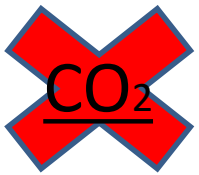
# FIRE

# *FIRE EXTINGUISHERS*

For **Class A fires**,




1.Multi-purpose dry chemical powder,
2. Foam,
3. Water

Coal,
Plastic,
Wood,
Sugar,
Paper,
Cotton etc.

SOLIDS

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For **Class B fires**,


1. Foam
2. Dry chemical powder
3. $CO_2$

Gasoline,
Oil,
Alcohol,
Paint,
Varnish,
Olive oil,
Diesel etc

Liquids

For **Class C fires,**


1. Dry chemical powder
2. $CO_2$

**Natural gas, Propane, Butane, Hydrogen, Acetylene, Carbon monoxide etc**

**Liquids**

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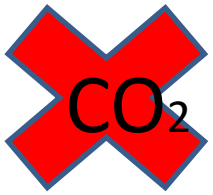
For **Class D fires,**

Dry metal powder *(Most common: Trimotoksinboraksin)*

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For **Class E fires,**

$CO_2$ and/or Halon gas

# FIRE TRAINING

- **CLASS A FIRE (Wood, paper, etc..)**

| | |
|---|---|
| • POWDER | • YES |
| • $CO_2$ | • NO |
| • WATER | • YES |

# FIRE TRAINING

- **CLASS B FIRE (liquids)**

| | |
|---|---|
| • FOAM | • YES |
| • POWDER | • YES |
| • WATER | • NO |
| • $CO_2$ | • YES |

# FIRE TRAINING

- **CLASS C FIRE (gases)**

| | |
|---|---|
| • POWDER | • YES |
| • $CO_2$ | • YES |
| • WATER | • NO |
| • FOAM | • NO |

# FIRE TRAINING

- **CLASS D FIRE; dry metal powder extinguishers**
  **(trimotoksinboroksin)**

Special Dry Chemical Powders: Chemicals developed against all metals are added to the dry powder and used to extinguish these fires.

# WATER

- ***1- Cooling :***

  - It is cheaper and easily available. In general, if water comes into contact with a burning object, it absorbs a considerable amount of heat in order to increase its own temperature. The surface of the flammable substance cools down via water, temperature decreases the burning point and the fire is extinguished.

- ***2- Asphyxiant:***

The water sprayed on the fire area evaporates by absorbing the heat and, since it is heavier than oxygen in density, it covers the flammable substance and removes the oxygen from the environment. However, when the water vapor at a certain temperature condenses, it does not play a cooler, but a heating role.

# WATER

***But;***

- Its disadvantages are transmitting electric current and slowly penetrating into the burning materials because of its high surface tension.

# WATER – EXTINGUISHERS


## Fire Classes


| | |
|---|---|
| **Vol** | · **6 lt.** |
| **Effect** | · **Cooling** |
| **Advantage** | · **Cheaper** |
| **Disadvantage** | · **Electrical conductivity** |

# Carbondioxide ($C0_2$)

-Since it is a colorless, odorless, non-conducting, heavier gas than air, it is widely used as a fire extinguisher.

- Carbon dioxide ($C0_2$) is not flammable and does not easily combine with chemical substances. Since it is gas, it easily disperses over the fire and covers the flammable substance. It sprays on the flammable material with its own pressure.

- $CO_2$ can be turned into liquid if it is cooled and its pressure is increased. Stored in high pressure tubes, CO usually becomes liquid while inside the tube. However, when it goes out of the tube, it turns into gas. The outlet temperature finds -78 degrees.

- Fuel and electrical fires are also used.

# CARBONDIOXIDE – EXTINGUISHERS ($CO_2$)


## Fire Class:

**Vol**

- **6 kg**

**Effect**

- **Asphyxiant**
- **Decreases oxygen in air**

**Advantage**

- **No pollution; can be used in computers and elektronic devices**

**Disadvantage**

- **Decreases oxygen**
- **The temperature can be (-) 78 degrees when it is sprayed**
- **Can cause cold burnings**

# Dry Chemical Powder

- Powders used in A, B, C class fires are composed of Ammonium Phosphate based compounds.

