# OM part B - LJ45

## Version 1.8 of 17-Aug-2026

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## AIR–OPS COMPLIANCE STATEMENT

| ON BEHALF OF AIR SERVICE LIEGE | |
|---|---|
| The Operator's Nominated Person hereunder certifies that this list of effective pages and the contents of this volume of the Operations Manual satisfy the requirements of the Commission Regulation (EU) No 965/2012 of 5 October 2012 (and latest applicable amendments) laying down the technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council. | |
| *(sign with date and signature)*<br>Digitaal ondertekend door Guy Ackaert<br>Datum: 2026.08.20 14:43:57 +02'00'<br>**G. Ackaert**<br>Flight Operations Manager | *(sign with date and signature)*<br>S. Bonsel<br>Digitally signed by S. Bonsel<br>Date: 2026.08.20 13:34:02 +02'00'<br>**J. Hofland**<br>Compliance Monitoring Manager |
| While the Operations Manual shall be globally acceptable by the Belgian CAA being the Competent Authority, elements of this manual are specifically accepted or approved in accordance with the regulation for CAT operations.<br>For commercial air transport (CAT) operations, as part of its certification process, the Company has submitted to the Belgian CAA, this Operations Manual(1) accompanied with the filled in form 'Operators Cross Reference Checklist (O-CRCL)' and signed 'Statement of Compliance'.<br><br>*Note 1: The Operations Manual is divided in Part A, Part B, Part C and Part D all published as a separate volume as defined in section I.1.3 of the OM Part A.* | |

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| 1.2 | 01-Feb-23 | 27-Apr-23 | 27-Apr-23 | K. Van de Sijpe |
| 1.3 | 01-Jan-25 | 25-Mar-25 | 25-Mar-25 | G. Ackaert |
| 1.4 | 05-Nov-25 | 17-Nov-25 | 27-Nov-25 | G. Ackaert |
| 1.5 | 16-Feb-26 | 30-Apr-26 | 30-Apr-26 | G. Ackaert |
| 1.6 | 30-Apr-26 | 08-Jun-26 | 08-Jun-26 | G. Ackaert |
| 1.7 | 11-Jun-26 | 25-Jun-26 | 25-Jun-26 | G. Ackaert |
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| | Section Administration and Control updated to introduce version 1.8 of this manual; |
| 1-22 | (NON PRIOR APPROVAL):Section 1.6.1: MZFM updated following the application of SB 45-11-5; |
| 1-23 | (NON PRIOR APPROVAL):Section 1.7: Figure center of gravity updated following the application of SB 45-11-5; |
| 2-36 | (NON PRIOR APPROVAL): Section 2.2.6.3: Text updated to add version number of the referenced AMM; |
| 2-37 | (NON PRIOR APPROVAL): Section 2.2.6.3: Figure update to add version number of the referenced AMM; |
| 3-15 | (NON PRIOR APPROVAL): Section 3.2.5.4: Warning updated; |
| A-1 | (NON PRIOR APPROVAL): Annex 2: Take-off briefing updated with NADP procedures. |

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## ADMINISTRATION AND CONTROL

► *Refer to the Operations Manual Part A Section I – Administration and control*

The Operations Manual (OM) shall contain operational instructions, which are to be complied with by all Company Personnel involved with the ground and/or the flight operations of the Company. All concerned Company Personnel shall be familiarised and remain familiar with its content and shall carry out their duties as described in the OM. If not, they may become subject to actions[1]. Refer to the OM Part A for a more detailed description of the applicable rules and regulations, language and terminology, description of the contents of the OM, distribution system, description of the annotation of pages, definitions, abbreviations, system of revisions and Company Personnel feedback procedures.

Nothing contained in the OM shall however prevent Company Personnel from exercising their own best judgement during any situation for which the OM makes no provisions or in case of an emergency.

In the interest of safety, a Commander (PIC) may deviate from the operational procedures and rules, if the situation he is in is an emergency situation that requires prompt decisions and actions. In the case of any deviation from the operational procedures and/or rules, the Commander (PIC) shall submit an occurrence report (OR).

[1] The Company embraces the just culture policy as described in the Safety Management Manual. The just culture policy does however not apply to the following conditions:

1. Gross negligence on the part of the individuals involved;
2. Criminal intent on the part of the individuals involved;
3. Intentional acts by the individual in the performance of their duties that contravene company policies and procedures or the accepted policies and procedures as set forth by governmental regulation;
4. The wrongful or unlawful consumption of medications, alcohol or controlled substances by the individual making the error;
5. An individual who knowingly fails to report an operational error, obvious hazard or a mandatory reporting item.

SECTION 0 - UNITS OF MEASUREMENT AND GENERAL INFORMATION

# 0.1 Units and conversions

The following units and conversions shall be applicable when using this manual:

*Table: Units and conversions*

| Units and conversions | | |
|---|---|---|
| To convert | Into | Multiply by |
| Meters | Feet | 3,28 |
| Feet | Meters | 0,304 |
| Yards | Feet | 3,00 |
| Inches | Millimeters | 25,4 |
| Millimeters | Inches | 0,039 |
| Kilometers | Statue Miles | 0,62 |
| Kilometers | Nautical Miles | 0,54 |
| Statue Miles | Kilometers | 1,609 |
| Statue Miles | Nautical Miles | 0,869 |
| Nautical Miles | Statue Miles | 1,15 |
| Nautical Miles | Kilometers | 1,852 |
| Liters | Imperial Gallon | 0,219 |
| Liters | US Gallon | 0,264 |
| US Gallon | Liters | 3,78 |
| US Gallon | Imperial Gallon | 0,83 |
| Pounds | Kilogram | 0,45 |
| Kilogram | Pounds | 2,204 |

# 0.2 Aircraft information

► *Refer to the Aircraft Flight Manual Section 1 – Limitations*

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

This manual shall be applicable for the following aircraft:

*Table: Aircraft information*

| **Aircraft information** | | | | |
|---|---|---|---|---|
| **Aircraft registration** | **OO-DOC** | **OO-MED** | **OO-HRG** | **OO-JGK** |
| **Type** | LJ45 (Learjet 45) | | LJ45 (Learjet 40) | |
| **Serial number** | 45-167 | 45-311 | 45-2064 | 45-2087 |
| **Manufacturer** | Bombardier | | | |
| **Maximum operational passenger seating configuration (MOPSC)** | | | | |
| **VIP configuration(3)** | 8+1(1) | 8+1(1) | 6+1(1) | 6+1(1) |
| **Two-stretcher configuration(3)** | 4+1(1)+2(2) | 3+1(1)+2(2) | n/a | n/a |
| **One-stretcher configuration (3)** | 5+1(1)+1(2) | n/a | n/a | n/a |

***Note 1**: Number of belted toilet seat installed (certified to carry an occupant during all phases of flight).*
***Note 2**: Number of LifePort patient loading and utility system (PLUS) including stretcher.*
***Note 3:** Configuration name as referenced to in this manual.*

# 0.3 Aircraft dimensions

The following aircraft dimensions shall be applicable:

*Figure: Aircraft dimension (**OO-DOC** and **OO-MED**)*

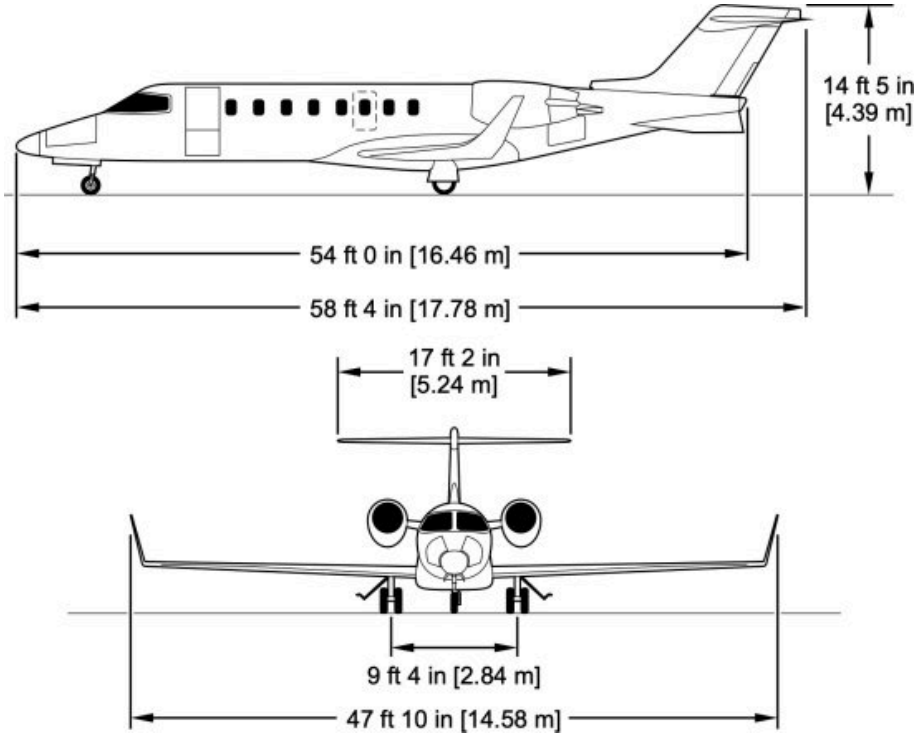
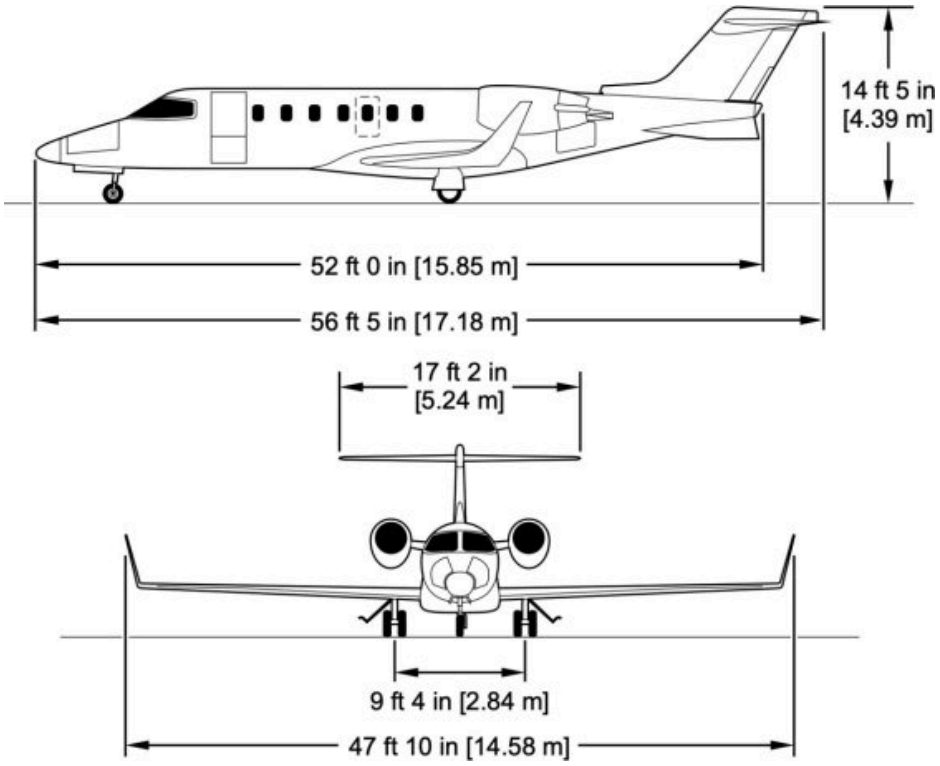



*Figure 2: Aircraft dimension (**OO-HRG and OO-JGK**)*



SECTION 1 - LIMITATIONS

# 1.1 Certification status

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: General: Type of Operation*

This aircraft is certified in accordance with Certification Specifications for Large Aeroplanes CS-25.

***WARNING***

***Certification and operational limitations are conditions of the type and airworthiness certificate and shall be complied with at all times as required by law.***

***CAUTION***

***Not all aircraft certification and operational limitations as published in the Aircraft Flight Manual (AFM) are included in this manual. As this manual only complements the information as found in the AFM, every Flight Crew Member shall ensure that all certification and operational limitations as published by the aircraft manufacturer are complied with even when not published in this manual.***

***In case of a conflict in contents between this manual and the applicable AFM or any other legal document published by the aircraft manufacturer, the latter shall prevail.***

*NOTE*

*For the EASA certification, please refer to the EASA type-certificate data sheet EASA.IM.A.020 as found on the EASA website* ***http://easa.europa.eu****.*

# 1.2 Seating configuration

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Performance configuration*

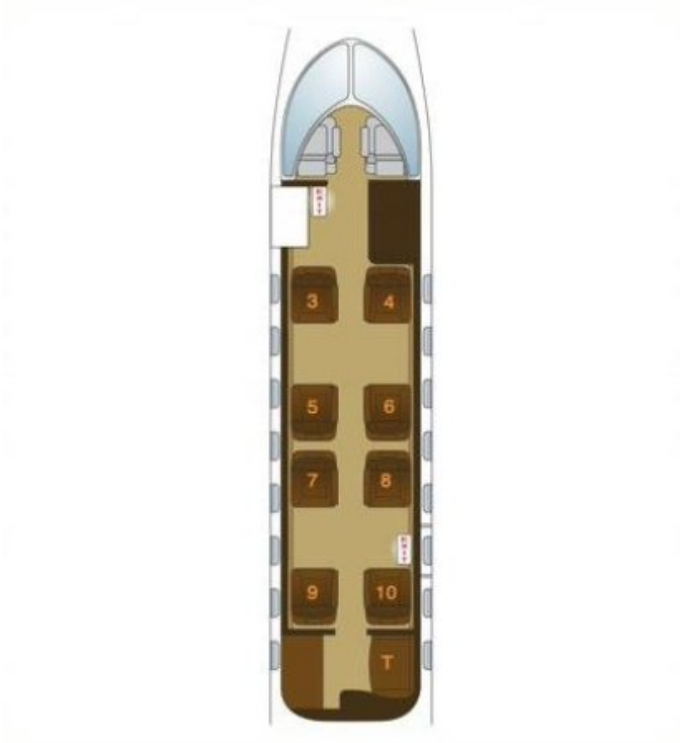
## 1.2.1 General

### 1.2.1.1 VIP configuration

#### 1.2.1.1.1 *Aircraft with registration OO-DOC & OO-MED*

The following seating configuration layout shall be applicable when the aircraft with registration OO-DOC and OO-MED is configured to have a maximum operational passenger seating configuration (MOPSC) of 9.

*Figure: Seating configuration layout - VIP configuration (OO-DOC and OO-MED)*



All operational flight plans (OFP), unless indicated differently by the Commander (PIC), shall be prepared using the following seating configuration sequence which excludes required Flight Crew Members in the cockpit for the operation of the flight:

*Table: Seating configuration sequence – VIP configuration (OO-DOC and OO-MED)*

| **Seating configuration sequence – VIP configuration (OO-DOC and OO-MED)** | | | |
|---|---|---|---|
| Sequence | Seat number (see above) | Arm(2) (mm) | PPS designation(1) |
| 1 | 5(4) + 6(4) | 8.069,58 | Seat 5+6 |
| 2 | 9(4) + 10(4) | 10.099,04 | Seat 9+10 |
| 3 | 7(4) + 8(4) | 9.047,48 | Seat 7+8 |
| 4 | 3(4) + 4(4) | 6.995,16 | Seat 3+4 |
| 5 | T(3+5) | 10.894,06 | Toilet |

***Note 1:*** *The Company flight planning software (PPS) designates this configuration as 'VIP CONFIG'.*

***Note 2****: For taxi, take-off and landing, seatbacks shall be fully upright and headrest extended.*

***Note 3****: Seat equipped with a standard 2-point lap type seatbelt.*

***Note 4****: Seat equipped with a 3-point upper torso restraint system type seatbelt. The part of the seatbelt going across the upper torso is however not manually lockable.*

***Note 5****: The toilet seat is certified to carry an occupant during all phases of flight.*

#### 1.2.1.1.2 *Aircraft with registration OO-HRG & OO-JGK*

The following seating configuration layout shall be applicable when the aircraft with registrations OO-HRG and OO-JGK are configured to have a maximum operational passenger seating configuration (MOPSC) of 7.

*Figure: Seating configuration layout - VIP configuration (OO-HRG & OO-JGK))*




All operational flight plans (OFP), unless indicated differently by the Commander (PIC), shall be prepared using the following seating configuration sequence which excludes required Flight Crew Members in the cockpit for the operation of the flight:

*Table : Seating configuration sequence – VIP configuration (OO-HRG & OO-JGK)*

| **Seating configuration sequence – VIP configuration (OO-HRG & OO-JGK)** | | | | |
|---|---|---|---|---|
| Sequence | Seat number (see above) | Arm[(2)] (mm) (OO-HRG) | Arm[(2)] (inch) (OO-JGK) | PPS designation[(1)] |
| 1 | 5[(4)] + 6[(4)] | 9.057,64 | 356,6 | Seat 5+6 |
| 2 | 3[(4)] + 4[(4)] | 7.833,36 | 308,4 | Seat 3+4 |
| 3 | 7[(4)] + 8[(4)] | 10.099,04 | 397,6 | Seat 7+8 |
| 4 | T[(3+5)] | 10.929,62 | 430,3 | Toilet |

***Note 1**: The Company flight planning software (PPS) designates this configuration as 'VIP CONFIG'.*
***Note 2**: For taxi, take-off and landing, seatbacks shall be fully upright and headrest extended.*
***Note 3**: Seat equipped with a standard 2-point lap type seatbelt.*
***Note 4**: Seat equipped with a 3-point upper torso restraint system type seatbelt. The part of the seatbelt going across the upper torso is however not manually lockable.*
***Note 5**: The toilet seat is certified to carry an occupant during all phases of flight.*

## 1.2.1.2 Medical configuration

► *Refer to EASA STC IM.A.S.01199 - Installation of emergency medical stretchers and bases, oxygen and electrical systems and associated LifePort Inc.*

► *Refer to LifePort PLUS supplement AFMS Learjet 45 (Doc. No. EGR-644-11) – Patient loading and utility system*

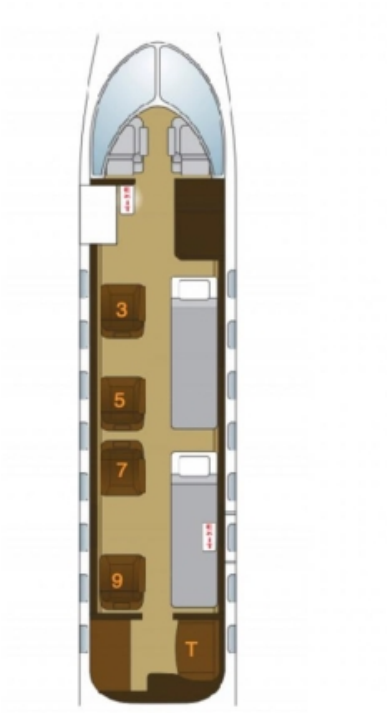
► *Refer to the Operations Manual Part B Section* ***1.15.2 – Medical equipment***

### 1.2.1.2.1 *Aircraft with registration OO-DOC*

#### 1.2.1.2.1.1 *Two-stretcher configuration*

The following medical configuration layout shall be applicable when the aircraft with registration OO-DOC is configured to have a maximum operational passenger seating configuration (MOPSC) of 7.

*Figure: Seating configuration layout – Two-stretcher configuration (OO-DOC)*



All operational flight plans (OFP), unless indicated differently by the Commander (PIC), shall be prepared using the following seating configuration sequence which excludes required Flight Crew Members in the cockpit for the operation of the flight:

*Table: Seating configuration sequence – Two-stretcher configuration (OO-DOC)*

| **Seating configuration sequence – Two-stretcher configuration (OO-DOC)** | | | |
|---|---|---|---|
| Sequence | Seat number (see above) | Arm(2) (mm) | PPS designation(1) |
| 1 | FWD(6) | 7.693,57 | Stretch F |
| 2 | 5(4) | 8.069,58 | Seat 5 |
| 3 | AFT(6) | 9.427,31 | Stretch A |
| 4 | 9(4) | 10.099,04 | Seat 9 |
| 5 | 7(4) | 9.047,48 | Seat 7 |
| 6 | 3(4) | 6.995,16 | Seat 3 |
| 7 | T(3+5) | 10.894,06 | Toilet |

***Note 1:*** *The Company flight planning software (PPS) designates this configuration as '2 STRETCHER'.*
***Note 2****: For taxi, take-off and landing, seatbacks shall be fully upright and headrest extended.*
***Note 3****: Seat equipped with a standard 2-point lap type seatbelt.*
***Note 4:*** *Seat equipped with a 3-point upper torso restraint system type seatbelt. The part of the seatbelt going across the upper torso is however not manually lockable.*
***Note 5****: The toilet seat is certified to carry an occupant during all phases of flight.*
***Note 6:*** *Stretcher equipped with harness-type and 2-point safety belt.*

#### 1.2.1.2.1.2 *One-stretcher configuration*

The following medical configuration layout shall be applicable when the aircraft with registration OO-DOC is configured to have a maximum operational passenger seating configuration (MOPSC) of 7.

*Figure: Seating configuration layout – One-stretcher configuration (OO-DOC)*




All operational flight plans (OFP), unless indicated differently by the Commander (PIC), shall be prepared using the following seating configuration sequence which excludes required Flight Crew Members in the cockpit for the operation of the flight:

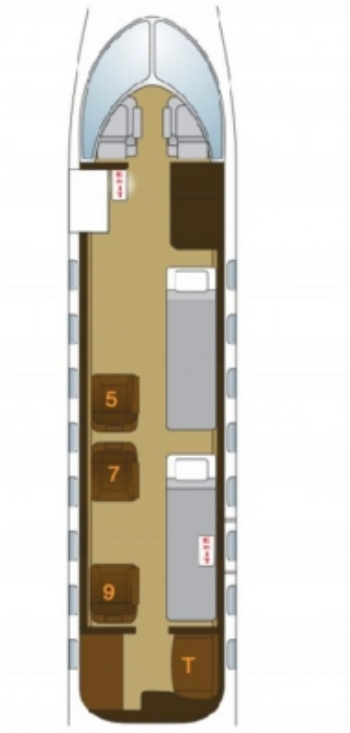
*Table 7: Seating configuration sequence – One-stretcher configuration (OO-DOC)*

| **Seating configuration sequence – One-stretcher configuration (OO-DOC)** | | | |
|---|---|---|---|
| Sequence | Seat number (see above) | Arm[2] (mm) | PPS designation[1] |
| 1 | FWD[6] | 7.693,57 | Stretch F |
| 2 | 5[4] | 8.069,58 | Seat 5 |
| 3 | 9[4]+10[4] | 10.099,04 | Seat 9 + 10 |
| 4 | 7[4] | 9.047,48 | Seat 7 |
| 5 | 3[4] | 6.995,16 | Seat 3 |
| 6 | T[3+5] | 10.894,06 | Toilet |
| ***Note 1:*** *The Company flight planning software (PPS) designates this configuration as '1 STRETCHER'.*<br>***Note 2****: For taxi, take-off and landing, seatbacks shall be fully upright and headrest extended.*<br>***Note 3****: Seat equipped with a standard 2-point lap type seat belt.*<br>***Note 4:*** *Seat equipped with a 3-point upper torso restraint system type seat belt. The part of the seat belt going across the upper torso is however not manually lockable.*<br>***Note 5****: The toilet seat is certified to carry an occupant during all phases of flight.*<br>***Note 6:*** *Stretcher equipped with harness-type and 2-point safety belt.* | | | |

#### 1.2.1.2.2 *Aircraft with registration OO-MED*

The following medical configuration layout shall be applicable when the aircraft with registration OO-MED is configured to have a maximum operational passenger seating configuration (MOPSC) of 6.

*Figure: Seating configuration layout – Two-stretcher configuration (OO-MED)*




All operational flight plans (OFP), unless indicated differently by the Commander (PIC), shall be prepared using the following seating configuration sequence which excludes required Flight Crew Members in the cockpit for the operation of the flight:

*Table: Seating configuration sequence – Two-stretcher configuration (OO-MED)*

| **Seating configuration sequence – Two-stretcher configuration (OO-MED)** | | | |
|---|---|---|---|
| Sequence | Seat number (see above) | Arm(2) (mm) | PPS designation(1) |
| 1 | FWD(6) | 7.693,57 | Stretch F |
| 2 | 5(4) | 8.069,58 | Seat 5 |
| 3 | AFT(6) | 9.427,31 | Stretch A |
| 4 | 9(4) | 10.099,04 | Seat 9 |
| 5 | 7(4) | 9.047,48 | Seat 7 |
| 6 | T(3+5) | 10.929,62 | Toilet |
| ***Note 1**: The Company flight planning software (PPS) designates this configuration as '2 STRETCHER'.*<br>***Note 2**: For taxi, take-off and landing, seatbacks shall be fully upright and headrest extended.*<br>***Note 3**: Seat equipped with a standard 2-point lap type seatbelt.*<br>***Note 4**: Seat equipped with a 3-point upper torso restraint system type seatbelt. The part of the seatbelt going across the upper torso is however not manually lockable.*<br>***Note 5**: The toilet seat is certified to carry an occupant during all phases of flight.*<br>***Note 6:** Stretcher equipped with harness-type and 2-point safety belt.* | | | |

## 1.2.2 Passengers with reduced mobility and special category passengers

AMC1 CAT.OP.MPA.155 (b), AMC1 CAT.OP.MPA.155 (c), AMC1 CAT.OP.MPA.165, CAT.OP.MPA.155 (b), CAT.OP.MPA.155 (c), CA…

► *Refer to the Operations Manual Part A Section 8.2.2.2 – Allocation of seats*

Passengers shall be seated where, in the event of an emergency evacuation, they may best assist and not hinder evacuation.

Passengers who occupy seats that permit direct access to emergency exits shall appear to be reasonably fit, strong, able and willing to assist the rapid evacuation of the aircraft in an emergency after an appropriate briefing by the crew.

On commercial air transport (CAT) flights, special category passengers (SCP's) shall not be allocated, nor occupy, seats that permit direct access to emergency exits or where their presence could:

1. Impede crew members in their duties;
2. Obstruct access to emergency equipment;
3. Impede the emergency evacuation of the aircraft.

*NOTE*

*'Direct access' means a seat from which a passenger may proceed directly to the exit without entering an aisle or passing around an obstruction.*

Passengers who do not appear fit, strong or able to assist with a rapid evacuation or who classify as special category passengers such as described in the Operations Manual Part A shall not be seated on the seats as indicated in red below as they may hinder evacuation through one of the emergency exits.

Besides the limitations as depicted above and the figure below, the following limitations shall also be adhered to:

1. The number of SCP's shall not exceed the number of passengers capable of assisting them in case of an emergency;
2. If the SCP travels with an accompanying passenger, the accompanying passenger shall be seated next to the SCP.

*NOTE*

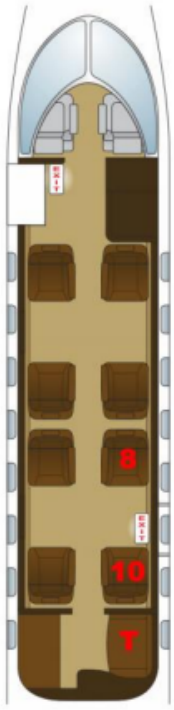
*'Next to' in this context means also a seat, in a club seating configuration, directly forward or aft of the SCP (i.e. face to face).*

### 1.2.2.1 VIP configuration

#### 1.2.2.1.1 *Aircraft with registration OO-DOC & OO-MED*

Passengers with reduced mobility or who classify as special category passengers such as described in the Operations Manual Part A shall not be seated on seats 8, 10 and T as they may hinder evacuation through one of the emergency exits:

*Figure: Prohibited seating positions for unfit passengers or SCP's – VIP configuration (OO-DOC and OO-MED)*



#### 1.2.2.1.2 *Aircraft with registration OO-HRG & OO-JGK*

Passengers with reduced mobility or who classify as special category passengers such as described in the Operations Manual Part A shall not be seated on seats 8 and T as they may hinder evacuation through one of the emergency exits:

*Figure: Prohibited seating positions for unfit passengers or SCP's – VIP configuration (OO-HRG & OO-JGK)*



## 1.2.2.2 Medical configuration

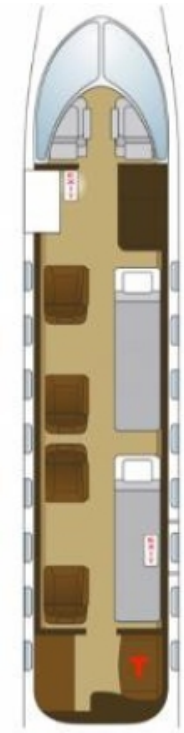
A passenger laying down secured on a stretcher is considered as a passenger without any mobility (immobile or secured passenger). Due to the configuration of the aircraft, at least one of the stretchers is positioned on the right hand side of the aircraft cabin below the emergency exit. The position of the stretcher, with or without the secured passenger and/or the applicable medical equipment required for the passenger, shall not block the emergency exit and/or impede its use.

### 1.2.2.2.1 *Aircraft with registration OO-DOC*

#### 1.2.2.2.1.1 Two-stretcher configuration

Passengers with reduced mobility or who classify as special category passengers such as described in the Operations Manual Part A but who are not laying down secured on a stretcher shall not be seated on seat T as they may hinder evacuation through one of the emergncy exits:

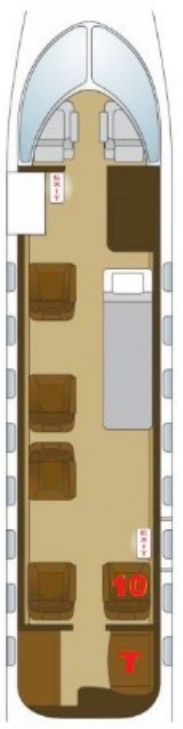
*Figure: Prohibited seating positions for unfit passengers or SCP's – Two-stretcher medical configuration (OO-DOC)*



#### 1.2.2.2.1.2 One-stretcher configuration

Passengers with reduced mobility or who classify as special category passengers such as described in the Operations Manual Part A but who are not laying down secured on a stretcher shall not be seated on seats 10 and T as they may hinder evacuation through one of the emergncy exits:

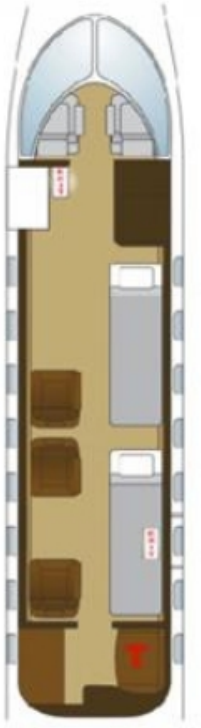
*Figure: Prohibited seating positions for unfit passengers or SCP's – One-stretcher medical configuration (OO-DOC)*



#### 1.2.2.2.2 *Aircraft with registration OO-MED*

Passengers with reduced mobility or who classify as special category passengers such as described in the Operations Manual Part A but who are not laying down secured on a stretcher shall not be seated on seat T as they may hinder evacuation through one of the emergency exits:

*Figure: Prohibited seating positions for unfit passengers or SCP's – Medical configuration (OO-MED)*



## 1.2.3 Multiple occupancy of a seat

CAT.OP.MPA.225 (b)

► *Refer to the Operations Manual Part A Section 8.2.2.2 – Allocation of seats*

► *Refer to the Operations Manual Part A Section 8.2.2.3 – Infant seating*

► *Refer to the Operations Manual Part B Section **11.1.4.5 – Brace position for lap-held infants***

► *Refer to the Operations Manual Part B Section **12.3.1 – Cabin oxygen system***

Multiple occupancy of a cabin seat by one adult and by one child younger than 2 years of age (i.e. infant) is permitted only if the infant is properly secured by a kangaroo belt or other restraint device supplementary to the adults safety belt harness. In such a case and when oxygen dispensing units are required, one unit each shall be available for both the adult and the infant which may require placarding the adjacent seat 'do not use' for making the necessary oxygen dispensing units available.

***CAUTION***

***A passenger carrying an infant shall not be considered as a SCP but also not as a passenger able to assist with a rapid evacuation in case of emergency as described in the section above hence not allowing him to occupy the seats as indicated in red above.***

*NOTE*

*The preferential seat allocation for a passenger carrying an infant, shall be the aft facing seats taking the best brace position for them into account.*

## 1.2.4 Passengers travelling with a pet of more than 8 kg/17.6 lbs in the cabin

► *Refer to the Operations Manual Part A Section 8.2.2.7.4 – Live Animals – Pets*

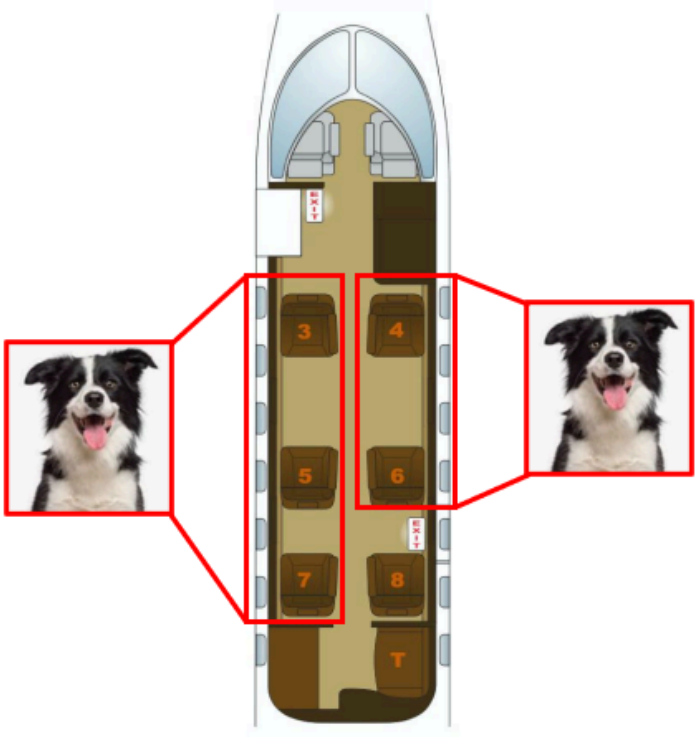
► *Refer to the Operations Manual Part A Section 8.2.2.7.5 – Live Animals – Assistance dogs*

### 1.2.4.1 Aircraft with registration OO-HRG & OO-JGK

Animals shall only be seated on passenger compartment seats or on the floor area as indicated by the square red box in the picture below as they may otherwise hinder evacuation through one of the emergency exits. If the animal is to be seated on the floor space between seat positions 3 and 5 or 4 and 6, neither of those seats shall be used by a passenger.

The animal shall wear a harness and is to be leashed to the seatbelt during all phases of the flight.

*Figure: Seating positions for animals with a mass above 8 kg/17.6 lbs in the passenger compartment of the OO-HRG and OO-JGK*

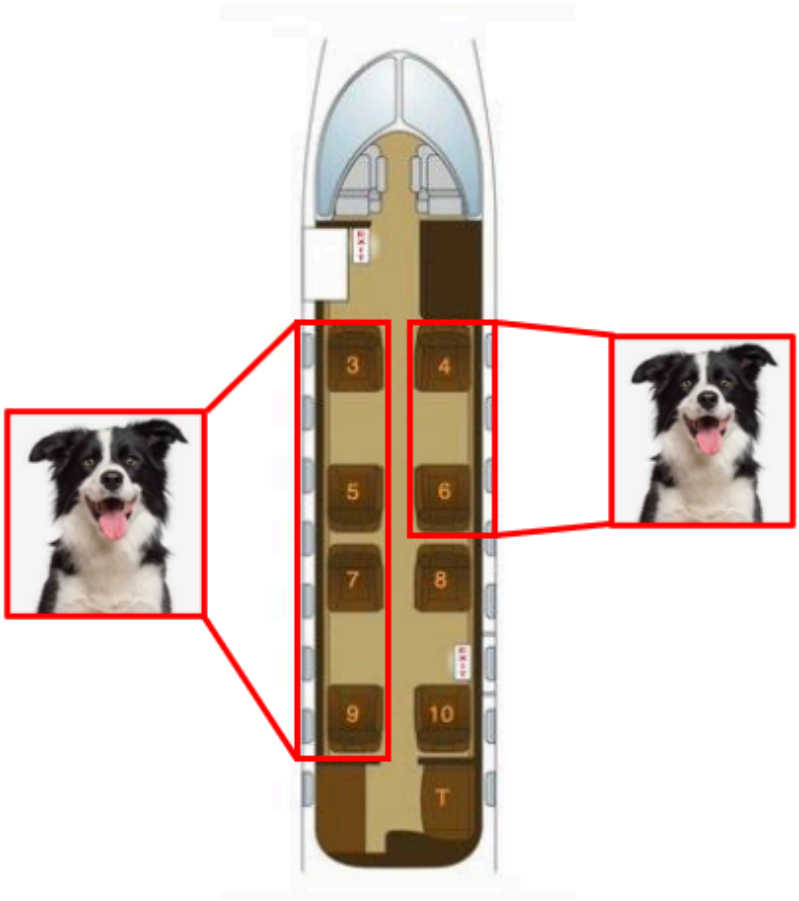


### 1.2.4.2 Aircraft with registration OO-MED and OO-DOC (VIP configuration only)

Animals shall only be seated on passenger compartment seats or on the floor area as indicated by the square red box in the picture below as they may otherwise hinder evacuation through one of the emergency exits. If the animal is to be seated on the floor space between seat positions 3 and 5, 4 and 6 or 7 and 9, neither of those seats shall be used by a passenger.

The animal shall wear a harness and is to be leashed to the seatbelt during all phases of the flight.

