

## Community Emergency Response Team









### Utilities, Hazardous Materials And Fire Safety

Released: 20 January 2023

Contra Costa CERT Coalition

0

## Community Emergency Response Team

-  Personal safety is ALWAYS the number one priority
-  Show up prepared
  - Wear appropriate clothing and footwear, have WATER
  - Wear PPE – your personal protective equipment ...gloves, helmet, goggles, mask, boots, etc.
  - Have at least one communications device: cell, radio, etc.
-  Work as a team
-  Size-up - maintain situational awareness
-  The CERT goal is to do the  
**Greatest Good for the Greatest Number**
-  *Hope for the best but plan for the worst!*


Visual UHF.1


Contra Costa CERT Coalition


73


1

Unit Objectives

 Identify and reduce potential hazards from fire, utility, and hazardous materials at home and in the community

 Explain the role CERTs play in fire safety and response, including the CERT size-up process and minimum safety precautions

 Extinguish a small fire using a fire extinguisher




Visual UHF.2      Contra Costa CERT Coalition      73

2

UTILITIES

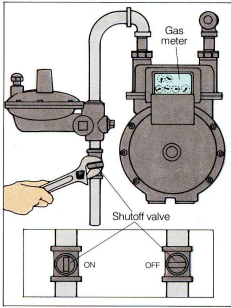
Locating and Managing Utilities  
Following a Disaster



Contra Costa CERT Coalition

3

Utilities



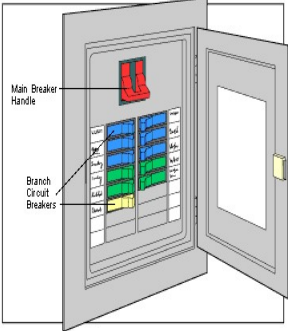
**GAS SHUTOFF**

Gas meter

Shutoff valve

ON


OFF



**ELECTRICAL PANEL**

Main Breaker Handle

Branch Circuit Breakers



**WATER SHUTOFF**

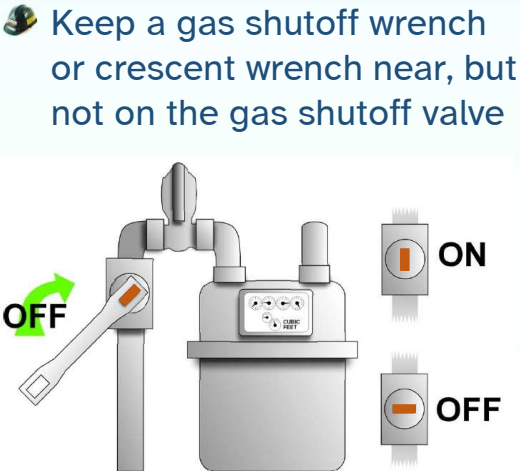
Visual UHF.4

Contra Costa CERT Coalition

73

4

Utilities




**Keep a gas shutoff wrench or crescent wrench near, but not on the gas shutoff valve**

OFF

ON

OFF



12" minimum

Visual UHF.5


Contra Costa CERT Coalition

73

5

Utilities

Automatic Gas Shutoff Valve



Two types:

➤ Excess flow

➤ Quake triggered, approximate magnitude 5.5

Installed by a licensed plumber

Visual UHF.6

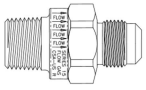
Contra Costa CERT Coalition


73

6

Utilities

Appliance Gas Excess Flow Shutoff Valve





Placed between line valve and flex line to appliance

Sized based on BTU per hour of appliance

One valve for each appliance

Installed by homeowner or a licensed plumber


Visual UHF.7

Contra Costa CERT Coalition

73

7

House Electrical Service Drop



- A Service Drop is an electrical line that carries energy from the power pole to the house.


