

Electrical & Mechanical Services Department

Hong Kong Energy Efficiency Registration Scheme for Buildings and Building Energy Codes

Amendments in 2007 edition (based on 2005 edition)

To suit changes in technological advancement and to cope with trade practices, there are amendments to the 2005 edition. The revisions have been agreed in a Review Task Force with members from representative organizations in the building industry including professional institutes, trade associations and the academia. The following lists the amendments.

Registration Scheme

- Registration extended to energy-audited buildings with good (at 50th percentile) energy performance gauged using EMSD's Benchmarking Tool in EMSD web-site;
- Application form simplified; and
- Paragraphs and sentences streamlined.

Lighting Code

- Reference of Luminous Efficacy at operating temperature dictated by the condition of the serving space added;
- Minimum Allowable Luminous Efficiency requirements and Maximum Allowable Controlgear Loss requirements extended to outdoor lighting;
- Minimum Allowable Luminous Efficacy requirements upgraded, and EMSD's Voluntary Energy Efficiency Labelling Scheme for Compact Fluorescent Lamps quoted as requisite requirements (in Table LG2 of Code):

Extract of **Table (LG2): Minimum Allowable Values of Luminous Efficacy for Various Types of Lamps** (crossed out figures indicate the 2005 edition requirements)

Minimum Allowable Values of Luminous Efficacy for Various Types of Lamps			
Lamp Type	Lamp Code	Nominal Lamp Wattage {L _w }	Minimum Allowable Luminous Efficacy (lm/W)
Tubular Fluorescent T5	MCF (T5)	10 W ≤ {L _w } < 14 W	60 75
		14 W ≤ {L _w } < 30 W	65 97
		{L _w } ≥ 30 W	70 97
All Other Tubular Fluorescent	MCF	{L _w } < 18 W	50 65
		18 W ≤ {L _w } < 40 W	55 75
		{L _w } ≥ 40 W	65 75
Compact Fluorescent (Controlgear Non-integrated)	CFN	Comply with latest requirements on minimum allowable luminous efficacy in The HK Voluntary Energy Efficiency Labelling Scheme for Compact Fluorescent Lamps, EMSD, available for download at http://www.emsd.gov.hk/emsd/eng/peel/eels_sch_doc.shtml .	
Compact Fluorescent (Controlgear Integrated)	CFG		
Metal Halide	MBI	{L _w } < 500 W	65 85
		{L _w } ≥ 500 W	80 90
Mercury Vapour	MBF	{L _w } < 50 W	35 40
		50 W ≤ {L _w } < 250 W	45 50
		{L _w } ≥ 250 W	50 55

Minimum Allowable Values of Luminous Efficacy for Various Types of Lamps			
Lamp Type	Lamp Code	Nominal Lamp Wattage {L _w }	Minimum Allowable Luminous Efficacy (lm/W)
Low Pressure Sodium Vapour	SOX	{L _w } < 40 W	130
		40 W ≤ {L _w } < 100 W	140
		{L _w } ≥ 100 W	160
High Pressure Sodium Vapour	SON	{L _w } < 50 W	30 40
		50 W ≤ {L _w } < 125 W	82
		125 W ≤ {L _w } < 500 W	80 110
		{L _w } ≥ 500 W	120
Blended Vapour (with built-in tungsten filament)	MBTF	{L _w } < 150 W	10
		150 W ≤ {L _w } < 300 W	20
		{L _w } ≥ 300 W	25
Tungsten Filament (including reflector lamps)	GLS	{L _w } < 20 W	6
		20 W ≤ {L _w } < 40 W	8
		40 W ≤ {L _w } < 60 W	10
		60 W ≤ {L _w } < 100 W	12 13
		100 W ≤ {L _w } < 150 W	13
		{L _w } ≥ 150 W	14
Tungsten Halogen (including reflector lamps)	TH	{L _w } < 20 W	11 12
		20 W ≤ {L _w } < 100 W	15
		100 W ≤ {L _w } < 500 W	16 17
		500 W ≤ {L _w } < 1000 W	19
		{L _w } ≥ 1000 W	22

