

**Part 1 General..... 1**

**1.1 Scope ..... 1**

**1.2 Purpose and Exceptions..... 2**

**1.3 Definition ..... 2**

**Part 2 Electric Elevators ..... 19**

**2.1 Construction of Hoistways and Hoistway Enclosures ..... 19**

2.1.1 Hoistway Enclosures..... 19

2.1.2 Construction at Top and Bottom of the Hoistway ..... 20

2.1.3 Floor Over Hoistways ..... 20

2.1.4 Control of Smoke and Hot Gases ..... 20

2.1.5 Windows and Skylights..... 20

2.1.6 Projections, Recesses and Setbacks in Hoistway Enclosures ..... 21

**2.2 Pits ..... 21**

2.2.1 General..... 21

2.2.2 Design and Construction of Pits..... 21

2.2.3 Guards Between Adjacent Pits..... 21

2.2.4 Pit Access ..... 21

2.2.5 Illumination of Pits..... 23

2.2.6 Stop Switch in Pits..... 23

2.2.7 Minimum Pit Depths Required..... 23

2.2.8 Access to Underside of Car..... 23

**2.3 Location and Guarding of Counterweights ..... 23**

2.3.1 Location of Counterweights..... 23

2.3.2 Counterweight Guards..... 23

2.3.3 Remote Counterweight Hoistways..... 23

2.3.4 Counterweight Runway Enclosures..... 24

**2.4 Vertical Clearances and Runbys for Cars and Counterweights ..... 24**

2.4.1 Bottom Car Clearances..... 24

2.4.2 Minimum Bottom Runby for Counterweighted Elevators..... 24

2.4.3 Minimum Bottom Runby for Uncounterweighted Elevators..... 25

2.4.4 Maximum Bottom Runby..... 25

2.4.5 Counterweight Runby Data Plate..... 25

2.4.6 Maximum Upward Movement of the Car ..... 25

2.4.7 Top Car Clearances ..... 25

2.4.8 Top of Counterweight Clearances ..... 26

2.4.9 Equipment on Top of Car Not Permitted to Strike Overhead Structure..... 26

**2.5 Horizontal Car and Counterweight Clearances ..... 26**

2.5.1 Clearances Between Cars, Counterweights, and Hoistway Enclosures..... 26

**2.6 Protection of Space Below Hoistways ..... 27**

2.6.1 Where the Space is Underneath the Counterweight and/or Its Guides..... 27

2.6.2 Where the Space is Underneath the Car and/or Its Guides..... 27

**2.7 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms ..... 27**

2.7.1 Enclosure of Rooms and Spaces..... 27

2.7.2 Maintenance Path and Clearance..... 28

2.7.3 Access to Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms ..... 28

2.7.4 Headroom in Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms.. 29

2.7.5 Working Areas Inside the Hoistway and in the Pit ..... 30

2.7.6 Location of Machinery Spaces, Machine Rooms, Control Spaces, Control Rooms and Equipment ..... 32

2.7.7 Machine and Control Rooms Underneath the Hoistway..... 34

2.7.8 Remote Machine Rooms and Control Rooms..... 34

2.7.9 Lighting, Temperature, and Humidity in Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms ..... 35

**2.8 Equipment in Hoistways, Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms ..... 35**

2.8.1 Equipment Allowed ..... 35

2.8.2 Electrical Equipment and Wiring..... 35

## A17.1–2013/CSA B44-13 Table of Contents

2.8.3 Pipes, Ducts, Tanks, and Sprinklers.....	35
2.8.4 Electrical Heaters.....	36
2.8.5 Air Conditioning.....	36
2.8.6 Miscellaneous Equipment .....	36
<b>2.9 Machinery and Sheave Beams, Supports, and Foundations .....</b>	<b>37</b>
2.9.1 Supports Required.....	37
2.9.2 Loads on Machinery and Sheave Beams, Floors, or Foundations and Their Supports.....	37
2.9.3 Securing of Machinery and Equipment to Beams, Foundations, Guide Rails Structural Walls, or Floors.....	37
2.9.4 Allowable Stresses for Machinery and Sheave Beams or Floors, Their Supports, and Any Support Members That Transmit Load to the Guide Rails or Structural Walls .....	38
2.9.5 Allowable Deflections of Machinery and Sheave Beams, Their Supports, and Any Support Members Loaded in Bending That Transmit Load to Guide Rails or Structural Walls .....	38
2.9.6 Allowable Stresses Due to Emergency Braking.....	38
<b>2.10 Guarding of Equipment and Standard Railing .....</b>	<b>39</b>
2.10.1 Guarding of Equipment.....	39
2.10.2 Standard Railing.....	39
<b>2.11 Protection of Hoistway Openings .....</b>	<b>39</b>
2.11.1 Entrances and Emergency Doors Required.....	39
2.11.2 Types of Entrances.....	40
2.11.3 Closing of Hoistway Doors.....	40
2.11.4 Location of Horizontally Sliding or Swinging Hoistway Doors.....	40
2.11.5 Projection of Entrances and Other Equipment Beyond the Landing Sills.....	40
2.11.6 Opening of Hoistway Doors.....	40
2.11.7 Glass in Hoistway Doors.....	41
2.11.8 Weights for Closing or Balancing Doors.....	42
2.11.9 Hoistway Door Locking Devices and Power Operation.....	42
2.11.10 Landing-Sill Guards, Landing-Sill Illumination, Hinged Landing Sills, and Tracks on Landings.....	42
2.11.11 Entrances, Horizontal Slide Type.....	43
2.11.12 Entrances, Vertical Slide Type.....	44
2.11.13 Entrances, Swinging Type.....	45
2.11.14 Fire Tests.....	46
2.11.15 Marking.....	46
2.11.16 Factory Inspections.....	47
2.11.17 Transoms and Fixed Side Panels.....	47
2.11.18 Installation Instructions.....	47
2.11.19 Gasketing of Hoistway Entrances.....	47
<b>2.12 Hoistway Door Locking Devices and Electric Contacts, and Hoistway Access Switches ..</b>	<b>47</b>
2.12.1 General.....	47
2.12.2 Interlocks.....	47
2.12.3 Hoistway Door Combination Mechanical Locks and Electric Contacts.....	49
2.12.4 Listing/Certification Door Locking Devices and Door or Gate Electric Contacts.....	49
2.12.5 Moved to 2.14.5.7 .....	50
2.12.6 Hoistway Door Unlocking Devices.....	50
2.12.7 Hoistway Access Switches.....	50
<b>2.13 Power Operation of Hoistway Doors and Car Doors .....</b>	<b>52</b>
2.13.1 Types of Doors and Gates Permitted.....	52
2.13.2 Power Opening.....	52
2.13.3 Power Closing.....	52
2.13.4 Closing Limitations for Power-Operated Horizontally Sliding Hoistway Doors and Horizontally Sliding Car Doors or Gates.....	56
2.13.5 Reopening Device for Power-Operated Car Doors or Gates.....	57
2.13.6 Sequence Operation for Power-Operated Hoistway Doors with Car Doors/Gates.....	57
<b>2.14 Car Enclosures, Car Doors and Gates, and Car Illumination .....</b>	<b>57</b>
2.14.1 Passenger and Freight Enclosures, General.....	57
2.14.2 Passenger-Car Enclosures.....	59
2.14.3 Freight-Car Enclosure.....	61

