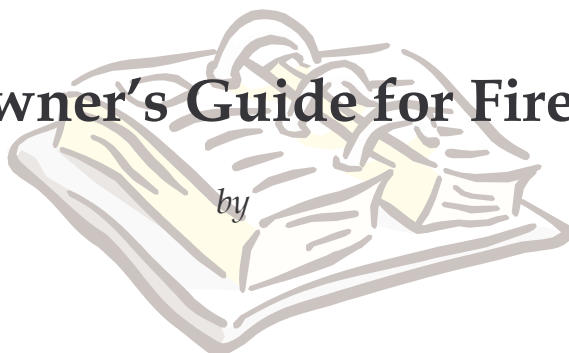


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Final Report :: C - Fire Codes
IITK-GSDMA Project on Building Codes

House Owner's Guide for Fire Safety



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- This document has been developed under the project on Building Codes sponsored by Gujarat State Disaster Management Authority, Gandhinagar at Indian Institute of Technology Kanpur.
- The views and opinions expressed are those of the authors and not necessarily of the GSDMA, the World Bank, IIT Kanpur, or the Bureau of Indian Standards.
- Comments and feedbacks may please be forwarded to:
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Let us learn about home fire safety
Guidance / Instructions Booklet

With a little care, you can prevent
these hidden dangers, and make your home —

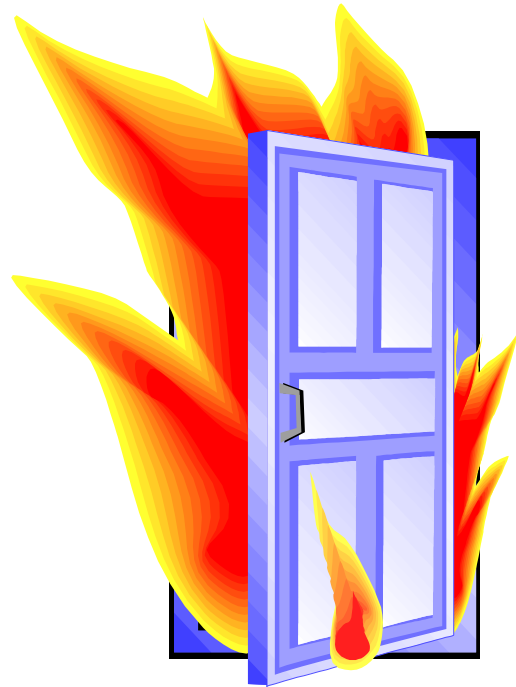
A Safe Home

The Gujarat State Disaster Management Authority



World Bank funded Gujarat Emergency Earthquake Reconstructions Programme by The Gujarat State Disaster Management Authority (GSDMA)

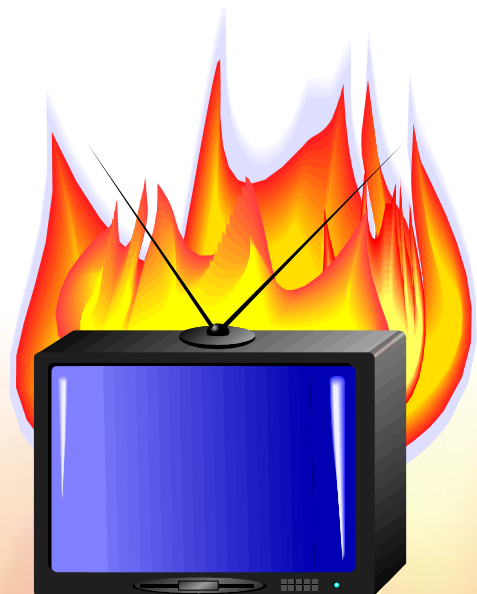
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Foreword (by GSDMA)

I am glad to know that GSDMA, with the help of experts of IIT-Kanpur has brought out this **“Home Owner’s Guide on Fire Safety”**.