- EMSD's Voluntary Energy Efficiency Labelling Scheme for Electronic Ballasts quoted as prerequisite (in Table 4.3 of Code) in the requirements on Maximum Allowable Values of Lamp Controlgear Loss:

Extract of Table (LG3) : Maximum Allowable Values of Lamp Controlgear Loss

Maximum Allowable Values of Lamp Controlgear Loss			
Lamp Type	Lamp Code	Nominal Lamp Wattage {L _w }	Maximum Allowable Lamp Controlgear Loss (W)
Lamp controlled by Electronic Ballast			
All types	All types	Complies with Table 1 of The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Electronic Ballasts, EMSD, available for download at http://www.emsd.gov.hk/emsd/eng/pee/eels_sch_doc.shtml	

- Maximum Allowable Lighting Power Density (LPD) requirements upgraded, with a performance approach for LPD compliance introduced to Atrium/Foyer & Vehicle Depot, and Maximum Allowable LPD requirements extended to Retails, Restaurant, & Vehicle Unloading Bay (in Table LG4 of Code):

Extract of Table (LG4) : Maximum Allowable Values of Lighting Power Density for Various Types of Space (crossed out figures indicate the 2005 edition requirements)

Maximum Allowable Values of Lighting Power Density for Various Types of Space		
Space Code	Type of Space	Lighting Power Density (W/m ²)
A.	Spaces for Common Activities	
A.1	Atrium / Foyer (headroom over 5m)	23 25
A.2	Carpark	8 6
A.3	Conference / Seminar Room	25 18
A.4	Corridor	15 12
A.5	Data Processing Room	25 16
A.6	Storeroom / Cleaner	15 11
A.7	Kitchen / Pantry	22 13
A.8	Lift Lobby	22 15
A.9	Machine Room / Switch Room	15 13
A.10	Reception / Waiting / Queuing Area	22 14
A.11	Rest / Recreation Room	22 13
A.12	Staircase	13 8
A.13	Toilet / Washroom / Shower Room	15 13
A.14	Vehicle Depot (for maintenance / repair / inspection) / Vehicle Unloading Bay	22 11
<p>For A1 & A14, a lighting energy approach may be adopted as an alternative deemed-to-satisfy approach to LPD requirements for installation with energy-efficient lighting features such as on-off programming, timer-control, photo-sensor, automatic dimming etc., where</p> <ul style="list-style-type: none"> - the lighting energy saving shall be calculated for all operating hours; - the lighting energy of the actual design shall not exceed that of a hypothetical reference space complying with the LPD requirements but not having the said energy-efficient features; - the design space and reference space shall have the same dimensions, and room & utilization indexes; and the maximum lighting area in a building under the energy approach does not exceed 20%. 		
B.	Offices	
B.1	Open Plan Office / Cellular Office	23 17
B.2	Drawing Office	28 20
C	Hotels	
C.1	Bedroom	25 17
C.2	Banquet Room / Function Room / Ball Room	40 23
D	Educational Institutions	
D.1	Classroom / Lecture Theatre / Laboratory	22 17
D.2	Library (reading area, stack area, audio visual centre)	23 17
E.	Mass Assembly Area	
E.1	Seating Area inside a Theatre / Cinema / Auditorium / Concert Hall	25 25
E.2	Mass Assembly Area / Assembly Hall	25 18
E.3	Exhibition Hall / Gallery	25 23
F.	Indoor Sports Grounds	
F.1	Spectator Seating Area	20 16
F.2	Indoor Sports Ground for Badminton, Basketball, Volleyball or Table Tennis : <ul style="list-style-type: none"> • for amateur players • for tournament 	22 17 28
F.3	Squash Courts <ul style="list-style-type: none"> • for amateur players • for tournament 	25 17 40 28

F.4	Indoor Swimming Pool • for amateur players • for tournament	16 15 19 28
F.5	Ice Rink • for amateur players • for tournament	19 15 24 28
G.	Retails	20 (new requirement)
H.	Restaurant	23 (new requirement)

- a fewer number of lighting control points than stipulated in Table (LG5) in Office Space conditionally allowed; and
- the performance approach on LPD requirement (clause 4.3.4) in a composite space emphasized.

