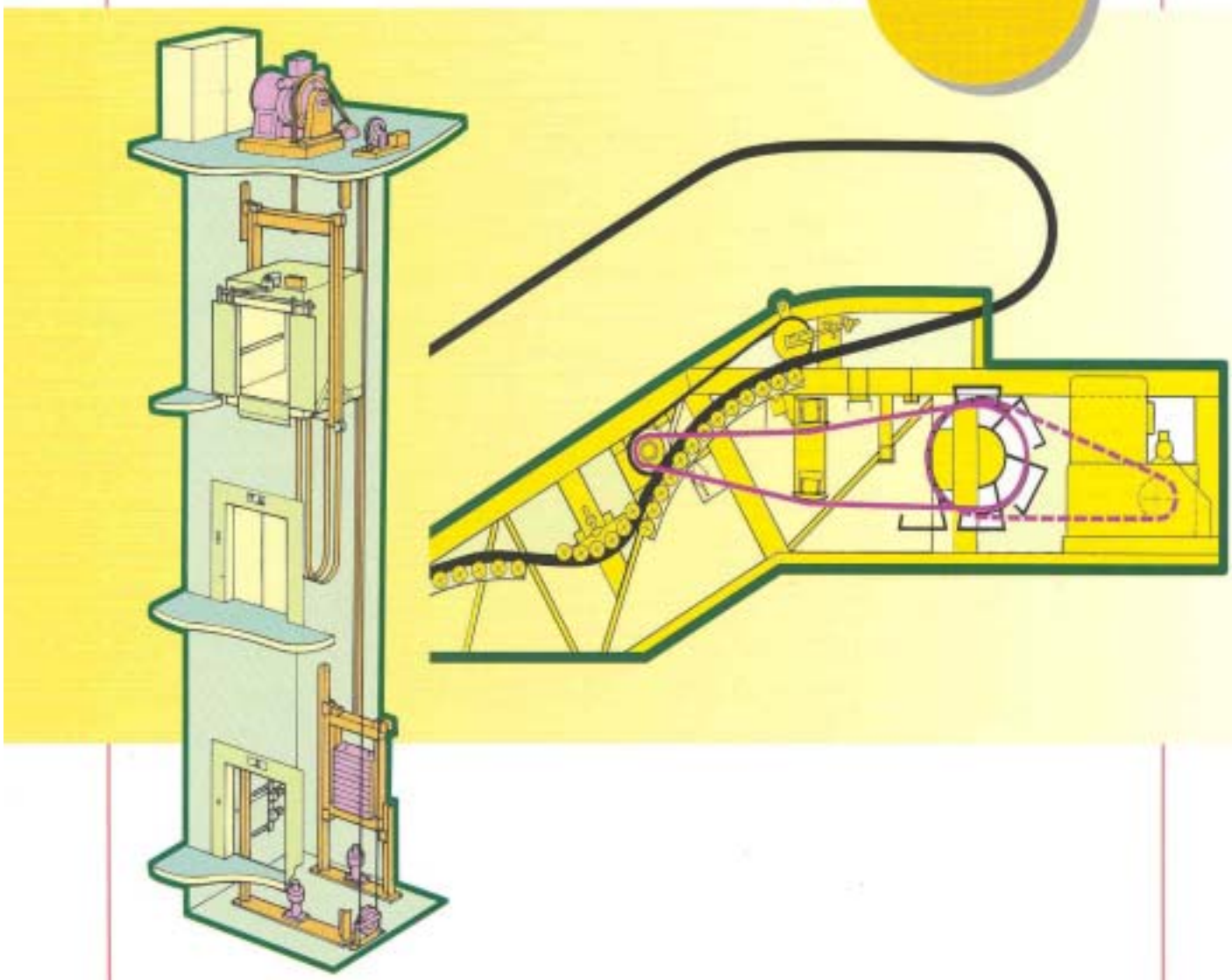
CODE OF PRACTICE FOR

Energy Efficiency of Lift and Escalator Installations

2005 EDITION



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Foreword

The Code of Practice for Energy Efficiency of Lift and Escalator Installations aims to set out the minimum requirements on energy efficiency of lift and escalator installations in buildings. It forms a part of a set of comprehensive Building Energy Codes that addresses energy efficiency requirements on building services installations. Designers are encouraged to adopt a proactive approach to exceed the minimum requirements of this code.

