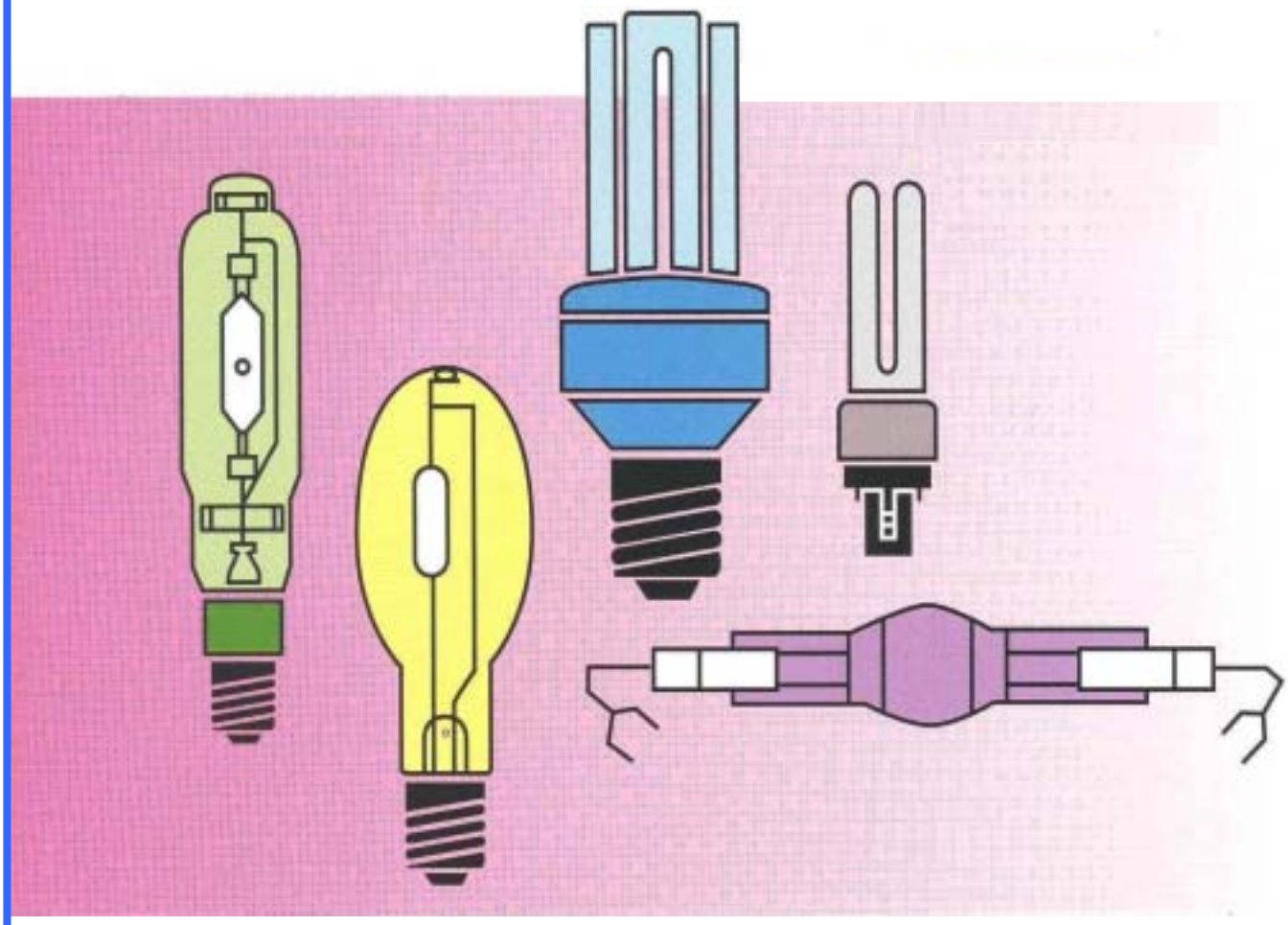
Code of Practice for

Energy Efficiency of Lighting Installations

2007 EDITION



EMSD

Addendum 1 to Code of Practice for Energy Efficiency of Lighting Installations, 2007 edition

Amendments are hereby stipulated as follows:

1) Replace the entire Table (LG2) in Sub-clause 4.1, (page 3) with the following table:

Table (LG2): 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)	
Fluorescent tube			MCF	L_w	Colour Temperature	
					< 6000°K	≥ 6000°K
T5 Luminous Efficacy referenced at 35°C operating temperature	Tubular & U-Shape	High Efficiency type with Lumen per unit tube length < 2700 Lumen/m		14	87	80
				21	90	84
				28	93	87
				35	94	87
		High Output type with Lumen per unit tube length ≥ 2700 Lumen/m		24	75	71
				39	81	76
				49	90	85
				54	83	79
				80	79	75
	Circular			40W – 60W	70	65
				< 40W	75	70
T8 & Non-T5 Luminous Efficacy referenced at 25°C operating temperature				< 15	49	45
				15	63	59
				18	71	69
				30	76	73
				36	88	86
				≥ 58	85	82
For Fluorescent tubes of same type having a Wattage falling between two indicated values, the L_w can be calculated by linear interpolation between the two Luminous Efficacy values of the two closest Wattage values indicated.						
Compact Fluorescent – Non-integrated Type with NO built-in controlgear			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/pee/eels_sch_doc.shtml. (Extract at Appendix A)		
Integrated Type with built-in controlgear			CFG			
Metal Halide			MBI	{L_w} < 100 W	70	
				100 ≤ {L_w} < 400 W	75	
				{L_w} ≥ 400 W	85	
Mercury Vapour			MBF	{L_w} ≤ 50 W	35	
				50 W < {L_w} < 250 W	45	
				{L_w} ≥ 250 W	50	
Low Pressure Sodium Vapour			SOX	20 W ≤ {L_w}	100	
				20 W < {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	
				50 W ≤ {L_w} < 125 W	65	
				125 W ≤ {L_w} < 500 W	85	
				{L_w} ≥ 500 W	120	
Blended Vapour *(with built-in tungsten filament)*			MBTF	{L_w} ≤ 100 W	10	
				100 W < {L_w} ≤ 160 W	15	
				160 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**
		100 W ≤ $\{L_w\}$ < 150 W	13
		$\{L_w\}$ ≥ 150 W	14
Tungsten Halogen *(including reflector lamps)*	TH	$\{L_w\}$ < 20 W	12
		20 W ≤ $\{L_w\}$ ≤ 100 W	15
		100 W < $\{L_w\}$ ≤ 500 W	**16**
		500 W < $\{L_w\}$ < 1000 W	19
		$\{L_w\}$ ≥ 1000 W	22

2) Add the following paragraph after Table (LG2) in Sub-clause 4.1 (page 3)

Exception:

A maximum of 5% of lamps in a space, calculated based on the total lighting load in corresponding space, subject to the space meeting LPD requirements in Table (LG4).

3) Add the following paragraph to Sub-clause 4.2 (page 4) on controlgear loss:

Exception:

A maximum of 5% of lamps in a space, calculated based on the total lighting load in corresponding space, subject to the space meeting LPD requirements in Table (LG4).

4) In Sub-clause 4.2 on LPD, the lighting energy approach applicable to Spaces A1 & A14 (page 5) applies to all types of spaces.

5) Add the following paragraph to Sub-clause 4.4 (page 7) on lighting control:

Exception:

In a space with LPD lower than the LPD values in Table (LG4), fewer no. of control points could be provided, the percentage of which should not be less than the ratio given by the difference between required LPD and actual LPD to the required LPD.

6) Replace in Appendix C1 (page 18) the table for Form LG-1 with the following table:

Data of Lamps & Luminaires — Office — Sheet 1 of (1) — **Form LG-1**

Luminaire Designation	Lamp Code *quoted from Table (LG2)*	Nominal Lamp Wattage { L_w } *(Lamp only)*	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in Table (LG1)*	Minimum Allowable Value *Table (LG2)*			Circuit Wattage {CW} Manufacturer data or calculated by: *{n} x {L_w} + {Controlgear Loss per Luminaire}*	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
FL2	MCF T5	14	98	***87***	2	1	**31.6**	32
FL4	MCF T5	28	98	***93***	1	1	**30.5**	32
FL5	MCF T5	28	98	***93***	2	1	**59.1**	62.1
FL6	MCF T5	35	99	***94***	1	1	**38.5**	39

FL7	MCF T5	35	99	***94***	2	1	**77**	77.2
FL8	CFN 2-tube	16	67	*65*	1	1	**17.2**	19
FL9	CFN 2-tube	12	69	*65*	1	1	**13.5**	16
FL10	MCF T5	14	98	***87***	1	1	**16.4**	17

7) Replace in Appendix C2 (page 21) the table for Form LG-1 with the following table:

Data of Lamps & Luminaires		Office	Sheet 1 of (1)			Form LG-1	
Luminaire Designation	Lamp Code *quoted from* ***Table (LG2)***	Nominal Lamp Wattage { L_w } (*Lamp only*)	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in* ***Table (LG1)***	Minimum Allowable Value ***Table (LG2)***			Circuit Wattage {CW} Manufacturer data or **calculated by:** *{n} x {L_w} + {Controlgear Loss per Luminaire}*	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
BH1	MBI	100	87	***75***	1	1	110	111.8
BH2	SON	100	85	***65***	1	1	110.5	111.8
BH3	MCF T5	35	97	***94***	1	1	38.5	39
BH4	TH	150	17.2	***16***	1	N.A.	150	N.A.
BH5	MBI	70	88	***70***	1	1	78.5	80
BH6	SON	50	83	***65***	1	1	57.2	58.8
BH7	GLS	40	10	*10*	1	N.A.	40	N.A.

