

SAFETY ALERT

PLASTIC MANUFACTURING INDUSTRIES

Injection Moulding | Blow Moulding | Extrusion | Grinding & Ancillary Operations

1. PURPOSE

Plastic manufacturing industries—encompassing injection moulding, blow moulding, extrusion, scrap grinding, powder handling, and material movement operations—are exposed to a spectrum of simultaneous mechanical, thermal, electrical, fire, and material-handling hazards. Accidents in these facilities have resulted in serious injuries including amputations, crush injuries, burns, and electrocutions.

This Safety Alert is issued to:

- Prevent accidents and occupational illnesses in plastic processing factories
- Draw the attention of Occupiers, Managers, and Workers to critical hazards and mandatory safeguards
- Promote a Zero-Harm culture across plastic manufacturing sector

2 INDUSTRIES COVERED

This alert applies to all registered factories engaged in:

- Injection moulding of chairs, tables, crates, industrial components, caps, and fittings
- Blow moulding of bottles, containers, and hollow articles
- Extrusion of pipes, profiles, sheets, and films
- Scrap grinding, granule handling, and powder processing
- Packaging material manufacturing
- And related activities

3 MAJOR HAZARD AREAS & REQUIRED SAFEGUARDS

A. Injection Moulding Machines

❑ KEY HAZARDS	✔ SAFETY MEASURES
<ul style="list-style-type: none"> • Crushing between moving platens (closing force up to 1,000 tonnes) • Burns from hot barrels, nozzles, and purged molten plastic • Hydraulic hose burst — high-pressure oil injection injuries • Accidental machine startup during maintenance (stored energy) • Electrical shock from heater bands and control panels 	<ul style="list-style-type: none"> • Safety interlocking guards must never be bypassed or defeated • Emergency stop (E-stop) switches to be accessible to the operator at all times • Wear heat-resistant gloves and face shield during purging • Apply LOTO before any maintenance, die change, or nozzle work • Inspect hydraulic hoses and fittings periodically; replace if abraded • Safety sensors and limit switches must remain functional — test weekly • Never allow manual access inside mould area during machine operation • Use insulated tools for heater-band maintenance

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❑ KEY HAZARDS	✔ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Entanglement with moving mould halves and parison handling equipment ▪ Burns from heated parisons and mould surfaces ▪ High-pressure air release during moulding cycle (up to 1 0 bar) ▪ Falling heavy moulds during changeover ▪ Electrical and pneumatic system hazards 	<ul style="list-style-type: none"> ▪ Install fixed interlocked guards on all moving mould areas ▪ Fully de-pressurize pneumatic and hydraulic circuits before maintenance ▪ Use certified lifting arrangements for all mould changeovers ▪ Air pressure systems must be fitted with pressure relief valves (PRVs) ▪ Conduct periodic inspection of pneumatic lines, hoses, and fittings ▪ Operators must not reach into any moving mould zone

C. Air Compressors & Compressed Air Systems

❑ KEY HAZARDS	✔ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Receiver explosion due to corrosion, over-pressure, or PRV failure ▪ High-pressure air injection injury (fatal at > 40 psi) ▪ Pipe or hose whip from rupture ▪ Fire from overheating or oil carryover into hot surfaces 	<ul style="list-style-type: none"> ▪ Air receivers must be inspected and tested ▪ Safety relief valves and pressure gauges to be calibrated regularly ▪ Drain condensate from receivers daily ▪ Strictly prohibit use of compressed air for cleaning body or clothing ▪ Ensure adequate ventilation around compressor rooms ▪ Maintain proper earthing and overload protection on all electrical supplies

