



When can a cylinder be marked empty?

Aug 24, 2021

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.

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Reference:

1. J. Gale, DOT response to E.Y.Ngai, Aug 20, 2001, Ref 01-0169