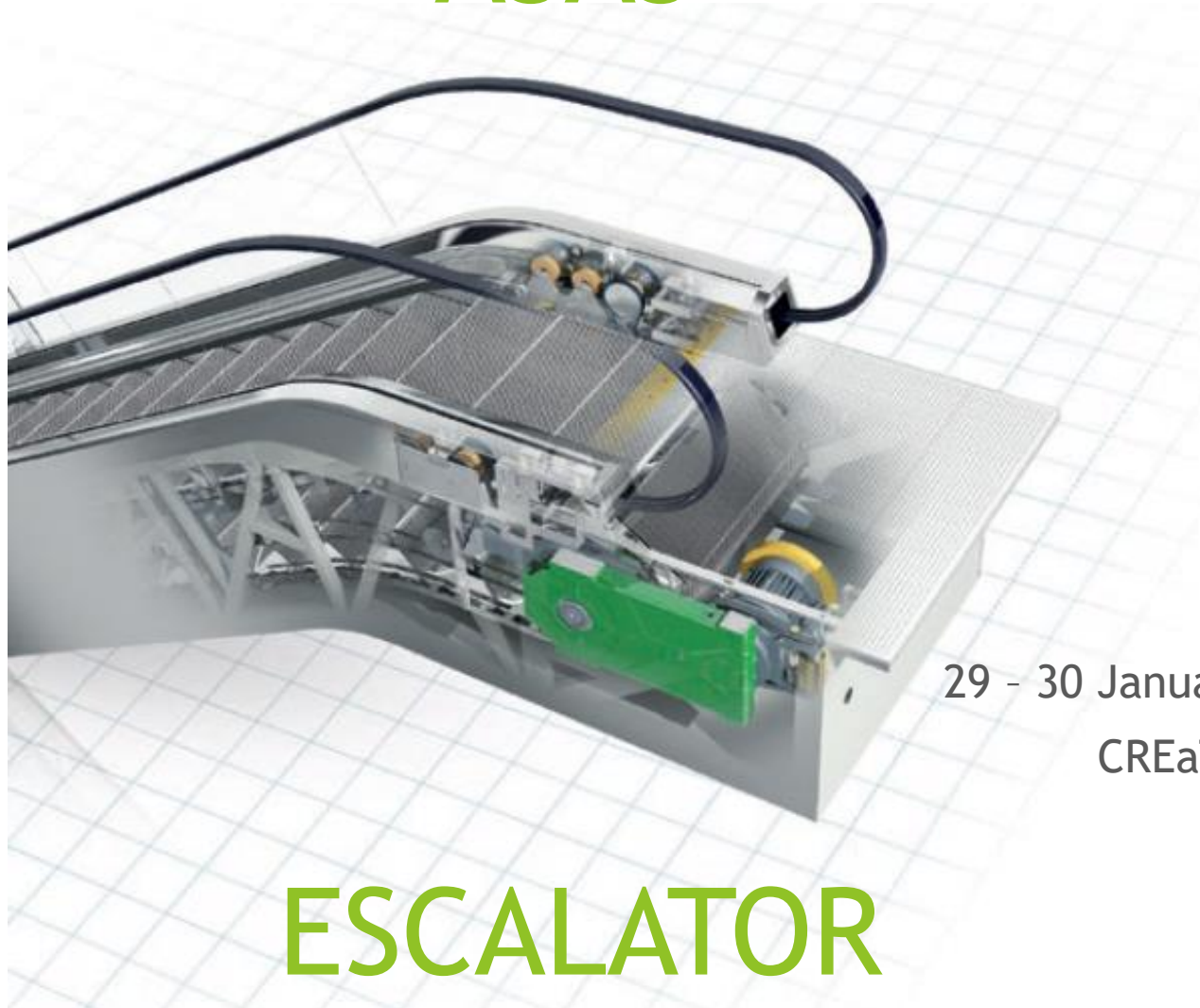


# KURSUS REKABENTUK ASAS



29 - 30 Januari 2020  
CREaTE, JKR

## ESCALATOR

# KANDUNGAN KURSUS

- ▶ 30 Januari 2020 (Khamis)
  - Pengenalan
  - Jenis Susunan Escalator
  - Dimensi Escalator
  - Traffic Capacity
  - Komponen Escalator
  - Building Segment

# PENGENALAN ESCALATOR

- ▶ Early escalators were known by a variety of names, including "travelling staircase," "inclined elevator" and "magic stairway." Around 1900, Charles Seeberger, who designed the forerunner of the modern escalator, came up with the name that finally stuck. His term "escalator" is a combination of "elevator" and "scala," the Latin word for steps.

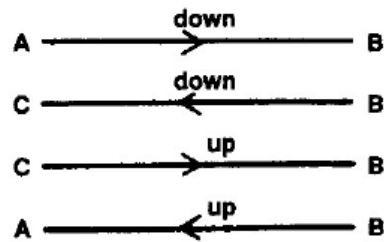
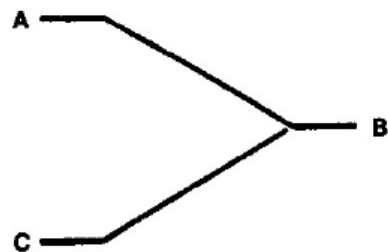
# STANDARD UNTUK ESCALATOR

- ▶ BS EN 115 :1995
- ▶ BS EN 115-1: 2008
- ▶ MS 1918-1:2011
- ▶ ISO 25745-3:2015
- ▶ ISO 9589:1994
- ▶ ISO 14798:2009
- ▶ ISO 22201-2:2013

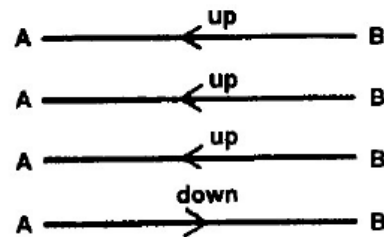
# KENAPA PERLU ESCALATOR?

