



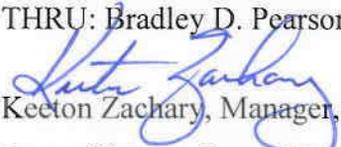
# Federal Aviation Administration

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## Memorandum

Date: August 25, 2010

To: John Duncan, Manager, Air Transportation Division, AFS-200  
THRU: Bradley D. Pearson, Manager, Flight Standards Division, ANM-200 

From:   
Keeton Zachary, Manager, Seattle Aircraft Evaluation Group, SEA-AEG

Prepared by: Bryan Watson, Operations Specialist, SEA-AEG, 425-917-6622

Subject: ERJ 170/190 Flight Standardization Board (FSB) Report, Revision 2 -  
Coordination and Publication

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Attached is the ERJ 170/190 Flight Standardization Board (FSB) Report, Revision 2, for your review, signature, and publication on the Operations Specifications web site. This revision incorporates the addition of the ERJ 190 ECJ model and the inclusion of Heads-Up Guidance Training requirements.

In keeping with our QMS FSB process, please return the signed coordination sheet with original signatures to this office for our files.

Attachments

FLIGHT STANDARDIZATION BOARD REPORT

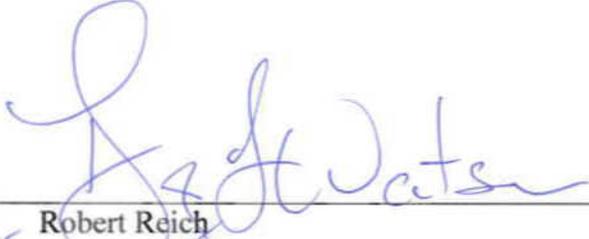
ERJ-170/ERJ-190  
(Revision 2)

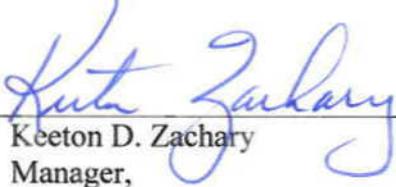
APPROVED  DATE: 9/22/2010  
Stacey Anderson

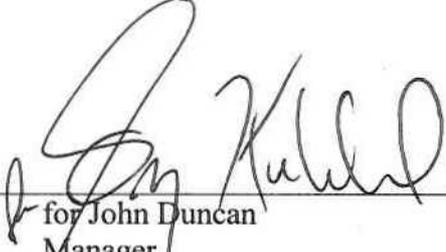
Chairman, ERJ-170/ERJ-190 Flight Standardization Board  
Seattle Aircraft Evaluation Group

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MANAGEMENT COORDINATION SHEET

  
for Robert Reich  
Assistant Manager, Operations  
Seattle Aircraft Evaluation Group  
Date 8-26-10

  
Keeton D. Zachary  
Manager,  
Seattle Aircraft Evaluation Group  
Date 8-26-10

  
for John Duncan  
Manager,  
Air Transportation Division  
Date 9/08/2010

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## REVISION RECORD

REVISION NO.	DATE
Original	4/05/2004
One	9/29/2005
Two	08/10/2010

## 1. PURPOSE AND APPLICABILITY

1.1 This FSB report specifies FAA master training, checking, and currency requirements applicable to crews operating ERJ-170/ERJ-190 aircraft under 14 CFR 121. Provisions of the report:

- a) define a common pilot "type rating(s)" assigned to the ERJ-170 and ERJ-190,
- b) describe any unique requirements applicable to initial, transition, upgrade, or recurrent qualification,
- c) provide "Master Difference Program Requirements" for crews requiring differences qualification for mixed-fleet-flying or transition,
- d) provide examples of acceptable "Operator Difference Requirement (ODR)" tables,
- e) describe acceptable training program and device characteristics when necessary to establish compliance with pertinent Master Difference Requirements (MDRs),
- f) set checking and currency standards including specification of those checks that must be administered by FAA or operators, and
- g) list regulatory compliance status (compliance checklist) for 14 CFRs 121, 91, 61, Advisory Circulars, or other operationally related criteria reviewed by the Aircraft Evaluation Group (AEG) or Flight Standardization Board (FSB).

1.2 This report includes:

- a) minimum requirements which must be applied by FAA field offices, (e.g. MDRs, Type Rating designations, etc.),
- b) information which is advisory in general, but is mandatory for particular operators if the designated configurations apply and if approved for that operator (e.g. MDR footnotes, acceptable ODR tables), and
- c) information which is used to facilitate FAA review of an aircraft type or variant that is proposed for use by an operator (e.g. compliance checklist).

Various sections within the report are qualified as to whether compliance is required, considering the provisions of AC 120-53 as recommended, or is advisory in nature.

1.3 Provisions of this report are effective until amended, superseded, or withdrawn by subsequent FSB determinations.

#### 1.4 Acronyms

AC	Advisory Circular
AEG	Aircraft Evaluation Group
AQP	Advanced Qualification Program
ATPC	Airline Transport Pilot Check
CFIT	Controlled Flight Into Terrain
CFR	Code of Federal Regulations
CHDO	Certificate Holding District Office
EICAS	Engine Indication and Crew Alerting System
FADEC	Full Authority Digital Engine Control System
FBS	Fixed Base Simulator
FMS	Flight Management System
FSB	Flight Standardization Board
FTD	Flight Training Device
GPS	Global Positioning System
HUD	Head-Up Display
IAW	In Accordance With
LOE	Line Operational Evaluation
LOFT	Line Oriented Flight Training
MCR	Master Common Requirements
MDA	Minimum Descent Altitude
MDR	Master Differences Requirements
MFD	Multi Function Display
NSET	National Simulator Evaluation Team
ODR	Operator Difference Requirements
PFD	Primary Flight Display
POI	Principal Operations Inspector
PTS	Practical Test Standards
TSO	Technical Standard Order

1.5 This report addresses ERJ-170 and ERJ-190 variants as specified in the FAA Type Certificate Data Sheet (TCDS). These include the following: ERJ-170-100, ERJ-170-200, ERJ-190-100, ERJ-190-200 and ERJ-190 ECJ. The ERJ-170-100, ERJ-170-200, and ERJ-190-100, ERJ-190-200 are often commercially referred to as the Embraer 170, Embraer 175 and Embraer 190, Embraer 195 respectively.

## 2. PILOT "TYPE RATING" REQUIREMENTS

2.1 Type Rating. In accordance with the provisions of 14 CFRs 1, 61, 121 and AC 120-53, a common pilot "Type Rating" assigned to the ERJ-170 and ERJ-190 and is designated "ERJ-170, ERJ-190".

## 3. "MASTER COMMON REQUIREMENTS" (MCRs)

3.1 Common requirements for all ERJ-170/ERJ-190 airplanes.

3.1.1 Landing Minima Categories, 14 CFR 97.3. All ERJ-170/ERJ-190 airplanes are considered Category C aircraft for the purposes of determining "straight-in landing weather minima". For circling, the minima to be used are as specified in operation specifications for each operator as follows:

a) For operators with Automated Standard Operations Specifications (Paragraph C53(c)), circling minima are as specified for the actual approach speed to be used for a circling maneuver, or

b) If automated operations specifications have not been issued, circling minima are as designated by current Standard Operations Specifications and 14 CFR 97.3.

3.1.2 Normal "Final Landing Flap Setting", 14 CFR 91.126(c). The normal "final landing flap setting" per 14 CFR 91.126(c) is considered to be "Flaps Full" for all ERJ-170/ERJ-190 airplanes.