8) Replace in Appendix C3 (page 24) the table for Form LG-1 with the following table:

Data of Lamps & Luminaires		Office	Sheet 1 of (1)			Form LG-1	
Luminaire Designation	Lamp Code *quoted from* ***Table (LG2)***	Nominal Lamp Wattage { L_w } (*Lamp only*)	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in* ***Table (LG1)***	Minimum Allowable Value ***Table (LG2)***			Circuit Wattage {CW} Manufacturer data or **calculated by:** *{n} x {L_w} + {Controlgear Loss per Luminaire}*	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
BR1	GLS	60	14	***12***	1	N.A.	60	*N.A.*
BR2	CFG	22	60	*55*	1	1	24	*25*
BR3	GLS	40	11	*10*	1	N.A.	40	*N.A.*
BR4	TH	35	19	*15*	1	1	37.8	*N.A.*
BR5	GLS	100	13	*13*	1	N.A.	100	*N.A.*
BR6	MCF	13	70	***49***	1	1	15	*15.7*
BR7	TH	35	20	*15*	1	1	37.8	*N.A.*
TL1	GLS	40	14	*10*	1	N.A.	40	*N.A.*
TL2	CFN 2-tube	13	69	*65*	1	1	16	*16.7*
TL3	TH	20	18	*15*	1	1	22.8	*N.A.*

FR1	CFN 2-tube	6.5	68	*50*	1	1	7.5	*9*
FR2	TH	35	15	*15*	1	1	37	*N.A.*
FR3	GLS	30	11	*8*	6	N.A.	180	*N.A.*
FR4	CFG	8	60	*45*	2	1	18	*19*
FR5	MCF T5	21	97	***90***	1	1	22.8	*24*

(Amendments are shown in red)

- END -

Foreword

The Code of Practice for Energy Efficiency of Lighting Installations aims to set out the minimum design requirements on energy efficiency of lighting installations. It forms a part of a set of comprehensive ***Building Energy Codes*** that address energy efficiency requirements on building services installations. Designers are encouraged to adopt a proactive approach to exceed the minimum requirements.

The ***Building Energy Codes*** were developed by ad hoc task forces under the Energy Efficiency & Conservation Sub-committee of the Energy Advisory Committee. The set of comprehensive *Building Energy Codes* cover this Code, the Codes of Practice for Energy Efficiency of Air Conditioning Installations, Electrical Installations, and Lift & Escalator Installations, and the Performance-based Building Energy Code.

To promote the adoption of the ***Building Energy Codes***, the Hong Kong Energy Efficiency Registration Scheme for Buildings was also launched. The Registration Scheme provides the certification to a building complying with one or more of the ***Building Energy Codes***.

To supplement and further explain the codes, corresponding Guidelines were also published.

The Building Energy Codes and Registration Scheme documents are available for download at
http://www.emsd.gov.hk/emsd/eng/pee/eersb.shtml
Enquiry: hkeersb@emsd.gov.hk

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Amendments

The Code was first published in 1998. To suit changes in technological advancement and to cope with trade practices, there have been amendments to the first published edition, which were agreed in code review task forces with members from representative organizations in the building industry including professional institutes, trade associations and the academia.

In 2002, the minimum number of lighting control points was slightly relaxed for spaces over 200m^2. In 2005, slightly tightened were the minimum allowable luminous efficacy values for MCF, maximum allowable lamp controlgear losses for MCF & CFN, and maximum allowable values of LPD for Staircase, Office, Classroom / Lecture Theatre / Laboratory and Library. Also, small spaces and occasionally occupied spaces were exempted from the maximum allowable LPD requirement.

In 2007, the Maximum Allowable LPD requirements are upgraded; Minimum Allowable Luminous Efficacy requirements upgraded; EMSD's Voluntary Energy Efficiency Labelling Scheme (EELS) for Compact Fluorescent Lamps quoted as requisite requirements (in Table LG2 of Code); EMSD's EELS for Electronic Ballasts quoted as requisite requirements (in Table 4.2 of Code); Minimum Allowable Luminous Efficiency requirements and Maximum Allowable Controlgear Loss requirements extended to outdoor lighting; a performance approach for LPD compliance introduced to Atrium/Foyer & Vehicle Depot; Maximum Allowable LPD requirements extended to Retails, Restaurant, & Vehicle Unloading Bay; a fewer number of lighting control points in offices conditionally allowed; and the performance approach on LPD requirement in a composite space emphasized.

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CONTENTS

1. SCOPE

1.1 Unless otherwise stated, this Code applies to offices, schools, carparks, places of public entertainment & recreation, places of public assembly, hotels, shops, department stores, restaurants, and communal areas of residential buildings.

1.2 This Code does not apply to the following indoor space :

a) any space of a hospital, a clinic or an infirmary,
b) any space used for utility service such as power stations and sub-stations,
c) any space for domestic inhabitation or industrial processing.

1.3 This Code applies to *fixed lighting installations* except the following :

a) specialised lighting installations solely used for one of the following functions :
(i) industrial research application, (ii) television broadcasting,
(iii) theatrical production, (iii) audio-visual presentation.
b) display lighting for exhibit or monument
c) emergency lighting of non-maintained type

2. DEFINITIONS

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

"*Area of a Space (unit : m^2)***"** is measured based on the space's internal dimensions excluding wall thickness.

"*Circuit Wattage (unit : W)***"** means the power consumption, including lamp controlgear loss, of a lamp. Circuit Wattage is equal to the sum of Nominal Lamp Wattage and Lamp Controlgear Loss.

"*Display Lighting***"** refers to a kind of lighting solely used for exhibiting the appearance of an object and not used for general illumination purpose.

"*Emergency Lighting of Non-Maintained Type***"** refers to a kind of emergency lighting that remains OFF until failure of normal power supply.

"*Lamp Controlgear***"** is a device used for starting and maintaining the operation of a lamp.

"*Lamp Controlgear Loss (unit : W)***"** means the power consumption of a lamp controlgear operating under the design voltage, frequency and temperature of a lighting installation.

"*Lighting Control Point***"** means a lighting control device designed for use by occupants of a space.

"*Lighting Power Density (unit : W/m^2)***"** means the electrical power consumed by lighting installations per unit floor area of an illuminated space.

"*Luminaire***"** refers to a lighting device, which distributes light from a single lamp or a group of lamps. A luminaire should include controlgears and all necessary components for fixing and mechanical protection of lamps.

"*Luminous Flux* *(unit : lm)*" is a quantitative measure of light emitted by a light source. The quantity is derived from radiant flux (power in watts) by evaluating the radiation in accordance with the spectral sensitivity of the standard eye as described by the *CIE Standard Photometric Observer*.

***"Luminous Efficacy* *(unit : lm/W)*"** is defined as a ratio of luminous flux emitted by a single lamp to the power consumed by the lamp. Its numerical value is equal to the lamp's Luminous Flux divided by the Nominal Lamp Wattage. The lamp's Luminous Flux refers to a value measured at *prescribed initial operating hours* as listed in Table (LG1).

Table (LG1) : Prescribed Initial Operating Hours for Various Types of Lamps

Lamp Type	Lamp Code	Prescribed Initial Operating Hours (hours)
Tubular Fluorescent	MCF	2000
Compact Fluorescent (*Non-Integrated Type without built-in controlgear*)	CFN	100
Compact Fluorescent (*Integrated Type complete with built-in controlgear*)	CFG	100
Metal Halide	MBI	100
Mercury Vapour	MBF	100
Low Pressure Sodium Vapour	SOX	100
High pressure Sodium Vapour	SON	100
Blended Vapour (complete *with built-in tungsten filaments*)	MBTF	100
Tungsten Filament (*including Reflector Lamps*)	GLS	100
Tungsten Halogen (*including Reflector Lamps*)	TH	100

***"Nominal Lamp Wattage* *(unit : W)*"** means the power consumption of a lamp, excluding the lamp controlgear loss, given by the lamp manufacturer.

"Space" refers to a region that is illuminated by artificial lighting and is bounded by a physical floor , a physical ceiling and physical walls.

3. GENERAL APPROACH

3.1 This Code sets out the minimum requirements for achieving energy-efficient lighting installations. The requirements of this Code are generally expressed in terms of *luminous efficacy, lamp controlgear loss* and *lighting power density*. In this Code, there is no specific requirement for indoor illumination levels. However, in the course of selecting an appropriate indoor illumination level for a space, energy efficiency should be taken into consideration in addition to other lighting requirements.

3.2 For microscopic control of lighting energy efficiency, the Code's minimum requirements are expressed in terms of *Minimum Allowable Luminous Efficacy (lm/W)* and *Maximum Allowable Lamp Controlgear Loss (W)* for various types of lamps.

3.3 For macroscopic control of lighting energy efficiency, the Code's minimum requirements are expressed in terms of *Maximum Allowable Lighting Power Density (W/m^2)* which is a measure of the total lighting energy efficiency of a lighting installation.

4. ENERGY EFFICIENCY REQUIREMENTS FOR LIGHTING

4.1 Minimum Allowable Luminous Efficacy

For any lamp of a type as listed in Table (LG2), the luminous efficacy shall be equal to or greater than the corresponding minimum allowable value as indicated in Table (LG2).

