



When Is a Cylinder Hazardous Waste?

In May of 1980 the Resource Conservation and Recovery Act (RCRA) and regulations defined requirements for Hazardous Waste. There was considerable debate as to the applicability of these regulations to cylinders containing gas residue being returned to the gas supplier. If they were this would have been onerous for gas suppliers and their customers. Gas suppliers would become waste disposal companies, cylinders would have to be manifested, common carriers could not transport these cylinders, etc.

Laurence Bierlein, General Counsel to the Compressed Gas Association summarized the CGA position in a letter on Oct 28, 1980 to Steven Silverman, EPA Office of General Counsel. He stated that:

Cylinders containing residue that are discarded in a landfill are “contained gaseous material” falling within the requirements of RCRA. It is our position, however, that the handling of residues that have been removed from returned cylinders is not a function involving “contained gaseous waste” and, therefore is not regulated under RCRA

He went on to state

Upon receipt of a cylinder returned by his customer, a gas producer may do any of several things with the residue. If he merely refills the unit, topping it off and sending it back to a customer, there is no waste and, of course, no question of involvement of any waste regulations. Due to the potential for contamination, however this practice may not be appropriate in all circumstances. Other options include re-entry of the residue into the production stream of the company with purification as required, reuse of the gas, chemical reaction of the residue or flaring through stacks. In certain instances gases are vented directly to the atmosphere, a process not addressed under the regulations of May 19 or the statutory definition of disposal and in our view clearly outside RCRA.

A meeting was held on Oct 15, 1980, between CGA and EPA. On Nov 3, 1980, John P. Lehman Director Hazardous and Industrial Waste Division, EPA sent a letter agreeing with the CGA position. This was further clarified in a Nov 1981 letter from Christopher Capper, Acting Assistant Administrator for Solid Waste and Emergency Response.

Final rulemaking was published in the Federal Register Vol 47 160 pg 36094 Aug. 18, 1982



All compressed gas cylinders are owned or are equivalent control of the gas supplier. When the customer has completed his use of the gas, the cylinder is returned to the gas supplier. As a matter of safety, there is residual pressure in the cylinder when it is returned. (The return transportation is extensively covered under the Federal Hazardous Materials Regulations, 49CFR 170-189) The customer's purpose in making this shipment is to return the supplier's property not to discard the remaining contents of the cylinder. The general practice is to return the cylinder for refilling. The customer does not make the decision on the final disposition of the residue in the cylinder, this is the exclusive prerogative of the gas supplier. Further the decision whether or not to discard the contents of the container is not made until the container is returned to the supplier.

Under these circumstances, the customer is not generating a waste by merely returning the cylinder and neither the returned container nor the contained residue is a "solid waste" as that term is defined by the Resource Conservation and Recovery Act and 40CFR Part 251

The regulations are very strict on when a cylinder can be marked empty and the DOT hazard labels and markings removed.

49 CFR§173.29 Empty packagings.

(a) General. Except as otherwise provided in this section, an empty packaging containing only the residue of a hazardous material shall be offered for transportation and transported in the same manner as when it previously contained a greater quantity of that hazardous material.

(b) Notwithstanding the requirements of paragraph (a) of this section, an empty packaging is not subject to any other requirements of this subchapter if it conforms to the following provisions:

(1) Any hazardous material shipping name and identification number markings, any hazard warning labels or placards, and any other markings indicating that the material is hazardous (e.g., RQ, INHALATION HAZARD) are removed, obliterated, or securely covered in transportation. This provision does not apply to transportation in a transport vehicle or a freight container if the packaging is not visible in transportation and the packaging is loaded by the shipper and unloaded by the shipper or consignee;

(2) The packaging-

(i) Is unused;

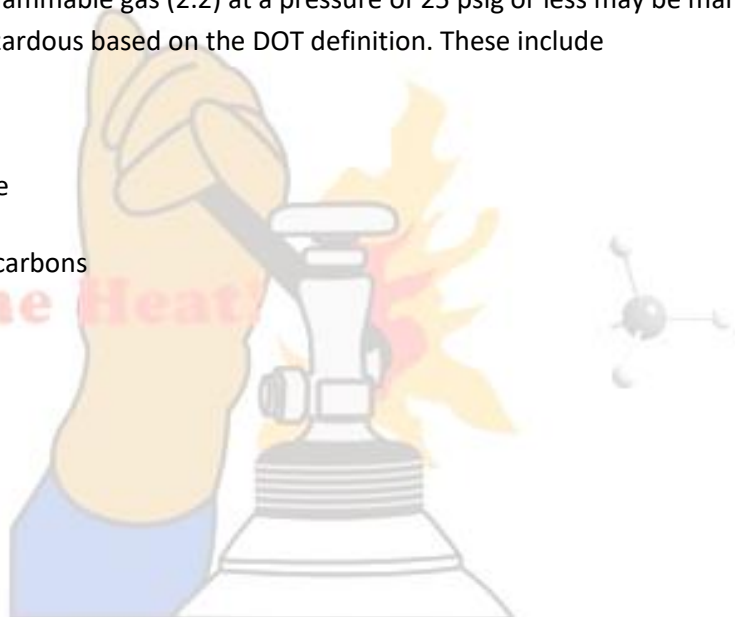


- (ii) Is sufficiently cleaned of residue and purged of vapors to remove any potential hazard;
- (iii) Is refilled with a material which is not hazardous to such an extent that any residue remaining in the packaging no longer poses a hazard; or
- (iv) Contains only the residue of-
 - (B) A Division 2.2 non-flammable gas, other than ammonia, anhydrous, and with no subsidiary hazard, at an absolute pressure less than 280 kPa (40.6 psia); at 20° C (68° F); and

This means any used cylinder containing other than a Nonflammable gas (2.2) must retain the markings and hazard labels as if full. The shipping papers will be marked “last containing”.

Cylinders containing a Nonflammable gas (2.2) at a pressure of 25 psig or less may be marked “Empty” since they are no longer hazardous based on the DOT definition. These include

1. Argon
2. Carbon dioxide
3. Carbon tetrafluoride
4. Compressed air
5. Halogenated hydrocarbons
6. Helium
7. Krypton
8. Neon
9. Nitrogen
10. Nitrous oxide
11. Oxygen
12. Sulfur hexafluoride
13. Xenon



For all gases the cylinder must be cleaned and purged of the gas before it can be labelled “Empty” and the labels and markings removed for transportation. ¹

EPA's definition of empty cylinders. They add a requirement for triple rinsing if the cylinder contained an acute hazardous waste, see 40CFR261.7(b)(2)&(3). Acute hazardous wastes in cylinders include:

1. Cyanogen
2. Cyanogen Chloride
3. Fluorine
4. Hydrogen Cyanide
5. Nickel Carbonyl
6. Nitric Oxide
7. Nitrogen Dioxide
8. Phosgene



9. Phosphine
Only after triple rinsing can the cylinder be disposed of as a nonhazardous waste.

Eugene Ngai

