

# HAZMAT



## Advancement Module 03 Dallas CERT

# Materials for this unit:

- You should have a copy of the Emergency Response Guidebook, either in print or online, plus - paper and a pen or pencil
- The current electronic copy is available at:  
<https://www.phmsa.dot.gov/hazmat/library/erg>

- CERT safety protocol for hazmat
- Reading Placards
- Using the Emergency Response Guide (ERG)
- Response within CERT abilities

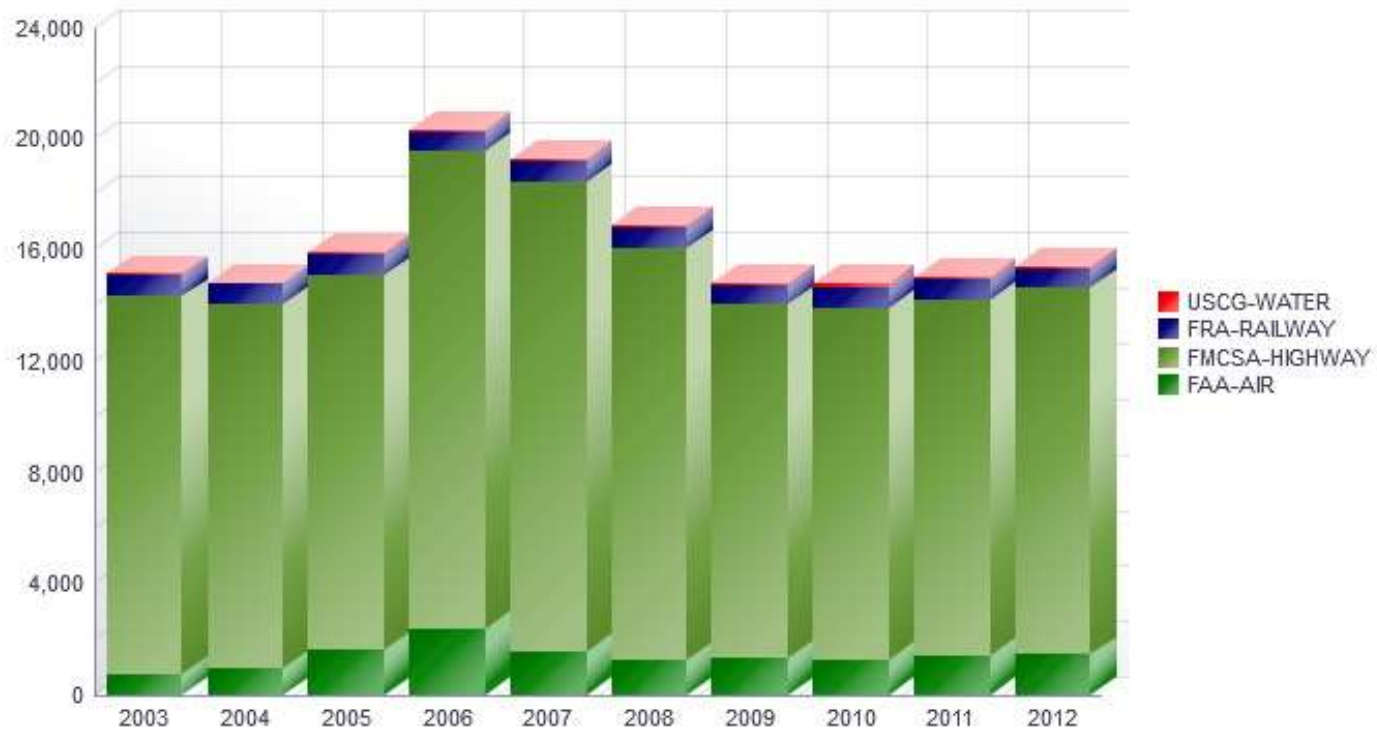
# HAZMAT

# Stats

Pipeline and Hazardous Materials Safety Administration  
Office of Hazardous Material Safety  
All Incidents

Select chart measure:

Incidents ▼



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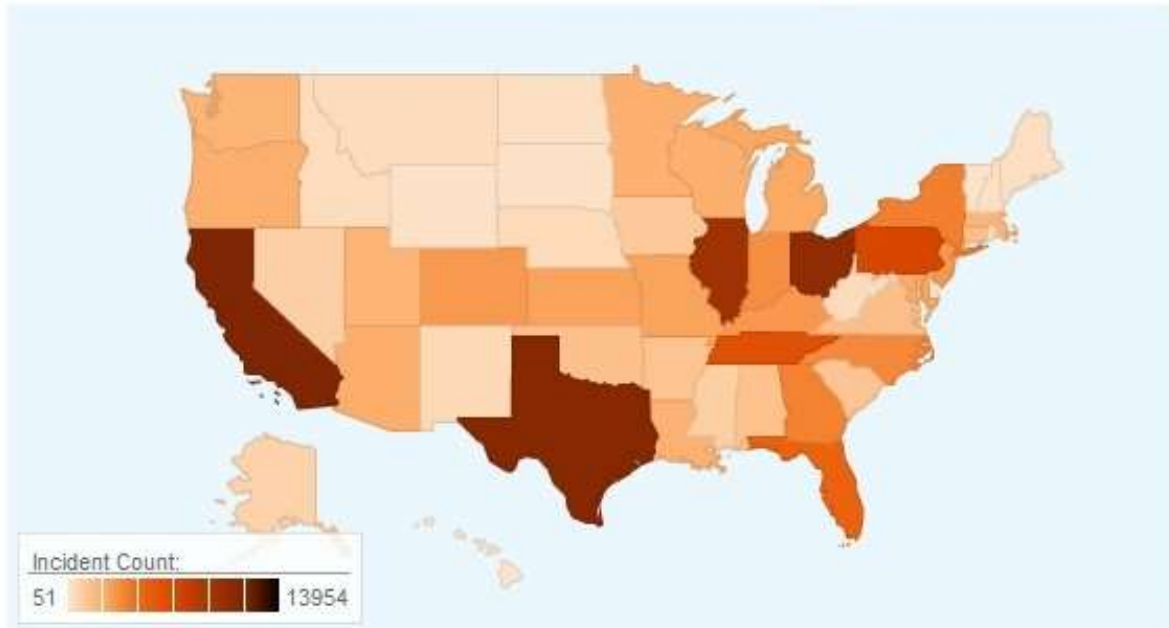


# HAZMAT

# Texas

U.S. Department of Transportation  
Pipeline and Hazardous Materials Safety Administration  
Office of Hazardous Material Safety  
2004 - 2013 Incident Map

All Incidents



Source: Hazmat Intelligence Portal, U.S. Department of Transportation. Data as of 10/21/2013.

Texas = 13407



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- CERT team members must protect themselves and others, doing the greatest good for the greatest number
- CERT training is **not sufficient** to:
  - deal directly with a hazardous substance, or
  - rescue people affected by the substance
- **MOVE AWAY** and keep others safe



- **OBSERVE** – size up the incident
  - Location, wind direction, people affected
  - Substance involved
- **REPORT**
- **EVACUATE & SET UP A PERIMETER**
- **DECONTAMINATION** – consult ERG, use tepid/cold water, blot dry
- **TRIAGE** – any injuries



- While CERT members should not get close to a hazmat incident, that does not mean they should abandon victims.
  - Verbal support may be possible until professional responders arrive
  - Victims may be talked into moving to a decontamination area
  - The ERG also has suggested first aid cautions for each substance



# TERRORISM?



## If you recognize event as potential terrorism incident

- **Notify OEM or 911** of potential terrorist incident
- Isolate the scene and deny entry
- Scan for secondary devices
- Do not drive through spills or clouds
- Position vehicles headed away from the incident for a quick departure
- Look for physical indicators:
  - Debris field
  - Casualties
  - Dead animals and vegetation
  - Unusual odors, color of smoke, vapor clouds
- Protect crime scene and evidence