Table (LG2): 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	75
		14 W ≤ {L_w} < 30 W	97
		{L_w} ≥ 30 W	97
All Other Tubular Fluorescent	MCF	{L_w} < 18 W	65
		18 W ≤ {L_w} < 40 W	75
		{L_w} ≥ 40 W	75
Compact Fluorescent *(Non-integrated Type without built-in controlgear)*	CFN	Comply with latest requirements on minimum allowable luminous efficacy in The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Compact Fluorescent Lamps, EMSD, available for download at http://www.emsd.gov.hk/emsd/eng/pee/ eels_sch_doc.shtml. (Extract at Appendix A)	
Compact Fluorescent *(Integrated Type complete with built-in controlgear)*	CFG		
Metal Halide	MBI	{L_w} < 500 W	85
		{L_w} ≥ 500 W	90
Mercury Vapour	MBF	{L_w} < 50 W	40
		50 W ≤ {L_w} < 250 W	50
		{L_w} ≥ 250 W	55
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	40
		50 W ≤ {L_w} < 125 W	82
		125 W ≤ {L_w} < 500 W	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	13
		100 W ≤ {L_w} < 150 W	13
		{L_w} ≥ 150 W	14
Tungsten Halogen *(including reflector lamps)*	TH	{L_w} < 20 W	12
		20 W ≤ {L_w} < 100 W	15
		100 W ≤ {L_w} < 500 W	17
		500 W ≤ {L_w} < 1000 W	19
		{L_w} ≥ 1000 W	22

4.2 Maximum Allowable Lamp Controlgear Loss

For any lamp of a type as listed in Table (LG3), the lamp controlgear loss shall be equal to or smaller than the corresponding maximum allowable value as listed in Table (LG3).

Table (LG3) : 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 Electromagnetic Ballast			
Tubular Fluorescent	MCF	$\{L_w\} \leq$ 18 W	7
		18 W < $\{L_w\}$ < 58 W	10
		58 W ≤ $\{L_w\}$ < 85 W	12
		$\{L_w\}$ ≥ 85 W	16
Compact Fluorescent *(Non-integrated Type without built-in controlgear)*	CFN	$\{L_w\}$ < 18 W	6
		$\{L_w\}$ ≥ 18 W	9
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 (Extract at Appendix A)	

4.3 Maximum Allowable Lighting Power Density

4.3.1 The provision stated in paragraph (4.3.2) applies to any space that is classified as one of the space types as listed in Table (LG4).

4.3.2 For a building that comprises of one or more discrete spaces, the lighting power density of each space shall not exceed the corresponding maximum allowable value as listed in Table (LG4).

Table (LG4) : Maximum Allowable Values of Lighting Power Density for Various Types of Space

Space Code	Type of Space	Maximum Allowable Lighting Power Density (W/m^2)
A.	**Spaces for Common Activities**	
A.1	Atrium / Foyer (headroom over 5m)	25
A.2	Carpark	6
A.3	Conference / Seminar Room	18
A.4	Corridor	12
A.5	Data Processing Room	16
A.6	Storeroom / Cleaner	11
A.7	Kitchen / Pantry	13
A.8	Lift Lobby	15
A.9	Machine Room / Switch Room	13
A.10	Reception / Waiting / Queuing Area	14
A.11	Rest / Recreation Room	13
A.12	Staircase	8
A.13	Toilet / Washroom / Shower Room	13
A.14	Vehicle Depot (for maintenance / repair / inspection) / Vehicle Unloading Bay	11
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 - 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	17
B.2	Drawing Office	20
C	**Hotels**	
C.1	Bedroom	17
C.2	Banquet Room / Function Room / Ball Room	23
D	**Educational Institutions**	
D.1	Classroom / Lecture Theatre / Laboratory	17
D.2	Library (reading area, stack area, audio visual centre)	17
E.	**Mass Assembly Area**	
E.1	Seating Area inside a Theatre / Cinema / Auditorium / Concert Hall	25
E.2	Mass Assembly Area / Assembly Hall	18
E.3	Exhibition Hall / Gallery	23

Table (LG4) : Maximum Allowable Values of Lighting Power Density for Various Types of Space (continued)

Space Code	Type of Space	Maximum Allowable Lighting Power Density (W/m^2)
F.	**Indoor Sports Grounds**	
F.1	Spectator Seating Area	16
F.2	Indoor Sports Ground for Badminton, Basketball, Volleyball or Table Tennis : • *for amateur players* • *for tournament*	 17 28
F.3	Squash Courts • *for amateur players* • *for tournament*	 17 28
F.4	Indoor Swimming Pool • *for amateur players* • *for tournament*	 15 28
F.5	Ice Rink • *for amateur players* • *for tournament*	 15 28
G.	**Retails**	20
H.	**Restaurant**	23

Exception:

- Space with small area e.g. meter room, where there is only a single luminaire of generally lowest capacity, or
- Room of an occasionally occupied nature such as unmanned plant room with individual lighting control readily accessible by the occupant.

4.3.3 For any space in which different functional activities are performed at different times, it is considered as a ***multi-functional space***. The functional activities are classified in terms of various space types as listed in Table (LG4). The illumination for each space type is provided by a specific combination of different groups of luminaires.

The requirements for a *multi-functional space* are as follows :

a) The lighting power density of each combination of luminaires shall not exceed the maximum allowable value corresponding to the type of space illuminated by that combination of luminaires.

b) Each combination of luminaires shall be provided with an independent lighting control facility.

4.3.4 For a space in which different functional activities are performed simultaneously, it is considered as a *composite space*. The functional activities are classified in terms of various space types as listed in Table (LG4). The lighting power density of a *composite space* shall not exceed the *equivalent maximum allowable lighting power density* calculated as follows :-

Equivalent Maximum Allowable Lighting Power Density for a Composite Space

$$= \left\{ \frac{[A_1 \times LPD_1] + [A_2 \times LPD_2] + \ldots. + [A_n \times LPD_n]}{[A_1 + A_2 + \ldots. + A_n]} \right\}$$

where

A_1 , A_2 , ... , A_n *refers to areas of n different parts of a composite space, and*

LPD_1 , LPD_2 .,...., LPD_n *refers to the maximum allowable values of lighting power density corresponding to areas* A_1 , A_2 , ..., A_n *respectively.*

In a composite space, a constituent space's lower lighting performance can be compensated by the higher performance in another constituent space.

4.4 Interior Lighting Control

4.4.1 If a lighting installation is designed for operation by occupants of a space, the lighting control points should be located at positions that are easily accessible to the occupants.

4.4.2 For any space that is classified as an open plan office, a cellular office or a drawing office, the minimum number of lighting control points for that office space is given in Table (LG5).

Table (LG5) : Minimum Number of Lighting Control Points for Office Space

Space Area A (m^2)	Minimum No. of Lighting Control Points
$A \leq 10\ m^2$	1
$10\ m^2 < A \leq 20\ m^2$	2
$20\ m^2 < A \leq 30\ m^2$	3
$10 \times (N-1)\ m^2 < A \leq 10 \times N\ m^2$	N : integer < 20
$50 \times (N-20) + 200\ m^2 < A \leq 50 \times (N-19) + 200\ m^2$	N : integer $\geq$ 20

5. SUBMISSION OF INFORMATION

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

FORM LG-G : Lighting Installations Summary

FORM LG-1 : Data of Lamps & Luminaires

FORM LG-2 : Lighting Power Density

Lighting Installations Summary

Sheet ___ of (___)

Form LG-G

Project/Building* Name : _____

Lighting Installation Works Completion Date : _____

Lighting Load Total Area with fixed lighting installations (m^2) : _____

Total Installed Lighting Power (kW) : _____

Note : - Total Installed Lighting Power refers to the sum of circuit wattage (i.e. lamp wattage plus lamp controlgear loss) of all luminaires installed

- Calculation details should be properly filed for ready retrieval for inspection

Submitted Lighting Forms, Drawings, Catalog etc. (tick where applicable)

	No. of Sheets
☐ Form LG-G series (Lighting Installations Summary)	
☐ Form LG-1 series (Data of Lamps & Luminaires Worksheet)	
☐ Form LG-2 (Lighting Power Density Worksheet)	
☐ Drawings (separate list to be provided)	
☐ Other supportive documents such as catalog, calculation etc. (separate list to be provided)	

Data of Lamps & Luminaires

Sheet __ of (___)

Form LG-1

Luminaire Designation	Lamp Code *quoted from **Table (LG2)***	Nominal Lamp Wattage { L_w } *(excluding Controlgear Loss)*	Luminous Efficacy		No. of Lamps per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in **Table (LG1)***	Minimum Allowable Value *Table (LG2)*		Circuit Wattage {CW} Manufacturer data or calculated by: ***{n} x {L_w} + {Controlgear Loss per Luminaire}***	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n}	(W)	(W)

Lighting Power Density

Sheet __ of (___)

Form LG-2

Floor	Space			Data of Luminaires			Lighting Power Density	
	Name of Space	Area {A}	Calculated Illuminance	Designation	Quantity	Circuit Wattage { CW } *(quoted from Form LG-1)*	Calculated LPD $\frac{\{N\} \times \{CW\}}{\{A\}}$	Maximum Allowable LPD
		(m^2)	(lux)		{ N }	(W)	(W/m^2)	(W/m^2)

Appendix A – Extract from EELS

A1 Extract from "The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Compact Fluorescent Lamps"

The requirements (indicated as Tables 1 & 2) in the document are extracted below. The applicable version as at March 2007 is the January 2006 version. Readers should refer to EMSD's website for the up-to-date version.

