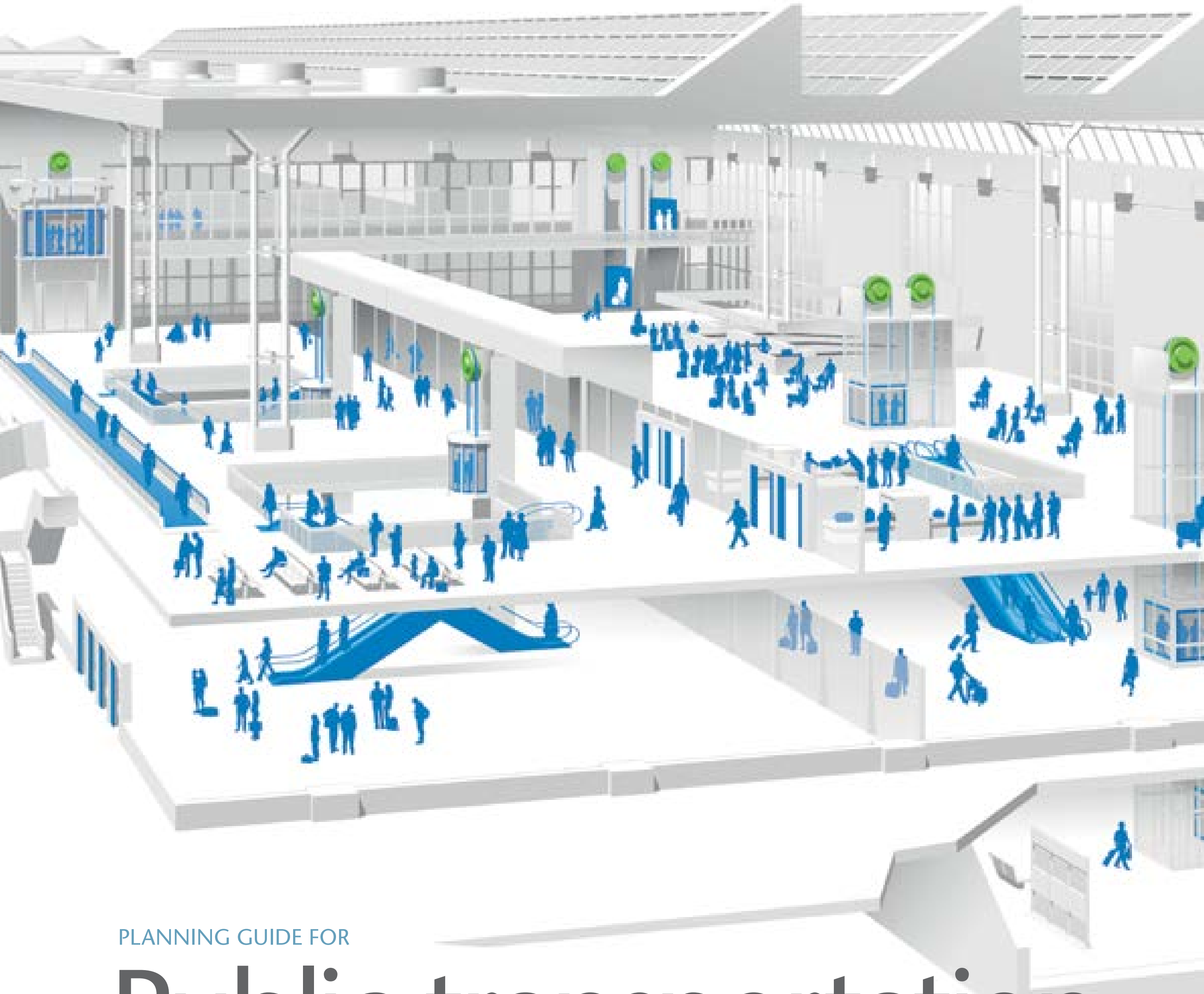
Dedicated to People Flow™



PLANNING GUIDE FOR

Public transportation elevators

Table of Contents

1. Introduction

1.1 About this Planning Guide

The purpose of this Planning Guide is to provide basic information on elevators for the public transportation segment (airports, railway stations, underground stations, transit centers etc.), and to help you find the best elevator solution for your particular needs.

1.2 About KONE

KONE is known worldwide for manufacturing, installing, servicing and modernizing elevators, escalators and automatic building doors. We have supplied elevators to thousands of public transportation buildings worldwide, from the New York metro to Beijing Capital Airport, and have over 800 service centers in 49 countries.

However, KONE provides more than elevators, escalators and automatic building doors. We provide a complete solution that is greater than the sum of its parts. This means providing help in ensuring the efficient flow of people throughout the entire facility. Our vision is therefore to deliver the best People Flow™ experience. By People Flow we mean moving people smoothly, safely, comfortably and without waiting.


出发
公共汽车
停车库
P

2. Special demands of public transportation

With new developments in technology improving the ease and accessibility of travel for everyone, it is no surprise that the volume of travelers continues to grow. This is putting greater demands on airports and transit centers, where all elements – metro station, railway station, hotel and shopping center for example – have to be seamlessly integrated.

2.1 Airports

There are many types of traffic at an airport, as passengers arrive and depart by plane, train, metro, bus and car, and go to or through shopping areas, hotels and conference centers. KONE supplies a complete range of solutions for airports: passenger and service elevators, escalators and autowalks.

On top of the equipment, KONE helps manage the flow of people through an airport. Our comprehensive People Flow™ solutions ensure smooth and efficient movement of people and goods, with all of the components working seamlessly together, and supported for their entire lifecycle.

To ensure the best possible traffic in and through the airport, early planning of People Flow™ is essential. Our People Flow planning guide for transit centers (ref. ID 7172) provides valuable help in this respect.

2.1.1 Benefits of KONE elevators in airports

- Eco-efficient™ life cycle and low lifetime costs
- Accessibility: KONE equipment is easy to use – for all passengers (not only disabled users)
- Easy maintenance and operation
- Reliability and safety of components
- Cutting-edge technology
- Carefully planned placement of elevators, escalators and automatic doors ensuring efficient People Flow
- Full customization of elevator design available
- KONE has materials that comply the EN81-71 vandal code Category 1 and 2
- Quick and easy deliveries

Airport references on page 42 or www.kone.com/airports

2.2 Transit centers (railway and metro stations)

As with an airport, a transit center must be seen as an integrated whole. KONE is the world's most experienced supplier of People Flow™ solutions for mass transit systems. We take into account not only the flow of people through a railway, underground or bus station, but also through the shopping malls, restaurants and office buildings that are often closely integrated with these transit centers, and the movement of people between these areas.

In this way our equipment provides safe and convenient transportation for millions of passengers every day. The equipment must operate in the toughest conditions, around the clock, year-round, and often outdoors in humidity, rain or snow.

To ensure the best possible traffic in and through the transit center, early planning of People Flow is essential. Our People Flow planning guide for transit centers (ref. ID 7172) provides valuable help in this respect.

Transit center references on page 42 or www.kone.com/transitcenters

2.2.1 Benefits of KONE elevators in railway and metro stations

- Eco-efficient™ life cycle and low lifetime costs
- Accessibility: KONE equipment is easy to use, for all passengers
- Reliability of components
- Uncompromising safety
- Vandal-proof equipment complying with vandal codes
- Equipment meets required EMC standards and is safe to operate in critical environments
- Proactive maintenance solutions.


Bishan Place / Bishan St 13
Lift to street
Passenger service
Circle Line
Lift to
Circle Line

2.3 Main specifications for public transportation elevators

Airports and transit centers place special demands on elevators, depending on the daily and yearly usage range of each elevator (the duty served by the elevator). In simple terms, duty is defined as starts per year and is divided into four types:

- Low-duty = up to 200 000 starts/year
- Mid-duty = up to 400 000 starts/year
- Heavy-duty = up to 800 000 starts/year
- Extra heavy-duty = over 1 million starts/year meaning that the elevator is in constant use.

For more information on the definition of duty, see section 4.2.2.

The public transportation segment generally requires either machine room-less elevators or elevators with the machine room placed down on the main floor. The reason for this is to avoid electrical interference from machine rooms located at the top of the elevator shaft.

KONE can meet these requirements. We offer a wide range of machine room-less elevators for loads up to 5000 kg. If a machine room is required on the ground floor, our elevators for the public transportation segment are ideal for loads up to 4000 kg.

Other general demands are a low travel distance (generally less than 60 m) and a speed of normally up to 3.0 m/s. KONE has a wider offering available than what is generally required by the public transportation segment.

2.4 Electromagnetic compatibility standards

Electromagnetic compatibility (EMC) is the ability of electrical and electronic equipment to operate:

- satisfactorily in its intended electromagnetic environment
- without disturbing the operation of other equipment

EMC standards are used to verify electromagnetic compatibility under normal environmental conditions.

KONE elevators meet and exceed all relevant safety and accessibility standards and regulations, including the requirements of the EMC Directive 2004/108/EC, which incorporates the following standards:

- EN 12015, which regulates the escape of electromagnetic energy from a product to the external environment.
- EN 12016, which regulates the level of shielding a product must have against electromagnetic disturbances in the surrounding environment.

2.5 LSH and LH cables

KONE elevators and components can be supplied with low-smoke halogen-free (LSH) and halogen-free (HF) cables according to the requirements of each individual installation.

LSH and HF cables are commonly used in public spaces and office buildings. Combined with other fire prevention and suppression methods, these fire-retardant cables can help minimize fire-related deaths and property damage.

Table 1: LSH/HF wire and cable

Advantages	Disadvantages
• LSH wire and cable produces less smoke when burned, allowing people to exit a burning building more quickly and also resulting in less soot damage to electronic equipment located near the fire.	• Because LSH cable is stiffer than standard cable, it is more susceptible to jacket cracking caused by pulling lubricants or bending. Special lubricants1 can be used to minimize cable damage during installation.
• Because LSH cable releases little or no halogen gas when burned, it results in less damage to the human respiratory system if inhaled and also helps to minimize corrosion damage to equipment located near the fire.	• LSH cable jacket compounds usually have very high filler content to provide the required flame and smoke performance. As a result, most have poorer mechanical, chemical resistance, water absorption, and electrical properties than non-LSH compounds.
• LSH cable jackets have a lower friction coefficient than some non-LSH jackets, which can make installation easier.	• Current-generation LSH cable is not yet proven long-term in the field.

3. Ordering a public transportation elevator

The special needs of the public transportation segment demand elevators with special characteristics, which need to be considered as early as possible in the planning phase.

If details are clarified early during the tendering or budgeting phase, the design, engineering, manufacturing and delivery can be implemented with lower costs and shorter lead times.

