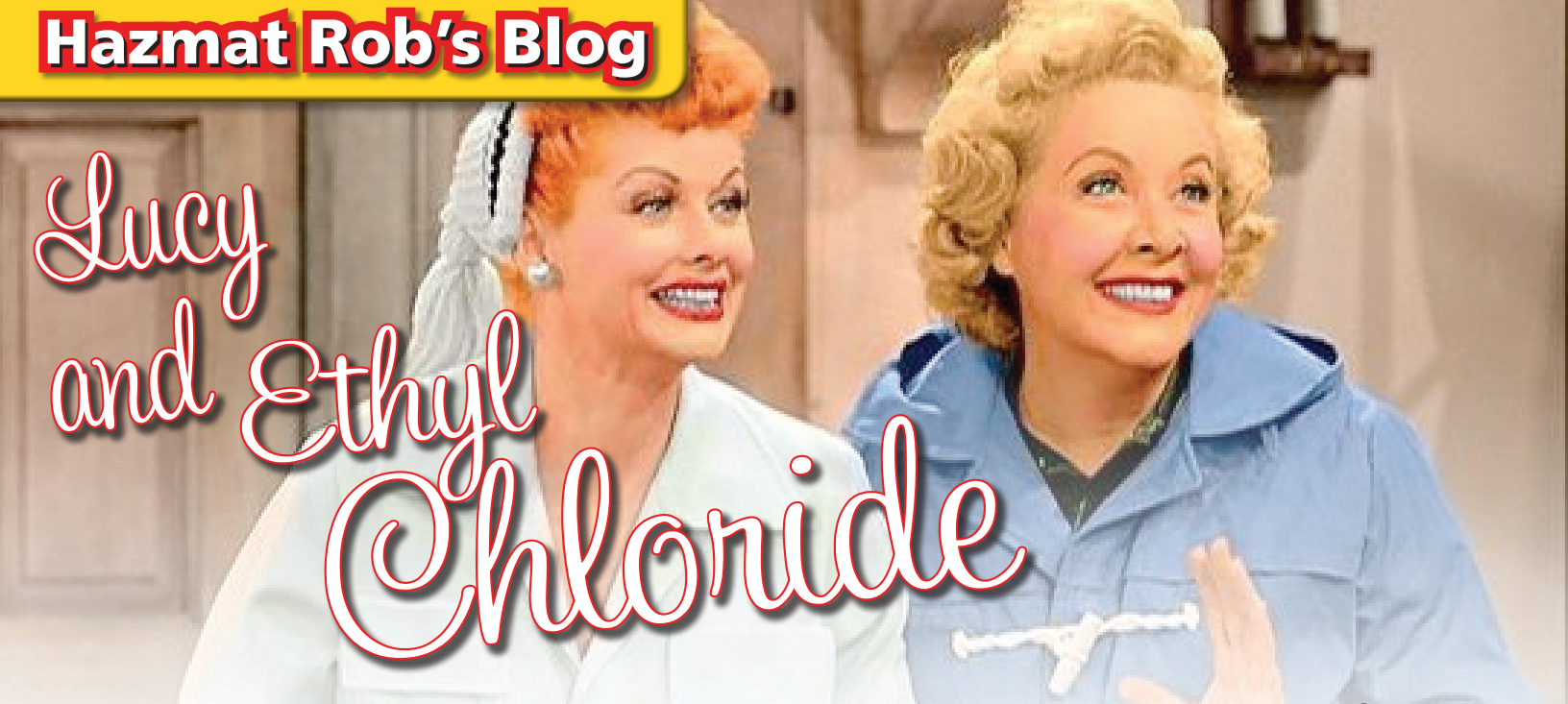

Lucy and Ethyl Chloride

I spend all day on proper shipping names in my Hazardous Materials and Waste Management Seminars, ALL day. If you don't select the correct proper shipping name for your hazardous material, hazardous waste, hazardous substance, marine pollutant or elevated temperature material, you are in trouble. If I were to write every day for the rest of my life about the 49 CFR Department of Transportation Hazardous Materials Regulations (HMR), 60% of it would be about the proper shipping name. It is easy to determine the hazard class, the packing group and the labels required for a hazardous materials shipment. However, if the shipping name is not correct, the shipper would be in violation.