- ▶ Tiada “Masa Menunggu”
- ▶ Mengangkut ramai orang dalam jarak/ketinggian yang dekat/sederhana
- ▶ Mengangkut secara berterusan

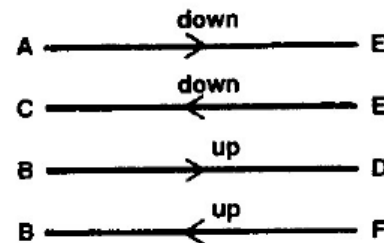
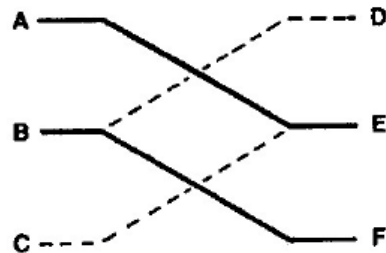
# ESCALATOR ARRANGEMENT



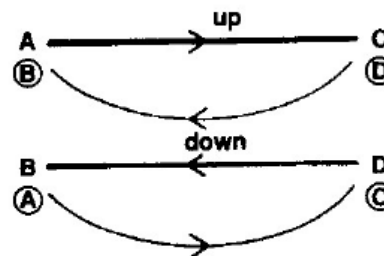
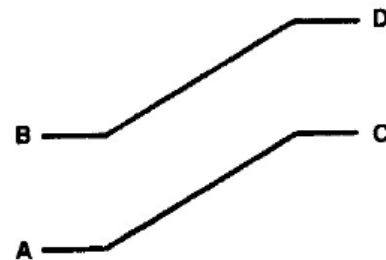
PARALLEL