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- CERT Team should wear full Personal Protective Equipment (PPE) to protect against accidental minor exposure, provide very limited protection, and keep out particulates & smoke
  - Nitrile & work gloves
  - Helmet
  - Goggles
  - Work boots or Galoshes (if available)

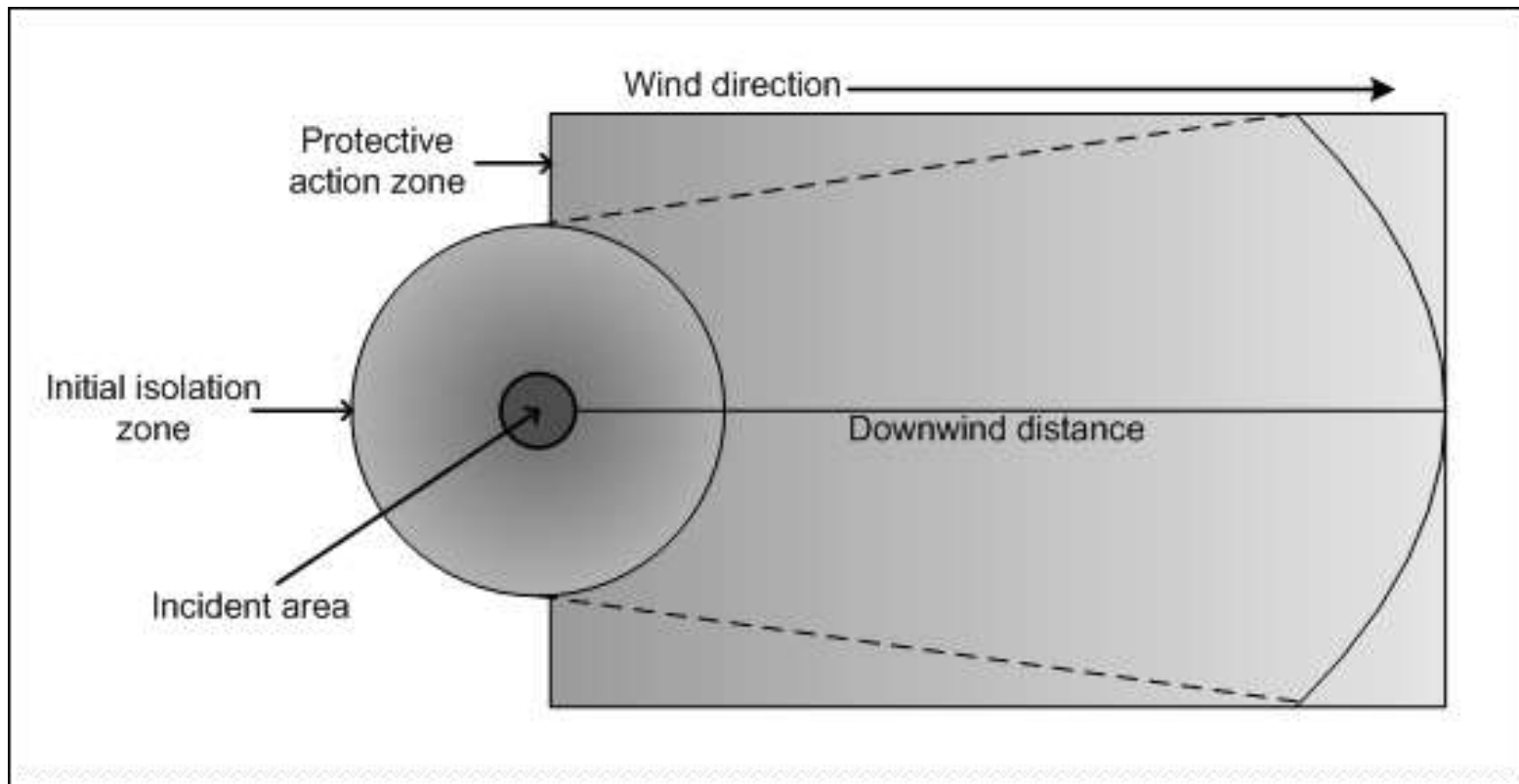


- CAUTION
  - In any HAZMAT situation involving explosives or terrorist potential **DO NOT use radios or cell phones** within the evacuation zone and preferably within at least a half mile
  - These electronic devices may :
    - ❖ Cause an static charge to build
    - ❖ Activate a radio frequency trigger device

