



# GUIDE TO PART 117 FLIGHT TIME LIMITATIONS AND REST REQUIREMENTS

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## **FOREWORD**

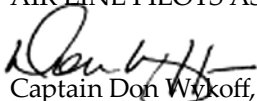
This Edition 2 of the Guide to Flight Time Limitations and Rest Requirements addresses the requirements and application of Part 117 to Part 121 passenger operations.

Part 117, effective January 4, 2014, is the first major revision of the flight limitation regulations in 60 years. This new rule is science based and introduces several new concepts such as Flight Duty Period (FDP), Fatigue Risk Management System (FRMS), augmentation limits based on the quality of the on-board rest facility and increased rest requirements. Unfortunately, Part 117 does not yet apply to all-cargo operations. Cargo operations will continue to be governed by Part 121, Subparts Q, R and S, unless the carrier voluntarily opts in to Part 117 which is permitted under the new rules. The Guide to Subparts Q, R and S is available on the ALPA website at the Flight Time/Duty Time Committee page.

This Guide is based on the Final Rule, FAA comments in the Preamble to the Final Rule and FAA clarifications and interpretations. Therefore, this Guide is considered authoritative and is intended to answer anticipated questions regarding the practical application of Part 117 in plain language. However, it is the individual flightcrew member's responsibility to determine if he/she is in compliance with Part 117. Further, this Guide does not address any collective bargaining agreement (CBA) scheduling limitations. To determine those limitations, flightcrew members must refer to their CBA. As new questions regarding the application of Part 117 arise, ALPA will seek answers from the FAA and update this Guide as necessary.

The most recent Guide is posted on the ALPA website. You should check the ALPA website at the Flight Time/Duty Time Committee page for the current version of the Guide. Should you have a particular question about the application of Part 117 that is not addressed in this Guide, ALPA members may contact the ALPA Legal Department (703-689-4323) who, if appropriate, can seek an interpretation from the FAA as to the application of Part 117 to a specific circumstance.

AIR LINE PILOTS ASSOCIATION, INT'L



Captain Don Wolkoff, Chairman  
Flight Time/Duty Time Committee

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## **I. ACCLIMATED (117.3)**

It is important for flightcrew members to know if they are acclimated as that will determine where they enter the FDP Table and whether 30 minutes must be deducted from their maximum FDP.

“Acclimated means a condition in which a flightcrew member has been in a theater for 72 hours or has been given at least 36 consecutive hours free from duty.”

“Theater means a geographical area in which the distance between the flightcrew member’s flight duty period departure point and arrival point differs by no more than 60 degrees longitude.”

**Q-01.** I only fly in the continental 48 states. Am I always acclimated?

**A-01.** Yes. The area between the East and West Coasts of the United States does not exceed 60° longitude.

**Q-02.** I am acclimated to SFO time and fly SFO-JFK which has a 3-hour time difference. I am then given a 10-hour rest period before reporting for duty at JFK. Do I use local time (JFK) or SFO time to determine my Flight Duty Period (FDP) start time?

**A-02.** You would calculate your FDP start time based on your last acclimated time zone which is SFO time.

**Q-03.** In the scenario in Question 2 above, is there ever a circumstance where a different time could be used?

**A-03.** Yes. If a flightcrew member is acclimated to a theater that encompasses the flightcrew member’s home base, then the certificate holder may designate home base time to determine FDP limits. Once this designation is made, then the FDP limits for the entire FDP series are determined using home base time.

**Q-04.** A flightcrew member is assigned to operate ATL-CDG. Upon arrival in CDG, the crewmember is released to an 18-hour rest before reporting for the return flight. To determine the FDP start time, what time does the crewmember use, ATL or Paris, to enter the Table?

**A-04.** The flightcrew member is unacclimated as he/she has traveled more than 60° and has not been in theater for 72 hours or received a 36-hour rest. Therefore, ATL time, which is the crewmember's last acclimated time, must be used to determine the FDP start time. In this circumstance, 30 minutes will be deducted from the Table C maximum to determine the FDP limit.

**Q-05.** A flightcrew member operates a series of segments during a single FDP and flies more than 60° longitude from the starting point, but the last leg returns him to a destination that is only 55° from the starting point. Since the flightcrew member had one leg flown more than 60°, is the flightcrew member now unacclimated?

**A-05.** The determination of whether a flightcrew member entered a new theater is based on the location where the FDP began and where it ends, not including any intermediate stops. In this example, the flightcrew member remains acclimated to the theater where he/she began the FDP as the end point was not more than 60° longitude from the starting point.

**Q-06.** A flightcrew member is acclimated to a new theater that, like the U.S., has more than one time zone. What time zone is used to determine the FDP start time?

**A-06.** The flightcrew member would use local time at the acclimation point, which is when a 36-hour rest is given or the flightcrew member is in theater for 72 hours. If the theater encompasses the flightcrew member's home base, then the carrier could elect to use home base time as discussed in Question 3 above.

**Q-07.** A flightcrew member who is acclimated to Texas travels to China on vacation, spends 2 days in China, and returns to Texas. When he/she returns, is he/she still acclimated to Texas time for purposes of determining a FDP start time?

**A-07.** Yes, because the travel to China did not occur as part of a FDP.

**Q-08.** A flightcrew member travels from Texas to China during a FDP. The crewmember, after arrival in China, is given 2 days off by the certificate holder. The crewmember then returns to Texas to begin a FDP. Is the flightcrew member still acclimated to Texas time?

**A-08.** No. The flightcrew member changed theaters from Texas to China by flying more than 60° longitude during the FDP and by spending 2 days of rest (more than the required 36 hours). He/she becomes acclimated to China local time, and until he/she receives 36 hours of rest or is in Texas (or another theater) for 72 hours, he/she must utilize China local time to determine the start time of his/her next FDP in Texas.

**Q-09.** A flightcrew member changes theaters during a single FDP that includes an intermediate stop in the new theater. Since the flightcrew member is not acclimated to this new theater, is a new FDP calculation required before flying the next leg after the intermediate stop to determine if it can be flown?

**A-09.** No. A flightcrew member's acclimated status and FDP length is locked in once he/she begins a FDP. A flightcrew member cannot become unacclimated until the FDP ends.

**Q-10.** A flightcrew member is scheduled to fly to a different theater and released from all duty for 34 hours. He/she would determine the FDP start time and length by using the time where the crewmember was last acclimated. However, due to an early arrival, the actual rest is extended to 36.5 hours. Is the crewmember now acclimated so he/she must determine the FDP by using local time?

**A-10.** Yes. Since the flightcrew member experienced unanticipated acclimation, he/she would be synchronized with the local time of the new theater and would use that time to determine the FDP start time and length from the appropriate Table. This new acclimation start point must be utilized to determine all future FDP start times until he/she receives either a 36-hour rest period or spends 72 hours in a new theater.

## **II. FLIGHT DUTY PERIOD (FDP) (117.13)**

**Q-11.** What is a FDP?

**A-11.** Part 117 imposes a new limitation on flightcrew members.

Flight Duty Period (FDP) means:

“[A] period that begins when a flightcrew member is required to report for duty with the intention of conducting a flight, a series of flights, or positioning or ferrying flights, and ends when the aircraft is parked after the last flight and there is no intention for further aircraft movement by the same flightcrew member. A flight duty period includes the duties performed by the flightcrew member on behalf of the certificate holder that occur before a flight segment or between flight segments without a required intervening rest period. Examples of tasks that are part of the flight duty period include deadhead transportation, training conducted in an aircraft or flight simulator, and airport/standby reserve, if the above tasks occur before a flight segment or between flight segments without an intervening required rest period.”

**Q-12.** Is there a difference between a domestic and an international FDP?

**A-12.** No. Part 117 limits are the same for all Part 121 passenger operations.

**Q-13.** How do I determine my maximum unaugmented FDP if I am given an assignment for flight duty?

**A-13.** Using your start time and the number of scheduled flight segments, your maximum unaugmented FDP is determined by the following Table:

**TABLE B TO PART 117—FLIGHT DUTY PERIOD: UNAUGMENTED OPERATIONS**

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of flight segments						
	1	2	3	4	5	6	7+
0000–0359 . . . . .	9	9	9	9	9	9	9
0400–0459 . . . . .	10	10	10	10	9	9	9
0500–0559 . . . . .	12	12	12	12	11.5	11	10.5
0600–0659 . . . . .	13	13	12	12	11.5	11	10.5
0700–1159 . . . . .	14	14	13	13	12.5	12	11.5
1200–1259 . . . . .	13	13	13	13	12.5	12	11.5
1300–1659 . . . . .	12	12	12	12	11.5	11	10.5
1700–2159 . . . . .	12	12	11	11	10	9	9
2200–2259 . . . . .	11	11	10	10	9	9	9
2300–2359 . . . . .	10	10	10	9	9	9	9

**Note:** If you are not acclimated, the above times are reduced by 30 minutes.

**Q-14.** If you are scheduled to report at 0700 and fly 4 legs, what is the maximum FDP?

**A-14.** Using Table B, your maximum FDP would be 13 hours.

**Q-15.** My carrier provides 15 minutes (30 minutes international) after blocking in to perform post flight duties. Does this time count as part of the FDP?

**A-15.** No. The FDP is defined as the time from when the flightcrew member is scheduled to start a duty that includes a flight segment until the aircraft is in the “blocks” after the flightcrew member’s last segment with no intention of further aircraft movement by the same flightcrew member.