*Figure: Seating positions for animals with a mass above 8 kg in the passenger compartment of the OO-MED and OO-DOC (VIP configuration only)*



## 1.3 Kinds of operation

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Type of operation*

► *Refer to the Minimum Equipment List (MEL)*

The aircraft shall be approved for the following kinds of operation when the required equipment, as shown in the Minimum Equipment List (MEL), is installed and operable:

1. VFR (visual),
2. IFR (instrument),
3. Day,
4. Night,
5. Flights into (known) icing conditions.

# 1.4 Types of operation

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

The aircraft shall be approved for the following types of operation:

*Table: Operations specifications*

| Operations specifications(1) | |
|---|---|
| Type of operation | Commercial air transportation (CAT) operation and non-commercial operation with complex motor-powered aircraft (NCC) by AOC |
| Area of operation | FIR EUR + AFI + MID/ASIA + NAM + NAT |
| Transport of dangerous goods | Not authorised |
| Take-off minima | RVR 125 m(2) |
| Landing minima | CAT I(4) |
| RVSM | EUR RVSM + AFI RVSM + MID RVSM + ASIA RVSM + NAT RVSM + NAM RVSM |
| ETOPS | Not authorised(3) |
| Oceanic / remote (RNAV 10)(5) | Authorised |
| Oceanic / remote (RNP 4)(6) | Not authorised |
| RNAV 5 (B-RNAV) | Authorised |
| RNAV 2(7) | Not authorised |
| RNAV 1 (P-RNAV) | Authorised |
| RNP 1 | Authorised |
| RNP APCH operations | LNAV - LNAV/VNAV - LPV(9) |
| RNP AR APCH operations(8) | Not authorised |
| NAT HLA MNPS operations | Authorised(13) |
| Operations in areas of metric altimetry | Authorised |
| Steep approach operations **OO-DOC, OO-JGK & OO-MED** | Authorised |
| Steep approach operations **OO-HRG** | Not authorised |
| Reduced required landing distance operations | Not authorised |
| CPDLC operations | Not authorised |
| Transponder capabilities | Mode S with enhanced surveillance (EHS) and ADS-B OUT functionality |
| Performance-based communication and surveillance (PBCS)(12) | Not authorised |
| Use of electronic flight bag (EFB) system | Authorised (full approval)(10) |

| ATC flight plan suffixes(11) | |
|---|---|
| Item 10a suffixes(14) | SDFGHRWXYM3BZ |
| Item 10b suffixes | LB1 |
| Item 18 PBN suffixes | PBN/A1B2B3B4D2D3O2S2 DAT/CPDLCX |

**Operations specifications(1)**

***Note 1**: In case of a conflict in contents between this table and the Company air operator certificate (AOC) or any other legal document published by the Belgian CAA, the latter shall prevail.*

***Note 2**: A take-off shall only be performed with an RVR no less than 125 meters. If one or both Flight Crew Members is / are not trained accordingly for low visibility take-off procedures, the RVR shall not be less than 400 meters. If both Flight Crew Members are trained accordingly for low visibility take-off procedures but for a different LVTO RVR, the highest of both RVR's shall be applicable as minimum RVR.*

***Note 3**: Refer to the Operations Manual Part B Section 2.20 (ETOPS operation) for a detailed description of the applicable limitations.*

***Note 4**: RVR not less than 550 meters and DH not lower than 200 ft.*

***Note 5**: Designated and authorised as RNP 10.*

***Note 6**: RNP 4 is the oceanic / remote navigation specification to support 30 NM trackspacing (instead of 50 NM track spacing for RNAV10) with ADS-C and CPDLC FANS 1/A required.*

***Note 7**: This is a non-European en-route standard. Guidance for this RNP standard is provided in ICAO Doc 9613.*

***Note 8**: Each RNP AR approach requires a special approval.*

***Note 9**: RNP APCH operations (i.e. RNAV(GNSS or GPS)) down to LNAV (i.e. NPA GNSS or GPS), LNAV/VNAV (i.e. APV Baro) and LPV (i.e. SBAS APV and SBAS CAT I) minima shall be authorised. Approaches depicted as 'GLS' and 'RNAV(RNP)' to a certain runway shall not be authorised.*

***Note 10**: Refer to Section 2.1.4.1 of the OM Part A for the electronic instead of paper documents allowed to be carried under the full EFB approval (i.e. EFB authorised). At all times, electronic documents may be replaced by paper documents (i.e. conventional procedure) if more convenient or in case of an EFB (partial) failure (refer to the applicable MEL).*

***Note 11**: Based on the above operations specifications, the below ATC flight plan field 10 and 18 suffixes have been established.*

***Note 12**: The performance-based communication and surveillance (PBCS) concept provides objective operational criteria to evaluate different and emerging communication and surveillance technologies, intended for evolving air traffic management (ATM) operations.*

*The PBCS concept is aligned with that of performance-based navigation (PBN). While the PBN concept applies required navigation performance (RNP) and area navigation (RNAV) specifications to the navigation element, the PBCS concept applies required communication performance (RCP) and required surveillance performance (RSP) specifications to communication and surveillance elements, respectively.*

***Note 13**: Operating restrictions shall apply within the NAT HLA MNPS airspace, as the aircraft is not authorised to perform RNP 4 operations. Refer to section 8.3.2.3 of the OM Part A for more details.*

***Note 14**: Together with the suffix 'Z' in item 10a, 'DAT/CPDLX' is added to item 18 of the ATC flight plan to indicate that the aircraft is exempted from the datalink mandate (i.e. CPDLC VDL Mode 2) requirement in the Single European Sky (SES).*

## 1.5 Crew composition

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Minimum Flight Crew*

► *Refer to the Operations Manual Part A Section 1.4 – Authority, duties and responsibilities of the crew*

► *Refer to the Operations Manual Part A Section 4.1.4 – Minimum crew requirement and flight duty planned*

► *Refer to the Operations Manual Part A Section 4.2 – Designation of the Commander (PIC)*

► *Refer to the Operations Manual Part B Section* ***2.1.3 - Crew resource management procedures***

The minimum flight crew for any type of operation shall be two qualified Flight Crew Members, no single-pilot operations shall be allowed.

The aircraft shall be operated without any Cabin Crew Member(s).

# 1.6 Mass and balance limitation

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Weight and C.G. limits*

► *Refer to the Operations Manual Part B Section **6.1 - General** .*

## 1.6.1 Aircraft mass and balance design limitations

The aircraft shall be operated within the following mass and balance design limitations:

*Table: Aircraft mass and balance design limitations*

| **Aircraft mass and balance design limitations** | | | | |
|---|---|---|---|---|
| Aircraft registration | OO-DOC | OO-MED | OO-HRG | OO-JGK |
| Maximum design ramp mass | 9.865 kg | 9.865 kg | 9.344 kg | 21.250 lbs |
| Maximum design take-off mass | 9.752 kg | 9.752 kg | 9.231 kg | 21.000 lbs |
| Maximum design landing mass | 8.709 kg | 8.709 kg | 8.709 kg | 19.200 lbs |
| Maximum design zero fuel mass | 7.484 kg | 7.484 kg | 7.258 kg | 16.000 lbs |
| Minimum Flight Weight | 6.350 kg | 6.350 kg | 6.124 kg | 13.500 lbs |

The take-off mass shall be limited by the most restrictive of the following requirements:

1. Maximum certified take-off mass as indicated above;
2. Maximum take-off mass permitted by climb requirements (refer to the AFM Section 5 - Performance: Take-off);
3. Take-off field length (refer to the AFM Section 5 - Performance: Take-off).

The landing mass shall be limited by the most restrictive of the following requirements:

1. Maximum certified landing mass as indicated above;
2. Maximum landing mass permitted by approach climb or brake energy limits (refer to the AFM Section 5 - Performance: Approach and landing);
3. Landing distance (refer to the AFM Section 5 - Performance: Approach and landing).

## 1.6.2 Baggage and storage limitations

The aircraft shall be operated within the following baggage and storage mass and balance limitations:

*Table: Baggage and storage mass and balance limitations*

| **Baggage and storage mass and balance limitations** | | | | | |
|---|---|---|---|---|---|
| **Area** | **PPS designation** | **Arm (mm) All except OO-JGK** | **Arm (In) OO-JGK** | **Maximum mass** | |
| | | | | All except OO-JGK | OO-JGK |
| Cabin baggage compartment | CABIN | 11.031,2 | 434.3 | 77,1 kg | 170 lbs |
| Baggage compartment | BAGGAGE | 13.817,6 | 544 | 226,8 kg | 500 lbs |

# 1.7 Center of gravity limitation

AMC1 CAT.POL.MAB.100 (a)

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Weight and C.G. limits*

The aircraft shall be operated within the following center of gravity limitations:

*Figure: Center of gravity limitations (OO-DOC and OO-MED)*

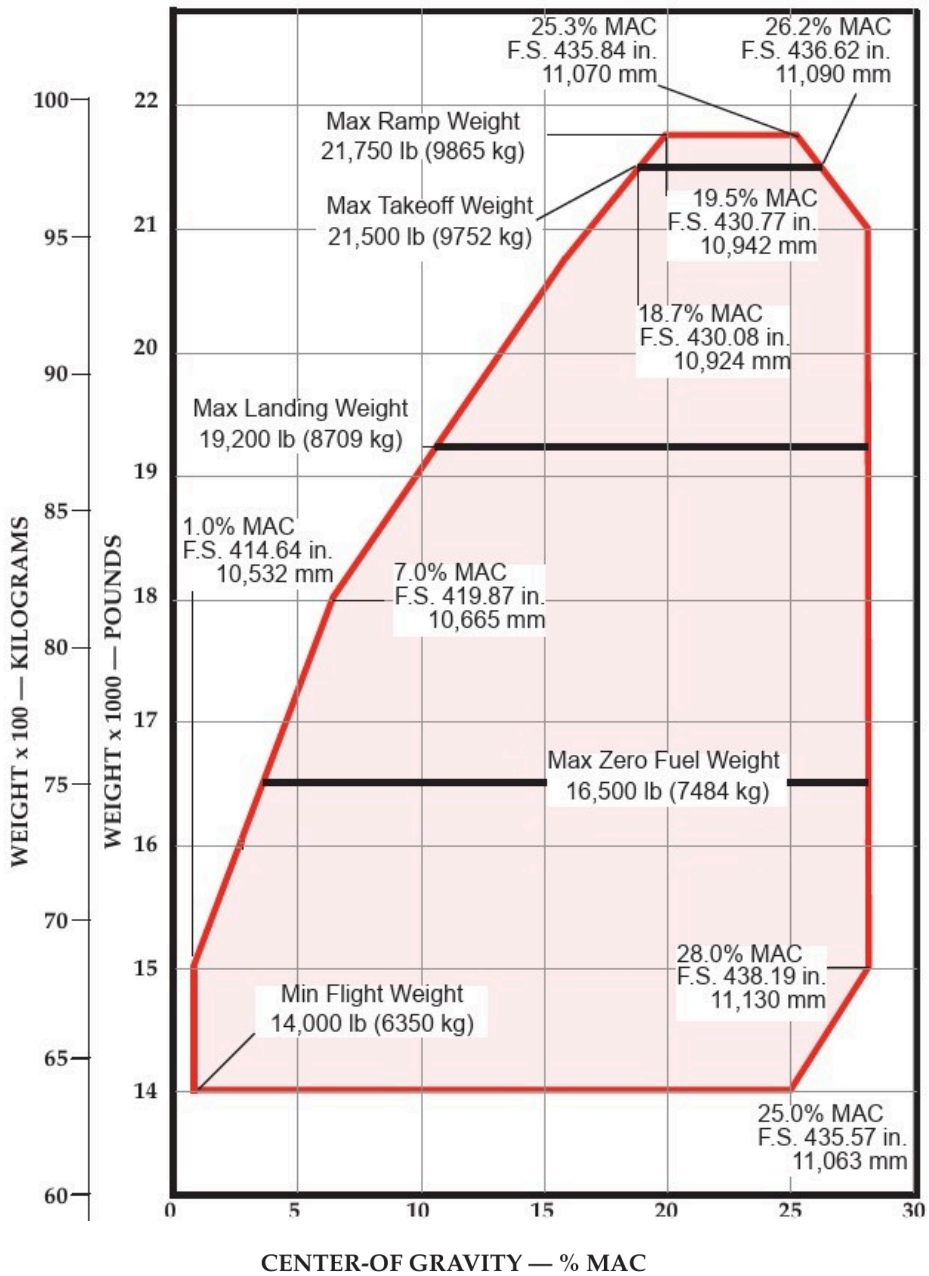


*Figure: Center of gravity limitations (OO-HRG)*

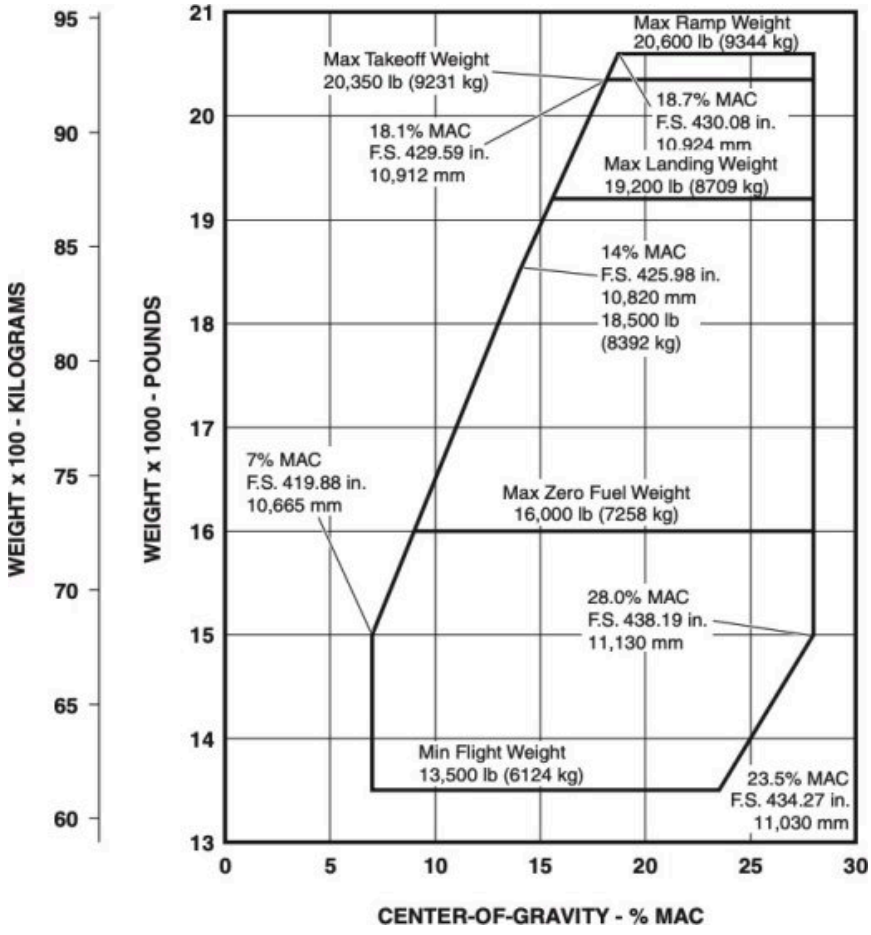
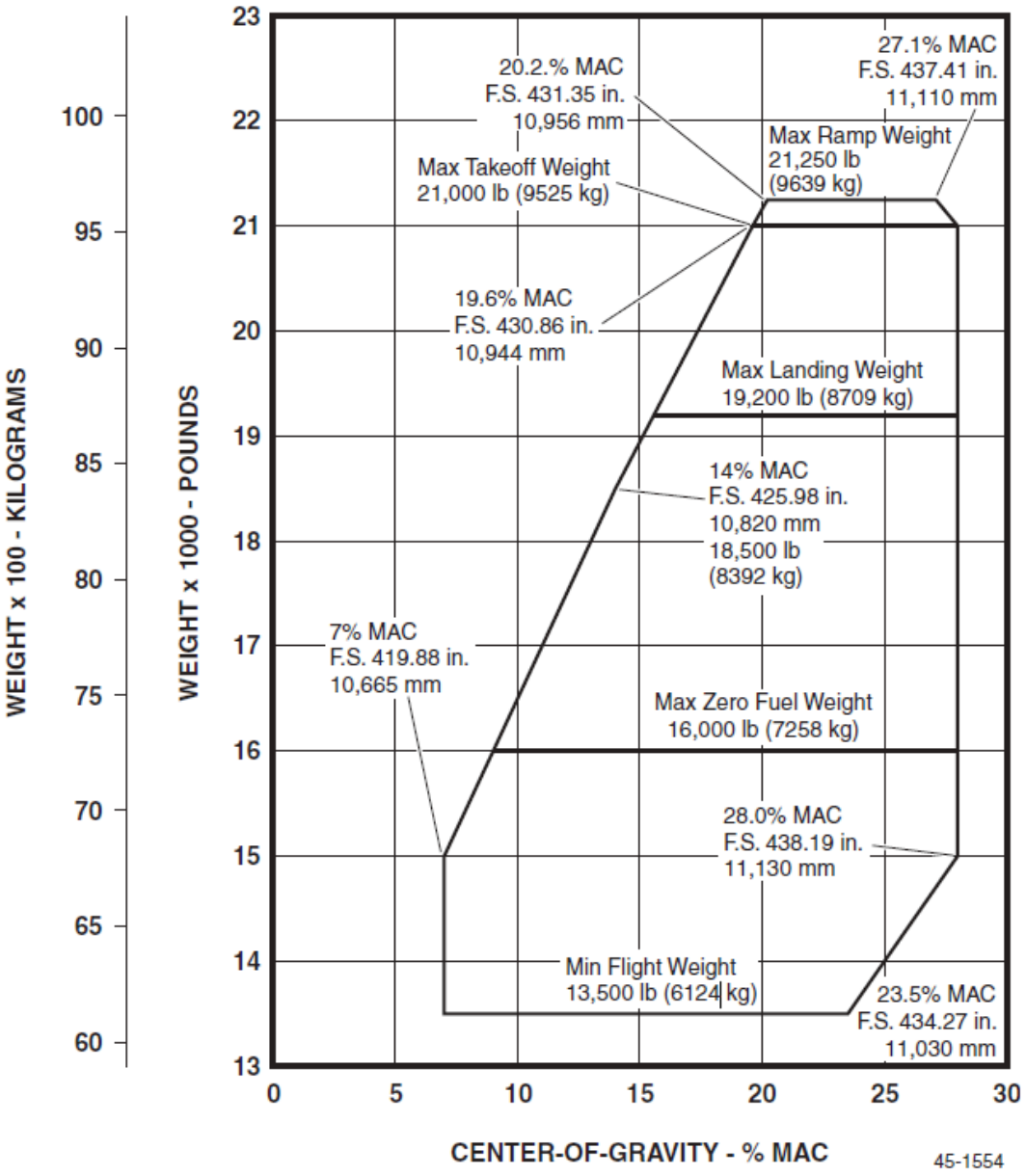


*Figure: Center of gravity limitations (OO-JGK)*



# 1.8 Speed limitation

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Airspeed/Mach Limits*

The aircraft shall be operated with the following speed limitations:

*Table: Speed limitations*

| **Speed limitations** | |
|---|---|
| $V_{MO}$ | 330 KIAS |
| $M_{MO}$ (Between 25.000 ft and 37.000 ft) | M 0.785- M 0.81 |
| $M_{MO}$ (above 37.000 ft) | M 0.81 |
| Maximum flap extended speed ($V_{FE}$) Partial flaps (8°) | 250 KIAS |
| Maximum flap extended speed ($V_{FE}$) Partial flaps (20°) | 200 KIAS |
| Maximum flap extended speed ($V_{FE}$) Full Flaps (40°) | 150 KIAS |
| Maximum landing gear operating speed ($V_{LO}$) | 200 KIAS |
| Manoeuvring speed ($V_A$) (1) | Refer to the AFM section 1- Limitations: Figure airspeed / mach limits |
| Minimum control speeds Air ($V_{MCA}$)(2) | Flaps 8°: 103 KIAS<br>Flaps 20°: 101 KIAS |
| Minimum control speeds Ground ($V_{MCG}$) | Rudder boost ON and APR ON: 102 KIAS Rudder boost ON and APR OFF: 100 KIAS |
| ***Note 1**: Maneuvers involving full application of rudder and aileron controls, as well as maneuvers that involve angles of attack near stall should be confined to speeds below $V_A$. Avoid rapid and large alternating control inputs, especially in combinations with large changes in pitch, roll or yaw as they may cause structural failure at any speed, including below $V_A$.*<br>***Note 2**: $V_{MCA}$ is a function of altitude and temperature. During flight tests, the aircraft was controllable down to stall speed. The speed shown is the minimum demonstrated speed corrected for maximum thrust effect with rudder boost on or off.* | |

# 1.9 Flight envelope limitation

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Operational Limits/ Requirements*

## 1.9.1 Take-off and landing operational limitations

The aircraft shall be operated with the following take-off and landing operational limitations:

*Table: Take-off and landing operational limitations*

| Take-off and landing operational limitations | |
|---|---|
| Maximum altitude limit | 14.000 ft |
| Minimum / Maximum ambient temperature | Refer to AFM figure 1-3 and Section V |

The following limitations shall also be taken into consideration:

1. The maximum approved fuel imbalance is 91 kg / 200 lbs;
2. Take-off and landings shall be limited to paved runway surfaces;
3. Antiskid shall be operational for take-off.

## 1.9.2 En-route operational limitations

The aircraft shall be operated with the following en-route operational limitations:

*Table: En-route operational limitations*

| En-route operational limitations | |
|---|---|
| Maximum operating altitude | 51.000 ft |
| Minimum / maximum ambient temperature | Refer to the AFM figure 1-3 |
| Maximum operating altitude of the APU | 10.000 ft(1) |
| Maximum altitude with flaps extended | 18.000 ft |
| Maximum altitude for the extension of Landing Gear | 18.000 ft |
| ***Note 1**: No APU installed on the aircraft with registration OO-HRG & OO-JGK.* | |

# 1.10 Wind limits

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Take-off, en-route and landing*

► *Refer to the Operations Manual Part A Section 8.1.3.12 – Crosswind operations*

► *Refer to the Operations Manual Part A Section 8.2.5 – Safe aircraft parking*

The aircraft shall be operated with the following wind limitations:

*Table: Wind limitations*

| **Wind limitations (including gusts)** | |
|---|---|
| Maximum crosswind component for take-off and landing | 22 kts |
| Maximum tailwind component for take-off and landing | 10 kts(1) |
| ***Note 1**: Tailwind limit of 10 kts is limited to take-off below 12.000 ft MSL. Above 12.000ft, a take-off with tailwind shall not be considered.* | |

# 1.11 Performance limitations for applicable configurations

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Operational limits / requirements*

The aircraft shall be operated with the following load factors:

*Table: Load factors*

| **Load factors** | |
|---|---|
| Flaps up | -1,0 G to + 2.9 G |
| Flaps (8°-15°- 40°) | 0.0 to +2,0 G |
| ***Note 1**: These acceleration values limit the bank angle in a level coordinated turn to 70° (flaps up) and 60° (flaps down).* | |

## 1.12 Runway slope

► *Refer to the Aircraft Flight Manual Section 5 – Performance*

Aircraft Flight Manual performance data is available for runway slopes from uphill gradients of 2% till downhill gradients of -2%.

## 1.13 Limitations on wet or contaminated runways

► *Refer to the Aircraft Flight Manual Section 5: Performance*

► *Refer to the Operations Manual Part B Section* ***2.23 – Cold weather operation***

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aircraft during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based.

In the case of a contaminated runway, the first option for the Commander (PIC) is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments and any further safety measures he considers justified under the prevailing conditions.

Flight Crew Members shall maintain an adequate overall level of safety whilst such operations are limited to rare occasions and all additional measures ensuring an equivalent level of safety shall be ensured. Such measures are special crew training, additional distance factoring and more restrictive wind limitations.

# 1.14 Airframe contamination

AMC1 CAT.OP.MPA.255, CAT.OP.MPA.255 (a)

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Icing*

► *Refer to the Aircraft Flight Manual Section 4 – Abnormal procedures: Anti-icing*

► *Refer to the Aircraft Flight Manual Section 5 - Performance*

► *Refer to the Operations Manual Part A Section 8.2.4 – De-icing and anti-icing on the ground*

► *Refer to the Operations Manual Part A Section 8.3.8.3 – Icing conditions in flight*

► *Refer to the Operations Manual Part B Section **2.23 – Cold weather operation***

## 1.14.1 Operation in icing conditions

This aircraft shall be approved for flight in icing conditions when the required equipment is installed and operational. This approval is based on tests conducted in natural and simulated icing conditions.

These conditions do not include, nor were tests conducted in, all icing conditions that may be encountered (e.g. freezing rain, freezing drizzle, mixed conditions or conditions defined as severe). Such icing conditions have the potential of producing hazardous ice accumulations, which:

1. Exceed the capabilities of the aircraft's ice protection equipment;
2. Create unacceptable aircraft performance.

Flight into icing conditions, which lie outside those tested, is not prohibited. However, Flight Crew Members shall be prepared to divert the flight promptly if hazardous ice accumulations occur.

Refer to the section 1 of the Aircraft Flight Manual for limitations relating to icing in flight and section 2 for normal procedures relating to icing in flight, abnormal procedures associated with icing equipment malfunctions and procedures required for severe icing conditions. Refer to section 5 for performance degradations associated with icing in flight.

## 1.14.2 Operation in severe icing conditions

CAT.OP.MPA.255 (c)

Severe icing may result from environmental conditions outside of those for which the aircraft is certified. Flight in freezing rain, freezing drizzle or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system or may result in ice forming aft of the protected surfaces. This ice may not be shed when using the ice protection systems and may seriously degrade the performance and controllability of the aircraft.

During flight, severe icing conditions shall be determined by the following visual cues:

1. Unusually extensive ice accumulation on the airframe and windshield in areas not normally observed to collect ice;
2. Accumulation of ice on the upper surface of the wing aft of the protected area.

If one or more of the above visual cues exist:

1. Use of the autopilot is prohibited;
2. Immediately request priority handling from Air Traffic Control to facilitate a route or altitude change to exit the icing conditions;
3. Leave flaps in current position, do not extend or retract;
4. Avoid abrupt and excessive maneuvering that may exacerbate control difficulties;
5. If unusual or uncommanded roll control movement is observed, reduce angle-of attack.

All wing icing inspection lights shall be operative prior to flight into known or forecast icing conditions at night.

***NOTE***

*This supersedes any relief possibly provided by the Minimum Equipment List.*

# 1.15 System limitations

► *Refer to the Aircraft Flight Manual Section 1 – Limitations*

► *Refer to the Operations Manual Part B Section 12 - Aircraft systems*

## 1.15.1 General

Some systems and/or equipment however may require some more detailed explanation (e.g. specific limitations for a certain system and/or equipment); hence they shall be detailed below.

## 1.15.2 Medical equipment

► *Refer to EASA STC IM.A.S.01199 - Installation of emergency medical stretchers and bases, oxygen and electrical systems and associated LifePort Inc.*

► *Refer to LifePort PLUS supplement AFMS Learjet 45 (Doc. No. EGR-644-11) – Patient loading and utility system*

► *Refer to the Operations Manual Part B Section* ***1.2.2 – Medical configuration***

The following limitations shall be observed:

1. The AeroSled shall be installed on the PLUS module in such a way that the patient's head is forward in the aircraft;
2. If a backrest is installed on the AeroSled, it shall be fully lowered during critical phases of flight;
3. A minimum of 1 Attendant shall be provided for each stretcher occupant who is incapable of independently exiting the aircraft;
4. Occupant restraints, including shoulder belts, shall be secured during taxi, take-off and landing;
5. It shall be ensured that, if required, a life jacket and passenger oxygen mask for the occupant of the stretcher is available to the occupant;
6. No obstruction shall be permitted in front of the emergency exit during critical phases of flight;

***NOTE***

*An obstruction is any object, other than the PLUS or AeroSled, greater than 50 cm (21 inch) above the lower seat track including seats, cabinets or carry-on baggage.*

7. Occupancy of the AeroSled during critical phases of flight shall be limited to non- ambulatory passengers only;
8. Handles at each end of the PLUS to facilitate removal / installation, shall be removed before flight;
9. No forward-facing seat, with a forward seat stud located within 90 cm (35,8 inch) aft of the PLUS assembly, may be occupied during critical phases of flight;
10. No storage is allowed in the PLUS oxygen system bays;
11. All the required placards shall be installed on the equipment as detailed in the limitations of the applicable LifePort supplement.

SECTION 2 - NORMAL PROCEDURES

# 2.1 General procedures

## 2.1.1 Introduction

AMC1 ORO.MLR.100 - (e), AMC1 ORO.MLR.100 - (f)

The standard operating procedures (SOP's) as described in section 2 and 3 of this manual are based on the different manufacturer guidelines and some common practices in the industry. They have been adapted to ensure standardisation among different aircraft fleets operated within the Company. However, where standardisation was not feasible, differences between different fleets remain and are marked in the different Operations Manuals Part B.

The SOP's shall be supplemented by information about specific operating techniques and recommendations for specific types of operations (contaminated runways, RVSM, etc). The SOP's assume that all aircraft systems are operating normally and that all automation is used normally. Conditions may arise, where the application of the Company SOP's are not the best course of action. Only after due consideration, and agreement of both Flight Crew Members, a deviation from Company SOP's may be permitted.

In case a discrepancy or contradiction arises between the procedures described in this manual and the Aircraft Flight Manual (AFM), the Aircraft Flight Manual shall be considered as legal authority.

## 2.1.2 Manufacturer standard operating procedures

► *Refer to the Recommended Operating Procedures and Techniques Manual*

The manufacturer has published a Recommended Operating Procedures and Techniques (ROPAT) Manual, which serves as a guideline for the implementation of safe and efficient operational procedures for Learjet 40/45 aircraft.

Flight Crew Members shall adhere to the standard operating procedures (SOP's), which have been described in this ROPAT Manual. As this manual does not take into account Company specific procedures and as it is not a substitute for any of the Company Operations Manuals required by the applicable regulations, the procedures described in the ROPAT Manual shall be supplemented with the Company specific procedures described in this manual.

If a subsection in this manual only refers to the ROPAT Manual, the ROPAT Manual procedures shall be considered Company procedures and shall be adhered to. If additional Company procedures are required, these shall be added below the reference to the ROPAT Manual.

In case a discrepancy or contradiction arises between the procedures described in this manual and the ROPAT Manual, this manual shall be considered as legal authority. However, in case a discrepancy or contradiction arises between the limitations described in this manual and the Aircraft Flight Manual (AFM), the AFM shall be considered as the legal authority.

Parts of the ROPAT Manual where this manual does not refer to specifically are to be considered guidelines and/or useful information.

## 2.1.3 Crew resource management procedures

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Crew coordination*

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Advising of Aircraft configuration Change*

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Minimum Flight Crew*

► *Refer to the Operations Manual Part A Section 1.4 – Authority, duties and responsibilities of the crew*

► *Refer to the Operations Manual Part A Section 4.2 – Designation of the Commander (PIC)*

► *Refer to the Operations Manual Part B Section **1.5 - Crew composition***

All aircraft are operated under the Pilot Flying (PF) and Pilot Monitoring (PM) concept. Each of both Flight Crew Members shall always advise the other Flight Crew Member if he is intending to operate something in the cockpit, so the other Flight Crew Member maintains situational awareness at all times. Duties are also assigned according to the mission phase. Pre- and post-flight duties are shared between the Pilot-in-Command (Commander) and the other Flight Crew Member (SIC), while in-flight phases are shared between the Pilot Flying (PF) and the Pilot Monitoring (PM).

The Pilot Flying (PF) shall be responsible for controlling the throttles (energy management), flight path, aircraft configuration and the navigation by either supervising the autopilot or by hand flying the aircraft with or without flight director.

The Pilot Monitoring (PM) shall be responsible for monitoring and supporting tasks. These include communications with ATC, SOP actions, flight director and flight management systems (FMS) mode selections and target entries when the PF is hand flying the aircraft, monitoring systems and aircraft configuration and cross checking the PF to provide back-up.

The Commander (PIC) shall be assigned by the Flight Operations Manager. He maintains overall responsibility for the safe and efficient conduct of the flight. The Commander (PIC) of the flight will assign the PF and PM duties for each sector. He will allocate duties, taking into account the experience level of both Flight Crew Members, the level of complexity of the planned flight, weather, etc.

The Flight Crew Member in the left seat shall be referred to as CM1, the Flight Crew Member in the right seat as CM2. In most cases, the Flight Crew Member in the left seat (CM1) shall be the Commander (PIC) of the flight. During training or operations with two Captains, the Commander (PIC) may be in the right seat and this only when he is qualified to do so.

## 2.1.4 Sterile cockpit concept

AMC1 ORO.GEN.110 (f), CAT.OP.MPA.215, ORO.GEN.110 (f)

► *Refer to the Operations Manual Part A Section 8.3.10 – Flight Crew Members at their stations*

► *Refer to the Operations Manual Part A Section 8.3.14 – Use of headset*

► *Refer to the Operations Manual Part B Section **2.1.16 – Clean cockpit concept***

Flight Crew Member's distraction has been a contributing factor in some aviation accidents. During critical phases of flight, Flight Crew Members shall be focused on flight path monitoring, ATC communication, terrain awareness and aircraft configuration. The sterile cockpit procedure shall be applied:

1. During critical phases of flight including pushback and taxiing of the aircraft;
2. When starting and shutting down the engines and all related tasks to it including performing checklists (i.e. before start checklist and shutdown checklist);
3. When performing checklists;
4. Below 10.000 ft above the aerodrome of departure after take-off and the aerodrome of destination before landing, except for cruise flight;
5. When the autopilot is not engaged;
6. During any other phases of flight as determined by the Commander (PIC).

*NOTE*

*Flight Crew Members shall also not engage in non-operational communication with Passengers during the last 1.000 ft before reaching the assigned level.*

During the sterile cockpit procedure, the following shall be applicable:

1. A Flight Crew Member shall be restricted to essential operational activities and shall not engage in non-operational communication with each other or with the passenger(s);
2. Both Flight Crew Members shall be seated at their assigned station with their seatbelt and shoulder harness properly fastened. Seats and rudder pedals shall be properly adjusted by both Flight Crew Members in order to allow, if necessary, for full control including full rudder deflection and maximum braking;
3. Both Flight Crew Members shall not handle any portable electronic device (PED) which is not properly secured. When so properly secured, handling shall be limited to essential operational activities only;
4. The Pilot Flying (PF) shall, in case the autopilot is engaged, keep his hands free so he can immediately intervene, if necessary, without any delay;
5. Passengers shall, if deemed necessary by the Commander (PIC), be briefed on the sterile cockpit concept as to minimize distraction of the crew and/or access of the passengers to the cockpit;
6. The clean cockpit concept shall be applied;
7. Headsets shall be used.

## 2.1.5 Manufacturer and Company checklists

ORO.GEN.110 (h)

### 2.1.5.1 Use of normal checklists

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL132B Section N (Learjet 40) – Normal procedures*

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL126C Section N (Learjet 45) – Normal procedures*

► *Refer to the Operations Manual Part B Section **2.26 – Specific system and/or equipment additional normal procedures***

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

#### 2.1.5.1.1 *General*

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Checklists*

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Flow patterns*

Flight Crew Members shall use the abbreviated Company checklist or the Manufacturer Crew Checklist & Quick Reference Handbook during normal operations. Normal checklists enhance flight safety by providing an opportunity to confirm or correct the systems and aircraft configuration for critical items.

***CAUTION***

***The Abbreviated Company checklist takes the required items related to the installation of the medical equipment (if carried) and Company procedures such as but not limited to the use of the EFB, in an abbreviated form, into account and should therefore preferably be used.***

*NOTE*

*In case a discrepancy or contradiction arises between the procedures described in the abbreviated Company checklist and the Manufacturer Crew Checklist & Quick Reference Handbook, the Manufacturer Crew Checklist & Quick Reference Handbook shall be considered as legal authority.*

There are two types of normal checklists:

1. **A read and do checklist** being a checklist where the Flight Crew Member reads out loud the item from the checklist, accomplishes or verifies its status and calls out the verified status of the item. The following checklist shall be performed on the basis of read and do:
    a. Any abnormal or emergency checklist;
    b. The parts of the before taxi and before take-off checklist which are below the line;
2. **A challenge and response checklist** being a checklist where the Flight Crew Member reading the checklist reads the item, both Flight Crew Members check the status of the item and the challenged Flight Crew Member responds with the status of the verified item. A normal checklist shall be performed on the basis of challenge and response.

To enhance communication and understanding between Flight Crew Members when performing a challenge and response checklist, the following standard rules and phraseology shall be used at all times:

1. The responding Flight Crew Member shall respond to the challenge only after having checked or corrected the required configuration;
2. If noticing that the required configuration is not correct, the responding Flight Crew Member shall announce the actual configuration;
3. In all cases, the challenging Flight Crew Member shall wait for a positive response (and shall cross-check the validity of the response, as required) before moving to the next item.

In case of a read and do checklist, the PM shall read out loud the checklist and the status of the item. Performing a read and do checklist is preferably done when the PF is able to listen to the checklist called out at loud so any item and status called by the PM may be monitored by the PF. If the status is not in compliance with the expected checklist item status, the Flight Crew Member who challenges will discontinue reading the checklist to announce and, after coordination with the other Flight Crew Member, take the appropriate corrective action if required. The other Flight Crew Member shall crosscheck this corrective action.

If the PF fails to initiate a normal checklist, the PM shall suggest the initiation of the checklist by applying good CRM practice. Normal checklists shall be called in a timely manner during low-workload periods.

When the response listed in the checklist is ‘as required’, the actual configuration or status of the system shall be announced.

When a checklist is called for, it shall either be completed in full or down to the line when items after the line cannot yet be completed. The Flight Crew Member reading the checklist shall hold the checks at the line if the items after the line cannot be completed.

When engines are running, items shall not be skipped and returned to except where interrupted by ATC or for safety reasons. When a checklist was interrupted, the checklist shall be retaken from the top.

The PM shall always verbalize the completion of the checklist by calling out loudly “(relevant checklist – see below) CHECKLIST COMPLETED”.