The following questions are crucial:

- What is the duty of the elevator – in other words its usage rate?
- What codes need to be followed and especially do vandal codes need to be followed?
- Are there any special software systems and is an OPC (an interface standard in communication between industrial automation systems) interface needed (see section 6.2)?

Within the KONE process, a number of car and signalization templates, guides and other tools for the different phases of public transportation projects are available. Their use will help to ensure better efficiency and a good match between the solution provided and your requirements.

Because of the heavier usage, public transportation elevators need more attention and therefore maintenance than regular elevators for offices or residential buildings. Within the sector, maintenance requirements will differ: a 24/7 constant usage elevator will require more maintenance work and component replacements than a lower usage elevator.

3.1 Key cost drivers for elevators in public transportation

In the public transportation segment, cost is an extremely important issue. Below are listed the most common factors that cause increased costs. It is worth paying attention to these factors early in the planning process.

Technical dimensions

- Machine room placed elsewhere than at the top of shaft or inside the shaft
- Other than vertical elevations
- Tight or steel shaft
- Outdoor elevators or any entrances outdoors
- Low pit or headroom
- Adjacent doors in car
- Wider or deeper car sizes than standard (dimensions stated in KONE planning guides or ISO dimensions)
- Fire-fighting elevator.

Car design

- EN81-71 vandal codes for materials and elevator design structure
- Scenic or window car
- Special local decoration
- Windows in doors
- Special curved floor
- Other than standard KONE signalization or wide displays
- Special limited custom design including LED lights.

Software

- Special group controls
- Turnstiles
- OPC interface (can be handled with KONE E-link™ monitoring software).

Choosing any of the above may alter the price and delivery time and increase the engineering hours. The following issues may be affected:

- Selected scope
- Price
- Engineering/design of elevators
- Delivery and assembly/installation
- Maintenance
- Component replacement, spare parts
- Lifetime of elevators.

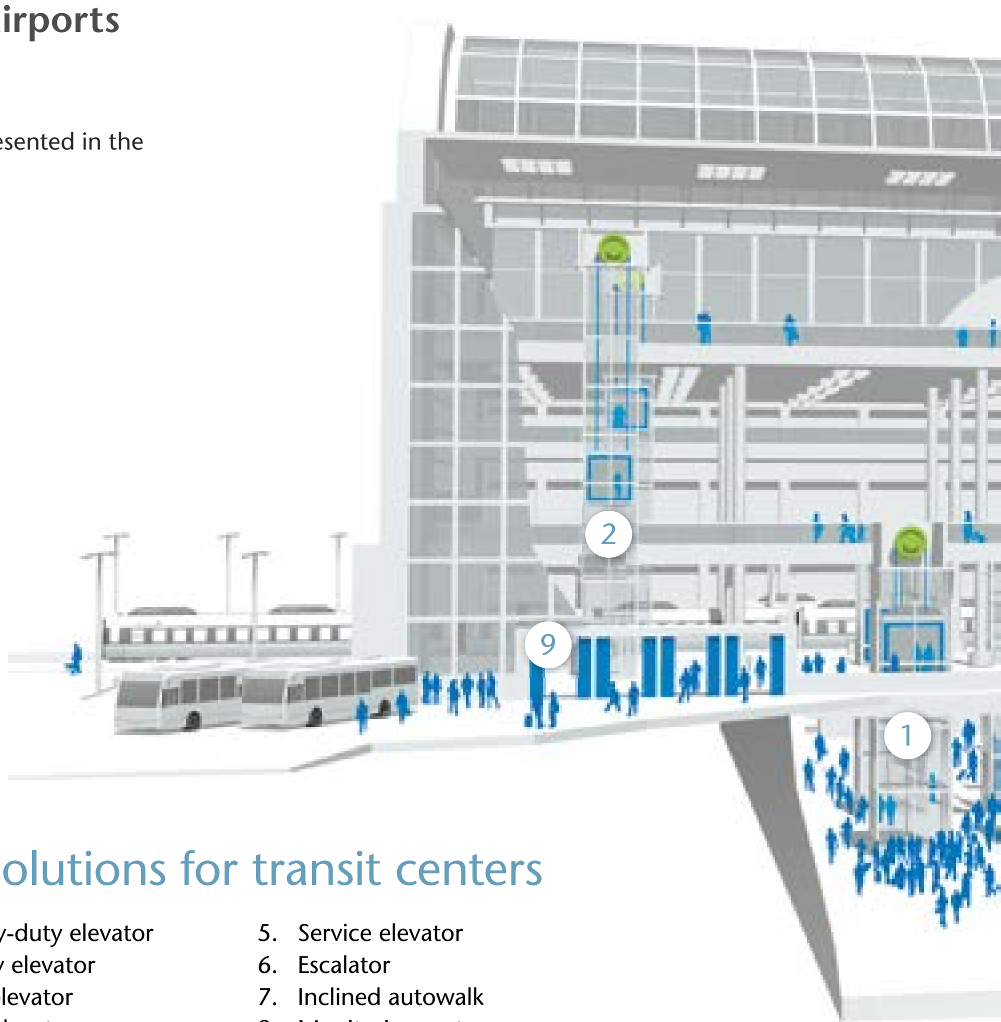
4. Choice of hoisting components

The choice of hoisting components for public transportation elevators is determined by the following inter-related factors:

- Starts per year
- Rated load
- Travel
- Speed
- Machine room or machine room-less elevator
- Regeneration of energy (today a default in elevators due to global eco-efficiency targets)

4.1 KONE solutions for airports and transit centers

KONE solutions for transit centers are presented in the following page.



KONE solutions for transit centers

1. Extra-heavy-duty elevator
2. Heavy-duty elevator
3. Mid-duty elevator
4. Low-duty elevator
5. Service elevator
6. Escalator
7. Inclined autowalk
8. Monitoring system
9. Automatic building doors
10. KONE Steel Shaft

The key data for choosing the correct duty in a transit center can be obtained from traffic calculations which simulate the people flow throughout the area. Figure 1 displays the most important choices about the elevator-escalator ratio for transit centers. The elevator duty is defined by how much traffic is guided only through the elevators.

Numbers 1 and 2 in the illustration represents heavy- or extra heavy-duty elevators. The difference between them is whether the transit area is closed during any time of the day. If the transit area is open 24 hours every day, the elevator is extra heavy-duty, meaning the elevator is in constant usage apart from monthly maintenance visits. If the transit center is closed for part of the day then a heavy-duty elevator is the correct selection.

These extra heavy-duty (over 1 million starts per year) and heavy-duty (up to 800 000 starts per year) elevators are chosen for situations where for some reason **escalators** are not available to take care of the main traffic flow.

Extra heavy-duty and heavy-duty elevators are designed to serve in cases where all or most of the traffic flow goes through the **elevators**. An example is a building where escalators can not be installed. Another example is an underground station where it is wise to bring passengers directly to the street level with a group of elevators.

Number 3 indicates a mid-duty elevator with up to 400 000 starts per year. This means that some of the traffic other than accessibility traffic (e.g. people with disabilities) is also coming through this elevator.

Numbers 4 and 5 indicate a low-duty elevator with up to 200 000 starts per year. This means only the accessibility traffic (e.g. people with disabilities) is going through the elevator. It can be located at the metro or railway platform further away from the normal people flow routes, which already reduces the usage of the elevator. Freight/goods elevators are commonly also low-duty elevators.