Minimum Allowable Luminous Efficacy for Integrated Type CFLs WITH Built-in Control Gear (CFG) [Table 1]

Rated Lamp Wattage (L_w)	Minimum Allowable Luminous Efficacy (lumen/W)
$L_w \leq$ 10W	45
11W $\leq L_w \leq$ 20W	50
21W $\leq L_w \leq$ 30W	55
$L_w \geq$ 31W	60

Minimum Allowable Luminous Efficacy for Non-integrated Type CFLs WITHOUT Built-in Control Gear (CFN) [Table 2]

Rated Lamp Wattage (L_w)	Minimum Allowable Luminous Efficacy (lumen/W)
$L_w \leq$ 10W	50
11W $\leq L_w \leq$ 30W	65
$L_w \geq$ 31W	75

A2 Extract from "The Hong Kong Voluntary Energy Efficiency Labelling Scheme for Electronic Ballasts"

The requirements (indicated as Table 1) of the document are extracted below. The applicable version as at March 2007 is the December 2004 version. Readers should refer to EMSD's website for the up-to-date version.

Maximum allowable ballast-lamp circuit power for different lamp types [Table 1]

Ballast Category	[1] Rated Lamp Power		Maximum Allowable Power Consumption [2]
	50 Hz	High Frequency (HF)	
1 linear fluorescent lamps – T8 in general	4 W	3.4 W	≤ 6 W
	6 W	5.1 W	≤ 8 W
	8 W	6.7 W	≤ 11 W
	13 W	11.8 W	≤ 15 W
	15 W	13.5 W	≤ 16 W
	18 W	16 W	≤ 19 W
	30 W	24 W	≤ 31 W
	36 W	32 W	≤ 36 W
	38 W	32 W	≤ 38 W
	58 W	50 W	≤ 55 W
	70 W	60 W	≤ 68 W

[1] A lamp operating on electromagnetic ballast has a lower rating when operating on high frequency electronic ballast.

[2] Whenever a lamp power of ballast falls between two values indicated in the table, the maximum input power of ballast-lamp circuit should be calculated by linear interpolation between the two values of maximum input power for the two closest lamp power values indicated.

Ballast Category	[1] Rated Lamp Power		Maximum Allowable Power Consumption [2]
	50 Hz	High Frequency (HF)	
T5 in general	--	14 W	≤ 17 W
	--	21 W	≤ 24 W
	--	24 W	≤ 27 W
	--	28 W	≤ 32 W
	--	35 W	≤ 39 W
	--	39 W	≤ 43 W
	--	49 W	≤ 55 W
	--	54 W	≤ 60 W
	--	80 W	≤ 88 W
2 compact 2 tubes fluorescent lamps	5 W	4.5 W	≤ 7 W
	7 W	6.5 W	≤ 9 W
	9 W	8 W	≤ 11 W
	11 W	10 W	≤ 14 W
	13 W	12 W	≤ 16 W
	18 W	16 W	≤ 19 W
	24 W	22 W	≤ 25 W
	36 W	32 W	≤ 36 W
	--	40 W	≤ 45 W
	--	55 W	≤ 61 W
3 compact 4 tubes flat fluorescent lamps	18 W	16 W	≤ 19 W
	24 W	22 W	≤ 25 W
	36 W	32 W	≤ 36 W
4 compact 4 tubes fluorescent lamps	10 W	9.5 W	≤ 11 W
	13 W	12.5 W	≤ 14 W
	18 W	16.5 W	≤ 19 W
	26 W	24 W	≤ 27 W
5 compact 6 tubes fluorescent lamps	18 W	16.5 W	≤ 19 W
	26 W	24 W	≤ 27 W
	--	32 W	≤ 36 W
	--	42 W	≤ 47 W
6 compact 2 D fluorescent lamps	10 W	9 W	≤ 11 W
	16 W	14 W	≤ 17 W
	21 W	19 W	≤ 22 W
	28 W	25 W	≤ 29 W
	38 W	34 W	≤ 38 W
	--	55 W	≤ 61 W
7 for circular fluorescent lamps	22 W	19 W	≤ 22 W
	32 W	30 W	≤ 35 W
	40 W	32 W	≤ 37 W
	--	22 W	≤ 26 W
	--	40 W	≤ 45 W
	--	55 W	≤ 61 W
8 HID lamps *(high intensity discharge type such as MBI & SON)*	35 W	--	≤ 43 W
	70 W	--	≤ 80 W
	150W	--	≤ 165 W
	250W	--	≤ 270 W
	400W	--	≤ 430 W

Appendix B – Explanatory Notes for Sample Calculations

A. General

Three sets of sample calculations are enclosed in Appendix C1, C2 & C3 to illustrate the use of standard Forms LG-1 and LG-2 for the following types of building :-

a. Office Building

Appendix C1 : Sample Calculations for a Typical Floor of an Office Building

Note (a) : The typical office floor consists of several "discrete spaces" of the following space types :-

"office", "drawing office", "data processing room", "rest room", "meeting / conference room", "store room", "library", "pantry", "corridor", "lavatory", "lift lobby", "staircase" and "machine room"

b. Commercial Building

Appendix C2 : Sample Calculations for a Bank Hall

Note (b) : The Bank Hall is considered as a "composite space" that comprises 3 parts - "foyer", "lift lobby" & "open plan office".

Note (c) : The sample calculations for the Bank Hall illustrate the compliance with sub-paragraph (4.3.4) of the Code regarding lighting power density of a "composite space".

c. Hotel Building

Appendix C3 : Sample Calculations for 2 Hotel Bedrooms and 1 Function Room

Note (d) : The 2 hotel bedrooms have different combinations of space types as follows:
i. "bedroom 1" comprises 3 spaces - a bedroom, a rest room & a toilet
ii. "bedroom 2" comprises 3 spaces - a bedroom, a corridor & a toilet

Note (e) : The Function Room is considered as a "multi-functional space" that can be used either as a Banquet Room, a Seminar Room or a Ball Room".

Note (f) : The sample calculations for the Function Room illustrate the compliance with sub-paragraph (4.3.3) of the Code regarding lighting power density of a "multi-functional space".

B. Explanatory Notes for Standard Form LG-1

The standard Form LG-1 contains prescribed technical data of all lamps and luminaires that are selected for a particular project. The details of required information are described as follows :

B.1 Luminaire Designation

Each type of luminaire should be identified by a unique user-defined designation. A same set of luminaire designations should be used for all submitted standard forms and drawings.

B.2 Lamp Code

Depending on the lamp type of the luminaire, an appropriate Lamp Code should be quoted from the Table (LG2) of the Code.

B.3 Nominal Lamp Wattage

This column of data refers to nominal lamp wattage of a single lamp, excluding the lamp controlgear loss, quoted from the lamp manufacturer's technical specifications. The figure may be different on electromagnetic ballast and electronic ballast. An example is a 1200mm T8 tube could be rated 36W when using electromagnetic ballast and 32W when using electronic ballast.

B.4 Luminous Efficacy

For a particular lamp, its luminous efficacy is quoted directly from the lamp manufacturer's technical specifications. Alternatively, with reference to Table (LG1) of the Code, the luminous efficacy of a lamp can be calculated as follows :

Luminous Efficacy at the Prescribed Number of Initial Operating Hours

$$= \left[\frac{(\text{ the Lamp's Luminous Flux at the Prescribed No. of Initial Operating Hours })}{(\text{ Nominal Lamp Wattage })} \right]$$

B.5 Circuit Wattage

This column of data refers to the lamp circuit wattage of a single luminaire from manufacturer's technical specifications, or calculated as follows :

$$\text{Circuit Wattage} = \left[\begin{matrix} \text{No. of Lamps} \\ \text{per Luminaire} \end{matrix} \right] \times \left[\begin{matrix} \text{Nominal} \\ \text{Lamp Wattage} \end{matrix} \right] + \left[\begin{matrix} \text{Total Controlgear Loss} \\ \text{per Luminaire} \end{matrix} \right]$$

For direct matching lamp and ballast from the same manufacturer, the circuit wattage may be obtained from the manufacturer's technical specification. Otherwise, the power requirement of the lamp and ballast could be summed up to obtain the circuit wattage. When doing the summation, pay attention to the quantity of lamps and ballasts in the luminaire. The allowable figures of maximum ballast loss can be found in Appendix A.

C. Explanatory Notes for Standard Form LG-2

C.1 Name of Space

For a particular space, the space names shown on the Form LG-2 and the submitted drawings should be the same. For easy identification of spaces that have the same generic name (e.g. office), it is preferable to assign a location code expressed in terms of (x,y) co-ordinates [e.g. (A,17)] to each space. With reference to the Form LG-2 of *Appendix B1*, each space name is designated as an appropriate *location code* to indicate its location on the office layout plan.

C.2 Space Area

As defined in paragraph 2 of the Code, the area of a space is measured based on the space internal dimensions, excluding wall thickness. The numerical value of space area (measured in m^2) should be rounded to 1 decimal place.

C.3 Space Illuminance

This column of data refers to the calculated values of illuminance inside a space measured at working plane or floor level as appropriate to the function of the space. The calculations of space illuminance are based on the actual quantities of luminaires installed in the space.

C.4 Luminaire Designation

Each type of luminaire should be identified by a unique user-defined designation. A same set of luminaire designations should be used for all submitted standard forms and drawings.

C.5 Quantity of Luminaires

This column of data refers to the actual total quantity of a particular type of luminaire installed in a space.

C.6 Circuit Wattage

For a particular luminaire designation, the value of Circuit Wattage is equal to the corresponding value quoted from Form LG-1.

