



أكاديمية الإمارات للدفاع المدني  
Emirates Civil Defence Academy



UNITED ARAB EMIRATES  
MINISTRY OF INTERIOR  
GEN. COMMAND OF CIVIL DEFENSE  
DIRECTORATE GEN. OF DUBAI CIVIL DEFENSE



**FIRE SAFETY  
FUNDAMENTALS  
AND PROPER USE OF  
FIRE  
EXTINGUISHERS**



**5th Edition September 2017**

**Copyright ©**

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher.

**Disclaimer**

"The content of this document has been developed by The Fire and Emergency Services Training Institute (FESTI) for The Emirates Civil Defence Academy (ECDA) part of Dubai Civil Defence (DCD). This material may be used by other training companies for educational purposes only. ECDA and FESTI accept no liability for the delivery of this material unless the training is provided by ECDA or FESTI."



# INTRODUCTION TO FIRE SAFETY



This course has been designed to provide you with simple safety tips that will help prevent fires at home and in the workplace, and to educate you on the proper usage of fire extinguishers. Every day, fires cause great loss of life and property.

They impact industries negatively by destroying businesses, and traumatise families by destroying homes. Most of these tragic incidents are preventable.

Fire extinguishers are the first line of defence against this destruction, it is necessary that everyone knows how to operate them and understands their limitations. While knowing how to use an extinguisher is vital, fire safety goes beyond just that. It includes learning how to keep your home and workplace free of fire hazards and being careful in the face of any threat.

A portable fire extinguisher can save lives and property by extinguishing a small fire or containing it until the Civil Defence arrives. Portable extinguishers, however useful, do have their limitations. Because fire grows and spreads so rapidly, the number one priority for residents and workers must be to get out safely.

In short, it is an attitude that must be lived every day, both at work and at home.



# WHAT IS FIRE ?

Fire is a rapid chemical reaction known as combustion, which occurs when fuel and oxygen interact in the presence of sufficient heat to cause ignition.



## THE FIRE TRIANGLE

The triangle is composed of three elements: fuel, oxygen and heat.



## FUEL

The word 'fuel' describes any combustible material, regardless of whether it is a gas, a liquid or a solid. Examples include wood, paper, plastic, rubber, flammable liquids and flammable gases.



## OXYGEN

The right concentration of oxygen is required to sustain combustion.



## HEAT

Heat is a form of energy termed 'thermal energy'. Sufficient thermal energy must be applied to raise the combustible material to its ignition temperature. Sparks, arcs, flames, friction all release thermal energy.





# THE FUNDAMENTALS OF PUBLIC FIRE SAFETY

Protection against fire need not be complicated. Even the simplest things can help save you and your loved ones from fire. Here are the basic steps of fire prevention:

## ELECTRICAL EQUIPMENT



### **When using electrical equipment, ensure the following:**

- The electrical appliances do not have loose or damaged cords or plugs.
- The outlets are not overloaded with plugs.
- You are not running electrical wires under rugs or heavy furniture.
- You are not overstretching an extension cord.

### **Some signs of electrical system problems:**

- You have to unplug one appliance before connecting another.
- You have to use extension cords or 'octopus' outlets extensively.
- Fuses blow or circuit breakers trip frequently.
- Lights dim when you switch on another appliance.



# COOKING FIRES



Cooking is the leading cause of fires and fire-related injuries in homes. Read the following guidelines to learn how to avoid cooking-related fires and injuries, and how to deal with cooking fires should they arise.

## To prevent cooking fires:

- Attend to your cooking at all times.
- Keep the handles of pots and pans turned in to avoid knocking them over.
- If you are wearing long, flowing sleeves whilst cooking, make sure they never contact the flame.
- Always ensure that electric cords, curtains, tea towels and oven cloths are at a safe distance away from the stovetop.
- Only barbecue outdoors, never indoors. Do not barbecue in the garage, either. While barbecuing, keep away from deck rails, tablecloths and tree limbs.

## If a cooking fire does occur:

- Smother the fire by sliding a lid over the pot or pan, or by using a fire blanket.
- Turn off the stove and if safe to do so shut off electrical or gas sources.
- For an oven fire, turn off the heat and keep the oven door shut.
- For a microwave fire, unplug the device or cut off the power and keep the microwave door shut.

## CAUTION:

- Never pour water onto a grease fire.
- Never discharge a portable extinguisher directly onto a cooking pan or pot this will only spread the fire further.
- Do not try to carry the pot or pan of grease outside this may lead to burns.
- Never leave the stove unattended.