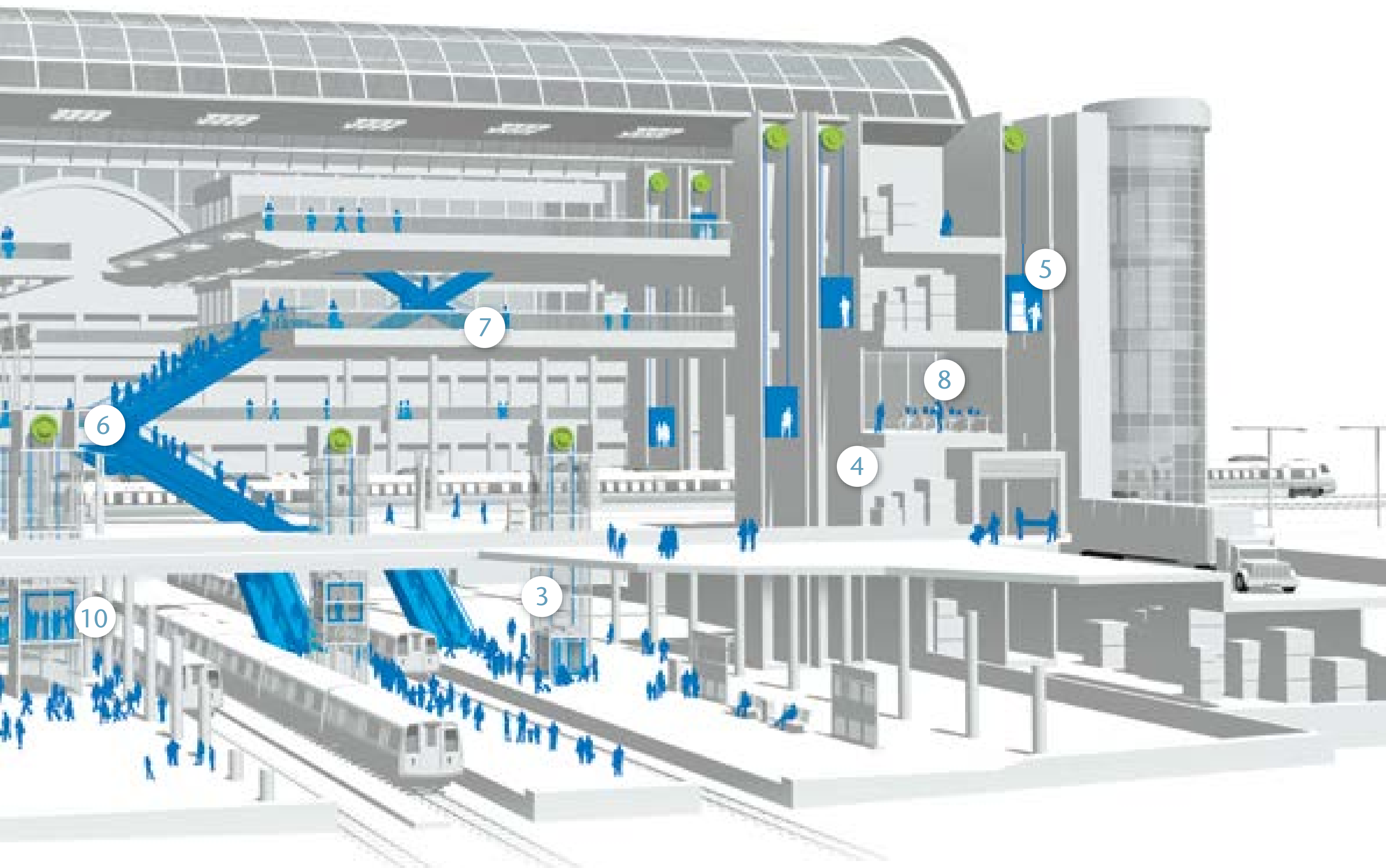
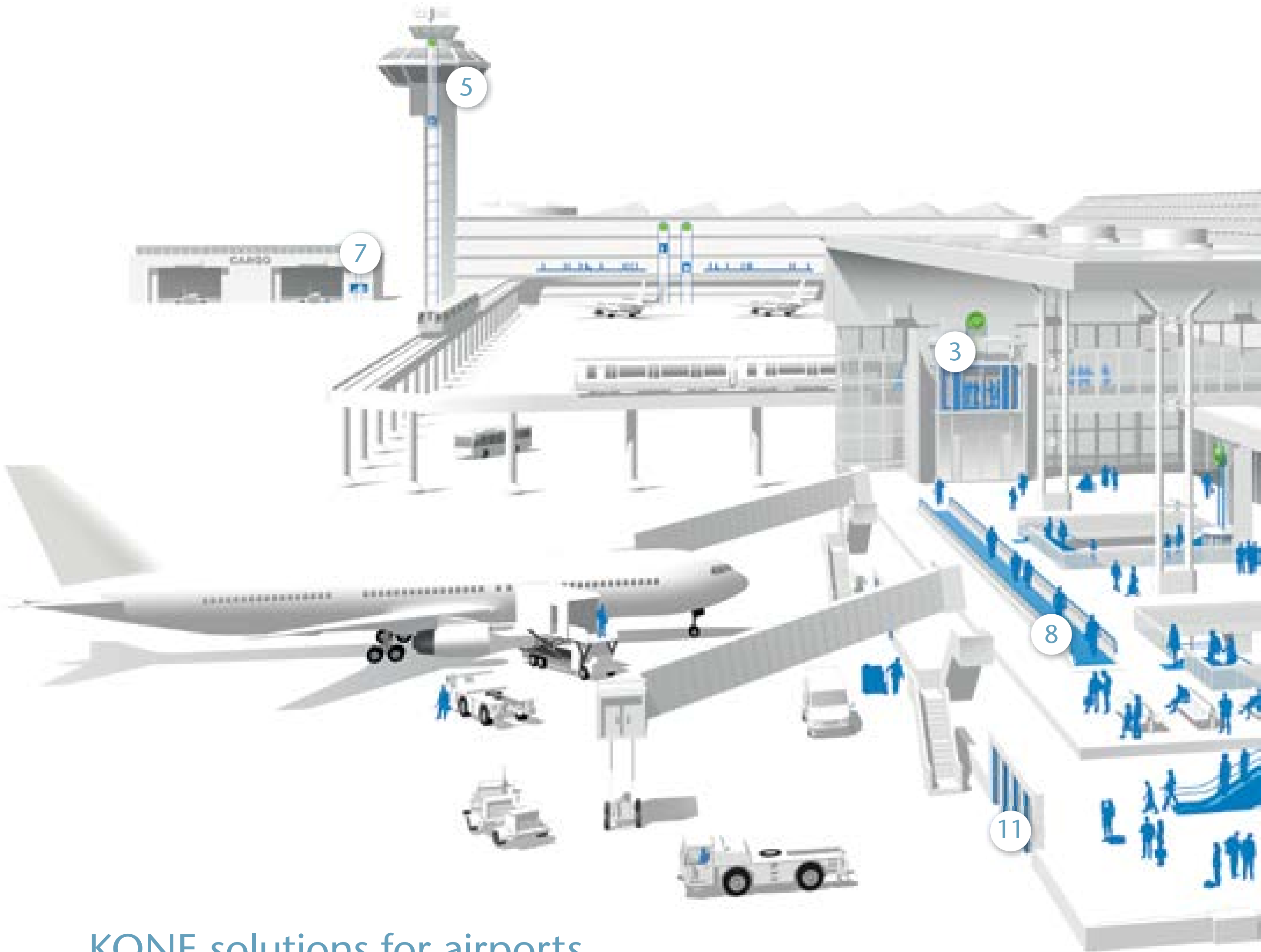


Figure 1. KONE's elevator solutions for public transportation: transit centers

Selecting the correct duty for an elevator in an airport depends on traffic calculations performed through people flow simulation. Figure 2 illustrates the most important choices with regards to the elevator-escalator ratio for common elevators in airports. The elevator duty is defined by how much of the traffic is guided only through the elevators. The need for an extra heavy-duty elevator in an airport is rare, as people flow during night is very low or non-existent. Extra heavy-duty elevators are only needed for a constant traffic flow, 24 hours per day.



KONE solutions for airports

1. Heavy-duty elevators
2. Mid-duty elevators
3. Large elevators for APM stations
4. Low-duty elevators
5. Air traffic control tower elevators
6. Service elevators
7. Freight elevators
8. Autowalks
9. Escalators
10. Monitoring systems
11. Automatic building doors

(12. Self-standing KONE Steel Shafts)

Number 1 in the illustration represent mid- or heavy-duty elevators. The difference between them is whether the people flow is directed only through elevators at the airport or also through escalators.

Numbers 2 and 3 are mid-duty elevator. They are chosen in cases where the main traffic flow goes through escalators. There may be some traffic through them in addition to accessibility traffic, bringing the usage up to 400 000 starts per year.

These heavy-duty elevators are chosen in situations where **escalators** are not required to take care of the main traffic. Heavy-duty elevators are required in cases where all or most of the traffic flow goes through the **elevators**. This duty demands monthly maintenance.

Numbers 4,5 and 6 are low-duty elevators up to 200 000 starts per year. This means only the accessibility traffic is going through the elevator. This elevator can be located at the airport in areas with multiple escalators or in rarely used areas where the usage of the elevator is reduced. Freight/goods, personnel and air control traffic tower elevators are common low-duty elevators.

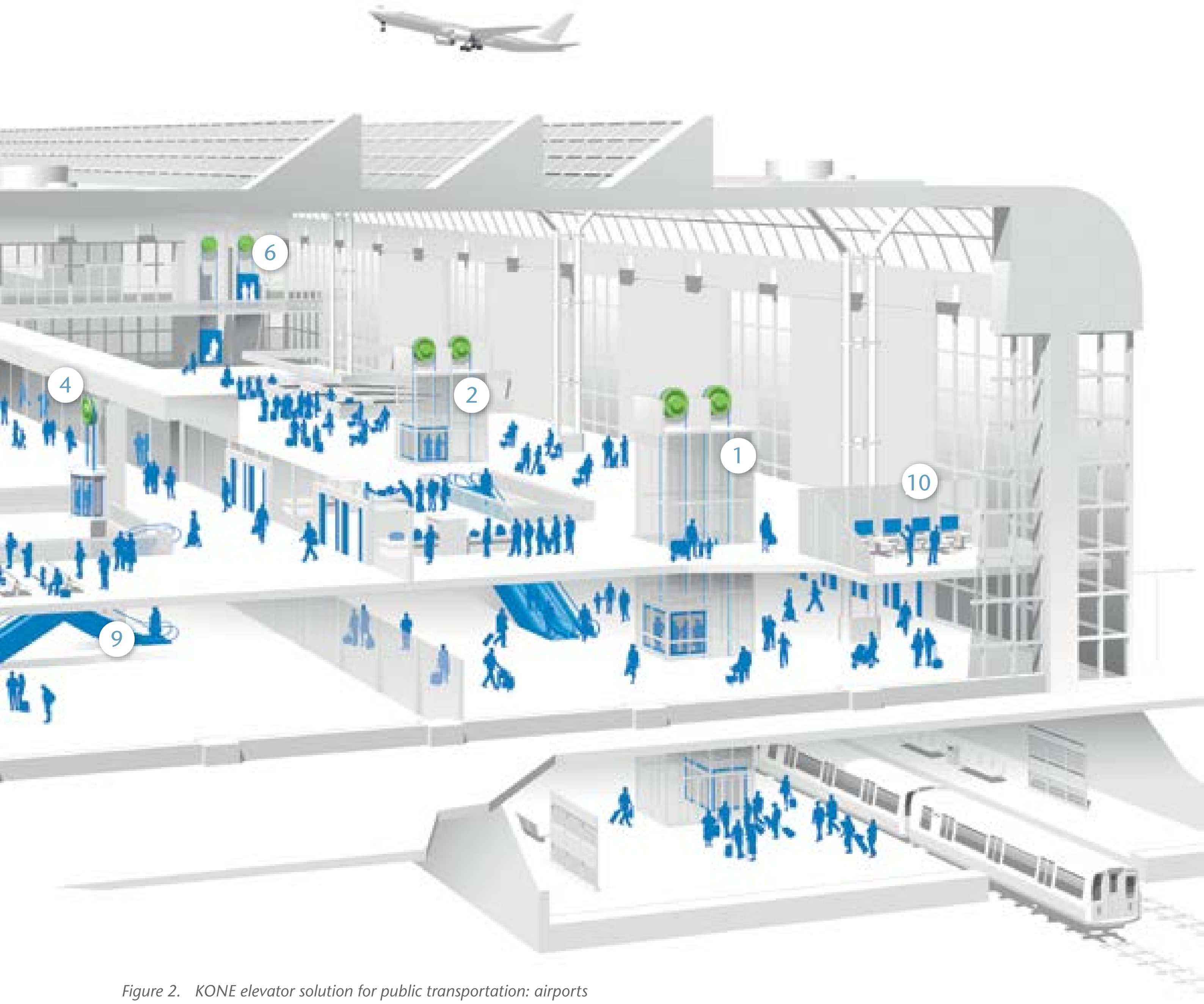


Figure 2. KONE elevator solution for public transportation: airports

4.2 Technical terms

To define what is meant by duty, the number of starts per year must first be defined.

4.2.1 Definition of starts per year

The most commonly used factor to specify an elevator in the public transportation segment is the number of starts per year. This is a controversial way of calculating elevator usage since every time the elevator moves it is recorded as a start.

However, during heavy loading the car will re-level itself possibly multiple times. This re-leveling will artificially inflate the number of starts per year. This means that in practice the start-counter in the elevator may show more starts for elevator than when counting with theoretical starts per year.

In our elevator technical qualifications we use the number of theoretical starts per year, which only indicates the elevator going either up or down and not counting in the re-leveling.