## A17.1–2013/CSA B44-13 Table of Contents

2.14.4 Passenger and Freight Car Doors and Gates, General Requirements.....	61
2.14.5 Passenger Car Doors.....	63
2.14.6 Freight Elevator Car Doors and Gates.....	65
2.14.7 Illumination of Cars and Lighting Fixtures.....	65
<b>2.15 Car Frames and Platforms .....</b>	<b>66</b>
2.15.1 Car Frames Required.....	66
2.15.2 Guiding Members.....	66
2.15.3 Design of Car Frames and Guiding Members.....	67
2.15.4 Underslung or Sub-Post Frames.....	67
2.15.5 Car Platforms.....	67
2.15.6 Materials for Car Frames and Platform Frames.....	67
2.15.7 Car Frame and Platform Connections.....	68
2.15.8 Protection of Platforms Against Fire.....	68
2.15.9 Platform Guards (Aprons).....	68
2.15.10 Maximum Allowable Stresses in Car Frame and Platform Members and Connections...	68
2.15.11 Maximum Allowable Deflections of Car Frame and Platform Members.....	69
2.15.12 Car Frames with Sheaves.....	69
2.15.13 Suspension-Rope Hitch Plates or Shapes.....	69
2.15.14 Calculation of Stresses in Car-Frame and Platform-Frame Members.....	70
2.15.15 Platform Side Braces.....	70
2.15.16 Hinged Platform Sills.....	70
2.15.17 Fastening of Compensation Means.....	70
<b>2.16 Capacity and Loading .....</b>	<b>70</b>
2.16.1 Minimum Rated Load for Passenger Elevators.....	70
2.16.2 Minimum Rated Load for Freight Elevators.....	70
2.16.3 Capacity and Data Plates.....	72
2.16.4 Carrying of Passengers on Freight Elevators.....	72
2.16.5 Signs Required in Freight Elevator Cars.....	73
2.16.6 Overloading of Freight Elevators.....	73
2.16.7 Carrying of One-Piece Loads Exceeding the Rated Load.....	73
2.16.8 Additional Requirements for Passenger Overload in the Down Direction .....	74
2.16.9 Special Loading Means.....	74
<b>2.17 Car and Counterweight Safeties .....</b>	<b>74</b>
2.17.1 Where Required and Location.....	74
2.17.2 Duplex Safeties.....	74
2.17.3 Function and Stopping Distance of Safeties.....	74
2.17.4 Counterweight Safeties.....	75
2.17.5 Identification and Classification of Types of Safeties.....	75
2.17.6 Reserved for Future Use.....	76
2.17.7 Governor-Actuated Safeties and Car-Safety Mechanism Switches Required.....	76
2.17.8 Limits of Use of Various Types of Safeties.....	76
2.17.9 Application and Release of Safeties.....	76
2.17.10 Minimum Permissible Clearance Between Rail-Gripping Faces of Safety Parts.....	77
2.17.11 Maximum Permissible Movement of Governor Rope to Operate the Safety Mechanism	77
2.17.12 Minimum Factors of Safety and Stresses of Safety Parts and Rope Connections.....	77
2.17.13 Corrosion-Resistant Bearings in Safeties and Safety-Operating Mechanisms.....	77
2.17.14 Marking Plates for Safeties.....	77
2.17.15 Governor-Rope Releasing Carriers.....	78
2.17.16 Rail Lubricants and Lubrication Plate.....	78
<b>2.18 Speed Governors .....</b>	<b>78</b>
2.18.1 Speed Governors Required and Location.....	78
2.18.2 Tripping Speeds for Speed Governors.....	78
2.18.3 Sealing and Painting of Speed Governors.....	78
2.18.4 Speed-Governor Overspeed Switch.....	78
2.18.5 Governor Ropes.....	80
2.18.6 Design of Governor Rope-Retarding Means for Type B Safeties.....	80
2.18.7 Design of Speed-Governor Sheaves & Traction Between Speed-Governor Rope & Sheave .....	80
2.18.8 Factors of Safety in Load-Bearing parts of Speed Governor.....	81

**A17.1–2013/CSA B44-13 Table of Contents**

2.18.9 Speed-Governor Marking Plate.....	81
<b>2.19 Ascending Car Overspeed and Unintended Car Movement Protection .....</b>	<b>81</b>
2.19.1 Ascending Car Overspeed Protection.....	81
2.19.2 Unintended Car Movement Protection .....	81
2.19.3 Emergency Brake (See Nonmandatory Appendix F).....	82
2.19.4 Emergency Brake Supports.....	83
<b>2.20 Suspension Means and Their Connections .....</b>	<b>83</b>
2.20.1 Suspension Means.....	83
2.20.2 Suspension Means Data.....	83
2.20.3 Factor of Safety.....	84
2.20.4 Minimum Number and Diameter of Suspension Means .....	84
2.20.5 Suspension-Member Equalizers.....	85
2.20.6 Securing of Suspension Wire Ropes to Winding Drums.....	85
2.20.7 Rope Turns on Winding Drums.....	85
2.20.8 Suspension-Means Monitoring and Protection.....	85
2.20.9 Suspension -Member Fastening.....	86
2.20.10 Auxiliary Rope Fastening Devices.....	91
2.20.11 Suspension Member Test .....	91
<b>2.21 Counterweights .....</b>	<b>91</b>
2.21.1 General Requirements.....	91
2.21.2 Design Requirements for Frames and Rods.....	92
2.21.3 Cars Counterbalancing One Another.....	92
2.21.4 Compensation Means.....	92
2.21.4.2 Tie-Down Compensation Means .....	92
<b>2.22 Buffers and Bumpers .....</b>	<b>93</b>
2.22.1 Type and Location.....	93
2.22.2 Solid Bumpers.....	93
2.22.3 Spring Buffers.....	93
2.22.4 Oil Buffers.....	93
<b>2.23 Car and Counterweight Guide Rails, Guide-Rail Supports, and Fastenings .....</b>	<b>95</b>
2.23.1 Guide Rails Required.....	95
2.23.2 Material.....	95
2.23.3 Rail Section.....	96
2.23.4 Maximum Load on Rails in Relation to the Bracket Spacing.....	96
2.23.5 Stresses and Deflections.....	97
2.23.6 Guide-Rail Surfaces.....	103
2.23.7 Rail Joints and Fishplates.....	103
2.23.8 Overall Length of Guide Rails.....	103
2.23.9 Guide-Rail Brackets and Building Supports.....	103
2.23.10 Fastening of Guide Rails to Rail Brackets.....	104
<b>2.24 Driving Machines and Sheaves .....</b>	<b>104</b>
2.24.1 Type of Driving Machines.....	104
2.24.2 Sheaves and Drums.....	105
2.24.3 Factor of Safety for Driving Machines and Sheaves.....	105
2.24.4 Fasteners and Connections Transmitting Load.....	106
2.24.5 Shaft Fillets and Keys.....	106
2.24.6 Cast-Iron Worms and Worm Gears.....	106
2.24.7 Friction Gearing and Clutches.....	106
2.24.8 Braking System and Driving-Machine Brakes.....	106
2.24.9 Indirect-Driving Machines.....	107
2.24.10 Means for Inspection of Gears.....	107
<b>2.25 Terminal-Stopping Device .....</b>	<b>107</b>
2.25.1 General Requirements.....	107
2.25.2 Normal Terminal Stopping Devices.....	107
2.25.3 Final Terminal Stopping Devices.....	108
2.25.4 Emergency Terminal Stopping Means.....	109
<b>2.26 Operating Devices and Control Equipment .....</b>	<b>111</b>
2.26.1 Operation and Operating Devices.....	111
2.26.2 Electrical Protective Devices.....	114

## A17.1–2013/CSA B44-13 Table of Contents

2.26.3 Contractors and Relays for Use in Critical Operating Circuits.....	116
2.26.4 Electrical Equipment and Wiring.....	116
2.26.5 System to Monitor and Prevent Automatic Operation of the Elevator w/Faulty Door Contact Circuits .....	117
2.26.6 Phase Protection of Motors.....	117
2.26.7 Installation of Capacitors or Other Devices to Make Electrical Protective Devices Ineffective .....	117
2.26.8 Release and Application of Driving Machine Brakes.....	120
2.26.9 Control and Operating Circuits.....	120
2.26.10 Absorption of Regenerated Power.....	122
2.26.11 Car Platform to Hoistway Door Sills Vertical Distance.....	122
2.26.12 Symbols.....	122
<b>2.27 Emergency Operation and Signaling Devices .....</b>	<b>122</b>
2.27.1 Car Emergency Signaling Devices.....	122
2.27.2 Emergency or Standby Power System.....	125
2.27.3 Firefighters' Emergency Operation: Automatic Elevators.....	126
2.27.4 Firefighters' Emergency Operation: Non-Automatic Elevators.....	132
2.27.5 Firefighters' Emergency Operation: Automatic Elevators w/Designated Attendant Operation .....	133
2.27.6 Firefighters' Emergency Operation, Occupant Evacuation Operation: Inspection Operation .....	133
2.27.7 Firefighters' Emergency Operation: Operating Procedures.....	133
2.27.8 Switch Keys.....	135
2.27.9 Elevator Corridor Call Station Pictograph .....	135
2.27.10 Reserved for Future Use.....	135
2.27.11 Occupant Evacuation Operation.....	135
<b>2.28 Layout Drawings .....</b>	<b>139</b>
2.28.1 Information Required on Layout Drawings.....	139
<b>2.29 Identification .....</b>	<b>139</b>
2.29.1 Identification of Equipment.....	139
2.29.2 Identification of Floors.....	139
<b>2.30 Sway Control Guides.....</b>	<b>140</b>
2.30.1 Sway Control Guides .....	140
2.30.2 Suspension Means.....	140
2.30.3 Abrasion Protection .....	140
2.30.4 Guiding Members .....	140
<b>Part 3 Hydraulic Elevators .....</b>	<b>141</b>
3.1 Construction of Hoistways and Hoistway Enclosures .....	141
3.1.1 Strength of Pit Floor.....	141
3.1.2 Floors Over Hoistways.....	141
<b>3.2 Pits.....</b>	<b>141</b>
3.2.1 Minimum Pit Depths Required.....	141
<b>3.3 Location and Guarding of Counterweights .....</b>	<b>141</b>
<b>3.4 Bottom and Top Clearances &amp; Runbys for Cars &amp; Counterweights .....</b>	<b>141</b>
3.4.1 Bottom Car Clearance.....	141
3.4.2 Minimum Bottom and Top Car Runby.....	142
3.4.3 Car Top and Bottom Maximum Runby.....	142
3.4.4 Maximum Upward Movement .....	142
3.4.5 Top Car Clearance.....	142
3.4.6 Top Clearance and Bottom Runby of Counterweight.....	142
3.4.7 Equipment on Top of Car Not Permitted to Strike Overhead Structure .....	142
3.4.8 Clearances Above Hydraulic Jack Projecting Above the Car .....	142
<b>3.5 Horizontal Car and Counterweight Clearances .....</b>	<b>142</b>
<b>3.6 Protection of Spaces Below Hoistway .....</b>	<b>142</b>
3.6.1 Jack-Supporting Structure.....	143
3.6.2 Counterweight Safety Actuation.....	143
3.6.3 Buffer Types.....	143
3.6.4 Buffer Supports.....	143

