Elevator Technology

Noise and ride comfort performance

thyssenkrupp

evolution 100/200/300

Noise

1 Shaft / Machine

	1 m/s L_{Aeq} ($L_{Apk\,max}$) dB(A)	1,6 m/s L_{Aeq} ($L_{Apk\,max}$) dB(A)	2 m/s L_{Aeq} ($L_{Apk\,max}$) dB(A)	2,5 m/s L_{Aeq} ($L_{Apk\,max}$) dB(A)
≤ 1000 kg	50 (53)	55 (60)	60 (65)	62 (67)
≤ 1600 kg	60 (65)	62 (67)	62 (67)	62 (67)
≤ 2500 kg	60 (65)	62 (67)	*	*
≤ 4000 kg	62 (67)	*	*	*

*Consult specific values

At 1 m from the machine, inside the shaft

2 Car

L_{Aeq} ≤ 50 dB(A) ±2 dB(A) average
$L_{Apk\,max}$ 55 dB(A)

3 Landing door

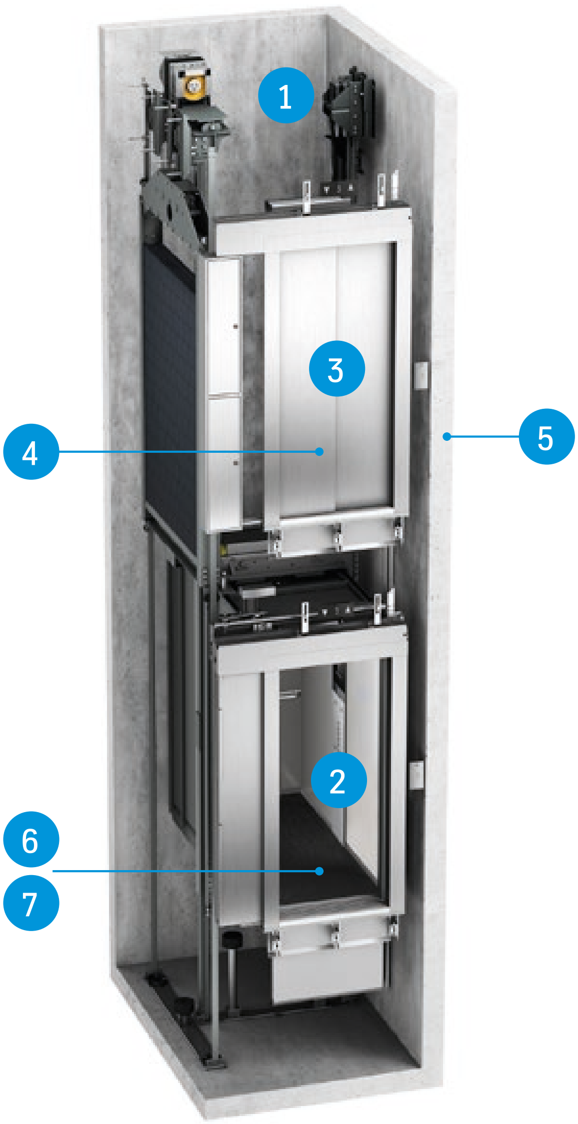
L_{Aeq} ≤ 50 dB(A) ±2 dB(A) average
$L_{Apk\,max}$ 60 dB(A)
At 1 m from the landing, including noise of the door

4 Pass-by noise at the landing

$L_{Apk\,max}$ 50 dB(A)
At 1 m from the landing

5 Adjacent rooms[1)]

L_{Aeq} ≤ 30 dB(A) including impulse noise



Ride comfort

With roller guides for speed ≥ 1,6m/s

6 Lateral car vibration

ISO PP ≤ 10 mg
ISO A95 ≤ 7 mg ± 3 mg

7 Vertical car vibration

ISO PP ≤ 15 mg
ISO A95 ≤ 10 ± 3 mg

Notes

All these values can only be achieved following a correct assembly process. The ride comfort / noise values are based on evolution 100 /200 accordingly. These same values can also be considered as the entry values for evolution 100/200/300, with real values showing optimized performance.
1) It is the responsibility of the building designer to ensure that the shaft provide enough air-borne and structure-borne noise attenuation. The VDI 2566-2:2004 prescribes a maximum permissible A-weighted sound level LApk max in adjacent rooms of 30 dB(A).