**Q-16.** Can my scheduled report time be adjusted to change my FDP?

**A-16.** FDP limits are determined by scheduled reporting time and not by actual reporting time (the scheduled reporting time for a FDP is created once that FDP has been assigned to a flightcrew member). In order to change the reporting time, the flightcrew member would have to be shifted to long or short call reserve.

For long call reserve, the flightcrew member would have to be provided notification of the change to the FDP before beginning the rest period specified in Section 117.25. If the flightcrew member is placed on short call reserve, the reserve availability period (RAP) would begin at the originally scheduled report time.



**Q-17.** I have begun a FDP with four scheduled flight segments. Can the certificate holder adjust the number of flight segments flown either more or less, which could affect the maximum FDP?

**A-17.** Yes. A certificate holder can change the number of flight segments in a FDP after the FDP has started by assigning additional flight segments or canceling segments. That modification may change the FDP limit. The flightcrew member would have to determine if the FDP is changed by referring to Table B.

**Q-18.** A flightcrew member is scheduled for 4 flight segments but during the FDP a diversion is necessary, for reasons beyond the control of the air carrier, resulting in 5 flight legs flown rather than 4. Does this require a change in the maximum FDP?

**A-18.** No. A diversion does not constitute a new flight segment for purposes of Part 117. The FDP limits and flight limits would continue to apply as originally scheduled.

**Q-19.** A certificate holder cancels a flight before takeoff. Does that segment still count for determining the maximum FDP?

**A-19.** No. If a flight is canceled before takeoff, it does not count as a flight segment for Part 117 FDP purposes. A flight segment consists of a takeoff and landing.

**Q-20.** In the above example, if the aircraft is taxied under its own power to a hold area and then canceled, would the taxi time and hold time count as FDP and flight time?

**A-20.** The time would count as part of a FDP but not flight time since there was no takeoff and landing.

**Q-21.** A flightcrew is scheduled as unaugmented crew, but once the FDP is in progress, the carrier wants to extend the FDP. Can the carrier augment the crew by adding another flightcrew member and increase the FDP?

**A-21.** No. An unaugmented flightcrew member's FDP limit cannot be increased by augmenting the crew once the FDP has started.

**Q-22.** Can a carrier increase the FDP by augmenting the crew prior to the start time of the FDP?

**A-22.** Yes. The carrier can increase the FDP limit by augmenting the crew before the start of the FDP.

**Q-23.** Can a carrier schedule an augmented crew in domestic operations?

**A-23.** Yes. Part 117 allows domestic augmentation.

**Q-24.** Can a flightcrew member's FDP limit be extended; and if so, under what conditions would an extension be allowed?

**A-24.** There are two ways to extend a flightcrew member's FDP limit: (1) pre-takeoff extension; and (2) post take-off extension. A pre-takeoff extension, because of unforeseen operational circumstances, of up to 2 hours, can be made if the pilot-in-command and the certificate holder agree that the crew is fit and the flight can be safely operated if the FDP is extended. An extension of more than 30 minutes can be granted only once prior to receiving a 30 consecutive-hour rest. The certificate holder is required to report all extensions over 30 minutes to the FAA Administrator. A post-takeoff FDP may be extended to enable the aircraft to land at the scheduled or alternate airport. The same conditions outlined for a pre-takeoff extension apply. These extension rules also apply to combined reserve availability and FDP limits.

**Q-25.** Are there any weekly or monthly limits on the number of 30 minute FDP extensions?

**A-25.** No. The FAA has granted certificate holders freedom to extend the maximum FDP limits up to 30 minutes. However, a flightcrew member always has responsibility to ensure he/she is fit for each individual flight segment during a FDP, including extended FDPs.

**Q-26.** Is non-flight duty, such as flight training, either before or after a flight segment considered part of the FDP?

**A-26.** If the non-flight duty occurs prior to a flight segment with no intervening rest, it counts as part of the FDP. If it occurs after the flight segment, it is not part of the FDP.

**Q-27.** A flightcrew member has already used his/her over-30-minute FDP extension during a rolling 168 hour period. After take-off due to unforeseen circumstances, the flightcrew discovers that they will need to extend their FDP more than 30 minutes. Can they legally do so in this circumstance?

**A-27.** No. The over-30-minute extension applies to each individual flightcrew member and can only be taken once during any rolling 168 hour period without receiving a 30-hour rest (i.e. the 30-hour rest resets the extension provisions). Therefore, to avoid a violation, the FAA strongly recommends that the certificate holders (1) add buffers to the flightcrew member's schedule to account for possible unexpected events, and (2) provide the flightcrew member with a 30 consecutive-hour rest period as soon as possible in order to reset the FDP extension.

**Q-28.** Can a FDP be extended if the extension will cause the flightcrew member to exceed a cumulative FDP limit?

**A-28.** No, with one exception. The cumulative limits are hard limits except for post-takeoff flight extensions when unforeseen operational circumstances arise. A post-takeoff FDP flight extension expires when the aircraft lands.

**Q-29.** Is the concurrence of the PIC necessary if a FDP extension is required for another flightcrew member, and could the PIC concur to an extension less than 2 hours?

**A-29.** The PIC must concur in all FDP extensions over 30 minutes even if it is for another flightcrew member. The PIC can also concur to only a shorter extension that he/she believes can safely be carried out even though the certificate holder wants a full 2-hour extension. The certificate holder must keep a record of the PIC's concurrence.

**Q-30.** If the PIC concurs with the carrier for a 2-hour FDP extension, can the FO refuse the extension?

**A-30.** Yes. Each individual flightcrew member must "sign off" that they are fit to fly before each segment, i.e., the PIC can accept a 2-hour extension but the FO can independently state he/she is not fit for further duty and could not under the circumstances accept the extension.

**Q-31.** If a flightcrew member is given a longer rest period than required by Part 117, can that rest be terminated early to assign a new FDP?

**A-31.** No. A previously scheduled FDP can only be changed by utilizing the reserve provision which requires notice for long call and a 10-hour rest break to be placed on short call reserve. (See the reserve provisions for additional restrictions.)

**Q-32.** A flightcrew member is on days off. Can the company call him for a flight assignment?

**A-32.** Yes. If the flightcrew member answers the call, the company can assign him to flight duty. However, the Company must give the flightcrew the required 10-hour rest period and then place the crewmember on short call reserve.

**Q-33.** Can a flightcrew member who is on days off voluntarily elect to pick up a trip from open time?

**A-33.** Yes. This is not prohibited by the regulation so long as the flightcrew member is rested, fit for duty, within applicable limits for duty and flight time, and prepared to perform the assigned duties.

**Q-34.** A flightcrew member, after the passengers deplane, is assigned to move the aircraft from a gate to the hanger or from the customs area to a domestic gate. Is this aircraft movement part of the FDP?

**A-34.** Yes. Part 117.3 states that a FDP ends “when the aircraft is parked after the last flight and there is no intention for further aircraft movement by the same flightcrew member.” The phrase “further aircraft movement” does not say that the movement must be for the purpose of flight; hence, moving the aircraft to reposition it would be included in a FDP and establish the “FDP end point.”

**Q-35.** A certificate holder has a high degree of confidence before takeoff that the destination airport will be hit by a typhoon but nevertheless directs that the aircraft take off. Can the certificate holder use a post-takeoff extension to safely land the aircraft at the destination or diversion airport if the typhoon occurs?

**A-35.** No. The certificate holder and the flightcrew member must have a reasonable expectation that the flight can be completed to the intended destination within the pertinent FDP limit. If this is not the case, the aircraft should not take off or the flight should be planned to land “short” within the FDP limits.

**Q-36.** If a PIC concurs in an extension of a FDP, must there be a record of the PIC's concurrence?

**A-36.** Yes. The PIC could note his/her concurrence with a FDP extension on a flight release, ACARS or some other form as long as there is evidence the PIC concurred with the extension.

**III. FLIGHT TIME LIMITATIONS – FLIGHT TIME LIMITATIONS IN PART 117 ARE ACTUAL NOT SCHEDULED (117.11)**

**Q-37.** How do I determine my flight time limitation?

**A-37.** If you are not assigned to an augmented crew, using your report time, you determine your flight time limit by using the following Table:

**TABLE A TO PART 117 – MAXIMUM FLIGHT TIME LIMITS FOR UNAUGMENTED OPERATIONS TABLE**

<b>Time of Report (acclimated)</b>	<b>Maximum flight time (hours)</b>
0000–0459 .....	8
0500–1959 .....	9
2000–2359 .....	8

**Q-38.** A flightcrew member is assigned a “legal” schedule. However, due to weather, the scheduled flight time was exceeded. Before takeoff on the next flight segment, the flightcrew member determines by the time the aircraft is in the blocks it will exceed the flight limitations. Can the flight be flown?

**A-38.** No. If it is determined before takeoff that the flight cannot be completed within the flight time limits, it cannot operate.

**Q-39.** How is flight time calculated for Part 117?

**A-39.** From the time the aircraft moves under its own power with the intention of flight and takes off until it is parked (blocks in), flight time is calculated to the nearest minute. For example, if the time the moment the aircraft moved under its own power with the intention of flight and takes off until it is in the blocks of destination was 29 minutes, 29 seconds; it would be 29 minutes of flight time. If it was 29 minutes, 30 seconds; it would be 30 minutes of flight time.