When unable to complete a checklist completely due to open items, the PM shall call out loud “(relevant checklist – see below) CHECKLIST COMPLETED EXCEPT FOR (checklist item)”. When these open items have been completed, the PM shall call out loud “(relevant checklist – see below) CHECKLIST NOW COMPLETED”.

***CAUTION***

***As long as a checklist has been started but has not been completed due to open items in that checklist, sterile cockpit procedures shall apply.***

*NOTE*

*Open items are typically at the end of the applicable checklist. The checklist items related to autopilot / yaw damper and landing lights part of the before landing checklist shall not be required to be completed to meet the stable criteria.*

When low visibility procedures are in force, any checklist and/or briefing shall be performed stationary, at the apron or at the holding point. No checks shall be done while taxiing to have both Flight Crew Members available for a safe taxi procedure.

The normal checklists called for within the Company on this type of aircraft are:

| | |
|---|---|
| 1. Cockpit preparation (PF) | Challenge and response |
| 2. Before start (PF) | Challenge and response |
| 3. Before taxi (PF) | Challenge and response |
| 4. Before take-off (PF) | Challenge and response |
| 5. After take-off (PF) | Challenge and response |
| 6. Passing FL100 / 10.000 ft (as applicable) (PF) | Challenge and response |
| 7. Cruise (PF) | Challenge and response |
| 8. Descent (PF) | Challenge and response |
| 9. Approach (PF) | Challenge and response |
| 10. Before landing (PF) | Challenge and response |
| 11. After landing (PF) | Challenge and response |
| 12. Shutdown (PF) | Challenge and response |

*NOTE*

*The parts of the before taxi checklist and before take-off checklist that are depicted below the line (i.e. below *** ready for taxi *** and *** cleared for take-off ***) shall be completed according to the 'read and do' principle.*

***CAUTION***

***The Manufacturer uses a different naming convention for its normal checklists. Despite that, these checklists shall be used using the same procedures as described above if the Manufacturer's normal checklist is used.***

#### 2.1.5.1.2 *Checklist triggers*

Certain actions and/or moments shall trigger the request for a certain checklist.

*Table: Checklist triggers*

| **Checklist triggers** | |
|---|---|
| Checklist | Trigger(1) |
| Before start | Start-up clearance received |
| Before taxi | Before commencing to taxi with the taxi clearance received (if given) |
| Before take-off | Take-off briefing completed(2) |
| After take-off | Climbing to the first assigned flight level with the standard pressure set on all altimeters(3+4) |
| Passing FL100 / 10.000 ft | When climbing through FL100 or 10.000 ft whichever is applicable(12+13) |
| Cruise | Stabilised on the assigned cruising level with cruise power (or lower) set(5) |
| Descent | Descending towards the arrival aerodrome with aircraft performance calculated and the approach, landing and go-around briefing given(6+7+8+9) |
| Approach | Descending to the first assigned altitude (height) with the QNH (QFE) set on all altimeters(10) |
| Before landing | Gear confirmed down by both Flight Crew Members |
| After landing | At a suitable time after clearing the active runway |
| Shutdown | Parking brake set and both engines spooled down(11) |

*Note 1: A more detailed triggering system and/or items to be performed before calling for a certain checklist may sometimes be found in the applicable section of this manual.*
*Note 2: If the take-off briefing is given before commencing to taxi (e.g. low visibility procedures), the before take-off checklist shall be performed after completing the final take-off review (updated take-off briefing for any subsequent last minute changes if any) and before entering the active runway.*
*Note 3: Performing the checklist may be delayed at the discretion of the Commander (PIC) if workload does not allow the checklist to be performed.*
*Note 4: If the flight is performed at lower levels not climbing to a flight level and/or the first portion of the flight does not include climbing to a flight level, the after takeoff shall be performed within 10 minutes after take-off.*
*Note 5: If the desired cruising level may not be reached directly (e.g. step climb), the cruise checklist shall be performed on a lower cruising level within 30 minutes after take-off.*
*Note 6: The descent checklist shall be initiated not later than descending through FL100 / 10.000 ft or passing the initial approach fix (IAF), whichever occurs first.*

| Checklist triggers |
| --- |
| *Note 7: If not all parts of the arrival and approach clearance have been received at the start of the descent; subsequent follow-up descent briefing may be required.*<br>*Note 8: If the flight is performed at lower levels not including an arrival and/or a subsequent descent, the descent checklist shall be performed at least 10 minutes before the expected landing time.*<br>*Note 9: On short flights (e.g. positioning from EBBR to EBAW) the descent and approach checklist may be combined on the condition that a review of the expected arrival and approach procedure is included in the take-off briefing and all required performance data is calculated before departure.*<br>*Note 10: If the flight is performed at lower altitude (height), the approach checklist shall be performed at least before passing the IAF or entering the circuit if performing a visual approach.*<br>*Note 11: For passenger comfort, it may be acceptable to only perform the initial part of the shutdown checklist before disembarking the passenger(s) (e.g. batteries remaining on to provide lighting to passenger when disembarking at night). Both Flight Crew Members shall ensure after disembarking the passenger(s) that the shutdown checklist is fully completed.*<br>*Note 12: In areas of operation where the transition level is higher than 10.000 ft, this checklist may be performed before the after take-off checklist or together with the after take-off checklist depending the workload.*<br>*Note 13: If the flight is performed at lower levels not climbing above FL100 or 10.000 ft (as applicable), this checklist may be omitted.* |

#### 2.1.5.1.3 *Abbreviated Company checklist*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

For operational reasons, the Company produces per type or class of aircraft an abbreviated Company checklist, which is an abbreviated checklist based on the checklist produced by the aircraft manufacturer tailored to meet the types of operations performed and adhere with the Company standard operating procedures (SOP's).

Company abbreviated checklists shall follow the same structure, general flow and procedures as the aircraft manufacturer checklists.

*NOTE*

*A reference to the applicable version of the Manufacturer Crew Checklist & Quick Reference Handbook shall be depicted on the abbreviated Company checklist to show compliance with that version. If no reference is depicted and/or a newer version of the Manufacturer Crew Checklist & Quick Reference Handbook is available, the abbreviated Company checklist shall not be used.*

#### 2.1.5.1.4 *Supplementary Company checklist*

► *Refer to the Operations Manual Part A Annex 20 – Supplementary Company checklist - Generic*

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

The Company provides a supplementary Company checklist as an addition to the existing Company or Manufacturer procedures. The generic part may be found as part of the Operations Manual Part A assisting the crew in repeating some procedures embedded in the manual as more practical procedures to be used during actual operations.

The part of the supplementary Company checklist which is aircraft type specific may be found as part of the applicable Operations Manual Part B and contains procedures not provided by the Manufacturer or where a Manufacturer checklist may need some further elaborating as it may not be meeting the Company requirements / procedures.

*NOTE*
*Normal procedures in this checklist are grouped together based on its use. Emergency and abnormal procedures are depicted alphabetically depicting the emergency procedures first.*

### 2.1.5.2 Location of checklists

► *Refer to the Operations Manual Part B Annex 4 – AFM take-off and landing performance extract – LJ45*

The following checklists shall be stored in the cockpit according to the following limitations:

1. At least one **Manufacturer Crew Checklist & Quick Reference Handbook** located within reach of the Pilot Monitoring (PM) when seated at his designated station. When not in use during non-critical phases of fight, the checklist may temporary be stored between the pedestal and the cockpit seats. When not in use during critical phases of flight, it shall be stored in such a way that it remains in its position during acceleration / deceleration of the aircraft;
2. Two **Company Quick Reference Handbooks (Company QRH)** of which one is located near (i.e. within reach of the applicable Flight Crew Member) each cockpit seat when not in use. When not in use during non-critical phases of flight, the QRH may temporary be stored between the pedestal and the cockpit seats. When not in use during critical phases of flight, it shall be stored in such a way that it remains in its position during acceleration / deceleration of the aircraft. The Company QRH shall exist out of (and in that order):
    a. An abbreviated Company checklist – LJ45,
    b. A supplementary Company checklist – LJ45,
    c. The supplementary Company checklist – Generic,
    d. AFM take-off and landing performance extract.

## 2.1.6 Use of standard calls

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Checklists*

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Deviations*

Standard calls shall be used to:

1. Give a command or transfer an information;
2. Acknowledge a command or an information transfer;
3. Give a response or ask a question;
4. Callout a change of indication;
5. Identify a specific event.

When using standard calls, use the following clear phraseology:

1. **“CHECK”**: A command for the other Flight Crew Member to verify an item;
2. **“CHECKED”**: A confirmation from the other Flight Crew Member that an item has been verified;
3. **“CROSS-CHECKED”**: A confirmation that information has been verified at both pilot stations;
4. **“SET”**: A command for the other Flight Crew Member to set a specific value or a response from the other Flight Crew Member confirming the specific value to be set;
5. **“SELECT”**: A command to the other Flight Crew Member to initiate a system mode, configuration or setting;
6. **“SELECTED”**: The response from the other Flight Crew Member confirming the initiation of a system mode, configuration or setting requested;
7. **“ARM”:** A command to the other Flight Crew Member to select a mode which does not become active until certain other conditions are met;
8. **“ARMED”**: A response from the other Flight Crew Member confirming the mode requested;
9. **“INSERT”**: A command for the other Flight Crew Member when referring to FMS programming;
10. **“INSERTED**”: A response from the other Flight Crew Member confirming the FMS programming to be performed as requested;
11. **“ENGAGE”**: A command for the other Flight Crew Member to engage a system or select a mode;
12. **“ENGAGED”**: A response from the other Flight Crew Member confirming the engaging of the system or selection of the mode;
13. **“ON / OFF (following the name of a system)**”: A command to the other Flight Crew Member to select or deselect a system or a response from the other Flight Crew Member confirming the status of the system.

When moving switches, the result shall always be announced and crosschecked by reading it on the applicable annunciation.

The PM shall use the deviation limits as set out below to make a corrective call.

*Table: Deviation limits before making a corrective call*

| **Deviation limits before making a corrective call(1)** | | | |
|---|---|---|---|
| Parameter | Phase of flight | | Deviation limit |
| Altitude | Take-off, climb, cruise and descent | | +/- 100 ft |
| | Approach | | +100 ft / -0 ft |
| Speed | Take-off and approach | | +10 kts / -5 kts |
| | Climb, cruise and descent | | +10 kts / -10 kts |
| Bank | All | | 30° |
| Lateral navigation | Take-off, climb, cruise and descent | | 5° / 1 NM |
| | Approach | ILS and LOC | 1 dot |
| | | VOR | +/- 5° |
| | | RNP(2) | 1 dot |
| | | NDB | +/- 10° |
| Glideslope / glidepath | Approach | | +1 dot / -0 dot |
| Rate of descent | Approach | | 1.000 ft/min |

***Note 1:*** *The speed, to which the deviations are referred to, is the target speed for the phase of flight, as agreed before. If a deviation from these parameters is required, it shall be briefed by the PF.*
***Note 2****: Where SBAS APV and SBAS CAT I (i.e. LPV minima) approaches have an angular lateral performance, NPA GNSS (i.e. LNAV minima) and APV BARO (i.e. LNAV/VNAV minima) approaches have a linear lateral performance with reference to the defined path.*

When making a corrective call, use common sense. Allow the PF the time to detect and correct the error or deviation. Corrective calls are mandatory when:

1. Accurate parameter control is essential;
2. The flight is in a critical phase;
3. Parameter deviation has gone unnoticed by the PF.

The PM shall call “CHECK SPEED”, “CHECK ALTITUDE”, “CHECK RATE OF DESCENT”, etc as the case may be. PF shall reply “CORRECTING” and corrects the deviating parameter. If PF does not reply or the corrective action is not observed, the PM shall re-initiate his call. If still no reply or no corrective action is given, the PM shall assume the PF’s incapacitation and take over control.

## 2.1.7 Normal crew tasks

When flying a procedure, use the principle of 'next step' callouts. It will be a recall for the PF and a crosscheck possibility for the PM. The use of next step principle shall be imperative especially in marginal weather operations.

## 2.1.8 Transferring control of the aircraft

The PF shall transfer controls each time he needs to engage in an activity that will divert his attention from his primary tasks or when the failure of primary flight instruments on his side requires him to do so.

Whatever the automation level, all transfers of control shall result in a swap in task allocation, without any doubt to which Flight Crew Member is actually in control of the aircraft. When transferring control, the PF shall make every effort to ensure that the aircraft is correctly trimmed.

When transferring control on request of the PF, the following practice shall be applied:

*Table: Callouts transferring control on request of the PF*

| **Callouts transferring control on request of the PF** | | |
|---|---|---|
| Situation | PF | PM |
| PF requests transfer of control | Your control | --- |
| PM assumes control | --- | My control |

When transferring control on request of the PM (for safety reasons when PM is the Commander / PIC), the following practice shall be applied:

*Table: Callouts transferring control on request of the PM*

| **Callouts transferring control on request of the PM** | | |
|---|---|---|
| Situation | PF | PM |
| PM assumes control | --- | My control |
| PF releases the controls | Your control | --- |

## 2.1.9 Use of autopilot

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Flight Guidance Controller (FGC) Panel Protocol*

► *Refer to the Operations Manual Part A Section 8.3.19 – Autopilot and autothrottle*

### 2.1.9.1 General

Flying the aircraft remains the highest priority of any Flight Crew Member.

The purpose of automation is to aid any Flight Crew Member in performing his function. A Flight Crew Member shall be proficient in operating the aircraft at all levels of automation. He shall be knowledgeable in the selection of the appropriate degree of automation and shall have the skills to move from one level of automation to another.

### 2.1.9.2 Automation levels

Automation may be defined in 4 levels:

*Table: Automation levels*

| **Automation levels** | |
|---|---|
| Level | Description |
| 1 | No automation. The aircraft is hand flown with autopilot and flight director disengaged.<br><br>This level of automation is not flown with the exception of:<br><br>1. When situation is too complex for any automation (turning final from circling);<br>2. When recovering from gross deviations that have been entered due to incorrect automatic flight management;<br>3. Failure of the autopilot and/or flight director;<br>4. An issue where safety relies upon such disengagement. Such examples are, but not limited to, unexpected response from automation, windshear recovery, collision avoidance and GPWS terrain warning. |
| 2 | The aircraft is hand flown with basic flight director guidance. This is the primary mode used for take-off, initial departure, approach and landing. |
| 3 | The autopilot is engaged. The flight director is coupled to raw radio data or basic modes such as heading and/or altitude.<br><br>This level is appropriate when responding to ATC instructions in a dynamic environment such as in terminal areas. |
| 4 | The autopilot is engaged with full use of the available automation coupled to the FMS.<br><br>Under these circumstances, great care shall be taken to maintain situational awareness. This level is not appropriate when significant changes to route or runways have been issued by ATC. |

### 2.1.9.3 Use of the TCS button

The TCS button allows the PF to manually control the aircraft in pitch and roll while the button remains pressed in. It temporarily disengages the pitch and roll channels of the autopilot. The yaw damper remains engaged. It also synchronies the flight director pitch command to the current pitch attitude and resets the IAS or VS target bug to the current value.

When the TCS function is used to disconnect the autopilot temporarily the TCS button shall not be released until the PF has manually flown the aircraft back on to the desired flight path and the flight path indications and trends are steady.

The TCS function shall not be used when established on an autopilot coupled ILS. Flight path deviations shall be corrected by disengaging the autopilot and performing manual flight path adjustments obeying the stabilised approach criteria. The re-engagement of the autopilot shall be upon pilot's discretion.

***CAUTION***

***Releasing the TCS button prior to the aircraft being flown steady on the desired flight path may result in the autopilot commanding excessive pitch attitudes.***

***CAUTION***

***The TCS function shall only be used for short-time corrections. Using TCS inhibits the automatic pitch trim function. Using TCS for long periods may result in an out of trim condition and possible attitude upset when the TCS is released.***

*NOTE*

*Care shall be taken when using the TCS button to synch the attitude when the autopilot is engaged as in the 'IAS' mode, the aircraft shall maintain the new reset speed.*

### 2.1.9.4 Selection of automation

Use of level 3 and level 4 automation during terminal operations, shall be limited to circumstances permitting advance preparation, review of FMS programming and complete crew briefing.

Proper use of automation reduces cockpit workload while improper use will do the opposite, which may lead to serious safety breaches. The selected level of automation at any time shall permit the Flight Crew Members to distribute the workload comfortably and maintain situational awareness.

### 2.1.9.5 Management of the autopilot

Management of the autopilot is based on whether or not the autopilot is engaged.

*Table: Task sharing with autopilot engaged*

| **Task sharing with autopilot engaged** | |
|---|---|
| PF | PM |
| 1. Manages the aircraft's path and energy safely and efficiently;<br>2. Selects and manages the appropriate automation level including all required inputs;<br>3. Inserts FMS navigation;<br>4. Complies with ATC instructions;<br>5. Calls for required checklists and configuration changes. | 1. Monitors the aircraft's path and energy;<br>2. Monitors that the appropriate automation level is selected;<br>3. Handles ATC;<br>4. Reads all required checklists and performs configuration changes when called for;<br>5. Monitors aircraft systems and completes all required in-flight logs and handles charts and performance data computations. |
| ***Note**: Programming of the FMS navigation system (action that requires a 'heads down' of the PF for a longer period of time) by the PF, shall not be authorised in a sterile cockpit (at or below FL100) even with the autopilot engaged. Programming of the FMS navigation system shall be performed at or below FL100 by the PM and this only after clear instructions by the PF. Inputs in the FMS like, but not limited to, a 'direct to' input or changing a FMS page are not considered as 'heads down' actions.* | |

*Table: Task sharing with autopilot disengaged*

| **Task sharing with autopilot disengaged** | |
|---|---|
| PF | PM |
| 1. Manages the aircraft's path and energy safely and efficiently;<br>2. Calls for the appropriate automation level including all required inputs;<br>3. Monitors that the appropriate automation level is selected;<br>4. Calls for FMS navigation changes;<br>5. Complies with ATC instructions;<br>6. Calls for required checklists and configuration changes. | 1. Monitors the aircraft's path and energy;<br>2. Selects and manages the appropriate automation level including all required inputs when called for;<br>3. Inserts FMS navigation when called for;<br>4. Handles ATC;<br>5. Reads all required checklists and performs configuration changes when called for;<br>6. Monitors aircraft systems and completes all required in-flight logs and handles charts and performance data computations. |

### 2.1.9.6 Flight management annunciator callouts

Flight management annunciator (FMA) indications or changes shall be called out except when:

1. The aircraft is on the ground;
2. A go-around is being performed until after the gear has been selected up.

With the autopilot engaged, the PF shall call the FMA mode changes. When the autopilot is not engaged, the PM shall call the mode changes.

Any flight management annunciation, which is not in accordance with the current phase of flight, shall be called out and this by any Flight Crew Member.

## 2.1.10 Communications

CAT.OP.MPA.215

► *Refer to the Recommended Operating Procedures and Techniques Manual – General Procedures: Radio Tuning*

### 2.1.10.1 General

► *Refer to the Operations Manual Part A Section 8.3.14 – Use of headset*

Headsets (including boom microphone) shall be worn by all Flight Crew Members on the flight deck at or below FL100. The use of headsets is at the Commander's (PIC's) discretion at cruising altitude above FL100.

When VHF frequencies are in use for communicating with ATC, COM 1 should be used for communications with ATC. COM 2 should be used for reception of ATIS, communication with aerodrome information services or fixed base operator (FBO) frequencies. When COM 2 is not being used, Flight Crew Members shall listen out on 121,5 MHz.

When HF frequencies are used for communicating with ATC, Flight Crew Members shall continue listening out on 121,5 MHz. If no headsets are used (using the SELCAL function), the frequency 121,5 MHz shall be monitored using the speaker function.

### 2.1.10.2 Communication rules

Standard phraseology as published in ICAO document 4444 shall be used. Flight Crew Members shall become familiar with ATC procedures and phraseology used within all areas of operation.

When transferring radio communication from the PM to the PF, the following callouts shall be made:

*Table: Callouts transferring radio communication*

| **Callouts transferring radio communication** | | |
|---|---|---|
| Situation | PF | PM |
| PM requests transfer of radio | ---<br><br>My COM 1 *or* my COM 2 | Your COM 1 *or* your COM 2<br><br>--- |
| Radio transfer terminated | ---<br><br>Your COM 1 *or* your COM 2 | My COM 1 *or* my COM 2<br><br>--- |
| ***Note:*** *When referring to "RADIOS" instead of "COM 1" or "COM 2", it means that all radio communication is transferred (i.e. "MY RADIO'S"). During normal operations typically only 1 radio control is transferred whilst during non-normal operations this is done for all radios when determining the task distribution.* | | |

### 2.1.10.3 HF transceiver and SELCAL

Each time a new frequency is selected, the transceiver needs a short mute transmission to tune the antenna. It is available for normal transmission and reception when the display shows a steady channel and frequency indication.

*NOTE*
*The aircraft of this type are equiped with 1 HF unit (OO-DOC, OO-JGK and OO-MED) or 2 HF units (OO-HRG) and have a SELCAL code.*

### 2.1.10.4 CPDLC communication

This type of aircraft is not equiped with CPDLC; hence this section shall not be applicable.

## 2.1.11 Briefing procedures

► *Refer to the Recommended Operating Procedures and Techniques Manual – Normal Procedures: Take-off briefing & approach briefing*

► *Refer to the Operations Manual Part B Section* ***2.1.15 - Threat and error management***

To ensure mutual understanding and effective cooperation among Flight Crew Members and with ATC, in-depth briefings shall be conducted on each flight. Effective briefings shall be short, structured, concise and adapted to the particular conditions of the take-off or approach and landing.

Prior to the first flight of a mission, a complete briefing shall be conducted. The briefing for subsequent flights may be reduced when continuing with the same crew.

Crew briefings are aimed at the following objectives, in support of standard operating procedures:

1. Define and communicate action plans and expectations, under normal or non-normal conditions;
2. Define and communicate operational threats affecting the flight and how they are to be managed;
3. Confirm applicable task sharing (Flight Crew Member role and responsibility).

Briefings should be conducted during low-workload periods. The take-off briefing should preferably be conducted while the aircraft is stationary.

‘Rushing during descent’ is a significant factor in approach and landing incidents and accidents. To prevent any rush in initiating the descent and the resulting increased workload in conducting the approach, the descent preparation and the approach and go-around briefings should be completed as early as possible, before or during descent.

*NOTE:*
*Refer to section* ***2.7.4 - ‘Rushing during descent’ principle and dangers*** *of this manual for a more detailed explanation of the ‘rushing during descent’ principle and dangers.*

## 2.1.12 Flight Crew Member occupied

There will be occasions when the PM will be occupied and not immediately available for a requested function. Common sense and the context of the situation shall dictate the proper course of action. The PF, however, shall not divert his attention from the control and monitoring of the aircraft. Any change to the control of the aircraft shall be briefed by the PF to the PM when the PM is no longer unavailable.

## 2.1.13 Use of aircraft electronic charts

► *Refer to the Operations Manual Part A Section 8.3.21 – Use of aircraft electronic charts*

► *Refer to the Operations Manual Part A Section 8.9 – Electronic flight bag*

This type of aircraft is not equipped with aircraft electronic charts; hence this section shall not be applicable.

## 2.1.14 Electronic flight bag

AMC3 SPA.EFB.100 (b) (3) - (b), AMC3 SPA.EFB.100 (b) (3) - (c)

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.9 – Electronic flight bag*

► *Refer to the Operations Manual Part B Section **1.4 - Types of operation***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

► *Refer to the Minimum Equipment List (MEL) ATA 46 – Information systems*

► *Refer to the Electronic Flight Bag Policy and Procedures Manual*

This section contains the aircraft specific electronic flight bag (EFB) operational procedures. The general procedures shall be depicted in the relevant section of the OM Part A as detailed in the reference above. Refer to the Minimum Equipment List (MEL) for the specific dispatch procedures with less than standard equipment.

For aircraft listed on the Company's Air Operator Certificate (AOC), the use of an EFB including type B software shall require a specific approval from the Competent Authority prior to operating. For aircraft listed on the Company's Declaration (DEC), the use of an EFB shall require a Company operational approval prior to operating.

Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

### 2.1.14.1 General

The Company viewable stowage (i.e. portable) EFB system (i.e iPad mini) shall be used together with the standard operating procedures, and both shall be used in all the phases of the flight, assuring total situation awareness and all lookout principles without increasing the total workload in the flight crew compartment.

Flight Crew Members shall be aware of risk of distraction from PEDs in the cockpit. At all times, Flight Crew Members shall be conscious of the potential for distraction from their primary duties and employ strategies to mitigate this risk.

Both Flight Crew Members shall have downloaded the relevant flight data to their devices.

When a system update is required, it should preferably be performed over Wi-Fi, with sufficient time allocated to complete the process. It is strongly recommended that updates are not performed immediately prior to a flight, and that the device remains connected to both a power source and Wi-Fi throughout the process. Data and entries for individual flights may also be downloaded by transferring the data between the operating devices using the crossfeed function.

Flight data shall be updated during turnaround or if instructed by OCC.

### 2.1.14.2 Specific charging procedures

► *Refer to the Operations Manual Part A Section 8.9.4.6 – General charging procedures*

For aircraft OO-DOC, OO-MED and OO-HRG the iPads may be charged using a Company provided powerbank as no AC plugs are available in the cockpit.

For aircraft OO-JGK, two US type power outlets are available, one besides each cockpit seat.

## 2.1.14.3 Pre-flight procedures

► *Refer to the Operations Manual Part A* ***8.9.5.4 - Jeppesen FD Pro application global settings***

As part of their pre-flight, Flight Crew Members shall:

1. Check the iPad for normal operations (i.e. no cracks, scratches, parts missing, etc);
2. Check all accessories for normal operations (i.e. covers, securing devices, power cables, etc);
3. Adjust the iPad screen brightness as desired;
4. Verify the status of the iPad battery to be sufficiently charged being:
    a. If able to charge in flight, at least 60% battery life;
    b. If unable to charge in flight, at least 60 % battery life + 10 % battery life for every hour of expected flight time;
5. Connect the device to the WIFI or mobile data if no WIFI is available;
6. Verify the status of the software and applications;
7. Check the revision status on both EFB's to ensure current updates are loaded in the system. If not, proceed with update procedures;
8. Retrieve all required operational documents by:
    a. Performing all required Crewbriefing tasks;
    b. Performing all Skylegs EFB tasks;
    c. Performing all Jeppesen FD Pro application tasks;
    d. Performing all TAILLOG application tasks;
    e. Performing all Guru2 application tasks;
    f. Updating flight data during turnaround or if instructed by OCC;
9. Select moving map and own-ship position on (if applicable), confirm inflight weather is selected off;
10. Check populated downloaded OFP data are correct and edit/fill in where necessary,
11. Each pilot shall independently make takeoff, landing and alternate dispatch calculations by using Guru2 performance application to cross-check the results. Any discrepancy between their results is not permitted and shall be investigated jointly to determine the cause. Ultimately, no difference in the final result is allowed. Once all calculations have been successfully executed and controlled, the Commander (PIC) shall approve and export the Performance Report. If necessary, this approved report can be unlocked to make corrections for weather conditions, takeoff, landing and alternate aerodrome settings, change of RWY etc. after which it will need to be re-approved and sent to the backoffice. See section **2.1.14.9 - Post-flight procedures**.
12. TAILLOG Pre-Flight report shall be controlled and signed by the Commander (PIC) on his own device or when transferred from the device of the SIC to the Commander's (PIC's) device;
13. On arrival at the aircraft, ensure the viewable stowage devices are serviceable and the iPad is attached securely and correctly at the respective pilot's operating position.
14. Confirm correct Jeppesen FD Pro application global settings (refer to OM A 8.9.5.4)
15. Engage airplane mode;
    a. Confirm cellular mode is OFF;
    b. Confirm Wi-Fi mode is OFF;
    c. Confirm Bluetooth mode is OFF.

### 2.1.14.4 Before departure procedures

Before departure, appropriate charts shall be selected on the Jeppesen FD Pro application.

Prior to take off, the commander (PIC) shall ensure that the performance calculation made is still valid for the active runway and the actual weather conditions. In case a recalculation is needed this shall be done after the aircraft has come to a complete stop with the parking brake set. The procedure described under point 11 in section **2.1.14.3 - Pre-flight procedures** shall be used.

Prior to take off, the Commander (PIC) shall ensure that the EFB systems in use on the aircraft are safely stowed in viewable stowage and that the ‘Lock Rotation’ function is activated.

### 2.1.14.5 Taxiing the aircraft

Before taxi is commenced all Flight Crew Members shall check for free control movement and assuring that the EFB's do not interfere with the flight controls. Both Flight Crew Members shall have the airport chart available for viewing on their EFB devices whilst the aircraft is taxiing for departure.

Provisions in the Operations Manual Part B section **2.5.1 - Taxi procedures** shall be followed in order to minimise the risk of runway incursions.

### 2.1.14.6 Take Off / Departure

Both PF and PM shall have the appropriate charts on their EFB. From adjusting the takeoff power until reaching 1500 ft AGL or final segment climb the flight crew shall not program or touch the EFBs. The main focus in this segment shall be on establishing the aircraft for climb. In case of a published departure route the pilot shall only program or touch when it is safe to do so and not compromise the aircraft handling.

### 2.1.14.7 In-flight procedures

When the EFB’s are used during flight they shall be placed in a way to not interfere or block any emergency equipment, cockpit controls or limit the visibility on any flight instruments.

No EFB’s shall be placed on the glare shield.

When not required, the EFB shall be put in STBY mode to save battery life.

Flight crew may remove the EFB device from the mount, especially when giving briefings.

During cruise, the PM shall primarily have the TAILLOG “Flight Progress” page available for viewing on their EFB device whilst the PF shall have the relevant charts available.

An EFB (Electronic Flight Bag) environment poses a higher risk of distraction.

Therefore, from the completion of the Before Start checklist until the completion of the Shutdown checklist, the Pilot Flying (PF) shall not consult other EFB applications than the Jeppesen FD Pro Application (charts) unless deemed required for the safety of the flight.

Before the TOD each pilot shall independently complete inflight landing calculations by using Guru2 performance application to cross-check the results, using the latest weather information. Any discrepancy between their results is not permitted and shall be investigated jointly to determine the cause.

Before descending below FL100, both flight crew shall place and secure their EFB device in the viewable stowage in the correct orientation.

### 2.1.14.8 Approach procedures

Before starting the approach and when the terminal charts on the iPad are expected to be used (i.e. in case IFIS is inoperative, not installed or not up to date), appropriate charts shall be selected on the Jeppesen FD Pro application.

The Commander (PIC) shall ensure that the EFB systems in use on the aircraft are safely stowed in viewable stowage and that the 'Lock Rotation' function is activated.

When entering the final approach segment, flight crews shall no longer program the EFB's.

### 2.1.14.9 Post-flight procedures

'Airplane Mode' shall be switched off in order that the EFB can send and receive data. The flight crew shall ensure that a minimum of one EFB has connectivity via WiFi or cellular. If connectivity cannot be achieved, the flight crew shall report the issue as soon as practicable to OCC.

The post flight report shall be completed. Confirm that the following times are already filled in:

- OFF Block Time
- Take-off Time

Enter the following required data:

- Landing Time
- ON Block Time
- Name of the Pilot Flying (PF)
- Fuel on board after arrival
- Fuel Burn (calculated)
- Reason for any fuel difference

The report shall be submitted from the Commander (PIC)'s iPad (EFB). If filled in on the other crewmember's iPad, the completed report shall first be transferred to the Commander (PIC)'s EFB.

The Commander (PIC) must sign the post-flight report to approve it.

## 2.1.15 Threat and error management

### 2.1.15.1 General

There are three basic components in the threat and error management (TEM) model:

1. Threats,
2. Errors,
3. Undesired aircraft state (UAS).

Threats and errors are part of everyday aviation operations that shall be managed by the crew, since both threats and errors carry the potential to generate an undesired aircraft state (UAS). The crew shall also manage undesired aircraft states, since they carry the potential for unsafe outcomes. Undesired aircraft state management largely represents the last opportunity to avoid an unsafe outcome and thus maintain safety margins in flight operations.

#### 2.1.15.1.1 Threats

Threats are defined as ‘events or errors that occur beyond the influence of the crew, increase operational complexity, and which shall be managed to maintain the margins of safety’. During typical flight operations, the crew shall have to manage various contextual complexities. Such complexities would include, for example, dealing with adverse meteorological conditions, aerodromes surrounded by high mountains, congested airspace, aircraft malfunctions, errors committed by other people outside of the cockpit, such as air traffic controllers, etc.

These threats need to be identified early in order that solutions can be discussed and implemented by the crew to resolve threats before they become a reality. Unresolved threats can become errors and have a negative impact on the safety of the flight.

#### 2.1.15.1.2 Errors

Errors are defined as ‘actions or inactions by the crew that lead to deviations from organisational or crew intentions or expectations’. Unmanaged and/or mismanaged errors frequently lead to undesired aircraft states. Errors in the operational context thus tend to reduce the margins of safety and increase the probability of adverse events.

#### 2.1.15.1.3 Undesired aircraft state

Undesired aircraft state (UAS) is defined as ‘crew-induced aircraft position or speed deviations, misapplication of flight controls or incorrect systems configuration, associated with a reduction in margins of safety’. Undesired aircraft states that result from ineffective threat and/or error management may lead to compromising situations and reduce margins of safety in flight operations.

### 2.1.15.2 Threat and error management part of crew briefings

Crew briefings shall identify threats known to exist. When identified, options and solutions shall be discussed in order to eliminate or reduce the threat level to acceptable. Company Flight Crew Member shall use the 'TWO-C' principle as part of their 'threat briefings':

1. **T – Terrain**: The crew shall consider the terrain around the area in which the aircraft is operating;
2. **W – Weather**: The crew shall examine the weather and the impact this may have on aircraft performance;
3. **O – Operational**: Any other operational threats which may have impact on the aircraft (e.g. MEL items, NOTAM's, aerodrome layout, QFE operations, etc);
4. **C – Crew**: Self-assessment of the crew ability to carry out their duty (e.g. fatigue, unfamiliar with the aerodrome, etc).

## 2.1.16 Clean cockpit concept

► *Refer to the Operations Manual Part B Section **2.1.4 – Sterile cockpit concept***

Loose items in a cockpit have been a contributing factor in some aviation incidents and accidents. In view of the possible consequences, the cockpit should remain clean and tidy at all times during flight.

Flight crew Members shall incorporate the following checks in their pre-flight actions in order to ensure their working environment is well secured for a flight:

1. Inspect the cockpit for forgotten or misplaced items before take-off and ensure all are properly secured. This also helps to assure their availability throughout the flight;
2. All personal items such as jackets, PED's or luggage shall be secured;
3. If necessary, remind the observer seat occupant not to create distractions and to adopt the same measures and discipline against unsecured items.

This attitude and level of alertness shall be maintained during the flight, putting a particular emphasis on this concept when sterile cockpit procedures are in force.

*NOTE*

*The Company provides Company loose equipment bags in each cockpit to be able to securely store smaller items if required.*

Items that may be present in the cockpit shall be put and stowed at their dedicated location using the following principle:

*Table: Clean cockpit concept*

| Clean cockpit concept | | |
|---|---|---|
| Item / location | Non-sterile cockpit | Sterile cockpit |
| Beverages | Beverages when contained in cups shall be placed in the cupholders. The same shall apply to beverage cans and bottles once opened. | No cups or opened cans shall be present in the cockpit. Bottles may be stored in cupholders for use on the condition that they can be closed when not being used. |
| Meals | Meals shall only be consumed by one FCM at a time. Clear coordination between FCM's to be established to designate duties in such a case. The FCM consuming the meal, shall not perform any Pilot Flying (PF) duties while doing so. | Meals shall not be consumed and required catering material shall not be present in the cockpit. |
| Central pedestal and glareshield | No item shall be placed on the central pedestal or glareshield. | |
| Headsets | Headsets when not in use shall be hung on the provided hook. | Headsets shall be used. |
| Manuals and paperwork | Manuals and paperwork when not being used, shall be placed in a lateral stowage position which may include behind or besides cockpit seats. | During critical phases of flight, no items shall be placed between the cockpit seat and the central pedestal (i.e. inboard). |
| Trash | As soon as practicable, trash shall be placed in the waste bin or properly secured. | No unsecured trash shall be present in the cockpit. |
| Small loose equipment (e.g. staplers, etc) | Items shall not be placed on or near flight controls. | Small loose equipment shall not be used unless required for the safe operation of the flight. |
| Personal flight bags, Company loose equipment bags, etc | They shall be closed again after obtaining whatever was necessary. | They shall not be accessed during critical phases of flight unless required for the safe operation of the flight. |

## 2.1.17 Use of erroneous take-off parameters

► *Refer to the Operations Manual Part B Section **2.5.4.1 – Take-off briefing***

### 2.1.17.1 General

The use of erroneous take-off parameters is a safety issue of general concern. It can result in early rotation with the potential for **tail strike**, collision with obstacles in the departure path, **loss of control** immediately after becoming airborne or runway overrun (i.e. as a result of either failure to get airborne or a decision to **reject the take-off**). In a number of cases, the loss of an aircraft during take-off has been directly attributed to the use of erroneous take-off parameters.

Most frequently, the erroneous parameters are derived as a result of using an incorrect value for the aircraft take-off mass but can also be linked to data entry errors, reference to the wrong performance chart, failure to update the parameters to reflect a runway change, an intersection departure or changing weather conditions or selection of a take- off configuration that does not match that assumed in the performance calculations.

### 2.1.17.2 Precautionary procedure

Flight Crew Members shall take the following precautions:

1. Give yourself enough time to perform calculations and enter data into the flight management system (FMS). Beware of distractions;
2. FMS data entry shall be slow and deliberate to ensure that the data entered reflects your intentions;
3. Double check data that has been entered to ensure consistency;
4. The FMS will not alert the Flight Crew Member if there is an incorrect entry. So check the FMS to detect unrealistic values and significant errors (i.e. gross error check);
5. Double check all input and output when retrieving performance and speed data;
6. If the take-off is abnormal, react promptly.