# HAZMAT

# Time, Distance, Shielding

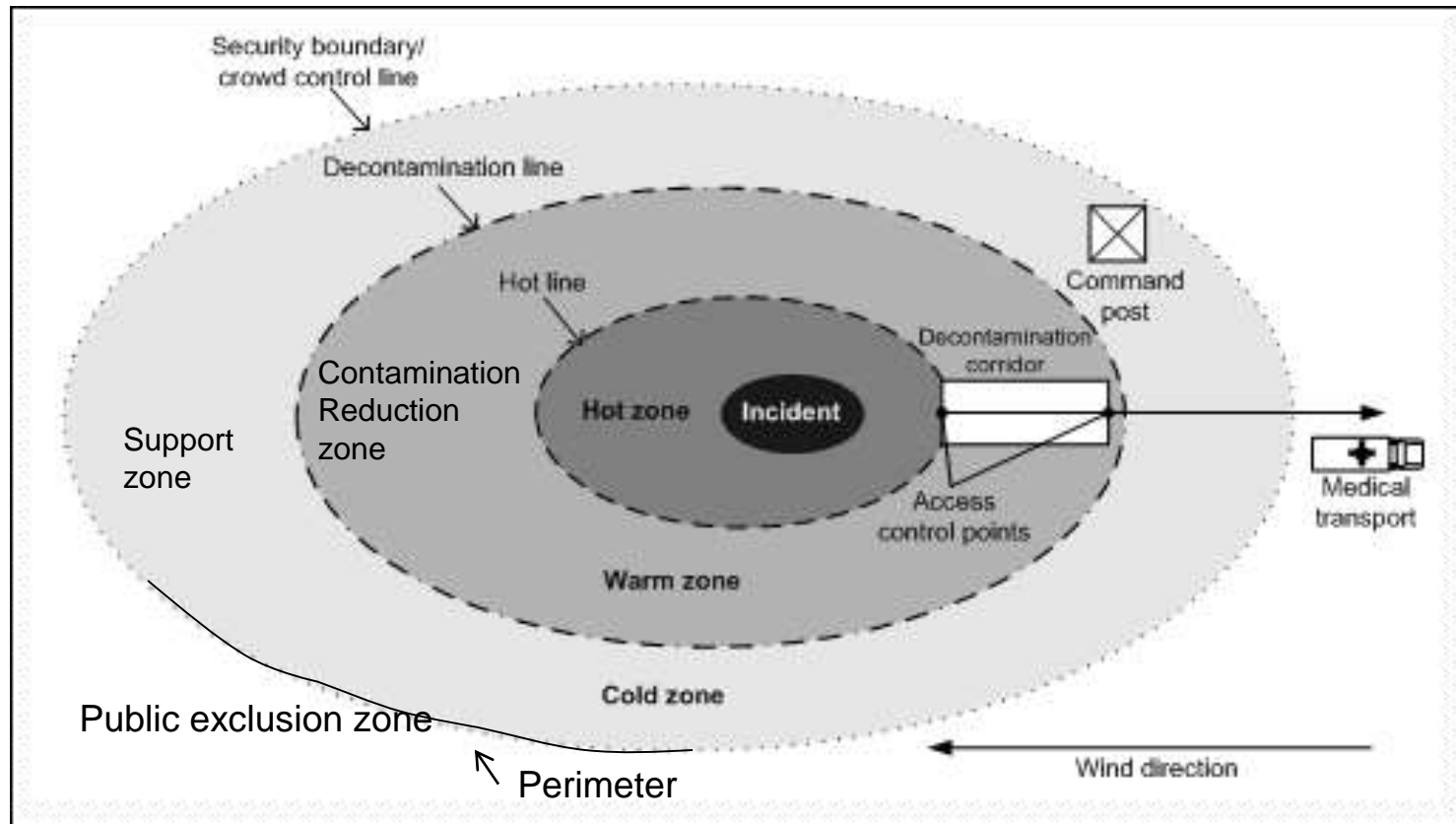
- Observe ERG evacuation distances



# HAZMAT

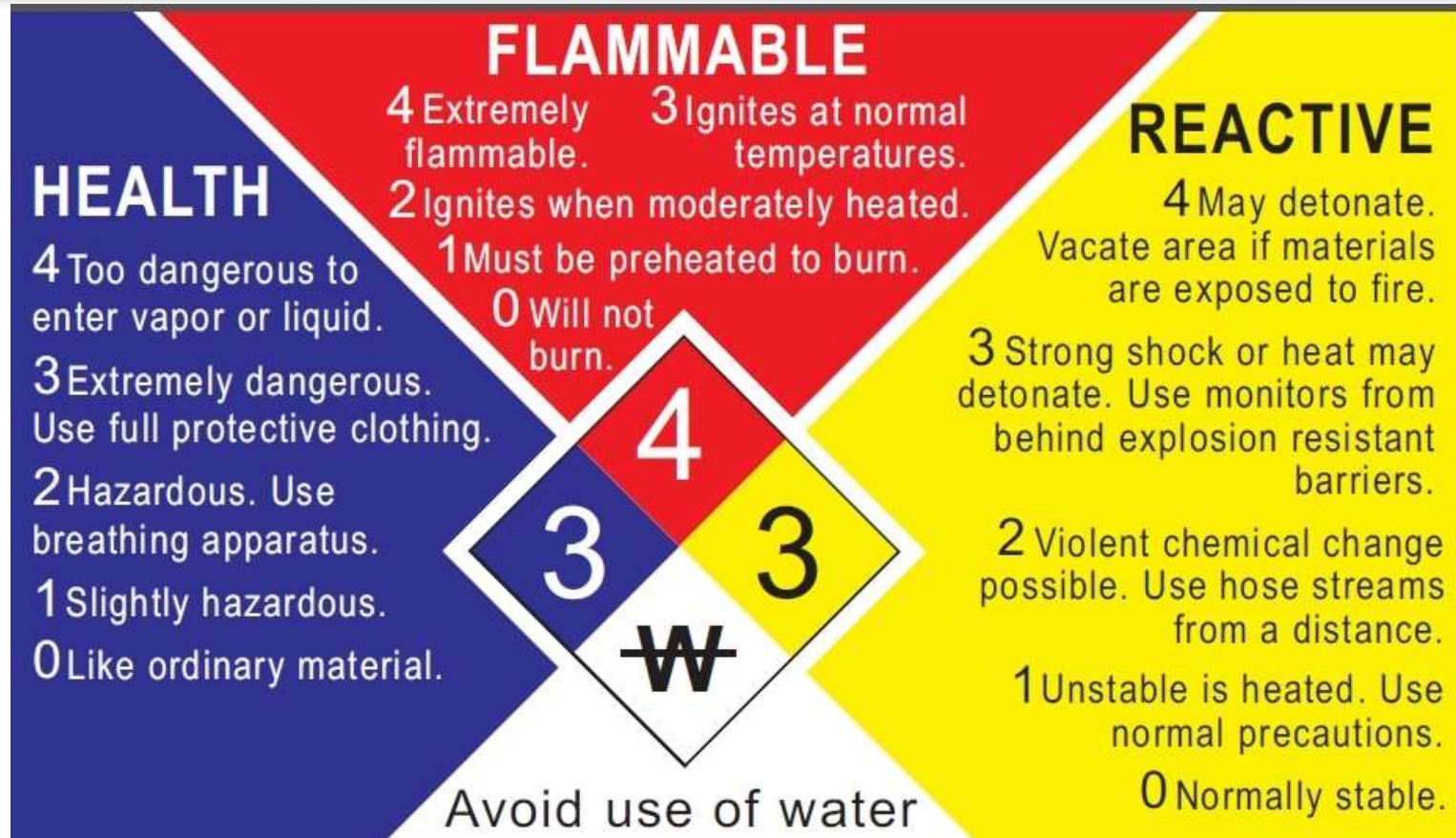
# Time, Distance, Shielding

- Evacuate upwind, uphill, upstream





# NFPA 704\* Response Guide Numbers



\* NFPA = National Fire Protection Association



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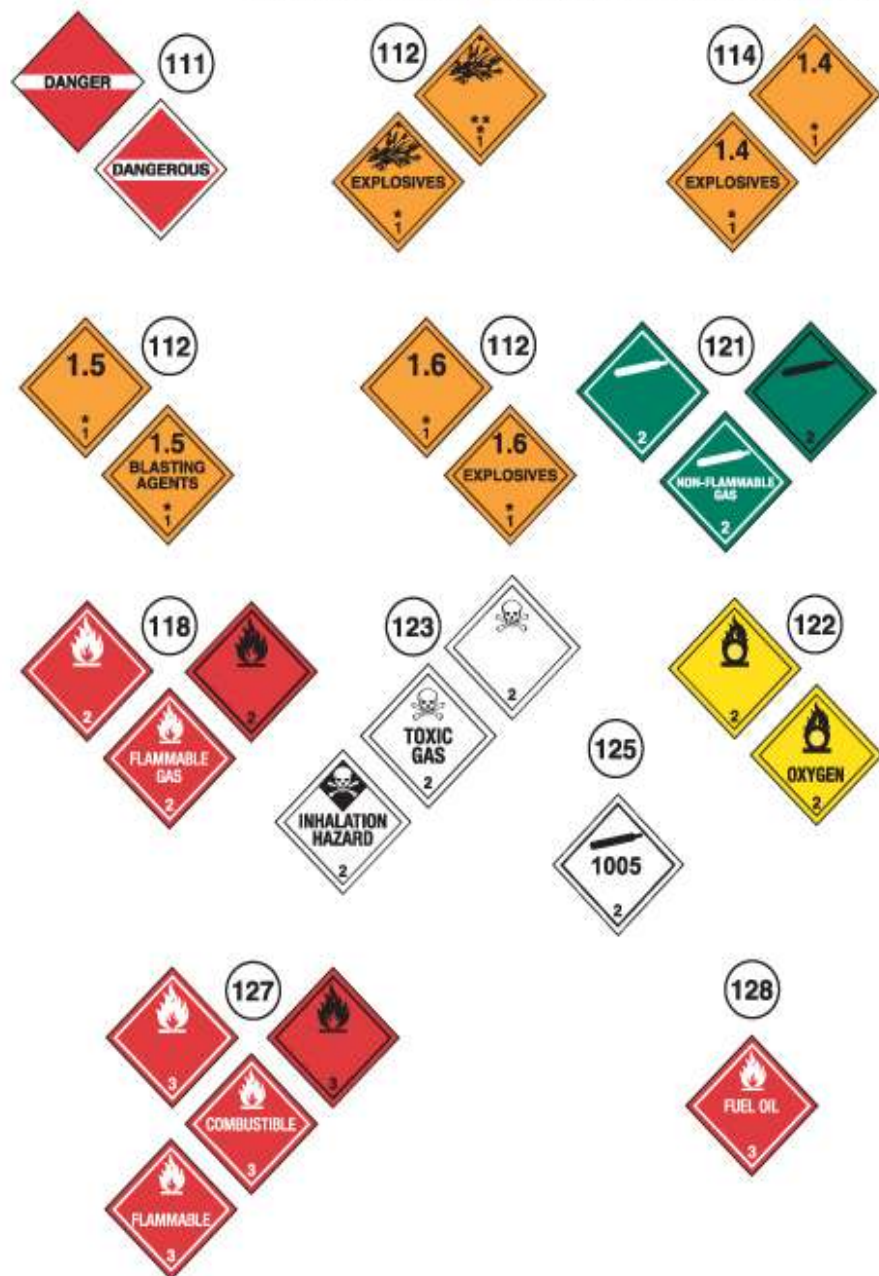
- Note that in the ERG, some of the explosive substance Guides say:  
*“Move people out of the line of sight of the scene and away from windows”*
- Does that translate into “TAKE COVER” for you?