- Q-40.** The flightcrew is on board the aircraft for a flight. The aircraft is pushed back by a tug and, due to airport congestion, the aircraft has to wait 20 minutes before getting clearance to taxi. Does this time count as flight time?
- A-40.** No, as the aircraft has not yet moved under its own power with the intention of flight.
- Q-41.** Due to unforeseen circumstances after takeoff, the aircraft has to land at an alternate airport, while remaining within the flight time limitations. Can the flightcrew proceed to the original destination if the flight time limits would then be exceeded?
- A-41.** No. Any subsequent flight must remain within the flight time limitations.
- Q-42.** A flightcrew member exceeds the flight time limits due to unforeseen circumstances that arise after takeoff that results in landing at an alternate airport. Can the flightcrew member perform any further flying?
- A-42.** No. The flightcrew member has exceeded the flight time limit and cannot perform any further flying under Part 117 until a required rest period is provided.
- Q-43.** An aircraft taxis to a holding area under its own power and expects an extended delay. The engines are shut down and the aircraft remains in the holding area for an hour. Does all of the taxi and hold time count as flight time?
- A-43.** Yes. Once the aircraft moves under its own power with the intention of flight, all of the time, until the aircraft lands and is parked at the destination, counts as flight time.
- Q-44.** Same scenario as in Question 43 above, but the aircraft is towed to the holding area. Does the tow time and hold time count as flight time?
- A-44.** No, because the aircraft did not move under its own power. That time is not counted as flight time. (This would have no bearing on the FDP limits.)
- Q-45.** A flight pushes back and taxis to the runway under its own power with the intention of flight. Before taking off, the flight crew is notified that the flight is canceled and the aircraft returns to the gate. Is the taxi time counted as flight time?

**A-45.** No, because there was no takeoff and landing. However, this could change the FDP since the segment was not flown.

**Q-46.** An aircraft taxis to the runway with the intention of flight but has to return to the gate for a mechanical reason or to emplane or deplane passengers or freight. The pilots remain on board the aircraft while the required action is taken. The aircraft then departs and lands at the destination. How is flight time counted in this circumstance?

**A-46.** In this example, the flight time starts when the aircraft first taxis under its own power from the gate, continues through the period of delay when the aircraft returns to the gate and in which the pilot must remain on board, and ends at the moment the aircraft comes to rest at the point of landing at the destination airport.

**Q-47.** An aircraft moves under its own power with the intention of flight and has to return to the gate for mechanical reasons. The crew is assigned to a replacement aircraft which takes off and lands at the destination airport. How is flight time counted in this circumstance?

**A-47.** Flight time is counted from the time the first aircraft moves under its own power until the aircraft returns to the gate plus the flight time from the time the replacement aircraft first moves under its own power until it lands and comes to rest at the destination airport.

**Q-48.** Prior to takeoff an aircraft taxis under its own power to a de-icing pad, shuts down the engines, is deiced and then takes off. Is all of this time counted as flight time?

**A-48.** Yes. The aircraft moved under its own power with the intention of flight, so all of the time counts.

**Q-49.** A flightcrew conducts three flight segments under Part 117 followed by a Part 91 ferry flight. Do the limits of Part 117 apply to the ferry flight?

**A-49.** Yes, a Part 117 flight segment preceded the Part 91 flight operation.

## IV. AUGMENTED FLIGHTCREW (117.11, 117.17)

**Q-50.** What are the flight time limits for augmented crew?

**A-50.** For a 3 pilot crew, it is 13 hours and for a 4 pilot crew, it is 17 hours.

**Q-51.** How does a flightcrew member determine the FDP if the crew is augmented.

**A-51.** Apply your start time to the following Table to determine your FDP.

**TABLE C TO PART 117—FLIGHT DUTY PERIOD: AUGMENTED OPERATIONS**

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) used on rest facility and number of pilots					
	Class 1 rest facility		Class 2 rest facility		Class 3 rest facility	
	3 Pilots	4 Pilots	3 Pilots	4 Pilots	3 Pilots	4 Pilots
0000-0559 . . . . .	15	17	14	15.5	13	13.5
0600-0659 . . . . .	16	18.5	15	16.5	14	14.5
0700-1259 . . . . .	17	19	16.5	18	15	15.5
1300-1659 . . . . .	16	18.5	15	16.5	14	14.5
1700-2359 . . . . .	15	17	14	15.5	13	13.5

**Note:** If the flightcrew member is not acclimated, the above maximums are reduced by 30 minutes.

**Q-52.** If a flightcrew member is not acclimated and has traveled to a new theater, for example a JFK to CDG flight, what time zone would the flightcrew member use to determine the FDP for the return flight to JFK?

**A-52.** The flightcrew member would use the time zone where he/she was last acclimated which, in this case, would be JFK time.



**Q-53.** Augmented flights have a 3 flight segment limit. Can this flight segment limit be extended if a diversion is made necessary by winds or other operational issues beyond the air carrier's control?

**A-53.** A diversion is not a flight segment for Part 117 purposes. Therefore, the diversion would not count toward the 3 flight segment limit. This provision also applies even if a planned fuel stop was known prior to departure.

**Q-54.** A flightcrew member is assigned to an augmented crew of 3 pilots for a 12-hour flight. The crewmember is at the controls for 9 hours. Does he/she count the entire 12-hour flight as flight time?

**A-54.** Yes. All 3 flightcrew members count the entire 12 hours.

**Q-55.** Is there any restriction as to the amount of flight time a flightcrew member can be at the controls on an augmented flight?

**A-55.** Part 117.12(c) requires that the pilot flying the aircraft during landing must be provided a 2 consecutive hour in-flight rest during the second half of his/her FDP. The pilot monitoring during the landing must be provided a 90-consecutive minute in-flight rest. Other than these required rest opportunities, there is no restriction in Part 117 on the amount of flight time a pilot may spend at the controls during an operation that otherwise meets the pertinent FDP, flight time and cumulative limits.

**Q-56.** How is the class of on-board rest facility determined?

**A-56.** The FAA must certify each class of on-board rest facility on each carrier's aircraft that operates with an augmented crew and that designation should be a part of the certificate holder's operation specifications. An on-board rest facility could be certified in more than one classification. See AC 117-1 for information on the different classes of rest facilities.

**Q-57.** An aircraft has a designated Class 3 on-board rest facility. The seat for a scheduled flight is inoperable and will not recline 40 degrees. Can the flight operate?

**A-57.** The Operator's MEL procedures for an inoperative recline mechanism would govern. The MEL may, or may not, allow continued use as an on-board rest facility. However, if there is no MEL, the flight cannot operate with an augmented crew over 9 hours of flight time until the seat is fully operational and will recline 40°.

**Q-58.** An aircraft has a designated Class 2 rest facility. On a scheduled flight the privacy curtains are inoperable. Can the flight operate?

**A-58.** It may operate depending on the Operator's MEL procedures for an inoperative privacy curtain. The MEL may, or may not, allow continued use as an on-board Class 2 rest facility. However, a Class 3 facility does not require a privacy curtain, so the facility may meet the requirements for a Class 3 facility.

**Q-59.** Is each member of an augmented crew required to be fully qualified and current?

**A-59.** At all times during an augmented flight, there must be at least one flightcrew member at the controls who is fully qualified and current. *See* 121.543(b)(3)(i).

## **V. CUMULATIVE LIMITS (117.23)**

**Q-60.** Are there cumulative flight time limits?

**A-60.** Yes. A flightcrew member is limited to 100 hours of flight time in 672 consecutive hours (28 days). This is a “rolling” 672 hours and replaces the former limit of 100 hours in any calendar month and the former monthly and quarterly limits for international augmented operations. The 30 or 32 hours in 7 days limit has also been eliminated. A flightcrew member is also limited to 1,000 hours in any 365 consecutive day period. This is a rolling 365 days and replaces the 1,000 hours in a calendar year limit.

**Q-61.** Are there any cumulative FDP limits?

**A-61.** Yes. A flightcrew member may not exceed 60 FDP hours in any 168 “rolling” consecutive hours (7 days) and 190 FDP hours in any “rolling” 672 consecutive hours (28 days).

**Q-62.** Can the cumulative limits be extended?

**A-62.** The cumulative limits are “hard” and cannot be extended except in only one very limited circumstance, which is when an unforeseen event occurs post takeoff. However, once the aircraft is safely on the ground at the next point of landing (including a diversion airport), the flightcrew member cannot operate any Part 117 flight until such time as he/she can do so without exceeding the cumulative limits.

**Q-63.** If a flightcrew member flies for more than one certificate holder or Part 91K Program Manager, must that time be reported to the applicable operator?

**A-63.** Yes. The flightcrew member has an obligation to report flying to the certificate holder that counts toward the cumulative limits.

**Q-64.** How does a flightcrew member determine his/her time for cumulative limit purposes?

**A-64.** Before each flight, the flightcrew member should look back at the number of flight and FDP hours to the nearest minute he/she has actually accumulated to determine if the flight can be operated within the cumulative limits. If not, the flightcrew member cannot operate the flight.

**Q-65.** Who is responsible for monitoring the cumulative flight limits?

**A-65.** This is a joint responsibility placed on both the certificate holder and the flightcrew member.

**Q-66.** Does personal and military flying time count for cumulative limit purposes?

**A-66.** No. Only flying performed by the flightcrew member on behalf of a certificate holder or 91K Program Manager during the applicable periods counts for determining the cumulative limit.

