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To: Recipients of FSD Circular Letters

Dear Sirs/Madams,

FSD Circular Letter No. 1/2006
Fire Safety Standards for Emergency Lighting

Pursuant to section 2 of the Fire Services Ordinance (FSO), Cap 95, Laws of Hong Kong, emergency lighting units/systems are classified as “fire service installations or equipment.” In this connection, the general specifications for emergency lighting are stipulated in the Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, testing and Maintenance of installations and Equipment (FSI Codes) published by this Department.

At present, the standard of emergency lighting to be provided in all premises shall comply with the general specifications as stipulated in the FSI Codes. Nevertheless, in order to facilitate the trades concerned, 2 sets of requirements, i.e. Requirements for Emergency Lighting Systems [PPA/104 (3rd Revision)] and Requirements for Self-contained Luminaires Emergency Lighting Systems [PPA/104(A) (3rd Revision)] have been formulated and imposed by this Department on various licensed premises such as food premises, cinemas / theatres, places of public entertainment / assembly, child care centres, schools, massage establishments, etc.

With a view to keeping the fire safety requirements in pace with the changing environment of the concerned trades as well as technical advancement and to uphold safety standards in premises admitting members of the public, this Department has conducted a review on the current requirements on emergency lighting. Subsequent to the review and consultation with the trades as well as the Fire Safety Standards Advisory Group which comprises representatives from the Architectural Services Department, Housing Department, Hong Kong Institution of Engineers, Institution of Fire Engineers (HK Branch), Association of Registered Fire Service Installation Contractors of Hong Kong Limited and this Department, the fire safety

requirements for emergency lighting systems and self-contained luminaries emergency lighting systems have been revised. The two sets of revised requirement, viz. PPA/104 (4th Revision) and PPA/104(A) (4th Revision) are attached at **Appendix I and Appendix II** and can also be downloaded from the FSD's official website at www.hkfsd.gov.hk/home/eng/circular.html for reference.

Apart from updating of relevant requirements with reference to the current international /national standards, the main areas of revision are as follows:-

- a) approved room for batteries accommodation
- b) power supply
- c) fire protection to exposed cable
- d) non-flammability properties
- e) automatic provision of emergency lighting upon power / system failure
- f) provision of emergency lighting in small area premises

Amongst the revised provisions of the requirements, your particular attention is drawn to the incorporation of the provision at section 6.10.2 of the "Code of Practice for the Emergency Lighting of Premises other than Cinemas and Certain Other Specified Premises used for Entertainment" (BS 5266-1:1999) so that "emergency lighting luminaries shall comply with the non-flammability (resistance to flame and ignition) provisions specified in BS EN 60598-2-22 and external parts shall also be subjected to the 850°C hot wire test; any burning parts should self-extinguish within 30 seconds".

Test report(s) / certificates issued by a recognized testing organization or a local university laboratory competent to certify the properties regarding resistance to flame and ignition and performance of the emergency lighting shall be required for certification of compliance.

In order to let the parties concerned have sufficient time for complying with the revised requirements in particular the hot wire test as specified above, the revised requirements will be imposed on licensed or registered premises for all submissions of applications received by respective Licensing Authority / this Department with effect from **1.1.2007** after which time any emergency lighting system / self-contained luminaries emergency lighting system newly installed in such premises failing to comply with the requirements would not be accepted by this Department.

Yours faithfully,

(CHAN Chor-kam)
for Director of Fire Services



Requirements for Emergency Lighting Systems

A. Specification

1. The Emergency Lighting Systems shall comply with British Standard 5266-1:1999 and BS EN 1838:1999 except that exit sign shall comply with Section 5.10 of the Code of Practice for Minimum Fire Service Installations and Equipment.
2. Batteries used shall be heavy duty and of rechargeable (Secondary) type; batteries of primary cells of any type whatsoever will not be acceptable.
3. Batteries shall be installed in a room approved for this purpose by the Building Authority, Housing Authority or Director of Architectural Services, as appropriate, unless :-
 - (i) the battery is an enclosed type and its entire installation shall conform to BS6133:1995 with capacity not exceeding 400 ampere-hours; or
 - (ii) the battery is valve regulated sealed type conforms to BS6290-4:1997 as specified in section 8 of FSD Circular Letter 4/96 XI.
4. All batteries for the emergency lighting circuits shall be kept fully charged at all times.
5. Power Supply
 - (i) For cinemas/theatres/premises accommodating 500 persons or less, the emergency lighting system shall be capable of maintaining the stipulated lighting level for a period of not less than 1 hours with power supplied either from a dedicated Uninterruptible Power Supply (UPS) system or from a central batter DC supply system; or
 - (ii) For cinemas/theatres/premises accommodating more than 500 persons, the emergency lighting system shall be :-
 - a) maintained for a period of not less than 2 hours with power supplied either from a dedicated UPS system or from a central battery DC supply; or