3.1.3 Autopilot Engage/Disengage Altitudes. The autopilot must not be engaged below a minimum engage altitude of 400 feet AGL after takeoff. The autopilot must be disengaged before the airplane descends below 50 feet AGL when it is coupled to an ILS glideslope and localizer unless it is in the go-around mode. The autopilot must be disengaged before the airplane descends below Minimum Descent Altitude (MDA) on a non precision approach with the autopilot engaged.

3.1.4 No other special or unique requirements common to ERJ-170/ERJ-190 are identified beyond those provided by 14 CFR 61, 91 and 121.

## 4. "MASTER DIFFERENCE REQUIREMENTS" (MDRs)

4.1 Requirements for particular ERJ-170/ERJ-190 Variant Combinations. Master Difference Requirements (MDRs) for variants of the and ERJ-170/ERJ-190 are shown in Appendix 1. These provisions apply when differences between variants exist which affect crew knowledge, skills, or abilities related to flight safety (e.g., Level A or greater differences).

4.2 MDR Footnotes. Footnotes to MDR requirements define acceptable "required means" or "alternate means" of compliance. A footnote can indicate requirements that are less restrictive than the basic designation, or more restrictive than the basic designation, depending on the significance of the differences between particular variants.

4.3 Terminology. The term "must" is used in this report and certain MDR Footnotes even though it is recognized that this FSB report, and AC 120-53 on which it is based, provides one acceptable means, but not necessarily the only means of compliance with 14 CFR 121 Subpart N and O requirements. This terminology acknowledges the need for operators to fully comply with provisions in this FSB report, if this AC method is to be applied as that operator's means of compliance with 14 CFR 121. Operators who choose this method must comply with each applicable MDR provision including footnotes. Partial, or selective application of the process or its provisions, does not constitute an acceptable means of compliance with 14 CFR 121 under AC 120-53.

## 5. ACCEPTABLE "OPERATOR DIFFERENCE REQUIREMENTS" TABLES -

5.1 ODR Tables. ODR tables are used to show an operator's compliance method. Detailed Embraer generic ODR tables are on file with the Seattle AEG. Copies are available on request. These ODR tables are provided as Embraer generic, and therefore may not include items that are applicable to particular operators.

5.2 Operator Preparation of ODR Tables. Operators flying "mixed fleet" variants and types must have approved ODR tables pertinent to their fleet.

5.3 ODR Table Coordination. New ODR tables proposed by operators should be coordinated with the FSB prior to FAA approval and implementation. Through this coordination, the FSB can ensure consistent treatment of variants and types between various operators and compatibility of the ODR tables with MDR provisions.

5.4 ODR Table Distribution. Originally approved ODR tables are retained by the operator. Copies of approved ERJ-170/ERJ-190 ODR tables are retained by the Certificate Holding District Office (CHDO). Copies of all approved ODR tables should be forwarded to the FSB Chairman, Seattle Aircraft Evaluation Group (AEG), SEAAEG.

## 6. FSB SPECIFICATIONS FOR TRAINING

### 6.1 General.

6.1.1 Assumptions Regarding Airmen's Previous Experience. The provisions of Section 6 of this report apply to programs for airmen who have experience in 14 CFR 121 or 14 CFR 135 air carrier operations and multi-engine transport turbojet or turboprop aircraft. For airmen not having this experience, additional requirements may be appropriate as determined by the POI, FSB, and AFS-200.

6.1.2 ERJ-170/ERJ-190 Full Course programs. Principal Inspectors for operators initially introducing a ERJ-170/ERJ-190 type, may approve programs consistent with programs previously approved. For information regarding previously approved programs, FAA Principal Inspectors for other existing ERJ-170/ERJ-190 operators may be consulted. In the event of uncertainty regarding evaluation of a proposed program, the FSB should be consulted.

## 6.2 Pilots Initial, Transition and Upgrade Ground Training

6.2.1 Pilots: Initial, Transition and Upgrade Ground Training, 14 CFR 121.419. Initial, transition, or upgrade ground training for the ERJ-170/ERJ-190 is accomplished as specified by 14 CFR 121.419 or an approved AQP program. No unique provisions or requirements are specified. Training program hours may be reduced as specified in 14 CFR 121.405.

6.2.2 Pilots: Initial, Transition and Upgrade Flight Training. Initial, transition, or upgrade flight training for the ERJ-170/ERJ-190 is accomplished as specified by 14 CFR 121.424 or an approved AQP program. No unique provisions or requirements are specified. Training program hours may be reduced as specified in 14 CFR 121.405.

6.2.3 Crewmember Emergency Training. Crewmember emergency training should be conducted for the ERJ-170/ERJ-190 in accordance with 14 CFR 121.417. The objective of emergency training for the ERJ-170/ERJ-190 aircraft is to provide crewmembers with the necessary knowledge concerning emergency equipment, situations, and procedures, to ensure implementation of the correct actions in the event of an emergency.

Emergency training consists of instruction on the location, function, and operation of emergency equipment that is different in each variant of the ERJ-170/ERJ-190 and from other aircraft in the operator's fleet. Where emergency equipment is common, instruction may be adjusted for crewmembers qualified and current on this equipment, provided records are available which demonstrate that crewmembers meet 14 CFR 121.417 and 14 CFR 121.683(a) requirements. For example, if the fire extinguishers are common to fire extinguishers on other aircraft in the operator's fleet, training may be simultaneously credited for both aircraft. Conversely, for equipment that is unique to the ERJ-170/ERJ-190, training on the emergency equipment for each variant is required.

Emergency training also consists of instruction in crewmember emergency assignments and procedures including crew coordination and communication, the handling of emergency or other unusual situations, and emergency performance and observation drills, that are specific to each variant of the ERJ-170/ERJ-190.

In accordance with 14 CFR 121.417 and the Aviation Safety Inspector's Handbook 8900.10, emergency training requirements refer to two types of training: "general" emergency training and "aircraft-specific" emergency training. General emergency training is instruction on those emergency items that are common to the ERJ-170/ERJ-190 and all aircraft in the operator's fleet, e.g., instruction on fire extinguishers and

firefighting procedures, if common to all aircraft. Aircraft-specific emergency training is training on those items that are specific to the ERJ-170/ERJ-190 aircraft. An example of aircraft-specific emergency training is instruction on the location of emergency equipment for each variant of the ERJ-170/ERJ-190 aircraft.

As part of an approved training program, an operator may use many methods when conducting aircraft-specific emergency training, including classroom instruction, pictures, videotape, ground training devices, computer-based instruction, and static aircraft training.

There are no specified training program hours for Crewmember Emergency Training. A chart addressed in 8900.10 provides "national norms" for the approval of the general emergency training program hours. The complexity of the different variants of the ERJ-170/ERJ-190 aircraft and the complexity of the type of operation to be conducted should be considered when approving the ERJ-170/ERJ-190 aircraft-specific emergency training.

6.2.4 Areas of Emphasis. The following areas of emphasis should be addressed during ground and flight training:

- a) The engine indication and crew alerting system (EICAS), the primary flight displays (PFDs), and multifunction displays (MFDs). Altitude and airspeed are presented on vertical scale instruments in both digital and analog formats. Pilots need to be able to understand the multitude of information presented on these displays. Pilots transitioning from traditional round dial basic "T" instruments may require additional training and instrument scan practice to gain proficiency in manually flying by reference to the PFD. Recognition of reversionary modes and display failures and appropriate corrective action to be taken should be addressed.
- b) Flight Control System. An operational understanding of the basic modes of operation as well as an understanding of the fly-by-wire primary and secondary flight control systems and their associated system components.
- c) Flight Guidance System including the Autopilot, Autothrottle, and Flight Director. An understanding of the various lateral and vertical modes and the ability to select and arm the modes during different phases of flight is essential.
- d) Full Authority Digital Electronic Control (FADEC). An operational understanding of the FADEC and the engine thrust mode selection is required.
- e) System control panels using pushbuttons with integral light bars. Pilots should have an understanding of the switch position and system configuration as it relates to whether the light bar is illuminated or not. This understanding is required for both normal and abnormal system operation.

f) Head-Up Display (HUD). If Head-Up Displays are installed and used, training in accordance with Appendix 6 or equivalent should be provided. If mixed flying of HUD and non-HUD equipped aircraft occurs, the operator should have approved ODR tables reflecting the HUD installation.