Home should be the safest place on earth for a person and his family. But unfortunately a number of hazards, particularly fire start in somebody’s home and spread to the neighborhood. Sheer negligence and lack of attention to small details lead to such a situation.

Home is a place where we keep a number of gadgets, electrical and electronic to make our life comfortable. Each of them makes our life easy, but if neglected can lead to fire. This booklet is a comprehensive guide on how to take care of all such small things, which when neglected can cause a big fire. One can call it a Safety Manual that every homeowner must be conversant with.

I congratulate GSDMA on bringing out this booklet. GSDMA has been constantly striving for promoting safety as a way of life. This booklet is another step in that endeavor.

P.K. Laheri
Chief Secretary
Government of Gujarat

Preface

Concerned about the need to reduce disasters, the Gujarat State Disaster Management Authority has assigned a project to Indian Institute of Technology Kanpur, to undertake a review of building codes related to earthquakes, wind and fires. The project also envisages development of commentaries on the codes and the explanatory handbooks so as to facilitate a better compliance of the codes.

Fire causes huge losses of life and property every year. And yet, with some precaution, most fires can be prevented and damage minimized. Therefore, a suggestion was made in one of the meetings connected with the above project that a simple guide be also developed that will address the basic precautions that a common person needs to take towards fire safety. The present publication is a result of this suggestion.

The guide was developed by Ms. Sakshi Agrawal, Project Associate at IIT Kanpur under the guidance of Shri G.B. Menon, Fire Advisor (Retd.) to the Government of India. Shri Jnan Panda, Project Associate, IIT Kanpur assisted in graphics. We are thankful to the officers of GSDMA for their enthusiasm and support.

It is hoped that the readers will find the guide useful. Suggestions for further improvements in the guide will be highly appreciated and may be sent to nicee@iitk.ac.in.

Sudhir K. Jain

Professor of Civil Engineering

Indian Institute of Technology Kanpur, And
Team Leader, IITK – GSDMA Project on Building Codes

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1. Do you know?

Most fires occur in the home when people are asleep.

In less than 30 seconds a small flame can be completely out of control and turn into a major fire. It takes only one minute for thick black smoke to fill inside a house.

In a few minutes a house can be in flames, and then in another few minutes turn into ashes.



The heat from fire alone can kill. Room temperatures in a developing fire can be **60° C** at floor level and **300° C** or more at eye level. Inhaling of this hot air will scorch the lungs also.

This heat is high enough to make clothes melt on to the skin. Within less than three minutes room temperature can get so high that all the things present there ignite at once. This sudden ignition is known as **flashover**, which can be fatal to everyone present.

Fire is not bright, it can cause darkness. It starts bright, but quickly produces thick black smoke, resulting in darkness.

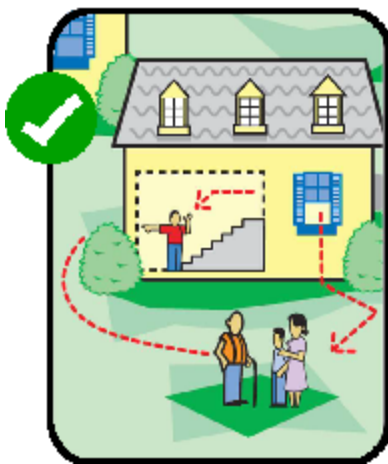


Smoke and toxic gases as a result of fire can kill more people than flames can. Fire uses up the oxygen you need and produces smoke and poisonous gases that kill. Breathing even small amounts of smoke and toxic gases can make you drowsy, disoriented and short of breath. The odourless, toxic fumes can lull you into deep sleep before the flames reach your door. You may not wake up in time to escape.

2. How to keep yourself safe?

2.1 Escape Planning

- 1) Fire can consume the entire room in which it started in just 3 short minutes.
- 2) If fire breaks out in your home, firstly get out of your house.
- 3) Inform the fire department.