Visual UHF.8

Contra Costa CERT Coalition


73

8


Electrical Service Devices




Electrical Meter




Service Disconnect



Generator Manual Transfer Switch



Breaker Panel



Breaker Panel with Tesla Powerwall, Grid-tied Solar Controller and Transfer Switch

Visual UHF.9


Contra Costa CERT Coalition


73


9

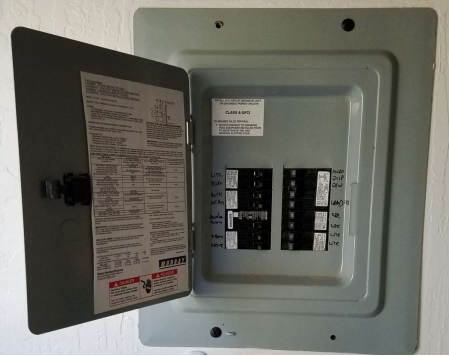
Electrical Sub-Panel

Sub-Panels

 Sub-panel acts as a waypoint between the main service panel and branch circuits down the line

 Saves money during construction

 May be found in utility closets, add-ons, laundry rooms




Visual UHF.10


Contra Costa CERT Coalition


73

10

Curb Box – Water Supply Shutoff



 Shutoff here at the supply valve in case of broken sprinkler or construction work



Visual UHF.11


Contra Costa CERT Coalition


73

11

6

House Water Shutoff

 Recommended water shutoff for inside the home is not the supply valve near the street but the shutoff valve next to the house



Visual UHF.12

Contra Costa CERT Coalition

73

12

HAZARDOUS  
MATERIALS

Identifying and Managing  
Hazardous Materials Before and  
Following a Disaster

Contra Costa CERT Coalition

13



## Home Chemistry

🧑‍🔬 When storing chemicals, use the acronym

### L. I. E. S.

🧑‍🔬 **L**imit, **I**solate, **E**liminate, **S**eparate

🧑‍🔬 Store gasoline safely



Visual UHF.14Contra Costa CERT Coalition73

14

## L. I. E. S.

🧑‍🔬 Some common household chemicals that should never be mixed or stored together:

- Bleach with Acid Toilet Bowl Cleaners
- Bleach with Vinegar
- Bleach with Ammonia
- Highly Alkaline Products with Highly Acidic Products

🧑‍🔬 Drain cleaners are frequently made from sodium hypochlorite which is chlorine bleach. Other common ingredients are acids like hydrochloric and sulfuric and caustic chemicals such as lye and caustic soda



Visual UHF.15Contra Costa CERT Coalition73


15



### Getting Rid of Chemicals

*Need to get rid of 'stuff' ?*

-  Household hazardous waste disposal is possible for residents, normally **AT NO CHARGE**, at many places in the Bay Area. For the nearest location, search the web for "Household Hazardous Waste"
-  Fire extinguishers that are no longer in use are considered Hazardous Waste by Federal Law and must be taken to a hazardous waste disposal site. Most fire departments cannot accept used extinguishers



Visual UHF.16      **Contra Costa CERT Coalition**      73

16

### Should I Eat / Drink That ?

 **Poison Control**

- Toddler, dog or you eat pills?
  - People – (800) 222-1222 (free) [Poison.org](https://www.poison.org)
  - Animals – (888) 426-4435 (not free, \$65.00)



Visual UHF.17      **Contra Costa CERT Coalition**      73

17


Old Drugs

Disposal of unused medications / old pills

Disposal of pharmaceuticals into sewers has become a serious public health concern. It can allow medications to make their way into regional water sources by passing through wastewater treatment plants

There is disagreement between the FDA and most local sanitary districts. **Most local districts say do not flush**

Many local law enforcement offices and pharmacies have collection boxes for unwanted drugs



Visual UHF.18

Contra Costa CERT Coalition

73

18

Hazardous Materials





Are toxic to humans, animals or the environment through absorption, inhalation, injection or ingestion

THE GOLDEN RULE OF HAZMAT: If you have not yet identified the substance, treat it like it's **ETHYL METHYL NASTY STUFF**. Stay away from it. Don't poke it, look at it the wrong way or insult it. Report your finding and let professionals handle the rest.

