U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Flightcrew Member Rest Facilities | **Date:** 9/19/12 | **AC No:** 117-1

Initiated by: AFS-220 | **Change:**

1. PURPOSE. This advisory circular (AC) describes an acceptable means, but not the only means, of compliance with Title 14 of the Code of Federal Regulations (14 CFR) part 117 conducting augmented flightcrew member operations. Prior to utilizing onboard crewmember rest facilities, all 14 CFR part 121 certificate holders operating under part 117 must obtain Federal Aviation Administration (FAA) approval and qualification for the classification of onboard rest facilities used. Part 117 identifies onboard sleeping facilities as "Rest Facilities."

2. DISCUSSION. This AC references criteria that may be used for the design and installation of crewmember rest facilities on transport category aircraft capable of augmented flightcrew operations. If, in addition to providing rest facilities, an operator voluntarily provides an area for storing personal articles and for changing clothing, then this AC provides useful information and advice for their design and installation. Certificate holders operating under part 117 that are considering installing rest facilities into their aircraft may refer to this AC prior to installation, to ensure the rest facility meets the specifications outlined in part 117, § 117.3. For operators conducting operations other than under part 117, this AC references FAA acceptable criteria and guidance that may be useful for the design and installation of flightcrew sleeping quarters and rest facilities on transport category aircraft capable of long-range operations with augmented or enlarged flightcrew complements.

3. RELATED 14 CFR PARTS.

- Title 14 CFR Part 25 Subpart D, Design and Construction, §§ 25.789, 25.791, 25.831, 25.853, 25.1301, 25.1445, and 25.1529.
- Title 14 CFR Part 121 Subpart J, Special Airworthiness Requirements § 121.285; Part 121 Subpart K, Instrument and Equipment Requirements, §§ 121.311(b), 121.317, 121.327, and 121.329.
- Title 14 CFR Part 117, Flightcrew Member Duty and Rest Requirements.

4. DEFINITIONS. For purposes of this document, these terms are defined as follows:

a. Class 1 Rest Facility. Means a bunk or other surface that allows for a flat sleeping position and is located separate from both the flight deck and passenger cabin in an area that is temperature-controlled, allows the flightcrew member to control light, and provides isolation from noise and disturbance (§ 117.3, "sound" definition SAE ARP 4101/3 and "horizontal flat" definitions, SAE ARP 4101/3).

b. Class 2 Rest Facility. Means a seat in an aircraft cabin that allows for a flat or near flat sleeping position; is separated from passengers by a minimum of a curtain to provide darkness and some sound mitigation; and is reasonably free from disturbance by passengers or flightcrew members (§ 117.3).

c. Class 3 Rest Facility. Means a seat in an aircraft cabin or flight deck that reclines at least 40 degrees and provides leg and foot support (§ 117.3).

d. Free Space. An area designated for the use of the crew to change and stow clothing. Society of Automotive Engineers (SAE) Aerospace Recommend Practice (ARP) 4101/3 definition.

e. Rest Facilities. Means a bunk or seat accommodation installed in an aircraft that provides a flightcrew member with a sleep opportunity.

f. Significance of Rest Facility Classification. Each rest facility has a classification ranking from one through three that defines the maximum flight duty period (FDP) limits predicated on the flightcrew member's start time, the number of pilots and the classification of rest facility to be used for augmented flightcrew operations. A class 1 facility provides for the longest FDP, a class 2 provides for the second longest FDP, and a class 3 provides for the third longest FDP.

g. Sleeping Surface. Any surface such as a bed, bunk, or seat that meets the guidelines referenced in this AC.

5. RELATED READING MATERIAL. This AC and SAE ARP 4101/3, Crew Rest Facilities, should be used in conjunction with ARP 4101, Flight Deck Layout and Facilities, for the design and installation of crewmember rest facilities. The following SAE documents may also be applicable and may be obtained for a fee from:

SAE Institute
400 Commonwealth Drive
Warrendale, PA 15086
1-877-606-7323 (U.S. and Canada)
1-724-776-4970 (International)
CustomerService@sae.org

- SAE ARP 1323, Type Measurements of Aircraft Interior Sound Pressure Levels During Cruise.
- SAE ARP 4245, Quantities for Description of the Acoustical Environment in the Interior of the Aircraft.

TNO Defense, Security and Safety
Kampweg 5
P.O. Box 23
3769 ZG Soesterberg
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Document Number: TNO-DV 2007 C362

NOTE: This report provides additional information and detail concerning crewmember rest facilities onboard aircraft.

- TNO Report Recommendation, Extension of Flying Duty Period In-Flight Relief, project number 032.13267, dated July 29, 2007.

6. OPERATIONAL CONSIDERATIONS.

a. Crewmember Rest Facilities. The location of crewmember rest facilities in an aircraft is an important decision that should be based on an analysis of the following factors to ensure that an adequate environment is provided to enable crewmember to obtain sleep of adequate quality (SAE ARP 4101/3).

