

U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Subject:  
INFORMATION: Policy Statement on Testing of Flightcrew  
Oxygen Masks for Transport Category Airplanes.  
Date:  
DRAFT

From:  
Manager, Transport Airplane Directorate, Aircraft  
Certification Service, ANM-100  
Reply to  
Attn. of:  
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To:  
See Distribution  
Regulatory  
Reference

14 CFR 25.1447  
(c)(2)(i)

#### Summary

The purpose of this memorandum is to clarify Federal Aviation Administration (FAA) certification policy on methods of compliance with 14 CFR 25.1447(c)(2)(i), which requires that flightcrew oxygen masks be installed so that they can be donned within five seconds. The issue in question is the test methods used to show compliance with this requirement.

#### Current Regulatory and Advisory Material

Section 25.1447(c)(2)(i) requires the following [*italics added to identify the portion of the rule that is covered by this policy memorandum*]:

- (c) If certification for operation above 25,000 feet is requested, there must be oxygen dispensing equipment meeting the following requirements:
- (2) Each flight crewmember on flight deck duty must be provided with a quick-donning type oxygen dispensing unit connected to an oxygen supply terminal. This dispensing unit must be immediately available to the flight crewmember when seated at his station, and installed so that it:

*(i) Can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand, within five seconds and without disturbing eyeglasses or causing delay in proceeding with emergency duties;*

#### Relevant Past Practice

Previous methods for showing compliance normally include testing, with mask donning performed by test pilots (FAA and/or DER) in the actual airplane, usually while on the ground. The test procedures and conditions have been variable from program to program in terms of parameters such as these:

1. The number of test runs.
2. Pilot positioning of hands at test initiation.
3. The wearing of glasses and/or headsets.
4. Pass/fail criteria (i.e., how many trials must be less than or equal to five seconds).

These non-standardized approaches to testing can yield uneven results. The purpose of this policy is to encourage more standardized methods for evaluating the quick donning mask when showing compliance with § 25.1447(c)(2)(i).

#### Policy

Many transport airplanes are being fitted with full-face oxygen masks for the flightcrew. In addition, some applicants are storing these masks in smaller compartments. As a result, some of the designs have longer or more variable donning times. As the donning time for these masks has gotten closer to the five-second limit, it has become increasingly important to have well-defined and standardized testing methods.

Showing compliance with this rule involves measuring human performance, which is inherently variable. The requirement is on the design - that the mask can be placed on the face within five seconds. In order to determine if the design meets this requirement, we ask pilots to don the mask a number of times, which is a way of sampling pilot performance. Remembering that pilot performance will most likely result in a distribution of donning times, there are two key aspects of donning performance that should be considered:

1. Looking across test cases, does the average performance indicate that the five-second requirement is being met?
2. Even if the average performance is five seconds or less, it would be possible for 50 percent or more of the trials to be over five seconds. Therefore, it is also important to establish a criterion regarding the distribution of test results in order to ensure that the mask can be consistently donned within five seconds.

The FAA considers the following an acceptable method for demonstrating compliance with the

requirements of § 25.1447(c)(2)(i):

**TEST CONDITIONS AND METHOD:**

1. A donning test must be conducted from each flight crewmember station. Each donning test should consist of at least five donning events.
2. Prior to the initiation of each mask-donning event, the pilot should be seated at the design eye reference position with the seat belt and shoulder harness fastened, with one hand on the control wheel and the other on the throttles. For other flight crewmember positions (e.g., flight engineer), appropriate seating and hand positions may be determined on a case-by-case basis. It is acceptable, but not required, to use flight engineers as test subjects for tests involving flight engineer stations.
3. The test subjects must wear glasses during the test. In addition, the pilot must wear a headset unless the AFM prohibits their use. Daytime lighting conditions may be used, unless flight deck arrangement and lighting systems suggest that locating and retrieving the mask may be difficult in nighttime lighting conditions.
4. Timing should begin when the start of the test event is announced by the test director, and end when the mask is properly sealed on the pilot's face. The method of initiating the test event and determining when the mask is sealed is at the discretion of the test participants. A stopwatch, or other means shown to be reasonably accurate, may be used to time the tests.

**SUCCESS CRITERIA:**

For each donning test:

1. At least 80 percent of the donning events should be completed in five seconds or less.
  2. The average time for each donning test must be five seconds or less.
- The donning tests at each flight crewmember station must be successful.

This policy is not intended to change the level of safety required by § 25.1447(c)(2)(i). However, use of this policy will help standardize the methods of compliance and produce more consistent compliance findings for all applicants.

**Effect of Policy**

The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a "binding norm". The office that implements policy should follow this policy when applicable to the specific project. Whenever an applicant's proposed method of compliance is outside this established policy, it must be coordinated with the policy issuing office, e.g., through the issue paper process or equivalent.

Applicants should expect that the certificating official will consider this information when making findings of compliance relevant to new certificate actions. Also, as with all advisory material, this policy statement identifies one means, but not the only means, of compliance.