



# Federal Aviation Administration

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## Memorandum

Date: January 12, 2015

To: Manager, Transport Standards Staff, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Vladimir Ulyanov, ANM-116

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Crew Determination of Quantity of Oxygen in Passenger Oxygen System on Model A330 and A340 airplanes, FAA Project Number AT10356IB-T.

ELOS Memo #: AT10356IB-T-S-2

Reg. Ref.: § 25.1441(c)

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This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Airbus Model A330 and A340 airplanes.

### Background

Title 14, Code of Federal Regulations (14 CFR) section 25.1441(c) requires:

*“There must be a means to allow the crew to readily determine, during flight, the quantity of oxygen available in each source of supply.”*

Airbus has proposed an ELOS finding to the requirements of § 25.1441(c).

### Applicable regulations

§ 25.1441(c)

### Regulation requiring an ELOS finding

§ 25.1441(c)

**Description of compensating design features or alternative standards which allow the granting of the ELOS finding (including design changes, limitations or equipment need for equivalency)**

The Airbus proposed modification replaces the Type II chemical Oxygen containers in the lavatories with a new decentralized gaseous oxygen Type II container. The oxygen source is a 3,000 psig high pressure oxygen cylinder with flow dosing instead of a chemical oxygen generator. The oxygen supply time remain unchanged.

The decentralized oxygen cylinders are designed to be sealed for the Designated Life Limit. Once expended, they cannot be refilled on the airplane and must be removed and replaced, similar to chemical oxygen generators. There is no pressurized piping with fittings necessary, so the most typical items for leakages are not present.

In gaseous oxygen systems, leakage most often occurs in the high or intermediate pressure area of the system, typically at the oxygen cylinder, pressure regulators or at fittings associated with the high or intermediate pressure piping interconnecting the cylinders, and is related to improper maintenance activities or in-service wear or damage. Maintenance activities associated with this kind of system that can expose it to damage include replacing or refilling depleted bottles, removing and replacing bottles for periodic maintenance. The Airbus proposed design ensures that the oxygen source is a lifetime sealed oxygen high-pressure cylinder. The oxygen source can be considered as full oxygen capacity provided the oxygen quantity has not depleted since the date of manufacture.

**Explanation of how design features or alternative standards provide an ELOS to that intended by the regulation**

An acceptable means of compliance is to rely on the design features, proper maintenance, and life limits to ensure that the oxygen cylinders are at full oxygen capacity at any time, including during flight, provided that:

1. A detailed description of the design is provided to demonstrate that quantity indication is not necessary.
2. The cylinder is designed and tested to ensure that it will retain its required quantity of oxygen throughout its expected life under foreseeable operating conditions.
3. A means is provided for maintenance to readily determine whether a cylinder has discharged.
4. The life limit of the cylinder is established by test and analysis.
5. Each cylinder is labelled such that the expiration date can be easily determined by maintenance.

- 6. Airbus defines maintenance and inspection procedures in the maintenance planning documents to ensure that
  - i) Discharged cylinders are removed from the airplane, and
  - ii) Cylinders are not installed on the airplane past their expiration date.

7. Each cylinder does not supply oxygen to more than six oxygen masks.

**FAA approval and documentation of the ELOS finding**

The FAA has approved the aforementioned ELOS finding in project issue paper S-2, titled Crew Determination of Quantity of Oxygen in Passenger Oxygen System. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS finding. This ELOS memorandum number should be listed in the type certificate data sheet under the Certification Basis section in accordance with the statement below:

ELOS Findings have been made for the following regulation:  
 § 25.1441(c), Crew Determination of Quantity of Oxygen in Passenger Oxygen System; (documented in TAD ELOS Memo AT10356IB-T-S-2).

**Original signed by Victor Wicklund**

Transport Airplane Directorate  
 Aircraft Certification Service

**January 12, 2015**

Date

ELOS Originated by: Propulsion & Mechanical Systems Branch	Project Engineer: Robert Hettman	Routing Symbol: ANM-112
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