



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

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

JUL 23 2013

Mr. David Fountain
Executive Vice-President and General Counsel
Authorized Testing Inc.
2522 Kansas Avenue
Riverside, CA 92507

Ref. No. 13-0071

Dear Mr. Fountain:

This responds to your March 28, 2013 request for clarification of the requirements of § 180.205(g)(4) in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) as they relate to the hydrostatic testing of cylinders manufactured under DOT-SP15555 and DOT-SP11670. You state in your request that PHMSA representatives performed a compliance inspection at the Oilphase Products Centre, Schlumberger Oilfield UK plc, in Aberdeen, Scotland on January 11, 2013. In the follow up letter to the exit briefing dated March 18, 2013 the facility representatives were told that:

“[T]he special permits do not exempt you from the hydrostatic testing requirements listed in the regulation for the manufacturing of DOT 3A cylinders, so § 178.36(i)(1) applies. The regulation requires testing to be by water-jacket method, or other suitable methods operated so as to obtain accurate data. During our inspection, we observed the use of a calibrated cylinder being used to calibrate the system, and observed actual tests being performed using the water jacket method. The water jacket method and the use of a calibrated cylinder to verify accuracy of the test equipment and the requirements pertaining to confirming accuracy of the test equipment using a calibrated cylinder are set forth in § 180.205(g)(4). This section states that the calibrated cylinder must show NO permanent expansion.”

In your letter you question the applicability of Part 180 to the hydrostatic test required during the manufacturing process for cylinders. Your questions are paraphrased and answered, specific to your scenario, below.

Q1. Do the calibration procedures for hydrostatic retesting set forth in § 180.205(g)(4) apply to the hydrostatic test required in the manufacturing process of cylinders?

A2. Section 178.36(i)(1) states that during the manufacturing process “each cylinder must successfully withstand a hydrostatic test, as follows: the test must be by water-jacket, or other suitable methods, operated so as to obtain accurate data.” If one chooses to use the water-jacket method, they must confirm this method is operated so

as to obtain accurate data. During the requalification process, a cylinder calibrated in accordance with § 180.205(g)(4) must be used to ensure the system is properly functioning and that all data that is obtained is accurate. For the manufacturing process, the method to determine that the equipment is properly functioning and that all data that is obtained is accurate is not specified. If the hydrostatic testing during the manufacturing process is completed using the water jacket method, the equipment should be calibrated in accordance with § 180.205(g)(4). PHMSA acknowledges that § 178.36(i)(1) does not directly reference the hydrostatic retesting set forth in § 180.205(g)(4) and we intend to address and clarify this requirement in a future rulemaking.

Q2. How would a manufacturer be aware that the hydrostatic testing procedure set forth in § 180.205(g)(4) applies to the manufacturing process set forth in § 178.36(i)(1)?

A2. Currently, § 178.36(i)(1) does not directly indicate that the hydrostatic testing procedures in § 180.205(g)(4) apply to the manufacturing process. As such, PHMSA acknowledges that a manufacturer may not be aware that the hydrostatic testing procedure set forth in § 180.205(g)(4) apply to the manufacturing process set forth in § 178.36(i)(1). PHMSA intends to address and clarify this requirement in a future rulemaking.

Q3. Section 178.36(i)(1) allows hydrostatic tests to be conducted by “other suitable methods, operated to obtain accurate data.” In your letter (see attached), you describe your specific procedures and ask if PHMSA would consider your testing method to be “suitable” and in compliance with § 178.36(i)(1)?

A3. We are of the opinion that the *method* you describe to verify the accuracy of your testing equipment is suitable to obtain accurate data and therefore in compliance with § 178.36(i)(1); however, the *results* of your test procedure did indicate some expansion of the calibrated cylinder which is not normal.

We appreciate you bringing these issues to our attention and intend to address them in a future rulemaking. In the meantime, we suggest that you conform to the calibration procedures for hydrostatic retesting set forth in § 180.205(g)(4) when performing the hydrostatic test required in the manufacturing process of cylinders set forth in § 178.36(i)(1).

I hope this answers your inquiry. If you need additional assistance, please contact this office at 202-366-8553.

Sincerely,



Charles E. Betts
Director,
Standards and Rulemaking Division

as to obtain accurate data. During the requalification process, a cylinder calibrated in accordance with § 180.205(g)(4) must be used to ensure the system is properly functioning and that all data that is obtained is accurate. For the manufacturing process, the method to determine that the equipment is properly functioning and that all data that is obtained is accurate is not specified. If the hydrostatic testing during the manufacturing process is completed using the water jacket method, the equipment should be calibrated in accordance with § 180.205(g)(4). PHMSA acknowledges that § 178.36(i)(1) does not directly reference the hydrostatic retesting set forth in § 180.205(g)(4) and we intend to address and clarify this requirement in a future rulemaking.

