Btus

* Energy contents are expressed as either High (gross) Heating Value (HHV) or Lower (net) Heating Value (LHV). LHV is closest to the actual energy yield in most cases. HHV (including condensation of combustion products) is greater by between 5% (in the case of coal) and 10% (for natural gas), depending mainly on the hydrogen content of the fuel. For

IOWA STATE UNIVERSITY University Extension most biomass feed-stocks this difference appears to be 6-7%. The appropriateness of using LHV or HHV when comparing fuels, calculating thermal efficiencies, etc. really depends upon the application. For stationary combustion where exhaust gases are cooled before discharging (e.g. power stations), HHV is more appropriate. Where no attempt is made to extract useful work from hot exhaust gases (e.g. motor vehicles), the LHV is more suitable. In practice, many European publications report LHV, whereas North American publications use HHV (Source: Bioenergy Feedstock Network -- <u>http://bioenergy.ornl.gov/</u>)

References

Bioenergy Feedstock Information Network: <u>http://</u> bioenergy.ornl.gov/

Biomass Energy Datebook, U.S. Department of Energy: <u>http://cta.ornl.gov/bedb/appendix_a.shtml</u> BP Conversion Factors: <u>http://www.bp.com/conver</u>sionfactors.jsp

ConvertIt: <u>http://www.convertit.com/Go/ConvertIt/</u> <u>Measurement/Converter.ASP</u>

Energy Information Administration: <u>http://www.eia.</u> <u>doe.gov/</u>

Energy Information Administration - Energy Kids Page: <u>http://www.eia.doe.gov/kids/energyfacts/sci</u>ence/energy_calculator.html

Iowa Energy Center, Iowa State University: <u>http://</u> www.energy.iastate.edu/

Wikipedia: http://en.wikipedia.org/wiki/Main_Page

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^{...} and justice for all

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