4.2.2 Definition of duty

Generally duty is defined either as:

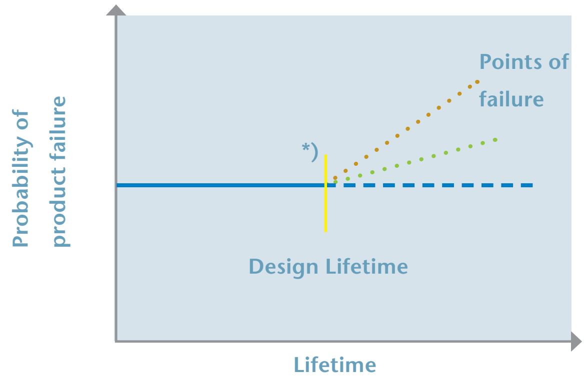
1) the number of cycles (changes between an idle period and a period when the system is activated and running)

2) how long the component or entity is exposed to stress ("travel km per year"), which is calculated as the vertical distance an elevator runs in the shaft per year.

In the public transportation segment the duty is defined by starts per year. For example, low-duty is up to 200 000 starts per year meaning that the elevator is designed for occasional usage in a calculated maximum of 200 000 starts per year. The elevator is also maintained with this same expectance of usage and lifetime in mind. When heavier usage is needed then the elevator needs to be designed, engineered and maintained according to this usage.

4.2.3. Definition of design lifetime

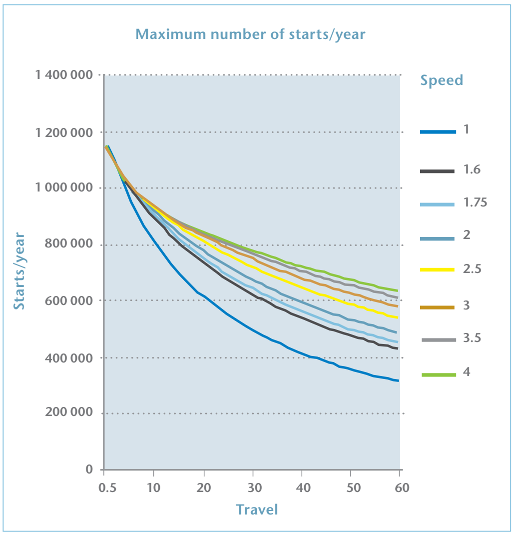
Design lifetime is the time within the selected duty and defined conditions (environmental, mechanical, and climatic) for which a product performs within its defined reliability range. When this lifetime is exceeded, the likelihood of failure increases.



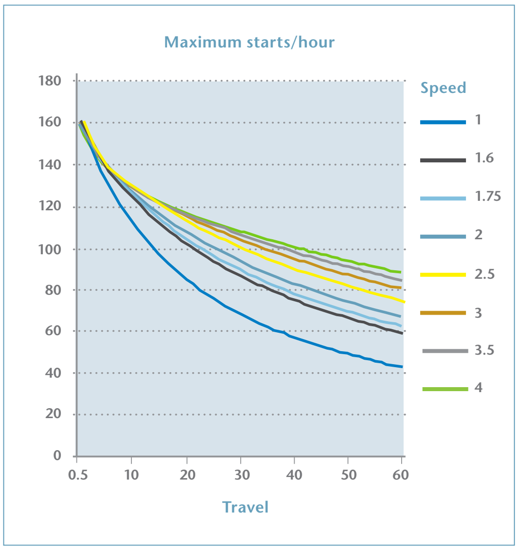
*) After this point the probability of the product failure increases but the product may still have a long lifetime.

Graph 1. Design lifetime

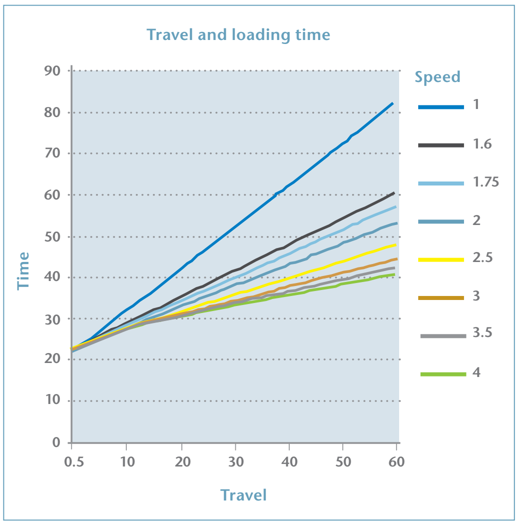
KONE uses design lifetime to calculate the lifetime cost and warranty length for installed equipment. It also helps us recommend the most appropriate maintenance plan for each individual customer, and is a key input for KONE Modular Based Maintenance™ solutions.



Graph 2. Maximum starts per year



Graph 3. Maximum starts per hour



Graph 4. Travel and loading time

The graph 2 shows that the speed of the elevator and the travel distance affect the potential maximum number of starts per year.

From the graph it can be seen that with a 5-meter travel it is possible for an elevator to reach over 1 100 000 starts per year. With a 30-meter travel it is possible to reach 800 000 starts per year.

The speed of the elevator is significant in elevator selection but has little effect when the travel is small as the elevator can not reach full speed.

The calculated time for a stop per landing in this graph is 12 seconds, which covers the time people go in and out and the doors open and close. A slow passenger will influence this time and reduce the speeds amount of starts per year.

The graph 3 shows how the speed and travel distance of an elevator affect the potential maximum number of starts per hour.

With a 5-meter travel distance it is possible for an elevator to reach up to 160 starts per hour. With a 30-meter travel distance, it is possible to reach over 100 starts per hour.

Note that these values will be affected by slow passengers who do not enter the car in the calculated time. The calculated time for a stop per landing in this graph is 12 seconds, which includes the time people go in and out, and the doors open and close. A slow passenger will influence this time and reduce the speed.

The graph 4 shows how the travel time and loading time are formed by time in seconds and travel.

For example, if travel is 40 meters with a speed of 1.0 m/s (the blue line) the travel and loading time is about 60s.

This graph is based on a loading time at every landing of 12s, which means that when the car arrives at the floor, it takes 12s for the doors to open, the people to get in and out, and the doors close.

4.3 Description of KONE elevator duties

Low-duty

Low-duty elevators go up to 200 000 starts per year. In the public transportation sector these are generally elevators in rarely used areas, accessibility elevators, air control tower elevators and freight/goods elevators. Personnel elevators are also mainly low-duty elevators.

Mid-duty

Mid-duty elevators go up to 400 000 starts per year. This duty is selected when the main traffic is not passing through elevators, but goes through escalators, while some traffic in addition to accessibility traffic is going through the elevators.

Heavy-duty

Heavy-duty elevators go up to 800 000 starts per year. This duty is selected when the elevator handles all or most of the people flow in the area, for example from the underground platform up to the main transit floor.

Compared to a mid-duty elevator, a heavy-duty or extra heavy-duty elevator has larger more robust components. Especially in heavy- and extra heavy-duty elevators, a few components need to be chosen for heavier usage such as machinery, drive and doors. Due to the increased usage rate, the lifetime of the components is also less than in mid-duty elevators.

To understand this changes in lifetimes according to duties by components, ask your KONE representative for the public transportation segments for design lifetime and spare parts data.

Extra heavy-duty

Extra heavy-duty elevators go over one million starts per year, depending on travel, speed, door openings and people going in and out. See chapter 4.3.

An extra heavy-duty elevator is chosen when all of the traffic goes through the elevators and the transit area is open for 24 hours a day every day. In these cases the only time the elevator is not in use and running is the monthly maintenance break. Due to this constant usage there is a need to have elevators maintained frequently and spare part changes well planned in advance proactively. When the transit center is closed during the night and the elevator is therefore not in use, an extra heavy-duty elevator is not necessary; a heavy-duty elevator is adequate.

Compared to a mid-duty elevator, an extra heavy-duty elevator has larger, more robust components. Especially in heavy- and extra heavy-duty elevators, a few components need to be chosen for heavier usage such as machinery, drive and doors.

Technically the differences between heavy- and extra heavy-duty elevators are small or non-existent. Due to the increased usage rate, the lifetime of components is also less than in mid- or heavy-duty elevators. Proactive maintenance and frequent maintenance with active component changes is highly important in extra heavy-duty elevators.

To understand this changes in lifetimes according to duties by components, ask your KONE representative for the public transportation segments for design lifetime and spare parts data.

4.4 Layouts and dimensions

Most of the layout and dimension information for public transportation elevator shafts and cars is available in the following Planning Guides:

- People Flow Planning Guide for Transit Centers
- KONE MonoSpace® 500 Planning Guide
- KONE MonoSpace® 700 Planning Guide
- KONE TranSys™ Planning Guide
- KONE MiniSpace™ Planning Guide for Europe
- KONE MiniSpace™ Planning Guide for Asia-Pacific
- KONE MiniSpace™ Planning Guide for China
- KONE MiniSpace™ Planning Guide for North America
- KONE Scenic Elevators Planning Guide

KONE's airport offering includes the self-standing KONE Steel Shaft frame with glass or steel walls.

- The machine room-less KONE MonoSpace is rated to carry loads of 1000-2500 kg at speeds of up to 2 m/s
- Drawings are made on a case-by-case basis once the elevator layouts are ready, ensuring the shaft and the elevator fit perfectly together
- Modular shaft: available up to 30 m travel
- CE-marking

Where the building requirements deviate from the specifications in the above guides, please contact your local KONE representative for more information. KONE Major Projects is excellent partner in challenging public transportation projects. KONE can provide solutions meeting the public transportation needs for heavy-duty elevators. They typically involve issues such as wider than normal elevator cars, more space for the elevator shafts and deeper pits. Often there is also a need to install an elevator outdoors in a self-standing elevator shaft. See section 4.4.2.

4.4.1 Layout drawings

KONE provides elevator layout drawings for the tender and supply phases of public transportation projects. For more information about the layouts, please contact your local KONE representative.

4.4.2 KONE steel shaft pack

KONE has a solution for designing self-standing elevator shafts that can be installed outdoors. Shaft walls can be made of steel or glass. KONE can deliver the steel shaft drawings to the builder and also deliver the whole construction through a 3rd party supplier based on the KONE drawings. For more information, please contact your local KONE representative.

Figure 3. Self-standing steel shaft

4.5 Maintenance of heavy- or extra heavy-duty elevators

KONE develops a unique maintenance plan for each piece of equipment. Maintenance is performed for each technical module of the equipment at the correct intervals. This ensures quality and end-user safety, and minimizes equipment downtime. KONE Modular Based Maintenance™ meets all relevant regulations and standards.

