ELEVATOR DYNAMICS ENGINE

VERTICAL TRANSPORTATION STUDY

Elevator Traffic Analysis Report

Skyline Tower

Sunset Street 12

Up-peak calculation: pass

For this 12-floor office with 700 people, 4 lifts x 10 passengers at 2.5 m/s deliver 12.7% handling capacity in 27 s intervals. Design demand is 12%. This meets the up-peak criteria for an office. Cars leave the lobby about every 27 s, waits around 13.5 s if the lobby is full.

Job number	PRJ-012345
Building type	Office (multi tenant)
Building	12 floors served · 700 people
Design demand	12 % of population per 5 min
Lift group	4 cars × 10 passengers at 2.5 m/s
Analysis basis	Calculation and benchmark simulation series (ISO 8100-32 Clauses 7 and 8)
Report ID	EDE-2026-0818-c159
Issued	18 August 2026
Prepared using	Elevator Dynamics Engine v0.1.0

This is a traffic planning study prepared with software that uses ISO 8100-32:2020 and CIBSE Guide D methods. Calculated figures were produced by this software from the inputs in this report. This is not an ISO or CIBSE approval. It is not a lift contract, a safety certification, or a substitute for the judgement of a qualified lift traffic engineer. See the methodology and legal notice at the end of this document.

ISO 8100-32:2020 · 9.1

General

This report presents a vertical transportation planning study for the lift group described below. It follows the reporting structure of ISO 8100-32:2020 Clause 9 and uses the up-peak design criteria of Table 2, together with the service quality bands of CIBSE Guide D.

Analysis methods used

- Calculation method (Clause 7): up-peak round trip time, interval and handling capacity. Always performed.
- Simulation method (Clause 8): discrete-event simulation of the lift group under a generated passenger stream. Performed for this report.

> **Status of this document**
>
> This is a planning study intended to support concept design and lift sizing decisions. It is not a lift supply contract, a safety or conformity certification, and it does not replace manufacturer data or a site survey.

ISO 8100-32:2020 · 9.2

Authorship data

Item	Value
Project name	Skyline Tower
Project address	Sunset Street 12
Job number	PRJ-012345
Report ID	EDE-2026-0818-c159
Analysis software	Elevator Dynamics Engine (EDE) v0.1.0
Generated at	18 Aug 2026, 20:35 GMT+8

Responsible person

The software computes the calculated figures from the inputs in this report; a named person remains responsible for those inputs and for issuing the report. Complete on issue.

Prepared by _____

Organisation _____

Date _____

ISO 8100-32:2020 · 9.3

Information related to the building

Field	Value
Building type	Office (multi tenant)
Floors served (including entrance)	12
Floor-to-floor height	3.30 m
Travel height above entrance	36.3 m
Population served	700
Population basis	net area / area per person
Population distribution	Uniform above entrance
Design demand	12 % of population per 5 min

Population is the figure used in the analysis. ISO 8100-32 Clause 6.3 gives area, room and dwelling based estimating rules where a surveyed population is not available.

ISO 8100-32:2020 · 9.4

Design criteria

Criteria applied for an office (multi tenant) building, taken from ISO 8100-32:2020 Table 2. The installation must also cover the stated design demand of 12 % of the population per 5 min. Where the achieved figure falls short of either the table minimum or the design demand, the criterion is reported as a fail.

Criterion	Target	Achieved	Status
Handling capacity (HC)	min 12 % and min 12 %	12.7 %	PASS
Interval (INT)	max 30 s	27.0 s	PASS
Average waiting time (AWT)	up to 25 s excellent, up to 35 s acceptable	13.5 s	EXCELLENT

Handling capacity and interval are pass/fail criteria under ISO 8100-32. The waiting time entry is a CIBSE Guide D qualitative service band, not an ISO threshold: ISO 8100-32 §5.4.3 leaves the required waiting time to the designer. A design is reported as meeting criteria only when both ISO criteria pass and the waiting time band is not Poor.

ISO 8100-32:2020 · 9.5

Data related to the lift installation

Parameter	Symbol	Value
Number of cars in group	L	4
Rated capacity	CC	10 persons
Car loading factor	—	80 %
Rated speed	v	2.50 m/s
Acceleration	a	1.00 m/s²
Jerk	j	1.00 m/s³
Door opening time	to	2.0 s
Door closing time	tc	3.0 s
Passenger transfer time	tp	1.20 s
Start delay	tsd	0.50 s
Levelling delay	tl	0.04 s
Dispatch control	—	Estimated-ETA collective

The car loading factor is the share of rated capacity assumed to be carried per trip in the up-peak calculation; CIBSE Guide D uses 80 %. The simulation loads cars to their physical rated capacity instead. Only single-group estimated-ETA collective control is modelled: destination control systems and multi-deck lifts are outside the scope of this tool and of the ISO 8100-32 calculation method.