Proper shipping names determine packaging, and improper packaging causes accidents. Proper shipping names authorize containers, but regardless of what containers are indicated in Column 8 of the HM Table, it is the shipper's responsibility to insure that containers never fail due their contents. But, believe me, by picking the correct proper shipping name, the shipper would have a better chance of knowing what container may not be authorized especially when shipping mixtures of chemicals.

This is not the first time I have written about the mixture and solution regulations under DOT. The reason I want to revisit this topic is because I had a very good customer call me recently after a DOT inspection and letter of probable violation. He was formulating a defense and wanted help with his campaign. There was only one problem; he was wrong. He had the right hazard class, packing group and label, but because he used the wrong shipping name, it authorized the wrong container.

Ok, if it had not been a mixture of the gas, ethyl chloride, with another hazardous material, this might not have happened because very few gases are listed by their proper shipping name in the 172.101 Hazardous Materials Table. Most cylinders of gas are not authorized to be shipped under their pure chemical names; I honestly believe that most shippers would be shocked to learn how few gases are listed by their chemical names in Column 2 of the 172.101 Hazardous Materials Table. So when you find a gas that is listed by name, it may have its own exclusive packaging section in the regulations.

Here's what I mean. When shipping non-bulk containers of liquids and solids in Packing Group I, II, or III, regardless of their shipping names, you seem to be repeatedly sent to the same packaging instructions. If you look up and down the 172.101 Hazardous Materials Table in Column 8B, Non-bulk Packaging Requirements, you will notice that DOT consistently authorizes 173.201 for liquids in Packing Group I, 173.202 for Packing Group II and 173.203 for liquids in Packing Group III. For solids in non-bulk containers, packaging authorizations in most cases can be found in 173.211, for Packing Group I, 173.212 for Packing Group II and 173.213 for Packing Group III.

So, as a general rule, when you ship non-bulk containers of flammable liquids in Packing Group II, most people assume the packaging instructions will be found in Section 173.202. But that's not the case; shippers are required to meet the requirements listed for that proper shipping name in Column 8 of the 172.101 Hazardous Materials Table regardless of the material's hazard class, packing group or label(s).

Let me explain, if you select the proper shipping name Paint, Class 3, PG II, or Acetone, Class 3, PG II or even Flammable Liquid, N.O.S., Class 3, PG II, all three of these proper shipping names direct the shipper to a list of approved containers in 173.202 Non-bulk packaging for liquid hazardous materials in Packing Group II. But you must never assume that if two different chemicals share the same hazard class, packing group and label(s) that they are both authorized to be shipped in the same container type. This dead wrong!

I believe this is most evident when shipping gases. If you select the proper shipping names Difluoromethane (Division 2.1 flammable gas), Compressed gas, flammable, N.O.S. (again a Division 2.1, flammable gas) or even Methane Fluoride (also a Division 2.1 flammable gas), you will find that for each of these 2.1 Flammable Gas shipping names, Column 8B directs the shipper to the packaging instructions in 173.302 - filling of cylinders with non-liquefied compressed gases. So most people assume that when you ship a 2.1 flammable gas, you must always meet the requirements in 173.302, which again, is a mistake.

Before I go any further, I need to get something off my chest. I told you that most shippers did not know that very few gases are listed in the Hazardous Materials Table by their pure chemical names; well, neither did I. It wasn't until I wrote my first "break in the web" blog a few years ago titled "Don't Call Me an Aerosol'' that I first realized just how few pure gases are listed by their proper shipping names. What I learned by writing that blog was that most gases are shipped under an end-use name or N.O.S. (not otherwise specified) shipping name like Aerosols or Compressed gas, flammable, N.O.S. In fact, when you look up most N.O.S names for gases, you will find you are constantly being sent to the same two sections of the book, 173.302 for cylinders of non-liquefied compressed gases and 173.304 for cylinders of liquefied compressed gases.