Air Conditioning Code

- Fouling reference condition fixed at 0.000018m² °C/W for evaporator and 0.000044m² °C/W for condenser (in clause 9.1 of Code)
- Minimum Allowable Coefficient of Performance requirements upgraded (Tables 9.5 to 9.12B of Code) (crossed out figures below indicate the 2005 edition requirements):

Minimum COP for Unitary Air Conditioner					
	<u>Air-Cooled</u> (including single package & room coolers)				<u>Water - Cooled</u>
Capacity Range (kW)	10 and Below	Above 10 & Below 40	40 to 200	Above 200	All Ratings
Minimum COP (Cooling mode)	Comply with latest requirements on Grade 3 Energy Label or better in The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Room Coolers, EMSD. #	2.4	2.4	2.6	2.7 3
Minimum COP - Heat Pump (Heating Mode)		2.7 3 for VRV	2.9 for VRV		
		2.7	2.8	2.9	

VRV: Capacity control through variation of refrigerant volume flow.
#: Available for download at http://www.emsd.gov.hk/emsd/eng/pee/eels_sch_doc.shtml

Minimum COP for Air-cooled Chiller					
	<u>Reciprocating</u>		<u>Centrifugal</u>	<u>Scroll</u>	<u>Screw</u>
Capacity Range (kW)	below 400	400 and above	All Ratings		
COP	2.4 2.6	2.7 2.8	2.7 2.8	2.7	2.7 2.9

Minimum COP for Water-cooled Chiller												
	<u>Reciprocating</u>			<u>Centrifugal</u>			<u>Scroll</u>			<u>Screw</u>		
Capacity Range (kW)	< 500	500 to 1000	> 1000	< 500	500 to 1000	> 1000	< 500	500 to 1000	> 1000	< 500	500 to 1000	> 1000
COP	3.2 3.4	3.7 3.9	4 4.1	3.8 4	4.2 4.5	5.2 5.7	4.5 4	4.5	5.2	4.5 4.6	4.5 4.6	5.2 5.5

- applicants requested to provide data on Part Load Values of AC equipment and motor power of fan coil units (in Forms for submission).

Electrical Code

- Minimum Motor Efficiency requirements upgraded (Table 5.1 in Code)

Motor Rated Output (P)	Minimum Rated Efficiency (%)
$1.1 \leq P < 1.5$	76.2 (new requirement)
$1.5 \leq P < 2.2$	78.5 (new requirement)
$2.2 \leq P < 3$	81 (new requirement)
$3 \leq P < 4$	82.6 (new requirement)
$4 \leq P < 5.5$	84.2 (new requirement)
$5.5 \leq P < 7.5$	84 85.7
$7.5 \leq P < 11$	85.5 87
$11 \leq P < 15$	85.5 88.4
$15 \leq P < 18.5$	88.5 89.4
$18.5 \leq P < 22$	88.5 90
$22 \leq P < 30$	88.5 90.5
$30 \leq P < 37$	88.5 91.4
$37 \leq P < 45$	89.5 92
$45 \leq P < 55$	90 92.5
$55 \leq P < 75$	90 93
$75\text{kW} \leq P < 90\text{kW}$	91.5 93.6
$P \geq 90\text{kW}$	92 93.9

- Maximum Allowable Copper Loss requirements for exceedingly lengthy circuits conditionally relaxed (in Clause 4 of Code);
- requirement on synchronous power transfer devices (Clause 5.4.4 in 2005 edition) waived, to suit trade practice; and
- a performance requirement as an alternative to THD compliance introduced (at end of Clause 6.1).

