Civil Aviation Administration of China (CAAC)

Aircraft Evaluation Group (AEG)

Aircraft Evaluation Report

For

CRJ200/700/900

Rev.0 Date: 31/May/2012

Manufacturer: Bombardier

Revision Record & Approval

Revision No.	Section	Page No.	Date
Rev.0	All	All	31 May, 2012

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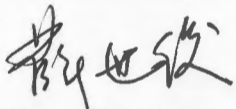

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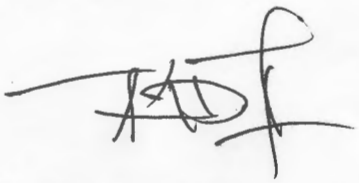

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Foreword

The Bombardier CRJ Series of aircraft evolved from the original Challenger 600 business jet and is listed on the same type certificate data sheet.

CL-600-2B19 is the first and smallest airplane in the CRJ Series, and was first type certificated by TCCA in July 31, 1992. The airplane is marketed as the CRJ200 or the business cabin version of the same aircraft as the Challenger 850. The CRJ200 was validated by CAAC in September 30, 2000.

CL-600-2C10 was type certificated by TCCA in December 22, 2000. The airplane is marketed as the CRJ700 (also marketed as CRJ701, 702 to identify the number of passenger seats) or the business cabin version of the same aircraft as the Challenger 870. The CRJ700 was validated by CAAC in October 21, 2003.

CL-600-2D24 was type certificated by TCCA in September 9, 2002. The airplane is marketed as the CRJ900 or in a business cabin configuration as the Challenger 890. The CRJ900 was in the process of validation by CAAC Airworthiness Department when this report is finalized.

The model CRJ200 and CRJ700 aircraft has been operated by Chinese operator since October 2000 and October 2003 respectively. At the time, CAAC had not set up the function of Aircraft Evaluation Group (AEG), and when CAAC AEG started the evaluation to import type of aircraft in July 2009, these aircraft were considered grandfathered by CAAC AEG evaluation.

CRJ900 was evaluated by CAAC AEG in April 2012, and as it shares the same pilot type rating and most of the technical publications with CRJ series aircraft, a catch-up evaluation for CRJ series aircraft also involved.

Note: *For catch-up evaluation, CAAC AEG will based on the exist status of the involved grandfathered aircraft, and only considered the new variants or modifications and effected factors associate with the grandfathered type aircraft.*

Section 1: Pilot Type Rating and Qualification Specification

1.1 Statement and Explanation

For CRJ200 and CRJ700 airplane, while they are considered as grandfathered aircraft types for CAAC AEG evaluation, they shares the same type rating and TCCA OEB report with CRJ900, a Flight Standardization Board (FSB) catch-up evaluation for the pilot type rating and qualification specification has been conducted by CAAC AEG based on TCCA Operational Evaluation Board (OEB) Report which specifies the pilot type rating, training, checking, and currency specifications for the flight crews of Bombardier CRJ series.

Hereby, the provisions in this section can be used, as the basis, by Chinese operators to develop their pilot qualification and training program for above airplane.

Alternate means of compliance to the requirements of CCAR 61, 91, 121, other than as specified in the provisions of this section, must be approved by Flight Standards Department of CAAC. If alternate compliance is sought, operators will be required to establish that proposed alternate means provide an equivalent level of safety to the provisions of this section, and analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

Find TCCA OEB Report here:

http://www.tc.gc.ca/eng/civilaviation/standards/commerce-OEB-Reports-3632.htm

1.2 Pilot Type Rating and Licence Endorsement

Upon the FSB evaluation, the Pilot Type Rating for CRJ series is listed as following:

Manufacturer	Aircraft Type	Pilot Type Rating
Bombardier	CL-600-2B19(CRJ200)	CL-65
	CL-600-2C10(CRJ700)	
	CL-600-2D24(CRJ900)	

License endorsement:
"CL-65" for getting a type rating from CRJ200, CRJ700 and CRJ900, Checking records should also be shown for the specific airplane type.

1.3 ODR and MDR

Operator Difference Requirement (ODR) and Master Difference Requirement (MDR) tables of CRJ200, CRJ700 and CRJ900 have been given by TCCA OEB Report.

