VIP Reference

Z-13018/01/2024-SS-I
Government of India
Ministry of Labour & Employment

Shram Shakti Bhawan
New Delhi, dated 25.11.2024

To,
The Director General,
ESI Corporation, Panchdeep Bhawan,
C.I.G. Road,
New Delhi-2.

Subject:- DO Letter from Shri Punya Salila Srivastava, IAS, Secretary, Ministry of H&FW, Govt. of India regarding direction for review and strengthen capacities for prevention, preparedness and mitigation against fire accidents in all health facilities. -reg.

****

Sir,

I am directed to forward herewitha copy of the D.O. No. Z-28015/33/2024-DMCell dated 18.11.2024 received from Shri Punya Salila Srivastava, IAS, Secretary, Ministry of H&FW, Govt. of India on the subject mentioned above.

2. It is requested to take necessary action in the matter and the action taken report may be furnished directly to Director General of Health Services under intimation to this Section.

Encl.: - as above.

Yours faithfully,

(D.M. Khare)
Under Secretary to the Govt.
of India
Ph. 011-23327180

पुण्य सलिला श्रीवास्तव, भा.प्र.से.
सचिव
PUNYA SALILA SRIVASTAVA, IAS
Secretary

सत्यमेव जयते

आज़ादी का अमृत महोत्सव

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण विभाग
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
Government of India
Department of Health and Family Welf
Ministry of Health and Family Welfar
D.O No. Z.28015/33/2024-DMCell
18th November, 2024

Office of DS(SK) FTS / Dy. No. 943 Date 22/11/24

SECRETARY (L&E) Dy. No./F.T.S. No. 84498 Date 24.11.24

This is in continuation of this Ministry's previous communication vide DO letters dated 23.03.2024; 29.05.2024; 06.06.2024; 30.07.2024 (copies enclosed), wherein State Health Departments were requested to review and strengthen capacities for prevention, preparedness and mitigation against fire accidents in all health facilities. Further, a detailed checklist on 'Prevention and Maintenance of Fire Safety' that may be utilized at facility level had also been circulated to all States/UTs (Copy enclosed).

2. Some of the key issues that emerged in this context, during earlier stakeholder consultations, include the following:

a. A large number of fire accidents in health facilities are attributable to electrical reasons.
b. Lack of centralized database of all health facilities.
c. Issues relating to implementation of Section 32 of the Clinical Establishments (Registration and Regulation) Act, 2010, which provides for cancellation of registration of health facilities, if there is imminent danger to the health and safety of patients.

3. Despite substantive measures taken by some of the States to prevent and prepare against fire accidents in health facilities (both public and private), continued reporting of such accidents and loss of precious lives highlight the need to take up rigorous review and monitoring of fire prevention and safety protocols in all health facilities.

4. In view of the above, all States/UTs are requested to take up this issue on priority and direct all health facilities to undertake their respective evaluations as per the proforma enclosed. States are also requested to prioritize the following key areas for preparedness and response planning in context of fire safety in all health facilities:

a. Review and updation of fire prevention and response plans of all health facilities and training all healthcare staff on fire safety protocols, evacuation procedures, and use of fire- fighting equipment
b. Conducting regular preventive fire safety drills including evacuation plans.
c. Implementing and maintenance of appropriate fire prevention measures, such as regular and optimal preventive maintenance of electrical circuits and systems.
d. Installation and optimum maintenance of fire detection and suppression systems, including smoke alarms, fire extinguishers with regular check on expiry date, sprinklers etc.

.....contd/-

Room No. 156, 'A' Wing, Nirman Bhawan, New Delhi-110011
Tele : (O) 011-

5. States/UTs are also requested to constitute district level committees headed by District Collectors comprising of relevant officials from health, fire services and public works departments to undertake physical inspection of all health facilities. Such committees may also be directed to undertake suitable actions against the defaulters, as deemed necessary under the law.

I would urge all States/UTs to take up these activities with utmost priority.

Yours sincerely,

Encl : as above

(Punya Salila Srivastava)

Chief Secretaries of all States/UTs

Copy to: Additional Chief Secretary / Principal Secretary / Secretary (Health)
All States / UTs

Copy to : For kind information and appropriate action in respect of hospitals & other medical facilities in their domain

1. Home Secretary
2. Secretary, Ministry of Labour & Employment
3. Chairman, Railway Board

Punya Salila

(Punya Salila Srivastava)

Checklist for Prevention and Maintenance of Fire Safety

Fire safety measures	Yes/No
1. Functional fire-fighting system	
a. Is there easy access to fire extinguishers?	
b. Are the fire extinguishers within expiry limit?	
c. Are the hydrants accessible?	
d. Are the fire alarms functional and audible throughout the facility? (test)	
2. Regular maintenance and testing	
a. Are all fire extinguishers checked in last month?	
b. Are fire alarms and hydrants checked in last three months?	
3. Regular electrical load audits (Nat electrical code of India-2023)	
a. Was electrical load audit conducted in last 6 months?	
4. Oxygen safety:	
a. Are oxygen tanks stored in a safe place? (away from heat source, no-smoking policy in place)	
b. Signage displays fire hazard	
5. Installation of smoke detectors and fire alarms	
a. Do patient treatment and common areas have smoke detectors and fire alarms?	
b. Are they tested in last month as per IS 2189?	
6. Combustible material control	
a. Has hospital conducted an audit to identify and replace combustible material with non-combustible or fire-resistant material in patient care area	
7. Non-combustible material for electrical ducts	
a. Are the Electrical ducts sealed with fire-resistant sealants throughout?	
8. Avoid overloading power sources	
a. Check multiple high-power devices are not connected to a single circuit	
b. Conduct Preventive maintenance of all electrical points of heavy-duty equipment, including air conditioners.	
9. Installation of water sprinkles and hosepipes	
a. Does critical areas like ICU and OT have automatic sprinkler systems?	
b. Does critical areas like ICU and OT have accessible hosepipes?	
10. Did facility receive fire safety NOC within last year?	
a. Liaising with fire safety officers at the local level for fire safety audits, staff training, mock drills	
11. Evacuation plans	
a. Are there well-marked escape routes in health facility?	
b. Are fire exit doors free from obstruction and functional?	
c. Are there well-marked assembly areas?	
d. Are the emergency exists free of obstruction?	
f. Is the evacuation plan displayed prominently in multiple areas and floors?	
12. Staff training and drills	
a. Is staff trained in fire prevention and firefighting?	
b. Is staff trained in emergency fire response and evacuation?	
All hospital staff should know	
• Location of Manually Operated Electronic Fire Alarm (push button fire alarm) boxes	
• Location of fire extinguishers, hose reel provided on respective floors	
• Nearest exit from their work and patient area	
• Assembly point	
• Patient prioritization and Evacuation plan	

एल. एस. चाँगसन, भा.प्र.से.
अपर सचिव
L. S. Changsan, IAS
Additional Secretary

सत्यमेव जयते

आज़ादी का अमृत महोत्सव

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - 110011
Government of India
Ministry of Health & Family Welfare
Nirman Bhawan, New Delhi - 110011

D. O. No. Z.28015/33/2024-DM Cell
30th July, 2024

Respected Ma'am / Sir,

This is in continuation of my previous communication vide DO letter of even number dated 6th June, 2024 (**copy enclosed**), wherein State Health Departments were requested to review and strengthen capacities for prevention, preparedness and mitigation against fire accidents in all health facilities in your State. With an accompanying proforma, all States/UTs were also requested to communicate certain minimum set of parameters related to comprehensive electrical and fire safety audits of health facilities to get an understanding of major areas for improvement.

2. During stakeholder consultations at Central level as well as during virtual review meeting held with all States/UTs on 29th 2024, a number of key highlights have emerged:

a. A large majority of fire accidents in health facilities are attributable to electrical reasons.
b. The mandatory requirement for NOC from local fire departments is not applicable to all health facilities (depending on area, bed capacities etc.), and the rules regulating such requirements, vary between States.
c. Many States conveyed lack of any centralized database of all health facilities.
d. While the Clinical Establishments (Registration and Regulation) Act, 2010, under Section 32 provides for cancellation of registration of health facilities, if there is imminent danger to the health and safety of patients, many States are yet to adopt/implement the same.

3. Accordingly, States were requested to undertake a review of existing Clinical Establishments Acts, and undertake necessary amendments to the same to provide for comprehensive electrical and fire safety audits of health facilities. Pending such amendments, the States have also been requested to consider issuance of an executive order for the purpose, in consultation with fire safety and electrical departments.

4. In a recent communication from Director General (FS, CD&HG) vide DO No. VIII-11011/04/2023-DGCD(F), dated 4th June 2024 (**copy enclosed**), all States/UTs have been requested to fast-track fire auditing of all health facilities by establishing joint task force under the Police Commissioner in Metropolitan cities and the District Magistrate in the districts comprising officials from the health department, fire department and an electrical inspector.

5. I urge all States/UTs to undertake measures, as deemed suitable to ensure, that recurring occurrence of fire accidents in health facilities can be minimized and loss of previous lives can be avoided altogether.

....2/-

6. I sincerely request the full cooperation of the State Government for building a disaster resilient health system. Also, it is again requested that directions may be given to the concerned officials for submitting the duly fille proforma (as referred to in para 1 above) and sharing with this Ministry at the earliest.

With warm regards,

Your's Sincerely,

(Ms. L. S. Changsan)

Chief Secretaries of all States/UTs.

एल. एस. चाँगसन, भा.प्र.से.
अपर सचिव
L. S. Changsan, IAS
Additional Secretary

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - 11001
Government of India
Ministry of Health & Family Welfare
Nirman Bhawan, New Delhi - 1100

आज़ादी का अमृत महोत्सव

D. O. No. Z.28015/33/2024-DM Cell
06th June, 2024

Dear Ma'am / Sir,

This is in continuation of earlier communication vide DO No. A-11013/08/2303/2024; dated 23rd March, 2024 issued to all States/UTs jointly by this Ministry and National Disaster Management Authority. (copy enclosed)

2. As highlighted in the communication referred to above, State Health Departments and State Disaster Management Authorities were requested to work in close collaboration to ensure that all hospitals within your jurisdiction take immediate and necessary actions particularly with regards to comprehensive fire and electrical safety audits to ensure compliance to relevant safety standards.

3. I am sure that many States/UTs have undertaken requisite assessments and corrective measures in this regard. However, it is of utmost importance that compliance to such standards is routinely assessed and necessary corrective measures taken, as per gap analysis, are implemented on ground to avoid any accidental morbidity or mortality.

4. As per the previous communication, certain key area of intervention was highlighted. Of these included (i) Assessment of functional status of fire-fighting systems, including smoke detector and fire alarms; (ii) Biannual electrical load audits, especially with regards to high-demand areas like ICUs; (iii) Installation of water sprinklers and hosepipes, especially in critical areas, including ICUs and operation theatres; (iv) Need for obtaining fire safety NOC; (v) Hospital disaster management planning, (vi) Conduct of mock-drills, especially evacuation drills.

5. In order to have correct assessment of hospital safety with regards to fire safety and to identify any systematic gaps that could be addressed, a proforma has been prepared for all States/UTs. (copy enclosed)

6. It is requested that State/UT Government's response as duly filled proforma may be shared with this Ministry at the earliest.

7. Looking forward to continued and close collaboration with all States/UTs in making our health facilities resilient and responsive to fire accidents.

With regards,

Your's Sincerely,

(Ms. L. S. Changsan)

To,

Addl. Chief Secretary/ Principal Secretary/ Secretary (Health) of all States/UTs.

प्रो.(डॉ.) अतुल गोयल
Prof. (Dr.) Atul Goel
MD (Med.)
स्वास्थ्य सेवा महानिदेशक
DIRECTOR GENERAL OF HEALTH SERVICES

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
स्वास्थ्य सेवा महानिदेशालय
Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services

No. A-11013/08/2303/2024
29 May 2024

Dear Colleagues,

I draw your kind attention to the hazard of incidents of fire in healthcare facilities with rising temperatures across the country in this summer that predicted to be severe.

If I may re-emphasize, safety and wellbeing of patients (both outpatients and inpatients), staff and visitors are of utmost importance in these healthcare facilities.

Most of these fire-incidents is a result of short-circuits due to sub-optimal electrical maintenance and/or overload of electricity lines due to use of Air-Conditioners and other equipment. Given the potential risks associated with fire hazards in hospitals, it is imperative that strict protocols and measures be put in place to prevent, detect and respond to fires effectively. Establishing a robust fire safety plan and conducting fire-evacuation and safety drills will not only ensure compliance with regulatory requirements but also safeguard lives and property.

In this regard, as earlier communicated that temperature is escalating during the present summer months and hospital fires have become a more significant threat. There is importance of proactive measures to prevent such devastating incidents. Kindly take immediate action on the following: -
Conducting regular preventive fire risk assessment drills to identify potentially vulnerable areas

a. Implementing appropriate fire prevention measures, such as proper storage of flammable materials and regular and optimal preventive maintenance of electrical circuits and systems.
b. Providing staff training on fire safety protocols, evacuation procedures, and use of fire-fighting equipment.
c. Installation and optimum maintenance of fire detection and suppression systems, including smoke alarms, fire extinguishers, and sprinklers.
d. Establishing an emergency response plan with SOPs for evacuating patients, staff, and visitors in the untoward event of a fire.
e. Most importantly, regular conduction of mock emergency drills without compromise.

Cont'd...p/2

Room No. 446-A, Nirman Bhawan, New Delhi-110108
Tel. No. 011-23061063, 23061438, Fax No. 011-23061924, email dghs@nic.in

Further, a checklist is enclosed herewith for your kind reference. It is requested to take necessary action in the matter and the action taken report may be furnished to this Directorate at the earliest.

With regards,

Yours sincerely,

Enclosure : As above

(Atul Goel)

To

- Addl. Chief Secretary/ Principal Secretary/ Secretary Health of all States/UTs
- Director AIIMS Delhi and LHMC Delhi
- Medical Superintendent, SJH, RMLH
- EDs, All AIIMS
- Principal/MS, All Medical Colleges

APURVA CHANDRA
Secretary
Department of Health & Family Welfare

KAMAL KISHORE
Member & HOD
National Disaster Management Authority

D.O. No.A-11013/08/2303/2024

23rd March, 2024

Subject: Urgent Measures to Prevent Hospital Fires During Summer Months

Dear Chief Secretary

As temperatures escalate during the summer months, hospital fires become a more significant threat. We write this joint letter to underscore the paramount importance of proactive measures to prevent such devastating incidents.

We request you to direct the State Health Departments and State Disaster Management Authorities to work in close collaboration to ensure that all accredited hospitals within your jurisdiction take immediate action on the following:

- **Thorough Inspections:** Conduct comprehensive fire safety audit / on-site inspections of all hospitals to assess fire safety compliance. Ensure that fire-fighting systems, including fire alarms, fire smoke detectors, fire extinguishers, fire hydrants. and fire lifts, are present and fully functional.
- **Electrical Load Audits:** Address the critical issue of insufficient electrical load capacity. Hospitals must regularly conduct electrical load audits, particularly when adding new equipment or converting spaces into ICUs. Any identified discrepancies must be promptly rectified.
- **Fire NOC Compliance:** Hospitals must strictly adhere to regulatory requirements and obtain valid fire No-Objection Certificates (NOCs) from their respective state fire departments. Prioritize re-calibration of electrical loads in older buildings constructed before adopting fire safety norms.

To facilitate this, we are enclosing a detailed set of instructions outlining the steps and measures to be undertaken by hospitals to ensure fire safety compliance. We strongly recommend disseminating this information among all accredited hospitals and conducting follow-up reviews to ensure the implementation of these critical safety measures.

The safety of our patients and the integrity of our healthcare facilities are of paramount importance. We count on your valuable support and immediate action to prevent any fire-related incidents in our hospitals.

Thank you for your attention to this urgent matter.

Yours sincerely,

(Apurva Chandra)

(Kamal Kishore)

To Chief Secretaries of all States/UTs

Instructions for Ensuring Fire Safety in Hospitals and Healthcare Facilities
Following are the instructions that need to be carried out to prevent occurrences of fire incidents in hospitals and various other healthcare facilities:

1. **Functional Fire-Fighting Systems**: Hospitals must regularly inspect fire-fighting equipment such as fire extinguishers, hydrants, and alarms. This includes checking the expiry dates of extinguishers, ensuring hydrants are accessible and have adequate water pressure, and that fire alarms are operational and audible throughout the facility.
2. **Regular Maintenance and Testing**: Establish a maintenance schedule for all fire safety equipment. This should include monthly checks of fire extinguishers, quarterly tests of fire alarms and hydrants, and annual professional inspections to certify their effectiveness in accordance with relevant Indian Standards.
3. **Regular Electrical Load Audits**: Conduct electrical audits bi-annually to evaluate the hospital's power consumption, particularly in high-demand areas like ICUs. Upgrades or modifications should be assessed by a certified electrician to ensure they meet safety standards without overloading the system as per the National Electrical Code of India-2023.
4. **Oxygen Safety**: In areas with oxygen tanks or piped oxygen, implement strict no-smoking policies and controls on heat sources. Signage should clearly mark these areas, and staff should be trained on the risks associated with high-oxygen environments.
5. **Installation of Smoke Detectors and Fire Alarms**: Ensure fire smoke detectors and fire alarms are installed in all hospital areas, particularly in patient rooms, hallways, and common areas. Test these systems monthly as stipulated in IS 2189 and replace batteries annually or as needed.
6. **Combustible Material Control**: Audit materials used in hospital construction and furnishings to identify and replace combustible materials with non-combustible or fire-resistant alternatives, especially in patient care areas.
7. **Non-Combustible Material for Electrical Ducts**: Inspect electrical ducts to ensure they are sealed with materials like intumescent firestop sealants that prevent the spread of fire and smoke through openings.
8. **Avoid Overloading Power Sources**: Use power management systems to monitor electrical loads and prevent overloading. Ensure that multiple high-power devices are not connected to a single circuit. Regularly review power distribution to accommodate new equipment safely.
9. **Installation of Water Sprinklers and Hosepipes**: Fit critical areas, including ICUs and operation theatres, with automatic sprinkler systems and accessible hosepipes. These systems should be linked in sync with the fire alarm system to be activated in the event of a fire.
10. **Strict Adherence to the National Building Code**: Regularly review and update hospital infrastructure to comply with the latest fire safety standards outlined in the National Building Code 2016. This includes ensuring proper ventilation systems, fire-resistant doors, and emergency lighting in corridors and stairwells.
11. **Obtaining Fire Safety NOC**: Annually Renew the Fire Safety No-Objection Certificate as per State Fire Safety Rules from the local fire department. This

includes submitting up-to-date fire safety plans and records of equipment maintenance and staff training.

12. **Staff Training and Drills**: Implement a continuous training program for all staff on fire prevention, emergency procedures, and the use of fire-fighting equipment. Conduct bi-annual fire drills, including evacuation drills, to ensure staff, doctors, and patients know how to respond in an emergency.
13. **Evacuation Plans**: Develop comprehensive evacuation plans that include clear, well-marked escape routes, emergency exits free of obstructions, and designated safe assembly areas. Plans should be displayed prominently throughout the hospital and in staff training programs. Each hospital has to formulate an SoP to be followed in case of a fire incident.

