

Injection Molding Machine Maintenance

Lesson 1

I. Safety Systems

A. Safety signs:

- Danger
- Caution
- Warning signs

Employees must read and understand ALL safety signs before operating the machinery or performing any maintenance.

B. Emergency stop button:

1. When this button is pressed, all movement and pumps must immediately stop.
2. For newer machines:
 - a. The emergency stop button must be pulled toward the operator before the pump can be restarted.
3. The emergency stop button should be checked daily by a maintenance person.

C. Safety device checks

1. All safety interlocks and guards should be checked for proper operation:
 - a. after every mold change
 - b. the start of every shift
2. Guards - guards must be in place over the heated barrel.
3. Purge guard - there is a purge guard over the nozzle and it is designed to prevent plastic from splashing during purging.
4. Safety interlock - check it to ensure that the machine won't purge if the cover is open.

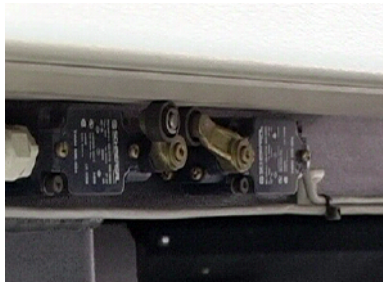
Notes

5. Three safety devices designed to prohibit clamp closing when the safety gate is open:

- a. Electrical interlock
- b. Hydraulic interlock
- c. Mechanical safety interlock

NOTE: In Europe only an electrical and hydraulic safety interlock are required at the operator's station.

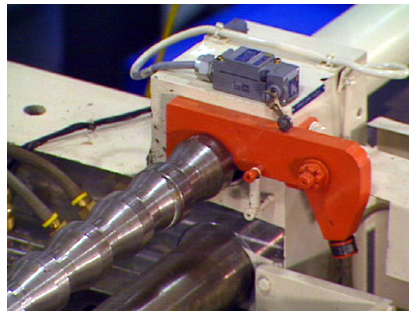
Safety Interlocks



With the motors running and the operator gate open, try to close the mold. If the system is working properly, the mold will not close. Do separate checks on both the gate's electrical limit switch (or switches), and the hydraulic cut-off (interlock valve), to ensure that both of them are working properly and will stop the clamp if either remains open.

NOTE: On most modern molding machines, the manufacturer has installed two electrical interlock switches. This is to prevent any intentional or accidental closing of one electrical interlock.

Mechanical Safety Bar

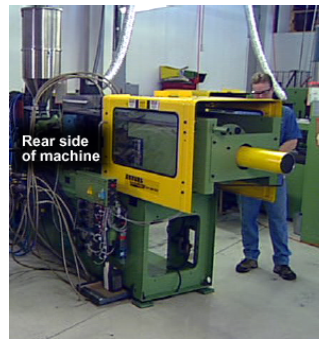


There is also a mechanical safety bar drop that falls in place when the operator gate is open.

Notes

6. Closing the gate moves the bar out of its blocking position.
 - a. For older style machines, this bar must be set to the proper length for the mold being used.
 - b. Some machines use a toothed stop bar.
7. When the front operator gate is open, a stop plate drops and positions itself in front of a tooth on the stop rod.
 - a. This prevents additional clamp movement. In this design, a length adjustment is not usually necessary.

Rear Gate



The other side of the molding machine has a rear gate. Operators should never work from the rear side of the injection molding machine. This gate does not have the three safety interlocks found on the operator's side of the machine.

In addition to the front and rear gates, many machines have guards that cover the top, front, and rear of the clamp system.

NOTE: Regardless of whether or not the machine is completely guarded, you should never reach over, under, or around any of the guards or safety gates. It is a violation of OSHA rules.

8. Checking safety interlocks
 - a. Open and close each of the front, rear and top guards on both the operator and non-operator sides of the machine.
 - 1) The pump motor must automatically shut off when the safety limit switches are opened.

NOTE: If these safeties are inoperative or purposely deactivated, there is potential for serious injury or loss of life.

- b. Safety interlocks should be checked after every mold change and at the start of each shift.

Notes

c. Some machines will have a limit switch, or switches, on the clamp to prevent over-travel of the mold height adjustment.

1) Prevents damage to the mold.

2) Prevents rear clamping platen from coming off the machine ways.

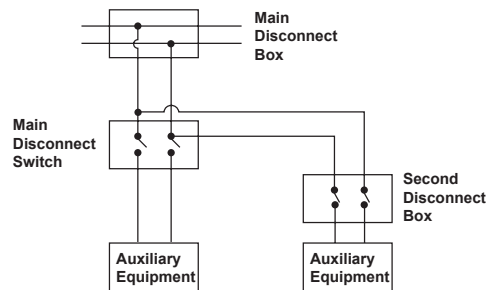
d. Activate these switches and verify that the pump motors shut off.

D. Auxiliary equipment safety:

Some machines are part of a cell system that includes:

- Part handling equipment
- Robots
- Dryers
- Granulators

NOTE



A molding cell may have multiple electrical “drops” from one or two bus lines. Or it may have just one drop to a main disconnect box with an additional feed routed to a second disconnect box. The second feed will be hot since it feeds from the top of the original disconnect. In this case, deactivating the main disconnect will NOT turn off the power to the second disconnect box.

1. Each auxiliary device must have its own safety placard clearly posted, that tells you which devices are operative even when one or more disconnects are turned off.
2. When working on auxiliary equipment, maintenance personnel must check that the following sources are off:
 - Electrical
 - Hydraulic
 - Air power