6.2.5 Training for Seat Dependent Tasks. Accomplishment of certain tasks, procedures, or maneuvers require training of a crewmember for a particular crew position (i.e. captain, first officer, check airman, etc.). Training programs should recognize and address the necessary seat/position related tasks for the applicable crewmember. Accordingly, training programs should address seat dependent tasks or maneuvers to the extent necessary to satisfy crew qualification objectives, and IAW ODR tables when applicable.

6.2.5.1 Features or Procedures Which Could Have Seat Dependent Elements (as determined by each operator and POI). These may include the following:

- a) Rejected Takeoff
- b) Emergency descent
- c) Manual gear extension

6.2.6 Special Event Training. Special event training is recommended for the ERJ-170/ERJ-190. Such training should be conducted to improve basic crew member understanding and confidence regarding aircraft handling qualities, options and procedures as these relate to design characteristics and limitations. Examples of this training could include the following:

- a) Recovery from unusual attitudes
- b) Handling qualities and procedures during recovery from an upset condition (e.g., wake vortex encounter).

6.2.7 Controlled Flight Into Terrain (CFIT). Due to continued industry efforts to reduce exposure to CFIT accidents, special emphasis on this topic is appropriate. Emphasis on altitude awareness, GPWS warnings, situational awareness and crew coordination is appropriate.

6.3 Differences Training.

6.3.1 Differences Training, 14 CFR 121.418. Unless an initial or transition program is completed for each variant, differences training is necessary for qualification in each variant as shown in the MDR. A training program addressing pertinent differences described by individual operator ODRs, including normal and abnormal operations, if applicable, is required for each aircraft flown.

## 6.4 Recurrent Training

6.4.1 Recurrent Training, 14 CFR 121.427. Recurrent training must include appropriate training in accordance with 14 CFR 121.427 or an approved Advanced Qualification Program (AQP) program.

For flight attendants, ERJ-170/ERJ-190 recurrent training consists of instruction as necessary in the ERJ-170/ERJ-190 general operational subjects, as addressed in Paragraph 6.5.3, "Flight Attendants: Initial and Transition Ground Training: 14 CFR 121.421" and in the ERJ-170/ERJ-190 aircraft-specific emergency subjects, as addressed in Paragraph 6.2.3, "Crewmember Emergency Training: 14 CFR 121.417".

As part of an approved training program, an operator may use many methods when conducting recurrent training, including classroom instruction, pictures, videotape, ground training devices, computer-based instruction, and static aircraft training.

Recurrent training should include a quiz or review to determine the state of the flight attendant's knowledge with respect to the duties and procedures required in routine, abnormal, and emergency situations for each variant of the ERJ-170/ERJ-190 aircraft. In addition, recurrent training should include a competence check to determine flight attendant ability to perform assigned duties and responsibilities for the ERJ-170/ERJ-190 aircraft. The competence check should cover each piece of emergency equipment and each emergency procedure unique to each variant of the ERJ-170/ERJ-190 aircraft.

Training program hours for Recurrent Training may be reduced as specified in 14 CFR 121.405.

6.4.2 Recurrent Ground Training Time Reductions. Recurrent ground training may be reduced below programmed hours required in 14 CFR 121.427(c), in accordance with 14 CFR 121.405 or an approved AQP program.

6.4.3 Recurrent Flight Training. Recurrent flight training requires appropriate maneuvers and procedures identified in 14 CFR 121, Appendix E, for the ERJ-170/ERJ-190 or an approved AQP. Appropriate emphasis should be placed on systems and procedures that may not have been used operationally, and are expected to be used prior to the next recurrent training event (e.g. FMS, GPS, etc.). As permitted by 14 CFR 121.427(d)(1)(ii), satisfactory completion of a proficiency check, in accordance with 14 CFR 121 Appendix F, may be substituted for training.

6.4.4 Recurrent Training Level Adjustments. (Reserved)

## 6.5 Other Training

6.5.1 LOFT Programs, 14 CFR 121.409(b)(3). When operators have LOFT programs, POIs should review those programs to assure their suitability.

6.5.2 Flight Navigator, 14 CFR 121.420. Flight Navigator initial and transition ground training is not applicable to the ERJ-170/ERJ-190 aircraft.

6.5.3 Flight Attendants, Initial and Transition Ground Training, should be conducted in accordance with 14 CFR 121.421. The objective of aircraft ground training is to provide flight attendants with an understanding of the ERJ-170/ERJ-190 aircraft. This knowledge is necessary for the flight attendant to perform the duties and procedures required in routine, abnormal, and emergency situations.

Aircraft ground training includes instruction in two distinct subject areas: ERJ-170/ERJ-190 general operational subjects training and ERJ-170/ERJ-190 aircraft-specific emergency subjects training. The ERJ-170/ERJ-190 aircraft-specific emergency subjects training is addressed in Paragraph 6.2.3, "Crewmember Emergency Training: 14 CFR 121.417".

ERJ-170/ERJ-190 general operational subjects training consists of instruction in the general description of the aircraft, aircraft equipment, furnishings, and systems; routine crewmember communication and coordination procedures; routine crewmember duties and procedures during each phase of flight; and passenger handling responsibilities for each variant of the ERJ-170/ERJ-190 aircraft.

As part of an approved training program, an operator may use many methods when conducting aircraft ground training, including classroom instruction, pictures, videotape, ground training devices, computer based instruction, and static aircraft training.

Initial and Transition Ground Training must include a competence check to determine flight attendant ability to perform assigned duties and procedures on the ERJ-170/ERJ-190 aircraft. The competence check should cover each piece of emergency equipment and each emergency procedure unique to each variant of the ERJ-170/ERJ-190 aircraft.

Training program hours for Initial Ground Training may be reduced as specified in 14 CFR 121.405; there are no specified training program hours for Transition Ground Training. The complexity of the different variants of the ERJ-170/ERJ-190 aircraft and the complexity of the type of operation to be conducted should be considered when approving ERJ-170/ERJ-190 Transition Ground Training.

6.5.4 Aircraft Dispatchers, Initial and Transition should be conducted in accordance with 14 CFR 121.422.

## 7. FSB SPECIFICATIONS FOR CHECKING

### 7.1 General

7.1.1 Checking Items. Pertinent knowledge, procedures, and maneuvers specified by 14 CFR 61 Appendix A, FAA Practical Test Standards (PTS) and 14 CFR 121, Appendix F, pertinent to multi-engine turbojet transport aircraft apply.

7.1.2 Areas of emphasis. The following areas of emphasis should be addressed during checks as necessary:

- a) Proficiency with manual and automatic flight must be demonstrated.
- b) Proper selection and use of PFD/MFD displays, raw data, flight director, and Flight Guidance System modes should be demonstrated, particularly during instrument approaches.
- c) Demonstration of FMS navigation (departures and arrivals) proficiency.
- d) Proper outside visual scan without prolonged fixation on FMS operation should be demonstrated, and failure of component(s) of the FMS should be addressed.