# STORAGE



Improper storage of materials can lead to dangerous fire conditions and potential for blocked exits. Keep storage areas, stairway landings and other out-of-the-way locations free from paper waste, empty cartons, dirty rags and other flammable material.

## To prevent storage-related fires:

- Read the product labels carefully.
- Store only the things you truly need.
- Keep dangerous items out of the reach of children.
- Do not store flammable liquids or gases or other hazardous materials at home, except those that you really need.
- Keep all chemicals in their original containers.
- Flammable liquids must be kept away from ignition sources, in cool, well-ventilated areas. Limit the amount of flammable and combustible liquids to what you truly need.

# CLEANING SUPPLIES



Improper storage and use of cleaning products could lead to dangerous conditions which may include fire, explosions and health hazards. Good housekeeping habits are essential for a safe home and workplace.

## Good housekeeping habits are important because they:

- Allow you to reduce the amount of flammable and combustible materials.
- Help you reduce ignition hazards.
- Are vital to maintaining a safe evacuation plan for occupants.
- Allow for a quick emergency response.
- Keep all flammable materials, such as paper towels and cloths, at a safe distance away from heat sources.





# MACHINERY



There is a large variety of potential ignition sources in machinery. The most common are hot surfaces, like exhaust or steam pipes, overheated machinery, short-circuiting electrical installations and sparks caused by the operation of switchgears.

## To prevent machinery-related fires:

- Maintenance crews should act promptly if they spot a leakage of flammable liquids during routine service or maintenance work. The crew must clean up the area and address the problem so that the flammable liquid does not reach an ignition source.
- All machinery must contain an approved fire extinguisher of an adequate size.
- All employees must follow a standard program for maintenance, inspection and cleaning.
- Preventative maintenance is your main guard against machinery-related fires.

## CAUTION:

Always adhere to safe fuelling procedures. The extra few seconds spent on following proper techniques are insignificant when compared to the loss of expensive equipment or the many weeks or months spent in a hospital burn ward due to carelessness.





# CONSTRUCTION



Fire is a very real threat on any construction site. Usually, ignition has a simple cause, such as careless smoking, bad organisation, sloppy maintenance of electrical tools, portable heating, faulty wiring or lack of adequate fire monitoring. Another common cause of construction site fires is negligent conduct while performing hot work such as welding, cutting or grinding. Keep firefighting equipment accessible at all times, especially during construction.

## ARSON



Arson is the crime of setting fire to buildings, woodlands, vehicles or other property, with the malicious intent of causing damage. It can be distinguished from other fire causes, such as spontaneous ignition and the natural processes that lead to wildfires.

### To prevent arson:

- Train employees to secure all doors, windows, skylights and especially entrances on alleyways at the end of every working day.
- Make all windows visible from the parking lot and street.
- Keep your property well lit at night.
- Train employees to be wary of strangers and to report any suspicious behaviour immediately.
- Ask your neighbours to keep watch over your business or home when you are away.



# CARELESSNESS



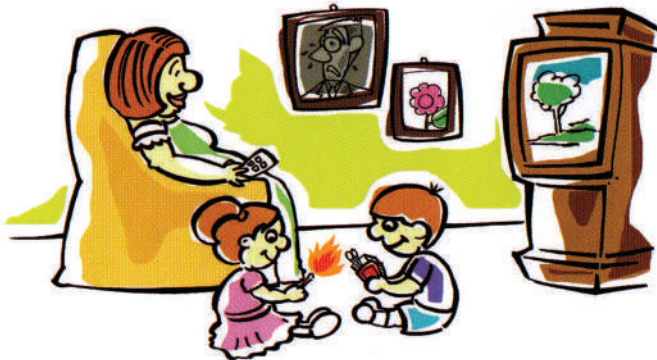
You can reduce the risk of fatal fires to a minimum by following the below simple practices.

## Carelessness

- Make sure curtains and other flammable items are well away from burning candles.
- Always pay close attention while cooking. Avoid placing flammable items near the stove.
- Take appropriate precautions when using candles.
- Avoid drug use and intoxication as they may impair your judgement.
- Use proper handling procedures for flammable or combustible liquids or flammable gases when near potential ignition sources.
- Always dispose of matches and cigarettes properly. Never leave lit cigarettes or matches near combustible materials.