The proactive maintenance system of KONE is based on high-tech remote monitoring. This means predicting when components will break down and replacing them before they become a problem. Routine maintenance is taken care of during off-times when it will not disturb passengers.

Proactive maintenance is particularly important for public transportation elevators in heavy- or extra heavy-duty, meaning constant use. As the number of starts per year increases, the lifetime of ropes, bearings and other wearing components decreases. KONE has made calculations of the wear of components and creates a proactive component replacement program for each elevator designed for heavy-duty use.

For more information about proactive maintenance, please contact your local KONE representative.

4.5.1 Lifetime

The lifetime designed for a product sets the foundation for quality and reliability targets. It is extremely important that the designed lifetime matches with the intended market conditions and is aligned with corresponding KONE products, solutions and processes. The designed lifetime naturally includes activities that are planned, such as regular maintenance (Modular Based Maintenance™).

Setting lifetime requirements is an optimization task with multiple variables. Duty is one of the key variables in defining lifetime. Duty is considered in this context as a combination of technical stress (forces) and how much the component is exposed to the stress.

In heavy- and extra heavy-duty elevators component lifetime in years is smaller compared to low or mid duty due to the heavy usage. The actual lifetime in kilometers is exactly the same as in mid-duty ropes for example, but because of more frequent usage of the elevator, the lifetime in years is less in heavy- or extra heavy-duty elevators. Longer elevator lifetime can of course be handled with proper maintenance and proactive component replacement in all duty classes elevators.

5 Choice of car interior component materials

Codes regulating the elevator industry pose limitations on the car design and the choice of car interior components. Details are determined by the codes to be complied with. Note that sometimes the codes may have contradictory requirements, which means that not all of the requirements can be met.

Below is a summary of the requirements of the most common codes on public transportation elevator car design. To fully understand the code requirements, study the codes or contact your local KONE representative.

5.1 Accessibility code EN81-70

The EN81-70 standard specifies the minimum requirements for the safe and independent access and use of all elevator platforms. The standard takes into account people with disabilities, including people who use wheelchairs.

Table 1. Elevator car requirements for compliance with EN81-70 (information is not platform specific)

Feature	Requirements		
Elevator type	**Type 1** elevator accommodates one wheelchair user.	**Type 2** elevator accommodates one wheelchair user and an accompanying person.	**Type 3** elevator accommodates one wheelchair user and several other users. It also allows a wheelchair to be turned around in the car.
Minimum rated load	450 kg	630 kg	1275 kg
Minimum car dimensions	• Width: 1000 mm • Depth: 1250 mm	• Width: 1100 mm • Depth: 1400 mm	• Width: 2000 mm • Depth: 1400 mm
Minimum door clear opening	800 mm	900 mm	1100 mm
Door safety device	Curtain of light		
Announcements in car	Recorded human voice announcer		

Handrail	• Location: at least on the side wall opposite to the car operating panel (COP).
	• The handrail must have the following properties:
	  • Projecting ends closed and turned towards the wall
	  • Completely made with stainless steel to avoid allergic reactions and dust collection
	  • Easy to clean.		

Mirror	• Type: partial height (or full height, if used with EN81-70 compliant handrail) • Location: rear wall or the side wall opposite to the COP		
Fixings	Stainless steel[1]		
COP	• Location with centre opening doors: on the right hand side • Location with side opening doors: on the side towards which the door closes • Placement: the distance between the buttons and the front wall is 400 mm • Double COP: not available		
Push buttons	• Buttons with accessibility function • Exit floor button: with a high green collar • Alarm button: with a high yellow collar		
Landing signalization	• Hall lantern[2] • Visible and audible feedback signal when pushing the landing call button • The visible feedback signal (call registered light) must be a halo ring around the button. • The volume of the audible feedback signal must be 35 – 65 dB(A) and adjustable separately between the main floor and the other floors. • Audible feedback signal when pushing the landing call button even if the landing call is already registered		

1) Mirror and handrail fixings must be stainless steel to avoid allergic reactions and accumulation of dust.
2) For a single elevator, a visible and audible signaling device inside the car may be adequate, if the signaling can be noticed from the landing during the elevator arrival at landing.

5.2 Vandal code EN81-71

The EN81-71 vandal code defines how the elevator must be protected from possible vandal attacks and how it must perform after such attacks. Examples of vandalism against which the public transportation elevators have to be protected are crushing, cutting, human behavior, shearing and trapping. Typical items that may be used by vandals are keychain, walking stick, wire, cigarette lighter, pen, chewing gum and pocket knife.

To protect the elevator against acts of vandalism, the car, car doors, landing doors and signalization must be made with vandal-resistant components. A position indicator in the car (car operating panel) and on the main floor landing is mandatory.

EN81-71 defines two distinct categories of vandal protection: Category 1 and Category 2. They are described below. Note that it is also up to the customer, local regulations, country regulations or area regulations as to which category is applicable. The vandal code specifies how the elevator must be designed technically but also how the elevator car interior and doors must be protected. If the airport or underground is fully controlled by cameras and manpower, different coding applies from that of a place not controlled at all.

Note: Elevators with EN81-1 and EN81-20 standards are classified as no vandal protection and always have a reasonable degree of protection.

5.2.1 Examples of elevators complying with EN81-71

Depending on the operating environment, the elevator may be recommended to comply with the EN81-71 vandal resistance code.

EN81-71 category	Elevator environment
No vandal code	• Scenic elevator in an office complex with controlled entry • Elevator in a building with a reception or security desk, which will have restricted access but where it is not possible to monitor passengers once they enter the elevator • An elevator fitted with surveillance cameras, or a glass elevator (for example, in a shopping center)
Category 1	• An enclosed elevator in a shopping center, which will have unobserved general public users
Category 2	• Sports stadiums • Railway stations • Hospital emergency departments • Social housing developments • Other similar environments

5.2.2 EN81-71 Category 1 and 2 compliant car design

EN81-71 Category 1 and Category 2 vandal-resistant elevators are designed for installation in a variety of different public spaces. Category 1 equipment is designed to prevent moderate acts of vandalism in elevator environments where passengers cannot be monitored, for example, shopping center and car park elevators, or where limited surveillance exists, such as elevators in some airport areas. Category 2 equipment is designed to prevent severe acts of vandalism in elevator environments where passengers cannot be monitored, for example, subway station elevators and airport car-park elevators with no surveillance measures in place.

Please read the complete vandal code texts for a detailed explanation of their requirements. Your local KONE representative can provide you with an example car interior template and a list of standard KONE materials, as well as information about Category 2 compliant signalization. Both solid and window-car templates are available. For situations where the codes contradict one another, see section 5.4 of this planning guide.

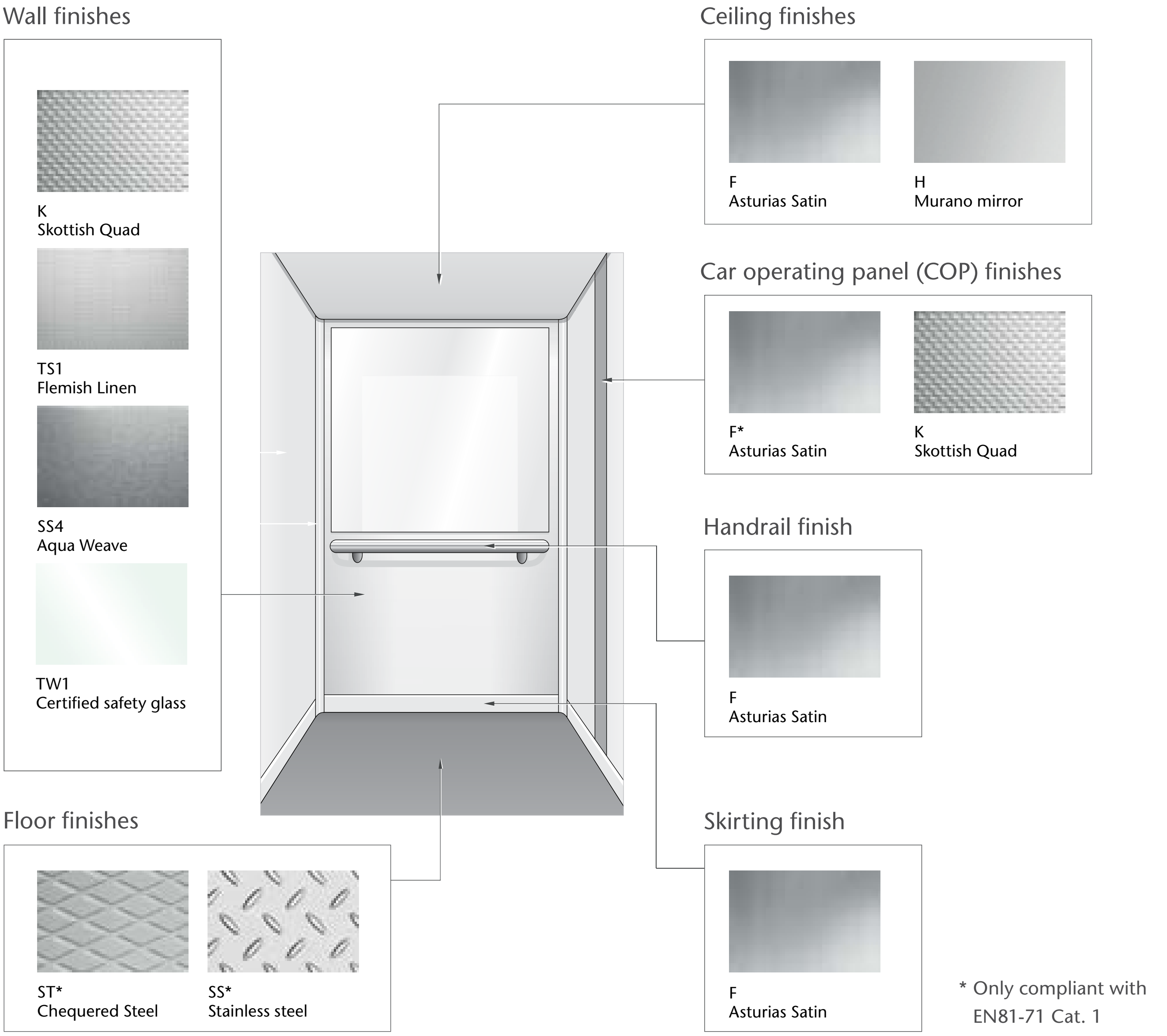


Figure 4. EN81-71 Category 1 and 2 compliant car interior materials

Note:
Additionally note that vandal code does reflect to other areas as well. Mostly the effects are protecting the shaft and stopping entry to any elevator technical area with mechanical ways of protection and electrical alarms.

