

LICENSING AND CERTIFICATION COMMAND

FIRE PROTECTION ENGINEERING COMPLIANCE DIVISION

FIRE PROTECTION FACILITIES GROUP



Part 2 – Specification for Gas Extraction System for Battery Room and Electrical Charging Facilities

Part 2

FSD Circular Letter No. 3/2023

Specification of Gas Extraction System for Battery Room and Electrical Charging Facilities

Gas Extraction System - Prevailing Requirements

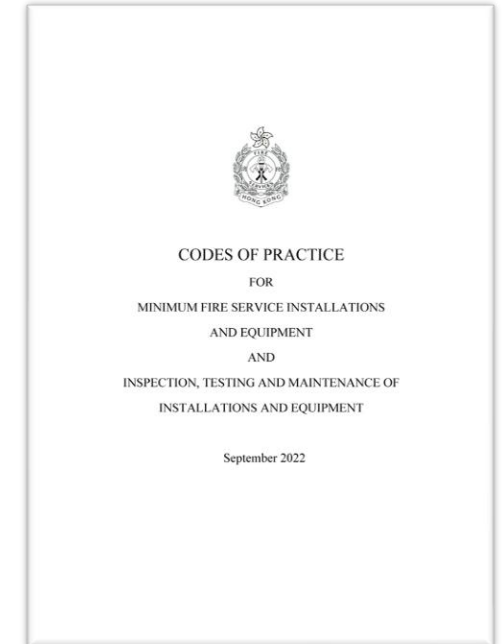
Code of Practice for Minimum Fire Service Installations and Equipment (2022 Version)

“Gas extraction system” means

An electrically/mechanically operated system capable of removing flammable vapours/gases from the part of the building where such vapours/gases may be generated through normal operation of the plants or work processes.

Types of buildings requiring Gas extraction system

- 4.1 Aircraft maintenance and repair facilities
- 4.5 Battery Rooms and electrical charging facilities
- 4.10 Chemical manufacturing / processing plants
- 4.36 Mechanical Plant Rooms (Group 1)
- 4.37 Mechanical Plant Rooms (Group 2)
- 4.39 Petro-chemical complexes



◆ NO Specification of Gas Extraction System in Part V of CoP

Gas Extraction System - Prevailing Requirements

FSD Circular Letter No. 4 of 1996

Part XI Para. 8 – Battery Rooms Mechanical Ventilating Systems

- Purpose
 - *To Maintain the average concentration of hydrogen gas which may evolve during a recharge of the battery.*
- Design Calculation
- Mechanical Ventilating System Technical Requirements
- Requirements for Separate Battery Room
 - *Depends on the types of battery accommodated, i.e. Open type / enclosed type / valve regulated type*

Specification of Gas Extraction System for Battery Rooms and Electrical Charging Facilities

Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

Purpose of Review

- To enhance to fire safety standards in battery rooms and electrical charging facilities
- To restate the Mechanical Ventilating System for battery room as FSI
- Keep abreast of latest international standards,
 - i.e. NFPA 1, NFPA 91, NFPA 111, NFPA 855
- Facilitate industry development and community needs
- Clarify the unclear area in the previous version



Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

1. Scope of Application

- To reduce the concentration of flammable vapour/gas, such as hydrogen, which may be released during the charging of the battery, to below its lower explosion limit.
- Dedicated battery room accommodating the following types of battery having total outputs of not less than 400 Ampere-hour:-
 - Lead-acid (鉛酸蓄電池);
 - Nickel-cadmium (鎳鎘電池); or
 - Other types of battery evolving flammable vapour/gas during recharging of the Battery.



Lead-acid battery



Nickel-cadmium battery

Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

1. Scope of Application

- All open type batteries regardless of size shall be accommodated in dedicated battery room.



