

## Reading Hazardous Materials Placards

~or~

“What’s that tank car, intermodal container, or truck carrying?”

Text and Photos by Rich Mahaney, Superintendent, Eastern Iowa Division/NMRA

Bulk containers transporting hazardous materials are required to be placarded per the Department of Transportation (DOT) regulations in the United States. Similar rules apply in Canada and Mexico, and are part of an international marking system.

Placards are a diamond shaped hazardous material information source for emergency responders, railroad employees and others. They are approximately 10.8 inches (273 mm) by 10.8 inches (273 mm) and sit on the point at a 45 degree angle. Labels, which are just like placards for most classes of hazardous materials, only smaller in size, are attached to non-bulk containers or packages of hazardous materials. Labels are approximately 4 inches (100 mm) by 4 inches (100 mm) and again are a diamond shape.



A placard provides the viewer with a variety of information through several different methods. First is the color of the placard.

Red indicates flammable, green indicates nonflammable, yellow indicates oxidizer, blue indicates dangerous when wet, white indicates inhalation hazard and poison, black and white indicates corrosive (acid and caustic), red and white indicates flammable solid or spontaneously combustible, depending on the color pattern on the placard, white and yellow indicates radiation or radioactive, orange indicates explosives, white with black stripes indicates miscellaneous hazardous materials, and there is another red and white placard that says “dangerous” on it.

A second information indicator is the number in the bottom corner of the diamond. This number refers to the hazard classes as used internationally and by the United States DOT.

There are 9 classes for hazardous materials:

- Class 1 explosives
- Class 2 gases (flammable, nonflammable, inhalation hazard/poison, or oxygen)
- Class 3 liquids that burn (flammable and combustible liquids, based on their flashpoint)
- Class 4 flammable solids, spontaneously combustible, or dangerous when wet materials
- Class 5 oxidizers and organic peroxides
- Class 6 poison/toxic solids and liquids, infectious materials
- Class 7 radioactive (three sub classes)
- Class 8 corrosives (acids and bases)
- Class 9 miscellaneous

A third indicator is the symbol in the upper corner of the diamond. A variety of symbols are used to indicate combustion, radiation, oxidizers, compressed gas, destruction of materials and skin by corrosives, an explosion, or skull and cross bones to indicate poisons.

The fourth item on a placard is the four digit United Nations (UN) number used for the hazardous material contained in the container. There are hundreds of four digit numbers used, from 1001 (acetylene) to 9279 (hydrogen, absorbed in metal hydride). The number in some cases is specific to a chemical and in other cases reflects a variety of hazardous materials. (For example, 1017 is only used for chlorine, 1005 has five chemical listings, 1993 is used for eight chemical listings and 2810 is used for 36 chemical listings.)

In some cases placards will give the real name of the chemical instead of using the four digit number, or will describe the hazard (flammable, inhalation hazard, radioactive) and not list the chemical name or four digit number. Placards from other countries can be found in United States and may have different words than North American placards. It is possible to see a red placard with a 3 in the bottom corner and the words "inflammable liquid" on it, which sounds like the chemical may not burn, but this actually means the "chemical will burn". If you are looking for unique placards, watch the placards going by on intermodal containers that are passing through our area. Also, some containers or tank cars may have a placard without the four digit "UN" number, but instead will have an "orange" panel with the UN number on it. The orange panel is another way of legally posting the four digit chemical UN number on the container. You will commonly see the orange panel on molten sulfur filled tank cars.