This code was developed by the Task Force on Lift and Escalator Energy Code that was established under the Energy Efficiency & Conservation Sub-committee of the Energy Advisory Committee. The Task Force members include:-

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This Code was first published in 1998 by the Electrical & Mechanical Services Department.

The set of comprehensive *Building Energy Codes* cover this Code, the Codes of Practice for Energy Efficiency of Air Conditioning Installations, Electrical Installations, and Lighting Installations, and the Performance-based Building Energy Code.

The Building Energy Codes and Registration Scheme documents are available for free download at http://www.emsd.gov.hk/emsd/eng/pee/eersb.shtml
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Amendment to 2000 Edition

- Tables (4.1.1a), (4.1.1b) and (4.1.1c):- maximum allowable electrical power of traction lifts revised, involving minor shift in ranges of rated load and rated speed;
- Table (4.1.2):- maximum allowable electrical power of hydraulic lifts revised, involving minor shift in range of Rated Load;
- Clause 4.1.3:- requirement on maximum allowable decoration load added;
- Requirements on lift systems handling capacity (clause 4.3 in 2000 edition) and lift traffic design (clause 4.4 in 2000 edition) waived;
- Table 4.3 *(Table (4.5) in 2000 edition)*:- requirement on total harmonic distortion of lift motor specific to operating current less than 40A added;
- Tables (5.2a) to (5.2e):- requirements on maximum allowable electrical power of escalators & passenger conveyors revised, involving minor shift in ranges of rated load and rated speed
- Table (5.3):- requirement on total harmonic distortion of escalator/conveyor motor specific to operating current less than 40A added;
- Clause 5.4:- operating condition of motor elaborated

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Acknowledgement

In the preparation of this Code, reference has been made to the following publications:

a) Guide D: 2000, Transportation Systems in Buildings, CIBSE

b) Barney, G.C., and Dos Santos, S.M., Elevator Traffic Analysis Design and Control, Peter Peregrinus, 1995

c) Stawinoga, Roland, "Designing for Reduced Elevator Energy Cost", ELEVATOR WORLD magazine, Jan 1994

d) Al-Sharif, Lutfi, Bunching in Lifts, ELEVATOR WORLD magazine, Jan 1996

e) Malinowski, John, Elevator Drive Technologies, ELEVATOR WORLD magazine, Mar 1998

f) Guide Notes on Elevators (Lifts) Planning, Selection and Design, 1997, Department of Public Works & Services, Australia

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1. SCOPE

1.1 This Code shall apply to passenger lifts, freight lifts, lifts used for vertical transportation of motor vehicles, bed passenger lifts, escalators and passenger conveyors in all buildings, with the exclusion of the following installations :

a) *Builders' lifts used for vertical transportation of persons in a building construction site*

b) *Hoists used for vertical transportation of materials*

c) *Service lifts*

d) *Lifts and hoists installed in a performance stage*

e) *Lift equipment for building maintenance*

f) *Traction lift equipment with load > 5000kg and rated speed > 3m/s*

1.2 This Code shall apply to new installations and upgrading of motor drive and controller in relations to lifts, escalators and passenger conveyors.

2. DEFINITIONS

The expressions that appear in this Code are defined as follows:-

"Bed Passenger Lift" means a lift used for transportation of passenger and bed including stretcher.

"Building" has the meaning assigned to it in section 2 of the Buildings Ordinance (Cap. 123).

"Builders' Lift" means a lifting machine-

(a) that has a cage;
(b) the operating controls for which are located inside the cage;
(c) the cage of which is raised and lowered by means of a rack and pinion suspension system or rope suspension system;
(d) the direction of movement of which is restricted by guide or guides, and is used for construction work, and includes the supports, liftway and enclosures and the whole of the mechanical and electrical apparatus required in connection with the operation and safety of the builder's lift;

"Commercial Building" means a building, or that part of the building, constructed or intended to be used for business, trade or entertainment.

"Composite Building" means a building that is partly domestic and partly non-domestic.