कर्मचारी राज्य बीमा निगम
(श्रम एवं रोजगार मंत्रालय, भारत सरकार)
EMPLOYEES' STATE INSURANCE CORPORATION
(Ministry of Labour & Employment, Govt. of India)

पंचदीप भवन सी.आई.जी. मार्ग नई दिल्ली-110002
PANCHDEEP BHAWAN CIG MARG NEW DELHI-110002
Email: chief-engr@esic.nic.in

No. Pt. W-11/12/1/Misc/2023-PMD 05-06-2024

Reminder-II

To,

All Regional Director of ESI Corporation	All Dean of ESIC Medical Colleges
All Medical Superintendent of ESIC Hospitals	All Medical Superintendent of ESIS Hospitals

Subject:- Report of Fire NOC and Fire audit of all ESIC / ESIS Hospitals - reg.

Reference:- I) Note of the Secretary (L&E), MoLE vide dated 17.01.2024

II) ESIC Hqrs. Office letter No. W-11/12/1/2023-PMD dated 19.01.2024

Sir/Madam,

Kind attention is invited to Hqrs. Office letters of even No. dated 19.01.2022, 08.07.2022, 13.07.2022, 04.08.2022, 06.01.2023, 02.02.2023, 14.03.2023, 11.04.2023, 26.06.2023, 05.09.2023, 13.09.2023, 25.09.2023 and 19.01.2024 on the above cited subject wherein, it was informed to report of the Fire NOC and Fire audit of all Hospitals those to be executed through local Govt. authorities/CPWD/NIT's/IIT's and local Govt. Universities only. Further guidelines on the subject matter were issued from time to time wherein it was directed to take necessary action for obtaining fire NOC in respect of all ESIC / ESIS Hospitals.

In this regard, it is intimated that all ESIC / ESIS hospitals to be equipped with all necessary fire safety and fighting equipment as per norm and all ESIC / ESIS hospitals to obtain fire NOC at the earliest. It is also intimated that status reports will be communicated to the Secretary, MoLE.

Hence, present status reports may be forwarded every fortnightly to **chief-engr@esic.nic.in** and undersigned i.e. **suresh.biswas@esic.nic.in** till completion of the works. In this regards, it is intimated that some of the ESIC establishments ATR are yet to receive.

This is for information and necessary compliance to all concerned on **'Top Most Priority'.** This issues with the approval of competent authority

Yours faithfully,

Signed by Suresh Biswas
Date: 05-06-2024 13:00:14
SURESH BISWAS

ASSISTANT EXECUTIVE ENGINEER(CIVIL)(PMD)

Encl:- As above

Copy to:

i. PS to IC (PMD) for kind information.
ii. PS to CE for kind information
iii. Web Content Manager for uploading on ESIC Website.

ASSISTANT EXECUTIVE ENGINEER(CIVIL)(PMD)

कर्मचारी राज्य बीमा निगम
(श्रम एवं रोजगार मंत्रालय, भारत सरकार)
Employees' State Insurance Corporation,
(Ministry of Labour and Employment,
Govt. of India)

पंचदीप भवन, सी. आई. जी. मार्ग, नई दिल्ली – 110002.
Panchdeep Bhawan, C.I.G Marg, New Delhi – 110002.
Email: chief-engr@esic.nic.in

File No. Pt. W-11/12/1/MISC/2017-PMD Comp. No.328623 31-05-2024

To,

All Regional Directors of ESI Corporation
All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC/ESIS Hospitals
Director (M) Delhi & Director (M) Noida

Sub: - Fire safety compliance in all ESIC owned Buildings & ESIS run Buildings like Hospital, Medical Colleges, Office Buildings and Electro-mechanical Equipment etc. reg.

Ref: - (1) T.O.L No. W-11/12/1/2023-PMD dated 19.01.2024
(2) T.O.L of Fire Safety advisory dated 29.02.2024

Sir/Madam,

Kindly refer the above cited subject and various communications issued from Hqrs. Office regarding fire hazards and safety for prevention from fire incident in the field units like hospitals, medical colleges, office buildings, etc.

As we all are aware that summer season in on peak and may cause fire incident leading to loss of life and property. In this regard, following general guidelines are again reiterated as follows:

1) Regular inspections and maintenance of all electromechanical equipment by qualified personnel and OEM engineers/technicians only. It should be verified that installations meet the required electrical and mechanical codes and standards.

2) Ensure all maintenance activities comply with the manufacturer's recommendations and relevant safety standards.

3) Avoid overloading of electrical circuits to prevent the fault/ short circuit which may cause spark and fire. Joints and connectors should be properly fixed with appropriate rating of lugs.

4) All electrical panels, Bus Bar, Bus Trunks, Cable tranche, protective equipment like Circuit Breakers, CT&PT, Power Transformer, DG Sets should be properly maintained and their AMC/CAMC should be in live condition.

5) Use surge protectors to safeguard equipment against power surges and prevent overheating.

6) All electrical/ MEP equipment should have proper earthen system.

7) Ensure lightning arrester must be install in all buildings. The primary purpose of installing lightning arrestors is to protect buildings from lightning strikes, which can cause significant structural damage, electrical fires, and pose a serious risk to human life.

8) Conduct regular inspections of all electrical equipment. Check for signs of wear and tear, frayed wires, and other damage.

9) UPS and its battery should be in healthy condition and their AMC/CAMC must be in live condition.

10) Regularly clean and maintain AC/HVAC systems to prevent dust and debris buildup. Check for and repair any leaks in the duct work that may pose fire hazards.

11) For medical devices, follow the manufacturer's maintenance schedule strictly. Train medical staff on the safe use and emergency shutdown of medical devices.

12) Conduct regular fire safety mock drills and ensure staff are familiar with emergency procedures.

13) Ensure that all areas with electromechanical equipment are equipped with appropriate fire detection and suppression systems. Regularly test and maintain these systems to ensure functionality.

14) Encourage staff to report any unusual sounds, smells, or operational issues immediately.

15) Always switch off and unplug electrical equipment when not in use, especially at the end of the day.

16) Establish clear procedures for the emergency shutdown of equipment in case of fire. Ensure these procedures are easily accessible and understood by all staff members as mentioned in the fire safety advisory issued under reference (2).

17) Maintain adequate ventilation around electromechanical equipment to prevent overheating. Ensure that vents and filters are clean and free from obstructions. Also, may use of mechanical ventilation and fresh air system.

18) Avoid using extension cords and multiple plug adaptors that can increase the risk of electrical fires. Also avoid unnecessary heating equipment/appliances like electric kettle, electric heater, heating element, Oven etc.

19) Distribute electrical loads by using appropriate rating of plugs and sockets for all equipment. Avoid using makeshift connections.

20) Store flammable/ inflammable materials away from electromechanical equipment. Ensure that equipment is used in accordance with the manufacturer's guidelines.

21) Keep electrical equipment away from water and other liquids to prevent electrical shock and fire hazards.

22) Ensure that appropriate fire extinguishers (e.g. Class C for electrical fires) are available and accessible near electrical equipment. In case of an electrical fire, immediately disconnect the power source, if it is safe to do so.

23) Fire exist signages must be visible and ramp/stair for fire exist must be always clear.

24) For lifts conduct regular safety inspections and maintenance by State Electrical Inspector and OEM. Ensure emergency communication systems within elevators are functional.

25) Medical gas pipeline system is critical due to the high flammability of gases like oxygen and the potential for catastrophic consequences in case of a fire. Hence, ensure proper ventilation where medical gases are stored and used to prevent gas accumulation.

26) Implement continuous gas leak detection systems to promptly detect and address gas leaks. Store medical gas cylinders in well-ventilated, fire-resistant rooms away from combustible materials.

27) Install zone valves to isolate sections of the pipeline in case of an emergency. Ensure emergency shut-off valves are easily accessible and clearly marked in MGPL System.

In view of the above, all concerned are requested to be more vigilant and ensure all the fire safety norms and above mentioned instructions are being observed diligently.

Yours Sincerely

Signed by Shiv Shankar Mandal
Date: 31-05-2024 11:20:20
(S.S.Mandal)

Lt. Col.

Chief Engineer

Copy to:

1. PPS to DG, ESIC for kind information.
2. PS to IC(PMD) for kind information.
3. Zonal ICs for kind information.
4. Zonal MCs for kind information.
5. MC (MS) for kind information.
6. MC (ME) for kind information.
7. MC (Admin) for kind information.
8. Web Content Manager for uploading on ESIC Website.

Chief Engineer

मुख्यालय
कर्मचारी राज्य बीमा निगम
पंचदीप भवन, कामरेड इंद्रजीत गुप्ता मार्ग,
नई दिल्ली - ११०००२
Website - www.esic.nic.in

सत्यमेव जयते

HEADQUARTERS OFFICE
Employees' State Insurance Corporation
Panchdeep Bhawan: C.I.G Marg,
New Delhi-110002
Website - www.esic.nic.in

No. W-11/12/Misc./2017-PMD **Dated: 26.06.2023**

To,

All Deans of ESIC Medical Colleges	**All Regional Directors of ESI Corporation**
All Medical Superintendents of ESIC Hospitals	**D(M) Delhi, D(M) Noida**

Subject: - Fire Safety compliance / Fire NOC for ESIC / ESIS Buildings

Sir / Madam,

Kind attention is invited to Hqrs. Office letter of even No. dated 02.02.2023 and 14.03.2023 wherein it was informed to conduct fire safety audit and disability audit of all the ESI Hospitals by any Govt. Institutions / Central PSUs / State Govt. PSUs. Further guidelines on the subject matter were issued from time to time wherein it was directed to take necessary action for obtaining fire NOC in respect of ESIC / ESIS establishments.

It was also informed earlier that wherever Fire NOC is not available or stands expired, efforts may be made to obtain Fire NOC for all ESIC / ESIS Hospitals and offices. It was further directed to take all the necessary action in this regard as early as possible so that all of our buildings / premises become full compliant from fire safety angles at the earliest.

It is brought out that all installations regarding fire protection may be reviewed with the assistance of the Engineers posted in the Regional Offices and ESIC Hospitals, all functional safety equipment as per fire safety guidelines be examined and necessary remedial actions may be taken wherever deficiencies are found, so that all ESI buildings are fully fire safety compliant.

Instructions issued from Hqrs. Office vide even No. dated 28.12.2018, 01.01.2019, 08.04.2019, 01.08.2019, 13.08.2019, 10.05.2021, 24.05.2021, 15.06.2021, 12.08.2021 (Copy enclosed) may also be referred for compliance.

Accordingly, since so many instructions from Hqrs. Office have been issued from time to time, any untoward incident should not happen in the ESI building premises due to lack of fire safety maintenance compliance. It will be the responsibility of the Estate Officer / Concerned Authority to ensure all necessary actions are complete, all licenses are obtained and all ESI buildings are fire safety compliant.

Yours faithfully,

Encl. As above.

(S.S. MANDAL)
LT. COL.
CHIEF ENGINEER

Copy to:

1) PPS to DG / PPS to FC / PPS to IC (PMD)
2) PPS to all Zonal IC's / PPS to all Zonal MC's
2) All EEs / AEEs, ESIC Regional Offices / Hqrs. Office – for immediate compliance.

CHIEF ENGINEER

MOST IMMEDIATE

EMPLOYEES' STATE INSURANCE CORPORATION
HEADQUARTERS OFFICE,
PANCHDEEP BHAWAN, CIG ROAD, NEW DELHI-110002
Tel. No. 011-23236782, email: chief-engr@esic.nic.in

No. W-11/2/1 /Misc/2017-PMD **Dated: 28.12.2018**

All Deans of ESIC Medical Colleges	**All Regional Directors of ESI Corporation**
All Medical Superintendents of ESIC Hospitals	**All Medical Superintendents of ESIS Hospitals**

Subject:- Fire Safety compliance / Fire NOC for buildings owned by ESI Corporation – regarding

Sir,

With reference to above and discussion held in Conference of RD / MS in Delhi during 21.12.2018 & 22.12.2018 about various issues including Fire NOC for ESI Hospitals / Buildings.

You are therefore requested to take following actions immediately:

1. Application for obtaining Fire NOC for Hospitals to be submitted to Fire Departments where Fire NOC has not yet been obtained.
2. Action for renewal of Fire NOC to be initiated immediately where it got expired.
3. Where the Hospital / Medical College are functioning, but certain works are still pending to get fire NOC, the remaining works may be carried out from ARM/SR works, urgently.
4. Ascertain the working conditions of fire safety equipments, accessories and plants periodically to ensure their proper functionality.
5. Fire drills are to be conducted at least once in six months so as to ensure that the fire safety equipments, accessories and plants as well as mechanism evacuation etc. are in full preparedness.

This is for information and necessary action to all concerned on **'Top Most Priority'**.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

(1)

Most Immediate

HEADQUARTERS
)YEES' STATE INSURANCE CORPORATION
EP BHAVAN: C.I.G. ROAD, NEW DELHI-110002.

File No. : **W-11/12/1/M.sc.\2017-PMD** **Dated : 01/01/2019**

All Regional Directors of ESI Corporation	**All Deans of ESIC Medical Colleges**
All Medical Superintendents of ESIC Hospitals	**All Medical Superintendents of ESIS Hospitals**

Subject : Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Dispensaries, Office buildings, Staff Quarters etc.

Reference : HQ's letter no. W-11/12/1/Misc./2017 - PMD ; Dated : 28/12/2018

Sir / Madam.

In continuation with the above referred letter, most urgent actions need to be taken by the all concerned in time bound manner so as to ensure that ESIC buildings e.g. Hospitals, Dispensaries, Office Buildings, Staff Quarters etc. become compliant from fire safety angles, as given below :

1. For such buildings where Fire NOC has expired long time back and has not been renewed the buildings / premises are to be inspected by local fire inspectors / officials so as to ascertain the extent of their compliance from fire safety angles vis – a – vis extent norms.
2. Fire Safety inspectors / officials be requested to give their inspection reports giving the details about deficiencies in fire safety compliances along with remedial measures to be adopted both on immediate and long term basis so that ESIC can get the buildings retrofitted adequately.
3. Based on reports by fire safety inspectors / officials, the works to be carried out in the buildings through specialized agencies preferably empaneled with local fire department or having valid license from them. After work is complete, the fire safety inspectors / officials be called for inspection of the buildings for giving NOC.
4. For such buildings where Fire NOC is already issued earlier but has not been renewed immediate actions are required to be taken by local concerned ESIC officials / Estate officers for making application to the concerned fire department / office for renewal of Fire NOC with a request for inspecting the building urgently so that extent of compliances from fire safety angles can be ascertained. The deficiencies if any pointed out by the fire safety inspectors / officials may be complied most urgently by getting the required works executed by specialized agencies through empaneled agencies with local fire department or having valid license from them. After completion of the work, the local fire department be requested immediately to get the building inspected for renewing the NOC on most urgent basis.

5. The works related to fire safety compliance may be executed under SR / ARM works most urgently and in time bound manner. Additional budget, if needed over and above the fund already available, HQ may be immediately requested to release the required amount of fund. However, the works related to fire safety norms are required to be taken up immediately by utilizing the available fund under SR / ARM heads without further loss of time.

6. As already intimated earlier, mock fire drills are to be conducted frequently to ensure required level of preparedness and alertness so that in the event of any incident of fire, the situation is brought under control as immediately as possible without any loss of human lives & properties. It is to emphasize that local fire safety officials and ESIC officials be involved in mock drill exercise to make such exercise more participative to realize the objective of making our buildings fully safe and protected from any potential fire hazards.

In view of the above, it is requested to do the needful in this regard as early as possible so that all of our buildings / premises become full compliant from fire safety angles at the earliest.

Please accord **Top Priority.**

Yours faithfully,

(Sudip Dutta)
Chief Engineer

28 II

MOST IMMEDIATE

HEADQUARTERS
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAVAN: C.I.G. ROAD, NEW DELHI-110002.

No.W-11/12/1/Misc./2017-PMD **Dated: 8.4.2019**

All Regional Directors of ESI Corporation	All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC Hospitals	All Medical Superintendents of ESIS Hospitals

Sub: - Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Medical Colleges, Dispensaries, Office Buildings, Staff Quarters etc.

*****

Sir/Madam,

Please refer HQ's letters No. W-11/12/1/Misc./2017-PMD on dated 28.12.2018 and 01/01/2019 on the above subject.

It has come to notice that fire safety norms are not properly compiled even though this office issued above letters as well as the same matter discussed during recently conducted video conference on dated 13.2.2019.

It has also been found that fire drills are not conducted regularly.

In view of above, you are requested to take necessary actions for following:-

a) To prepare evacuation plan of different buildings.
b) To take necessary action for fire drill for Medical Colleges, Hospitals and office buildings.
c) To Examine for providing at least 30% area for openable windows in different buildings.
d) To examine the issue for replacement of metal false ceiling in place of installed gypsum board.
e) Servicing of ACs, Chiller Plants must to be done regularly.
f) Refilling of fire extinguishers as per their expiry date.
g) To check the working of fire alarm system.
h) To check fire fighting system like pumps, fire header system, Fire hose cabinet/sprinkler etc. at appropriate interval of time.

You are, therefore, requested to furnish status for above within 15 days from the date of issue of this letter.

Yours faithfully,

(SUDIP DUTTA)

HEADQUARTERS OFFICE
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAWAN: CIG MARG: NEW DELHI-2

No. W-11/12/1/Misc/2017-PMD

Dated: 01.08.2019

To

All Regional Directors of ESI Corporation	**All Deans of ESIC Medical Colleges**
All Medical Superintendents of ESIC Hospitals	

Sub: NOC FOR FIRE IN ESI ESTABLISHMENTS .

Sir/Madam

Please refer to this office letters of even no. dated 28.12.2018, 01.01.2019 and 08.04.2019 on the above subject wherein it was requested to take necessary action for obtaining fire NOC in respect of ESIC Establishments. Further It was also requested to approach to Empanelled Architects of ESIC to resolve the deficiencies for fire related works.

But as on date it has been found that fire NOC of ESIC Hospital buildings, Medical Colleges and offices are still pending. You are therefore requested to approach to CPWD for carrying out necessary work for fire NOC.

Please do the needful in this regard as early as possible so that all of our buildings / premises become full compliant from fire safety angles at the earliest.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

Copy to

1. PPS to DG ESIC
2. Shri Harnam Singh, Chief Project Manager, RPZ, CPWD E-Wing, Nirman Bhawan, New Delhi for information and necessary action
3. Shri D.N. Arya SE, PMD, Hqrs office for information and necessary action
4. SE (WZ) for information and necessary action.
5. SE (SZ) for information and necessary action.

CHIEF ENGINEER

(19)

HEADQUARTERS OFFICE
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAWAN: CIG MARG: NEW DELHI-2

No. W-11/12/1/Misc/2017-PMD

Dated: 13.08.2019

To

All Regional Directors of ESI Corporation	**All Deans of ESIC Medical Colleges**
All Medical Superintendents of ESIC Hospitals	

Sub: NOC FOR FIRE IN ESI ESTABLISHMENT .

