

DIN EN 289:2014-09 (E)

Plastics and rubber machines - Compression moulding machines and transfer moulding machines - Safety requirements

Contents		Page
Foreword		5
Introduction		6
1	Scope	7
2	Normative references	8
3	Terms and definitions	10
4	List of significant hazards	14
4.1	General	14
4.2	Danger areas on presses	14
4.3	General hazards	16
4.3.1	Mechanical hazards	16
4.3.2	Electrical hazards	16
4.3.3	Thermal hazards	16
4.3.4	Hazards generated by noise	16
4.3.5	Hazards generated by dusts, gases and vapours	16
4.3.6	Slip, trip and fall hazards	16
4.3.7	Hazards due to malfunctioning of the hydraulic system due to contamination of the hydraulic fluid	16
4.3.8	Hazards due to malfunctioning of the electrical part of the control system	16
4.3.9	Hazards due to electromagnetic interference	16
4.3.10	Hazards generated by neglecting ergonomic principles in machine design	17
4.4	Hazards in specific machine areas	17
4.4.1	Mould area	17
4.4.2	Clamping unit area outside the mould area	17
4.5	Hazards associated with power operated mould clamping systems	17
4.5.1	General	17
4.5.2	Specific hazards associated with magnetic clamping systems	17
4.6	Hazards associated with power operated mould changing equipment	18
4.7	Additional hazards associated with specific design	18
4.7.1	Presses where whole body access is possible between the movable guard or the light curtain for the mould area and the mould area itself	18
4.7.2	Presses where whole body access is possible to the mould area	18
4.7.3	Shuttle/turntable machines	18
4.7.4	Carousel machines	18
4.8	Additional hazards when using ancillary equipment	18
5	Safety requirements and/or protective measures	19
5.1	General	19
5.1.1	Basic requirement	19
5.1.2	Setting operations	19
5.1.3	Safety related parts of the control system (SRP/CS)	19
5.1.4	Emergency stop	19
5.2	Basic requirements for safeguards used on presses	20
5.2.1	Guards	20
5.2.2	Light curtains	20
5.2.3	Two-hand control devices	20
5.2.4	Hold-to run control devices	21

5.2.5	Pressure sensitive mats, floors and edges	21
5.3	Safety requirements and/or protective measures to prevent general hazards	21
5.3.1	Mechanical hazards	21
5.3.2	Electrical hazards	22
5.3.3	Thermal hazards	22
5.3.4	Hazards generated by noise	22
5.3.5	Hazards generated by dusts, gases and vapours	23
5.3.6	Slip, trip and fall hazards	23
5.3.7	Hazards due to malfunctioning of the hydraulic system due to contamination of the hydraulic fluid	23
5.3.8	Hazards due to malfunctioning of the electrical part of the control system	23
5.3.9	Hazards due to electromagnetic interference	23
5.3.10	Hazards generated by neglecting ergonomic principles	24
5.4	Safety requirements and/or protective measures in specific machine areas	24
5.4.1	Mould area	24
5.4.2	Clamping unit area outside the mould area	29
5.5	Safety requirements and/or protective measures for power operated mould clamping systems	30
5.5.1	General	30
5.5.2	Magnetic clamping systems	30
5.6	Safety requirements and/or protective measures for power operated mould changing equipment	31
5.7	Additional safety requirements and/or protective measures associated with specific design	32
5.7.1	Presses where whole body access is possible between the movable guard or the light curtain for the mould area and the mould area itself	32
5.7.2	Presses where whole body access is possible to the mould area	34
5.7.3	Shuttle/turntable machines	35
5.7.4	Carousel machines	35
5.8	Additional safety requirements and/or protective measures when using ancillary equipment	36
6	Verification of the safety requirements and/or protective measures	37
7	Information for use	39
7.1	General	39
7.2	Instruction handbook	40
7.2.1	General	40
7.2.2	General instructions	40
7.2.3	Emergency stop and rescue procedure	40
7.2.4	Light curtains	40
7.2.5	Stopping distance and stopping time	40
7.2.6	Flexible hose assemblies	40
7.2.7	Noise emission	40
7.2.8	Exhaust ventilation system	41
7.2.9	Maintenance of the hydraulic system	41
7.2.10	Presses equipped with two-hand control devices	41
7.2.11	Additional mechanical restraint device for downstroking presses with two hydraulic restraint devices	41
7.2.12	Movements of cores and ejectors and their drive mechanisms	41
7.2.13	Personal protective equipment against thermal hazards	42
7.2.14	Presence detecting devices in the mould area	42
7.2.15	Key lockable switch	42
7.2.16	Ancillary equipment	42
7.2.17	Mould clamping	42
7.2.18	Magnetic mould clamping	42
7.2.19	Maximum additional mass	43
7.2.20	Setting of carousel machines	43
7.2.21	Machines with upstroking platen	43
7.3	Marking	44
7.4	Warning signs and alarm signals	44

Annex A (normative) Acknowledgement systems	45
A.1 Single acknowledgement system	45
A.2 Double acknowledgement system	45
Annex B (normative) Noise test code	46
B.1 Introduction	46
B.2 Measurement of the A-weighted emission sound pressure level at the operator's or other specified positions	46
B.3 Determination of the A-weighted sound power level	46
B.4 Installation and mounting conditions for noise measurement	46
B.5 Operating conditions	47
B.6 Information to be recorded and reported	47
B.6.1 General	47
B.6.2 General data	47
B.6.3 Technical data of the press	47
B.6.4 Standards	48
B.6.5 Mounting and operating conditions	48
B.6.6 Acoustic data	48
B.7 Declaration and verification of noise emission values	48
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	49
Bibliography	50