U.S. Department
of Transportation

Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

MAR 03 2017

Mr. Neil Smith
Cabin Fleet Manager – International & Domestic Fleets
Qantas
C Wing Level 4
10 Bourke Street
Mascot NSW 2020 Australia

Reference No. 16-0147

Dear Mr. Smith:

This letter is in response to your September 7, 2016, email and subsequent conversations requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to requalification requirements in § 180.209(b)(1) for a specification DOT 3AA cylinder. Specifically, you state that your company uses DOT 3AA cylinders filled exclusively with oxygen. Based on your company practices, the cylinders are routinely refilled before the pressure falls below 50 psi and are requalified every 10 years instead of 5 years in accordance with § 180.209(b)(1). You also reference the July 26, 2016 Notice of Proposed Rulemaking (NPRM) titled, "Hazardous Materials: Miscellaneous Amendments Pertaining to DOT Specification Cylinders (RRR)" [HM-234; 81 FR 48977], which proposes to amend some of the requalification requirements in § 180.209(b).

We have paraphrased and answered your questions as follows:

Q1. You ask if a DOT 3AA cylinder is subject to the hammer test requirement in § 180.209(b)(1)(iii) at the time of refill. You note that your company interprets the meaning of "refill" as it applies to § 180.209(b) as filling an oxygen cylinder when it contains less than 50 psi.

A1. The answer is yes. If your company wishes to requalify a DOT 3AA cylinder every 10 years instead of every 5 years, as outlined in § 180.209(b)(1), the cylinder must meet all applicable requirements, including the hammer test, prior to being refilled. The HMR is silent on the definition of "refill" for this exception, but generally "refill" has meant the filling of a cylinder regardless of the pressure at the time of refill.

As it is currently written in the HMR and as a condition to allow a 10-year requalification period instead of a 5-year period, the cylinder must pass the hammer test in accordance with CGA C-6 before each refill. The test protocol calls for the cylinder to be empty prior to performing the hammer test. For the purposes of the HMR, a cylinder containing a permanent Division 2.2 gas is empty when the pressure is less than 29.0 psig at 20 °C.

Q2. You ask if an internal inspection is required each time you refill a DOT 3AA cylinder.

A2. The answer is no. There is no regulatory requirement to conduct an internal inspection each time a cylinder is refilled. However, there is a requirement to internally inspect a DOT 3AA cylinder at the time of requalification. Specifically, § 180.205(f)(1) requires that a steel cylinder be visually inspected in accordance with CGA C-6, which requires an internal inspection be conducted each time a cylinder is requalified or if the cylinder fails the hammer test.

Please note that if the cylinder is subject to the hammer test at the time of refill, such as is required in § 180.209(b)(1), failure of the hammer test may present conditions rendering the cylinder unsafe and subject to testing and inspection in accordance with § 180.205(d)(1).

Q3. You ask if it was PHMSA's intention in the HM-234 NPRM [81 FR 48977] to remove the authorization to requalify a DOT 3AA cylinder every 10 years. Specifically, you reference the table in § 180.209(a), which proposes to list a 5- or 12-year requalification period for a DOT 3AA cylinder.

A3. The answer is no. The § 180.209(a) table should specify a 5-, 10-, or 12-year requalification period for a DOT 3AA cylinder. This was an inadvertent error and will be amended in the publication of the final rule.

Q4. You ask if it was PHMSA's intention in the HM-234 NPRM to restrict those cylinders removed from aircraft from the 10-year requalification period exception as outlined in § 180.209(b)(1).

A4. The answer is no. It is not PHMSA's intention to restrict cylinders removed from aircraft from the 10-year requalification in § 180.209(b). This will be addressed in the final rule.

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

Sincerely,

Dirk Der Kinderen
Chief, Standard Development Branch
Standards and Rulemaking Division

Geller
180.209
Cylinders Clarifications
16-0147

Goodall, Shante CTR (PHMSA)

From: Betts, Charles (PHMSA)
Sent: Wednesday, September 07, 2016 9:46 AM
To: Goodall, Shante CTR (PHMSA)
Attachments: image2016-09-07-092814.pdf

Importance: High

Please log and assign to a specialist for response. Please treat this for expedited handling.

Thanks,
Charles

Dear Mr Betts

Please find attached a letter requesting clarification on CFR 180.209.

Yours sincerly

Neil Smith
Cabin Fleet Manager – International & Domestic Fleets

Engineering Services | Qantas Airways Limited
Address C Wing Level 4, 10 Bourke Street, Mascot NSW 2020 Australia
Phone +61 2 9691 0548 | **Mobile** +61 402 38 65 69 | **Email**: neil.smith@qantas.com.au

Facsimile Transmission

To	From
Fax Number 001112023665713	Fax Number
	Email
Company	Company
Address	Address
Telephone	Telephone
Total number of pages inclusive of this Sheet 8	Date 07.09.16

Confidentiality. [redacted]

Subject FAO: Mr Charles Betts | Clarification of CFR 180.209

QANTAS

Qantas Engineering

Charles Betts
Director
Standards and Rulemaking
Department of Transport

By Fax: +1 202 366 7435

Neil Smith
Cabin Fleet Manager
Engineering Services
Qantas Airways Limited
Address C Wing Level 4
10 Bourke Street
Mascot NSW 2020 Australia

7 September 2016

Dear Mr Betts,

I wish to seek clarification of Qantas Airways' understanding of the existing regulation and NPRM of 49 CFR 180.209 per PHMSA-2011-0140 (HM-234).