Legend

Noise

L_{Aeq} The A-weighted equivalent continuous sound pressure level in decibels measured over a stated period of time
$L_{Apk\,max}$ The maximum A-weighted sound pressure value measured over a certain period of time
The sound pressure level is A-weighted and designated with dB(A) to adjust to the mid-range frequencies of human hearing. Also be aware that sound levels are logarithmic values (dB) and cannot be added directly. A doubling of sound level results in a measured increase of 3 dB.

Ride comfort

ISO PP Maximum peak-to-peak vibration levels, according to ISO 18738:2003. The maximum peak-to-peak vibration level is the greatest of all the peak-to-peak values found between defined boundaries.
ISO A95 Typical peak-to-peak vibration levels, according to ISO 18738:2003. The A95 (typical) peak-to-peak vibration level is that value which 95% of the peak-to-peak levels, between defined boundaries, are equal to or below this value.

Noise and ride comfort information

Nowadays the elevator is a necessary facility providing access and vertical mobility for visitors and residents in buildings with numerous floors. When used in residential buildings, the noise and vibration of elevator operation can potentially intrude on residences adjacent to the equipment.

Noise

During normal elevator operation several types of noise are produced (drive and brake operation, door operation, relay switching, cooling fan, etc.). Beyond the real sound pressure values, noise disturbances are based on user perceptions, type of noise and ambient noise. The impact is often compounded by the modern trend towards the use of lightweight construction materials. The most significant effect may result in lower sound quality, disturbed sleeping conditions and less enjoyment of residences.

The acoustic quality of an elevator is evaluated through several sound measurements close to the main noise-making components (machine, controller and landing door).

Additionally, noise measurement in adjacent rooms provides information about the sound comfort quality of the elevator system in the building. The role of architects and contractors in defining the building wall mass specification and construction procedures is key to assuring that the sound pressure level in adjacent rooms fulfills the regulation requirements. The VDI 2566 -2:2004 standard provides wall design descriptions according to the room configuration to support prescriptions in this regard.

Ride comfort

Ride comfort quality in an elevator is mainly evaluated through car vibrations, as well as jerk and acceleration. Vertical car vibration is caused by vibrations from the drive and frequency inverter that are transferred into the car through the traction system. Lateral car vibration is caused by the car passing through guiderail joints that are not smooth or by guiderail installations that are not straight.

Careful, professional installation, as well as high-quality performance from key components (like the machine, inverter, car and guide rails) are essential for a comfortable riding experience.

Based on thyssenkrupp Elevator engineering and elevator manufacturing expertise, we enhance our commitment to passengers and building residents' comfort by continuously optimizing our elevators, installation methods and service to the highest comfort standards.

Typical sound pressure levels

Source	dB(A)
Jet plane taking off at 100 m	120+
Truck passing at 10 m	80-100
Person shouting at 1 m	80
Vacuum cleaner	80
Average volume of TV or radio	70-90
Normal voice at a distance of 1 m	55-60
evolution landing door closing at 1 m	≤ 50
Background noise in a quiet occupied living room	35-40
Inside an unoccupied house	25-35
Threshold of human hearing	0

Applicable standards for noise and ride comfort quality:

- **VDI-2566-2:2004**
  Acoustic design for lift systems without machine room (MRL)
- **ISO 18738:2012**
  Measurement of ride quality. Part 1: Lifts
- **ISO 2631-1:2008**
  Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 1: General requirements
- **ISO 8041:2005 C1:2007**
  Human response to vibration - measuring instrumentation

Contact

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