## Table of Placards

- Find the early pages of the ERG that depict the different placards used in the transport of dangerous goods. Should the placard on a vehicle be damaged, the general appearance gives a clue about the goods.
- Each group of placards is associated to a 3-digit guide number (**ORANGE** Section).
- **Caution:** The recommended guides should be considered as a last resort if the material cannot be identified by any other means.

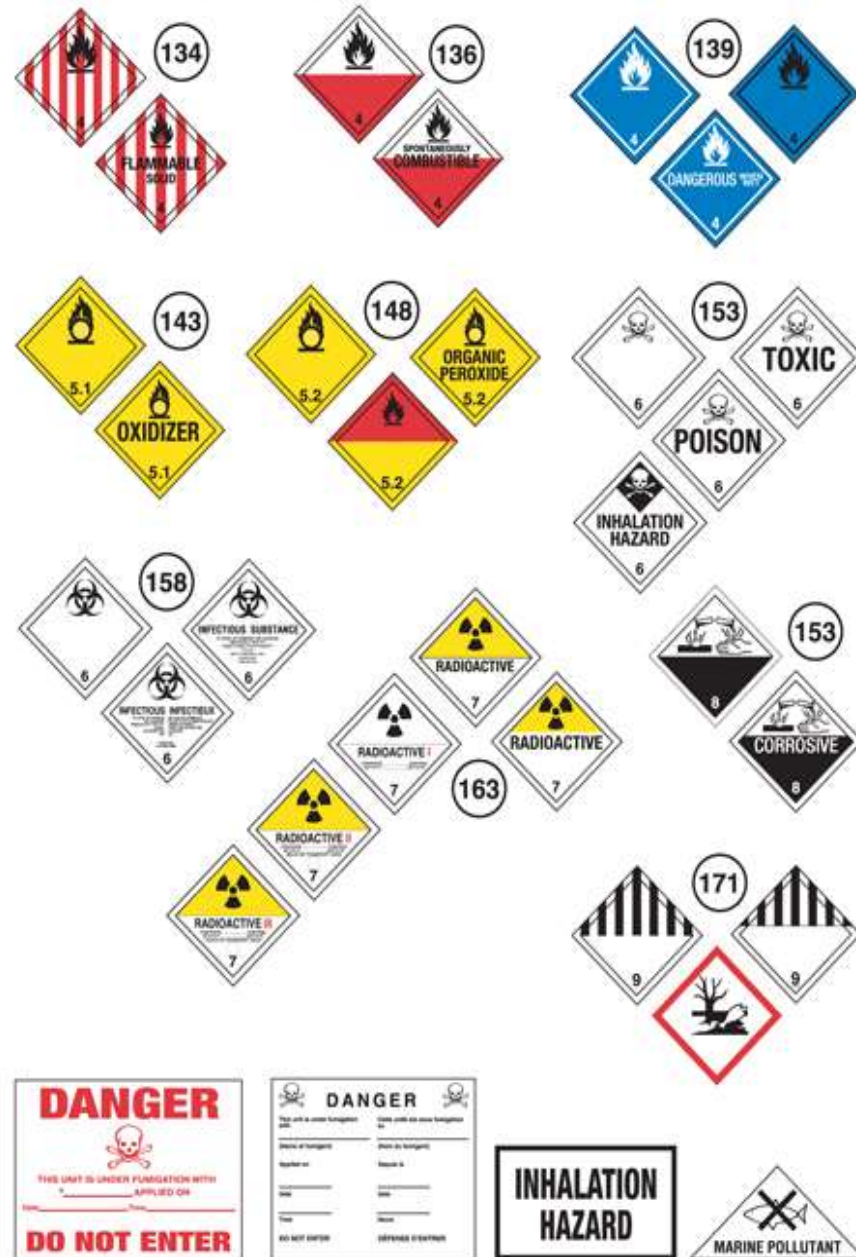
## TABLE OF PLACARDS AND INITIAL

USE THIS TABLE ONLY IF MATERIALS CANNOT BE SPECIFICALLY IDENTIFIED BY



## RESPONSE GUIDE TO USE ON-SCENE

USING THE SHIPPING DOCUMENT, NUMBERED PLACARD, OR ORANGE PANEL NUMBER



## Rail Car and Road Trailer ID Charts

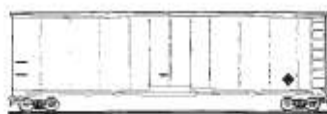
- Find the pages that depict the general shapes of railcars and road trailers used in the transportation of dangerous goods. Their shape is another clue.
- Each shape is associated to a 3-digit guide number in the **ORANGE** Section (Table 1 is the **GREEN** section)
- **Caution:** The recommended guides should be considered as a last resort if the material cannot be identified by any other means.



## RAIL CAR IDENTIFICATION CHART\*



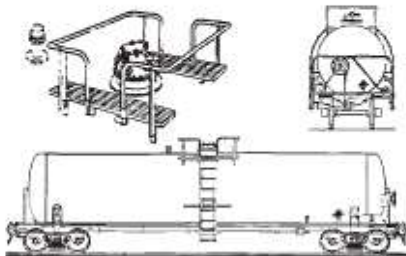
Hopper Car  
Dry Bulk 140



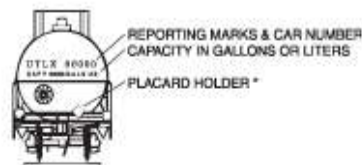
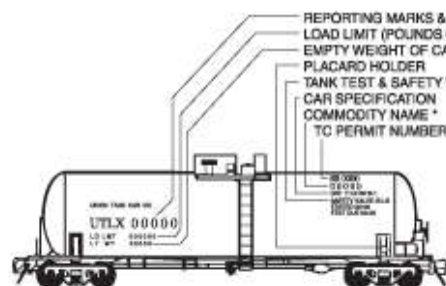
Box Car  
Mixed Cargo 111



Pressure Tank Car  
Compressed Liquefied Gases 117



Low Pressure Tank Car  
Liquids 131



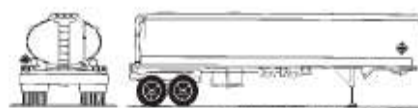
**CAUTION:** Emergency response personnel must be aware that rail tank cars vary widely in construction, fittings and purpose. Tank cars could transport products that may be solids, liquids or gases. The products may be under pressure. It is essential that products be identified by consulting shipping documents or train consist or contacting dispatch centers before emergency response is initiated.

The information stenciled on the sides or ends of tank cars, as illustrated above, may be used to identify the product utilizing:

- the commodity name shown; or
- the other information shown, especially reporting marks and car number which, when supplied to a dispatch center, will facilitate the identification of the product.

\* The recommended guides should be considered as last resort if the material cannot be identified by any other means.