Qantas operates cylinders that are manufactured to the DOT 3AA specification (ref Figure1), they are used exclusively for oxygen, have a capacity of 11cu foot and manufactured by Avox Systems Inc. These cylinders are maintained under an approved System of Maintenance, to a vendor supplied, Component Maintenance Manual, CMM 35-31-55.

When we have viewed the proposed changes in the NPRM, Qantas reassessed the maintenance of these cylinders and wanted to confirm our understanding of this requirement, especially for the hammer test and requirements for a 10years interval between Hydrostatic Test.

The CMM refers to DOT requirements per 49 CFR180.209 to determine the additional conditions required to certify the cylinders to 10years (nominally 5years) between Hydrostatic Test (HT).

Cylinders conforming to these additional criteria are identified with a star shaped stamp. The 10year option has been chosen by Qantas.

Figure 1 - Typical oxygen cylinder with 3AA DOT marking

One of the requirements per 49 CFR180.209 (b) (iii) is:

Before each refill, the cylinder is removed from any cluster, bank, group, rack or vehicle and passes the hammer test specified in CGA Pamphlet C-6 (IBR, see §171.7 of this subchapter).

The referenced CGA (Compressed Gas Associated) C-6 document shows the requirements of the Hammer Test.

6.2 Hammer test

The hammer test is a valuable indicator of internal corrosion and is a convenient test that can be made without removing the valve before each charging of the cylinder. The hammer test should be performed on empty unpressurized cylinders.

The hammer test consists of tapping the cylinder sidewall with a light blow using a 1/2 lb (0.23 kg) ball-peen hammer or equivalent. A cylinder will normally have a clear ring. A dull ring would indicate internal corrosion, liquid, or accumulation of foreign material in the cylinder. Such cylinders shall be inspected internally in accordance with 6.4.

NOTE—The hammer test is not applicable on aluminum cylinders

If fails hammer test / or in doubt, inspect per 6.4

6.4 Internal Inspection

Cylinders shall be inspected internally at least every time the cylinder is periodically retested, or when they fail the hammer test before filling, or when there is reason to believe that there is internal contamination, or corrosion.

6.4.1 Preparation for inspection

The interior of cylinders shall be prepared for inspection by removing dirt, scale, or other condition as necessary to permit the inspection of the internal surface. Cylinders with interior coating shall be examined for defects in the coating. If the coating is defective, it shall be removed.

A good inspection light of sufficient intensity to clearly illuminate interior walls is mandatory for internal inspection. Cylinders containing hazardous materials shall be purged to remove residual gas or liquid before being examined with a light.

QANTAS Qantas Engineering.

Within Qantas we complete the requirements per the vendor CMM, which aligns with CGA 6.4.1

Subtask 35-31-55-210-012

B. DOT-3AA-1800 Steel Cylinder

(Refer to 500 thru 500D, IPL Fig. 1; 500 thru 500A, IPL Fig. 1B).

(1) Look at the last and initial cylinder hydrostatic test dates found on the cylinder crown, near the cylinder neck.

Hydrostatic tests must be performed as noted in Table 5003 using approved procedures by service locations having up-to-date United States Department of Transportation approval. Additional hydrostatic tests may be required in your country.

(2) DOT-3AA-1800 steel cylinder service-life is given in Table 5003.

(1) Do a check of the cylinder surfaces for either heat or fire damage.

(2) Do a check of the cylinder for dents, gouges, digs or bulges.

NOTE: It may be necessary to remove any heavy paint coatings from the exterior surface of the cylinder to correctly check for dents, gouges, digs or bulges.

(3) Make sure that identification plates and warning labels can be read and are not damaged.

(4) Do a check of the cylinder neck for cracks, distortion, contamination or thread damage.

(5) Put a Bright Inspection Light (Table 5002) inside the cylinder and do a check for contamination and corroded surfaces.

(8) Make sure the inside of the cylinder does not have an odor.

Furthermore, the Bright Light Inspection ensures that there is NO corrosion/contamination and is completed at each Hydrostatic Test (currently every 10years) and when a regulator is overhauled (every 5years) and when the cylinder is returned to the workshop with less than 50PSI.

The Hammer Test is part of the qualification to 10years, it is not required for qualification to 5years per the existing regulation.

The Qantas interpretation of the term, refill, is the filling of the oxygen cylinder when the cylinder has less than 50PSI. Empty to full- refill.

