



# Transport Canada Civil Aviation (TCCA) OPERATIONAL EVALUATION REPORT

Revision: 1

Date: 2023-11-03

## EMBRAER S.A.

### E-JETS AIRCRAFT SERIES

Type Certificate Data Sheet (TCDS)*	TCDS Identifier/Master Series	Marketing Name		Pilot Type Rating
A-244	ERJ 170-100	E170	E-Jets-E1	E170
A-244	ERJ 170-200	E175		E170
A-244	ERJ 190-100	E190		E170
A57NM (FAA)	ERJ 190-100 ECJ	Lineage 1000		ERJ-190 (FAA)
A57NM (FAA)	ERJ 190-200	E195		ERJ-190 (FAA)
A-244	ERJ 190-300	E190-E2	E-Jets-E2	E170
A-244	ERJ 190-400	E195-E2		E170

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## 1. Record of revisions

Revision Number	Sections(s)	Date
Initial issue	ALL	2005/12/12
1	ALL	2023/11/03

## 2. Introduction

### 2.1 General

The Transport Canada Flight Technical and Operator Certification (FTOC) section of the Civil Aviation Standards Branch is responsible for the TCCA Operational Evaluation (OE) program. FTOC's objectives during the OE of a new or modified aircraft are to determine:

- a) The acceptability of a manufacturer's training program for use by Canadian operators;
- b) Pilot qualification and type rating requirements including training, checking, and currency requirements, and;
- c) The operational suitability of an aircraft type.

This report lists those determinations for use by:

- a) TCCA inspectors who approve training programs;
- b) TCCA inspectors; Approved Check Pilots (ACPs) who conduct Pilot Proficiency Checks (PPCs) and Advanced Qualification Program (AQP) Evaluators who conduct Line Operational Evaluations (LOEs); and
- c) Air operators, private operators and training providers, to assist them in developing their flight-crew member training, checking and currency programs.

Determinations made in this report are based on the evaluations of specific variants of the E-Jets aircraft series made in accordance with current regulations, standards and guidance. Modifications and upgrades made to the aircraft series described herein, or introduction of new related aircraft, may require amendment of the findings in this report.

### NOTES

1. Embraer S.A. training programs evaluated during OEs are not granted TCCA approval. It is incumbent upon the air operators or private operators to ensure their E-Jets aircraft series training program is approved or accepted by the Minister under their relevant TCCA regulatory framework (as applicable under subpart 705 or 604 of the *Canadian Aviation Regulations* (CARs)) and with the material indicated in this report.
2. The OE activity assesses a specific training program and its content which is relevant to a specific date. Determinations made in this report do not account for

any subsequent changes to the training program which have not been evaluated by the OEB.

## **2.2 Regulatory requirements / language**

This OE report uses mandatory terms such as “must”, “shall” and “is/are required” to convey the intent of the Regulatory requirements and other guidance documents. The term “should” is understood to mean that the proposed method of compliance must be used, unless an alternate means of compliance has been determined and approved.

### **NOTE**

The terms “Pilot” and “Flight Crew” may be used interchangeably within this report and should be used specifically when dictated by the context of their use.

### **3. Highlights of change**

This Operational Evaluation Board (OEB) Report Revision 1 adds the Embraer ERJ 190-300 (E190-E2) and the ERJ 190-400 (E195-E2). This revision is in an entirely new TCCA OE report format and more closely harmonizes with the ERJ-170 Revision 6 and ERJ-190 Revision 7 FAA Flight Standardization Board Report (FSBR). The Differences tables have also been updated. Change bars are not included in this document because the entire report is revised and updated.

## **4. General**

### **4.1 Scope of report**

This OE report applies to all variants of the Embraer E-Jets aircraft series and is in accordance with current regulations, standards, and guidance material. The contents of this report are harmonized where possible with the FAA, EASA, and ANAC reports.

#### **NOTES**

1. This report refers to the E-Jets aircraft series by their TCDS/ Master Series identifier (e.g., ERJ 170-100, ERJ 170-200, ERJ 190-100, ERJ 190-300 or ERJ 190-400), by their marketing names (e.g., E170, E175, E190, E190-E2 or E195-E2) or by the Pilot Type Rating designators (E170) as necessary for convenience and clarity.
2. This report refers to E-Jets-E1 or E-Jets-E2 when it is required to only identify one of the two E-Jets aircraft series generations.
3. This report may use as necessary one of the following marketing names when referring to all variants of this aircraft: E-Jets or all E-Jets aircraft series or all E-Jets variants.

### **4.2 Guidance material**

TCCA OEs were conducted in accordance with the latest revisions of FAA Advisory Circular (AC) AC-120-53B Change 1, Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations, and the Joint Operational Evaluation Board (JOEB) OPS/FCL Common Procedures for conducting Operational Evaluation Boards (Common Procedures Document (CPD)).

#### **NOTE**

Test evaluation processes (T1/T2/T3/T5) referred through this report are processes used by the OEB to validate the training differences levels proposed by the Original Equipment Manufacturer (OEM). Guidance material listed above can provide more details on those processes.

### **4.3 OE report effectivity**

Provisions of this report are effective until amended, superseded, or withdrawn by subsequent OE findings.



TCCA reserves the responsibility and authority to re-evaluate and modify sections of this report based on new or revised advisory material, amended *Canadian Aviation Regulations* (CARs), aircraft operating experience, or the evaluation of new or modified aircraft under the provisions of the CPD or FAA AC-120-53B Change 1 (latest revision).

#### **4.4 Application of OE report**

All relevant parts of this report are applicable on the effective date of this report.

#### **4.5 Alternate means of compliance**

The OEB Chairman, the Program Manager of Flight Technical and Operator Certification (FTOC) and/or the Chief Commercial Flight Standard (CFS) should be consulted when alternate means of compliance, other than those specified in this report, are proposed. An applicant shall be required to submit a proposed alternate means that provides an equivalent level of safety to the provisions of the CARs and this OE report. Analysis, demonstrations, proof of concept testing, differences documentation, and/or other substantiation may be required.

In the event an alternate compliance is sought, training program credits, simulator approvals, and device approvals may be significantly limited, and reporting requirements may be increased to ensure equivalent levels of training, checking, and currency are maintained. TCCA 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.

#### **4.6 AQP/OEB report relationship**

Where an air operator has an approved AQP, differences between this report and an operator's proposed training, checking, and currency requirements under an AQP should be substantiated and documented as part of the operator's AQP approval process. Program approvals under AQP need to ensure the provisions and requirements of this report have been addressed, and where necessary, coordination with the OEB has been completed.

#### **4.7 E-Jets-E1 Operational Evaluation**

The OEM training courses evaluated can be used by POIs to assist them in approving or accepting training programs to operate the E-Jets aircraft series in commercial air services (under subpart 705 of the CARs) or private operations (under subpart 604 of the CARs).

##### **4.7.1 E170 Initial training**

In September 2003, a Joint Operational Evaluation Board (JOEB) evaluated the E170 initial training. The E170 entered service in 2004.

#### **4.7.2 Differences between E170 and E175**

In December 2004, a JOEB evaluated differences from the E170 (Base aircraft) and the E175 (Related aircraft) using a T1/T2 evaluation process. Master Level A/A differences were established by CAA between the E170 and the E175. The E175 entered service in 2005.

#### **NOTE**

TCCA has accepted the findings of the Central Joint Aviation Authorities (CJAA) JOEB Report dated March 17, 2005 for the Embraer 170 (ERJ170) and Embraer 175 (ERJ175) and the Federal Aviation Administration's Flight Standardization Board Report Embraer ERJ170 and the ERJ175.

#### **4.7.3 Differences between E170 and E190**

In May 2005, EASA, ANAC and TCCA jointly evaluated differences from the E170 (base aircraft) and the E190 (related aircraft). Master level A/A differences were established between the E170 and the E190.

#### **NOTES**

1. The OEB Chairman, or the Program Manager of FTOC should be consulted for inquiries related to course content evaluated.
2. Embraer S.A. contracted the following training provider during this OE:
  - a. Air Canada Training Centre, Toronto, Ontario.

### **4.8 E-Jets-E2 Operational Evaluation**

The OEM training courses evaluated can be used by POIs to assist them in approving or accepting training programs to operate the E-Jets aircraft series in commercial air services (under subpart 705 of the CARs) or private operations (under subpart 604 of the CARs).

#### **4.8.1 Scope of the OE**

From September 20 to November 4, 2022, an OE was conducted to evaluate the E-Jets-E2 Training programs proposed by Embraer S.A., and establish the associated pilot qualification requirements, pilot type rating (refer to note 3 below) and operational suitability of the Embraer E-Jets-E2 (refer to note 1 and 2 below).

The training courses evaluated and accepted were comprised of the:

- a) E190-E2 (E190-300) initial training;
- b) E190 (E190-100) to E190-E2 (E190-300) differences training; and
- c) E190-E2 (E190-300) to E195-E2 (E190-400) differences training (Refer to note 2 below).

### NOTES

1. The OEB Chairman, or the Program Manager of FTOC should be consulted for inquiries related to course content evaluated.
2. Embraer S.A. contracted the following training provider during this OE:
  - a. FlightSafety International (FSI), Toronto, Ontario.
3. TCCA has validated by analysis the E190-E2 operational suitability determination established by the FAA/EASA/ANAC (via a suitability flight following the T2/T3 evaluation process of October and November 2017).
4. TCCA has validated by analysis the E195-E2 operational suitability determination established by the FAA/EASA/ANAC (via the T1 evaluation process of December 2018 where the FAA/EASA/ANAC established that the E195-E2 is a variant of the E190 and the E190-E2).
5. The **E170** pilot type rating designation is assigned to the ERJ 190-300 and ERJ 190-400 variants.

#### 4.8.2 E190-E2 Initial training

From September 20 to October 27, 2022, TCCA established an Operational Evaluation Board (OEB) to evaluate the E190-E2 Initial training and establish the operational suitability (refer to note 1 below) of the E190-E2.

The OEB evaluated instructor-led training (ILT), cockpit procedures training (CPT) and full flight simulator (FFS) training that was delivered in Toronto, Ontario, by FlightSafety International (FSI) as the training provider for Embraer S.A.

Following the training evaluation (ILT, CPT and FFS), test subjects underwent a PPC / T5 evaluation process (OEB specific) to evaluate the proposed Level D training program using an E190-E2 Interim Level C qualified FFS.

Following the PPC / T5 evaluation process, an on-aircraft validation flight was conducted for each test subject on the E195-E2 because of the interim Level C

qualification status of the FFS. The OE team conducted those flights from Gaviao Peixoto Embraer aerodrome (GPX) SP, Brazil. These flights included numerous approaches during day in visual meteorological conditions (VMC) weather conditions and were compliant with paragraph (2)(i) of schedule I of section 725.106 of the *Commercial Air Service Standards (CASS)*.

The E190-E2 initial training course format (ILT, CPT & FFS) evaluated by TCCA was deemed to be acceptable for use as the basis of an air operator's (under subpart 705 of the CARs) and private operator's training program (under subpart 604 of the CARs).

The complete E190-E2 training program outline, detailed ground and flight training schedule and detailed initial training syllabus evaluated during the OE can be found in the Appendix 4 of this report.

### NOTES

1. The OEM training course evaluated was performed to CAT I approach minimums and Standard take-off minima. The additional training required to qualify operators for Special Authorization/Specific Approval (SA) for take-off minima reported visibility RVR 1200 feet RVR 600 Feet and CAT II was not evaluated under the scope of the E-Jets-E2 OE. As such and per section 4.5 of this report, additional evaluations may be required.
2. RNP AR (0.3 and < 0.3 Operations) and LPV approaches were not evaluated under the scope of the E-Jets-E2 OE. As such and per section 4.5 of this report, additional evaluations may be required.

#### 4.8.3 Differences between E190 and E190-E2

From October 30 to November 3, 2022, the TCCA OEB evaluated E190 to E190-E2 differences training. The scope of this evaluation included the instructor-led training (ILT) and full flight simulator (FFS) training (using an interim level C FFS no-motion), that was delivered by FlightSafety International (FSI) as the training provider for Embraer S.A.

Following the ILT and FFS training evaluation, the test subjects underwent a T3 evaluation process to evaluate the training and checking differences proposed respectively to level D/B using an E190-E2 interim level C FFS.

The master differences requirements (MDR) for training and checking differences of Level D/B respectively were established between the E190 to the E190-E2. The MDR table can be found in the Appendix 2 of this report. The difference tables (DT) from the E190 to E190-E2 can be found in the Appendix 3 of this report.

The complete E190 to E190-E2 training program outline, detailed ground and flight training schedule and detailed training syllabus evaluated during the OE can be found in the Appendix 5 of this report.

### NOTES

1. Flight training must be conducted in a no-motion Level C or D full flight simulator – or higher.
2. TCCA validated the T2 conducted by the FAA/EASA/ANAC in 2017 by analysis, therefore during the OE, TCCA waived the T2 and proceeded with a T3 only.
3. Same as the E190, the **E170** pilot type rating designation is assigned to the E190-E2 variant.
4. The reverse differences training from the E190-E2 to the E190 was not evaluated under the scope of the E-Jets-E2 OE.

#### 4.8.4 Differences between E190-E2 and E195-E2

In November 2022, TCCA evaluated by analysis differences from the E190-E2 to the E195-E2 from the FAA/ANAC/EASA determination established via a T1 evaluation process in December 2018 (refer to note 2 below).

Master differences requirements (MDR) for Training and Checking Differences of level A/A respectively were established between the E190-E2 to the E195-E2. The MDR can be found in the Appendix 2 of this report. The difference tables (DT) from the E190-E2 to E195-E2 can be found in the Appendix 3 of this report.

The complete E190-E2 to E195-E2 differences training program outline, detailed ground training schedule and detailed training syllabus evaluated during the OE can be found in the Appendix 6 of this report.

### NOTES

1. TCCA has validated by analysis the E190-E2 operational suitability determination established by the FAA/EASA/ANAC (via a suitability flight following the T2/T3 evaluation process of October and November 2017).
2. TCCA has validated by analysis the E195-E2 operational suitability determination established by the FAA/EASA/ANAC (via a T1 evaluation process of December 2018 where the FAA/EASA/ANAC established that the E195-E2 is a variant of the E190 and the E190-E2).

## 5. Acronyms

AC	Advisory Circular
ACP	Approved Check Pilot
ACFT	Aircraft
ADS	Air Data System
ADS-B	Automatic Dependent Surveillance - Broadcast
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AGL	Above Ground Level
AMS	Air Management System
ANAC	<i>Agência Nacional de Aviação Civil (Brazil)</i>
AOM	Airplane Operations Manuals
AP	Autopilot
APU	Auxiliary Power Unit
AQP	Advanced Qualification Program
ATC	Air Traffic Control
AUTO	Automatic
AV	Audiovisual Presentation
AWM	Airworthiness Manual
CAR	Canadian Aviation Regulations
CASS	Commercial Air Service Standards
CAS	Crew Alerting System
CAT	Category
CAT II	Category II Operation
CBT	Computer-Based Training
CFIT	Controlled Flight Into Terrain
COM	Company Operations Manual
CPD	Common Procedures Document
CPDLC	Controller Pilot Datalink Communication
CPT	Cockpit Procedures Trainer
CRM	Crew Resource Management
DU	Display Unit
DVDR	Digital Voice-Data Recorder
EASA	European Union Aviation Safety Agency
EDS	Electronic Display System
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System

EICAS	Engine Indication and Crew Alerting System
E-Jets	E1 and E2 generations
E1	E-Jets first generation (ERJ 170-100/200; ERJ 190-100)
E2	E-Jets second generation (ERJ 190-300, ERJ 190-400)
ETOPS	Extended Range Twin-Engine Operations
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control System
FAR	Federal Aviation Regulation
FCC	Flight Control Computer
FD	Flight Director
FFS	Full Flight Simulator
FLT CHAR	Flight Characteristics
FMS	Flight Management System
FSB	Flight Standardization Board (FAA)
FSBR	Flight Standardization Board Report (FAA)
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
FTOC	Flight Technical and Operator Certification (TCCA)
GPS	Global Positioning System
G/S	Glideslope
HGS	Head-Up Guidance System
HO	Handout
HUD	Head-Up Display
ICBI	Interactive Computer-Based Instruction
IDG	Integrated Drive Generator
ILS	Instrument Landing System
ILT	Instructor–Led Training
IMC	Instrument Meteorological Conditions
INAV	Integrated Navigation
IRS	Inertial Reference System
JOEB	Joint Operational Evaluation Board
LNAV	Lateral Navigation
LOE	Line Operational Evaluation
LPV	Localizer Performance with Vertical Guidance
MCDU	Multi Control Display Unit
MDR	Master Differences Requirements
MEL	Minimum Equipment List
MFD	Multifunction Display
MFF	Mixed Fleet Flying

N <sub>1</sub>	Low Pressure Rotor Speed
N <sub>2</sub>	High Pressure Rotor Speed
NAC	National Aircraft Certification
NAV	Navigation
NG	Next Generation
NPA	Non-Precision Approach
OE	Operational Evaluation
OEB	Operational Evaluation Board
OEM	Original Equipment Manufacturer
OVRD	Override
PF	Pilot Flying
PFD	Primary Flight Display
PIC	Pilot In Command
PM	Pilot Monitoring
POI	Principal Operations Inspector
PPC	Pilot Proficiency Check
PROC CHNG	Procedural Changes
PTT	Part Task Trainer
QRH	Quick Reference Handbook
RAAS	Runway Awareness and Advisory System
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance Authorization Required
RTO	Rejected Takeoff
RVR	Runway Visual Range
SA	Special Authorization/Specific Approval
SATCOM	Satellite Communication
SB	Service Bulletin
SIC	Second In Command
SOPM	Standard Operating Procedures Manual
STBY	Standby
SU	Stand-Up Instruction
TASE	Training Area of Special Emphasis
TCAS	Traffic Collision Avoidance System
TCBI	Tutorial Computer-Based Instruction
TCCA	Transport Canada Civil Aviation
TO/GA	Takeoff/Go-Around
TOLD	Takeoff and Landing Data
TCDS	Type Certificate Data Sheet
TLI	Transition Line Indoctrination



TTL	Technical Team Leader
V <sub>1</sub>	Takeoff Decision Speed
VMC	Visual Meteorological Conditions
V <sub>REF</sub>	Reference Landing Speed
V <sub>LO</sub>	Landing Gear Operating Speed
V <sub>MO</sub>	Maximum Operating Airspeed
VNAV	Vertical Navigation

## 6. Definitions

These definitions are for the purposes of this report only.