C.7 Calculated Value of Lighting Power Density (LPD)

The numerical value of LPD should be rounded to 1 decimal place. The LPD of an indoor space is calculated by the following equation :

$$\text{Lighting Power Density} = \left\{ \frac{\left(N_1 \times CW_1\right) + \left(N_2 \times CW_2\right) + \cdots + \left(N_n \times CW_n\right)}{(A)} \right\}$$

where **N_1 , N_2 , ..., N_n refer to Quantities of n different types of luminaires installed in a space,**
CW_1 , CW_2, ..., CW_n refer to Circuit Wattage of n different types of luminaires in the space
(A) refers to area of space.

D. Sample Calculations for a Multi-functional Space

With reference to the layout plan of a Hotel's Function Room shown in Appendix C3, the Function Room is designated as a *multi-functional space* that can be used either as a Banquet Room, a Seminar Room or a Ball Room.

Referring to Form LG-2 of *Appendix C3*, the LPD calculations for the Hotel's Function Room are divided into 3 parts in accordance with 3 different room functions (i.e. banquet, seminar & ball). The illumination for each room function is provided by a specific combination of luminaires. For instance, a combination of luminaires FR1, FR2, FR3, FR4 & FR5 is used for providing illumination for the Banquet Room. The selected uminaries' *designations*, *quantities* and *circuit wattage* are indicated in each part of the calculations.

The LPD calculations for different room functions are given in Table (A2). The results of calculations are summarised in Table (A1). According to the requirements stated in paragraph 4.3.3 of the Code, the LPD of each room function of a *multi-functional space* should not exceed the *maximum allowable value* corresponding to that room function.

Room Function	Calculated LPD (W/m^2)	Max. Allowable LPD (W/m^2)	Compliance with paragraph 4.3.3 of the Code
Banquet Room	22.7	23	Complied (since the calculated LPD is smaller than the max allowable LPD)
Seminar Room	14.5	17	Complied (since the calculated LPD is smaller than the max allowable LPD)
Ball Room	19.9	23	Complied (since the calculated LPD is smaller than the max allowable LPD)

Table (A1) : Calculation Results for a Hotel's Function Room which is designated as a Multi-functional Space

Name of Space	Designation	Quantity	Circuit Wattage (W)	Lighting Power Density (LPD) (W/m^2)
Function Room (used as a Banquet Room) **room area = 251 m^2**	FR1 FR2 FR3 FR4	96 90 8 12	7.5 37 180 18	LPD of the *Multi-functional Space* when it is used as a Banquet Room $= \frac{(96 \times 7.5 + 90 \times 37 + 8 \times 180 + 12 \times 18)\ W}{251\ m^2}$ $= 22.7\ W/m^2$
Function Room (used as a Seminar Room) **room area = 251 m^2**	FR1 FR5	96 128	7.5 22.8	LPD of the *Multi-functional Space* when it is used as a Seminar Room $= \frac{(96 \times 7.5 + 128 \times 22.8)\ W}{251\ m^2}$ $= 14.5\ W/m^2$
Function Room (used as a Ball Room) **room area = 251 m^2**	FR2 FR3 FR4	90 8 12	37 180 18	LPD of the *Multi-functional Space* when it is used as a Ball Room $= \frac{(90 \times 37 + 8 \times 180 + 12 \times 18)\ W}{251\ m^2}$ $= 19.9\ W/m^2$

Table (A2) : LPD Calculations for Different Room Functions of a Multi-Functional Space

E. Sample Calculations for a Composite Space

With reference to the layout plan of a Bank Hall shown in *Appendix C2*, the Bank Hall is designated as a *composite space* consisting of 3 parts –"Foyer", "Lift Lobby" & "Open Plan Office".

total area of composite space

= (space area of Foyer) + (space area of Open Plan Office) + (space area of Lift Lobby)

= 462 m^2 + 286 m^2 + 64.4 m^2

= **812.4** m^2

The lighting power density of the *composite space* is calculated based on the luminaire data shown in Table (A3).

Data of Luminaires		
Designation	Quantity	Circuit Wattage (W)
BH1	32	110
BH2	24	110.5
BH3	55	38.5
BH4	10	150
BH5	57	78.5
BH6	8	57.2
BH7	6	40

Table (A3) : Luminaire Data quoted from the Form LG-2 of Appendix B2

Lighting Power Density of a Composite Space

$$= \left\{ \frac{\left(N_1 \times CW_1\right) + \left(N_2 \times CW_2\right) + \cdots\cdots + \left(N_7 \times CW_7\right)}{(A)} \right\}$$

$$= \frac{(32 \times 110)+(24 \times 110.5)+(55 \times 38.5)+(10 \times 150)+(57 \times 78.5)+(8 \times 57.2)+(6 \times 40)\ W}{812.4\ m^2}$$

$$= \mathbf{18.4\ W/m^2}$$

According to paragraph 4.3.4 of the Code, the *equivalent maximum allowable lighting power density* for the *composite space* is calculated as follows :-

Equivalent Maximum Allowable Lighting Power Density **of a Composite Space**

$$= \left\{ \frac{\left(A_1 \times LPD_1\right) + \left(A_2 \times LPD_2\right) + \left(A_3 \times LPD_3\right)}{\left(A_1 + A_2 + A_3\right)} \right\}$$

$$= \frac{(462\ m^2 \times 25\ W/m^2) + (286\ m^2 \times 17\ W/m^2) + (64.4\ m^2 \times 15\ W/m^2)}{462\ m^2 + 286\ m^2 + 64.4\ m^2}$$

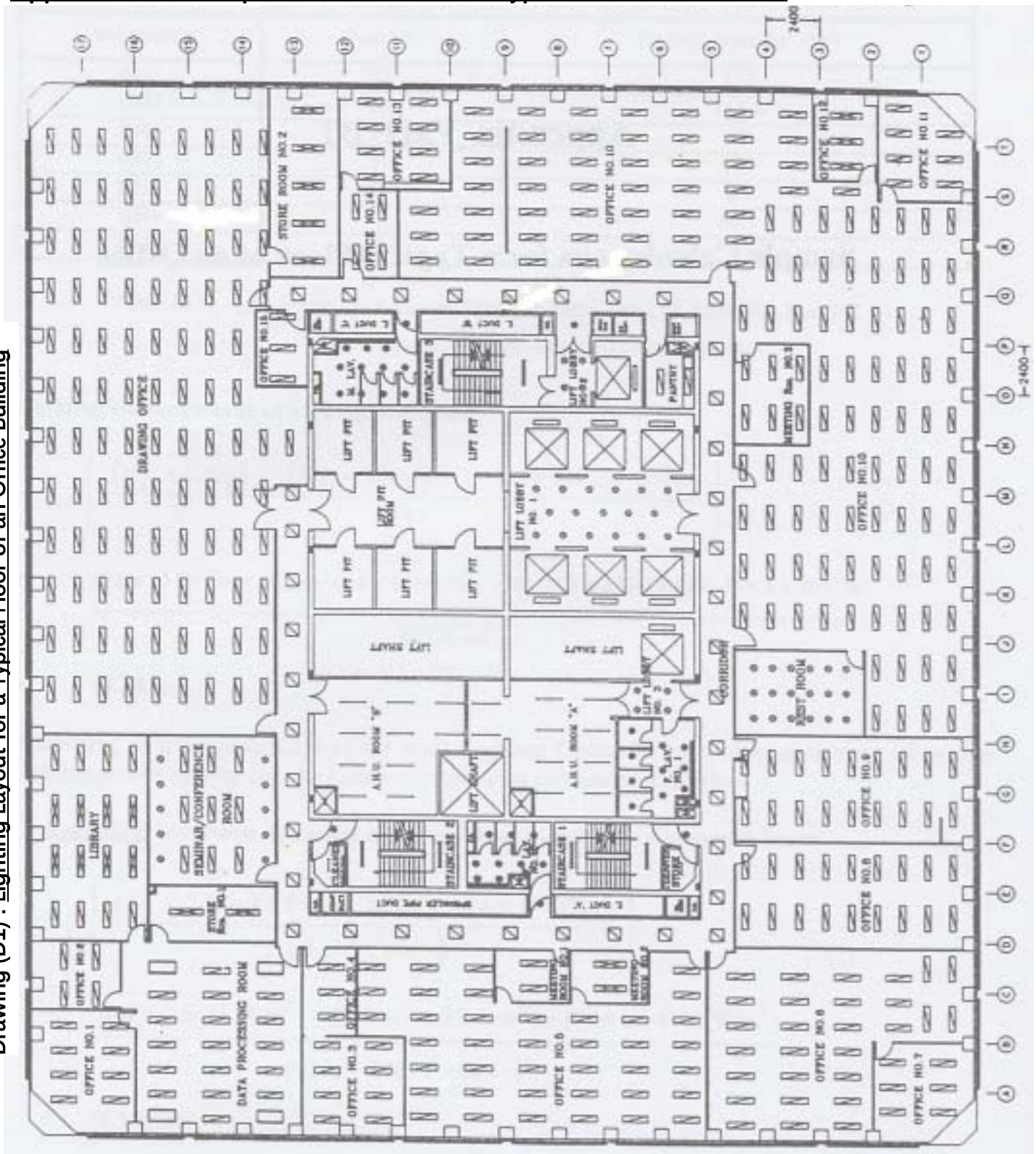
$$= \mathbf{21.4}\ W/m^2$$

where A_1 = area of Foyer — LPD_1 = Max. Allowable LPD for Foyer
A_2 = area of Open Plan Office — LPD_2 = Max. Allowable LPD for Open Plan Office
A_3 = area of Lift Lobby — LPD_3 = Max. Allowable LPD for Lift Lobby

According to the above calculations, the lighting power density (i.e. 18.4 W/ m^2) of the composite space is smaller than the *equivalent maximum allowable value* (i.e. 21.4 W/ m^2). Therefore, the requirements stated in paragraph 4.3.4 of the Code are deemed to be satisfied.