### 2.1.17.3 Gross error check

The range of variables in some parameters affecting aircraft performance data can be so great that it would not be possible for Flight Crew Members to know precisely what to expect in every circumstance.

However, it is possible to develop ‘rules of thumb’ and gross error checks for many of the values that are input to and output by the FMS on a given aircraft type. Knowing roughly what to expect from a calculation before it is executed, or what performance parameters an aircraft is likely to exhibit, will help Flight Crew Members to recognise potential data anomalies.

# 2.2 Pre-flight procedures

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Exterior Preflight, Walk-Around Inspection*

► *Refer to the Operations Manual Part B Section 10 – Survival and emergency equipment including oxygen*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

## 2.2.1 General

The following task sharing procedures shall be applicable:

*Table: Task sharing flight preparation*

| **Task sharing flight preparation(1)** | | | | | | |
|---|---|---|---|---|---|---|
| Item | CMDR (PIC) | SIC | CM1 | CM2 | PF | PM |
| Weather and NOTAM's | X | X | | | | |
| Operational flight plan | X | | | | | |
| ATC flight plan and slot | X | | | | | |
| Technical status, MEL and DDL | X | | | | | |
| Legal and operational documents | X | | | | | |
| Electronic flight bag (EFB) | X | | | | | |
| Pre-flight external check | X | | | | | |
| Pre-flight safety check | X | | | | | |
| Pre-flight security check | X | | | | | |
| Fuel | X | X | | | | |
| Catering | | X | | | | |
| Cleaning | | X | | | | |
| ***Note 1**: During the flight preparation, all legal and operational documents shall be checked by the Commander (PIC) and signed accordingly (where required) for acceptance. It is however common practise for the other Flight Crew Member to print and prepare all relevant paperwork giving the Commander (PIC), when both Flight Crew Members meet for the pre-flight briefing, an update on the actions already performed.* | | | | | | |

The pre-flight external check shall be performed according to the Manufacturer Crew Checklist & Quick Reference Handbook.

The Commander (PIC) shall check the emergency and safety equipment during the pre-flight safety check. He checks the presence and condition of the emergency and safety equipment by means of the cabin & emergency layout. The pre-flight safety check shall always be performed before each first flight or before a series of flights. The pre-flight safety check includes:

1. All portable emergency equipment installed on board,
2. All fixed equipment installed in the aircraft,
3. The emergency light system,
4. All available seats and, if installed, the patient loading and utility systems,
5. The toilet area,
6. The galley area,
7. The cargo compartment.

Deficiencies in safety equipment shall be checked according to the MEL. Equipment found at a wrong place shall be re-stowed at the appropriate location.

The Commander (PIC) is also responsible to check the aircraft for suspicious items. This means performing a visual check for suspicious items in cargo holds, toilets, bins, seat pockets, the area under and between seats, the waste bins, wardrobes, galleys, lockers etc. The aircraft shall be checked for items left behind, on purpose or not, by passengers, handling staff, cleaning staff etc. Some items may endanger the safety of the flight and therefore a thorough security check shall be completed. The security check shall be performed when cleaning and catering personnel have left the aircraft and before any passengers arrive at the aircraft.

The pre-flight inspection shall be signed off by the Commander (PIC) on the Aircraft Technical Log (ATL). In case of Maintenance Personnel or the other Flight Crew Member completing the pre-flight inspection, it may be shortened. The pre-flight safety check and pre-flight security check shall always be completed by a Flight Crew Member. The final responsibility remains at all times with the Commander (PIC).

The following task sharing procedures are also applicable:

*Table: Task sharing cockpit preparation*

| **Task sharing cockpit preparation**[(1)] | | | | | | |
|---|---|---|---|---|---|---|
| Item | CMDR (PIC) | SIC | CM1 | CM2 | PF | PM |
| Cockpit setup including EFB | | | | | X | X |
| Cabin status & catering | | X | | | | |
| Immigration & Customs | X | | | | | |
| Luggage | X | | | | | |
| Passenger handling | X | | | | | |
| Passenger boarding & briefing | X | | | | | |
| Take-off briefing | | | | | X | |
| ***Note 1**: During the cockpit setup, all mission-related entries are normally performed by the PF and verified by the PM. As the Commander (PIC) is however taking care of the passengers, it is common practice for the other Flight Crew Member to prepare the cockpit before arrival of the passengers. The other Flight Crew Member shall, in that case, brief the Commander (PIC) on the setup already performed.* | | | | | | |

The NAV lights shall be on to indicate to any ground personnel that the aircraft is powered (either by battery, GPU or APU (OO-MED & OO-DOC)).

The BEACON light shall be on to indicate to any ground personnel that the aircraft engines are or may be started and/or that the aircraft is or may start taxiing. The same procedure shall be applicable when towing the aircraft under control of ATC.

Embarkation shall not commence until the Commander (PIC) has given clearance to do so. Embarkation shall not commence until the crew has confirmed that the passenger steps are safely in position. Passengers shall not be allowed to embark the aircraft without at least one Flight Crew Member present.

## 2.2.2 Fueling procedures

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Fuel Limits*

► *Refer to the Operations Manual Part A Section 8.2.1 – Fueling procedures*

Before fueling the aircraft, the aircraft shall statically be grounded to the servicing unit.

Adding anti-ice additives when refueling the aircraft is not required but may be used if desired. Refer to the Aircraft Flight Manual for the applicable procedures for adding ant-ice additives.

***WARNING***

***Anti-icing additives containing Ethylene Glycol Monomethyl Ether (EGME) are harmful if inhaled, swallowed, or absorbed through the skin, and may cause eye irritation. It is also combustible. Before using this material, refer to all safety information on the container.***

***WARNING***

***Anti-icing additives containing Diethylene Glycol Monomethyl Ether (DIEGME) is slightly toxic if swallowed and may cause eye redness, swelling and irritation. It is also combustible. Before using this material, refer to all safety information on the container.***

***CAUTION***

***Make sure that the additive is directed into the flowing fuel stream and that the additive flow is started after the fuel flow starts and is stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel tank or aircraft painted surface. Use not less than 20 fluid ounces of additive per 156 gallons of fuel or more than 20 fluid ounces of additive per 104 gallons of fuel.***

## 2.2.3 APU operations

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Auxiliary Power Unit (APU) Limits*

*NOTE*

*The aircraft with registration OO-HRG & OO-JGK are not equipped with an APU, hence this section shall not be applicable to these aircraft.*

No APU may be started while fueling is in process. Prior to starting the APU, the NAV lights shall be switched on.

The use of the APU gives the crew the opportunity to complete the majority of the exterior and interior inspection. The crew may establish the cabin environment at a comfortable level prior to the arrival of the passengers.

Special consideration shall be given to noise-sensitive aerodromes where APU operation is either prohibited or restricted.

***CAUTION***

***The aircraft APU is not approved for unattended operation. A Flight Crew Member shall remain in the vicinity of the aircraft and shall regularly check the online status of the APU generator.***

### 2.2.4 Flight ID

The flight ID shall be inserted during cockpit preparation prior to each flight. The flight ID shall be the flight number as inserted in item 7 of the flight plan. For the Company, this is normally the callsign of the aircraft.

The flight ID shall be crosschecked with the flight ID in item 7 of the ATC flight plan. If there is any doubt, please confirm your flight ID with the Company OCC.

Do not place any spaces or symbols in the flight ID.

### 2.2.5 Transponder operations

During system power-up, the transponder will default to STANDBY mode and ADS-B will automatically be enabled but will not broadcast until TA/RA (or any other transponder / TCAS mode besides STANDBY) is selected.

***CAUTION***

***The transponder shall be ON during all phases of flight and during aerodrome surface movement operations when ADS-B OUT is required. If the transponder is not in 'ATC ON', ADS-B OUT is not functional.***

Check the appropriate aerodrome charts for the applicable procedures if described. Aerodrome procedures may deviate from the procedure as set out above.

*NOTE*

*Two ADS-B out status messages are available through the ATC window of the RMU:*

*ADS-B FAIL or ADS-B DGR (Degrade)*

## 2.2.6 Tire pressure checking procedures

Every preflight of the first flight of each day shall include a tire pressure check to confirm if the pressure is within a tolerable range. For this reason, tire pressure gauges have been placed on board Company aircraft by the CAMO department.

These inspections and servicing activities will be performed under the Part-145 approval of Ascend Aviation. They may only be carried out by pilots who have been trained by Ascend Aviation and who hold a valid Authorization Certificate issued by Ascend Aviation.

Flight Crew Members who are authorized to perform this check shall follow the instructions below.




*Figure: Tire pressure gauge and valve cap*

### 2.2.6.1 Procedure

1. Remove the valve caps of the tire (1);
2. Press to reset the gauge by pressing button 2 until it reads “0” PSI (2)
3. Place the device over the valve cap until you hear a pressure relief and release the measurement button (2)
4. Remove the gauge and read the value in PSI and compare with the tolerable value ranges in the ATL binder(3)
5. Re-install the valve caps of the tire (1);

An overview with references to the required tire pressures and operating procedures can be found in the table below. A hardcopy with the values can be found in the black ATL binder.

| Aircraft Type | Reference to tire pressure and operating procedures |
|---|---|
| LJ 40 | AMM 12-10-04, latest revision. Hardcopy in the ATL binder |
| LJ 45 | AMM 12-10-04, latest revision. Hardcopy in the ATL binder |

### 2.2.6.2 Work Order

Each month, CAMO opens a work order with Ascend Aviation for each aircraft.
Form AAG-Form-145-070, latest revision, is used for the tracking and recording of the performed checks and servicing activities. This form can be found in the ATL binder of the aircraft.

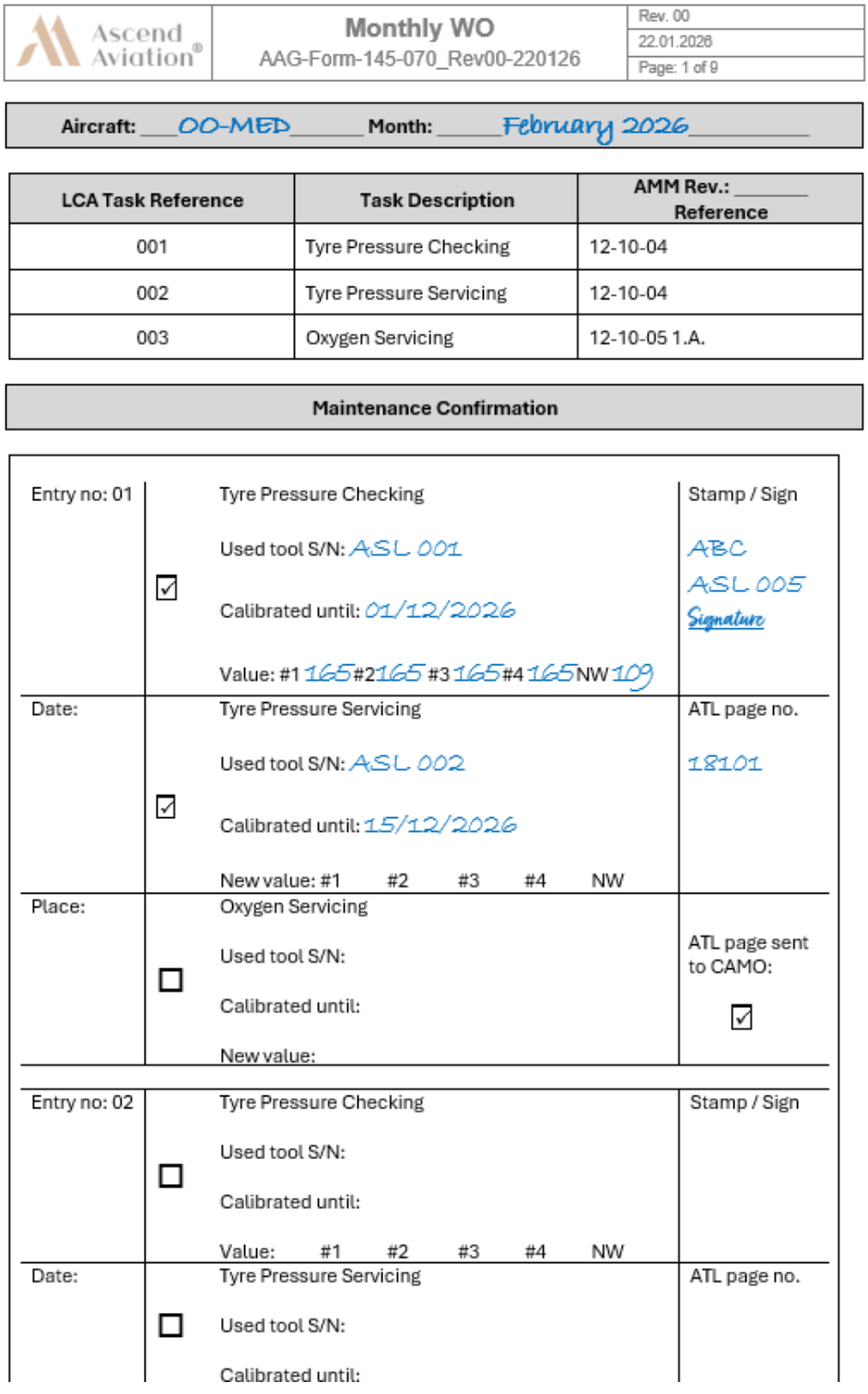
**For every check or servicing performed, an entry must be made.**

On the Monthly Work Order (WO), a maximum of 20 entries can be recorded. Refer to the example below. For each entry, all relevant details must be completed, including:

- The serial number of the tire pressure gauge
- The serial numbers of any servicing tools used
- The applicable calibration due date(s)

In the right-hand (R/H) column, the following information must be entered:

- Signature / Internal authorization reference (e.g. authorization number or stamp)
- ATL page number
- In addition, the corresponding ATL page must be completed as per the **instructions and example** in **2.2.6.3 - Completion of the Aircraft Technical Log Following Maintenance** below.
  The ATL must be sent to CAMO and this must be confirmed by ticking the appropriate checkbox. The ATL page must be emailed to: camo-asl@aslgroup.eu.



| Ascend Aviation® | Monthly WO<br>AAG-Form-145-070_Rev00-220126 | Rev. 00<br>22.01.2026<br>Page: 1 of 9 |
|---|---|---|

**Aircraft:** OO-MED **Month:** February 2026

| LCA Task Reference | Task Description | AMM Rev.: _____ Reference |
|---|---|---|
| 001 | Tyre Pressure Checking | 12-10-04 |
| 002 | Tyre Pressure Servicing | 12-10-04 |
| 003 | Oxygen Servicing | 12-10-05 1.A. |

**Maintenance Confirmation**

| | | |
|---|---|---|
| Entry no: 01 | Tyre Pressure Checking<br>Used tool S/N: ASL 001<br>☑ Calibrated until: 01/12/2026<br>Value: #1 165 #2 165 #3 165 #4 165 NW 109 | Stamp / Sign<br>ABC<br>ASL 005<br>Signature |
| Date: | Tyre Pressure Servicing<br>Used tool S/N: ASL 002<br>☑ Calibrated until: 15/12/2026<br>New value: #1 #2 #3 #4 NW | ATL page no.<br>18101 |
| Place: | Oxygen Servicing<br>Used tool S/N:<br>☐ Calibrated until:<br>New value: | ATL page sent to CAMO:<br>☑ |
| Entry no: 02 | Tyre Pressure Checking<br>Used tool S/N:<br>☐ Calibrated until:<br>Value: #1 #2 #3 #4 NW | Stamp / Sign |
| Date: | Tyre Pressure Servicing<br>☐ Used tool S/N:<br>Calibrated until: | ATL page no. |

### 2.2.6.3 Completion of the Aircraft Technical Log

Once it is confirmed that aircraft tire pressures are within the specified range, the ATL shall be signed under item 8 for acceptance by the Commander (PIC).

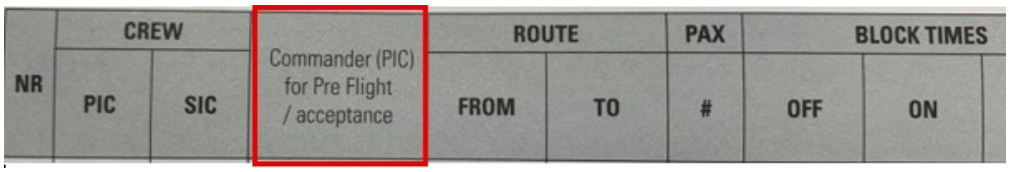



*Figure: ATL entry item 8*

**In case the tire pressure is outside the tolerable range**, the CAMO department shall be contacted before flight. In case of other questions or remarks, you may contact camo-asl@aslgroup.eu directly.

For the following entries, refer to the example on the next page:

1. **Corrective Action / Remarks**
   Provide a brief description of the work accomplished. The entry must always reference:
   - The specific task listed in your internal authorization (e.g. tire Pressure Check, tire Pressure Servicing, Oxygen Servicing), and
   - The applicable maintenance data used (i.e. the relevant AMM version and chapter, which may be copied from the work order).

   Example: *"tire pressure servicing performed i.a.w. AMM version xxx section 12-10-04."*

2. **Name / Signature /Date**
   Enter your name, signature, and date. As space is limited, a unique abbreviation may be used, provided the signatory can be clearly identified.
   Example: *"Menke FME 22/01"*

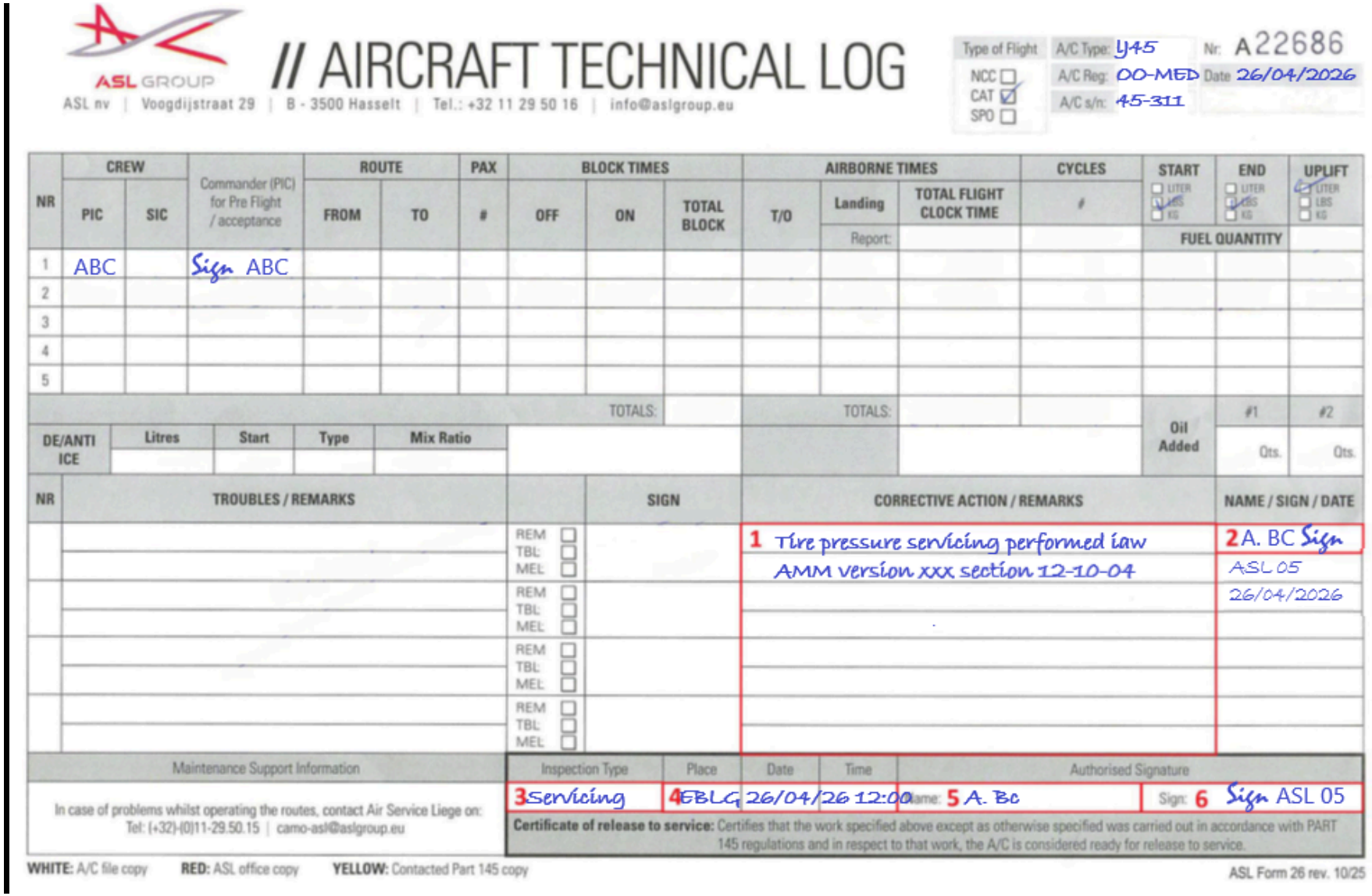
3. **Inspection Type**
   Insert an appropriate term describing the work carried out.
   Example:*"Servicing"*

4. **Location, Date, and Completion Time**
   Enter the location where the work was performed (the airport ICAO code is sufficient), together with the date and time of completion.
   Example: *"EDGS / 22 Jan / 09:50"*

5. **Printed Name**
   Enter your full name. The format is at your discretion.
   Example: *"Frederic Menke" or "F. Menke"*

6. **Signature and Authorization Reference**
   Insert your signature along with your internal authorization reference (e.g. authorization number or stamp).
   Example: *"[Signature] – [Authorization No./Stamp]"*

The ATL page must be emailed to: camo-asl@aslgroup.eu before departure.



ASL GROUP

ASL nv | Voogdijstraat 29 | B - 3500 Hasselt | Tel.: +32 11 29 50 16 | info@aslgroup.eu

# // AIRCRAFT TECHNICAL LOG

Type of Flight: NCC ☐ CAT ☑ SPO ☐

A/C Type: Y45 Nr: A22686

A/C Reg: OO-MED Date: 26/04/2026

A/C s/n: 45-311

| NR | CREW PIC | CREW SIC | Commander (PIC) for Pre Flight / acceptance | ROUTE FROM | ROUTE TO | PAX # | BLOCK TIMES OFF | BLOCK TIMES ON | BLOCK TIMES TOTAL BLOCK | AIRBORNE TIMES T/O | AIRBORNE TIMES Landing | AIRBORNE TIMES TOTAL FLIGHT CLOCK TIME | CYCLES # | START | END | UPLIFT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Report: | | | FUEL QUANTITY | | |
| 1 | ABC | | Sign ABC | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| | | | | | TOTALS: | | | | | | TOTALS: | | | | | |

| DE/ANTI ICE | Litres | Start | Type | Mix Ratio | Oil Added | #1 | #2 |
|---|---|---|---|---|---|---|---|
| | | | | | | Qts. | Qts. |

| NR | TROUBLES / REMARKS | | SIGN | CORRECTIVE ACTION / REMARKS | NAME / SIGN / DATE |
|---|---|---|---|---|---|
| | | REM ☐ TBL ☐ MEL ☐ | | 1 Tire pressure servicing performed iaw AMM version xxx section 12-10-04 | 2 A. BC Sign ASL 05 26/04/2026 |
| | | REM ☐ TBL ☐ MEL ☐ | | | |
| | | REM ☐ TBL ☐ MEL ☐ | | | |
| | | REM ☐ TBL ☐ MEL ☐ | | | |

| Maintenance Support Information | Inspection Type | Place | Date | Time | Authorised Signature |
|---|---|---|---|---|---|
| In case of problems whilst operating the routes, contact Air Service Liege on: Tel: (+32)-(0)11-29.50.15 \| camo-asl@aslgroup.eu | 3 Servicing | 4 EBLG | 26/04/26 | 12:00 | Name: 5 A. Bc Sign: 6 Sign ASL 05 |

**Certificate of release to service:** Certifies that the work specified above except as otherwise specified was carried out in accordance with PART 145 regulations and in respect to that work, the A/C is considered ready for release to service.

**WHITE:** A/C file copy **RED:** ASL office copy **YELLOW:** Contacted Part 145 copy

ASL Form 26 rev. 10/25

## 2.3 Pre-departure procedures

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Before starting engines*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

The Commander (PIC) shall ensure that passengers are briefed of the escape routes and exits of the aircraft, that they are informed of the location and the use of the emergency equipment on board of the aircraft. He shall also make sure that:

1. Curtains and divider doors are open for take-off and landing;
2. Cabin occupants' seatbelts are properly secured;
3. Crew seatbelts and shoulder harnesses are secured;
4. The parking brake is set and/or chocks are in place.

The following task sharing procedures shall be applicable:

*Table: Task sharing before start*

| **Task sharing before start** | | | | | | |
|---|---|---|---|---|---|---|
| Item | CMDR (PIC) | SIC | CM1 | CM2 | PF | PM |
| Doors(1) | X | | | | | |
| ATC clearance(2) | | | X | X | | |
| Engine start(3) | | | | | X | |
| ***Note 1**: The Commander (PIC) closes the doors. The other Flight Crew Member shall monitor door indications in the cockpit.*<br>***Note 2**: ATC clearance should preferably be obtained when both Flight Crew Members are at their station.*<br>***Note 3**: The PF shall start the engines while the PM shall monitor engine parameters. The PM shall call out loud all applicable engine parameters (e.g. "ITT", 'N1", etc). No other tasks shall be performed by any Flight Crew Member while starting the engines.* | | | | | | |

Before starting the engines, both Flight Crew Members shall verify that the area around the aircraft is free and it is safe to start the engines. CM1 shall call "LEFT FREE" and CM2 shall call "RIGHT FREE".

# 2.4 Altimeter setting and checking procedures

CAT.OP.MPA.101

► *Refer to the Operations Manual Part A Section 8.3.3 – Altimeter setting procedures*

► *Refer to the Operations Manual Part A Section 8.3.4 – Altitude alerting system procedures*

► *Refer to the Operations Manual Part B Section* ***2.21 - QFE altimeter setting and metric units operation procedures***

## 2.4.1 General

It is obvious that the altimeter is a primary instrument on board of the aircraft. Statistics show that level busts are an increasing safety issue in busy airspace. Strict adherence to the altimeter procedures is essential for safe operations.

During the pre-flight instrument scan, altimeter readings shall be verified to comply with limitations set by the Manufacturer and by the Operations Manual.

The Company uses QNH as standard value. Care shall be taken when converting QNH to QFE values. The same care shall be taken when operating into countries applying metric units of altitude.

Flight crews are reminded that when transitioning from standard pressure to QNH (QFE), the selected QNH (QFE) must be verified for consistency using all available information. As a best practice, crews are expected to cross-check the QNH (QFE) against the following three independent sources whenever available:

- METAR information for the destination aerodrome
- ATIS or VOLMET information
- QNH (QFE) transmitted by ATC during descent or approach clearance

Any discrepancy between these sources must be clarified with ATC without delay.
The expected QNH (QFE) shall be explicitly stated during the approach briefing, and crews are reminded to maintain heightened awareness for any subsequent QNH (QFE) updates issued by ATC. Particular attention is required when flying procedures that rely on barometric vertical navigation, where incorrect QNH settings may not be detected by standard altitude cross-checks alone. The use of standard phraseology and full readback of barometric settings remain essential at all times. Refer to **2.4.3 - Standby altimeter** for the use of the standby altimeter during the descent phase.

Whenever the outside temperature deviates from standard temperature, the indicated altitude (height) deviates from the true altitude (height):

1. At high temperature, the true altitude (height) is higher than the indicated altitude (height);
2. At low temperature, the true altitude (height) is lower than the indicated altitude (height), resulting in reduced terrain clearance.

Altimeters shall be checked and crosschecked during the following stages of flight:

1. During the taxi instrument check;
2. When lining up on the runway (runway elevation check);
3. During climb when climbing to a flight level;
4. During descent when descending to an altitude (height);
5. During approach when passing the outer marker (OM) or leaving the final approach fix when no outer marker is available.

When climbing to a flight level from an altitude (height), the following practice shall be applied:

*Table: Callouts climbing to a flight level*

| **Callouts climbing to a flight level** | | |
|---|---|---|
| Situation | PF | PM |
| Climbing to flight level, when passing transition altitude(3) | Set standard | --- |
| PF and PM set standard on their respective altimeter(2) | --- | Standard set, passing FL xx ... top |
| PF verifies the crossing FL | Checked, within limits(1) | --- |
| ***Note 1**: Refer to the OM Part A Section 8.3.2.4 for the applicable RVSM operation limitations and, if required, contingency procedures.*<br>***Note 2**: Changes to the standby altimeter shall be done by the PM.*<br>***Note 3**: Setting the altimeter setting to QNE at an altitude lower than the transition altitude during the climb out when cleared to a flight level is considered 'non standard' and shall be announced as such to assure crew awareness.* | | |

When descending to an altitude or height, the following practice shall be applied:

*Table: Callouts descending to an altitude or height*

| **Callouts descending to an altitude or height** | | |
|---|---|---|
| Situation | PF | PM |
| Descending to an altitude or height, when passing transition level(4) | Set QNH xxxx *or* set QFE xxxx | --- |
| PF and PM set the QNH or QFE on their respective altimeter(2+3) | --- | QNH set *or* QFE set, passing xxxx ft ... top |
| PF verifies the crossing altitude | Checked, within limits(1) | --- |
| ***Note 1**: In case the altimeter of the PF reads lower, the PF shall call "MINUS XXXX FT". In that case, the PF shall raise the applicable minima for the intended approach by the amount of the deviation. No correction should be made if the difference is within 50 ft.*<br>***Note 2**: Refer to the OM Part A Section 8.3.2.2.9 for the applicable RNP approach (RNP APCH) procedure limitations and, if required, contingency procedures.*<br>***Note 3**: Changes to the standby altimeter shall be done by the PM.*<br>***Note 4:** Setting the altimeter setting to QNH at an altitude higher than the transition level during descent when cleared to an altitude is considered 'non standard' and shall be announced as such to assure crew awareness.* | | |

When ATC assigns a new level, the following practice shall be applied:

*Table: Callouts climbing or descending to a new level (autopilot engaged)*

| Callouts climbing or descending to a new level (autopilot engaged) | | |
|---|---|---|
| Situation | PF | PM |
| ATC instruction received | Altitude (height) xxxx *or* FL xxx set | --- |
| PM checks his altimeter indication | --- | Checked |
| 1.000 ft before reaching the assigned level | One thousand to go | --- |
| PM checks his altimeter indication | --- | Checked |
| ALT (steady) | ALT green | --- |
| PM cross-checks | --- | Checked |

*Table: Callouts climbing or descending to a new level (autopilot disengaged)*

| Callouts climbing or descending to a new level (autopilot disengaged) | | |
|---|---|---|
| Situation | PF | PM |
| ATC instruction received | Set altitude (height) xxxx *or* FL xxx | --- |
| PM sets the assigned level | --- | Altitude (height) xxxx *or* FL xxx set |
| PF checks his altimeter indication | Checked | --- |
| 1.000 ft before reaching the assigned level | One thousand to go | --- |
| PM checks his altimeter indication | --- | Checked |
| ALT (steady) | ALT green | --- |
| PM cross-checks | --- | Checked |

Unless otherwise specified in an air traffic control instruction, to avoid unnecessary TCAS resolution advisories (RA's) in aircraft at or approaching adjacent altitudes or flight levels, climbing or descending to an assigned altitude of flight level shall be done at a rate less than 1.500 ft/min throughout the last 1.000 ft of climb or descent.

***CAUTION***

***When the autopilot is in the altitude capture mode, subsequent vertical mode changes such as the selection of a vertical speed mode shall be prohibited as this may cause the autopilot either to cancel the altitude capture or not to properly capture the selected level. The performance of the autopilot during any level capture shall be closely monitored.***

*NOTE*

*In RVSM airspace the rate of climb or descent shall be reduced to 1.000 ft/min or less during the last 1.000 ft before reaching the assigned level unless otherwise instructed by ATC.*

*NOTE*

*During the last 1.000 ft before reaching the assigned level, non-operational items shall be limited and/or delayed allowing both Flight Crew Members to focus on the level off of the aircraft to the assigned level.*

## 2.4.2 Altimeter corrections

AMC1 CAT.OP.MPA.145 (a)

► *Refer to the Operations Manual Part B Section **2.23 - Cold weather operation***

### 2.4.2.1 General

This section deals with altimeter corrections for pressure, temperature and, where appropriate, wind and terrain effects. The Commander (PIC) shall be responsible for these corrections, except when under radar vectoring. In case of radar vectoring, the controller issues clearances such that the prescribed obstacle clearance shall exist at all times, taking the cold temperature correction into account.

### 2.4.2.2 Pressure correction

When flying at levels with the altimeter set to QNE (1.013,25 hPa), the minimum safe altitude (MSA) shall be corrected for deviations in pressure when the pressure is lower than the standard atmosphere. An appropriate correction is 30 ft (10 m) per hPa below 1.013,25 hPa.

When using QNH (QFE) as altimeter setting, a pressure correction shall not be required.

### 2.4.2.3 Temperature correction

► *Refer to the Operations Manual Part A Section 8.1.1.3 – Low temperature correction*

Based on the aerodrome temperature, corrections to the barometric DA(H) and MDA(H) shall be applied to compensate for the negative outside air temperature (OAT) effect on true altitude. Refer to the OM Part A for a more detailed procedures and correction table.

### 2.4.2.4 Wind correction

The combination of strong winds (and mountainous terrain) may cause local changes in atmospheric pressure due to the Bernoulli Effect. This occurs particularly when the wind direction is across mountain crests or ridges.

Corrections for wind speed shall be applied in addition to the standard corrections for pressure / temperature and ATC should be advised.

*Table: Values (ft) to be added to minimum altitudes (heights) due to wind*

| **Values (ft) to be added to minimum altitudes (heights) due to wind** | |
|---|---|
| Wind speed (kts) | Altimeter error (ft) |
| 20 | 53 |
| 40 | 201 |
| 60 | 455 |
| 80 | 812 |

### 2.4.3 Standby altimeter

The standby altimeter provides backup altitude indication if one or both of the primary altimeters are lost. When approaching the destination, the destination airfield QNH (QFE) is set in the standby altimeter when received by ATC or ATIS. It shall then be compared with the METAR for the destination aerodrome, any discrepancy or inconsistency shall be investigated and resolved. When cleared to descend to an altitude (height), the QNH (QFE) given by ATC at that time will be compared with the value set on the standby altimeter for possible gross error detection.

Any discrepancy between these sources must be clarified with ATC without delay.

### 2.4.4 Radio altimeter

When the radio altimeter becomes alive, the PF/PM (first to notice) calls “RADIO ALTIMETER ALIVE”. The PM/PF verifies that this is consistent with the aircrafts position and altitude and replies “CHECKED”.

It is essential that when the radio altimeter comes alive during a phase of the flight where it is not expected, immediate action is required, especially in IMC. A terrain avoidance action shall be considered, except if it can be established with reasonable certainty that the terrain clearance is sufficient and will be maintained.

### 2.4.5 Altitude selector

► *Refer to the Operations Manual Part A Section 8.1.3 – Methods for determination of aerodrome operating minima*

► *Refer to the Operations Manual Part B Section **2.9 - VFR approach procedures***

► *Refer to the Operations Manual Part B Section **2.10 - IFR approach procedures***

► *Refer to the Operations Manual Part B Section **2.11 - Visual approach and circling***

When cleared to a certain level during climb or descend, the altitude selector shall be set to the assigned level. When flying a SID, in the absence of a limiting level supplied by ATC, the altitude selector shall be set to the first limiting level on the SID.

*NOTE*
*When selecting ‘VNAV’ as vertical mode, the altitude selector shall be the limiting factor in the level of automation as it will never pass through the level selected*

During descent on a CAT I approach, the altitude selector shall remain set to the last assigned level until the vertical profile is captured. After capture, it shall then be reset to the missed approach altitude (height).

During descent on an APV approach, the altitude selector shall remain set to the last assigned level until the vertical profile is captured. After capture, it shall then be reset to the missed approach altitude (height).

During descent on an NPA approach, the altitude selector shall remain on the last assigned level until inbound to the FAF. About 1 to 0,5 NM before the FAF, set the altitude selector 500 ft above the current altitude (or the missed approach altitude if higher) to prevent ‘altitude hang- up’ and prepare to set the appropriate vertical speed to be ready for descent at the FAF.

If the missed approach altitude is at or below the last assigned level (i.e. inbound to the FAF), the altitude selector shall be reset to the missed approach altitude once the final descent begins and the aircraft is below the missed approach altitude.

During descent on a circling approach, the altitude selector shall be set to the circling minima. When maintaining the MDA(H) it shall be reset to the missed approach altitude (height).

When performing a visual approach, the altitude selector shall be set to 1.500 ft above aerodrome elevation (AAL) unless depicted otherwise.

# 2.5 Taxi, take-off and climb procedures

## 2.5.1 Taxi procedures

AMC1 CAT.GEN.MPA.124, AMC1 NCC.GEN.119, CAT.GEN.MPA.124, CAT.GEN.MPA.125, NCC.GEN.119

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Before taxi, taxi and before take-off and runway line-up*

► *Refer to the Recommended Operating Procedures and Techniques Manual – Normal Procedures: Taxi*

► *Refer to the Operations Manual Part A Section 8.2.2.11 – Start-up, ramp departure and arrival procedures*

► *Refer to the Operations Manual Part B Section* ***2.1.4 - Sterile cockpit concept***

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

***CAUTION***

***Taxiing shall be treated as a safety-critical activity due to the risks to the movement of the aeroplane and the potential for a catastrophic event on the ground. Taxiing is a high- workload phase of flight that requires the full attention of the crew.***

***CAUTION***

***Taxiing with only one engine running (i.e. single-engine taxi) shall not be allowed.***

The PF performs the taxi. Before taxiing the aircraft, all required Flight Crew Members shall verify that the area around the aircraft is free and it is safe to move forward. CM1 shall call “LEFT FREE” and CM2 shall call “RIGHT FREE”.