- 6.1 Base Aircraft** – An aircraft identified for use as a reference to compare differences with another aircraft.
- 6.2 Current** – A crewmember meets all requirements to operate the aircraft under the applicable CAR or CASS.
- 6.3 Differences tables** – Describe the differences between a pair of related aircraft, and the minimum levels operators must use to conduct differences training and checking of flight crew members. Difference levels range from A to E.
- 6.4 Master Differences Requirements (MDR)** – Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.
- 6.5 Mixed Fleet Flying (MFF) program** – A program permitting the operation of a base aeroplane and one or more variant(s) of the same, common or different type by one or more flight crew member, between training or checking events in accordance with an approved process based on the recommendations of an OE report that is acceptable to the Minister.
- 6.6 Operational Evaluation (OE)** – A TCCA evaluation of the pilot qualifications requirements of an aircraft type (pilot type rating, minimum flight crew member training, checking and currency requirements, and unique or special pilot qualification requirements (e.g., specific flight characteristics, no-flap landing)), operational suitability of an aircraft type and the Original Equipment Manufacturer (OEM) training program.
- 6.7 Operational suitability** – A determination during an operational evaluation that an aircraft or system may be used in the Canadian airspace system and meets the applicable operational regulations (e.g., CAR subparts 604, 605, 701,702,703,704 and 705 as applicable).
- 6.8 Qualified** – A flight crew member holds the appropriate licenses and ratings as required by the applicable operating regulations.
- 6.9 Related aircraft** – Any two or more aircraft of the same make with either the same or different type certificates that have been demonstrated and determined by TCCA to have commonality.
- 6.10 Seat dependent tasks** – Maneuvers or procedures using controls that are accessible or operable from only one flight crew member seat.

- 6.11 Specific flight characteristics** – A maneuver or procedure with unique handling or performance characteristics that TCCA has determined must be checked.
- 6.12 Training Areas of Special Emphasis (TASE)** – A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized training devices or training equipment.
- 6.13 Variant** –Aeroplane or a group of aeroplanes with the same characteristics that have pertinent differences from a base aeroplane. Pertinent differences are those that require different or additional flight crew member knowledge, skills and/or abilities that affect flight safety.

## 7. Pilot Type Rating

The pilot type rating designator for all variants of the Embraer E-Jets aircraft series is **E170**. The **E170** Pilot Type Rating published in Appendix A - Aircraft Type Designator Tables of Standard 421 - Flight Crew Permits, Licenses and Ratings – *Canadian Aviation Regulations* (CARs) has been assigned to the E170, E175, E190, E190-E2 and E195-E2.

## **8. Related aircraft**

### **8.1 Related aircraft on same TCDS**

The ERJ 170-100LR/SE/STD/SU, ERJ 170-200LR/STD/SU, ERJ 190-100IGW/LR/STD, ERJ 190-300 and the ERJ 190-400 are related aircraft listed on TCCA TCDS A-244.

#### **NOTE**

Refer to table on the cover page of this OE report for the relationship between TCDS designators, marketing names and pilot type rating designator.

### **8.2 Related aircraft on different TCDS**

The aircraft indicated at section 8.1 are related aircraft with the ERJ 190-100 ECJ and the ERJ 190-200 listed on FAA TCDS A57NM.

#### **NOTE**

The ERJ 190-100 ECJ and the ERJ 190-200 have not been type certified in Canada and are therefore not included on TCDS A-244, nor assigned a TCCA pilot type rating designator.

## **9. Pilot training**

### **9.1 Previous experience**

The provisions of this section apply to all E-Jets training programs for pilots who have experience in CAR subpart 705 air operator or equivalent operations (i.e., CAR 704, CAR 604) in multi-engine transport category turbojet or turboprop aeroplanes. Pilots receiving E-Jets training should have experience in high altitude operations, highly integrated avionics systems with, EICAS, EFIS, and FMS. Pilots without this experience may require additional training.

### **9.2 E-Jets initial type training course requirement**

An E-Jets air operator's initial type training course must meet the flight training requirements of CASS 725.124 (11) Level C or CASS 725.124(12) Level D training program. The initial type training course must satisfy the type rating requirements of CASS 421.40(3) (a) (iii), and the training requirements of CASS 725.106(1).

#### **NOTE**

Private operator training programs are to be developed in accordance with the requirements of subpart 604 of the CARs .

### **9.3 E-Jets initial training**

Air operators must establish an initial training program that is compliant with CAR 705.124(2)(a). Initial training for flight crews must include appropriate training in accordance with CASS 725.124 or an approved advanced qualification program (AQP) training program.

#### **9.3.1 Ground training**

An E-Jets air operator's initial ground training program shall include the technical initial ground training requirements of CASS 725.124(6)(a).

#### **9.3.2 Flight training**

An E-Jets air operator's initial flight training program must meet the flight training requirements of CASS 725.124 (11) Level C or CASS 725.124 (12) Level D training program.

## **9.4 Recurrent training**

Air operators must establish a recurrent training program that is compliant with CAR 705.124(2)(a)(iv). Recurrent training for flight crews must include appropriate training in accordance with CASS 725.124 or an approved AQP program.

In addition, air operators must include the applicable training areas of special emphasis (TASE) from section 9.5 of this report.

### **9.4.1 Ground training**

An E-Jets air operator's recurrent ground training program must incorporate the technical annual ground training requirements of CASS 725.124(6)(b) of the CASS.

### **9.4.2 Flight training**

An E-Jets air operator's recurrent flight training program must incorporate appropriate maneuvers and procedures in accordance with CASS 725.124 or an approved AQP program.

## **9.5 Training Areas of Special Emphasis (TASE)**

### **NOTE**

References to "pilots" in this section include both pilot-in-command (PIC) and second-in-command (SIC) unless otherwise specified.

Pilots must receive special emphasis training in the following areas.

### **9.5.1 TASE - E-Jets-E1**

Pilots must receive special emphasis on the following areas during E-Jets-E1 training:

#### **9.5.1.1 TASE – E-Jets-E1 - Ground training**

Pilots must receive special emphasis on the following areas during E-Jets-E1 ground training:

- a) Engine Indicating and Crew Alerting System (EICAS), Primary Flight Displays (PFD), and Multifunction Displays (MFD). Altitude and airspeed are presented on vertical scale instruments in both digital and analog formats. Pilots must be given academic training of the information presented on these displays. This item must be included in initial, upgrade, transition, and recurrent training.
- b) Flight Control System. An academic understanding of normal and direct modes of operation of the fly by wire primary and secondary flight control systems and their associated system components. This item must be included in initial, upgrade, transition, and recurrent training.

- c) Flight Guidance Control System (FGCS) including the autopilot, autothrottle, and flight director (FD). An academic understanding of the various lateral and vertical modes and the ability to select and arm the modes during different phases of flight is essential. This item must be included in initial, upgrade, transition, and recurrent training.
- d) Full-Authority Digital Engine Control (FADEC). An academic understanding of the FADEC and the engine thrust mode selection is required. This item must be included in initial, upgrade, transition, and recurrent training.
- 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. This item must be included in initial, upgrade, transition, and recurrent training.
- f) Head Up Display (HUD). Not evaluated under the scope of the E-Jets-E1 OE.

#### **9.5.1.2 TASE – E-Jets-E1 - Flight training**

Pilots must receive special emphasis on the following areas during E-Jets-E1 flight training:

- a) EICAS, PFDs, and MFDs. Altitude and airspeed are presented on vertical scale instruments in both digital and analog formats. Pilots need to be able to understand the information presented on these displays. Pilots transitioning from traditional round dial basic “T” instruments may require additional flight 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. This item must be included in initial, upgrade, transition, and recurrent training.
- b) Flight Control System. An operational understanding of normal and direct modes of operation of the fly by wire primary and secondary flight control systems and their associated system components. This item must be included in initial, upgrade, transition, and recurrent training.
- c) FGCS including the Autopilot, Autothrottle, and FD. 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. This item must be included in initial, upgrade, transition, and recurrent training.



- d) FADEC. An operational understanding of the FADEC and the engine thrust mode selection is required. This item must be included in initial, upgrade, transition, and recurrent training.
- e) System Control Panels using Pushbuttons with Integral Light Bars. Pilots should have an operational understanding of the switch position and system configuration as it relates to whether the light bar is illuminated or not. This training is required for both normal and abnormal system operation. This item must be included in initial, upgrade, transition, and recurrent training.
- f) HUD. Not evaluated under the scope of the E-Jets-E1 OE.

### **9.5.2 TASE – E-Jets-E2**

Pilots must receive special emphasis on the following areas during E-Jets-E2 training:

#### **9.5.2.1 TASE – E-Jets-E2 - Ground and flight training**

Pilots must receive special emphasis on the following areas during ground and flight training for the E-Jets-E2. Those items must be included in initial, upgrade, transition, and recurrent training:

- a) Flight management system (FMS),
- b) Automatic flight control system (AFCS) including system architecture, autopilot coupling logic,
- c) Automatic flight guidance and display controller panels design,
- d) FD guidance based on flight path angle (FPA) with acceleration pointer,
- e) PFD, MFD, including use of the reversionary modes, and EICAS,
- f) Understanding of the E-Jets-E2 fly-by-wire concepts, functions, and associated abnormal and emergency procedures,
- g) Cursor control devices (CCD),
- h) Windshear escape guidance,
- i) Ailerons and elevators disconnection mechanism, and
- j) Power plant system and proper use of take-off modes.

#### **NOTE**

System characteristics, limitations, normal and abnormal procedures and operation in cold weather must be emphasized during training.

### **9.5.2.2 TASE – E-Jets-E2 – Differences training E1/E2 - Ground and flight training**

Pilots must receive special emphasis on the following areas during ground and flight training for the E-Jets-E2:

- a) Flight Control System. An academic understanding of the full fly-by-wire closed loop architecture and characteristics; flight control laws, protections, and flight optimization functions (best beta); absence of rudder pedals and control wheel backdrive upon utilization of trim. This item must be included in initial, upgrade, transition, differences, and recurrent training,
- b) Automatic Flight System. An academic understanding of the architecture integration into full fly-by-wire system; no control column wheel backdrive during autopilot operation; autopilot coupling logic; automatic flight guidance and display controller panels design. This item must be included in initial, upgrade, transition, differences, and recurrent training, and
- c) Engines. An academic understanding of the start characteristics, FADEC, and limitations. This item must be included in initial, upgrade, transition, differences, and recurrent training.

### **9.6 Special training – E-Jets-E2 – Speed decay special training - Ground and flight training**

If the ASEL mode is activated after Takeoff or Go Around and there is an engine failure, the flight director may maintain a high pitch angle for altitude capture resulting in an airspeed reduction (speed decay).

Pilots must receive special ground and flight training during the E-Jets-E2 initial and differences training on the following procedures found in TCCA AFM Supplement 15 section EMERGENCY AND ABNORMAL PROCEDURES:

- a) ENGINE FAILURE DURING APPROACH
- b) TAKEOFF WITH ENGINE FAILURE AT OR ABOVE V1
- c) ONE ENGINE INOPERATIVE APPROACH AND LANDING

The ground training should consist of an instructor-led training (ILT) where a detailed explanations is provided to the flight crew. A video showing the speed decay with supporting explanations by the instructor is recommended.

The flight training will include as a minimum:

- a) A pre-flight briefing including the speed decay video (as described in the paragraph above),
- b) A FFS demonstration of a speed decay scenario during takeoff (one per crew),
- c) A FFS recovery of a speed decay scenario during takeoff (one per pilot as PF), and
- d) A FFS recovery of a speed decay scenario following a go around (one per pilot as PF).

#### **NOTE**

The flight training must be conducted in a Level C or D full flight simulator (FFS C-D).

### **9.7 Specific flight characteristics**

There are no specific flight characteristics.

### **9.8 Seat dependent tasks**

Pilots must receive training in these seat dependent tasks:

- a) HUD (Left seat): Not evaluated under the scope of OEs.
- b) Manual landing gear extension (right seat); initial, transition and recurrent training.
- c) Nosewheel steering (left seat); initial, upgrade, transition, and recurrent training.

### **9.9 Flight Simulation Training Devices (FSTD)**

An approved Level C or D E-Jets FFS equipped with day and night visual scenes that is representative of an operator's specific E-Jets aircraft series configuration is required for flight training.

The FFS must have the Primus EPIC software Load revision 27.1 or higher installed for the E-Jets-E1 or the revision 5.0 or higher installed for the E-Jets-E2.

Training and Checking under CARs Part IV, VI and VII must be conducted on a certified FTD and FFS in accordance with section 606.03 of the CARs.

FTD and FFS characteristics are designated in the *Aeroplane and Rotorcraft Simulator Manual* (TP 9685). The FSTD specific systems qualifications are found in the TCCA Qualification Certificate.

## NOTES

1. If a FFS from one variant is being used in lieu of a FFS of another variant, operators must provide differences training at least once during each training interval. For this purpose, the following must be considered:
  - a. The E170, E175 and the E190 are defined as the E-Jets-E1. The use of an E190 FFS for all E-Jets-E1 variants is acceptable as no E170/E175 FFS exist; and
  - b. The E190-E2 and the E195-E2 are defined as the E-Jets-E2. The use of an E190-E2 FFS for all E-Jets-E2 variants is acceptable as no E195-E2 FFS exist.
2. Primus EPIC software Load revision 7.5 was installed on the FFS during the E-Jets-E2 OE.

### 9.10 Training equipment

There are no specific systems or procedures that are unique to the E-Jets aircraft series that require specific training equipment.

### 9.11 Differences training

#### 9.11.1 Differences training between related aircraft

Pilots must receive differences training among E-Jets-E1 (E170, E175 and E190), the E-Jets-E1 and E-Jets-E2, and the E190-E2 and E195-E2. Refer to Appendices 2, 3 and 7 of this report.

#### NOTE

CARs 705 air operators who established a transition / mixed fleet flying (MFF) approved training program should refer to section 9.13 of this report.

##### 9.11.1.1 E170, E175 and E190 (E-Jets-E1)

Ground training is required for differences between the E170, E175 and E190. TCCA established that differences training of level A is required. Refer to Appendices 2, 3 and 7 of this report.

##### 9.11.1.2 E-Jets-E1 and E-Jets-E2

Ground and flight training is required for differences between the E-Jets-E1 and the E-Jets-E2. TCCA established that differences training of Level D is required. Refer to Appendices 2, 3, 5 and 7 of this report.

## NOTE

The E-Jets-E2 to E-Jets-E1 reverse differences training has not been evaluated under the scope of the E-Jets-E2 OE.

### 9.11.1.3 E190-E2 and E195-E2

Ground training is required for differences between the E190-E2 and the E195-E2. TCCA established that differences training of level A is required. Refer to Appendices 2, 3, 6 and 7 of this report.

### 9.11.2 Differences training – Optional equipment

A number of optional equipment were evaluated under the scope of OEs. Those assessments were conducted through documental analysis based on the ANAC OE report and Embraer S.A. training substantiation reports, AFM, AOM, QRH and SOPM review.

TCCA established that differences training of level A is required for the following optional equipment evaluated through documental analysis:

- a) Automatic dependent surveillance – broadcast OUT (ADS-B OUT);
- b) Volumetric 3D weather radar (RDR-4000);
- c) Takeoff and landing (TOLD) function.

TCCA established that differences training of level B is required for the following optional equipment evaluated through documental analysis:

- a) Controller Pilot Datalink Communication (CPDLC).

## NOTES

1. Operator specific optional equipment items have not been evaluated under the scope of OEs. Operators should note that the E-Jets has a wide range of optional equipment which may require additional flight crew training. TCCA approved training programs for initial, recurrent, transition and upgrade training, as applicable, must include training on TCCA certified optional equipment.
2. Graphical flight planning (GFP) differences training was evaluated as an ILT session under the scope of the E-Jets-E2 OE. TCCA established that differences training of level B is required. The GFP is not TCCA certified and as such is not an option available for operators until validated by TCCA National Aircraft Certification (NAC) branch.

3. Refer to Appendix 3 of this report for all optional equipment differences training available for the E-Jets. Some optional equipment may be identified as not evaluated under the scope of OEs and/or as not TCCA certified. As such those differences training may not be available for operators until validated by NAC. As per section 4.5 of this report, additional evaluations may be required. The training and checking level identified have not been evaluated during the scope of OEs and may changed following subsequent evaluation.

### **9.11.3 Differences training – FMS**

Pilots qualified on E-Jets variants without NG-FMS may qualify on E-Jets variants with NG-FMS with differences training. TCCA established that differences training of Level A is required.

#### **NOTES**

1. The next generation flight management system (NG-FMS) is the Honeywell Primus EPIC load 27.1 or later for the E-Jets-E1 and load 5.0 or later for the E-Jets-E2.
2. Refer to Appendices 3 of this report for a more exhaustive list of all FMS differences training available for the E-Jets.
3. FMS differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.

### **9.12 Other training items**

Reserved.

#### **NOTE**

Specialty training activities have not been evaluated under the scope of OEs. Operators should note that the E-Jets has a wide range of specialty training which require additional flight crew training. These activities covered by specialty training may require a Special Authorization/Specific Approval (SA) from TCCA. TCCA approved training programs for initial, recurrent, transition and upgrade training, as applicable, may include specific training on the operator's specialty training.

### **9.13 CAR 705 Transition / Mixed Fleet Flying (MFF) approved training program(s)**

A CAR 705 air operator may develop an approved transition program to obtain credits for training, checking, consolidation period requirements, line checks, line indoctrination and validity periods in order to transition from a base aeroplane to one or more variants of the same type, common type or different type under an approved transition program as set out in the air operator's company operations manual.

Additionally, a CAR 705 air operator may develop an approved MFF program to operate a base aeroplane and one or more variants of the same type, common type or different type under an approved MFF program after complying with the requirements of a transition program, in order to provide relief for 90 days pilot qualification requirements on the applicable aeroplane type(s) intended to be operated between training and checking events.

