

DIN EN 81-2:2010-08 (E)

Safety rules for the construction and installation of lifts - Part 2: Hydraulic lifts (includes Amendment A3:2009)

Contents	Page
Foreword	5
Introduction	7
1 Scope	11
2 Normative references	12
3 Definitions	14
4 Units and symbols	18
4.1 Units	18
4.2 Symbols	18
5 Lift well	18
5.1 General provisions	18
5.2 Well enclosure	18
5.3 Walls, floor and ceiling of the well	22
5.4 Construction of the walls of lift wells and landing doors facing a car entrance	24
5.5 Protection of any spaces located below the car or the balancing weight	25
5.6 Protection in the well	25
5.7 Headroom and pit	25
5.8 Exclusive use of the lift well	27
5.9 Lighting of the well	28
5.10 Emergency release	28
6 Machinery and pulley spaces	28
6.2 Access	28
6.3 Machinery in machine room	29
6.4 Machinery inside the well	31
6.5 Machinery outside of the well	35
6.6 Devices for emergency and test operations	36
6.7 Construction and equipment of pulley spaces	37
7 Landing doors	38
7.1 General provisions	38
7.2 Strength of doors and their frames	39
7.3 Height and width of entrances	40
7.4 Sills, guides, door suspension	40
7.5 Protection in relation to door operation	41
7.6 Local lighting and «car here» signal lights	42
7.7 Locking and closed landing door check	43
7.8 Closing of automatically operated doors	46
8 Car and balancing weight	46
8.1 Height of car	46
8.2 Available car area, rated load, number of passengers	46
8.3 Walls, floor and roof of the car	49
8.4 Apron	50
8.5 Car entrance	50
8.6 Car doors	50

8.7	Protection during operation of doors	52
8.8	Reversal of closing movement	53
8.9	Electrical device for proving the car doors closed	53
8.10	Sliding doors with multiple, mechanically linked panels	53
8.11	Opening the car door	54
8.12	Emergency trap doors and emergency doors	54
8.13	Car roof	55
8.14	Car header	56
8.15	Equipment on top of the car	56
8.16	Ventilation	56
8.17	Lighting	56
8.18	Balancing weight	57
9	Suspension, precaution against free fall, descent with excessive speed and protection against unintended car movement.....	57
9.1	Suspension	57
9.2	Pulley and rope diameter ratios, rope/chain terminations	57
9.3	Distribution of load between the ropes or the chains	58
9.4	Protection for pulleys and sprockets	58
9.5	Precautions against free fall, descent with excessive speed and creeping of the car	59
9.6	Precautions against free fall of the balancing weight	62
9.7	(Kept free)	62
9.8	Safety gear	62
9.9	Clamping device	64
9.10	Tripping means for safety gears and clamping devices	65
9.11	Pawl device	68
9.12	Electrical anti-creep system	69
9.13	Protection against unintended car movement	70
10	Guide rails, buffers and final limit switch	72
10.1	General provisions concerning guide rails	72
10.2	Guiding of the car and balancing weight	74
10.3	Car buffers	74
10.4	Stroke of car buffers	75
10.5	Final limit switch	77
11	~~~~Clearances between car and wall facing the car entrance, and between car and balancing weightTMTMTMTM	78
11.1	General provision	78
11.2	Clearances between car and wall facing the car entrance	78
11.3	~~~~Clearances between car and balancing weightTMTMTMTM	79
12	Lift machine	79
12.1	General provisions	79
12.2	Jack	80
12.3	Piping	83
12.4	Stopping the machine and checking its stopped condition	84
12.5	Hydraulic control and safety devices	84
12.6	Checking the pressure	87
12.7	Tank	88
12.8	Speed	88
12.9	Emergency operation	88
12.10	Protection of the pulley(s) or sprocket(s) on the jack	89
12.11	Protection of machinery	89
12.12	Motor run time limiter	89
12.13	Slack rope (or chain) safety device for indirect acting lifts	90
12.14	Protection against overheating of the hydraulic fluid	90
12.15	Normal stopping of the car at landings and levelling accuracy	90
13	Electric installations and appliances	90
13.1	General provisions	90
13.2	Contactors, relay-contactors, components of safety circuits	91

13.3	Protection of motors and other electrical equipment	92
13.4	Main switches	93
13.5	Electric wiring	94
13.6	Lighting and socket outlets	95
14	Protection against electric faults ; controls ; priorities	96
14.1	Failure analysis and electric safety devices	96
14.2	Controls	108
15	Notices, markings and operating instructions	112
15.1	General provisions	112
15.2	Car	112
15.3	Car roof	113
15.4	Machine and pulley spaces.....	113
15.5	Well	114
15.6	Overspeed governor	114
15.7	Pit	115
15.8	Buffers	115
15.9	Landing identification	115
15.10	Electrical identification	115
15.11	Unlocking key for landing doors	115
15.12	Alarm device	115
15.13	Locking devices	115
15.14	Safety gear	115
15.15	Emergency lowering valve	116
15.16	Hand pump	116
15.17	Groups of lifts	116
15.18	Tank	116
15.19	Rupture valve/one-way restrictor	116
16	Examinations - Tests - Register - Maintenance	116
16.1	Examinations and tests	116
16.2	Register	117
16.3	Installer information	118
	Annex A (normative) List of the electric safety devices	119
	Annex B(normative) Unlocking triangle	121
	Annex C (informative) Technical dossier	122
	Annex D (normative) Examinations and tests before putting into service	125
	Annex E (informative) Periodical examinations and tests, examinations and tests after an important modification or after an accident	131
	Annex F (normative) Safety components - Tests procedures for verification of conformity	133
	Annex G (Informative) Proof of guide rails	165
	Annex H (normative) Electronic components - Failure exclusion	198
	Annex J (normative) Pendulum shock tests	206
	Annex K (normative) Calculations of rams, cylinders, rigid pipes and fittings	212
	Annex L (informative) #Machinery spaces - Access (6.1).....	221
	Annex M (informative) !!Description of possible measures.....	226
	Annex ZA (informative) %%%Relationship between this European Standard and the Essential Requirements of EU Directive 95/16/EC amended by 2006/42/EC.....	227