- Powders used for Class B and C fires are powders of sodium bicarbonate origin.

- Dry chemical powders melt when exposed to the hot surface during fire and become sticky and adhere on the flammable substance. This layer cuts off contact with air. It extinguishes the fire with drowning.

- Dry chemical powders are not toxic.
- However, inhalation makes it difficult to breathe.
- Because they cover the environment like fog, they can also reduce vision.

# ABC – POWDER – EXTINGUISHERS


## Fire Classes:


**vol**

- **1, 2, 6, 12, 25, 50 and 100 kg**

**Effect**

- **Asphyxiant**

**Advantage**

- **It extinguishes A, B and C class fires**

**Disadvantage**

- **Irritating to respiratory system**
- **Leaves great pollution**

# FOAM

- Foam is a chemical compound.

- It blocks the contact of the flammable substance with oxygen by covering the burning surface.
- It has cooling and asphyxiant character. Therefore, it is a good extinguisher.
- It is used in Class B fires and class A fires that cannot be controlled.

**Especially used in fuel fires.**

# FOAM- EXTINGUISHERS


## Fire Classes:


**Vol** · **6 lt.**

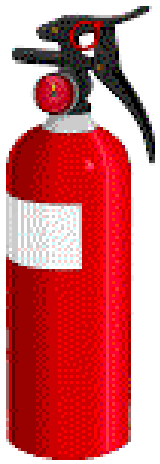
**Effect** · **Asphyxia and cooler**

**Advantage** · **Less pollution**

**Disadvantage** · **It can not be used for C – Class – fires**

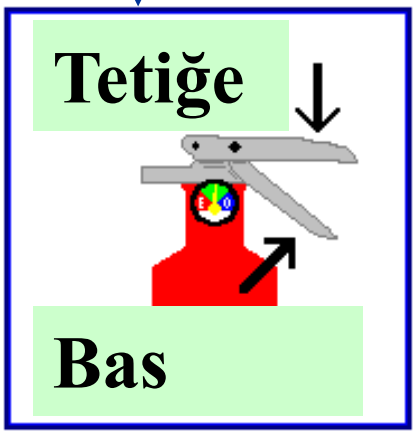
# How To Use A fire Extinguisher ?

**P**ull the pin



**A**im at base of flame

**S**queeze the tirgger

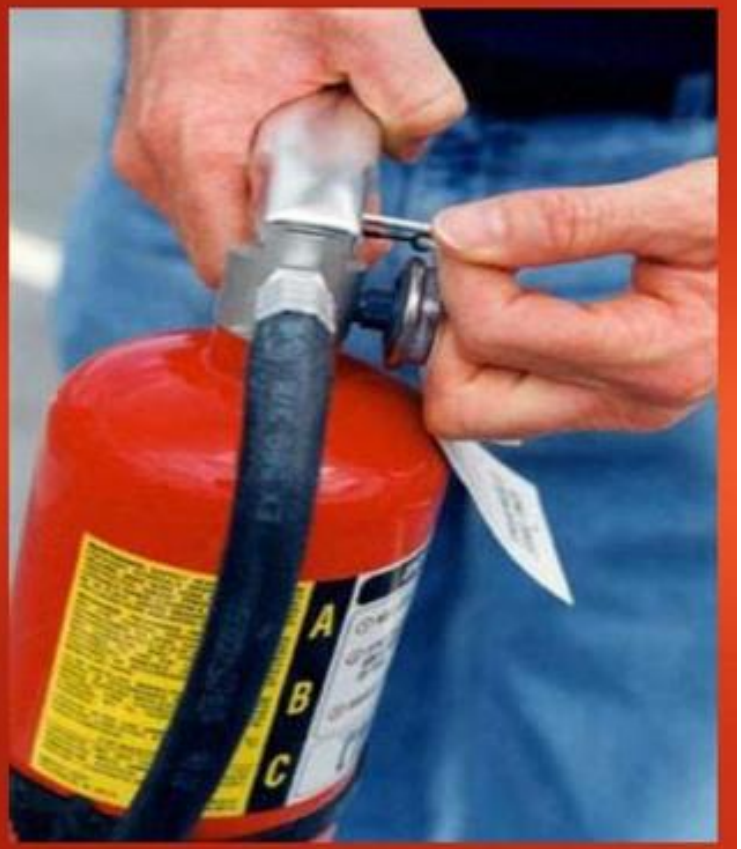



**S**weep from side to side


P → Pull
A → Aim
S → Squeeze
S → Sweep

Pull the ***Pin***…

This will allow you to discharge the fire extinguisher. The pin prevents the fire extinguisher from being accidentally discharged by squeezing the handle.