Sir/Madam

Please refer to this office letters of even no. dated 28.12.2018, 01.01.2019, 08.04.2019 and 01.08.2019 for fire NOC. In our letter dated 01.08.19, it was requested to approach CPWD for carrying out necessary work of fire NOC, action taken report in regard may please be forwarded to this office

ESI Hospitals where the fire NOC has not yet obtained till date said information may please be communicated to this office. At Hqrs level, we may request CPWD to take necessary action for Fire NOC..

This is for information and necessary compliance.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

Copy to:-

1. Shri D. N. Arya SE, PMD HQRS office for information and necessary action
2. SE (WZ) fro information and necessary action.
3. SE (SZ) for information and necessary action.

CHIEF ENGINEER

Computer/C:/per/contractual engineers/letter

HEAD QUARTERS OFFICE
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAVAN: C.I.G. ROAD, NEW DELHI-110002.
PH.011-23235782
Chief Engineer e-mail :- chief-engr@esic.nic.in

No.-W-11/12/1/Misc./2017-PMD Dated:- 10.05.2021

All Regional Directors of ESI Corporation	All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC Hospitals	All Medical Superintendents of ESIS Hospitals

Sub:- Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Medical Colleges, Dispensaries, Office Buildings, Staff Quarters etc.

Sir/Madam,

Kind reference is invited to this office letters of even no. dated 28.12.2018, 01.01.2019, 08.04.2019, 01.08.2019 and 13.08.2019 regarding fire NOC. (Copies enclosed for reference)

In this connection the undersigned is also directed to enclose a copy of D.O. letter dated 30th November, 2020 issued by the Union Home Secretary which may also kindly be perused.

As you are aware, there has been a fire incident in the ESIC Hospital Andheri, Mumbai in December, 2018 resulting in loss of life as well as disruption of hospital activities. Now that we are at the peak of summer season, it has to be ensured that no more fires take place due to high load on the internal wirings and short circuits. At the same time, it has to be ensured that there is uninterrupted power supply in all hospitals to cater to oxygen beds, ICU beds and ventilators.

It is therefore requested that all installations regarding fire protection may be reviewed with the help of the engineers posted in the Regional Offices and ESIC Hospitals, all functional safety equipment as per fire safety guidelines examined, and necessary remedial actions taken wherever deficiencies are found.

Wherever fire NOC is not there or is expired, efforts may be made to obtain fire NOC for all ESIC Hospitals and Offices at the earliest.

This issues with the approval of DG.

Encl.: As above.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

Copy to:-

1. IC(PMD)
2. Superintending Engineer, Hqrs./Superintending Engineer, West Zone.
3. All Executive Engineers, Hqrs.Office & Zones
4. All AEE, all Zones.

CHIEF ENGINEER

HEAD QUARTERS OFFICE
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAVAN: C.I.G. ROAD, NEW DELHI-110002.

No.- W-11/12/1/Misc./2017-PMD

Dated:- 24.05.2021

All Regional Directors of ESI Corporation	All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC Hospitals	All Medical Superintendents of ESIS Hospitals

Sub:- Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Medical Colleges, Dispensaries, Office Buildings, Staff Quarters etc., need for regular CAMC/AMC of equipments.

Sir/Madam,

Recent incidents of fire in ESIC Hospitals Noida and Basaidarapur have occurred due to UPS/battery faults.

It is therefore requested that:-

a. Fire protection of all installations may be reviewed with the help of the engineers posted in the Regional Offices and ESIC Hospitals. All functional safety equipment as per fire safety guidelines are required to be examined, and necessary remedial actions taken wherever deficiencies are found.

b. **Wherever fire NOC is not there or is expired, efforts may be made to obtain fire NOC for all ESI Hospitals and Offices at the earliest.**

c. Servicing of Air-conditioners, Chiller plant, DG Sets and all electro-mechanical equipment must be done regularly.

d. Refilling of fire extinguishers as per expiry date.

e. Working of fire alarm system to be checked regularly.

f. Fire fighting system like pump, fire header system, fire hose cabinet/sprinkler to be checked at appropriate interval of time. Fire alarm and Fire-fighting system should be covered under CAMC/AMC.

g. UPS Battery and UPS are required to be maintained properly. UPS System Cabinet should be cleaned through blower. Battery connections and battery volts are to be checked in output load. Output voltage should be between 10.5 volts to 13.05 volts. Frequency at UPS Panel can be checked through the display meter, frequency 50 hz is recommended. UPS System should also be under CAMC/AMC. Whenever UPS does not give requisite standby time, it should be replaced as dead equipment can easily turn dangerous.

h. Mock drills are to be conducted frequently to ensure required level of preparedness and alertness so that in the event of any incident of fire, the situation is brought under control immediately as possible without any loss of human lives and property. Local fire safety officials and ESIC officials may be involved in mock drill exercises to make such exercises to make them more participative to realize the objective of making our buildings fully safe and protected from any potential fire hazards. One officer may be designated as fire officer for the purpose.

i. Evacuation plans are to be prepared for different buildings and displayed at all lift lobbies and staircase landings.

In view of above, it is requested to do the needful in this regard as early as possible so that all of our buildings/premises become fully compliant from the fire safety angle at the earliest.

This issues with the approval of Director General.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

Copy to:-IC(P&A)/IC(ICT)/MC/MC(ME)

HEAD QUARTERS OFFICE
EMPLOYEES' STATE INSURANCE CORPORATION
PANCHDEEP BHAVAN: C.I.G. ROAD, NEW DELHI-110002.
PH.011-23235782
Chief Engineer e-mail :- chief-engr@esic.nic.in

No.- W-11/12/1/Misc./2017-PMD

Dated:- 15.06.2021

All Regional Directors of ESI Corporation	All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC Hospitals	

Sub:- Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Medical Colleges, Dispensaries, Office Buildings, Staff Quarters etc., need for regular CAMC/AMC of equipments.

Sir/Madam,

Maintenance and upkeep of fire fighting equipment, power back up maintenance and upkeep are extremely important issues and proper maintenance would contribute to a large extent to prevent avoidable breakdowns and untoward incidents.

Therefore, in continuation of this Office letter No. W-11/12/Fire/NOC/2019-PMD dated 24.05.2021, it is requested that:-

1. A fire officer may be designated for each ESIC Hospital/Medical Colleges & Hospital, Regional Office, Sub-Regional Office. Designated fire officer of the institution should prepare evacuation plan and display the plan at all lift lobbies, landings. The designated fire officer could be of Assistant Director rank or Social Security Officer.
2. Designated fire officer should contact local fire department for carrying out mock drill. During and in course of such mock drill, deficiencies that come to notice in equipment should be rectified.
3. If any special repair are required, may be got done in consultation with fire department through S.R tender procedure.
4. This will enable issue of fire NOC by fire services department, wherever applicable.
5. Mock drills to be carried out twice, in the month of March and October in each year.

It is reiterated that power back up equipment, air-conditioners, chillers and DG sets may be reviewed for maintenance as mentioned in this Office letter dated 24.05.2021.

In is requested that the steps detailed above may kindly be followed. Fire preparedness would be reviewed by V.C shortly, for which intimation would be sent separately.

This issues with the approval of the Director General.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

Headquarters Office
Employees' State Insurance Corporation,
(Ministry of Labour and Employment, Govt. of India)
Panchdeep Bhawan, C.I.G Marg
New Delhi – 110002.
E-mail – Chief-engr@esic.nic.in

No. Pt. W-11/12/1/Misc/NOC/2017-PMD **Dated: 12.08.2021**

To,

All Regional Directors of ESI Corporation
All Deans of ESIC Medical Colleges
All Medical Superintendents of ESIC Hospitals

Subject: - Fire Safety Norms compliance in all ESIC owned buildings like Hospitals, Medical Colleges, Dispensaries, Office Buildings, Staff Quarters etc.

Sir/Madam,

Please refer to this office letter no. W-11/12/1/Misc/NOC/2017-PMD dated 15.06.2021 for fire NOC, wherein it was requested to appoint a fire officer of the rank of Assistant Director and Social Security Officer for each ESIC Hospital/Medical Colleges & Hospital, Regional Office, Sub-Regional Office. But as on date this office has not yet received necessary compliance from different zones except RO Telangana and RO Indore.

In this regard it is further stated that a Standardized workman deployment schedule for all hospitals was issued vide this office letter no. SE/HQ/Manpower/ARM/19-PMD dated 26.04.2019 wherein, one Firefighting Technician for each shift was approved having minimum qualifications of Fire Safety Diploma with 3 years experience. Along with electricians, plumbers etc, this firefighting technician is required to be appointed though ARM agency.

It would be absolutely necessary to maintain the deployment of such firefighting technician for each hospital, including ESIS hospitals. One of such Firefighting technicians could be designated as Fire Officer for each hospital and an officer in the rank of AD/SSO could be designated as Nodal Officer for fire safety purposes.

The Fire officer and Nodal officers may be advised to take necessary action like preparation of evacuation plan and display of the plan at all lift lobbies, landings, conducting mock drills in association with local Fire department, evaluating fire preparedness of all hospitals and taking necessary corrective action for removal of deficiencies in fire preparedness.

If necessary, independent fire audit may also be got done.

Compliance of these instructions may be reported positively.

This letter issues with the approval of the Director General.

Yours faithfully,

(SUDIP DUTTA)
CHIEF ENGINEER

कर्मचारी राज्य बीमा निगम
(श्रम एवं रोजगार मंत्रालय, भारत सरकार)
EMPLOYEES' STATE INSURANCE CORPORATION
(Ministry of Labour & Employment, Govt. of India)

पंचदीप भवन सी.आई.जी. मार्ग नई दिल्ली-110002
PANCHDEEP BHAWAN CIG MARG NEW DELHI-110002
Email: chief-engr@esic.nic.in

No.: Pt. W -11/12/1/MISC/2017-PMD

29-02-2024

To,

All Regional Director of ESI Corporation / All Dy. Director (I/C) of ROs/SROs / All Dean of ESIC Medical Colleges / All Medical Superintendent of ESIC Hospitals / All Medical Superintendent of ESIS Hospitals / Director (M) Delhi Director (M) Noida

Subject: Fire Safety Advisory for All ESIC/ESIS Establishments-Reg.

Sir / Madam,

In continuation of earlier issued instructions in regard of Fire safety compliance/Fire NOC for ESIC/ESIS buildings, a 'Fire Safety Advisory' has been devised to organize conscious, planned and determined efforts to improve fire prevention, life safety and fire protection measures in our all ESIC's establishments such as Hospitals, Medical Colleges, Regional Offices, Sub- Regional Offices, DCBOs, Dispensaries, Branch Offices, Staff Quarters & all other buildings.

In view of above, it is kindly requested to bring out this 'Fire Safety Advisory' to the notice of all ESIC/ESIS officers/Officials/Staffs & do the needful accordingly as early as possible in this regard so that all of our buildings/premises can become fully compliant from fire safety at the earliest.

This has been issued for information and necessary compliances.

This has been issued with approval of the DG, ESIC.

Yours Faithfully,

S.S. Mandal
(Lt. col.)
Chief Engineer

Encl.: - Fire Safety Advisory

Copy to :-

1. PPS to IC-PMD, ESIC Hqrs. New Delhi for kind information.
2. PPS/PS to Zonal Insurance Commissioner / Zonal Medical Commissioner for kind information.
3. Zonal Executive Engineer / Assistance Executive Engineer Hqrs. for information and necessary action.
4. Website content manager with request to upload on ESIC website.

Chief Engineer

PREFACE

As you all known that ESIC has constructed many new hospitals, Offices, Medical Colleges & also renovated old deteriorated buildings of many Hospitals/Offices all over the country from past a decade with state of art infrastructure along with sophisticated equipments in order to provide better medical facilities to our ESIC's beneficiaries. Hospitals are the most complex of building types. Each hospital is comprised of a wide range of services and functional units. These include diagnostic and treatment functions, such as clinical laboratories, imaging, emergency rooms, and surgery; hospitality functions, such as food service and housekeeping; and the fundamental inpatient care or bed-related function.

In order to organize conscious, planned and determined efforts to improve fire prevention, life safety and fire protection measures in our all ESIC's establishments such as Hospitals, Medical Colleges, Regional Offices, Sub- Regional Offices, DCBOs, Dispensaries, Branch Offices, Staff Quarters & all other buildings, this '**Fire Safety Advisory**' has been prepared which are a compilation of various Fire Norms/Acts as prevails across the country, hospitals safety guidelines issued by National Disaster management guidelines, Fire safety guidelines of various institutions etc. in respect of Fire safety. Apart from basic Fire safety, Fire safety measures related to disabled person have also been incorporated as far as feasible in ESI establishments. In addition, certain Safety tips/guidelines in case of an LPG emergency or a gas cylinder leakage also covered in this Fire safety advisory as such Canteen/Kitchen/Medical gas pipelines systems are available almost all ESIC establishments.

This Fire safety Advisory has been prepared with aim to have awareness of all ESI staff in regard to Fire safety so as to take preventive and active measures in case of Fire incident take places so as to save not only ESI properties but also precious human life.

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S.N.	**DESCRIPTION**	**PAGE NO.**

1. INTRODUCTION: -

Fire safety is the set of practices intended to prevent and reducethe destruction caused by fire. Fire safety measures include those that are intended to prevent ignition of an uncontrolled fire, and those that are used tolimit the development and effects of a fire after it starts. Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are toughto occupants of the building. Threats to fire safety are commonly referred toas fire hazards. A fire hazard may include a situation that increases the likelihood of a fire or may impede escape in the event a fire occurs. Fire safetyis often a component of building safety.

The staff/employees should have a working knowledge of basic fire science and chemistry. A fire, or combustion, is a chemical reaction. An understanding of the chemical reaction is the basis for preventing fires, as wellas extinguishing fires once they initiate. A working knowledge of basic fire science and chemistry is essential for developing and implementing a successful fire

2. What is FIRE: -

A fire is a chemical reaction. There are many variables that can affect a fire. Effective fire safety management planning controls the variables that can affect a fire. Therefore, it is imperative to understand the variables. A fire is self-sustained oxidation of a fuel that emits heat and light. A fire requires three variables to initiate: a fuel, oxygen, and heat.

The fire triangle is a well-known representation of the three variables needed to initiate a fire. In order to initiate a fire, fuel, oxygen, and heat are required.

FIRE TETRAHEDRON: -

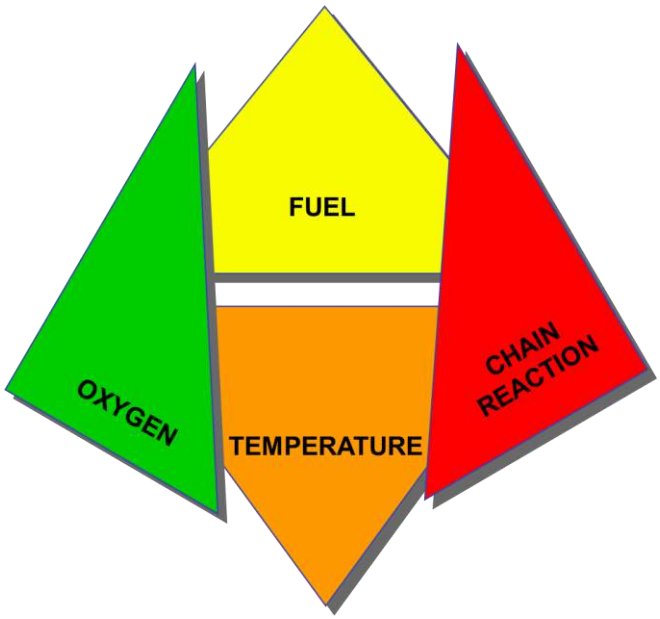
Fire prevention is the concept of preventing the variables of the fire triangle from coming into contact with each other to initiate a fire. Once a fire begins, it requires four variables to sustain the combustion reaction. The four variables required to sustain a fire are fuel, oxygen, heat, and chemical chain reactions. These four variables represent the fire tetrahedron.

Chemical chain reactions are a product of the combustion process. The chemical reactions ultimately produce combustion byproducts such as carbon monoxide, carbon dioxide, carbon, and other molecules, depending on the specific fuel. It is these byproducts of combustion found in the smoke that usually affect the safety and health of occupants and fire fighters.

Once a fire begins and is self-sustaining, the objective is to control and extinguish the fire. Fire extinguishment is done by eliminating one of the variables of the fire tetrahedron. By removing the fuel, oxygen, or heat, or

inhibiting the chemical chain reactions, a fire can be extinguished. The conceptof fire protection assumes fires will occur, and focuses on controlling fires by eliminating or otherwise controlling the variables of the fire tetrahedron. The concept of fire prevention differs from fire protection because fire prevention attempts to control the variables of the fire triangle before a fire occurs.

THE FIRE TETRAHEDRON



To further understand the fire triangle, it is necessary to analyze what influence each side of the fire triangle has in the combustion process. For the safety manager, this analysis is the key for understanding the concept of fire prevention.

Fire prevention attempts to prevent fuels, oxygen, and heat from combining to start a fire. Fire prevention strategies include controlling fuels, controlling oxygen sources, and con- trolling heat sources. A discussion of fuels, oxygen, and heat sources follow:

2.1 FUEL: -

A fuel is a combustible solid, liquid, or gas. Like in any chemical reaction, a source of energy is needed to sustain the heat required. The most common solid fuels are wood, paper, cloth, coal, and so forth. Flammable and combustible liquids include gasoline, fuel oil, paint, kerosene, and other similar materials. Propane, acetylene, and natural gas are some examples of gases that are flammable. Solid and liquid fuels share a common characteristic; they must be converted into a gas in order to support combustion. Gaseous fuelscan undergo direct oxidation because the molecules are already in the gas state. Some liquid fuels can undergo direct oxidation because they produce vapors at ambient temperatures and pressures. Other liquid fuels and solid fuels, however, undergo sequential oxidation. This means that a fuel must be heated first to produce sufficient concentrations of gas to support combustion. From a fire safety standpoint, the Fire Nodal Officer/Maintenance staffs/security staffs should be aware of the different types of fuels locatedin the workplace.

The ease of ignition of a solid fuel is dependent on several factors. Themost important factor is the surface to mass ratio of the fuel. The surface to mass ratio refers to how much of a fuel' s surface area is exposed to the environment in relation to its overall mass. The Fire Nodal Officer/Maintenance staff should be concerned with two things regarding the surface to mass ratio of a fuel. First, the more surface area that is exposed, the easier it is for a fire to initiate and the more rapidly it can burn. Second, the more mass that a solid fuel has, the more difficult it will be to initiate and sustain combustion. Consider cotton as a

fuel in a hospital. Cotton dusts and lint will burn easier and faster than a tightly bound bale of cotton.

2.2 OXYGEN: -

The atmosphere contains approximately 21% oxygen by volume. During combustion, the oxygen necessary for oxidation is sufficiently provided from the surrounding air. When the oxygen content of the atmosphere falls below 15%,a free-burning fire will begin to smolder. When the oxygen content of the atmosphere falls below 8%, a smoldering fire will stop burning (Bryan, 1982). Oxygen can also be provided by other sources that release oxygen molecules during a chemical reaction. The Fire Nodal Officer/Maintenance staff/All staff should be aware of these oxidizers in the workplace and segregate them from any fuels.