Appendix C1 – Sample Calculations for a Typical Floor of an Office

Drawing (D1) : Lighting Layout for a Typical Floor of an Office Building



Legend

- FL4 : 1 X 28W 6500K MCF T5, w/1 electronic ballast recessed luminaire with general purpose louvers
- FL4 : 1 X 28W 6500K MCF T5, w/1 electronic ballast ceiling-mtd luminaire with prismatic diffuser
- FL5 : 2 X 28W 6500K MCF T5, w/1 electronic ballast recessed luminaire with general purpose louvers
- FL5 : 2 X 28W 6500K MCF T5, w/1 electronic ballast ceiling-mtd luminaire with prismatic diffuser
- FL6 : 1 X 35W 6500K MCF T5, w/1 electronic ballast recessed luminaire with general purpose louvers
- FL8 : 1 x 16W 2-tube 2700K CFN w/1 electronic ballast recessed downlight
- FL9 : 1 x 12W 2-tube 2700K CFN w/1 electronic ballast recessed downlight
- FL10 : 1 X 14W 6500K MCF T5, w/1 electronic ballast ceiling-mtd luminaire with prismatic diffuser
- FL2 : 2 X 14 W 6500K MCF T5, w/1 electronic ballast ceiling-mtd luminaire

Appendix C1 - Sample Calculations for a Typical Floor of an Office

Data of Lamps & Luminaires — Office — Sheet 1 of (1) — Form LG-1

Luminaire Designation	Lamp Code *quoted from Table (LG2)*	Nominal Lamp Wattage { L_w } *(Lamp only)*	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in Table (LG1)*	Minimum Allowable Value *Table (LG2)*			Circuit Wattage {CW} Manufacturer data or calculated by: *{n} x {L_w} + {Controlgear Loss per Luminaire}*	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
FL2	MCF T5	14	98	*97*	2	1	**31.6**	32
FL4	MCF T5	28	98	*97*	1	1	**30.5**	32
FL5	MCF T5	28	98	*97*	2	1	**59.1**	62.1
FL6	MCF T5	35	99	*97*	1	1	**38.5**	39
FL7	MCF T5	35	99	*97*	2	1	**77**	77.2
FL8	CFN 2-tube	16	67	*65*	1	1	**17.2**	19
FL9	CFN 2-tube	12	69	*65*	1	1	**13.5**	16
FL10	MCF T5	14	98	*97*	1	1	**16.4**	17

Lighting Power Density — Office — Sheet 1 of (2) — Form LG-2

Floor	Space			Data of Luminaires			Lighting Power Density	
	Name of Space	Area {A}	Calculated Illuminance	Designation	Quantity	Circuit Wattage { CW } *(quoted from Form LG-1)*	Calculated LPD $\frac{\{N\} \times \{CW\}}{\{A\}}$	Maximum Allowable LPD
		(m^2)	(lux)		{ N }	(W)	(W/m^2)	(W/m^2)
20/F	Office 1 (A17)	17.2	520	FL4	8	30.5	**14.2**	*17*
20/F	Office 3 (A11)	19.3	480	FL4	8	30.5	**12.6**	*17*
20/F	Office 4 (C12)	8.7	450	FL4	3	30.5	**10.5**	*17*
20/F	Office 5 (B9)	101.3	530	FL4	39	30.5	**11.7**	*17*
20/F	Office 6 (C3)	66.3	560	FL4	28	30.5	**12.9**	*17*
20/F	Office 8 (E3)	45.7	510	FL4	18	30.5	**12.0**	*17*
20/F	Office 9 (G3)	45.9	510	FL4	18	30.5	**12.0**	*17*
20/F	Office 10 (R4)	321.3	590	FL4	131	30.5	**12.4**	*17*
20/F	Office 11 (T1)	16.4	450	FL4	7	30.5	**13.0**	*17*
20/F	Office 12 (T3)	9.3	550	FL6	3	38.5	**12.4**	*17*
20/F	Office 13 (T11)	19.5	500	FL4	8	30.5	**12.5**	*17*
20/F	Office 14 (R11)	9.4	470	FL4	4	30.5	**13.0**	*17*
20/F	Office 15 (P13)	7.1	550	FL4	3	30.5	**12.9**	*17*
20/F	Drawing Off 1 (N15)	280	570	FL4	107	30.5	**11.7**	*20*
20/F	Data Processing Room (B14)	57.5	600	FL4	17	30.5	9.0	
				FL5	4	59.1	4.1	

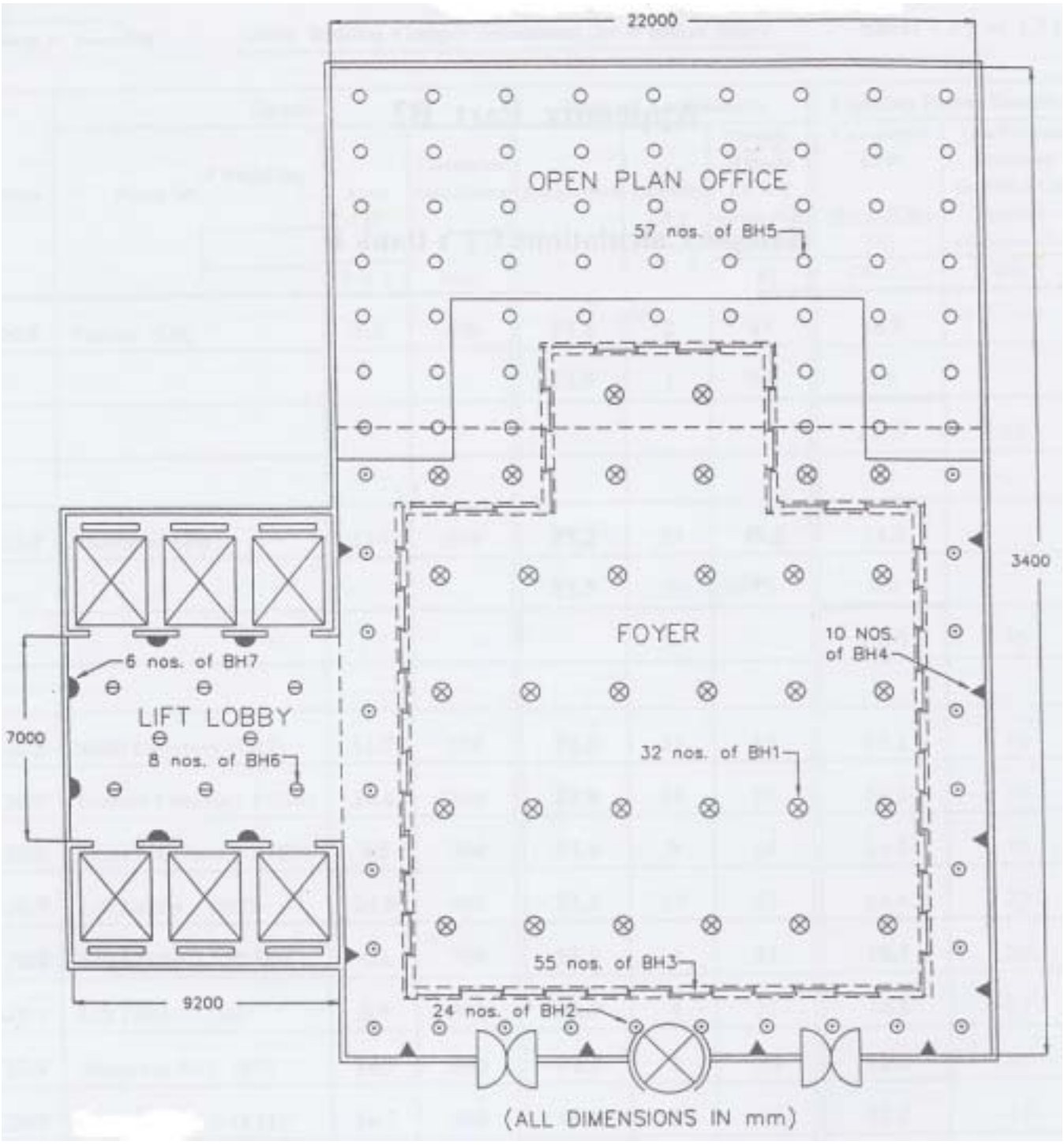
Lighting Power Density — Office — Sheet 1 of (2) — Form LG-2