7.1.3 No Flap Landings. Demonstration of a No Flap approach and landing during an 14 CFR 61 Appendix A or 14 CFR 121 Appendix F check is appropriate. In accordance with Order 8900.10, when the flight test is conducted in the airplane in actual flight, a touchdown from a no flap is not required. The approach should be flown to the point where the inspector or examiner can determine whether the landing would or would not occur in the touchdown zone.

### 7.1.4 Head-Up Display (HUD).

a) When HUD use is approved, checking must include suitable demonstration of HUD use for modes and phases of flight authorized. Checking standards for HUD are equivalent to those for non-HUD operations except for Category III. For Category III, performance equivalent to or better than that demonstrated for manual Category III HUD operations in the original equipment STC, should be shown by each PIC.

b) HUD vs. Flight Director and Raw Data. When HUD is installed, PC maneuvers, LOFT or other demonstrations may be completed using HUD at the check airman/inspectors discretion. However, periodic assessment of non-HUD skills should be demonstrated, and at any time a check airman/inspector may at their discretion request that authorized maneuvers be performed without use of HUD (e.g. if manual CAT I F/D operations are authorized, the airman being checked may be requested to perform the maneuver without HUD).

## 7.2 Type Ratings

7.2.1 Oral Examinations. Oral examinations for the ERJ-170/ERJ-190 may be completed at the end of the academic phase of training. When an airman is qualifying in only the ERJ-170 or ERJ-190, oral test items need only address the model for which the test is being conducted.

7.2.2 Practical Tests. Practical tests may follow standard provisions of 14 CFR 61, Appendix A, or approved Line Operational Evaluation (LOE) provisions of AQP. The satisfactory completion of a practical type rating evaluation in any ERJ-170 or ERJ-190 variant will meet the requirement for the ERJ-170, ERJ-190 type rating. In order to operate another variant, crewmembers operating under 14 CFR Part 121 are required to satisfactorily comply with the requirements of the MDR and ODR tables in Appendices 1 and 2. The same requirement should be followed by flight crewmembers operating under 14 CFR Parts 91 or 125.

7.2.3 Application For and Issuance Of Type Ratings. Airmen completing pertinent 14 CFR 61 requirements or AQP provisions in either a ERJ-170 or ERJ-190 variant in accordance with FSB requirements described in this report, may apply to the FAA for the ERJ-170, ERJ-190 type rating endorsement. Upon completion of required tests, and submission of an application (FAA Form 8710-1), authorized FAA inspectors or designees may issue the necessary pilot certificate with type rating.

## 7.3 Proficiency Checks

7.3.1 General. Proficiency Checks are administered as designated in 14 CFR 121.441 and 14 CFR 121, Appendix F, for the ERJ-170/ERJ-190 or in accordance with an approved AQP. A proficiency check in either the ERJ-170 or ERJ-190 suffices for the type, if initial and recurrent qualification is conducted IAW MDR and approved ODR tables for that operator. These checks must be administered by an authorized check airman, or FAA Aviation Safety Inspector. Satisfactory completion of a proficiency check may be substituted for recurrent flight training as permitted in 14 CFR 121.433(c).

## 8. FSB SPECIFICATIONS FOR CURRENCY

8.1 Currency Required by FAR 121.439. Addressed separately unless otherwise approved. For programs approved through ODR tables, currency is specified in accordance with MDRs.

8.2 Currency criteria for mixed fleet operations. These are shown in MDR/ODR tables. The following currency provisions apply to programs approved through ODR tables:

ERJ-170 and ERJ-190 Variants. Take off and landing credit is permitted. Takeoffs and landings performed in one aircraft/variant are equivalent to those performed in the other aircraft/variants.

## 9. AIRCRAFT COMPLIANCE CHECKLIST

### 9.1 Compliance Checklist (see Appendix 4).

EMBRAER has not provided the FSB with a complete compliance checklist to identify those specific operating rules or policies for which the ERJ-170/ERJ-190 complies. This report will be updated when a complete compliance checklist has been received and reviewed. It is the responsibility of the Certificate Holding District Office (CHDO) to review compliance with pertinent operating rules prior to 14 CFR 121 approval for an operator to use the ERJ-170/ERJ-190 in service.

### 9.2 Discussion of Specific Compliance Checklist Items

9.2.1 ERJ-170/ERJ-190 Observer Seat. On ERJ-170/ERJ-190 aircraft, the observer seat complies with the requirements of 14 CFR 121.581.

#### 9.2.2 Emergency Evacuation.

a) ERJ-170-100. The ERJ-170-100 has successfully been demonstrated under 14 CFR 121.291 for configurations and passenger capacities up to 78 passengers with a minimum of 2 Flight Attendants. Accordingly, an additional 14 CFR 121.291 full scale evacuation is not necessary for aircraft configurations consistent with previously approved tests. Passenger capacity less than or equal to the demonstrated capacity may be authorized. A partial-evacuation for the ERJ-170-100 is required unless the particular certificate holder has previously operated a ERJ-170-100 with the same or similar interior and exit configuration.

b) ERJ-170-200. A maximum passenger capacity of 80 has been approved for the ERJ-170-200 based on the emergency evacuation demonstration IAW FAR 121.291 that was conducted for the ERJ-170-100. Accordingly, an additional 14 CFR 121.291 full scale evacuation is not necessary for aircraft configurations consistent with previously approved tests. Passenger capacity less than or equal to the demonstrated capacity may be authorized. A partial-evacuation for the ERJ-170-200 is required unless the particular certificate holder has previously operated a ERJ-170-200 with the same or similar interior and exit configuration.

c) ERJ-190-100. The ERJ-190-100 has successfully been demonstrated under 14 CFR 121.291 for configurations and passenger capacities up to 108 passengers with a minimum of 3 Flight Attendants. Accordingly, an additional 14 CFR 121.291 full scale evacuation is not necessary for aircraft configurations consistent with previously approved tests. Passenger capacity less than or equal

to the demonstrated capacity may be authorized. 14 CFR 121.391 addresses the minimum number of flight attendants required for the actual seating capacity. A partial-evacuation for the ERJ-190-100 is required unless the particular certificate holder has previously operated an ERJ-190-100 with the same or similar interior and exit configuration.

d) ERJ-190-200. The ERJ-190-200 has successfully been demonstrated under 14 CFR 121.291 for configurations and passenger capacities up to 124 passengers with a minimum of 3 Flight Attendants. Accordingly, an additional 14 CFR 121.291 full scale evacuation is not necessary for aircraft configurations consistent with previously approved tests. Passenger capacity less than or equal to the demonstrated capacity may be authorized. 14 CFR 121.391 addresses the minimum number of flight attendants required for the actual seating capacity. A partial-evacuation for the ERJ-190-200 is required unless the particular certificate holder has previously operated a ERJ-190-200 with the same or similar interior and exit configuration.

9.2.3 Proving Tests, 14 CFR 121.163. Initial 14 CFR 121 proving tests in accordance with provisions of 14 CFR 121.163 (a) for the ERJ-170-100 are based on an approved program completed by U.S. Airways.

Proving tests in accordance with 14 CFR 121.163 (b) are appropriate in accordance with FAA Order 8900.10, Vol. 3, Chapter 29, when the ERJ-170/ERJ-190 is new to a particular operator. When an operator is currently operating either the ERJ-170 or ERJ-190 and it adds the other variant aircraft in the same kind of operation, proving tests are not required. Proving test requirements and reductions are as designated by FAA Order 8900.10 and the CHDO, or as otherwise specified by the FSB or AFS-200.

