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Water Purging — A Quick and Easy Technique

It has always been necessary to purge the barrels of extruders and molding machines whenever changing colors or resin formulations. Purging can also be an effective way to eliminate oxidized or degraded polyethylene that has built up over time on the surface of the barrel, screw and head of your machine.

Purging is done to reduce or eliminate the need to disassemble and clean equipment by hand. Many companies claim their purge compounds provide a thorough cleaning while at the same time reducing scrap, time and labor. However, many of these compounds are expensive, often ineffective or difficult to use and typically require more than one hour to do the job from start to finish.

PURGING THE MACHINE WITH WATER

An often overlooked but effective method used by experienced processors is a water purge. Water is mixed with resin and introduced into the machine. As the water is carried through the system, it turns to steam, which "scrubs" the machine's parts, usually in less than 30 minutes. Water purging can be done on all types of blow molding machines, although it is most effective with machines with temperature profiles at or below 370° F. If water purging is combined with start-up or shut-down procedures and done regularly, the time the procedure takes decreases even further while its effectiveness goes up.

The following step-by-step procedure for water purging can be posted near the machine. Please make sure all operators pay particular attention to the safety notes described in the procedure.

1. Disconnect the hose feeding the material hopper and let the hopper run dry while continuing to make bottles. Leave the temperature controllers at the same settings as used during bottle production.
2. While you are waiting for the hopper to empty, prepare the purge sample.
 - Fill a five-gallon bucket with the virgin resin used to make the bottles.
 - Fill the bucket of resin with water until the resin is completely saturated and begins to float.
 - Drain off the excess water so that no free standing water is left in the container. The only water in the bucket should be the water on the surface of the pellets.
3. When the hopper is empty, continue to run the extruder at the standard RPM for making bottles and allow plastic to collect in the pan.

SAFETY NOTE. You must wear safety glasses or a face shield (a face shield is recommended) when working or standing next to the hopper or die head from this point of the procedure until it is completed. Steam forms and you should hear popping, cracking and hissing noises as the material exits the die. Steam can also blow back through the hopper so it is recommended that you do not look down into the hopper after wet material has been introduced into it. Protective clothing with long sleeves and gloves should also be worn.

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4. When material stops coming out of the die, dump one half of the water-coated pellets into the hopper (the extruder should still be running).
5. Open the tooling (drop the mandrel) 10 turns to allow any purged material to exit freely out the end of the die.
6. Close the mold safety gates.
7. Let the material run into the pan. When material stops coming out the die head, dump the rest of the water-coated pellets into the hopper.
8. Continue to run material into the pan until no more material comes out of the die head.
9. Reconnect the material feed line to the hopper and fill the line with plastic. Continue to run the extruder and collect material in the pan until the parison is free of bubbles.

At this point you are ready to make bottles again.

For more information about blow molding, contact your LyondellBasell sales or technical service representative.