***Aim*** at the base of the fire.

Hit the fuel. If you aim at the flames the extinguishing agent will fly right through without stopping the fire.

***Squeeze*** the top handle.

Squeezing the handle opens a valve that releases the pressurized extinguishing agent from the fire extinguisher.

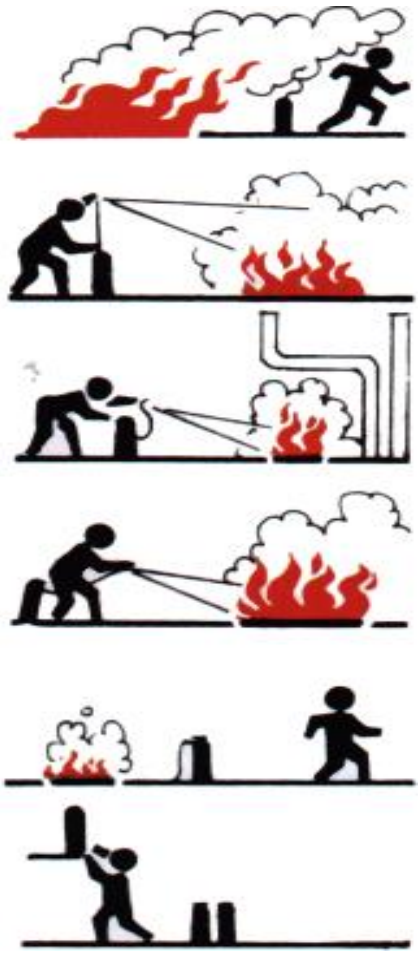
***Sweep*** from side to side.
(until the fire is completely out)

Start using the fire extinguisher from a safe distance (6-8 feet) then slowly move forward if possible.

Once the fire is out, keep an eye on the area in case it reignites.

# How To Use a fire Extinguisher ?

WRONG



TAKE THE WIND BACK

KEEP THE DEVICE BOTTOM OF THE FLAME

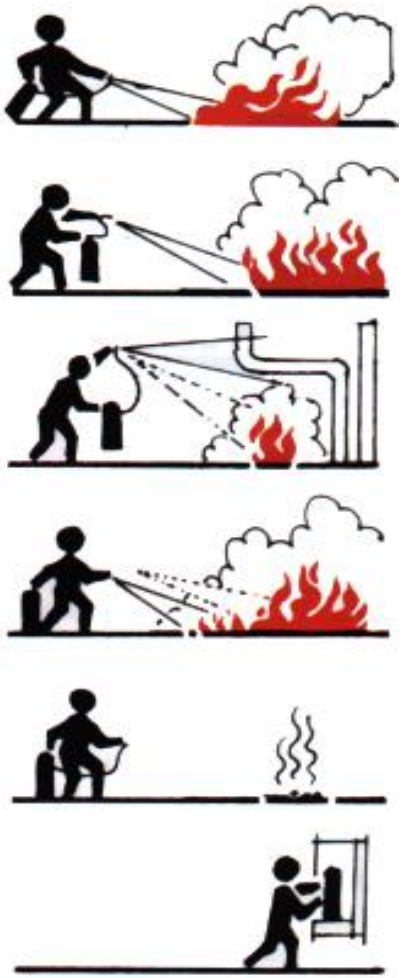
KEEP THE DEVICE WHERE FIRE BORNS

**EXTINGUISH FIRSTLY FRONT, THEN FORWARD**

**DON'T LEAVE ANYWHERE WİTHOUT COMPLETELY EXTINGUISHING**

**HANG THE DEVICE TO THE SHOULDER LEVEL**

TRUE



# FIRE FIGHTING TEAM

*What they do?*

**a) Extinguishing Team (At least 3 people):** Immediately interfere to extinguish the fire at the workplace and / or prevent its spreading,

**b) Rescue Team (At least 3 people):** To save life and property from fire,

**c) Protection Team (At least 2 people):** To protect the goods and documents rescued by the rescue team, to prevent panic and chaos that may arise due to fire,

**d) İlk Yardım Ekibi (En az 2 kişi):** Yangın nedeniyle yaralanan veya hastalanan kişilere ilk yardım yapmak.

Fire **evacuation** drills for every employee take place at **least once** per **year**.