1.4 Specification for Training

The following Type Rating Training Course proposed by Bombardier for CRJ series is as following, and has to be considered as a minimum:

- Transition Course: Long Core Curriculum in CRJ700/900 Training Control Manual (Chapter One, Section 1) of Bombardier Aerospace Training Centre

- Difference Course: CL-65 Difference Training in the Training Control Manual (Chapter three, Section 2) of Bombardier Aerospace Training Centre

Note 1: If the Pilot takes difference course from CRJ200 to CRJ700/900, he must have completed all items of the EICAS 2000 training, unless these items were covered during initial training.
Note 2: Since only level a training differences defined between CRJ700 and CRJ900, there is no special request for CRJ700 and CRJ900 differences training.
Note 3: Training courses are available by request to Bombardier.

The following areas should receive special emphasis in CL-65 pilot type rating training:

<u>Systems Integration Training</u>

- Flight Control Panel (FCP)
- Flight Mode Annunciator (FMA)

- FADEC if applicable
- FMS (an expanded training footprint should be considered for pilots without previous FMS experience)
- Engine (or thrust) Mode Annunciator

Flight Training - Full Flight Simulator

- Aileron PCU Runaway
- Dual Hydraulic System Malfunctions (System 1 or 2 and 3)
- Air Driven Generator (ADG) Deployment
- Dutch Roll (with and without both yaw dampers operative
- High Altitude / Slow Speed
- 10,000 feet / Landing Configuration
- ILS Approach on Standby Instruments;
- Landing with Ground Lift Dumpers (GLD) not deployed
- Aircraft performance in low energy go-around situations
- Circling approach and manoeuvring at night
- Effects of wing leading edge contamination
- Inadvertent thrust reverser deployment
- Windshear
- GPS (if applicable)
- TCAS

Special Event Training

- Following training should be conducted to improve basic crew understanding and confidence regarding aircraft handling qualities, options and procedures as these relate to design characteristics and limitations:
  - Recovery from unusual attitudes
  - Handling qualities and procedures during recovery from an upset condition (e.g., wake vortex encounter)
  - Operation of aircraft in icing environments including super cooled liquid droplet (SLD) events
  - Low Energy Awareness Training
  - High Altitude Stall Recovery
  - Engine Failure/Malfunction Recognition Training
  - Flight Deck Admission Control Training
- Special Event Training Specific to CRJ200
  - Airworthiness Directive CF-2008-15R1 applicable to the CL-600-2B19 requires specific pilot training in cold weather and icing conditions. (This training is available on line at http://batraining.com under the heading of Take-off Safety Information).

1.5 Specification for Checking

As required by CCAR Part 61 and 121 when initial qualification on the CRJ200, CRJ700 or CRJ900.

Following difference training between CRJ200 and CRJ700/900, checking on the differences as per the approved ODR tables should be required.

For mixed fleet flight of CRJ200 and CRJ700/900, a proficiency check that is conducted on any of the CRJ200 or CRJ700/900 will be valid for others, provided that the differences have been covered during the recurrent training as per the approved ODR tables, and should alternate between the CRJ200 and CRJ700/900.

Note: For the differences between CRJ700 and CRJ900, no practical test is required, and proficiency check may be conducted on either CRJ700 or CRJ900.

1.6 Specification for Currency

As required by CCAR Part 61 and 121, and currency is considered to be common for the CRJ200, CRJ700 and CRJ900.

1.7 Specification for Flight Simulation Training Devices

The close similarity of the CRJ700 and CRJ900 enables a single simulator cover all two aircraft.

When this report has been finalized, the Flight Simulation Training Devices qualified in accordance with CCAR Part 60 are available for CRJ200, CRJ700 and CRJ900.

Note: For detailed information of qualified Flight Simulation Training Devices, please reference to website http://123.127.67.21/Default.aspx, or contact to Transport Flight Standard Division of Flight Standards Department or National Simulator Team of CAAC.