Visual UHF.19

Contra Costa CERT Coalition

73

19

### Hazardous Materials

#### Building Placards

Blue = Health  
Red = Flammability  
Yellow = Instability  
White = Special hazard

4 = Severe Hazard  
3 = Serious Hazard  
2 = Moderate Hazard  
1 = Slight Hazard  
0 = Minimal Hazard  
W = Use NO WATER  
OX = Oxidizer  
SA = Simple Asphyxiant

Visual UHF.20

Contra Costa CERT Coalition

73

20

### Hazardous Materials

#### Examples of building placards

The NFPA 704 diamond provides information to first responders and are typically located outside buildings, on doors, or on tanks, and visible to emergency responders during spill or fire.

Visual UHF.21

Contra Costa CERT Coalition

73

21

### Hazardous Materials Identification

#### Global Harmonized System on Containers



**Skull and Crossbones**  
Acute toxicity via oral, dermal, or inhalation



**Flame Over Circle**  
Oxidising substances



**Health Hazard**  
Aspiratory or respiratory hazard, carcinogenicity, mutagenicity



**Environment**  
Hazardous to the environment



**Exploding Bomb**  
Explosives, self-reactive substances, organic peroxides



**Gas Cylinder**  
Compressed, liquefied, or dissolved gases



**Flame**  
Flammable, pyrophoric, self-heating substances, water reactive



**Corrosion**  
Corrosive, skin damage, eye damage



**Exclamation Mark**  
May cause immediate health effect - eye, skin, respiratory

HazCom GHS labels that are on chemical containers provide information about hazards to workers using hazardous chemicals under normal conditions of use.

Visual UHF.22


Contra Costa CERT Coalition

73

22

### HazMat in Storage

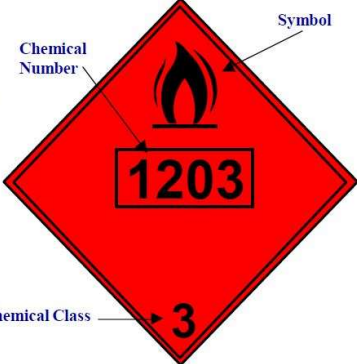
#### UN and NA Placards



Symbol

Name

Chemical Class



Symbol

Chemical Number

Chemical Class

Visual UHF.23












Contra Costa CERT Coalition

73

23

### HazMat in Transit

#### Vehicle Placards

Orange	Red	White	Red	Red & White	
					
					
Red & White	Blue	Yellow	White	Yellow & White	Black & White

Visual UHF.24


Contra Costa CERT Coalition

73

24

### Hazardous Materials

🚒 Example of vehicle placard



Chemical code 1203 is Gasoline

Visual UHF.25

Contra Costa CERT Coalition


73

25

### Hazardous Materials Response

**Most important:** Remember **S. I. N.**

-  **S**afety: Safety is the Number 1 priority
-  **I**solate: Keep people out of the area
-  **N**otify: Get help, document what you see




Visual UHF.26

Contra Costa CERT Coalition

73

26

### Hazardous Materials



**Remember:**

All hazardous material placards are a stop sign for CERT volunteers!

Visual UHF.27


Contra Costa CERT Coalition

73

27

### Hazardous Materials

🚒 Question: Who carries hazardous materials on a regular basis and does not have to have placards on their vehicles?



Visual UHF.28


Contra Costa CERT Coalition

73

28

### Hazardous Materials

🚒 Answer:



Visual UHF.29

Contra Costa CERT Coalition

73

29



# FIRE SAFETY

Reducing Fire Hazards and  
Putting Out Fires

Contra Costa CERT Coalition

30

## The Fire Triangle

Three things must be present at the same time to produce fire:

1. **Oxygen** to sustain combustion
2. **Heat** to reach ignition temperature
3. **Fuel** or combustible material