**A17.1–2013/CSA B44-13 Table of Contents**

<b>3.7 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms</b> .....	<b>143</b>
<b>3.8 Electrical Equipment, Wiring, Pipes, and Ducts in Hoistway, Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms</b> .....	<b>143</b>
<b>3.9 Machinery and Sheave Beams, Supports and Foundations</b> .....	<b>143</b>
<b>3.10 Guarding of Exposed Auxiliary Equipment</b> .....	<b>143</b>
<b>3.11 Protection of Hoistway Landing Openings</b> .....	<b>144</b>
3.11.1 Emergency Doors .....	144
<b>3.12 Hoistway Door Locking Devices, Car Door/Gate Electric Contacts and Hoistway Access Switches</b> .....	<b>144</b>
3.12.1 General.....	144
3.12.2 Car Door or Gate Electric Contacts and Car Door Interlocks.....	144
<b>3.13 Power Operation, Power Opening and Power Closing of Hoistway Doors/Car Doors/Gates</b> .....	<b>144</b>
<b>3.14 Car Enclosures, Car Doors and Gates, and Car Illumination</b> .....	<b>144</b>
<b>3.15 Car Frames and Platforms</b> .....	<b>144</b>
3.15.1 Requirements.....	144
3.15.2 Maximum Allowable Stresses & Deflections in Car Frame and Platform Members.....	144
3.15.3 Calculations of Stresses & Deflections in Car Frame and Platform Members.....	144
<b>3.16 Capacity and Loading</b> .....	<b>145</b>
3.16.1 Minimum Rated Load for Passenger Elevators.....	145
3.16.2 Minimum Rated Load for Freight Elevators.....	145
3.16.3 Capacity and Data Plates.....	145
3.16.4 Carrying of Passengers on Freight Elevators.....	145
3.16.5 Signs Required in Freight Elevators.....	145
3.16.6 Overloading of Freight Elevators.....	145
3.16.7 One-Piece Loads Exceeding the Rated Load.....	145
3.16.8 Additional Requirements for Passenger Overload.....	145
3.16.9 Special Loading Means.....	145
<b>3.17 Car Safeties, Counterweight Safeties, Plunger Gripper, and Governors</b> .....	<b>145</b>
3.17.1 Car Safeties.....	145
3.17.2 Counterweight Safeties.....	145
3.17.3 Plunger Gripper.....	145
3.17.4 Governors .....	147
<b>3.18 Hydraulic Jacks</b> .....	<b>147</b>
3.18.1 Hydraulic Jack and Connections.....	147
3.18.2 Plungers.....	147
3.18.3 Cylinders.....	148
3.18.4 Plunger Stops.....	149
3.18.5 Welding.....	149
3.18.6 Marking of Hydraulic Jack .....	149
<b>3.19 Valves, Pressure Piping and Fittings</b> .....	<b>149</b>
3.19.1 Materials and Working Pressures.....	149
3.19.2 Pressure Piping.....	150
3.19.3 Connections and Fittings.....	150
3.19.4 Valves.....	151
3.19.5 Piping Buried in the Ground.....	152
3.19.6 Welding.....	152
3.19.7 Electrical Requirements.....	152
<b>3.20 Ropes and Rope Connections</b> .....	<b>152</b>
<b>3.21 Counterweights</b> .....	<b>152</b>
3.21.1 Counterweights .....	152
3.21.2 Counterweight Sheaves.....	152
<b>3.22 Buffers and Bumpers</b> .....	<b>152</b>
3.22.1 Car Buffers or Bumpers.....	152
3.22.2 Counterweight Buffers.....	153
3.23 Guide Rails, Guide-Rail Supports, and Fastenings.....	153
3.23.1 Direct-Acting Hydraulic Elevators.....	153
3.23.2 Roped-Hydraulic Elevators.....	153
<b>3.24 Hydraulic Machines and Tanks</b> .....	<b>153</b>



## A17.1–2013/CSA B44-13 Table of Contents

3.24.1 Hydraulic Machines (Power Units).....	153
3.24.2 Tanks.....	153
3.24.3 Atmosphere Storage and Discharge Tanks.....	153
3.24.4 Welding.....	153
<b>3.25 Terminal-Stopping Devices.....</b>	<b>153</b>
3.25.1 Normal Terminal Stopping Devices.....	153
3.25.2 Terminal Speed Reducing Devices.....	154
3.25.3 Final Terminal Stopping Devices.....	155
<b>3.26 Operating Devices and Control Equipment.....</b>	<b>155</b>
3.26.1 Operating Devices and Control Equipment.....	155
3.26.2 Inspection Operation.....	155
3.26.3 Anti-Creep and Leveling Operation.....	155
3.26.4 Electrical Protective Devices.....	156
3.26.5 Phase Reversal and Failure Protection.....	156
3.26.6 Control and Operating Circuits.....	156
3.26.7 Recycling Operation for Multiple or Telescopic Plungers.....	156
3.26.8 Pressure Switch.....	156
3.26.9 Low Oil Protection.....	157
3.26.10 Auxiliary Power Lowering Operation.....	157
<b>3.27 Emergency Operation and Signaling Devices.....</b>	<b>157</b>
3.27.1 Phase I Emergency Recall Operation After Device Actuation.....	157
3.27.2 Phase I Emergency Recall Operation Prior to Device Actuation.....	157
3.27.3 Device Actuation at Recall Level.....	157
3.27.4 Device Actuation w/Phase II Emergency In-Car Operation in Effect.....	158
<b>3.28 Layout Data.....</b>	<b>158</b>
3.28.1 Information Required on Layout Drawing.....	158
<b>3.29 Identification.....</b>	<b>158</b>
<b>Part 4 Elevators with Other Types of Driving Machines.....</b>	<b>159</b>
<b>4.1 Rack and Pinion Elevators.....</b>	<b>159</b>
4.1.1 Hoistways, Hoistway Enclosures, and Related Construction.....	159
4.1.2 Machinery Rooms and Machinery Spaces.....	159
4.1.3 Equipment in Hoistways or Machine Rooms.....	159
4.1.4 Supports and Foundations.....	159
4.1.5 Emergency Doors.....	159
4.1.6 Car Enclosures, Car Doors and Gates, and Car Illumination.....	159
4.1.7 Car Frames and Platforms.....	159
4.1.8 Capacity and Loading.....	160
4.1.9 Car Safeties and Speed Governor.....	160
4.1.10 Counterweights.....	160
4.1.11 Car Buffers.....	160
4.1.12 Guide Rails, Guide-Rail Supports and Fastenings.....	160
4.1.13 Rack and Pinion Driving Machine.....	160
4.1.14 Terminal Stopping Devices.....	160
4.1.15 Operating Devices and Control Equipment.....	161
4.1.16 Emergency Operation and Signal Devices.....	161
4.1.17 Layout Drawings.....	161
4.1.18 Welding.....	161
<b>4.2 Screw-Column Elevators.....</b>	<b>161</b>
4.2.1 Hoistways, Hoistway Enclosures, and Related Construction.....	162
4.2.2 Vertical Clearance and Runby for Cars.....	162
4.2.3 Horizontal Car Clearance.....	162
4.2.4 Protection of Spaces Below Hoistway.....	162
4.2.5 Machine Rooms and Machinery Spaces.....	162
4.2.6 Equipment in Hoistways and Machine Rooms.....	162
4.2.7 Supports and Foundations.....	163
4.2.8 Car Enclosures, Car Doors and Gates, and Car Illumination.....	163
4.2.9 Car Frames and Platforms.....	163
4.2.10 Capacity and Loading.....	163