MULTIPLE  
PARALLEL

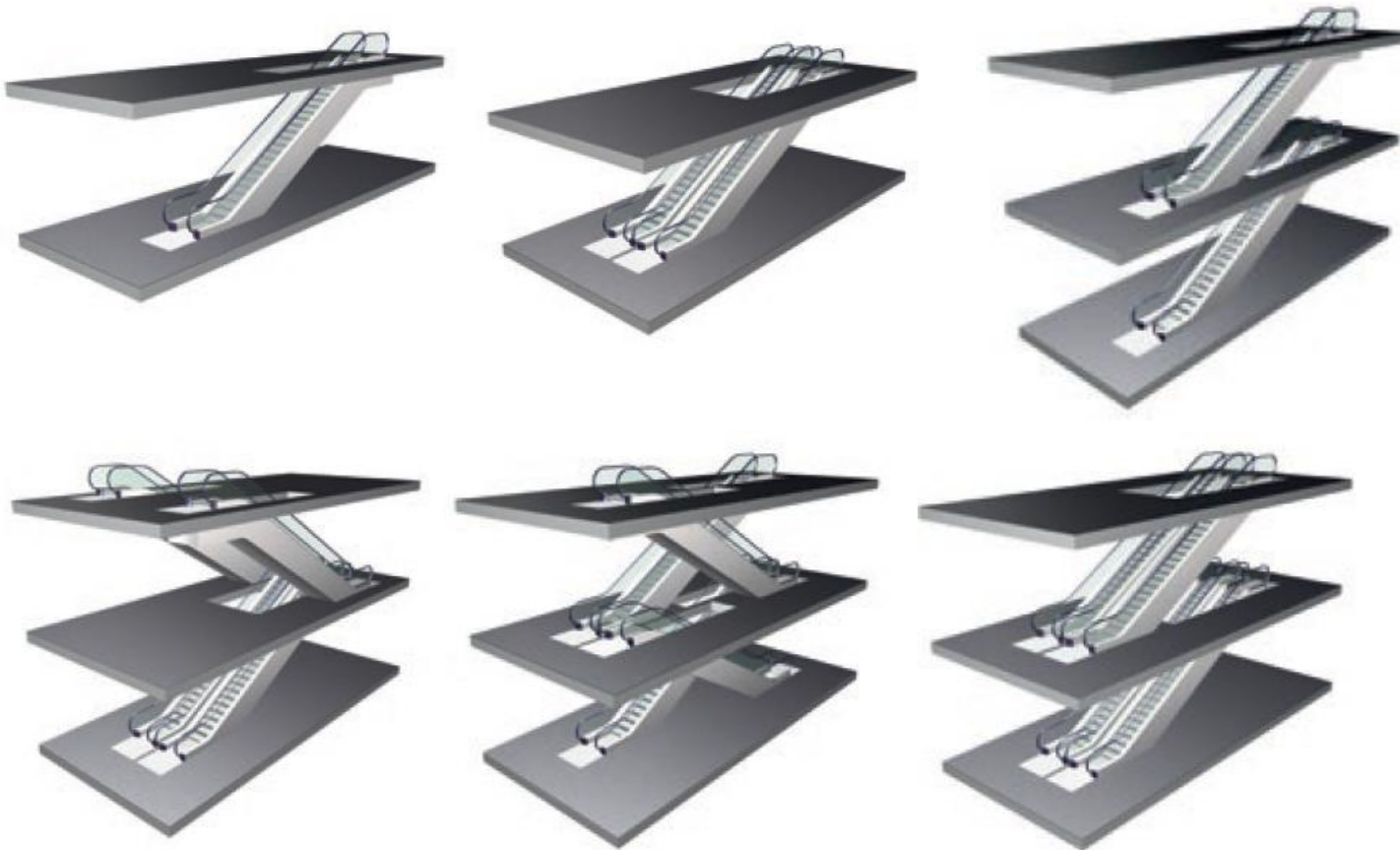


CROSS-OVER OR  
CRISS-CROSS

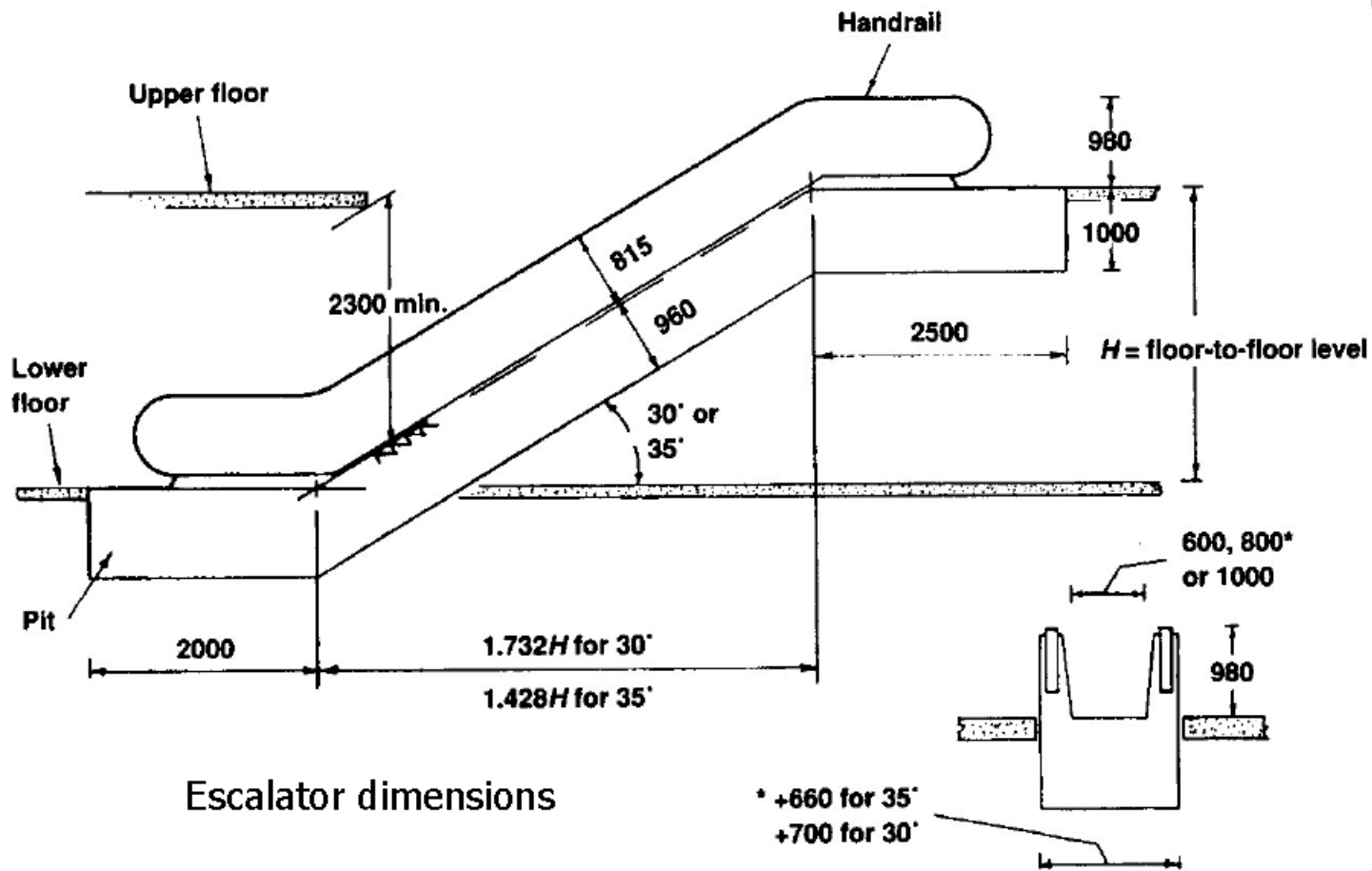


WALKAROUND

# ESCALATOR ARRANGEMENT



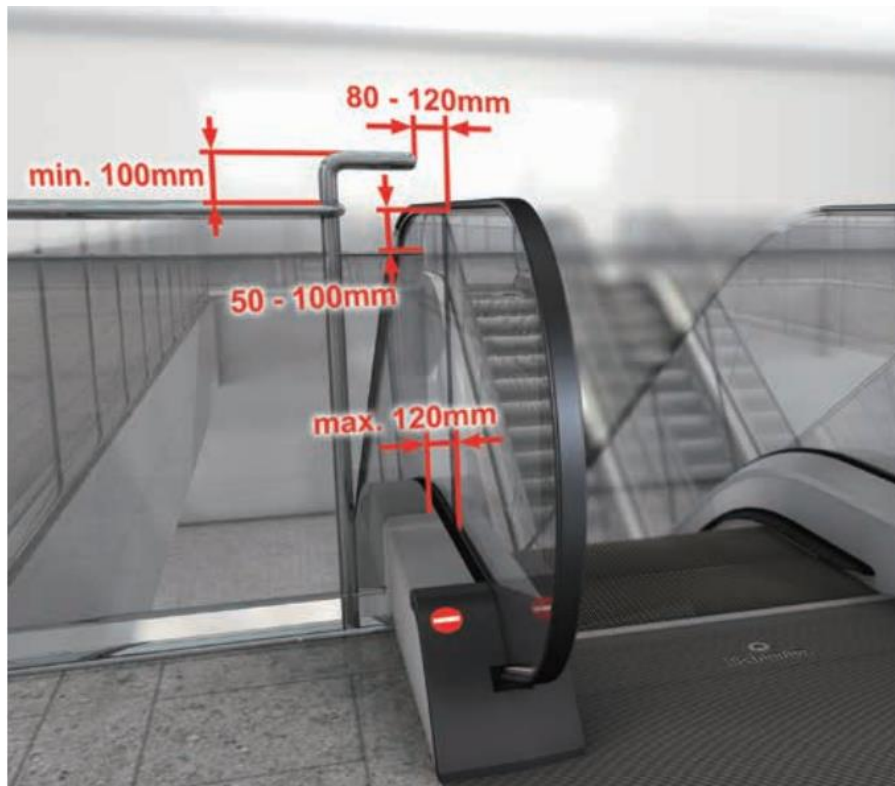
# ESCALATOR DIMENSIONS



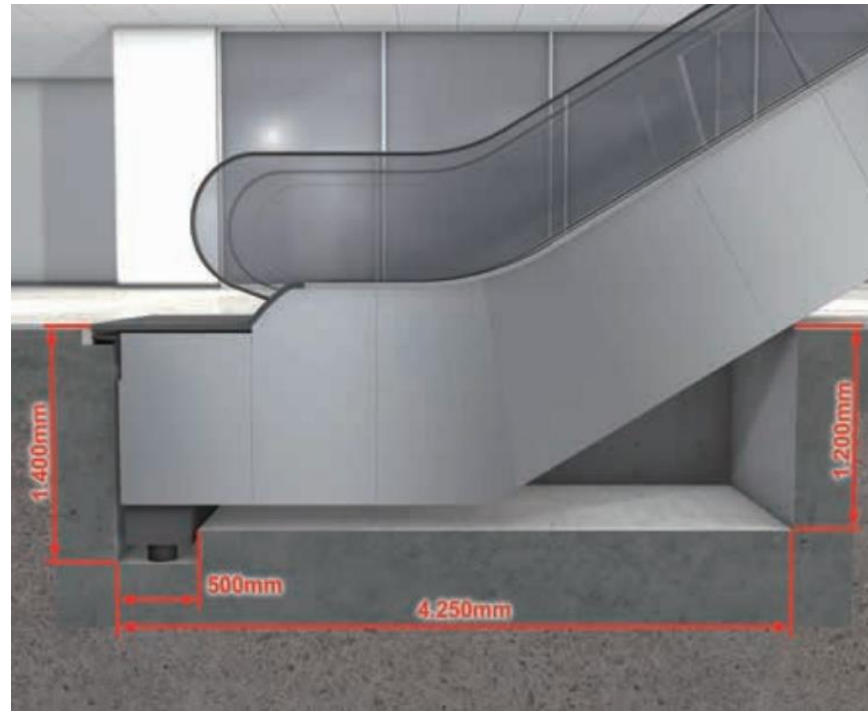