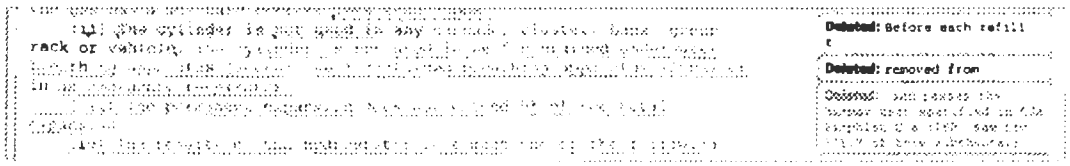
The term 'top up' is used when oxygen is added between 26PSI and 1800PSI. Qantas typically uses the 50PSI for our in-service criteria and 26PSI for new cylinder deliveries, with reference to the document below:

From OEM (Original Equipment Manufacturer) documentation The OEM, Avox, describes in SIL-35-126 NEW US DEPARTMENT OF TRANSPORTATION (US DOT) RULE HM224B FOR AIR SHIPMENT OF CHEMICAL OXYGEN GENERATORS AND CYLINDER ASSEMBLIES THAT CONTAIN COMPRESSED OXYGEN INTO AND WITHIN THE US, that when a partially filled bottle is received, then it is to be charged. There is NO indication in this documentation for a further Hammer Test prior to charging the cylinder; steps as follows:

(4) After arrival at destination

(a) Charge the cylinder assembly to full operating pressure before placing into service.
(b) Remove the shipping tag (P/N 10015660; see Figure 3) from the neck of the cylinder.
(c) Verify that the cylinder is charged to full operating pressure.
(d) Check the cylinder assembly for leaks.
(e) Issue an EASA Form 1 or equivalent as required.
(f) Add statement to block 13 on the EASA Form 1 or equivalent stating that service was performed in accordance with the CMM and the SIL.
(g) Add in block 12 of the EASA Form 1 or equivalent "Inspected/Tested."
(h) Sign on the right side in block 20.
(j) Install in aircraft or place in stores ready for service.

The NPRM for the revision of 49 CFR 180.209 removes the requirement for the Hammer Test. This is in part due to the Hammer Test not being an effective tool to determine corrosion and there is NO control of the filling operation, post qualifying the cylinder, extract below.



Rational for submitted changes to 49 CFR 180.200 – 215 page 8 of 11

180.209 (b)(1)(ii) Removed hammer test. I have never heard of a single cylinder being condemned for corrosion that was detected by the hammer test. Furthermore, no one is disassembling banks of cylinders in order to do the hammer test "each time it is filled". And more importantly, that is a fill operation, not part of the requalification. It is more appropriate to simply disallow these applications from the 10 year test. Added "cascade"

The last sentence above is significant, as the qualification to 10years should not be subject to a 'fill operation' that the qualification has no control over. The NPRM is written to remove these cylinders as candidates for 10year interval between HT.

The NPRM in 49 CFR 180.209 (a) Periodic qualification of cylinder for DOT 3A, 3AA has removed the option for 10years, giving a 5 or 12year option.

TABLE 1—REQUALIFICATION OF CYLINDERS

Specification under which cylinder was made	Minimum test pressure (psig)	Requalification period (years)
DOT 3	3000 psig	5
DOT 3A, 3AA	5/3 times service pressure, except nonconsensus service (see § 180.209(c)).	5, or 10 (see § 180.209(b), (f), (h) and (j))

However, in 49 CFR 180.209 (b) There remains requirements to meet a 10year requalification

10 years instead of every 5 ars
provided e cylinder conforms to all of
the l conditions:

In 49 CFR 180.209(ii) the requirement is for the "cylinder not used in any cascade, bank, group, rack or vehicle."

The **existing** requirement for 49 CFR 180.209 b(iii) "the cylinder is removed from any cluster, bank, group, rack or vehicle".

Qantas has understood this to advise that the cylinder is removed from its location and filled away from its installation. Many of the cylinders Qantas have installed are single cylinders and we also note that the DOT differentiates between vehicles and aircraft in other rules but the term aircraft is not mentioned in 49 CFR180.209 b(iii).

Qantas conducts an internal examination of the cylinder with a bright light, which is a superior inspection for corrosion than the hammer test.

If the understanding above is correct, we would consider that Qantas can remain certifying the 3AA cylinders to 10years.

Could the DOT please clarify the option to requalify cylinders to 10years and confirm that a bright light corrosion inspection is required only at re-fill (lower than 50PSI) not 'top-up'.

If possible Qantas would like to arrange a telecon, at your convenience, to discuss this topic with your representative(s).

Yours sin

Neil Smith

Cabin Fleet Manager – International & Domestic Fleets
Engineering Services
Qantas Airways Limited
Phone +61 2 9691 0548 | Mobile +61 402 38 65 69 | Email: neil.smith@qantas.com.au