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Energy performance of lifts, escalators and moving walks —

Part 1: Energy measurement and verification

Performance énergétique des ascenseurs, escaliers mécaniques et trottoirs roulants —
Partie 1: Mesure de l'énergie et vérification

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 10, *Lifts, escalators and moving walks,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 25745-1:2012), which has been technically revised.

The main changes are as follows:

— updated scope for lifts regarding energy storage systems and fan.

A list of all parts in the ISO 25745 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document has been prepared in response to the rapidly increasing need to ensure and to support the efficient and effective use of energy.

This document is intended to be a reference for the following parties:

— building developers or owners determining and confirming the energy consumption of a building;

— building owners and service companies for performing regulatory periodic energy verification;

— manufacturers, installers and maintenance providers of lifts, escalators and moving walks;

— consultants and architects involved in specification of lifts, escalators and moving walks.

The total energy consumption over the entire life cycle of lifts, escalators and moving walks consists of the energy to manufacture, install, operate, and the disposal of lifts, escalators and moving walks. However, for the purpose of this document, only the power consumption of the lift, escalator or moving walk required for its operation is considered in the assessment of energy consumption and its verification.

This document is suitable for national or regional jurisdictional energy performance purposes.

Energy performance of lifts, escalators and moving walks —

Part 1: Energy measurement and verification

1 Scope

1.1 General

This document specifies:

a) methods of measuring actual energy consumption of lifts, escalators and moving walks on a single unit basis;

b) methods of carrying out periodic energy verification checks on lifts, escalators and moving walks in operation.

This document only considers the energy performance during the operational portion of the life cycle of the lifts, escalators or moving walks.

1.2 Lifts

For lifts, this document does not cover energy aspects, such as:

a) hoistway lighting;

b) heating and cooling equipment, including fans in the lift car;

c) machine room lighting;

d) machine room heating, ventilation and air conditioning;

e) non-lift, display systems, closed circuit television security cameras, etc.;

f) non-lift, monitoring systems (building management systems, etc.);

g) the effect of lift group dispatching on energy consumption;

h) non-lift equipment consumption through the power sockets;

i) energy storage systems if used as an alternative energy source for operation.

1.3 Escalators and moving walks

For escalators and moving walks, this document does not cover energy aspects of the ancillary equipment, such as:

a) lighting with the exception of comb plate lighting and step gap lighting and traffic light;

b) cooling and heating;

c) alarm devices and emergency battery supplies equipment, etc.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
ancillary current
current drawn by the ancillary circuit(s) through the ancillary switch(es)

3.2
ancillary energy
energy (3.6) used by the *ancillary equipment* (3.3)

3.3
ancillary equipment
equipment such as lighting, fans, heating, alarm devices and emergency battery supplies

3.4
ancillary power coupling point
point where ancillary power measurements are taken, and which is located at the output side of the lift, escalator or moving walk ancillary power breaker

Note 1 to entry: See Annex A.

3.5
autostart condition
condition when an escalator or moving walk is stationary, powered up and ready to start when initiated by passenger detection

3.6
energy
power consumed over time

3.7
energy meter
instrument capable of measuring *energy* (3.6)

3.8
idle
condition when a lift is stationary at a floor following a run before the standby mode is entered

3.9
main power coupling point
point where the main power measurements are taken, and which is located at the output side of the main switch/disconnect for the lift, escalator or moving walk

Note 1 to entry: See Annex A.

3.10
no load condition
condition when an escalator or moving walk is running at *nominal speed* (3.11, 3.12) without passengers

Note 1 to entry: If one or more passengers are on the escalator or moving walk, it is considered as running under load condition.

3.11
nominal speed
<escalator> speed in the direction of the moving steps when operating the equipment in the *no load condition* (3.10), stated by the manufacturer as that for which the escalator has been designed

3.12
nominal speed
<moving walk> speed in the direction of the pallets or belt when operating the equipment in the *no load condition* (3.10), stated by the manufacturer as that for which the moving walk has been designed

3.13
non-lift equipment
equipment not required by the lift to perform all the necessary operations to ensure the safe and intended functioning of the installation

3.14
reference cycle
<lift> cycle during which the empty car is run from the bottom terminal landing to the top terminal landing, and then back to the bottom terminal landing including two complete door cycles

3.15
running current
current drawn by the lift, when it has achieved rated speed in either the up or down direction

3.16
slow speed condition
condition when an escalator or moving walk is running at slow speed without passengers

3.17
standby condition
<lift> condition when a lift is stationary at a floor and may have reduced the power consumption to a lower level set for that particular lift

Note 1 to entry: For units with power back-up systems, the lift should be connected and operating on main power with backup power outputs disabled while the measurements are taken.