- 4) In order to keep yourself safe, prepare your **escape routes**.
 - a. First of all draw a floor plan of your home.
 - b. Mark two ways out of every room. (especially the sleeping areas)
 - c. Discuss the escape route with each family member.
 - d. If your building has an **elevator** - **never include** this as a part of your escape route.

- e. Always use stairs as an escape route.
- f. If you have two-storey house, and when normal escape routes are not available, you can still *escape from the balcony or window by tying sari or clothes to any fixed objects and climbing down*.



- g. **Never open any door immediately**. First find out whether the door is hot or cold. If door is hot, do not open it and look for other alternatives to escape. If it is cold then open with caution and close it immediately, in order to stop the entry of smoke and heat to other rooms.



h. In case of heavy smoke, crawl on your hands and knees. Always keep your head 1 to 2 feet (30-60 cm) above the floor. Always maintain contact with the walls. This will help you to find out your exit easily.

i. Fix one **common meeting place** in the home vicinity where all family members can gather after escape from fire. This will help in finding if any family member is missing.



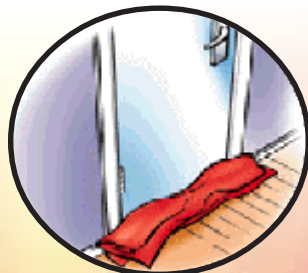
2.2 General Precautions

1) Always practice the escape plan at least twice a year.



2) Make sure that each family member can unlock the doors and windows quickly even in the dark.

3) There should be telephone connection in the room of old or disabled family members.

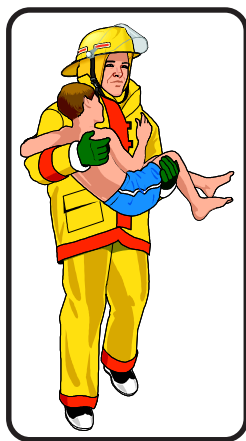


4) If you are completely trapped in the fire, close all the doors between you and the fire. Stuff all the cracks around the doors in order to keep the smoke out.



Wait near the window or any other opening and give signals for help.

- 5) Never waste time to rescue your possessions. Try to get out of the place at the earliest.



- 6) Once you are out of your home don't go back for any reason. If any family member is trapped, inform the fire fighters. They are well trained and experienced to enter the burning building.

- 7) Always remember the emergency number of nearby fire station. (101)
- 8) Always keep the exits and stairways of your building clear of furniture, toys, and other obstructions as they could slow the escape.



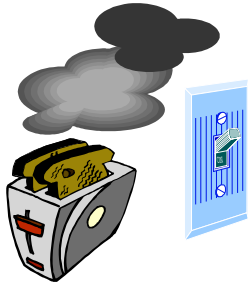
- 9) Try to buy children's sleepwear made of cotton or flame-retardant fabric.
- 10) Teach children not to hide from fire fighters in case they get struck in a building in flames.

3. Never Let Fire Enter your Home

3.1 Precautions to be taken in Kitchen

3.1.1 While Cooking

- 1) Whenever a pan containing food catches fire, never pour water on it. Always slide a lid over the pan and then turn off the burner.



- 2) If the fire starts in the stove/oven, don't use water to stop the fire. Close the stove/oven and turn off the fuel/power supply immediately. If fire gets out of control then call for the fire department (101).



- 3) **Never allow** children to play in the kitchen. Their carelessness can cause fires.



- 4) **Never leave** cooking unattended, it can lead to fire.
- 5) After every use always switch off the appliances and also don't forget to unplug them.
- 6) Built-up grease catches fire easily so always keep appliances including oven, toaster etc clean.



- 7) **Never wear** loose clothes while cooking. Also, never lean over stoves to reach for things on shelves behind or above the stove. Loose clothes can catch fire more easily.