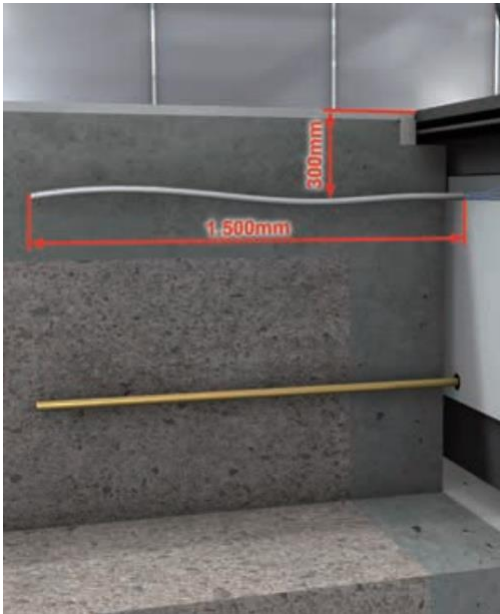
Escalator dimensions



# ESCALATOR DIMENSIONS



# ESCALATOR DIMENSIONS



# ESCALATOR DIMENSIONS

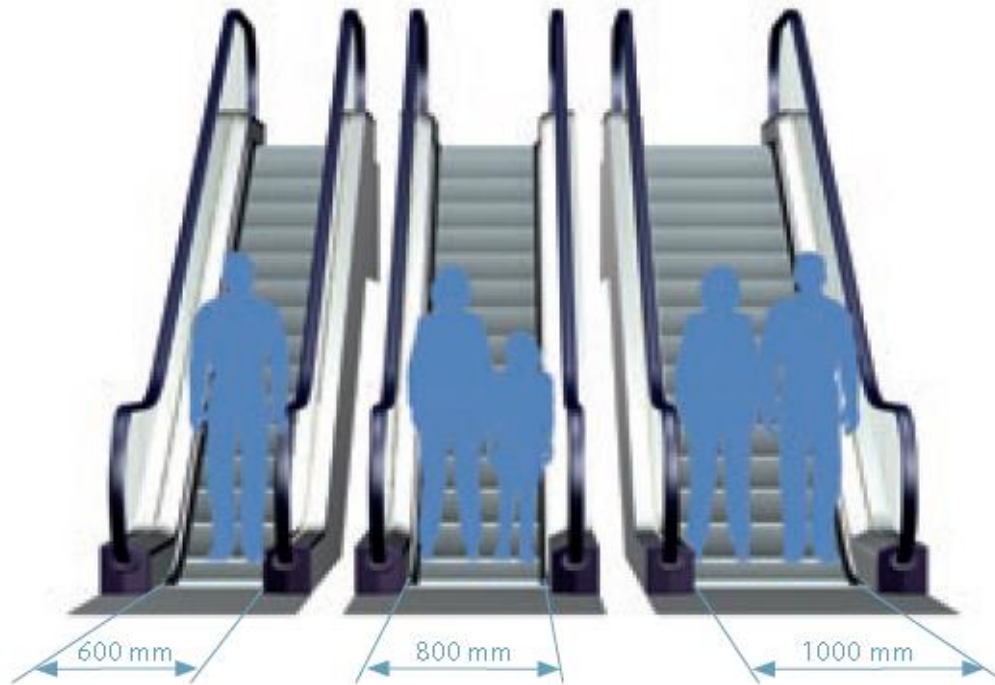
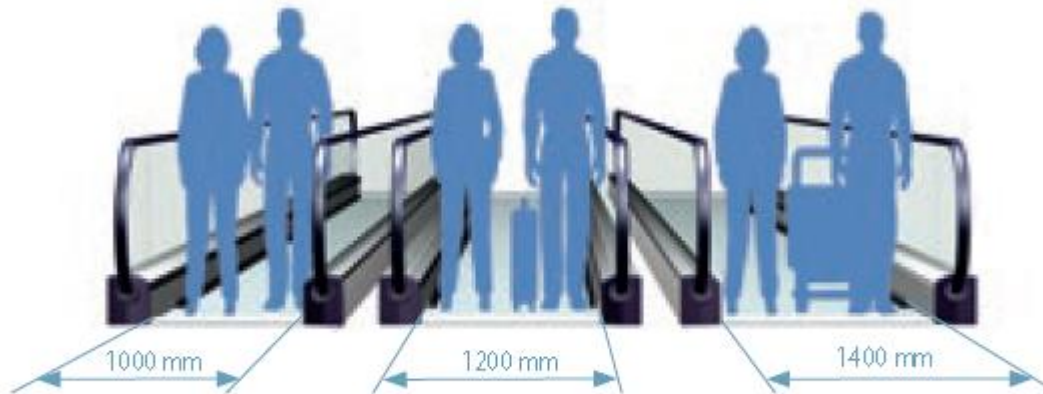
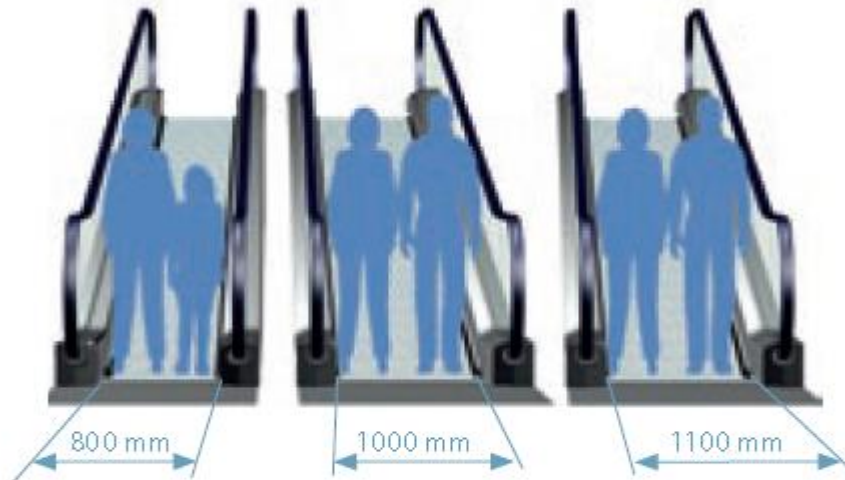