## ROAD TRAILER IDENTIFICATION CHART\*



DOT406, TC406, SCT-306  
Non-pressure Liquid Tank  
(MC306, TC306) 131



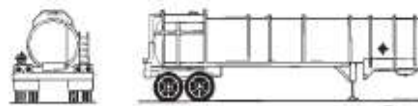
MC338, TC338, SCT-338  
Cryogenic Liquid Tank  
(TC341, CGA341) 117



DOT407, TC407, SCT-307  
Low Pressure Chemical Tank  
(MC307, TC307) 137



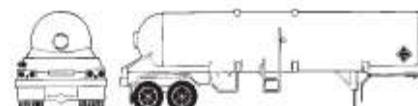
Compressed Gas/  
Tube Trailer 117



DOT412, TC412, SCT-312  
Corrosive Liquid Tank  
(MC312, TC312) 137



Dry Bulk Cargo  
Trailer 134



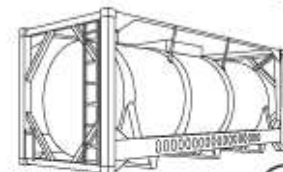
MC331, TC331, SCT-331  
High Pressure Tank 117



Mixed Cargo 111



DOT407, TC407, DOT412, TC412  
Vacuum Loaded Tank  
(TC350) 137



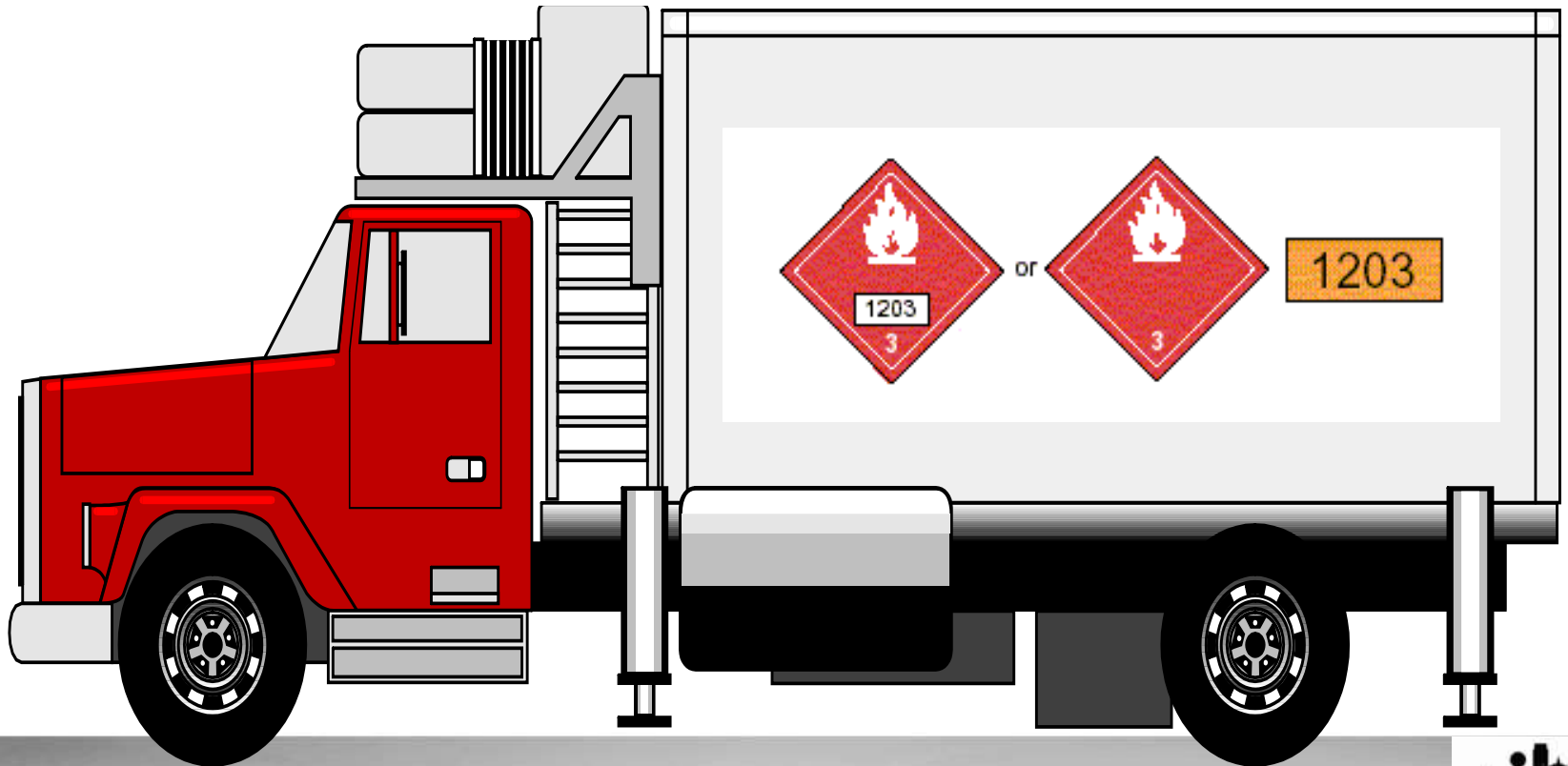
Intermodal Tank 117

**CAUTION:** This chart depicts only the most general shapes of road trailers. Emergency response personnel must be aware that there are many variations of road trailers, not illustrated above, that are used for shipping chemical products. The suggested guides are for the most hazardous products that may be transported in these trailer types.

\* The recommended guides should be considered as last resort if the material cannot be identified by any other means.

# ERG2016

A) The 4-digit ID Number on a placard or orange panel;



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# ERG2012

B) The 4-digit ID Number (following UN or NA) on a shipping document or package;

SHIPPING DOCUMENT							
Destination(City-Town) Name: <i>Company ABC</i> Address: <i>1234 Main St.</i> <i>Town, Province</i>				Consignor Name: <i>Company DEF</i> Address: <i>5678 1st Avenue</i> <i>Town, Province</i>			
Name of carrier <i>Transport ABC</i>		Prepaid <input checked="" type="checkbox"/> Collect <input type="checkbox"/>		Transport unit no. <i>1</i>			
Point of origin		Shipping date <i>05/01/2005</i>			Shipper's no. <i>1234</i>		
REGULATED DANGEROUS GOODS				24 HOUR NUMBER: <i>613-996-6666</i> ERP reference & telephone number: <i>N/A</i>			
Shipping name (technical name) if applicable		class primary	class subsi- diary	UN number	packing group/ risk group	quantity	packages requiring labels
<i>Gasoline</i>		<i>3</i>	<i>-</i>	<i>1203</i>	<i>II</i>	<i>6000L</i>	<i>—</i>
THIS IS TO CERTIFY THAT THE ABOVE NAMED ARTICLES ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELLED AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE TRANSPORTATION OF DANGEROUS GOODS REGULATIONS							
SPECIAL INSTRUCTIONS							
NON REGULATED GOODS							
Packages	Description of articles					Weight	
Received in apparent good order						Consignee's signature	
						Shipper's signature	
Received above in apparent good order			Driver's signature			Drivers' no.	

Example of a shipping document

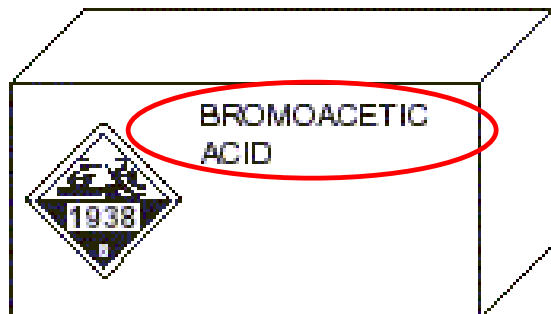


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# ERG2016

C) The name of the material on a shipping document or package.



OR



Example of a package

SHIPPING DOCUMENT						
Destination(City-Town) Name: <i>Company ABC</i> Address: <i>1234 Main st.</i> <i>Town, Province</i>			Consignor Name: <i>Company DEF</i> Address: <i>5678 1st Avenue</i> <i>Town, Province</i>			
Name of carrier <i>Transport ABC</i>		Prepaid <input checked="" type="checkbox"/> Collect <input type="checkbox"/>		Transport unit no. <i>1</i>		
Point of origin		Shipping date <i>05/01/2005</i>		Shipper's no. <i>1234</i>		
REGULATED DANGEROUS GOODS		24 HOUR NUMBER: <i>613-996-6666</i> ERP reference & telephone number: <i>N/A</i>				
Shipping name (technical name) if applicable	class primary	class subsi- diary	UN number	packing group/ risk group	quantity	packages requiring labels
<i>Gasoline</i>	<i>3</i>	<i>—</i>	<i>1203</i>	<i>II</i>	<i>6000L</i>	<i>—</i>
THIS IS TO CERTIFY THAT THE ABOVE NAMED ARTICLES ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELLED AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE TRANSPORTATION OF DANGEROUS GOODS REGULATIONS						
SPECIAL INSTRUCTIONS						
NON REGULATED GOODS						
Packages	Description of articles					Weight
Received in apparent good order					Consignee's signature <i>[Signature]</i>	
Received above in apparent good order					Driver's signature <i>[Signature]</i>	
					Shipper's signature <i>[Signature]</i>	
					Drivers' no.	

