

BUILDING CONDITIONS AFFECTING ELEVATOR PERFORMANCE

The listed conditions are not within the control of the elevator contractor, but may impact elevator performance. Corrections need to be coordinated with the elevator contractor. The "Problems" and "Corrections" are not intended to be all-inclusive. The appropriate corrections must be applied to the specific problem. Not all problems can be corrected.

TERM	DESCRIPTION	PROBLEMS	CORRECTIONS
1.0 Air Quality	The proportion of polluting particles measured in the immediate area of free air.	<ul style="list-style-type: none"> • Particulates - Dust, soot, abrasives, etc. - bind switch gear, increases wear on mechanical systems, contacts fail to make, cause electrical shorts. • Corrosives - Damage contacts, wiring connections, electronics and mechanical systems. 	<ul style="list-style-type: none"> • Filters on ventilation louvers. • Pressurize machinery spaces, machine rooms, Control spaces and control rooms. See 8.0. • Seal and air condition. • Seal machine and control rooms, pipe in filtered air. • Increase lubrication. • Specify plating or use stainless steel, bronze, etc.
1.1 <i>Temperature</i>	<i>The degree of hot or cold measured on a Celsius or Fahrenheit scale.</i>	<ul style="list-style-type: none"> • <i>High temperature – Insulation and electronic component life reduction, erratic operation and equipment shut down.</i> • <i>Low temperature - Icing, lubricants congeal, switch gear becomes sluggish, elastomer hardens, erratic operation and equipment shut down.</i> 	<ul style="list-style-type: none"> • <i>Mechanical ventilation.</i> • <i>Air condition.</i> • <i>Insulate machinery spaces, machine rooms, control spaces and control rooms.</i> • <i>Add thermostatically controlled heating.</i> • <i>Automatic louvers.</i>
1.2 <i>Humidity</i>	<i>The level of moisture in the atmosphere, measured by a hygrometer.</i>	<ul style="list-style-type: none"> • <i>High humidity - Rust and corrosion to both mechanical and electrical systems – insulation failures, electrical shorts, electronic failures.</i> • <i>Low Humidity - Static electricity may damage electronic components, lubricants dry out and commutation problems.</i> 	<ul style="list-style-type: none"> • <i>Air condition.</i> • <i>Heat for wet, cold conditions.</i> • <i>De-humidify.</i> • <i>Specify plating or use stainless steel, bronze, etc.</i> • <i>Humidify.</i>
2.0 Ambient Noise	The measurable sound existing within an environment.	<ul style="list-style-type: none"> • Sound generated by others exceeding 50 dBA. • Sound transmission and amplification by building. 	<ul style="list-style-type: none"> • Identify source. • Sound deadening: machinery spaces, machine rooms, control spaces and control rooms. • Sound isolate mechanical and electro mechanical equipment.
3.0 Ambient Vibration	The measurable vibration existing within an environment.	<ul style="list-style-type: none"> • Vibration transmitted to car or hoistway. • Resonance of building. 	<ul style="list-style-type: none"> • Mechanical isolation. • Detune resonant components.

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			<ul style="list-style-type: none"> • Provide damping.
4.0	Building Compression/Expansion	The vertical movement of a building due to expansion or contraction of building materials used in construction of the building.	<ul style="list-style-type: none"> • Bowing of rails. • Vertical change in landing sill position.
			<ul style="list-style-type: none"> • Ensure free vertical movement of rails relative to building. • Realign rails. • Adjust stopping zone.
5.0	Building Materials	The materials used to construct areas surrounding hoistways, machine rooms, and wellways that affect or transmit vibration and/or sound within the building.	<ul style="list-style-type: none"> • See 2.0, 3.0, 4.0, 5.0, 5.1, and 5.2.
			<ul style="list-style-type: none"> • See 2.0, 3.0, 4.0, 5.0, 5.1, and 5.2.
6.0	Building Sway	The periodic movement of a building from the normal stationary position.	<ul style="list-style-type: none"> • Poor ride quality. • Damage to ropes. • Damage to traveling cables. • Car or counterweight safety application. • Damage to hoistway equipment.
			<ul style="list-style-type: none"> • Detune resonant components. • Reduce car speed. • Install rope followers. • Program positioning of cars. • Add damping (strike points). • Guide return side of governor rope, etc.
6.1	<i>Period</i>	<i>The time to complete one cycle of movement about the normal stationary position. (Equal to the reciprocal of the frequency.)</i>	<ul style="list-style-type: none"> • See 5.0.
			<ul style="list-style-type: none"> • See 5.0.
6.2	<i>Magnitude</i>	<i>The maximum distance a building moves about a normal stationary position.</i>	<ul style="list-style-type: none"> • See 5.0.
			<ul style="list-style-type: none"> • See 5.0.
7.0	Electromagnetic Interference (EMI)	The electromagnetic energy imposed on the elevator electrical equipment. Electromagnetic energy can be conducted through building wiring and/or radiated through air into the elevator electrical system. Note see ASME A17.1/CSA B44, requirement 2.26.4.4.	<ul style="list-style-type: none"> • Erratic operations and shut down. • Relocate transmitter. • Relocate antenna; install ground plane. • Equipment shielding. • Install EMI filters. • Use components with EMI shields. • Ground system integrity. • Use twisted pairs and/or shielded wiring. • Use de-bouncing techniques.