2.3 HEAT: -

The Fire Nodal Officer/Maintenance staff should be concerned with sources of heat commonly found in the workplace. This is a concern because sources of heat provide the energy necessary to initiate combustion. By preventing heat sources from contacting the ignitable fuel-air mixtures, fires can be effectively prevented from occurring. Some common sources of heat for ignition in the workplace are: -

- Open flames such as from cutting and welding torches.
- Sparks such as from electrical equipment, brazing, or grinding
- Hot surfaces such as electrical motors, wires, and process pipes
- Radiated heat from boilers or portable heaters
- Lightning
- Static discharges such as during the transfer of flammable liquids
- Arcing from wires and electrical equipment

- Compression such as hydraulic oil under pressure on a machine
- Exothermic chemical reactions
- Spontaneous ignition from slow oxidation or fermentation combined withproper insulation of a fuel
- Smoking

Heat is transferred by three methods: conduction, convection, or radiation. Conduction occurs when two bodies are touching one another and heat is transferred from molecule to molecule. Convection is the transfer of heat through a circulating medium rather than by direct contact. The medium canbe either a gas or a liquid. Radiation is the transfer of electromagnetic waves through any medium. For the safety manager, recognizing how heat can be transferred in the workplace is helpful for preventing fires.

As mentioned, four fire extinguishing principles exist. They are highlighted below:

1. *Control the fuel:–* Controlling the fuel is accomplished by two methods. First, the fuel can be physically removed or separated from the fire. For instance, afire involving stacks of wood pallets could be controlled by removing any exposed stacks of pallets to a safe location. Another example is closing a valve feeding a gas or flammable liquid fire. Second, the fuel can be chemically affected by diluting the fuel.

2. *Control the oxygen: –* Controlling the oxygen requires that the oxygen be inhibited, displaced, or the concentration of oxygen be reduced below 15% by volume. Smoldering fires should be diluted to an oxygen concentration below8% by volume. The oxygen supply to a fire can be inhibited by smothering the fire. Smothering a fire places a barrier between the flame and the atmosphere. This can be accomplished with a blanket or applying a layer of

foam to form a vapor barrier. Displacing and reducing the oxygen concentration involves applying an inert gas to the fire, such as carbon dioxide. The carbon dioxide displaces the oxygen thus lowering the concentration to a level that cannot sustain the fire. Applying an inert gas to a fire requires that the fire be located in a confined space. Personnel must be aware that displacing the oxygen or diluting the oxygen concentration affects their ability to breathe. Fire extinguishment using this method requires that personnel be absent from the confined area or protected by self -contained breathing apparatus.

3. *Control the heat: –* Controlling the heat requires that the heat be absorbed. Combustion is an exothermic chemical reaction. If the heat emitted by the reaction can be absorbed faster than the reaction can produce the heat, thenthe reaction cannot be sustained. Water is the most common extinguishing agent. Water is also the most efficient extinguishing agent because it has the capability to absorb immense amounts of heat.

4. *Inhibit the chemical chain reactions: –* Inhibiting the chemical chain reactions requires that a chemical agent be introduced into the fire. Certain chemical agents can interfere with the sequence of reactions by absorbing free radicals from one sequence that are needed to complete the next sequence. Dry chemical extinguishing agents commonly used in portable fire extinguishers have this ability.

3. CLASSES OF FIRE: -

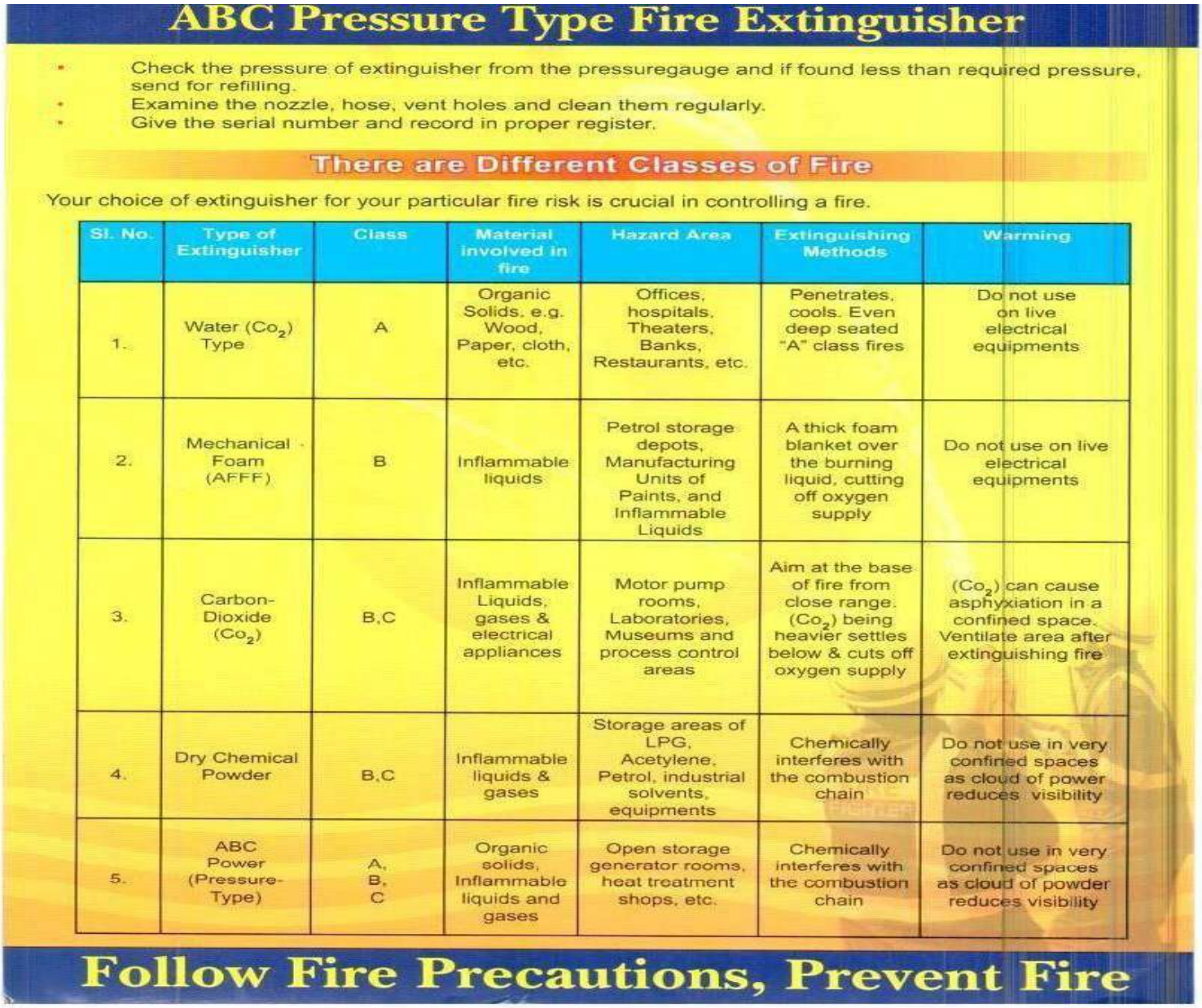
Fires are classified based upon the type of fuel that is consumed. Fires are classified into categories so personnel can quickly choose appropriate extinguishing agents for the expected fire and associated hazards. Fires are classified into five

general classes. Each class is based on the type of fuel and the agents used in extinguishment. The five classes of fire are described next:

- Class A– Class A fires involve ordinary combustibles such as wood, paper, cloth, rubber, and some plastics. Water is usually the best extinguishing agent because it can penetrate fuels and absorb heat. Dry chemicals usedto interrupt the chemical chain reactions are also effective on Class A fires.
- Class B– Class B fires involve flammable and combustible liquids and gases such as gasoline, alcohols, and propane. Extinguishing agents that smother the fire or reduce the oxygen concentration available to the burning zone are most effective. Common extinguishing agents include foam, carbon dioxide, and dry chemicals.
- Class C– Class C fires involve energized electrical equipment. Non-conductive extinguishing agents are necessary to extinguish Class C fires. Dry chemicals and inert gases are the most effective agents. If it can be done safely, personnel should isolate the power to electrical equipment before attempting to extinguish a fire. Once electrical equipment is de-energized, it is considered a Class A fire.
- Class D– Class D fires involve combustible metals such as magnesium, sodium, titanium, powdered aluminum, potassium, and zirconium. Class D fires require special extinguishing agents that are usually produced for the specific metal.

- Class K– Class K fires most often occur where cooking media (fats, oils,and greases) are used, and most of the time are found in commercial cooking operations. Class K fire extinguishers are required in any location that cooks oils, grease, or animal fat. Any location that fries must have a Class K fire extinguisher. Every commercial kitchen should have a Class K extinguisher located in it to supplement the suppression system.

4. THREE STAGES OF FIRE: -



ABC Pressure Type Fire Extinguisher

- Check the pressure of extinguisher from the pressuregauge and if found less than required pressure, send for refilling.
- Examine the nozzle, hose, vent holes and clean them regularly.
- Give the serial number and record in proper register.

There are Different Classes of Fire

Your choice of extinguisher for your particular fire risk is crucial in controlling a fire.

Sl. No.	Type of Extinguisher	Class	Material involved in fire	Hazard Area	Extinguishing Methods	Warning
1.	Water (Co_2) Type	A	Organic Solids, e.g. Wood, Paper, cloth, etc.	Offices, hospitals, Theaters, Banks, Restaurants, etc.	Penetrates, cools. Even deep seated "A" class fires	Do not use on live electrical equipments
2.	Mechanical Foam (AFFF)	B	Inflammable liquids	Petrol storage depots, Manufacturing Units of Paints, and Inflammable Liquids	A thick foam blanket over the burning liquid, cutting off oxygen supply	Do not use on live electrical equipments
3.	Carbon-Dioxide (Co_2)	B,C	Inflammable Liquids, gases & electrical appliances	Motor pump rooms, Laboratories, Museums and process control areas	Aim at the base of fire from close range. (Co_2) being heavier settles below & cuts off oxygen supply	(Co_2) can cause asphyxiation in a confined space. Ventilate area after extinguishing fire
4.	Dry Chemical Powder	B,C	Inflammable liquids & gases	Storage areas of LPG, Acetylene, Petrol, industrial solvents, equipments	Chemically interferes with the combustion chain	Do not use in very confined spaces as cloud of power reduces visibility
5.	ABC Power (Pressure-Type)	A, B, C	Organic solids, Inflammable liquids and gases	Open storage generator rooms, heat treatment shops, etc.	Chemically interferes with the combustion chain	Do not use in very confined spaces as cloud of powder reduces visibility

Follow Fire Precautions, Prevent Fire

Fires evolve through several stages as the fuel and oxygen available are consumed. Each stage has its own characteristics and hazards that should be understood by safety managers and fire-fighting personnel.

4.1 INCIPIENT STAGE: -

The incipient stage is the first or beginning stage of a fire. In this stage, combustion has begun. This stage is identified by an ample supply of fuel and oxygen. The products of combustion that are released during this stage normally include water vapor, carbon dioxide, and carbon monoxide. Temperatures at the seat of the fire may have reached 1000°F, but room temperatures are still close to normal.

4.2 FREE-BURNING STAGE: -

The free-burning stage follows the incipient stage. At this point, the self-sustained chemical reaction is intensifying. Greater amounts of heat are emitted and the fuel and oxygen supply are rapidly consumed. Room temperatures can rise to over 1300°F. In an enclosed compartment, the free-burning stage can become dangerous. Because of the heat intensity, the contents within a compartment are heated. At some point, if the compartment is not well ventilated, compartment contents will reach their ignition temperature. A flashover occurs when the contents within a compartment simultaneously reach their ignition temperature and become involved in flames. It is not uncommon for room temperatures to exceed 2000°F following a flashover. Human survival, even for properly protected fire fighters, is difficult if not impossible for a few seconds within a compartment following a flashover.

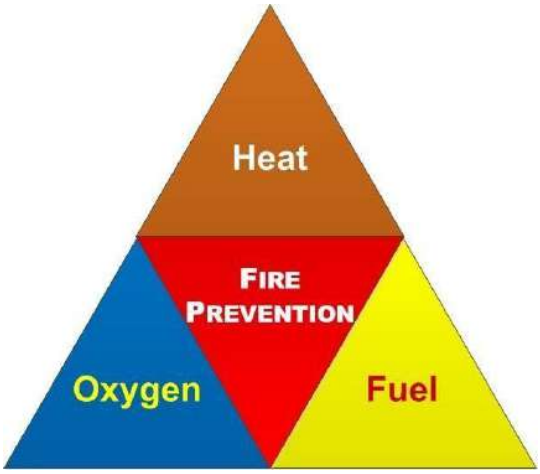
4.3 SMOLDERING STAGE: -

The smoldering stage follows the free-burning stage. As a free-burning fire continues to burn, the chemical reaction will eventually consume the available oxygen within the compartment and ultimately convert it into carbon monoxide and carbon dioxide. This causes the oxygen concentration within the compartment to decrease. When the oxygen concentration decreases to 15%by volume, the chemical reaction will not have sufficient oxygen to support free-burning combustion. Visibly, the flames subsist and the fuel begins to glow.A smoldering fire is identified by a sufficient amount of fuels and lower oxygen concentrations. Smoldering fires, especially when insulated within a compartment, can continue the combustion process for hours. Room temperatures can range from 1000-1500°F. The byproducts of combustion also fill the compartment and human survival is impossible. During the smoldering stage, an extreme hazard, called a backdraft, can develop. A backdraft occurs when oxygen is introduced into a smoldering compartment fire. The immediate availability of sufficient oxygen in the presence of sufficient fuel, heat, and chemical chain reactions causes flaming combustion again. In some cases, the backdraft is so violent that an explosion will occur. Human survival, even of properly protected fire fighters, is usually not possible.

5. FIRE PREVENTION & PROTECTION:

5.1 FIRE PREVENTION

Fire prevention requires segregating the three elements of the fire triangle.A fire needs three elements - heat, oxygen and fuel. Without heat, oxygen andfuel a fire will not start or spread. A key strategy to prevent fire is to remove one or more of heat, oxygen or fuel.



(I) HEAT: -

Heat can be generated by work processes and is an essential part of some processes such as cooking/Electric operatedequipments/appliances/machines etc. This heat must be controlled and kept away from fuel unless carefully controlled. Heat generated as a by-product ofa process must be dealt with properly.

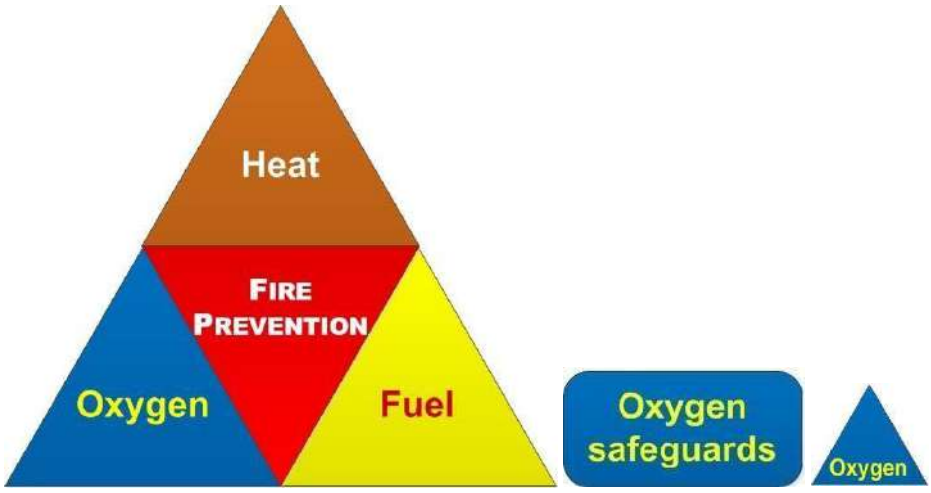
❖ Heat Safeguards

- Ensure staff are aware of their responsibility to report dangers.
- Control sources of ignition.
- Have work places inspected and cleaned regularly.
- Treat independent building uses, such as an office over a dispensary as separate purpose groups and therefore compartmentalize from each other.
- Ensure cooking food is always attended.
- Use the Electricity Supply Board's Safely .
- Have regard to relevant Authority Safety Alerts,.
- Use the Code of Practice For Avoiding Danger From Underground Services

(ii) OXYGEN: -

Oxygen gas is used: -

- In welding, flame cutting and other similar processes.
- for helping people with breathing difficulties.
- In hyperbaric chambers as a medical treatment.
- In decompression chambers.
- for food preservation and packaging.
- In steelworks and chemical plants.



The air we breathe contains about 21% oxygen. Pure oxygen at high pressure, such as from a cylinder, can react violently with common materials such as oil and grease. Other materials may catch fire spontaneously. Nearly all materials including textiles, rubber and even metals will burn vigorously in oxygen. With even a small increase in the oxygen level in the air to 24%, it becomes easier to start a fire, which will then burn hotter and more fiercelythan in normal air. It may be almost impossible to put the fire out. A leakingvalve or hose in a poorly ventilated room or confined space can quickly increase the oxygen concentration to a dangerous level.

The main causes of fires and explosions when using oxygen are: -

- Oxygen enrichment from leaking equipment.
- use of materials not compatible with oxygen.
- use of oxygen in equipment not designed for oxygen service.
- Incorrect or careless operation of oxygen equipment.

❖ Oxygen Safeguards: -

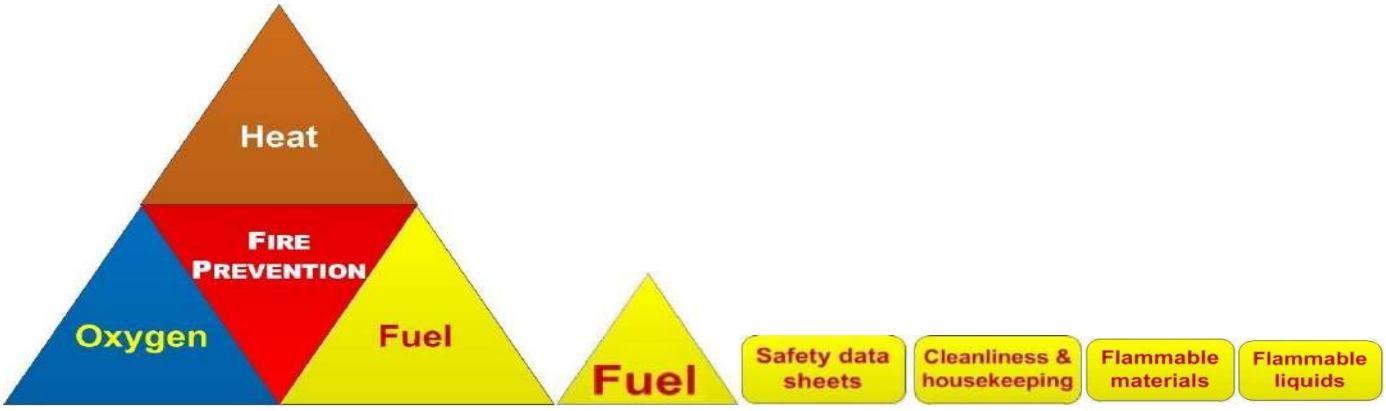
- Ensure employees are aware of their responsibility to report dangers.
- See safeguards in the Code of Practice for Working in ConfinedSpaces.
- Oxygen should never be used to "sweeten" the air in a confinedspace
- **Where oxygen is used,**
  - ➢ follow safety advice from the supplier.
  - ➢ follow the safeguards on the safety data sheet.
  - ➢ keep the safety data sheet readily available.
- Be aware of the dangers of oxygen if in doubt, ask.