Section 2: Master Minimum Equipment List

2.1 Statement and Explanation

For CRJ200 and CRJ700 airplane, while they are considered as grandfathered aircraft types for CAAC AEG evaluation, they shares the same Master Minimum Equipment List with CRJ900, Flight Operation Evaluation Board (FOEB) catch-up evaluation for Bombardier CRJ series airplane has been conducted by CAAC AEG based on the Bombardier CRJ series Master Minimum Equipment List approved by TCCA, which outlines the items of equipment that may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations.

Hereby, the MMEL and its future revisions approved by TCCA can be used, as the basis, by Chinese operators to develop their Minimum Equipment List (MEL) for above airplanes.

Find the TCCA MMEL here:

http://www.tc.gc.ca/eng/civilaviation/certification/projects-mmel-menu-1379.htm

Note: Since there is no clear identification for more restrictive revisions of MMEL items, the operators should incorporate each MMEL revision into MEL within 60 days as required by AC-121/135-49.

2.2 CAAC Supplemental

Not applicable.

Section 3: Maintenance Review Board Report

3.1 Statement and Explanation

For CRJ700 airplane, while it is considered as a grandfathered aircraft types for CAAC AEG evaluation, but as it shares the same Maintenance Review Board Report (MRBR) with CRJ900, Maintenance Review Board (MRB) catch-up evaluation for Bombardier CRJ700 and CRJ900 airplane has been conducted by CAAC AEG based on the Bombardier CRJ700 and CRJ900 Maintenance Review Board Report (Part1 of Maintenance Require Manual) approved by TCCA, which outlines the initial minimum maintenance requirements to be used in the development of an approved operator's maintenance program for the airframe, engines, systems and components.

Note: For CRJ200 airplane, Maintenance Review Board Report (MRBR) approved by TCCA is available in Bombardier website.

Hereby, the MRBR and its future revisions approved by TCCA can be used, as the basis, by Chinese operators to develop their maintenance program for above airplanes.

Note: Airworthiness Limitations (AWL) for CRJ700 and CRJ900 are included in the Part 2 of Maintenance Require Manual.

MRBR distribution:
By Bombardier website.

3.2 CAAC Supplemental

Not applicable.

Section 4: Operational and Continued Airworthiness Instructions

4.1 Statement and Explanation:

This section is the formal notification that CAAC AEG has conducted the evaluation of the operational and continued airworthiness instructions for Bombardier CRJ900 airplane based on the relevant policies and procedures of Bombardier.

Hereby, the Operational & Continued Airworthiness Instructions document listed in the attachment was found acceptable by CAAC AEG, and will give the necessary guidance for properly operating and maintaining the Bombardier CRJ900 airplane within the approved operating conditions and limitations.

This acceptance may not assure the accuracy and applicability of the content in each document, it is the aircraft owner's or operator's responsibility to report any defect or discrepancy in the documents to the aircraft manufacturer, or report to CAAC AEG website: http://aeg.caac.gov.cn/.

Operational & Continued Airworthiness Instructions distribution:
By Bombardier website, except engine manuals are distributed by engine manufacturer directly to operators and through their website.

4.2 List of Operational and Continued Airworthiness Instructions

Manual	Reference No.	Description	Revision/Date
FCOM	CSP A-013	Flight Crew Operating Manual	As revised
QRH	CSP C-022	Quick Reference Handbook	As revised
WBM	--	Weight & Balance Manual	As revised
CCOM	CSP C-013	Flight Crew Operating Manual	As revised
PRM	CRJ79_PRM_Vol1&2	Pilot Reference Manual	As revised
MPD	CSP B-136	Maintenance and Planning Document(CRJ700/705/900/1000)	As revised
AMM	CSP B-001	Aircraft Maintenance Manual	As revised
AIPC	CSP C-006	Aircraft Illustrated Parts Catalog	As revised
SSM	CSP C-004	System Schematic Manual	As revised
WM	CSP C-003	Wiring Manual	
ESPM	CSP BC-115	Electrical/Electronic Components-Standard Practices Manual	As revised
ITEM	CSP B-007	Illustrated Tool and Equipment Manual	As revised
FIM	CSP B-009	Fault Isolation Manual	As revised
NTM	CSP B-010	Nondestructive Testing Manual	As revised
SRM	CSP B-008	Structural Repair Manual	As revised
CMM	CSP ABCD-033	Component Maintenance Manual	As revised

Note 1: The acceptance of above manuals is not affected due to customization.