*NOTE*

*The use of the term ‘clear’ is not allowed in this context (e.g. “RIGHT (LEFT) IS CLEAR”).*

If the Commander (PIC) is the PF, he shall call “TAXI, MY CONTROL” when ready for taxi, the PM shall reply “YOUR CONTROL”. If the Commander (PIC) is the PM, he shall call “TAXI, YOUR CONTROL” when ready for taxi, the PF shall reply “MY CONTROL” allowing the PF to commence the taxi procedure.

Checking the brakes, the PF calls “CHECKING MY BRAKES”. To request a brake check from the other Flight Crew Member, he calls “CHECK YOUR BRAKES”.

Performing an instrument check during a turn, the PF checks the primary flight instruments and calls the applicable readings. The PM crosschecks the readings called out by the PF to confirm by “CROSSCHECKED”.

Every Flight Crew Member’s seat and rudder pedals shall have been adjusted so that it is possible to apply maximum braking with full rudder deflection. During taxiing, all required Flight Crew Members’ heels shall be on the floor, sliding the feet up on the rudder pedals only when required to apply brakes to slow the taxi speed or when manoeuvring on the ramp.

Before commencing the taxi, all required Flight Crew Members shall assure during the before taxi checklist that the area is free of all ground equipment and acknowledge that the GPU (if used) is disconnected from the aircraft. The PF shall switch the LDG-TAXI lights to TAXI before commencing the taxi.

Flight Crew Members shall take all available measures to enhance situational awareness. This shall be done during taxi by:

1. Applying the sterile cockpit procedures;
2. Using only standard radiotelephony (RTF) phraseology;
3. Having the necessary aerodrome layout charts available;
4. Hearing and understanding all taxi clearances by both Flight Crew Members;
5. Crosschecking all taxi clearances against aerodrome charts, surface markings, signs and lights;
6. Stopping and holding at all lighted stop bars. Proceeding shall only be done with explicit clearance to enter or cross the runway when it has been issued by the aerodrome control tower and when the stop bar lights are switched off;
7. Stopping the aircraft and contacting air traffic control when unsure of the current position.

The Pilot Monitoring (PM) shall monitor the Pilot Flying (PF) of the correct taxi routing and adherence to the taxi clearances.

Idle thrust is adequate for taxiing under most conditions. The tendency is to taxi faster than desired. This is especially true during a runway turn-off after landing.

Thrust use during ground operation demands sound judgement and technique. The air blast effects at relatively low power can be destructive and cause injury. Do not start a turn until sufficient forward speed has been attained to carry the aircraft through the turn at idle thrust.

Avoid following other aircrafts too closely. Jet blast is a major cause of foreign object damage (FOD).

For passenger comfort, adjust the taxi speed to the surface condition and turn radius. Nose wheel scrubbing indicates excessive steering angle and/or taxi speed for surface condition. The normal taxi speed shall not exceed approximately 20 kts

GS and prior to a turn, speed shall be slowed to the appropriate speed for the condition. To ensure maximum wingtip clearance during turns, yellow taxi lines shall be centered between the two main gears. A small overshoot of the nose wheel may be needed during turn initiation.

All Flight Crew Members shall constantly maintain a good lookout especially during the initial phase of the taxi, whilst the aircraft has to be maneuvered closely to other aircraft such as when taxiing in congested areas. It is therefore recommended to postpone any other duties until the aircraft is free of all obstructions. Do not be diverted from the primary task of safely taxiing the aircraft, avoid all unnecessary activity and duties (including paperwork) that may be accomplished at another time.

TAXI lights shall be on during taxiing. When the aircraft comes to a stop, the TAXI lights shall be turned off. When performing the last turn towards a Marshaller, the PF should consider requesting the PM to turn the TAXI lights off.

STROBE lights shall be on any time the aircraft is on an active runway, even when just crossing it. RECOG lights shall be on below 10.000 ft. LANDING lights shall be on when cleared for take-off or cleared to land. LANDING lights may be on during taxi at night if environmental conditions so require.

All recommended braking techniques shall aim at minimizing the number of brake applications and controlling brake temperature. General rules are:

1. Avoid continuous, mild braking applications for extended periods of time;
2. Minimize the duration of each brake application when practical by using shorter applications with higher pressure on the pedals;
3. Avoid using brakes asymmetrically.

When taxiing when the brakes are cold, do not intentionally use the brakes solely to heat them. Taxi speed shall carefully be managed. Let the aircraft accelerate to a maximum safe speed and then use the brakes in one increasingly firm application to slow the aircraft. Then release the brakes and allow the aircraft to accelerate again. Less frequent use of brakes with higher braking pressure may improve brake life.

When taxiing when the brakes are warm, carefully manage taxi speed. Let the aircraft accelerate to a maximum safe speed, then apply brakes short but firm. This will help keep the brakes within operating temperature range limits by allowing more cooling time and less brake friction time. At landing, apply brakes with no delay after the nose landing gear has touched down. Move directly to a single firm and steady brake application and hold pedal pressure until decelerated to taxi speed. Apply pressure up to a maximum comfortable deceleration.

## 2.5.2 Towing and pushback procedures

AMC1 CAT.OP.MPA.205, CAT.OP.MPA.205

### 2.5.2.1 General

There will be occasions when the aircraft may not be taxied directly from its parking position, requiring a tow or pushback. In this case, the crew shall ensure that adequate ground personnel are available to move the aircraft safely.

The tow bar connects to the wheel hub on either side of the nose wheel. The aircraft is steered with a tow bar connected to an appropriate vehicle or with a tug, which lifts up the nose wheel.

***CAUTION***

***Always ensure that the control lock is removed before towing the aircraft. Serious damage to the steering linkage may result if the aircraft is towed while the control lock is installed. The aircraft shall not be towed with a flat shock strut.***

While the aircraft is in motion, the anti-collision light (i.e. beacon) shall be on when towing the aircraft under control of ATC.

In case the towing or pushback is performed with a towbar, at least one Flight Crew Member shall remain in the cockpit to guard the brakes.

When the aircraft is being towed, including pushback, and it is intended to start the engines during or shortly after that tow for the purpose of taking off, both Flight Crew Members shall remain in the cockpit and all checklist(s) up to and including the before start checklist shall be completed before starting the tow.

### 2.5.2.2 Braking procedures

If braking is required from the cockpit, every Flight Crew Member shall make every effort to warn those towing the aircraft prior to applying the brakes by flashing for example the LDG-TAXI lights. If voice communications are used via VHF, the simple command "STOP THE AIRCRAFT" shall be used.

### 2.5.2.3 Communication with ground personnel

The crew shall establish communication with Ground Personnel via hand signals as appropriate. If there is any doubt as to which hand signals to use, the crew shall pre-brief the signals with the person leading the pushback or towing operation.

## 2.5.3 Thrust reversers check procedures

On the first flight of the day, after any maintenance or if performance is based on their use (e.g. wet runway take-off), a thrust reversers (T/R) check shall be performed.

*Table: Thrust reversers check callouts*

| **Thrust reversers check callouts** | | |
|---|---|---|
| Situation | PF | PM |
| The PF initiates the thrust reversers check by deploying the thrust reverser levers in idle | Thrust reverser check | --- |
| The PF verifies the green 'DEP', annunciations to be displayed on the EICAS. | --- | 2 deployed |
| The PF stows the thrust reverser levers and the PM verifies that the green 'DEP' goes out. | --- | Stowed |

***WARNING***

***Do not attempt to fly the aircraft if the thrust reverser pre-flight check was unsuccessful.***

## 2.5.4 Take-off procedures

► *Refer to the Recommended Operating Procedures and Techniques Manual – Normal Procedures: Take-off (Normal)*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

### 2.5.4.1 Take-off briefing

The take-off briefing shall be given, after completion of the instrument set-up, by the PF designated for the sector and should cover:

1. ATIS, NOTAM's and weather;
2. MEL and DDL items affecting performance;
3. Receiver autonomous integrity monitoring (RAIM) availability (if required);
4. Take-off and landing dispatch conditions;
5. Take-off alternates (if weather required) including return procedures depending on the weather (i.e. VMC or IMC) and aircraft performance (e.g. maximum landing mass) in case of an occurrence after V1 including occurrences other than an engine failure;
6. Mass and balance;
7. Runway conditions and wind;
8. Take-off data including gross error check;
9. Noise abatement procedure NADP 1 "Noise one" or NADP2 "Noise two";
10. SID;
11. Engine failure procedures, including engine failure flap retraction altitude (EFFRA) and minimum sector altitude (MSA);
12. Navigation aid setup;
13. Rejected take-off procedures;
14. Taxi routing;
15. Use of EFB;
16. 'TWO-C' threats.

The take-off briefing should be given when stationary and updated later on for any subsequent last-minute changes. After the first sector, the take-off briefing may be reduced if items are standard referring to the standard operating procedures when the Flight Crew Members are flying more than one sector together in the same duty period.

A successful briefing is one that leaves neither Flight Crew Member in doubt as to circumstances prevailing. Should any doubt remain in the mind of the Flight Crew Member being briefed, he shall make sure that any uncertainty is clarified before the briefing stage is passed.

For the take-off briefing, touch drills may be used to recall Flight Crew Member's individual actions and duties, especially in case of rejected take-off. It shall cover:

1. Flight Crew Member actions and duties in case of malfunctions prior to V1 resulting in a rejected take-off;
2. The routing and altitude constraints in case of engine failure at or after V1;
3. The expected discipline in the overall conduct of the flight;
4. Any other important considerations.

The following task sharing procedures shall be applicable:

*Table: Task sharing before and during take-off*

| Task sharing before and during take-off | | | | | | |
|---|---|---|---|---|---|---|
| Item | CMDR (PIC) | SIC | CM1 | CM2 | PF | PM |
| Take-off call | X | | | | | |
| Engines spool up | | | | | X | |
| Thrust levers | | | | | X | |
| STOP decision | | | | | X | X |
| STOP actions | | | | | X | |

Both Flight Crew Members shall verify that the approach area and runway are free of traffic and it is safe to enter the runway (if weather permits). The CM1/CM2 shall call “APPROACH FREE”; the CM2/CM1 shall reply “CHECKED”. The CM1/CM2 shall call “RUNWAY FREE”; the CM2/CM1 shall reply “CHECKED”.

Entering the runway, the PF shall read the barometric altimeter and shall call “THRESHOLD ELEVATION, XXXX FT”. He shall also read the aircraft heading and shall call “RUNWAY QFU XXX”. The PM verifies consistency of both readings and shall call “CHECKED”.

During normal operations, the parking brake shall not be used on an active runway.

If the Commander (PIC) is the PF, he shall call “TAKE-OFF, MY CONTROL” when ready for departure, the PM shall reply “YOUR CONTROL”. If the Commander (PIC) is the PM, he shall call “TAKE-OFF, YOUR CONTROL” when ready for departure, the PF shall reply “MY CONTROL” allowing the PF to commence the take-off procedure.

***CAUTION***

***If compliance with the published performance requirements of the SID (or clearance received from ATC) is not possible, take-off shall be prohibited unless an alternate climb-out procedure which ensures terrain and obstacle clearance is established.***

The following procedures and callouts shall be applicable during take-off:

*Table: Procedure and callouts before and during take-off*

| **Procedures and callouts before and during take-off** | | |
|---|---|---|
| Situation | PF | PM |
| PF advances the thrust levers to the take-off thrust setting | Take-off thrust set | --- |
| PM checks the take-off thrust is set with all engine parameters normal<br><br>*Note: In case the Take-Off Thrust is not properly set by the time the PF calls "Set take-Off Thrust" the PM shall adjust the Thrust levers manually. The PF shall keep his/her hand on the thrust levers as they are adjusted. The PM shall monitor the engine parameters during the take-off roll and call out any abnormalities* | --- | Checked,<br>Indications normal |
| Monitor Airspeed indications | Call out any abnormalities | |
| 80 KIAS | --- | Eighty knots |
| PF verifies 80 knots | Checked | --- |
| $V_1$<br>*Note: The $V_1$ call must be completed by $V_1$* | --- | V One |
| $V_r$ | --- | Rotate |
| PM observes positive rate of climb based on both the VSI and altimeter | --- | Positive rate |
| | Gear up | --- |
| Gear handle moved to the up position by the PM | --- | --- |
| PM checks the landing gear to be up and landing gear lights to be out.<br>He turns the LDG-TAXI lights switches to OFF | --- | --- |

The following procedures and callouts shall be applicable after take-off:

T*able: Procedures and callouts after take-off - NADP1*

| **Procedures and callouts after take-off – NADP1** | | |
|---|---|---|
| Situation | PF | PM |
| During climb maintain $V_2$ +10 to max 20kts<br>*Note: Do not exceed 20° Nose Up*<br><br>Passing 400 ft<br><br>PM sets the heading requested or selects NAV | <br><br>Select Heading XXX<br>or<br>select NAV<br><br>--- | <br><br>---<br><br>Heading XXX selected<br>or<br>NAV selected |
| Verify flight mode | | |
| At 1500ft AAL<br><br>PF reduces the thrust levers to climb thrust or lower setting<br><br>PM checks climb thrust is set<br><br>*Note: In case the Climb Thrust is not properly set PM shall adjust the thrust levers.* | <br><br>Climb thrust set *or*<br>xx % N1 set<br><br>--- | <br><br>---<br><br>Checked |
| At 3000 ft AAL<br><br>Accelerate smoothly to en-route climb speed<br><br>Speed consistent with flap retraction speed<br><br>PM checks speed above $V_2$+ 10 and below 250KIAS if flaps 8 is used *or* below 200 KIAS if flaps 20 is used and selects flaps up<br><br>PM checks for flaps up | <br><br><br>Flaps up<br><br>--- | <br><br><br>---<br><br>Speed checked, flaps up |
| Engaging yaw damper<br><br>PM selects the yaw damper on | Engage yaw damper | ---<br><br>Yaw damper engaged |

| Procedures and callouts after take-off – NADP1 | | | | |
|---|---|---|---|---|
| **SItuation** | | | **PF** | **PM** |
| Selecting the required vertical navigation | Autopilot not engaged | PM selects the requested modes and settings | Select FLC Normal/High<br>or<br>select SPD xxx<br>or<br>select VS xxxx | ---<br><br>FLC Normal / High selected<br>or<br>SPD xxx selected<br>or<br>VS xxxx selected |
| | | PF verifies settings and correct modes are engaged | Checked | |
| | Autopilot engaged | PF selects desired modes and settings | FLC Normal / High selected<br>or<br>SPD xxx selected<br>or<br>VS xxxx selected | --- |
| | | PM verifies settings and correct modes are engaged | | Checked |

*Notes:*

1. *Depending on the departure procedure and the level of automation desired, selecting and crosschecking horizontal and vertical navigation guidance may vary in sequence.*
2. *The callouts for lateral navigation may be omitted if the appropriate modes were already selected before departure.*

*Table: Procedures and callouts after take-off - NADP2*

| **Procedures and callouts after take-off – NADP2** | | |
|---|---|---|
| Situation | PF | PM |
| During climb maintain V2 +10 to max 20kts<br>*Note: Do not exceed 20° Nose Up*<br><br>Passing 400 ft<br><br>PM sets the heading requested or selects NAV | <br><br>Select Heading XXX<br>or<br>select NAV<br><br>--- | <br><br>---<br><br>Heading XXX selected<br>or<br>NAV selected |
| Verify flight mode | | |
| At 800 ft AAL<br><br>Accelerate smoothly to clean speed+10 to max 20kts<br>*Note: Do not exceed 20° Nose Up*<br><br>Speed consistent with flap retraction speed<br><br>PM checks speed above $V_2$+ 10 and below 250KIAS if flaps 8 is used *or* below 200 KIAS if flaps 20 is used and selects flaps up<br><br>PM checks for flaps up<br><br>After flaps are up<br>PF reduces the thrust levers to climb thrust or lower setting<br><br>PM checks climb thrust is set<br><br>*Note: In case the Climb Thrust is not properly set PM shall adjust the Thrust levers.* | <br><br><br><br>Flaps up<br><br>---<br><br>---<br><br>Climb thrust set *or*<br>xx % N1 set<br><br>---<br><br>--- | <br><br><br><br>---<br><br>Speed checked, flaps up<br><br>---<br><br>---<br><br>Checked |
| At 3000 ft AAL<br><br>Accelerate smoothly to en-route climb speed | ---<br><br>--- | ---<br><br>--- |
| Engaging yaw damper<br><br>PM selects the yaw damper on | Engage yaw damper<br><br>--- | ---<br><br>Yaw damper engaged |

| Procedures and callouts after take-off – NADP2 | | | | |
|---|---|---|---|---|
| **SItuation** | | | **PF** | **PM** |
| Selecting the required vertical navigation | Autopilot not engaged | PM selects the requested modes and settings | Select FLC Normal/High<br>or<br>select SPD xxx<br>or<br>select VS xxxx | ---<br><br>FLC Normal / High selected<br>or<br>SPD xxx selected<br>or<br>VS xxxx selected |
| | | PF verifies settings and correct modes are engaged | Checked | |
| | Autopilot engaged | PF selects desired modes and settings | FLC Normal / High selected<br>or<br>SPD xxx selected<br>or<br>VS xxxx selected | --- |
| | | PM verifies settings and correct modes are engaged | | Checked |

*Notes:*

1. *Depending on the departure procedure and the level of automation desired, selecting and crosschecking horizontal and vertical navigation guidance may vary in sequence.*
2. *The callouts for lateral navigation may be omitted if the appropriate modes were already selected before departure.*

### 2.5.4.2 Crosswind take-off procedures

When performing a crosswind take-off, application of smooth symmetrical thrust is essential. Maintain directional control through the rudder pedal steering. Keep ailerons into the wind. Directional deviations shall be corrected immediately with smooth and positive rudder control inputs.

Progressively decrease the amount of aileron deflection as ground speed increases. During aircraft rotation, hold the control wheel in the displaced position to keep the wings level. The aircraft is in a sideslip with crossed controls at this point. At lift-off, a slow, smooth recovery from this sideslip (removing cross-control inputs) will result in the aircraft being stabilised with the appropriate drift correction.

### 2.5.4.3 Turns immediately after take-off

Obstruction clearance, noise abatement or departure procedures may require an immediate turn after take-off.

Avoid turning below 400 ft AAL. If turning below 400 ft AAL cannot be avoided, limit bank angle to 15° maximum. ATC instructions may specify departure instructions deviating from these general rules. Furthermore, the IAS shall be at or above manoeuvring speed (V2 + 10) in order to increase bank angle above 15° but with a maximum of 30°.

With all engines operating, maintain V2 + 10 and take-off flaps to the predetermined flap retraction altitude.

After completion of the turn, adjust the pitch attitude to accelerate and complete the flaps retraction sequence.

## 2.5.5 Climb procedures

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Climb*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

During climb, both Flight Crew Members shall be performing a general crosscheck. Any abnormality shall be announced and taken care off. During climb with obstacle limitations, the PF shall take special care that the altitudes passing are at least those of the required climb gradient. The PF shall take special attention to the correct navigation of the SID and the engine parameters.

On a regular base, the following checks shall be performed:

1. Aircraft systems,
2. Engine parameters,
3. Fuel consumption.

# 2.6 Noise abatement procedures

AMC1 NCC.OP.120, CAT.OP.MPA.130, NCC.OP.120

## 2.6.1 General

At many locations, the close proximity of aerodromes to densely populated areas has created considerable problems resulting from noise by aircraft landing and taking off. In many instances this has led Authorities to enforce noise abatement rules.

Flight Crew Members shall take all possible measures during take-off and landing to ensure that noise created be kept to a minimum and shall comply with relevant noise abatement procedures and ATC instructions. Safety of flight operations shall always take precedence over compliance with noise abatement rules and the final decision shall always rest with the Commander (PIC).

## 2.6.2 Noise preferential runways

At aerodromes where the preferential use of specific runways is prescribed, Flight Crew Members should normally use the preferential runway for landing or take-off only up to a tailwind component of 5 knots, including gusts, and up to a crosswind component of 15 knots, including gusts, provided:

1. The runway surface condition is not adversely affected;
2. All requirements in respect of runway length and obstacle clearance are met;
3. For landing in conditions when the ceiling is not lower than 500 ft AAL or for take- off and landing when the horizontal visibility is not less than 1 NM;
4. No wind shear has been reported or forecasted or no adverse weather conditions are expected to affect the approach or departure;
5. Compliance with the above is not in conflict with any other provision relating to tail wind and/or crosswind limitations.

## 2.6.3 Noise abatement departure procedure

AMC1 CAT.OP.MPA.130

The operating procedures for the take-off and climb shall ensure that the necessary safety of flight operations is maintained while minimizing exposure to noise on the ground. The following 2 operating procedures (NADP 1 and NADP 2) for the take-off and climb phase have been developed and are considered safe taking the following criteria into account:

1. Any noise abatement procedure shall not be executed below 800 ft AAL;
2. Executing of a noise abatement procedure is secondary to the satisfaction of any obstacle requirement;
3. The thrust settings to be used subsequent to the failure or shutdown of an engine or any other apparent loss of performance, at any stage in the take-off or noise abatement climb, are at the discretion of the Commander (PIC) and noise abatement considerations no longer apply;
4. Noise abatement climb procedures are not to be used in conditions where wind shear warnings exist or the presence of wind shear or downburst activity is suspected;
5. The maximum acceptable body angle specified for the aircraft type shall not be exceeded.

The first procedure (NADP 1) is intended to provide noise reduction for noise-sensitive areas in close proximity to the departure end of the runway. The second procedure (NADP 2) provides noise reduction to areas more distant from the runway end.

The two procedures differ in that the acceleration segment for flap retraction is either initiated prior to reaching the maximum prescribed level or at the maximum prescribed level. To ensure optimum acceleration performance, thrust reduction may be initiated at an intermediate flap setting.

***NOTE***

*For both procedures, intermediate flap transitions required for specific performance-related issues may be initiated prior to the prescribed minimum level. However, no thrust reduction may be initiated prior to attaining that prescribed minimum level.*

***NOTE***

*The indicated airspeed for the initial climb portion of the departure prior to the acceleration segment shall be flown at a climb speed of V2 + 10 to 20 kts.*

***NOTE***

*Unless otherwise instructed, or when specific aerodrome procedures require otherwise, NADP 2 shall be used as the standard noise abatement procedure.*

### 2.6.3.1 Noise abatement departure procedure 1

The noise abatement departure procedure 1 (NADP 1) involves a thrust reduction at or above the prescribed minimum level and delaying flap retraction until the prescribed maximum level is attained.

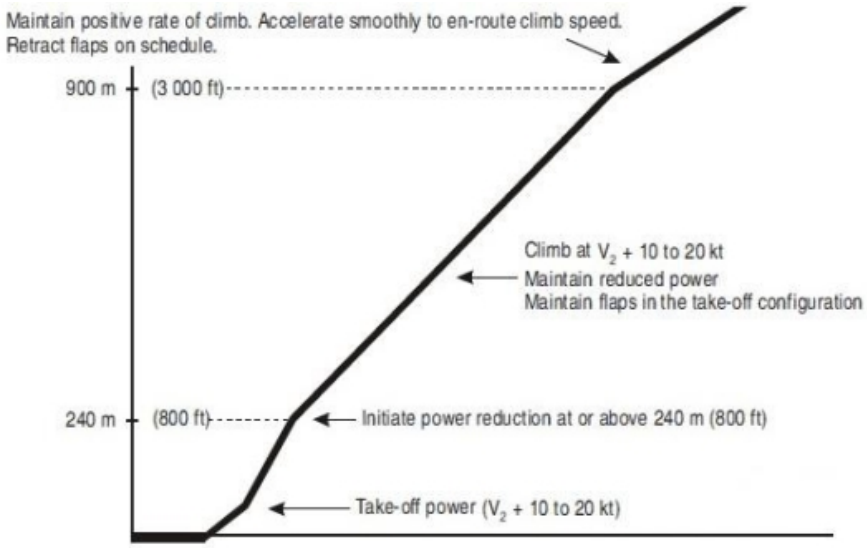
At the prescribed maximum level, accelerate and retract flaps on schedule while maintaining a positive rate of climb and complete the transition to normal en-route climb speed.

The noise abatement procedure is not to be initiated at less than 800 ft AAL. The initial climbing speed to the noise abatement initiation point shall not be less than V2 + 10 kts.

On reaching a level at or above 800 ft AAL, adjust and maintain engine thrust in accordance with the noise abatement thrust schedule provided in the Aircraft Flight Manual. Maintain a climb speed of V2 + 10 to 20 kts with flaps in the take-off configuration.

At no more than a level equivalent to 3.000 ft AAL, while maintaining a positive rate of climb, accelerate and retract flaps on schedule. At 3.000 ft AAL, accelerate to the normal en-route climb speed.

*Figure: Noise abatement departure procedure 1*



### 2.6.3.2 Noise abatement departure procedure 2

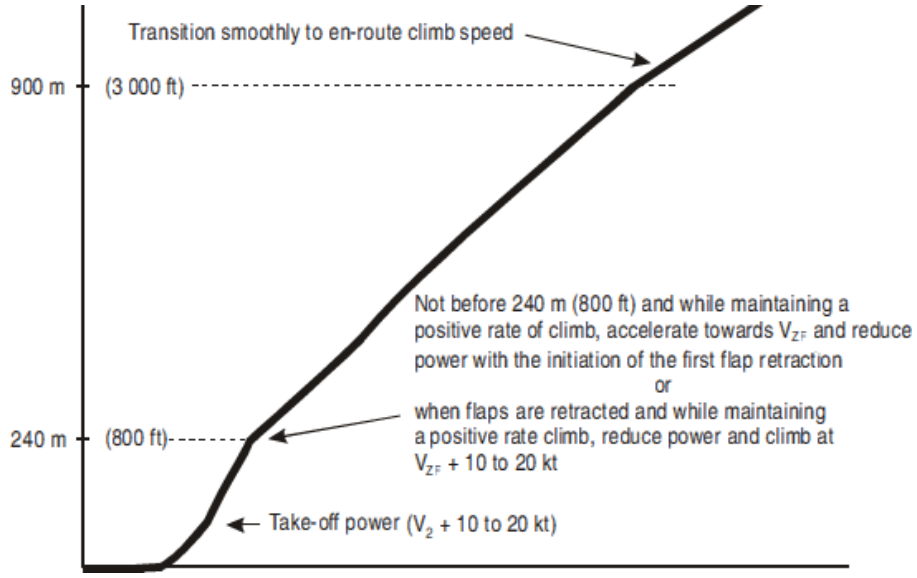
The noise abatement departure procedure 2 (NADP 2) involves an initiation of flap retraction on reaching the minimum prescribed level. The flaps are to be retracted on schedule while maintaining a positive rate of climb. The thrust reduction is to be performed with the initiation of the first flap retraction or when the zero flap configuration is attained. At the prescribed level, complete the transition to normal en-route climb procedures.

The noise abatement procedure is not to be initiated at less than 800 ft AAL. The initial climbing speed to the noise abatement initiation point is $V_2$ + 10 to 20 kts.

On reaching a level equivalent to at least 800 ft AAL, decrease aircraft body angle whilst maintaining a positive rate of climb, accelerate towards flaps up speed and reduce thrust with the initiation of the first flaps retraction or reduce power after flaps retraction.

Maintain a positive rate of climb and accelerate to and maintain a climb speed equal to flaps up speed + 10 to 20 kts till 3.000 ft AAL. At 3.000 ft AAL, accelerate to normal en- route climb speed.

*Figure 14: Noise abatement departure procedure 2*



## 2.6.4 Noise abatement approach procedure

In noise abatement approach procedures, which are developed:

1. The aircraft shall not be required to be in any configuration other than the final landing configuration at any point after passing the outer marker or 5 NM from the threshold of the runway of intended landing, whichever is earlier;
2. Excessive rates of descent shall not be permitted.

Compliance with published noise abatement approach procedures shall not be required in adverse operating conditions such as:

1. If the runway surface condition is adversely affected;
2. In conditions when the ceiling is lower than 500 ft AAL or when the horizontal visibility is less than 1 NM;
3. When the crosswind component, including gusts, exceeds 15 kts;
4. When the tailwind component, including gusts, exceeds 5 kts;
5. When wind shear has been reported or forecasted or adverse weather conditions are expected to affect the approach;
6. Compliance with the above is not in conflict with any other provision relating to tail wind and/or crosswind limitations.

## 2.6.5 Noise abatement landing procedure

Noise abatement procedures shall not contain a prohibition of use of reverse during landing.

# 2.7 Cruise and descent procedures

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Descent*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

## 2.7.1 Cruise procedures

During cruise, both Flight Crew Members shall regularly perform a general crosscheck of all aircraft systems. The PM shall take care of the radio communication.

Special care shall be taken to ensure correct navigation. The PM shall follow the operational flight plan (OFP) and shall note all details as ETA, ATO, fuel burn, clearances and eventual rerouting. He shall also monitor any weather information and shall keep record of any weather change affecting the flight.

## 2.7.2 In-flight fuel management policy and procedures

► *Refer to the Operations Manual Part A Section 8.3.7 – In-flight fuel / energy management policy and procedures*

The Commander (PIC) shall continually ensure that the amount of usable fuel remaining on board is protected and not less than the fuel that is required to proceed to an aerodrome where a safe landing can be made. Refer to the OM Part A for more detailed procedures.

## 2.7.3 Descent procedures

► *Refer to the Operations Manual Part B Section 2.1.4 – Sterile cockpit concept*

► *Refer to the Operations Manual Part B Section **2.1.5.1.2 – Checklist triggers***

The descent checklist shall be commenced when descending towards the arrival aerodrome. Prior to initiating the checklist, the aircraft performance shall have been calculated and the approach, landing and go-around briefing given.

To aid in situational awareness, when descending through FL100 or 10.000 ft AAL (whichever is higher) the PM shall call out “FL100” or “10.000 FT”. This shall serve as a check that the correct speed is being flown and that the sterile cockpit procedures becomes in force.

If descending to an aerodrome is mainly at the Flight Crew Member’s discretion, a general rule of thumb is to have the aircraft passing 10.000 ft AAL at least 30 NM from the destination aerodrome. This objective is to ensure an arrival in a terminal area at an altitude and speed that shall allow a stabilised descent and approach to the runway.

## 2.7.4 ‘Rushing during descent’ principle and dangers

► *Refer to the Operations Manual Part B Section **2.8.4 – Stabilised approach***

### 2.7.4.1 Introduction

Rushed and unstabilised approaches are the largest contributory factor in CFIT and other approach-and-landing accidents. Rushed approaches result in insufficient time for the crew to correctly plan, prepare and execute a safe approach.

Continuing an unstabilised approach is a causal factor in 40 % of all approach-and- landing accidents.

### 2.7.4.2 Benefits of a stabilised approach

Conducting a stabilised approach increases the overall situational awareness by increasing:

1. Horizontal situational awareness by closely monitoring the flight path;
2. Speed awareness by monitoring speed deviations;
3. Vertical situational awareness by monitoring the vertical flight path and the rate of descent;
4. Energy awareness by maintaining the engine power to the level required to fly a 3° approach path at the final approach speed (or at the minimum ground speed, as applicable).

In addition, a stabilised approach provides the following benefits:

1. More time and attention are available for the monitoring of ATC communications, weather conditions and systems operation;
2. More time is available for effective monitoring and back-up by the PM;
3. Defined flight-parameter-deviation criteria and minimum stabilisation height support the decision to land or go-around;
4. Landing performance is consistent with published performance;
5. Situational awareness is increased.

### 2.7.4.3 Factors involved in unstabilised approaches

The following circumstances, factors and errors are often cited when discussing rushed and unstabilised approaches:

1. Fatigue (e.g. due to disrupted sleep cycle, personal stress, etc);
2. Pressure of flight schedule (e.g. making up for a delay);
3. Any crew induced or controller induced circumstances resulting in insufficient time to plan, prepare and execute a safe approach;
4. ATC instructions that result in flying too high and/or too fast during the initial or final approach (e.g. request for maintaining high speed down to the outer marker or for glideslope / glidepath capture from above, etc);
5. Excessive altitude and/or excessive airspeed (e.g. inadequate energy management) early in the approach;
6. Late runway change (i.e. lack of ATC awareness of the time required to reconfigure the aircraft systems for a new approach);
7. Non-standard task sharing resulting in excessive head down work (e.g. FMS reprogramming);
8. Short outbound leg or short downwind leg (e.g. in case of unidentified traffic in the area);
9. Inadequate use of automation: Late take-over from automation (e.g. in case of the autopilot failing to capture the glideslope / glidepath, usually due to crew failure to arm the approach mode);
10. Premature or late descent due to absence of positive FAF identification;
11. Insufficient awareness of wind conditions;
12. Incorrect anticipation of aircraft deceleration characteristics in level flight or on a glideslope / glidepath;
13. Failure to recognize deviations or to remember the excessive-parameter- deviation criteria;
14. Belief that the aircraft will be stabilised at the stabilization height or shortly thereafter;
15. Excessive confidence by the PM that the PF will achieve a timely stabilisation;
16. PF / PM over reliance on each other to call excessive deviations or to call for a go-around;
17. Visual illusions during the visual segment;
18. Continued approach without acquisition of adequate visual references or after loss of visual references;
19. Failure to accurately follow the PAPI or VASI;
20. Failure to adequately maintain the aiming point.

## 2.7.4.4 Company prevention strategy and personal lines of defence

The Company prevention strategy and personal line of defence to reduce the number of unstabilised approaches shall identify and minimise the factors involved (see above) and provide crew recommendations (see below) for the early detection and correction of unstabilised approaches.

Every Flight Crew Member shall implement the following four-step strategy:

1. Anticipate,
2. Detect,
3. Correct, and
4. Decide.

### 2.7.4.4.1 Anticipate

Some factors likely to result in a rushed and unstabilised approach shall be anticipated.

Whenever practical, Flight Crew Members and controllers should avoid situations that may result in rushed approaches.

The descent and approach briefing shall provide an opportunity to identify and discuss these factors.

### 2.7.4.4.2 Detect

Defined excessive parameter deviation criteria and a defined stabilisation height shall provide the PF and PM with a common reference for effective monitoring (e.g. early detection of deviations).

To provide the time availability and attention required for an effective monitoring, the following shall be avoided:

1. Late briefings,
2. Unnecessary radio calls,
3. Unnecessary actions,
4. Non-essential cockpit conversations (i.e. breaking the sterile-cockpit concept).

Reducing the workload, cockpit distractions and/or interruptions shall also provide the crew with more alertness and availability to:

1. Cope with fatigue
2. Comply with an unanticipated ATC request (e.g. runway change or visual approach);
3. Adapt to changing weather conditions or approach hazards;
4. Manage a system malfunction (e.g. flaps failing to extend).

#### 2.7.4.4.3 Correct

Positive corrective actions shall be taken before deviations develop into a challenging or a hazardous situation in which the only safe action is a go-around.

Corrective actions may include:

1. The timely extension of landing gear to correct an excessive altitude or an excessive airspeed;
2. Extending the outbound leg or downwind leg.

#### 2.7.4.4.4 Decide

If the aircraft is not stabilised on the approach path in landing configuration, at the minimum stabilisation height, a go-around shall be initiated unless the crew estimates that only small corrections are necessary to rectify minor deviations from stabilised conditions due, amongst others, to external perturbations.

Following a PM flight parameter exceedance call-out, the suitable PF response shall be:

1. Acknowledge the PM call-out, for proper crew coordination purposes;
2. Take immediate corrective action to control the exceeded parameter back into the defined stabilised conditions;
3. Assess whether stabilised conditions will be recovered early enough prior to landing, otherwise initiate a go-around.

The following behaviors often are involved in the continuation of an unstabilised approach:

1. Confidence in a quick recovery (i.e. postponing the go-around decision when parameters are converging toward target values);
2. Overconfidence because of a long and dry runway and/or a low gross-weight, although airspeed and/or vertical speed are excessive;
3. Inadequate readiness or lack of commitment to conduct a go-around;
4. Go-around envisaged but not initiated because the approach was considered being compatible with a safe landing;
5. Absence of decision due to fatigue or workload (i.e. failure to remember the applicable excessive deviation criteria).

A change of mindset should take place from ‘We will land unless …’ to ‘Let’s be prepared for a go-around and we will land if the approach is stabilised and if we have sufficient visual references to make a safe approach and landing’.

# 2.8 Approach, landing preparation and briefing procedures

► *Refer to the Aircraft Flight Manual Section 2 - Normal procedures: Approach and before landing*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

## 2.8.1 Monitoring

Both Flight Crew Members shall monitor all instruments for warning flags during the approach. Any instrument showing a warning flag shall be brought to the attention of the other Flight Crew Member.

## 2.8.2 Uncertainty

If at any time during the approach, there is a disagreement between Flight Crew Members on course, heading, altitude, position, procedures or configuration, a missed approach shall be initiated. Any discrepancies between Flight Crew Members or instruments shall be resolved at a safe level.

## 2.8.3 Approach, landing and go-around briefing

The approach, landing and go-around briefings should cover the following generic aspects of the approach and landing, including a possible missed approach and a second approach or diversion:

1. Aircraft status;
2. Fuel status;
3. ATIS and weather;
4. NOTAM’s;
5. Receiver autonomous integrity monitoring (RAIM) availability (if required);
6. Landing distance at time of arrival (LDTA);
7. Top of descent;
8. Appropriate aerodrome charts,
9. Use of automation;
10. Use of aircraft systems;
11. Landing and stopping;
12. Taxi to gate or stand;
13. Go-around;
14. Alternate;
15. Use of EFB;
16. ‘TWO-C’ threats.

The approach checklist shall not be commenced before receiving an ATC clearance descending to a QNH altitude or QFE height. As part of the approach checklist or prior to the approach checklist, an altimeter check shall be performed.

