

ISO 20430:2020-04 (E)

Plastics and rubber machines - Injection moulding machines - Safety requirements

Contents	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms, definitions and abbreviated terms	3
3.1 Terms and definitions	3
3.2 Abbreviated terms	11
4 Safety requirements and/or protective/risk reduction measures	11
4.1 Basic requirements	11
4.1.1 General	11
4.1.2 Start, stop and restart functions	11
4.1.3 Emergency stop	12
4.1.4 Guards	12
4.1.5 ESPE in the form of light curtains	15
4.1.6 Two-hand control devices	15
4.1.7 Pressure-sensitive mats, floors and edges	16
4.1.8 Requirements for automatic monitoring	16
4.1.9 Movements caused by gravity during production	17
4.2 Mould area	17
4.2.1 Hazards due to the closing movement of the platen during production	17
4.2.2 Hazards due to the closing movement of the platen on sides of the machine where a cycle cannot be initiated	19
4.2.3 Hazards due to movements other than the closing movement of the platen during production	20
4.2.4 Use of control guards	21
4.2.5 Thermal hazards	24
4.2.6 Additional safety requirements for machines with a downstroking platen	24
4.2.7 Additional requirements for machines where whole-body access is possible between the interlocking guard or light curtain for the mould area and the mould area itself	25
4.2.8 Additional requirements for machines where whole-body access to the mould area is possible	26
4.3 Clamping mechanism area or area behind the movable platen	28
4.3.1 Basic safety requirements	28
4.3.2 Additional safety requirements for machines with an upstroking platen	28
4.3.3 Additional requirements for machines with toggle systems	29
4.4 Area of movement of cores and ejectors and their drive mechanisms outside the mould and/or clamping mechanism areas	29
4.5 Nozzle area	29
4.5.1 Mechanical hazards	29
4.5.2 Thermal hazards	30
4.6 Injection unit area	30
4.6.1 Mechanical hazards	30
4.6.2 Thermal hazards	31
4.6.3 Mechanical and/or thermal hazards	32
4.7 Discharge area	32
4.8 Safety requirements and/or protective measures against hazards not associated with a particular area of the machine	33

4.8.1	Hazards due to flexible hoses	33
4.8.2	Release of fluids under pressure.....	33
4.8.3	Hazards during adjustment and maintenance.....	33
4.8.4	Electrical hazards and hazards due to electromagnetic interference.....	33
4.8.5	Thermal hazards.....	34
4.8.6	Hazards generated by noise.....	34
4.8.7	Hazards generated by gases, fumes and dusts.....	34
4.8.8	Slip, trip and fall hazards.....	35
4.8.9	Hydraulic and pneumatic systems.....	35
4.8.10	Power-operated guards.....	35
4.8.11	Hazards due to unintentionally interrupted forward movement of the screw/piston.....	35
4.9	Additional safety requirements and/or protective measures associated with specific machine design.....	36
4.9.1	Shuttle-table machines/machines with sliding table/platen and turn-table machines and carousel machines.....	36
4.9.2	Multi-station machines with mobile injection unit.....	36
4.9.3	Cellular foam injection moulding machines.....	36
4.9.4	Additional requirements for machines where the injection unit discharges towards the operating position.....	37
5	Verification of the safety requirements and/or protective measures.....	39
6	Information for use.....	41
6.1	General.....	41
6.2	Instruction handbook.....	42
6.2.1	General.....	42
6.2.2	Emergency stop.....	42
6.2.3	Overall system stopping performance.....	42
6.2.4	Stopping time.....	42
6.2.5	Light curtains.....	42
6.2.6	Moulds and extensions.....	42
6.2.7	Movements of cores and ejectors.....	42
6.2.8	Machines with toggle systems.....	43
6.2.9	Machines with a downstroking or upstroking platen.....	43
6.2.10	Thermal hazards in the mould area.....	43
6.2.11	Maintenance operations on machines with vertical clamping unit.....	43
6.2.12	Machines where whole-body access is possible.....	43
6.2.13	Presence detecting devices in the mould area.....	43
6.2.14	Injection unit.....	43
6.2.15	Machines where the injection unit discharges towards the operating position.....	44
6.2.16	Interrupted forward movement of the screw/piston.....	44
6.2.17	Flexible hose assemblies.....	44
6.2.18	Adjustment and maintenance.....	44
6.2.19	Exhaust system.....	44
6.2.20	Non-permanent safe means of access.....	44
6.2.21	Designated access and working positions.....	45
6.2.22	Cellular foam injection moulding.....	45
6.2.23	Cleaning of hydraulic system.....	45
6.2.24	Noise emission.....	45
6.2.25	Splashing hazards where two-hand control devices are used.....	45
6.3	Marking.....	45
6.4	Warning signs.....	46
6.5	Warning devices.....	46
	Annex A (informative) List of significant hazards.....	47
	Annex B (normative) Protective Type I.....	55
	Annex C (normative) Protective Type II.....	67
	Annex D (normative) Protective Type III.....	81
	Annex E (normative) Two-hand control device for the mould area.....	125
	Annex F (normative) Acknowledgement system.....	136
	Annex G (normative) Use of proportional valves for the platen movement.....	137

Annex H (informative) Warning signs, prohibition signs and mandatory action signs	138
Annex I (normative) Noise test code	142
Bibliography	148