- 8) Ladies wearing sarees and nighties should be more careful while cooking. Their dupattas or sarees are more prone to catch fire.
- 9) Always keep the pot holders, dish towels, blowing curtains etc away from the burner, as they too can catch fire very easily.

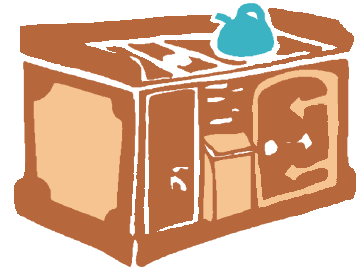




10) As oil can catch fire easily so always be cautious while cooking/heating oil. Also never leave heated oil unattended.

11) Always cook on a raised platform.

12) Never leave lighted stoves, sigris etc on the floor.



3.1.2 While using kerosene/oil stoves

1) Never pump a pressure stove too much. It may burst.

2) A stove with threads is much safer than a pressure stove.

3) **Don't refill** kerosene while the stove is burning. Refilling should be done only a few minutes after putting out the stove.

4) Always check for oil leaks in the stove. If there is leak, get it repaired or replace the stove.

5) Kerosene bottles should be kept away from the stove.



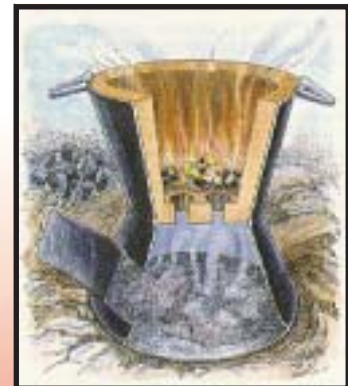
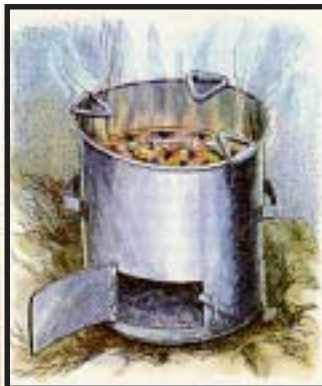
3.1.3 While using Wood or Coal Stoves (Sigris)

1) Always use **stove boards** under wood or coal stoves in order to protect the floor from heat.

2) Keep combustible items at least three feet away from the stove.

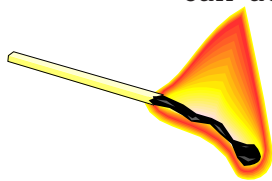
3) For **cleaning and maintenance** of stove always follow the manufacture's instructions.

4) Never ever burn trash or other items instead of wood/coal in the stove.



3.1.4 Gas Stoves

- 1) Before going to sleep at night don't forget to **turnoff** the gas cylinder valves.
- 2) Always keep valves and pipe, connecting the gas cylinder and burner, clean and change them immediately if they get cracked.
- 3) Always **use long pipes** to connect gas burners with cylinders.
- 4) Always check for gas leakage from the cylinder before buying it from gas cylinder vendors.
- 5) Those who use burners with pilot facility should always follow the manufacture's instructions for lighting the pilot. Otherwise, gas vapours can accumulate and ignite, burning your hand or face.



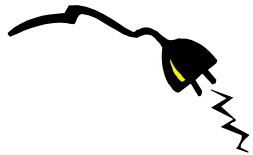
- 6) Light one match, before you turn on the gas, to prevent gas build-up. Keep flammable materials away from gas-fired appliances.
- 7) After cooking, make it a habit to close first gas cylinder valve and then the burner knob. This will help the gas remaining in the pipe to burn out.
- 8) Get the burner regularly cleaned by a mechanic.
- 9) Always keep the gas **cylinder upright**. Never keep it horizontal.
- 10) When a new cylinder is bought, check for leakage by applying soap bubbles on pipe and connections. This may be got checked through the representative who delivers the cylinder.
- 11) In case you can smell gas in the kitchen:
 - Close cylinder valve and burner knob.
 - Get out of the kitchen at the earliest leaving out doors and windows open.
 - Inform the Fire Brigade (101).



