

WDGS Extruder

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Objective:

- To construct a device to meter Wet Distillers Grains at a constant rate.

Solution:

- Make a proof of concept application that adds WDGS to an AG-Bagger at constant rate.

Problem Statement:

- There is no efficient way to add WDGS to an AG-Bag system.

Deliverables:

- Working Prototype
- Auto-Cad Design
- Testing Data of Speed vs. Extrusion Angle



Design

Extruding Auger

- One main extruding auger
- Variable pitch auger
 - We used a variable pitch auger to insure that the flighting at the end of the auger is at maximum capacity.
- Dimensions
 - 6 in diameter
 - 8 ft long
 - 6 in to 2 in pitch for 6 ft.
 - 2 in pitch for the final 2 ft.



Extruding Auger



Extruding Pipe

Extruding Pipe

- Sloping Inlet - to increase constant particle flow
- Dimensions
 - 4' long
 - 6" diameter
- Where the WDGS enters the pipe with the aid of the variable pitch auger and is extruded out at a constant rate.

Agitating Augers

- Two agitating augers
- Have 16" of flighting with 3" inserts welded onto the flighting to increase particle flow.
- Rotate simultaneously to eliminate bridging of WDGS over the extruding auger.
- Dimensions
 - 6' long
 - 10" diameter
 - 6" flighting
 - 3" weldon inserts



Agitating Auger with Plastic Sheets in place

Components

- 3.04 cu-in Hydraulic Motors
- 4 Eaton Hydraulic Fittings
- 5 sheets of 4x8 3/4in Plywood
- 2 sheets of 4x8 1/8 in Plastic
- Weld-on Hubs and Sprockets
- 3 feet bar stock with keyway
- 8 ft 6 in PVC pipe



Hydraulic motors used with adapter



Drive train and sprockets for agitation augers



Thank you to Valero Renewables for donating the WDGS



Testing Process

- Speed vs. Angle
 - Speed was in 50 and 100 rpm
 - Angle was for -30 and 30 degrees
- Measurement in lbs/min
 - Scales