D. Mould Handling, Chain Pulley Blocks & Cranes

❑ KEY HAZARDS	✔ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Falling moulds (weight often exceeds 500 kg) causing fatal crush injuries ▪ Crane or chain pulley block collapse due to overloading ▪ Sling or shackle failure from use of uncertified rigging gear ▪ Finger crushing during mould alignment 	<ul style="list-style-type: none"> ▪ Only trained, authorized operators and riggers to perform mould lifting ▪ Use competent person tested and certificated chain pulley blocks, EOT cranes, and slings ▪ Display Safe Working Load (SWL) prominently on all lifting equipment ▪ Conduct periodic third-party load-testing of all lifting equipment ▪ Never stand below or walk under a suspended load at any time ▪ Use proper lifting eye bolts and balanced lifting methods ▪ Barricade and demarcate mould-changing areas during operations

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□ KEY HAZARDS	✓ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Amputation of fingers and hands from rotating blades ▪ Flying particles and ejection of pieces ▪ Dust inhalation (fine polymer dust) ▪ Excessive noise — sensorineural hearing loss ▪ Entanglement with rotating blades if guards are removed 	<ul style="list-style-type: none"> ▪ All grinders to have fixed hopper guards and interlock-protected access panels ▪ Interlocks must stop machine operation immediately when any guard is opened ▪ Never push scrap manually into a running grinder; use push tools or paddles ▪ Operators must wear: safety goggles, cut-resistant gloves, ear plugs / muffs, dust mask ▪ Install and maintain dust extraction / LEV systems at all grinding stations ▪ Implement strict housekeeping; prevent scrap accumulation around machines

F. Plastic Granules & Powder Handling

□ KEY HAZARDS	✓ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Slipping on spilled granules (high-frequency accident cause) ▪ Combustible dust explosion risk (fine polyethylene / polypropylene dust at LEL) ▪ Respiratory disease from chronic inhalation of polymer dust ▪ Static electricity accumulation — ignition source in dusty environments ▪ Manual handling injuries (musculoskeletal disorders from 25-50 kg bags) 	<ul style="list-style-type: none"> ▪ Avoid spillage during loading/unloading; clean spills immediately ▪ Use vacuum conveying systems or enclosed transfer in preference to open tipping ▪ Provide anti-static bonding and earthing on all powder-handling equipment ▪ Workers to wear appropriate respirators (minimum FFP2) in dusty areas ▪ Store granules and powder away from all ignition sources ▪ Use ergonomic handling aids; limit manual lift ▪ Conduct periodic combustible dust hazard assessments

G. Electrical Maintenance Activities

□ KEY HAZARDS	✓ SAFETY MEASURES
<ul style="list-style-type: none"> ▪ Electrocution and arc-flash burns ▪ Fire from short circuits or overloaded temporary wiring ▪ Accidental machine start during electrical work 	<ul style="list-style-type: none"> ▪ Implement and strictly enforce LOTO on all energy sources before electrical work ▪ Only certified electricians authorised under the Electricity Act to perform maintenance ▪ Use appropriate insulated PPE and insulated tools for all live-adjacent work ▪ Electrical panels to remain closed, labelled, and accessible ▪ Ensure proper earthing and ELCB / RCCB protection on all circuits ▪ Strictly prohibit temporary wiring and jugaad connections ▪ Conduct thermography surveys periodically to detect hotspots

4 FIRE & EXPLOSION SAFETY

Plastics, solvents, and polymer dusts used in processing operations are combustible. A fire or dust explosion in a plastic factory can be catastrophic. The following measures shall be taken to ensure safety:

- Provide portable fire extinguishers (CO₂ / DCP) near all machines — inspect monthly
- Install automatic fire detection and sprinkler / hydrant systems where applicable
- Prevent overheating of barrel heaters, platens, and process equipment
- Conduct regular electrical inspections and thermography surveys
- Prohibit smoking and use of open flames throughout the plant premises
- Store flammable solvents and materials in designated, ventilated, clearly labelled stores
- Keep all emergency exits, escape routes, and evacuation paths unobstructed at all times
- Conduct fire mock drills at least once every six months; document outcomes
- Display emergency contact numbers, assembly points, and evacuation maps prominently