3.2 While using Electricity and its appliances

3.2.1 General Electrical Safety

- 1) Be sure all electrical appliances are in perfect working condition before using them.



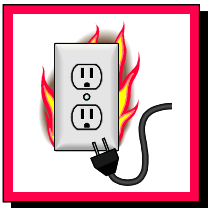
- 2) **Replace** any frayed, cracked cords immediately.

- 3) Never overload the outlets or extension cords. Overloading can lead to overheating, which in turn can start a fire.



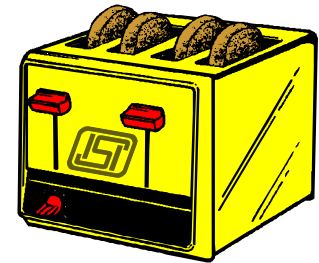
- 4) If your house uses **fuses** in the electricity supply (as against more modern circuit breakers), never use thicker wire in the fuse than specified. A thicker fuse cannot provide protection against over-loading.

- 5) Never run the extension cords under the rugs or carpets.



- 6) Defective electrical fittings and appliances must be replaced or repaired by a competent electrician. Have the electrical installations checked for serviceability and defects periodically.

- 7) Always disconnect the appliances immediately if they emit burning smell, give a feeling of tingle, or blow a fuse.

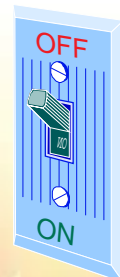


- 8) Always use the electrical appliances with **ISI mark** only.



- 9) Always provide cover on electrical outlets in order to provide protection to children. Never leave an electrical appliance in operation unattended.

- 10) Never use electrical appliances with wet hands or in wet clothes or shoes. Wet appliances can cause short circuit which can further end up with fire.

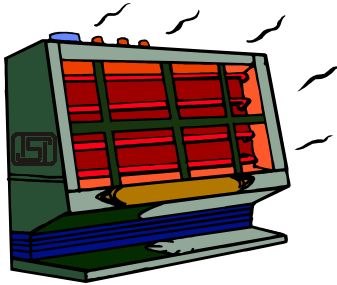


- 11) Switch off the appliances after use, and remove the plug from the socket. This applies to TV, computer, music system etc. also.

- 12) Always keep electrical appliances away from wet floors and give special attention to electrical appliances in the bathroom and kitchen.
- 13) Always **use voltage stabilizers** with automatic cut-off device or alarm for all electrical appliances.



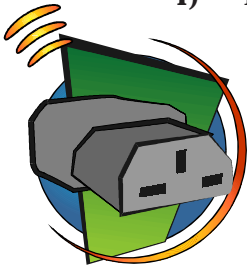
3.2.2 Electrical Heater



- 1) Always use heaters with **ISI Mark** only.
- 2) Always keep the heaters **at least 3 feet (one meter)** away from the furniture, curtains, or anything that burns.

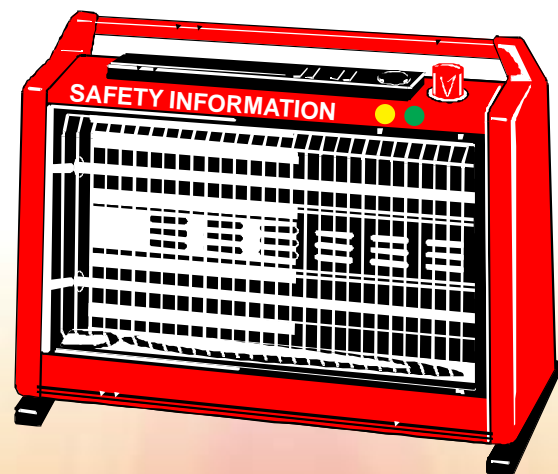


- 3) Switch off the heater before going to bed or going out of the house.
- 4) Keep children and pets away from the heater.