## A17.1–2013/CSA B44-13 Table of Contents

4.2.11 Car Safeties and Speed Governor.....	163
4.2.12 Safety Nut and Data Tag.....	163
4.2.13 Car Buffers.....	163
4.2.14 Guide Rails, Guide-Rail Supports and Fastenings.....	163
4.2.15 Driving Machine and Screw Column.....	163
4.2.16 Terminal Stopping Devices .....	164
4.2.17 Operating Devices and Control Equipment.....	164
4.2.18 Emergency Operation and Signaling Devices.....	165
4.2.19 Layout Drawings.....	165
4.2.20 Welding.....	165
<b>4.3 Hand Elevators.....</b>	<b>165</b>
4.3.1 Hoistways, Hoistway Enclosures, and Related Construction.....	165
4.3.2 Pits.....	165
4.3.3 Top Clearances.....	165
4.3.4 Enclosures for Machines and Control Equipment.....	165
4.3.5 Overhead Beams and Supports, and Access to Machines and Sheaves.....	165
4.3.6 Hoistway Entrances.....	166
4.3.7 Hoistway Gates for Landing Openings.....	166
4.3.8 Hoistway Door and Hoistway Gate Locking Devices.....	166
4.3.9 Car Enclosures.....	166
4.3.10 Use of Glass in Cars.....	166
4.3.11 Car Frames and Platforms.....	166
4.3.12 Car Compartments.....	166
4.3.13 Cars Counterbalancing One Another.....	167
4.3.14 Capacity and Loading.....	167
4.3.15 Car Safeties.....	167
4.3.16 Suspension Means.....	167
4.3.17 Counterweights.....	167
4.3.18 Guide Rails and Fastenings.....	167
4.3.19 Driving Machines and Sheaves.....	167
4.3.20 Power Attachments.....	168
4.3.21 Layout Data.....	168
4.3.22 Inspections and Tests.....	168
<b>Part 5 Special Application Elevators .....</b>	<b>169</b>
<b>5.1 Inclined Elevators.....</b>	<b>169</b>
5.1.1 General Requirements.....	169
5.1.2 Construction of Hoistway and Hoistway Enclosures.....	169
5.1.3 Pits and Work Spaces.....	169
5.1.4 Counterweight Pit Guards.....	170
5.1.5 Clearances for Cars and Counterweights.....	170
5.1.6 Protection of Spaces in Line With the Direction of Travel.....	170
5.1.7 Equipment in Hoistways and Machine Rooms.....	170
5.1.8 Protection of Hoistway Openings.....	170
5.1.9 Reserved for Future Use .....	170
5.1.10 Access to Hoistways for Inspection, Maintenance, and Repairs.....	170
5.1.11 Car Enclosures.....	170
5.1.12 Car Frames and Platforms.....	171
5.1.13 Capacity and Loading.....	171
5.1.14 Car and Counterweight Safeties.....	172
5.1.15 Speed Governor Drive.....	172
5.1.16 Suspension Ropes and Their Connections.....	172
5.1.17 Car and Counterweight Buffers.....	172
5.1.18 Car and Counterweight Guide Rails, Guide-Rail Supports, and Fastenings.....	172
5.1.19 Driving Machines.....	174
5.1.20 Operating Devices and Control Equipment.....	174
5.1.21 Emergency Operations and Signaling Devices.....	175
5.1.22 End-Loading Inclined Elevators.....	175
5.1.23 Special Requirements for Inclined Elevator Layout Drawings .....	175



<b>5.2 Limited-Use/Limited-Application Elevators</b> .....	<b>175</b>
<b>5.2.1 Electric Limited-Use/Limited-Application Elevators</b> .....	<b>175</b>
5.2.1.1 Construction of Hoistway and Hoistway Enclosure .....	175
5.2.1.2 Pits.....	176
5.2.1.3 Location and Guarding of Counterweights .....	176
5.2.1.4 Vertical Clearances and Runbys for Cars and Counterweights .....	176
5.2.1.5 Horizontal Car and Counterweight Clearances .....	177
5.2.1.6 Protection of Spaces Below Hoistways .....	177
5.2.1.7 Machinery Spaces, Machine Rooms, Control Spaces and Control Rooms .....	177
5.2.1.8 Equipment in Hoistways, Machinery Spaces, Machine Rooms, Control Spaces and Control Rooms .....	177
5.2.1.9 Machinery and Sheave Beams, Supports, and Foundations .....	177
5.2.1.10 Guarding .....	177
5.2.1.11 Protection of Hoistway Landing Openings .....	177
5.2.1.12 Hoistway Door Locking Devices and Electric Contacts, and Hoistway Access Switches .....	177
5.2.1.13 Power Operation of Hoistway Doors and Car Doors .....	177
5.2.1.14 Car Enclosures, Car Doors, and Car Illumination .....	177
5.2.1.15 Car Frames and Platforms .....	177
5.2.1.16 Capacity, Loading, Speed, and Rise. ....	178
5.2.1.17 Car and Counterweight .....	178
5.2.1.18 Speed Governors .....	178
5.2.1.19 Ascending Car Overspeed and Unintended Car Movement Protection .....	178
5.2.1.20 Suspension Ropes and Their Connections .....	178
5.2.1.21 Counterweights .....	178
5.2.1.22 Buffers and Bumpers .....	178
5.2.1.23 Car and Counterweight Guide Rails, Guide-Rail Supports, and Fastenings .....	179
5.2.1.24 Driving Machine and Sheaves .....	179
5.2.1.25 Terminal Stopping Devices .....	179
5.2.1.26 Operating Devices and Control Equipment .....	179
5.2.1.27 Emergency Operations and Signaling Devices .....	179
5.2.1.28 Manual Operation .....	179
5.2.1.29 Layout Data .....	179
5.2.1.30 Welding .....	180
5.2.1.31 Identification .....	180
<b>5.2.2 Hydraulic Limited-Use/Limited-Application Elevators</b> .....	<b>180</b>
5.2.2.1 Bottom and Top Clearances and Runbys .....	180
5.2.2.2 Machinery Spaces, Machine Rooms Control Spaces and Control Rooms .....	180
5.2.2.3 Car Frames and Platforms.....	180
5.2.2.4 Capacity and Loading .....	180
5.2.2.5 Alternative to Speed Governor for Roped-Hydraulic Elevators .....	180
5.2.2.6 Hydraulic Jacks and Sheaves .....	180
5.2.2.7 Valves, Pressure Piping, and Fittings .....	180
5.2.2.8 Counterweights .....	180
5.2.2.9 Buffers and Bumpers .....	180
5.2.2.10 Guide Rails, Guide-Rail Supports, and Their Fastenings .....	180
5.2.2.11 Hydraulic Machines and Tanks .....	180
5.2.2.12 Terminal Stopping Devices .....	180
5.2.2.13 Operating Devices and Control Equipment .....	180
5.2.2.14 Emergency Operations and Signaling Devices .....	180
5.2.2.15 Layout Data .....	180
<b>5.3 Private Residence Elevators</b> .....	<b>180</b>
<b>5.3.1 Private Residence Electric Elevators</b> .....	<b>181</b>
5.3.1.1 Construction of Hoistway and Hoistway Enclosures .....	181
5.3.1.2 Pits .....	181
5.3.1.3 Top Car Clearances .....	181
5.3.1.4 Horizontal Car Clearances .....	181
5.3.1.5 Pipes in Hoistways .....	181
5.3.1.6 Guarding of Suspension Means .....	181