# GOOD PRACTICE FOR EVACUATION SAFETY

## EVACUATION ROUTES

- Evacuation routes are clearly marked with lines and arrows.
- Routes are free from obstructions.

## EMERGENCY EXITS

- Emergency exits are sufficient in number and unlocked at all times.
- All emergency exits are well indicated and properly signposted.

## EMERGENCY LIGHTING


- Emergency lighting is installed along egress routes, at exits, in stairways and at other appropriate locations.
- Emergency lighting undergoes regular inspection and testing.

## EVACUATION MAP

- Evacuation maps are available in all work areas and clearly visible for everyone.
- Evacuation maps contain clear explanations and are easily understandable.

## ASSEMBLY POINTS

- Designated assembly points are outside the building and can shelter the entire workforce in case of an emergency.
- They do not interfere with emergency services.

Everybody at the factory should receive training in order to be prepared for fires and the event of an evacuation of the premises. This must be in line with the emergency response plan and address local regulations, where applicable.

## STAFF TRAINING

- All members of staff should know how to react in case of an emergency.
- Most importantly, they must know how to evacuate the premises as quick and as safe as possible.
- It is sensible to have staff trained in fighting small fires in order to respond to fires as quick as possible.

## STAFF TRAINING: EVACUATION DRILLS

- Conduct an evacuation drill for all workers at least once per year.
- An evaluation of the fire drill can point out weaknesses or hazards, and will help to steadily improve the evacuation process.

## STAFF TRAINING: LOCAL FIRE FIGHTERS

Fires are dangerous and should generally be fought by professional fire fighters. Small fires can be extinguished by employees, which have undergone a fire fighter training. It is suggested to:

- Form local fire fighting teams: one fire fighter for each section of the factory.
- Provide initial training to fire fighters, as well as regular updates, e.g. conducted by the local fire department or by a fire extinguisher supplier. Training should include the actual use of fire fighting equipment.
- Help everybody to identify the local fire fighters, e.g. by a brightly colored wristband, waistcoat or a badge and display their pictures prominently.

# COLORS AND SIGNS

| Color | Function | Typical uses |
|---|---|---|
| **Red** | Stop<br>Prohibition | Stop signal<br>Emergency stop device<br>Prohibition sign |
| | Location of fire equipment | Fire extinguisher location |
| **Green** | Security situations<br>Rescue equipment<br>Emergency room | Passing signals and emergency exits<br>Emergency showers<br>The first aid and rescue |
| **Yellow** | Caution<br>Hazard warning | Warning signs (risk of fire, explosion, radiation, toxicity, etc.). |
| **Light blue** | Obligation or prescription<br>Information (1) | Mandatory signs to bring a personal protective equipment<br>Technical safety instructions |
| (1) With the exception of alerts (see UNI 7543-3). | | |

# Prohibition Signs

A red circle with a red diagonal line through it. The pictogram is black on a white background.

**Colour:** Red

**Shape:** Circle

**Meaning:** Do not, Never, Stop, No

No fire match

No entry

Do not smoke

Do not extinguish with water

Do not touch

Do not use forklift

Do not drink

Do not touch
High voltage

# Fire Equipment Signs

Square or rectangular in shape. The pictogram is white on a red background, and will often have a white border.