Floor	Space			Data of Luminaires			Lighting Power Density	
	Name of Space	Area {A}	Calculated Illuminance	Designation	Quantity	Circuit Wattage { CW } *(quoted from Form LG-1)*	Calculated LPD {N} x {CW} / {A}	Maximum Allowable LPD
		(m^2)	(lux)		{ N }	(W)	(W/m^2)	(W/m^2)
							13.1	*16*
20/F	Meeting Room 1 (C8)	4.8	450	FL4	2	30.5	**12.7**	*18*
20/F	Meeting Room 2 (C7)	7.6	500	FL6	2	38.5	**10.1**	*18*
20/F	Meeting Room 3 (O4)	12.8	500	FL4	6	30.5	**14.3**	*18*
20/F	Rest Room (I3)	19.1	380	FL9	18	13.5	**12.7**	*13*
20/F	Conference Room (F14)	33.2	540	FL4	9	30.5	8.3	
				FL8	10	17.2	5.2	
							13.4	*18*
20/F	Store Room 1 (D14)	11.7	320	FL6	2	38.5	**6.6**	*11*
20/F	Store Room 2 (S13)	24.1	350	FL6	5	38.5	**8.0**	*11*
20/F	Library (F17)	43.2	560	FL4	8	30.5	5.6	
				FL6	8	38.5	7.1	
							12.8	*17*
20/F	Pantry (O5)	5.4	350	FL4	2	30.5	**11.3**	*13*
20/F	Corridor (I5)	124	310	FL2	39	31.6	9.9	
				FL9	5	13.5	0.5	
							10.5	*12*
20/F	Male Lavatory (O12)	11.7	320	FL9	11	13.5	**12.7**	*13*
20/F	Female Lavatory 1 (G6)	10.6	320	FL9	10	13.5	**12.7**	*13*
20/F	Female Lavatory 2 (E9)	9.5	330	FL9	9	13.5	**12.8**	*13*
20/F	Lift Lobby 1 (M7)	24.8	400	FL8	17	17.2	**11.8**	*15*
20/F	Lift Lobby 2 (O7-O8)	4.6	350	FL8	4	17.2	**15.0**	*15*
20/F	Lift Lobby 3 (I6)	5.9	300	FL8	4	17.2	**11.7**	*15*
20/F	Staircase No.1 (E7)	14.7	180	FL5	2	59.1	**8.0**	*8*
20/F	Staircase No.2 (E11)	14.7	180	FL5	2	59.1	**8.0**	*8*
20/F	Staircase No.3 (O9)	15.3	170	FL5	2	59.1	**7.7**	*8*
20/F	AHU Room "A" (H8)	30.6	370	FL4	10	30.5	**10.0**	*13*
20/F	AHU Room "B" (H11)	33.4	330	FL4	10	30.5	**9.1**	*13*
20/F	Cleaner's Store 1 (E5)	2.5	195	FL10	1	16.4	**6.6**	*11*
20/F	Cleaner's Store 2 (E12)	2.5	195	FL10	1	16.4	**6.6**	*11*

Appendix C2 - Sample Calculations for a Bank Hall

Drawing (D2) : Lighting Layout Plan for a Bank Hall

(The Bank Hall is considered as a composite space consisting of 3 parts – Foyer, Open Plan Office & Lift Lobby)



Legend

- BH1 : 1 x 100W MBI, fluorescent coated, elliptical shape, warm colour 3200K recessed downlight
- BH2 : 1 x 100W SON, 2500K recessed downlight
- BH3 : 1 x 35W MCF T5, electronic ballast, 2700K recessed luminaire with general purpose louvers
- BH4 : 1 x 150W TH, double-ended linear 2850K wall-mounted downlight
- BH5 : 1 x 70W MBI clear 4000K lamp bulb recessed downlight
- BH6 : 1 x 50W SON elliptical 2000K recessed downlight
- BH7 : 1 x 40W GLS frosted candle lamp wall-mounted luminaire

Data of Lamps & Luminaires — Bank Hall — Sheet 1 of (1) — Form LG-1

Luminaire Designation	Lamp Code *quoted from **Table (LG2)***	Nominal Lamp Wattage { L_w } *(Lamp only)*	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in **Table (LG1)***	Minimum Allowable Value *Table (LG2)*			Circuit Wattage {CW} Manufacturer data or calculated by: ***{n} x {L_w} + {Controlgear Loss per Luminaire}***	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
BH1	MBI	100	87	*85*	1	1	110	111.8
BH2	SON	100	85	*82*	1	1	110.5	111.8
BH3	MCF T5	35	97	*97*	1	1	38.5	39
BH4	TH	150	17.2	*17*	1	N.A.	150	N.A.
BH5	MBI	70	88	*85*	1	1	78.5	80
BH6	SON	50	83	*82*	1	1	57.2	58.8
BH7	GLS	40	10	*10*	1	N.A.	40	N.A.

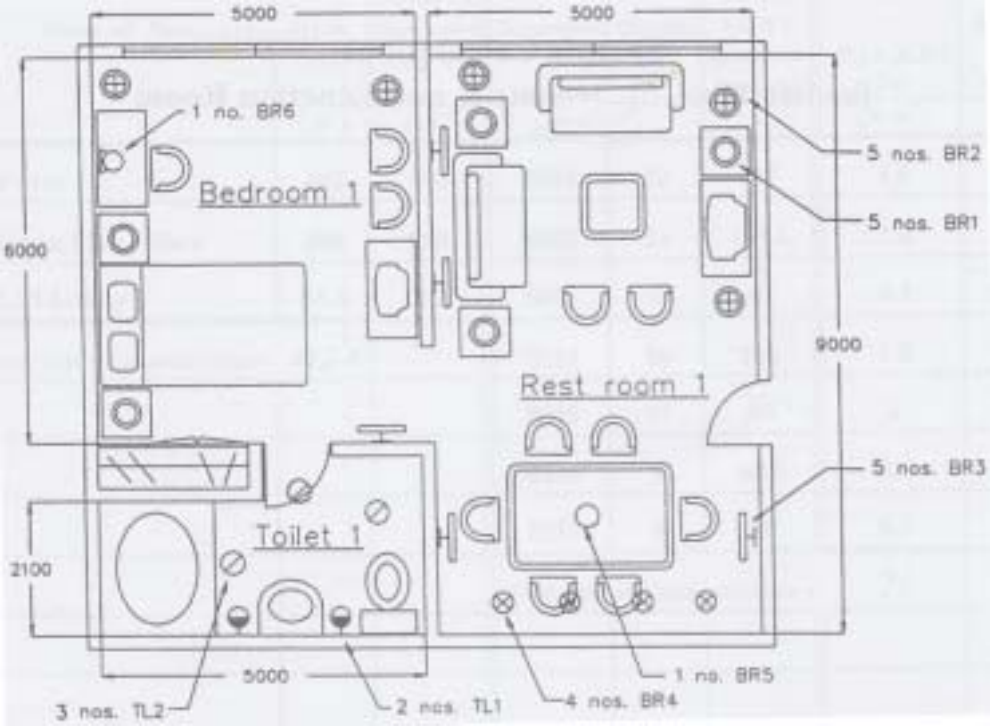
Lighting Power Density — Bank Hall — Sheet 1 of (1) — Form LG-2

Floor	Space			Data of Luminaires			Lighting Power Density	
	Name of Space	Area {A}	Calculated Illuminance	Designation	Quantity	Circuit Wattage { CW } *(quoted from **Form LG-1**)*	Calculated LPD $\frac{\{N\} \times \{CW\}}{\{A\}}$	Maximum Allowable LPD
		(m^2)	(lux)		{ N }	(W)	(W/m^2)	(W/m^2)
G/F	Foyer	462	490	BH1	32	110	4.3	
	Open Plan Office	286	550	BH2	24	110.5	3.3	
	Lift Lobby	64.4	200	BH3	55	38.5	2.6	
				BH4	10	150	1.8	
				BH5	57	78.5	5.5	
				BH6	8	57.2	0.6	
				BH7	6	40	0.3	
	Total Area of Composite Space =	**812.4**				Total LPD of Composite Space =	***18.4***	***21.4***

Appendix C3 - Sample Calculations for 2 Hotel Bedrooms and 1 Function Room

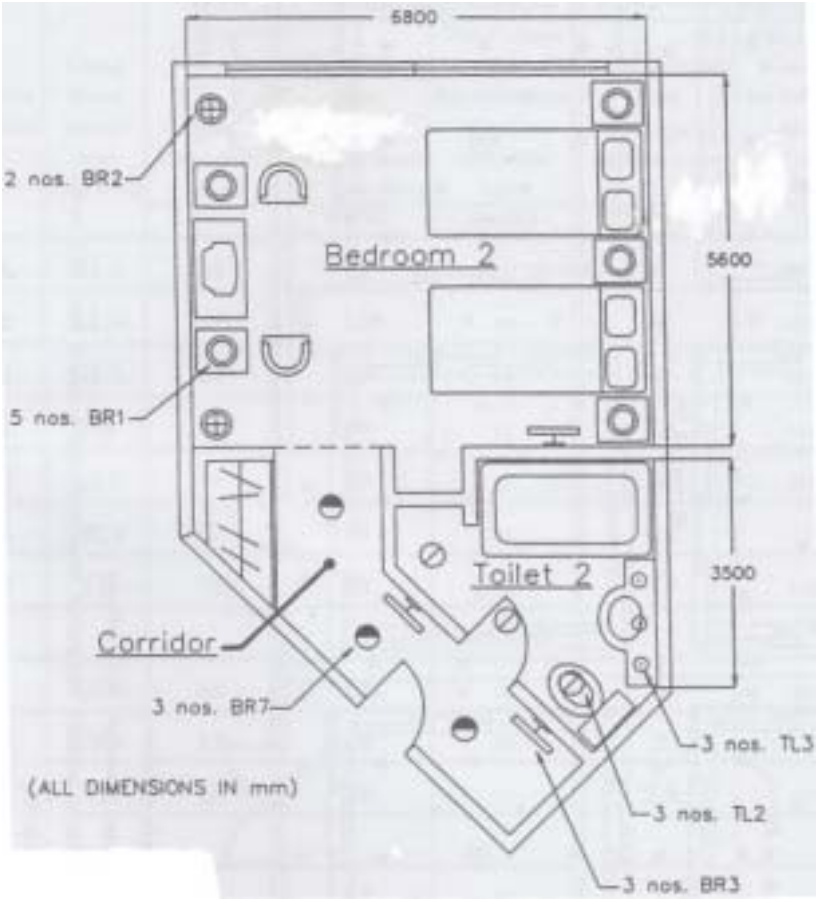
Drawing (D3) : Lighting Layout Plan for Bedroom 1 of a Hotel