(1) There should be a sufficient number of sleeping surfaces provided to accommodate the maximum number of crewmembers that would be expected to use these surfaces during the same period of time (SAE ARP 4101/3).

(2) For crewmember sleeping quarters, adequate volume should be provided for sleeping. The recommended volume per individual is 1.0 m^3 (35 $feet^3$). (SAE ARP 4101/3).

(3) For crewmember rest facilities, adequate volume should be provided for sleeping, personal articles storage, and changing of clothes. The following volumes are recommended:

(a) Individual sleeping space volume: 1.0 m^3 (35 $feet^3$). (SAE ARP 4101/3), and

(b) Free space adjacent to the sleeping surfaces for ingress and egress and changing of clothes: 1.85m^3 (65 $feet^3$). (SAE ARP 4101/3).

b. Sleeping Surfaces. The following are acceptable criteria for sleeping surfaces:

(1) Class 1 Facility. Dimensions for each sleeping surface of 1.98 x 0.76m (78 x 30 inches). The sleeping surfaces should be designed so that they are flat and as level during cruise flight. Suitable means should be provided to ensure occupant privacy for each sleeping surface area, e.g., curtains in an over-and-under arrangement or a divider curtain in a side-by-side arrangement (SAE 4101/3).

(2) Class 2 Rest Facility. A class 2 rest facility is a seat in an aircraft cabin that allows for a flat or near flat sleeping position, and it is separated from passengers by a minimum of a curtain to provide darkness and some sound mitigation. It is reasonably free from disturbance by passengers or flightcrew members. Examples are so-called “Lie-Flat” seats, or “Flat Bed” seats (§ 117.3, TNO Report recommendation paragraph 5.2.5).

(3) Class 3 Rest Facility. A class 3 rest facility is a seat in an aircraft cabin or flight deck that reclines at least 40 degrees. It provides leg and foot support (§ 117.3, TNO Report recommendation paragraph 5.2.5).

c. Isolation. The following are acceptable criteria for isolation of flight crew rest facilities:

(1) Class 1 Rest Facility. The crewmember rest facility should be in a location where intrusive noise, odors, and vibration have minimum effect on sleep. The spectrum of the sound within this facility should be limited to broadband without annoying tones. Special attention should be given to the existence of doors, passenger convenience systems, public address systems, etc., in the immediate area to minimize intrusive noise and ensure they have minimal effect on sleep. A noise level during cruise flight in the range of 70 to 75 dB A is considered a reasonable design objective (SAE ARP 4101/3, 1323, 4245).

(2) Class 2 Rest Facility. A common grouping of seats (row subsection) that should be shared only by other crewmembers. The seat should be separated from the cockpit and passengers by acoustic curtains or panels and provisions for darkening and sound mitigation of the sleep environment should be available (TNO REPORT recommendation paragraph 5.2.5).

d. Environmental (Class 1 Rest Facility Only). Airflow and temperature control should provide a uniformly well-ventilated atmosphere free from drafts, cold spots, and temperature gradient. The FAA recommends that the rest facility be designated a nonsmoking area (SAE ARP 4101/3, 1323, 4245).

e. Public Address System (Class 1 Rest Facility Only). The FAA recommends that the public address system or an alternative means should include provisions to provide only relevant information to crewmembers in the crewmember rest facility (e.g., in flight emergencies, aircraft depressurization, preparation of compartment occupants for landing, etc). (SAE ARP 4101/3, 1323, 4245).

f. Emergency Lighting (Class 1 Rest Facility Only). Emergency lighting should be provided in crewmember rest facilities (SAE ARP 4101/3, 1323, 4245).

g. Stowage and Restraints (Class 1 Rest Facility Only). In accordance with the applicable part 121 requirements, suitable personal articles stowage and occupant restraint systems must be provided to each occupant of sleeping surfaces as well as each occupant of any seats located in crewmember rest facilities (SAE ARP 4101/3, 1323, 4245).

h. Emergency and Other Equipment (Class 1 Rest Facility Only).

(1) Approved oxygen equipment must be provided for each crewmember that uses a sleeping surface and crewmember rest facility seat, including an aural alert to awaken a sleeping crewmember (SAE ARP 4101/3, 1323, 4245).

(2) There should be one or more lighted “FASTEN SEAT BELTS” signs within the view of the occupants of each sleeping surface and seat located within a crewmember rest facility. These lighted signs should be dimmable for sleeping purposes (SAE ARP 4101/3, 1323, 4245).

(3) If the operating rules and the operator permits smoking in a crewmember rest facility, an adequate number of self-contained, removable ashtrays for each seat in the facility must be provided.