- 5) Well tested cords should be used.
- 6) **Replace** the frayed, cracked or damaged cords immediately.

- 7) Heater **should have** following provisions:
 - a. A safety light.
 - b. Safety information on the heater.
 - c. A power cord with safety information on it.
 - d. A carrying handle.
 - e. An overheated cut-off device.

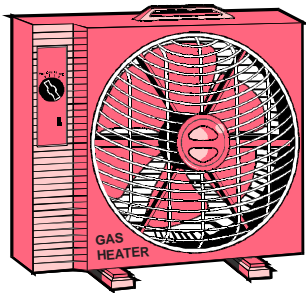


3.2.3 Liquid Fuelled Electric Appliances

- 1) Never refuel hot appliance, as it can ignite the liquid fuel.
- 2) Always refuel them outside, where spills won't cause any hazard.
- 3) Always use fuel recommended by the manufacturer.
- 4) **Never use** cheaper or lower grade fuel.



3.3 Gas Fuelled Heaters



- 1) Always check for blockage of the gas vents.
- 2) **Never install** gas heaters in small size or closed rooms as it can increase the concentration of carbon monoxide, a highly toxic gas.
- 3) Always check for gas leakage from the gas cylinders of the heater.

3.4 Smoking is bad for Health, and Can Also Cause Fires



- 1) Never discard the cigarette butts carelessly.
- 2) Never smoke in bed or when you are drowsy.



- 3) Always use large, deep ashtrays with some water in it.
- 4) Always put water on butt before discarding them.
- 5) Before leaving the home alone, always check for smoldering cigarettes.



3.5 Matches and Lighters

- 1) Never leave matches and lighters within children's reach.



- 2) Always store them at a place where kids cannot get them.



- 3) Teach children that these are not toys and kids should not play with these.



3.6 Fire Crackers

- 1) Buy only approved firework products manufactured by licensed manufacturers. Do not buy generic fireworks with no labels identifying the manufacturer.
- 2) Always read instructions carefully before burning the crackers.



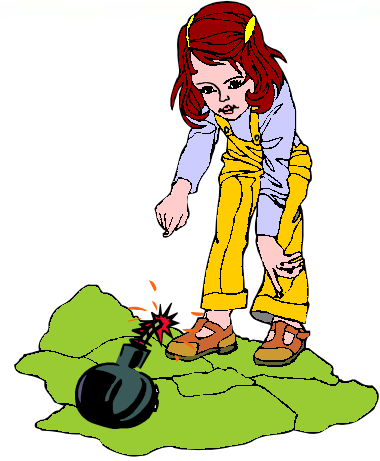
- 3) Advise children on the proper and safe usage of fireworks. Strict adult supervision is required for children to handle fireworks.
- 4) Never drink alcoholic beverages before using fireworks.



- 5) Always keep fireworks away from fire or other lighted flames or cigarettes.

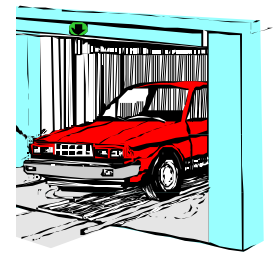


- 6) **Never pick unlit/unexploded crackers.**
- 7) **Never burn the crackers while holding them in hand. Never bend over them while lighting.**
- 8) **Always light fireworks from arms length and then immediately retire to a safe distance.**
- 9) **Do not burn the crackers near combustible or flammable objects, or near your stock of fireworks. Your stock of fireworks should be at a safe distance from your firing site and should be kept in a closed container where it won't be easily lit by wayward fireworks.**



- 10) **Always keep doors and windows of your home closed to keep away wayward fireworks from entering your house and igniting flammable objects.**

- 11) **Always keep your vehicles covered or inside the garages during this time.**



