

# BIOMASS DENSIFICATION AND QUALITY OF DENSIFIED BIOMASS

## LAB OVERVIEW

Level: Grades 9-16

Estimated Time to Completion: 90 Minutes

Prior Knowledge: Background Provided

In this lab investigation, students will become familiar with densification, a process used to increase the density of biomass to facilitate its use as a biofuel. Students will then conduct several measurements to evaluate the quality of densified biomass for use as a fuel. Measurements include:

1. Bulk density
2. Moisture content
3. Percent fines
4. Length and diameter of biomass pellets
5. Durability

Upon completion, students will be able to:

- Define terminology associated with biomass densification and quality of densified biomass.
- Conduct procedures for evaluating the physical quality of densified biomass used for fuel. Measurements include bulk density, moisture content, percent fines, length and diameter of biomass pellets, and durability.
- Apply concepts of densification and quality control to bioenergy system management.

## MATERIALS REQUIRED

1.5-2ft<sup>3</sup> of Densified Biomass (wood or other biomass pellets)

1L Plastic Beaker

Ruler or Straight-edge

Drying Oven

Glass, Metal, or Ceramic Containers (capable of holding at least 50cm<sup>3</sup>)

Dessicator

1/8-in opening or U.S. Standard No. 6 Wire Screen Sieve

Receiving Pan

Vernier Caliper (capable of measuring diameter and length to within 0.001in)

Quart sized Re-sealable Poly Storage Bags

Scale (capable of weighing up to 2-3kg to the nearest 0.01g)

## NOTES TO INSTRUCTOR

- The Moisture Content portion of the lab investigation should be prepared in advance to conserve work time.
- Industry Fuel Standard Data can be found for comparison in the "Supporting Materials" folder of the downloadable lab package.
- Links to videos demonstrating various densification techniques may also be found in the "Supporting Materials" folder.