"Domestic Building" means a building constructed or intended to be used for habitation and the expression "domestic purpose" shall be construed accordingly.

"Escalator" means an inclined, continuous stairway which is driven by mechanical power and used for raising or lowering passengers

"Freight Lift" means a lift mainly intended for the transport of goods, which are generally accompanied by persons handling the goods. A general freight lift is one which:-

- the loading in the lift will normally be evenly distributed over the floor of the car;
- the weight of any single piece of freight, or the weight of any single truck, which may be used in the loading of the lift, and the load therein, will be not more than a quarter of the rated load of the lift;
- the lift will be loaded only manually or by means of trucks which are not driven by any form of power.

An industrial truck loaded freight lift is one which will be loaded and unloaded by industrial truck, and the loading is not necessarily evenly distributed over the floor, and the weight of any single piece of freight and its truck can exceed a quarter of the rated load of the lift.

"Hotel" means any building used wholly or in part primarily for the purpose of accommodation on a commercial basis.

"Hydraulic Lift" means a lift which the lifting power is derived from an electrically driven pump transmitting hydraulic fluid to a jack, acting directly or indirectly on the lift car.

"Lift" means a lifting machine or appliance having a car or platform the direction of movement of which is restricted by a guide or guides, but does not include an escalator.

"Lift Bank" means a lift system with two or more lift cars serving a zone.

"Passenger Conveyor" means a continuous walkway which is driven by mechanical power and used for the conveyance of passengers on the same or between different traffic levels.

"Passenger Lift" means a lift which is wholly or mainly used to carry persons.

"Rated Speed" of an escalator or a passenger conveyor means the speed of a no-load escalator or passenger conveyor in the direction of the moving steps, pallets or the belt at which the steps, pallets on the belt move and for which the escalator or passenger conveyor has been built and normal operation is guaranteed by the manufacturer.

"Service Lift" means a lift, used or intended to be used exclusively for carrying goods, having a rated load of not more than 250 kg and a car in which the area of the floor is not more than 1 m^2 and whose height is not more than 1200 mm.

"Total Power Factor" = $$\frac{P}{\sqrt{P^2 + Q^2 + D^2}}$$

where P = active power in kW of fundamental component
Q = reactive power in kVAr not including any harmonic component
D = distortion power in kVAd contributed from harmonic components

"Total Harmonic Distortion (THD)" = $$\frac{\sqrt{\sum_{h=2}^{\infty} I_h^2}}{I_1}$$

where I_1 = r.m.s. value of fundamental current (A)
I_h = r.m.s. value of current of the h^{th} harmonic order (A)

"Up Peak Traffic Condition" means the traffic condition when the dominant or only traffic flow is in an upward direction with all or the majority of passenger entering the lift system at the main terminal of the building.

"Vehicle Lift" means a lift which is suitably dimensioned and designed for carrying motor vehicles.

3. GENERAL APPROACH

This Code sets out the minimum requirements for achieving energy-efficient lift, escalator and passenger conveyor installations. The Code's requirements entail the following aspects :

a) Maximum allowable electrical power of lifts, escalators & passenger conveyors

b) Energy management of lifts, escalators & passenger conveyors, and

c) Total harmonic distortion and total power factor

If conflict(s) occur between the requirements of this Code of Practice and the latest edition of the following publications/Ordinances and their subsequent amendments, the requirements of the conflicting publications/Ordinances shall supersede the conflicting requirements of this Code of Practice:

- Code of Practice For The Electricity (Wiring) Regulation *published by Electrical & Mechanical Services Department, Government of The Hong Kong Special Administrative Region*

- Code of Practice On The Design and Construction of Lifts and Escalators *published by Electrical & Mechanical Services Department, Government of The Hong Kong Special Administrative Region*

- Code of Practice on the Examination, Testing and Maintenance of Lifts and Escalators, 1996 Edition *published by Electrical & Mechanical Services Department, Government of The Hong Kong Special Administrative Region*

- Code of Practice on the Building Works for Lifts and Escalators, 1993 Edition, *published by Buildings Department, Government of The Hong Kong Special Administrative Region*

- Code of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment *published by Fire Services Department, Government of The Hong Kong Special Administrative Region*

- Circular Letters relating to Lift and Escalator issued by the Electrical & Mechanical Services Department.