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8.0 Pressurization	The introduction of air into a contained area sufficient to create and maintain pressure above the surrounding area.	<ul style="list-style-type: none"> • Pressurization may cause erratic operation. • Doors fail to close fully due to airflow out of hoistway through open hoistway door. 	<ul style="list-style-type: none"> • See ASME A17.1/CSA B44.
9.0 Vents	Apertures located in a solid surface to allow air flow through the surface.	<ul style="list-style-type: none"> • See 10.0. 	<ul style="list-style-type: none"> • See 10.0.
9.1 <i>Ventilation</i>	<i>The process of introducing air movement into a space to minimize the adverse effect of temperature and humidity.</i>	<ul style="list-style-type: none"> • See 1.1 and 1.2. • Air movement. 	<ul style="list-style-type: none"> • See 1.1 and 1.2. • Control introduction of air into space.
10.0 Windage	The effect of air movement on elevator equipment.	<ul style="list-style-type: none"> • See 5.0, 10.1, 10.2 and 10.3. 	<ul style="list-style-type: none"> • See 5.0, 10.1, 10.2 and 10.3.
10.1 <i>Buffeting</i>	<i>Air movement in irregular or periodic pressure pulses which tend to move the elevator car about erratically.</i>	<ul style="list-style-type: none"> • Poor ride quality. • Pulsing sound as separator beams and entrances are passed. 	<ul style="list-style-type: none"> • Bevel beams. • Add air foil to car top and/or bottom. • Aerodynamics designs for elevator cab, toe guards, etc. • Control clearances between car and hoistway.
10.2 <i>Hoistway Air Turbulence</i>	<i>The non-laminar air motion caused by the movement of the elevator car(s) and dimensional cross section changes of the hoistway.</i>	<ul style="list-style-type: none"> • Poor ride quality. • Wind noise (howling) in hoistway when car is in motion. • Damage to traveling cables ropes, etc. • Loose fascia and toe guards. 	<ul style="list-style-type: none"> • Proper hoistway venting. • See 10.1. • Program movement and positioning of cars. • Proper sizing of hoistway.
10.3 <i>Stack Effect</i>	<i>Air flow in a hoistway due to pressure gradient resulting from differences in internal and external temperature and pressure.</i>	<ul style="list-style-type: none"> • Doors fail to close fully due to air flow into hoistway through open hoistway door. • Problem is most severe with low outside temperatures. 	<ul style="list-style-type: none"> • Proper hoistway venting. • Install revolving door or air lock at building entrance. • Install low friction gibs at offending floor(s). • Modify interlock door operator interface to force doors closed. • Balance heating, ventilating and air conditioning. • Keep machinery spaces, machine rooms, Control spaces and control rooms windows and doors closed. • Use of closed loop door

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TERM	DESCRIPTION	PROBLEMS	CORRECTIONS
			<i>control system.</i>
11.0 Weather Exposure	Elevators in an uncontrolled environment.	<ul style="list-style-type: none"> • High winds, snow, rain and ice. • Same conditions as 1.1, 1.2, 5.0, 5.1, 5.2 and 9.0. 	<ul style="list-style-type: none"> • Install ice scrapers at guide shoes. • Apply heaters to rails, pit equipment and sills. • Provide moisture proof wiring and fixtures. • Provide corrosive resistant hoistway equipment including door and sills. • Run traveling cables in troughs. • Avoid rope or chain compensation. • Special entrance design.
11.1 Observation Elevator	See ASME A17.1/CSA B44, Section 1.3 definition "elevator, observation".	<ul style="list-style-type: none"> • High winds, snow, rain and ice. • Same conditions as 1.1, 1.2, 5.0, 5.1, 5.2 and 10.0. 	<ul style="list-style-type: none"> • Install ice scrapers at guide shoes. • Apply heaters to rails, pit equipment and sills. • Provide moisture proof wiring and fixtures. • Provide corrosive resistant hoistway equipment including door and sills. • Run traveling cables in troughs. • Avoid rope or chain compensation. • Special entrance design. • Enclose hoistway.