

DIN EN 12622:2010-04 (E)

Safety of machine tools - Hydraulic press brakes

Contents		Page
Foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms, definitions and abbreviations	9
3.1	Terms and definitions	9
3.2	Abbreviations	12
4	List of significant hazards	12
5	Safety requirements and/or measures	15
5.1	Protection of mechanical hazards	15
5.1.1	Description of the safeguarding of access to moving parts	15
5.1.1.1	General	15
5.1.1.2	Fixed enclosing guards	15
5.1.1.3	Interlocking guards with or without guard locking	15
5.1.1.4	ESPE using AOPD	16
5.1.1.5	Laser actuated AOPD	20
5.1.1.6	Hold to run control	22
5.1.1.7	Scanner systems	22
5.1.1.8	ESPE using AOPD when used in automatic cycle as a trip device	23
5.1.2	Location of the safeguarding of access to moving parts	24
5.1.2.1	Prevention of access from the front	24
5.1.2.2	Prevention of access from the sides	25
5.1.2.3	Prevention of access from the rear	25
5.2	Control systems	26
5.2.1	General	26
5.2.2	Manual control devices	26
5.2.3	Failure of power supply	26
5.2.4	Protection against external influences	26
5.2.5	Safety functions	26
5.2.5.1	General	26
5.2.5.2	Behaviour of the control system in case of failure	33
5.2.5.3	Stop or hold to stop closing stroke of the beam	34
5.2.5.4	Stop back gauges	34
5.2.5.5	Back gauges movement limitation	34
5.2.5.6	Stop work-piece support movement	35
5.2.5.7	Slow speed	35
5.2.5.8	Muting	35
5.2.5.9	Blanking	36
5.2.5.10	Emergency stop	36
5.2.5.11	Mode selection	36
5.2.5.12	Single stroke function	37
5.2.6	Other functions	37
5.2.6.1	Start	37
5.2.6.2	Restart	37
5.2.6.3	Reset	38
5.2.6.4	Normal stop	38

5.2.7	Use of electronic components	38
5.2.7.1	Access to the NC program	38
5.2.7.2	Use of PES for safety functions	38
5.3	Mode of operation	39
5.3.1	Description of the various modes of operation	39
5.3.2	Setting mode	39
5.3.3	Production modes	39
5.3.3.1	Single cycle manual load and/or unload	39
5.3.3.2	Automatic cycle with automatic load and unload	40
5.4	Basic design considerations	40
5.4.1	Stability	40
5.4.1.1	Prevention of unintended gravity fall of the beam (down stroking press brakes)	40
5.4.1.2	Stability of the press brake	40
5.4.1.3	Stability of the work piece	40
5.4.2	Risk of break up during operation	40
5.4.3	Tool holder and tool design	41
5.4.4	Access to raised work stations or platforms	41
5.4.5	Slips, trips and falls	41
5.4.6	Release of trapped persons	41
5.4.7	Guarding of drives, transmission machinery and ancillary devices	41
5.5	Protection against non-mechanical hazard	42
5.5.1	Noise	42
5.5.2	Electrical hazards	43
5.5.3	Ergonomic and handling	43
5.5.4	Hydraulic and pneumatic systems	43
5.5.4.1	General	43
5.5.4.2	Valves	44
5.5.4.3	Hydraulic systems	44
5.5.5	Thermal hazards	45
5.5.6	Hazards generated by materials and substances	45
5.5.7	Hazards generated by lasers	45
5.5.8	High pressure fluid ejection hazards	45
5.5.9	Isolation and energy dissipation	45
5.5.10	Maintenance	45
5.5.11	Errors of fitting	45
6	Verification of the safety requirements and/or protective measures	46
7	Information for use	48
7.1	Marking	48
7.2	Instruction handbook	49
7.3	Commercial informations	50
Annex A (normative) Calculation of minimum safety distances		51
Annex B (normative) The overall response time of the press brake stopping performance		53
Annex C (informative) Example of redundant and monitored hydraulic control circuits for a down-stroking press brake		54
Annex D (normative) Conditions for noise measurement of press brakes		55
Annex E (informative) Side safeguarding for manually fed press brakes		56
Annex F (informative) Markings		57
Annex G (normative) Laser actuated AOPD system tests		58
Annex H (informative) Bending speed		59
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42		61
Bibliography		62