## Protect your children:

- Warn children about the dangers of playing with fire.
- Keep all matches, lighters and candles out of the reach of small children.
- Teach young children to bring any matches or lighters they find to an adult immediately.
- Teach older children that matches are tools that should only be used in the presence of an adult.



# SMOKING



Cigarette smoking is the leading cause of fire deaths. The danger of smoking-related fires is not limited to the smokers themselves, but extends to their families, friends and neighbours. Most cigarette fires are instigated by improperly discarded smoking material

(cigarettes, cigars, pipes, etc.)

## **Follow these steps to prevent smoking-related fires:**

- Do not smoke in bed or anywhere you might fall asleep.
- Always smoke outdoors.
- Do not put out cigarettes in potted plants, landscaping plants or bark dust. These can very easily catch fire.
- Use a deep, sturdy ashtray or a non-combustible container that cannot be tipped over.
- Before throwing away butts or ashes, douse them with water or sand.



**DON'T BE THE CAUSE OF FIRE  
STAY SAFE !**





# NATURAL CAUSES

## 1. Intense Sunlight

can be a cause of fire. Sunlight passing through bottles, jars or glass table tops or reflecting off mirrors can set fire to furniture, paper, flammable liquids or other potential fuels.



## 2. Static electricity

An electrical charge is produced on objects when they are separated. If the charge builds up, it will develop enough energy to jump as a spark to a nearby grounded or less highly charged object. This spark can ignite flammable vapours, flammable gases or finely dispersed combustible solid materials.

## 3. Lightning

It is important to be prepared for this dangerous weather phenomenon. The areas most commonly ignited by lightning fires are roofs, sidewalls, framings, and electrical wires.



### Outdoor safety

- If you can hear thunder, you are within the striking distance of lightning. Look for shelter inside a home, large building or a hard-topped vehicle right away.
- Do not go under tall trees for shelter.
- Wait at least 30 minutes after the last thunderclap before leaving your shelter.
- If you are in or on open water, return to land and seek shelter immediately.

### Indoor safety

- Stay away from windows and doors.
- Unplug appliances and other electrical items like computers, and turn off air conditioners. If you are unable to unplug a device, turn it off.
- Avoid contact with plumbing fixtures and corded electrical devices.





# EXTINGUISHING FIRE



Fire can be controlled and extinguished by an interruption in the supply of one or more of the three elements of the fire triangle. By removing or eliminating one side of the triangle (fuel, oxygen or heat), you can extinguish the fire.

- Cool the burning material (remove heat).
- Remove the fuel (starve the fire).
- Exclude oxygen (smother the fire).
- Break the chemical reaction.



## COOLING

The most effective way to reduce the temperature of a fire is to apply water to it.

**Caution:** Never apply water to fires involving flammable liquids or energised electrical equipment.



## REMOVE FUEL

Removing the fuel source effectively extinguishes any fire.



## EXCLUDE OXYGEN

In its simplest form, this method is used to extinguish range top fires. A cover is placed on a pan of burning grease, starving the fire of oxygen and thus extinguishing it.



## BREAK THE CHEMICAL REACTION

Certain fire extinguishers expel an agent that interrupts the chemical chain reaction, thus extinguishing the fire.