**Colour:** Red

**Shape:** Square

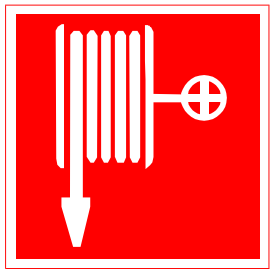
**Meaning:** Here is the fire equipment, Fire extinguishers, Fire alarm

Fire extinguisher)

*Fire extinguisher*

*Emergency fire telephone*

**Fire ladder**



**Fire hose**

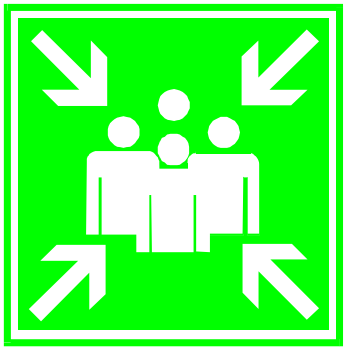
# Safe Condition Signs

Rectangular or square in share. The pictogram is white on a green background, and will often have a white border.

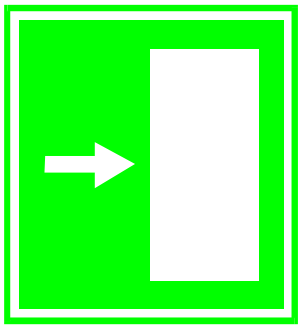
**Colour:** Green

**Shape:** Rectangle

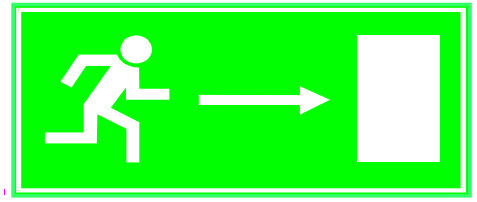
**Meaning:** Follow, This way, Escape route, First aid



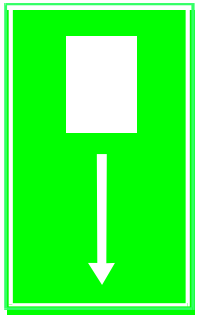
Assembly point



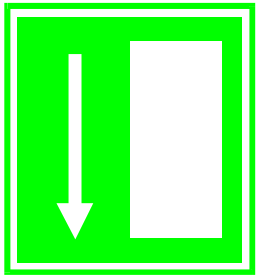
**Emergency exit**



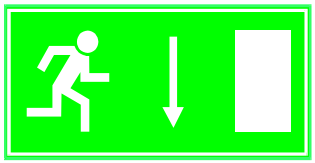
**Emergency exit direction**



**Emergency exit**



**Direction arrow emergency exit**



**Emergency exit direction**

Emergency telephone

# Warning Signs

Triangular in shape. The pictogram is black on a yellow background, the triangle has a black border.

**Colour:** Yellow

**Shape:** Triangle

**Meaning:** Warning, Be careful, Be aware

Highly flammable

Warning explosive

Warning oxidising agent

Danger electric shock risk

Warning non-ionizing Radiation

Danger acid

Danger overhead crane

Danger

Warning forklifts In operation

Warning laser hazard

Kuvvetli manyetik alan

Warning obstacle

Warning toxic

Warning Sudden drop

Warning biohazard

Warning of low temperature

Warning irritant

Radiation risk

# Mandatory Signs

Round in shape. The pictogram is white on a blue background.

**Colour:** Blue

**Shape:** Circle

**Meaning:** Do this, You must, Obey

Wear protective clothing

Use face shield

Safety harness

Safety goggles must be worn

Hand protection must be worn

Foot protection must be worn

Wear a face mask

Safety helment must be worn

Pedestrians

**If you discover a fire..**

1. **Activate** the fire alarm and/or alert other staff.
   Call fire station (110)

2. **Try to fight** the fire if it is smaller
   If safe to do so, assist anyone in immediate danger.

3. **Prevent** the **fire** from **spreading**
   Close all doors behind you to confine the fire.

4. **Leave** the fire area immediately.

   Use exit stairwells to leave the building.

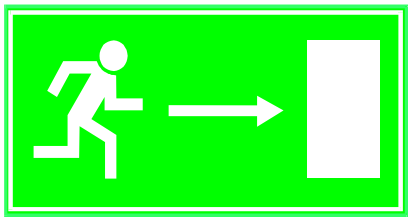
**ELEVATOR - DEATH TRAP !**

## A cautionary note on elevators:

Do not use elevator!

Do not use the elevator(s).