## **VI: REST PERIOD (117.25)**

**Q-67.** What are the rest requirements in Part 117?

**A-67.** There are three primary rest requirements.

- 1.** Before beginning any reserve or FDP assignment, the flightcrew member must have received a 30 consecutive-hour rest within the past 168 consecutive hours that precedes the beginning of the FDP.
- 2.** Before a flightcrew member may accept any assignment to a FDP or reserve, he/she must have had a 10 consecutive-hour rest period including a minimum 8 uninterrupted hours of sleep opportunity immediately preceding the FDP or reserve assignment.
- 3.** If a flightcrew member travels more than 60 degrees longitude in a FDP or series of FDPs and is away from home base for 168 consecutive hours, the crewmember must be given 56 consecutive hours of rest upon return to home base that must encompass 3 physiological nights based on local time. A physiological night's rest means 10 hours of rest that encompasses the hours of 0100 and 0700 at the flightcrew member's home base, unless the individual has acclimated to a different theater.

**Q-68.** How is the required rest period measured?

**A-68.** The rest period is measured from release from duty until the flightcrew member starts a FDP or reserve assignment.

**Q-69.** Does the travel time to and from the hotel count as part of the 10-hour rest period?

**A-69.** Yes. However, if the travel time would prevent an 8-hour uninterrupted sleep opportunity, the flightcrew member must advise the carrier and ensure they get the required 8-hour sleep opportunity.

**Q-70.** Who determines if a flightcrew member has received an 8 consecutive-hour sleep opportunity?

**A-70.** Only the flightcrew member can make this determination because of the many variables involved.

**Q-71.** When does a sleep opportunity begin so the 8 hours can be determined?

**A-71.** A sleep opportunity generally commences once a flightcrew member is at a location where the flightcrew member can reasonably be expected to go to sleep and not have that sleep interrupted, such as a hotel.

**Q-72.** What should the flightcrew member do if he/she determines that an 8-hour uninterrupted sleep opportunity can't be achieved for some reason, such as delayed van rides, inability to get a room key, etc.?

**A-72.** The flightcrew member should advise the certificate holder as soon as possible of the need to delay the next FDP reporting time to allow for an 8-hour uninterrupted sleep opportunity.

**Q-73.** Will a sleep interruption not caused by the certificate holder such as a fire alarm, construction noise, etc. require the flightcrew member to delay the next reporting time to obtain the required rest?

**A-73.** The determination whether an interruption has caused a sleep disruption during the 8-hour rest period can only be made by each individual flightcrew member. Consider the fire alarm example. Some flightcrew members may have no problem returning to sleep, with no requirement to delay the report time. Others may find it difficult to get back to sleep even if the interruption was short. In this instance, each flightcrew member individually would have to advise the certificate holder of the need to delay the report time.

**Q-74.** Can the certificate holder require a flightcrew member to check a computer, email calendar, text or other conversation media to determine assignment, changes, etc. during a rest period?

**A-74.** No. During a rest period, regardless of length, a flightcrew member must be free from all restraint. If a flightcrew member is required to do something by the certificate holder, he/she is not free from all restraint.

**Q-75.** Could a flightcrew member on his/her own volition do the tasks in Question 74 above?

**A-75.** Yes, but the flightcrew member's decision to perform any task for the certificate holder during a rest period must be entirely voluntary. This could also include voluntarily performing computer based training, monthly schedule bidding, required safety reports, etc.

**Q-76.** Can the certificate holder make one phone call to a flightcrew member without interrupting his/her rest?

**A-76.** The FAA has a "one phone call" policy that "generally" allows a certificate holder to initiate one phone call during a crewmember's rest period. If the crewmember voluntarily chooses to answer the phone call, the FAA does not view the phone call as disruptive and breaking the rest period. However, a flightcrew member may have difficulty getting back to sleep after being woken up by a certificate holder's phone call. In that situation, a flightcrew member may have his/her sleep opportunity interrupted. Thus, a certificate holder runs the risk of interrupting a flightcrew member's sleep opportunity during the rest period by making a phone call.

**Q-77.** How is the 168 consecutive-hour period determined for the 30 consecutive-hour rest requirement?

**A-77.** The 168 consecutive-hour period is the period that precedes the beginning of any FDP. Therefore, before beginning a FDP, the flightcrew member must look back 168 consecutive hours to ensure during that time he/she has had the 30 consecutive-hour rest.

**Q-78.** Does the 30 consecutive-hour rest have to be prospectively identified? For example, could a rest less than 30 hours be extended to satisfy the 30-hour requirement?

**A-78.** No. A rest period must be prospective in nature which means the flightcrew member must be told in advance that he/she will be on a rest period for a specified duration. The flightcrew member must be told before the rest period begins that he/she will be receiving a 30-hour rest to comply with Part 117.

## **VII: RESERVE STATUS (117.21)**

**Q-79.** Does Part 117 address reserve duty?

**A-79.** Yes. Part 117 divides reserve duty into three categories; airport/standby, short call and long call reserve. Unless the certificate holder specifically designates the reserve assignment as airport/standby or short call reserve, the flightcrew member is on long call reserve.

**Q-80.** What is airport/standby reserve?

**A-80.** The flightcrew member must be required to be on the airport property and his/her reserve duty period would be determined by the time he/she goes on airport duty using the FDP Table.

**Q-81.** What is short call reserve?

**A-81.** During the reserve availability period (RAP), the flightcrew member is subject to being assigned flight duty in a short period of time as determined by the certificate holder without receiving a Part 117 rest period before reporting.

**Q-82.** If a flightcrew member is on short call reserve, what is the maximum length of his/her RAP?

**A-82.** For an unaugmented operation, the total number of hours a flightcrew member may spend in a flight duty period and a RAP may not exceed the lesser of the FDP from Table B plus 4 hours, or 16 hours, as measured from the beginning of the RAP. The reserve limits are applied to individual flightcrew members. (Examples are provided at the conclusion of this document.)

**Q-83.** Are the RAP limits different in an augmented operation?

**A-83.** Yes. The total hours that an augmented flightcrew member may spend in a FDP and RAP is the FDP from Table C (the Augmented Table) plus 4 hours as measured from the beginning of the RAP. (An example is provided at the conclusion of this document.)



**Q-84.** What are the limits for long call reserve?

**A-84.** Notwithstanding any collective bargaining provisions, in long call reserve, you are subject to call anytime during any 24-hour time period. However, the certificate holder must give the flightcrew member at least 10 hours' notice so he/she can get rest prior to starting a FDP. The FDP limit would be determined from the FDP Table depending on the report time for flight duty.

If the flight assignment begins before and will operate into the window of circadian low (WOCL, which is 0200-0559), the flightcrew member must be given a 12 hour notice of the assignment. This WOCL assignment does not require a 12-hour rest period, the rest requirements remain unchanged (see Question 67).

**Q-85.** Does a flightcrew member on long call reserve need 12 hours' notice if he/she is notified of a flight assignment that begins in the WOCL?

**A-85.** No. The 12 hour notice is only required if the FDP begins before the WOCL and operates into the WOCL.

**Q-86.** Is the WOCL determined by local time or last acclimated time?

**A-86.** The WOCL is determined by last acclimated time.

**Q-87.** What rest is required before a flightcrew member can accept a short call reserve assignment?

**A-87.** The flightcrew member must receive at least a 10-hour rest break with a minimum of an 8-hour uninterrupted sleep opportunity.

**Q-88.** Does the 30 consecutive-hour rest in 168 consecutive-hours requirement apply to a flightcrew member given a reserve assignment?

**A-88.** Yes. Before accepting a reserve assignment (RAP or FDP), a flightcrew member must look back 168 consecutive hours from the beginning of the assignment to determine if the required 30-hour rest has been given.

**Q-89.** If a flightcrew member is assigned a RAP, can it be terminated early? For example, the crewmember is assigned a RAP of 0700-2100. The certificate holder at 0800 advises the crewmember that

his/her RAP is terminated. The crewmember is then given 10 hours of rest and assigned to a new RAP beginning at 1800. Is this permissible?

**A-89.** Yes, because Part 117 does not prohibit a certificate holder from early termination of a RAP. This mirrors the rest period required for a long call reserve.

**Q-90.** A flightcrew member on reserve is assigned a 3-day trip. On day 3, the flightcrew member flies one segment and returns to base. After block-in, the certificate holder assigns 3 additional segments which can be completed within the FDP, flight time and cumulative limits. Is this permissible?

**A-90.** If the flightcrew member has completed the FDP (blocked in), he/she cannot be placed on a RAP to allow further flight assignments until he/she has received a 10 consecutive-hour rest. However, before the end of the FDP, the certificate holder could reschedule and add the 3 flight segments. In that event, the flightcrew member would have to recalculate the FDP, flight time and cumulative limits to determine if the additional flight segments can be legally flown. The flightcrew member would also have to reaffirm his or her fitness for duty before beginning each flight segment.

**Q-91.** A flightcrew member has 50 hours of FDP duty in the preceding 5 days (120 hours) and is on a RAP. Three hours into the RAP he/she is given a FDP assignment of 10 hours. Does all of this time (13 hours) count toward the cumulative FDP limits (60 hours in a rolling 168 hours)?

**A-91.** No. Only the 10-hour FDP would count towards the cumulative FDP limits.

**Q-92.** Part 117.27 limits consecutive night time operations to three consecutive FDPs that infringe upon the WOCL without a rest break during the duty periods. Does this limitation apply to reserve duty? Can a flightcrew member be scheduled for more than 3 consecutive reserve periods that infringe the WOCL?