Figure 5.4 Escalator step widths

# ESCALATOR DIMENSIONS



*Figure 5.5 Horizontal autowalk pallet widths*



*Figure 5.6 Inclined autowalk pallet widths*

# TRAFFIC CAPACITY

The following formula can be used to ascertain capacity and compare efficiencies and suitability of escalators at building design stage:

$$N = \frac{3600 \times P \times V \times \cos \theta}{L}$$

Where,

- $N$  = number of persons moved per hour
- $P$  = number of persons per step
- $V$  = escalator speed ( $\text{ms}^{-1}$ )
- $L$  = length of step (m)
- $\theta$  = angle of incline

# TRAFFIC CAPACITY (Contoh Kiraan)

## ■ Example

- An escalator of 30° incline, one passenger per step, a speed of 0.5 ms<sup>-1</sup> and 400 mm tread or step length

$$N = \frac{3600 \times 1 \times 0.5 \times \cos 30^\circ}{0.4}$$

$$= 4500 \times \cos 30^\circ$$

$$= 3897 \text{ nos. persons moved per hour}$$

# CALCULATING TRAFFIC CAPACITY

Table 4.1 Traffic capacity calculations according to EN 115-1

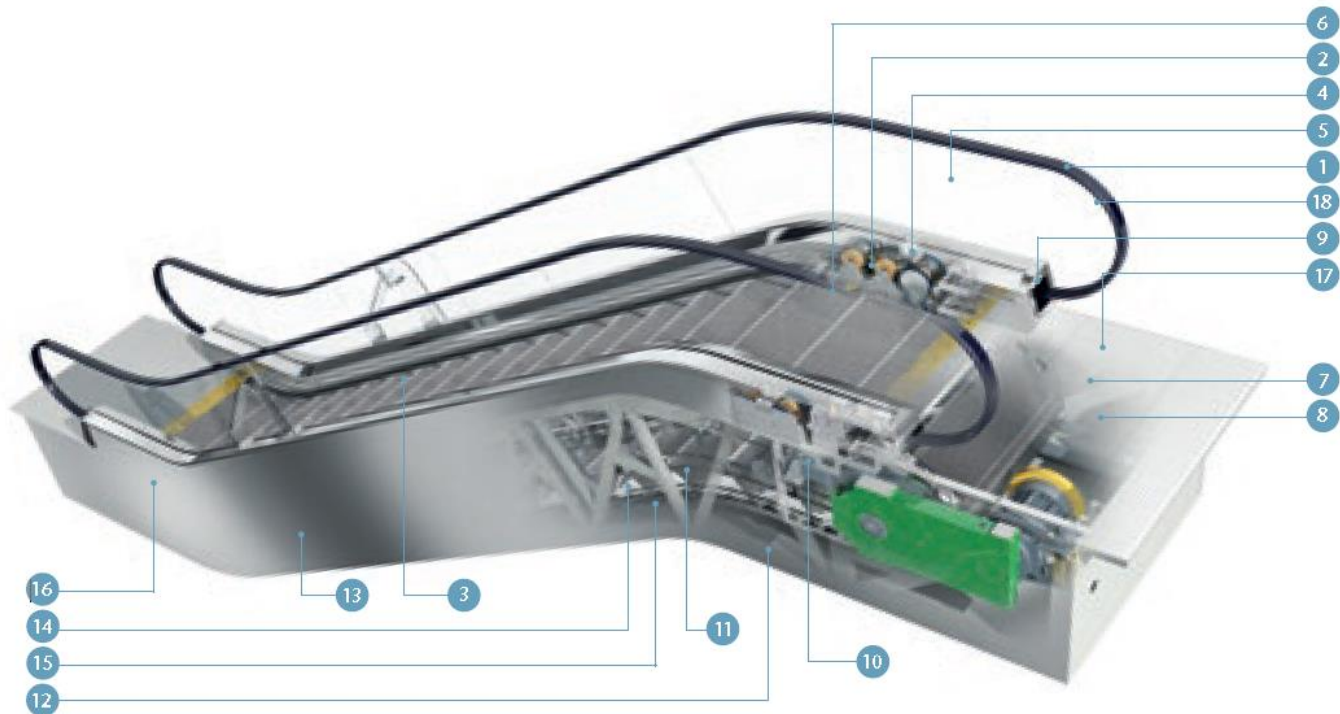
Step/pallet width	Nominal speed		
	0.5 m/s	0.65 m/s	0.75 m/s
600 mm	3,600 persons/h	4,400 persons/h	4,900 persons/h
800 mm	4,800 persons/h	5,900 persons/h	6,600 persons/h
1000 mm	6,000 persons/h	7,300 persons/h	8,200 persons/h