Q2. How would a manufacturer be aware that the hydrostatic testing procedure set forth in § 180.205(g)(4) applies to the manufacturing process set forth in § 178.36(i)(1)?

A2. Currently, § 178.36(i)(1) does not directly indicate that the hydrostatic testing procedures in § 180.205(g)(4) apply to the manufacturing process. As such, PHMSA acknowledges that a manufacturer may not be aware that the hydrostatic testing procedure set forth in § 180.205(g)(4) apply to the manufacturing process set forth in § 178.36(i)(1). PHMSA intends to address and clarify this requirement in a future rulemaking.

Q3. Section 178.36(i)(1) allows hydrostatic tests to be conducted by “other suitable methods, operated to obtain accurate data.” In your letter (see attached), you describe your specific procedures and ask if PHMSA would consider your testing method to be “suitable” and in compliance with § 178.36(i)(1)?

A3. We are of the opinion that the *method* you describe to verify the accuracy of your testing equipment is suitable to obtain accurate data and therefore in compliance with § 178.36(i)(1); however, the *results* of your test procedure did indicate some expansion of the calibrated cylinder which is not normal.

We appreciate you bringing these issues to our attention and intend to address them in a future rulemaking. In the meantime, we suggest that you conform to the calibration procedures for hydrostatic retesting set forth in § 180.205(g)(4) when performing the hydrostatic test required in the manufacturing process of cylinders set forth in § 178.36(i)(1).

I hope this answers your inquiry. If you need additional assistance, please contact this office at 202-366-8553.

Sincerely,

Charles E. Betts
Director,
Standards and Rulemaking Division



**AUTHORIZED
TESTING INC.**

2522 Kansas Avenue • Riverside, CA 92507 USA
Phone: (951)682-4110 • Fax: (951) 682-6090

O'Donnell
§180.205
§178.36
Cylinders
13-0071

To: Standards and Rulemaking Division

**US Department of Transportation,
PHMSA,
East Building, 2nd Floor,
1200 New Jersey Avenue, SE,
Washington, DC 20590.**

28th March 2013.

1. We write to seek clarification of the required method of demonstrating that hydrostatic test equipment complies within the 1% accuracy requirement for the *manufacturing* of DOT-SP 15555 and DOT S-P 11670 cylinders.
2. The query arises following the suggestion of probable IIA violation noted in an Exit Briefing after a compliance inspection at Oilphase Products Centre, Schlumberger Oilfield UK plc, Aberdeen, Scotland on 11th January 2013.
3. PHMSA Compliance have determined by letter to us dated 18th March, 2013 as follows:

“The special permits for both DOT-SP 15555 and DOT-SP 11670 state that these cylinders are made in conformance with 3A cylinders and refer you to 178.35 and 178.36 except as specifically noted therein. The special permits do not exempt you from the hydrostatic testing requirements listed in the regulation for the manufacturing of DOT 3A cylinders, so 178.36(i)(1) applies. The regulation requires testing to be by water-jacket method, or other suitable methods operated so as to obtain accurate data. During our inspection, we observed the use of a calibrated cylinder being used to calibrate the system, and observed actual tests being performed using the water jacket method.

The water jacket method and the use of a calibrated cylinder to verify accuracy of the test equipment and the requirements pertaining to confirming accuracy of the test equipment using a calibrated cylinder are set forth in 180.205(g)(4). This section states that the calibrated cylinder must show NO permanent expansion.

The investigators reviewed the calibration procedures and requirements with you at the time of inspection and discussed with you at length. The determination made by

PHMSA is that 180.205 does apply in this case, and that proper calibration was not achieved on days where the expansion showed greater than zero. "

4(a). It seems to us that section 180.201 clearly indicates that the requirements of Subpart C, in addition to those contained in part 178, are applicable solely for the purpose of prescribing requirements for the continuing qualification, maintenance, or periodic requalification of relevant cylinders.

(b). In particular, we believe that s.180.205(g)(4) relates exclusively to the verification of cylinder requalification test equipment. It has no bearing upon the test equipment utilized in the manufacturing process, and

(c). The applicable specification in this case does not refer to s.180, nor is there any reference to it in 178.36, nor can anything be found anywhere else, in CGA pamphlets for example, to guide the manufacturer or an IIA to s.180. This begs one important question, how is the manufacturer and the IIA to know that s.180 applies (if it does) in a *manufacturing* compliance audit, in order for them to comply?

d). We also mention the distinction between the wording in ss.178 and 180. S.178.36(i) requires the hydrostatic test equipment be operated so as to obtain *accurate data*. There are several ways to show this is being achieved and there is no mention of a calibrated cylinder in s.178, as it is not a necessity to obtaining accurate data. S.180, however, refers to *apparatus calibration*; there is only one way to achieve that - by calibrated cylinder, which is required under s.180 requalification testing; but, we submit, not under s.178 manufacturing.

