STANDARD OPERATING PROCEDURE

Corrugated Roller Mill

Manufacturer: Witt Corrugating Incorporated
Location: Dry Processing Pilot Plant, 1851 Food Sciences Building
Publication Date: 01/29/2014
Description and Uses

The Witt Corrugated-Roller Mill is designed to fractionate dry grain (usually corn) into fractions with desired particle size ranges to produce flaking grits, coarse grits, fine grits, cones and flour using a series of enclosed corrugated roller mills. There is a series of three separately enclosed mills along a large table, each separately controlled by a start/stop activation switch located on the anterior side of the table, directly below and to the left of each mill. Each mill is equipped with one rotating feeding roller and two rotating corrugated grinding rollers measuring 6" in length. One mill is equipped with rolls having 1/8" corrugations for producing flaking and coarse grits; one is equipped with rolls having 1/16" corrugations for producing coarse and fine grits; and another is equipped with 1/32" corrugations to produce fine grits, cones and flour. The gap between the rotating corrugated rolls can be adjusted with a movable lever located on the right side of each mill to achieve the desired particle size. The ground sample is deposited into a drawer located beneath the rolls. A hopper is present above each mill for easy feeding. There is also an automatic feeder attached to a base that is positioned along a track located behind the roller mills. The automatic feeder is equipped with its own hopper and variable-speed control system, and can be easily positioned along the track to accommodate each mill.

Power Specifications

Motor: Three Baldor motors (one per mill); Cat #L-3703
Horsepower: 2 HP per motor
Voltage/Amperage: 208-230V; 18.8 Amp
Speed: 1140 rpm @ 60 Hz.

Potential Hazards and Safety Precautions

Electric Shock/High Voltage (208-230V)

- Make certain to use the correct outlet that is specifically designed to fit the electrical cord plug.
- Make sure the area around the outlet, floor and your hands are completely dry when plugging or unplugging the electrical cord to/from the outlet.

Belt-driven Pinch Points/Possible Entanglement of Extremities, Hair, Jewelry or Clothing

- Make certain belt safeguards are in place and front roller-access hatches are closed before operating mill.
- Make sure to secure long hair and any loose clothing or jewelry before operating the mill.
- Never place fingers or hands into the mill without the equipment being shut off and locked out.
- Nothing, except the grain for which the mill is intended to grind, should ever be placed between the rolls or into the mill while it is running.
Flying Debris/Potential Eye Damage

- Make certain belt safeguards are in place and front roll-access hatches are closed before operating mill.
- Wear safety goggles while mill is in operation.

Required Personal Protective Equipment

- Lab Coat
- Hair Net
- Safety Goggles
- Tie Back Long Hair
- Ear Protection
- No Open-toed or Open-heeled Shoes
- Dust Mask
- No Loose Fitting Clothing

Training

Required Training

*Denotes courses offered online
- Machine & Site-Specific Training
- Fire Safety & Extinguisher Training*
- Lab Safety: Fundamental Concepts*
- Personal Protective Equipment*

Recommended Training for Frequent Users

*Denotes courses offered online
- Electrical Safety & Lockout/Tagout
- Safeguarding Mechanical Hazards
- Shop Safety Fundamentals: Basic Procedures & Policies*
Operation

1. Be sure to acquire all required training before operating mill. Operation requires site-specific training on this machine.
2. Read operator’s manual (if available) before operating mill.
3. Be sure to wear all required personal protective equipment.
4. During operation, report any problems to the pilot plant manager.
5. Choose the proper mill based on the desired particle size:
   - Mill #1 (for coarse grinding) to produce flaking or coarse grits.
   - Mill #2 (for medium grinding) to produce coarse and fine grits.
   - Mill #3 (for fine grinding) to produce fine grits, cones and flour.
6. Adjust the movable lever located on the right side of each mill to the upright position.
7. To adjust the gap setting between the rolls of the desired mill, be sure the mill is unplugged! The collection drawer will need to be removed to gain access to the corrugated rolls from underneath the mill. Using a metal thickness gauge, measure the gap between the rolls from underneath. The gap between the rolls can be adjusted by tightening or loosening the fine-adjustment knobs on the left and right sides of each mill. This will increase or decrease particle size for the desired effect.
8. Once the desired gap setting has been achieved, close the front access hatch and put the collection drawer back in place.
9. Plug the mill into the correct outlet. Be sure your hands, floor and surrounding area are completely dry to avoid possible electric shock.
10. Activate the desired mill by pressing the START button located on the anterior side of the table just to the left of the corresponding collection drawer.
11. Slowly feed the grain sample (must be less than 24% moisture) into the hopper located at the top of the mill; or, if you prefer, use the automatic feeder by positioning the feeder over the hopper of the desired mill. The automatic feeder is equipped with its own hopper (with an adjustable open/close latch at its base) and a variable-speed control to adjust the rate at which the corn is fed into the mill.
12. Collect the ground sample in the drawer located directly beneath the roller mill. Check the grind of the sample and, if necessary, readjust the gap between the rolls to achieve the desired result.
13. Once milling is complete, depress the STOP button located directly beneath the START button. If used, unplug the variable-speed control for the automatic feeder and return cord to its storage position.
14. Empty the milled sample from the collection drawer into a storage container and save for analysis or further processing as needed.
15. Return the collection drawer to its proper location.
16. Unplug mill and return cord to its storage position.
Clean-up Procedures

Please note that these clean-up procedures are for non-transgenic grains only. Transgenic material has a separate, more thorough clean-up procedure. For more information, see special standard operating procedures for the handling of transgenic material.

1. To clean, be sure the mill is unplugged and locked out!
2. Adjust the movable lever located on the right side of each mill to the down position to widen the gap between the corrugated rolls.
3. Use a brush to remove as much debris as possible from the hopper and inside the mill, through the corrugated rolls and into the collection drawer. Empty the drawer into an appropriate place for disposal and put the drawer back into its proper location.
4. Using a pressurized air hose, completely clean out any debris from the corrugated-roller mills, collection drawers, hoppers, feeder, external components, bench top and surrounding area.
5. Sweep up and discard all debris into the appropriate place for disposal.
6. Once the mill and area is clean, have the mill inspected by the pilot plant manager and initiate check-out procedures.

Machine Care and Maintenance

• Mills must be properly cleaned and inspected after each use.
• All inspections are performed by the pilot plant manager.
• Motors and moving parts should be properly lubricated on a regular basis by the pilot plant manager or a trained service technician.

Accessories

Metal thickness gauge set