- Prevent oxygen enrichment by ensuring that equipment is leak-tightand in good working order.
- Check that ventilation is adequate.
- Always use oxygen cylinders and equipment carefully and correctly.
- Always open oxygen cylinder valves/outlet-inlet valve slowly.
- Do not smoke where oxygen is being used,
- Never use replacement parts which have not been specificallyapproved for oxygen service.
- Never use oxygen equipment above the pressures certified by themanufacturer.
- Never use oil or grease to lubricate oxygen equipment.
- Never use oxygen in equipment which is not designed for oxygen service.
- Operators of locations storing large amounts of oxidizing substances.

(iii) FUEL: -

Workplaces in which large amounts of flammable materials are displayed, stored or used can present a greater hazard than those where the amount keptis small.

In relation to fire, fuel consists of flammable material. Flammable materialis material that burns readily in a normal atmosphere. Flammable materials include flammable liquids (e.g. petrol, Diesel etc.), flammable gasses (e.g. propane and butane) and flammable solids (e.g. charcoal, paper etc.). It is important to identify all flammable materials that are in your workplace so that proper controls can be put in place.



Great care is required in the storage, handling and use of flammable materials. Safety Data sheets may provide detailed advice.

- **Fuel Safeguards: -**
  - Identify all flammable materials so that proper controls can be put in place.
  - Identify use of substances with flammable vapors (e.g. someadhesives).
  - Reduce quantities of flammable materials to the smallest amount necessary for running the business and keep away from escape routes.
  - Replace highly flammable materials with less flammable ones.
  - Store remaining stocks of highly flammable materials properly outside, in a separate building, or separated from the main workplace by fire- resisting construction.
  - Provide clearly marked separate storage for flammable chemicals, gas cylinders, and waste materials.
  - Train officers/all staffs/maintenance and Security persons on safe storage, handling and use of flammable materials.

- Keep stocks of office stationery and supplies and flammable cleaners' materials in separate cupboards or stores. They should be fire-resisting with a fire door if they open onto a corridor or stairway escape route.
- This is highly specialized work and a detailed risk assessment must be conducted.
- Detailed work instructions must be put in place.
- Advice should be sought from the gas supplier as needed.
- Workers must be properly trained and supervised.
- The quantity of flammable liquids in work rooms should be kept to a minimum, normally no more than a half-day's or half a shifts supply.
- Flammable liquids, including empty or part-used containers, should be stored safely. Small quantities (Tens of Liters) of flammable liquids can be stored in the workroom if in closed containers in a fire-resisting (e.g. metal), bin or cabinet fitted with means to contain any leaks.
- Flammable liquids should not be decanted within the store. Decanting should take place in a well-ventilated area set aside for this purpose, with appropriate facilities to contain and clear up any spillage.
- Container lids should always be replaced after use, and no container should ever be opened in such a way that it cannot be safely resealed.
- Flammable liquids should be stored and handled in well ventilated conditions. Where necessary, additional properly designed exhaust ventilation should be provided to reduce the level of vapors concentration in the air.
- Storage containers should be kept covered and proprietary safety containers with self-closing lids should be used for dispensing and applying small quantities of flammable liquids.

- Avoid accumulations of combustible rubbish and waste and remove at least daily and store away from the building.
- Never store flammable or combustible rubbish, even temporarily, inescape routes, or where it can contact potential sources of heat.
- Clean cooking surfaces on a regular basis to prevent grease build-up.
- Rags and cloths which have been used to mop up or apply flammable liquids should be disposed of in metal containers with well-fitting lids and removed from the workplace at the end of each shift or working day.
- Keep safety data sheets safely available in the event of a fire sothat the information is available for emergency services.

5.2 FIRE PROTECTION: -

Fire is a chemical reaction that requires three elements to be present for the reaction to take place and continue. The three elements
are:

- Heat, or an ignition source
- Fuel
- Oxygen

These three elements typically are referred to as the "**fire triangle**". Fire is the result of the reaction between the fuel and oxygen in the air. Scientists developed the concept of a fire triangle to aid in understandingof the cause of fires and how they can be prevented and extinguished.Heat, fuel and oxygen must combine in a precise

way for a fire to startand continue to burn. If one element of the fire triangle is not present or removed, fire will not start or, if already burning, will extinguish.

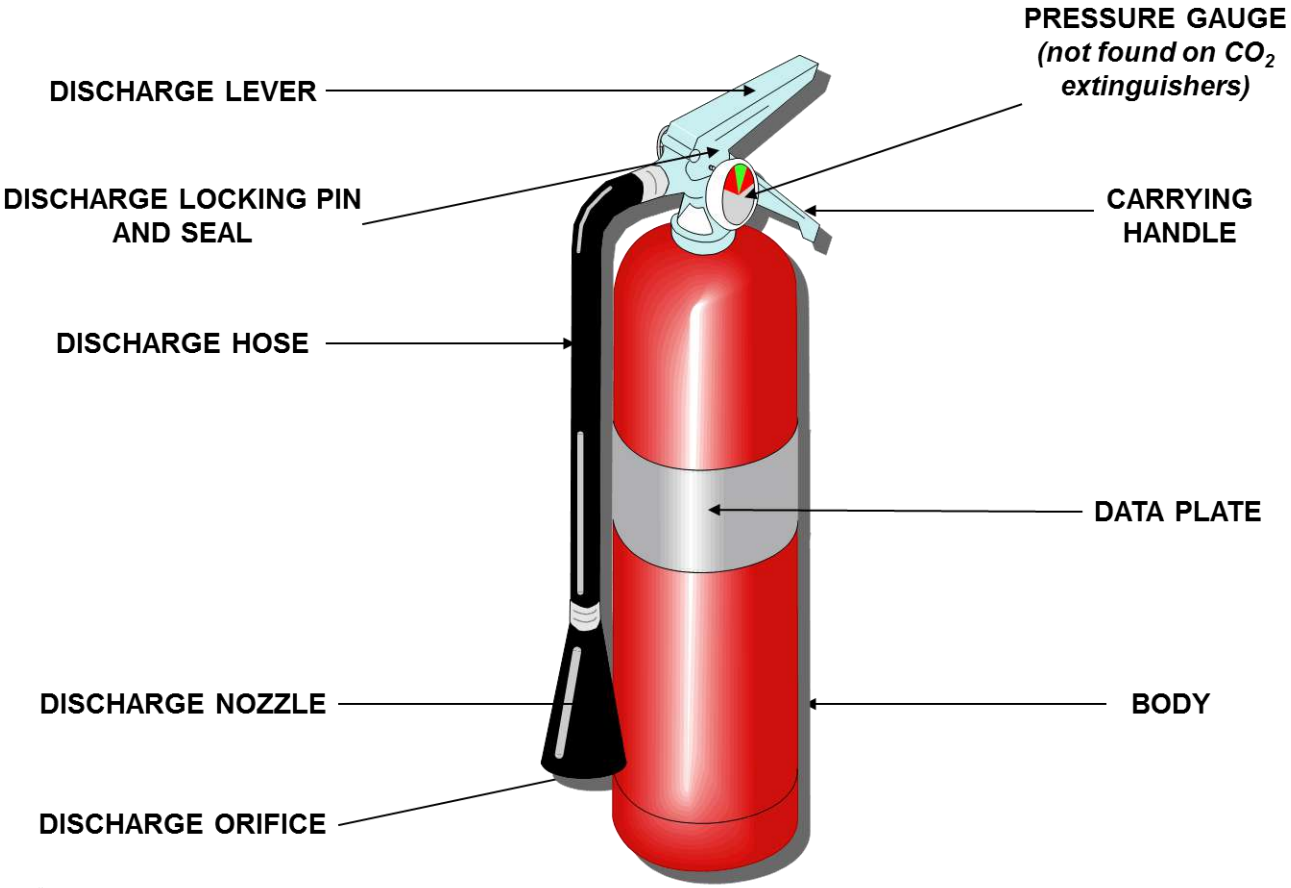
Ignition sources can include any material, equipment or operation that emits a spark or flame —including obvious items, such as torches, as well as less obvious items, such as static electricity and grinding operations. Equipment or components that radiate heat, such as kettles, catalytic converters and mufflers, also can be ignition sources. Fuel sources include combustible materials, such as wood, paper, trash and clothing; flammable liquids, such as gasoline or solvents; and flammable gases, such as propane or natural gas. Oxygen in the fire triangle comes from the air inthe atmosphere. Air contains approximately 78 percent nitrogen, 21 percent oxygen & 1 percent other gases and water vapors.

6. Fire Extinguishers: -

There are different types of fire extinguishers designed to put out the different classes of fire. Selecting the appropriate fire extinguisher is an important consideration. The wrong extinguisher actually may make a fire emergency worse.

For example, failing to use a Crated extinguisher on energized electrical components may endanger workers by causing the extinguishing material to be electrified by the energized components that are on fire. C-rated fire extinguishers put out the fire by using a chemical that does not conduct electricity.

Fire Extinguisher Anatomy

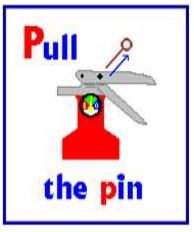


The following table illustrates the types of extinguishers, fire classes for which each is used and the limitations of each extinguisher.

Fire Extinguisher Type	*Class of Fire it Extinguishes*	*Extinguisher Limitations/ Comments*
Dry Chemical (multipurpose)	*A, B, C*	*Generally good for use in roofing industry*
Foam—alcohol-resistant and aqueous film-forming foam (AFFF) types	*B*	*Expensive; effective on Class B only; limited shelf life; generally not needed in roofing industry*
Water	*A*	*Good only for Class A fires*
Metal X	*D B, C;*	*Expensive; must be kept dry; ineffective on A, typically not needed in roofing industry*
Carbon Dioxide	*B, C*	*If used in confined areas, will create oxygen deficiency; not effective in windy conditions; can cause frostbite during discharge; typically not used in roofing industry*
Halon	*B, C*	*Expensive; not effective in windy conditions; toxic gases may be released in extremely hot fires because of decomposition; generally not used in roofing industry*
Potassium Acetate	*K*	*Expensive, wet chemical extinguisher for commercial cooking operations using oils and fats*

Remember this easy acronym when using an extinguisher - P.A.S.S.

Pull the pin.



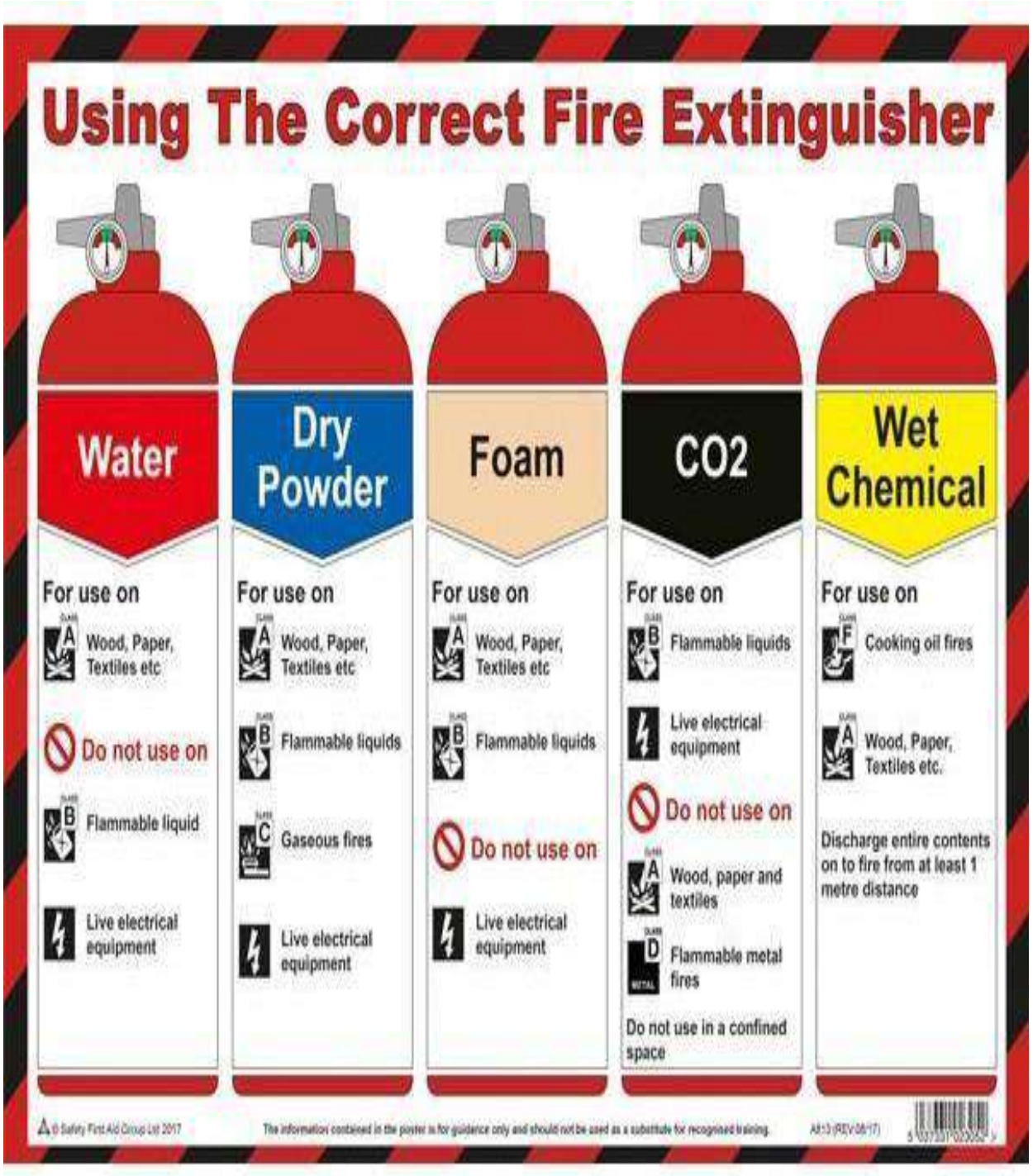
Aim the nozzle.

Squeeze the handle.

Sweep side to side at the base of the fire.

Note: -

- **Staffs should be aware of that if a fire cannot be extinguished using one full extinguisher, they should evacuate the site and let the fire department or Fire person handle the situation.**
- **The Security Guards / Supervisors should be trained to extinguish fire with the help of fire extinguishing cylinders and other firefighting material available on the spot. They will also help the firefighting staff in extinguishing the fire or in any other natural calamities.**


Using The Correct Fire Extinguisher
Water
For use on
Wood, Paper, Textiles etc
Do not use on
Flammable liquid
Live electrical equipment
Dry Powder
For use on
Wood, Paper, Textiles etc
Flammable liquids
Gaseous fires
Live electrical equipment
Foam
For use on
Wood, Paper, Textiles etc
Flammable liquids
Do not use on
Live electrical equipment
CO2
For use on
Flammable liquids
Live electrical equipment
Do not use on
Wood, paper and textiles
Flammable metal fires
Do not use in a confined space
Wet Chemical
For use on
Cooking oil fires
Wood, Paper, Textiles etc.
Discharge entire contents on to fire from at least 1 metre distance
© Safety First Aid Group Ltd 2017
The information contained in the poster is for guidance only and should not be used as a substitute for recognised training.
A813 (REV 08/17)

7. EMERGENCY EVACUATION: -

Emergency evacuation is the urgent immediate egress or escape of people away from an area that contains an imminent threat, an ongoing threat or a hazard to lives or property.

Examples range from the small-scale evacuation of a building due to a storm or fire to the large-scale evacuation of a city because of a flood, bombardment or approaching weather system, especially a Tropical Cyclone. In situations involving hazardous materials or possible contamination, evacuees may be decontaminated prior to being transported out of the contaminated area.

❖ **Evacuation Sequence: -**

The sequence of an evacuation can be divided into the following phases:

- ✓ **Detection**
- ✓ **Decision**
- ✓ **Alarm**
- ✓ **Reaction**
- ✓ **movement to an area of refuge or an assembly station**
- ✓ **transportation**

The time for the first four phases is usually called pre-movement time.

The most common equipment in buildings to facilitate emergency evacuations are fire alarms, exit signs, and emergency lights. Some structures need special emergency exits or fire escapes to ensure the availability of alternative escape paths.

Despite the use of fire-retardant material, and compliance with fire regulations, fires still may be occurred. All ESIC establishments (ROs/SROs/BOs/Hospitals/Collages/DCBO/staff qtrs.) should have regular fire drills so that all personnel know exactly what to do. All officers/staff personnel should be trained and drilled in: -

- **Fire prevention.**
- **Location and use of fire alarms.**
- **Location and use of fire extinguishers.**
- **Location of emergency exits.**
- **Evacuation procedures.**

Oxygen supports combustion. Post signs to show that oxygen is inuse where applicable. If a patient is receiving oxygen as part of his treatment,be sure that the patient, his roommates, and visitors know that smoking is prohibited.

If a fire occurs, follow these steps: -

- Activate the fire alarm procedures.
- Turn off oxygen, lights, and any Electrical equipment in the vicinity ofthe fire wherever possible.
- Remove/shift the patients who are in immediate danger.
- Notify the hospital "switchboard" of the location of the fire.
- Close windows and doors to reduce ventilation.
- Using the fire extinguisher, attempt to extinguish the fire.
- Return patients who are not endangered to their rooms.
- Post a guard to direct the fire department.

Note: - Fire & Life Safety Inspections of hospitals/Offices/institution buildings shall be in accordance as given below: -

- **National Building Code of India-part-IV "Fire & Life safety"**
- **Respective State Fire Safety Rules/ACTs /Norms/By-Laws.**
- **Or Any other applicable statutes.**
- **Renewal of Fire NOC, compliances of local fire norms as applicable in respect of existing Firefighting installations.**

for example; - In Maharashtra state, six monthly "twice a year" Form-B in every January and July issued by licensee Fire agencies registered with Maharashtra Fire service in respect of good and efficient working condition of Firefighting system installed in building & their maintenance to be submitted by occupier or owner as per Maharashtra Fire Prevention and Life Safety Measure Act.

8. Requirements for Fire & Life Safety:

1. Firefighting equipment like wet riser, hydrants, auto sprinkler, Fire alarm system, Fire extinguishers of all types and sizes should be available as per table below (adapted from NBC 2016 as amended upto date).
2. Operational and maintenance plan for firefighting equipment including refilling of extinguishers.
3. Up to date fire drawings to be available. Where applicable, the fire drawings should also specify the location of fire dampers.
4. Fire detection and smoke detectors exist across all floors. The detectors shall be tested for functionality at regular intervals, and records maintained.
5. Central fire alarm system is installed at a location which is staffed 24/7.
6. Fire exit plan for each floor. Exit door should be openable and free fromany materials which will obstruct way.
7. Fire Exit signage on all floors well illuminated/ self-glowing, as per NBCguidelines.
8. Emergency illumination system in case power goes-off.
9. Designated place for assembly of patients and staff in case of fire.
10. Mock fire drill records and schedule of conduct of mock drills.