## 2.8.4 Stabilised approach

AMC1 CAT.OP.MPA.115, AMC1 CAT.OP.MPA.115 (a), AMC3 CAT.OP.MPA.115, CAT.OP.MPA.310

► *Refer to the Operations Manual Part A Section 8.1.3.9 – Continuous descent final approach operations*

All flights shall be stabilised not later than 1.000 ft above aerodrome elevation without visual reference to the ground and 500 ft above aerodrome elevation with visual reference to the ground. An approach is considered stabilised when all of the following criteria are met:

1. The aircraft is on the required approach path and profile with the correct track set, approach aids tuned and identified as appropriate to the approach type flown and on the required vertical profile;
2. Only small changes in heading and pitch are required to maintain the correct flight path. The bank angle shall be less than 30 degrees;

*NOTE*

*A final turn towards the runway with visual reference to the ground (i.e. circling operations) shall not be considered as unstable if properly briefed.*

3. The aircraft speed is not more than $V_{ref}$ + 20 and not less than Vref;

*NOTE*

*Some approaches especially at busier aerodromes require a higher approach speed than VREF + 20 until a certain distance (e.g. 160 KIAS until 4 DME at EDDF). A speed higher than VREF + 20 shall not be considered as unstable if properly briefed.*

4. Correct configuration for the stage of approach is set;
5. Rate of descent shall not exceed 1.000 ft/min or 300 ft/min above the rate of descent needed to fly the applicable approach, whichever is greater;

*NOTE*

*If an approach requires a rate of descent greater than 1.000 ft/min (e.g. steep approach procedure), this rate of descent shall not be considered unstable if properly briefed. Zero rate of descent may be used when the descent path needs to be regained from below the profile.*

6. Thrust and trim settings are appropriate for the aircraft configuration;
7. All briefings and checklists have been completed;

*NOTE*

*The checklist items related to autopilot / yaw damper and landing lights part of the before landing checklist shall not be required to be completed to meet the stable criteria.*

8. ILS approaches are flown within half full-scale deflection of the localizer and on or up to half full-scale deflection above the glideslope. Conventional non-precision approaches are flown within half full-scale deflection for a VOR approach and within 5° of the required bearing for a NDB approach. RNP APCH procedures are flown within half full-scale deflection of the defined lateral path and, if applicable, on or up to half full-scale deflection above the vertically defined path. In the case of circling approaches flown after a CDFA, the aircraft shall be stabilised in the circling configuration not later than passing 1.000 ft above the runway elevation.

An approach that becomes unstabilised shall require an immediate go-around.

## 2.8.5 Visual reference

During the approach, visual references on or near the aerodrome will become available. The following callouts related to acquiring visual references shall be used:

1. “AERODROME IN SIGHT” means when approaching the aerodrome, the PM / PF becomes visual with the aerodrome but not necessary with the actual landing runway. The PF / PM may respond with “AERODROME IN SIGHT” confirming also to be visual with the same reference or “CHECKED” indicating not to be visual yet;
2. “APPROACH LIGHTS IN SIGHT” means the PM / PF becomes visual with the approach lights (if any) of the landing runway but not necessary with the actual landing runway. The PF / PM may respond with “APPROACH LIGHTS IN SIGHT” confirming also to be visual with the same reference or “CHECKED” indicating not to be visual yet;
3. “VISUAL” means the PM / PF becomes visual with the actual landing runway and will remain so during the rest of the planned approach. The PF / PM may respond with “VISUAL” confirming also to be visual with the same reference and desiring to continue with visual approach procedures or “CHECKED” indicating not to be visual yet or wanting to continue with the applicable approach callouts;
4. “CONTINUE” means the PF is visual with the actual landing runway and has the intend to land after being authorised by ATC (if applicable) and after the PM confirmed to be visual with the actual landing runway by him announcing “VISUAL”.

Refer also to the ‘decision to land’ section below for a more elaborated procedure on the callout “CONTINUE”. Callouts such as “(INTERMITTENT) GROUND CONTACT” and “LANDING” shall not be used.

## 2.8.6 Decision to land

The decision to land shall be announced by the PF, by making the callout “CONTINUE” at the earliest at 500 ft AAL on a VFR approach or visual / circling phase of an IFR (i.e. instrument) approach or at 500 ft above the minima on an IFR (i.e. instrument) approach without visual / circling phase.

The callout “CONTINUE” by the PF shall only be made when:

1. The landing runway is actually in his sight and will remain so during the rest of the planned approach;

*NOTE*

*The callout “CONTINUE” may replace the callout “VISUAL” as it includes the visual prerequisites but only after the PM called “VISUAL” indicating he also has the landing runway in sight.*

2. The aircraft is authorised to land (if applicable);
3. The approach is considered stable which is confirmed by the Commander (PIC) by him making the callout “STABLE”.

## 2.8.7 $V_{app}$ and $V_{ref}$

An approach speed ($V_{app}$) is established to safely deal with gusty wind conditions and possible windshear during approach and landing.

The approach speed used during approach and landing is calculated based on the figures as published in the Aircraft Flight Manual corrected for the wind. The standard approach speed, which is based on a no wind condition, shall be increased with ½ steady wind speed + gust.

$$V_{app(wind)} = V_{app(no\ wind)} + ½ \text{ steady wind speed + gust difference}$$

The combined corrections are subject to a maximum of 15 KIAS increase and should not be exceeded except in extreme conditions.

$V_{ref}$ is the speed at which the aircraft is expected to cross the threshold. $V_{ref}$ is based on the stall speed of the aircraft including a safety margin. Although the safety margin, do not cross the runway threshold with a speed below $V_{ref.}$

The standard reference speed, which is based on a no wind condition, shall be increased with ½ gust.

$$V_{ref}(wind) = V_{ref}(no\ wind) + ½ \text{ (gust factor up to a maximum of 15 kts)}$$

Do not cross the runway threshold with a speed of $V_{ref}$ + 10 kts or more. Any speed excess shall result in an increased landing distance required.

# 2.9 VFR approach procedures

► *Refer to the Operations Manual Part A Section 8.1.4 – Operating minima for VFR flights*

► *Refer to the Operations Manual Part B Section **2.4.5 – Altitude selector***

► *Refer to the Operations Manual Part B Section **2.11 – Visual approach and circling***

A VFR approach should be performed on a nominal 3° (5%) glideslope using visual references such as PAPI and VASI when available. The approach shall be stabilised 500 ft AAL on the correct approach path, in the landing configuration at Vapp with the appropriate thrust applied. The autopilot should not be used and (the) flight director(s) should be turned off. Bear in mind the possible risk of optical illusions due to hindered night vision.

Avoid descending through the correct approach path especially with idle thrust. Late recognition of this situation without a prompt thrust increase may lead to considerable speed decay and altitude loss. Avoid any tendency to ‘tuck under’ in the late stages of the approach. Avoid destabilizing the approach in the last 100 ft, in order to have the best chance of performing a good touchdown at the desired position.

# 2.10 IFR approach procedures

## 2.10.1 Conventional precision approach

►*Refer to the Operations Manual Part A Section 8.1.3.4 – Determination of DH / MDH for instrument approach operations*

►*Refer to the Operations Manual Part B Section **2.4.5 – Altitude selector***

►*Refer to the Operations Manual Part B Section **2.10.3 – RNP APCH operations***

### 2.10.1.1 General

Before arming the navigation mode ‘APP’ the aircraft shall be cleared for the approach. It shall be noted that there is a difference between the ATC clearance “CLEARED LOCALISER” and “CLEARED APPROACH”. When instructed to intercept the localizer, the lateral navigation mode ‘NAV’ instead of the navigation mode ‘APP’ shall be armed.

An altitude (height) crosscheck shall be performed. The glideslope shall never be intercepted from above in between the published final approach point and the decision altitude (height). Flight Crew Members shall use all available means to confirm the glideslope validity as early in the approach as possible, for example by cross-checking the altitude (height) at glideslope interception against available DME information.

### 2.10.1.2 Outer marker check

On an ILS approach, the indicated altitude (height) on the glideslope when passing the outer marker or official substitute shall be compared to the officially published altitude (height). The indicated altitude (height) may differ slightly from the published altitude (height) because of temperature deviations from ISA. This outer mark check also provides a mean of validating the altimeter setting used. Any doubt about the validity of the glideslope signal or altimeter setting value requires an immediate go-around.

When passing the outer marker, the following practice shall be applied:

*Table: Callouts passing the outer marker*

| **Callouts passing the outer marker** | | |
|---|---|---|
| Situation | PF | PM |
| Passing the outer marker | Outer marker xxxx ft | --- |
| PM checks the approach charts | --- | Checked |

### 2.10.1.3 Navigation set-up procedures

The following procedure in setting up the different navigation modes shall be applicable:

*Table: Conventional precision approach (PA) operation set-up procedure*

| Conventional precision approach (PA) operation set-up procedure | | | | |
|---|---|---|---|---|
| **Type of approach** | **Jeppesen minima** | **PFD NAV source** | **FGC button** | **FGC annunciation** |
| ILS | ILS | LOC | APP | LOC - GS |

### 2.10.1.4 Approach callouts

The following procedures describe the procedural callouts to be performed on an ILS approach. Callouts and commands strictly related to gear and flap extension are detailed in the next section. Navigational aids shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts PF first to notice localiser alive*

| Callouts PF first to notice localiser alive | | |
|---|---|---|
| Situation | PF | PM |
| Localiser alive | Loc alive | --- |
| PM confirms | --- | Checked |

Table: Callouts PM first to notice localiser alive

| Callouts PM first to notice localiser alive | | |
|---|---|---|
| Situation | PF | PM |
| Localiser alive | --- | Loc alive |
| PF confirms | Checked | --- |

*Table: Callouts during a conventional precision approach (PA)*

| **Callouts during a conventional precision approach (PA)[4+9]** | | |
|---|---|---|
| Situation | PF[1] | PM[2] |
| LOC (steady)<br><br>PM checks the localiser to be captured | Loc green<br><br>--- | ---<br><br>Checked |
| Glideslope to come alive | Glide alive<br><br>--- | ---<br><br>Checked |
| GS (steady)<br><br>PM checks the glideslope to be captured | Glideslope green<br><br>--- | ---<br><br>Checked |
| PF requests the go-around altitude / height to be set<br><br>PM checks the go-around altitude / height<br><br>PF checks the go-around altitude / height | Set go-around altitude / height<br><br>---<br><br>Checked | ---<br><br>Go-around altitude / height xxxx set<br><br>--- |
| Approaching 1.000 ft AAL (IMC)[8] or 500 ft AAL (VMC) | ---<br><br>(See note 5) | Plus 1.000[5] or plus 500[5]<br><br>--- |
| 200 ft above decision altitude / height<br><br>PF checks the altitude / height | ---<br><br>Checked | Plus 200[3]<br><br>--- |
| 100 ft above decision altitude / height<br><br>PF checks the altitude / height | ---<br><br>Checked | Approaching minima[3]<br><br>--- |
| Decision altitude / height[6+9]<br><br>Visual reference obtained by the PF | ---<br><br>Continue[7] or go-around, select flaps 8 | Minima[3]<br><br>--- |

***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section 2.8.5 of this manual for the applicable visual reference callouts.*

***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section 2.8.5 of this manual.*

***Note 3**: May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section 2.8.5 of this manual).*

***Note 4**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the*

| Callouts during a conventional precision approach (PA)(4+9) |
| --- |
| *callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section* ***2.12 - Missed approach*** *of this manual.*<br>***Note 5****: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*<br>1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*<br>2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*<br>***Note 6****: Refer to section* ***2.4.1 - General*** *of this manual for the applicable procedures to increase the DA(H) when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section* ***2.4.2 - Altimeter corrections*** *of this manual for the applicable pressure, temperature and wind altimeter correction procedures toincrease the DA(H).*<br>***Note 7****: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section* ***2.8.6 - Decision to land*** *of this manual into account.*<br>***Note 8****: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA(H) being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA(H).*<br>***Note 9****: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.* |

Where a course shall be flown in case of missed approach, drift may be taken into account when setting the missed approach heading in order to maintain the desired course when the lateral navigation mode 'HDG' is selected.

### 2.10.1.5 Aircraft configuration

Flaps shall be selected as per flaps speed schedule throughout the approach. The aircraft configuration prior to glide slope interception shall normally be with no flaps with the appropriate manoeuvring speed.

*Table: Callouts during the conventional precision approach (PA) configuration schedule*

| **Callouts during the conventional precision approach (PA) configuration schedule** | | |
|---|---|---|
| Situation | PF | PM |
| Glideslope alive | Select flaps 8(1) | --- |
| PM checks speed below 250 KIAS and selects flaps 8 | --- | Speed checked, flaps 8 selected |
| PM checks for flaps 8 to be extended | --- | Flaps 8 set |
| 1 dot above the glideslope | Select gear down, Flaps 20 | --- |
| PM checks speed below 200 KIAS and selects gear down & Flaps 20 | --- | Speed checked, gear down, Flaps 20 selected |
| PM checks the gear being down & Flaps 20 to be extended | --- | Flaps 20 Set, Gear Down 3 greens, confirm |
| PF checks the gear being down | Down 3 greens | --- |
| Above 1.000 ft in IMC or 500 ft in VMC | Select flaps 40 | --- |
| PM checks speed below 150 KIAS and selects flaps 40 | --- | Speed checked, flaps 40 selected |
| PM checks for flaps 40 to be extended | --- | Flaps 40 set |
| **Note 1**: It may be decided to select flaps 8 at an earlier stage in the approach phase. The same callouts for flaps 8 shall be used using 250 KIAS as the maximum speed. | | |

As soon as the gear is down and confirmed by both Flight Crew Members, the PF shall call for the ‘before landing checklist’.

## 2.10.2 Conventional non-precision approach

► *Refer to the Operations Manual Part A Section 8.1.3.4 – Determination of DH / MDH for instrument approach operations*

► *Refer to the Operations Manual Part A Section 8.1.3.9 – Continuous descent final approach operations*

► *Refer to the Operations Manual Part B Section **2.4.5 – Altitude selector***

► *Refer to the Operations Manual Part B Section **2.10.3 – RNP APCH operations***

### 2.10.2.1 General

Non-precision approaches shall be flown closely following a continuous descent profile (CDFA).

The aim of a CDFA procedure is to minimise the vertical manoeuvring required while flying the final approach segment to landing. The goal is to achieve a continuous final approach descent path that approximates that of a normal glide path. The descent angle flown ensures that minimum FAF crossing altitude (height) and any step-down altitudes (heights) between the FAF and the MAP are respected. The aircraft is descended towards a DA(H) / MDA(H) until the required visual references are obtained and the descent continued to landing or until the DA(H) / MDA(H) is reached where the missed approach is commenced.

The procedure shall be flown as a stabilised approach in order to achieve a constant angle descent to 50 ft over the threshold. A stabilised approach shall never have any level segment of flight at DA(H) / MDA(H). Flight Crew Members shall not descend below DA(H) / MDA(H) unless the required visual references as stated are distinctly visible mandating a prompt go-around manoeuvre at DA(H) / MDA(H) if not.

Make full use of the ground speed information during final approach. On a 3° descent profile (5% slope), the required rate of descent is approximately equal to 5 times the ground speed (rule of thumb).

A go-around is mandatory whenever the aircraft is in a position from which a safe landing may not be performed. Due consideration shall be given to landing performance requirements. It is mandatory to over-fly the published missed approach point before flying the missed approach track.

When performing an FMS coupled approach to fly a conventional NPA approach, the procedure shall be monitored with reference to the conventional navigation aid associated with the procedure.

### 2.10.2.2 Altimeter procedures

As the pressure altimeter is used for DA(H) determination, an altimeter check shall be performed. This check shall be performed normally before commencing (or during) the approach checklist but not later than at 1.000 ft AAL.

All available published navigational aids such as DME fixes, radials, bearings or radar fixes shall be used to determine the descent profile.

Where one or more step down fixes are part of the approach procedure, adjust the rate of descent so as to cross the step-down fix at or slightly above the published altitude (height). Obviously, avoiding one or more level off shall make flight path and speed control much easier.

The PM shall inform the PF about the target altitude (height) at each specific check point of the published descent profile.

The rate of descent during non-precision approaches shall never exceed 1.000 ft per minute.

### 2.10.2.3 Navigation set-up procedures

The following procedure in setting up the different navigation modes shall be applicable:

*Table: Conventional non-precision approach (NPA) operation set-up procedure*

| Conventional non-precision approach (NPA) operation set-up procedure | | | | |
|---|---|---|---|---|
| Type of approach(1) | Jeppesen minima | PFD NAV source | FGC button | FGC annunciation |
| LOC | LOC (GS out) | LOC | NAV - VS | LOC - VS |
| VOR | CDFA | VOR | APP - VS | VAPP - VS |
| | | FMS | NAV - VS | LNAV - VS |
| NDB / LCTR | | FMS | NAV - VS | LNAV - VS |
| | | N/A | HDG - VS | HDG - VS |
| ***Note 1**: May or may not include DME (i.e. VOR or VOR/DME, etc).* | | | | |

### 2.10.2.4 Approach callout procedures

#### 2.10.2.4.1 Localizer only based approaches

The following procedures describe the procedural callouts to be performed on a LOC only approach. Callouts and commands strictly related to gear and flaps extension are detailed in the next section. Navigational aids shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts PF first to notice localiser alive*

*Table: Callouts PF first to notice localiser alive*

| Callouts PF first to notice localiser alive | | |
|---|---|---|
| Situation | PF | PM |
| Localiser alive | Loc alive | --- |
| PM confirms | --- | Checked |

*Table: Callouts PM first to notice localiser alive*

| Callouts PM first to notice localiser alive | | |
|---|---|---|
| Situation | PF | PM |
| Localiser alive | --- | Loc alive |
| PF confirms | Checked | --- |

*Table: Callouts during a LOC only approach*

| Callouts during a LOC only approach[7] | | |
|---|---|---|
| Situation | PF[1] | PM[2] |
| LOC (steady)<br><br>PM checks the localiser to be captured | Loc green<br><br>--- | ---<br><br>Checked |
| When established at the FAF, the PF starts the descent using vertical speed<br>PM checks if the 'VS' mode is set with the appropriate vertical speed | VS minus xxx set[5]<br><br>--- | ---<br><br>Checked |
| If not already done before the FAF, PF requests the go-around altitude / height to be set<br>PM checks the go-around altitude / height<br>PF checks the go-around altitude / height | Set go-around altitude / height[4]<br><br>---<br><br>Checked | ---<br><br>Go-around altitude / height xxxx set<br><br>--- |
| During the descent, the PM reads the different altitudes / heights versus distances (if DME available)<br>PF checks the published descent profile versus the actual descent profile | ---<br><br>Checked *or* correcting | xx DME, xxxx ft<br><br>--- |
| Approaching 1.000 ft AAL (IMC)[11] or 500 ft AAL (VMC) | ---<br><br>(See note 8) | Plus 1.000[8] or plus 500[8]<br><br>--- |
| 200 ft above decision altitude / height<br><br>PF checks the altitude / height | ---<br><br>Checked | Plus 200[6]<br><br>--- |
| 100 ft above decision altitude / height<br><br>PF checks the altitude / height | ---<br><br>Checked | Approaching minima[6]<br><br>--- |
| Decision altitude / height[3+9]<br><br>Visual reference obtained by the PF | ---<br><br>Continue[10] *or* go-around, select flaps 8 | Minima[6]<br><br>--- |

| Callouts during a LOC only approach(7) |
|---|
| ***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section **2.8.5 - Visual reference** for the applicable visual reference callouts.*<br>***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section **2.8.5 - Visual reference** of this manual.*<br>***Note 3**: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.*<br>***Note 4**: When the missed approach altitude (height) to be selected is equal to or below the actual altitude (height) being flown, delay selecting the missed approach altitude (height) until passing the missed approach altitude (height) during the descent to avoid an altitude capture.*<br>***Note 5**: Not applicable when flying the approach without autopilot and flight director.*<br>***Note 6**: May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section **2.8.5 - Visual reference** ).*<br>***Note 7**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*<br>***Note 8**: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*<br>1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*<br>2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section **2.12 - Missed approach** .*<br>***Note 9**: Refer to section **2.4.1 - General** of this manual for the applicable procedures to increase the DA(H) when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section **2.4.2 - Altimeter corrections** for the applicable pressure, temperature and wind altimeter correction procedures to increase the DA(H).*<br>***Note 10**: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section **2.8.6 - Decision to land** into account.*<br>***Note 11**: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA(H) being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA(H).* |

Where a course shall be flown in case of missed approach, drift may be taken into account when setting the missed approach heading in order to maintain the desired course when the lateral navigation mode 'HDG' is selected.

For further details about go-around approach procedures, see below.

### 2.10.2.4.2 VOR or NDB / LCTR based approaches

The following procedures describe the procedural callouts to be performed on a VOR or NDB / LCTR approach (with or without DME). Callouts and commands strictly related to gear and flap extension are detailed in the next section. Navigational aids shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts PF first to notice the ADF within 10 degrees*

| Callouts PF first to notice ADF within 10 degrees | | |
|---|---|---|
| Situation | PF | PM |
| ADF within 10 degrees | Within 10 degrees | --- |
| PM confirms | --- | Checked |

*Table: Callouts PM first to notice the ADF within 10 degrees*

| Callouts PM first to notice ADF within 10 degrees | | |
|---|---|---|
| Situation | PF | PM |
| ADF within 10 degrees | --- | Within 10 degrees |
| PF confirms | Checked | --- |

*Table: Callouts PF first to notice the VOR alive*

| Callouts PF first to notice the VOR alive | | |
|---|---|---|
| Situation | PF | PM |
| VOR becoming alive | Course alive | --- |
| PM confirms | --- | Checked |

*Table: Callouts PM first to notice the VOR alive*

| Callouts PM first to notice the VOR alive | | |
|---|---|---|
| Situation | PF | PM |
| VOR becoming alive | --- | Course alive |
| PF confirms | Checked | --- |

*Table: Callouts during a VOR or NDB / LCTR (with or without DME) approach*

| **Callouts during a VOR or NDB / LCTR (with or without DME) approach(7)** | | |
|---|---|---|
| Situation | PF(1) | PM(2) |
| When established at the FAF, the PF starts the descent using vertical speed | VS minus xxx set(5) | --- |
| PM checks if the 'VS' mode is set with the appropriate vertical speed | --- | Checked |
| If not already done before the FAF, PF requests the go-around altitude / height to be set | Set go-around altitude / height(4) | --- |
| PM checks the go-around altitude / height | --- | Go-around altitude / height xxxx set |
| PF checks the go-around altitude / height | Checked | --- |
| During the descent, the PM reads the different altitudes / heights versus distances (if DME available) | --- | xx DME, xxxx ft |
| PF checks the published descent profile versus the actual descent profile | Checked *or* correcting | --- |
| Approaching 1.000 ft AAL (IMC)(11) or 500 ft AAL (VMC) | --- *(see note 8)* | Plus 1.000(8) *or* plus 500(8) --- |
| 200 ft above decision altitude / height | --- | Plus 200(6) |
| PF checks the altitude / height | Checked | --- |
| 100 ft above decision altitude / height | --- | Approaching minima(6) |
| PF checks the altitude / height | Checked | --- |
| Decision altitude / height(3+9) | --- | Minima(6) |
| Visual reference obtained by the PF | Continue(10) *or* go-around, select flaps 8 | --- |

| Callouts during a VOR or NDB / LCTR (with or without DME) approach[7] |
|---|
| ***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section **2.8.5 - Visual reference** for the applicable visual reference callouts.*<br>***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section **2.8.5 - Visual reference** .*<br>***Note 3**: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.*<br>***Note 4**: When the missed approach altitude (height) to be selected is equal to or below the actual altitude (height) being flown, delay selecting the missed approach altitude (height) until passing the missed approach altitude (height) during the descent to avoid an altitude capture.*<br>***Note 5**: Not applicable when flying the approach without autopilot and flight director.*<br>***Note 6**: May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section **2.8.5 - Visual reference** ).*<br>***Note 7**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*<br>***Note 8**: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*<br>1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*<br>2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*<br>***Note 9**: Refer to section **2.4.1 - General** for the applicable procedures to increase the DA(H) when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section **2.4.2 - Altimeter corrections** for the applicable pressure, temperature and wind altimeter correction procedures to increase the DA(H).*<br>***Note 10**: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section **2.8.6 - Decision to land** into account.*<br>***Note 11**: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA(H) being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA(H).* |

On a non-precision approach, lateral track guidance may not be very accurate (except for a localizer approach) and the aircraft may not be nicely aligned with the runway centerline. Therefore, it is very important that the PM gives clear and precise information to the PF. Avoid misleading announcements.

Where a course shall be flown in case of missed approach, drift may be taken into account when setting the missed approach heading in order to maintain the desired course when the lateral navigation mode 'HDG' is selected.

### 2.10.2.5 Aircraft configuration

Flaps shall be selected as per flap speed schedule throughout the approach. The following summarises the flap and gear sequence assuming that the aircraft is established inbound with no flaps at the appropriate manoeuvring speed.

*Table: Callouts during the conventional non-precision approach (NPA) configuration schedule*

| **Callouts during the conventional non-precision approach (NPA) configuration schedule** | | |
|---|---|---|
| Situation | PF | PM |
| 5 NM prior to the final approach fix | Select flaps 8(1) | --- |
| PM checks speed below 250 KIAS and selects flaps 8 | --- | Speed checked, flaps 8 selected |
| PM checks for flaps 8 to be extended | --- | Flaps 8 set |
| 3 NM prior to the final approach fix | Select gear down, Flaps 20 | --- |
| PM checks speed below 200 KIAS and selects gear down & Flaps 20 | --- | Speed checked, gear down, Flaps 20 selected |
| PM checks the gear being down & Flaps 20 to be extended | --- | Flaps 20 Set, Gear Down 3 greens, confirm |
| PF checks the gear being down | Down 3 greens | --- |
| Above 1.000 ft in IMC or 500 ft in VMC | Select flaps 40 | --- |
| PM checks speed below 150 KIAS and selects flaps 40 | --- | Speed checked, flaps 40 selected |
| PM checks for flaps 40 to be extended | --- | Flaps 40 set |
| ***Note 1**: It may be decided to select flaps 8 at an earlier stage in the approach phase. The same callouts for flaps 8 shall be used using 250 KIAS as the maximum speed.* | | |

As soon as the gear is down and confirmed by both Flight Crew Members, the PF shall call for the ‘before landing checklist’.

## 2.10.3 RNP APCH operations

► *Refer to the Aircraft Flight Manual Supplement W1594 – DUAL UNS 1-EW*

► *Refer to the Operations Manual Part A Section 8.3.2.2.9 – RNP APCH general operational procedures*

► *Refer to the Operations Manual Part B Section **2.4.5 – Altitude selector***

► *Refer to the Operations Manual Part B Section **2.19 – Performance-based navigation***

► *Refer to the Minimum Equipment List (MEL) Section I.3.2.1 – Performance-based navigation operation*

This section contains the aircraft specific performance-based navigation (PBN) operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. The criteria for dispatch shall be detailed in the minimum aircraft system performance specifications (MASPS) part of the MEL.

Performance-based navigation (PBN) operational procedures shall require a Company operational approval prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

### 2.10.3.1 Aircraft specific procedures and limitations for NPA GNSS, APV BARO, SBAS APV and SBAS CAT I approach

Both Flight Crew Members shall confirm, before approaching the FAF, that the blue ‘APP’ icon adjacent to the HSI is displayed, indicating the CDI sensitivity criteria have been met.

The ‘Level of Service’ indicators (LOS), one for FMS 1 and one for FMS 2 shall allow both Flight Crew Members to see the current level of service of the 1 UNS-EW FMS.

‘LNAV’ will be illuminated and both LPV and VNAV will be extinguished when the LOS allows for operations to NPA GNSS minima.

Both ‘LNAV’ and ‘VNAV’ will be illuminated and ‘LPV’ extinguished when the LOS allows for APV BARO operations.

‘LPV’ will be illuminated and both ‘LNAV’ and ‘VNAV’ will be extinguished when the LOS allows for operations down to LPV minima.

The FMS approach annunciator (White “FMS 1 LOS” or “FMS 2 LOS” next to the PFD) shall be illuminated when crossing the final approach fix (FAF) in order to conduct an RNP approach procedure.

### 2.10.3.2 NPA GNSS approach additional specific procedures and limitations

NPA GNSS approaches shall be flown closely following a continuous descent profile (CDFA).

The aim of a CDFA procedure is to minimise the vertical manoeuvring required while flying the final approach segment to landing. The goal is to achieve a continuous final approach descent path that approximates that of a normal glide path. The descent angle flown ensures that minimum FAF crossing altitude (height) and any step-down altitudes (heights) between the FAF and the MAP are respected. The aircraft is descended towards a DA(H) / MDA(H) until the required visual references are obtained and the descent continued to landing or until the

DA(H) / MDA(H) is reached where the missed approach is commenced.

The procedure shall be flown as a stabilised approach in order to achieve a constant angle descent to 50 ft over the threshold. A stabilised approach shall never have any level segment of flight at DA(H) / MDA(H). Flight Crew Members shall not descend below DA(H) / MDA(H) unless the required visual references as stated are distinctly visible mandating a prompt go-around manoeuvre at DA(H) / MDA(H) if not.

Make full use of the ground speed information during final approach. On a 3° descent profile (5% slope), the required rate of descent is approximately equal to 5 times the ground speed (rule of thumb).

A go-around is mandatory whenever the aircraft is in a position from which a safe landing may not be performed. Due consideration shall be given to landing performance requirements. It is mandatory to over-fly the published missed approach point before flying the missed approach track.

### 2.10.3.3 APV BARO additional specific approach procedures and limitations

The following additional specific APV BARO approach procedures and limitations shall apply:

1. Use of VNAV guidance to a DA(H) shall be prohibited;
2. Use of VNAV to a DA(H) shall be prohibited without a current altimeter setting for the landing aerodrome;
3. Use of VNAV vertical guidance shall be prohibited when the barometric altitude is corrected to the landing field elevation (i.e. QFE operation);

### 2.10.3.4 SBAS APV and SBAS CAT I additional specific approach procedures and limitations

The following additional specific SBAS APV and SBAS CAT I approach procedures and limitations shall apply:

1. APP mode shall be armed at least 2 NM prior to the FAF. APP will not arm however for procedures identified in the FMS as circling approaches.
2. LPV shall be indicated on the Level of Service indicator within 2 NM of the FAF;
3. The minimum decision altitude for an SBAS APV and SBAS CAT I approach shall be 250 ft AGL or that specified on the procedure, whichever is higher.
   **Note**: This limitation is due to the lack of a TAWS “GLIDESLOPE” alert for RNP approaches down to LPV minima.
4. TAWS shall be operational in order to be able to conduct an approach down to LPV minima.

### 2.10.3.5 Navigation set-up procedures

Approaching the IAF shall be done using magenta needles with the lateral navigation NAV mode engaged. The following procedure in setting up the different navigation modes between the IAF and FAF shall be applicable:

*Table: RNP APCH operation set-up procedure*

| RNP APCH operation set-up procedure | | | | | |
|---|---|---|---|---|---|
| Type of approach | Jeppesen minima | PFD NAV source | FGC button | LOS annunciators | PFD indications |
| SBAS CAT I(3) | LPV | FMS | APP | LPV | FMS-VNAV |
| SBAS APV(3) | LPV | FMS | APP | LPV | FMS-VNAV |
| APV BARO(2) | LNAV / VNAV | FMS | APP | LNAV - VNAV | FMS-VNAV |
| NPA GNSS | LNAV | FMS | NAV - VS | LNAV | FMS-VS |

## 2.10.3.6 Approach callout procedures

### 2.10.3.6.1 NPA GNSS approaches

The following procedures describe the procedural callouts to be performed on an NPA GNSS approach. Callouts and commands strictly related to gear and flap extension are detailed below. Set-up shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts during an NPA GNSS approach*

| **Callouts during an NPA GNSS approach(7)** | | |
|---|---|---|
| Situation | PF(1) | PM(2) |
| At the FAF, the PF starts the descent using vertical speed | VS minus xxx set(5) | --- |
| PM checks if the 'VS' mode is set with the appropriate vertical speed | --- | Checked |
| If not already done before the FAF, PF requests the go-around altitude / height to be set | Set go-around altitude / height(4) | --- |
| PM checks the go-around altitude / height | --- | Go-around altitude / height xxxx set |
| PF checks the go-around altitude / height | Checked | --- |
| During the descent, the PM reads the different altitudes / heights versus distances | --- | Distance xx, xxxx ft |
| PF checks the published descent profile versus the actual descent profile | Checked or correcting | --- |
| Approaching 1.000 ft AAL (IMC)(11) or 500 ft AAL (VMC) | --- | Plus 1.000(8) or plus 500(8) |
| | (See note 8) | --- |
| 200 ft above decision altitude / height | --- | Plus 200(6) |
| PF checks the altitude / height | Checked | --- |
| 100 ft above decision altitude / height | --- | Approaching minima(6) |
| PF checks the altitude / height | Checked | --- |
| Decision altitude / height(3+9) | --- | Minima(6) |
| Visual reference obtained by the PF | Continue(10) or go-around, select flaps 8 | --- |

| Callouts during an NPA GNSS approach[7] | | |
|---|---|---|
| Situation | PF[1] | PM[2] |

***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section **2.8.5 - Visual reference** for the applicable visual reference callouts.*
***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section **2.8.5 - Visual reference** .*
***Note 3**: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.*
***Note 4**: When the missed approach altitude (height) to be selected is equal to or below the actual altitude (height) being flown, delay selecting the missed approach altitude (height) until passing the missed approach altitude (height) during the descent to avoid an altitude capture.*
***Note 5**: Not applicable when flying the approach without autopilot and flight director.*
***Note 6**: May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section **2.8.5 - Visual reference** ).*
***Note 7**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*
***Note 8**: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*

1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*
2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*

***Note 9**: Refer to section **2.4.1 - General** for the applicable procedures to increase the DA(H) when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section **2.4.2 - Altimeter corrections** for the applicable pressure, temperature and wind altimeter correction procedures to increase the DA(H).*
***Note 10**: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section **2.8.6 - Decision to land** into account.*
***Note 11**: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA(H) being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA(H).*

Flaps shall be selected as per flap speed schedule throughout the approach. The following summarises the flap and gear sequence assuming that the aircraft is established inbound with no flaps at the appropriate manoeuvring speed.

*Table: Callouts during the NPA GNSS approach configuration schedule*

| **Callouts during the conventional non-precision approach (NPA) configuration schedule** | | |
|---|---|---|
| Situation | PF | PM |
| 5 NM prior to the final approach fix | Select flaps 8(1) | --- |
| PM checks speed below 250 KIAS and selects flaps 8 | --- | Speed checked, flaps 8 selected |
| PM checks for flaps 8 to be extended | --- | Flaps 8 set |
| 3 NM prior to the final approach fix | Select gear down, Flaps 20 | --- |
| PM checks speed below 200 KIAS and selects gear down & Flaps 20 | --- | Speed checked, gear down, Flaps 20 selected |
| PM checks the gear being down & Flaps 20 to be extended | --- | Flaps 20 Set, Gear Down 3 greens, confirm |
| PF checks the gear being down | Down 3 greens | --- |
| Above 1.000 ft in IMC or 500 ft in VMC | Select flaps 40 | --- |
| PM checks speed below 150 KIAS and selects flaps 40 | --- | Speed checked, flaps 40 selected |
| PM checks for flaps 40 to be extended | --- | Flaps 40 set |
| ***Note 1**: It may be decided to select flaps 8 at an earlier stage in the approach phase. The same callouts for flaps 8 shall be used using 250 KIAS as the maximum speed.* | | |

As soon as the gear is down and confirmed by both Flight Crew Members, the PF shall call for the ‘before landing checklist’.

### 2.10.3.6.2 APV BARO approach

The following procedures describe the procedural callouts to be performed on an APV BARO approach. Callouts and commands strictly related to gear and flap extension are detailed below. Set-up shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts during an APV BARO approach*

| **Callouts during an APV BARO approach(5)** | | |
|---|---|---|
| Situation | PF(1) | PM(2) |
| Glidepath to come alive | Glidepath alive<br><br>--- | ---<br><br>Checked |
| VNAV(steady)<br><br>PM checks the glidepath to be captured | VNAV green<br><br>--- | ---<br><br>Checked |
| PF requests the go-around altitude to be set<br><br>PM checks the go-around altitude<br><br>PF checks the go-around altitude | Set go-around altitude<br><br>---<br><br>Checked | ---<br><br>Go-around altitude xxxx set<br><br>--- |
| Approaching 1.000 ft AAL (IMC)(9) or 500 ft AAL (VMC) | ---<br><br>(See note 6) | Plus 1.000(6) or plus 500(6)<br><br>--- |
| 200 ft above decision altitude<br><br>PF checks the altitude | ---<br><br>Checked | Plus 200(4)<br><br>--- |
| 100 ft above decision altitude<br><br>PF checks the altitude | ---<br><br>Checked | Approaching minima(4)<br><br>--- |
| Decision altitude(3+7)<br><br>Visual reference obtained by the PF | ---<br><br>Continue(8) or go-around, select flaps 8 | Minima(4)<br><br>--- |

| Callouts during an APV BARO approach[5] | | |
|---|---|---|
| Situation | PF[2] | PM[2] |

***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section **2.8.5 - Visual reference** for the applicable visual reference callouts.*
***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section **2.8.5 - Visual reference** .*
***Note 3**: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.*
***Note 4**: May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section **2.8.5 - Visual reference** ).*
***Note 5**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*
***Note 6**: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*

1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*
2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section 2.12 of this manual.*

***Note 7**: Refer to section **2.4.1 - General** for the applicable procedures to increase the DA when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section **2.4.2 - Altimeter corrections** for the applicable pressure, temperature and wind altimeter correction procedures to increase the DA.*
***Note 8**: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section **2.8.6 - Decision to land** into account.*
***Note 9**: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA.*

Flaps shall be selected as per flap speed schedule throughout the approach. The following summarises the flap and gear sequence assuming that the aircraft is established inbound with no flaps at the appropriate manoeuvring speed.