(4) If the operating rules and the operator do not permit smoking in a crewmember rest facility, then one or more "NO SMOKING" placards legible to the occupants of each sleeping surface and seat located in the facility must be provided.

(5) A means, such as an interphone, must be available for the cockpit crewmembers to communicate with the sleeping crewmember.

7. REQUESTING APPROVAL FOR THE USE OF FLIGHTCREW MEMBER REST FACILITIES. Before using an aircraft with an augmented flightcrew, the certificate holder must ensure the aircraft onboard rest facility receives FAA qualification meeting the criteria for one of the three classifications prescribed in part 117. The classification of the onboard rest facilities (i.e., class 1, 2, and 3) defines the augmented flightcrew member's maximum FDP based upon the flightcrew member's start time, the number of flightcrew members assigned, and the classification of rest facility.

a. Augmented Flightcrew Operations. Prior to conducting augmented flightcrew operations, the certificate holder must have a qualification analysis statement (QAS) issued to the specific aircraft used for augmented flightcrew operations, which qualifies the onboard rest facility as either a class 1, 2, or 3. A class 1 rest facility provides for the longest FDP, whereas a class 3 provides the shortest FDP. The certificate holder must also have operation specification (OpSpec) A117, Use of Onboard Flightcrew Member Rest Facilities. OpSpec A117 authorizes flightcrew member augmentation based on the qualification of onboard flightcrew rest facilities listed in the OpSpec. Additionally, the certificate holder should develop augmentation operating procedures relative to the use of the specific onboard rest facilities.

(1) Augmentation operating procedures, at a minimum, should include the following:

- Specific operating procedures for augmented flightcrew operations,
- Use of augmentation Table C in part 117,
- Minimum equipment list (MEL) procedures, if applicable,
- Loss of cabin altitude,
- Emergency communications,
- Smoke in the cabin, and
- Fires in the rest facility.

(2) Evaluation and qualification of onboard rest facilities will follow one of four paths:

- Existing rest facilities (adequacy evaluated in accordance with AC 121-31, Flight Crew Sleeping Quarters and Rest Facilities),
- Newly installed class 1,
- Newly installed class 2 and 3, and
- Previously qualified rest facilities (class 1, 2, or 3 in accordance with the criteria established in part 117).

b. Qualifying Existing Rest Facilities Formerly Evaluated for Adequacy in Accordance with AC 121-31 and Newly Installed Class 1 Rest Facilities. Rest facilities formerly evaluated for adequacy in accordance with AC 121-31 and newly installed onboard class 1 rest facilities must be evaluated and qualified by the Aircraft Evaluation Group (AEG) responsible for that aircraft type in concert with the appropriate Aircraft Certification Office (ACO). The AEG will coordinate with the certificate-holding district office (CHDO) throughout the evaluation and involve the principal operations inspector (POI) having oversight responsibility of the certificate holder. If the results of the evaluation meet the specifications prescribed in part 117, the AEG will issue a QAS for that aircraft.

(1) Early identification of the qualification project is essential for ensuring a timely evaluation of the rest facility. Therefore, the certificate holder should submit their request to their POI as early as possible for rest facility qualification. For newly installed class 1 rest facilities, the certificate holder should coordinate with the FAA prior to installation to ensure the rest facility being installed meets the classification prescribed in part 117. Requests for FAA qualification of the rest facility should be made in a timely manner so that an inspection and evaluation of the rest facility may be scheduled after the installation is complete. Requests should also include evidence that the rest facility has been certified for occupancy in accordance with the requirements of part 25 as being part of the original type certificate (TC), amended TC, or Supplemental Type Certificate (STC).

> **NOTE: Proposed instructions for continued airworthiness (ICA) should be included with the request. Also, in the event the design of the rest facility requires some preparation by the crew prior to use, such as expanding sections, the evaluation request should include appropriate preparation procedures, recommended qualification/training requirements, and proposed actions to be taken in the event any item or component of the facility becomes inoperative.**

(2) Upon satisfactory inspection and evaluation of the rest facility and its associated equipment, the evaluating AEG will complete the QAS for that aircraft including any qualifications regarding the findings (i.e., location of toilets, galleys, etc) in the near vicinity of the facility such that if changes were made in the near environment of the facility, a re-evaluation of the facility would be required. The QAS will remain in effect until a modification to the rest facility or a component of the rest facility renders it noncompliant with the specifications prescribed in part 117, or the FAA determines the rest facility no longer meets the specification(s) prescribed in part 117 for that classification. A copy of the QAS will be issued to the certificate holder and the FAA will also retain a copy.

c. Qualifying Newly Installed Class 2 and 3 Rest Facilities. For newly installed class 2 and 3 rest facilities, the certificate holder should coordinate with the FAA prior to installation to ensure the rest facility being installed meets the classification prescribed in part 117. Requests for FAA qualification of the rest facility should be made in a timely manner to the certificate holder's POI so that an inspection and evaluation of the rest facility may be scheduled after the installation is complete. New installation of class 2 and 3 crewmember onboard rest facilities will be inspected and evaluated by the POI having oversight responsibilities of the certificate holder. During this process, the POI holds approval authority. The AEG responsible for that

aircraft type will serve in an advisory role to the POI. The POI will confer with the AEG as necessary during this process. The certificate holder will provide the POI with the proposed ICA at the time of the qualification request. Also, in the event the design of the rest facility requires some preparation by the crew prior to use, such as expanding sections or leg and foot support, the evaluation request should include appropriate preparation procedures, recommended qualification/training requirements, and proposed actions to be taken in the event any item or component of the facility becomes inoperative.