**A-92.** Section 117.27 only applies to an actual FDP. Because a RAP is not a flight duty period, an assignment of three or more RAP's covering the WOCL would not trigger the limitations of Section 117.27. However, if the crewmember is assigned a FDP that would infringe the WOCL, Section 117.27 would apply if he/she was assigned FDPs that infringed upon the WOCL more than 3 consecutive times.

**Q-93.** Would the above answer to Question 92 be different if the WOCL reserve duty was airport/standby reserve duty?

**A-93.** Yes. Time spent on airport/standby reserve counts as a FDP so all time in this status is counted towards the FDP cumulative limits and would trigger the WOCL rest requirements of Section 117.27.

## **VIII: FLIGHT DUTY PERIOD: SPLIT DUTY (117.15)**

**Q-94.** Does Part 117 address continuous duty overnights/standbys?

**A-94.** Yes, Section 117.15 permits CDOs that would not otherwise meet Table B FDP limits by imposing several conditions on such scheduling. A mid-duty rest opportunity between the hours of 2200 and 0500 local time must be provided sometime after the completion of the first flight segment of the FDP. The mid-duty rest must also be scheduled before the beginning of the FDP and must consist of not less than 3 hours in a suitable accommodation. Note that some overnight trips will fit the existing Table B FDP limits without the need to use the split duty provisions of Section 117.15.

**Q-95.** What is the maximum length for a split duty assignment?

**A-95.** The combined total time of the scheduled FDP and mid-duty rest opportunity cannot exceed 14 hours. A carrier cannot utilize the 30-minute and 2-hour extension provisions of Section 117.19 to extend the total split duty (FDP plus mid-duty rest) beyond 14 hours.

**Q-96.** What is a suitable accommodation?

**A-96.** A suitable accommodation means a temperature-controlled facility with sound mitigation and the ability to control light that provides a flightcrew member with the ability to sleep either in a bed, bunk or in a chair that allows for a flat or near flat sleeping position. This definition only includes ground facilities and not aircraft on board rest facilities or passenger seats.

**Q-97.** Can the suitable accommodation standards be met if there was more than one individual sleeping in the room?

**A-97.** Yes. Access to a suitable accommodation does not need to limit use to one individual.

**Q-98.** Can the actual split duty rest be more than scheduled?

**A-98.** Yes. There is no prohibition in Part 117 against providing more rest than scheduled. If the actual split duty rest exceeds the scheduled rest period, then the portion of the actual rest that exceeds the scheduled rest would be considered part of the FDP. The FDP would remain subject to the 30 minute and 2 hour FDP extension provisions specified in Part 117.19 so long as the total rest and flight duty together are within the 14-hour limit.

## **IX: DEADHEAD TRANSPORTATION (117.25(g))**

**Q-99.** How does Part 117 treat deadheading?

**A-99.** Time spent deadheading is considered duty and treated similar to a FDP. However, only Table B is utilized for calculating deadhead FDP limits (for both unaugmented and augmented FDPs). Deadhead transportation is not considered a flight segment. If time spent in deadhead transportation exceeds the applicable Table B FDP limit, a rest equal to the length of the deadhead (but at least 10 hours) must be given. Five examples will show how deadheading is treated.

**Example 1:** A flightcrew member reports for a FDP at 0430 and flies one segment that concludes at 0800 and he/she is released from duty. The FDP ends at 0800. At 1100, the crewmember begins a series of deadhead flights that terminate at 1530 which would be 4:30 hours of deadhead travel time. Since that time is well within any FDP limit, only 10 hours of rest is required before another FDP can be assigned. The start of the rest period would be 1530.

**Example 2:** Assume the above facts but that the entire assignment was deadhead transportation from 0430 report – until 1530 release from duty, which is 11 hours. The highest FDP limit (Table B) that begins at 0430 is 10 hours. Therefore, a compensatory rest equal to the length of the deadhead (11 hours) would be required before a new FDP could be assigned. The start of the rest period would be 1530.

**Example 3:** A flightcrew member reports for a deadhead assignment at 0430 which terminates at 1530. Can the flightcrew member accept a flight assignment beginning at 1545? No. The deadhead assignment was 11 hours which exceeds the Table B FDP limit (10 hours) so the flightcrew member would require an 11 hour rest before beginning a new FDP.

Example 4: A flightcrew member is engaged in deadhead transportation from 0430 to 1100. He/she is given a 2-hour flight assignment beginning at 1130. Can the assignment be accepted? Yes. Since the deadhead occurred prior to a flight assignment, the entire deadhead is counted as part of the FDP. In this example with one segment, the Table B FDP limit starting at 0430 is 10 hours. Since the assigned flight terminates within the 10-hour limit, it can be flown without an intervening rest period.

Example 5: A flightcrew member is engaged in deadhead transportation from EWR to HKG reporting at 2345 and blocking in at 1710 – a total of 17:25 duty. Can he/she be scheduled to depart on a new FDP after a 10-hour rest period? No. The Table B FDP limit when reporting at 2345 is 10 hours. Since the deadhead segment was in excess of this limit, a compensatory rest equal to the length of the deadhead segment (17:25) is required.

## **X: FITNESS FOR DUTY (117.5)**

Part 117 requires that each flightcrew member must report for a FDP rested and prepared to perform his/her assigned duties.

**Q-100.** Can the pilot-in-command certify that all flightcrew members are fit for duty?

**A-100.** No. Each individual flightcrew member must certify their fitness for duty and sign a statement to that effect.

**Q-101.** Can this certification be done electronically using ACARS or a smart phone app?

**A-101.** Yes, but the certification must be signed by the flightcrew member; and if that statement is made through electronic means, the flightcrew member would have to electronically sign the statement.

**Q-102.** What should a flightcrew member do in the event that he/she is or becomes too fatigued to safely operate the aircraft?

**A-102.** The flightcrew member is obligated to report that he/she is fatigued pursuant to Section 117.5 and the certificate holder's Fatigue Risk Management Plan. For example, a flightcrew member reports rested for a FDP with 6 flight segments. After the 4<sup>th</sup> segment, the crewmember reports that he/she is able to fly the 5<sup>th</sup> segment but not the last assigned segment. The certificate holder is not required to "second guess" the crewmember and the certificate holder would not violate Section 117.5(c) if the crewmember operates the 5<sup>th</sup> flight segment.

**Q-103.** Must a flightcrew member sign the dispatch/flight release for each segment during an FDP that they are fit to perform their assigned duties?

**A-103.** Yes, the flightcrew member must sign the dispatch/flight release for each segment.



**Q-104.** Prior to starting the fourth segment of a five segment FDP, a flightcrew member decides he/she is too fatigued to perform his/her duties. What actions should the flightcrew member take?

**A-104.** Report the fatigue event to the carrier and do not sign the dispatch/flight release.

## **XI: FATIGUE RISK MANAGEMENT SYSTEM (FRMS) (117.7)**

**Q-105.** What is a FRMS?

**A-105.** FRMS is a management system that a certificate holder can use to mitigate the effects of fatigue in its particular operations. It is a data-driven process and a systematic method used to continuously monitor and manage safety risks associated with fatigue-related error.

**Q-106.** Can FRMS be used as an alternative method of complying with Part 117?

**A-106.** Yes, however, the certificate holder must gather scientific data to show that the proposed schedule will provide an equivalent level of safety and the FAA must give OpSpec approval. The FAA expects that each FRMS request will be tailored to the requesting certificate holders' operations, and the FAA has stated that it will not allow multiple certificate holders to operate under the same FRMS OpSpec.

**Q-107.** Can FRMS be used to avoid large portions of Part 117?

**A-107.** FRMS permits the certificate holder to exceed specified provisions of Part 117 to the extent that an equivalent level of safety against the possibility of fatigue-related accidents or incidents is demonstrated. A certificate holder can submit broad requests that seek alternatives to large portions of Part 117. However, broad requests to the FAA for deviation from the requirements of Part 117 will likely be more difficult to obtain than a narrowly drawn request.

**Q-108.** Can a certificate holder use data from another certificate holder to support a FRMS request?

**A-108.** Certificate holders are not prohibited from using each other's data in a FRMS request. The FAA plans to evaluate each FRMS request on an individual basis because of the differences between certificate holders' operations.

## **XII: FATIGUE EDUCATION AND AWARENESS TRAINING PROGRAM (117.9)**

**Q-109.** What is the Fatigue Education and Awareness Training Program?

**A-109.** Each certificate holder must develop and implement an education and awareness program that must be approved by the FAA.

**Q-110.** Who must receive this training?

**A-110.** All employees responsible for administering Part 117, including flightcrew members, dispatchers, scheduling personnel, persons directly involved in operational control and anyone providing direct management oversight of these areas.

**Q-111.** What is the purpose of the training?

**A-111.** It is designed to increase awareness of fatigue, fatigue counter measures, and the effects of fatigue on pilots.

**Q-112.** Is this training recurring?

**A-112.** Yes, it must be done annually for all employees identified in Question 110 above.

**Q-113.** Is the certificate holder required to update the program?

**A-113.** Yes. The certificate holder must update its awareness training program every two years and must notify the FAA of the update. The FAA will review it and either accept or reject it.

### **XIII. EXAMPLES**

**Q-114.** How does an acclimated unaugmented flightcrew member determine if he/she can accept a flight assignment?

**Example:** The flightcrew member is scheduled to report at 0900 to fly 5 segments for a total of 7 flight hours and the last segment terminates at 2000. Can the assignment be accepted?