Note 2: The acceptance of above manual doesn't mean that the other applicable technical publication for couldn't be used by Chinese operators.

Note 3: Information of Component Maintenance Manual provided by vendors can be found in the website.

Note4: The Cabin Crew Manual did not developed by Bombardier.

Section 5: CCARs Compliance Checklist

5.1 Statement and Explanation:

This section is the formal notification that CAAC AEG has developed the compliance checklist for Bombardier airplane based on the following aircraft configuration:

- Type Certificate Data Sheet
- RAD-690-100_RevG Type Specification for the Regional Jet Series 900

The checklist is provided as an aid to identify those specific requirements of rules for which compliance has already been demonstrated for the type design. The checklist also notes the requirements of rules which remain to be demonstrated compliance by the operators.

When the aircraft configuration differs from the above stated aircraft configuration, it is the responsibility of the operator and its CAAC Principle Inspector (PI) to evaluate those differences and develop the compliance to the relevant requirements of rules.

It also remains the responsibility of the operator and it’s PI to evaluate the corrective actions for those items not satisfactorily addressing compliance in the checklist prior to approval of the appropriate operation.

5.2 CCAR-91R2 Compliance Checklist

Articles/Subject	Compliance	Remark/Limitation
§91.401 Civil aircraft: Certifications required	Complies with Fuel venting and exhaust emissions requirements	Other requirements should be checked by PI.
§91.403 Instrument and Equipment for VFR operation	Complies	
§91.405 Instrument and Equipment for IFR operation	Complies	
§91.407 Instruments and Equipments for night and over-the-top operation	Complies	Requirements in operation should be checked by PI
§91.409 Mach number indicator	Complies	
§91.411 Radio communication equipment	Complies	Requirements in operation should be checked by PI
§91.413 Navigation equipment	Complies	Reference to CCAR91 Appendix B, C, D for more information.. Requirements in operation should be checked by PI.
§91.415 Emergency and life-saving equipment	Complies except spare electrical fuses	Spare electrical fuses should be checked by PI before operation approval.
§91.417 Additional emergency and Life equipments for over water operation	Not Complies for extended over water operation	Equipments installation for extended operation should be checked by PI before operation approval.
§91.419 Additional emergency and Life-saving equipment for rotorcraft over water flights	Not applicable	
§91.421 Additional emergency and Life-saving equipment for flights over designated land areas	Not complies	Installation of additional emergency and Life-saving equipment for flights over designated land areas should be checked by PI before operation approval.
§91.423 Oxygen equipment-operation at high altitude	Complies	
§91.425 Equipment for operation in icing conditions	Complies	
§91.427 ATC transponder and altitude reporting equipment	Complies	Requirements in operation should be checked by PI.

Articles/Subject	Compliance	Remark/Limitation
§91.429 Altitude alerting system or device: Turbojet-powered civil airplanes.	Complies	Requirements in operation should be checked by PI.
§91.431 Weather radar	Complies	Requirements in operation should be checked by PI.
§91.433 Flight recorder	Complies, except: 1. CVR only record information for 30 minute for some aircraft. 2. Data link communication record not applicable currently.	1. CVR record capability for 2 hours should be further checked by PI before operation approval. 2. Requirements for record of data link communications should be checked by PI when installation of data link communications. 3. Requirements in operation should be checked by PI.
§91.435 Emergency locator transmitter	Optional Complies (Portable ELT is optional installation)	1. Installation of optional portable ELT should be further checked by PI before operation approval. 2. Requirements in operation should be checked by PI.
§91.437 Terrain awareness and warning system.	Complies	Requirements in operation should be checked by PI.
§91.439 Traffic Alert and Collision Avoidance equipment and use	Complies	Requirements in operation should be checked by PI.
§91.441 Radiation indicator	Not applicable	
Appendix B Category II Operations: Manual, Instruments, Equipment, and Maintenance	Complies	Requirements in operation should be checked by PI.
Appendix C Operations within airspace designated as Minimum Navigation Performance Specification Airspace.	Complies The FMS has been demonstrated to provide a minimum RNP level of RNP 10	1. Reference to AFM for more information. 2. Requirements in operation should be checked by PI.
Appendix D Operations in Reduced Vertical Separation Minimum(RVSM)	Complies	Requirements in operation should be checked by PI.