- The Building (Construction) Regulations and Building (Planning) Regulations, Cap. 123.

- The Lifts and Escalators (Safety) Ordinance, Cap.327.

- The Electricity Ordinance, Cap. 406.

- The Noise Control Ordinance, Cap. 400.

4. REQUIREMENTS ON LIFT

4.1 Maximum Allowable Electrical Power

4.1.1 Maximum Allowable Electrical Power of Traction Lifts

The running active electrical power of the motor drive of any traction lift system carrying a rated load at its rated speed in an upward direction shall be equal to or less than the maximum allowable values indicated in Table (4.1.1a), Table (4.1.1b) and Table (4.1.1c).

Rated Load (kg)	Maximum Allowable Electrical Power (kW) of Traction Lift Systems for various Ranges of Rated speed (Vc) in m/s				
	Vc < 1	1 ≤ Vc < 1.5	1.5 ≤ Vc < 2	2 ≤ Vc < 2.5	2.5 ≤ Vc < 3
L < 750	7	10	12	16	18
750 ≤ L < 1000	10	12	17	21	24
1000 ≤ L < 1350	12	17	22	27	32
1350 ≤ L < 1600	15	20	27	32	38
1600 ≤ L < 2000	17	25	32	39	46
2000 ≤ L < 3000	25	37	47	59	70
3000 ≤ L < 4000	33	48	63	78	92
4000 ≤ L < 5000	42	60	78	97	115
L ≥ 5000	0.0083L+ 0.5	0.0118L+1	0.0156L+0.503	0.019L+2	0.0229L+ 0.5

Table (4.1.1a) : Maximum Allowable Electrical Power of Traction Lifts (Vc < 3)

Rated Load (kg)	Maximum Allowable Electrical Power (kW) of Traction Lift Systems for various Ranges of Rated speed (Vc) in m/s				
	3 ≤ Vc < 3.5	3.5 ≤ Vc < 4	4 ≤ Vc < 5	5 ≤ Vc < 6	6 ≤ Vc < 7
L < 750	21	23	25	30	34
750 ≤ L < 1000	27	31	32	39	46
1000 ≤ L < 1350	36	40	45	52	60
1350 ≤ L < 1600	43	49	52	62	72
1600 ≤ L < 2000	53	60	65	75	88
2000 ≤ L < 3000	79	90	95	115	132
3000 ≤ L < 4000	104	120	130	150	175
4000 ≤ L < 5000	130	150	160	190	220

Table (4.1.1b) : Maximum Allowable Electrical Power of Traction Lifts (3 ≤ Vc < 7)

Rated Load (kg)	Maximum Allowable Electrical Power (kW) of Traction Lift Systems for various Ranges of Rated speed (Vc) in m/s		
	$7 \leq Vc < 8$	$8 \leq Vc < 9$	$Vc \geq 9$
$L < 750$	39	45	$4.887Vc + 0.0014Vc^3$
$750 \leq L < 1000$	52	60	$6.516Vc + 0.0021 Vc^3$
$1000 \leq L < 1350$	70	80	$8.797Vc + 0.0021Vc^3$
$1350 \leq L < 1600$	83	95	$10.426Vc + 0.00266 Vc^3$
$1600 \leq L < 2000$	105	120	$13.033Vc + 0.0014Vc^3$
$2000 \leq L < 3000$	155	175	$19.549Vc + 0.0030Vc^3$
$3000 \leq L < 4000$	205	235	$26.065Vc + 0.0038Vc^3$
$4000 \leq L < 5000$	255	290	$32.582Vc + 0.0048Vc^3$

Table (4.1.1c) : Maximum Allowable Electrical Power of Traction Lifts ($Vc \geq 7$)

4.1.2 Maximum Allowable Electrical Power of Hydraulic Lifts

The running active electrical power of the hydraulic oil pump motor of any hydraulic lift system carrying a rated load at its rated speed in an upward direction shall be equal to or less than the maximum allowable values indicated in Table (4.1.2).