	EN81-71 Cat. 1 The following must be considered	EN81-71 Cat. 2 The following must be considered
Car body	Additional strengthening compared to standard car	Additional strengthening compared to standard car
Materials	• Must be resistant to attacks with a screwdriver, knife, or torch • Must be scratch resistant • Must be able to withstand frequent cleaning	In addition to Cat. 1 requirements: • Must be resistant to attacks with side cutters • Must be resistant to corrosion damage caused by cleaning solvents
Car and landing door, frames and architraves	• Must be made from non-combustible material • Must be made from limited-flammability material • Material must be t hicker than that used in a standard car	• Same as Cat. 1
Ceiling	• Must be able to support a mass of up to 150 kg at any single point where a person can suspend themselves • Fixings must not be able to be removed within 60 seconds using either hands or tools	• Must be vandal code-compliant to prevent people from suspending themselves
Floor	• Must be made from material with limited flammability • Fixings, especially at seam joints, must not present a tripping hazard	• Same as Cat. 1
Signalization	• Must be made from material with limited flammability • Stainless steel finishing must be used • Both car operating panel (COP) and landing call stations (LCS) must fulfill water-resistance requirements according to the IPX3-rating	In addition to Cat. 1 requirements: • Structure must be designed so that the signalization keyhole is vandal-proof. Standard keyholes are not permitted due to the risk of, for example, chewing gum being inserted into them
Mirror	• Stainless steel fixings and handrails, as well as standard glass or stainless steel mirrors, are permitted	• Not permitted
Handrail	• All standard KONE accessories have an EN81-71 Cat. 1 compliant option available	• Must be attached so that inside car it is not openable
Lighting	• Must be a minimum rating of 100 lux at floor level	• Same as Cat. 1
All car fixings	• Buffer rails, walls, car operating panels (COP), landing call stations (LCS), doors, windows, mirrors, ceiling etc. must be installed in such a way that they cannot be removed, or can only be removed using specialist tools	• Buffer rails, walls, COP, LCSs, doors, windows, mirrors, ceiling etc. must be installed in such a way that the fixings are not visible and no materials are removable. For example, the LCSs must be attached to the wall from the shaft side
Wood	• Not permitted in any structures, including the strengthening structures invisible to passengers	• Same as Cat. 1
Doors	• Must be protected and strengthened in multiple ways.	• Must be sufficiently durable to withstand a forceful attack and must have sufficient vandalism protection. Maintenance access must also be protected by a specialist emergency locking device (ELO) to prevent vandalism.
Trapdoors	• Standard trapdoors are permitted	• Must be designed so that the keyhole is vandal-proof. Standard keyholes are not permitted due to the risk of, for example, chewing gum being inserted into them • It must only be possible to open the trapdoor from the roof side

Figure 5. EN81-71 compliant car interior

5.3 Fire-fighter code EN81-72

The EN81-72 compliant elevator is provided with additional fire protection. It has additional controls and signals, and the elevator car has a special structure. Therefore it can be used under the direct control of the fire service, in the event of fire.

The EN81-72 safety code only covers the requirements related to elevator installation. It does not describe the requirements for the fire-resistant building structure that is essential for building a fire protected lobby.

Table 2. Elevator installation requirements for compliance with EN81-72

Feature	Requirements
Building	• Each landing entrance used for fire fighting purposes has a fire protected lobby. • The source of the secondary power supply is located in a fire protected area. • The primary and secondary electrical power supply cables of the fire fighting elevator are fire protected and separated from each other.
Fire-fighting elevator	• The elevator serves every floor of the building. The source of the secondary power supply is located in a fire protected area. • The elevator rated load with standard car sizes is 630 kg or more. • Dual entrance cars are not allowed. • The elevator reaches the furthest floor from the fire service access level within 60 seconds.
Safety	• Landing control devices and indicator continue to function in an ambient temperature up to 65 °C. • All electrical equipment in the elevator shaft and on the car located within 1 m of any landing door is protected with an enclosure that fulfils at least the requirements of IPX3. • All electrical equipment located less than 1 m above the elevator pit floor is IP67 protected. Sockets, switches and the lowest lamp is located at least 0.5 m above the highest permissible water level in the pit. • Water level in pit must be controlled to stay below the level of fully compressed car buffers. • Also, the water level is not allowed to reach equipment that could cause an elevator malfunction.
Fire fighter rescue from the elevator car	• The roof of the elevator car has an emergency trap door with minimum measurements of 0.4 × 0.5 m for 630 kg elevators and 0.5 × 0.7 m for larger elevators. • A ladder and a safe access route to the elevator car roof is available from every landing door. • Adequate stepping points and clear identification of the trap door release point is available inside the elevator car.
Control system	• The switch of the fire fighting elevator is located in the lobby that is intended as the service access level for fire fighters. The switch is marked with a fire fighting elevator pictogram. • Phase 1 and 2 operation of the fire fighting elevator are in accordance with the norm description (SW).
Power supply	• The power supply system consists of the primary and secondary power supply. • The secondary power supply is sufficient to run the fire fighting elevator at the rated load. • Change over of electrical supplies causes a correction drive if the car is between floors.
Car and landing controls	• The car and landing controls do not register false signals caused by heat, smoke or moisture. • The car and landing controls and the landing indicator are protected to fulfil at least the requirements of IPX3. • In addition to the normal floor level markings inside the elevator car, the fire service access level is clearly marked on or adjacent to the car call button that takes the car to the fire access level. The marking for the fire access level is the fire fighting elevator pictogram.
Fire service communication system	• The fire fighting elevator has an intercom system for interactive two way speech communication between the fire fighting elevator car, fire access level and the MAP.

To fully understand the fire-fighter code requirements, please study the text of the code itself.

For situations where the codes contradict one other, see section 5.4.

5.4 Code contradictions

On rare occasions the codes contradict with each other as described below. The accessibility code does not cause problems with either of the other two codes. With accessibility code compliance, KONE needs to know which type of the EN81-70 you are aiming to fulfill, in regard to demands on the car size. For more information see section 5.1.

There are no contradictions with code combination of vandal code EN81-71 Category 1, accessibility code EN81-70 and fire-fighter code EN81-72. For KONE standard options for this combination contact your KONE representative for car and signalization templates, available materials and additional information.

Vandal code EN81-71 Category 2 forbids:

The vandal code EN81-71 Category 2 forbids any keyholes into which a vandal could stick something or unlock the lock. Locks as such are allowed, but keyholes not.

Another problem is that for the fire-fighter code EN81-72 a trap door is needed and the fire-fighter must open the trap door from inside the car with a key, but the vandal code EN81-71 Category 2 forbids trap door locking from inside the car. The same problem is valid for the storage of a fire-fighter's ladder in the car.

Fire fighter code EN81-72 requires:

The fire-fighter code EN81-72 requires the following features forbidden by the vandal code EN81-71 Category 2:

- Key switch for COP.
- Storage of fire-fighter's ladder inside the car. The problem is how to lock the ladder as no keyholes are accepted.
- Opening of trap door from inside the car. This is hard to implement due to the vandal Category 2 keyhole restrictions.

For an example car interior template with a list of KONE standard materials for code combination EN81-70, EN81-72 and EN81-71 Category 1 (notes with EN81-71 Category 2), contact your local KONE representative.

5.5 KONE standard offering for car design items complying with codes

As not all countries need to apply a vandal code, compliance with EN81-71 may not be necessary. In such a case the car design can be selected from the whole KONE offering.

For easier car interior planning, KONE provides information about car design materials and components that have been checked for compliance with the code requirements discussed above.

Ask your local KONE representative to provide a set of example car design templates to assist in planning elevators that comply with the vandal codes. These templates cover both vandal code EN81-71 Category 1 and 2 with solid and window cars. Also example car templates are available for combination of accessibility code EN81-70, fire-fighter code EN81-72 and vandal code EN81-71 Category 1 with clarifications on the contradictions to vandal code Category 2.

5.6 KONE design offering and custom design services

It is possible to choose the car interior components and materials quite freely from the KONE offering or to create custom designs, but code issues must always be studied carefully for each case. For the list of available EN81-71 Cat. 1 and Cat .2 compliant materials, please see section 5.2.2 on page 26.

5.6.1 Material and component samples

It is possible to acquire samples of materials or components to be used in the elevator. Examples of material samples are:

- Stainless steel
- Titanium nickel
- Plastic laminate
- Stone
- Wood
- Glass

Component samples are for example:

- Handrails
- Light fitting
- Signalization items.

5.6.2 Anti-graffiti coating

KONE offers an anti-graffiti material coating for elevators installed in public transportation environments. This transparent coating protects the car's interior surfaces from graffiti and other heavy soiling by preventing adhesion of paints, sprays, and marker inks. Any remaining markings can be easily removed with standard cleaning agents. The coating is resistant to acids and mildly alkaline cleaning products, including strong graffiti-remover solutions.

This invisible coating has no impact on the appearance of the car interior or its flammability properties.

Please contact your local KONE sales agent for more information.

5.7 Vandal resistant signalization KSS 140

KONE KSS 140 vandal-resistant signalization is designed specifically for EN81-71 Category 1 and 2 elevators. The durable yet stylish car operating panel (COP) and landing signalization devices are impact, scratch, splash, and burn resistant, as well as being extremely easy to clean. In addition to EN81-71, KONE KSS 140 signalization is also compliant with the EN81-70 European accessibility standard and EN81-72 and EN81-73 fire-related standards.

- COP dual-function emergency symbols that act as both emergency lighting and call-connection sequence indicator when alarm button is pressed
- Highly durable, easy-to-clean COP faceplate options
- Impact-resistant shielding and fire-resistant plastic coating on COP and landing signalization devices

5.8 KONE elevator doors

KONE offers a wide range of elevator door options designed to meet the needs of demanding heavy traffic environments such as transit centers and airports. KONE elevator doors combine the best in safety, performance, durability, and visual design. There are a wide range of door types to choose from, including solid and glass designs, as well as different options for door frame design. KONE offers elevator doors for both EN81-71 Category 1 and Category 2-compliant equipment.

KONE elevator doors are available with a hidden sill option, which prevents small objects from becoming trapped in the sill and stopping the door from closing. As well as helping to prevent elevator downtime, this option also results in a clean and simple visual appearance.

Figure 6. Hidden Sill

5.8.1 KONE KES 600 door offering

The KES 600 door offering consist of solid doors.

Figure 7. KES 600 solid door, narrow frame EN 81-71 Category 1

KES 600 steel door with narrow frame

Compliant with EN81-71 Cat. 1 vandal code

- LL: 700-1100 mm
- HH: 2000, 2100 mm

Figure 8. KES 600 solid door, frame EN 81-71 Category 1

KES 600 steel door with frame

Compliant with EN81-71 Cat. 1 vandal code

- LL: 700-1100 mm
- HH: 2000, 2100 mm

5.8.2 KONE KES 800 door offering

The KES 800 door offering consists of solid and glass doors.