Together, they produce the chemical reaction that is fire

Take away any one of these things and the fire will be *extinguished*



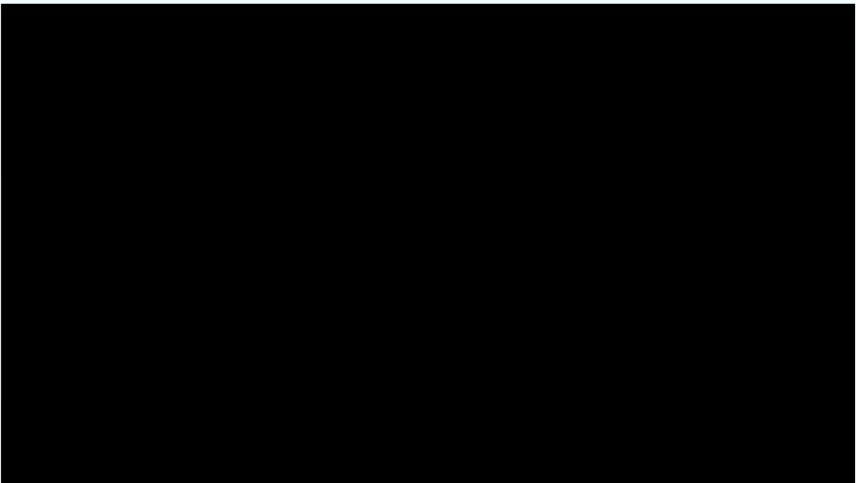
Visual UHF.31

Contra Costa CERT Coalition

73

31

Flashover Video




Visual UHF.32


Contra Costa CERT Coalition


73


32

Reduce Fire Hazards

 Never leave a pan unattended

 If things go wrong, don't panic !

 Turn off the heat if it is safe to do




Visual UHF.33


Contra Costa CERT Coalition


73




33

Reduce Fire Hazards

 NEVER use water on oil or grease

 Use a cookie sheet to smother flames

 Put a lid or slide the cookie sheet over the top of the pot




Visual UHF.34



Contra Costa CERT Coalition

73

34

Reduce Fire Hazards

 Don't be a "pack rat"



Visual UHF.35

Contra Costa CERT Coalition

73

35

Reduce Fire Hazards

HOMEOWNER ASLEEP

HEATER TOO CLOSE TO BED

UNDERSIZED EXTENSION CORD

3 feet from the heat

Visual UHF.36

Contra Costa CERT Coalition

73

36

Reduce Fire Hazards

Avoid the “electrical octopus”

A photograph showing a wall outlet with several electrical cords plugged into it. A fire is burning out of the outlet, illustrating the danger of overloading a circuit.

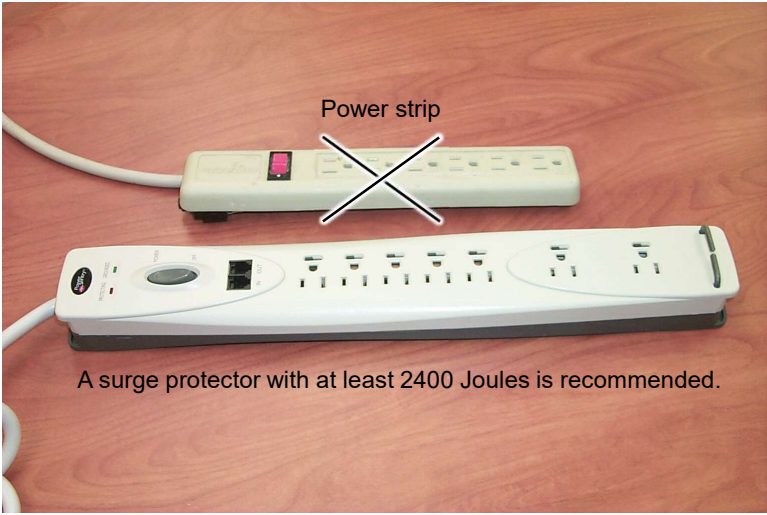
Visual UHF.37

Contra Costa CERT Coalition

73

37

Reduce Fire Hazards



A surge protector with at least 2400 Joules is recommended.