Rated Load (kg)	Maximum Allowable Electrical Power (kW) under rated conditions
$L < 1000$ kg	28
$1000 \text{ kg} \leq L < 2000$ kg	53
$2000 \text{ kg} \leq L < 3000$ kg	75
$3000 \text{ kg} \leq L < 4000$ kg	97
$4000 \text{ kg} \leq L < 5000$ kg	121
$L \geq 5000$ kg	0.0242L

Table (4.1.2) : Maximum Allowable Electrical Power of Hydraulic Lifts

4.1.3 Maximum Allowable Decoration Load

The maximum sole decoration load shall not be more than 50% of the rated load with a limitation of 600kg.

4.2 Energy Management of Lift Systems

a) Under normal operating status, at least one lift car of a lift bank shall operate under a *standby mode* during off-peak period when the traffic demand on the vertical transportation system is low.

b) Under a standby mode of operation, a lift car does not respond to passenger calls until it returns to the normal operation mode. If the lift is utilising DC M-G motor drive, the driving motor of the DC M-G motor drive system shall also be shut down during this standby mode operation.

c) Metering devices or permanent provisions (including suitable accessibility and sufficient space) for connection with such devices shall be provided for each electricity supply feeder for the vertical transportation systems, including the electrical load of the motor drive and the auxiliary loads such as ventilation and lightings, for measurement of voltages (phase-to-phase and phase-to-neutral), currents (line currents and neutral currents), total power factor, energy consumption (kWh), power (kW) and maximum demand (kVA) for the lift system.

d) For each lift car within a lift bank, when it has been idling for 2 minutes with the lift doors closed, the lift car's ventilation shall be shut off automatically until the lift car is activated again by passenger call.

4.3 Total Harmonic Distortion of Motor Drive Systems

At the moment a lift car is moving up with rated load at its rated speed, the *Total Harmonic Distortion (THD)* produced by the lift motor drive system measured at the isolator connecting the lift equipment to the feeder circuit of the building is limited to maximum allowable values specified in Table (4.5) :

Circuit Fundamental Current of Motor Drive	Maximum THD (%)
$I < 40A$	40
$40A \leq I < 80A$	35
$80A \leq I < 400A$	22.5
$400A \leq I < 800A$	15

Table (4.3) : Maximum Allowable THD for Lift Motor Drive Systems

4.4 Total Power Factor of Motor Drive Systems

The *Total Power Factor* of a motor drive circuit measured at the isolator connecting the lift equipment to the building's feeder circuit shall not be less than 0.85 when the lift car is carrying a rated load at its rated speed in an upward direction. In case the Total Power Factor is less than 0.85, design calculations are required at design stage of a building project to demonstrate adequate provision of power factor correction to achieve the minimum *Total Power Factor* of 0.85.

5. Requirements On Escalators & Passenger Conveyors

5.1 Energy Management of Escalators & Passenger Conveyors

Metering devices or permanent provisions (including suitable accessibility and sufficient space) for connection with such measuring devices shall be incorporated into each electricity feeder for the escalators or passenger conveyors for measurement of voltages (phase-to-phase and phase-to-neutral), currents (line currents and neutral currents), total power factor, energy consumption (kWh), power (kW) and maximum demand (kVA).

5.2 Maximum Allowable Electrical Power of Escalators & Passenger Conveyors

For any escalator other than public service escalator operating under *no-load condition*, the running active electrical power of a *steps driving motor* shall be equal to or less than the maximum allowable values shown in Table (5.2a).

Step Width (mm)	Rise of Escalator (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s		
		Vr < 0.5	0.5 ≤ Vr < 0.6	0.6 ≤ Vr < 0.75
600	R < 3.5	1350	1550	1950
600	3.5 ≤ R < 5	1600	1900	2350
600	5 ≤ R < 6.5	1850	2250	2750
600	R ≥ 6.5	220R+455	260R+558	318R+687
800	R < 3.5	1500	1700	2050
800	3.5 ≤ R < 5	1800	2100	2550
800	5 ≤ R < 6.5	2100	2500	3050
800	6.5 ≤ R < 8	2450	2900	3550
800	R ≥ 8	242R+619	267R+731	329R+898
1000	R < 3.5	1600	1900	2300
1000	3.5 ≤ R < 5	2000	2300	2850
1000	5 ≤ R < 6.5	2330	2800	3400
1000	6.5 ≤ R < 8	2750	3200	3950
1000	R ≥ 8	282R+688	368R+812	365R+1050