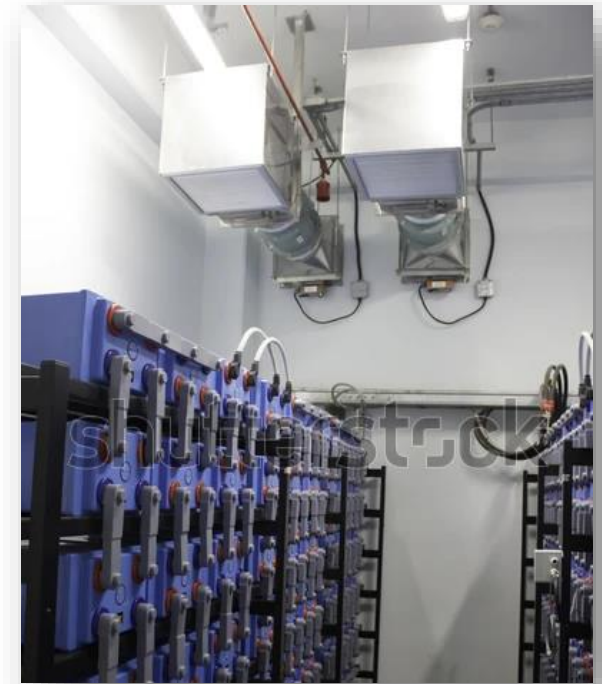
Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

2. Design Calculation

- The safety limit of hydrogen gas concentration inside the battery room is **1% by volume** maximum during the worst-case event of simultaneous “boost” charging of all the batteries.; or
- The extraction shall be provided at a rate not less than **5.1 Litre/sec/m²** of the floor area of the room.

(The design shall follow the guidelines in BS EN IEC 62485-1, BS EN IEC 62485-2, NFPA1, NFPA111 or other acceptable international standards as agreed by the Director of Fire Services.)



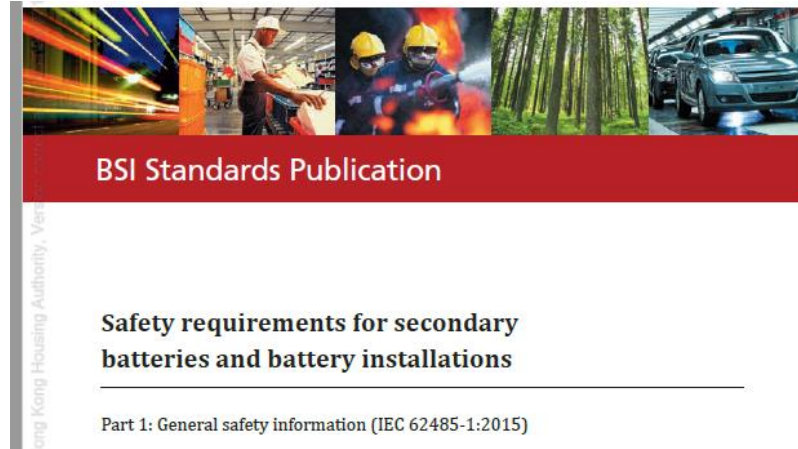
Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

2. Design Calculation



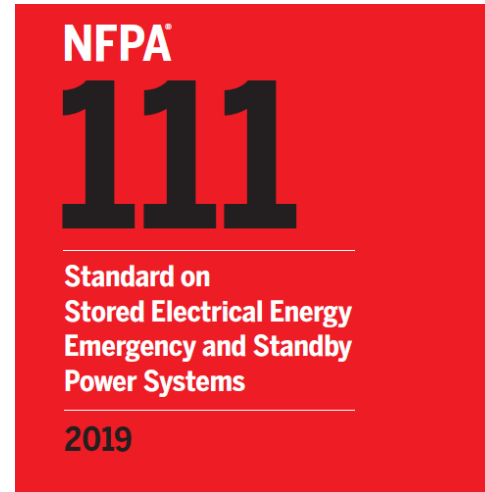
NFPA1



BS EN IEC 62485-1



BS EN IEC 62485-2



NFPA111

Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

3. Technical Requirements

- The system shall be independent to all other systems. The extracted air shall be exhausted directly to open air.
- Extraction points at the highest level; air inlets at low level.
- If ductwork passes through compartments, any part of the ductwork outside the serviced compartment shall be totally enclosed by fire resisting construction.

(BS 476: Part 20 or same fire resisting period as the serviced compartment.)



Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

3. Technical Requirements

- Means of operation
 - Continuous ventilation or
 - Electrically interlocked with the battery charger.

(If the ventilation is not continuously provided, the charger cannot be put in operation when the ventilating fan is not running.)

- **Audio and visual indication** shall be provided at fire control panel to monitor status of the gas extraction system, i.e. Power Supply On, Fan Running and Fail.
- There shall be no damper nor other restrictions in the ductwork or shafts.



Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

3. Technical Requirements

- The operation of gas extraction system shall not affect the operation of other FSI in case of fire.
- Addition of Ductwork Requirements outside serviced compartment.
 - Make reference to specification of smoke extraction ductwork to ensure the integrity of fire compartment.
- Addition of Fire Resisting Cable Requirements
 - To align with specification of fire resisting cable of FSI (Shall comply with the same requirements in Appendix 8 of the CoP(Sep 2022).)

Minimum Fire Resisting Cable Requirements for Fire Service Installations

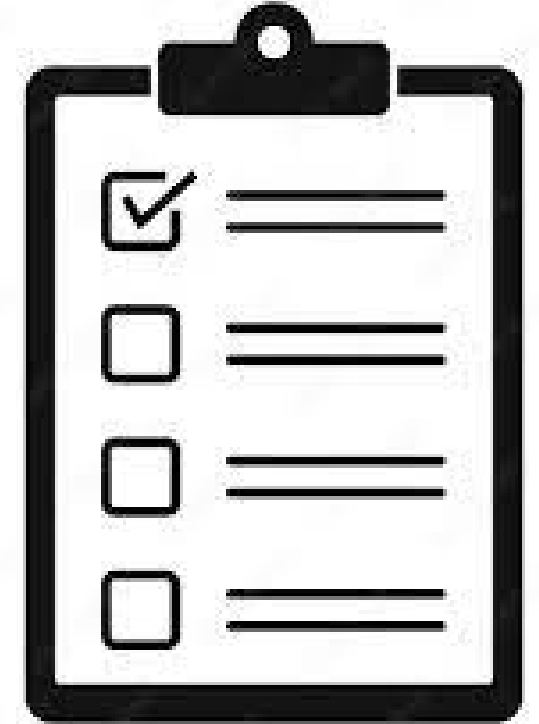
Item	Type of Fire Service Installations	Minimum Requirements
1.	Audio/visual advisory systems	<p><u>For standard cables or cable systems as defined in BS 5839-1, they shall comply with:</u></p> <p>(a) BS EN 50200 (PH30) and Annex E of BS EN 50200 (a duration of survival time of 30 minutes); or</p> <p>(b) BS EN 60702; or</p> <p>(c) BS 7629-1 (Cat. Standard 30); or</p> <p>(d) BS 7846 (Cat. F2 for cables of overall diameter not exceeding 20mm or Cat. F30 for cables of overall diameter exceeding 20mm); or</p> <p>(e) BS 6387 Cat. CWZ; or</p> <p>(f) Other international standards acceptable to the Director of Fire Services.</p>
		<p><u>For enhanced cables or cable systems as defined in BS 5839-1, they shall comply with:</u></p> <p>(g) BS EN 50200 (PH120) and BS 8434-2 (a duration of survival time of 120 minutes); or</p> <p>(h) BS EN 60702; or</p> <p>(i) BS 7629-1 (Cat. Standard 120); or</p> <p>(j) BS 7846 (Cat. F2 for cables of overall diameter not exceeding 20mm or Cat. F120 for cables of overall diameter exceeding 20mm); or</p> <p>(k) BS 6387 Cat. CWZ; or</p> <p>(l) Other international standards acceptable to the Director of Fire Services.</p>
2.	Automatic actuating device	Cable shall comply with: ←
3.	Automatic fixed installations other than water	(a) BS 6387 Cat. CWZ; or
4.	Automatic fixed installation using water (other than sprinkler system)	(b) BS EN 60702; or
5.	Deluge systems	(c) BS 8491 (minimum fire survival time of 120 minutes); or
6.	Drencher systems	(d) BS 7629-1 (Cat Enhanced 120); or
7.	Fire hydrant/hose reel systems	(e) BS 7846 (Cat. F2 for cables of overall diameter not exceeding 20 mm or Cat. F120 for cable of overall diameter exceeding 20mm); or

Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

List of Major Revision

4. Inspection, Testing and Maintenance

- To demonstrate the satisfactory performance including gas extraction flow rate, means of actuation, audio and visual indication for status monitoring and other requirements
- The system shall be maintained in efficient working order at all times and shall be inspected by a registered fire service installation contractor at least once in every 12 months.



Revised Specification for Gas Extraction System for Battery Rooms and Electrical Charging Facilities

Target Buildings

- The revised specification shall be applicable to **all developments** with initial building plan submission received by the department on or after 1 September 2023.
- Building plans submitted before 1 September 2023 are welcome to voluntarily adopt these revised requirements.



The End