Example of a shipping document



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# ERG 2016



1) Look up the material's 3-digit Guide number in either:

- The ID Number index (**YELLOW**-bordered pages);
- The name of material index (**BLUE**-bordered pages);
- Note if the substance is highlighted in **GREEN**.

As a ***last resort***, if the ID number or the name of material are not available, use the **Table of Placards and/or the Rail Car & Road Trailer Identification Charts**



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- 2) Turn to the numbered guide (**ORANGE**-bordered pages):
- Read carefully all the information provided in the **ORANGE** Guide;
  - use jointly the **GREEN** Section if the substance is highlighted green in the yellow or blue section

# ERG 2016

- **CAUTION:** If a reference to a guide cannot be found and the incident is believed to involve dangerous goods:

Turn to **GUIDE 111**

and use it until additional information becomes available.

- If the incident involves explosives:



- Use **GUIDE 112** for all explosives, except:
- For Class 1.4 Explosives, use **GUIDE 114**.  
(Class 1.4 has no significant blast hazard)



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# Now for some Examples!

- For each of the following examples:
  - Find the **ORANGE**-bordered Guide-pages using the information provided;
  - Identify the suggested distances / zones in the **ORANGE** and/or **GREEN** Sections;
  - Describe the main characteristics and hazards of the substance.



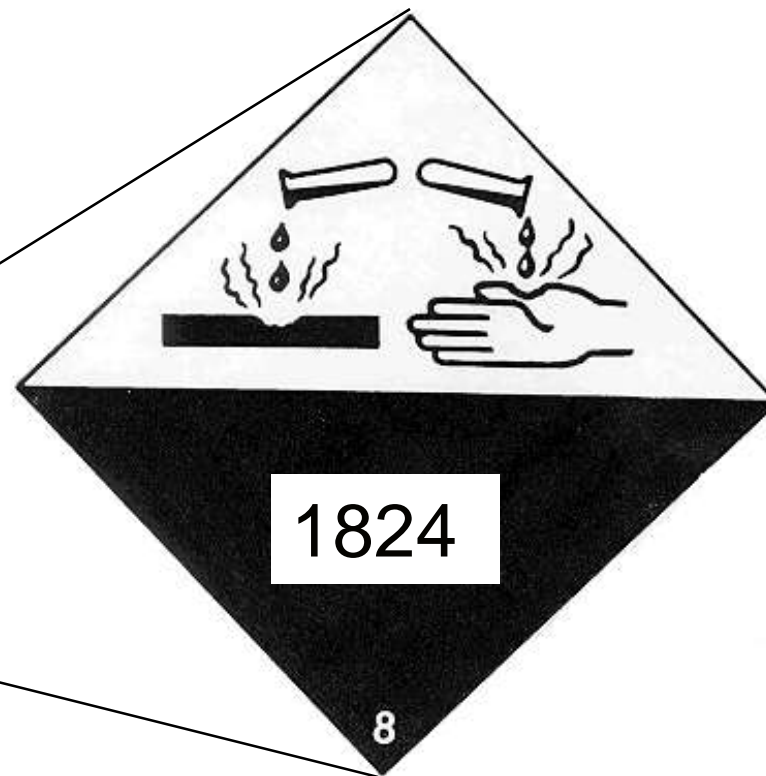
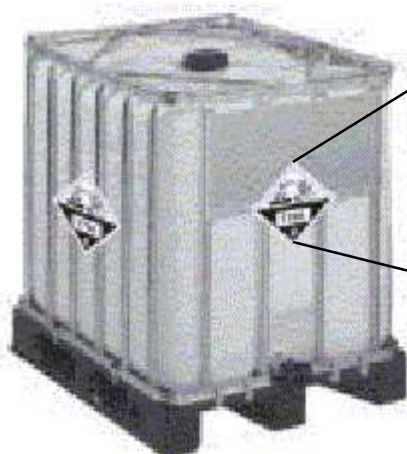
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## Example 1

- A 1000-litre tote container is leaking.



# Solution for Example 1



ID No. is 1824

- The **YELLOW**-bordered pages indicate that the name of the material is *Sodium hydroxide, solution* or *Caustic soda, solution* and refers to **Guide 154**;
- Substance not highlighted; no need for the **GREEN** Section;
- The **Guide 154** corresponds to ***Substances - Toxic and/or Corrosive (Non-Combustible)***;
- As an immediate measure, the Guide suggests to isolate the leak area in all directions for at least 50 metres for liquids

# Solution for Example 1



- In **Guide 154**, under the *Potential Hazards* Section, the *Health* hazards precede the *Fire or Explosion* hazards;
- This type of substance is toxic by inhalation / ingestion / skin contact and may cause severe injury or death;
- Effect of contact or inhalation may be delayed;
- Fire may produce irritating, corrosive and/or toxic gases;
- This type of substance is non-combustible.

## Example 2

- A tanker truck carrying the following product rolled over and is leaking from the top hatch.



## Solution for Example 2



**ID No. is 1202**

- The **YELLOW**-bordered pages indicate that the substance is *Diesel fuel* or *Fuel oil*, and refers to **Guide 128**;
- Substance not highlighted; no need for the **GREEN** Section
- The **Guide 128** corresponds to ***Flammable Liquids (Non-Polar / Water-Immiscible)***;
- As an immediate precautionary measure, the Guide suggests to isolate spill or leak area for at least 50 metres in all directions. If the spill is large, the Guide suggests to consider an initial downwind evacuation of at least 300 metres;

## Solution for Example 2



- At **Guide 128**, under the *Potential Hazards* Section, the *Fire or Explosion* hazards precede the *Health* hazards;
- This type of substance is flammable and vapours may form explosive mixture with air;
- Most vapours are heavier than air, they will spread along the ground and collect in low or confined areas;
- Containers may explode when heated;
- Inhalation or contact with material may irritate or burn skin and eyes.



## Example 3

- A truck displaying this placard is on fire on the side of the road.



## Solution for Example 3



- The placard indicates the material is an explosive of class 1.4G;
- According to the Table of placards, **Guide 114** must be used when explosives in class 1.4 are involved;
- Explosives are not highlighted; there is no need to refer to the **GREEN** Section (see Explosives in the **BLUE** Section);
- In case the truck is involved in a fire, the Guide suggests to isolate for 500 metres in all directions and to initiate an evacuation, including emergency responders, for 500 metres in all directions;

## Solution for Example 3



- At **Guide 114**, under the *Potential Hazards* Section, the *Fire or Explosion* hazards precede the *Health* hazards;
- This type of substance may explode and throw fragments at a distance of 500 metres or more if fire reaches cargo;
- Fire may produce irritating, corrosive and/or toxic gases.

## Example 4

- A tanker truck is involved in a road accident.