9.2.4 Ditching Demonstration 14 CFR section 121.291.

a) ERJ-190-100 - Documentation provided to the FSB indicates the ERJ-190-100 received credit for a full scale ditching demonstration in accordance with 14 CFR section 121.291(d) and FAA Order 8400.1, Vol III, Chapter 10, Section 4. A partial-ditching demonstration for the ERJ-190-100 is required in accordance with 14 CFR section 121.291(e).

b) ERJ-190-200 - A full scale ditching demonstration in accordance with 14 CFR section 121.291(d) and FAA Order 8900.1, Vol 3, Chapter 30 has NOT been accomplished by a Part 121 operator. Subsequent to a full scale demonstration a partial-ditching demonstration for the ERJ-190-200 is required in accordance with 14 CFR section 121.291(e).

## 10. FSB SPECIFICATIONS FOR FLIGHT TRAINING DEVICES AND SIMULATORS

10.1 Flight Training Device And Simulator Characteristics. Flight training device (FTD) and simulator characteristics pertinent to the ERJ-170/ERJ-190 are as specified by 14 CFR 121.407, 14 CFR 121 Appendix H, and AC 120-40B, 120-45A or 120-53, except as described below.

10.2 Use of FTDs for Specific Check/Evaluation Items. Certain ATPC, type rating, or proficiency check/evaluation items may be completed in FAA qualified FTDs. This is appropriate for items such as FMS initialization (e.g., 14 CFR 61, Appendix A - I.(b),(2)) or engine start non-normals (e.g., 14 CFR 61, Appendix A - I.(d)). Specific checking credit in such instances must be approved by the POI.

10.3 Aircraft Simulator And Flight Training Device Compatibility (Ref 14 CFR 121.407). When variants are flown in mixed fleets, the combination of simulators and flight training devices used to satisfy MDR or ODR provisions must match specific variants flown by that operator. The acceptability of differences between devices, simulators, and aircraft operated must be addressed by the POI.

10.4 Flight Training Device Approval. Requests for device approval should be made to the POI. If device characteristics clearly meet established FAA criteria and are qualified, the POI may approve those devices for that carrier. Where devices do not clearly satisfy a given level, POIs should request advice from the FSB Chairman (AEG), NSET, or AFS-200.

10.5 Door Trainers. Training in accordance with 14 CFR 121.417 must be conducted on an aircraft or in a training device representative of the operators fleet configuration.

## 11. APPLICATION OF FSB REPORT

11.1 Relevant parts of this report (e.g. Type Rating Designation, checking maneuvers, etc.) are effective when the report is approved by FAA.

## 12. ALTERNATE MEANS OF COMPLIANCE

12.1 Approval Level and Approval Criteria. Alternate means of compliance with differences requirements of 14 CFR 121 Subpart N and O for the ERJ-170/ERJ-190, other than as specified in provisions of this report, must be approved by AFS-200. If Alternate compliance is sought, operators will be required to establish that any proposed alternate means provides an equivalent level of safety to the provisions of AC 120-53 and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

12.2 Requires Equivalent Safety. In the event alternate compliance is sought, training program hour reductions, simulator approvals, and device approvals, may be significantly limited and reporting requirements may be increased to assure equivalent safety. FAA will generally not consider relief through alternate compliance means unless sufficient lead time has been planned by an operator to allow for any necessary testing and evaluation.

12.3 Unforeseen Circumstances. In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with MDR provisions, the operators may seek an interim equivalent program rather than a permanent alternate compliance method. Financial arrangements, schedule adjustment, and other such reasons are not considered "unforeseen circumstances" for the purposes of this provision.

## 13. MISCELLANEOUS - (Reserved)

APPENDIX 1

MASTER DIFFERENCES REQUIREMENTS

Type Rating ERJ-170,ERJ-190		FROM AIRPLANE				
		ERJ-170-100	ERJ-170-200	ERJ-190-100	ERJ-190-200	ERJ-190- ECJ
T O  A I R P L A N E	ERJ-170-100	/	A/A/A	A/A/A	A/A/A	A/A/A
	ERJ-170-200	A/A/A	/	A/A/A	A/A/A	A/A/A
	ERJ-190-100	A/A/A	A/A/A	/	A/A/A	A/A/A
	ERJ-190-200	A/A/A	A/A/A	A/A/A	/	A/A/A
	ERJ-190-ECJ	A/A/A	A/A/A	A/A/A	A/A/A	/

Note:

Installation of HGS (Head-Up Guidance System) requires additional training, checking and currency. Any ERJ-170/ERJ-190 flight crewmember who has received HGS training more than one year prior to operation of an HGS equipped ERJ-170/ERJ-190, will be required to complete FMS refresher training. HGS training is required for those flight crewmembers whose initial training was accomplished without HGS equipped training devices.

APPENDIX 2

ACCEPTABLE ODR TABLES

(AVAILABLE ON REQUEST FROM SEATTLE AEG)

APPENDIX 3

ACCEPTABLE DIFFERENCES TRAINING PROGRAM

(Reserved)

APPENDIX 4  
AIRCRAFT COMPLIANCE CHECKLIST

## APPENDIX 4 – AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

This checklist applies to the ERJ-170 and ERJ-190. Compliance with the following Operational Regulations (FAR 91 and FAR 121) has been established, based on aircrafts standard configuration.

### FAR 91

#### Subpart A – General.

#### 91.9 Civil Aircraft Flight Manual, markings, and placard requirements.

- (a) - (b) The ERJ-170/190 design supports this requirement by documenting the airplane limitations in the Airplane Flight Manual.
- (c) The ERJ-170/190 design meets the marking requirements of FAR 45.
- (d) This requirement is for rotorcraft and does not apply to the ERJ-170/190.

#### 91.21 Portable electronic devices.

- (a) - (d) These requirements are operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.

#### Subpart B – Flight Rules.

#### 91.191 Category II Manual.

- (a) - (b) Although the ERJ-170/190 is designed to operate in Category II operations this requirement does not apply to operations conducted under FAR 121 or FAR 135, as stated in 91.191 (c).

#### Subpart C – Equipment, Instrument and Certificate Requirements.

#### 91.203 Civil aircraft: Document required.

- (a) - (b) The ERJ-170/190 is delivered with a current airworthiness certificate appropriately displayed.
- (c) The ERJ-170/190 design does not include provisions for fuel tanks in the passenger compartment or the baggage compartment.
- (d) The fuel design complies with these requirements.

#### 91.205 Instrument and equipment requirements. Powered civil aircraft with valid airworthiness certificate.

- (a) ERJ-170/190 instrumentation supports this operational requirement.
- (b)(1) - (b)(6) The ERJ-170/190 instrumentation meets these requirements.
- (b)(7) This requirement does not apply to turbine-powered aircraft.
- (b)(8) The ERJ-170/190 instrumentation meets these requirements.
- (b)(9) - (b)(10) The ERJ-170/190 meets these requirements.
- (b)(11) This requirement does not apply to the ERJ-170/190.

- (b)(12) - (b)(13) The ERJ-170/190 instrumentation meets these requirements.
- (b)(14) These requirements do not apply to the ERJ-170/190.
- (b)(15) The ERJ-170/190 meets this requirement.
- (b)(16) - (b)(17) These requirements do not apply to the ERJ-170/190.
- (c)(1) Requirements for instruments and equipments in paragraph (b) are addressed above.
- (c)(2) - (c)(5) The ERJ-170/190 instrumentation meet these requirements.
- (c)(6) This requirement does not apply to the ERJ-170/190 design, which does not have fuses in the flight deck.
- (c)(8) - (c)(9) The ERJ-170/190 meets these requirements.
- (d)(1) Requirements for instruments and equipments in paragraph (b) and (c) are addressed above.
- (d)(2) The ERJ-170/190 instrumentation supports this requirement.
- (d)(3) This requirement for gyroscopic instruments does not apply to the ERJ-170/190 because the ERJ-170/190 has an Integrated Electronic Standby System (IESS), which meets these requirements.
- (d)(4) - (d)(9) The ERJ-170/190 instrumentation meets these requirements.
- (e) The ERJ-170/190 instrumentation meets these requirements.
- (f) - (g) These paragraphs do not apply to operations conducted under FAR 121 and FAR 135.
- (h) This requirement does not apply to ERJ-170/190.

