



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

1200 New Jersey Ave, SE  
Washington, D.C. 20590

JAN 7 2011

Mr. John Cox  
Fire Chief  
P. O Box 21  
Jamaica, Iowa 50128

Ref. No.: 10-0019-R

Dear Mr. Cox:

It has been brought to our attention that our response to your January 31 email regarding the condemnation criteria in the Hazardous Materials Regulations (HMR; 49 CFR parts 171-180) applicable to DOT-3AL cylinders manufactured of 6351-T6 aluminum alloy was incomplete. Specifically, you asked about conflicting condemnation criteria in § 180.209(m), Appendix C of Part 180, and CGA Pamphlet 6.1 regarding these cylinders.

In our April 28, 2010 letter, Ref. No.: 10-0019, we said the following:

Section 180.205(f)(4) requires each specification cylinder manufactured of 6351-T6 aluminum alloy used in self-contained underwater breathing apparatus (SCUBA), self-contained breathing apparatus (SCBA), or oxygen service to be inspected for sustained load cracking (SLC) in accordance with Appendix C of Part 180 every five years. The inspection must include both a visual inspection and an eddy current examination. Each cylinder with SLC that has expanded into the neck threads must be condemned in accordance with § 180.205(i). That is, the cylinder must be condemned when evidence of cracking exists to the extent that the cylinder is likely to be weakened.

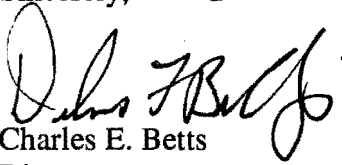
As prescribed in Appendix C of Part 180, visual examination of the neck and shoulder area of the [DOT 3AL] cylinder [described above] must be conducted in accordance with CGA Pamphlet 6.1. Cylinders with cracks must be condemned, and repair of neck cracks is not allowed. If the visual inspection does not identify cracks in the neck and shoulder area that would require condemnation of the cylinder, it must be subjected to an eddy current examination. If the eddy current examination reveals any crack in the neck or shoulder area of two thread lengths or more, the cylinder must be condemned.

In our April 28, 2010 response, we inadvertently provided partial information in the last sentence of the last paragraph. This letter is intended to clarify the requirements regarding condemnation criteria

specified in Appendix C of Part 180. The correct response is “[I]f the eddy current examination combined with a visual inspection reveals any crack in the neck or shoulder area of two thread lengths or more, the cylinder must be condemned”. Therefore, the letter designated as Ref. No.: 10-0019 is retracted and replaced by this letter, Ref. No.: 10-0019-R.

We apologize for any misunderstanding, and hope that it has not caused any inconvenience.

Sincerely,

  
jm Charles E. Betts  
Director  
Standards and Rulemaking Division

cc: Fred A. Nachman



Engrum  
§ 180.205  
§ 180.209  
Cylinders  
10-0230

October 26, 2010

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**Subject: Request for Clarification of PHMSA Letter of Interpretation No. 10-0019 re. Eddy Current Condemnation Criteria**

PHMSA Interpretation #10-0019 dated April 28, 2010 attempted to clarify the issue of conflicting condemnation criteria by stating that "If the eddy current examination reveals any crack in the neck or shoulder area of two thread lengths or more, the cylinder must be condemned." The wording and apparent intent does not allow for any visual confirmation of those flaws in the neck/thread area. Eddy current examination does not inspect the shoulder area for flaws.

**49CFR180 Appendix C(5) Condemnation Criteria** reads... *A cylinder must be condemned if the eddy current examination **combined with** visual examination reveals any crack in the neck or shoulder of 2 thread lengths or more.*

It is our clear understanding of **49CFR180** that a cylinder which fails *either* hydrostatic test or visual inspection must be condemned. The referenced interpretation No. 10-0019 for VE examinations seems to imply the same thing, i.e., if a cylinder fails hydro, visual inspection or eddy current examination, it must be condemned. **49CFR180 Appendix C(5)** does not say “or” which would clearly require the requalifier to condemn any 6351-T6 cylinder in SCBA, Scuba or oxygen service whenever a crack in the neck or shoulder area of 2 threads or more is indicated in the eddy current scans, regardless of whether or not it can be visually confirmed.