5. It also seems to us that amongst the practical reasoning behind the rule in s.180 - that a re-tester must use a calibrated cylinder that shows no permanent expansion - lies in the fact that the cylinders being re-tested have been in use for years, could be damaged and therefore demand a more rigorous test procedure than does the initial manufacturing process.

6. s.178.36 does of course require the testing apparatus to be accurate but allows the manufacturer and IIA to demonstrate accuracy by other suitable methods than the calibrated cylinder. The process used at the subject facility was as follows:

a). The Hydro system has two gages installed, a master and working gage. The master gage meets the required definition of master gage. The two gages are of the highest quality with readability far greater than the required 1% of test pressure.

b). The Expansion measuring device also provides readability of 10 times greater than the required .1cc. The scales have graduations of .01ccs, not .1cc.

c). The scales are also verified daily for accuracy and consistency by the use of calibrated weights.

- d). In addition to the Master gage verification method, a calibrated cylinder is installed instead of a production cylinder in order to verify the low-pressure system's stability and that it is leak free as described above.
- e). With the isolation valve open, the calibrated cylinder is pressurized to 5000psi and held while observing the two gages for accuracy and the expansion weigh bowl for any rise or fall indication a system leak. This is then repeated at each 5,000psi increment until the test pressure of 25,000psi is reached. The total expansion is then recorded and noted to be the required expansion at that pressure within the 1% accuracy and that readability was also within 1% or .1cc. The pressure is held long enough to note that the water system is tight, stable and without leaks. Then both gages are observed to be within the required 1% accuracy and 1% readability at 25,000psi. In this case, the gages were reading exactly the same with no movement in the weigh bowl. This data was collected after pressurizing in 5000psi increments up to 25,000psi and holding at each increment.
- f). At this point the operator has already demonstrated the equipment's ability to perform well within the 1% accuracy required and evidenced no leaks in the expansion indicating system or either of the two pressure gages.
- g). In addition to the above, prior to the beginning of each day, calibrated weights are used to ensure accurate data is displayed on the expansion indicating device (gram scale with .01 readability). Both scales indicate 100% accuracy when compared to the calibrated weights.
- h). The pressure is then released and when the gages are at 0 pressure, the permanent expansion is recorded. The indicated permanent expansion is verified to have not dropped below 0 indicating a possible low-pressure leak in the system and also noted to be within the 1% accuracy and 1% or .1cc readability.
- i). In this case, the display indicated a permanent expansion of .1cc which does not have any bearing on the systems accuracy. The average volume of a jacket the size used by OPC is 250 gallons. (This is about 946,350 cc of water and we are talking about 1 tenth of 1 cc. There are 9,463,500 increments of .1cc in the water jacket.) Even a slight deflection caused by air movement near the scale will affect the display under these circumstances.
- j). The ATI inspector records this data but does not, as a matter of procedure, re-pressurize the system any number of times in order to finally obtain 0.0cc permanent expansion since this is not required for the manufacturer and would not confirm the 1% accuracy. Re-pressurizing the system repeatedly only shows that the system can give inconsistent readings without making any adjustments or repairs. The chosen method absolutely confirms the system to be accurate and in this case, less than ½% was noted.
- k). The system demonstrated that it was absolutely accurate in that the gage was exactly accurate and the scale was also exactly accurate and the system was otherwise leak free. Had it not been leak free, there would have been excessive permanent expansion after being pressurized for that amount of time. With that in mind, .1cc would not be

considered excessive against a total volume of 946,000 cc of water in the displacement chamber. (Extreme temperature conditions due to cold weather in Scotland would also affect the expansion qualities of the cylinder). -- Cold weather expands water

7. Against the background of all of the above, we ask Standards and Rulemaking to clarify the following:

- a) does the calibration procedure set forth in s.180.205(g)(4) apply to the *manufacturing* process and in this case?
- b) If so, how are the IIAs and manufacturers to know this?
- c) Is the procedure described at length in paragraph 6 above acceptable for contextual, future usage?
- d) Do Standards and Rulemaking have any other comment and suggestions on this subject?

We look forward to your response.

Sincerely,



David Fountain
Executive vice-president and General Counsel
Authorized Testing, Inc.
2522 Kansas Avenue
Riverside, California 92507 USA
Phone: 951.682.4110
Fax: 951.682.6090
URL: <http://www.authorizedtesting.com>

"The contents of this communication are important, private, confidential and legally privileged. In the event of your receiving this message or a copy in error, please do not study the text but inform the sender immediately and then erase the document (s) and attachments. Thank you for your co-operation in this regard and please accept our apologies for any error and inconvenience."