**A17.1–2013/CSA B44-13 Table of Contents**

5.3.1.7 Protection of Hoistway Openings ..... 182

5.3.1.8 Car Enclosures, Car Doors and Gates, and Car Illumination ..... 182

5.3.1.9 Car Frames and Platforms ..... 183

5.3.1.10 Capacity, Loading, Speed, and Rise ..... 183

5.3.1.11 Safeties and Governors ..... 183

5.3.1.12 Suspension Means ..... 184

5.3.1.13 Counterweights ..... 184

5.3.1.14 Buffers and Buffer Supports ..... 185

5.3.1.15 Car and Counterweight Guide Rails and Guide Fastenings ..... 185

5.3.1.16 Driving Machine, Sheaves, and Their Supports ..... 185

5.3.1.17 Terminal Stopping Devices ..... 186

5.3.1.18 Operating Devices and Control Equipment ..... 187

5.3.1.19 Emergency Signaling Devices ..... 187

5.3.1.20 Marking Plates ..... 187

**5.3.2 Private Residence Hydraulic Elevators ..... 188**

5.3.2.1 General Requirements for Hydraulic Private Residence Elevators ..... 188

5.3.2.2 Driving Machines, Sheaves, and Supports for Direct-Plunger and Roped-Hydraulic  
Driving Machines ..... 188

5.3.2.3 Terminal Stopping Devices ..... 188

5.3.2.4 Anticreep Leveling Devices ..... 188

**5.4 Private Residence Inclined Elevators ..... 188**

5.4.1 Runway Protection ..... 188

5.4.2 Landing Enclosures and Gates (Where Required) ..... 188

5.4.3 Machinery Beams and Supports ..... 189

5.4.4 Car Enclosures, Car Doors, and Gates ..... 189

5.4.5 Car and Chassis Construction ..... 189

5.4.6 Capacity ..... 190

5.4.7 Safeties and Governors ..... 190

5.4.8 Suspension Means ..... 190

5.4.9 Counterweight Guiding and Construction ..... 190

5.4.10 Bumpers and Buffers ..... 190

5.4.11 Car and Counterweight Guide and Track Supports and Fastenings ..... 191

5.4.12 Driving Machines and Sheaves ..... 191

5.4.13 Terminal Stopping Devices ..... 191

5.4.14 Operating Devices and Control Equipment ..... 191

5.4.15 Marking Plates ..... 191

**5.5 Power Sidewalk Elevators ..... 191**

**5.5.1 Electric Sidewalk Elevators ..... 191**

**5.5.2 Direct-Plunger Hydraulic Sidewalk Elevators ..... 195**

**5.6 Rooftop Elevators ..... 195**

**5.6.1 Electric Rooftop Elevators ..... 195**

**5.6.2 Direct-Plunger Hydraulic Rooftop Elevators ..... 198**

**5.7 Special Purpose Personnel Elevators ..... 199**

5.7.1 Construction of Hoistways and Hoistway Enclosures ..... 199

5.7.2 Pits ..... 199

5.7.3 Location and Enclosing of Counterweights ..... 199

5.7.4 Vertical Clearances and Runby ..... 199

5.7.5 Horizontal Car and Counterweight Clearances ..... 200

5.7.6 Protection of Spaces Below Hoistway ..... 200

5.7.7 Overhead Machinery Beams and Supports ..... 200

5.7.8 Hoistway Doors and Gates ..... 200

5.7.9 Locking Devices for Hoistway Doors or Gates ..... 200

5.7.10 Car Enclosures, Car Doors and Gates, and Car Illumination ..... 200

5.7.11 Car Construction ..... 201

5.7.12 Capacity and Loading ..... 201

5.7.13 Car Safeties and Governors ..... 201

5.7.14 Suspension Ropes ..... 202

5.7.15 Counterweight Guiding and Construction ..... 202

5.7.16 Car and Counterweight Buffers ..... 202

## A17.1–2013/CSA B44-13 Table of Contents

5.7.17 Car Guide and Guide-Rail Fastenings.....	203
5.7.18 Driving Machines and Sheaves.....	203
5.7.19 Operating Devices and Control Equipment.....	203
5.7.20 Operation.....	203
5.7.21 Emergency Signal and/or Communication.....	204
5.7.22 Layout Drawings.....	204
5.7.23 Welding.....	204
<b>5.8 Marine Elevators .....</b>	<b>204</b>
<b>5.8.1 Electric Marine Elevators .....</b>	<b>204</b>
<b>5.8.2 Hydraulic Marine Elevators.....</b>	<b>205</b>
<b>5.8.3 Rack and Pinion Marine Elevators.....</b>	<b>205</b>
<b>5.9 Mine Elevators.....</b>	<b>205</b>
5.9.1 Construction of Hoistways and Hoistway Enclosures.....	206
5.9.2 Pits.....	206
5.9.3 Location and Guarding of Counterweights.....	206
5.9.4 Vertical Clearances and Runbys for Cars and Counterweights.....	206
5.9.5 Horizontal Car and Counterweight Clearances.....	206
5.9.6 Protection of Space Below Hoistways.....	206
5.9.7 Machine Rooms and Machinery Spaces.....	206
5.9.8 Equipment in Hoistways and Machine Rooms.....	206
5.9.9 Machinery and Sheave Beams, Supports and Foundations.....	206
5.9.10 Guarding.....	206
5.9.11 Protection of Hoistway Openings.....	206
5.9.12 Hoistway-Door Locking Devices & Electric Contacts & Hoistway Access Switches.....	206
5.9.13 Power Operation of Hoistway Doors and Car Doors.....	207
5.9.14 Car Enclosures, Car Doors and Gates, and Car Illumination.....	207
5.9.15 Car Frames and Platforms.....	207
5.9.16 Capacity and Loading.....	207
5.9.17 Car and Counterweight Safeties.....	207
5.9.18 Speed Governors.....	207
5.9.19 Ascending Car Overspeed and Unintended Car Movement Protection.....	208
5.9.20 Suspension Ropes and Their Connections.....	208
5.9.21 Counterweights.....	208
5.9.22 Buffers and Bumpers.....	208
5.9.23 Car and Counterweight Guide Rails, Guide-Rail Supports and Fastenings.....	208
5.9.24 Driving Machines and Sheaves.....	208
5.9.25 Terminal Stopping Devices.....	208
5.9.26 Operating Devices and Control Equipment.....	208
5.9.27 Emergency Operations and Signaling Devices.....	208
5.9.28 Layout Drawings.....	208
5.9.29 Identification.....	208
5.9.30 Welding.....	208
<b>5.10 Elevators Used for Construction .....</b>	<b>208</b>
5.10.1 Electric Elevators Used for Construction .....	209
5.10.2 Hydraulic Elevators Used for Construction .....	213
<b>5.11 Wind Turbine Tower Elevators .....</b>	<b>213</b>
5.11.1 Construction of Hoistways.....	213
5.11.2 Pits.....	213
5.11.3 Location and Enclosing of Counterweights.....	213
5.11.4 Vertical Clearances for Cars and Count.....	214
5.11.5 Horizontal Car and Counterweight Clearances.....	214
5.11.6 Protection of Spaces Below the Travel Path.....	214
5.11.7 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms.....	214
5.11.8 Equipment in the Travel Path, Machinery Space, and Control Spaces.....	215
5.11.9 Machinery and Sheave Beams, Supports, and Foundations.....	215
5.11.10 Guarding of Equipment and Standard Railing.....	215
5.11.11 Protection of Landing Platform Openings.....	216
5.11.12 Landing Platform Door Locking Devices and Electric Contacts.....	216
5.11.13 Power Operation of Landing Platform Doors and Car Doors or Gates.....	217

