



U.S. Department  
of Transportation  
**Research and  
Special Programs  
Administration**

JAN 31 2003

400 Seventh St., S.W.  
Washington, D.C. 20590

Mr. K. W. Ritchey  
708 E. 15<sup>th</sup> Street  
Kearney, MO 64060

Reference No.: 02-0313

Dear Mr. Ritchey:

This is in reference to your recent letter regarding the filling of manifolded carbon dioxide (CO<sub>2</sub>) cylinders under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). You inquired about the filling of a manifolded "three bottle system" that you state is "tied into a fill station on the side of the building." You inquired whether the high pressure CO<sub>2</sub> cylinders must "be removed and returned to an appropriate 'scale' and 'filling station' for proper and safe filling?"

You describe a cylinder filling technique that is possibly used at a customer's site. The configuration consists of three manifolded high pressure cylinders (two cylinders serve as liquid cylinders and one serves as a vapor cylinder) or any combination of a multiple of three cylinders. The "liquid" cylinders are filled with liquefied CO<sub>2</sub> to 90-95%, with a special fill manifold blocking the flow of CO<sub>2</sub> to the "vapor" cylinder. As the CO<sub>2</sub> expands, it vents through the fill manifold into the "vapor" cylinder.

Cylinders that are used at a work site and not offered for transportation come under the jurisdiction of the Department of Labor's Occupational Safety and Health Administration (OSHA). You should contact OSHA or your state agency for information concerning such cylinders.

With regard to transportation, a liquefied gas may not be offered for transportation unless packaged in a DOT authorized (DOT specification or exemption) cylinder and filled in accordance with the applicable requirements specified in the HMR. As specified in § 173.304a(a)(2) Table, the maximum permitted filling density for a cylinder filled with CO<sub>2</sub> is 68%. That is, each cylinder may be filled with liquid to no more than 68% of its water weight capacity at 60 degrees F. See Note 1 following the § 173.304a(a)(2) Table and § 173.301(a)(8) and (g)(1).

I hope this satisfies your inquiry. Should you have any further questions, please contact this office.

Sincerely,

Hattie L. Mitchell  
Chief, Regulatory Review and Reinvention  
Office of Hazardous Materials Standards



020313

173.304a

Mitchell

§173.304(a)  
Cylinder  
02-0313

To whom it may concern,  
I have had several friends, relatives, and co-workers inquire about this setup for "safety" reasons. I do not have the answers, but I did tell them I would check to see if and what the standards for "safety" are on this "Manifold" or "Three Bottled System". This system contains 3 "HIGH" pressure CO2 cylinders tied together on a manifold and then tied into a fill station on the side of the building (A). Is it true that the way they fill this system is by over filling the first 2 and then opening the third bottle to let the runoff spill over to it, as was described to me by several of the interested parties I mentioned before, or is it required that a "HIGH" pressure cylinder be removed and replaced with a full cylinder, and the empties be returned to an appropriate "scale" and "filling station" for proper and safe filling? We would appreciate any and all answers to this inquiry. Thank you very much for your quick response, as I know there are several interested lives waiting to hear, one way or another. Again, Thank you for your time.

K.W.Ritchey