- Step 1:** Did the crewmember have the required rest? Immediately before the beginning of the FDP, the flightcrew member must determine that he/she has had at least a 10-hour rest break with an 8-hour uninterrupted sleep opportunity and 30 consecutive-hours of rest in the last 168 consecutive hours. If so, proceed to Step 2.
- Step 2:** Would the assignment exceed the daily FDP or flight time limits? Using the FDP Table B, reporting at 0900 for 5 segments the maximum FDP length is 12.5 hours which means that the FDP must be scheduled to end no later than 2130. Using Flight Time Limit Table A, the maximum flight hours for reporting at 0900 would be 9 hours. This assignment is within these limits. Note: If the flightcrew member is not acclimated, the FDP limits are reduced by 30 minutes (in this example a 12-hour limit or a scheduled end time of 2100).
- Step 3:** Would the assignment exceed the cumulative limits? The cumulative flight time limits are 100 hours in a 672 consecutive-hour period and 1,000 hours in any 365 consecutive-calendar day period. The cumulative FDP limits are 60 hours in a 168 consecutive-hour period and 190 hours in 672 consecutive-hours. In this example, cumulative limits would not be exceeded and the assignment can be accepted.

**Q-115.** How does an acclimated augmented flightcrew member determine if he/she can accept a flight assignment?

**Example:** The flightcrew member is scheduled to fly a multi-day flight JFK-CDG-JFK. The flightcrew member reports for duty at JFK after days off at 1700 and the flight arrives at CDG at 0830 local time. The crewmember is given a 26-hour rest break and reports at 1030 CDG local time for the return flight to JFK which is scheduled for 9:20 of flight time. This is a 3-person flightcrew operating an aircraft with a Class 2 rest facility. Can the flightcrew member accept the assignment?

**Step 1:** Did the crewmember have the required rest in CDG? Yes, because he/she was off for 26 hours and had an opportunity for 8 hours of uninterrupted sleep prior to reporting. Because the rest opportunity was less than 36 hours, the crewmember is considered not acclimated to CDG time.

**Step 2:** Using the augmented FDP Table C, the flightcrew member would determine the maximum FDP length by entering the Table using JFK time which would be 0430. The maximum FDP would be 13.5 hours (14 hours Table C limit less 30 minutes since the crew is not acclimated). Assuming the crew reported 2 hours prior to departure since this is an international flight, the scheduled FDP is 11:20 (2:00 pre-flight report and 9:20 flight time), which is within the maximum allowable FDP of 13.5 hours. The maximum flight limit for this crew is 13 hours under Section 117.11(a)(2), so this flight would also be within that limit.

**Step 3:** Would the assignment exceed the cumulative flight time or FDP limits? The cumulative flight time limits are 100 hours in a 672 consecutive-hour period and 1,000 hours in any 365 consecutive-calendar day period. The cumulative FDP limits are 60 hours in a 168 consecutive period or 190 hours in a 672 consecutive-hour period. In this example, the cumulative limits are not exceeded so the assignment can be accepted.

**Q-116.** How does an unaugmented reserve pilot determine his/her maximum FDP?

- Example 1:** An acclimated unaugmented flightcrew member begins a RAP at 0600. That flightcrew member is then assigned to an unaugmented FDP that begins at 1200 and consists of two flight segments. Given that the flightcrew member in this example began his/her RAP at 0600, he/she will have 6 hours of accumulated RAP time by the time his/her FDP will start at 1200. According to Table B, the FDP limit for a two-segment FDP that begins at 1200 is 13 hours. The applicable 13-hour FDP limit plus 4 hours equals 17 hours. Because this is greater than 16 hours, under Section 117.21(c)(3), the pertinent RAP + FDP limit for this unaugmented operation is 16 hours. As a result, to stay within the 16-hour RAP + FDP limit, this flightcrew member's FDP cannot exceed 10 hours without an extension, as his/her RAP will use up 6 hours of the 16-hour RAP + FDP limit.
- Example 2:** An acclimated unaugmented flightcrew member begins a RAP at 1100. That flightcrew member is then assigned to an unaugmented FDP consisting of five flight segments that begins at 1500. According to Table B, the FDP limit for a five-segment FDP that begins at 1500 is 11.5 hours. The applicable 11.5-hour FDP limit plus 4 hours equals 15.5 hours. Because this is smaller than 16 hours, under Section 117.21(c)(3), the pertinent FDP + RAP limit for this unaugmented operation is 15.5 hours. Since the flightcrew member in this example began his/her RAP at 1100, he/she will have 4 hours of accumulated RAP time by the time his/her FDP will start at 1500. Consequently, this flightcrew member can take the full 11.5-hour FDP as the 11.5-hour FDP plus the 4 hours of RAP will not exceed the 15.5-hour RAP + FDP limit.
- Example 3:** An acclimated unaugmented flightcrew member begins a RAP at 0500 and does not receive any FDP assignment. What is the latest time his/her RAP can be scheduled to end? Under Section 117.21(c)(1), the maximum length of a RAP period is 14 hours. In this example, the flightcrew member must be released no later than 1900.

**Q-117.** How does an augmented reserve pilot determine his/her maximum FDP?

**Example:** An acclimated augmented flightcrew member begins a RAP at 0600. That flightcrew member is then assigned to an augmented FDP with 3 pilots and a Class 3 rest facility that begins at 1200. According to Table C, the limit for a FDP that begins at 1200 is 15 hours. The applicable 15-hour FDP limit plus 4 hours equals 19 hours (Section 117.21(c)(4) total hours FDP + RAP equals FDP limit + 4 hours). Given that the flightcrew member in this example began his/her RAP at 0600, he/she will have 13 hours remaining by the time his/her FDP starts at 1200. In effect, this flightcrew member's maximum FDP cannot exceed 13 hours without an extension, as his/her RAP will use up 6 hours of the 19-hour RAP + FDP limit.

## **APPENDIX A**

### **PART 117—FLIGHT AND DUTY LIMITATIONS AND REST REQUIREMENTS: FLIGHTCREW MEMBERS**

**Includes FAA Technical Corrections dated May 16, 2012; February 6, 2013; and November 19, 2013.**

#### **Sec.**

117.1 Applicability.

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117.11 Flight time limitation.

117.13 Flight duty period: Unaugmented operations.

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Table A to Part 117 – Maximum Flight Time Limits for Unaugmented Operations

Table B to Part 117 – Flight Duty Period: Unaugmented Operations

Table C to Part 117 – Flight Duty Period: Augmented Operations

**Authority:** 49 U.S.C. 106(g), 40113, 40119, 44101, 44701-44702, 44705, 44709-44711, 44713, 44716-44717, 44722, 46901, 44903-44904, 44912, 46105.

#### **§ 117.1 Applicability.**

(a) This part prescribes flight and duty limitations and rest requirements for all flightcrew members and certificate holders conducting passenger operations under part 121 of this chapter.

(b) This part applies to all operations directed by part 121 certificate holders under part 91, other than subpart K, of this chapter if any segment is conducted as a domestic passenger, flag passenger, or supplemental passenger operation.

(c) This part applies to all flightcrew members when participating in an operation under part 91, other than subpart K of this chapter, on behalf of the part 121 certificate holder if any flight segment



is conducted as a domestic passenger, flag passenger, or supplemental passenger operation.

(d) Notwithstanding paragraphs (a), (b) and (c) of this section, a certificate holder may conduct under part 117 its part 121 operations pursuant to 121.470, 121.480, or 121.500.

### § 117.3 Definitions.

In addition to the definitions in §§ 1.1 and 110.2 of this chapter, the following definitions apply to this part. In the event there is a conflict in definitions, the definitions in this part control for purposes of the flight and duty limitations and rest requirements of this part.

*Acclimated* means a condition in which a flightcrew member has been in a theater for 72 hours or has been given at least 36 consecutive hours free from duty.

*Airport/standby reserve* means a defined duty period during which a flightcrew member is required by a certificate holder to be at an airport for a possible assignment.

*Augmented flightcrew* means a flightcrew that has more than the minimum number of flightcrew members required by the airplane type certificate to operate the aircraft to allow a flightcrew member to be replaced by another qualified flightcrew member for in-flight rest.

*Calendar day* means a 24-hour period from 0000 through 2359 using Coordinated Universal Time or local time.

*Certificate holder* means a person who holds or is required to hold an air carrier certificate or operating certificate issued under part 119 of this chapter.

*Deadhead transportation* means transportation of a flightcrew member as a passenger or non-operating flightcrew member, by any mode of transportation, as required by a certificate holder, excluding transportation to or from a suitable accommodation. All time spent in deadhead transportation is duty and is not rest. For purposes of determining the maximum flight duty period in Table B of this part, deadhead transportation is not considered a flight segment.

*Duty* means any task that a flightcrew member performs as required by the certificate holder, including but not limited to flight duty period, flight duty, pre- and post-flight duties, administrative work, training, deadhead transportation, aircraft positioning on the ground, aircraft loading, and aircraft servicing.

*Fatigue* means a physiological state of reduced mental or physical performance capability resulting from lack of sleep or increased physical activity that can reduce a flightcrew member's alertness and ability to safely operate an aircraft or perform safety-related duties.

*Fatigue risk management system (FRMS)* means a management system for a certificate holder to use to mitigate the effects of fatigue in its particular operations. It is a data-driven process and a systematic method used to continuously monitor and manage safety risks associated with fatigue-related error.