**A17.1–2013/CSA B44-13 Table of Contents**

5.11.14 Car Enclosures, Car Doors and Gates, and Car Illumination..... 217

5.11.15 Car Frames and Platforms..... 218

5.11.16 Capacity and Loading..... 219

5.11.17 Car and Counterweight Safeties..... 220

5.11.18 Reserved for Future Use..... 221

5.11.19 Reserved for Future Use..... 221

5.11.20 Suspension Means and Their Connections..... 221

5.11.21 Counterweights..... 222

5.11.22 Buffers and Bumpers..... 222

5.11.23 Car and Counterweight Guidance Systems, Supports, and Fastenings..... 223

5.11.24 Driving Machines, Sheaves, and Brakes..... 223

5.11.25 Terminal Stopping Devices..... 225

5.11.26 Operating Devices and Control Equipment..... 226

5.11.27 Emergency Operation and Signaling Devices..... 228

5.11.28 Layout Drawings..... 228

5.11.29 Welding ..... 228

5.11.30 Engineering Tests, Type Tests, and Certification..... 229

5.11.31 Maintenance, Repair, Replacement, and Testing..... 229

5.11.32 Acceptance Inspections and Tests..... 229

5.11.33 Periodic Inspections and Witnessing of Tests..... 229

**5.12 Outside Emergency Elevators..... 229**

5.12.1 Guidance in Use of ASME A17.7/CSA B44.7..... 229

5.12.2 Performing Risk Assessments..... 229

5.12.3 Operating Instructions..... 229

**Part 6 Escalators and Moving Walks ..... 230**

**6.1 Escalators ..... 230**

6.1.1 Protection of Floor Openings..... 230

6.1.1.1 Protection Required..... 230

6.1.2 Protection of Trusses and Machines Spaces Against Fire ..... 230

6.1.2.1 Protection Required..... 230

6.1.3 Construction Requirements..... 230

6.1.3.1 Angle of Inclination ..... 230

6.1.3.2 Geometry ..... 230

6.1.3.3 Balustrades ..... 230

6.1.3.4 Handrails ..... 233

6.1.3.5 Steps..... 233

6.1.3.6 Entrance and Egress Ends ..... 234

6.1.3.7 Trusses or Girders ..... 234

6.1.3.8 Step Wheel Tracks ..... 234

6.1.3.9 Rated Load ..... 234

6.1.3.10 Design Factors of Safety ..... 235

6.1.3.11 Chains ..... 235

6.1.3.12 Headroom..... 235

6.1.3.13 Welding ..... 235

6.1.3.14 Non-Escalator-Related Equipment ..... 235

6.1.3.15 Water Accumulation..... 235

6.1.4 Rated Speed ..... 235

6.1.4.1 Limits of Speed ..... 235

6.1.5 Driving Machine, Motor, and Brake..... 236

6.1.5.1 Connection Between Driving Machine and Main Drive Shaft ..... 236

6.1.5.2 Driving Motor ..... 236

6.1.5.3 Brakes..... 236

6.1.6 Operating and Safety Devices..... 237

6.1.6.1 General ..... 237

6.1.6.2 Starting and Inspection Control Switches ..... 237

6.1.6.3 Electrical Protective Devices..... 237

**A17.1–2013/CSA B44-13 Table of Contents**

6.1.6.4 Handrail Speed Monitoring Device ..... 239

6.1.6.5 Missing Step and Missing Dynamic Skirt Devices..... 239

6.1.6.6 Tandem Operation ..... 239

6.1.6.7 Reserved for Future Use ..... 240

6.1.6.8 Escalator Smoke Detectors..... 240

6.1.6.9 Signs ..... 240

6.1.6.10 Control and Operating Circuits ..... 240

6.1.6.11 Electrically Powered Safety Devices ..... 240

6.1.6.12 Installation of Capacitors or Other Devices to Make Electrical Protective Devices  
Ineffective ..... 241

6.1.6.13 Completion or Maintenance of Circuit ..... 241

6.1.6.14 Escalator Manual Reset ..... 241

6.1.6.15 Contactors and Relays for Use in Critical Operating Circuits ..... 242

6.1.7 Lighting, Access, and Electrical Work..... 242

6.1.7.1 Lighting of Machine Room and Truss Interior ..... 242

6.1.7.2 Lighting of Escalator ..... 242

6.1.7.3 Access to Interior ..... 242

6.1.7.4 Electrical Equipment and Wiring ..... 242

6.1.8 Outdoor Escalators..... 242

6.1.8.1 Weatherproofing ..... 242

6.1.8.2 Precipitation ..... 242

6.1.8.3 Slip Resistance..... 243

**6.2 Moving Walks..... 243**

6.2.1 Protection of Floor Openings..... 243

6.2.1.1 Protection Required..... 243

6.2.2 Protection of Supports and Machine Spaces Against Fire..... 243

6.2.2.1 Protection Required..... 243

6.2.3 Construction Requirements..... 243

6.2.3.1 Angle of Inclination ..... 243

6.2.3.2 Geometry ..... 243

6.2.3.3 Balustrades ..... 243

6.2.3.4 Handrails ..... 244

6.2.3.5 Pallet-Type Treadway..... 244

6.2.3.6 Belt-Type Treadway..... 245

6.2.3.7 Width ..... 245

6.2.3.8 Entrance and Egress Ends ..... 245

6.2.3.9 Supporting Structure..... 245

6.2.3.10 Rated Load ..... 246

6.2.3.11 Design Factors of Safety ..... 247

6.2.3.12 Chains ..... 247

6.2.3.13 Reserved for Future Use ..... 247

6.2.3.14 V-Belt Drives ..... 247

6.2.3.15 Headroom..... 247

6.2.3.16 Welding ..... 247

6.2.3.17 Nonmoving-Walk Related Equipment ..... 247

6.2.3.18 Water Accumulation..... 247

6.2.4 Rated Speed..... 247

6.2.5 Driving Machine, Motor, and Brake..... 248

6.2.5.1 Connection Between Driving Machine and Main Drive Shaft ..... 248

6.2.5.2 Driving Motor..... 248

6.2.5.3 Brakes ..... 248

6.2.6 Operating and Safety Devices..... 248

6.2.6.1 General ..... 248

6.2.6.2 Starting and Inspection Control Switches ..... 249

6.2.6.3 Electrical Protective Devices..... 249

6.2.6.4 Handrail Speed Monitoring Device ..... 251

6.2.6.5 Missing Pallet Device ..... 251

6.2.6.6 Tandem Operation ..... 251

6.2.6.7 Moving Walk Smoke Detectors..... 251

**A17.1–2013/CSA B44-13 Table of Contents**

6.2.6.8 Signs .....	251
6.2.6.9 Control and Operating Circuits .....	251
6.2.6.10 Electrically Powered Safety Devices .....	252
6.2.6.11 Installation of Capacitors or Other Devices to Make Electrical Protective Devices Ineffective .....	252
6.2.6.12 Completion or Maintenance of Circuit .....	252
6.2.6.13 Moving Walk Manual Reset .....	252
6.2.6.14 Contactors and Relays for Use in Critical Operating Circuits .....	252
6.2.7 Lighting, Access, and Electrical Work.....	252
6.2.7.1 Lighting of Machine Room and Truss Interior .....	252
6.2.7.2 Lighting of Treadway .....	252
6.2.7.3 Access to Interior .....	253
6.2.7.4 Electrical Equipment and Wiring .....	253
6.2.8 Outdoor Moving Walks.....	253
6.2.8.1 Weatherproofing .....	253
6.2.8.2 Precipitation .....	253
6.2.8.3 Slip Resistance.....	253
<b>Part 7 Dumbwaiters and Material Lifts .....</b>	<b>254</b>
<b>7.1 Power and Hand Dumbwaiters w/o Automatic Transfer Devices .....</b>	<b>254</b>
7.1.1 Construction of Hoistways and Hoistway Enclosures .....	254
7.1.2 Pits.....	254
7.1.3 Location and Guarding of Counterweights.....	254
7.1.4 Vertical Car Clearances and Runbys for Cars and Counterweights.....	254
7.1.5 Horizontal Car and Counterweight Clearances.....	255
7.1.6 Protection of Spaces Below Hoistway.....	255
7.1.7 Machine Rooms and Machinery Spaces.....	255
7.1.8 Electrical Equipment, Wiring, Pipes, Ducts and HVAC in Hoistways and Machine Rooms.....	255
7.1.9 Machinery and Sheave Beams, Supports and Foundations.....	256
7.1.10 Guarding of Equipment.....	256
7.1.11 Protection of Hoistway Openings.....	256
7.1.12 Hoistway Door Locking Devices, Access Switches, and Unlocking Devices.....	257
7.1.13 Power Operation of Hoistway Doors and Car Doors or Gates.....	258
7.1.14 Identification.....	258
<b>7.2 Electric and Hand Dumbwaiters w/o Automatic Transfer Devices .....</b>	<b>258</b>
7.2.1 Car Enclosures, Car Doors and Gates, and Car Illumination.....	258
7.2.2 Car Frames and Platforms.....	259
7.2.3 Capacity and Loading.....	260
7.2.4 Car and Counterweight Safeties.....	260
7.2.5 Speed Governors.....	261
7.2.6 Suspension Means.....	261
7.2.7 Counterweights.....	262
7.2.8 Buffers and Bumpers.....	262
7.2.9 Car and Counterweight Guide Rails, Guide-Rail Supports and Fastenings.....	262
7.2.10 Driving Machines and Sheaves.....	263
7.2.11 Terminal Stopping Devices.....	263
7.2.12 Operating Devices and Control Equipment.....	263
7.2.13 Layout Data.....	264
7.2.14 Welding for Dumbwaiters.....	264
<b>7.3 Hydraulic Dumbwaiters w/o Automatic Transfer Devices .....</b>	<b>264</b>
7.3.1 Car Enclosures, Car Doors and Gates and Car Illumination.....	264
7.3.2 Car Frames and Platforms.....	264
7.3.3 Capacity and Loading.....	264
7.3.4 Car and Counterweight Safeties.....	264
7.3.5 Hydraulic Driving Machines .....	264
7.3.6 Rope, Rope Connections, and Sheaves.....	264
7.3.7 Counterweights.....	265
7.3.8 Buffers and Bumpers.....	265



