AIRBUS

FROM
Philippe de Gouttes
DATE
August 3, 2004
PHONE
+33 (0) 5 61 93 27 91
FAX
+33 (0) 5 61 93 31 55
E-MAIL
philippe.de-gouttes@airbus.com
OUR REFERENCE
M04008101
YOUR REFERENCE

Docket Management System
U.S. Department of Transportation
400 Seventh Street, SW.
Nassif Building, Room PL-402
Washington, DC 20590-001
U.S.A.

DOCKET No. RSPA-04-17664 (HM-224B), RIN 2137-AD33
HAZARDOUS MATERIALS REGULATIONS: TRANSPORTATION OF COMPRESSED OXYGEN, OTHER OXIDIZING GASES AND CHEMICAL OXYGEN GENERATORS ON AIRCRAFT

Dear Sir,

Airbus thanks the Research and Special Programs Administration for offering an opportunity to comment on this matter.

The proposed regulation would limit the authorized cylinders to steel or aluminium ones complying with DOT specifications 3A, 3AA, 3AL, and 3HT. This restriction is based on the assumption that these are the most commonly used cylinders for the transportation of compressed oxygen aboard aircraft, and on the wish to simplify the pressure relief device setting requirements.

Actually a significant portion of compressed oxygen cylinders are already made of composite material, and this trend will likely increase in the future. Those composite cylinders are submitted to the same qualification tests as the steel/aluminium ones, and their prohibition would result in drawbacks that are not commensurate with the expected simplification of the rule.

We therefore request the RSPA to reconsider the restriction to DOT specifications 3A, 3AA, 3AL, and 3HT. Detailed explanation can be found in the attached memorandum.

Yours sincerely,

Hartwig Asshauer
Certification Manager, Air & Hydro-mechanical Systems
Product Integrity Division

Philippe de Gouttes
Manager, Aviation Regulations
Product Integrity Division

AIRBUS

MEMORANDUM

TO
Hartwig Asshauer EAA
COPY
Joern Schecker ECYS1

FROM
Peter Kaul
LOCATION / DEPARTMENT
Hamburg / ECYS1
DATE
02.08.2004
PHONE
0049 40 743 81900
FAX
0049 40 743 75417
E-MAIL
peter.kaul@airbus.com
REFERENCE
X35ME0414759

Comments to NPRM RIN 2137-AD33 Transportation of compressed oxygen

Abbreviations

AOG	Aircraft on Ground
DOT	Department of Transportation
HMR	Hazardous Materials Regulations
NTSB	Nation Transportation Safety Board
RSPA	Research and Special Programs Administration

Background

The NTSB found that one of the causes for the Valuejet accident on May 11th 1996 was a fire in the cargo compartment where several chemical oxygen generators were improperly carried as cargo. In response to these findings the DOT proposes several changes in the HMR regarding the transportation of compressed oxygen cylinders aboard freighter/passenger aircraft.

Proposed changes

The DOT proposes an amendment of the Hazardous Materials Regulations. In this amendment the following changes are proposed regarding the transportation of compressed oxygen cylinders:

- Shipment of compressed oxygen cylinders is limited to Steel and Aluminium cylinders as specified by DOT3A, DOT3AA, DOT3AL and DOT3HT.
- Pressure Relief Device settings are revised to prevent release of oxygen into the environment while the cylinder is exposed to fire. The Pressure Relief Device settings should be set between a minimal deviation of –10% of the test pressure and the test pressure.
- Oxygen cylinders have to be shipped in outer packages meeting flame penetration and thermal resistant requirements equal to the requirements for cargo lining

Impact on Airbus

Composite oxygen cylinders are not mentioned in the new legislation and therefore could not be transported by aircraft any longer. If composite oxygen cylinders can no longer be transported by plane, this could impact:

- All Airbus gaseous crew and passenger oxygen systems
- New composite portable oxygen cylinders

Impact on Crew and Passenger oxygen system

Currently Airbus uses composite oxygen cylinders for storage of oxygen for crew and passenger oxygen systems of all Airbus aircraft.
Oxygen is stored in up to 213 cuft composite oxygen cylinders under a maximum fill pressure of 1850 psig.

Many airlines, which have composite oxygen cylinders that store the oxygen, will have problems regarding the maintenance/servicing of these composite oxygen cylinders.

The airlines will not be able to quickly transport spare composite cylinders from one airport to another. This non availability of spare parts can lead to the grounding of aircraft. These AOG cases could lead to substantial additional costs.
This could have as a consequence that airlines would have to store spare composite oxygen cylinders on every airport that they land on, leading too much higher maintenance costs.