#### **NOTES**

1. Pilots transitioning between any E-Jets variants (e.g. ERJ 170-100 and ERJ 170-200, ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/-200 to ERJ 190-300/-400, ERJ 190-100 to ERJ 190-300/-400) or conducting Mixed Fleet Flying (MFF) with different E-Jets variants (e.g. ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/200 and ERJ 190-300/400, ERJ 190-100 and ERJ 190-300/400) require exemptions to specific provisions of CAR 705.106, CASS 725.106 and CAR 705.113. Appendices 2, 3 and 7 provide the training, checking and transition credits between the E-Jets aircraft series. TCCA Policy Letter AARX No. 173, Original issue, dated July 25, 2005 (RDIMS # 1040396) provide guidance on flight crew member qualification credits for transition programs and mixed fleet Flying Programs.
2. The E-Jets-E2 to E-Jets-E1 reverse differences training has not been evaluated under the scope of the E-Jets-E2 OE.
3. Provisions found in this section are only applicable for subpart 705 of the CARs.

#### **9.13.1 Alternating recurrent training between E-Jets variants**

Under an approved transition/MFF program, recurrent training may alternate between E-Jets variants.

The air operator shall provide recurrent technical ground training on one variant with differences technical ground training on the other variant(s) as detailed in the appendix 3 of this report.

However, air operators who elect to alternate recurrent training between the E-Jets-E1 and E-Jets-E2 variants under an approved MFF program are not required during the recurrent training to complete the level D flight training portion of the differences training detailed in the appendix 3 of this report.

The air operator must include the applicable training areas of special emphasis (TASE) from section 9.5 of this report for all E-Jets variants operated under an approved Transition/MFF program(s).

#### **NOTE**

Air operators involved in a MFF operations with any variant(s) of E-Jets-E1 paired with any variant(s) of E-Jets-E2 should consider the following for the purposes of alternating recurrent simulator training under an approved transition/MFF training program(s):

- a) The E170, E175 and the E190 are defined as the E-Jets-E1 and should be considered the same variant.
- b) The E190-E2 and the E195-E2 are defined as the E-Jets-E2 and should be considered the same variant.

#### **9.13.2 Transition Line Indoctrination (TLI)**

Transition line indoctrination (TLI) related to E-Jets aircraft series are provided in Appendix 7 of this report.



## **10. Pilot checking**

### **10.1 Landing from a no flap or non standard flap approach**

Reserved

### **10.2 Specific flight characteristics**

There are no specific flight characteristics.

### **10.3 Seat dependent tasks**

Pilots must be checked in these seat dependent tasks:

- a) HUD (Left seat): Not evaluated under the scope of OEs.
- b) Nosewheel steering (left seat); initial, upgrade, transition, and recurrent checking.

### **10.4 Other checking items**

Reserved.

#### **NOTE**

Specialty training activities have not been evaluated under the scope of OEs. Operators should note that the E-Jets has a wide range of specialty training which may require additional flight crew checking. The activities covered by specialty training may require a Special Authorization/Specific Approval (SA) from TCCA. TCCA approved training programs for initial, recurrent, transition and upgrade training, as applicable, may include specific checking on the Operator's specialty training.

### **10.5 FSTD**

An approved Level C or D E-Jets FFS equipped with day and night visual scenes that is representative of an operator's specific E-Jets aircraft series configuration is required for flight checking.

The FFS must have the Primus EPIC software load revision 27.1 or higher installed for the E-Jets-E1 or the revision 5.0 or higher installed for the E-Jets-E2.

#### **NOTES**

1. If a FFS from one variant is being used in lieu of a FFS of another variant, operators must comply with the differences training provisions from section 9.9 of this report. For this purpose, the following must be considered:

- a. The E170, E175 and the E190 are defined as the E-Jets-E1. The use of an E190 FFS for all E-Jets-E1 variants is acceptable as no E170/E175 FFS exist; and
- b. The E190-E2 and the E195-E2 are defined as the E-Jets-E2. The use of an E190-E2 FFS for all E-Jets-E2 variants is acceptable as no E195-E2 FFS exist.

2. Primus EPIC software load revision 7.5 was installed on the FFS during the E-Jets-E2 OE.

## **10.6 Equipment**

There are no specific systems or procedures that are unique to the E-Jets aircraft series that require specific equipment.

## **10.7 Differences checking between related aircraft**

Differences checking between certain E-Jets aircraft variants may be required. The level of checking is specified in Appendix 2 and 3.

### **NOTE**

CARs 705 operators who established a transition et/ou MFF approved training program(s) should refer to section 10.8 of this report.

## **10.8 CAR 705 Transition / MFF approved training program(s)**

A CAR 705 air operator may develop an approved transition program to obtain credits for training, checking, consolidation period requirements, line checks, line indoctrination and validity periods in order to transition from a base aeroplane to one or more variants of the same type, common type or different type under an approved transition program as set out in the air operator's company operations manual.

Additionally, a CAR 705 air operator may develop an approved MFF program to operate a base aeroplane and one or more variants of the same type, common type or different type under an approved MFF program after complying with the requirements of a Transition program, in order to provide relief for 90 days pilot qualification requirements on the applicable aeroplane type(s) intended to be operated between training and checking events.

## NOTES

1. Pilots transitioning between any E-Jets variants (e.g. ERJ 170-100 and ERJ 170-200, ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/-200 to ERJ 190-300/-400, ERJ 190-100 to ERJ 190-300/-400) or conducting Mixed Fleet Flying (MFF) with different E-Jets variants (e.g. ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/200 and ERJ 190-300/400, ERJ 190-100 and ERJ 190-300/400) require exemptions to specific provisions of CAR 705.106, CASS 725.106 and CAR 705.113. Appendices 2, 3 and 7 provide the training, checking and Transition credits between the E-Jets aircraft series. TCCA Policy Letter AARX No. 173, Original issue, dated July 25, 2005 (RDIMS # 1040396) provide guidance on Flight Crew member qualification credits for transition programs and mixed fleet flying programs.
2. Line checks conducted in one variant should satisfy the requirements for all variants. If the operator's line operations (e.g., route structure, area of operation, ETOPS) of one variant is significantly different from another variant, then separate line checks should be conducted.
3. The currency requirements detailed at sections 11 of this report shall be maintained.
4. The E-Jets-E2 to E-Jets-E1 reverse differences training has not been evaluated under the scope of the E-Jets-E2 OE.
5. Provisions found in this section are only applicable for subpart 705 of the CARs.

### 10.8.1 Alternating PPC between E-Jets variants

Under an approved transition/MFF program, recurrent checking events may alternate between E-Jets variants.

PPCs should alternate each six months for flight crew members.

When such alternating checks are accomplished, the differences checking assessment of the other variant within the series grouped (e.g., within E170/175/190 (E-Jets-E1) or E170/175/190 (E-Jets-E1) and E-Jets-E2 or E190-E2 and E195-E2) may be satisfied by ground training, written questionnaire, oral review, or other method approved by the Principal Operations Inspector (POI) or Technical Team Lead (TTL). However, such simplified programs may not be approved if they result in progressive loss of knowledge or skills related to particular differences over successive recurrent periods.

**NOTE**

Air operators involved in a MFF operations with any variant(s) of E-Jets-E1 grouped with any variant(s) of E-Jets-E2 may consider the following for the purposes of alternating recurrent simulator checking under an approved transition/MFF training program(s):

- a) The E170, E175 and the E190 are defined as the E-Jets-E1 and should be considered the same variant.
- b) The E190-E2 and the E195-E2 are defined as the E-Jets-E2 and should be considered the same variant.

## **11. Pilot currency**

There are no additional currency requirements for the E-Jets aircraft series other than those already specified under subpart 705 and subpart 604 of the CARs.

### **11.1 Differences currency between related aircraft**

Not established for CARs 604 operators.

For currency credit established between related aircraft for CARs 705 air operators, refer to section 11.2.1 of this report.

### **11.2 CAR 705 MFF approved training program**

A CAR 705 air operator may develop an approved transition program to obtain credits for training, checking, consolidation period requirements, line checks, line indoctrination and validity periods in order to transition from a base aeroplane to one or more variants of the same type, common type or different type under an approved Transition Program as set out in the air operator's company operations manual.

Additionally, a CAR 705 air operator may develop an approved MFF program to operate a base aeroplane and one or more variants of the same type, common type or different type under an approved MFF program after complying with the requirements of a Transition program, in order to provide relief for 90 days pilot qualification requirements on the applicable aeroplane type(s) intended to be operated between training and checking events.

### **NOTES**

1. Pilots conducting MFF between any E-Jets variants (e.g., ERJ 170-100 and ERJ 170-200, ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/200 and ERJ 190-300/400, ERJ 190-100 and ERJ 190-300/400) require exemptions from subparagraphs 705.106(1)(b)(i) and (ii), of the CARs. TCCA Policy Letter AARX No. 173, Original issue, dated July 25, 2005 (RDIMS # 1040396) provide guidance on Flight Crew Member Qualification Credits for Transition Programs and Mixed Fleet Flying Programs.
2. Those provisions found in section 11.2 are only applicable for Subpart 705 of the CARs.

### **11.2.1 CAR 705 MFF currency requirements between E-Jets variants**

Under an approved MFF program and with reference to section 11.1 of this report, there is no differences currency requirements between all E-Jets variants.

Takeoff and landing credits may be permitted between all E-Jets variants. Takeoffs and landings performed in one variant are equivalent to those performed in the other variant.

## 12. Operational suitability

All E-Jets aircraft series are operationally suitable for operations under subpart 705 and subpart 604 of the CARs.

### NOTES

1. TCCA has validated by analysis the E190-E2 operational suitability determination established by the FAA/EASA/ANAC (via a suitability flight following the T2/T3 evaluation process of October and November 2017).
2. TCCA has validated by analysis the E195-E2 operational suitability determination established by the FAA/EASA/ANAC (via a T1 evaluation process of December 2018 where the FAA/EASA/ANAC established that the E195-E2 is a variant of the E190 and the E190-E2).

## **13. Miscellaneous**

### **13.1 ETOPS**

Reserved

### **13.2 Emergency evacuation**

Reserved

### **13.3 Forward observer seat**

All E-Jets aircraft series forward center observer seat has been evaluated by the FAA and determined to meet the requirements of FAR 121.581(a), FAR 125.317(b), FAR 135.75(b) and FAA Advisory Circular (AC) 120-83, Flight Deck Observer Seat and Associated Equipment. TCCA has accepted by analysis the FAA findings.

For all E-Jets aircraft series, the observer seat complies with the requirements of AWM 525.785.

### **13.4 Aircraft approach category and circling minima**

Approach category for all E-Jets aircraft series is Category C.

Circling approaches for the E-Jets are flown with the landing gear down, flaps 5° or flaps FULL, and  $V_{REF} + 5$  kts. The approach category and associated approach minima will be determined by the approach/circling speed flown and shall not be less than Category "C" speed on a circling approach.

### **13.5 Normal landing flaps**

All E-Jets aircraft series normal final landing flap setting is flaps 5° and Flaps FULL settings.

### **13.6 Optional equipment**

#### **NOTE**

Operator specific optional equipment items have not been evaluated under the scope of OEs. Operators should note that the E-Jets has a wide range of optional equipment which may require additional flight crew training. TCCA approved training programs for initial, recurrent, transition and upgrade training, as applicable, must include training on TCCA certified optional equipment.



## 14. References

1. ANAC Operational Evaluation Report for the Embraer E-Jets Revision 12 dated 01/08/2023 (August 01, 2023) or later revision ([Avaliação Operacional — Português \(Brasil\) \(www.gov.br\)](#)).
2. ANAC Type Certificate Data Sheet (TCDS) No. EA-2003T05 for the Embraer ERJ-170 Revision 27 dated January 01, 2022 or later revision ([Produtos Aeronáuticos Certificados no Brasil \(anac.gov.br\)](#)).
3. ANAC Type Certificate Data Sheet (TCDS) No. EA-2005T13 for the Embraer ERJ-190 Revision 30 dated April 28, 2023 or later revision ([Produtos Aeronáuticos Certificados no Brasil \(anac.gov.br\)](#)).
4. FAA Flight Standardization Board (FSB) Report for the Embraer ERJ-170 Revision 6 dated 12/06/2018 (December 06, 2018) or later revision (<https://drs.faa.gov/>).
5. FAA Flight Standardization Board (FSB) Report for the Embraer ERJ-190 Revision 7 dated 06/28/2022 (June 28, 2022) or later revision (<https://drs.faa.gov/>).
6. FAA Type Certificate Data Sheet (TCDS) A56NM for the Embraer ERJ-170 Revision 20 dated 01/21/2022 (January 21, 2022) or later revision (<https://drs.faa.gov/>).
7. FAA Type Certificate Data Sheet (TCDS) A57NM for the Embraer ERJ-190 Revision 22 dated 01/21/2022 (January 21, 2022) or later revision (<https://drs.faa.gov/>).
8. FAA Advisory Circular AC120-53B, Change 1, Guidance for Conduction and Use of Flight Standardization Board Evaluations, dated 10/24/16 (October 24, 2016) or later revision ([https://faa.gov/regulations\\_policies/advisory\\_circulars/](https://faa.gov/regulations_policies/advisory_circulars/)).
9. EASA Operational Suitability Data (OSD) Flight Crew for the Embraer ERJ 170/190 Revision K dated August 3<sup>rd</sup>, 2023, or later revision.
10. EASA Type Certificate Data Sheet (TCDS) IM.A.001 for the Embraer ERJ-170 Revision 13 dated 01/31/2022 (January 31, 2022) or later revision (<https://www.easa.europa.eu/document-library/type-certificates>).
11. EASA Type Certificate Data Sheet (TCDS) IM.A.071 for the Embraer ERJ-190 Revision 24 dated 01/31/2022 (January 31, 2022) or later revision (<https://www.easa.europa.eu/document-library/type-certificates>).
12. JOEB OPS/FCL Common procedures for conducting Operational Evaluation Boards, dated June 10, 2004.

13. TCCA Type Certificate Data Sheet (TCDS) A-244, Issue No. 37, dated June 01, 2023 or later issue.
14. TCCA Policy Letter AARX No. 173, Flight Crew Member Qualification Credits for Transition Programs and Mixed Fleet Flying Programs, Original issue, dated July 25, 2005 (RDIMS # 1040396).

## Appendix 1 – Differences legend

### Training differences legend

Differences level	Type	Training method examples	Conditions
A	Self-instruction	<ul style="list-style-type: none"> <li>• Operating manual revision (HO)</li> <li>• Flight crew operating bulletin (HO)</li> </ul>	<ul style="list-style-type: none"> <li>• Crew has already demonstrated understanding on base aircraft (e.g. updated version of engine).</li> <li>• Minor or no procedural changes required.</li> <li>• No safety impact if information is not reviewed or is forgotten (e.g., different engine vibration damping mount).</li> <li>• Once called to attention of crew, the difference is self-evident.</li> </ul>
B	Aided instruction	<ul style="list-style-type: none"> <li>• Audiovisual presentation (AV)</li> <li>• Tutorial computer-based instruction (TCBI)</li> <li>• Stand-up instruction (SU)</li> </ul>	<ul style="list-style-type: none"> <li>• Systems are functionally similar.</li> <li>• Crew understanding required.</li> <li>• Issues need emphasis.</li> <li>• Standard methods of presentation required.</li> </ul>
C	Systems Devices	<ul style="list-style-type: none"> <li>• Interactive (full-task) computer-based instruction (ICBI)</li> <li>• Cockpit procedures trainers (CPT)</li> <li>• Part task trainers (PTT)</li> <li>• Level 4 or 5 flight training device (FTD 4-5)</li> </ul>	<ul style="list-style-type: none"> <li>• Training can only be accomplished through systems training devices.</li> <li>• Training objectives focus on mastering individual systems, procedures or tasks versus highly integrated flight operations or “real-time” operations.</li> <li>• Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.</li> </ul>
D	Maneuvers Devices	<ul style="list-style-type: none"> <li>• Level 6 or 7 flight training device (FTD 6-7)</li> <li>• Level A or B full flight simulator (FFS A-B)</li> </ul>	<ul style="list-style-type: none"> <li>• Training can only be accomplished in flight maneuver devices in a real-time environment.</li> <li>• Training requires mastery of interrelated skills versus individual skills.</li> <li>• Motion, visual, control loading and specific environmental conditions may be required.</li> </ul>
E	Level C/D FFS or Aircraft	<ul style="list-style-type: none"> <li>• Level C or D full flight simulator (FFS C-D)</li> <li>• Aircraft (ACFT)</li> </ul>	<ul style="list-style-type: none"> <li>• Motion, visual, control loading, audio and specific environmental conditions are required.</li> <li>• Significant full task differences that require a high fidelity environment.</li> <li>• Usually correlates with significant differences in handling qualities.</li> </ul>

### Checking differences legend

Differences level	Checking method examples	Conditions
A	None	None
B	<ul style="list-style-type: none"> <li>• Oral or written exam</li> <li>• Tutorial computer-based instruction (TCBI) self-test</li> </ul>	<ul style="list-style-type: none"> <li>• Individual systems or related groups of systems.</li> </ul>
C	<ul style="list-style-type: none"> <li>• Interactive (full-task) computer-based instruction (ICBI)</li> <li>• Cockpit procedures trainers (CPT)</li> <li>• Part task trainers (PTT)</li> <li>• Level 4 or 5 flight training device (FTD 4-5)</li> </ul>	<ul style="list-style-type: none"> <li>• Checking can only be accomplished using systems devices.</li> <li>• Checking objectives focus on mastering individual systems, procedures or tasks.</li> </ul>
D	<ul style="list-style-type: none"> <li>• Level 6 or 7 flight training device (FTD 6-7)</li> <li>• Level A or B full flight simulator (FFS A-B)</li> </ul>	<ul style="list-style-type: none"> <li>• Checking can only be accomplished in flight maneuver devices in a real-time environment.</li> <li>• Checking requires mastery of interrelated skills versus individual skills.</li> <li>• Motion, visual, control loading and specific environmental conditions may be required.</li> </ul>
E	<ul style="list-style-type: none"> <li>• Level C or D full flight simulator (FFS C-D)</li> <li>• Aircraft (ACFT)</li> </ul>	<ul style="list-style-type: none"> <li>• Significant full task differences that require a high fidelity environment.</li> </ul>

## Appendix 2 – Master Differences Requirements (MDR) table

These are the minimum levels of training and checking required, derived from the highest level in the differences tables in Appendix 3. Differences levels are arranged as training/checking.