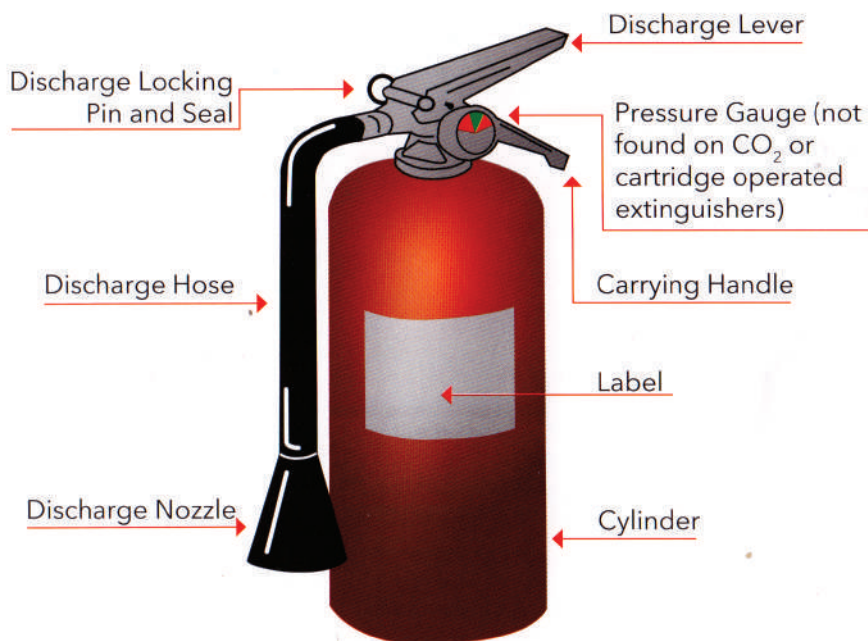


# PORTABLE FIRE EXTINGUISHER

A portable device, carried or on wheels and operated by hand, containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing fire.

To be effective, every fire extinguisher must have some means of expelling the agent by one of the following mechanisms:

- Manual pump
- Stored pressure
- Pressure cartridge



# CLASSES OF FIRE



Fires fall into one of five distinct classes. Knowing to which of these classes a fire belongs enables you to choose the appropriate extinguisher. You need to be aware of the classes of fire that each extinguisher is capable of extinguishing. The five classes of fire recognized within the UAE Fire and Life Safety Code Of Practice are A, B, C, D and K. The classes and their approved symbols are in the following chart:





<p>Class A</p> 	<p>Describes fires of ordinary combustible materials, such as wood, cloth, paper, rubber and many plastics. These fuels can be easily extinguished with water.</p>	
<p>Class B</p> 	<p>Describes fires of flammable liquids and gases. Combustible liquids, petroleum greases, tars, oils, oilbased paints, solvents, lacquers and alcohols, butane, propane and methane are the most common fuels for B class fires.</p> <p>Note: Do not attempt to extinguish fires involving pressurised flammable liquids or pressurised gases unless the fuel source can be promptly shut off.</p>	 
<p>Class C</p> 	<p>Describes fires involving energised electrical equipment.</p> <p>If safe to do so, the first step of extinguishing class C fires is to turn off or disconnect the electrical power.</p>	
<p>Class D</p> 	<p>Describes fires of combustible metals, such as magnesium, titanium, sodium, lithium, and potassium.</p>	
<p>Class K</p> 	<p>Describes fires in cooking appliances that involve combustible cooking materials (vegetables, animal oils or fats). K class fires commonly occur in commercial kitchens and food preparation facilities that use deep fryers.</p>	



# TYPES OF EXTINGUISHERS

In addition to the approved symbols from the UAE Code, many fire extinguishers throughout Dubai will feature colour coding to enable easier identification. Most commonly, a coloured band at the top of the extinguisher indicates its type. Each type of extinguisher may be found in various sizes which are appropriate for the fire hazards at their location.



## Water (Class "A")

- Red.
- Contains water pressurised with compressed air.
- Used for ordinary combustibles such as wood, paper, rubbish or textiles.
- Discharge period of 60-100 seconds.
- Effective Range: 6-15 metres.
- Not to be used on flammable liquid fires.
- Not to be used on energised electrical equipment.



## Foam (Class "A or B")

- Red with a cream band or all cream.
- Contains water and an aqueous film-forming foam additive pressurised with compressed air.
- Discharge period of 40-90 seconds.
- Effective Range: 6-9 metres.
- Used for flammable liquid fires, such as petrol, oil and paint fires.
- Must never be used on fires involving live electrical equipment.





### **Carbon Dioxide (Class "B" & "C")**

- Red with a black band or all black.
- Used on fires involving flammable liquids or live electrical equipment.
- The discharge period depends on the size of the extinguisher.
- Effective Range: 1-3 metres.



### **Dry Powder / Dry Chemical (Class "A, B, C, D")**

- Red with a blue band or all blue.
- Contains a bicarbonate base powder or specialised powders to extinguish fires of different types of metals.
- Suitable for fires involving ordinary combustibles, flammable liquids, flammable gases, live electrical equipment or metals.
- The discharge period depends on the size of the extinguisher.
- Effective Range: 3-9 metres (less for metal type extinguishers).



### **Wet Chemical (Class "A or K")**

- Red with a gold band or all gold.
- Has a liquid alkaline extinguishing agent.
- Used in kitchens on deep fryer fires involving cooking oil and other fats.
- Effective range: 2-3 metres.
- Must never be used on fires involving live electrical equipment.