5.3 CCAR-121R4 Compliance Checklist

Articles/Subject	Compliance	Remark/Limitation
§121.153 Aircraft certification and equipment requirements	Complies	CRJ900 certified for transport category airplane.
§121.155 Single-engine airplanes prohibited	Not applicable	CRJ900 is a twin engine aircraft.
§121.157 Airplane limitations: Type of route	Comply with the ditching requirements of 25.801	Equipments for extended over water operation are to be installed by customer option..
§121.161 Demonstration of Emergency Evacuation Procedures	Comply with the full capacity emergency evacuation demonstration for 90 passengers.	It is the responsibility of operator to demonstrate the compliance for other demonstration requirements, and should be checked by PI.
§121.213 Space of passenger seats	Complies with Bombardier baseline configuration	If other than Bombardier baseline configuration, it is the responsibility of PI to check the conformity.
§121.215 Carriage of cargo in passenger compartments	Not applicable	There is no approved cargo bins located in the passenger compartment, therefore cargo is not permitted. Hand baggage is the only items which are permitted
§121.217 Carriage of cargo in cargo compartments	Not applicable	There are no cargo compartments on the aircraft which allow access of the crew during flight.
§121.301 General	Complies	Requirements in operation should be checked by PI.
§121.305 Airplane instruments and equipment	Complies	
§121.307 Engine instruments	Complies	
§121.308 Lavatory fire protection	Complies	
§121.309 Emergency equipment	Complies except Emergency medical kit	1. Installation of Emergency medical kit and items within should be checked by PI before operational approval. 2. Requirements in operation should be checked by

Articles/Subject	Compliance	Remark/Limitation
		PI.
§121.310 Additional emergency equipment	Complies	
§121.311 Seats, safety belts, and shoulder harnesses	Complies	Requirements in operation should be checked by PI.
§121.312 Materials for compartment interiors	Complies	
§121.313 Miscellaneous equipment	Complies	Requirements in operation should be checked by PI.
§121.314 Cargo and baggage compartments	Complies	No “Class D” compartment is provided on the aircraft.
§121.315 Cockpit check list	Complies	
§121.316 Fuel tanks	Complies	
§121.317 Passenger notification	Complies	Requirements in operation should be checked by PI.
§121.318 Public address system	Complies	
§121.319 Crewmember interphone system	Complies	
§121.320 Altitude holding and warning system	Complies	
§121.323 Instruments and equipment for operations at night	Complies	
§121.325 Instruments and equipment for operations under IFR	Complies	
§121.327 Supplemental oxygen for life support: Reciprocating engine powered airplanes	Not applicable	
§121.329 Supplemental oxygen for life support: turbine engine powered airplanes	Complies	Requirements in operation should be checked by PI.
§121.331 Supplemental oxygen for emergency descent and for first aid for reciprocating engine powered airplanes with pressurized cabins	Not applicable	
§121.333 Supplemental oxygen for emergency	Complies	Requirements in operation should be checked by PI.

Articles/Subject	Compliance	Remark/Limitation
descent and for first aid for turbine engine powered airplanes with pressurized cabins		
§121.335 Oxygen Equipment standards	Complies	
§121.337 Protective breathing equipment	Complies	Requirements in operation should be checked by PI.
§121.339 Emergency equipment for over water operations	Not Complies for extended over water operation	Equipments installation for extended operation should be checked by PI before operation approval.
§121.341 Equipment for operations in icing conditions	Complies	
§121.342 Pitot heat indication systems	Complies	
§121.343 Flight recorders	Complies	Requirements in operation should be checked by PI.
~~**§121.344** Quick Access Recorder or equivalent equipment~~		Removed to §121.352 in CCAR-121R4.
§121.345 Radio equipment	Complies	Requirements in operation should be checked by PI.
§121.346 Air ground two way data link communication system	Not applicable	
§121.347 Radio equipment for operations under VFR over routes navigated by piloting	Complies	
§121.349 Radio equipment for operations under IFR or for operations under VFR over routes not navigated by piloting	Complies	Requirements in operation should be checked by PI.
§121.351 Radio equipment for extended over water operations and for certain other operations	Not Complies	Installation of radio equipments for extended operation and for certain other operations should be checked by PI before operation approval.
§121.352 Quick Access Recorder or equivalent equipment	Complies	Requirements in operation should be checked by PI.