To related aircraft ↓	From base aircraft →	ERJ 170-100	ERJ 170-200	ERJ 190-100	ERJ 190-300	ERJ 190-400
ERJ 170-100		Not applicable	A/A	A/A	Not evaluated	Not evaluated
ERJ 170-200		A/A	Not applicable	A/A	Not evaluated	Not evaluated
ERJ 190-100		A/A	A/A	Not applicable	Not evaluated	Not evaluated
ERJ 190-300		Not evaluated	Not evaluated	D/B (1)	Not applicable	A/A
ERJ 190-400		Not evaluated	Not evaluated	Not evaluated	A/A	Not applicable

### Footnotes to MDR table:

All items identified as a Level D differences training level in Appendix 3 must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher.

**Appendix 3 – Difference tables**

<b>Table</b>	<b>From base aircraft</b>	<b>To related aircraft</b>	<b>Page</b>
Design differences table	E170, E175, E190 (E-Jets-E1)	E170, E175, E190 (E-Jets-E1)	47
Maneuver differences table	E170, E175, E190 (E-Jets-E1)	E170, E175, E190 (E-Jets-E1)	51
Design differences table	E190 (E-Jets-E1)	E190-E2/E195-E2 (E-Jets-E2)	53
Maneuver differences table	E190 (E-Jets-E1)	E190-E2/E195-E2 (E-Jets-E2)	78
Design differences table	E190-E2 (E-Jets-E2)	E195-E2 (E-Jets-E2)	90
Maneuver differences table	E190-E2 (E-Jets-E2)	E195-E2 (E-Jets-E2)	95

This **Design differences table, E170, E175, E190 (E-Jets-E1)**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

Some optional equipment/speciality training may be identified as not evaluated under the scope of OEs and/or as not TCCA certified. As such those differences training programs may not be available for operators until validated by NAC. As per section 4.5 of this report, additional evaluations may be required. Therefore, the training and checking level identified have not been evaluated during the scope of OEs and may changed following subsequent evaluation.

<b>APPLICABILITY</b> <b>E170</b> <b>E175</b> <b>E190</b>	<b>DESIGN</b>	<b>REMARKS</b>	<b>FLT CHAR</b>	<b>PROC CHG</b>	<b>TRAINING</b>	<b>CHECKING</b>
	Dimensions	Different external dimensions.	No	No	A	A
	Cabin	Different passenger capacity.	No	No	A	A
	Cargo	Different cargo volume capacity.	No	Yes	A	A
	Engines	Different takeoff modes.	No	No	A	A
	Limitations	Different Weights, Center of Gravity, Operational Envelope and Airspeed.	No	No	A	A
	Noise Levels	<ul style="list-style-type: none"> <li>• Effective Perceived Noise Levels (EPNL's) are different.</li> <li>• Refer to specific model AFM for noise levels measured in EPNdb.</li> </ul>	No	No	A	A
	EICAS Messages	<b>E190</b> <ul style="list-style-type: none"> <li>• Message associated to proper locking of the overwing emergency door.</li> <li>• DOOR EMER LH (RH) OPEN message.</li> </ul>	No	No	A	A

APPLICABILITY E170 E175 E190	DESIGN	REMARKS	FLT CHAR	PROC CHG	TRAINING	CHECKING
	ATA 22 Autoflight	Autoland: (***) (* Level D/D applicable to pilots not qualified on E2 Autoland.(****) (**) Level A/A applicable to pilots already qualified on E2 Autoland.(****) (***) Not evaluated under the scope of OEs and not TCCA certified. (****) Not applicable as the E2 to E1 reverse differences training has not been evaluated.	No	Yes	D*(A**)	D* (A**)
	ATA 23 Communications	CPDLC (Option)* *Not evaluated under the scope of OEs	No	No	B	B
	ATA 24 Electrical Power	Different load distribution among AC/DC busses.	No	Yes	A	A
	ATA 26 Fire Protection	<b>E170, E175</b> • FWD underfloor Cargo (3 detectors). • AFT underfloor Cargo (2 detectors). <b>E190</b> • One additional smoke detector on the FWD and AFT Cargo Area.	No	No	A	A
	ATA 27 Flight Controls	<b>E190</b> • Mach trim feature. • Flaps 3 is available for takeoff.	No	No	A	A
	ATA 28 Fuel	Different fuel quantity.	No	No	A	A



APPLICABILITY E170 E175 E190	DESIGN	REMARKS	FLT CHAR	PROC CHG	TRAINING	CHECKING
	ATA 31 Indication	Primus EPIC System Software Load: <ul style="list-style-type: none"> <li>• Primus EPIC Load 25.9 (*)</li> <li>• Primus EPIC Load 27.1 (*)</li> <li>• Primus EPIC Load 27.2 (*)</li> <li>• Primus EPIC Load 27.3 (*)</li> <li>• Primus EPIC Load 27.4 (*)</li> </ul> (*) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.	No	No	A	A
	ATA 32 Landing Gear	<ul style="list-style-type: none"> <li>• Landing Gear Warning Inhibition reactivation TLA (Thrust Lever Angle) values changed.</li> <li>• Tire and Wheel:               <ul style="list-style-type: none"> <li>- Different tire pressure values.</li> </ul> </li> </ul>	No	No	A	A
	ATA 32 Landing Gear	AUTOBRAKE (Option) (*) (*) Not evaluated during the E-Jets-E1 OE	No	Yes	B	B
	ATA 33 Lights	<b>E190</b> <ul style="list-style-type: none"> <li>• Three external emergency lights are installed close to the overwing emergency exits.</li> </ul>	No	No	A	A

APPLICABILITY E170 E175 E190	DESIGN	REMARKS	FLT CHAR	PROC CHG	TRAINING	CHECKING
	ATA 34 Navigation	<ul style="list-style-type: none"> <li>• Advanced RAAS with Landing Alerts and HGS – New symbols for NG-FMS (Load 27.1).(Option) (*)</li> <li>• E-JETs Advanced Features Package (INAV / Charts &amp; Maps/New Classic MFD) (Load 27.2).(Option) (*)</li> <li>• Synthetic Vision System (SVS) – Smartview (Load 27.3).(Option) (*)</li> </ul> (*) Not evaluated under the scope of OEs and not TCCA certified.	No	No	A	A
	ATA 34 Navigation	RNP AR<0.3nm (***) (*) Level D/D applicable to pilots not qualified on E2 RNP AR<0.3.(****) (**) Level A/A applicable to pilots already qualified on E2 RNP AR<0.3. (****) (***) Not evaluated under the scope of OEs (****) Not applicable as the E2 to E1 reverse differences training has not been evaluated.	No	Yes	D* (A**)	D* (A**)
	ATA 52 Doors	<b>E190</b> <ul style="list-style-type: none"> <li>• Two overwing type III emergency exits.</li> </ul>	No	Yes	A	A
	ATA 71 Powerplant	Different Takeoff Thrust Ratings.	No	No	A	A

This **Maneuver differences table, E170, E175, E190 (E-Jets-E1)**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

Some optional equipment/speciality training may be identified as not evaluated under the scope of OEs and/or as not TCCA certified. As such those differences training programs may not be available for operators until validated by NAC. As per section 4.5 of this report, additional evaluations may be required. Therefore, the training and checking level identified have not been evaluated during the scope of OEs and may changed following subsequent evaluation.

APPLICABILITY E170 E175 E190	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	External Inspection	<b>E190</b> • Addition of overwing exit and emergency lights.	No	Yes	A	A
	Normal Takeoff	<b>E170, E175</b> • During Takeoff, in case of flight director is inoperative, the pilot must rotate the airplane according to following: FLAPS POS / TAKE OFF PITCH: • 1 / 11° • 2 / 10° • 4 / 12°	No	No	A	A

<b>APPLICABILITY</b> E170 E175 E190	<b>MANEUVER</b>	<b>REMARKS</b>	<b>FLT CHAR</b>	<b>PROC CHNG</b>	<b>TRAINING</b>	<b>CHECKING</b>
	Normal Takeoff	<b>E190</b> • During Takeoff, in case of flight director is inoperative, the pilot must rotate the airplane according to following: FLAPS POS / TAKE OFF PITCH: • 1 / 11° • 2 / 11° • 3 / 9° • 4 / 12°	No	No	A	A
	Non-Normal	Read and do Checklist changes due to annunciation and system changes listed in Design Difference Tables.	No	Yes	A	A

This **Design differences table, E190 baseline configuration avionics load software version 27.1 basic next generation flight management system (NG-FMS) to the E190-E2 baseline configuration avionics load software version 5.0 basic NG-FMS**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

Some optional equipment/speciality training may be identified as not evaluated under the scope of OEs and/or as not TCCA certified. As such those differences training programs may not be available for operators until validated by NAC. As per section 4.5 of this report, additional evaluations may be required. Therefore, the training and checking level identified have not been evaluated during the scope of OEs and may changed following subsequent evaluation.

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Flight Deck General Design	Different Amount of Display Units.	No	No	B	B
	Dimensions	Different Dimensions.	No	No	B	B
	Minimum Turning Radius	Different Minimum Turning Radius.	No	No	B	B
	Limitations Weight	Different Weights.	No	No	B	B
	Limitations Center of Gravity	Different Center of Gravity Envelopes.	No	No	B	B
	Limitations Operational Envelope	Different Operational Envelopes.	No	No	B	B
	Limitations Landing Gear Operation/Extended Speed	Different V <sub>LO</sub> for Retraction and Extension.	No	No	B	B
	Limitations Cold Soaked Fuel Frost	Different ice or frost accumulation tolerance on the wing.	No	No	B	B

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations Maximum Maneuvering Speed	Different Maneuvering Speed Envelopes.	No	No	B	B
	Limitations Fuel	Different Fuel Quantities.	No	No	B	B
	Limitations APU	<ul style="list-style-type: none"> <li>• Different APU.</li> <li>• Different Operational Limits.</li> </ul>	No	No	B	B
	Limitations Engines	<ul style="list-style-type: none"> <li>• Different Engines.</li> <li>• Different Takeoff Thrust Ratings &amp; Limitations.</li> </ul>	No	No	B	B
	Limitations Autopilot	Minimum Height for use of autopilot modified.	No	No	B	B
	Performance	Overall performance is different, including different range/endurance capability and takeoff/landing field length requirements.	No	No	A	A
	ATA 21 Air Conditioning	<p><b>GENERAL</b></p> <ul style="list-style-type: none"> <li>• Enhanced temperature control system architecture implemented.</li> <li>• Cabin automatic temperature control per passenger count via MCDU setting.</li> </ul>	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 22 Autoflight	<b>AUTOPILOT</b> <ul style="list-style-type: none"> <li>• New triple channel architecture as part of the Full Fly-By-Wire system implemented.</li> <li>• Autopilot servos removed (motionless control column/wheel when AP is engaged).</li> <li>• Autopilot coupling/breakout logic implemented.</li> </ul>	No	No	B	B
	ATA 22 Autoflight	<b>GUIDANCE PANEL</b> <ul style="list-style-type: none"> <li>• Redesigned. Pushbuttons and knobs relocated, renamed and/or removed.</li> </ul>	No	No	D (FFS-no motion)	B
	ATA 22 Autoflight	<b>YAW DAMPING</b> <ul style="list-style-type: none"> <li>• Yaw damping automatic operation as part of the Full Fly-By-Wire implemented.</li> </ul>	No	No	A	A
	ATA 22 Autoflight	Autoland: (***) (*) Level D/D applicable to pilots not qualified on E1 Autoland. (**) Level A/A applicable to pilots already qualified on E1 Autoland. (***) Not evaluated under the scope of OEs and not TCCA certified.	No	Yes	D*(A**)	D*(A**)

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 23 Communications	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• Iridium SATCOM system implemented (Option).(*)</li> <li>(*) Not evaluated under the scope of OEs and not TCCA certified.</li> <li>• Audio panel dual HF design implemented.</li> </ul>	No	No	A	A
	ATA 24 Electrical Power	<b>AC POWER GENERATION SYSTEM</b> <ul style="list-style-type: none"> <li>• Increased power generation capacity.</li> <li>• DC/AC static inverter removed.</li> <li>• AC stand-by bus removed.</li> <li>• Different Load Distribution among AC/DC busses</li> </ul> <b>INDICATIONS</b> <ul style="list-style-type: none"> <li>• Electrical system synoptic: <ul style="list-style-type: none"> <li>• 'AC STBY' bus indication removed.</li> <li>• Batteries electrical current information implemented.</li> </ul> </li> </ul>	No	No	B (SU)	B
	ATA 25 Equipment/Furnishings	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• Overwing exit escape slide systems implemented.</li> <li>• Cockpit emergency equipment relocated.</li> </ul>	No	No	B(SU)	B



FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 25 Equipment/Furnishings	<p><b>GENERAL</b></p> <ul style="list-style-type: none"> <li>• Sliding-type, wall rail mounted cockpit observer seat implemented.</li> <li>• Different cockpit seat adjustments.</li> </ul> <p><b>E190-E2</b></p> <ul style="list-style-type: none"> <li>• Minimum cabin seating reduced from 98 to 97 passengers.</li> </ul>	No	No	A	A
	ATA 25 Equipment/Furnishings	<p><b>GENERAL</b></p> <p><b>E195-E2</b></p> <ul style="list-style-type: none"> <li>• Addition of one overwing emergency exit (two per side).</li> <li>• Dual lane overwing exit escape slide implemented.</li> <li>• Maximum passenger cabin configuration increased.</li> <li>• Different emergency equipment location.</li> </ul> <p><b>INDICATION</b></p> <p><b>E195</b></p> <ul style="list-style-type: none"> <li>• Status synoptic page.</li> <li>• Additional overwing emergency exit indication implemented.</li> </ul>	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 26 Fire Protection	<b>SMOKE DETECTION</b>  • Smoke detectors quantity by cargo compartment modified.	No	No	A	A
	ATA 26 Fire Protection	<b>SMOKE DETECTION</b>  • Smoke detection system in the e-bays implemented.	No	No	B (SU)	B
	ATA 27 Flight Controls	<b>GENERAL</b>  • Full Fly-By-Wire closed-loop system architecture implemented (ailerons FBW).  • Enhanced Normal Mode flight control laws and protection functions implemented (full envelope protection).  • Enhanced Direct Mode features implemented.  • Normal or Direct operational modes applicable to all three axis simultaneously.	Yes	Yes	B (SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	<b>PRIMARY AND SECONDARY FLIGHT CONTROL SURFACES</b> <ul style="list-style-type: none"> <li>• Ailerons FBW-controlled with spoileron logic implemented.</li> <li>• Multifunction Spoilers available during Direct Mode operation of the flight controls system.</li> <li>• Fourth pair of Multifunction Spoilers (MFS #4) implemented.</li> <li>• Fifth pair of slats implemented.</li> <li>• Smaller horizontal stabilizer implemented.</li> <li>• Single slotted flaps implemented.</li> </ul>	No	No	B (SU)	B
	ATA 27 Flight Controls	<b>HYDRAULIC SYSTEM</b> <ul style="list-style-type: none"> <li>• Actuators even-odd day (active - stdby) design concept replaced by active – active.</li> <li>• Multifunction Spoiler #4 on hydraulic system 2 implemented.</li> </ul>	No	No	B (SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	<b>INDICATIONS</b> <ul style="list-style-type: none"> <li>• Flight controls system synoptics:                             <ul style="list-style-type: none"> <li>- Surface awareness information window implemented.</li> <li>- Multifunction Spoilers #4 indication implemented.</li> <li>- Hydraulic system even-odd day indication removed.</li> <li>- Ailerons mode/actuators status information implemented.</li> </ul> </li> <li>• One Engine Inoperative sideslip (Best Beta) color-coded target indication implemented on PFD.</li> </ul>	No	Yes	B (SU)	B
	ATA 27 Flight Controls	<b>COCKPIT CONTROLS</b> <ul style="list-style-type: none"> <li>• FLIGHT CONTROLS MODE panel with only one NORMAL MODE pushbutton for the three axis implemented.</li> <li>• Rudder pedals artificial feel centering forces feature removed upon trim utilization.                             <ul style="list-style-type: none"> <li>- Force-feel feedback alleviation via yaw trim actuation removed as per FFBW (no rudder pedals trim backdrive).</li> </ul> </li> <li>• Control wheel artificial feel centering forces feature removed upon trim utilization:                             <ul style="list-style-type: none"> <li>- Force-feel feedback alleviation via roll trim actuation removed as per FFBW (no control wheel trim backdrive).</li> </ul> </li> </ul>	No	No	B (SU)	B

<p><b>FROM BASE AIRCRAFT: E190 (NG-FMS)</b></p> <p><b>TO RELATED AIRCRAFT: E190-E2/E195-E2</b></p>	<p><b>DESIGN</b></p>	<p><b>REMARKS</b></p>	<p><b>FLT CHAR</b></p>	<p><b>PROC CHNG</b></p>	<p><b>TRAINING</b></p>	<p><b>CHECKING</b></p>
	<p>ATA 28 Fuel</p>	<p><b>FUEL TANKS</b></p> <ul style="list-style-type: none"> <li>• Center tank (fuel transfer system) implemented.</li> <li>• Two AC fuel pumps and one fuel SOV in center tank implemented.</li> <li>• Two scavenge pumps removed</li> </ul> <p><b>CONTROLS</b></p> <ul style="list-style-type: none"> <li>• FUEL TRANSFER switch on FUEL control panel implemented.</li> <li>• FUEL DC PUMP switch moved from FUEL control panel to APU control panel.</li> <li>• Different refueling/defueling control panel.</li> </ul>	<p>No</p>	<p>Yes</p>	<p>B (SU)</p>	<p>B</p>
	<p>ATA 28 Fuel</p>	<p><b>INDICATIONS</b></p> <p>-EICAS:</p> <ul style="list-style-type: none"> <li>• Center tank indication implemented.</li> </ul> <p>-Fuel system synoptic:</p> <ul style="list-style-type: none"> <li>• Center tank indication implemented.</li> </ul> <p>-Wings magnetic level indicators removed.</p>	<p>No</p>	<p>No</p>	<p>B (SU)</p>	<p>B</p>

