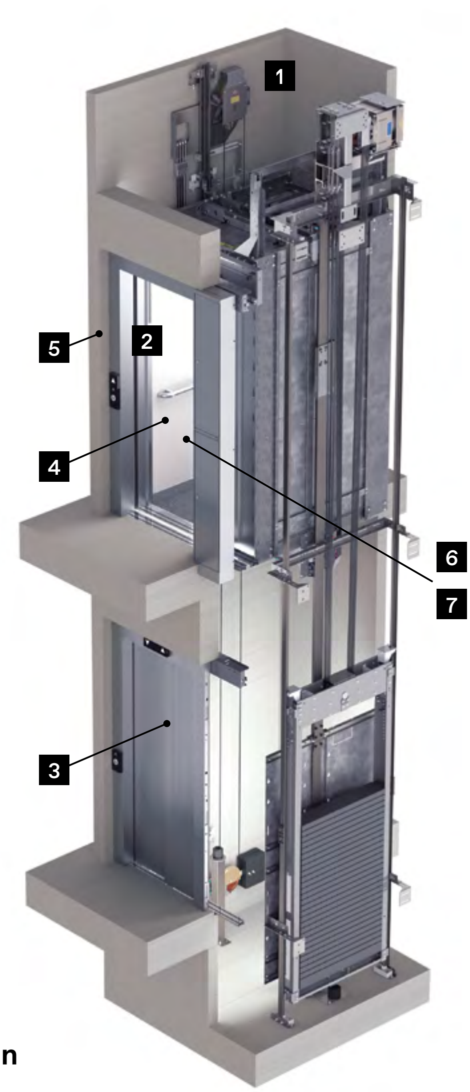
NOISE AND RIDE COMFORT PERFORMANCE

synergy 100/200

Noise



1 Shaft / Machine

L_{Aeq} ≤ 50 dB(A) ± 2 dB(A) average
L_{Apk} max 53 dB(A)
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)
At 1 m high inside the car

3 Landing door

L_{Aeq} ≤ 50 dB(A) ± 2 dB(A) average
L_{Apk} max 60 dB(A)
At 1 m from the landing

4 Top floor landing

L_{Aeq} ≤ 45 dB(A) ± 2 dB(A) average
L_{Apk} max 60 dB(A)
At 1 m from the control cabinet

5 Adjacent rooms

L_{Aeq} ≤ 30 dB(A) including impulse noise
Fulfils the DIN8989:2019 protection goals* according to DIN4109 for volumes up to 31,25 m³ and VDI 4100 SST I.
Measurements based on a synergy 100 with 1000 kg at 1 m/s.

Ride comfort

6 Lateral car vibration

ISO PP ≤ 10 mg
ISO A95 ≤ 8 mg ± 3 mg

7 Vertical car vibration

ISO PP ≤ 15 mg
ISO A95 ≤ 12 ± 3 mg

Measurements based on a synergy 100 at 1 m/s. These same values can also be considered as the entry values for synergy 200 elevator system, with real values showing optimised performance.

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	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.

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 operations can potentially intrude on residences adjacent to the equipment.

Noise

During normal elevator operations 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 ensuring that the sound pressure level in adjacent rooms fulfills the regulation requirements. The DIN 8989:2019 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. Horizontal 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.

Contact us:

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
synergy 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:

- **DIN 8989:2019**
  Acoustical design in buildings - Lifts
  *

DIN 4109, VOLUME UP TO 31,25 M³			
VDI 4100, SST 1 (<30dB)			
Situation	A	B	C
Octave 63 Hz	90	75	85
Octave 125 Hz	86	71	81
Octave 250 Hz	85	70	80
Octave 500 Hz	85	70	80

- **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

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

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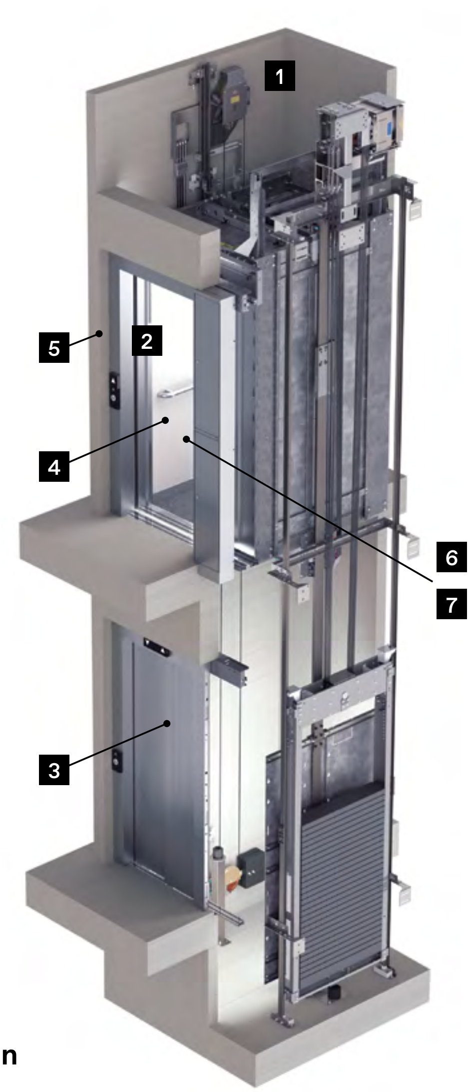

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