ISO 8100-32:2020 · 9.6

Calculated lift performance output data

Up-peak calculation results for the design demand of 12 % of the population per 5 min, using the round trip time method of ISO 8100-32 Annex D and CIBSE Guide D.

Metric	Value	Criterion	Status
Round trip time (RTT)	107.9 s	—	INFO
Interval (INT)	27.0 s	max 30 s	PASS
Handling capacity (HC)	12.7 %	min 12 %	PASS
Average waiting time (AWT)	13.5 s	CIBSE band	EXCELLENT
Average time to destination (ATT)	20.2 s	—	INFO
Highest reversal floor (H)	10.22	—	INFO
Expected stops (S)	5.87	—	INFO

The calculation assumes a full lobby with pure incoming traffic and evenly distributed destinations above the entrance. In this condition the average waiting time is taken as half the interval (AWT = INT / 2), which is the standard up-peak convention rather than a measured queueing result. The average time to destination adds the in-car travel time to the first stop.

ISO 8100-32:2020 · 9.7

Simulated lift performance output data

Discrete-event simulation of the lift group under a generated passenger stream, following the simulation method of ISO 8100-32 Clause 8.

Run parameters

Parameter	Value
Run type	Benchmark series (design demand plus increasing demand steps)
Simulated period	120 min
Design demand	12 % of population per 5 min
Traffic template	Lunch two-way
Traffic mix (in / out / interfloor)	45 / 45 / 10 %
Average arrival batch size	1.50
Random seed	Not set (run not repeatable)
Passengers generated	2,016

Simulated service metrics

Metric	Value	Meaning
Average waiting time (AWT)	23.5 s	Mean time from arrival at the landing to boarding a car
95th percentile waiting time	66.4 s	95 % of passengers waited less than this
Longest waiting time	172.7 s	Worst single wait observed
Waits over 60 s	7.8 %	Share of passengers with a wait CIBSE Guide D treats as poor service
Average transit time	40.1 s	Mean in-car travel time from boarding to alighting
Average time to destination	63.6 s	Door-to-door time: waiting plus transit
Delivered handling capacity	11.9 %	Passengers delivered per 5 min as a share of population
Passengers delivered / 5 min	83.5	Absolute number of passengers delivered in a five-minute period
Maximum queue length	24	Longest landing queue at any moment
Time to clear	120 min 39 s	Simulated time until the last passenger was served

Delivered handling capacity reflects the traffic actually offered during the run. Below saturation it therefore tracks demand rather than the maximum the group could deliver, which is why ISO 8100-32 §8.2 asks for a series of runs at increasing demand.

Distribution of waiting times

Waiting time band	Passengers	Share
0 to 15 s	924	45.8 %
15 to 30 s	524	26.0 %
30 to 45 s	280	13.9 %
45 to 60 s	130	6.4 %
60 to 90 s	119	5.9 %
90 to 120 s	30	1.5 %
Over 120 s	9	0.4 %

APPENDIX A

Calculation compared with simulation

The two methods answer slightly different questions. The calculation sizes the group against an idealised up-peak condition with a full lobby; the simulation measures the service delivered to a generated stream of individual passengers. Differences are expected and are not in themselves an error.

Metric	Calculation	Simulation	Difference
Handling capacity (%)	12.7	11.9	-0.8 %
Average waiting time (s)	13.5	23.5	+10.0 s
Average transit time (s)	20.2	40.1	+19.9 s