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 29 Hydraulic Power	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• Nosewheel steering and landing gear extension hydraulically segregated.</li> <li>• Main landing gear doors actuation by hydraulic system 2 implemented.</li> <li>• Multifunction Spoilers actuation rearranged within hydraulic systems 1 &amp; 2 and Multifunction Spoilers #4 implemented.</li> <li>• Flight controls actuators even-odd day (active - stdby) design concept replaced by active – active.</li> <li>• System 1 (2) AC Motor Pump automatic ON logic during single engine 2 (1) taxi implemented.</li> </ul>	No	Yes	B (SU)	B
	ATA 29 Hydraulic Power	<b>INDICATIONS</b> <ul style="list-style-type: none"> <li>• Hydraulic system synoptic: <ul style="list-style-type: none"> <li>- Multifunction Spoiler rearranged within hydraulic systems 1 &amp; 2.</li> <li>- Multifunction Spoiler #4 implemented.</li> </ul> </li> </ul>	No	No	A	A
	ATA 30 Ice and Rain Protection	<b>CONTROLS</b> <ul style="list-style-type: none"> <li>• ICE SPEED RESET function in the ICE PROTECTION control panel implemented.</li> </ul>	No	Yes	B (SU)	B
	ATA 30 Ice and Rain Protection	<b>INDICATIONS</b> <ul style="list-style-type: none"> <li>• Anti-ice system synoptic: <ul style="list-style-type: none"> <li>- Additional bleed air pressure indication implemented.</li> </ul> </li> </ul>	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	<b>GENERAL</b>  <b>E190-E2</b>  • Honeywell Primus EPIC Basic NG-FMS flight deck (load sw version 27.1) replaced by Honeywell Primus EPIC II Basic NG-FMS flight deck (load sw version 5.0).	No	Yes	D (FFS-no motion)	B
	ATA 31 Indicating/Recording Systems	<b>GENERAL</b>  <b>E190-E2</b>  • E2 Primus EPIC Field Loadable Software System (Load 5.7). (*)  (*) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	<p><b>GENERAL</b></p> <p><b>E190-E2 (*) (***)</b></p> <ul style="list-style-type: none"> <li>• Honeywell Primus EPIC II Basic FMS NG flight deck (load 7.0).</li> <li>• New aural warning system inhibition feature.</li> <li>• Aural warning added.</li> <li>• CAS Message added.</li> </ul> <p><b>E195-E2 (*) (**) (***)</b></p> <p>(*) E2 Primus EPIC Field Loadable Software System (Load 7.5) was the SW load used under the scope of the E-Jets-E2 OE. There is no differences training identified between SW load 7.0 and 7.5.</p> <p>(**) Honeywell Primus EPIC II Basic FMS NG flight deck (load 7.0) is baseline for the E195-E2 and therefore the Level A differences training indicated in this section is not applicable.</p> <p>(***) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.</p>	No	Yes	A	A



FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	<b>DISPLAY UNITS</b> <ul style="list-style-type: none"> <li>• 5 portrait 8"x10" replaced by 4 landscape 13"x10".</li> <li>• Multifunction windowing capability implemented.</li> <li>• Different reversion logic implemented.</li> <li>• Displays 1 and 4 (PFDs) available upon power-up/electrical emergency.</li> <li>• PFDs auxiliary window implemented: <ul style="list-style-type: none"> <li>- Flight information window implemented.</li> </ul> </li> </ul>	No	Yes	D (FFS-no motion)	B
	ATA 31 Indicating/Recording Systems	<b>DISPLAY UNITS</b> <ul style="list-style-type: none"> <li>• PFDs auxiliary window implemented: <ul style="list-style-type: none"> <li>• ATC uplink window implemented (OPT).</li> </ul> </li> </ul>	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	<b>CURSOR CONTROL DEVICES</b> <ul style="list-style-type: none"> <li>• Display selection buttons double-click (multifunction window toggling) function implemented.</li> <li>• CCD #2 'X' cursor symbology implemented.</li> <li>• CCD cursor "blooming" indication logic implemented.</li> </ul>	No	No	D (FFS-no motion)	B
	ATA 31 Indicating/Recording Systems	<b>CURSOR CONTROL DEVICES</b> <ul style="list-style-type: none"> <li>• Touch pad hotspots implemented.</li> </ul>	No	Yes	A	A

	<p>ATA 31 Indicating/Recording Systems</p>	<p><b>COCKPIT CONTROL PANEL</b></p> <ul style="list-style-type: none"> <li>• OVERHEAD - FUEL:                     <ul style="list-style-type: none"> <li>- FUEL TRANSFER switch on FUEL control panel implemented.</li> <li>- FUEL DC PUMP switch moved from FUEL control panel to APU control panel.</li> </ul> </li> <li>• OVERHEAD – APU:                     <ul style="list-style-type: none"> <li>- UEL DC PUMP switch moved from FUEL control panel to APU control panel.</li> </ul> </li> <li>• OVERHEAD – ICE PROTECTION:                     <ul style="list-style-type: none"> <li>- ICE SPEED RESET function in the ICE PROTECTION control panel implemented.</li> </ul> </li> <li>• GLARESHIELD - LIGHTS:                     <ul style="list-style-type: none"> <li>- EICAS brightness control knob removed.</li> <li>- STB/CLK knob replaced by COMPASS.</li> </ul> </li> <li>• GLARESHIELD - GUIDANCE:                     <ul style="list-style-type: none"> <li>- Redesigned. Pushbuttons and knobs relocated, renamed and/or removed.</li> </ul> </li> <li>• GLARESHIELD - DISPLAY CONTROLLER                     <ul style="list-style-type: none"> <li>- BARO SET pre-select function implemented.</li> <li>- BARO SET and MINIMUMS knobs swapped position.</li> <li>- V/L pushbutton renamed NAV.</li> </ul> </li> </ul>	<p>No</p>	<p>Yes</p>	<p>D (FFS-no motion)</p>	<p>B</p>
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		<p>- Both display controllers available during electrical emergency implemented.</p> <p><b>MAIN</b></p> <ul style="list-style-type: none"> <li>• Clock/chronometer/ET LRU removed. Functions implemented in the PFDS/flight information window.</li> <li>• IESI minor relocation.</li> <li>• Landing gear lever minor relocation.</li> <li>• AUTOBRAKE switch minor relocation. (Optional on the E190) (*)</li> </ul> <p>(*) Not evaluated during the E-Jets-E1 OE</p> <ul style="list-style-type: none"> <li>• ELT switch minor relocation.</li> <li>• EMERG/PRKG BRAKE indicating light minor relocation.</li> <li>• GND PROX TERR INHIB push button moved to control pedestal, guard implemented and renamed TERRAIN.</li> <li>• GND PROX G/S INHIB push button moved to control pedestal and renamed GLIDE SLOPE.</li> <li>• LG WRN INHIB push button moved to control pedestal and renamed LG WRN.</li> <li>• Revised placards information implemented.</li> <li>• Different DISPLAYS knob options on the REVERSIONARY PANEL</li> </ul> <p><b>CONTROL WHEEL</b></p>				
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<p><b>FROM BASE AIRCRAFT: E190 (NG-FMS)</b></p> <p><b>TO RELATED AIRCRAFT: E190-E2/E195-E2</b></p>	<p><b>DESIGN</b></p>	<p><b>REMARKS</b></p>	<p><b>FLT CHAR</b></p>	<p><b>PROC CHNG</b></p>	<p><b>TRAINING</b></p>	<p><b>CHECKING</b></p>
		<ul style="list-style-type: none"> <li>• Trim disconnection function of the AP/TRIM DISC pushbutton removed.</li> </ul> <p><b>CENTER PEDESTAL</b></p> <ul style="list-style-type: none"> <li>• FLIGHT CONTROLS MODE panel with only one NORMAL MODE pushbutton for the three axis implemented.</li> <li>• IGNITION knobs OVRD position renamed ON.</li> <li>• Audio panel dual HF design implemented.</li> <li>• LG WRN / GROUND PROX INHIBITS panel implemented.</li> <li>• GND PROX FLAP OVRD push button moved to LG WRN / GROUND PROX INHIBITS panel and renamed FLAP OVRD.</li> </ul>				

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	<b>COCKPIT CONTROL PANEL</b> <ul style="list-style-type: none"> <li>• OVERHEAD – DVDR: <ul style="list-style-type: none"> <li>- Honeywell or Universal models not available.</li> </ul> </li> <li>• MAIN <ul style="list-style-type: none"> <li>- CABIN SURVEILLANCE SYS control panel implemented (OPT). • CENTER PEDESTAL</li> <li>-CABIN NON ESSENTIAL panel implemented</li> </ul> </li> <li>• LATERAL PANELS <ul style="list-style-type: none"> <li>-EFB docking area and USB ports implemented.</li> </ul> </li> </ul>	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	<b>CAS MESSAGES</b> <ul style="list-style-type: none"> <li>• Removal, modification and addition of some CAS messages.</li> </ul>	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	<b>AURAL ALERTS</b> <ul style="list-style-type: none"> <li>• “Low Speed, Low Speed” implemented.</li> <li>• “Pitch Angle, Pitch Angle” implemented</li> </ul>	No	No	B(SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	<b>AURAL ALERTS</b> <ul style="list-style-type: none"> <li>• “Caution, No RNP” implemented (OPT)</li> <li>• “No RNP, No RNP” implemented (OPT)</li> <li>• “Monitor RADAR Display” implemented (OPT)</li> <li>• “Windshear Ahead, Windshear Ahead” implemented (OPT)</li> <li>• “Go-Around, Windshear Ahead” implemented (OPT)</li> </ul>	No	No	A	A
	ATA 32 Landing Gear	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• MLG trailing arm design implemented.</li> <li>• MLG and NLG height (fuselage ground clearance) increased.</li> <li>• MLG full concealment by additional doors implemented.</li> <li>• Alternate LG extension PSEM override switch removed.</li> <li>• Nosewheel steering capability after pulling the emergency extension lever implemented.</li> <li>• Different main landing gear tire pressure</li> </ul>	No	Yes	B (SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 32 Landing Gear	<b>AUTOBRAKE</b> <ul style="list-style-type: none"> <li>• Baseline autobrake implemented.</li> <li>• *Autobrake training and checking is Level A if previously trained and checked during an E1 training curriculum. (**)</li> </ul> (**) Not evaluated during the E-Jets-E1 OE	No	Yes	B (A*)	B (A*)
	ATA 32 Landing Gear	<b>INDICATIONS</b> <ul style="list-style-type: none"> <li>• Landing gear position indication window framed by flashing amber indication upon aural alert "landing gear" implemented.</li> </ul> <b>BRAKES</b> <ul style="list-style-type: none"> <li>• MFD status page:               <ul style="list-style-type: none"> <li>- Brake temperature numerical values on the MFD status page removed.</li> </ul> </li> </ul> <b>NOSEWHEEL STEERING</b> <ul style="list-style-type: none"> <li>• Turning radius runway minimum width decreased.</li> <li>• Largest radius clearance is required by the wing tip rather than by the h-stab tip.</li> </ul>	No	No	A	A
	ATA 33 Lights	<b>GLARESHIELD LIGHTS CONTROL PANEL</b> <ul style="list-style-type: none"> <li>• EICAS brightness control knob removed.</li> <li>• STB/CLK knob replaced by COMPASS.</li> </ul>	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• CDTI (ADS-B in) implemented (Option) (*).</li> <li>• Charts &amp; Maps implement (Option) (*).</li> <li>• INAV (integrated navigation) implemented (Option) (*).</li> <li>• SmartView (Synthetic Vision System) implemented (OPT) (*).</li> </ul> (*) Not evaluated under the scope of OEs and not TCCA certified.	No	Yes	A	A
	ATA 34 Navigation	<b>FLIGHT PLANNING</b> <ul style="list-style-type: none"> <li>• Graphical Flight Planning (GFP) implemented (Option) (*).</li> </ul> (*) Not TCCA certified.	No	No	B (SU)	B
	ATA 34 Navigation	<b>FLIGHT DIRECTOR</b> <ul style="list-style-type: none"> <li>• LNAV coupling at reduced height (50 ft AGL) implemented.</li> </ul>	No	Yes	B (SU)	B
	ATA 34 Navigation	<b>FLIGHT DIRECTOR</b> <ul style="list-style-type: none"> <li>• Removal of flight director presentation different logic implemented.</li> </ul>	No	Yes	A	A



FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	<b>GENERAL</b> • TOLD – Takeoff and Landing Function (Option)  <b>WEATHER RADAR</b> • RDR4000 3D volumetric weather radar implemented (Option): - Predictive windshear + other features.  <b>ENHANCED GROUND PROXIMITY WARNING FUNCTION</b> • Permanent peak mode annunciation implemented.	No	No	A	A
	ATA 34 Navigation	<b>RNP AR&lt;0.3nm (***)</b> (*) Level D/D applicable to pilots not qualified on E1 RNP AR<0.3. (**) Level A/A applicable to pilots already qualified on E1 RNP AR<0.3. (***) Not evaluated under the scope of OEs	No	Yes	D* (A**)	D* (A**)
	ATA 35 Oxygen	<b>GENERAL</b> • Standard 77 ft <sup>3</sup> flightcrew O <sub>2</sub> cylinder implemented.	No	No	A	A
	ATA 36 Pneumatic	<b>GENERAL</b> • Air preparation system implemented.	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 38 Water/Waste	<b>CONTROLS</b> • Baseline water drainage capability implemented. • Waste tank increased capacity implemented.	No	No	A	A
	ATA 44 Cabin Systems	<b>GENERAL</b> • Enhanced Cabin Management System and Passenger Service Units.	No	No	A	A
	ATA 46 Information Systems	<b>GENERAL</b> • EFB docking area and USB ports implemented.	No	No	A	A
	ATA 47 Inert Gas System	<b>GENERAL</b> • On-board inert gas generation system (OBIGGS) implemented.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	<b>GENERAL</b> • APS2600 APU implemented. • Door-equipped, single ram air inlet at 2 o'clock position implemented. • Fuel-oil heat exchange implemented. • Enhanced operational envelope implemented.	No	Yes	B (SU)	B
	ATA 49 Airborne Auxiliary Power	<b>CONTROLS</b> • APU control panel incorporated the FUEL DC PUMP knob from the FUEL control panel.	No	No	B (SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 50 Cargo and Accessory Compartments	<b>GENERAL</b> • Cargo compartment different volume & weight capacity.	No	No	A	A
	ATA 52 Doors	<b>PAX AND SVC</b> • Single handle for vent-flap, locking and latching implemented. • Emergency system handle different design/indication implemented.	No	Yes	B (SU)	B
	ATA 52 Doors	<b>OVERWING EMERGENCY</b> • Automatically disposed door implemented. <b>• E195-E2</b> - Addition of one overwing emergency exit (two per side).	No	Yes	B* (SU)	B
	ATA 52 Doors	<b>COCKPIT</b> • Reinforced cockpit door different hinges and latch design implemented.	No	No	A	A
	ATA 53 Fuselage	<b>EXTERNAL INSPECTION ELEMENTS</b> • Different location of some features/components as well as implementation/removal of others. <b>• E195-E2</b> - Stretched fuselage.	No	No	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 57 Wings	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• Gull-type wing with raked wingtips implemented.</li> <li>• <b>E195-E2</b> <ul style="list-style-type: none"> <li>- Different wing-tip implemented (raked).</li> </ul> </li> </ul>	No	No	A	A
	ATA 72 Engine General	<b>GENERAL</b> <ul style="list-style-type: none"> <li>• PW1919G/21G/22G/23G ultra high-bypass ratio, low speed gear-driven fan engines implemented.</li> <li>• Different Takeoff Thrust Ratings</li> <li>• Takeoff run thrust / elevator compensation schedule implemented.</li> <li>• Automatic dry-motoring cycle included during engine normal start (longer engine start cycle).</li> <li>• Different engine start indications (timing &amp; values).</li> </ul>	No	Yes	B (SU)	B
	ATA 72 Engine General	<b>FMS TAKE OFF DATA SETTING AND THRUST RATING SELECTION</b> <ul style="list-style-type: none"> <li>• TO-3 mode implemented.</li> <li>• CLB-1 / CLB-2 modes selectable on ground implemented.</li> </ul>	No	No	A	A
	ATA 72 Engine General	<b>IGNITION</b> <ul style="list-style-type: none"> <li>• One dual channel VDC-based (ESS BUSSES) exciter implemented.</li> </ul>	No	No	B (SU)	B

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 72 Engine General	<b>CONTROLS</b> • Ignition knob position OVRD renamed to ON.	No	No	A	A
	ATA 72 Engine General	<b>INDICATIONS</b> EICAS: • Fan vibration indication implemented. • AES (Assisted Engine Start) indication implemented. • WML/AES green & white indication logic implemented. • Engine EICAS indication decluttering 5 minutes after engines shutdown implemented (FADEC depower function).	No	Yes	B (SU)	B
	ATA 72 Engine General	<b>THRUST REVERSERS</b> • Fixed translating cowl replaced by blocker doors design.	No	No	B (SU)	B

This **Maneuver differences table, ERJ 190-100 baseline configuration avionics load software version 27.1 basic NG-FMS to the ERJ 190-300 baseline configuration avionics load software version 5.0 basic NG-FMS**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

Some optional equipment/speciality training may be identified as not evaluated under the scope of OEs and/or as not TCCA certified. As such those differences training programs may not be available for operators until validated by NAC. As per section 4.5 of this report, additional evaluations may be required. Therefore, the training and checking level identified have not been evaluated during the scope of OEs and may changed following subsequent evaluation.