Lift & Escalator Code

- Maximum Allowable Electrical Power requirements upgraded (extracts of tables for traction lifts shown below, with crossed out figures indicating the 2005 edition requirements, other tables being similar in extent of amendment not extracted):

Rated Load (kg)	Maximum Allowable Electrical Power (kW) of Traction Lift Systems for various Ranges of Rated speed (Vc) in m/s				
	$V_c < 1$	$1 \leq V_c < 1.5$	$1.5 \leq V_c < 2$	$2 \leq V_c < 2.5$	$2.5 \leq V_c < 3$
$L < 750$	7 6.7	10 9.5	12 11.4	16 15.2	18 17.1
$750 \leq L < 1000$	10 9.5	12 11.4	17 16.2	21 20	24 22.8
$1000 \leq L < 1350$	12 11.4	17 16.2	22 20.9	27 25.7	32 30.4
$1350 \leq L < 1600$	15 14.3	20 19	27 25.7	32 30.4	38 36.1
$1600 \leq L < 2000$	17 16.2	25 23.8	32 30.4	39 37.1	46 43.7
$2000 \leq L < 3000$	25 23.8	37 35.2	47 44.7	59 56.1	70 66.5
$3000 \leq L < 4000$	32 31.4	48 45.6	62 59.9	78 74.1	92 87.4
$4000 \leq L < 5000$	42 39.9	60 57	78 74.1	97 92.2	115 109.3
$L \geq 5000$	0.0083 0.0079L + 0.5 0.475	0.0118 0.0112L + 4 0.95	0.0156 0.0148L + 0.503 0.48	0.019 0.018L + 2 1.9	0.0229 0.0217L + 0.5 0.475

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

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 20	23 21.9	25 23.8	30 28.5	34 32.3
750 ≤ L < 1000	27 25.7	31 29.5	32 30.4	39 37.1	46 43.7
1000 ≤ L < 1350	36 34.2	40 38	45 42.8	52 49.4	60 57
1350 ≤ L < 1600	43 40.9	49 46.6	52 49.4	62 58.9	72 68.4
1600 ≤ L < 2000	53 50.4	60 57	65 61.8	75 71.3	88 83.6
2000 ≤ L < 3000	79 75.1	90 85.5	95 90.3	115 109.3	132 125.4
3000 ≤ L < 4000	104 98.8	120 114	130 123.5	150 142.5	175 166.3
4000 ≤ L < 5000	130 123.5	150 142.5	160 152	190 180.5	220 209

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 ≤ Vc < 8	8 ≤ Vc < 9	Vc ≥ 9
L < 750	39 37.1	45 42.8	4.887 4.643Vc + 0.0014 0.0013Vc ³
750 ≤ L < 1000	52 49.4	60 57	6.516 6.192Vc + 0.0021 0.002 Vc ³
1000 ≤ L < 1350	70 66.5	80 76	8.797 8.357Vc + 0.0021 0.002Vc ³
1350 ≤ L < 1600	83 78.9	95 90.3	10.426 9.905Vc + 0.00266 0.0025 Vc ³
1600 ≤ L < 2000	105 99.8	120 114	12.933 12.381Vc + 0.0014 0.0013Vc ³
2000 ≤ L < 3000	155 147.3	175 166.3	19.549 18.572Vc + 0.003 0.0029Vc ³
3000 ≤ L < 4000	205 194.8	235 223.3	26.065 24.762Vc + 0.0038 0.0036Vc ³
4000 ≤ L < 5000	255 242.3	290 275.5	32.5825 30.953Vc + 0.0048 0.0046Vc ³

Table (4.1.1c) : Maximum Allowable Electrical Power of Traction Lifts (Vc ≥ 7)

- high speed fire service lifts or sky lobby shuttles serving a tall zone exempted from the Maximum Allowable Electrical Power Requirements.

Performance-based Building Energy Code

- modeling assumptions revised to suit the LPD amendments in the Lighting Code.

Effective Date of 2007 edition : October 2007