## Solution for Example 4



- The ID No. is 1072;
- The **YELLOW**-bordered pages indicate that the product is *Oxygen, compressed* and refers to **Guide 122**;
- Substance not highlighted; no need for the **GREEN** Section
- The **Guide 122** corresponds to **Gases - Oxidizing (Including Refrigerated Liquids)**;
- As an immediate precautionary measure, the Guide suggests to isolate spill or leak area for at least 100 metres in all directions;
- In case of a large spill, the Guide suggests to consider an initial downwind evacuation of at least 500 metres;

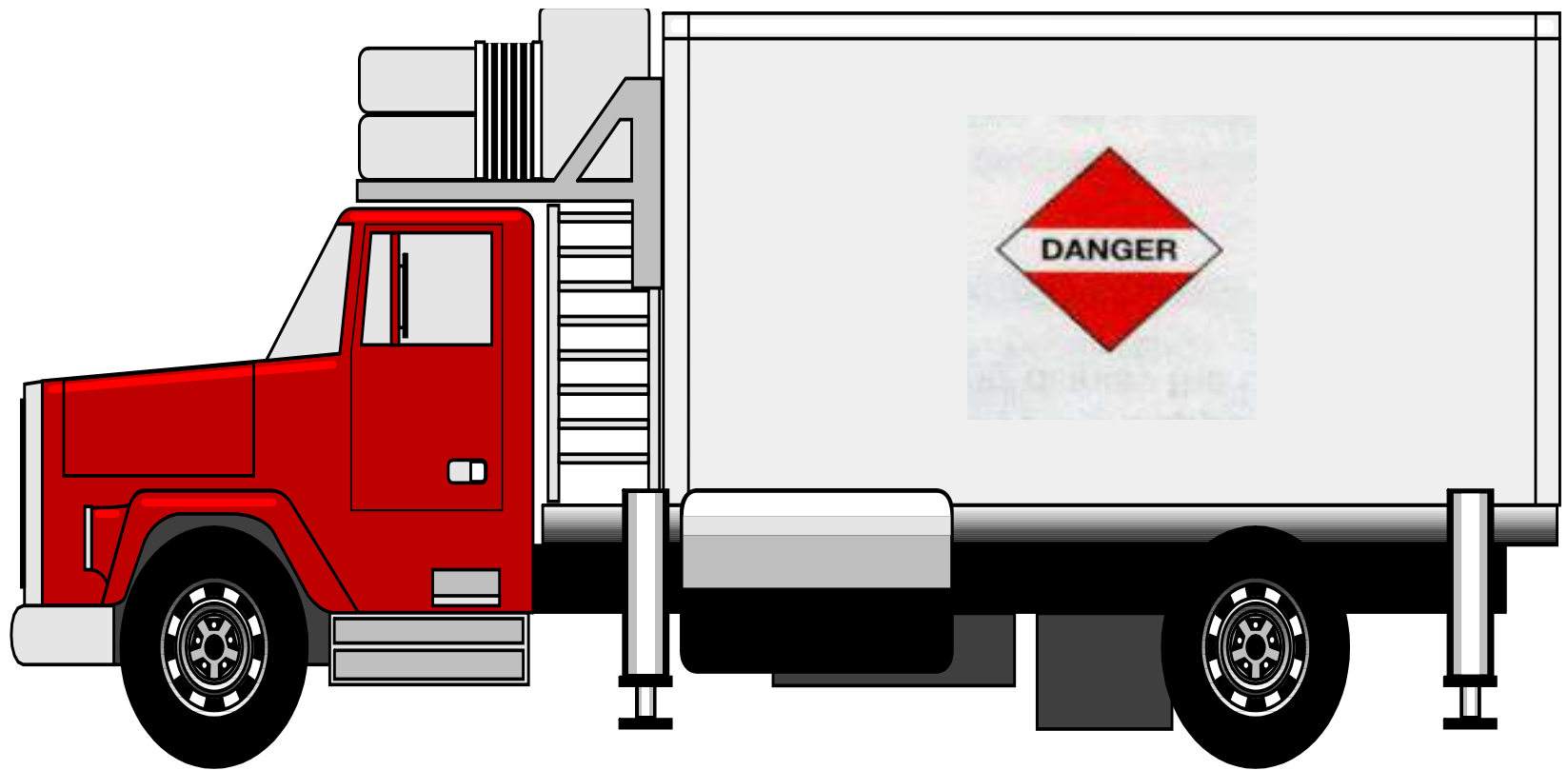


## Solution for Example 4



- At **Guide 122**, under the **Potential Hazards** Section, the **Fire or Explosion** hazards precede the **Health** hazards;
- This type of substance does not burn, but will support combustion;
- Some may react explosively with fuels;
- Containers may explode when heated;
- Vapours may cause dizziness or asphyxiation without warning.

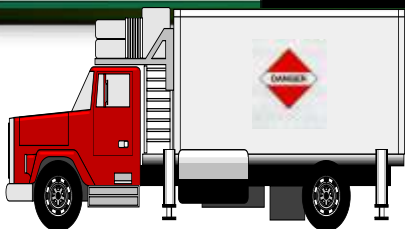
## Example 5



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## Solution for Example 5



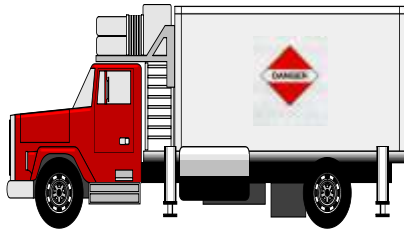
- There is no ID No. and the DANGER placard indicates a mixed load of dangerous goods;
- In this case, refer to **Guide 111**, *Mixed Load / Unidentified Cargo*;
- As an immediate precautionary measure, the Guide suggests to isolate the area for at least 100 metres in all directions, until the contents of the vehicle is known;
- In case of fire, the Guide suggests to isolate for 800 metres in all directions and to consider an initial evacuation of 800 metres in all directions;



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## Solution for Example 5



- At **Guide 111**, under the *Potential Hazards* Section, the *Fire or Explosion* hazards precede the *Health* hazards;
- Until the vehicle content is known, all hazards must be considered: flammability, corrosivity, toxicity...



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## Example 6

- A rail car is leaking at a well-known facility in your area, where chlorine cars are handled.



KTVI-TV St.Louis, Missouri, USA





## Solution for Example 6



KTVI-TV St Louis, Missouri  
USA

- The product involved is *Chlorine*;
- The **BLUE**-bordered pages indicate that the ID number is 1017, refers to **Guide 124** and the substance is highlighted;
- The **Guide 124** corresponds to **Gases – Toxic and/or Corrosive – Oxidizing**;
- Because the substance is highlighted and there is a spill situation, the Initial Isolation and Protective Action Distances must be taken from the **GREEN** Section;
- For ID 1017, the **GREEN** Section suggests refers to Table 3 which says for large spills use 500 metres as an Initial Isolation Distance;



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## Solution for Example 6

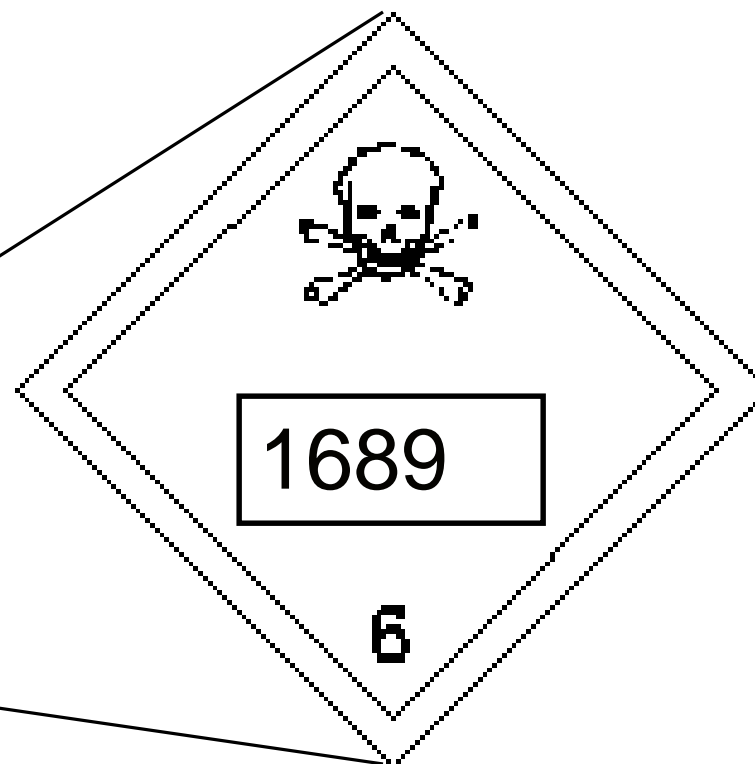
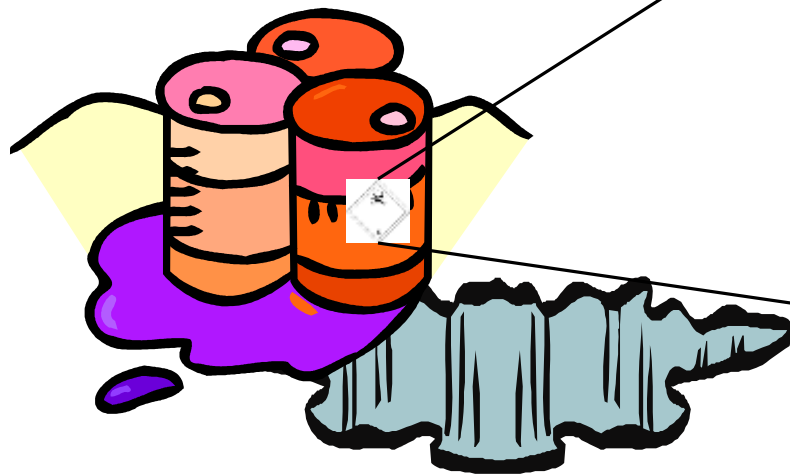