9. Emergency routes and Exits: -

The administration/Fire nodal officer/Maintenance staff/Care-taker must ensure that the routes to emergency exits and the exits themselves are kept clear at all times. In addition, the order requires that: -

1. Emergency routes and exits must lead as directly as possible to a place of safety.
2. It must be possible to evacuate the premises quickly and safely.
3. The number, size and distribution of exits must be adequate for themaximum numbers of persons who may be present.
4. Emergency doors must open in the direction of escape in all time.
5. Sliding/revolving doors must not be used as emergency exits.
6. Exit doors must be easily and immediately opened by any personwho may need to use them in an emergency.
7. Escape routes must be indicated by signs.
8. Emergency routes and exits must be adequately illuminated in the event of a failure of the normal lighting.
9. Proper roads in the premises should be provided for easy mobility of the fire Brigade appliances & marginal spaces around the building should be kept free from obstructions & open to sky at all time.
10. All portables firefighting equipments installed at various locations as per local hazard such as CO2, ABC, Foam, Fire Buckets should be strictly as per IS standards/local fire norms/Bye-Laws as prevail.
11. All the Fire Fighting equipments shall be well maintained and should be easily accessible in case of emergency.

12. Emergency Telephone numbers like **'Police"**, **Fire Brigade", "Hospital**, "Doctors" and **"Fire Nodal Officer"** of the hospital/Offices should be displayed in security cabin, Fire Control room, reception area & office premises adequately.
13. It shall be ensured that security & every staff are trained in handling firefighting equipments.
14. Cautionary boards such as **"Fire Extinguisher", 'Fire Bucket", "Danger", "NO Smoking", "Exit", "Fire Exit", "Fire Hydrant" etc.** should be displayed at the strategic locations physically shown & the caution Boards should be easily visible from a distance to guide the occupants in case of emergency. The sign should be of florescent type and should be glow in dark.
15. The Fire mock drill or evacuation drill should be plan /conductedand instruction should be given to the staff minimum four times in a year and drill should be carried out twice in a year or as per localfire norms as prevail.
16. On site & off- site emergency plan shall be prepared & mock drills shall be conducted twice in a year & instruction to every employee/staff shall be given once in three months.
17. The fluorescent glow signs like **"Staircase",** "Fire **Extinguisher",** **"Fire Escape", "Hydrant Point", "Manual Call Point (MCP)", "Exit", "Do Not Use Lift in Case of Fire"** shall be installed on strategic locations in all common areas of the building like passages, corridors, Lift Lobby etc.
18. Fire evacuation orders & exit Map shall be provided in every floor& in lobbies of the buildings.
19. The House Keeping shall be well maintained within the entire premises & Housekeeping supervisor/ staffs/personals must also be

well aware about the existing Fire system.

20. The Fire prevention & Fire protection system installed in the premises shall be maintained & shall be kept in good efficient working condition at all times.

Note: -

- Cleanliness is part of fire prevention
- Emergency fire signages are glow in dark signages.
- The Fire Signages are visible and are bilingual, with one local language.
- The egress routes are free from any materials that would cause hindrance in evacuation.
- The Fire Doors preferably have panic bars.
- The Fire Doors remain open at all times
- The Fire Doors have a proper fire rating and open outside.
- The Fire cabinets are open all the time.
- The Manual Call Points have means to break the glass.
- The Fire Extinguishers have a regular preventive maintenance schedule and stickers are put showing the date of checking and the next scheduled date for checking.
- The Emergency Exit signs should be displayed prominently.
- The staff is aware of the firefighting systems, responsibilities during fire emergencies, evacuation routes & techniques, conversant with the type of fire extinguishers and their area of use, trained to operate fire extinguishers, code announcements and assembly points in case of fire.

10. NDMA Guidelines for Fire Safety in Hospital: -

National Disaster Management Authority (NDMA), Government of India has also issued guidelines in regard to Hospital safety. These guidelines formulated by NDMA, in consultation with various stakeholders, academic experts, subject specialists from across the country and officials from concerned Ministries and Departments of Government of India. Those guidelines should also be referred in context of the Hospital Safety. These guidelines on Hospital Safety have been developed with the vision that all hospitals in India will be structurally and functionally safer from disasters, such that the risks to human life and infrastructure are minimized. However, fire safety pertaining to hospital extracted from these guidelines are as hereunder: -

10.1 Scope: -

Provisions laid down hereunder shall establish the minimum requirements for a reasonable degree of safety from fire emergencies in hospitals, such that the probability of injury and loss of life from the effects of fire are reduced. All healthcare facilities shall be so designed, constructed, maintained and operated as to minimize the possibility of a Fire emergency requiring the evacuation of occupants, as safety of hospital occupants cannot be assured adequately by depending on evacuation alone. Hence measures shall be taken to limit the development and spread of a fire by providing appropriate arrangements within the hospital through adequate staffing & careful development of operative and maintenance procedures consisting of:-

(1) Design and Construction;

(2) Provision of Detection, Alarm and Fire Extinguishment;

(3) Fire Prevention

(4) Planning and Training programs for Isolation of Fire; and,

(5) Transfer of occupants to a place of ***comparative safety*** or evacuation of the occupants to achieve ***ultimate safety***.

10.2 **Expected Levels of Fire Safety in Hospitals: -**

Hospitals shall provision for two levels of safety within their premises:

(1) Comparative Safety: - which is protection against heat and smoke within the hospital premises, where removal of the occupantsoutside the premises is not feasible and/or possible. Comparative Safety may be achieved through:

(a) Compartmentation

(b) Fire Resistant wall integrated in the Flooring

(c) Fire Resistant Door of approved rating

(d) Pressurized Lobby, Corridor, Staircase

(e) Pressurized Shaft (All vertical openings)

(f) Refuge Area

(g) Independent Ventilation system

(h) Fire Dampers

(i) Automatic Sprinkler System

(j) Automatic Detection System

(k) Manual Call Point

(l) First Aid

(m) Fire Fighting Appliances

(n) Fire Alarm System

(o) Alternate Power Supply

(p) Public Address System

(q) Signage

(r) Fire Exit Drills and orders

(2) *Ultimate Safety:-* which is the complete removal of the occupants from the affected area to an assembly point outside the hospital building. Ultimate Safety may be achieved through:

(a) Compartmentation

(b) Fire Resistant Door of approved rating

(c) Protected Lobby, Corridor, Staircase and Shaft

(d) Public Address System

(e) Signage

(f) Fire Drills and orders

10.3 Structural Elements of Fire Safety: -

10.3.1 Open Spaces: -

(1) Hospitals shall make provisions for sufficient open space in and around the hospital building to facilitate the free movement of patients and emergency/fire vehicles.

(2) These open spaces shall be kept free of obstructions and shall be motorable.

(3) Adequate passage way & clearance for fire fighting vehicles to enter the hospital premises shall be provided.

(4) The width of such entrances shall be not be less than 4.5 meters with clear head room not less than 5 meters.

(5) The width of the access road shall be a minimum of 6 meters.

(6) A turning radius of 9 meters shall be provided for fire tender movement.

(7) The covering slab of storage/static water tank shall be able to withstand the total vehicular load of 45 tone equally divided as a four-point load (if the slab forms a part of path/drive way).

(8) The open space around the building shall not be used for parking and/or any other purpose.

(9) The Setback area shall be a minimum 4.5 meters.

(10) The width of the main street on which the hospital building abuts shall not be less than 12 meters & when one end of that street shall join another street, the street shall not be less than 12 meters wide.

(11) The roads shall not be terminated in dead ends.

Note: - Local Buildings norms/rules/by-laws as prevails shall be superseded above requirements

10.3.2 **Basements: -**

(1) Basements, if provided shall be of type-1 construction and materialused shall conform to class A material.

(2) Basements shall be used only for parking vehicles and shall be protected with automatic sprinkler systems.

(3) Each basement shall be separately ventilated.

(4) Each vent shall have a cross-sectional area (aggregate) not less than 2.5% of the floor area spread evenly round the perimeter of the basement.

(5) A system of air inlets and smoke outlets shall be provided & clearly marked as "**AIR INLET**" & "**SMOKE OUTLET**".

(6) Clear headroom of minimum 2.4 meters shall be provided for the entire basement.

(7) A minimum ceiling height of any basement shall be 0.9 meters andmaximum 1.2 meters above the average surrounding ground level.

(8) The access to the basement shall be separate from the main and alternative staircase providing access and exit from higher.

(9) floors. Where the staircase continues, in the case of buildings served by more than one staircase, the same shall be of enclosed type serving as a Fire Separation between the basement and higher floors.

(10) Open ramps shall be permitted if they are constructed within the building line and surface drainage does not enter the basement.

(11) The staircase of the basement shall be of enclosed type having fire resistance not less than 02 hrs & shall be situated at the periphery of the basement to be entered at ground level from the open air and in such a position that smoke from any fire in the basement shall not obstruct any exit serving the ground & upper stores of the building. The staircase shall communicate with the basement through a lobby provided with fire resisting, self-closing doors of 02 hrs. resistance. Additional stairs shall be providedif travel distance does not meet specifications given in Table 22of the NBC.

(12) For multi-story basements, one intake duct may serve allbasement levels, but each level & basement compartment shall have a separate smoke outlet duct or ducts. The ducts shall have the same fire resistance rating as the compartment itself.

(13) Mechanical extractors for smoke venting system from lower basement levels shall also be provided. The actuation of the system shall be incorporated with the detection and sprinkler systems. The performance of the system shall be superior than standard units.

(14) Mechanical extractors shall have an interlocking arrangement,so that extractors shall continue to operate and supply fans shall stop automatically with the actuation of fire detection system.

(15) Mechanical extractors shall be designed to permit 30 air changes per hour in case of a fire emergency.

(16) Mechanical extractors shall have an alternate source of electricity supply.

(17) Ventilation ducts shall be integrated with the structure of the building and shall be made out of brick masonry or reinforced cement concrete as far as possible. Wherever this duct intersects the transformer area or an electrical switch board, fire dampers shall be provided.

(18) The basement shall not be permitted below the ward block of a hospital.

(19) No cut outs to upper floors shall be permitted in the basement.

(20) An openable window on the external wall shall be fitted with locks that can be easily opened.

(21) All floors shall be compartmented by a separation wall with 2 hrsfire rating, such that each compartment shall have a surface area not exceeding 750 sq. meters. Floors which are fitted with sprinkler systems may have their surface areas increased by 50%. In long building fire separation wall shall be at distances not exceeding 40 meters.

(22) Lift/Elevators shall not normally communicate with basements; if, however, Lifts are in communication, the lift lobby of the basement shall be pressurized. A positive pressure between 25 & 30 Pascal (Pa), shall be maintained in the lobby & a positive pressure of 50Pa shall be maintained in the Lift shaft. The mechanism for pressurization shall act automatically with the Fire Alarm. Provision shall be made to operate the system manually as well. The Lift car door shall have a Fire resistance rating equal to the Fire resistance of lift enclosure. The material used for interior finishing shall conform to class-1 materials.

10.3.3 **Means of Escape/Egress: -**

A means of escape/egress is a continuous and unobstructed wayto exit from any point in a building or structure to a public way. Three separate and distinct parts of an escape/egress are:

13.3.1.1 The Exit access,

13.3.1.2 The Exit, and

13.3.1.3 The Exit discharges.

(1) A means of Escape/egress comprises the vertical and horizontal travel and shall include intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stair enclosures, lobbies, and horizontal exits leading to an adjoining building at the same level.

(2) The exits in Healthcare facilities should be limited to doors leading directly outside the building, internal staircases and smoke proof enclosures, ramps, horizontal exits, external exits and exit passage.

(3) Exits shall be so arranged that they may be reached without passing through another occupied unit.

(4) Vertical evacuation of occupants within a health care facility is difficult and time consuming. Therefore, horizontal movement of patient is of primary importance. Because of the time required to move patients, exit access routes should be protected againstFire effects. Spaces open to the corridors shall neither be usedfor patients' sleeping, as treatment rooms nor for storing hazardous material.

10.3.4 **Internal Staircases: -**

(1) Internal staircases shall be constructed with non-combustible materials.

(2) Internal stairs shall be constructed as self-contained units along an external wall of the building constituting at least one of its sides and shall be completely closed.

(3) A staircase shall not be arranged around a Lift shaft.

(4) Hollow combustible construction shall not be permitted

(5) The construction material shall have 02 hrs fire resistance.

(6) Minimum width of stairs shall be 2 meters.

(7) Width of the tread shall not be less than 300 mm.

(8) The height of the riser shall not be less than 150 mm and thenumber of stairs per flight shall not exceed 15.

(9) Handrails shall be provided at a height of 1000 mm, which is to be measured from the base of the middle of the treads to the top of the handrails.

(10) Banisters or railings shall be provided such that the width of staircase is not reduced.

(11) Minimum head room in a passage under the landing of a staircase and under the staircase shall be 2.2 meters.

(12) The staircase shall be continuous from ground floor to the terrace and the exit door at the ground level shall open directly to the open spaces or a large lobby.

(13) The number of people in between floor landings of staircases shallnot be less than the population on each floor for the purpose of the design of the staircase.

(14) Fire/Smoke check doors shall be provided for a minimum of 2 hrs fire resistance rating.

(15) Lift openings and any other openings shall not be permitted.

(16) No electrical shaft and panel, AC ducts or gas pipelines, etc. shallpass through or open onto the staircases.

(17) No combustible material shall be used for decoration/wall paneling in the staircases.

10.3.5 **Protected Staircases**: -

Provisions given for internal staircases shall apply to protected staircases. Also, additional safeguards shall be provided as under:

(1) The staircases shall be enclosed by walls having 02 hrs fire resistance

(2) The external exit doors at ground floor shall open directly onto open spaces or a lobby and Fire & Smoke check doors shall be provided.

(3) Protected staircases shall be pressurized. Under no circumstances shall they be connected to a corridor, lobby and staircase which is unpressurized.

(4) Pressurization systems shall be incorporated in protected staircases where the floor area is more than 500 sq. meters. The difference in pressurization levels between staircase and lobby/corridor shall not be

greater than 5 Pa. Where 2 stage pressurization system is in use the pressure difference shall be as under:

(a) In normal conditions - Minimum 8Pa to 15 Pa.

(b) In emergency conditions - 50 Pa.

(c) The pressurization system shall be interconnected with theautomatic/manual fire alarm system for actuation.

10.3.6 **External Staircases: -**

(1) External staircases serving as a required means of egress shallbe of permanent fixed construction.

(2) External staircases shall be protected by a railing or guard. The height of such a guard/ railing shall not be less than 1200 mm.

(3) External staircases shall be separated from the interior of the building by walls that are fire resistant and have fixed or self-closing opening protectives', as required for enclosed stairs. External staircases shall extend vertically from the ground to a point 3 meters above the topmost landing of the stairway or the roof line whichever is lower, and at- least 3 meters horizontally.

(4) All openings below and outside the external staircases shall be protected with requisite fire resistance rating.

(5) External staircases shall be so arranged to avoid any discomfort/obstruction for persons with a fear of heights, from using them.

(6) External staircases shall be so arranged to ensure a clear direction of egress to the street.

(7) External staircases shall be continuous from the ground floor tothe terrace level

(8) The entrance to the external staircases shall be separate and remote from internal staircases.

(9) External staircases shall have a straight flight with a width notless than 2 meters, a tread not less than 300 mm, a riser not more than 150 mm and the number of risers shall be limited to 15 per flight.

(10) The handrail shall have a height not less than 1000 mm and not exceeding 1200 mm. Banisters shall be provided with a maximum gap of 150 mm.

Note: -

- Matches have heads but no brains, when you use their heads, use your brain too.
- Fire is a good servant but a bad master.
- What's burns never returns.
- Fire Prevention is better than fire extinction.
- Tackle a blaze before it starts.
- The best way to extinguish a fire is not have it.


KEEP EMERGENCY EXITS CLEAR AT ALL TIMES
You never Know when you might need one
FIRE EXIT
FIRE EXIT
Walkways and Fire escape routes should be kept clear at all times.
Fire exits should be clearly signed and doors should be free of any obstruction.
Fire action notices and equipment should be correctly located and available at all times to help in the event of a fire.

(11) Stair treads shall be uniformly slip resistant and shall be free of projections or lips that could trip stair users.

(12) External staircases used as fire escapes shall not be inclined at an angle greater than 45o from the horizontal

(13) Unprotected steel frame staircases shall not be acceptable means of egress; however steel staircases in an enclosed compartment with a fire resistance of 2 hrs will be accepted as means of escape.

(14) Elevators constitute a desirable supplementary facility though they are not counted as required exits. Patient's lifts shall have sufficient space for Stretcher trolley.

10.3.7 **Horizontal Exits: -**

A horizontal exit implies that the occupants will be transferred from one side of a partition to the other. Essential fire safety provisions for horizontal exits are as follows: -

(1) Width of the horizontal exits shall be same as the exit doorways.

(2) A horizontal exit shall be equipped with at least onefire/smoke door of minimum 2 hrs fire resistance of self- closing type. Further they shall have direct access to the fire escape staircase for evacuation.

(3) A refuge area of 15 Sq. Meter. or an area equivalent to 0.3 Sq Meter. per person for the number of occupants in two consecutive floors, whichever is more, shall be provided on the periphery of the floor or preferably on an open-air cantilever projection with at least one side protected with suitable railings/guards with a height not less than 1 meters.

(4) Within the aggregated area of corridors, patient rooms, treatment rooms, lounges, dining area and other low hazards areas on each side of the horizontal exit, a single door may be used in a horizontal exit given that the exit serves one direction only. Such doors shall be swinging doors or a horizontal sliding door.

(5) Where there is a difference in the level between areas connected by a horizontal exit, ramps not more than 1 in 10 meters slope shall be provided. The steps shall not be used.

(6) Doors shall be accessible at all times from both sides.

(7) A horizontal exit involving a corridor 8 ft or more in width serving as a means of egress from both sides of the doorway shall have the opening protected by a pair of swinging doors arranged to swing in the opposite direction from each other.

(8) An approved vision panel is required in each horizontal exit. Center mullions are prohibited.

(9) The total exit capacity of other exits (stairs, ramps, doorsleading outside the building) shall not be reduced to below one third of the amount that is required for entire area of the building.

10.3.8 **Exit Doors: -**

(1) Every door and every principal entrance that also serves asan exit shall be so designed and constructed that the way of Exit travel is obvious and direct.

(2) Width of the doors shall be minimum 2 meters and other requirements of the door shall comply with the NBC.

(3) Doors shall not be equipped with a latch or lock that requires the use of tool and/or key from the egress side.

(4) Where door locking arrangements are provided, provision shall be made for the rapid removal of patients by such reliable means as remote control of locks or the keys of all locks made readily available to staff who are in constant attendance.

(5) Doors in fire resistant walls shall be so installed that they may be normally kept in an open position, but shall close automatically. Corridor doors opening into the smoke barrier shall be not less than 2000 mm in width. Provision shall alsobe made for double swing single/double leaf type doors.