*Fit for duty* means physiologically and mentally prepared and capable of performing assigned duties at the highest degree of safety.

*Flight duty period (FDP)* means a period that begins when a flightcrew member is required to report for duty with the intention of conducting a flight, a series of flights, or positioning or ferrying flights, and ends when the aircraft is parked after the last flight and there is no intention for further aircraft movement by the same flightcrew member. A flight duty period includes the duties performed by the flightcrew member on behalf of the certificate holder that occur before a flight segment or between flight segments without a required intervening rest period. Examples of tasks that are part of the flight duty period include deadhead transportation, training conducted in an aircraft or flight simulator, and airport/standby reserve, if the above tasks occur before a flight segment or between flight segments without an intervening required rest period.

*Home base* means the location designated by a certificate holder where a flightcrew member normally begins and ends his or her duty periods.

*Lineholder* means a flightcrew member who has an assigned flight duty period and is not acting as a reserve flightcrew member.

*Long-call reserve* means that, prior to beginning the rest period required by §117.25, the flightcrew member is notified by the certificate holder to report for a flight duty period following the completion of the rest period.

*Physiological night's rest* means 10 hours of rest that encompasses the hours of 0100 and 0700 at the flightcrew member's home base, unless the individual has acclimated to a different theater. If the flightcrew member has acclimated to a different theater, the rest must encompass the hours of 0100 and 0700 at the acclimated location.

*Report time* means the time that the certificate holder requires a flightcrew member to report for an assignment.

*Reserve availability period* means a duty period during which a certificate holder requires a flightcrew member on short call reserve to be available to receive an assignment for a flight duty period.

*Reserve flightcrew member* means a flightcrew member who a certificate holder requires to be available to receive an assignment for duty.

*Rest facility* means a bunk or seat accommodation installed in an aircraft that provides a flightcrew member with a sleep opportunity.

(1) *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.

(2) *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.

(3) *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.

*Rest period* means a continuous period determined prospectively during which the flightcrew member is free from all restraint by the certificate holder, including freedom from present responsibility for work should the occasion arise.

*Scheduled* means to appoint, assign, or designate for a fixed time.

*Short-call reserve* means a period of time in which a flightcrew member is assigned to a reserve availability period.

*Split duty* means a flight duty period that has a scheduled break in duty that is less than a required rest period.

*Suitable accommodation* means a temperature-controlled facility with sound mitigation and the ability to control light that provides a flightcrew member with the ability to sleep either in a bed, bunk or in a chair that allows for flat or near flat sleeping position. Suitable accommodation only applies to ground facilities and does not apply to aircraft onboard rest facilities.

*Theater* means a geographical area in which the distance between the flightcrew member's flight duty period departure point and arrival point differs by no more than 60 degrees longitude.

*Unforeseen operational circumstance* means an unplanned event of insufficient duration to allow for adjustments to schedules, including unforecast weather, equipment malfunction, or air traffic delay that is not reasonably expected.

*Window of circadian low* means a period of maximum sleepiness that occurs between 0200 and 0559 during a physiological night.

### **§ 117.5 Fitness for duty.**

(a) Each flightcrew member must report for any flight duty period rested and prepared to perform his or her assigned duties.

(b) No certificate holder may assign and no flightcrew member may accept assignment to a flight duty period if the flightcrew member has reported for a flight duty period too fatigued to safely perform his or her assigned duties.

(c) No certificate holder may permit a flightcrew member to continue a flight duty period if the flightcrew member has reported him or herself too fatigued to continue the assigned flight duty period.

(d) As part of the dispatch or flight release, as applicable, each flightcrew member must affirmatively state he or she is fit for duty prior to commencing flight.

### **§ 117.7 Fatigue risk management system.**

(a) No certificate holder may exceed any provision of this part unless approved by the FAA under a Fatigue Risk Management System that provides at least an equivalent level of safety against fatigue-related accidents or incidents as the other provisions of this part.

(b) The Fatigue Risk Management System must include:

(1) A fatigue risk management policy.

(2) An education and awareness training program.

- (3) A fatigue reporting system.
- (4) A system for monitoring flightcrew fatigue.
- (5) An incident reporting process.
- (6) A performance evaluation.

### **§ 117.9 Fatigue education and awareness training program.**

(a) Each certificate holder must develop and implement an education and awareness training program, approved by the Administrator. This program must provide annual education and awareness training to all employees of the certificate holder responsible for administering the provisions of this rule including flightcrew members, dispatchers, individuals directly involved in the scheduling of flightcrew members, individuals directly involved in operational control, and any employee providing direct management oversight of those areas.

(b) The fatigue education and awareness training program must be designed to increase awareness of:

- (1) Fatigue;
- (2) The effects of fatigue on pilots; and
- (3) Fatigue countermeasures.

(c) (1) Each certificate holder must update its fatigue education and awareness training program every two years and submit the update to the Administrator for review and acceptance.

(2) Not later than 12 months after the date of submission of the fatigue education and awareness training program required by (c) (1) of this section, the Administrator shall review and accept or reject the update. If the Administrator rejects an update, the Administrator shall provide suggested modifications for resubmission of the update.

### **§ 117.11 Flight time limitation.**

(a) No certificate holder may schedule and no flightcrew member may accept an assignment or continue an assigned flight duty period if the total flight time:

(1) Will exceed the limits specified in Table A of this part if the operation is conducted with the minimum required flightcrew.

(2) Will exceed 13 hours if the operation is conducted with a 3-pilot flightcrew.

(3) Will exceed 17 hours if the operation is conducted with a 4-pilot flightcrew.

(b) If unforeseen operational circumstances arise after takeoff that are beyond the certificate holder's control, a flightcrew member may exceed the maximum flight time specified in paragraph (a) of this section and the cumulative flight time limits in 117.23(b) to the extent necessary to safely land the aircraft at the next destination airport or alternate, as appropriate.

(c) Each certificate holder must report to the Administrator within 10 days any flight time that exceeded the maximum flight time limits permitted by this section or § 117.23(b). The report must contain a description of the extended flight time limitation and the circumstances surrounding the need for the extension.

**§ 117.13 Flight duty period: Unaugmented operations.**

(a) Except as provided for in § 117.15, no certificate holder may assign and no flightcrew member may accept an assignment for an unaugmented flight operation if the scheduled flight duty period will exceed the limits in Table B of this part.

(b) If the flightcrew member is not acclimated:

(1) The maximum flight duty period in Table B of this part is reduced by 30 minutes.

(2) The applicable flight duty period is based on the local time at the theater in which the flightcrew member was last acclimated.

**§ 117.15 Flight duty period: Split duty.**

For an unaugmented operation only, if a flightcrew member is provided with a rest opportunity (an opportunity to sleep) in a suitable accommodation during his or her flight duty period, the time that the flightcrew member spends in the suitable accommodation is not part of that flightcrew member's flight duty period if all of the following conditions are met:

(a) The rest opportunity is provided between the hours of 22:00 and 05:00 local time.

(b) The time spent in the suitable accommodation is at least 3 hours, measured from the time that the flightcrew member reaches the suitable accommodation.

(c) The rest opportunity is scheduled before the beginning of the flight duty period in which that rest opportunity is taken.

(d) The rest opportunity that the flightcrew member is actually provided may not be less than the rest opportunity that was scheduled.

(e) The rest opportunity is not provided until the first segment of the flight duty period has been completed.

(f) The combined time of the flight duty period and the rest opportunity provided in this section does not exceed 14 hours.

**§ 117.17 Flight duty period: Augmented flightcrew.**

(a) For flight operations conducted with an acclimated augmented flightcrew, no certificate holder may assign and no flightcrew member may accept an assignment if the scheduled flight duty period will exceed the limits specified in Table C of this part.

(b) If the flightcrew member is not acclimated:

(1) The maximum flight duty period in Table C of this part is reduced by 30 minutes.

(2) The applicable flight duty period is based on the local time at the theater in which the flightcrew member was last acclimated.

(c) No certificate holder may assign and no flightcrew member may accept an assignment under this section unless during the flight duty period:

(1) Two consecutive hours in the second half of the flight duty period are available for in-flight rest for the pilot flying the aircraft during landing.

(2) Ninety consecutive minutes are available for in-flight rest for the pilot performing monitoring duties during landing.

(d) No certificate holder may assign and no flightcrew member may accept an assignment involving more than three flight segments under this section.

(e) At all times during flight, at least one flightcrew member qualified in accordance with § 121.543(b)(3)(i) of this chapter must be at the flight controls.

### **§ 117.19 Flight duty period extensions.**

(a) For augmented and unaugmented operations, if unforeseen operational circumstances arise prior to takeoff:

(1) The pilot in command and the certificate holder may extend the maximum flight duty period permitted in Tables B or C of this part up to 2 hours. The pilot in command and the certificate holder may also extend the maximum combined flight duty period and reserve availability period limits specified in § 117.21(c)(3) and (4) of this part up to 2 hours.

(2) An extension in the flight duty period under paragraph (a) (1) of this section of more than 30 minutes may occur only once prior to receiving a rest period described in § 117.25(b).

(3) A flight duty period cannot be extended under paragraph (a) (1) of this section if it causes a flightcrew member to exceed the cumulative flight duty period limits specified in § 117.23(c).

(4) Each certificate holder must report to the Administrator within 10 days any flight duty period that exceeded the maximum flight duty period permitted in Tables B or C of this part by more than 30 minutes. The report must contain the following:

(i) A description of the extended flight duty period and the circumstances surrounding the need for the extension; and

(ii) If the circumstances giving rise to the extension were within the certificate holder's control, the corrective action(s) that the certificate holder intends to take to minimize the need for future extensions.