# HOW TO USE A FIRE EXTINGUISHER REMEMBER P.A.S.S.



**P:** Pull the pin and hold the extinguisher with the nozzle pointing away from you. (Test the extinguisher in a safe area before proceeding).



**A:** Aim the nozzle at the base of the fire.



**S:** Squeeze the lever slowly and evenly to discharge the extinguishing agent. When the agent first hits the fire, the fire may briefly flare up (this is normal). Releasing the handle will stop the discharge.



**S:** Sweep the nozzle from side to side (to smother the burning material). Move carefully towards the fire. Keep the extinguisher aimed at the base of the fire and sweep back and forth until the flames appear to go out.



Stop and observe the fire area. If the fire re-ignites, repeat the process. If the fire stays out, back away.



# EXCEPTIONS TO P.A.S.S.

- Foam application should not involve sweeping from side to side. Create a foam blanket on the nearest side and let it spread across the burning liquid.
- CO<sub>2</sub> application requires the application to be done in a circular motion over the fire in order to displace the oxygen. You must get closer than with other types of extinguishers.
- In all cases, after extinguishment, back slowly away being careful that the fire does not re-ignite.

## FIRE BLANKET

Fire blankets are made of fire retardant material and are used to extinguish small fires. The blanket, when deposited over a fire, suffocates the flames by preventing oxygen from feeding them.

1. Pull the blanket out of the container.
2. Make sure that the fire is smaller than the blanket.
3. Hold the blanket in front of you by the top corners while keeping your hands concealed behind the blanket's corners.
4. Smother the fire by placing the blanket over the fire. Note: make sure that the blanket is covering the entire fire.
5. Do not remove the blanket for 30 minutes. Ensure that the heat source is eliminated (e.g. that the stovetop is turned off).

**CAUTION:** If the fire is not extinguished, do not attempt to retrieve the blanket



# UPON DISCOVERING A FIRE

- Sound the fire alarm.
- Inform Civil Defence **(997)**.
- If it is a small fire and you are trained, attempt to extinguish the fire and try to assist others.
- Evacuate the building.
- Do not use the elevator.
- If you are not trained in the use of fire extinguishers, close all doors and windows and leave the area.
- Gather in assembly points and perform a headcount.
- Meet the Civil Defence as they arrive and report the situation, location of fire and the number of evacuees.
- Report to DCD the number of people that did not evacuate and their last seen location.



# TO REPORT A FIRE



- **Remain Calm**
- **Call Civil Defence (997).**
- **State your name.**
- **Give your specific location.**
- **Describe the emergency.**
- **Describe the current situation.**
- **Detail any special hazards or needs, such as any hazardous materials stored on the site.**
- **State the location of non-ambulatory occupants (if any).**
- **Stay on the line unless you are told to do otherwise.**
- **Meet the Civil Defence upon their arrival to provide an update.**



# MAKING THE RIGHT DECISION



You are adequately trained.



You know what is burning.



You have the correct type and size of fire extinguisher.



The fire is not spreading rapidly.



Smoke and heat have not filled the area.



You have a clear escape path.



It is safe for you to fight the fire.

**Follow your instincts!**

## SMOKE AND HEAT

### WARNING

- Fire creates extensive heat, and dark smoke.
- Heat and smoke will rise to the ceiling and begin to fill the room from the top.
- Smoke contains carbon monoxide, hydrogen cyanide, and other poisonous gases.
- Smoke inhalation is the primary cause of death in fire victims.
- Exposure can be lessened by escaping from a smoke filled room by crawling towards your exit as near to the floor as possible.





# EVACUATION



Make sure you are familiar with your building's fire safety procedure. Know who your fire warden is and familiarise yourself with your building's different alarms. Note that some alarms will change their sound as they progress.

## Follow these simple rules:

- Remain Calm and keep others calm (no running);
- Be familiar with surroundings (Primary & Secondary Exit);
- Close all doors and windows if safe to do so (do not lock).
- Proceed to the nearest exit - not smoke or fire filled;
- Do not use the Elevator.
- Test doors with back of hand prior to opening;
- In a smoke filled room, crawl near the floor towards exit;
- If stuck in a room without an escape route, keep door closed, open window if possible and hang a towel outside to indicate your location.

## SOME FIRE-RELATED SIGNS YOU MAY SEE AROUND YOUR WORKPLACE:



# FIRE SUPPRESSION

## SAFETY TIPS

1. Select the type of extinguisher appropriate for the fire.
2. Select an appropriate angle of approach by the user, considering:
  - a. The safe and effective distance from which to fight the fire.
  - b. The movement and direction of the smoke.
  - c. After using the extinguisher, make sure that the situation is safe.