Visual UHF.38

Contra Costa CERT Coalition

73

38

Reduce Fire Hazards



Be “firewise” around your home and neighborhood  
[www.firewise.org](http://www.firewise.org)





Visual UHF.39

Contra Costa CERT Coalition

73

39

## Natural Gas, Carbon Monoxide and Propane

-  Natural gas is *lighter* than Air
  - Accumulates near the ceiling
-  Carbon Monoxide (CO) is *almost same* as Air
  - Diffuses into the air
  - Rises slowly in warm air currents
-  Propane is *heavier* than Air
  - Accumulates near the floor
-  All are Asphyxiants and displace oxygen in the lungs and blood




Visual UHF.40

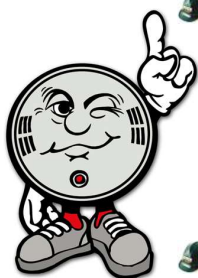
Contra Costa CERT Coalition

73

40

## Smoke and CO Detectors

-  Most house fire victims die from smoke or toxic gases
-  Install carbon monoxide detector
  - CA State Law effective July 1, 2011
  - CO results from incomplete burning of organic matter including all petroleum products
    - Gasoline
    - Natural gas
    - Propane
-  Test batteries for natural gas and carbon monoxide detectors every month
  - Change batteries every 6 months
  - New models have 10 year batteries



Visual UHF.41

Contra Costa CERT Coalition

73

41

Fire Detection - Smoke Detectors



Is one enough?

PLACE ONE SMOKE ALARM ON EVERY FLOOR AND IN EVERY SLEEPING ROOM

MULTI-STORY



SINGLE LEVEL - 1 Floor



Visual UHF.42

Contra Costa CERT Coalition

73

42

Fire Safety

Plan and practice 2 fire escape routes

Once you're out, stay out !

Don't go back in

Use the **back** of your hand to feel for heat





Visual UHF.43

Contra Costa CERT Coalition

73

43



### Fire Suppression Resources

- Local fire department
- Fire alarm systems
- Sprinkler systems
- Interior wet standpipes with hose
- Portable fire extinguishers



Visual UHF.44

Contra Costa CERT Coalition

73

44

### CERT Fire Size-up

- Size-up is the on-going evaluation of problems confronted within any emergency situation
- Size-up starts with the recognition of the emergency and continues until the emergency is under control. This process is carried out many times and by many different individuals at each emergency event
- The responsibility for size-up initially lies with the first responder that arrives on scene


Visual UHF.45

Contra Costa CERT Coalition

73

45

All CERT Size-up



**REMEMBER:**  
ALL CERT  
SIZE-UP IS A  
CONTINUAL  
PROCESS

Visual UHF.46

Contra Costa CERT Coalition

73

46

All CERT Size-up



360° SCAN – all around and everything above ground


Visual UHF.47

Contra Costa CERT Coalition

73

47


CERT Fire Size-up

 Can my buddy and I escape?

 Helps CERT volunteers decide:

➤ Whether to attempt to suppress a fire

➤ A plan of action

 Answer these questions:

➤ Do my buddy and I have the right equipment?

➤ Are there other hazards?

➤ Is the building structurally damaged?

➤ Can my buddy and I fight the fire safely?

Remember: The safety of individual CERT members is always the top priority

Visual UHF.48


Contra Costa CERT Coalition

73

48


CERT Fire Size-up Checklist

Step 1: Gather Facts

 Does the time of day or week impact fire suppression?

 Will weather conditions affect the fire situation?

 What type of structure is involved?

 Is the structure occupied?

 Are there special considerations?

 Are any other hazards likely to be involved?

Visual UHF.49

Contra Costa CERT Coalition


73


49

25


CERT Fire Size-up Checklist


**Step 2: Assess and Communicate the Damage**


 Do a 360° inspection, up, down and around

 Are normal communication channels functioning?

**Step 3: Consider Probabilities**

 Are there potential life-threatening hazards?

 Does the fire's path jeopardize other areas?

 Is there a high potential for more disaster activity that will impact personal safety?