- 12) **Crackers should be burned in an open area, never inside the house.**
- 13) **Always use fireworks as provided. Never dissect or assemble your own crackers. Trying to get the powder might cause accidental ignition.**



- 14) **Spectators should always keep distance.**
- 15) **Never use candles to light fireworks. Always use long sticks.**
- 16) **Always wear cotton or denims while burning crackers. Do not wear synthetic clothing like polyester.**

- 17) **Always keep a water bucket nearby to put out fire immediately.**
- 18) **If you have doubts as to the safety of burning any of the crackers, immediately STOP that.**



3.7 Bonfires

- 1) Bonfires should not be conducted within 50 feet from any structure or any combustible materials unless fire is contained in a barbecue pit.
- 2) All conditions which can spread fire should be removed.



- 3) Always attend the bonfires until the fire is fully extinguished.

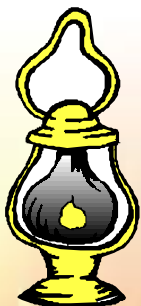
- 4) Always make sure **natural fire extinguishers** like mud, sand, and water are at least available at site. Better to have portable fire extinguishers at the place where the fire is kindled.



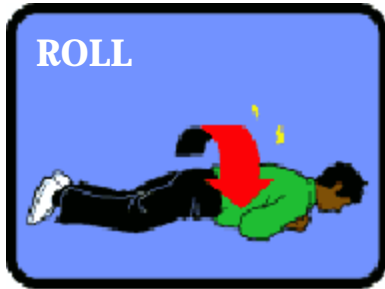
3.8. Other Hazards



- 1) Always keep attics, basements and garages clean of trashes.
- 2) During fire, the **dead trees, weeds and shrubs** surrounding the home **act as a fuel**. Therefore, these should be cut down and removed by the owner or occupant of the premises.
- 3) For religious ceremonies candles and oil lamps should be used with full precautions.
- 4) Lighted candles should not be left unattended.
- 5) Lighted candles should be securely fastened in place in order to prevent their overturning.
- 6) Always use oil lamps in which flames remain covered with side or top openings.



4. Stop, Drop and Roll and Other Tips



- 1) If your clothes catch fire, then **don't run**. Just cover your face and drop down and roll over and over to smother the flames. Running will only fan the fire.

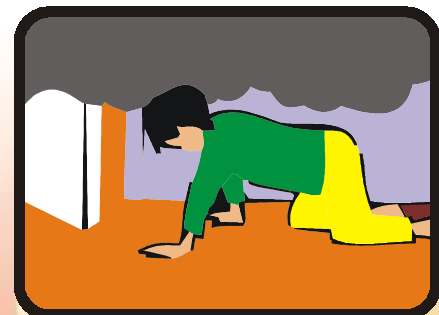


- 2) If some one else's clothes are on fire then push him or her to roll or cover the victim with blanket, coat or rug.



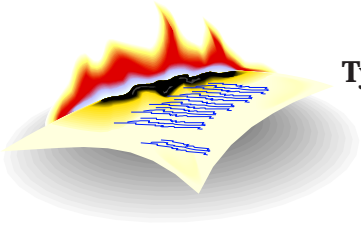
- 3) If you burn yourself, pour water over the burn till pain is less, and consult a doctor.

- 4) If you get trapped in a smoke filled room, drop down on all fours, hold your **head down** and crawl out.



5. Portable Fire Extinguishers

- 1) Different types of portable fire extinguishers are available, and they can be helpful in putting out small fires.
- 2) There are mainly three classes of fires, which can commonly occur in houses:



Type A: Ordinary fires of paper, wood, drapes, upholstery and other carbonaceous materials.

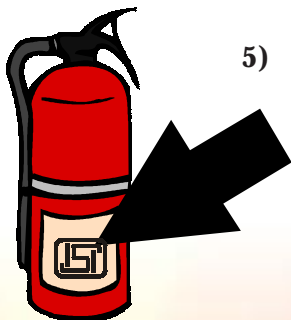
Type B: Oil fires - of fuel oil, gasoline, paint, grease, oil in frying pan, etc, and other flammable liquids.

