FIRE CLASSES & TYPES OF EXTINGUISHERS

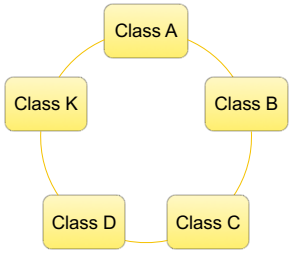
7–0

MAIN GOAL OF LEARNING 1

I can explain different classes of fire.

7–1

5 CLASSES OF FIRE



7–2

CLASS A FIRES INVOLVE ORDINARY COMBUSTIBLES.

Extinguished with:
- Water
- Water-based agents (Class A foam)
- Dry Chemicals

7–3

CLASS B FIRES INVOLVE FLAMMABLE, COMBUSTIBLE LIQUIDS AND GASES.

Extinguished with:
- Carbon Dioxide
- Dry Chemicals
- Class B Foam

7–4

CLASS C FIRE INVOLVES ENERGIZED ELECTRICAL EQUIPMENT.

Treat as Class A or B once power is off

7–5

CLASS D FIRES INVOLVE COMBUSTIBLE METALS AND ALLOYS.

- Lithium
- Magnesium
- Potassium
- Sodium

7–6

CAUTION!

The use of water or water-based agents on Class D fires will cause the fire to react violently, emit bits of molten metal, and possibly injure firefighters close by.

7–7

USE DRY POWDER, NOT DRY CHEMICAL, EXTINGUISHERS ON CLASS D FIRES.

Dry powder ≠ Dry chemical

7–8

CAUTION!

Do not use a dry chemical extinguisher on Class D fire. The dry chemical often reacts violently with burning metals.

7–9

CLASS K FIRES INVOLVE COMBUSTIBLE COOKING OILS.

Controlled by wet chemical systems, portable extinguishers

7–10

MAIN GOAL OF LEARNING 2

I can describe different types of fire extinguishers!

7–11

FIRE EXTINGUISHERS ARE ORGANIZED BY TYPE OF EXTINGUISHING AGENT AND THE METHOD USED TO EXPEL THEIR CONTENTS.

Extinguishing agent

- **Smothering** – Excludes oxygen
- **Cooling** – Reduces temperature
- **Chain breaking** – Interrupts chemical chain reaction
- **Saponification** – Forms oxygen-excluding foam

(Cont.)

7–12

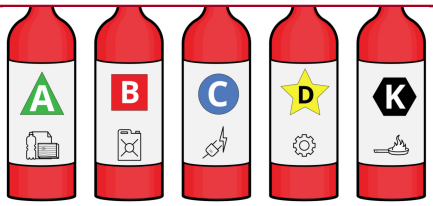
FIRE EXTINGUISHES ARE ORGANIZED BY TYPE OF EXTINGUISHING AGENT AND THE METHOD USED TO EXPEL THEIR CONTENTS.

Mechanisms to expel

- **Manual pump** – Physical pressure forces agent out nozzle
- **Stored pressure** – Compressed air or inert gas forces agent out nozzle
- **Pressure cartridge** – External expellant forces agent out nozzle when introduced to container

7–13

TYPES OF FIRE EXTINGUISHERS



- A: cloth, wood, rubber, paper, plastics
- B: gasoline, grease, oil
- C: electrical fires
- D: combustible metals
- K: kitchen fires

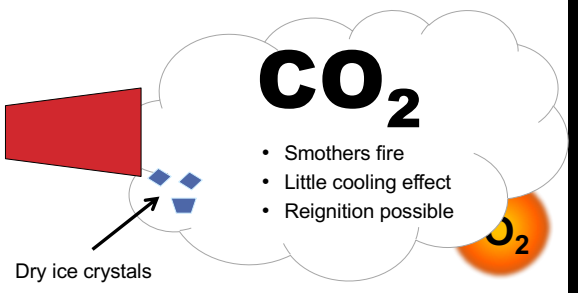
7–14

CARBON DIOXIDE (CO_2) EXTINGUISHERS DISCHARGE AS A GAS AND ARE MOST EFFECTIVE ON CLASS B AND C FIRES.

