WORKSAFE
NEW ZEALAND | MAHI HAUMARU AOTEAROA

FACT SHEET

INJECTION AND BLOW MOULDING PRESSES

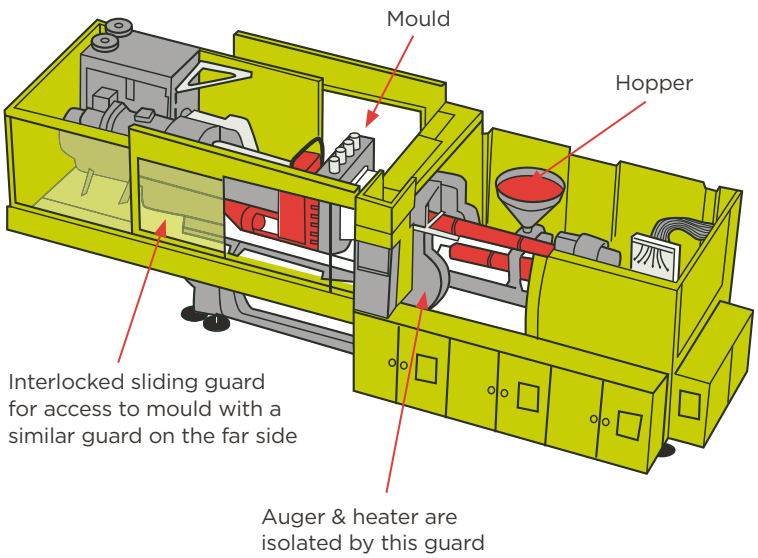
Injection and blow moulding presses use plastic granules loaded from a hopper into a closed auger. They pass through a heater to be melted and forced into a mould.

The moving part of the mould is forced against the fixed part by a hydraulic ram with several tonnes of force. Molten plastic is shaped into a hollow tube, which is blown into the shape of a mould, for example a bottle.

The mould is held closed during plastic injection and cooling. It is forced open by the hydraulic ram and the moulded item is taken out for further processing.

Blow moulders often have machinery associated with them to handle formed products. This additional machinery presents hazards that require identification and guarding.

FIGURE 1: INJECTION AND BLOW MOULDING PRESS



HAZARDS:

- Manual Lifting
- Entanglement from reaching into the auger
- Entrapment in closing moulds
- Heat from plastic
- Toxic fumes
- Entrapment in moving parts
- Dust
- Noise
- Slips, trips & falls
- Entrapment from unexpected movement (during maintenance, cleaning & repairs)

PPE:

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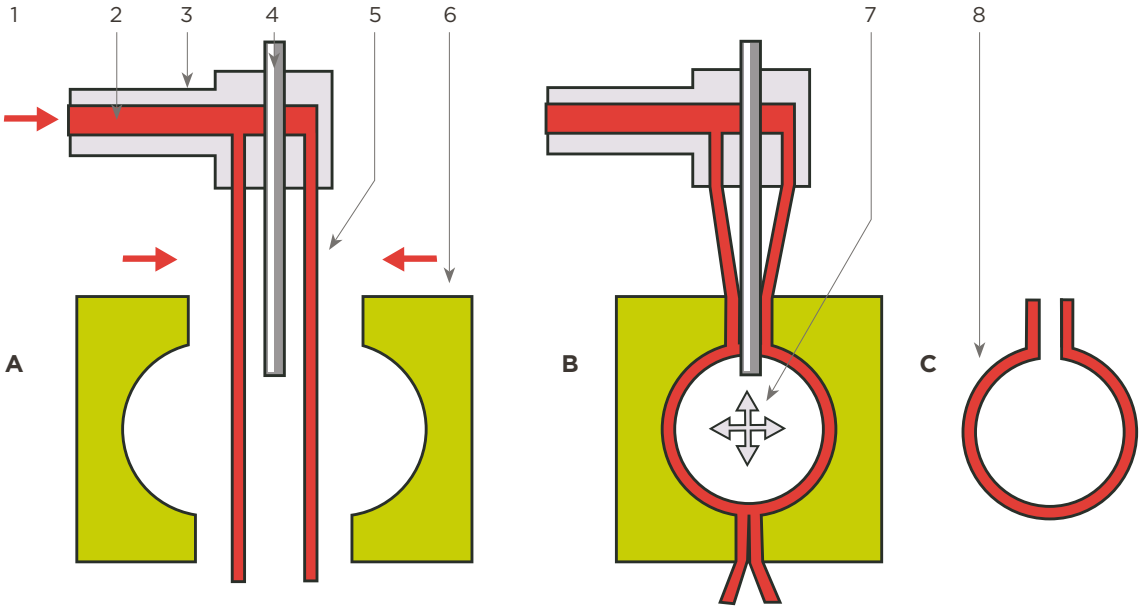
FIGURE 2: MOULDING PROCESS



Molten plastic (1 & 2) flowing through the heated supply head (3) forms parison (5).