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Internal Safety Inspection	<b>EMERGENCY EQUIPMENT</b> • Different location.  <b>FUEL PANEL</b> • Fuel transfer knob in AUTO position check implemented.  <b>APU PANEL</b> • DC pump knob in AUTO position check implemented.	No	Yes	A	A

<p><b>FROM BASE AIRCRAFT: E190 (NG-FMS)</b></p> <p><b>TO RELATED AIRCRAFT: E190-E2/E195-E2</b></p>	<p><b>MANEUVER</b></p>	<p><b>REMARKS</b></p>	<p><b>FLT CHAR</b></p>	<p><b>PROC CHNG</b></p>	<p><b>TRAINING</b></p>	<p><b>CHECKING</b></p>
	<p>Power Up</p>	<ul style="list-style-type: none"> <li>• Only displays 1 and 4 are to be available rather than 2 and 3.</li> <li>• Different battery voltage.</li> <li>• Two minute electrical PBIT rather than 3 minutes.</li> <li>• Annunciators testing implemented (moved from BEFORE START).</li> <li>• “AFT EBAY SMOKE”; “CTR EBAY SMOKE” and “FWD EBAY SMOKE” EICAS messages are also to be displayed when pressing the TEST button on the FIRE EXTINGUISHER panel.</li> <li>• Hydraulic panel as required / FLT CTRL BIT EXPIRED EICAS procedure removed.</li> </ul>	<p>No</p>	<p>Yes</p>	<p>A</p>	<p>A</p>

	External Inspection	<p><b>LEFT FWD FUSELAGE</b></p> <ul style="list-style-type: none"> <li>• Emergency light check implemented.</li> </ul> <p><b>NOSE SECTION</b></p> <ul style="list-style-type: none"> <li>• Lower FWD antenna check removed.</li> <li>• Battery air outlet check implemented.</li> </ul> <p><b>RIGHT FWD FUSELAGE</b></p> <ul style="list-style-type: none"> <li>• Emergency light check implemented.</li> </ul> <p><b>LOWER CENTER FUSELAGE</b></p> <ul style="list-style-type: none"> <li>• FWD drain mast check removed.</li> <li>• Water drain valve access door check implemented.</li> </ul> <p><b>RIGHT CENTER WING</b></p> <ul style="list-style-type: none"> <li>• Overwing exit door check implemented.</li> <li>• RH 1 and RH 2 magnetic level indicators check removed.</li> </ul> <p><b>ENGINE 2 LH SIDE</b></p> <ul style="list-style-type: none"> <li>• LH thrust reverser actuator access panel check implemented.</li> <li>• Anti-ice pressure relief door check removed.</li> <li>• T12 sensor replaced by a P2T2 sensor.</li> </ul> <p><b>ENGINE 2 RH SIDE</b></p> <ul style="list-style-type: none"> <li>• Anti-ice duct access panel and relief door check implemented.</li> <li>• RH thrust reverser actuator access panel check implemented.</li> <li>• FADEC cooling vent check removed.</li> <li>• Pre-cooler exhaust door check implemented.</li> </ul>	No	Yes	B	A
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		<ul style="list-style-type: none"> <li>• Turbine exhaust check implemented.</li> <li>• Pylon check implemented.</li> </ul> <p><b>RIGHT WING LEADING EDGE</b></p> <ul style="list-style-type: none"> <li>• RH 3 magnetic level indicator check removed.</li> </ul> <p><b>RIGHT WING TRAILING EDGE</b></p> <ul style="list-style-type: none"> <li>• Two static dischargers removed.</li> </ul> <p><b>RIGHT MAIN GEAR</b></p> <ul style="list-style-type: none"> <li>• Downlock springs check implemented.</li> <li>• Right main gear door check implemented.</li> </ul> <p><b>RIGHT AFT FUSELAGE</b></p> <ul style="list-style-type: none"> <li>• Overwing escape slide panel check implemented.</li> <li>• Drain mast check removed.</li> <li>• Lowers AFT antennas check removed.</li> <li>• Waste service door check implemented.</li> <li>• Emergency light check implemented.</li> <li>• System 3 hydraulic access check implemented.</li> </ul> <p><b>TAIL SECTION</b></p> <ul style="list-style-type: none"> <li>• Total of three static dischargers removed.</li> <li>• Right side access doors and panels check implemented.</li> <li>• Horizontal stabilizer position scale check implemented.</li> <li>• APU ventilation door check implemented.</li> <li>• APU access door check implemented.</li> <li>• Left side access doors and panels check implemented.</li> </ul>				
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		<ul style="list-style-type: none"> <li>• External DC power receptacle check implemented.</li> </ul> <p><b>LEFT AFT FUSELAGE</b></p> <ul style="list-style-type: none"> <li>• APU external power receptacle check removed.</li> <li>• Emergency light check implemented.</li> <li>• Overwing escape slide panel check implemented.</li> </ul> <p><b>LEFT MAIN GEAR</b></p> <ul style="list-style-type: none"> <li>• Downlock springs check implemented.</li> <li>• Left main gear door check implemented.</li> </ul> <p><b>LEFT WING TRAILING EDGE</b></p> <ul style="list-style-type: none"> <li>• Two static dischargers removed.</li> </ul> <p><b>LEFT WING LEADING EDGE</b></p> <ul style="list-style-type: none"> <li>• LH 3 magnetic level indicator check removed.</li> </ul> <p><b>ENGINE 1 LH SIDE</b></p> <ul style="list-style-type: none"> <li>• LH thrust reverser actuator access panel check implemented.</li> </ul> <p><b>ENGINE 1 RH SIDE</b></p> <ul style="list-style-type: none"> <li>• Anti-ice duct access panel and relief door check implemented.</li> <li>• LH thrust reverser actuator access panel check implemented.</li> <li>• FADEC cooling vent check removed.</li> <li>• Pre-cooler exhaust door check implemented.</li> <li>• Turbine exhaust check implemented.</li> <li>• Pylon check implemented.</li> </ul>				
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<p><b>FROM BASE AIRCRAFT: E190 (NG-FMS)</b></p> <p><b>TO RELATED AIRCRAFT: E190-E2/E195-E2</b></p>	<p><b>MANEUVER</b></p>	<p><b>REMARKS</b></p>	<p><b>FLT CHAR</b></p>	<p><b>PROC CHNG</b></p>	<p><b>TRAINING</b></p>	<p><b>CHECKING</b></p>
		<p><b>LEFT CENTER WING</b></p> <ul style="list-style-type: none"> <li>• Access doors and panels check implemented.</li> <li>• LH 1 and LH 2 magnetic level indicators check removed.</li> <li>• Air conditioning connection access door check removed.</li> <li>• Overwing exit door check implemented.</li> </ul>				

<p>FROM BASE AIRCRAFT: E190 (NG-FMS)</p> <p>TO RELATED AIRCRAFT: E190-E2/E195-E2</p>	<p>MANEUVER</p>	<p>REMARKS</p>	<p>FLT CHAR</p>	<p>PROC CHNG</p>	<p>TRAINING</p>	<p>CHECKING</p>
	<p>Before Start</p>	<p><b>COCKPIT LIGHTS PANEL</b></p> <ul style="list-style-type: none"> <li>• Annunciators test removed (moved to POWER UP).</li> </ul> <p><b>FUEL PANEL</b></p> <ul style="list-style-type: none"> <li>• FUEL TRANSFER selector knob to AUTO implemented.</li> <li>• DC pump check moved to APU panel.</li> </ul> <p><b>PASSENGER SIGNS PANEL</b></p> <ul style="list-style-type: none"> <li>• NO SMKG switched to ON task removed.</li> <li>• NO ELEC DEVICES toggle switch to ON task implemented.</li> </ul> <p><b>APU CONTROL PANEL</b></p> <ul style="list-style-type: none"> <li>• DC PUMP selector knob to AUTO task implemented.</li> </ul> <p><b>AUTOBRAKE PANEL</b></p> <ul style="list-style-type: none"> <li>• RTO selection implemented (baseline equipment on E2).</li> </ul> <p><b>CLOCK</b></p> <ul style="list-style-type: none"> <li>• Clock set up task removed.</li> </ul> <p><b>TRIM</b></p> <ul style="list-style-type: none"> <li>• ROLL and YAW operation checks removed.</li> </ul> <p><b>ALTERNATE GEAR EXTENSION COMPARTMENT</b></p> <ul style="list-style-type: none"> <li>• Override switch check removed.</li> </ul>	<p>No</p>	<p>Yes</p>	<p>A</p>	<p>A</p>

FROM BASE AIRCRAFT: E190 (NG-FMS) TO RELATED AIRCRAFT: E190-E2/E195-E2	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Engine Start	<ul style="list-style-type: none"> <li>• Engine parameters check procedure (selector RUN position) implemented.</li> <li>• Engine oil temperature check implemented.</li> </ul>	No	Yes	A	A
	Descent	Autobrake selection implemented (baseline equipment on E2).	No	Yes	A	A
	Shutdown	Increased thermal stabilization time in idle.	No	Yes	A	A
	ECS Off Takeoff	REF A/I OFF or ENG additional condition implemented.	No	Yes	A	A
	Single Engine Taxi	<p><b>TAXI IN</b></p> <ul style="list-style-type: none"> <li>• ACMP operation task removed.</li> <li>• Increased thermal stabilization time in idle.</li> </ul> <p><b>TAXI OUT</b></p> <ul style="list-style-type: none"> <li>• ACMP operation tasks removed.</li> <li>• Minimum oil temperature limitation implemented (ENG 1 (2) WARM UP status EICAS message).</li> </ul>	No	Yes	A	A

FROM BASE AIRCRAFT: E190 (NG-FMS)  TO RELATED AIRCRAFT: E190- E2/E195-E2	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Icing Conditions, Cold Weather, and Cold Soak Operations	<p><b>EXTERNAL SAFETY INSPECTION</b></p> <ul style="list-style-type: none"> <li>• Flaps inspection holes check implemented.</li> <li>• Batts and electronic computer ventilation holes check implemented.</li> </ul> <p><b>BEFORE START</b></p> <ul style="list-style-type: none"> <li>• ADS probe heaters operation task (as required) removed.</li> </ul> <p><b>AFTER START</b></p> <ul style="list-style-type: none"> <li>• ADS probe heaters pushed out task removed.</li> </ul> <p><b>AIRPLANE ANTI-ICING/DEICING FLUID APPLICATION WITH ENGINES/APU RUNNING</b></p> <ul style="list-style-type: none"> <li>• Pitch trim full nose down to neutral implemented.</li> </ul> <p><b>HOLDING</b></p> <ul style="list-style-type: none"> <li>• Minimum airspeed 210 KIAS replaced by FOLLOW THE GREEN DOT.</li> </ul> <p><b>DESCENT</b></p> <ul style="list-style-type: none"> <li>• Check removed.</li> </ul> <p><b>THROUGH-FLIGHTS</b></p> <ul style="list-style-type: none"> <li>• Flap inspection holes check implemented.</li> <li>• Battery and electronic compartment ventilation holes check implemented.</li> </ul>	No	Yes	A	A

<b>FROM BASE AIRCRAFT: E190 (NG-FMS)</b>  <b>TO RELATED AIRCRAFT: E190- E2/E195-E2</b>	<b>MANEUVER</b>	<b>REMARKS</b>	<b>FLT CHAR</b>	<b>PROC CHNG</b>	<b>TRAINING</b>	<b>CHECKING</b>
	Flight Controls	<ul style="list-style-type: none"> <li>• Pitch trim runaway procedure removed.</li> <li>• Roll (yaw) trim runaway procedure removed.</li> </ul>	No	Yes	A	A

	All Systems	<p>GENERAL</p> <ul style="list-style-type: none"> <li>• Some procedures have been either amended, removed or new ones have been implemented.</li> </ul> <p><b>E190-E2 (SW load 7.0) (*) (**)</b></p> <p>PERFORMANCE</p> <ul style="list-style-type: none"> <li>• Different performance data for landing in abnormal configuration</li> </ul> <p>AURAL WARNING INADVERT ANNUNCIATION</p> <ul style="list-style-type: none"> <li>• Inclusion of aural warning inadvertent annunciation</li> </ul> <p>DITCHING</p> <ul style="list-style-type: none"> <li>• Inclusion of the instruction to inhibit the aural warning via MCDU</li> </ul> <p>FORCED LANDING</p> <ul style="list-style-type: none"> <li>• Inclusion of the instruction to inhibit the aural warning</li> </ul> <p>PARTIAL OR GEAR UP LANDING</p> <ul style="list-style-type: none"> <li>• Inclusion of the instruction to inhibit the aural warning</li> </ul> <p>ENGINE AIRSTART ENVELOPE</p> <ul style="list-style-type: none"> <li>• Different engine airstart envelope</li> </ul> <p>UNRELIABLE AIRSPEED</p> <ul style="list-style-type: none"> <li>• Different unreliable airspeed tables</li> </ul> <p>DOOR EMER OPEN</p> <ul style="list-style-type: none"> <li>• Inclusion of the additional emergency OWE procedures</li> </ul> <p>AURAL WRN SYS OFF</p> <ul style="list-style-type: none"> <li>• Inclusion of aural wrn sys off procedure</li> </ul>	No	Yes	A	A
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<p>FROM BASE AIRCRAFT: E190 (NG-FMS)</p> <p>TO RELATED AIRCRAFT: E190-E2/E195-E2</p>	<p>MANEUVER</p>	<p>REMARKS</p>	<p>FLT CHAR</p>	<p>PROC CHNG</p>	<p>TRAINING</p>	<p>CHECKING</p>
		<p>BLEED 1 (2) OVERPRESS</p> <ul style="list-style-type: none"> <li>• Inclusion of a step to disengage AT</li> </ul> <p>FLT CTRL N-MODE FAIL</p> <ul style="list-style-type: none"> <li>• Removal of pitch and attitude indications check (load 7.0) (*)</li> </ul> <p>(*) E2 Primus EPIC Field Loadable Software System (Load 7.5) was the SW load used under the scope of the E-Jets-E2 OE. There is no differences training identified between SW load 7.0 and 7.5.</p> <p>(**) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.</p>				

This **Design differences table, from the ERJ 190-300 to the ERJ 190-400**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

FROM BASE AIRCRAFT: E190-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: E195-E2						
	DIMENSIONS	• Different Dimensions.	No	Yes	A	A
	MINIMUM TURNING RADIUS	• Different Minimum Turning Radius and runway width.	No	No	A	A
	LIMITATIONS WEIGHT	• Different Weights.	No	No	A	A
	LIMITATIONS CENTER OF GRAVITY	• Different Center of Gravity Envelopes.	No	No	A	A
	LIMITATIONS ENGINES	• Different Engine Models. • Different Takeoff Thrust Ratings.	No	No	A	A
	LIMITATIONS AUTOFLIGHT	• Different use height. (*) (*) E190-E2 Pre-Mod SB 27-0002	No	No	A	A
	PERFORMANCE	• Overall performance is different, including different range/endurance capability, noise levels and takeoff/landing field length requirements.	No	No	A	A

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 24 ELECTRICAL POWER	AC/DC BUSES LOAD DISTRIBUTION  • Different load distribution among the AC/DC busses.	No	No	A	A
	ATA 25 EQUIPEMENT/FURNISHING	INDICATION  • Status synoptic page.  • Additional Overwing emergency exit indication implemented.	No	No	A	A
	ATA 25 EQUIPEMENT/FURNISHING	GENERAL  • Addition of one overwing emergency exit (two per side).  • Dual lane overwing exit escape slide implemented.  • Maximum passenger cabin configuration increased.  • Different emergency equipment location.	No	No	A	A
	ATA 26 FIRE PROTECTION	SMOKE DETECTION  • Smoke detectors quantity by cargo compartment modified to FWD 4 / AFT 4.	No	No	A	A

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 INSTRUMENTS	<p>GENERAL</p> <ul style="list-style-type: none"> <li>• Honeywell Primus EPIC II Basic FMS NG flight deck (load sw version 7.0). (*) (**)</li> <li>(*) E2 Primus EPIC Field Loadable Software System (Load 7.5) was the SW load used under the scope of the E-Jets-E2 OE. There is no differences training identified between SW load 7.0 and 7.5.</li> <li>(**) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.</li> <li>• Aural warning system inhibition feature.</li> <li>• Introduction of the aural warning “PFD MISCOMPARE, PFD MISCOMPARE”.</li> <li>• Introduction of detection of generic failure in IRS by FCC.</li> </ul>	No	No	A	A
	ATA 31 INSTRUMENTS	<p>CAS MESSAGES</p> <ul style="list-style-type: none"> <li>• Addition and removal of some CAS messages.</li> <li>some CAS messages</li> <li>• New CAS message GPS NOT AVAIL.</li> <li>• New CAS AURAL WRN SYS OFF.</li> <li>• Removal of HYD 3 VLV FAIL.</li> </ul>	No	No	A	A

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 32 LANDING GEAR	MAIN LANDING GEAR TIRES  • Different main landing gear tire pressure.	No	No	A	A
	ATA 34 NAVIGATION	GENERAL  • Honeywell Primus EPIC II Basic FMS NG flight deck (load sw version 7.0) (*) (**)  (*) E2 Primus EPIC Field Loadable Software System (Load 7.5) was the SW load used under the scope of the E-Jets-E2 OE. There is no differences training identified between SW load 7.0 and 7.5.  (**) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.  • FMS to use magnetic heading for a hold on a database waypoint.  • New CAS message GPS NOT AVAIL	No	No	A	A
	ATA 50 CARGO	GENERAL  • Cargo compartment different volume and weight capacity.	No	No	A	A
	ATA 52 DOOR	• Addition of one overwing emergency exit (two per side).	No	No	A	A

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 53 FUSELAGE	<ul style="list-style-type: none"> <li>• Stretched fuselage.</li> <li>• Antennas repositioning.</li> </ul>	No	No	A	A
	ATA 57 WINGS	<ul style="list-style-type: none"> <li>• Different raked wing tip format.</li> </ul>	No	No	A	A
	ATA 72 ENGINE GENERAL	GENERAL <ul style="list-style-type: none"> <li>• Different Engine Models.</li> <li>• Different Takeoff Thrust Ratings.</li> </ul>	No	No	A	A

This **Maneuver differences table, from the ERJ 190-300 to the ERJ 190-400**, was proposed by Embraer S.A. and validated by TCCA. It lists the minimum differences levels operators must use to conduct differences training and checking of flight crew members.

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	EMERGENCY, ABNORMAL PROCEDURES	PERFORMANCE • Different performance data for landing in abnormal configuration.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	DITCHING • Inclusion of the instruction to inhibit the aural warning via MCDU.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	FORCED LANDING • Inclusion of the instruction to inhibit the aural warning.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	PARTIAL OR GEAR UP LANDING • Inclusion of the instruction to inhibit the aural warning.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	ENGINE AIRSTART ENVELOPE • Different engine airstart envelope (*) (*) E190-E2 Pre-Mod FADEC software version 9.5.6	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	UNRELIABLE AIRSPEED • Different unreliable airspeed tables.	No	Yes	A	A

FROM BASE AIRCRAFT: E190-E2  TO RELATED AIRCRAFT: E195-E2	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	EMERGENCY, ABNORMAL PROCEDURES	DOOR EMER OPEN  • Inclusion of the additional emergency OWE procedures.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	BLEED 1 (2) OVERPRESS  • Inclusion of a step to disengage AT.	No	Yes	A	A
	EMERGENCY, ABNORMAL PROCEDURES	FLT CTRL N-MODE FAIL  • Removal of pitch and attitude indications check (load 7.0). (*) (**)  (* ) E2 Primus EPIC Field Loadable Software System (Load 7.5) was the SW load used under the scope of the E-Jets- E2 OE. There is no differences training identified between SW load 7.0 and 7.5.  (**) Differences training assessment was not evaluated under the scope of OEs but was accepted by analysis based on the ANAC OE report findings.	No	Yes	A	A



## **Appendix 4 – E190-E2 Initial training**

Training program outline, detailed ground and flight training schedule and detailed initial training syllabus.