*Table: Callouts during the APV BARO approach configuration schedule*

| **Callouts during the APV BARO approach configuration schedule** | | |
|---|---|---|
| Situation | PF | PM |
| Glidepath alive | Select flaps 8(1) | --- |
| PM checks speed below 250 KIAS and selects flaps 8 | --- | Speed checked, flaps 8 selected |
| PM checks for flaps 8 to be extended | --- | Flaps 8 set |
| 1 dot above the glidepath | Select gear down & Flaps 20 | --- |
| PM checks speed below 200 KIAS and selects gear down & Flaps 20 | --- | Speed checked, gear down & Flaps 20 selected |
| PM checks the gear being down & Flaps 20 to be extended | --- | Flaps 20 Set, Gear Down 3 greens, confirm |
| PF checks the gear being down | Down 3 greens | --- |
| Above 1.000 ft in IMC or 500 ft in VMC | Select flaps 40 | --- |
| PM checks speed below 150 KIAS and selects flaps 40 | --- | Speed checked, flaps 40 selected |
| PM checks for flaps 40 to be extended | --- | Flaps 40 set |
| ***Note 1**: It may be decided to select flaps 8 at an earlier stage in the approach phase. The same callouts for flaps 8 shall be used using 250 KIAS as the maximum speed.* | | |

As soon as the gear is down and confirmed by both Flight Crew Members, the PF shall call for the ‘before landing checklist’.

### 2.10.3.6.3 SBAS APV and SBAS CAT I approach

The following procedures describe the procedural callouts to be performed on a SBAS APV and SBAS CAT I approach. Callouts and commands strictly related to gear and flap extension are detailed below. Set-up shall be assumed to be set on both sides with the approach clearance received and stabilised approach procedures complied with.

*Table: Callouts during a SBAS APV and SBAS CAT I approach*

| **Callouts during a SBAS APV and SBAS CAT I approach(4)** | | |
|---|---|---|
| Situation | PF(1) | PM(2) |
| Glidepath to come alive | Glidepath alive<br>---<br>--- | ---<br>Checked |
| VNAV (steady)<br>PM checks the glidepath to be captured | VNAV green<br>--- | ---<br>Checked |
| PF requests the go-around altitude / height to be set<br>PM checks the go-around altitude / height<br>PF checks the go-around altitude / height | Set go-around altitude / height<br>---<br>Checked | ---<br>Go-around altitude / height xxxx set<br>--- |
| Approaching 1.000 ft AAL (IMC)(7) or 500 ft AAL (VMC) | ---<br>*(See note 5)* | Plus 1.000(5) *or* plus 500(5)<br>--- |
| 200 ft above decision altitude / height<br>PF checks the altitude / height | ---<br>Checked | Plus 200(3)<br>--- |
| 100 ft above decision altitude / height<br>PF checks the altitude / height | ---<br>Checked | Approaching minima(3)<br>--- |
| Decision altitude / height(6+9+10)<br>Visual reference obtained by the PF | ---<br>Continue(8) or go-around, select flaps 8 | Minima(3)<br>--- |

| Callouts during a SBAS APV and SBAS CAT I approach[4] | | |
|---|---|---|
| Situation | PF[1] | PM[2] |

***Note 1**: During the approach, the PF shall monitor the necessary instruments and should only look outside when receiving a visual reference callout by the PM. Refer to section **2.8.5 - Visual reference** for the applicable visual reference callouts.*
***Note 2**: During the approach, the PM shall divide his attention between monitoring the necessary instruments and the outside scanning for visual references. When a visual reference is established, the PM shall make a callout according to section **2.8.5 - Visual reference** of this manual.*
***Note 3:** May be omitted if both FCM's confirm to be visual with actual landing runway (i.e. according to section **2.8.5 - Visual reference**).*
***Note 4**: At any time during the approach, any Flight Crew Member may decide to perform a go-around when being the PF or order the execution of a go-around when being the PM even if the decision to land was already previously taken. This decision shall be announced by the PM with the callout "GO-AROUND" or by the PF with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section **2.12 - Missed approach** .*
***Note 5**: At the predetermined level, following the callout of the PM "PLUS 1.000" or "PLUS 500, the callout by the Commander (PIC) shall be:*

1. *"STABLE" if the approach is considered stable allowing the PF to continue the approach. The SIC confirms with the callout "CHECKED"; or*
2. *"UNSTABLE" if the approach is considered unstable requiring the PF to perform a go-around (i.e. PF confirms with the callout "GO-AROUND, SELECT FLAPS 8". All subsequent callouts shall be according to the procedures as described in section **2.12 - Missed approach** .*

***Note 6**: Refer to section **2.4.1 - General** for the applicable procedures to increase the DA(H) when the altimeter of the PF reads lower than the one of the PM as checked during one of the required altimeter cross-checks. Refer to section **2.4.2 - Altimeter corrections** for the applicable pressure, temperature and wind altimeter correction procedures to increase the DA(H).*
***Note 7**: The 1.000 ft reference above the applicable aerodrome elevation (AAL) in IMC may for practical reasons be replaced by a 1.000 ft reference above the applicable DA(H) being higher. However, the stabilised criteria shall in that case be met at 1.000 ft above the applicable DA(H).*
***Note 8**: The decision to land shall be announced by the PF at the latest at the minima with all required FCM's visual with the landing runway. If done at an earlier stage, the PF shall take the limitations described in section **2.8.6 - Decision to land** into account.*
***Note 9**: The minimum decision altitude for an SBAS APV and SBAS CAT I approach shall be 250 ft AGL or that specified on the procedure, whichever is higher due to a TAWS limitation.*
***Note 10**: Refer to the OM Part A Section 8.1.3.1 for any additional increment to the published minima that may be specified by the Competent Authority.*

Flaps shall be selected as per flap speed schedule throughout the approach. The following summarises the flap and gear sequence assuming that the aircraft is established inbound with no flaps at the appropriate manoeuvring speed.

*Table: Callouts during the SBAS APV and SBAS CAT I approach configuration schedule*

| **Callouts during the SBAS APV and SBAS CAT I approach configuration schedule** | | |
|---|---|---|
| Situation | PF | PM |
| Glidepath alive | Select flaps 8(1) | --- |
| PM checks speed below 250 KIAS and selects flaps 8 | --- | Speed checked, flaps 8 selected |
| PM checks for flaps 8 to be extended | --- | Flaps 8 set |
| 1 dot above the glidepath | Select gear down,Flaps 20 | --- |
| PM checks speed below 200 KIAS and selects gear down & Flaps 20 | --- | Speed checked, gear down, Flaps 20 selected |
| PM checks the gear being down & Flaps 20 to be extended | --- | Flaps 20 Set, Gear Down 3 greens, confirm |
| PF checks the gear being down | Down 3 greens | --- |
| Above 1.000 ft in IMC or 500 ft in VMC | Select flaps 40 | --- |
| PM checks speed below 150 KIAS and selects flaps 40 | --- | Speed checked, flaps 40 selected |
| PM checks for flaps 40 to be extended | --- | Flaps 40 set |
| ***Note 1**: It may be decided to select flaps 8 at an earlier stage in the approach phase. The same callouts for flaps 8 shall be used using 250 KIAS as the maximum speed.* | | |

As soon as the gear is down and confirmed by both Flight Crew Members, the PF shall call for the ‘before landing checklist’.

# 2.11 Visual approach and circling

► *Refer to the Operations Manual Part A Section 8.1.3.5 – Circling operations*

► *Refer to the Operations Manual Part B Section **2.4.5 – Altitude selector***

► *Refer to the Operations Manual Part B Section **2.9 – VFR approach procedures***

## 2.11.1 Visual approach

A visual approach is an approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain. An IFR flight may be cleared for a visual approach provided both Flight Crew Members have the aerodrome in sight, can maintain visual reference to the terrain and:

1. The reported ceiling is not below the initial approach level for the aircraft so cleared; or
2. The Commander (PIC) reports at the initial approach level or at any time during the instrument approach that the visibility will permit a visual approach and he has the aerodrome in sight at all times.

When in controlled airspace, ATC shall provide separation between an aircraft cleared for visual approach and other departing or arriving traffic.

No visual approach shall be conducted if the correct position of the aircraft towards the runway is not known during the approach. The approach shall be stabilised 500 ft AAL on the correct approach path, in the landing configuration at Vapp with the appropriate thrust applied. Bear in mind the possible risk of optical illusions due to hindered night vision.

Be aware that visual approaches may be radar vectored initially.

Even more than during other phases of flight, a visual approach demands an extensive look out for other traffic. Regularly scan the runway. For the go-around routing, check ATC requirements.

## 2.11.2 Circling approach

A circling approach is the visual phase of an instrument approach to bring an aircraft into position for landing on a runway, which is not suitably located for a straight-in approach. Whenever straight in landing (runway aligned within 30° of the final approach course) is not possible, a circling approach shall be required.

When no circle to land minima are published for the approaching aerodrome, the manoeuvre is not authorised (unless in VMC conditions). If a landing on a non-instrument approach runway is required, use the visual approach criteria.

Use the following guidelines when making a circling approach:

1. Workload is very high and therefore the approach and initial maneuvering shall be made using the autopilot. The PF shall control and monitor the approach visually. The PM shall monitor engine parameters, speeds and altitudes (heights);
2. The aircraft shall circle with the aircraft in landing configuration, except for the final flap setting. If workload to maintain visual becomes too high, the PF may request the PM to adjust the thrust levers as required so as to maintain a constant (pre-briefed) speed;
3. Maintain the applicable minima until the aircraft is in a position from which a normal descent (< 1.000 ft/min) can be made to touchdown within the touchdown zone. It is advisable to maintain this altitude (height) until 30° off centerline;
4. Study the obstacles present in the circling area. Study carefully how and when to break off and the possible go-around routing(s);
5. Be sure you co-ordinate with ATC on the direction of the procedure;
6. During the circling, stay visual. Do not overshoot the runway axis on final. When descending below the minima, all obstacle protection is lost;
7. Perform the complete instrument approach preceding the circling manoeuvre as published. If an ILS is flown before circling, level off at the circling minima, keep tracking the LOC. If not visual, a go-around shall be required at the missed approach point of the LOC/GS out procedure. This can be confusing, as the ILS is flown with the minima of the circling approach and the missed approach point of the LOC/GS out procedure;
8. Do not break off too soon when becoming visual. Make sure you are within the protected area. Prefer a downwind on the PF side;
9. If crosswind exceeds 10 kts, prefer to circle to the downwind side of the landing runway;
10. Descent below the minima only if the landing threshold is in sight, obstacles can be cleared visually and if on profile for final descent. If an approach is misjudged or visual reference with the runway is lost, execute the missed approach without delay. Turn towards the instrument runway on which the approach has been made and coordinate with ATC.

## 2.11.3 Contact approach

As a Company policy, the cancellation of an established instrument approach and the continuation of the flight in minimal VMC without the aerodrome in sight shall not be allowed.

# 2.12 Missed approach

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Go-around*

► *Refer to the Operations Manual Part B Section **2.8.4 – Stabilised approach***

## 2.12.1 Go-around procedure

There is no negative interpretation made in assessing a Flight Crew Member's decision to initiate a go-around. When cleared for approach, a flight is also cleared for a go-around. Do not delay that decision!

***CAUTION***

***An approach that is unstable or becomes unstable shall require an immediate go-around.***

If a go-around has been executed for meteorological reasons, another approach shall only be commenced if the Commander (PIC) has reasons to believe that a second approach shall lead to a successful landing.

More than two approaches shall only be made if attempting a third approach would be safer than diverting to an alternate aerodrome.

The moment the "GOING AROUND" is announced by the PF or PM, the missed approach procedure shall be commenced in accordance with the requirements for the approach being flown or as directed by ATC.

Once the missed approach has been initiated, it shall be flown regardless of whether or not the runway environment subsequently becomes visible.

If a turning missed approach is required, execute the pull up and wait for gear up before initiating the turn. Limit the bank angle to 15 degrees until accelerating through V2 + 10.

The following practice shall be applied when performing a go-around:

*Table: Callouts during a go-around*

The following practice shall be applied when performing a go-around:

*Table: Procedures and callouts during a go-around*

| **Callouts during a go-around** | | |
|---|---|---|
| Situation | PF | PM |
| PF pushes the go-around button and advances the thrust lever to Go Around thrust setting. He verifies correct mode selection on the FMA. | Go-around, select flaps 8<br>Set Go-Around Thrust | --- |
| PM verifies speed within limits and sets flaps 8 (if not already set), and verifies Go Around thrust is set | --- | Speed checked,<br>flaps 8<br>Go Around thrust set |
| PM observes positive rate of climb based on both the VSI and altimeter with a speed below 200 KIAS | --- | Positive rate |
| Gear handle moved to the up position by the PM | Gear up<br>--- | ---<br>--- |
| PM checks the landing gear to be up and landing gear lights to be out. | --- | --- |
| He turns the LDG-TAXI light switches OFF if already turned on before | | --- |
| Passing 400 ft AAL | --- | Passing 400 ft |
| Speed consistent with flap retraction speed | Flaps up | --- |
| PM checks speed above $V_2$+ 10 and below 250 KIAS and selects flaps up. | --- | Speed checked, flaps up |
| PM checks for flaps up | --- | --- |
| Engaging of the yaw damper | Engage yaw damper<br>--- | ---<br>yaw damper engaged |
| Selecting the required vertical navigation | Select FLC Normal/High or SPD xxx or select VS xxxx<br>---<br>Checked | ---<br>FLC Normal/High selected *or* SPD xxxx selected *or* VNAV selected<br>--- |
| Selecting the required lateral navigation | Select HDG xxx *or* select NAV<br>---<br>Checked | ---<br>HDG xxx selected *or* NAV selected<br>--- |

| Callouts during a go-around | | |
|---|---|---|
| Situation | PF | PM |
| PF reduces thrust to climb thrust or lower setting<br>*Note: Setting climb thrust is normally performed when flaps are up. May however be performed whenever required.* | Climb thrust set *or* xx % N1 set | --- |
| PM checks the thrust setting<br>*Note: In case the Climb Thrust is not properly set PM shall adjust the Thrust levers.* | --- | Checked |

***Notes:***

1. *Depending on the go-around procedure and the level of automation desired, selecting and crosschecking horizontal and vertical navigation guidance may vary in sequence.*
2. *The callouts for lateral navigation may be omitted if the appropriate modes were already selected earlier.*
3. *The callouts as depicted, assume the initiation of a go-around after the aircraft has been configured for the approach or landing. If a go-around is initiated before, extra care shall be taken to confirm the desired versus actual gear and flap configuration as callouts may not be applicable and/or may be given in a different order.*

At a safe altitude (height) and clear of obstacles, the PF shall call for the appropriate go-around checklist. In the event of a non-normal or emergency situation the crew shall use the appropriate abnormal and/or emergency checklist.

*NOTE*

*When an approach was being performed using conventional navigational aids (green needles), it may be necessary to change to white needles when flying the go-around based on the FMS (white needles). Before giving the command 'NAV' the PF shall switch to white needles calling "WHITE NEEDLES".*

## 2.12.2 Balked landing procedure

### 2.12.2.1 General

A balked landing is a landing that is discontinued after the decision to land has been made.

### 2.12.2.2 Before touchdown

In the absence of procedures for a balked landing, the procedures for a missed approach shall be followed.

Some aerodromes may have different ATC procedures for a missed approach or a balked landing. Flight Crew Members shall be familiar with both before commencing the approach.

### 2.12.2.3 After touchdown

After touchdown the decision to discontinue a landing depends on many factors and is therefore not proceduralised. The decision to discontinue a landing rest solely with the Commander (PIC).

Factors to be taken into consideration for the decision to discontinue a landing are, but not limited to:

1. Flight crew proficiency (a balked landing after touchdown is not a trained manoeuvre);
2. Runway length remaining (runway length remaining on most runways is not indicated);
3. Runway length required (there is no published runway length required data after touchdown);
4. Runway contamination and/or condition;
5. Non-standard landings (when a touchdown occurred too fast and/or too long down the runway then the landing data published shall not be valid anymore and determining whether or not the aircraft may come to a full stop at the end of the runway is impossible);
6. Obstacles and/or terrain in the departure area;
7. Aircraft flap setting and reverse position;
8. Current airspeed (slower airspeeds require exponentially more runway to accelerate);
9. Wind condition (less headwind or more tailwind exponentially increases the runway required to accelerate again);
10. Weather (windshear, thunderstorms, icing, etc).

# 2.13 Normal landing

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: Before landing and landing*

► *Refer to the Operations Manual Part B Section **2.8.4 – Stabilised approach***

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

After the announcement “BEFORE LANDING CHECKLIST COMPLETED”, the PF shall give a reminder of the initial part of the missed approach.

Idle thrust approaches shall be avoided. The elevator shall be in trim throughout the whole approach so that full elevator effectiveness remains available.

As the aircraft approaches the touchdown point, reduce rate of descent and slowly reduce thrust to idle, so that engines are at idle as the aircraft touches down. Normally, a 2° to 3° pitch change shall only be required to reduce the rate of descent.

Plan to touchdown as near as possible to the 1.000 ft (300 meters) point. Do not allow the aircraft to float in ground effect, which may cause the available runway to be insufficient for landing deceleration.

As the aircraft touches down on the main gear, the nose wheel shall be controlled towards the ground whilst maintaining directional control. As soon as the main gear touches down, spoilers may be selected. Once the nose wheel is on the runway, brakes shall be applied and reverse may be selected while simultaneously keeping positive forward pressure on the elevator control keeping the ailerons into the wind.

If maximum braking should be required, apply maximum and steady force on the brake pedals. The anti-skid will modulate the pressure applied to each wheel to ensure maximum braking for the runway condition. Do not pump the pedals.

The following callouts shall be applicable during the rollout:

*Table: Callouts during the rollout*

| Callouts during the rollout | | |
|---|---|---|
| Situation | PF | PM |
| On touchdown, if the AUTOSPOILER function deploys the spoilers or when the PF extends the spoilers(1) | ---<br>--- | ---<br>Spoilers extended |
| On nose wheel touchdown, the PF applies wheel brakes and deploys the T/R’s | ---<br>--- | ---<br>Both deployed |
| 70 KIAS<br>PF selects thrust to idle reverse | ---<br>--- | 70<br>--- |
| 60 KIAS(2) | --- | 60 |
| ***Note 1:*** *If the AUTOSPOILER function is not available or fails to raise the spoilers automatically, the PF shall extend the spoilers*<br>***Note 2:*** *Speed (or lower) at which a high-speed runway exit may be selected by the PF to vacate the runway.* | | |

Note that the following conditions increase the required landing distance:

1. Delay in selecting spoilers;
2. Delay in selecting reverse thrust;
3. Delay in the application of braking;
4. Speed above Vref over the threshold;
5. Floating above the runway (extended flare);
6. Arriving too high over the threshold;
7. A flat approach path (less than 3°);
8. Wet and contaminated runways;
9. Landing with a tailwind.

# 2.14 Post landing procedures

► *Refer to the Aircraft Flight Manual Section 2 – Normal procedures: After landing/ Clearing Runway & Shutdown*

► *Refer to the Operations Manual Part A Section 8.2.2 – Aircraft, Passengers, Task Specialist and cargo handling procedures related to safety*

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45*

The first priority on the ground shall always be a good lookout. Do not perform any task unless you know where you are and where you are going.

Switches or levers should only be moved after the aircraft has cleared the active runway.

STROBE lights shall remain on and the 'after landing checklist' shall not be performed until the active runway has been vacated.

***CAUTION***

***Taxiing with only one engine running (i.e. single-engine taxi) shall not be allowed.***

After the shutting down of the engines, the shutdown checklist shall be completed. The after- flight paperwork should only be done when stationary with engines shut down.

***CAUTION***

***Observe any engine operating minimum time restriction at idle thrust before shutting down the engines.***

The following task sharing procedures shall be applicable:

*Table: Task sharing after landing*

| Task sharing after landing | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **CMDR (PIC)** | **SIC** | **CM1** | **CM2** | **PF** | **PM** |
| Taxi | | | | | x | |
| Clean-up | | | | | | x |

As soon as the aircraft is stationary on the apron, the transponder shall be put in STBY mode.

*Table: Task sharing during and after shutdown*

| Task sharing during and after shutdown | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **CMDR (PIC)** | **SIC** | **CM1** | **CM2** | **PF** | **PM** |
| Engine shut down | | | | | x | |
| Passenger disembarkation and luggage | x | | | | | |
| Reports | x | | | | | |
| APU (1) | | | | | | x |
| EFB (charging, updating and restowing)(2) | | x | | | | |
| ***Note 1:*** *Only applicable to aircraft with registration OO-DOC & OO-MED.*<br>***Note 2****: If required, an EFB may be charged and updated in a safe place outside of the aircraft*. | | | | | | |

Disembarkation shall not commence until the Commander (PIC) has given clearance to do so. Passengers shall not be allowed to disembark the aircraft without at least one Flight Crew Member present. The Commander (PIC) opens the cabin door and is the first person to leave the aircraft in order to assist disembarking the passengers. It's his responsibility to keep the passengers together. In case there is no handling agent present he shall escort the passengers to the terminal in a safe way.

On completion of duty or overnight, the aircraft shall be left with the parking brake off, chocks installed, all electrical switches, lights turned off and the batteries disconnected. Indicate clearly to any Ground Personnel that the aircraft may be moved or not preferably by placing a placard in front of the left-hand windshield indicating any possible towing limitation (e.g. parking brake set, etc).

*NOTE*

*Avoid setting the parking brake when the brakes are hot from severe usage or when moisture conditions and/or freezing conditions may form ice locks.*

*The parking brake should be left off and wheel chocks installed when the aircraft is left unattended. Changes in the ambient may cause the brakes to release or to exert excessive pressure.*

The main cabin door shall be locked, the emergency exits secured and all necessary cleaning done unless Company arrangements have been made with the applicable FBO to leave the aircraft open for later servicing.

All pitot covers and engine covers shall be fitted to the aircraft after final shutdown when the aircraft stays overnight or the aircraft is left for pick-up by another crew.

# 2.15 Operation on wet and contaminated runways

► *Refer to the Aircraft Flight Manual Section 2 – Cold Weather Operation*

► *Refer to* ***SECTION 1 - LIMITATIONS***

Use the following guidelines when making a departure or landing on a wet or contaminated runway:

1. Take-off and landing on contaminated runways shall not be attempted in tailwind conditions;
2. Landing on wet runways is not recommended in tailwind conditions;
3. Performance credit shall not be assumed for reported headwinds exceeding 10 knots;
4. An aircraft shall not depart if ice, wet snow or frost could develop during taxiing. On slippery taxiways and aprons, extreme caution shall be exercised. Use taxi speeds consistent with the prevailing conditions. If in doubt physically check the apron surface before deciding to taxi;
5. Runways covered for considerable proportion of their length with depths of water or slush, exceeding approximately 3 mm, may have an adverse effect on landing performance because under such conditions aquaplaning is likely to occur. Under these circumstances, a landing shall only be attempted if there is an adequate distance margin over and above the normal landing field length required;
6. Runways shall have a cleared strip width of 24,4 meters with no snowbanks or 27,4 meters with snowbanks of no more than 0,5 meters.

# 2.16 Steep approach operation

► *Refer to the Aircraft Flight Manual Supplement W1532 – EASA Steep Approach*

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.1.2.4.14 – Steep approach operations*

► *Refer to the Operations Manual Part B Section **1.4 – Types of operation***

► *Refer to the Operations Manual Part C Section 5.2 – Steep approach procedures*

***CAUTION***

***The aircraft with registration OO-HRG shall not be authorised to perform steep approach operations, hence this section shall not be applicable for this aircraft.***

This section contains the aircraft specific steep approach operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above.

For aircraft listed on the Company's Air Operator Certificate (AOC), steep approach operations shall require an approval from the Competent Authority prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

For aircraft listed on the Company's Declaration (DEC), steep approach operations shall require a Company operational approval prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

*NOTE*

*A steep approach procedure is an approach procedure using glideslope angles of 4,5° or more and with screen heights of less than 60 ft, but not less than 35 ft.*

## 2.16.1 Operational limitations

Operation of the aircraft is to adhere to the following operational limitations:

1. The wing flaps, antiskid system, spoilers and nose wheel steering system shall be operative;
2. The range of approved approach glide path angles is from 4,5° up to and including 5,5°;
3. Airspeed - SVREF;
4. Steep approaches commencing with one engine inoperative are prohibited;
5. Steep approaches in icing conditions are prohibited;
6. Maximum aerodrome elevation is 2.000 ft MSL;
7. Maximum Landing weight is 8.391 kg / 18.500 lbs;
8. Steep approaches with tailwind shall not be authorized.
9. Maximal crosswind shall be 15 kts.
10. Approach and landing with 'WING /STAB HT' or 'L (R) NAC – ON' is prohibited.
11. Center of Gravity limitations shall comply with the provisions in the AFM supplement W1532.

The aircraft is approved for steep approaches in visual or instrument meteorological conditions, with no icing conditions for the approach environment, using an approved visual or ILS glide path reference system. The AFM supplement shall be checked to make sure all limitations are complied with.

***CAUTION***

***An unstabilised approach may cause increased landing distance or a high sink rate resulting in a hard landing.***

## 2.16.2 Terrain awareness system limitations

To preclude undesired excessive sink rate mode aural warnings during steep approaches, the warning envelope for mode 1 is adjusted based on the selection of the Steep approach switch located on the GPWS switch panel.

## 2.16.3 Performance limitations

Operation of the aircraft is to adhere to the following performance limitations:

1. The aircraft shall be flown in accordance with the procedures and performance requirements as defined in supplement W1532 of the Aircraft Flight Manual (AFM);
2. Speed at glidepath intercept shall not be greater than $SV_{REF}$;
3. The aircraft shall be stabilised and fully configured for landing prior to glideslope intercept;
4. Perform the approach procedures in the basic AFM while selecting the Steep approach switch ON and use $SV_{REF}$ = 124 kts.

The performance data in the supplement is based on approach glidepath angles from 4,5° up to and including 5,5°.

# 2.17 NAT HLA MNPS operation

SPA.MNPS.100, SPA.MNPS.105

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.2.3 – NAT HLA MNPS procedures*

► *Refer to the Operations Manual Part A Annex 18 – Company oceanic operation (NAT HLA MNPS) checklist*

► *Refer to the Operations Manual Part B Section* ***1.4 - Types of operation***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

► *Refer to the Minimum Equipment List (MEL) Section I.3.2.1 – RNAV 10 NAT HLA MNPS and remote airspace operation*

This section contains the aircraft specific NAT HLA MNPS operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. The criteria for dispatch shall be detailed in the minimum aircraft system performance specifications (MASPS) part of the MEL.

NAT HLA MNPS operations shall require a specific approval from the Competent Authority prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

*NOTE*

*No aircraft specific operational procedures required for this type of aircraft besides the procedures already depicted in the OM Part A and OM Part B as mentioned in the references above.*

# 2.18 RVSM operation

SPA.RVSM.100, SPA.RVSM.115

► *Refer to the Aircraft Flight Manual Section 1 Limitations – Operational Limits / requirements: Reduced vertical separation minimums (RVSM)*

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.2.4 – RVSM operation*

► *Refer to the Operations Manual Part A Annex 12 – RVSM trend monitoring sheet*

► *Refer to the Operations Manual Part B Section **1.4 - Types of operation***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

► *Refer to the Minimum Equipment List (MEL) Section I.3.2.2 – RVSM operation*

This section contains the aircraft specific RVSM operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. The criteria for dispatch shall be detailed in the minimum aircraft system performance specifications (MASPS) part of the MEL.

RVSM operations shall require a specific approval from the Competent Authority prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

*NOTE*

*No aircraft specific operational procedures required for this type of aircraft besides the procedures already depicted in the OM Part A and OM Part B as mentioned in the references above.*

# 2.19 Performance-based navigation

AMC1 CAT.OP.MPA.126

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.2.2 – Performance-based navigation*

► *Refer to the Operations Manual Part B Section **1.4 – Types of operation***

► *Refer to the Operations Manual Part B Section **2.10.3 – RNP APCH operations***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

► *Refer to the Minimum Equipment List (MEL) Section I.3.2.3 – Performance-based navigation operation*

This section contains the aircraft specific performance-based navigation (PBN) operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. The criteria for dispatch shall be detailed in the minimum aircraft system performance specifications (MASPS) part of the MEL.

Performance-based navigation (PBN) operational procedures shall require a Company operational approval prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

*NOTE*

*Aircraft specific operational procedures required for this type of aircraft are detailed in section **2.10.3 - RNP APCH operations**.*

# 2.20 ETOPS operation

CAT.OP.MPA.140

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.5 - ETOPS*

► *Refer to the Operations Manual Part B Section **1.4 – Types of operation***

► *Refer to the Operations Manual Part B Section **10.1.12 – Life raft***

***CAUTION***

***The Company is not approved to operate this type of aircraft over a route that contains a point further from an adequate aerodrome, under standard conditions in still air, the distance flown in 120 minutes at the one engine inoperative (OEI) cruise speed as determined by the Company as an average for this purpose being 180 KIAS or a total distance of 300 NM, whichever is lesser, for this type of aircraft.***

# 2.21 QFE altimeter setting and metric units operation procedures

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.3 – Altimeter setting procedures*

► *Refer to the Operations Manual Part B Section **2.4 - Altimeter setting and checking procedures***

QFE altimeter setting and metric unit operations shall require a Company operational approval prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

## 2.21.1 General

The Company shall operate QFE as the primary altimeter setting when the country uses QFE as their primary altimeter setting.

QFE altimetry is normally used in conjunction with the metric systems (heights are given in meters instead of feet). QFE uses the elevation of the aerodrome as the zero reference line instead of MSL. As a result, the altimeters on the ground read  zero and not the field elevation.

***WARNING***

***The use of VNAV vertical guidance (except LPV) shall be prohibited when QFE is used as pressure setting.***

***CAUTION***

***The GPWS terrain display shall be inhibited by selecting TERR INHB to ON when using QFE as altitude reference.***

## 2.21.2 QFE procedures

Normal crew briefings shall include a discussion of these procedures.

Verify with ATC the QFE altimeter setting. Verify with ATC that vertical clearances are referred to QFE.

Below transition level, altimeters shall be set to QFE with the stand-by altimeter to QNH. Above transition height, all altimeters shall be set to QNE (1013,2 hPa). All altimeters shall be crosschecked for correct setting and reading.

## 2.21.3 Metric operation procedures

Meters shall be used as the aircraft is capable of selecting meters. If the aircraft is however not capable of selecting meters, than conversion to feet is required according to the table as depicted below.

*Table: Metric conversion table*

| Metric conversion table | | | |
|---|---|---|---|
| Meters | Feet | Meters | Feet |
| 100 | 300 | 5.400 | 17.700 |
| 200 | 700 | 5.700 | 18.700 |
| 300 | 1.000 | 6.000 | 19.700 |
| 400 | 1.300 | 6.300 | 20.700 |
| 500 | 1.600 | 6.600 | 21.700 |
| 600 | 2.000 | 6.900 | 22.600 |
| 900 | 3.000 | 7.200 | 23.600 |
| 1.200 | 3.900 | 7.500 | 24.600 |
| 1.500 | 4.900 | 7.800 | 25.600 |
| 1.800 | 5.900 | 8.100 | 26.600 |
| 2.100 | 6.900 | 8.600 | 28.200 |
| 2.400 | 7.900 | 9.100 | 29.900 |
| 2.700 | 8.900 | 9.600 | 31.500 |
| 3.000 | 9.800 | 10.100 | 33.100 |
| 3.300 | 10.800 | 10.600 | 34.800 |
| 3.600 | 11.800 | 11.100 | 36.400 |
| 3.900 | 12.800 | 11.600 | 38.100 |
| 4.200 | 13.800 | 12.100 | 39.700 |
| 4.500 | 14.800 | 13.100 | 43.000 |
| 4.800 | 15.700 | 14.100 | 46.300 |
| 5.100 | 16.700 | 15.100 | 49.500 |

For the departure and approach part of the flight, Jeppesen charts normally have a conversion table on the applicable plate showing the normal ATC altitude assignments used.

# 2.22 Low visibility operation

AMC2 SPA.LVO.105 (c), SPA.LVO.125

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.1.3.3 – Take-off minima*

► *Refer to the Operations Manual Part A Section 8.2.10 – Low visibility taxi operations*

► *Refer to the Operations Manual Part A Section 8.4.3 – Low visibility operations*

► *Refer to the Operations Manual Part B Section **1.4 - Types of operation***

This section contains the aircraft specific low visibilty take-off operations (LVTO) operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. For this aircraft type no special criteria for dispatch are applicable for low visibilty take-off operation (LVTO) and hence no minimum aircraft system performance specifications (MASPS) are depicted in the MEL.

Low visibility take-off operations shall require a specific approval from the Competent Authority prior to operating. Other low visibility operations, which also require approval from the Competent Authority shall not be authorised. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

*NOTE*

*No aircraft specific operational procedures required for this type of aircraft besides the procedures already depicted in the OM Part A and OM Part B as mentioned in the references above. No minimum aircraft system performance specifications (MASPS) depicted in the applicable MEL as not required for low visibilty take-off operations (LVTO).*

# 2.23 Cold weather operation

CAT.OP.MPA.250 (b), CAT.OP.MPA.255 (a)

► *Refer to the Aircraft Flight Manual Section 2 – Normal Procedures: Cold Weather Operation*

► *Refer to the Aircraft Flight Manual Addendum – DE-ICING / ANTI ICING*

► *Refer to the Operations Manual Part A Section 8.2.4 – De-icing and anti-icing on the ground*

► *Refer to the Operations Manual Part B Section* ***1.13 - Limitations on wet or contaminated runways***

► *Refer to the Operations Manual Part B Section* ***1.14 - Airframe contamination***

## 2.23.1 General

The problems associated with the operation of the aircraft in a low temperature environment may be minimised and a high standard of ground and flight safety may be maintained by following the precautions, practices and procedures as set out in this section.

After a prolonged exposure to ambient temperatures below -10°C (+14°F), extra operational procedures shall be required before operating the aircraft. Refer to the cold weather operations as described in the normal procedures of the Aircraft Flight Manual.

## 2.23.2 Pre-flight inspection procedure

In addition to the normal exterior pre-flight inspection, special attention shall be given to all vents, openings, control surfaces, hinge points, stall warning vane and the wing, tail and fuselage surfaces for accumulations of ice and/or snow. Removal of these accumulations shall be necessary prior to take-off.

The engine fan blades shall be inspected for ice and/or snow. Unless engine inlet and exhaust covers have been installed during snow and/or icing conditions, the fans shall be turned by hand in the direction of normal rotation to make sure they are free to rotate prior to starting the engines.

The removal of frozen deposits by chipping or scraping shall not be approved. A soft brush or mop may however be used to clear snow that is not adhering to the surface. If the use of de- icing and/or anti-icing fluids are required to produce a clean aircraft, special attention shall be given to ensure that the pitot masts, static ports, fuel vents, stall warning vane, cockpit windows and the area forward of the cockpit windows are free of any de-icing and/or anti-icing solution.

## 2.23.3 Ground de-ice and anti-ice procedures

Flight Crew Members shall be responsible for ensuring that the aircraft is free of ice and/or other contamination prior to operating the aircraft.

The addendum of the Aircraft Flight Manual gives Flight Crew Members advisory information on de-ice and anti-ice procedures. The Operations Manual Part A shall be consulted by Flight Crew Members for legal holdover times when spraying the aircraft with de-ice and/or anti-ice fluids.

## 2.23.4 Taxi procedure

Taxiing through deep snow or slush should be avoided when possible. Snow and slush may be forced into the brake assemblies, which may cause the brakes to freeze during a prolonged hold on the ground or during the subsequent flight. Flaps shall remain retracted during taxiing to avoid throwing of snow or slush into the flap mechanisms and/or to minimise damage to flap surfaces.

## 2.23.5 Before take-off procedure

After completion of the normal before take-off checklist, it shall be verified that the aircraft is still free of frozen contaminants. Ensure that the runway is free from any hazards such as snowdrifts, glazed ice and ruts.

***WARNING***

***Ice, frost or snow on top of de-icing and/or anti-icing solutions shall be considered as adhering to the aircraft. Take-off shall be prohibited.***

## 2.23.6 Take-off procedure

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aircraft during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based.

In the case of a contaminated runway, the first option for the Commander (PIC) is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments and any further safety measures he considers justified under the prevailing conditions.

Flight Crew Members shall maintain an adequate overall level of safety whilst such operations are limited to rare occasions and all additional measures ensuring an equivalent level of safety shall be ensured. Such measures are special crew training, additional distance factoring and more restrictive wind limitations.

## 2.23.7 Landing procedure

Braking and steering may be less effective on contaminated runways. Hydroplaning may also occur under wet runway conditions at higher speeds. The rudder shall be used to maintain directional control until the tires make solid contact with the runway surface.

Selecting reverse thrust may effectively reduce the stopping distance on contaminated runways. However reverse thrust may cause snow or moisture to be thrown forward, temporary reducing forward visibility.

## 2.23.8 Precautions before leaving the aircraft in cold weather

Flight Crew Members shall comply with the post flight operational procedures as set out in the cold weather operations as described in the normal procedures of the Aircraft Flight Manual.

Besides that, the crew shall ensure that:

1. Chocks are installed and the parking brake is released to minimize the possibility of the brakes freezing;
2. Install all protective covers and plugs;
3. Remove all freezable liquids from the galley;
4. Remove all EFB’s and related electronic equipment.

# 2.24 Automatic dependent surveillance - broadcast operation

► *Refer to the Aircraft Flight Manual Supplement BAS45040108 – Honeywell ADS-B OUT System*

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.2.5 – Automatic dependent surveillance – broadcast operations*

► *Refer to the Operations Manual Part B Section **1.4 – Types of operation***

► *Refer to the Operations Manual Part B Section **2.2.5 – Transponder operations***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

► *Refer to the Minimum Equipment List Section I.3.2.4 – ADS-B Operation*

This section contains the aircraft specific automatic dependent surveillance – broadcast (ADS- B) operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above. The criteria for dispatch shall be detailed in the minimum aircraft system performance specifications (MASPS) part of the MEL.

ADS-B operations shall require a Company operational approval prior to operating. Every Flight Crew Member shall ensure that his currency to perform as such is still valid.