(6) The fire resistance rating of doors shall meet fire resistance rating of construction material.

10.3.9 **Corridors and Passageways**: -

(1) The minimum width and height of corridors and passage ways shall be 2.4 meters. The exit corridor and passage ways shall have a width not less than the aggregate required width of Exit doorways leading from them in the direction of travel to the exterior. Corridors shall be adequately ventilated.

(2) Corridor walls shall form a barrier to limit the transfer of smoke, toxic gases and heat.

(3) Transfer grills, regardless of whether protected by fusible link operated dampers, shall not be used in corridor walls or doors.

(4) Openings if required in corridor walls for specific use, shall be suitably protected.

(5) Fixed wired glass opening vision panel shall be permitted in corridor walls, provided they don't exceed 0.84 Sq. meters in area and are mounted in steel or other approved metal frames.

10.3.10 **Compartmentation: -**

(1) In buildings or sections occupied by bed ridden patients where the floor area is over 280 Sq. meters., facilities shall move patients in Hospital beds to the other side of a smoke barrier from any part of such a building or section not directly served by approved horizontal exits from the floor of a building to outside.

(2) Any section of the building more than 500 Sq. meters shall be suitably compartmented with fire resistance of not less than 2 hrs.

(3) Every story used by inpatients for sleeping or treatment shall be divided into not less than two smoke compartments.

(4) Every story having an occupant load 50 or more persons, regardless of use, shall be divided into two smoke compartments.

(5) The size of each smoke compartment shall not exceed 500 Sq. meters.

10.3.11 **Ramps: -**

(1) All ramps shall comply with the applicable requirements for stairways regarding enclosure, capacity and limiting dimensions except in certain cases where steeper slopes may be permitted wit inclination less than 1 in 8 (under no condition shall the slopes greater than 1 in 8be used).

(2) Ramps shall be surfaced with approve nonskid & non-slippery material.

10.3.12 **Service Shafts/Ducts: -**

(1) Service shafts/ducts shall be enclosed by walls with 2 hrs. and doors with 1 hr fire resistance rating. All such ducts/shafts shall be properly shielded and facilities shall be available to control fires along these shafts/ducts at all levels.

(2) A vent opening at the top of a service shaft shall have an area between one fourth and half of the area of the shaft.

(3) Refuge chutes shall have openings at least 1 meter above the roof level for venting purpose and they shall have an enclosure wall of non-combustible material with fire resistance rating of 2 hrs. They shall not be located within the staircase enclosure or service shaft and be as far away from the exit as possible.

(4) The inspection panels and doors of air conditioning shafts shall bewell fitted, with a fire resistance rating of 1 hr.

10.3.13 Openings in Separation Walls and Floors: -

(1) At the time of designing openings in separation walls and floors particular attention shall be paid to all factors that will help limit the spread of fire through these openings and the fire ratings of thesestructural members shall be maintained.

(2) For type 1 to 3 construction, a door way or opening in a separation wall on any floor shall be limited to 5.6 Sq. meters in area with amaximum height/width of 2.75 meters Every wall opening shall be protected with fire resistant doors having the fire rating of not less sthan 2 hrs. in accordance with accepted standards.

(3) Every vertical opening between the floors of a building shall be suitably enclosed or protected as necessary to prevent the spread of fire, smoke and fumes such that there is a reasonable level of safety for the occupants using the means of egress. It shall be ensured to provide a clear height of 2100 mm in the passage/escape path of occupants and thereby limitation of damage to the building and its contents.

10.3.14 **Fire Stop or Enclosure of Openings: -**

(1) Where openings are permitted for external walls they shall not exceed 3/4th the area of the wall and shall be protected with fire resisting assemblies or enclosures with a fire resistance equivalent to that ofthe wall in which these are situated. Such assembles and enclosures shall also be capable of preventing the spread of smoke and fumes through the openings so as to facilitate the safe evacuation of buildingin case of a fire.

(2) All openings in the floors shall be protected by vertical enclosures extending above and below such openings. The walls of such enclosures shall have a Fire resistance of not less than 2 hrs. andall openings therein shall be protected with a fire resisting assembly.

(3) For type 4 constructions, openings in separation walls or floors shall be fitted with 2 hrs fire resisting assemblies.

(4) Openings in the walls and floors which provide access to building services like cables, electrical wiring, telephone cables, plumbing pipe etc. shall be protected by enclosures in the form of ducts/shafts witha fire resistance of not less than 2 hrs.

(5) The inspection doors for Electrical shafts and ducts shall have fire resistance rating not be less than 2 hrs and all other service shaftsand ducts shall have a fire resistance rating not less than 1 hr.

(6) Medium and low voltage wiring in shafts/ducts shall either be armoredor run through a metal conduit. The space in between the conduit pipes and the walls/slabs shall be filled by a filler material that has a fire resistance rating of not less than 1 hr. The above parameters shall not be applied on patients and goods lift well opening.

10.3.15 Non-Structural Elements of Fire Safety: -

10.3.15.1 Underground Static Water Tank for Fire Fighting: -

Provisions shall be made for a dedicated firefighting tank, of suitable capacity as per NBC P-IV, that shall remain full at all times. However,special attention shall be given to calculating the actual capacity of thewater tank to ensure its compatibility to the installed firefighting system.

(1) A four way collecting head shall be provided at an easily accessible location near the tank.

10.3.15.2 Fire Pump Room: -

(1) Provisions shall be made to have a centralized room to house thepumps that supply water to the various firefighting systems. The pumps shall be as per NBC P-IV.

(2) The following pumps shall be installed:

(a) Jockey Pump: An electrically driven centrifugal single/two stage pump of 280 LPM capacity shall be installed to maintain the system pressure upto 7 kg/cm2. They shall be activated automatically whenever the pressure falls below 5.5 kg/cm2.

(b) Main Fire Pump: An electrically driven centrifugal Multi stage pump of 2850 LPM capacity shall be installed to feed the Fixed Fire Fighting System. Provisions shall be made for an alternate electric supply with a changeover switch for this pump.

(c) Diesel Fire Pump: A diesel driven prime mover multi stage pump of 2850 LPM capacity shall be installed to feed the Fixed Fire Fighting system in case of failure to main Fire Pump.

10.3.15.3 Yard Hydrant: -

(1) Provision shall be made to install a yard hydrant throughout the premises. The distance between two successive hydrants

shall not exceed 45 meters.

10.3.15.4 Wet Rising Mains: -

(1) A vertical rising main of G.I. C class steel pipeline with an internal diameter of 100 mm shall be provided from the ground floor to the top most floor of the hospital along with hydrant outlets fitted at the heightof 0.9 meters from the flooring at each floor.

(2) First Aid hose reels with a diameter of 25 mm and length of 45mtrs, shall be provided at each floor fitted with a 6.5mm diameter shut off type nozzle.

(3) An air release valve shall be provided at the top of the rising main.

(4) A Fire service inlet shall be provided at the ground floor.

10.3.16 Hose Box: -

(1) A glass front cabinet containing two RRL type delivery hoses, each 15 meters in length and with a diameter of 63mm instantaneous coupling fitted with associated branch pipe, shall be provided.

10.3.17 Automatic Sprinkler System: -

(1) The entire building including the basements shall be fitted with sprinklers connected to a gong bell/fire detection panel, which shallbe located in the central control room.

(2) The entire building including the basement shall be fitted with an Automatic Fire Detection and Alarm system comprising of smoke detectors, and manual call points which shall be connected to the fire alarm panel in the central control room.

(3) The sprinkler, fire detection and alarm systems shall be provided with an alternative source of power supply.

(4) Initiation of required fire alarm system shall be by manual means or by means of any detection device.

(5) An internal audible alarm shall be incorporated.

(6) Pre-signal systems are prohibited.

(7) Corridors shall have an approved automatic detection system.

10.3.18 Emergency and Escape Lighting: -

(1) Emergency lighting shall be powered from a source independent ofthe normal lighting system.

(2) Emergency lights shall clearly and unambiguously indicate the escape routes.

(3) Emergency lighting shall provide adequate illumination along escape routes to allow the safe movement of persons towards and through the exits.

(4) Emergency lighting shall be provided in a manner to ensure that fire alarm call points and firefighting equipments provided along the escape routes are readily located.

(5) The horizontal luminance at floor level on the center line of an escape route shall be not less than 10 lux. Additionally, for escape routes that are upto 2 meters in width, 50% of the route width shall be lit to a minimum of 5 lux.

(6) The emergency lighting shall be activated within one second of the failure of the normal lighting.

(7) The luminaries shall be mounted as low as possible but at least 2 meters above the floor level.

(8) Emergency lighting shall be designed to ensure that a fault or failure in any open luminaries does not further reduce the effectiveness of the system.

(9) Emergency lighting luminaries and their fittings shall be of non-flammable type.

(10) The emergency lighting system shall be capable of continuous operation for a minimum of 1 and a half hours (90 minutes).

11. Causes of Electrical Accidents & Electrical Fire: -

1. Use of old equipments and cables which are prone to cause earthleakage due to their inadequate insulation resistance.
2. Uses of undersized wires and Cables.
3. Dragging of metal plates/Street section/equipment above cables whichmay result in insulation damage/failure.
4. Repairing of electrical equipments with power on.
5. Excavating buried cables route which may contain live cables.

6. Not providing route marker.
7. Scaffolding /crane boom touching overhead lines. Haphazard way of taking power from distribution board without properplug socket and with multiple twisted joints.
8. Not using proper fuse wire in high rupturing capacity (HRC) fuse carriers.
9. Entry of moisture into switch boards.
10. Assuming low voltage to be safe.
11. Use of earth/structure as neutral or return path for glowing a bulb oroperating tools.
12. Use of protection devices with higher rating other than actual needed.
13. Wrong design of electrical installation.
14. Inadequate protection scheme.
15. Insufficient clearance for cooling and maintenance of transformer.
16. Lack of preventive maintenance of electrical system/equipments.
17. Insufficient fault isolators amounting to wrong selection of circuitbreaker/load break switch.
18. Improper bus ratings.
19. Not providing proper earthing to electrical equipments.

11.1 Causes of Short Circuits: -

1. Faulty circuit wire insulation caused due to old or damaged insulation.
2. Overloading single socket outlet by using multi pin plugs.

Note: - "Chalta- Hai" attitude - Avoid this in every place of works.

- **Always switch off all appliances wherever possibleat the mains at the end of the working day.**
- **Avoid overloading sockets by providing enough socket outlets.**
- **If you find or suspect a fault, stop using the equipments, disconnect from the electrical supply and label 'Do not use".**
- **Switch off and unplug equipments before you clean it or adjust.**

3. Use of undersized wire not enough to handle the estimate electricalload on the circuit.
4. Loose wire connection sometimes allows neutral and live wire to touch which can cause short circuit.
5. Faulty appliances wiring can occur in the plug, in the power cordsor inside the device itself.

11.2 Dealing with short circuit: -

1. locate the tripped circuit breaker.
2. Disconnect the power source before taking up electrical repair works.
3. Unplug appliances before trying to inspect or repair them.
4. Call competent/certified electrician /maintenance staff/Engineers toget the repair works as required.
5. Timely replace or repair damaged or loose electrical cords.

Note: - A Flammable items that is too close to a light fixtureor bulb is the leading factor contributing to Electrical fire.
"Give them Space"

12. Electrical Safety Precautions: -

1. Display Single line diagram, Shock treatment Chart, emergency contactphone no. etc. in electrical switchgear room.
2. Fix danger/Caution boards on conspicuous positions.
3. Keep a good first aid kit at easily accessible place and check/replacecontents at regular intervals.
4. Adopt color coding wires, green cables should be used only for earthing.
5. Locate switched in such a way that they are easily accessible duringemergencies.
6. Always follow good housekeeping.
7. Ensure availability of proper protection device in each circuit.
8. Never pull off plugs without switching off.
9. Use only three pins plug-in single-phase circuit.
10. Clearly Marks circuit breakers & switches to indicate the load/circuit.
11. Ensure overhead lines are switched off before movement of crane intheir vicinity.

Note: - 1. Never leave any wire exposed. Use Insulation Tape.
2. Get all the electrical work done only be a qualified electrician.

12. Do not renew a blown fuse, until the cause is identified and rectified.
13. Do not close any switch unless you know why it was kept open.
14. Do ask for help when need to use electrical equipments.
15. Do not touch electrical appliances or wire with WET Hands.

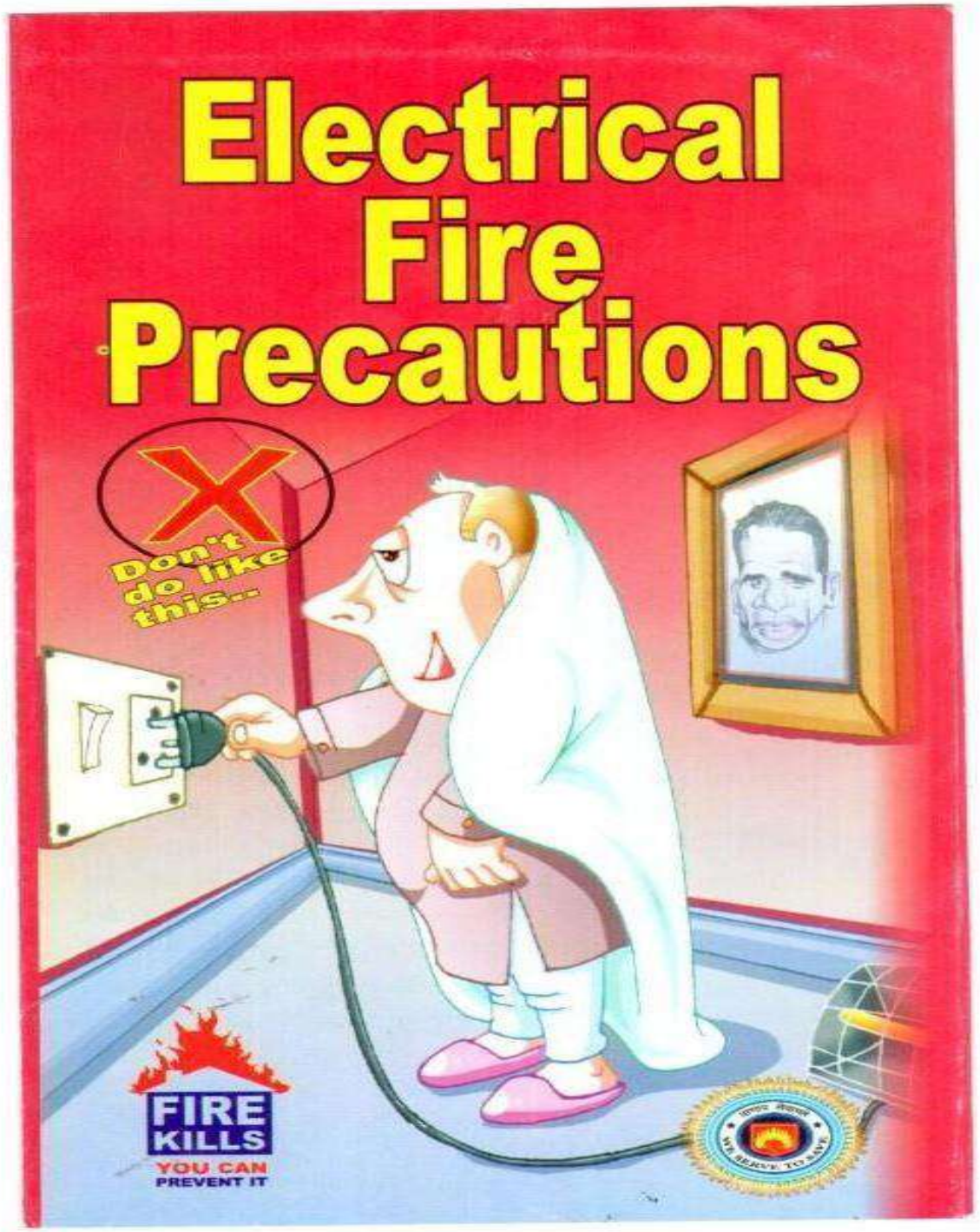
12.1 Safety tips in case of an LPG emergency or a gas cylinder leakage: -

Since LPG is combustible, it is imperative to ensure that certain measures, precautions and procedures are maintained so that there are no casualties and issues: -

- Do not panic and calm your mind.
- Open all the doors & windows for ventilation. LPG is heavier than air, and hence it tends to settle down. Opening the doors must be the first step.
- Shut off supply of gas if it is safe to do so.
- Turn off all naked flames and eliminate all sources of ignition BUT do not turn electrical switches on or off.
- Put the safety cap back on the cylinder.
- Close the regulator and burner knobs.
- Do not operate any electrical switches, appliances, or equipment in the kitchen.
- Isolate the electrical supply from the outside source as far as possible, if required.
- Call your LPG dealer/supplier for emergency assistance.
- Keep the emergency number handy.
- Try to isolate the cylinder to an open space and cover it with a wet cloth.
- Never use a lighted match stick to check leaks.
- Do not Switch off or switch on any Electrical appliances.
- Do not use electric fan to dispel the smell of LPG.

- Call the nearest dealer or contact Fire Station or take the gas cylinder to an openground and diffuse it.
- Smell a leak and prevent the fire.
- Unconnected cylinders must not be stored and valves should be switched off when the cylinder is not being used.
- Entry must be restricted to only authorized people and extra material must never be stored in the LPG storage area especially combustible ones.
- Regular maintenance, the use of BIS-standard appliances, ensuring that the safety cap on the LPG cylinder is not tampered with during delivery, and ensuring that the LPG cylinder is authentic are the main safety considerations while handling LPG.
- A gas cylinders should be stored outside in a well-ventilated area, be carried and stored upright at all times. You must ensure that valves are turned off firmly when not in use
- In case leakage cannot be controlled, the fire department must be notified immediately.
- In case of a fire, only use a D.C.P type of a fire extinguisher or call the fire station.
- If a person has inhaled the gas and experiencing difficulty breathing, immediately get them outside the incident location so that they can breathe fresh air. Ensure they are lying in a comfortable position. Administer artificial respiration if necessary.
- Gas leakages alarm/Gas leakage detector must be installed in kitchen/Canteen.
- Only authorized personnel should be permitted to enter the LPG manifold area.
- Do not Smoke inside the LPG manifold. Safety cap should be kept when cylindersare not in use.
- Do not allow match boxes, lighters, open flames, hot metal items and non-flameproof electrical appliances inside the manifolds.
- Ensure that fire extinguishers are kept in ready to use conditions and keep sufficient water near by the cylinder manifold installation.
- Maintain a Log book for keeping records of each and every activity within the LPGInstallation.
- All Vehicles except those required for emergency use should be moved away.

12.2 Electrical Fire Precautions: -



Electricity is a major cause of Fire accidents. About 60% fires are of electric origin on account of electric short circuit, overheating, overloading, use of non-standard appliances, illegal tapping of electric wires, improper electrical wiring, carelessness and ignorance etc. It can lead to serious fires and fatal accidents, if proper fire precautions are not followed. Such fire incidents can be minimized, if adequate fire precautions are observed.

This leaflet will brief about the main areas of electrical hazard in your establishments and explains how you can stop fire starting.