The **Sept/2000 Nondestructive Inspection of High Pressure Aluminum Gas Cylinders Report**, page 37, prepared for Mark Toughiry at DOT reads... *If the flaw is not visually detected, it is deemed to be a false positive on the part of the eddy current system so the cylinder is not rejected based on this false positive.* Table 4-1 showed the comparisons of effective identification of flaws by visual vs. eddy vs. UE in detecting neck cracks. Our reading showed visual inspection to pick up as many flaws as eddy examination without false positives. Discussions at CGA Cylinder Spec meetings when this regulation was being promulgated also lead us to understand that the Eddy Exam required Visual Confirmation.

Condemnation criteria quoted above which used the language “**combined with**” did not use the word “**or**” or “**and/or**” which would have made it perfectly clear that you could not override an eddy current scan even if the visual did not confirm.

It is our understanding that eddy current machines are not capable of checking the shoulder area of a medical cylinder- only the thread area. That area as well as any thread indications can be picked up and viewed with an Optical-Plus magnification light.

It is our understanding that it is difficult for the eddy current machine to differentiate a crack from a tool stop. See Figures 10 and 11 in **CGA C6.1- 2006**. Accordingly, the visual Optical-Plus light is needed to confirm it to preclude unnecessary condemnations.

VE examination scans also pickup indications from corrosion, dirt, thread folds, tool stops, etc.. How would the requalification process preclude unnecessary condemnation of 6351-T6 cylinders if a visual with a magnified Optical-Plus Light or some other equivalent device wasn't utilized to confirm a true condemnable defect picked up on the VE scan?

We also question the regulation in its exemption of CO2 cylinders from this requirement as we find a significant percentage of neck cracks that are rejected visually? While they are in a lower pressure service, they do expand and blow PRDs in high temperature Arizona environments.

Our mission at Thunderbird is to be compliant and safe without unnecessarily condemning our clients' fleet of 6351-T6 aluminum cylinders. Our clients rely on our integrity and diligence to understand and comply with Federal codes and best practices when requalifying their cylinders. Accordingly, we were confused by the letter of interpretation. Since we knowingly overrode visual eddy indications when unconfirmed by visual, are we subject to DOT sanctions of fines, incarceration and loss of authorization? What was our liability should injury or death occur? Would we lose the trust of our clients and regulators, if we did not do the right thing? Should we

ignor past requalifications and just change our procedures moving forward, thus exposing our customers and their clients to noncompliant requalifications and possible injury? Should we report our violation of the code to DOT as interpreted by 10-0019?

Our decision, first, was to review and the codes and referenced materials. Second, we made a weekend review of all our computerized eddy current scans and overrides to understand the extent of this change and prepare a recall notice to get those cylinders back for reexamination and condemnation. Third, we prepared this request to ask what is our requirement as to advising DOT? How could we get this issue clarified promptly so we could move forward with the correct procedures as well as how to handle the past requalifications? Not only are we confused, but we are also embarrassed as we base our reputation of knowing these answers?

We were advised to recall the recall until clarification is received from DOT as other knowledgeable requalifiers, customers and a manufacturer of these cylinders had similar misunderstandings of the regulations. We request a prompt response so we can advise our personnel on how to proceed with future examinations which could result in a 35% condemnation rate of 6351-T6 cylinders. And, finally, we again request that DOT sets up an Email distribution list of all its authorized requalifiers to distribute code changes and letters of interpretation when they are issued.

Respectfully submitted,

A handwritten signature in cursive script that reads "Fred".

Fred A. Nachman  
President

(Request\_for\_DOT\_Clarification-Eddy\_Current-Condemnation\_Criteria\_102710.doc)

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