Table (5.2a) : Maximum Allowable Electrical Power of Escalator other than public service escalator operating under no-load condition

For any public service passenger conveyor operating under *no-load condition*, the running active electrical power of a *steps driving motor* shall be equal to or less than the maximum allowable values shown in Table (5.2e) and Table (5.2f). A passenger conveyor can be considered as a public service passenger conveyor when all the following conditions apply:

(i) They are part of a public traffic system including entrance and exit points (for example passenger conveyors connecting a traffic station and a premise); and

(ii) They are suitable for regularly operating for approximately 140 hours/week with a load reaching 100% of the brake load during periods lasting for at least 0.5 hour during any time interval of 3 hours.
During the planning stage it should be specified if it will be a public service passenger conveyor.

Step Width (mm)	Rise of Escalator (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s		
		Vr < 0.5	0.5 ≤ Vr < 0.6	0.6 ≤ Vr < 0.75
800	R < 3.5	2100	2500	3100
800	3.5 ≤ R < 5	2500	3000	3700
800	5 ≤ R < 6.5	2900	3450	4300
800	6.5 ≤ R < 8	3300	3900	4850
800	R ≥ 8	307R+837	366R+1003	456R+1246
1000	R < 3.5	2250	2650	3300
1000	3.5 ≤ R < 5	2650	3400	3900
1000	5 ≤ R < 6.5	3050	3650	4500
1000	6.5 ≤ R < 8	3450	4100	5150
1000	R ≥ 8	322R+882	365R+1168	481R+1317

Table (5.2b) : Maximum Allowable Electrical Power of Public Service Escalators operating under no-load condition

For any passenger conveyor other than public service passenger conveyor operating under *no-load condition*, the running active electrical power of a steps driving motor shall be equal to or less than the maximum allowable values shown in Table (5.2c) and Table (5.2d).

Step Width (mm)	Nominal Length of Conveyor (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s		
		Vr < 0.5	0.5 ≤ Vr < 0.65	0.65 ≤ Vr < 0.75
800	*l* < 8	1150	1450	1900
800	8 ≤ *l* < 12	1650	2100	2750
800	12 ≤ *l* < 16	2150	2750	3500
800	16 ≤ *l* < 20	2650	3900	4400
800	*l* ≥ 20	127*l*+102	186*l*+149	211*l*+169
1000	*l* < 8	1300	1650	1900
1000	8 ≤ *l* < 12	2100	2700	3050
1000	12 ≤ *l* < 16	2800	3550	4000
1000	16 ≤ *l* < 20	3450	4400	4950
1000	*l* ≥ 20	164*l*+131	209*l*+168	237*l*+190

Table (5.2c): Maximum Allowable Electrical Power of Passenger Conveyor other than Public Service Passenger Conveyor operating under no-load condition (Vr < 0.75)

Step Width (mm)	Nominal Length of Conveyor (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s
		0.75 ≤ Vr < 0.90
800	*l* < 8	2250
800	8 ≤ *l* < 12	3250
800	12 ≤ *l* < 16	4300
800	16 ≤ *l* < 20	5300
800	*l* ≥ 20	253*l*+203
1000	*l* < 8	2250
1000	8 ≤ *l* < 12	3650
1000	12 ≤ *l* < 16	4800
1000	16 ≤ *l* < 20	5950
1000	*l* ≥ 20	285*l*+228

Table (5.2d): Maximum Allowable Electrical Power of Passenger Conveyor other than Public Service Passenger Conveyor operating under no-load condition (0.75≤ Vr < 0.90)

For any public service passenger conveyor operating under *no-load condition*, the running active electrical power of a *steps driving motor* shall be equal to or less than the maximum allowable values shown in Table (5.2e) and Table (5.2f). A passenger conveyor can be considered as a public service passenger conveyor when all the following conditions apply:

(i) They are part of a public traffic system including entrance and exit points (for example passenger conveyors connecting a traffic station and a premise); and

(ii) They are suitable for regularly operating for approximately 140 hours/week with a load reaching 100% of the brake load during periods lasting for at least 0.5 hour during any time interval of 3 hours.
During the planning stage it should be specified if it will be a public service passenger conveyor.