**A17.1–2013/CSA B44-13 Table of Contents**

7.3.9 Guide Rails, Guide-Rail Supports, and Fastenings..... 265

7.3.10 Terminal Stopping Devices..... 265

7.3.11 Operating Devices and Control Equipment..... 265

7.3.12 Layout Data..... 265

**7.4 Material Lifts w/o Automatic Transfer Devices ..... 266**

7.4.1 General Requirement..... 266

7.4.2 Classification..... 266

7.4.3 Construction of Hoistways and Hoistway Enclosures..... 266

7.4.4 Pits..... 266

7.4.5 Location and Guarding of Counterweights..... 266

7.4.6 Vertical Clearances and Runbys for Cars and Counterweights..... 266

7.4.7 Horizontal Car and Counterweight Clearances..... 268

7.4.8 Protection of Spaces Below Hoistways..... 268

7.4.9 Machinery Spaces, Machine Rooms, Control Spaces and Control Rooms ..... 268

7.4.10 Equipment in Hoistways and Machine Rooms..... 268

7.4.11 Machinery and Sheave Beams, Supports, and Foundations ..... 269

7.4.12 Guarding of Equipment and Standard Railing ..... 269

7.4.13 Protection of Hoistway Landing Openings..... 269

7.4.14 Hoistway Door Locking Devices & Electric Contacts, & Hoistway Access Switches..... 269

7.4.15 Power Operation of Hoistway Doors and Car Doors and Gates..... 270

7.4.16 Identification of Equipment..... 270

**7.5 Electric Material Lifts w/o Automatic Transfer Devices ..... 270**

7.5.1 Car Enclosures, Car Doors and Gates and Car Illumination..... 270

7.5.2 Car Frames and Platforms..... 271

7.5.3 Capacity and Loading..... 271

7.5.4 Car and Counterweight Safeties..... 272

7.5.5 Speed Governors..... 272

7.5.6 Suspension Ropes and Their Connections..... 272

7.5.7 Counterweights..... 272

7.5.8 Buffers and Bumpers..... 272

7.5.9 Car and Counterweight Guide Rails, Guide-Rail Supports and Fastenings..... 273

7.5.10 Driving Machine and Sheaves..... 273

7.5.11 Terminal Stopping Devices..... 273

7.5.12 Operating Devices and Control Equipment..... 273

7.5.13 Layout Data..... 275

7.5.14 Welding..... 275

**7.6 Hydraulic Material Lifts w/o Automatic Transfer Devices ..... 275**

7.6.1 Hoistways, Hoistway Enclosures, and Related Construction..... 276

7.6.2 Mechanical Equipment..... 276

7.6.3 Hydraulic Driving Machines..... 276

7.6.4 Valves, Pressure Pipings, and Fittings..... 276

7.6.5 Counterweight Ropes, Rope Connections, and Sheaves..... 276

7.6.6 Hydraulic Machines and Tanks..... 276

7.6.7 Terminal Stopping Device..... 276

7.6.8 Operating Devices and Control Equipment..... 276

7.6.9 Layout Data..... 277

**7.7 Automatic Transfer Devices ..... 277**

7.7.1 General..... 277

7.7.2 Clearances..... 277

7.7.3 Guarding..... 277

7.7.4 Floor Level ..... 277

**7.8 Power Dumbwaiter with Automatic Transfer Devices ..... 277**

7.8.1 Requirements..... 277

7.8.2 Safety Devices..... 277

7.8.3 Emergency Stop Switch..... 277

7.8.4 Structural Capacity Load..... 278

**7.9 Electric Material Lifts with Automatic Transfer Devices ..... 278**

7.9.1 Hoistways, Hoistway Enclosures, and Related Construction..... 278

7.9.2 Machinery and Equipment..... 278

<b>7.10 Hydraulic Material Lifts with Automatic Transfer Devices</b> .....	<b>279</b>
<b>7.11 Material Lifts with Obscured Transfer Devices</b> .....	<b>279</b>
<b>Part 8 General Requirements</b> .....	<b>280</b>
<b>8.1 Security</b> .....	<b>280</b>
8.1.1 General.....	280
8.1.2 Group 1: Restricted.....	280
8.1.3 Group 2: Authorized Personnel.....	280
8.1.4 Group 3: Emergency Operation.....	280
8.1.5 Group 4: Other.....	281
<b>8.2 Design Data and Formulas</b> .....	<b>281</b>
8.2.1 Minimum Rated Load for Passenger Elevators.....	281
8.2.2 Electric Elevator Car Frame and Platform Stresses and Deflections.....	281
8.2.3 Impact on Buffer Supports.....	285
8.2.4 Gravity Stopping Distances.....	286
8.2.5 Governor Tripping Speeds.....	286
8.2.6 Stopping Distances for Car and Counterweight Safeties.....	286
8.2.7 Factors of Safety for Suspension Wire Ropes for Power Elevators.....	286
8.2.8 Hydraulic Jack and Piping.....	286
8.2.9 Hydraulic Elevator Car Frame and Platform Stresses and Deflections.....	297
8.2.10 Minimum Oil Buffer Strokes: Inclined Elevators.....	299
8.2.11 Stopping Distances for Car and Counterweight Safeties for Inclined Elevators.....	299
8.2.12 Material Lifts with Automatic Transfer Devices, Design, Data, and Formulas.....	300
<b>8.3 Engineering Tests, Type Tests, and Certification</b> .....	<b>300</b>
8.3.1 General Requirements for Tests and Certification.....	300
8.3.2 Type Tests of Car and Counterweight Oil Buffers.....	301
8.3.3 Type Tests of Interlocks, Combination Mechanical Locks & Electric Contacts, & Door Or Gate Electric Contacts.....	303
8.3.4 Entrance Fire Type Tests.....	305
8.3.5 Type Tests for Hydraulic Control Valves.....	305
8.3.6 Escalator Brake Type Test.....	306
8.3.7 Vertical Burn Engineering Test.....	306
8.3.8 Test Method for Evaluating Room Fire Growth Contribution of Textile Wall Covering... ..	307
8.3.9 Engineering Tests for Hydraulic Overspeed Valves.....	307
8.3.10 Engineering Tests – Safety Nut & Speed Limiting Devices of Screw-Column Elevators.....	307
8.3.11 Step and Pallet Fatigue Engineering Test.....	307
8.3.12 Suspension-Member Tests.....	308
<b>8.4 Elevator Safety Requirements for Seismic Risk Zone 2 or Greater</b> .....	<b>308</b>
8.4.1 Horizontal Car and Counterweight Clearances.....	309
8.4.2 Machinery and Sheave Beams, Supports, and Foundations.....	309
8.4.3 Guarding of Equipment.....	309
8.4.4 Car Enclosures, Car Doors and Gates, and Car Illumination.....	310
8.4.5 Guiding Members and Position Restraints.....	310
8.4.6 Compensating Rope Sheave Assembly.....	311
8.4.7 Counterweights.....	311
8.4.8 Car and Counterweight Guide-Rail Systems.....	311
8.4.9 Driving Machines and Sheaves.....	321
8.4.10 Emergency Operation and Signaling Devices.....	321
8.4.11 Hydraulic Elevators.....	327
8.4.12 Design Data and Formulas for Elevators.....	329
8.4.13 Component Force Levels Based on Ground Motion Parameters.....	331
8.4.14 Elevator Seismic Design Force.....	332
8.4.15 Component Operating Weight (Wp).....	333
8.4.16 Machine Rooms and Machinery Spaces.....	333
<b>8.5 Escalator and Moving Walk Safety Requirement for Seismic Risk Zone 2 or Greater</b> .....	<b>333</b>
8.5.1 Balustrade Construction.....	333
8.5.2 Truss Members.....	333
8.5.3 Supporting Connections Between the Truss and the Building.....	334
8.5.4 Earthquake Protective Devices.....	334

<b>8.6 Maintenance, Repair, Replacement and Testing</b> .....	<b>334</b>
8.6.1 General Requirements.....	334
8.6.2 Repairs.....	337
8.6.3 Replacements.....	338
<b>8.6.4 Maintenance and Testing of Electric Elevators</b> .....	<b>340</b>
8.6.4.19 Periodic Test Requirements – Category 1 .....	342
8.6.4.20 Periodic Test Requirements – Category 5 .....	343
<b>8.6.5 Maintenance and Testing of Hydraulic Elevators</b> .....	<b>346</b>
8.6.5.14 Periodic Test Requirements – Category 1 .....	347
8.6.5.15 Periodic Test Requirements – Category 3 .....	347
8.6.5.16 Periodic Test Requirements – Category 5 .....	348
<b>8.6.6 Maintenance and Testing of Elevators with Other Types of Driving Machines</b> .....	<b>348</b>
<b>8.6.6.1 Rack-and-Pinion Elevators</b> .....	<b>348</b>
8.6.6.1.1 Rack-and-Pinion Elevator Periodic Test .....	348
<b>8.6.6.2 Screw-Column Elevators</b> .....	<b>348</b>
8.6.6.2.1 Screw Column Elevator Periodic Test .....	348
<b>8.6.6.3 Hand Elevators</b> .....	<b>348</b>
8.6.6.3.1 Hand Elevator Periodic Test .....	348
<b>8.6.7 Maintenance and Testing of Special Application Elevators</b> .....	<b>348</b>
<b>8.6.7.1 Inclined Elevators</b> .....	<b>348</b>
8.6.7.1.1 Periodic Test .....	348
<b>8.6.7.2 Limited-Use/Limited-Application Elevators</b> .....	<b>348</b>
8.6.7.2.1 Periodic Test .....	348
<b>8.6.7.3 Private Residence Elevators</b> .....	<b>348</b>
8.6.7.3.1 Periodic Test .....	348
<b>8.6.7.4 Private Residence Inclined Elevators</b> .....	<b>349</b>
8.6.7.4.1 Periodic Test .....	349
<b>8.6.7.5 Power Sidewalk Elevators</b> .....	<b>349</b>
8.6.7.5.1 Periodic Test .....	349
<b>8.6.7.6 Rooftop Elevators</b> .....	<b>349</b>
8.6.7.6.1 Periodic Test .....	349
<b>8.6.7.7 Special Purpose Personnel Elevators</b> .....	<b>349</b>
8.6.7.7.1 Periodic Test .....	349
<b>8.6.7.8 Shipboard Elevators</b> .....	<b>349</b>
8.6.7.8.1 Periodic Test .....	349
<b>8.6.7.9 Mine Elevators</b> .....	<b>349</b>
8.6.7.9.5 Periodic Test .....	349
<b>8.6.7.10 Elevators Used for Construction</b> .....	<b>349</b>
8.6.7.10.1 Periodic Test Requirements – Category 1.....	349
8.6.7.10.2 Periodic Test Requirements – Category 3.....	349
8.6.7.10.3 Periodic Test Requirements – Category 5.....	349
<b>8.6.7.11 Wind Turbine Tower Elevator</b> .....	<b>350</b>
8.6.7.11.1 Periodic Test Requirements .....	350
8.6.7.12 Outside Emergency Elevators.....	350
8.6.7.12.1 Periodic Test Requirements - Category 1.....	350
8.6.7.12.2 Periodic Test Requirements - Category 5.....	350
<b>8.6.8 Maintenance and Testing of Escalator and Moving Walks</b> .....	<b>350</b>
8.6.8.15 Periodic Test Requirements – Category 1.....	352
<b>8.6.9 Maintenance and Testing of Moving Walks</b> .....	<b>353</b>
<b>8.6.10 Maintenance and Testing of Dumbwaiters and Material Lifts</b> .....	<b>354</b>
8.6.10.1 Material Lifts and Dumbwaiters Without Automatic Transfer Devices .....	354
8.6.10.1.1 Periodic Test .....	354
8.6.10.2 Material Lifts and Dumbwaiters With Automatic Transfer Devices .....	354
8.6.10.2.1 Periodic Test .....	354
<b>8.6.11 Special Provisions</b> .....	<b>354</b>
8.6.11.1 Firefighters’ Emergency Operation.....	354
8.6.11.2 Two-Way Communications Means.....	355
8.6.11.3 Access Keys.....	355
8.6.11.4 Cleaning of a Car and Hoistway Transparent Enclosure.....	355