Step width	Theoretical transportation capacity		Effective transportation capacity at a rated speed of		
Table according to EN 115-1 (other national regulations can be met)					
	v = 0.5 m/s	v = 0.5 m/s uncrowded	v = 0.5 m/s convenient	v = 0.5 m/s crowded	v = 0.65 m/s crowded
600 mm	4500 pers./h	1800 pers./h	2700 pers./h	3600 pers./h	4400 pers./h
800 mm	6750 pers./h	2400 pers./h	3600 pers./h	4800 pers./h	5900 pers./h
1000 mm	9000 pers./h	3000 pers./h	4500 pers./h	6000 pers./h	7300 pers./h



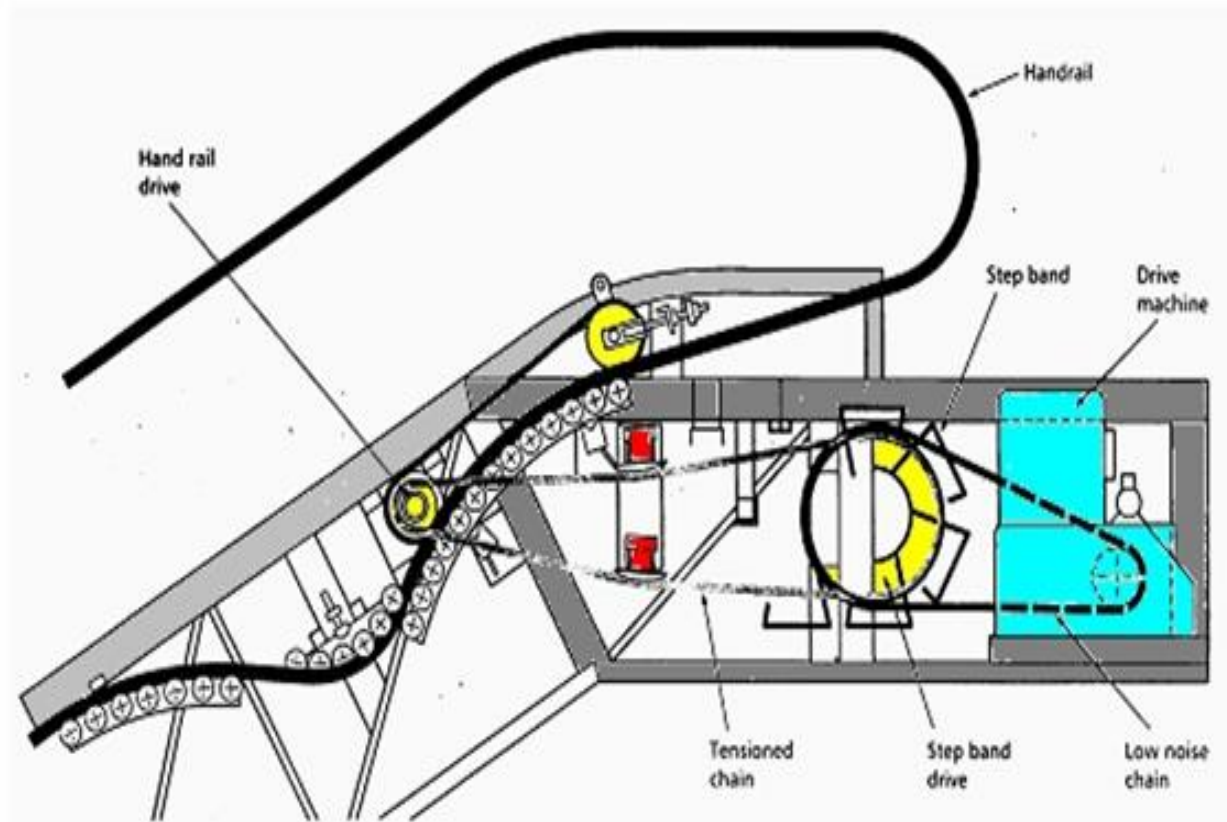
# ESCALATOR COMPONENTS

Item	Component		
1	Handrail	10	Handrail drive
2	Skirting	11	Transition radii
3	Steps/pallets	12	Truss
4	Decking	13	Side cladding
5	Balustrade	14	Step chain
6	Horizontal steps/pallets	15	Tracks
7	Drive station	16	Return station
8	Controller	17	Access cover plate
9	Front plate	18	Newel