PPA/104 (4th Revision)

- b) maintained for a period of not less than 1 hours with power supplied either from a dedicated UPS system or from a central battery DC supply on the condition that the supply system is backed up by an emergency generator conformed to the standard as stipulated in the Code of Practice for Minimum Fire Service Installations and Equipment and dedicated for fire service installations.
6. If a central battery DC supply system is used for the Emergency Lighting System, it shall be operated at a normal battery voltage of not less than 24 volts and not more than 120 volts D.C. from a common bank.
 7. An automatic trickle charger with mains input and suitable output, fitted with meters, regulators, pilot lights, testing facilities and warning signals in both visual and audio forms, shall be provided for the UPS system or central battery DC supply system. The visual and audio warning signals shall be terminated in the management office of the cinema/theatre/premises or a place agreed with the Fire Services Department to alert the management of system fault. The charger shall be capable of fully re-charging the batteries in not more than 12 hours, if the emergency lighting is not also backed up by emergency generator. For emergency lighting systems backed up by emergency generator, the time required to fully recharge the battery system shall not be more than 24 hours.
 8. The supply from the batteries shall feed a main distribution fuse board and thence be subdivided to four subdistribution fuse boards, as follows:-
 - Exit lighting
 - Stair lighting
 - Auditorium lighting
 - Stage lighting
 9. Outgoing circuits shall be suitably protected by fuses to British Standard 88:1988 or miniature circuit breakers to BS EN 60898:1991.
 10. The emergency lighting system shall be wired in M.I.C.C. cable to BS EN 60702-1:2002, BS EN 60702-2:2002 and BS 6207-3:2001 as appropriate or other power supply cable conforms to BS 6387:1994 Cat. CWZ or other international standards acceptable to the Director of Fire Services and be fully segregated from the general distribution system.
 11. All lighting fittings in the emergency lighting system shall comply with the non-flammability (resistance to flame and ignition) provisions specified in BS EN 60598-2-22:1999 and external parts shall also be subjected to the 850°C glowing/hot wire test; any burning parts thereof should self-extinguish within 30 seconds. Such lighting fittings shall be permanently fixed in position.

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12. Upon failure of the main lighting system or in the event of power failure, the emergency lighting system shall automatically light up to at least 90% of the stipulated illumination level within 5 seconds.

B. Other Requirements

13. Batteries in celluloid containers shall not be installed, stored or used.
14. A margin allowance of 12½ % of the total required battery capacity (ampere-hour rating but not voltage) shall be provided, i.e. 100% + 12½ % = 112½ %.
15. A diagram showing details of the distribution system and the circuit wiring of the emergency lighting system shall be erected at the main distribution board.
16. The minimum illumination provided at floor level by the emergency lighting system shall be:-

Staircase / exit route not less than 2 lux

Nightclub, restaurant, dance hall,
or premises where people have
freedom of movement and there are
loose fixtures and fittings. not less than 1 lux

Cinemas and theatres (auditorium) not less than 0.5 lux

measured at the mid-point between any two emergency lighting fittings. A discretionary tolerance of minus 10% is permitted and all readings shall be taken by an illuminance meter.

17. All luminaires shall have equal lumen output and distribution characteristics giving equal intensity of light in all material directions. Each luminaire shall be so sited as to avoid impairment of vision from glare. Luminaires, except where so specified and approved, shall be mounted at a height of not less than 2 metres.
18. The maximum permissible period for visual adaptation shall not exceed 5 seconds at any point on the premises.
19. The minimum number of fittings required in any installation shall not be less than two (N.B. if only one fitting was provided and a lamp filament failure occurred, a hazardous situation would result.)
20. In the event of failure of the main lighting, the public shall, unless the capacity of the battery is sufficient to maintain the specified conditions for not less than four hours, within one hour be required to leave the building and they shall not be re-admitted until the general lighting has been fully restored and the emergency system recharged.