### **General description**

The Embraer E-Jets-E2 aircrafts are the second generation of the E-Jets-E1 and encompass E190-E2 and E195-E2 aircraft models. As the E-Jets-E1 aircraft series, the E-Jets-E2 aircraft series are Transport Category airplanes of conventional layout (two wing-mounted engines, tricycle type landing gear, conventional tail design). The E190-E2 is a variant of the E190. In turn, the E195-E2 are variant of the E190-E2.

### **NOTE**

The following E190-E2 initial training program outline, detailed ground and flight training schedule and detailed initial training syllabus was presented by Embraer S.A and evaluated by the OEB team during the OE.

### **Training program outline**

An operator shall ensure that candidates receive both ground and FFS training as per the following course outline. These represent the minimum acceptable training requirements. An operator should not present a training program with less than the required curriculum content and timing identified in this appendix.

## Ground training outline

<b>Ground training</b>	<b>Hours</b>
General operational subjects <ul style="list-style-type: none"> <li><input type="checkbox"/> Operational publications</li> <li><input type="checkbox"/> Flight planning performance</li> <li><input type="checkbox"/> Performance</li> <li><input type="checkbox"/> Weight &amp; balance</li> <li><input type="checkbox"/> Windshear</li> <li><input type="checkbox"/> Stall recognition and recovery</li> <li><input type="checkbox"/> CRM</li> </ul>	8.0
Aircraft systems <ul style="list-style-type: none"> <li><input type="checkbox"/> Systems</li> <li><input type="checkbox"/> Lab</li> </ul>	56.0
<b>Instructor-Led Training (ILT)</b>	<b>64.0</b>
<b>Cockpit procedures training</b>	<b>12.0</b>
<b>Ground training hours</b>	<b>76.0</b>
<b>Written exam</b>	<b>3.0 (*)</b>

(\*) Time indicated not included in the 76 hours Total.

## Flight training outline

<b>Flight training (as a crew)</b>					
<b>Module</b>	<b>Authority</b>	<b>Minimum device</b>	<b>PF (Hours)</b>	<b>PM (Hours)</b>	<b>Total time (Hours)</b>
<b>FTD (*)</b>	TCCA	FFS (C or D) (*)	2.0	2.0	4.0 (**)
<b>1</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>2</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>3</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>4</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>5</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>6</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>7</b>	TCCA	FFS (C or D)	2.0	2.0	4.0 (**)
<b>Flight training hours</b>			<b>16.0</b>	<b>16.0</b>	<b>32.0 (**)</b>

(\*) The FTD session must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher

(\*\*) FFS time does not include time for briefing/de-briefing

### NOTES

1. Simulator session training hours represents the required times for each flight crew.
2. Flight crew checking times are in addition to the training hours allotted.
3. During the OE, the authority conducted the Flight training using an Interim Level C FFS.

**Detailed ground and flight training schedule**

<b>Training day</b>	<b>Training module</b>	<b>Subject order</b>	<b>PPT</b>	<b>Subject time (hours)</b>
Day 1	Admin	In-Brief		0.5 (*) (**)
	Admin	Authority Break		0.5 (*) (**)
	Admin	Welcome/Introduction		0.5
	GOS	Approved Manuals	PUBS MEL	1.5
	SYS	Aircraft General - Emergency Equipment - EDS	AGO AGO - EDS EE	5
Day 2	SYS	Lighting	LTS	1
	SYS	Master Warning - TCAS - EGPWS	MWS	1
	SYS	Electrical	ELE	3
	SYS	Fuel	FUL	1
	SYS	APU	APU	1
Day 3	SYS	Powerplant	PPT	4
	SYS	Fire Protection	Fire	2
	SYS	Hydraulics - Part 1	HYD	1
Day 4	SYS	Hydraulics - Part 2	HYD	1

	SYS	Landing Gear & Brakes	LGR	2
	SYS	Flight Controls	FCN	4
Day 5	SYS	Pneumatics & AC	PNE-AIR	2
	SYS	Pressurization	PRS	1
	SYS	Oxygen	OXY	1
	SYS	Flight Instruments - Display Management	FI FI - DMGT	2.5
	SYS	Weather Radar	RDR	0.5
Day 6	GOS	Windshear	MWS-WSR	1
	SYS	Autoflight	AFCS	2
	SYS	FMS	FMS	2.5
	SYS	Anti-Ice & Rain Protection	ICE	2
Day 7	SYS	Communications	COM	1
	SYS	Navigation	NAV	1
	SYS	VNAV	VNAV	2
	SYS	FMS Lab #1		2
	GOS	Weight & Balance	WB	1
Day 8	GOS	Performance	PER	1.5
	GOS	Flight Planning	FPLN	1
	GOS	CRM/TEM	CRM/TEM	1
	SYS	FMS Lab #2		2.5

Day 9	SYS	Walkaround		1
	SYS	FMS Lab #3		5
Day 10	SYS	Stall	MWS-STALL	1
	SYS	System Review	SR	1.5
	Admin	Exam		3 (**)
Day 11	SIT	CPT - Normal Procedures		4
Day 12	SIT	CPT - Normal Procedures		4
Day 13	SIT	CPT - Emergency Procedures		4
Day 14	FTD			4 (***)
Day 15	FFS 1			4 (***)
Day 16	FFS 2			4 (***)
Day 17	FFS 3			4 (***)
Day 18	FFS 4			4 (***)
Day 19	FFS 5			4 (***)
Day 20	FFS Waiver			4 (***)
Day 21	FFS 6			4 (***)
Day 22	FFS 7			4 (***)
Day 23	OE T5(*)/PPC			4 (***)

(\*) OE purposes only.

(\*\*) Time indicated not included in the 76 hours Total.

(\*\*\*) FFS time does not include time for briefing/de-briefing.

## Detailed training syllabus

### Ground Training – ILT

#### Instructor-Led Training (ILT)

##### A. Aircraft General

- Airplane Basic Data
- Cockpit General
- Electronic Display System (EDS)
- Passenger Cabin
- Cabin Management System (CMS)
- Lighting
- Doors
- Escape Slides
- Cockpit Door
- Cabin Surveillance System (CSS)
- Water and Waste
- Cargo Compartment
- External Preflight Inspection
- Emergency Equipment

##### B. Warning System

- Visual Warnings
- Aural Warnings
- Takeoff Configuration
- Stall Protection

- Enhanced Ground Proximity Warning System (EGPWS)
- Windshear Detection and Escape
- Runway Awareness and Advisory System (RAAS) (if applicable)
- Traffic Collision Avoidance System (TCAS)

**C. Electrical**

- AC System
- DC System
- Power Generation, Distribution and Control
- Circuit Breakers
- Electrical Loads Distribution
- Electrical Configurations

**D. Auxiliary Power Unit (APU)**

- Operational envelope
- APU & Fuel control panels
- Fuel Supply
- APU Bleed
- APU Operation

**E. Fuel**

- Fuel & APU control panels
- Fuel Indications
- Fuel Tanks (Wings and center tank)
- On-Board Inert Gas Generation System
- Fuel Pumps and valves



- Fuel Crossfeed
- Engine Fuel Shutoff Valve
- Fuel Low Level
- Refueling and Defueling

#### **F. Engine**

- Engine architecture
- Ignition architecture
- Normal and abnormal engine operation including start cycle
- Engine Indications
- Engine Fuel System
- Lubrication System
- Thrust Reverser
- Engine Control System

#### **G. Fire Protection**

- Engine Fire Protection System
- APU Fire Protection System
- Cargo Compartment Fire Protection
- Electronic Bays Smoke Detection System
- Cabin Smoke Detection (if applicable)
- Lavatory Fire Protection

#### **H. Hydraulic**

- Hydraulic system architecture
- Hydraulic System 1

- Hydraulic System 2
- Hydraulic System 3
- Main components: Pumps, Valves, Reservoirs and Accumulators

#### **I. Landing Gear and Brakes**

- Landing Gear & Brakes system architecture
- Landing Gear doors
- Air-Ground Positioning System
- Landing Gear Operation
- Landing Gear Aural Warning
- Brakes Components and Protections
- Autobrake
- Nosewheel Steering System
- Minimum Turning Radius

#### **J. Flight Controls**

- Flight-By-Wire architecture, description and components
- Control laws and envelope protection
- Normal and Direct modes
- Primary and secondary flight control surfaces
- Flight Controls Indications
- Flight Controls and Trim control panels

#### **K. Air Management System (AMS)**

- Pneumatic System
- Environmental Control System

Cabin Pressure Control System

Air Preparation System

**L. Oxygen**

Flight Crew Oxygen System

Passenger Oxygen

**M. Ice and Rain Protection**

Ice and Rain Controls including Ice speed reset function

Ice Detection

Wing Protection

Engine Protection

ADS Probes Protection

Windshield Protection

**N. Avionics**

Flight Instruments and Air Data System

Communication System

Navigation System and Sensors

Weather Radar

Lightning Sensor System (if applicable)

Flight Management System (FMS)

**O. Automatic Flight**

Flight Guidance Control System

Flight Director Modes

Autopilot system architecture

ILS Approach

Autothrottle

### **Systems Integration – Systems / FMS Lab sessions**

Systems Integration provides the pilot with instruction on aircraft systems interrelationships with respect to normal and abnormal operation and indications.

Modules are normally conducted using various media for presentation, and training will be conducted using the DTS or an equivalent device.

Subject matter will be integrated into lessons concerning control panels operation, checklist usage, PF/ PM duties and systems/ FMS related interactive exercises.

Furthermore, before the FSTD module, pilots are recommended to be trained to carry-out the ground procedures according to the SOPM manual, as in the sequence that follows:

- Power-Up Procedure
- Before Start Procedure
- FMS Preparation and Operation
- Engine Start
- Engine Shutdown
- Power-Down Procedure

**NOTE:**

Depending on pilot's progress, FMS and system integration ff exercises may even be applied on a simulated flight scenario (complete flight profile).

### **Written Exam**

## Ground Training - CPT

### Systems Integration – CPT sessions

#### CPT Nº 1

- Internal Safety Inspection
- Power-Up Procedure
- Before Start Procedure
- Normal engine start
- After Start Procedure
- Before Takeoff Procedure
- Normal takeoff
- After Takeoff Checklist
- Climb
- Cruise
- Approach preparation
- Descent
- ILS Approach
- Before Landing Checklist
- Landing
- After landing sequence
- Shutdown Procedure
- Leaving the Airplane Procedure

#### CPT Nº 2

- Internal Safety Inspection/ Power-Up

- Before Start Procedure
- Normal engine start
- After Start Procedure
- Before Takeoff Procedure - NO TAKEOFF CONFIG (Demo)
- Normal takeoff
- After Takeoff Checklist
- Climb
- Cruise
- Approach preparation
- Descent
- Non-precision Approach
- Before Landing Checklist
- Go-Around Procedure
- Landing
- After landing sequence
- Shutdown/ Leaving the Airplane Procedure

**CPT Nº 3**

- Before Start Procedure (aircraft already powered-up)
- Abnormal engine start
- After Start Procedure
- Before Takeoff Procedure
- Takeoff
- After Takeoff Checklist
- Climb

- Cruise
- System Abnormals - demo
- Approach preparation
- Descent
- Ice Condition
- ILS/ Non-precision Approach
- Before Landing Checklist
- Go-Around Procedure
- Landing
- After landing sequence
- Shutdown Procedure

## Flight training

### Flight Training

#### FTD MODULE (\*)

(\*) must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher

#### Preflight Procedures

- Performance Calculations
- Normal Procedures
- Normal Engine Start

#### Takeoff and Departure Phase

- Normal Takeoff
- Departure Procedures

#### Normal, Abnormal and Emergency Procedures

- Powerplant
- Air Management System
- Fuel
- Electrical
- Hydraulic
- Flight Control
- Ice and Rain Protection
- Automatic Flight
- Stall Warning / Avoidance Devices
- EGPWS, Weather Radar, Radio Altimeter and Transponder
- Flight Instruments and Air Data System



- Communication, Navigation and Flight Management System (FMS)
- Landing Gear and Brakes
- Auxiliary Power Unit (APU)

**Instrument Procedures**

- Arrival Procedures
- Precision Approach (AP ON)

**Landings and Approaches to Landings**

- Normal Approach and Landing

**Post Flight Procedures**

- After landing procedures
- Parking and Securing

Note: Simple failures of selected systems should be introduced and divided between the two pilots.

**FFS Module 1**

**Preflight Procedures**

- Normal Procedures
- Normal Engine Start

**Takeoff and Departure Phase**

- Normal takeoff and Climb
- Departure Procedures

**Inflight Maneuvers**

- Steep Turns
- Slow Flight
- Approach to Stall, Clean Configuration
- Approach to Stall, Takeoff or Approach Configuration
- Approach to Stall, Landing Configuration
- Recovery from Unusual Attitudes (Low / High Altitudes)
- Flight Characteristics (Direct Mode)
- Flight Maneuvers (turns, climbs, descents)
- Low Altitude Slow Flight & Green Dot
- Stall Training
- Overspeed Protection Demonstration

**Instrument Procedures**

- Arrival Procedures
- Precision Approach
- Missed Approach
- Precision Approach (AP OFF)

**Landings and Approaches to Landings**

- Normal Approach and Landing

**Normal, Abnormal and Emergency Procedures**

- Stall Warning / Avoidance Devices
- Automatic Flight
- Electronic Display System

**Post Flight Procedures**

- After landing procedures

Parking and Securing

## **FFS Module 2**

### **Preflight Procedures**

- Normal Procedures
- Abnormal Engine Start

### **Takeoff and Departure Phase**

- Rejected Takeoff
- Crosswind Takeoff
- Departure Procedure

### **Inflight Maneuvers**

- TCAS Resolution Advisory
- Engine failure (shutdown / restart)

### **Instrument Procedures**

- Arrival Procedures
- Holding
- Non-Precision Approach
- Missed Approach
- Precision Approach
- Precision Approach with One Engine Inoperative

### **Landings and Approaches to Landings**

- Normal Approach and Landing
- Crosswind Landing

- Approach and Landing with One Engine Inoperative

### **Normal and Abnormal Procedures**

- Powerplant
- Fuel
- Hydraulic
- Landing Gear

### **Postflight Procedures**

- After landing procedures
- Parking and Securing

## **FFS Module 3**

### **Preflight Procedures**

- Normal Procedures
- Abnormal Engine Start

### **Takeoff and Departure Phase**

- Rejected Takeoff
- Engine Failure at or above  $V_1$
- Departure Procedures

### **Inflight Maneuvers**

- Engine failure (shutdown)

### **Instrument Procedures**

- Arrival Procedures
- Non-Precision Approach (AP OFF)

- Precision Approach with One Engine Inoperative
- Missed Approach with One Engine Inoperative
- Precision Approach with One Engine Inoperative (AP OFF)

**Landings and Approaches to Landings**

- Normal Approach and Landing
- Crosswind Landing
- Landings with One Engine Inoperative

**Normal, Abnormal and Emergency Procedures**

- Powerplant
- Hydraulic
- EGPWS
- Air Data System
- Fire Protection (in flight and on the ground)
- Smoke
- Pressurization System
- Emergency Descent (Maximum Rate)
- Emergency Evacuation
- Automatic Flight
- Communication

**Postflight Procedures**

- After landing procedures
- Parking and Securing

**FFS Module 4**

**Preflight Procedures**

- Normal Procedures
- Normal Engine Start

**Takeoff and Departure Phase**

- Normal Takeoff
- Performance Limited Takeoff
- Contaminated Runway Takeoff
- Crosswind Takeoff
- Departure Procedures

**Inflight Maneuvers**

- Steep Turns
- High Altitude Stall
- Engine failure (shutdown / restart)
- Driftdown

**Instrument Procedures**

- Arrival Procedures
- Non-Precision Approach
- Missed Approach (Windshear)
- Precision Approach
- Circling Approach

**Landings and Approaches to Landings**

- Crosswind Landing
- No Flap / Nonstandard Flap Approach and Landing

- Performance Limited Landing
- Contaminated Runway Landing
- Low Energy Awareness
- Go-around / Rejected Landing

**Normal, Abnormal and Emergency Procedures**

- Powerplant
- Flight Controls
- Electrical
- Electronic Display System

**Postflight Procedures**

- After landing procedures
- Parking and Securing

**FFS Module 5**

**Preflight Procedures**

- Normal Procedures
- Abnormal Engine Start
- Single Engine Taxi

**Takeoff and Departure Phase**

- Rejected Takeoff
- Low Visibility Takeoff
- Engine Failure at or above  $V_1$  (Speed Decay Demonstration and Recovery (\*))

(\*) The engine failure for the Speed decay scenario on Takeoff must occur just after the ASEL is captured.

- Departure Procedures
- Windshear

### **Inflight Maneuvers**

- Engine failure (shutdown / restart)
- Approach to Stall, Clean Configuration
- Approach to Stall, Takeoff or Approach Configuration
- Approach to Stall, Landing Configuration

### **Instrument Procedures**

- Arrival Procedures
- Non-Precision Approach with One Engine Inoperative
- Missed Approach with One Engine Inoperative (Speed Decay Recovery (\*))

(\*) The engine failure for the Speed decay scenario on Missed Approached must occur just after the ASEL is captured.