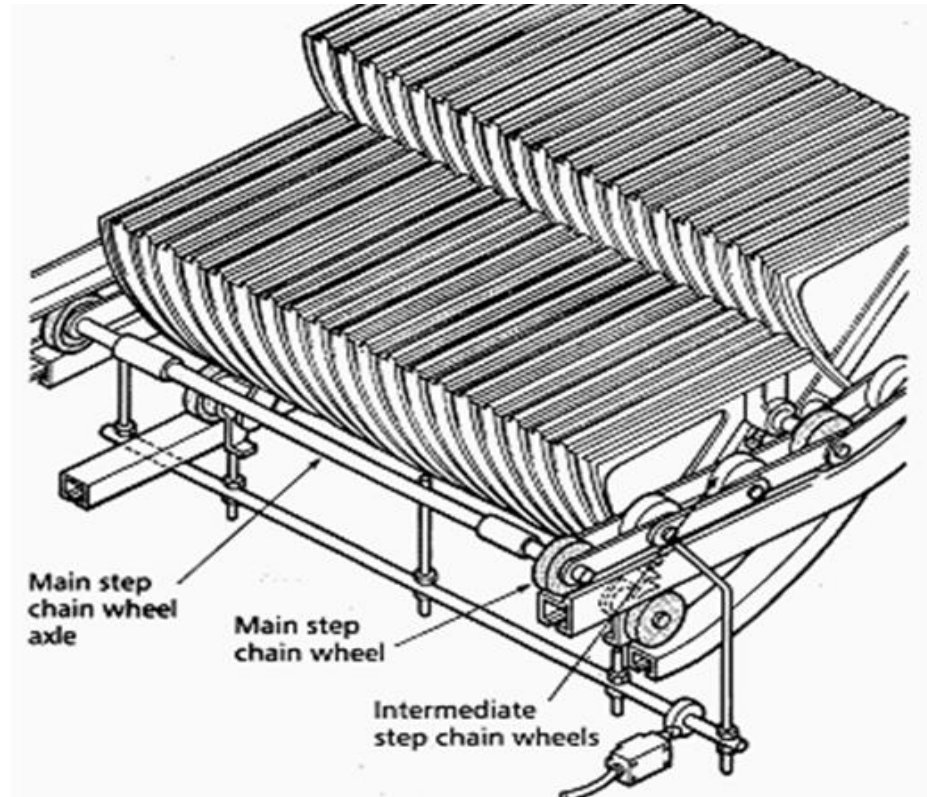


# ESCALATOR COMPONENTS



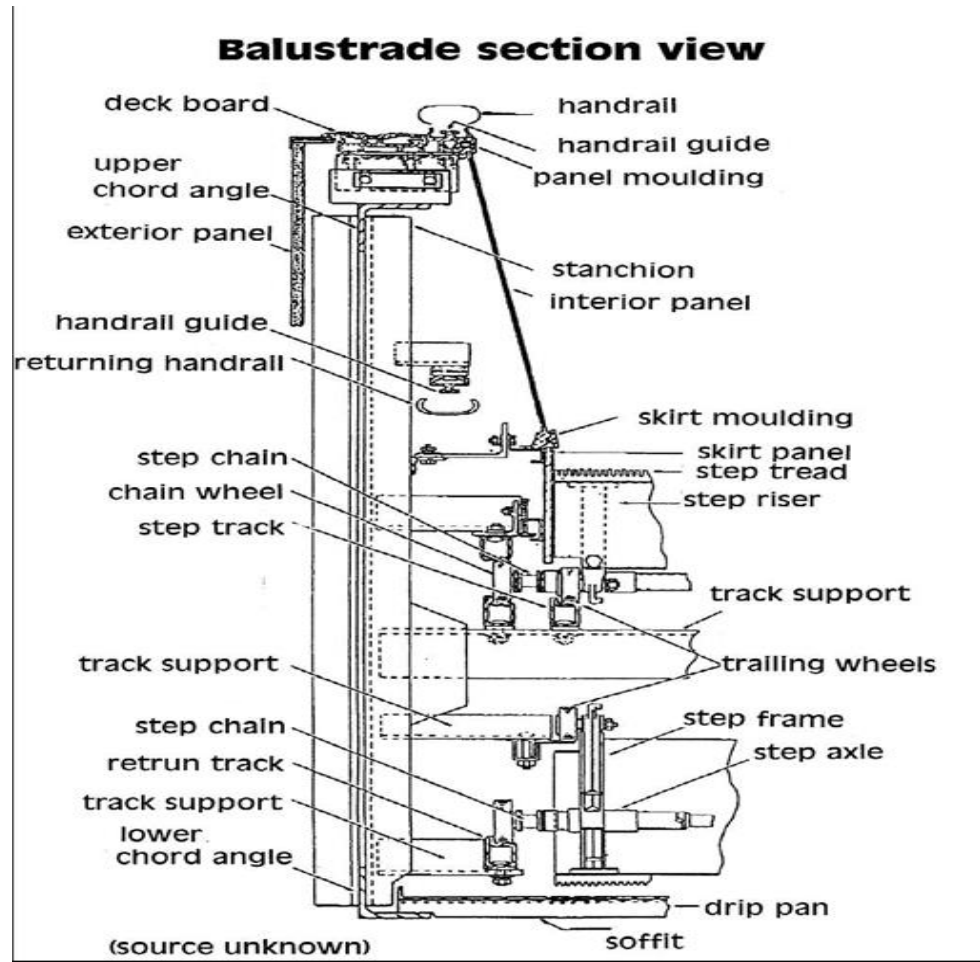
**Detail of upper station**

# ESCALATOR COMPONENTS

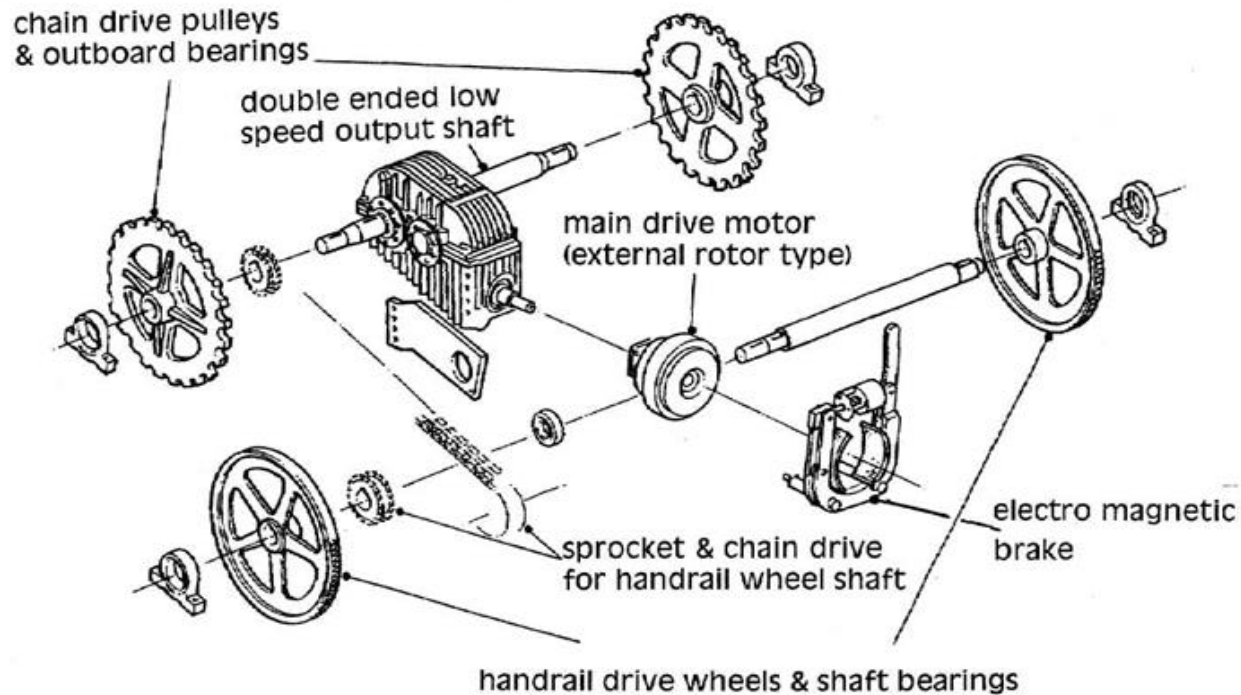


**Detail of step**

# ESCALATOR COMPONENTS



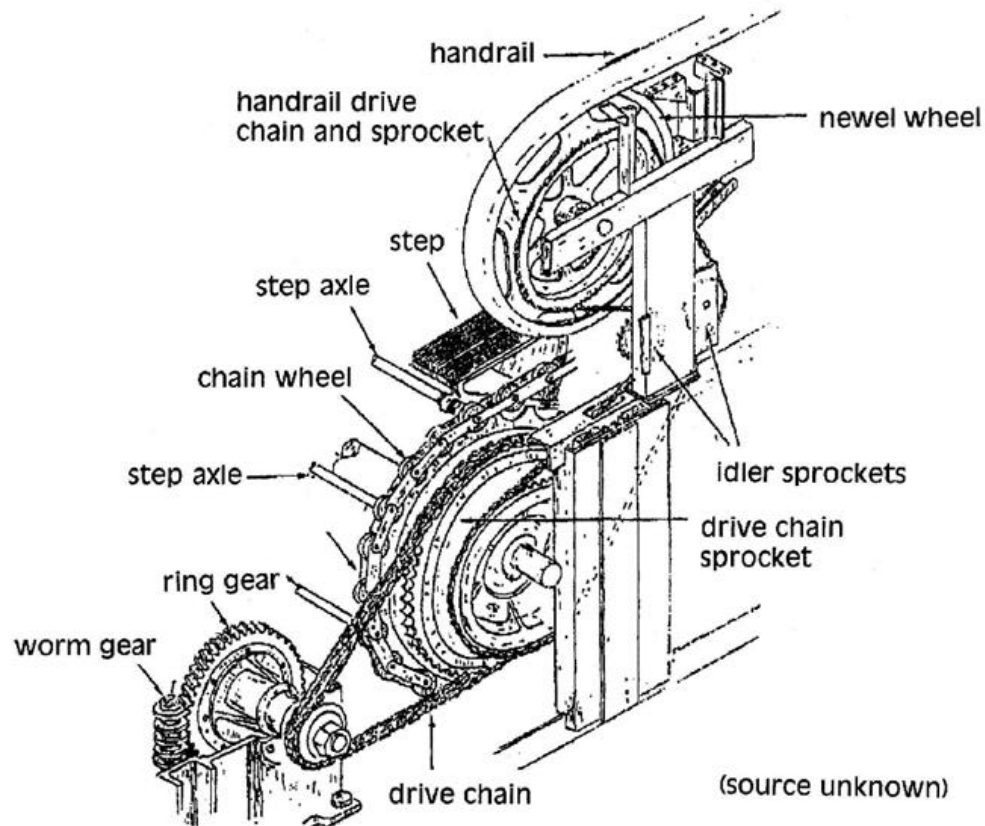
# ESCALATOR COMPONENTS



(courtesy NALM)

## Escalator gear unit

# ESCALATOR COMPONENTS



**Escalator drive sprocket assembly**

# ESCALATOR COMPONENTS

- Circulation safety:**
- yellow lines
  - deflector devices
  - yellow spots on handrails
  - landing lighting

- Equipment safety:**
- Overspeed
  - reversal of direction
  - auxiliary brake
  - step breakage
  - step elongation
  - sagging step
  - comb plate
  - handrail guard
  - broken handrail
  - successive escalators



# TRANSPORTATION CHARACTERISTICS

Escalators	Horizontal autowalks	Inclined autowalks	Elevators
Continuous	Continuous	Continuous	Interrupted
Mass transport	Mass transport	Mass transport	Limited number
Short-medium distances	Medium-long distances	Short-medium	Higher rises
In between floors	On one floor	In between floors	In between floors
Steer people flow	Save time and effort	Steer people flow	Improve accessibility

The escalator system isn't nearly as good as an elevator at lifting people dozens of stories, but it is much better at moving people a short distance. This is because of the escalator's high **loading rate**.