Visual UHF.50


Contra Costa CERT Coalition

73

50


CERT Fire Size-up Checklist

**Step 4: Assess Your Own Situation**

 What resources are available?

 What equipment is available?

**Step 5: Establish Priorities**

 Can fire suppression be safely attempted by CERT?

 Are there other, more pressing needs at the moment?

**Step 6: Make Decisions**

 Where will deployment of available resources do the greatest good while maintaining an adequate margin of safety?

Visual UHF.51


Contra Costa CERT Coalition

73

51


CERT Fire Size-up Checklist


Step 7: Develop a Plan of Action

 Determine how many personnel and other resources should be deployed

Step 8: Take Action

Step 9: Evaluate Progress

 Continually size-up

 Adjust plan as needed

Visual UHF.52


Contra Costa CERT Coalition

73

52

CERT Fire Size-up Checklist

The Mental Management of Emergencies

 Responders panic because:

- They do not know or remember exactly how they are supposed to respond
- They are not aware of their own impaired decision-making when their adrenaline takes over
- They have been working too many hours and they have forgotten what it is like to make calm decisions
- Stress drains serotonin and dopamine to levels that impair cognitive thinking

Visual UHF.53

Contra Costa CERT Coalition

73

53


CERT Fire Safety


*“CERTS Don’t Get Hurt”*

 Use **P**ersonal **P**rotective **E**quipment (**PPE**)

 Have a communications plan

 Have a backup team

 Have two ways to exit



Visual UHF.54

Contra Costa CERT Coalition

73

54

CERT Fire Safety

 Put out small fires, this size 

 Prevent additional fires





 Shutoff utilities after a disaster to prevent fires

Visual UHF.55

Contra Costa CERT Coalition

73

55

Fire Suppression Don'ts

 Don't get too close

 Don't try to fight a fire alone

 Don't try to suppress large fires

 Don't enter smoke-filled areas



Visual UHF.56

Contra Costa CERT Coalition

73

56

CERT Fire Safety

Use the buddy system for all CERT activities, especially fire safety!





Visual UHF.57

Contra Costa CERT Coalition


73


57

29



Fire Fuels

 Fuels are things that will burn

 There are three main classifications of fuels

➤ Two more for commercial environments











Visual UHF.58

Contra Costa CERT Coalition

73

58

Classification of Fuels

		Ordinary Combustibles	Wood, Paper, Cloth, Etc.
		Flammable Liquids	Grease, Oil, Paint, Solvents
		Live Electrical Equipment	Electrical Panel, Motor, Wiring, Etc.
		Combustible Metal	Magnesium, Aluminum, Etc.
		Commercial Cooking Equipment	Cooking Oils, Animal Fats, Vegetable Oils

Visual UHF.59

Contra Costa CERT Coalition

73

59

### Fire Extinguisher Types

Standard ABC Extinguishers

	Water	Foam	Dry Chemical	Carbon Dioxide	Wet Chemical	Clean Agent (Halogenated)	Dry Powder
Ordinary Combustible Materials	✓	✓	✓*	✗	✓	✓	✗
Flammable Liquids and Gases	✗	✓	✓	✓	✗	✓	✗
Energized Electrical Equipment	✗	✗	✓	✓	✗	✓	✗
Flammable Metals	✗	✗	✗	✗	✗	✗	✓
Cooking Oils and Greases	✗	✗	✗	✗	✓	✗	✗

\* not all models work on Class A fires

Visual UHF.60

Contra Costa CERT Coalition

73

60

### Choosing a Fire Extinguisher

Typical ABC Fire Extinguisher specifications

Size	2.5	5	10
Height	14.87	15.25	18.94
Width	5.5	7.25	7.75
Depth	3	4.25	5.25
Weight Pounds	5.8	10.4	13.3
Nominal Discharge Time	9.5	14	22
Discharge Range, Feet	10-15	12-18	16-20
Rating	1-A:10-B:C	3-A:40-B:C	4-A:80-B:C

Source - Badger Fire Protection

Visual UHF.61

Contra Costa CERT Coalition

73

61

Parts of a Fire Extinguisher

A diagram of a red fire extinguisher with various parts labeled with arrows. The labels are: Safety Pin (pointing to the top pin), Nozzle (pointing to the front attachment), Pressure gauge (pointing to the gauge on the handle), Tube (pointing to the internal tube), High Pressure Gas Canister (pointing to the inner cylinder), and Dry Chemical, Carbon Dioxide, or Water (pointing to the main body of the extinguisher).