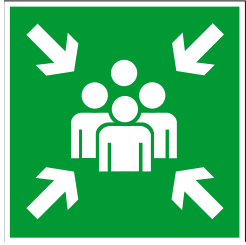
- even with walking disabilities!



Elevators could fail during a fire, earthquake or flood.

Elevator shafts may be exposed to smoke and that smoke could reach occupants.

**ASSEMBLY POINT**



in case of fire in building you should go at assembly point

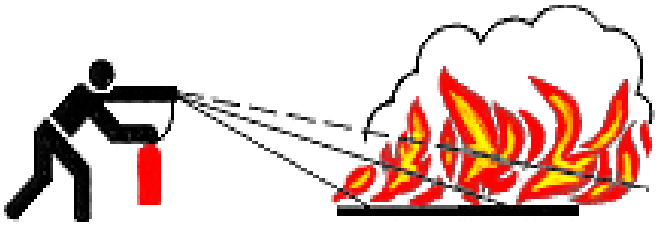
- Fire Assembly Points are temporary gathering areas where it can be immediately determined if everyone is out of the building.

The **assembly point should be** a suitable safe distance away from the **building**, far enough away to **be** clear of any possible smoke or heat being generated from the building.

**Incredible !**

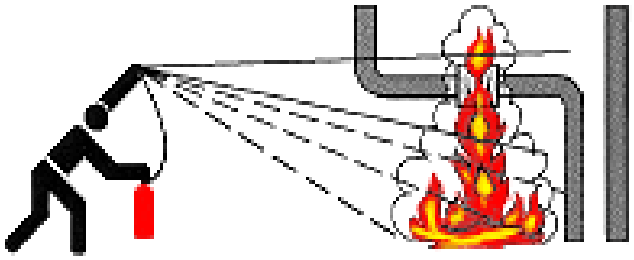
**CORRECT EXTINGUISHING ACTIVITIES**

**Yangını rüzgarı arkanıza alarak söndürünüz**

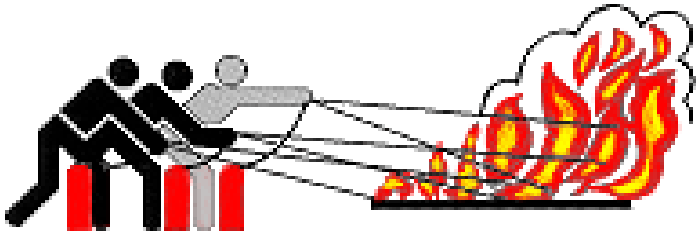


**Yüzey yangınlarını önden başlayarak söndürünüz**

# CORRECT EXTINGUISHING ACTIVITIES

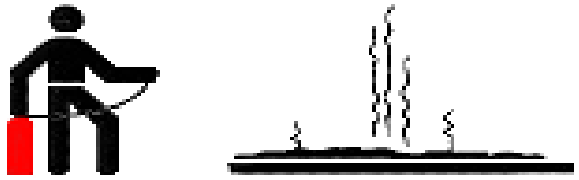


**Caution: Extinguish dripping fires from top to bottom.**



**If there are too many extinguishers, use them all at once - not in sequence!!**

# CORRECT EXTINGUISHING ACTIVITIES



**Be careful of re-ignition !!!**


**Do not leave used extinguishers in their places !!!**

***Recommended References***


https://www.youtube.com/watch?v=9igRiyURobE

https://www.youtube.com/watch?v=NC05T5c4O7Q

Bilir, N. 2016. Ministry of Labour and Social Security. Ministry of Labour and Social Security Publication Number: 62, Ankara.

https://www.osha.gov/sites/default/files/2019-03/fireprotection.pdf

Campbell, R. , Levenstein, C. 2015. Fire and Worker Health and Safety: An Introduction to the Special Issue. A Journal of Environmental and Occupational Health Policy 24(4):45-468.

http://www.firesafetyfirst.co.uk/publications/FSF%20-%20Fire%20Safety%20Manual.pdf

https://www.ailevecalisma.gov.tr/medias/4579/kitap08.pdf

https://www.ilo.org/dyn/natlex/docs/MONOGRAPH/92011/106963/F1028231731/TUR92011%20Eng.pdf