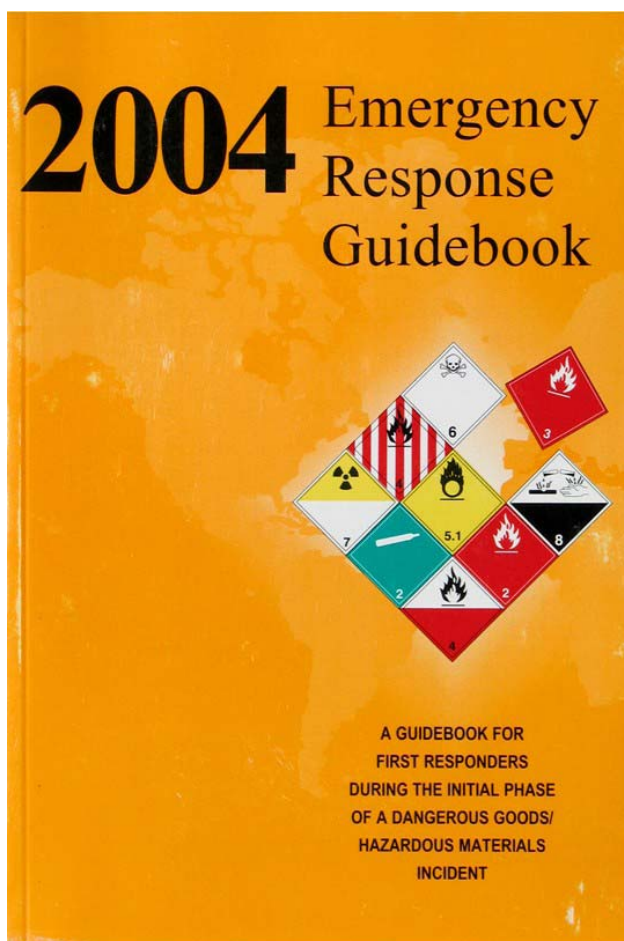
Placards are required to be posted on all four sides of a “bulk container” (rail car, truck, intermodal container), meaning there needs to be four placards. In addition to tank cars and intermodal, you will find hazardous materials being transported in box cars, covered hoppers, gondolas, and on flat cars. Sometimes you might see more than one placard on the side of a container, that is being done by an “over achieving employee”, because only one is needed. Bulk containers with less than one placard per side (if only one placard is needed for the chemical), are subject to a citation(s) from transportation inspection/enforcement agencies. There are some chemicals that are required to have more than one placard on the container; this is because they have been identified as having more than one hazard that needs to be warned of. Anhydrous Hydrogen Fluoride is required to have three different placards on each side of the “container”. A missing placard on a railroad car could be a \$2,000 fine.



Commonly seen placard four digit numbers on railroad tank cars in Iowa are:

- 1005 anhydrous ammonia
- 1017 chlorine
- 1075 liquefied petroleum gas
- 1090 acetone
- 1170 ethanol
- 1203 gasoline
- 1789 hydrochloric acid
- 1824 sodium hydroxide (liquid caustic soda)
- 1830 sulfuric acid
- 1987 denatured alcohol (ethanol)
- 2014 or 2015 hydrogen peroxide
- 2187 carbon dioxide
- 2448 molten sulfur

To be able to find out what other placard numbers indicate, the easiest method is to purchase an "Emergency Response Guidebook". The 2004 edition is the most current edition (a 2008 edition is being worked on). They can be purchased from LabelMaster, Lab Safety, J.J. Keller and many other places on the internet. They do come in a variety of sizes and styles, so a type or size and style can be found to meet any budget. You can also download "ERG" information to your personal computer from the United States DOT website or the Transport Canada website for free, and you can just look up the chemicals on line by using an electronic version of the ERG.



The Emergency Response Guidebook has several sections based on the color of the pages. White pages provide directions, emergency phone numbers, general information and guidance. The yellow section lists the chemicals based on their four digit UN guide numbers. The blue section lists the chemicals in alphabetical order (a way for you to get the four digit UN number and the guide page number also). The orange section is the guide pages which provide emergency chemical information, actions to take, personal protective equipment guidelines, fire extinguishing material recommendations and isolation/evacuation distances; these are known as the "guide pages". The green section provides distances for isolation and protective action (evacuation and shelter-in-place distances) for chemical that are gases or will travel as gases and a list of water reactive chemicals that will give off toxic gases when they get wet.

Tank cars are required to be placarded when they are loaded with hazardous materials. When tank cars are emptied, they are required to continue to be placarded until they are washed out, or cleaned out such that all traces of the hazardous materials are removed. "Empty" tank cars with some product still left in them are known as "residue" tank cars. "Residue" tank cars may have as much as 3% of their original contents still in them, but be listed on the train list as "empty". So when you are watching tank cars going past you at a railroad crossing, you may not know if the car is full, half full or almost empty because they will all be "placarded" the same. This is where a check of the compression of the springs on the trucks may help, or being able to read the train list if you can talk to the train crew. At one time, placards could just be turned around in their holders, because on the backside was the same placard markings, but it read "residue", but those are gone now.

I hope this will make train watching more interesting for you. Railroads transport lots of different chemicals, with one of the safest records there is in the transportation industry.



1,365 words  
1.14  
3 photos