Figure 9. KES 800 solid door, EN 81-71 Category 1 and 2

KES 800 steel door

Compliant with EN81-71 Cat. 1 and 2 vandal code

- Solid stainless steel doors available in standard KONE offering
- EN81-71 Cat. 1 and 2 certified range: LL = 900-3000 mm

Figure 10. KES 800 glass door, EN 81-71 Category 1

KES 800 glass door Cat. 1

Compliant with EN81-71 Cat. 1 vandal code

- Laminated hardened glass 4+4 mm in standard KONE offering
- EN81-71 Cat. 1 certified range: LL= 700-3000 mm

Figure 11. KES 800 glass door, EN 81-71 Category 2

KES 800 glass door Cat. 2

Compliant with EN81-71 Cat. 2 vandal code

- Laminated hardened glass 4+4 mm available in standard KONE offering
  - EN81-71 Cat. 2 certified range: LL= 900-1600 mm, 1800-3200 mm

Note:
The differences between category 1 and category 2 glass doors are the glass sizes and frames. These differences are stated by the code and therefore can not been removed or altered.

5.8.3 Emergency locking device

KONE offers an emergency locking device (ELO) option for the elevator emergency landing door, as required by EN 81-71 Category 2 equipment. The ELO can also be installed as an optional feature at the customer's request. Category 2 equipment must also have an emergency power backup available, either in the form of an emergency network or a UPS system with a capacity of at least 2 hours.

5.9 Mock-up build

KONE can manufacture a mock-up of a customized car for customer approval before the final design and delivery. There are two kinds of mock-ups. There is a quality mock-up, when the car interior is checked but there is no time reserved to change the design. This check generally extends the delivery time by a few weeks. This check-up is to verify the quality of the cars and components. The second type of mock-up is when the car is built with all its final components, but the customer can change the design. This increases the delivery time estimated from 12 weeks up depending if the the design is changed, the materials are changed, whether the materials are hard to acquire etc.

For a specific case contact your KONE local representative for an estimate. Other parts and fixtures can also be mocked-up. The mock-ups are created as early as possible to ensure enough time for the engineering and manufacturing phases.
There is a standardized process for the mock-up build. The process includes the following phases:

- Mock-up design with a solution proposal
- (car drawings, visual renderings, samples and
- information about the design benefits,
- costs and lead times)
- Purchasing and manufacturing
- Material management
- Building mock-up car
- Customer inspection and changes (if needed).

6. People Flow Intelligence

Property owners and developers are under increasing pressure to ensure that tenants can move around buildings as quickly and comfortably as possible while simultaneously providing improved security and access control. Kone's comprehensive and flexible people flow intelligence solutions are designed to meet these demands. They are based on industry-leading technology that can be adapted according to your changing needs, which enables efficient building management, and adds real value to your property.

6.1 KONE E-link™

KONE E-link™ allows easier control of the elevator system and adds value for the building owner, facility manager and tenants:

- Monitoring the location and status of the elevators in real time locally and remotely
- Large building complex or geographically (even globally) remote building monitoring and managing from a single location
- Local and remote control of equipment with scheduled commands, such as mode changes and locking
- System alarms notifying of any problems in real time, allowing you to react to them without delay
- The monitoring data can be stored and used later to generate reports, or verify the use and availability of the monitored equipment
- You can control the elevators remotely, by changing the service mode of an individual elevator
- Other systems in the building can be integrated with KONE E-link™ to increase the automation level of the building
- KONE E-link™ can be configured to interface with non-KONE control systems as well as with older generation of KONE equipment
- You can access the KONE E-link™ system using workstations that are linked to a local area network
- History playback of elevator and escalator events for security and legal purposes
- Faster reaction to malfunctions, possible vandalism and troubleshooting
- Faster rescue of entrapped passengers
- Reduced operating costs
- Intuitive user interface
- Short learning curve even for an occasional user.

KONE E-link™ has standard interfaces to enable connections to elevators and external systems. KONE E-link™ connects to KONE elevators through a CAN or a serial bus using the KONE Monitoring protocol.

6.1.1 Architecture and operating principle

The KONE E-link™ system architecture is modular. It enables both a single site and multiple site installation. The well-defined communication interfaces allow elevators from both KONE and other manufacturers to be monitored within the same system.

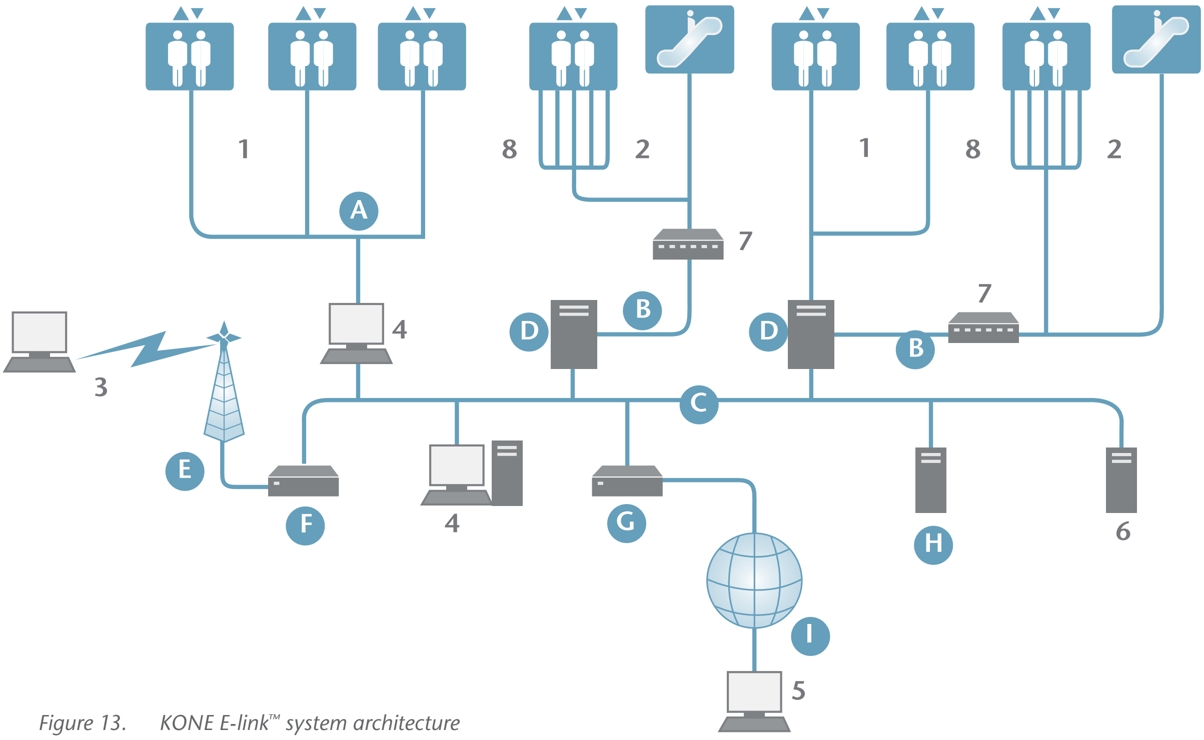


Figure 13. KONE E-link™ system architecture

A	CAN	1	KONE equipment
B	RS	2	Other manufacturer's equipment
C	LAN (ethernet)	3	Workstation with the KONE E-link™ GUI connected to the building LAN through WLAN for monitoring
D	KIC[1	4	Any authorized workstation with the GUI in the building LAN for monitoring
E	WLAN	5	Workstation with the GUI connected to the remote access server through the Internet for monitoring
F	Firewall	6	Connection to the building management
G	Remote access server	7	Other elevator and escalator interface unit
H	Statistics server	8	Interface signals to other elevators and escalators
I	Internet		

Note:
The workstations where the GUI clients are installed are not automatically provided with KONE E-link™.
The workstations can be separately ordered using a specific order form.

Operating principle

The KONE interface controller (KIC[1)]) receives operation data from the elevators, processes it into monitoring data and makes it available in the local area network. KONE elevators communicate with KIC using a controller area network (CAN) or a serial (RS) bus for communication. If other manufacturers' elevators are connected to the system, KIC detects certain signals from the elevators and creates monitoring data from them.

The monitoring data can be stored to a database for later use or delivered to other systems in the building through the OPC[2)] interface. The other systems can also provide control commands to the elevators through the OPC interface. For example, the logistics control system can give calls to the elevators to meet the transportation needs.

The GUI client allows system users to view the monitoring data in real time through the KONE E-link™. The system can be monitored from a single location, such as the control room, from several locations, or even from remote sites. The workstations can be connected to the system either through the customer's network, or through external networks. In addition, remote monitoring over the Internet is enabled.

1) KIC is an industrial workstation with a KONE-specific CAN-board and regular serial ports.

2) OPC is open connectivity in industrial automation and the enterprise systems that support industry. Interoperability is assured through the creation and maintenance of open standards specifications.

6.2 OPC interface

An additional interface is provided to connect to other non-KONE manufacturers' elevators and escalators as well as to older generations of KONE control systems.

KONE E-link™ can provide the collected data to external systems through an OPC DAS 2.05A interface.

OPC stands for OLE for Process Control – "open connectivity via open standards". OPC is an interface standard in communication between industrial automation systems. OPC server software is used for connecting 3rd party systems to KONE E-link™.

The OPC interface can be used to integrate KONE E-link™ with other building management systems to increase automation in the building. The data can be sent to, for example:

- 3rd party GUI used to control other systems in the building
- Building management systems for creating a visual image of the elevators
- Passenger guidance or logistics systems to provide information about elevator position and status.

6.3 KONE InfoScreen

The KONE InfoScreen is a standard, global solution designed to manage and display elevator, building, and other multimedia information in elevator cars and landing lobbies. The KONE InfoScreen improves guidance and wayfinding inside your building. The content displayed can be easily managed online (premium offering) or offline (standard offering).

6.4 Access Control Interface

Access control interface: KONE smart access control solutions can be used to integrate your elevator system with your access control solution, promoting safety and security throughout your building. KONE offers flexible integration allowing any make or model of access control system to be used.

Note:
Not all the corresponding features of KONE E-link™ can be obtained when used in conjunction with non-KONE equipment.

7. Elevator design tools

The online tools provided by KONE and located at www.kone.com help you browse different elevator solutions in the initial phase of the construction project and find the optimum solution quickly. This shortens the process in the later phases of the project.

