STANDARD OPERATING PROCEDURE

Extruder, Single or Twin-screw

Model: 2003GR-8
Manufacturer: C.W. Brabender Instruments Inc.
Location: Technology Transfer Pilot Plant, 1598 Food Sciences Building
Publication Date: 03/04/2014
Description and Uses

Extrusion is a process by which a material is extruded into a constant profile shape through a die. This extruder can accommodate both single- and twin-screw applications. Single-screw extrusion uses one screw within a cylindrical barrel to continuously push the material through the die. Twin-screw extrusion is used to generate a superior mixture compared to single-screw extrusion. Two screws are used within a figure-8-shaped barrel. Twin screws are usually used to compound or blend two or more different materials.

Power Specifications

Motor: DR-2051, No. 0118/PE
Power: 5 kW
Voltage/Amperage: 230V, 1-phase/25A
Field Voltage/Amperage: 200V/0.92A
Arm Voltage/Amperage: 180V/23.6A
Speed/Frequency: 2500 rpm@60 Hz.

Potential Hazards and Safety Precautions

**Electric Shock/High Voltage (180-230 V)**

- 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.

**Rotating Pinch Points/Possible Entanglement of Extremities, Hair, Jewelry or Clothing**

- The extruder operates with high-speed moving parts. Keep hands, body parts, hair, jewelry and clothing clear of all moving parts while the extruder is in operation.
- Make sure to secure long hair and any loose clothing or jewelry before operating the machine.

**Hot Surfaces/Possible Burns to Hands and/or Extremities**

- The extruder operates at very high temperatures. Never place any body parts near the extruder while it is in operation.
- Ensure that the vent fans are turned on while the machine is in operation.

**Flying Debris/Potential Eye Damage**

- Always use proper personal protective equipment at all times while operating the extruder.
High Pressure/Possible Explosion

• Extruders operate under high pressure. If too much material is fed into the hopper at once, high pressure can build and cause the screw to stop turning and damage the motor. Also, hot material can splash over the operator due to excessive pressure release.

Required Personal Protective Equipment

Safety Goggles
Protective Footwear (no open-toed shoes)
Lab Coat
Hair Net
Heat-resistant Gloves
Tie Back Long Hair
Long Pants & Long Sleeves
No Loose Fitting Clothing

Training

Required Training

*Denotes courses offered online

Machine & Site-Specific Training
Fire Safety & Extinguisher Training*
Laboratory Safety: Core Concepts*

Recommended Training for Frequent Users

Electrical Safety & Lockout/Tagout
Laboratory Safety: Spill Procedures
Operation

Operation: Start-up

1. Before you begin, be sure to familiarize yourself with the machine by reading the Instruction Manual located in the file cabinet in the Technology Transfer Pilot Plant, 1598 Food Sciences Building.

2. After reading the Instruction Manual, decide which extrusion barrel to use for your specific application. Then, attach the barrel to the machine (refer to the manual for attachment instructions).

3. Check the circuit breaker (panel LIS) to make sure that the electrical switch for the Brabender extruder (#30-32 and #34-38) is switched to the ON position.

4. Electrically heated extruders normally require compressed-air cooling. To cool the temperature control zones, attach hoses to the air or water supply. There is a dedicated air and water cooling supply for this machine (see Figure 1). Please refer to the Instruction Manual for instructions on how to control the cooling settings.

Operation: Extrusion

1. Turn the speed-control dial counterclockwise to zero rpm (see Figure 2). This will ensure that the drive does not move when the power is applied.

2. Turn ON the power switch (see Figure 3). The power indicator lamp will automatically light up. Ensure that the safety stop (see Figure 2) is disengaged (pulled up).

3. Turn the directional switch (forward/backward switch) to “FWD” (see Figure 2). Make sure that the internal/external switch is set at “INT” position.

4. Set the desired temperatures by pressing the up and down arrow in the temperature control panel (see Figure 4). Wait until the set temperature is reached.

5. Once the desired temperature is reached, turn the speed control dial (see Figure 2) clockwise to increase the speed to the desired setting. The speed will be shown in the speed display.

6. Start adding materials to be extruded into the hopper.
**Operation: Shutdown**

1. When the extrusion is complete, fill the hopper with purge materials. Wait for all the purge materials to come out of the barrel (refer to Instruction Manual for Shutting Down Procedures).
2. Turn the speed control dial (see Figure 2) counterclockwise to reduce the speed to zero.
3. Press the safety stop button (see Figure 2). Then, turn OFF the power switch (see Figure 3).
4. Turn OFF all air and water-cooling lines.
5. Turn OFF the main power in the circuit breaker.

**Clean-up Procedures**

After purging, please refer to the Instruction Manual for disassembly and clean-up procedures

**Machine Care and Maintenance**

- Inspect the machine after every use for any leakage or broken parts.
- Report any operational difficulties, leaks or broken parts to the pilot plant manager.
- All detailed inspections are performed by the pilot plant manager.

**Accessories**

Three sets of extrusion barrels