**A17.1–2013/CSA B44-13 Table of Contents**

8.6.11.5 Emergency Evacuation Procedures for Elevators.....	355
8.6.11.6 Escalators and Moving Walks Startup and Procedures.....	355
8.6.11.7 Operating Instructions for Means Specified in 2.7.5.1.1 or 2.7.5.2.1.....	356
8.6.11.8 Egress and Reentry Procedure From Working Areas in 2.7.5.1.3 or 2.7.5.2.3.....	356
8.6.11.9 Operating Instructions for Retractable Platforms.....	356
8.6.11.10 Category 5 Tests Without Load Via Alternative Test Methodologies.....	356
8.6.11.11 Examination After Shutdown Due to Traction Loss.....	357
8.6.11.12 Examination After Safety Application.....	357
8.6.11.13 Occupant Evacuation Operation.....	357
8.6.11.14 Examination After Shutdown Due to Broken-Suspension-Member Detection Means	357
<b>8.7 Alterations</b> .....	<b>357</b>
8.7.1 General Requirements.....	357
8.7.2 Alterations to Electric Elevators.....	358
8.7.3 Alterations to Hydraulic Elevators.....	366
8.7.4 Alterations to Elevators with Other Types of Driving Machines.....	372
8.7.4.1 Rack and Pinion Elevators.....	372
8.7.4.2 Screw-Column Elevators.....	372
8.7.4.3 Hand Elevators.....	372
8.7.5 Alterations to Special Application Elevators.....	372
8.7.5.1 Inclined Elevators.....	372
8.7.5.2 Limited-Use/Limited-Application Elevators.....	372
8.7.5.3 Private Residence Elevators.....	372
8.7.5.4 Private Residence Inclined Elevators.....	372
8.7.5.5 Power Sidewalk Elevators.....	372
8.7.5.6 Rooftop Elevators.....	373
8.7.5.7 Special Purpose Personnel Elevators.....	373
8.7.5.8 Shipboard Elevators.....	373
8.7.5.9 Mine Elevators.....	373
8.7.5.10 Outside Emergency Elevators.....	373
8.7.6 Alterations to Escalators and Moving Walks.....	373
8.7.7 Alterations to Dumbwaiters and Material Lifts.....	375
<b>8.8 Welding</b> .....	<b>375</b>
8.8.1 Qualification of Welders.....	375
8.8.2 Welding Steel.....	375
8.8.3 Welding Metals Other Than Steel.....	375
<b>8.9 Code Data Plate</b> .....	<b>375</b>
8.9.1 Required Information.....	375
8.9.2 Location.....	375
8.9.3 Material and Construction.....	375
<b>8.10 Acceptance Inspections and Tests</b> .....	<b>376</b>
8.10.1 General Requirements for Acceptance Inspections and Tests.....	376
<b>8.10.2 Acceptance Inspection and Tests of Electric Elevators</b> .....	<b>377</b>
8.10.2.2 Inspection and Tests Requirements for <b>New Installations</b> .....	377
8.10.2.3 Inspection and Tests Requirements for <b>Altered Installations</b> .....	382
<b>8.10.3 Acceptance Inspection and Tests of Hydraulic Elevators</b> .....	<b>383</b>
8.10.3.2 Inspection and Tests Requirements for <b>New Installations</b> .....	383
8.10.3.3 Inspection and Tests Requirements for <b>Altered Installations</b> .....	387
<b>8.10.4 Acceptance Inspection and Tests of Escalators and Moving Walks</b> .....	<b>388</b>
8.10.4.1 Inspection and Tests Requirements for <b>New Installations</b> .....	388
8.10.4.2 Inspection and Tests Requirements for <b>Altered Installations</b> .....	390
<b>8.10.5 Acceptance Inspection and Tests of Other Equipment</b> .....	<b>391</b>
8.10.5.1 Sidewalk Elevator .....	391
8.10.5.2 Private Residence Elevators .....	391
8.10.5.3 Hand Elevators .....	391
8.10.5.4 Dumbwaiters .....	391
8.10.5.5 Material Lifts and Dumbwaiters With Automatic Transfer Devices .....	391
8.10.5.6 Special Purpose Personnel Elevators .....	392
8.10.5.7 Inclined Elevators .....	392

**A17.1–2013/CSA B44-13 Table of Contents**

8.10.5.8 Shipboard Elevators ..... 392

8.10.5.9 Screw-Column Elevators ..... 392

8.10.5.10 Elevators Used for Construction ..... 392

8.10.5.11 Rooftop Elevators ..... 392

8.10.5.12 Rack-and-Pinion Elevators ..... 392

8.10.5.13 Limited-Use/Limited-Application Elevators ..... 392

8.10.5.14 Wind Turbine Tower Elevators..... 392

8.10.5.15 Outside Emergency Elevators..... 392

**8.11 Periodic Inspections and Witnessing of Tests ..... 393**

8.11.1 General Requirements for Periodic Inspections and Witnessing of Tests..... 393

**8.11.2 Periodic Inspections of Electric Elevators ..... 394**

8.11.2.1 Periodic Inspection Requirements ..... 394

**8.11.3 Periodic Inspections of Hydraulic Elevators..... 396**

8.11.3.1 Periodic Inspection Requirements ..... 396

**8.11.4 Periodic Inspections of Escalators and Moving Walls ..... 398**

8.11.4.1 Periodic Inspection and Test Requirements ..... 398

**8.11.5 Periodic Inspections of Other Equipment ..... 398**

8.11.5.1 Sidewalk Elevator ..... 398

8.11.5.2 Private Residence Elevators..... 398

8.11.5.3 Hand Elevators..... 398

8.11.5.4 Dumbwaiters..... 398

8.11.5.5 Material Lifts and Dumbwaiters With Automatic Transfer  
Devices..... 398

8.11.5.6 Special Purpose Personnel Elevators..... 398

8.11.5.7 Inclined Elevators..... 398

8.11.5.8 Shipboard Elevators ..... 398

8.11.5.9 Screw-Column Elevators..... 398

8.11.5.10 Rooftop Elevators..... 399

8.11.5.11 Rack-and-Pinion Elevators..... 399

8.11.5.12 Limited-Use/Limited-Application Elevators..... 399

8.11.5.13 Elevators Used for Construction..... 399

8.11.5.14 Wind Turbine Tower Elevators..... 399

8.11.5.15 Outside Emergency Elevators..... 399

**8.12 Flood Resistances ..... 399**

8.12.1 Flood-Resistant Design and Construction. .... 399

**Part 9 Reference Codes, Standards, and Specifications ..... 400**

**9.1 Reference Documents..... 401**

**9.2 Procurement Information..... 408**

**Nonmandatory Appendices ..... 411**

Appendix A Control System..... 412

Appendix B Unlocking Zones..... 413

Appendix C Location of Top Emergency Exit..... 414

Appendix D Rated Load and Capacity Plates for Passenger Elevators..... 415

Appendix E Elevator Requirements for Persons with Physical Disabilities in Jurisdictions  
Enforcing NBCC..... 416

Appendix F Ascending Car Overspeed and Unintended Car Movement Protection..... 424

Appendix G Top of Car Clearance ..... 428

Appendix H Private Residence Elevator Guarding (5.3.1.6.2)..... 433

Appendix I Escalator and Moving Walk Diagrams..... 434

Appendix J Relationship of Pit Ladder to Hoistway Door Unlocking Means ..... 441

Appendix K Beveling and Clearance Requirements (7.4.7.4)..... 442

Appendix L Index of Alteration Requirements for Electric Elevators, Hydraulic Elevators,  
Escalators, and Moving Walks..... 443

Appendix M Inertia Application for Type A Safety Device Location of Test Weight  
[8.10.2.2(ii)(2)]..... 448

Appendix N Recommended Inspection and Test Intervals in “Months”..... 449

NONMANDATORY APPENDIX O DELETED.....

**A17.1–2013/CSA B44-13 Table of Contents**

Appendix P	Plunger Gripper Stopping Distances.....	457
Appendix Q	Explanatory Figures for the Definitions of Elevator Machinery Space, Machine Room, Control Space, Control Room, Remote Machine Room, or Remote Control Room ...	458
Appendix R	Inspection Operation and Hoistway Access Switch Operation Hierarchy .....	461
Appendix S	Vertically Sliding Doors – Illustrations of Detection Zones (2.13.3.4).....	463
Appendix T	Inspection and Replacement of Steel Wire Ropes.....	476
Appendix U	Design Requirements — Traction Elevator Suspension System.....	478
Appendix V	Building Features for Occupant Evacuation Operation.....	479
Appendix W	Wind Turbine Tower Elevator Clearances.....	481
Appendix X	Acceptance Tests.....	482
Appendix Y	Maintenance Control Program Records.....	486
<b>Index</b>	.....	<b>490</b>