- Have limited reach
- Easily dispersed by wind
- No freeze protection required

7–15

CO_2 IS STORED UNDER ITS OWN PRESSURE AND IS DISCHARGED THROUGH A PLASTIC OR RUBBER HORN.



7–16

CAUTION!

When carbon dioxide is discharged, a static electrical charge builds up on the discharge horn. Touching the horn before the charge has dissipated can result in a shock.

7–17

OPERATE WHEELED (CO_2) EXTINGUISHERS IN THE SAME MANNER AS HANDHELDS.

Commonly found in airports and industrial facilities

7–18

DRY CHEMICAL AGENTS ARE CONSIDERED NONTOXIC AND SAFE FOR USE.

- May reduce visibility
- May create respiratory problems
- May not be compatible with foam

7–19

FOLLOW THESE STEPS WHEN USING DRY CHEMICAL EXTINGUISHERS ON CLASS A FIRES.

1. Direct discharge to cover with chemical
2. After flames knocked down, apply to smoldering area

7–20

HANDHELD DRY CHEMICAL EXTINGUISHERS COME IN TWO BASIC DESIGNS.

Cartridge-operated

- Pressure cartridge connected
- Tank not pressurized until plunger pushed

Stored pressure

- Similar to air-pressurized water
- Constant pressure around 200 psi (1 400 kPa)

7–21

CAUTION!

When pressurizing a cartridge-type extinguisher, do not place your head or any other part of your body above the top of the extinguisher. If the fill cap was not properly screwed back on, the cap and/or a cloud of agent can be forcibly discharged.

7–22

USE DRY POWDER EXTINGUISHERS ON FIRES FOR CLASS D METALS.

- No single agent works on all metals
- Comes in several models
- Apply with extinguisher or scoop
- Consult manufacturer's guide

7–23

DRY POWDER CREATES A SMOTHERING BLANKET OVER BURNING AREA.

- Apply sufficient depth
- Apply gently; do not break crust
- Avoid scattering

CAUTION!

Water applied to a combustible metal fire results in a violent reaction that intensifies the combustion and causes bits of molten material to spatter in every direction.

FOLLOW THESE STEPS IF BURNING METAL IS ON A COMBUSTIBLE SURFACE.

1. Cover fire with powder
2. Create layer of powder nearby, 1-2 inches (25-50 mm) deep
3. Spread nearby – Add more as needed
4. Leave undisturbed until completely cool

MAIN GOAL OF LEARNING 3

I can explain the considerations taken when selecting and using portable fire extinguishers.

FIRE EXTINGUISHERS RATED FOR MULTIPLE CLASSES OF FIRE ARE IDENTIFIED BY A COMBINATION OF LETTERS.

- Class A-B-C
- Class A-B
- Class B-C
- Use for intended purpose only

Ratings for each class do not affect each other

FIRE EXTINGUISHERS ARE IDENTIFIED BY COLORED GEOMETRIC SHAPES OR PICTOGRAPHS.

Class Name	Letter Symbol	Image Symbol	Description
Class A or Ordinary Combustibles	A (Ordinary Combustibles)		Includes fuels such as wood, paper, plastic, rubber, and cloth.
Class B or Flammable and Combustible Liquids and Gases	B (Flammable Liquids)		Includes all hydrocarbon and alcohol based liquids and gases that will support combustion.
Class C or Electrical	C (Electrical Equipment)		This includes all fires involving energized electrical equipment.
Class D or Combustible Metals	D (Combustible Metals)		Examples of combustible metals are: magnesium, potassium, titanium, and zirconium.
Class K or Kitchen	K (Cooking Oils)		Includes unsaturated cooking oils in well-insulated cooking appliances located in commercial kitchens.

