

# DIN EN 81-22:2014-12 (E)

## Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 22: Electric lifts with inclined path

---

<b>Contents</b>		<b>Page</b>
Foreword .....		5
<b>0</b>	<b>Introduction .....</b>	<b>6</b>
<b>0.1</b>	<b>General .....</b>	<b>6</b>
<b>0.2</b>	<b>Considerations .....</b>	<b>6</b>
<b>0.3</b>	<b>Principles .....</b>	<b>6</b>
<b>0.4</b>	<b>Assumptions .....</b>	<b>7</b>
<b>1</b>	<b>Scope .....</b>	<b>10</b>
<b>2</b>	<b>Normative references .....</b>	<b>11</b>
<b>3</b>	<b>Terms and definitions, symbols and abbreviated terms .....</b>	<b>13</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>13</b>
<b>3.2</b>	<b>Symbols and abbreviated terms .....</b>	<b>19</b>
<b>4</b>	<b>List of significant hazards .....</b>	<b>19</b>
<b>4.1</b>	<b>General .....</b>	<b>19</b>
<b>5</b>	<b>Safety requirements and/or protective measures .....</b>	<b>22</b>
<b>5.1</b>	<b>General provisions .....</b>	<b>22</b>
<b>5.2</b>	<b>Lift well .....</b>	<b>22</b>
<b>5.3</b>	<b>Machine, working areas and pulley spaces .....</b>	<b>32</b>
<b>5.4</b>	<b>Landing doors .....</b>	<b>43</b>
<b>5.5</b>	<b>Car, vehicle, counterweight, balancing weight .....</b>	<b>50</b>
<b>5.6</b>	<b>Suspension, compensation, overspeed protection and protection against unintended vehicle movement .....</b>	<b>61</b>
<b>5.7</b>	<b>Running tracks, guide rails, counter-guide rails and safety gear operating element - Buffers - Final limit switches .....</b>	<b>72</b>
<b>5.8</b>	<b>Clearances between vehicle and wall facing the vehicle entrance, and between car, counterweight or balancing weight .....</b>	<b>78</b>
<b>5.9</b>	<b>Lift machine .....</b>	<b>79</b>
<b>5.10</b>	<b>Electric installations and appliances .....</b>	<b>85</b>
<b>5.11</b>	<b>Protection against electric faults; controls; priorities .....</b>	<b>91</b>
<b>6</b>	<b>Verification of the safety requirements and/or protective measures .....</b>	<b>107</b>
<b>6.1</b>	<b>Methods to be used .....</b>	<b>107</b>
<b>6.2</b>	<b>Specific data, test reports and certificates .....</b>	<b>114</b>
<b>7</b>	<b>Information for use .....</b>	<b>114</b>
<b>7.1</b>	<b>General .....</b>	<b>114</b>
<b>7.2</b>	<b>Signals and warning devices .....</b>	<b>114</b>
<b>7.3</b>	<b>Inspection and test .....</b>	<b>119</b>
<b>7.4</b>	<b>Accompanying documents (in particular, instruction handbook) .....</b>	<b>120</b>
<b>Annex A (normative)</b>	<b>List of the safety contacts .....</b>	<b>124</b>
<b>Annex B (normative)</b>	<b>Unlocking triangle .....</b>	<b>126</b>
<b>Annex C (informative)</b>	<b>Technical dossier .....</b>	<b>127</b>

C.1	Introduction .....	127
C.2	General .....	127
C.3	Technical documents and plans .....	127
C.4	Electric schematic diagrams .....	128
C.5	Verification of conformity .....	128
Annex D (normative) Examinations and tests before putting into service .....		129
D.1	General .....	129
D.2	Examinations .....	129
D.3	Tests and verifications .....	129
Annex E (informative) Periodical examinations and tests, examinations and tests after an important modification or after an accident .....		133
E.1	Periodical examinations and tests .....	133
E.2	Examinations and tests after an important modification or after an accident .....	133
Annex F (normative) Safety components - Test procedures for verification of conformity .....		135
F.0	Introduction .....	135
F.1	Landing door locking devices .....	136
F.2	Safety gear .....	140
F.3	Overspeed governors .....	144
F.4	Buffers .....	147
F.5	Safety circuits containing electronic components and/or programmable electronic systems (PESSRAL) .....	153
F.6	Ascending vehicle overspeed protection means .....	156
F.7	Unintended vehicle movement protection means .....	159
Annex G (informative) Calculation of the supporting structure, the running tracks, the guide rails, the vehicle and the safety gear gripping element .....		164
G.1	General .....	164
G.2	Actions to take into account for calculation .....	164
G.3	Proof of guide rails .....	167
Annex H (normative) Electronic components- Failure exclusion .....		168
H.1	Scope .....	168
H.2	Failure exclusions - conditions .....	168
Annex I (informative) Safety circuits .....		172
I.1	Design guide-line for safety circuits .....	172
I.2	Description of possible measures .....	172
Annex J (normative) Pendulum shock tests .....		179
J.1	General .....	179
J.2	Test rig .....	179
J.3	Panels .....	179
J.4	Test procedure .....	179
J.5	Interpretation of the results .....	180
J.6	Test report .....	180
J.7	Exceptions from the tests .....	180
Annex K (informative) Traction evaluation .....		185
K.1	General provisions .....	185
K.2	Traction calculation .....	185
K.3	Practical example .....	190

<b>Annex L (normative) Evaluation of safety factor for suspension ropes .....</b>	<b>193</b>
<b>L.1      General .....</b>	<b>193</b>
<b>L.2      Equivalent number Nequiv of pulleys .....</b>	<b>193</b>
<b>L.3      Static safety factor .....</b>	<b>194</b>
<b>L.4      Examples .....</b>	<b>195</b>
<b>Annex M (informative) Machinery spaces - Access (5.3.3) .....</b>	<b>197</b>
<b>Annex N (informative) Building interfaces .....</b>	<b>198</b>
<b>N.1      General provisions .....</b>	<b>198</b>
<b>N.2      Support of guide rails .....</b>	<b>198</b>
<b>N.3      Ventilation of car, lift well and machinery spaces .....</b>	<b>198</b>
<b>Annex O (informative) Environment: aspects to be considered for a risk analysis .....</b>	<b>201</b>
<b>Annex P (informative) Determination of anti-slip properties for floor surfaces .....</b>	<b>203</b>
<b>P.1      General .....</b>	<b>203</b>
<b>P.2      Testing and assessing anti-slip properties .....</b>	<b>203</b>
<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 95/16/EC .....</b>	<b>205</b>
<b>Bibliography .....</b>	<b>206</b>