U.S. Department
of Transportation
**Pipeline and
Hazardous Materials Safety
Administration**

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

JUL 28 2005

Mr. Michael Fox
Chemical Accident Reconstruction Service, Inc.
9121 E. Tanque Verde Road #105
Tucson, Arizona 85749

Ref. No. 05-0081

Dear Mr. Fox:

This responds to your March 30, 2005 letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to DOT 2Q inner non-refillable metal receptacles. Specifically, you ask if a DOT 2Q container that passes a hydraulic pressure test and fails when subjected to a heat-to-burst test would satisfy the pressure test requirements for DOT 2Q containers specified in § 178.33a-8.

As specified in § 178.33a-8, one out of each lot of 25,000 DOT 2Q containers or fewer, successfully produced each day must be pressure tested to destruction and must not burst below 270 psig. The HMR do not specify the type of pressure test that must be used, nor do the HMR require multiple pressure tests to be conducted on a single lot of DOT 2Q containers. The manufacturer is responsible for selecting the appropriate pressure test method to use on the single container selected from each lot. Therefore, if a manufacturer chooses to use a hydraulic pressure test method and the container does not burst below 270 psig, the lot of DOT 2Q containers passes the pressure test requirement. However, if a manufacturer chooses to use a heat-to-burst test method and the container bursts below 270 psig, the lot of DOT 2Q containers fails the pressure test requirement and must be rejected. In that event, 10 additional containers may be selected at random from the same lot and subjected to the test under which the failure occurred. If any of the 10 additional containers fails the test, the lot of DOT 2Q containers must be rejected.

If you would like to propose a change to the HMR, you may submit a petition for rulemaking following procedures outlined in § 106.95.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

John A. Gale
Chief, Standards Development
Office of Hazardous Materials Standards

050081

173.306(a)(3)ii
178.33a-8

Chemical Accident Reconstruction Services, Inc.

March 30, 2005

August 28, 2004

Webb
§ 173.306(a)(3)(ii)
§ 178.33a-8
Limited Quantity for
Compressed Gases
05-0081

John A. Gale
Chief, Standards Development
U.S. Department of Transportation
Office of Hazardous Materials Standards
Washington, D.C 20590

Re: 49 CFR 173.306(a)(3)(ii)

Dear Mr. Gale:

Thank you for your letter (copy attached) of March 18, 2005 in answer to my inquiry of August 28, 2004.

After waiting such a long time (about 7 months), it was disappointing that your letter did not answer the question that was asked. Your letter was also inconsistent with my conversations with Mr. Staniszewski. Therefore, I will re-ask the question and try to make it clearer.

For the purpose of my question, please assume I am asking only about DOT 2Q containers. The question has to do with test method to determine burst pressure and the finding that the results depend on the test method used to perform the burst test.

If I perform a burst test using hydraulic (water) methods, the containers do not burst below the DOT minimum burst pressure of 270 psig. They may begin to deform below 270 psig, but the double seam does not unravel or leak until higher pressures (over 350 psig) are reached. Therefore, via the hydraulic test, the containers pass the DOT 270 psig burst criterion. As I discussed with Mr. Staniszewski, the hydraulic method is very slow and does not involve any kinetic energy.

On the other hand, if I perform heat-to-burst tests, the containers explode (violently) at pressures substantially below the 270-psig minimum. I have seen explosions of DOT 2Q containers as low as 180-200 psig. These are the same DOT 2Q containers that pass the hydraulic test with flying colors. The different result is due to the kinetic energy present in the heat-to-burst test that is not present in the hydraulic testing.

While I am not making an argument one way or the other, it is obvious that transporters and consumers rarely encounter DOT 2Q containers filled with high-pressure water. On the other hand, there is a definite possibility that they might encounter a DOT 2Q container filled with its contents, which have been exposed to some type of heat.

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From the viewpoint transporter and consumer safety, it would seem that if a DOT 2Q container violently explodes at pressures well below 270-psig in a heat-to-burst test, then that container would NOT meet DOT specifications, even if it passed a hydraulic burst test. It seemed that Mr. Staniszewski agreed with that when we spoke.

Therefore, the question I would like to have answered is:

> If a DOT 2Q container passes the 270-psig burst requirement via a hydraulic pressure test, but explodes well below 270-psig in a heat-to-burst test, does that container pass or fail DOT 2Q burst specifications?

Your prompt answer to the above simple question will be greatly appreciated.

Thank you for your assistance.

Sincerely,

MICHAEL FOX

Michael Fox, Ph.D.
Founder

P.S. Note that the experiments demonstrating the differences between hydraulic test methods and heat-to-burst testing have been accepted for June publication in a peer-reviewed journal. They will also be presented, discussed and published in more detail at the Fall ASM Conference.