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FIRE EXTINGUISHERS ARE CHOSEN TO ACHIEVE TWO MAIN GOALS.

Minimize risk to life and property

Effectively extinguish fire

CHOICE OF FIRE EXTINGUISHERS

Type / Extinguisher	CLASS A Combustible materials (e.g. paper & wood)	CLASS B Flammable liquids (e.g. paint & petrol)	CLASS C Flammable gases (e.g. butane and methane)	CLASS D Flammable metals (e.g. lithium & potassium)	Electrical Electrical equipment (e.g. computers & generators)	CLASS F Deep fat fryers (e.g. chip pans)	Comments
Water	✓	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✗	Can be used safely up to 1000 volts
CO2	✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✓	Use on extremely high temperatures

USE CLEAN AGENT OR CO_2 EXTINGUISHERS IN AREAS WITH COMPUTER EQUIPMENT.

Dry chemicals can be damaging

MAIN GOAL OF LEARNING 4

I can use a fire extinguisher properly!

OPERATING PROCEDURES FOR ALL FIRE EXTINGUISHERS ARE SIMILAR, BUT BE FAMILIAR WITH LABEL INSTRUCTIONS.




FOLLOW THESE GENERAL STEPS FOR USING FIRE EXTINGUISHERS.

Approach with wind at back

Pick up and carry by handles

(Cont.)

FOLLOW THESE GENERAL STEPS FOR USING FIRE EXTINGUISHERS.

Be sure agent reaches fire

Apply from appropriate distance

After fire reduces in size

- If not extinguished after full discharge, withdraw and reassess
- If solid fuel, use appropriate tool to overhaul
- If liquid fuel, appropriate foam may be necessary

7–36

REMEMBER THE FOLLOWING CONSIDERATIONS WHEN USING EXTINGUISHERS.

Extinguishers are first-aid appliances

Work in unison if more than one

Lay empty extinguishers on their side

7–37

MAIN GOAL OF LEARNING 5

I can know procedures used for the inspection, care and maintenance of portable fire extinguishers!

7–38

FOLLOW THESE GENERAL PROCEDURES FOR EVERY EXTINGUISHER INSPECTION.

- ✓ In proper location, accessible
- ✓ Nozzle/horn unobstructed
- ✓ Hose free of cracks, dirt, grease
- ✓ Shell free of damage

(Cont.)

7–39

FOLLOW THESE GENERAL PROCEDURES FOR EVERY EXTINGUISHER INSPECTION.

- ✓ Instructions are legible
- ✓ Seal and pin not tampered with
- ✓ Filled and fully pressurized; if deficient by 10% weight, remove from service
- ✓ Check inspection tag

7–40

FOLLOW THESE GENERAL GUIDELINES WHEN CARING FOR EXTINGUISHERS.

Never drop or throw

Carry according to size and weight

Remove pin only when ready to use

Store securely

(Cont.)

7–41

FOLLOW THESE GENERAL GUIDELINES WHEN CARING FOR EXTINGUISHERS.

- Lay on side when empty
- Do not store/stack items in front of wall- mounted
- Shake dry chemical monthly

7–42

CLEAN EXTINGUISHERS PERIODICALLY AND AFTER EVERY USE.

- Warm water, soap to remove dirt, grease
- Avoid solvents that damage plastic parts
- Use steel wool or sand paper to remove corrosion
- Only trained personnel should repair or refill

7–43

SUMMARY 1

Portable fire extinguishers can control or extinguish small incipient or early growth stage fires quickly in the hands of trained personnel; you must be familiar with their characteristics and be able to select and use them properly.

(Cont.

7–44

SUMMARY 2

Not only should you be familiar with their characteristics and be able to select and use them properly, you must also be able to educate the public.

7–45

SUMMARY 3

Inspecting, caring for, maintaining extinguishers assigned to your apparatus and facility are also important skills for you to have.

7–46