## REMINDERS

Use a portable fire extinguisher when the fire is confined to a small area, such as a wastebasket, and is not growing; everyone has exited the building; the fire department has been called or is being called; and the room is not filled with smoke.



**Remain upwind and at a safe distance from the fire.**



**Pull the pin and test the extinguisher towards the fire.**



**Remember P.A.S.S.: Pull Aim Squeeze Sweep.**



**After extinguishment, back away from the fire, watch your footing and stay safe.**



# REVIEW QUESTIONS

**1. The three elements of the fire triangle are oxygen, fuel, and heat.**

- a. True.
- b. False.

**2. Class A fires involve ordinary combustibles such as textiles, paper, plastics, rubber and wood.**

- a. True.
- b. False.

**3. In the PASS method of application, what does the "A" indicate?**

- a. Aim the nozzle.
- b. Align the handle.
- c. Alert the fire department.
- d. Activate the extinguisher.

**4. Which of the following classes of fire involves oils and greases normally found in commercial kitchens and food preparation facilities that use deep fryers?**

- a. Class A fires.
- b. Class B fires.
- c. Class C fires.
- d. Class K fires.

**5. Portable fire extinguishers are classified according to:**

- a. The cost of the extinguisher.
- b. Who is able to use the extinguisher.
- c. The types of fire for which they are intended.
- d. Whether they are for commercial or residential use.



# REVIEW QUESTIONS

**6) How does a fire blanket extinguish a fire?**

- a) By cooling.
- b) By breaking the chemical chain reaction.
- c) By excluding oxygen.
- d) By removing the fuel.

**7) Which of the following is not a source of fuel for a fire?**

- a) Wood.
- b) Oxygen.
- c) Flammable liquids.
- d) Flammable gases.

**8) Which type of extinguisher is safe to use on fires involving live electrical equipment?**

- a) Water.
- b) Carbon Dioxide.
- c) Foam.
- d) Wet Chemical.

**9) Which is the primary cause of death in victims of fire?**

- a) Smoke inhalation.
- b) Falling down stairs.
- c) Heart attack.
- d) Burn injuries.

**10) What should you do when you are evacuating a building?**

- a) Leave all doors open so others have a clear path.
- b) Use the elevators to evacuate quickly.
- c) Crawl near the floor if the room is filled with smoke.
- d) Run quickly down the stairs to escape as soon as possible.





# NOTES:

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



# NOTES:

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



# IN AN EMERGENCY

CALL POLICE:	9 9 9
CALL AMBULANCE:	9 9 8
CALL CIVIL DEFENCE	9 9 7
CALL SECURITY:	
MY BUILDING NAME:	
MY BUILDING LOCATION:	
MY EXACT LOCATION IN BUILDING:	
MY NEAREST EXIT STAIRS:	
MY ALTERNATE EXIT STAIRS:	
FIRE EXTINGUISHER LOCATION:	
MY NEAREST PULL STATION:	
MY ASSEMBLY POINT LOCATION:	
MY FIRE WARDEN IS:	



NO:



أكاديمية الإمارات للدفاع المدني  
Emirates Civil Defence Academy



UNITED ARAB EMIRATES  
MINISTRY OF INTERIOR  
GEN. COMMAND OF CIVIL DEFENSE  
DIRECTORATE GEN. OF DUBAI CIVIL DEFENSE

### OPERATING YOUR FIRE EXTINGUISHER



**P**ULL THE PIN



**A**IM AT THE BASE



**S**QUEEZE TRIGGER



**S**WEEP

**Remember:**

- Test extinguisher before approaching the fire.
- Keep low & approach with the wind at your back.
- Back away, watching for re-ignition.

### Review:

- Upon discovering a fire sound the alarm to warn everyone.
- Call 997.
- Close all doors and windows.
- Evacuate the building – DO NOT use elevators - gather in the assembly point – meet Civil Defence.
- Determine size and type of fire.
- Select proper extinguisher.
- Fight fire if safe to do so.
- Once extinguished, back away and monitor the site until Civil Defence arrives.

## USEFUL NUMBERS



997



998



999

[www.ecda.gov.ae](http://www.ecda.gov.ae)

© All rights reserved by ECDA.