Visual UHF.62

Contra Costa CERT Coalition

73

62

Parts of a Fire Extinguisher

A close-up photograph of the pressure gauge on a red fire extinguisher. The gauge has a red face with a needle pointing into the green 'full' range. The text on the gauge includes 'RECHARGE', 'OVERCHARGE', 'SAFE', 'PRESSURE', 'PSI', 'FOR USE AT -54°C (-65°F) 2017Q4', and 'USE WITH DRY CHEMICAL ONLY'. The black hose is labeled 'EXT-3300 DLA-3'.

🧑🔧 Pressure gauge indicating a full extinguisher


Visual UHF.63

Contra Costa CERT Coalition

73

63


Fire Extinguisher Rating / Labeling



Labels show the class of fire and the amount of extinguishing agent.

➤ 1A is equivalent to 1.25 gallons of water

➤ 10B can cover roughly 10 square feet




Visual UHF.64

Contra Costa CERT Coalition

73

64

Maintenance of Fire Extinguishers



MYTH

Every six months, turn them over a few times to prevent caking of the powder

Fire extinguisher manufacturers agree that this is not needed and may, in fact, be harmful


Visual UHF.65


Contra Costa CERT Coalition

73


65

Maintenance of Fire Extinguishers

 Replace if 10 years or older

 Replace with a metal head, not plastic

➤ Most extinguishers do not have a date code. Use a marker and put your purchase date on the bottom.



Where to buy or service? Look in the yellow pages

Visual UHF.66

Contra Costa CERT Coalition

73

66


How to Use a Fire Extinguisher

Pull

Aim

Squeeze

Sweep



Visual UHF.67

Contra Costa CERT Coalition

73

67

### How to Use a Fire Extinguisher

**1 Pull**  
the pin



**2 Aim** at  
the base  
of the fire



**3 Squeeze**  
the handle



**4 Sweep**  
from side  
to side




Visual UHF.68


Contra Costa CERT Coalition


73


68

### How to Use a Fire Extinguisher

 Size-up fire before you decide to fight it. Be upwind!

 Before approaching a fire, have pins pulled on both extinguishers (yours and your buddy's)

 Test the extinguishers before approaching any fire to be sure they work


 LEAD :: **BUDDY**


COMMAND :: **RESPONSE**

Ready :: **Ready**

Going in :: **Going in**

Backing out :: **Backing out**

 Communicate!




Visual UHF.69


Contra Costa CERT Coalition

73


69

How to Use a Fire Extinguisher





Start using the extinguisher from a safe distance away, about 8 feet and then move forward



Keep about 6 feet between you and the fire

Visual UHF.70

Contra Costa CERT Coalition

73

70

Firefighting Resources



What if you don't have an extinguisher?

Try "creative" resources or confinement

Flow at 40 PSI

100 Foot Hose

1/2" Hose 6 GPM

5/8" Hose 11 GPM

3/4" Hose 18 GPM

Double the length – Half the flow





Visual UHF.71

Contra Costa CERT Coalition


73

71

36



## Questions ?



Visual UHF.72

Contra Costa CERT Coalition

73

72

## Takeaways

-  **Utilities** – locate and shutoff as needed
-  **Hazardous Materials**
  - L.I.E.S. - Limit, Isolate, Eliminate, Separate
  - Placards, Building, Global Harmonized, Vehicle
  - S.I.N. – Safety, Isolate, Notify
-  **Fire**
  - Reduce Hazards – Detect
  - Firewise USA® – Protect Your Home
  - Size-Up
  - Fire Extinguishers

Visual UHF.73

Contra Costa CERT Coalition

73

73