KTVI-TV St.Louis, Missouri, USA

- For ID 1017, the **GREEN** Section suggests, for large spills during the day, 2.1 miles as a Protective Action Distance in moderate wind; The Emergency Responders will have to decide which Protective Action will be pursued: evacuation, shelter in place, or a combination of both;
- At **Guide 124**, under *Potential Hazards*, the *Health* hazards precede the *Fire or Explosion* hazards;
- The **Guide 124** indicates that this product is toxic and may be fatal if inhaled or absorbed through the skin.

## Example 7

- A drum is leaking in a puddle of water.



## Solution for Example 7



- The ID Number is 1689;
- The **YELLOW**-bordered pages indicate that this substance is *Sodium cyanide*;
- It refers to **Guide 157** and the substance is highlighted;
- The **Guide 157** corresponds to ***Substances – Toxic and/or Corrosive (Non-Combustible / Water-Sensitive)***;
- The substance is highlighted and there is a spill situation: Table 1 / the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;



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## Solution for Example 7



- Under ID No.1689, the **GREEN** Section suggests distances specifically when the product is spilled in water. If this is not the case, the initial isolation and evacuation distances must be taken from **Guide 157**, under **Public Safety**;
- Since the product is leaking in water, the **GREEN** Section suggests an Initial Isolation Distance of 30 metres in all directions for a small spill and 100 metres in all directions for a large spill;
- Additionally, the Protective Action Distances for day and night will have to be taken from the **GREEN** Section;



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## Solution for Example 7



- The **Guide 157** indicates that this type of substance is toxic and non-combustible, but fire will produce irritating, corrosive and/or toxic gases;
- For a water-reactive substance (mention **when spilled in water** in Table 1) , refer to the last pages of the **GREEN** Section (Table 2), where the TIH gases produced are listed, for each water-reactive substance; in this case the gas produced is *HCN* or *Hydrogen cyanide*;
- Searching for *Hydrogen cyanide* in the **BLUE** Section, there is a reference to **Guide 117**, which correspond to **Gases – Toxic – Flammable (Extreme Hazard)**.

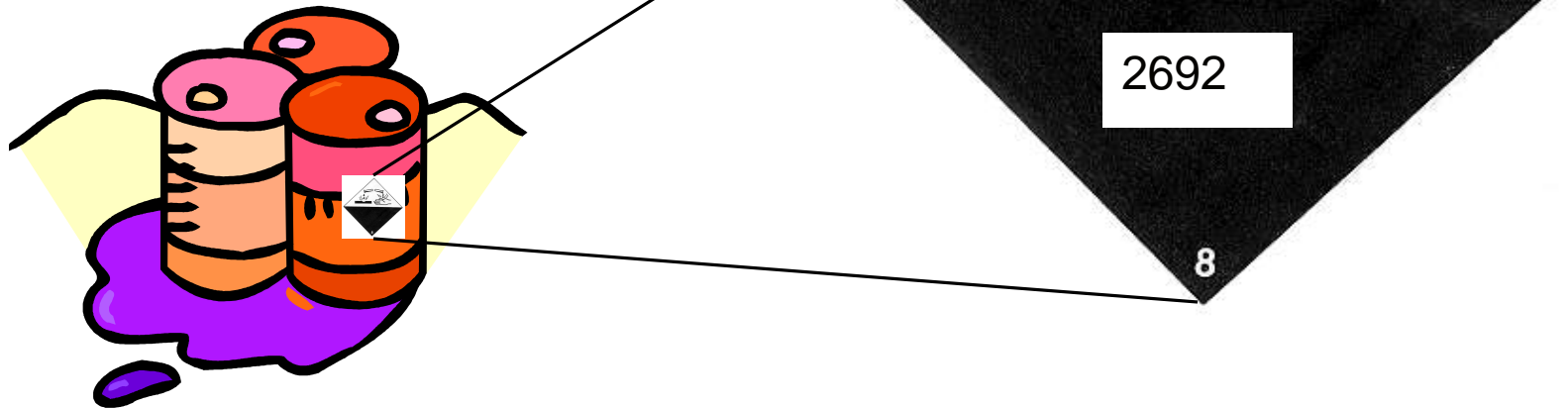
## Solution for Example 7



- NOTE: In the **GREEN** section (Table 1), you must use the Initial Isolation and Protective Action Distances (IIPAD) for the water reactive material itself (**when spilled in water**) (*in this case UN1689*) and not the IIPAD for the generated TIH gas (*Hydrogen cyanide*).
- ***Be prepared to move back though!***

## Example 8

- A drum containing this substance is punctured and is leaking on the ground.





## Solution for Example 8

**ID No. is 2692;**

- The **YELLOW**-bordered pages indicate that this substance is called *Boron tribromide*;
- It refers to **Guide 157** and is highlighted;
- The **Guide 157** correspond to ***Substances – Toxic and/or Corrosive (Non-Combustible / Water-Sensitive)***;
- Since the substance is highlighted and there is a spill situation, the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;
- For this product, the **GREEN** Section presents 2 separate entries for ID No. 2692: the 1<sup>st</sup> one applies when the product is spilled on the ground and the 2<sup>nd</sup> one, when it is spilled in water;

## Solution for Example 8



- In this case, the product is spilled on the ground and the Initial Isolation Distance suggested in the **GREEN** Section is 30 metres in all directions for a small spill and 60 metres in all directions for a large spill;
- Additionally, the Protective Action Distances for day and night will have to be taken from the **GREEN** Section;
- The **Guide 157** indicates that this type of substance is toxic and non-combustible, but a fire will produce irritating, corrosive and/or toxic gases.



## Example 9

- An alert for Sarin gas was activated in a building.





## Solution for Example 9

- The product involved is *Sarin*;
- The **BLUE**-bordered pages indicate that the ID No. is 2810;
- It refers to **Guide 153** and the substance is highlighted;
- The **Guide 153** corresponds to ***Substances – Toxic and/or Corrosive (Combustible)***;
- Since the substance is highlighted and there is a spill situation (type of dispersion is unknown), the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;
- In the **GREEN** Section, there are multiple entries for ID No. 2810; select ***Sarin (when used as a weapon)***;



## Solution for Example 9

- The **GREEN** Section suggests an Initial Isolation Distance of 60 metres in all directions for a small spill and 400 metres in all directions for a large spill; these distances will have to be adapted considering that the incident takes place inside a building;
- Additionally, the Protective Action Distances for day and night will have to be taken from the **GREEN** Section, and adapted;
- The **Guide 153** indicates that this type of substance is toxic and the effects of contact or inhalation may be delayed;
- The **Guide 153** also indicates that the substance is combustible, may burn, but does not ignite readily; a fire may produce irritating, corrosive and/or toxic gases.



- OBSERVE
- **REPORT**
- EVACUATE
- SET A PERIMETER
- DECONTAMINATE
- TRIAGE

# HAZMAT



Almost done,  
Now, Please take the quiz by  
clicking on this link:  
[HAZMAT Quiz](#)



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