7.1 Traffic planning

Determining the correct level and type of elevator service for the specific building is crucial. Insufficient handling capacity is difficult or impossible to correct later, and excessive handling capacity is expensive and wastes resources. Traffic planning tools help to determine the handling capacity, as well as define and model interaction among different transportation devices.

The KONE Quick Traffic calculation tool gives an architect or developer a quick initial estimate of the number of elevators needed in the project. Using Quick Traffic data, comparing different alternatives is very easy.

KONE Quick Traffic asks only a few basic questions and is then able to pinpoint the critical points within the building with regard to traffic flows. The tool can be used for planning People Flow™ systems with Conventional Control or Destination Control.

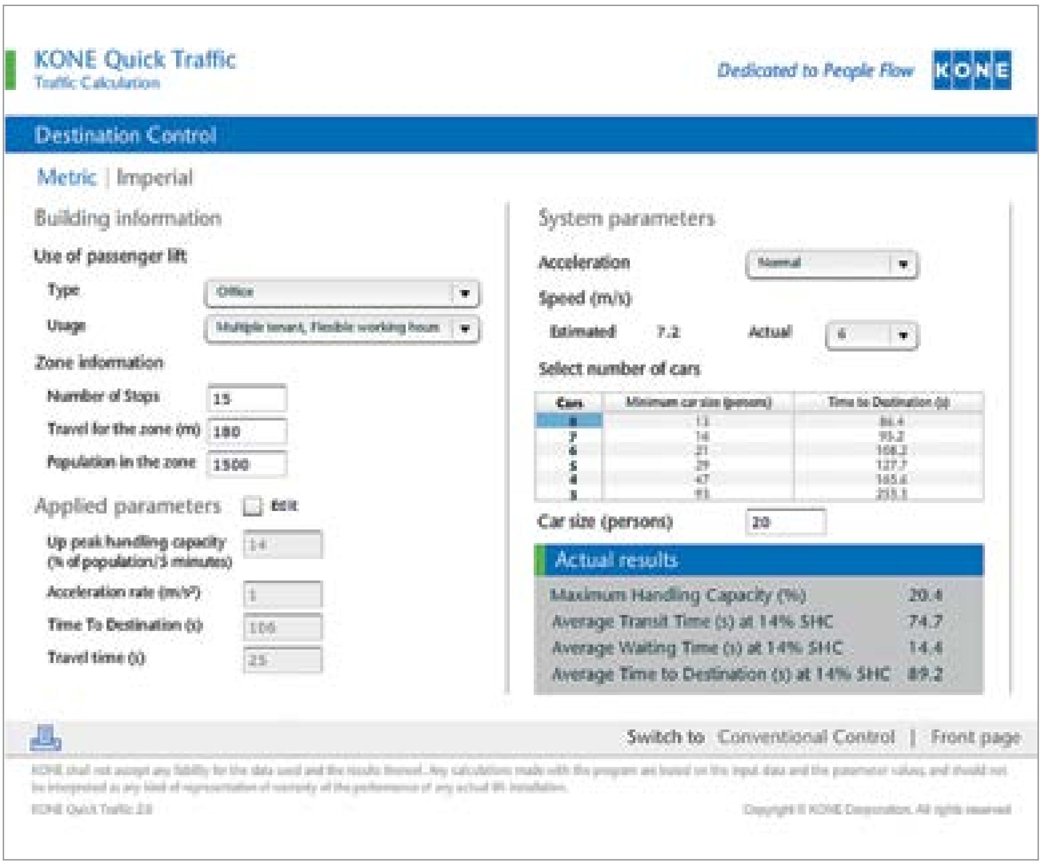


Figure 14. KONE Quick Traffic tool

7.2 Dimensioning

KONE provides design services and customized drawings for elevators and escalators. From the early stages, we can support you with detailed information and interface requirements.

With KONE dimensioning tools, it is possible to calculate and compare the space required by different elevator and escalator systems.

KONE Planulator™ is an advanced dimensioning tool. Featuring a full localization process, the tool also considers geographical information: it is possible to choose for example between centimeters and inches, as well as among the different elevator codes.

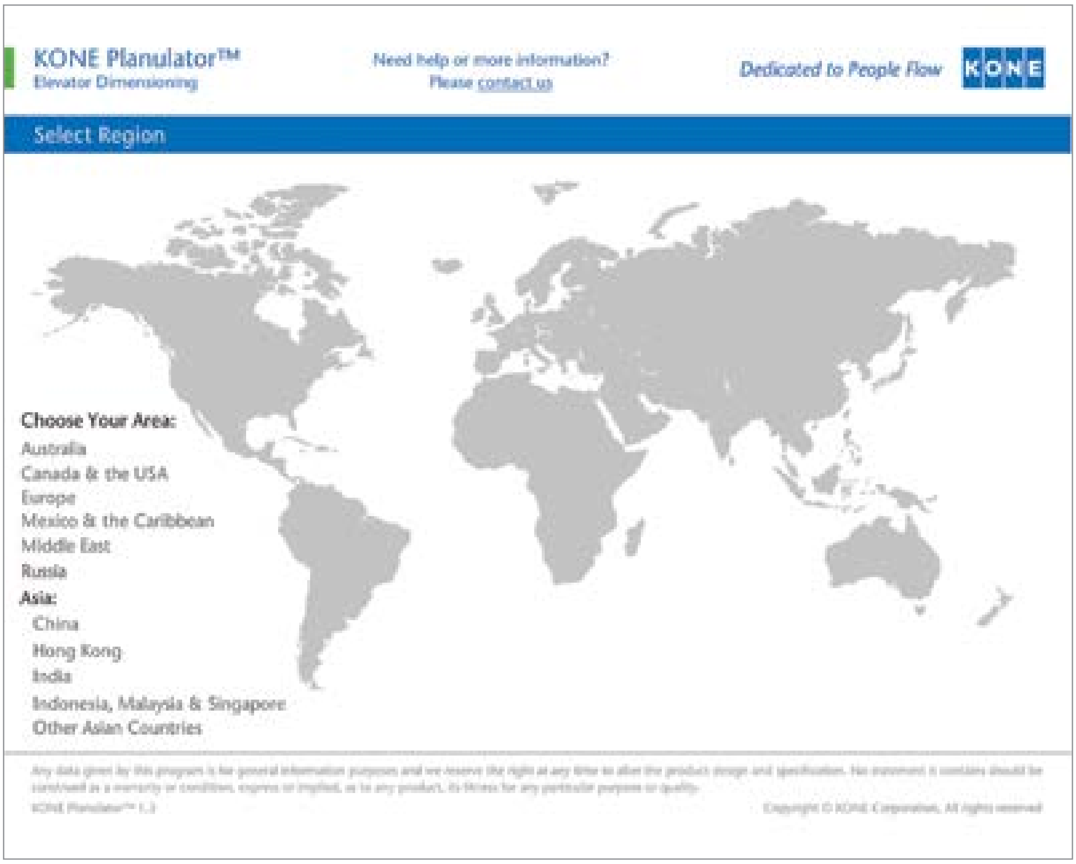


Figure 15. KONE Planulator™ tool

8. Further information

In addition to this guide, KONE can provide a lot of other useful material to support planning an efficient People Flow™ system for an airport or a transit center. Please contact your local KONE representative to acquire of any of the following:

- Brochures (Solutions for Public Transportation, Airports and Transit centers)
- KONE Book of Solutions: Public Transportation
- General KONE information such as quality and environment issues, Cworporate responsibility report
- Maintenance guidelines
- People Flow and elevator platform Planning Guides (including layout and dimension information); for a list of Planning Guides, refer to section 4.4
- Layout and car interior templates designed for public transportation buildings and elevators
- Design tools such as KONE Quick Traffic calculation tool to give a quick initial estimate of the number of passenger elevators needed in the project and KONE Planulator™ dimensioning tool to quickly access and compare the space required by different elevator systems.

KONE also has a public transportation document package available. Please contact your local KONE representative to receive the document package, which contains the following information:

- Elevator technology basics
- KONE processes and design philosophy
- Reliability, Availability, Maintainability and Safety (RAMS) description
- Electrical information (Drives & Controller, EMC, IP classes)
- Certificates held by KONE
- Rescue procedures
- Lifetime and spare parts information for elevator components
- Material safety, including a list of restricted substances and
  a list of plastic parts in an elevator.

KONE airport references

- Bangkok Suvarnabhumi Airport, Thailand
- Beijing Capital Airport, China
- Boston Airport, USA
- Chicago O'Hare, USA
- Cologne Airport, Germany
- Copenhagen Airport, Denmark
- Dammam Airport, Kingdom of Saudi Arabia
- Denver Airport, USA
- Frankfurt Airport, Germany
- Guangzhou Balyun Airport, China
- Hongqiao International Airport, China
- London Heathrow (BAA), UK
- Madrid Barajas Airport, Spain
- Malpensa Airport (Milano), Italy
- Montreal Airport (Trudeau), Canada
- Moskow (Sheremetyewo), Russia
- Munich Airport, Germany
- Nice Airport, France
- Paris Charles de Gaulle Airport, France
- Riyadh Airport, Saudi Arabia
- Schiphol Airport (Amsterdam), Netherlands
- Vienna International Airport Skylink Terminal, Austria
- Zürich Airport, Switzerland

KONE railway and metro references

- Ankara Metro, Turkey
- Bangkok Light Rail System, Thailand
- Beijing-Shanghai Express railway, China
- Berlin Central Station, Germany
- Budapest Metro, Hungary
- CTA Chicago, USA
- Delhi Metro, India
- French Railways and Metro systems: Paris
- German Railways and Metro systems: Berlin, Frankfurt, Dortmund, Essen, Bochum
- Helsinki Metro, Finland
- Hongqiao Transport Hub, China
- London Underground, UK
- Madrid Metro, Spain
- Milan Railways, Italy
- Montreal Metro, Canada
- Netherlands Railways: Amsterdam, Rotterdam
- New York Subway, USA
- Rome Metro, Italy
- Shenzhen North Railway Station, China
- Zhengzhou East Railway Station, China

KONE provides innovative and eco-efficient solutions for elevators, escalators, automatic building doors and the systems that integrate them with today's intelligent buildings.

We support our customers every step of the way; from design, manufacturing and installation to maintenance and modernization. KONE is a global leader in helping our customers manage the smooth flow of people and goods throughout their buildings.

Our commitment to customers is present in all KONE solutions. This makes us a reliable partner throughout the life cycle of the building. We challenge the conventional wisdom of the industry. We are fast, flexible, and we have a well-deserved reputation as a technology leader, with such innovations as KONE MonoSpace®, KONE EcoMod™ and KONE UltraRope™.

KONE employs on average 47,000 dedicated experts to serve you globally and locally.

KONE Corporation
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