**91.207 Emergency locator transmitters (ELT).**

- (a) ERJ-170/190 instrumentation meets this requirement.
- (b) The ERJ-170/190 design supports this requirement.
- (c) - (f) Operator's responsibility.

**91.209 Aircraft lights.**

- (a) - (b) All requirements of this paragraph are met by the aircraft lights design of the ERJ-170/190 with the exception of the lighting requirements for an anchored airplane (a)(3), which do not apply to this airplane.

**91.211 Supplemental oxygen.**

ERJ-170/190 crew oxygen system supports the operation of the airplane as defined by this requirement.

**91.213 Inoperative instruments and equipment.**

The ERJ-170/190 has an approved Master Minimum Equipment List. The use of an approved Minimum Equipment List is an operators responsibility.

- 91.215 ATC transponder and altitude reporting. Equipment and use.**  
(a) The ERJ-170/190 design includes controls and displays necessary to support this requirement.  
(b) - (d) Operator's responsibility.
- 91.217 Data correspondence between automatically reported pressure altitude data and the pilots altitude reference (altimeter).**  
(a) - (c) The ERJ-170/190 design includes instrumentations necessary to support this requirement.
- 91.219 Altitude alerting system or device. Turbojet powered civil airplanes.**  
(a) - (b) The ERJ-170/190 altitude alerting system support this requirement.  
(c) - (d) Operator's responsibility.
- 91.221 Traffic alert and collision avoidance system (TCAS). Equipment and use.**  
(a) The ERJ-170/190 design includes controls and displays to support this requirement.  
(b) Operator's responsibility.

**Subpart E – Maintenance, Preventive Maintenance, and Alterations.**

- 91.409 Inspections**  
(a) - (h) Operator's responsibility.
- 91.411 Altimeter system and altitude reporting (mode C) equipment. Tests and inspections**  
(a) - (d) Operator's responsibility.
- 91.413 ATC transponder and inspections.**  
(a) - (c) Operator's responsibility.
- 91.415 Changes to aircraft inspections programs.**  
(a) - (d) Operator's responsibility.

**Subpart F – Large and Turbine-Powered Multi-engined Airplanes.**

- 91.503 Flying equipment and operating information.**  
(a) - (d) Operator's responsibility.
- 91.507 Equipment requirements. Night VFR operations.**  
Operator's responsibility.

- 91.509 Survival equipment for overwater operations.**  
(a) - (f) Operator's responsibility.
- 91.511 Radio equipment for overwater operations.**  
(a) - (f) Operator's responsibility.
- 91.513 Emergency equipment.**  
(a) - (f) Operator's responsibility.
- 91.517 Passenger information about smoking and seat belts.**  
(a) This requirement is operational in nature, however the ERJ-170/190 passenger signs are controlled by overhead panel selectors in the flight deck.  
(b) This requirement does not apply to the ERJ-170/190 airplane because the airplane is marked with all necessary signs.  
(c) - (e) Operator's responsibility.
- 91.519 Passenger briefing.**  
Operator's responsibility.
- 91.521 Shoulder harness.**  
(a) - (b) Flight crew and flight attendant combined seat belt and shoulder harnesses meet the requirements of FAR 25.785 and thus meet this requirement.
- 91.523 Carry-on baggage.**  
(a) - (b) The ERJ-170/190 carry-on baggage stowage areas are designed to be used as is provided in FAR 91.525 and meet the load requirements of FAR 25.561(b)(3).
- 91.525 Carriage of cargo.**  
(a) - (b) Operator's responsibility.
- 91.527 Operating in icing conditions.**  
(a) - (d) Operator's responsibility.
- Subpart G – Additional Equipment and Operating Requirements for Large and Transport Category Aircraft.**
- 91.603 Aural speed warning device.**  
The ERJ-170/190 aural speed warning device meets the overspeed warning requirements of 25.1303(c)(1).
- 91.605 Transport category civil airplane weight limitations.**

- (a) This requirement does not apply to turbine-engine powered airplanes certificated after September 30, 1958.
- (b) - (c) The ERJ-170/190 design and Airplane Flight Manual provide sufficient information necessary for the operator to conduct operations defined in this requirement.

**91.607 Emergency exits for airplanes carrying passengers for hire.**

- (a) - (c) The ERJ-170/190 emergency exits comply with FAR 25 and this paragraph is not applicable.

**91.609 Flight recorders and cockpit voice recorders.**

- (a) The ERJ-170/190 flight data recorder and cockpit voice recorder were approved per the requirements in section 25.1457 and 25.1459.
- (b) This requirement is operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.
- (c) - (d) The ERJ-170/190 flight data recorder was designed and tested to meet all FAR 25, 91 and 121 requirements and approved per the requirements of section 25.1459.
- (e) - (f) The ERJ-170/190 cockpit voice recorder was designed and tested to meet all FAR 25, 91, 121 and requirements and approved per requirements of section 25.1457.
- (g) This requirement is operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.

**Appendix A – Category II Operations: Manual, Instruments, Equipment and Maintenance.**

- 1- Operator's responsibility.
- 2- ERJ-170/190 instrumentation includes controls and displays necessary to support this requirement.
- 3- All instruments are approved for category II operations upon delivery.
- 4- Operator's responsibility.

**FAR 121**

**Subpart G – Manual Requirements.**

**121.141 Airplane or rotorcraft flight manuals.**

- (a) The ERJ-170/190 is furnished with an FAA approved Airplane Flight Manual as required per section 25.1581.
- (b) Operator's responsibility.

**Subpart H – Aircraft Requirements.**

**121.157 Aircraft certification and equipment requirements.**

Operator's responsibility.

**121.161 Airplane limitations: Type of route.**

Operator's responsibility.

**Subpart I – Airplane Performance Operating Limitations.**

**121.173 General.**

Operator's responsibility.

**121.189 Transport category airplanes: Turbine engine powered; Takeoff limitations.**

Operator's responsibility.

**121.191 Transport category airplanes: Turbine engine powered; En route limitations: One engine inoperative.**

Operator's responsibility.

**121.195 Transport category airplanes: Turbine engine powered; Landing limitations: Destination airports.**

Operator's responsibility.

**121.197 Transport category airplanes: Turbine engine powered; Landing limitations: Alternate airports.**

Operator's responsibility.

**Subpart J – Special Airworthiness Requirements.**

**121.285 Carriage of cargo in passenger compartments.**

(a) - (b) ERJ-170/190 overhead bins and wardrobes meet these requirements.

(c) This requirement is not applicable to the ERJ-170/190.

**121.287 Carriage of cargo in cargo compartments.**

This requirement is not applicable to the ERJ-170/190.

**121.289 Landing gear: Aural warning device.**

This requirement is not applicable to the ERJ-170/190 as it complies with sec. 25.729.

**121.291 Demonstration of emergency evacuation procedures.**

An ERJ-170/190 Full-scale aborted takeoff demonstration was satisfactorily performed IAW sec. 25.803.

An ERJ-190 Full Scale Ditching demonstration was satisfactorily performed IAW Part 121 Appendix D.

**Subpart K – Instruments and equipment requirements.**

**121.305 Flight and navigation equipment.**

- (a) - (k) ERJ-170/190 instrumentation design provides the necessary controls and designs to meet these requirements.