Note 2 to entry: Care should be taken to ensure that the application of the standby condition does not compromise the safety of the installation.

3.18
standby condition
<escalator or moving walk> condition when the escalator or moving walk is stationary and powered on and can be started by authorized personnel

Note 1 to entry: For units with power back-up systems, the escalator or moving walk should be connected and operating on main power with backup power outputs disabled while the measurements are taken.

Note 2 to entry: Care should be taken to ensure that the application of the standby condition does not compromise the safety of the installation.

Note 3 to entry: There can be other electrical loads not associated with the escalator or moving walk, which should not be included.

3.19
standby current
current drawn by the lift, when in *standby condition* (3.17, 3.18)

3.20
terminal landings cycling test
test for lifts when the car is continuously cycled between the bottom terminal landing and the top terminal landing, with the door operations enabled and no load in the car

3.21
verification
procedure to identify any significant changes in *energy* (3.6) characteristics during the life of the lift, escalator or moving walk

Note 1 to entry: Verification can be used to compare actual consumption with projected consumption.

4 Measurement and verification of lift, escalator and moving walk energy usage

4.1 General

Measurements and verifications may be performed after commissioning, in-service and after modernization if required.

The measurements shall be:

— practical in the field;

— repeatable;

— able to utilize commonly available measuring equipment;

— performed by a trained, competent person.

Tables 1 and 2 summarize measurements to be made and the instrumentation required.

Table 1 — Lift measurement and verification of energy usage

Type of measurement	Measurements to be made	Instrumentation
Energy measurement (see 4.2 and 5.2)	Main energy — running Main energy — idle and standby Ancillary energy — running Ancillary energy — idle and standby	Energy meter (see 5.1)
Energy verification check (see 4.3.2 and 5.3)	Main current — running Main current — idle and standby Ancillary current — running Ancillary current — idle and standby	Current probe (see 5.1)

Table 2 — Escalator and moving walk measurement and verification of energy usage

Type of measurement	Measurements to be made	Instrumentation
Power measurement (see 4.2 and 6.2)	Power in standby condition Power in autostart condition Power in slow speed condition Power in no load condition Ancillary power	Power meter (see 6.1)
Power verification check (see 4.3.3 and 6.3)	Power in no load condition	Power meter (see 6.1)
NOTE No reference cycle is used for escalators and moving walks. Therefore, a power measurement and power verification check is applied.		

4.2 Lift energy measurements or escalator and moving walk power measurements

This measurement may be run on request after commissioning and at any point during the equipment life cycle as needed. It can be used to assess actual consumption and compare with projected consumption. The specification for the measurement system is indicated in 5.1 for lifts and 6.1 for escalators and moving walks.

4.3 Lift, escalator and moving walk energy verification check

4.3.1 General

This check is to verify that power usage of a unit has not significantly changed over the life of the installation.

4.3.2 Lift

Only the current is measured, as this is the most likely element of energy consumption to change with equipment ageing. Initially a current or a current profile is established after equipment commissioning and after modernization. Thereafter checks may be performed at any time during the operating life of the equipment, to determine whether the energy consumption of the equipment has changed. The specification for the measurement system is indicated in 5.1.

Usually aging affects the energy consumption when the lift is running. Therefore, unless modifications have been made it should only be necessary to measure the main current running.

4.3.3 Escalator and moving walk

Initially power in the no load condition is measured. Thereafter, periodic checks of power in the no load condition may be performed at any time during the operating life of the equipment, to determine whether the energy consumption of the equipment has changed. The specification for the measurement system is indicated in 6.1.

4.4 Multiple lift, escalator and moving walk installations

In the case of multiple lift, escalator and moving walk installations, each unit is tested as a standalone piece of equipment.

NOTE A group of lifts can be more energy efficient than single units operating alone.