SBG700D Shuttle Blow Molding Machine Product Changeovers

Product Changeovers

GEC has engineered the SBG 700 shuttle machine to facilitate rapid changeovers between products. We will describe the steps needed to change products in these areas:

1. Molds
2. Flowhead
3. Blowpins
4. Deflash
5. Bottle Takeout

There are different “degrees” of changeovers, depending upon the similarity of the products to be manufactured. Changeovers can be detailed, including changing of the flowhead, or they can be relatively simple, consisting primarily of the changing of the mold.

By understanding all the steps required, it is possible to predict the changeover time required between products.

Mold Changes

We have designed features into the machine which make mold changes a simple task on the SBG700 machine.

To start with, we have incorporated ball valves located close to molds, to shut off water circulation for mold change. These valves are visible in the photo on the right.

The machine also features an air pressure system with drain valve to empty water from the molds prior to removal from the machine.

Thanks to these features, you can change molds without leaking water all over the machine. You should estimate 1.5—2 man hours per change.
Platen Rollers

The SBG 700 machine utilizes rollers to facilitate rapid changeovers.

There are fixed cam rollers in the platens, which allow the molds to slide easily into place. These heavy-duty metal rollers support the full weight of the molds.

With these rollers, the molds are easily pushed to one side by hand, with no special tools.

Cam rollers in the platens allow the molds to slide into place. These permanent rollers are used with the bolt-on mold change arms to allow operators to remove molds with ease.

Mold Change Arms and Mold Change Procedure

In addition to the platen rollers, there are two mold change arms:

1. Outer mold change arms, which are attached to a platen on one side of the machine.

   The molds exit and enter the machine from one side - usually the opposite side of the bottle takeout direction.

   The molds are pinned so that they lock into place on the platens without adjustment.

   Using this approach, a complete mold change should take two hours or less. The steps to change the molds are thus as follows:

   - Move shuttles to home position.
   - Blow air out of water lines and shut off ball valves on water supply.
   - Install mold change arms. There is a mold stop on the outer arm to keep the molds from sliding past the end.
   - Install mold straps to keep the molds in the close position.

(continued)
5. Remove retaining screws in the rear platen only.

6. Using the setup pendant, open the right clamp so there is a small gap that clears the rear locator pin in the front platen.

7. Verify the mold has sufficient support on the mold change rollers and remove the front retaining screws.

8. Push the mold out of the machine until it hits the stop on the exterior mold change arm.

9. Shuttle the left clamp under the flowhead.

10. Repeat steps 4-8 above to remove the left mold from the machine.

Now you are ready to install the new molds.

1. Lightly stone and clean the platen surfaces to ensure that any burrs and dirt are removed.

2. Install mold straps. Ensure all seals and striker plates are properly installed.

3. Place the left mold on the mold change arm, then slide the mold into place. Align the mold locator pins.

4. Lightly tighten the mold retaining screws on the pin side only.

5. Close the platens, making sure the mold locator pin is properly positioned.

6. Close the left platen and install and tighten all mold retaining hardware.

7. Remove the inner mold change arms and the mold straps. Shuttle the left mold to provide clearance.

8. Install the right mold using the steps above.

9. Remove the outer mold change arms.

10. Calibrate the mold height.

Head Changes

We estimate that a single layer flowhead can be changed over with about two man hours (additional time may be required when changing to or from Muller co-ex flowheads, as the number of manifolds and heat zones are higher in that case).

The electrical connections are made using plugs that go into junction boxes—so the heaters unhook and connect easily.

Deflash Tooling

The weight of the head is supported by the steel rollers seen at the top of the photo on the left. These support the weight of the head, and allow easy adjustment of the head in the forward and reverse directions.

Simply bolt the flange to the extruder barrel, and connect the heaters. When the head comes up to temperature you are ready to push plastic!

Most containers will utilize both upper and lower deflash tooling.

The deflash station is hydraulic, and machine mounted. It also has easy adjustment in the vertical direction.

To change the deflash tooling, you must remove bolts on both the upper and lower tooling sets. The new tooling is then positioned on the deflash plate and connected using the same bolts.

GEC also utilizes a pneumatic tail support. This plate moves forward by air pressure to contact the tails on one side. This holds the tails straight when they are removed using the hydraulic deflash. The tails are thus kept vertical, and dropped onto the scrap conveyor in a controlled fash-
The bottle takeout and transfer system uses two servo motors for front-to-back and vertical travel. Bottles are removed from the deflash station using either grippers, or by inserting an interference fit pin in the necks of the bottles. With either approach, a typical changeover time of 30 minutes per side is required to change the bottle takeout.

No adjustment to the single-sided takeout conveyor height is required, as the servo system is programmed to use the correct vertical travel to place the bottles on the conveyor.

### Blow Pin Stations

There are two ways to change the blowpins on the SBG 700 machine:

1. Replace the blow pins
2. Replace the entire blowpin block assembly

To replace the blow pins, simply disconnect water cooling hose, unscrew the blow pin, twist on the new blow pin, tighten, connect the air hose, and recalibrate. Allow 10 minutes per blow pin for this approach.

Or, you can change the entire blow pin block and stripper plate (this approach is required if changing the number of heads). The “lower plate” in the top half of the photo below is attached to the “upper plate” by four bolts. You should also budget 1.5—2 man hours for a blow pin and stripper plate block changeover if using this approach.

### Bottle Takeout

The bottle takeout and transfer system uses two servo motors for front-to-back and vertical travel. Bottles are removed from the deflash station using either grippers, or by inserting an interference fit pin in the necks of the bottles.

With either approach, a typical changeover time of 30 minutes per side is required to change the bottle takeout.

### Typical Changeover – Man Hour Allotment

The typical changeover time for the SBG 700 machine, in man-hours, is thus:

- Flowhead (if needed) - 2 hours
- Deflash tooling - 2 hours
- Molds - 2 hours
- Blow Pins - 1.5 - 2 hours (complete assembly) or 10 minutes per pin
- Takeout Grippers - 1 hour

A two-man team, with experience, can execute a product changeover in four hours, or about 6 hours with a flowhead change.