**121.307 Engine instruments.**

- (a) - (b) These requirements are not applicable to the ERJ-170/190.
- (c) - (e) ERJ-170/190 engine instrumentation design has the necessary controls and displays necessary to meet this requirement.
- (f) This requirement is not applicable to the ERJ-170/190.
- (g) - (k) ERJ-170/190 engine instrumentation design has the necessary controls and displays necessary to meet this requirement.
- (l) This requirement is not applicable to the ERJ-170/190.

**121.308 Lavatory fire protection.**

- (a) Each lavatory is equipped with a smoke detector, which provides an aural alert in the lavatory and cabin and additionally a light at the associated attendant station.
- (b) Each lavatory has an automatic fire extinguisher located in the waste container cabinet.

**121.309 Emergency equipment.**

Operator's responsibility.

**121.310 Additional emergency equipment.**

- (a) - (i) ERJ-170/190 design meets these requirements.
- (j) This requirement is not applicable to ERJ-170/190 because there are no emergency exits in the passenger compartment in excess of the minimum required
- (k) This requirement is not applicable to ERJ-170/190 because there are no ventral or tailcone exits in the passenger compartment.
- (l) - (m) ERJ-170/190 design meets these requirements.

**121.311 Seats, safety belt, and shoulder harnesses.**

- (a) ERJ-170/190 design meets these requirements.
- (b) - (c) Operator's responsibility.
- (d) This requirement is not applicable to the ERJ-170/190 as there are no sideward facing seats.
- (e) Operator's responsibility.

- (f) - (g) The flight deck station and flight attendant seats comply with section 25.785.
- (h) - (i) Operator's responsibility.

**121.312 Materials for compartment interiors.**

- (a) - (b) Materials in compartments used by crewmembers or passengers were approved per the requirements in section 25.853.

**121.313 Miscellaneous equipment.**

- (a) This requirement is not applicable to the ERJ-170/190 because fuses are not installed on the airplane.
- (b) A windshield wiper is installed for each pilot's front window.
- (c) The power supply and distribution system has been shown compliant with the specified part 25 FARs.
- (d) Electrical power source failures are annunciated on EICAS.
- (e) - (g) ERJ-170/190 design meets these requirements.
- (h) - (i) These requirements are not applicable for the ERJ-170/190.
- (j) Operator's responsibility.

**121.314 Cargo and baggage compartment.**

- (a) - (b) Cargo and baggage compartments ceiling and sidewall linear panels are constructed with adequate materials and meet the test requirements of the specified Part 25 requirements.

**121.315 Cockpit check procedure.**

Operator's responsibility.

**121.316 Fuel tanks.**

Compliance has been demonstrated to the specified in FAR 25.

**121.317 Passenger information.**

- (a) The ERJ-170/190 is compliant with section 25.791, and overhead panel selectors in the flight deck control the passenger cabin signs.
- (b) - (c) Operator's responsibility.
- (d) ERJ-170/190 design meets these requirements.
- (e) - (k) These requirements are operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.

**121.318 Public address system.**

ERJ-170/190 design meets these requirements.

**121.319 Crewmember interphone system.**

ERJ-170/190 design meets these requirements.

**121.323 Instruments and equipment for operation at night.**

ERJ-170/190 design meets these requirements.

**121.325 Instruments and equipment for operations under IFR or over-the-top.**

ERJ-170/190 design meets these requirements.

**121.329 Supplemental oxygen for sustenance: Turbine engine power airplanes.**

Operator's responsibility.

**121.333 Supplemental oxygen for emergency descent and for first aid; turbine-engine-powered airplanes with pressurized cabins.**

Operator's responsibility.

**121.335 Oxygen equipment standards.**

(a) This requirement is for reciprocating engine powered airplanes and does not apply to the ERJ-170/190.

(b) The oxygen system meets the equipment standards of section 25.

**121.337 Protective breathing equipment.**

Operator's responsibility.

**121.340 Emergency flotation means required.**

Operator's responsibility.

**121.341 Equipment for operations in icing conditions.**

These requirements are for non-transport category airplanes and does not apply to the ERJ-170/190.

**121.342 Pitot heat indication system.**

The ERJ-170/190 complies with section 25.1326.

**121.343 Flight recorders.**

ERJ-170/190 design meets these requirements.

**121.344 Digital flight data recorders for transport category airplanes.**

ERJ-170/190 design meets these requirements.

**121.345 Radio equipment.**

(a) This requirement is operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.

(b) - (c) ERJ-170/190 design meets these requirements.

- 121.349 Radio equipment required. IFR flight operation.**  
(a) - (c) ERJ-170/190 design meets these requirements.  
(d) This requirement is operational in nature and as such compliance is not directly dependent on the ERJ-170/190 design.
- 121.351 Radio equipment for extended overwater operations and certain other operations.**  
Operator's responsibility.
- 121.353 Emergency equipment for operations over uninhabited terrain areas: flag, supplemental, and certain domestic operations.**  
Operator's responsibility.
- 121.354 Terrain Awareness and Warning- system.**  
(a) - (b) The ERJ-170/190 EGPWS complies with TAWS, TSO C151b.  
(c) The procedures are contained in the AFM.
- 121.355 Equipment for operations on which specialized means of navigation are used.**  
Operator's responsibility.
- 121.356 Collision avoidance system.**  
(a) ERJ-170/190 design meets these requirements.  
(b) This requirement is not applicable to the ERJ-170/190.  
(c) The procedures are contained in the ERJ-170/190 AFM.
- 121.357 Airborne weather radar equipment requirements.**  
(a) The ERJ-170/190 is equipped with a weather radar system WU 660 certified to TSO C63B.  
(b) Reserved.  
(c) - (e) Operator's responsibility.
- 121.358 Low-altitude windshear detection system. Equipment requirements.**  
ERJ-170/190 design meets these requirements.
- 121.359 Cockpit voice recorder.**  
(a) The ERJ-170/190 is equipped with a dual DVDR (FDR+CVR) that meets the Section 25 requirements.  
(b) Reserved.  
(c) The ERJ-170/190 DVDR meets the requirements applicable to Section 25.  
(d) - (e) These requirements are not applicable for the ERJ-170/190.

- (f) ERJ-170/190 design meets these requirements.
- (g) - (h) Operator's responsibility.

**121.360 Ground proximity warning glide slope deviation alerting system.**

- (a) The ERJ-170/190 EGPWS complies with TSO C92c and TSO C151b.
- (b) The procedures are contained in the AFM.
- (c) – (d) Operator's responsibility.
- (e) The ERJ-170/190 EGPWS complies with TSO C92c and TSO C151b.
- (f) This requirement is not applicable to the ERJ-170/190.

**Subpart T – Flight Operations.**

**121.581 Observer's seat . En route inspections.**

- (a) The ERJ-170/190 is equipped with a forward observer seat that has been shown to be suitable for its intended use in conducting the necessary en route inspections. The observer's seat is qualified by TSO-C127.
- (b) Operator's responsibility.
- (c) Not applicable to the ERJ-170/190.

APPENDIX 5

EXAMPLE FULL TRANSITION FOOTPRINT

(Reserved)

## APPENDIX 6

### EXAMPLE HEAD-UP DISPLAY TRAINING PROGRAM

The HUD pilot training requirements consists of those related to initial and recurrent ground and flight training. Unless covered concurrently during an initial or transition type rating course, a prerequisite to beginning this course of training is prior training, qualification and currency in the ERJ-170/ERJ-190 airplane. It should be noted that the program focuses principally upon training events flown in the left seat by the pilot-in-command (PIC) in FAR 121 operations. Nevertheless, first officer indoctrination and training is also essential.