# BUILDING SEGMENT



Running TIME?

TYPE? Arrangement?

Speed?

Environment?

- ▶ Public Transport Segment
- ▶ Airport Segment
- ▶ Retail Segment
- ▶ Office, Hotel, Medical Segment
- ▶ Leisure Segment



# CONTOH CIRI-CIRI MODEL DI PASARAN

Product name	Description (+type)	Segment	Maximum rise	Speed	Inclination	Duty cycle	Environment
TravelMaster 110	escalator	Commercial, retail, hotel, office	13 m	0.4, 0.5 m/s	30°, 35°	12-16 hours/day	Indoor, outdoor, semi-outdoor
TravelMaster 115	Inclined autowalk	Commercial, retail, hotel, office	7 m	0.5 m/s	10°, 12°	12-16 hours/day	Indoor, semi-outdoor
TravelMaster 120	escalator	Infrastructure	15 m	0.4, 0.5, 0.65, 0.75 m/s	27.3°, 30°, 35°	20-24 hours/day	Indoor, semi-outdoor, outdoor
TransitMaster 140	escalator	Infrastructure	18 m	0.4, 0.5, 0.65, 0.75 m/s	27.3°, 30°	20-24 hours/day	Indoor, outdoor
TransitMaster 165	horizontal autowalk	Infrastructure	15-60 m	0.4, 0.5, 0.65, 0.75 m/s	0-6°	20-24 hours/day	Indoor, semi-outdoor
TransitMaster 185	horizontal autowalk	Infrastructure	15-100 m	0.4, 0.5, 0.65, 0.75 m/s	0-6°	20-24 hours/day	Indoor, semi-outdoor
KONE InnoTrack	horizontal autowalk	Infrastructure	15-60 m	0.5, 0.65 m/s	0°	20-24 hours/day	Indoor