Step Width (mm)	Nominal Length of Conveyor (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s		
		Vr < 0.5	0.5 ≤ Vr < 0.65	0.65 ≤ Vr < 0.75
800	/< 8	1350	1750	2000
800	8 ≤ /< 12	1650	2100	2750
800	12 ≤ /< 16	2150	2750	3500
800	16 ≤ /< 20	2650	3900	4400
800	/≥ 20	127/+102	186/+149	211/+169
1000	/< 8	1450	1850	2100
1000	8 ≤ /< 12	2100	2700	3050
1000	12 ≤ /< 16	2800	3550	4000
1000	16 ≤ /< 20	3450	4400	4950
1000	/≥ 20	164/+131	209/+168	237/+190

Table (5.2e): Maximum Allowable Electrical Power of Public Service Passenger Conveyors operating under no-load condition (Vr < 0.75)

Step Width (mm)	Nominal Length of Conveyor (m)	Maximum Allowable Electrical Power in Watt for various Ranges of Rated Speed (Vr) in m/s
		0.75 ≤ Vr < 0.90
800	$l < 8$	2350
800	$8 \le l < 12$	3250
800	$12 \le l < 16$	4300
800	$16 \le l < 20$	5300
800	$l \ge 20$	253*l*+203
1000	$l < 8$	2450
1000	$8 \le l < 12$	3650
1000	$12 \le l < 16$	4800
1000	$16 \le l < 20$	5950
1000	$l \ge 20$	285*l*+228

Table (5.2f): Maximum Allowable Electrical Power of Public Service Passenger Conveyors operating under no-load condition (0.75 ≤ Vr < 0.90)

5.3 Total Harmonic Distortion of Motor Drive Systems

When an escalator/conveyor is operating with no load at its rated speed, the Total Harmonic Distortion (THD) produced by a motor drive system measured at the isolator connecting the escalator equipment to the building's feeder circuit is limited to a maximum allowable value specified in Table (5.3):

Circuit Fundamental Current of Motor Drive	Maximum THD (%)	
I < 40A	35, for electrical supply direct from building's feeder circuit	40, for electrical supply NOT direct from building's feeder circuit
40A ≤ I < 80A	35	
80A ≤ I < 400A	22.5	

Table (5.3) : Maximum THD of Motor Drive Systems for Escalators and Passenger Conveyors

5.4 Total Power Factor of Motor Drive Systems

The *Total Power Factor* of a motor drive measured/calculated at the isolator connecting the escalator/conveyor equipment to the power source shall not be less than 0.85 when the motor drive is operating under its *brake load* condition with rated speed in upward direction. Manufacturer's documentation are required to be submitted as proof. In case the Total Power Factor is less than 0.85 or manufacturer's documentation is not available, design calculations are required at design stage of a building project to demonstrate adequate provision of power factor correction to achieve the minimum Total Power Factor of 0.85.

6. SUBMISSION OF INFORMATION

The following standard forms are relevant to the provision of information in relation to this Code:-

FORM LE-G	Summary of Information on Lifts, Escalators & Passenger Conveyors
FORM LE-1	Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lift
FORM LE-2	Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lift
FORM LE-3	Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalator
FORM LE-4	Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyor
FORM LE-6	Energy Management of Lifts, Escalators & Passenger Conveyors

Schedule of Standard Forms

FORM LE-G	Summary of Information on Lifts, Escalators & Passenger Conveyors
FORM LE-1	Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lift
FORM LE-2	Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lift
FORM LE-3	Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalator
FORM LE-4	Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyor
FORM LE-6	Energy Management of Lifts, Escalators & Passenger Conveyors