Another possibility would be the replacement of composite oxygen cylinders with steel oxygen cylinders. Also in this case Airlines would be faced with significant additional costs due to:

- Investment in replacing composite oxygen cylinders with steel oxygen cylinders
- Increase in fuel consumption or decrease in payload due to higher weight of the steel oxygen cylinders.

In both cases Airbus would have to offer oxygen systems to the airlines, which have either higher maintenance costs and/or higher operational costs/weight.

Furthermore if Composite oxygen cylinders cannot be transported anymore by aircraft, composite cylinders can be only transported by ship/railway. This imposes severe constrains on the industrial process at Airbus. The composite cylinders have to be shipped much earlier to the aircraft final assembly line and Airbus has to order the composite oxygen cylinders on a much earlier point in time.

Impact on portable oxygen cylinders
Airbus is planning to replace its current standard 11 cuft steel portable oxygen cylinders with carbon fiber portable oxygen cylinders. These portable oxygen cylinders provide 2 percent of the passengers with first aid oxygen on cabin altitudes between 8000ft and 15000ft in accordance with JAR/FAR regulations.

The carbon fiber portable oxygen cylinder has a weight that is over 50 percent lighter compared to the current steel portable oxygen cylinder. This weight reduction is very beneficial for the airlines as it reduces fuel consumption or increases payload. Furthermore the use of carbon fiber lightweight portable oxygen cylinders improves the handling by flight- and maintenance crews.

Due to a significant increase in the amount of composite portable oxygen cylinders especially in the medical field, composite cylinders are manufactured on a large scale leading to a large reduction in purchasing cost for the airlines. Purchasing costs will decrease in the nearer future and will become equal to purchasing costs for traditional steel portable oxygen cylinders.

This would mean that composite portable oxygen cylinders would become economic interesting because of a good balance between weight saving potential and low purchasing costs.

Therefore it is likely that in the next decade in commercial aviation carbon fiber portable oxygen cylinders will replace steel portable oxygen cylinders.

Technical Assessment proposed changes

The proposal to limit the compressed oxygen cylinders to DOT 3A, 3AA, 3AL and 3HT is based on the DOT assumption that these are the compressed oxygen cylinders that represent the majority of cylinders that are in operation today.

Within Airbus however a large portion of compressed oxygen cylinders are already manufactured of composite material. Due to the combination of high weight saving potential with significant reductions in cost, composite cylinders will or have replaced steel compressed oxygen cylinders in commercial aviation.

Therefore a limitation to steel cylinders would seriously influence Airbus ability to provide airlines with weight optimized compressed oxygen cylinders for both:

- Oxygen storage for gaseous oxygen systems
- Portable oxygen cylinder.

The restriction to DOT 3A, 3AA, 3AL and 3HT specifications is based on the striving of the DOT to limit the number of Pressure Relief Device settings. However the Pressure Relief Devices are mostly part of pressure regulating devices and their settings depend on the testpressure of the compressed oxygen cylinder. Both composite and steel/aluminium compressed oxygen cylinders have a test pressure of 5/3 times the maximum fill pressure. Therefore there is no difference between a Pressure Relief Device for a composite compressed oxygen cylinder and that for a steel/aluminium compressed oxygen cylinder.

It should be noted that tests conducted for the qualification of both steel/aluminium and composite compressed oxygen cylinders are the same. The following tests are conducted:

- Burst test
- Hydraulic pressure test
- Drop test
- Flaw test
- Extreme temperature test
- **Fire resistance test**
- High velocity impact (Bullet) test
- Drag test

There is no reason to assume that the performance of composite compressed oxygen cylinders in fire conditions is less than for steel/aluminium compressed oxygen cylinders.

Conclusion

It is believed by Airbus that in the next decade the commercial aviation industry will make a comprehensive use of composite compressed oxygen cylinders for:

- Storage of oxygen as part of a gaseous oxygen system
- Portable oxygen cylinders for use for first aid

The limitation of compressed oxygen cylinders to DOT 3A, 3AA, 3AL and 3HT would seriously influence Airbus ability to provide airlines with weight optimized crew and passenger oxygen systems. Also the introduction of composite portable oxygen cylinders in commercial aviation would be significantly impacted. This would lead to additional costs for airlines due to higher fuel consumption or less payload.

Airlines with composite oxygen cylinders as part of gaseous crew/passenger oxygen systems will have significant additional costs due to higher maintenance costs, in particular to cover AOG cases.

Furthermore Airbus believes that there is no difference regarding the safety in a propagating fire between steel/aluminium oxygen cylinders and composite material oxygen cylinders. Therefore Airbus proposes to expand DOT 3A, 3AA, 3AL and 3HT specified compressed oxygen cylinders with composite oxygen cylinders specified according to DOT E exemptions.

With best regards,

Walter Deutscher ECYS1

Peter Kaul ECYS1