- Some electrical appliances are designed to be left "ON" all the time. Check the manufacturer's instructions or if you are unsure,with the shop where you bought it. All other electrical appliances should be switched off and unplugged when not in use. Remove plugs carefully, don't remove them by pulling the flexed.
- Use a three-pin plug which conforms to the Indian Standards and carries the ISI Marks.
- Overloading the socket by using several adaptors into the one socket can cause it to overheat and catch fire. Use a good quality adaptor and ensure it has the correct fuse.

12.3 WIRING A PLUG: -

- Learn the wiring colors and make sure you follow the instructionsas given by the manufactures when fitting a plug.

12.4 FUSE / MCB: -

- Always use the correct fuse / MCB for the equipments you are using and follow the manufacturer's instructions.

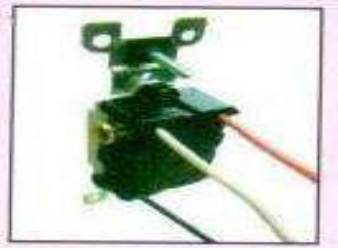
13. COOKING GADGETS: -

- Always make sure that saucepans are in a safe position. Flexes from electrical equipments, such as kettles and toasters, should be kept well away from the open fire and tea towels etc. should never be dried over the gadgets.
- Never leaver a saucepan unattended with the heat turned on and be especially careful when using chip pans with oil or fat.

- Make sure that ovens are not left on after use.

14. WARNING: -

- Look out for warning signs.
- Dangerous wiring.
- Hot plugs and sockets.
- Fuses that blow for no obvious reasons.
- Light flickering.
- Brown scorch marks on sockets and plugs. You should askyour electrician to check your wiring thoroughly if you see anyof the danger signs.



15. **HEATERS: -**

- Make sure you don't sit too close to the heater to keep warm. You could easily set light to your clothes or your chair, particularlyif you fall asleep.
- Heaters should always stand in a safe place where they cannot be knocked over and where they cannot be tripped over. They should be kept well away from furniture and soft furnishing, such as curtains and cushions. Do not position heaters where objects may fall onto them. Portable heaters should never be placed close to beds or used to dry clothes.
- As with open fires, make sure that all heaters are correctly guarded. If you have young children at establishments, make sure you use an all enclosed guard with your heater as well.

16. **Do's: -**

(i) Use ISI certified appliances.

(ii) Use good quality fuses of correct rating, miniature circuit breakers and earth leakage circuit breakers.

(iii) Use one socket for one appliance.

(iv) Switch off the electric supply of fire affected areas.

(v) Fuses and switches should be mounted on metallic cubicles for greater safety against fire.

(vi) Replace broken plugs and switches immediately.

(vii) Keep the electrical wires away from hot and wet surfaces.

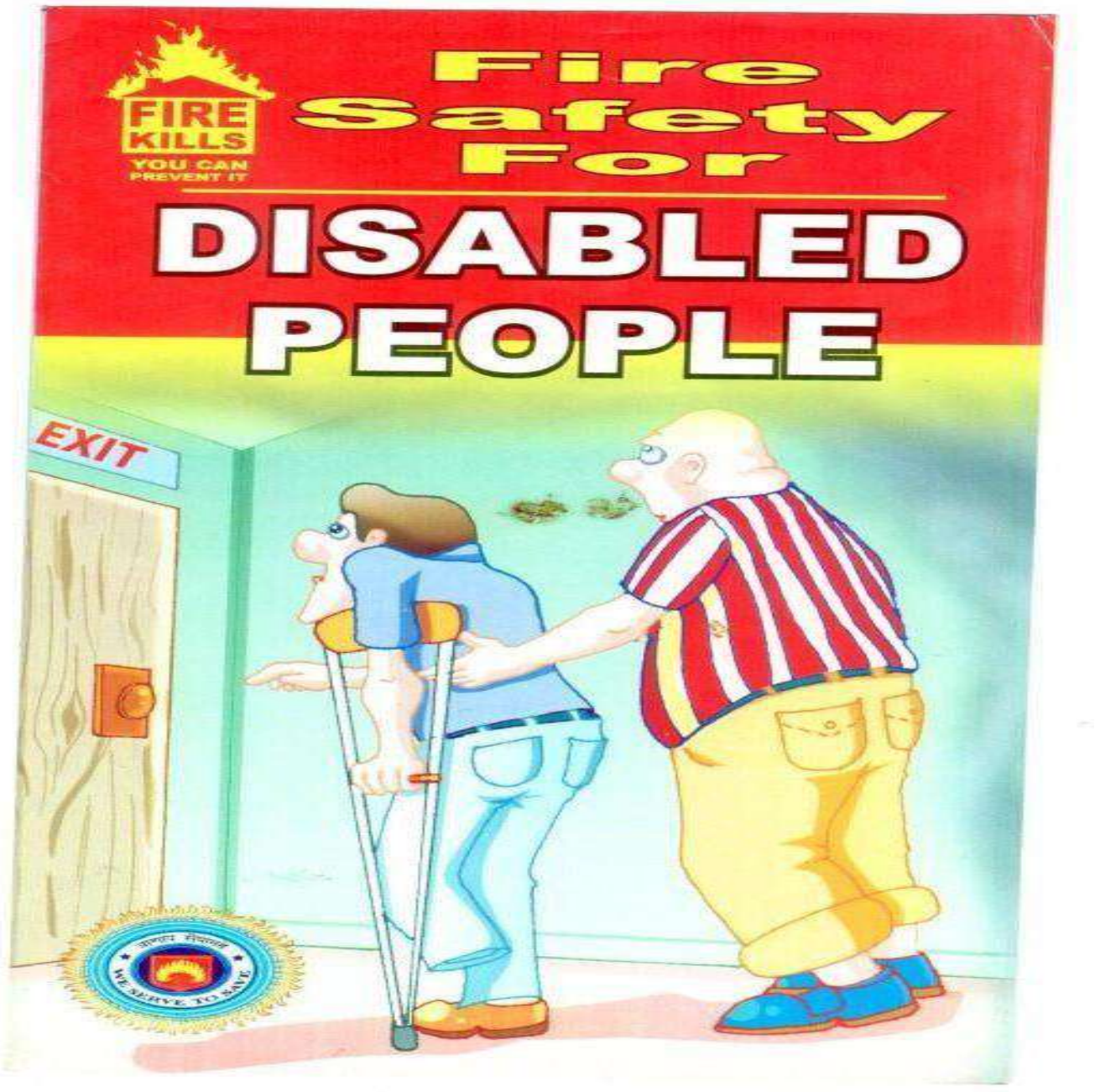
(viii) Switch off appliances after use and remove plugs from the socket.

(ix) Switch off the Main switch when leaving the premises establishments for a long duration.

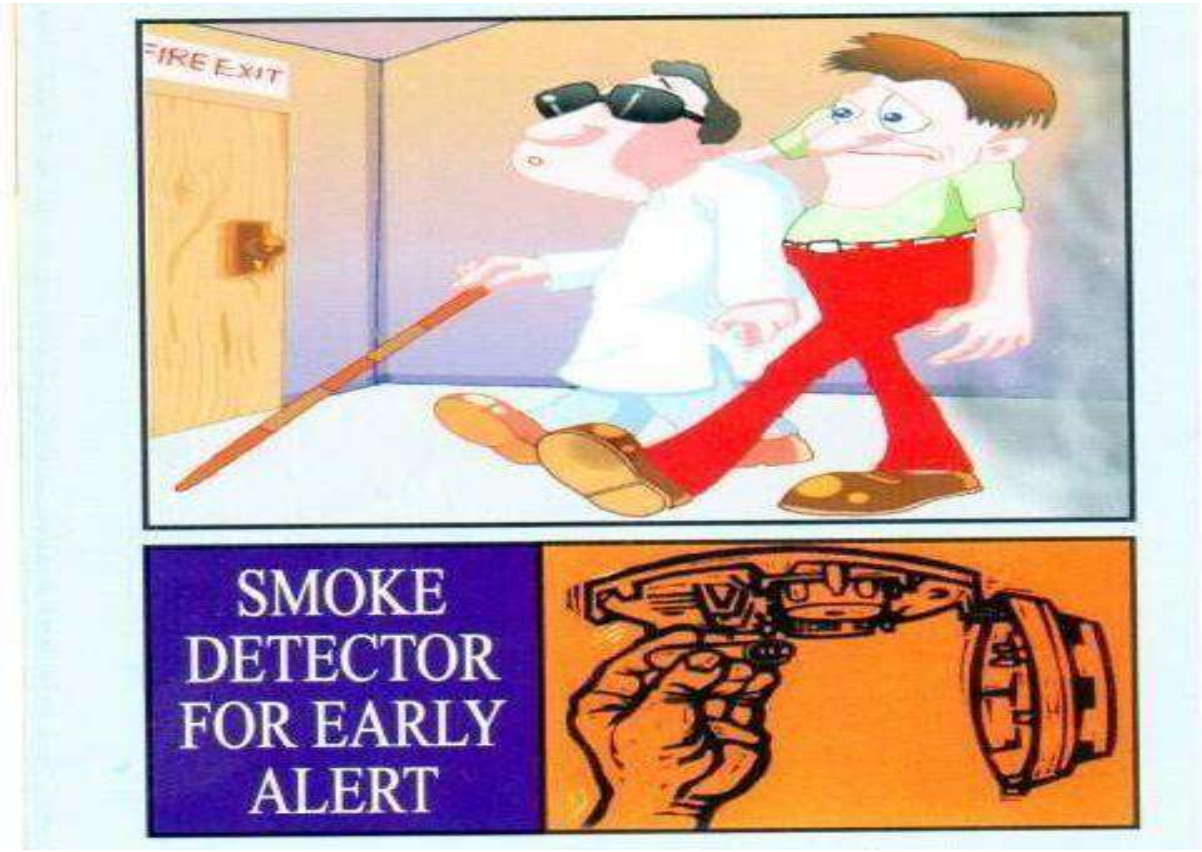
16.1 **Don'ts**: -

- Don't use substandard fixtures, appliances.
- Never have temporary or naked joints on wiring.
- Don't lay wires under carpets, mats or doorways. They get crushed, resulting in short circuiting.
- Don't allow appliances cords to dangle.
- Don't place bare wire ends in a socket.

17. Fire Safety for Disabled People: -



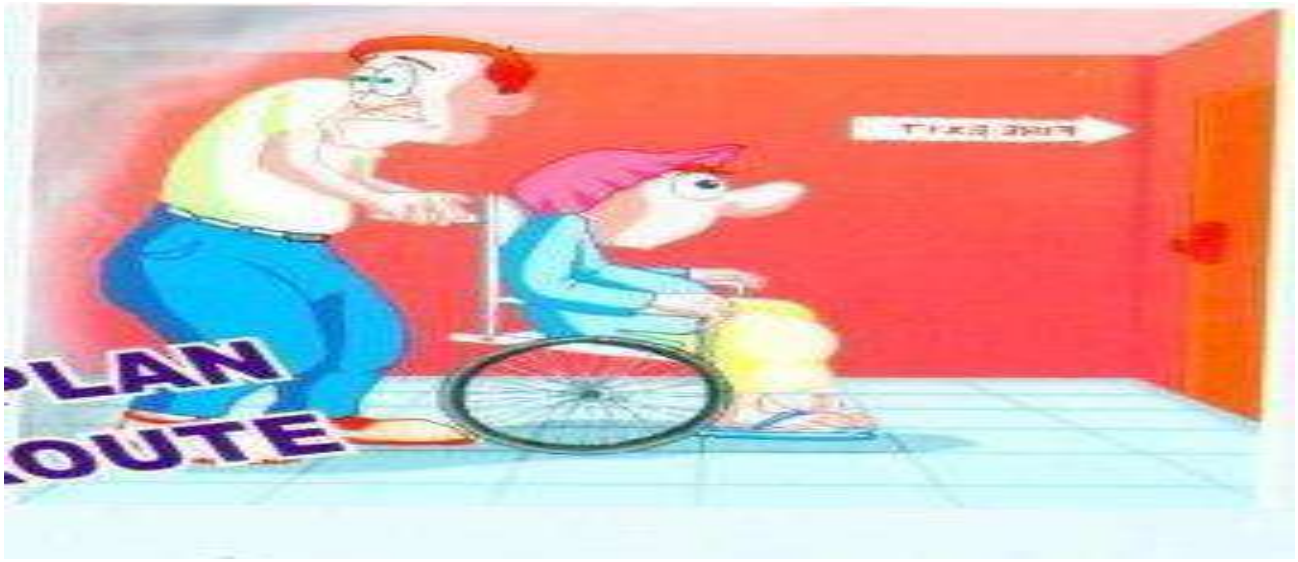
Fire safety arrangements and pre-planning can save many lives. If a fire occurs in your establishments, your chances of survival will depend on how quickly and safely you are able to get out.



- By giving an advance alert call, a smoke alarm can give you those precious few minutes of warning which would help you and your family to get out safety.
- Know at least two exits from every room. If you use a walker or wheelchair, check all exits to be sure you can get through the doorways. Make any necessary changes, such as installing exit ramps and widening doorways, to make an emergency escape easier.

17.1 **Smoke alarm for hearing Impaired People**: -

For people who cannot hear conventional smoke alarm, there are special devices available, which make use of a vibrating pad or flashing light, instead of the auditory signal. The vibrating pad alarms are particularly usefulfor deaf and blind people. If a fire occurs in your establishments you mayhave to get out in dark and difficult conditions. Escaping from a fire will bea lot easier if you have already planned your escape route and know whereto go:



- Make sure that your planned escape route is free from obstructions and that there are no loose floor coverings that could trip you.
- If you have serious mobility difficulties, you may wish to consider having your working place on the ground floor. If this is practical, it should be as near as possible to an exit way.
- If you would need assistance to make your escape, it is vital that you have some means of summoning help by your working place, i.e. buzzer, intercom or telephone.

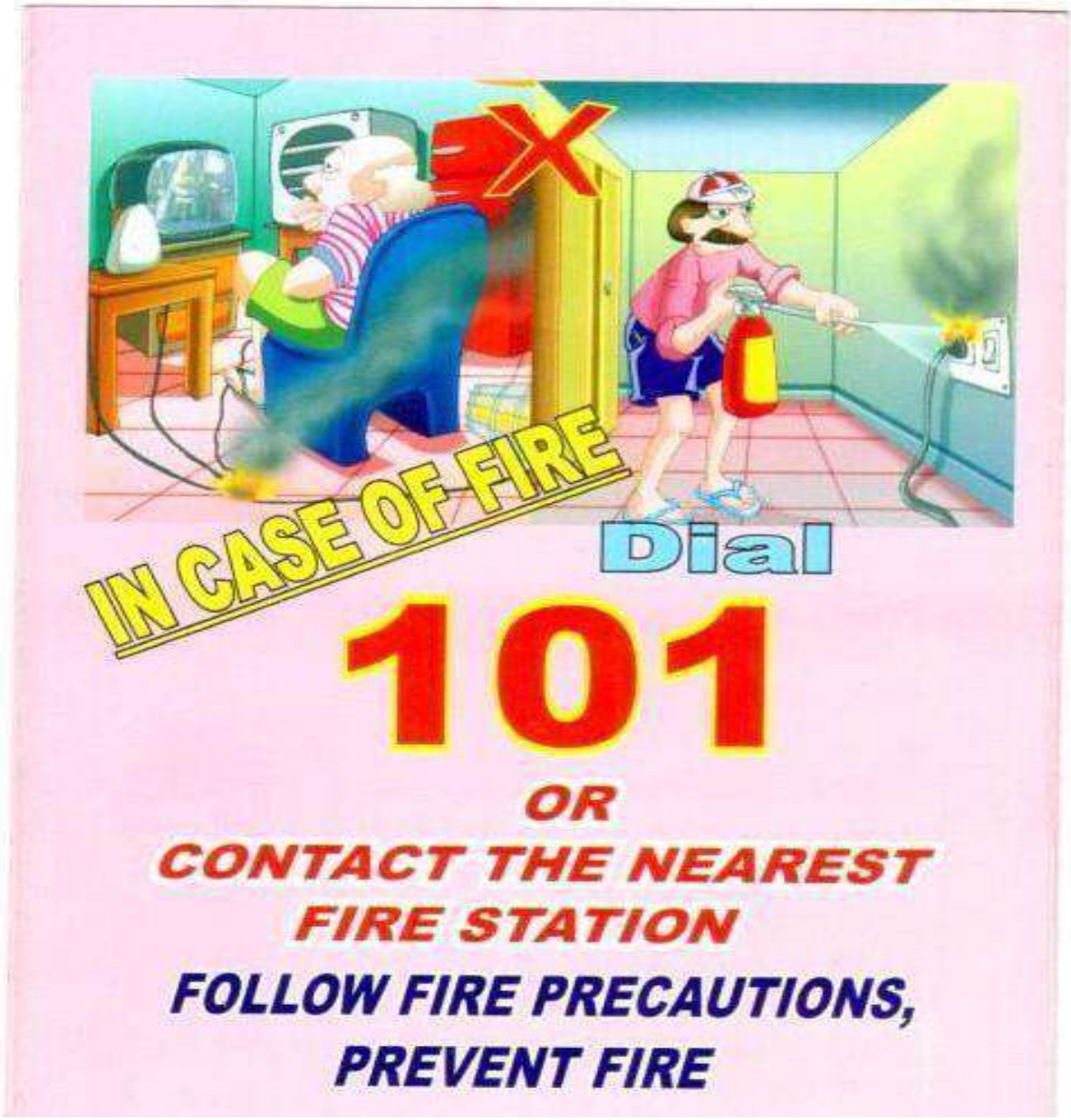
❖ 18. **What to do in Case of Fire: -**

- Before opening a closed door use the back of your hand to touch it. Don't open, if you feel hot – the fire will be on the other side.
- Get everyone out, as quickly as possible. Don't try to pick up valuables. Make your way out, as safety as you can and try not to panic. It will help you to plan your escape route now rather than waiting until the fire reaches you.
- Contact the Fire brigade. Clearly state the address of the fire.

- Never go back into the establishments/working place until a fire officer has told you it is safe to do so.

❖ 19. **If you are cut off by Fire: -**

- Try to remain calm.
- If you are unable to use the door because of flames or smoke, close the door and use towel or bed sheet to block any gaps. This willhelp stop smoke spreading into the room.
- Try to make your way to the window. If the room becomes smoky, crawl along the floor where it's easier to breathe.
- Open the window and try to attract the attention of others who can alert the fire brigade. Wait for the fire brigade to arrive.
- The fire brigade should arrive in a matter of minutes. If you are in immediate danger and your room is not too high from the ground, drop cushions or bedding to the ground below to break your fall from the window. If you can, get out feet first and lower yourself to the full length of your arms before dropping.



STOP ACCIDENTS BEFORE THEY STOP YOU!

20. Disclaimer: -

The above details are broader guidelines/advisory for information in respectof Fire safety for all works places of ESIC/ESIS. The same may neither be quoted in support/in defense of lapses, if any, found at any stage/level nor be acceptable under any circumstances whatsoever. Field unit must invariably follow the various guidelines/norms/rules/acts/by-laws as applicable in regardto fire safety as well as extent instructions of ESIC/Respective Local Authority and various other laid down procedures/norms.