Mould (6) closes to surround parison. Air from tube (4) blows parison (7).

Plastic cools, leaving formed products (8)

TASK – LOAD GRANULES

Hazard	Harm	Controls
Manual lifting	> Strain injury	> LIFT loads in manageable quantities. > USE mechanical aids when necessary. > USE pneumatic conveyors.

Bags of granules are often lifted manually to pour into the hopper.

Entanglement from reaching into the auger	> Risk of cuts and crushing to hands	> FIX guards where possible to prevent reaching into the auger. > KEEP interlocked guards safely maintained. > USE mesh to prevent reaching through hoppers.
Entrapment in closing moulds	> Crush injuries to anyone caught in a decreasing gap	> ISOLATE hazardous processes such as heat or mould closure. > Automatically PUSH moulded components from the mould, onto a belt conveyor or into a bin for collection. > PROVIDE dual channel interlocks, with mechanical stops if necessary, to ensure that moulds cannot close. > USE mechanical aids for lifting, when appropriate.

Moulds close with several tonnes of force, and weigh up to several kilograms.

TASK – HEATING, MELTING, AND MOULDING COLLECTION

Hazard	Harm	Controls
Heat from plastic	> Burns from touching the auger cover or being hit by molten plastic > Inhaling toxic fumes – breathing problems, lung damage	> ISOLATE hazardous processes such as heat or mould closure. > When heating granules, USE temperatures low enough to avoid formation of toxic vapours. > SHIELD the auger and heating equipment from contact. > PROVIDE adequate ventilation. > USE respiratory protection.
Toxic fumes from hot plastic		

Plastic becomes liquid at about 200°C. Plastic is forced into moulds under high pressure. Leakage between the auger and the mould is likely to squirt out jets of molten plastic.

Entrapment in moving parts	> Crush injuries > Bruising > Fractures	> USE dual channel interlocks to stop mould parts moving while guards are open. > FIX guards to prevent reach into moving parts – guards open MUST be interlocked to prevent movement. > MAINTAIN guard interlocks in a safe operational condition. > USE mesh within the hopper, or by high-sided hoppers, to prevent reach to the moving auger.

Presses with guards that close under power MUST be fitted with:

> sensitive edges on both sides to detect intrusion and stop, OR

> a reduced pressure closing system which allows a person to easily stop the guard.

If additional Safeguards are required, they MUST be fitted by competent suppliers.

OTHER (NON-MECHANICAL) HAZARDS

Hazard	Harm	Controls
Dust	> Eye irritation or damage > Breathing problems > Lung damage or cancer > Worsening of existing health problems > Risk of explosion or fire	> USE dust extraction equipment to minimise dust getting in the operator's breathing zone. > HANDLE and STORE granules to minimise spills and dust. > Promptly CLEAN plastic dust from surface. > PROVIDE adequate ventilation. > ALWAYS WEAR eye protection. > ALWAYS USE respiratory protection. > KEEP fire extinguishers nearby, and ensure operators know how to use them.

Noise	→	> Hearing damage or loss	→	> REDUCE noise levels by isolating machines or enclosing within noise barriers. > ASSESS noise levels. > ARRANGE hearing screenings. > ALWAYS WEAR hearing protection.

A safe noise level over an eight hour day is 85dB(A). An injection and blow moulding press may exceed this noise intensity.

Slips, trips and falls	→	> Trapping or crushing injuries > Burns > Bruising	→	> KEEP up-to-date housekeeping procedures. > KEEP the area around machines clear of slip and trip hazards.

TASK – MAINTENANCE, CLEANING & REPAIRS

Hazard		Harm		Controls
Entrapment from unexpected movement	→	> Cuts > Burns > Crush injuries	→	> LOCK-OUT ALL power supplies before maintenance, cleaning and repairs. > When guards are open, there MUST be a second option to shut off power. > USE the correct electrical rated equipment. > KEEP guard interlocks safely maintained. > KEEP daily inspection records, and ARRANGE regular testing. > ARRANGE annual inspections by a qualified technician. > REMOVE presses that fail safety tests, and DO NOT USE until repaired or replaced.

Instructions MUST be available in a language understood by the operators. Material safety data sheets (MSDSs) should be made available. Presses MUST meet original specification.

If additional safeguards are required, they MUST be added by a competent technician working to recognised standards.

References, current standards and further information can be found on the Safe Use of Machinery project page at: **www.worksafe.govt.nz**

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