How to read the differences

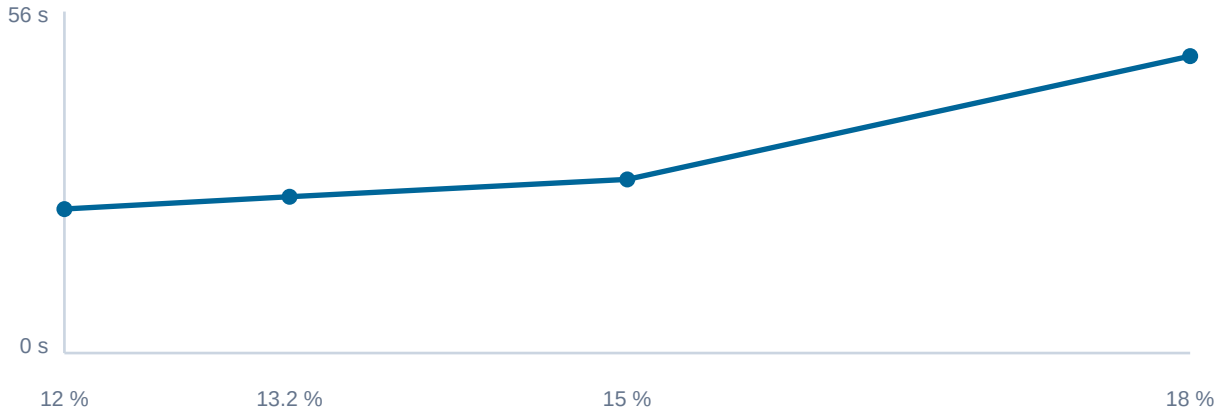
- Calculated handling capacity is the group's theoretical up-peak throughput. Simulated handling capacity is what was actually delivered against the offered demand, so below saturation it tracks demand rather than capability.
- Calculated waiting time is half the interval, an up-peak convention. Simulated waiting time comes from individual passenger arrivals and queueing, so it responds to bunching and to the traffic mix.
- The simulated traffic mix included outgoing and interfloor movement, so it is a different traffic condition from the pure up-peak calculation and closer agreement should not be expected.

APPENDIX B

Saturation study

ISO 8100-32 §8.3 asks for the design demand to be simulated together with a series of higher demands, so that the margin between the design condition and the point of saturation is visible. A run is treated as saturated when passengers are left behind or when the group delivers materially fewer passengers than arrived.

NO SATURATION WITHIN THE TESTED RANGE



Demand (%)	Offered /5 min	Delivered /5 min	AWT (s)	95th %ile (s)	Left behind	Status
12.0	84.0	84.0	23.5	66.4	0	OK
13.2	92.4	92.4	25.5	70.8	0	OK
15.0	100.5	100.5	28.3	75.9	0	OK
18.0	124.1	124.1	48.4	124.5	0	OK

The first row is the design demand. Later rows raise the offered demand in steps of 10 %, 25 % and 50 % above it.

APPENDIX C

Assumptions and scope

The following assumptions apply to the results in this report. Where a project departs from them, the analysis should be revisited.

- Single group under estimated-ETA collective control (ISO 8100-32 scope). Destination control and multi-deck groups are not modelled.
- Up-peak calculation assumes a full lobby with pure incoming traffic (CIBSE Guide D / ISO 8100-32 Annex D method).
- Simulated traffic mix is 45% incoming / 45% outgoing / 10% interfloor, so simulated results are not directly comparable with the pure up-peak calculation.
- No random seed was set, so the simulated figures will differ slightly if the run is repeated.

ISO 8100-32:2020 Clause 1 excludes destination control systems, multi-deck lifts, unequal floor populations and mixed-use zoning from its calculation method. Where this tool supports such a case it is flagged above as an extension beyond the standard method.

APPENDIX D

Methodology and standards

This appendix explains how the figures in this report were produced, so that a reviewer can judge their basis and reproduce them.

1. Standards referenced

- ISO 8100-32:2020, Lifts for the transport of persons and goods — Part 32: Planning and selection of passenger lifts to be installed in office, hotel and residential buildings. Clauses 5 to 9 cover design criteria, population and demand, the calculation method, the simulation method and reporting.
- CIBSE Guide D, Transportation systems in buildings. Used for the up-peak round trip time formulation and for the qualitative service bands applied to average waiting time.

2. Calculation method (ISO 8100-32 Clause 7)

The up-peak calculation assumes incoming traffic only, a full lobby, and passengers whose destinations are distributed across the floors above the entrance in proportion to their population. From these assumptions the tool derives the probable number of stops (S) and the highest reversal floor (H), then builds the round trip time (RTT) from the resulting flight times, door operations, passenger transfer times, start delays and levelling delays. Flight times are computed from a jerk-limited kinematic profile, so short inter-floor journeys that never reach rated speed are treated correctly. Interval is RTT divided by the number of cars, handling capacity follows from the number of passengers carried per round trip, and average waiting time is taken as half the interval.