Form LE-G

Summary of Information on Lifts, Escalators & Passenger Conveyors

Part (A) : General Information on Lifts, Escalators & Passenger Conveyors

Project/Building* Name : _____

Project/Building* Address : _____

_____

_____

Building Type(s)** : ☐ Residential ☐ Non-residential

☐ Other (please specify) : _____

Number of Floors in Building : _____

Type(s) of installation** ☐ Traction Lifts ☐ Hydraulic Lifts ☐ Escalators

☐ Passenger Conveyors

Anticipated Installation Commencement Date (dd/mm/yy) : _____
Anticipated Installation Completion Date (dd/mm/yy) : _____

Part (B) : Submitted LE Forms and Other Information

FORM	Description	Number of sheets
FORM LE-G	Summary of Information on Lifts, Escalators & Passenger Conveyors	
FORM LE-1	Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lift	
FORM LE-2	Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lift	
FORM LE-3	Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalator	
FORM LE-4	Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyor	
FORM LE-6	Energy Management of Lifts, Escalators & Passenger Conveyors	

* Delete as appropriate
** Select appropriate by putting a tick in the box

Electrical Power, Total Harmonic Distortion and Total Power Factor of Traction Lifts

Measurements are taken when a lift car is carrying rated load and at rated speed in the upward direction.

Lift Designation	Rated Load (kg)	Rated speed (m/s)	Circuit Current of Motor Drive (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%)	Total Power Factor	Decorative Load (kg)

Electrical Power, Total Harmonic Distortion and Total Power Factor of Hydraulic Lifts

Measurements are taken when a lift car is carrying rated load and at rated speed in the upward direction.

Lift Designation	Rated Load (kg)	Hydraulic Pump motor circuit current (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%)	Total Power Factor	Decorative Load

Electrical Power, Total Harmonic Distortion and Total Power Factor of Escalators

The Running Active Power and Total Harmonic Distortion (THD) are measured when the escalator is carrying no load and at rated speed.

The Total Power Factor is measured/calculated when the motor drive is operating at its brake load condition.

The escalator(s) below is/are public service escalator(s): yes/no

Escalator Designation	Rise of Escalator (m)	Step width (mm)	Rated Speed (m/s)	Motor Drive Circuit Current (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%) #	Supply from feeder circuit ? (yes or no)	Total Power Factor @ *(Note 1)*

Note 1: Manufacturer's measurement/calculation documents are required.

#: at no load and rated speed condition
@: at brake load condition

Electrical Power, Total Harmonic Distortion and Total Power Factor of Passenger Conveyors

The Running Active Power and Total Harmonic Distortion (THD) values are measured when the conveyor is carrying no load and at rated speed.

The Total Power Factor is measured/calculated when the motor drive is operating at its brake load condition.

The passenger conveyor(s) below is/are public service passenger conveyor(s): yes/no

Passenger Conveyor Designation	Nominal Length of Conveyor (m)	Step width (mm)	Rated Speed (m/s)	Motor Drive Circuit Current (A)	Measured Running Active Power (kW)	Total Harmonic Distortion (%) #	Supply from feeder circuit ? (yes or no)	Total Power Factor @ *(Note 1)*

Note 1: Manufacturer's measurement/calculation documents are required.

#: at no load and rated speed condition
@: at brake load condition

Energy Management of Lifts, Escalators & Passenger Conveyors

1) Energy Management of Lift Cars

Zone Designation	Lift Bank with DC-MG motor drive	Energy Management**	Provision of Metering Devices or provisions for connecting measuring devices for Lift Bank**
	Yes/No	☐ Standby mode ☐ Switch off Ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
	Yes/No	☐ Standby mode ☐ Switch off ventilation when idling more than 2 minutes	☐ Voltmeter ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters

2) Energy Management of Escalators and Passenger Conveyors

Group Designation	Number of Escalators/Passenger Conveyors in Group	Provision of Metering Devices or provisions for connecting measuring devices for Group of Escalators/Passenger Conveyors**
		☐ Voltmeter ☐ Ammeter ☐ kWh ..☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
		☐ Voltmeter ☐ Ammeter ☐ kWh . ☐ Total Power Factor ☐ Power ☐ Maximum Demand ☐ Connection points for the above meters
		☐ Voltmeter .. ☐ Ammeter ☐ kWh ☐ Total Power Factor ☐ Power .☐ Maximum Demand ☐ Connection points for the above meters

* Please tick appropriate