But not for Ethyl Chloride, which is a gas and one of the few that is listed by its name. Shippers should be aware just how fast things can go bad, when those pure chemical names that are listed, like Ethyl Chloride are not used. Ethyl Chloride is a flammable non-liquefied compressed gas in Division 2.1. Therefore, you might expect to find the reference number 173.302 for your packaging instructions in Column 8B of the Hazardous Materials Table. But that is not the case. There's a reason that Ethyl Chloride is listed by its proper shipping name and is never allowed to be shipped under an end-use or N.O.S. proper shipping name. If you were to reference the proper shipping name Ethyl Chloride in the Hazardous Materials Table you would not find Section 173.302 in Column 8B. Instead you would see the reference 173.322, which is specifically for packagings of Ethyl Chloride, which unlike most other Division 2.1 flammable gases, requires single or combination non-aluminum containers to meet the Packing Group I performance level requirements.

In fact, it was a shipment of Ethyl Chloride, mixed with a small amount of another hazardous material, that lead DOT to change the requirements for mixtures and solutions in 172.101(c) a few years ago. This shipper mixed Ethyl Chloride in the same cylinder with another Division 2.1 flammable gas. In the past, the Department, as you know, required shippers to use the chemical proper shipping names only if they were pure chemicals, but they went on to say, if a shipper **mixed a pure hazardous material, like Acetone, which is listed by name in the Table, with a non-hazardous material like water** and by doing so did not change the hazard class, packing group or labeling requirements shown for the pure chemical, the material should be shipped as (in this example) UN1090, Acetone, **Mixture**, 3, PG II, by using the packaging instructions for the shipping name Acetone in Column 8 of the Table.

The problem this shipper had was that the use of the word “mixture” was only allowed back then, when mixing a PURE hazardous material with a non-hazardous material. So, this shipper felt that adding the word ‘’mixture” to his shipping name, for his two separate hazardous materials in the same cylinder, was not authorized. So the shipper used the shipping name Compressed gas, flammable, N.O.S., 2.1, which authorized the use of aluminum cylinders in Column 8B. Unknown to the shipper, the reason Ethyl Chloride has its own packaging requirements in Section 173.322, is because Ethyl Chloride reacts with the aluminum on the inside of cylinders and they rupture. This was unfortunately what happened.

DOT did not cite the shipper for using the wrong name. Back then, he didn’t; he had used the right shipping name and one of its authorized containers. They cited him because the general packaging requirement mandates that even when the regulations authorize a package, it is the shipper’s responsibility to ensure that it is compatible with its lading, without regard to the shipping name used, because it is always the shipper’s responsibility to ensure that the authorized packages must never degrade or react with the material being shipped.

After this came to the attention of DOT, they decided to change the requirements for mixtures and solutions. So now, if a shipper references 172.101(c)(10) - Mixtures and Solutions, there has been a minor change to the wording. It now says that when you mix a hazardous material with a non-hazardous material or **a small percentage of a different hazardous material....**if the mixture does not change the hazard class, packing group or label(s) for the pure material listed in the HM Table, the shipper shall use the proper shipping name of the main chemical, like Acetone and add the word **“MIXTURE” or “SOLUTION”** to the proper shipping name, i.e.: UN1090, Acetone, Mixture, 3, PG II.

Under the change, DOT feels that by adding the word “mixture” or “solution” to Ethyl Chloride and the other small percentage of hazardous material, i.e.; Ethyl Chloride, Mixture, would have directed the shipper to the correct packaging requirements in Column 8B and to the restriction on aluminum cylinders. This would ensure that the material had a much better chance of being packaged correctly. Just remember, unless they are compatible with the material, authorized containers are not authorized for use.

When the Department of Transportation takes the time to list a gas in the HM Table by its proper shipping name, there is something about that material that may require the shipper to go beyond normal or general container requirements. Pure chemicals, when listed by name in the Table, are really not that hard to package or ship, but when your chemical is not listed by name or you have a mixture, it can get a little dicey. If you’re not sure you’re using the proper shipping name or containers, drop us an email or give us a call. Thank you for your input, readership and support.

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