Articles/Subject	Compliance	Remark/Limitation
§121.353 Emergency equipment for operations over uninhabited terrain areas	Not Complies	Installation of emergency equipment for operations over uninhabited terrain areas should be checked by PI before operation approval.
§121.354 Terrain awareness and warning system	Complies	
§121.355 Equipment for operations use specialized means of navigation	Not applicable	
§121.356 Airborne Collision Avoidance System (ACAS)	Complies	
§121.357 Airborne weather radar equipment requirements	Complies	Requirements in operation should be checked by PI.
§121.358 Low altitude windshear system equipment requirements	Complies	
§121.359 Cockpit voice recorders	Complies	Requirements in operation should be checked by PI.
§121.360 Ground proximity warning / glide slope deviation alerting system	Complies	Requirements in operation should be checked by PI.
§121.361 Language requirement for placards and markings	Complies	Require further check by PI before operation
§121.589 Forward Observer's seat for En route inspections	Complies	
§121 Appendix B First Aid Kits and Emergency Medical Kits	Not Complies	First Aid Kits and Emergency Medical Kits installation should be checked by PI before operation approval.
§121 Appendix H Extended range operation with two engine airplanes (ETOPS)	Not applicable	
§121 Appendix I Doppler Radar and Inertial	Not applicable	

Articles/Subject	Compliance	Remark/Limitation
Navigation System (INS)		

5.4 CCAR-135 Compliance Checklist

Not applicable.

Section 6: Other Evaluation Items

6.1 Forward Observer Seat

Based on the compliance statement submitted by Bombardier, CAAC AEG concluded that the seat referred to as the "third occupant seat" (center seat) of is considered to have met the requirements of AC-121-28.

Modifications to the above facilities from the original specifications will need approval by the responsible Principle Inspector (PI) of CAAC, additional analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

6.2 Flight Crew Sleeping Quarters

Not applicable.

6.3 Electronic Flight Bag

Not applicable.

6.4 Head-up Display

The CRJ Series aircraft are provided to install an optional Head's Up Guidance System, but not evaluated by CAAC AEG.

6.5 Emergency Evacuation Demonstration

The CRJ900 airplane full capacity emergency evacuation demonstration (for maximum passenger capacity of 90) has been conducted during type certification process.

Based on the test report provided by Bombardier, CAAC AEG concluded that CRJ900 has been shown to be in compliance with the full capacity emergency evacuation demonstration during the type certification process.

Note: For the emergency evacuation procedure and cabin crew training, there are no formal technical publications to be provided to operators, but Bombardier will provide training to the trainer to their customer operator, and the operator could develop their own emergency evacuation procedure and cabin crew training syllabus.

Appendix: CAAC AEG Team and Point of Contact

A.1: CAAC AEG Team

Mr. Xue Shi Jun	Director, Aircraft Evaluation Division, Flight Standards Department
Mr. Liu Yun Lei	Engineer, AEG Office of Civil Aviation Safety and Technology Center
Ms. Fan Jing Zhu	Engineer, AEG Office of Shanghai Aircraft Airworthiness Certification Center
Mr. Cai Jin Yu	Engineer, AEG Office of Shanghai Aircraft Airworthiness Certification Center

A.2: Point of Contact

Mr. Alexandre St-Arnaud	Airworthiness Specialist, Commercial aircraft
Mr. Al Bazeley	Supervisor, New Aircraft Programs Bombardier Aircraft Training
Mr. Yermakhan Riskulov	MMEL, RM&S,Regional Jets, Mirabel
Mr. Gary Peter Osborne	Maintenance Engineering, Customer Services & Support, Commercial aircraft
Mr. Li Hong Qing	Senior Director China Sale Commercial aircraft