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21. In the case of battery systems, the control and safety devices installed shall be regularly tested as follows :-
 - (i) Connections between the battery and the source of charging current shall be such that in no circumstances shall the battery discharge other than to the emergency lighting circuits.
 - (ii) A rectifier for battery charging should be provided for that purpose only and shall be so regulated that the battery cannot discharge appreciably under normal conditions.
22. Voltage and hydrometer tests, where appropriate, shall be carried out weekly and recorded in a register.
23. Once every month a discharge test, for 1 minute at the 10-hour discharge rate, shall be carried out and the results shall be entered in a register. The on-load voltage of each cell after this test shall be not less than 2.01 volts for lead acid and 1.25 volts for “NiFe” or nickel-cadmium. For other types of battery, advice(s) from the manufacturer of the battery/system shall be sought and that shall also be acceptable to the Director of Fire Services.
24. Relevant test report(s)/certificate(s) issued by a testing organization recognized by the Fire Services Department or a local university laboratory competent to certify the properties regarding resistance to flame and ignition and performance of the emergency lighting shall be submitted to the Fire Services Department.

Fire Services Department
May 2006



Requirements for Self Contained Luminaires
Emergency Lighting Systems

A. Definition

1. Luminaire means an apparatus which distributes, filters and transforms the light given by a lamp or lamps and which includes all the items necessary for fixing and protecting these lamps and for connecting them to the supply circuit.
2. Self-contained emergency lighting luminaire means a luminaire providing maintained or non-maintained emergency lighting in which all the elements, such as battery, the lamp, the control unit and the test and monitoring facilities, where provided, are contained within the luminaire or adjacent to it (that is, within 1 metre).

B. Specification

3. Emergency lighting luminaires shall comply with the non-flammability (resistance to flame and ignition) provisions specified in BS EN 60598-2-22:1999 and external parts shall also be subjected to the 850°C glowing/hot wire test; any burning parts should self-extinguish within 30 seconds.
4. All power cables extended outside the enclosure of a self-contained emergency lighting luminaire, other than the wiring connecting the luminaire to normal supply, shall conform to BS EN 60702-1:2002, BS EN 60702-2:2002 and BS 6207-3:2001 as appropriate or to BS 6387:1994 Cat. CWZ or other international standards acceptable to the Director of Fire Services.
5. An automatic trickle charger with a 220-volt input and suitable output and fitted with pilot lights or other indicating device shall be provided for the batteries. The charger shall be capable of re-charging the battery to 100% of the rated capacity in not more than 12 hours.
6. The self-contained luminaires emergency lighting systems shall be capable of maintaining the stipulated lighting levels for a period of not less than one hour (rated duration).
7. Upon failure of the main lighting system or in the event of power failure, the emergency lighting shall automatically light up to at least 90% of the stipulated illumination level within 5 seconds.
8. Each unit shall be provided with a properly labeled 'TEST' switch and charge monitor light. A low voltage cut out shall also be provided to disconnect the batteries when fully discharged.

C. Other Requirements

9. Each luminaire shall be so designed as to provide a broad non-glare illumination when in use. At least two sets of emergency lighting luminaire shall be provided in the premises so that the premises will not be plunged into total darkness in the event of a luminaire failure. (If the area of the premise is less than 16m², only one set of emergency lighting will be required.)
10. The minimum illumination provided at floor level by the emergency lighting systems shall be:-
- | | |
|---|----------------------|
| Staircase/exit route | not less than 2 lux. |
| Night club, restaurant, dance hall or premises where people have freedom of movement and there are loose fixtures and fittings. | not less than 1 lux. |

The measurements shall be taken at the mid-point between any two emergency lighting luminaries. All readings shall be taken by an illuminance meter and a discretionary tolerance of minus 10% is permitted.

11. Facilities exceeding 8m² gross area and facilities of less than 8m² without borrowed light should be provided with escape lighting complying as if they were part of an escape route. (For clarity, escape route means a route forming part of the means of escape from a point in a building to a final exit. Borrowed light means the light from other emergency lighting source. Escape lighting means that part of emergency lighting which is provided to ensure that the escape route is illuminated at all material times).
12. The emergency lighting system shall be installed and certified by a Registered Fire Service Installation Contractor.
13. Relevant test report(s)/certificate(s) issued by a testing organization recognized by the Fire Services Department or a local university laboratory competent to certify the properties regarding resistance to flame and ignition and performance of the emergency lighting shall be submitted to the Fire Services Department.
14. Periodical test shall be carried out to each luminaire according to the following procedures :-
- i) Each luminaire shall be energized from its battery by simulation of a failure of the supply to normal lighting for the period as specified below :-

Monthly	-	not exceeding one quarter of the rated duration as required in clause 6 above
Six-monthly	-	one quarter of the rated duration
Three-yearly	-	full duration
 - ii) The luminaire shall be functioning properly to maintain the stipulated lighting level and the normal power supply shall be restored after the test.
 - iii) The test results shall be recorded in a register.