1. INITIAL GROUND TRAINING: For airline operators, initial training should be conducted in accordance with the applicable provisions of FAR 121.415, 121.419, 121.424, 121.427, FAA AC 120-28C and the airline operation specifications. For all operators, the initial ground training program should include the following elements:
  - A. Classroom instruction covering HUD operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and non-normal pilot activities. For operators wishing credit for low visibility operations predicated on use of the HUD, information should be provided on the operational characteristics, capabilities, and limitations of the ground facilities (surface movement guidance control system) and airborne CAT III system. Airline policies and procedures concerning low visibility operations should include a reporting process, MEL issues, operation following a missed approach, IOE and currency requirements.
  - B. Classroom instruction (or CBT) on the HUD symbology set and it's interrelationship with airplane aerodynamics, inertial factors and environmental conditions.
  - C. A HUD pilot training manual or equivalent material in the Operations Manual which explains all modes of operation, the use of various HUD controls, clear descriptions of HUD symbology including limit conditions and failures, and incorporating a crew procedures guide clearly delineating pilot-flying (PF) and pilot-not-flying (PNF) duties, responsibilities and procedural call-outs and responses during all phases of flight during which HUD operations are anticipated. Emphasis on the availability and limitations of visual cues encountered on approach both before and after DH. This would include:
    - procedures for unexpected deterioration of conditions to less than minimum RVR encountered during approach, flare and rollout
    - demonstration of expected visual references with weather at minimum conditions

- expected sequence of visual cues during an approach in which visibility is at or above landing minima.
- D. A video tape demonstrating all modes of operation complete with sound. For operators wishing credit for low visibility operations predicated on use of the HUD, this should include narrative descriptions and several low weather approach demonstrations with procedural call-outs and responses. All critical procedural callout possibilities should be covered.
- E. If the HUD is used as a CAT II/CAT III landing system, emphasis on the need for rigorous crew discipline, coordination and adherence to procedural guidelines as is required for other CAT II/CAT III landing systems.
2. Initial Flight Training: Unless integrated with initial or transition type rating training, flight training dedicated to HUD familiarization and proficiency is in addition to other required elements. For FAR 121 operators, initial flight training should be conducted in accordance with the applicable provisions of FAR 121.424. Flight training dedicated to HUD familiarization and proficiency is in addition to other required elements. When a simulator is used, only FAA approved ERJ 170/190 simulators with both a visual and the Heads Up Guidance System installed may be used. For flight simulator training, all required approaches should be flown from no closer than the final approach fix (FAF) for instrument approaches and from no closer than approximately 1000 feet AGL (3 - 4 NM) to the runway threshold for visual approaches. The following flight training program is generic in nature and should not be construed to dictate what the flight course of instruction must consist of. Each operator has his own unique requirements, route structure, fleet composition and operations policies to consider in developing their training program. Therefore, what follows might be considered as a guide to an operator who is tailoring a HUD training program to fit his own needs.
- A. Airwork - Airwork should include:
- Straight and level flight, accelerations and decelerations
  - Normal and steep turns, climbs and descents
  - Approach to stall and recovery and unusual attitudes
  - Vectors to intercept and track selected VOR courses

Note: Emphasis should be placed on HUD unique symbology, i.e., flight path, flight path acceleration, airspeed error tape, AOA limit bracket, and excessive pitch chevrons. When this training is complete, the trainee should have a thorough understanding of the relationship between aircraft flight path parameters and the HUD symbology.

B. Visual Approaches (VMC mode)

- Perform one approach showing deviations above and below glideslope for symbology/runway relationship
- Straight-in landings, no wind, repeat with 10 kt cross wind and at night
- Circling approaches and landing with 10 kt crosswind 90

Note: It is desirable to fly half of these approaches at different airports that have dissimilar approach and runway lighting systems. Special emphasis should be placed on optimizing circling approach techniques and procedures. Approaches with the aircraft in a non-normal flap configuration should be included.

C. Instrument Approaches:

a) For all operators.

- Perform a CAT I approach to 200 foot DH, 2400 RVR, wind calm
- Demonstrate failures and incorrect settings on approach, i.e., mis-set runway elevation, airspeed, selected course, etc.
- Illustrate unique characteristics of symbology in wind shear conditions, i.e., erratic wind speed and direction, flight path, flight path acceleration and speed error, etc.
- Non-precision approach, VOR approach, 600-2, 15 knot crosswind

b) For operators wishing credit for low visibility operations predicated on use of the HUD.

- Perform a CAT II approach to 100 foot DH, 1200 RVR, 5 - 10 kts crosswind
- Perform a CAT IIIa ILS approach and landing starting on a 30 degree intercept to the ILS, below glideslope, weather clear and calm
- CAT IIIa ILS with 700 RVR, wind calm - another ILS with a 10 knot crosswind
- CAT IIIa ILS with 0/0 weather. After touchdown, raise weather to demonstrate position on runway
- CAT IIIa ILS with various reasons for a missed approach (system downgrade, "APCH WARN", etc.)
- CAT IIIa ILS with various RVRs and crosswinds, include light turbulence

Note: Several of the instrument approaches should include a variety of ground and airborne system failures requiring pilot recognition and appropriate procedural actions. Demonstrate system/component failures could include flap asymmetry problems, engine out operations, HGS sensor failures, etc. Demonstrate how HUD failure modes can reduce precision and increase pilot workload unless PF/PNF duties and responsibilities are clearly delineated and understood.

D. Takeoff: For operators wishing credit for low visibility takeoff operations predicated on use of the HUD.

- Normal takeoff, clear and calm, repeated with gusty winds
- Takeoff, 600 foot RVR, 5 knot crosswind
- Takeoff, 300 foot RVR, 5 knot crosswind, engine failure prior to V1
- Takeoff, 300 foot RVR, 5 knot crosswind, engine failure after V1
- Takeoff with HGS failure, 300 foot RVR

For airline operators; within 60 days subsequent to completion of HUD training, pilots must have completed their Initial Operating Experience (IOE) for HUD CAT II/IIIa operations. All previously qualified (in aircraft) pilots should be certified upon satisfactory completion of the HUD ground and flight training programs.

All initial, upgrade and transition captains must be certificated by a check airman during their IOE. This requirement should include three HUD assisted takeoffs: one visual approach and three instrument approaches in conditions not less than RVR 1800. First Officers should be certificated to perform Category II/IIIa PNF duties upon satisfactory completion of the HUD training program.

For all operators; prior to utilizing the HUD in IMC conditions below RVR 1800, each PIC must accomplish at least twenty-five manually flown HUD approaches to Category II/IIIa minima in VMC conditions. Each approach must terminate in a manually controlled HUD assisted landing or HUD assisted go-around. In addition, each PIC must accomplish at least twenty-five HUD assisted takeoffs in VMC conditions prior to using the HUD mode in IMC conditions. Upon completion of this requirement the HUD qualified pilot would then be certificated to conduct HUD approaches to company authorized minima as set forth in their Operations Specifications.

## **RECURRENCE REQUIREMENTS**

For operators wishing credit for low visibility operations on use of the HUD, during the six month recurrent training and proficiency checks, the following low visibility operations should be performed in addition to regular requirements:

- Approach and landing, 700 foot RVR, 10 knot crosswind
- Approach, 700 foot RVR, 10 knot crosswind, light turbulence with missed approach
- Takeoff, 300 foot RVR, 10 knot crosswind
- Takeoff, 300 foot RVR, engine failure either before or after V1

Selected ground training subjects should be reviewed annually.

APPENDIX 7

EXAMPLE - CURRICULUM SUBJECTS  
ERJ-170/190 PILOT INITIAL TRAINING

(Reserved)