(The Bedroom comprises 3 discrete spaces – Bedroom 1, Rest Room 1 & Toilet 1)



Drawing (D4) : Lighting Layout Plan for Bedroom 2 of a Hotel

(The Bedroom comprises 3 discrete spaces – Bedroom 2, Toilet 2 & Corridor)



Legend for Drawings (D3) & (D4)

BR1 : 1 x 60W GLS Satin lamp

BR2 : 1 x 22W CFG floor-mounted luminaire

BR3 : 1 x 40W GLS candle-shaped wall-mounted decorative luminaire

BR4 : 1 x 35W TH capsule luminaire c/w reflector wall washer

BR5 : 1 x 100W GLS frosted candle-shape ceiling-mounted luminaire

BR6 : 1 x 13W miniature MCF 5300K

BR7 : 1 x 35W TH capsule downlight c/w reflector

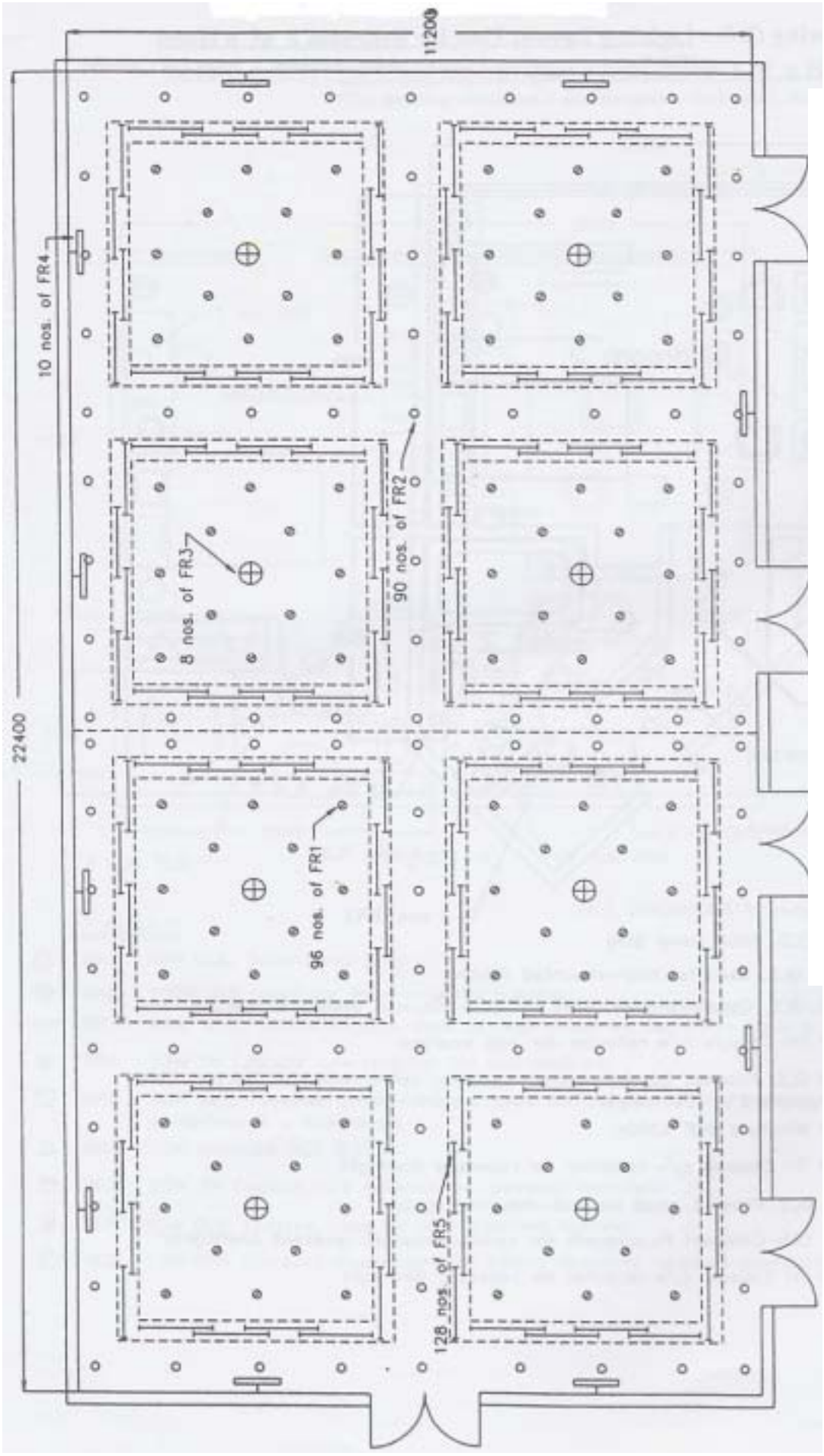
TL1 : 1 x 40W GLS frosted wall mounted luminaire

TL2 : 1 x 13W CFN ceiling-mounted recessed downlight

TL3 : 1 x 20W TH capsule recessed downlight c/w reflector

Drawing (D5) : Lighting Layout Plan for a Function Room of a Hotel

(The Function Room is considered as a **Multi-functional Space** that can be used either as a **Banquet Room**, a **Seminar Room** or a **Ball Room**)



Data of Lamps & Luminaires	Hotel	Sheet 1 of (1)	Form LG-1

Luminaire Designation	Lamp Code *quoted from* ***Table (LG2)***	Nominal Lamp Wattage { L_w } *(Lamp only)*	Luminous Efficacy		No. of Lamps per Luminaire	No. of Ballasts per Luminaire	Power Consumption per Luminaire (lamp + ballast)	
			Luminous Efficacy (manufacturer data) *at prescribed operating hours in* ***Table (LG1)***	Minimum Allowable Value ***Table (LG2)***			Circuit Wattage {CW} Manufacturer data or calculated by: ***{n} x {L_w} + {Controlgear Loss per Luminaire}***	Maximum Allowable Value
		(W)	(lm/W)	(lm/W)	{n} per Luminaire		(W)	(W)
BR1	GLS	60	14	*13*	1	N.A.	60	*N.A.*
BR2	CFG	22	60	*55*	1	1	24	*25*
BR3	GLS	40	11	*10*	1	N.A.	40	*N.A.*
BR4	TH	35	19	*15*	1	1	37.8	*N.A.*
BR5	GLS	100	13	*13*	1	N.A.	100	*N.A.*
BR6	MCF	13	70	*65*	1	1	15	*15.7*
BR7	TH	35	20	*15*	1	1	37.8	*N.A.*
TL1	GLS	40	14	*13*	1	N.A.	40	*N.A.*
TL2	CFN 2-tube	13	69	*65*	1	1	16	*16.7*
TL3	TH	20	18	*15*	1	1	22.8	*N.A.*
FR1	CFN 2-tube	6.5	68	*50*	1	1	7.5	*9*
FR2	TH	35	15	*15*	1	1	37	*N.A.*
FR3	GLS	30	11	*8*	6	N.A.	180	*N.A.*
FR4	CFG	8	60	*45*	2	1	18	*19*
FR5	MCF T5	21	97	*97*	1	1	22.8	*24*

Lighting Power Density				Hotel		Sheet 1 of (1)	Form LG-2	
Floor	Space			Data of Luminaires			Lighting Power Density	
	Name of Space	Area {A}	Calculated Illuminance	Designation	Quantity	Circuit Wattage { CW } *(quoted from Form LG-1)*	Calculated LPD {N} x {CW} / {A}	Maximum Allowable LPD
		(m^2)	(lux)		{ N }	(W)	(W/m^2)	(W/m^2)
1/F	Bedroom 1	30	70	BR1	2	60	4.0	
				BR2	2	24	1.6	
				BR6	1	15	0.5	
							6.1	
1/F	Rest Room1	45	100	BR1	3	60	4.0	
				BR2	3	24	1.6	
				BR4	4	37.8	3.4	
				BR5	1	100	2.2	
							11.2	*13*
1/F	Toilet 1	12.25	200	TL1	2	40	6.5	
				TL2	3	16	3.9	
							10.4	*13*
2/F	Bedroom 2	39	100	BR1	5	60	7.7	
				BR2	2	24	1.2	
							8.9	*17*
2/F	Toilet 2	11.5	200	TL2	3	16	4.2	
				TL3	3	22.8	5.9	
							10.1	*13*
2/F	Corridor of Bedroom 2	11	100	BR7	3	37.8	**10.3**	*12*
G/F	Function Room (Banquet)	251	440	FR1	96	7.5	2.9	
				FR2	90	37	13.3	
				FR3	8	180	5.7	
				FR4	12	18	0.9	
					Multi-functional Space (Banquet)		***22.7***	***23***
G/F	Function Room (Seminar)	251	565	FR1	96	7.5	2.9	
				FR5	128	22.8	11.6	
					Multi-functional Space (Seminar)		***14.5***	***17***
G/F	Function Room (Ball Rm)	251	280	FR2	90	37	13.3	
				FR3	8	180	5.7	
				FR4	12	18	0.9	
					Multi-functional Space (Ball Rm)		***19.9***	***23***

Note : The LPD of BR3 is not included in the LPD calculation for Bedrooms 1 & 2, based on clause 1.3(b) of the Code.

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