Type C: Gaseous fires- fires by LPG gas.



Apart from the above 3 classes of fires, electrical fittings, appliances etc, can also catch fire. There is no separate class for electrical fires. Once the current is switched off, they come under any other class.

- 3) Each of the above class of fire requires suitable fire extinguisher to tackle them.
- 4) **Multipurpose fire extinguishers** are available which can tackle all the three classes fires. For fires in electrical installations switchgears etc. carbon-dioxide or such gaseous extinguishers are suitable.



- 5) Following precautions should be taken while buying a fire extinguisher:
 - a. It should bear the ISI Certification mark of *Bureau of Indian Standards*.
 - b. Make sure fire extinguishers is of correct size and is easy to hold and operate.
 - c. It should be kept at a readily accessible and prominent location.
 - d. It should be serviced and inspected at regular intervals.
 - e. **Never use** partially used extinguishers. Recharge them after every use.

6. Fire department

Dial 101 in case of fire in your home.
They are always available for your assistance.



7. Safety Checklist



a. Safety in Kitchen

Yes No Do you cook on a raised platform?

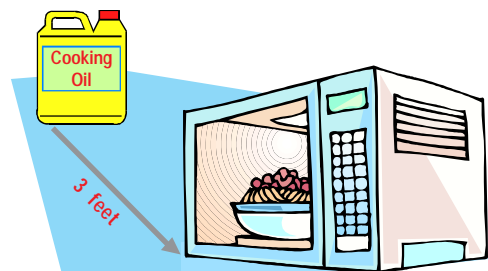
Yes No Does a grown-up always stay in the kitchen when food is cooking on the stove?

Yes No Are curtains (and other things that can burn) kept well away from the stove?

Yes No Are you cautious while cooking/heating oil?

b. Heating Safety

Yes No Do you keep all the **combustible** items atleast 3 feet away from all types of heating appliances?



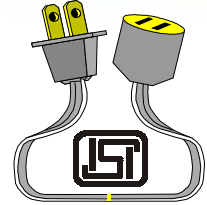
Yes No Are portable room heaters always turned off when you leave the room or go to sleep?

Yes No Do you follow manufacture's instructions for cleaning of the stoves/heaters?

Yes No Do you check for the gas/oil leak from the heaters/stoves?

c. Electrical Safety

- Yes No Are extension cords used safely? (Are they not under carpets or, across doorways?)
- Yes No Are electrical cords in good condition, without cracks or frayed?
- Yes No Do you buy electrical appliances with ISI mark?
- Yes No Do you use stabilizers with automatic cut-off device or alarm for your electric appliances?

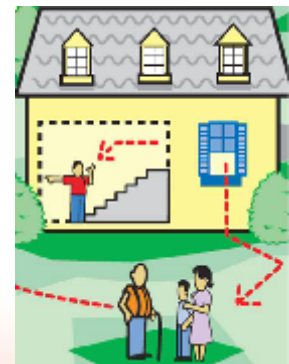


d. General Safety

- Yes No Are matches/lighters out of children's reach?
- Yes No Do you make sure that cigarette butts are discarded properly?
- Yes No Are elders present when crackers are burned?
- Yes No Do you keep bucket full of water while burning crackers?
- Yes No Do you make sure that bonfires are atleast 50 feet from any combustible items or structures?
- Yes No Do you keep portable fire extinguishers in your home?

e. Escape Route Safety

- Yes No Are all the exits in your home clear of furniture, toys and clutter?
- Yes No Does your family have a home fire escape plan that includes exits, usually a door and a window from each room?
- Yes No Do you and your family practice home fire drill?
- Yes No Does each member of your family know the fire department's emergency phone number?



HOME FIRE SAFETY

Guidance / Instructions Booklet

Prepared by

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