(1) The POI will conduct a visual operational inspection to determine the rest facility currently meets the specifications prescribed in part 117. Once the POI has determined the rest facility meets either the class 2 or 3 specification, the POI will issue a QAS for that aircraft.

(2) The QAS will remain in effect until a modification to the rest facility or a component of the rest facility renders it noncompliant with the specifications prescribed in part 117, or the FAA determines the rest facility no longer meets the specification(s) prescribed in part 117 for that classification. A copy of the QAS will be issued to the certificate holder and the FAA will also retain a copy.

d. Requalification of Previously Qualified Rest Facilities. Requalification of a previously qualified rest facility is required when an item or component associated with the rest facility is modified or altered in any way, except when an inoperative item or component of the rest facility is covered and properly deferred in accordance with the certificate holder's FAA-approved MEL. The purpose for requalifying a previously qualified rest facility is to determine that the modification(s) or alteration(s) have not changed the facility's physical specifications beyond that classification previously qualified. If the FAA determines the modified or altered rest facility does not meet the classification previously qualified, the rest facility may be evaluated to a different (lower) classification.

NOTE: In some cases, the certificate holder may upgrade their rest facility to meet the specifications for a higher classification of rest facility.

(1) The AEG responsible for that aircraft type is responsible for inspection, evaluation and requalification of previously qualified class 1 rest facilities. Inspection and evaluation of previously qualified class 2 and 3 onboard rest facilities is the responsibility of the POI. During this process, the POI holds approval authority. The AEG responsible for that aircraft type will serve in an advisory role to the POI. The POI will confer with the AEG as necessary during this process.

(2) For requalification of class 2 and 3 rest facilities, the POI will inspect the QAS along with the rest facility to ensure it meets the previous qualification. The POI will conduct a visual operational inspection to determine the rest facility currently meets the qualification criteria prescribed in part 117.

(3) Once the aircraft's onboard rest facility has been satisfactorily re-qualified, the FAA will reissue a QAS. A copy of the QAS will be issued to the certificate holder and the FAA will also retain a copy. The QAS will remain in effect until a modification to the rest facility or a component of the rest facility renders it noncompliant with the specifications prescribed

in part 117, or the FAA determines the rest facility no longer meets the specification(s) prescribed in part 117 for that classification.

e. Modifications and Repairs to Rest Facilities. Modifications and repairs that alter any part of the original specifications of the rest facility may disqualify it from the previously qualified classification. If an inoperative item or component is not covered under the certificate holder's FAA-approved MEL, the aircraft may only be used for un-augmented flightcrew operations until such time as the inoperative item(s) or component(s) associated with the rest facility has been repaired and returned to service. In the event an inoperative item or component associated with the rest facility is covered under the certificate holder's FAA-approved MEL for that aircraft, and properly deferred in accordance with the certificate holder's procedures, the certificate holder must comply with the applicable procedures for that deferral. Once the deferred item(s) have been corrected and returned to service, the rest facility qualification will resume without a subsequent evaluation and requalification by the FAA.

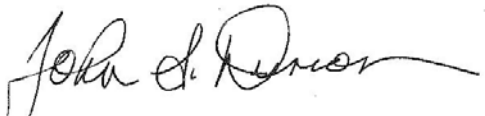
f. Issuance of the QAS and OpSpec A117. Prior to conducting augmented flightcrew operations, the certificate holder must obtain OpSpec A117.

(1) OpSpec A117 authorizes the certificate holder to conduct augmented flightcrew operations using a specific aircraft and qualified rest facility. The issuance of OpSpec A117 is contingent on the completion of a QAS qualifying that rest facility under one of the three classifications. OpSpec A117 must contain the following information:

- The aircraft serial number,
- Make/model/series,
- Classification of rest facility, and
- Number of installed sleep surfaces of that classification.

(2) Once the qualification process and visual operational inspection is complete, and the QAS has been issued, the POI will issue OpSpec A117 in accordance with the guidance stated in this AC.

8. CONTACT INFORMATION. For more information about the content of this AC, please contact the Air Transportation Division (AFS 200) at 202-267-8166.



/s/ for

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