5 HOUSEKEEPING REQUIREMENTS

Poor housekeeping is a primary contributing factor in slip, trip, and fire incidents. Factories must ensure:

- Plastic scrap is removed from work areas frequently — do not allow accumulation
- Spilled granules and oil leaks are cleaned up immediately
- Gangways, fire-exit routes, and emergency equipment are kept clear and unobstructed
- Finished goods, raw materials, and scrap are segregated in designated areas
- Stacking heights are safe and stable; racking is load-rated and inspected
- 5S principles (Sort, Set, Shine, Standardise, Sustain) are implemented and sustained

6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The Occupier shall provide, maintain, and enforce use of the following minimum PPE:

OPERATION	MANDATORY PPE
Moulding Operations	Heat-resistant gloves, face shield/goggles, safety shoes, apron
Grinding / Cutting	Face shield, cut-resistant gloves, ear plugs / muffs, dust mask
Powder Handling	Respirator (P2/P3), chemical goggles, anti-static clothing
Electrical Maintenance	Electrical insulating gloves, arc-flash protection, insulated tools
Material / Manual Handling	Safety helmet, safety shoes, leather gloves
Crane & Lifting Ops	Safety helmet, safety shoes, high-visibility vest
Compressed Air Work	Safety goggles, face shield, safety shoes

7 TRAINING & SUPERVISION

Management SHALL ensure that:

- All workers receive induction safety training before commencing work
- Job-specific SOP / Work Instruction training is provided and documented
- Emergency response, fire evacuation, and first-aid training is conducted periodically
- Crane, EOT, and lifting-equipment operators are trained and licensed as required
- Contractor and visitor safety management procedures are implemented
- Toolbox talks are conducted at shift start for hazardous or non-routine tasks

No worker shall operate any machinery without appropriate training, authorisation, and supervision.

8 ESSENTIAL DO'S & DON'TS

✓ DO's	✗ DON'Ts
<ul style="list-style-type: none"> ✓ Use machine guards at all times ✓ Follow LOTO procedures during every maintenance activity ✓ Wear appropriate PPE for your specific task ✓ Inspect lifting tools and slings before every use ✓ Maintain strict housekeeping; clean spills immediately ✓ Report unsafe conditions and near-misses without delay ✓ Follow PTW system for all non-routine / hazardous work ✓ Ensure emergency stops are accessible and tested regularly 	<ul style="list-style-type: none"> ✗ Do NOT bypass or defeat safety interlocks ✗ Do NOT clean or adjust moving machines ✗ Do NOT stand below suspended moulds or loads ✗ Do NOT use compressed air to clean body or clothing ✗ Do NOT overload cranes, chain pulley blocks, or slings ✗ Do NOT allow scrap or granule accumulation near machines ✗ Do NOT allow untrained workers to operate machinery ✗ Do NOT store flammable materials near ignition sources

9 EMERGENCY PREPAREDNESS

Every plastic manufacturing factory shall maintain and display:

- Emergency contact numbers: Local fire station, ambulance, hospital,
- Adequately stocked first-aid box with trained first-aiders on every shift
- Burn treatment station (cool running water available immediately near hot-work areas)
- Spill response materials for hydraulic oil and solvent spills
- Documented emergency shutdown and isolation procedures
- Fire evacuation plan with assembly point clearly identified
- Incident / near-miss reporting and investigation system

10. CONCLUSION

Plastic processing operations involve simultaneous mechanical, thermal, electrical, fire, and material-handling Hazards. A single lapse in safety can result in fatality or permanent disability. Strict implementation of engineering controls, safe operating procedures, preventive maintenance, robust supervision, and continuous worker training is not optional — it is a legal and moral obligation.

Issued in the interest of Industrial Safety and Prevention of Accidents. The above advisory is to create awareness on safety systems. This will not absolve the responsibility of managements to comply with statutory norms under relevant statutory provisions-

Issued by Director of Factories, Government of Telangana