3. Simulation method (ISO 8100-32 Clause 8)

A discrete-event simulation generates individual passengers with random arrival times, origins and destinations according to the traffic mix and demand recorded in section 9.7, then dispatches the group car by car and records the service each passenger actually received. Waiting time is measured from landing arrival to boarding, and transit time from boarding to alighting. Because arrivals are random, results vary between runs unless a random seed is set.

A benchmark run repeats the simulation at the design demand and at demands 10 %, 25 % and 50 % above it, as ISO 8100-32 §8.3 requires, to show the margin before the group saturates. A run counts as saturated when passengers are left behind or when delivered throughput falls more than 5 % short of the traffic offered.

4. Design criteria

Handling capacity and interval targets are taken from ISO 8100-32:2020 Table 2 for the building type recorded in section 9.3, and the installation must additionally cover the stated design demand. Waiting time is rated against the CIBSE Guide D service bands, which are advisory: ISO 8100-32 §5.4.3 leaves the required waiting time to the designer.

5. Exclusions

Only single-group estimated-ETA collective control is modelled. Destination control systems, multi-deck lifts, zoned or shuttle arrangements, goods and firefighting duty, and lift lobby space planning are outside the scope of this analysis, in line with the exclusions in ISO 8100-32 Clause 1.

6. Reproducibility

Item	Value
Software version	Elevator Dynamics Engine v0.1.0
Report ID	EDE-2026-0818-c159
Random seed	—
Repeatable	Calculated figures are deterministic; simulated figures require a random seed to reproduce exactly

APPENDIX E

Glossary

Symbol	Term	Meaning
RTT	Round trip time	Average time for one car to leave the entrance, serve its passengers and return.
INT	Interval	Average time between car departures from the entrance: RTT divided by the number of cars.
HC	Handling capacity	Passengers the group can carry in 5 min, as a percentage of the building population.
AWT	Average waiting time	Mean time from arriving at the landing to boarding a car.
ATT	Average time to destination	Waiting time plus in-car travel time, i.e. door-to-door time.
H	Highest reversal floor	Highest floor a car is expected to reach before returning to the entrance.
S	Probable stops	Expected number of stops a car makes on one up-peak round trip.
DES	Discrete-event simulation	Passenger-by-passenger simulation of the lift group over a period of time.
Saturation	—	The demand at which the group can no longer clear the traffic offered to it.

APPENDIX F

Legal notice

How this report was produced

Calculated (Clause 7) figures are generated by Elevator Dynamics Engine from the inputs in sections 9.3–9.5. Simulated (Clause 8) figures are included only when a discrete-event simulation was produced by the service for this design. Elevator Dynamics Engine does not issue this report to third parties; the person who exports and circulates it does.

No warranty

This report and the software used to produce it are provided as is, without warranty of any kind, express or implied. The results depend entirely on the accuracy and completeness of the inputs recorded in this document.

Planning study only

The analysis supports concept and scheme design decisions. It does not replace the judgement of a qualified lift traffic engineer, a site survey, measured traffic data, or the performance data of a specific lift product.

Not a safety or compliance certification

Nothing in this report certifies compliance with EN 81, the Lifts Directive, accessibility or fire regulations, or any other statutory requirement applicable to the installation.

Relationship to ISO and CIBSE

The methods used are aligned with ISO 8100-32:2020 and CIBSE Guide D. Elevator Dynamics Engine is not published, endorsed, certified or approved by ISO, CIBSE or any standards body, and reference to these documents does not imply their approval of this software or of this report.

Client responsibility

Before this report is relied upon for procurement or contract, the recipient is responsible for verifying the building population, the design demand, the lift parameters, and the suitability of the traffic conditions analysed.

Limitation of liability

To the fullest extent permitted by law, no liability is accepted for any loss or damage arising from use of, or reliance on, this report, including any indirect or consequential loss.

APPROVAL

Sign-off

This report is issued for review and approval. Complete and sign below; signatures may be applied by hand after printing or through an external electronic signature service.

Prepared by	Reviewed by	Approved by
Name	Name	Name
Title / organisation	Title / organisation	Title / organisation
Date	Date	Date
Signature	Signature	Signature

Analysis status at issue

- ☐ Up-peak calculation completed
- ☐ Simulation completed and confirmed
- ☐ Not applicable — calculation only

As generated, this report contains both calculated and simulated results. Report EDE-2026-0818-c159, issued 18 August 2026.