(5) Each certificate holder must implement the corrective action(s) reported in paragraph (a)(4) of this section within 30 days from the date of the extended flight duty period.

(b) For augmented and unaugmented operations, if unforeseen operational circumstances arise after takeoff:

(1) The pilot in command and the certificate holder may extend maximum flight duty periods specified in Tables B or C of this part to the extent necessary to safely land the aircraft at the next destination airport or alternate airport, as appropriate.

(2) An extension of the flight duty period under paragraph (b) (1) of this section of more than 30 minutes may occur only once prior to receiving a rest period described in § 117.25(b).

(3) An extension taken under paragraph (b) of this section may exceed the cumulative flight duty period limits specified in § 117.23(c).

(4) Each certificate holder must report to the Administrator within 10 days any flight duty period that either exceeded the cumulative

flight duty periods specified in § 117.23(c), or exceeded the maximum flight duty period limits permitted by Tables B or C of this part by more than 30 minutes. The report must contain a description of the circumstances surrounding the affected flight duty period.

### **§ 117.21 Reserve status.**

(a) Unless specifically designated as airport/standby or short-call reserve by the certificate holder, all reserve is considered long-call reserve.

(b) Any reserve that meets the definition of airport/standby reserve must be designated as airport/standby reserve. For airport/standby reserve, all time spent in a reserve status is part of the flightcrew member's flight duty period.

(c) For short call reserve:

(1) The reserve availability period may not exceed 14 hours.

(2) For a flightcrew member who has completed a reserve availability period, no certificate holder may schedule and no flightcrew member may accept an assignment of a reserve availability period unless the flightcrew member receives the required rest in § 117.25(e).

(3) For an unaugmented operation, the total number of hours a flightcrew member may spend in a flight duty period and a reserve availability period may not exceed the lesser of the maximum applicable flight duty period in Table B of this part plus 4 hours, or 16 hours, as measured from the beginning of the reserve availability period.

(4) For an augmented operation, the total number of hours a flightcrew member may spend in a flight duty period and a reserve availability period may not exceed the flight duty period in Table C of this part plus 4 hours, as measured from the beginning of the reserve availability period.

(d) For long call reserve, if a certificate holder contacts a flightcrew member to assign him or her to a flight duty period that will begin before and operate into the flightcrew member's window of circadian low, the flightcrew member must receive a 12 hour notice of report time from the certificate holder.

(e) A certificate holder may shift a reserve flightcrew member's reserve status from long-call to short-call only if the flightcrew member receives a rest period as provided in § 117.25(e).

### **§ 117.23 Cumulative limitations.**

(a) The limitations of this section include all flying by flightcrew members on behalf of any certificate holder or 91K Program Manager during the applicable periods.

(b) No certificate holder may schedule and no flightcrew member may accept an assignment if the flightcrew member's total flight time will exceed the following:

(1) 100 hours in any 672 consecutive hours or

(2) 1,000 hours in any 365 consecutive calendar day period.

(c) No certificate holder may schedule and no flightcrew member may accept an assignment if the flightcrew member's total Flight Duty Period will exceed:

- (1) 60 flight duty period hours in any 168 consecutive hours or
- (2) 190 flight duty period hours in any 672 consecutive hours.

### **§ 117.25 Rest period.**

(a) No certificate holder may assign and no flightcrew member may accept assignment to any reserve or duty with the certificate holder during any required rest period.

(b) Before beginning any reserve or flight duty period a flightcrew member must be given at least 30 consecutive hours free from all duty within the past 168 consecutive hour period.

(c) If a flightcrew member operating in a new theater has received 36 consecutive hours of rest, that flightcrew member is acclimated and the rest period meets the requirements of paragraph (b) of this section.

(d) A flightcrew member must be given a minimum of 56 consecutive hours rest upon return to home base if the flightcrew member: (1) Travels more than 60° longitude during a flight duty period or a series of flight duty period, and (2) is away from home base for more than 168 consecutive hours during this travel. The 56 hours of rest specified in this section must encompass three physiological nights' rest based on local time.

(e) No certificate holder may schedule and no flightcrew member may accept an assignment for any reserve or flight duty period unless the flightcrew member is given a rest period of at least 10 consecutive hours immediately before beginning the reserve or flight duty period measured from the time the flightcrew member is released from duty. The 10 hour rest period must provide the flightcrew member with a minimum of 8 uninterrupted hours of sleep opportunity.

(f) If a flightcrew member determines that a rest period under paragraph (e) of this section will not provide eight uninterrupted hours of sleep opportunity, the flightcrew member must notify the certificate holder. The flightcrew member cannot report for the assigned flight duty period until he or she receives a rest period specified in paragraph (e) of this section.

(g) If a flightcrew member engaged in deadhead transportation exceeds the applicable flight duty period in Table B of this part, the flightcrew member must be given a rest period equal to the length of the deadhead transportation but not less than the required rest in paragraph (e) of this section before beginning a flight duty period.

### **§ 117.27 Consecutive nighttime operations.**

A certificate holder may schedule and a flightcrew member may accept up to five consecutive flight duty periods that infringe on the window of circadian low if the certificate holder provides the flightcrew member with an opportunity to rest in a suitable accommodation during each of the consecutive nighttime flight duty periods. The rest opportunity must be at least 2 hours, measured from the time that the flightcrew member reaches the suitable accommodation, and must comply with the conditions specified in §117.15(a), (c), (d), and (e). Otherwise, no



certificate holder may schedule and no flightcrew member may accept more than three consecutive flight duty periods that infringe on the window of circadian low. For purposes of this section, any split duty rest that is provided in accordance with § 117.15 counts as part of a flight duty period.

**§ 117.29 Emergency and government sponsored operations.**

(a) This section applies to operations conducted pursuant to contracts with the U.S. Government and operations conducted pursuant to a deviation under § 119.57 of this chapter that cannot otherwise be conducted under this part because of circumstances that could prevent flightcrew members from being relieved by another crew or safely provided with the rest required under § 117.25 at the end of the applicable flight duty period.

(b) The pilot-in-command may determine that the maximum applicable flight duty period, flight time, and/or combined flight duty period and reserve availability period limits must be exceeded to the extent necessary to allow the flightcrew to fly to the closest destination where they can safely be relieved from duty by another flightcrew or can receive the requisite amount of rest prior to commencing their next flight duty period.

(c) A flight duty period may not be extended for an operation conducted pursuant to a contract with the U.S. Government if it causes a flightcrew member to exceed the cumulative flight time limits in § 117.23(b) and the cumulative flight duty period limits in § 117.23(c).

(d) The flightcrew shall be given a rest period immediately after reaching the destination described in paragraph (b) of this section equal to the length of the actual flight duty period or 24 hours, whichever is less.

(e) Each certificate holder must report within 10 days:

(1) Any flight duty period that exceeded the maximum flight duty period permitted in Tables B or C of this part, as applicable, by more than 30 minutes;

(2) Any flight time that exceeded the maximum flight time limits permitted in Table A of this part and § 117.11, as applicable; and

(3) Any flight duty period or flight time that exceeded the cumulative limits specified in § 117.23.

(f) The report must contain the following:

(1) A description of the extended flight duty period and flight time limitation, and the circumstances surrounding the need for the extension; and

(2) If the circumstances giving rise to the extension(s) were within the certificate holder's control, the corrective action(s) that the certificate holder intends to take to minimize the need for future extensions.

(g) Each certificate holder must implement the corrective action(s) reported pursuant to paragraph (f)(2) of this section within 30 days from the date of the extended flight duty period and/or the extended flight time.

**TABLE A TO PART 117 – MAXIMUM FLIGHT TIME LIMITS  
FOR UNAUGMENTED OPERATIONS TABLE**

Time of report (acclimated)	Maximum flight time (hours)
0000–0459 .....	8
0500–1959 .....	9
2000–2359 .....	8

**TABLE B TO PART 117—FLIGHT DUTY PERIOD: UNAUGMENTED OPERATIONS**

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of flight segments						
	1	2	3	4	5	6	7+
0000–0359 .....	9	9	9	9	9	9	9
0400–0459 .....	10	10	10	10	9	9	9
0500–0559 .....	12	12	12	12	11.5	11	10.5
0600–0659 .....	13	13	12	12	11.5	11	10.5
0700–1159 .....	14	14	13	13	12.5	12	11.5
1200–1259 .....	13	13	13	13	12.5	12	11.5
1300–1659 .....	12	12	12	12	11.5	11	10.5
1700–2159 .....	12	12	11	11	10	9	9
2200–2259 .....	11	11	10	10	9	9	9
2300–2359 .....	10	10	10	9	9	9	9

**TABLE C TO PART 117 - FLIGHT DUTY PERIOD: AUGMENTED OPERATIONS**

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) based on rest facility and number of pilots					
	Class 1 rest facility		Class 2 rest facility		Class 3 rest facility	
	3 Pilots	4 Pilots	3 Pilots	4 Pilots	3 Pilots	4 Pilots
0000–0559 .....	15	17	14	15.5	13	13.5
0600–0659 .....	16	18.5	15	16.5	14	14.5
0700–1259 .....	17	19	16.5	18	15	15.5
1300–1659 .....	16	18.5	15	16.5	14	14.5
1700–2359 .....	15	17	14	15.5	13	13.5