- Precision Approach with One Engine Inoperative (AP OFF)
- Visual Approach

### **Landings and Approaches to Landings**

- Crosswind Landing
- Landing with One Engine Inoperative
- Windshear

### **Normal, Abnormal and Emergency Procedures**

- Powerplant
- Electronic Display Unit



- Automatic Flight
- Fire Protection (in flight and on the ground)
- Smoke
- Emergency Evacuation
- Windshear Prevention / Recovery

**Postflight Procedures**

- After landing procedures
- Parking and Securing

**FFS Module 6**

a)

**Preflight Procedures**

- Cold Weather Operation
- Normal Engine Start

**Takeoff and Departures Phase**

- Normal Takeoff
- Noise Abatement Takeoff
- Crosswind Takeoff

**Inflight Maneuvers**

- CFIT Avoidance Training (VMC and IMC conditions)
- EGPWS Warning Corrective Maneuver

**Instrument Procedures**

- Arrival Procedures
- Holding

- Precision Approach
- Non-Precision Approach
- Missed Approach

**Landings and Approaches to Landings**

- Normal Landing
- Crosswind Landing

**Normal, Abnormal and Emergency Procedures**

- Pilot Incapacitation
- Ice Conditions
- Ice and Rain Protection

**Postflight Procedures**

- After landing procedures
- Parking and Securing

**FFS Module 7**

b)

**Preflight Procedures**

- Normal Procedures
- Abnormal Engine Start

**Takeoff and Departures Phase**

- Normal Takeoff
- Crosswind takeoff
- Crosswind Takeoff (Max Demonstrated)

- Rejected Takeoff
- Contaminated Runway Takeoff
- Engine Failure at or above V<sub>1</sub>
- Departure Procedures

**Inflight Maneuvers**

- Approach to Stall, Clean Configuration
- Approach to Stall, Takeoff or Approach Configuration
- Approach to Stall, Landing Configuration

**Instrument Procedures**

- Visual Training
- Visual Approach
- Precision Approach
- Precision Approach with One Engine Inoperative.
- Non-Precision Approach
- Missed Approach
- Missed Approach with One Engine Inoperative

**Landings and Approaches to Landings**

- Normal Landing
- Visual Approach and Landing
- No visual aids Approach and Landings
- Crosswind Landing
- Crosswind Landing (Max Demonstrated)
- Contaminated Runway Landing
- Landing with One Engine Inoperative
- No Flap / Nonstandard Flap Approach and Landing

**Normal, Abnormal and Emergency Procedures**

- Powerplant
- Flight Controls
- Automatic Flight
- Flight Instruments and Navigation
- Smoke
- Emergency Evacuation

**Postflight Procedures**

- After landing procedures
- Parking and Securing

Note: Non-Precision Approaches (NPA) **must** be flown using Stabilized Constant Descent Angle (SCDA) vertical path control technic.

**Pilot Checking (CARs 705 PPC or CARs 604 CC)**

## **Appendix 5 – Differences between E190 and E190-E2**

Training program outline, detailed ground and flight training schedule and detailed training syllabus

### **General description**

As an Embraer E-Jets-E2 aircraft series, the E190-E2 is a variant of the E190. As the E-Jets-E1 aircraft, the E-Jets-E2 are Transport Category airplanes of conventional layout (two wing-mounted engines, tricycle type landing gear, conventional tail design).

Refer to the Appendix 3 – Difference Tables (DT) of this report for a detailed list of the differences between the E190 and the E190-E2.

### **NOTE**

The following E190 to E190-E2 differences training program curriculum outline, detailed Ground and Flight training schedule and detailed differences training syllabus was presented by Embraer S.A and evaluated by the OEB team during the OE.

### **Training program outline**

An operator shall ensure that candidates receive both ground and FFS training as per the following course outline. These represent the minimum acceptable training requirements. An operator should not present a training program with less than the required curriculum content and timing identified in this appendix.

### **NOTES**

1. The E-Jets-E2 – Speed decay special training described in section 9.6 of this report must be included in the E190 to E190-E2 differences training footprint.
2. Pilots who will undergo the E190 to E190-E2 differences training must be proficient on the NG FMS (FMS Load 27.1 or later for the E190) prior to starting on course.

## Ground training (GT) and flight training outline

Day 1	Day 2	Day 3	Day 4
GT 1 (6:00)	GT 2 (6:00)	FFS 1 (4:00)	FFS 2 (4:00)
<p><b>Notes:</b>            GT = Ground Training            FFS = Full Flight Simulator (*)            FFS time does not include time for flight briefing/de-briefing            The following operational publications should be referenced during training:</p> <ul style="list-style-type: none"> <li>• E190-E2 AOM</li> <li>• E-Jets-E2 SOPM</li> <li>• E190-E2 QRH</li> </ul> <p>(*) must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher</p>			

## Detailed ground and flight training schedule and training syllabus

### Curriculum outline

Day	Ground Training Schedule and Syllabus	Hours
1	<b>Welcome &amp; Admin</b> <b>E2 Overview &amp; Manuals</b> <ul style="list-style-type: none"> <li>• Differences Overview</li> </ul>	1.0
	<b>Aircraft General:</b> <ul style="list-style-type: none"> <li>• Flight Deck</li> <li>• Dimensions</li> <li>• Minimum Turning Radii</li> <li>• Limitations</li> <li>• Equipment &amp; Furnishings</li> <li>• Doors</li> </ul>	1.0
	<b>Flight Instruments</b> <ul style="list-style-type: none"> <li>• Aural Alerts</li> </ul>	1.0
	<b>Autoflight</b>	0.5
	<b>Electrical</b>	0.5
	<b>Landing Gear &amp; Brakes</b> <ul style="list-style-type: none"> <li>• Hydraulics</li> </ul>	0.5
	<b>Fuel</b>	0.5
	<b>Engine</b> <ul style="list-style-type: none"> <li>• Starter Limitations</li> <li>• Indications</li> <li>• Thrust Reversers</li> </ul>	0.7

	<b>APU</b>	0.3
2	<b>Flight Controls</b>	3.0
	<ul style="list-style-type: none"> <li>Hydraulics</li> </ul>	
	<b>Fire Protection</b>	0.5
	<b>Ice &amp; Rain Protection</b>	0.5
	<ul style="list-style-type: none"> <li>Ice Speed Reset</li> </ul>	
	<b>Navigation</b>	0.5
	<ul style="list-style-type: none"> <li>Optional Features</li> <li>Graphical Flight Planning (GFP) (Level B differences training) (*)</li> </ul> <p>(*) GFP is not TCCA certified.</p>	
<b>External Inspections</b>	0.5	
<ul style="list-style-type: none"> <li>Pictorial Preflight</li> </ul>		
	<b>Review</b>	0.5
	<b>Written Exam</b>	0.5
	<b>Ground Training Hours</b>	<b>12.0</b>



Day	Flight Training Schedule (*)	Hours Crew	
		PF	PM
3	Simulator Session #1	2.0	2.0
4	Simulator Session #2	2.0	2.0
<b>Flight Training Hours</b> (*) must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher		<b>4.0</b>	<b>4.0</b>
<b>Pilot Checking (CARs 705 PPC or CARs 604 CC)</b>			

**NOTES**

1. Simulator session training hours represents the required times for each flight crew.
2. Flight crew checking times are in addition to the training hours allotted.

## Flight Training syllabus

### Flight Training

(\*) must be trained in a no-motion Level C or D full flight simulator (FFS C-D no motion) – or higher

### FFS Module 1

#### Cold & Dark Aircraft Condition

• Perform Differences Training for Cockpit Familiarization including:

##### - Overhead Panel

- o APU Control Panel
- o Fuel Panel
- o Ice Protection Panel

##### - Glareshield Panel

- o Flight Guidance Panel Differences
  - FPA and VS (wheel)
  - NAV (formerly labeled V/L)
  - LNAV (formerly labeled NAV, placement changed)
  - Altitude selector (dual knobs)
  - BARO pre-select knobs, including STD
  - YD button—removed
  - AUTOPILOT (formerly labeled AP)
  - APPR (formerly labeled APP)

##### - Main Panel

- o 4 DUs versus 5 DUs and how the 4 DUs work

- o Reversionary Panel

**- Center Pedestal**

- o Flight Control Mode Panel
- o NG FMS - MCDU Screen Differences
- o CCD Differences
- o LG WRN / Ground Prox Inhibits Panel
- o Cabin Non Essential Panel
- o RAAS Inhibit Button

**- Lateral Panels**

- o PC Outlet Panel
- o iPad/EFB Holder

**Aircraft Power Up and Engine Start**

- Perform Differences Training for Establishing Power Including:

- **Normal Power-Up**

- o Display (DU) Review
    - o CCD, Multi-Functioning Windowing, Synoptics & Indications
    - o Manual DU Reversion

- Perform Differences Training for Engine start

- **Normal Engine Start**

- o Where is clock, chronograph now?
    - o Start #2 engine first (as if for Single Engine Taxi)
    - o During engine start – Discuss engine starter characteristics & limitations.

- Note the motoring times and delay in fuel introduction.

- Review Start Differences (variable N<sub>2</sub>, lower ITT, no roll-back)

- o Before starting Engine #1, release parking brake, see that #1 HYD ACMP starts automatically.

**Flight profile Teaching points (PF leg) for the first pilot);**

- Discuss the scheduled thrust feature during once TO/GA has been set.
- Note the change in TARGET N<sub>1</sub> during the TO roll.
- Note the 50' LNAV engagement & selected VNAV engagement altitudes.
- Demonstrate the different vertical modes and pushbuttons on the Guidance Panel including the FPA / VS wheel as well as the dual knobs for the Altitude Selector.
- Demonstrate the different horizontal modes and pushbuttons on the Guidance Panel including NAV (formerly labeled V/L) and LNAV (formerly labeled NAV).
- Review the differences with the pushbuttons on the Guidance Panel including the removal of the YD button, the Baro pre-select knobs (including STD), AUTOPILOT (formerly labeled AP), and APPR (formerly labeled APP).
- Demonstrate SA TERRAIN vs TOPOGRAPHY.
- Review normal DU functionality (50/50 versus 80/20, need for one EICAS and one PFD at all times.
- Monitor normal fuel system operation--CTR XFR on/off as wing quantity varies
- Execute the published missed approach

**Note:** Flight profile teaching points must be repeat for the second pilot.

**FFS Module 2**

**Cold & Dark Aircraft Condition**

- Review as necessary the differences information previously presented in the FTD, including:

- **Overhead Panel**

- o APU Control Panel
- o Fuel Panel
- o Ice Protection Panel

- **Glareshield Panel**

- o Flight Guidance Panel Differences
  - FPA and VS (wheel)
  - NAV (formerly labeled V/L)
  - LNAV (formerly labeled NAV, placement changed)
  - Altitude selector (dual knobs)
  - Baro pre-select knobs, including STD
  - YD button—removed
  - AUTOPILOT (formerly labeled AP)
  - APPR (formerly labeled APP)

- **Main Panel**

- o 4 DUs versus 5 DUs and how the 4 DUs work
- o Reversionary Panel

- **Center Pedestal**

- o Flight Control Mode Panel
- o NG FMS - MCDU Screen Differences
- o CCD Differences
- o LG WRN / Ground Prox Inhibits Panel
- o Cabin Non Essential Panel
- o RAAS Inhibit Button

- **Lateral Panels**

- o PC Outlet Panel
- o iPad/EFB Holder

### **Aircraft Power Up and Engine Start**

- Review Differences Training for Establishing Power Including:

**- Normal Power-Up**

o Review as necessary information previously presented in the FTD

• Perform Normal Engine Start

**- Normal Engine Start**

o Review as necessary information previously presented in the FTD

**Flight profile Teaching points (PF leg for the first pilot);**

• Review as necessary the Takeoff Differences information previously presented in the FTD

• Accomplish DU Failures

o First, fail DU 4 and discuss reversion

o Second, fail DU 2 and discuss reversion

o Third, discuss how to view a synoptic page with just DU 1 and 3 available.

o Fourth, fail DU 3 and discuss the requirement to have one PFD and one EICAS working in the cockpit at all times

• Remove all DU malfunctions, revert as needed to get all DUs back to normal.

o Review as necessary normal DU functionality (50/50 versus 80/20) previously presented in the FTD

• New Scenario – Point out relocated switches now on the pedestal:

o LG WARN INHIB, GND PROX TERR INHIB, GND PROX G/S INHIB, GND PROX FLAP OVRD (AOM 14-15-05 pg 4)

• FLT CTRL N-MODE FAIL malfunction (wait until stable at FL310)

o Wait for level stabilized flight conditions

o Forces DIRECT MODE

o Review FLIGHT CONTROL SYNOPTIC page (All Yellow)

ALL flight controls are now in Direct Mode

New lower  $V_{MO}$  in order to stay within the flight envelope

Remove Fail before completing the QRH – Reset N-MODE

- New Scenario – LOW SPEED WARNING (If time remaining)
  - o Demo the Low Speed aural alert
  - o Slow down to the top of the yellow band
  - o Engage A/T again or Manual Thrust and check speed increase
- Execute a go-around
- Set LG DOOR OPEN immediately after Go-around, when they select gear up.
- Max speed is 250 KIAS with a gear door open (QRH).
- Give the flight crew time to use CRM and work on a solution to the scenario
- Leave the gear door open for the remainder of the flight. Edit FMS

**Flight profile Teaching points (PF leg for Pilot 2);**

- Review as necessary the Takeoff Differences information previously presented in the FTD
- Accomplish FUEL CTR XFR FAIL malfunction
  - o QRH directs manual operation of XFR pumps
    - Note – Fuel in Kg equivalent to fuel range mentioned in the QRH is 1600 Kg to 2200 Kg. You can leave the FUEL TRANSFER Knob ON for the remainder of the Flight. Shortly before Destination you will have FUEL WING OVERFILL (2300 Kg). QRH procedure.
  - o Point out if pumps do not work, we would have “TRAPPED FUEL” which would have to be accounted for.
  - o Show where to enter trapped fuel in MCDU (PERF INDEX 2/2)
  - o Discuss possibility of Diversion with Trapped Fuel.
- The purpose of this scenario is to introduce the use of a Secondary Flight plan.
  - o Have the flight crew take their time and do not rush
  - o Have the flight crew write down their new clearance
  - o Demo the use of the Secondary Flight plan
- FLT CTRL N-MODE FAIL malfunction (wait until stable at FL340)

- o Wait for level stabilized flight conditions
- o Forces DIRECT MODE
- o Review FLIGHT CONTROL SYNOPTIC page (All Yellow)
  - ALL flight controls are now in Direct Mode
  - New lower  $V_{MO}$  in order to stay within the flight envelope
  - Remove Fail before completing the QRH – Reset N-MODE
- New Scenario – LOW SPEED WARNING (If NOT previously done proceed with next scenario)
  - o Demo the Low Speed aural alert
  - o Slow down to the top of the yellow band
  - o Engage A/T again or Manual Thrust and check speed increase
- New Scenario – Fly OFFSET R 10 Nm with 20° angle,
  - o Demo RTE pg 1 insert and show details on page.
- New Scenario – IDG 2 OIL (If time remaining)
  - o IDG Selector OFF, then Disconnect (new Status after Eng shutdown)
  - o APU Start at FL340 (new APU limitation FL390)
- New Scenario due to – IDG 2 OIL, after engine shutdown
  - o Check New Status message IDG 2 DISC CMD (K1 coded)

**Pilot Checking (CARs 705 PPC or CARs 604 CC)**



## Appendix 6 – Differences between E190-E2 and E195-E2

Training program outline, detailed ground training schedule and detailed training syllabus.

### General description

As an Embraer E-Jets-E2 aircraft series, the E195-E2 is a variant of the E190-E2.

In summary, the main differences between the E190-E2 and the E195-E2 are:

- Lengthened fuselage with the necessary system design adjustments;
- Center fuselage due to the necessary adjustments to the lengthened fuselage;
- Increased passenger capacity (up to 146 passengers in high-density single-class arrangement);
- Two pairs of overwing emergency exits; and
- Wingtip Extension.

Refer to the Appendix 3 – Difference Tables (DT) of this report for a detailed list of the differences between the E190-E2 and the E195-E2.

### NOTE

The E190-E2 to E195-E2 differences training program outline, detailed ground training schedule and detailed differences training syllabus found in Embraer Report 196MSO1028 Rev C was presented by Embraer S.A and evaluated by the OEB team during the OE.

### Summary of the training program

An operator shall ensure that candidates receive the ground training as per the following course outline. These represent the minimum acceptable training requirements. An operator should not present a training program with less than the required curriculum content and timing identified in this appendix.

Day	Ground Training Outline – Schedule - Syllabus
1	Level A Differences training (*) (*) As per Embraer Report 196MSO1028 Rev C
<b>Pilot Checking (CARs 705 PPC or CARs 604 CC)</b>	

## Appendix 7 – Transition Line Indoctrination (TLI)

Under an approved Transition/MFF program(s), Transition Line Indoctrination (TLI) must be accomplished in accordance with the table below for flight crews flying the variants listed.

**Transition Line Indoctrination (TLI) table**

To Related Aircraft ↓	From Base Aircraft →	ERJ 170-100	ERJ 170-200	ERJ 190-100	ERJ 190-300	ERJ 190-400
ERJ 170-100		Not applicable	Not required (2)	Not required (2)	Not evaluated	Not evaluated
ERJ 170-200		Not required (2)	Not applicable	Not required (2)	Not evaluated	Not evaluated
ERJ 190-100		Not required (2)	Not required (2)	Not applicable	Not evaluated	Not evaluated
ERJ 190-300		Not evaluated	Not evaluated	4 (1)	Not applicable	Not required (2)
ERJ 190-400		Not evaluated	Not evaluated	Not evaluated	Not required (2)	Not applicable

(1) 4 = minimum of 4 flight segments (sectors).

(2) Line indoctrination on one variant validates experience on the other variants within the series provided differences between the variants are addressed during line indoctrination.

### NOTES

1. Pilots transitioning between any E-Jets variants (e.g., ERJ 170-100 and ERJ 170-200, ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/-200 to ERJ 190-300/-400, ERJ 190-100 to ERJ 190-300/-400) or conducting Mixed Fleet Flying (MFF) with different E-Jets variants (e.g. ERJ 170-100/200 and ERJ 190-100, ERJ 170-100/200 and ERJ 190-300/400, ERJ 190-100 and ERJ 190-300/400) require exemptions to specific provisions

of CAR 705.106, CASS 725.106 and CAR 705.113. This appendix provides the transition credits between the E-Jets series. Appendices 2 and 3 provide the training and checking credits between the E-Jets aircraft series. TCCA Policy Letter AARX No. 173, Original issue, dated July 25, 2005 (RDIMS # 1040396) provide guidance on Flight Crew Member Qualification Credits for Transition Programs and Mixed Fleet Flying Programs

2. Line checks conducted in one variant should satisfy the requirements for all variants. If the operator's line operations (e.g., route structure, area of operation, ETOPS) of one variant is significantly different from another variant, then separate line checks should be conducted.