## 2.24.1 Aircraft specific normal procedures

► *Refer to the Operations Manual Part B Section **2.2.5 - Transponder operations***

## 2.24.2 Aircraft specific contingency procedures

The amber message ‘ADS-B FAIL’ on both RMU indicates the ADS-B system has stopped transmitting or GPS is not available.

The amber message ‘ADS-B DGR’ on both RMU indicates the ADS-B system is operating in a degraded performance or when the pressure altitude is invalid.

*NOTE*

*In the event of airborne failures resulting in less than the minimum equipment requirements, ATC shall be notified without delay.*

# 2.25 Controller pilot data link communication

► *Refer to the Operations Manual Part A Section 1.1.5 – List of aircraft in service*

► *Refer to the Operations Manual Part A Section 8.3.2.6 – Controller pilot data link communication*

► *Refer to the Operations Manual Part B Section **1.4 – Types of operation***

► *Refer to the Operations Manual Part B Section **2.1.10.4 – CPDLC communication***

***CAUTION***

***CPDLC equipment not installed on this type of aircraft hence this section shall not be applicable and CPDLC operations shall not be authorised.***

# 2.26 Specific system and/or equipment additional normal procedures

## 2.26.1 General

Every Flight Crew Member shall ensure that all operational procedures as published by the Manufacturer are complied with even when not published in this manual.

Some systems and/or equipment however may require some more detailed explanation (e.g. specific normal procedures for a certain system and/or equipment); hence they shall be detailed below.

## 2.26.2 Medical equipment

► *Refer to the Operations Manual Part B Annex 1 - Abbreviated Company checklist LJ45 (Learjet 45)*

### 2.26.2.1 General

The occupant restraint harness shall secure the occupant during critical phases of flight. The shoulder straps shall be passed over the occupant's shoulders and fastened through the buckle of the torso belt. The thigh belt is secured over the lower limbs of the occupant.

To install the stretcher on the patient loading and utility system (PLUS), slide the stretcher down the pre-installed PLUS system until latching pins engage latching the stretcher into place. Rocking the sled from each end is an acceptable means of verification of the stretcher properly being latched.

### 2.26.2.2 Pre-flight procedures

As part of the pre-flight check, it shall be assured that:

1. The all limitations and procedures are applied with;
2. A life jacket is available for each patient when so required;
3. The patient loading and utility system(s) (PLUS), stretcher(s) and occupant(s) are secured;
4. All 4 latch pins (per PLUS) are engaging the latch stations (i.e. the pins emerge for the LifeLocks);
5. The crew is familiar with the location and operation of the oxygen shut-off valves located on the PLUS and shall manually open these valves if oxygen is expected to be required for the PLUS occupant during flight.

SECTION 3 - ABNORMAL AND EMERGENCY PROCEDURES

# 3.0 General

ORO.GEN.110 (h)

## 3.0.1 Priorities

When any Flight Crew Member recognizes a non-normal situation, the Commander (PIC) designates who controls the aircraft. The first priority is to maintain control of the aircraft at all times to ensure a safe flight path.

The following procedure may be useful as a guideline to determine priorities in case of a non- normal situation:

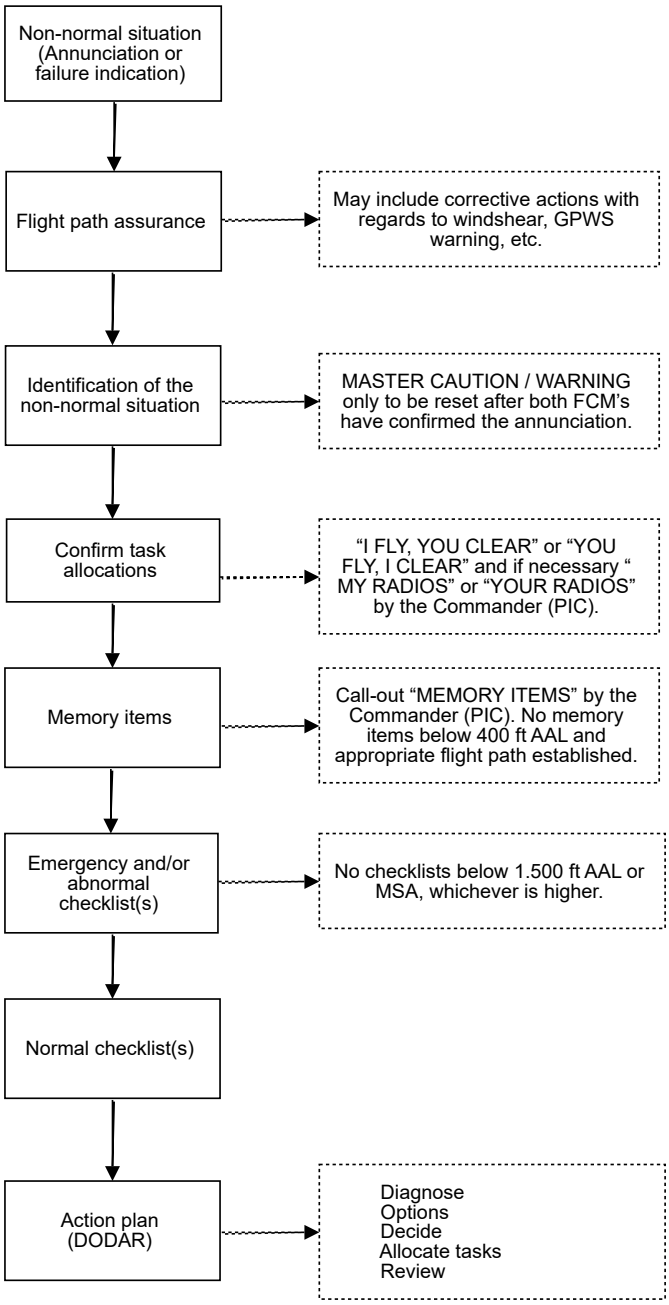
1. The first Flight Crew member to become aware of the non-normal situation shall **announce** the situation as he sees it. Master caution / warning indications shall only be reset after both Flight Crew Members have confirmed the annunciation;
2. The PF shall **fly the aircraft** to ensure a safe flight path;
3. Navigate the aircraft thinking about one-engine out (escape) routing, terrain, drift down and other limitations;
4. **Manage the situation** once all of the above has been assured. Abnormal or emergency procedures shall be initiated;
5. **Communicate** with the other Flight Crew Member and ATC. Use good CRM to confirm that both Flight Crew Members are fully aware of the nature of the problem. Advise ATC using a MAYDAY or PANPAN call.

The first priority shall be aircraft control. One Flight Crew Member (PF) shall fly the aircraft. The Commander (PIC) may elect either to fly the aircraft himself or to instruct the other Flight Crew Member to fly it. Assuming control of the aircraft does not relieve the Commander (PIC) of the responsibility for directing crew action.

The abnormal or emergency procedures shall be conducted as per the appropriate checklist(s) (see below). If time permits, assistance shall be sought from appropriate Company or ATC sources. Full use shall be made of all available communication systems.

A plan for subsequent action shall be prepared and briefed among the Flight Crew Members.

*Figure: Action plan in case of a non-normal situation*



## 3.0.2 Authority

The Commander (PIC) is the final authority concerning the safety, comfort and conduct of the aircraft, passenger(s) and other Flight Crew Member(s). The Commander (PIC) may and shall delay, divert or cancel any flight that cannot be conducted safely.

## 3.0.3 Notification

► *Refer to the Operations Manual Part A Section 12.3 – Communication procedures*

► *Refer to the Operations Manual Part B Section **3.7 – Distress communication***

The Commander (PIC) shall inform ATC or shall instruct to inform ATC (MAYDAY or PANPAN call) when an abnormal or emergency situation affects the safety of the flight.

In the event of an abnormal or emergency situation, contact the controlling agency and notify the nature of the distress and intention. If unable to contact the controlling agency, contact the emergency frequencies (121,500 MHz). If unable to contact any agency, set the transponder to 7700. If a forced or uncontrolled landing is likely, turn on the emergency locater transmitter.

## 3.0.4 Use of checklists

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL132B Section E (Learjet 40) – Emergency procedures*

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL126C Section E (Learjet 45) – Emergency procedures*

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL132B Section A (Learjet 40) – Abnormal procedures*

► *Refer to the Manufacturer Crew Checklist & Quick Reference Handbook CL126C Section A (Learjet 45) – Abnormal procedures*

► *Refer to the Operations Manual Part B Section **3.9 – System failures***

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

No single document may cover all possible abnormal or emergencies on board of an aircraft. The absolute reference is the Aircraft Flight Manual. Furthermore, the Manufacturer Crew Checklist & Quick Reference Handbook shall be used on board as a mean of quick reference in handling all abnormal and emergency procedures.

Application of abnormal and emergency procedures is non-routine. All actions shall be clearly announced before being performed. Procedures requiring prompt corrective action shall be treated according to the memory action principle. The great majority of failures will allow further read and do actions, as both applied in the Manufacturer Crew Checklist & Quick Reference Handbook.

Certain procedures in the Manufacturer Crew Checklist & Quick Reference Handbook will lead to two or more options before the procedure may be carried forward. Clear understanding of the situation and the available options shall be established between both Flight Crew Members before proceeding.

The appropriate emergency / abnormal checklist is called for by the Pilot Flying (PF) using the exact annunciation phraseology where applicable (i.e. “LEFT FUEL HEATER ABNORMAL CHECKLIST”). The Pilot Monitoring (PM) will look up the correct checklist and, before performing the checklist, confirm with the Pilot Flying (PF) that he has the correct checklist (i.e. PM shows PF the checklist header while calling “CONFIRM?”). The PM then performs the checklist using the read and do principle taking the principles of critical actions (see below) into account.

*NOTE*

*In case of multiple failures, the Commander (PIC) shall determine the order in which these failures, using the appropriate checklists, shall be performed. He shall consider possible root cause(s) causing these multiple failures and threats related to each failure and/or combination thereof.*

Completion of an abnormal or emergency checklist shall be announced by the PM with the wording “XXX CHECKLIST COMPLETED”. If the emergency or abnormal checklists include a descent & approach checklist and a before landing procedure, they replace the applicable normal checklists.

If for operational reasons the Commander (PIC) deems it necessary to interrupt a procedure in the checklist before it is completed, the wording “HOLD PROCEDURE” shall be used. When ready to resume, announce “CONTINUE PROCEDURE”. Identically if certain items of a procedure may be delayed in time, the PM shall clearly announce this and state the next items to be performed.

An abnormal or emergency checklist may include procedures replacing (part of) the normal checklist(s) (i.e. forced landing – both engines inoperative). When performing such a checklist, it may be required to anticipate certain checklist items (i.e. manual gear extension procedure taking longer than a normal gear extension) or depicted limitations (i.e. longer runway required than planned for normal operations) before they are actually covered in the checklist. This shall be anticipated by continuing to read the abnormal or emergency checklist and by reviewing the checklist for such items and limitations to be able to brief and anticipate them well in advance.

## 3.0.5 Abnormal and emergency procedures

Clear crew communication is vital in case of an abnormal or emergency procedure. Upon both Flight Crew Members positively identifying the actual problem(s) by means of the EICAS and all other available cockpit indications, the crew shall silence all disturbing aural warnings.

The Commander (PIC) initiates the necessary corrective actions and task distribution. These actions shall be initiated by the call “I FLY, YOU CLEAR” or “YOU FLY, I CLEAR”. Further task distribution may include “MY RADIOS” or “YOUR RADIOS”.

No emergency / abnormal checklist(s) shall be performed before an appropriate flight path is established and the aircraft is at least 1.500 ft AAL or MSA, whichever is higher. No memory items shall be performed before an appropriate flight path is established and the aircraft is at least 400 ft AAL. Corrective actions or memory items that are required to establish an appropriate flight path (i.e. windshear, GPWS warning, etc) shall be performed without undue delay.

Some actions may have serious consequences if being performed in the wrong manner (i.e. critical actions). Therefore, and as per good CRM practice, no other actions shall be taken in meantime (i.e. no ‘split cockpit’) and the PF/PM shall monitor the PM/PF where actions shall not be taken until cross confirmation has been positively established. Typically, monitoring is mandatory when actions are required related to:

1. Thrust levers,
2. Shutting down an engine,
3. Unloading a hydraulic or electrical system;
4. Fire buttons.

Monitoring of critical actions consists out of:

1. The PF / PM places his hand on the relevant item and announces out loud the action to be performed;
2. The PM / PF confirms and if possible, guards the ‘live’ item whenever the situation permits. Cross-confirmation shall always be required.

Do not rush actions when adequate time is available for proper analysis. Good knowledge and understanding of aircraft systems and AFM procedures are essential. The action items and callouts for a monitored engine shutdown may be found below:

*Table: Callouts for a monitored engine shutdown*

| **Callouts for a monitored engine shutdown** | | |
|---|---|---|
| Situation | PF | PM |
| The PF places his hand on the thrust lever of the failed engine / engine required to be shut down | Confirm thrust lever N°1 to idle *or* confirm thrust lever N°2 to idle | --- |
| The PM confirms and if possible places his hand on the thrust lever of the remaining operating engine | --- | Confirmed |
| The PF brings the thrust lever to idle and checks the engine instruments(1) | Idle | --- |
| The PM places his hand on the idle thrust lever | --- | Confirm thrust lever N°1 to cut-off *or* confirm thrust lever N°2 to cut-off |
| The PF confirms whilst keeping his hand on the thrust lever of the operating engine | Confirmed | --- |
| The PM brings the idle thrust lever to cut-off | --- | Cut-off |
| ***Note 1**: At any time, the PF detects an abnormal reaction of the aircraft and/or any instruments during the process of a monitored engine shutdown, he shall call "MY CONTROL" stopping the process.* | | |

## 3.0.6 Task distribution

The PF shall be responsible for:

1. Control of flight path and airspeed;
2. Thrust levers of the operating engine(s) and engine(s) requiring thrust reduction (if necessary, to idle in case of a failed engine / engine requiring to be shutdown);
3. Aircraft configuration;
4. Navigation;
5. Radio communication, if handed over from the PM to the PF during abnormal or emergency management.

The PM shall be responsible for:

1. Execution of abnormal and emergency checklists using the read and do principle;

*NOTE*
*If (part of) the abnormal or emergency checklist includes procedures replacing the normal approach and before landing checklist (e.g. single-engine approach and landing checklist), this (part of the) checklist shall be completed using the challenge and response principle.*

1. Execution of actions on PF request;
2. The thrust lever brought to idle by the PF for the purpose of securing or re-starting the engine;
3. Vacating the cockpit to perform duties in the cabin related to abnormal or emergency procedures (i.e. firefighting of PED fire);
4. Monitoring the flight path.

The Commander (PIC) shall be responsible for:

1. Overall emergency or abnormal procedures handling;
2. General flight management;
3. Appropriate ATC notification;
4. Appropriate passenger notification.

If available, the autopilot should be used. However, the autopilot has not been certified in all configurations and its performance may not be guaranteed. If the autopilot is used in such circumstances, extra vigilance shall be required and it shall be disconnected if the aircraft deviates from the desired or from a safe flight path.

## 3.0.7 The decision-making process and problem solving

The importance of a logical, analytical decision-making process cannot be over emphasised. There are several different techniques and methods. Which method an individual uses is not as important as the ability to achieve and maintain an effective, consistent method or system of managing abnormal or emergency situations. A rushed decision without due consideration of situation and options is almost always the wrong decision.

It may be a considerable advantage to use a method that employs a mnemonic. Most systems use a mnemonic to aid the ability of an individual to recall and use it under pressure.

As a Company procedure, the mnemonic **DODAR** is recommended:

*Table: Mnemonic DODAR explanation*

| **Mnemonic DODAR explanation** | |
|---|---|
| **D**iagnose | Analyse the inside and outside of the aircraft (i.e. What is the problem?). |
| **O**ptions | Don’t forget to consider weather, performance and fuel.<br>Determine the risks and benefits for each option. |
| **D**ecide | The Commander (PIC) decides after using and consulting all available resources. |
| **A**ct / assign | Brief other Flight Crew Member(s) and passenger(s) about the decision made and assign the appropriate tasks. |
| **R**eview | Inputs and/or information may change over time, hence review regularly the DODAR principle.<br>Reviewing is possibly the most important stage and is a constant process, not solely when the actions are complete. It shall be ensured that everything is proceeding according to plan and the expected safe outcome is likely. If this is not the case, the process shall be started again to diagnose what has changed or what is not working to adopt as necessary. |

# 3.1 Crew incapacitation

► *Refer to the Operations Manual Part A Section 8.3.15 – Incapacitation of Flight Crew Members*

► *Refer to the Operations Manual Part A Section 4.3 – Flight Crew incapacitation*

Since incapacitation may be either obvious or subtle, the most important measure is to maintain a high standard of alertness. Routine adherence to standard operating procedures and cockpit discipline is stressed because a procedural deviation might provide the first indication for arising problems.

A good means for detection is to follow the 'two-communication rule', any time a Flight Crew Member does not respond appropriately to any verbal request or any time a Flight Crew Member does not respond to any verbal communication associated with a significant deviation from the intended flight path, an incapacitation shall be suspected.

## 3.1.1 Obvious incapacitation

Obvious incapacitation means total functional failure and loss of capabilities. It will generally be an easily detectable and/or prolonged occurrence. Among the possible causes are heart disorders, severe brain disorders and severe internal bleeding. This may result from food poisoning which can occur at any location, but often in areas of poor hygiene. Food poisoning does not show its effects in a uniform manner or in a given time period.

## 3.1.2 Subtle incapacitation

Subtle incapacitation is considered a more significant operational hazard, because it is difficult to detect and the effects can range from partial loss of function to complete unconsciousness. Among the possible causes might be minor brain seizures, hypoglycaemia, personal problems, etc. Because a Flight Crew Member may not be aware of or capable of rationally evaluating his situation, this type of incapacitation is more dangerous.

Undue fatigue can produce very similar effects to incapacitation. The general physical capabilities are substantially reduced and may even lead to mental absences of short duration (micro sleep). These effects are also enhanced in periods of low cockpit workload. In order to counteract undue fatigue, two main points shall be considered by Flight Crew Members:

1. Coordination of sleep before and between flights;
2. Fatigue management during flight by organizing teamwork in the cockpit to allow for short recovery periods, by bright cockpit illumination or by physical movements in the cockpit.

## 3.1.3 Preventive measures to detect incapacitation

Routine adherence to standard operating procedures and cockpit discipline can be a great help to detect a subtle incapacitation. A procedural deviation might then provide the first indication of a problem.

The PM shall always call out any deviation from normal flight path or ATC clearance. Any time a Flight Crew Member does not respond to two clear verbal communications, an incapacitation shall be suspected.

### 3.1.4 Actions guidelines

In case of an incapacitation of a Flight Crew Member, the remaining Flight Crew Member shall assume immediate control of the aircraft by taking the following actions:

1. Take over the aircraft;
2. Take care of the incapacitated Flight Crew Member;
3. Prepare for landing.

Every action item is described in detail below.

#### 3.1.4.1 Take over the aircraft

Take-over of the aircraft shall be performed by:

1. Controlling the aircraft;
2. Activating the autopilot in the highest level of automation;
3. Declaring an emergency (MAYDAY call).

#### 3.1.4.2 Take care of the incapacitated Flight Crew Member

Taking care of the incapacitated Flight Crew Member depends on his situation. Assess his situation by checking his reaction to pain. By for example pinching an ear lobe it can be ascertained if the incapacitated Flight Crew Member is conscious or not.

Depending on the incapacitated Flight Crew Member being conscious or not, the tables below shall be used as they are designed as a guideline on how to assess the situation and act accordingly:

*Table: Incapacitated Flight Crew Member being conscious*

| Conscious Flight Crew Member (positive reaction to pain) | |
|---|---|
| Assess the situation | 1. Assess the situation with him. Ask him questions such as 'What happened?' or 'Has this happened before?',<br>2. Check if the pilot is on medication. |
| Secure the Flight Crew Member | 1. Pull the Flight Crew Member off the controls bearing in mind the location of the control column,<br>2. In case of an expected heart attack, prevent any further slump by placing an arm across his chest,<br>3. Secure the Flight Crew Member in his seatbelt,<br>4. Stand behind the seat; support him with one hand whilst fastening the harness with the other. Arms should be crossed under the harness straps,<br>5. Move the seat rearwards to the end of its travel. Ensure it locks into position and make sure feet are clear of pedals.<br><br>***Note**: Call for assistance from one of the passengers if necessary.* |
| Provide first aid | 1. Apply first aid procedures accordingly. The assistance of any (medical qualified)passenger might be requested,<br>2. Deliver oxygen if needed,<br>3. Monitor his condition as his conscious level may deteriorate. |

*Table: Incapacitated Flight Crew Member being unconscious*

<table>
<tr><th colspan="4">Unconscious Flight Crew Member (no reaction to pain)</th></tr>
<tr><th>Unable to move from his seat</th><th colspan="3">Able to move from his seat</th></tr>
<tr><td rowspan="4">1. Pull the Flight Crew Member off the controls bearing in mind the location of the control column,<br>2. In case of an expected heart attack, prevent any further slump by placing an arm across his chest,<br>3. Secure the Flight Crew Member in his seatbelt, crotch strap and shoulder harness,<br>4. Stand behind the seat, support him with one hand whilst fastening the harness with the other. Arms should be crossed under the harness straps,<br>5. Move the seat rearwards to the end of its travel. Ensure it locks into position and make sure feet are clear of pedals.<br><br>Note: Call for assistance from one of the passengers if necessary.</td><td colspan="3">1. Pull the seat fully aft,<br>2. Recline seat back if possible,<br>3. Armrest up and undo seatbelt,<br>4. Stand behind the seat, lift pilot under folded arms and carry him to the cabin to lay him on his back,<br>5. Check airways (A), breathing (B) and circulation (C).</td></tr>
<tr><td>No 'B' or 'C'</td><td colspan="2">'B' and 'C' preset</td></tr>
<tr><td rowspan="2">Perform cardiopulmonary resuscitation (CPR) and deliver oxygen.<br><br>Note: CPR is only effective if the Flight Crew Member can be removed from his seat.</td><td colspan="2">Check pulse rate and treat accordingly</td></tr>
<tr><td>If fast, suspect chock.<br><br>Note: If not possible to remove him from his seat, keep him in his seat and give oxygen.</td><td>If slow, suspect fainting.<br><br>Note: If not possible to remove him from his seat, keep him in his seat. Do not give oxygen, he will regain consciousness within 3 minutes.</td></tr>
</table>

#### 3.1.4.3 Prepare for landing

Prepare the aircraft for landing:

1. Inform ATC of your intentions;
2. Inform the passengers to reassure them;
3. Land at the nearest suitable aerodrome.

After landing taxi to a normal, but nearest practical, ramp position.

### 3.1.5 Other considerations

Do not allow the incapacitated Flight Crew Member to take any further part in the conduct of the flight or series of flights, even if he feels again fully fit.

The Company shall be informed without delay regarding the circumstances of the occurrence. Any incapacitation shall be reported in writing using an occurrence report (OR).

# 3.2 Fire and smoke drills

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures: Cabin / cockpit fire smoke or fume, Engine fire*

## 3.2.1 General

The applicable Manufacturer abnormal and emergency checklists cover the fire and smoke drills, which shall be executed without any undue delay. The checklists do however not cover possible causes and how to deal with fire if not part of an aircraft system (i.e. loose equipment such as PED's). This section elaborates further on the fire and smoke causes and fighting procedures in case of smoke or fire in the cockpit or cabin.

## 3.2.2 Definitions

For the purpose of this section, the following definitions shall be applicable:

**Aggressively pursuing** a fire means taking immediate action to determine the source of hot spots, smoke and/or flames. The crew shall quickly evaluate the situation, gain access to the fire and attack the fire using all available resources, which may include Able-Bodied Passengers (ABP's).

A **circuit breaker** is designed to open an electrical circuit automatically at a predetermined overload of current.

**Hidden fires** are fires that are not readily accessible, may be difficult to locate and are more challenging to extinguish. Some examples of hidden fires would be fires behind sidewall panelling or in overhead areas.

A **smouldering fire** is characterized by combustion without a visible flame and a slow combustion rate. A smouldering fire left unattended or a fire that has not been completely extinguished may ignite and grow into a larger uncontrollable fire in a short time.

A **suppressed fire** is a fire that has been partially extinguished which may or may not have visible flames. A suppressed fire if not extinguished, may re-establish itself and grow into a larger, uncontrollable fire in a short period of time.

### 3.2.3 Causes of in-flight fires

The following causes shall be considered as the most common causing fire(s) in an aircraft.

#### 3.2.3.1 Wiring failures

A majority of hidden in-flight fires are the result of electrical arcs along wire bundles. In most cases, the electrical arc acts as the initiating event, igniting other surrounding materials. The surface of insulation materials is often a conveyer of these initiating events, as contamination from spillage, accumulated dirt/dust, lubrication or corrosion inhibitors on these surfaces can promote flame spread (uncontaminated insulation materials are generally very fire resistant). In other instances, the re-setting of a tripped circuit breaker can overheat wiring, ultimately leading to failure and arcing, causing the same chain of events.

#### 3.2.3.2 Electrical component failure

Electrical motors may overheat, fail and possibly ignite surrounding materials. The spread of fire in these instances is often exacerbated by an accumulation of contaminants in the immediate area.

#### 3.2.3.3 Lightning strikes

Although very infrequent, there have been instances in which a lightning strike has initiated a fire. In these instances, faulty or contaminated insulation material contributed to the fire.

#### 3.2.3.4 Bleed air leaks

Aircraft with systems that use air from the engine (bleed air) depend on a series of pneumatic lines to deliver the air supply. A failure of any of these supply lines, if left unchecked, may cause high temperatures in the surrounding area and damage to the aircraft's equipment, wiring and associated components. High temperature bleed air leaks have been known to cause in-flight fires and structural damage.

#### 3.2.3.5 Faulty circuit protection

A malfunctioning circuit breaker that does not open (trip) when an abnormally high current draw is detected may cause the affected unit or associated wiring to overheat and ignite.

#### 3.2.3.6 Battery thermal runaway

Batteries are capable of ignition and subsequent explosion due to overheating. Shorting, rapid discharge or overcharging may cause this overheating. Overheating results in thermal runaway, which is a chemical reaction within the battery causing the internal temperature and pressure to rise. The result is the release of flammable electrolyte from the battery and, in the case of disposable lithium batteries, the release of molten burning lithium.

Once one battery cell goes into thermal runaway, it produces enough heat to cause adjacent battery cells to also go into thermal runaway. This produces a fire that repeatedly flares up as each battery cell in turn ruptures and releases its contents.

## 3.2.4 Fire prevention

Complying with the following subsections shall be considered as the most effective in preventing fire in the aircraft.

### 3.2.4.1 Resetting of tripped circuit breakers

Flight Crew Members may create a potentially hazardous situation if they reset a circuit breaker without knowing what caused it to trip. A tripped circuit breaker should not be reset in flight unless doing so is consistent with explicit procedures specified in the approved manuals and/or checklists used by the crew or unless, in the judgment of the Commander (PIC), resetting the circuit breaker is necessary for the safe completion of the flight.

A detailed entry in the airplane technical log (ATL) is a proven safety practice for tracking purposes and may provide maintenance personnel with key information to enable prompt trouble-shooting and effective corrective action on the ground.

Since circuit breakers are designed to open an electrical circuit automatically at a predetermined overload of current, they should not be used for operational functions (e.g. as an on / off switch) because they would not be performing their intended function, which is protection against overloads. Circuit breakers, even those suitable for frequent operation, should not be used as a switch to turn protected items on or off.

### 3.2.4.2 Handling of a crushed or damaged portable electronic device (PED)

AMC2 CAT.GEN.MPA.140, AMC2 NCC.GEN.130

There are a variety of ways that PED’s can be crushed or damaged in the aircraft including dropping, mishandling, electro-mechanical seats, etc. Just because a PED is damaged doesn't always mean it will go into thermal runaway, but it does become a hazardous material and should be treated as such.

The battery risk management system ‘FireSock’ can be used to place damaged PED’s into for the duration of the flight should they become damaged.

If the device is suspected of going into thermal runaway, the BATTERY / PED FIRE / SMOKE procedure shall be followed first before putting it into the FireSock.

## 3.2.5 Available cockpit / cabin firefighting equipment

► *Refer to the Operations Manual Part **B Section 10** – Survival and emergency equipment including oxygen*

When fighting a fire, a Flight Crew Member has the tools as described below available. Refer to section 10 of this manual for its exact location (except for the water or non-flammable liquids).

### 3.2.5.1 Halotron BrX (non-halon) fire extinguisher

A Halotron BrX (non-halon) fire extinguisher may be used for fires of classes A, B and C. For the exact operation, please refer to section 10 of this manual.

### 3.2.5.2 Water or non-flammable liquids

Water or non-flammable liquids shall be used on fabric and paper fires only. It shall also be used for damping down the material that was on fire after using the fire extinguisher(s).

### 3.2.5.3 Protective breathing equipment

If dense smoke is being generated, the protective breathing equipment (PBE) shall be fitted before entering the fire area. For the exact operation, please refer to section 10 of this manual.

### 3.2.5.4 Battery risk management system

The battery risk management system is for the transport of lithium battery-powered appliances (laptops, phones, personal electronic devices) in the aircraft after they have been crushed or damaged.

The fire-resistant burn bag is uniquely designed to contain fire in single cell or multiple cell lithium battery packs. Heat resistance gloves are included in the system and offer extra protection.

***WARNING***

***Do not use fire resistant burn bags to isolate burning lithium-type batteries. Transferring a burning appliance into the burn bag may be extremely hazardous. Do not move the device until you are certain the fire is extinguished.***

### 3.2.5.5 Crash axe

A crash axe shall be used to gain access to closed areas or to get behind panelling.

## 3.2.6 Firefighting procedures

► *Refer to the Operations Manual Part A Section 9.5.5.2 – Emergency procedures during flight*

### 3.2.6.1 General

When fire is announced or detected, the crew shall immediately and aggressively pursue to fight that fire.

If smoke is detected in the cabin, the Second-in-Command (SIC) shall leave the cockpit to investigate the cause and eventually suppress the fire. He shall protect himself by donning the protective breathing equipment (PBE) and taking with him all available firefighting equipment available.

The Commander (PIC) shall in meantime protect himself and make it his priority to bring the aircraft in a position from where a landing can be made, should the firefighting not be successful.

When fighting a fire, communication between the 2 Flight Crew Members shall be maintained. Update the PF regularly on the location, source and severity of the fire.

When a cockpit / cabin fire is present, apply the following general procedures:

1. Close all fresh air vents in the area of the fire;
2. Remove portable oxygen bottles out of the area of the fire (if present);
3. Move passengers away from the fire if reseating is possible;
4. Check the operation of the hand fire extinguisher(s);
5. Put on the protective breathing equipment (PBE);
6. When moving through the aircraft, make yourself as little as possible to stay clear of smoke as long as possible.

The procedures below cover more specific actions to be taken depending on the location of the fire.

*NOTE*

*Note that section 9 of the Operations Manual Part A contains several expended emergency procedure checklists covering specific procedures such as for dangerous goods incidents, battery fire / smoke, overheated battery without fire or smoke, crushed PED, etc.*

### 3.2.6.2 Toilet fire

A toilet fire shall be suppressed by taking the following actions:

1. Locate the fire by using the back of your hand to check for heat and look for smoke around the toilet door panels;
2. Collect the available firefighting equipment including the crash axe.

If smoke or heat is not present:

1. With the fire extinguisher in hand, gently open the toilet door (crack door) and be prepared to discharge the extinguisher at the base of the fire;
2. Search for the cause of the smoke and take appropriate action (keep the burning material wet).

If smoke or heat is present:

1. With the fire extinguisher in hand, crack the door slowly using the door as shield. Discharge all extinguishant into the toilet area and close the door again;
2. Wait for a few minutes, obtain the other hand fire extinguisher if possible;
3. Check for smoke and if possible, enter the toilet to locate the base of the fire. If necessary, discharge the additional extinguisher.

### 3.2.6.3 Concealed fire

The majority of the aircraft systems are contained throughout concealed parts of the aircraft cabin and under floor areas. Fire may be identified by flames, smoke or fumes coming from behind panelling. In such case, take the following actions:

1. Locate the fire by using the back of your hand to check for heat;
2. Collect the available firefighting equipment including the crash axe;
3. Carefully remove panelling, taking care not to damage wiring or pipes. If panelling cannot be removed, make a small hole using the axe;
4. Discharge the hand fire extinguisher into the opening;
5. Replace the panelling for at least 30 seconds (if possible);
6. Confirm that the fire is extinguished; use the second extinguisher (if necessary) to repeat the above procedure.

### 3.2.6.4 Waste bin fire

A waste bin fire shall be suppressed by taking the following actions:

1. Collect the available firefighting equipment;
2. Open the container carefully;
3. Discharging the fire extinguisher(s);
4. Shut the container to allow the fire to go out;
5. When the flames are extinguished thoroughly soak the contents.

### 3.2.6.5 Baggage fire

A baggage fire shall be suppressed by taking the following actions:

1. Collect the available firefighting equipment;
2. Discharge the fire extinguisher into the bag and seal it up. Take care not to spread the fire with the force of the extinguisher;
3. Investigate the bag, use the second hand fire extinguisher if necessary;
4. When the fire is extinguished, thoroughly soak the content with water or non- flammable liquids.

### 3.2.6.6 Passenger seat fire

A passenger seat fire shall be suppressed by using the fire extinguisher. Once the fire has been extinguished, thoroughly soak the seat using water or non-flammable liquids.

### 3.2.6.7 Electrical fire

An electrical fire (coffee machine, cabin screens, etc) shall be suppressed by taking the following actions:

1. Switching off the electrics (if not possible due to the fire, use the appropriate circuit breaker);
2. Collect the available firefighting equipment;
3. Discharge the fire extinguisher(s).

### 3.2.6.8 Battery / PED fire / smoke (in the cabin)

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Appliances such as laptops, cell phones, EFB's and other personal electronic devices (PED's) that are powered by lithium batteries pose a threat because these batteries have been known to unexpectedly enter a state of thermal runaway. Thermal runaway is caused by a defect in the one of the cells within the battery pack. This chemical reaction causes the cell to escalate in temperature often causing the adjacent cells to also enter this state. The result is extreme heat, a series of violent explosions causing out-gassing and flying debris, and smoke and fire of the surrounding packaging and nearby materials.

An electrical fire of a portable electronic device (PED) including personal transportation devices (hoverboards, self-balancing devices, gravity boards, etc) shall be suppressed by taking the following actions:

1. Identify the item;
2. Apply firefighting procedures;
3. Remove the external electrical power from the device (if applicable);
4. Cool the remaining cells with water or non-flammable liquids to prevent a (further) thermal runaway;
5. When the device has cooled (min 10 to 15 min), use protective equipment to put the device in a suitable empty container to completely submerge it in water or put the device in the fire-resistant burn bag.

***CAUTION***

***It's important to understand that the fire-resistant burn bag does not stop thermal runaway nor does it 'smother' the fire. The bag is a containment device that contains heat, debris and reduces the likelihood of secondary fires caused by proximity.***

Dousing with non-flammable liquids prevents adjacent cells from overheating. A battery pack involved in a fire can reignite multiple times as the heat is transferred to other cells in the pack. The device should be continually cooled with non-flammable liquids.

Use caution to ensure not to use liquids on, or in the immediate vicinity of any other piece of electrical equipment.

***CAUTION***

***Do not to pick up and attempt to move a burning device or a device that is emitting smoke. Do not cover the device or use ice to cool the device. This would insulate the device increasing the overheating of device and resulting in a thermal runway.***

### 3.2.6.9 Battery / PED fire / smoke in the cockpit

AMC2 CAT.GEN.MPA.140, AMC2 NCC.GEN.130

Because the electronic flight bag (EFB) is being used, the chances are high that crew will realise that the device is going into thermal runaway. Symptoms include:

1. Electrical smell,
2. Device feels hot to the touch,
3. Smoke emitting.

In these cases, the crew should act quickly to get the device into the fire-resistant burn bag (using protective equipment such as the heat resistant gloves) without sealing the bag. If possible, remove it from the flight deck.

In the cabin, the crew then have can douse with water or other non-flammable liquids inside the bag.

In a situation where the device goes into full thermal runaway in the cockpit, best judgment has to be used on how best to deal with the event. It may be necessary to use the fire-resistant burn bag and heat resistant gloves to protect one’s self in order remove the device from the area where the Flight Crew Member is seated and then follow the recommended procedures once it’s transferred to the cabin. The biggest concern shall be crew injury or incapacitation when moving a device.

# 3.3 Unpressurised and partially pressurized flights

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures: Emergency descent*

## 3.3.1 General

In case of a lack of oxygen on board or an unpressurised flight up to altitude of 14.000 ft MSL, the Commander (PIC) shall not accept a routing without marginal terrain clearance in IMC.

## 3.3.2 Decompression in flight

In case a decompression in flight is expected, all Flight Crew members shall act according to the applicable checklist. An emergency descent may have to be initiated.

Time permitting, the passenger may be briefed using the public address system. Clear and unambiguous instructions shall be given to the passengers to prepare them for the emergency possibly including an emergency descent. Note that, due to the decompression, a lot of noise created by the difference in pressure may limit the communication between the Flight Crew Members and the passengers. Also note that communication with passengers, while breathing pressured air, may be difficult for the Flight Crew Member. Instruct the passengers using “PUT ON MASK, SIT DOWN, FASTEN SEATBELT” to avoid confusion.

# 3.4 Exceeding structural limits such as an overweight landing

## 3.4.1 General

Overweight landings shall be avoided at all times.

In the event of an inevitable overweight landing due to weather or system malfunction, the landing shall be reported in the Aircraft Technical Log (ATL) and an occurrence report (OR) shall be filed. The Company shall be informed at once. The Continuing Airworthiness Manager shall, in accordance with the technical instructions as issued by the Manufacturer, instruct the crew about the action to be taken if at an outstation.

## 3.4.2 Overweight landing procedures

As no abnormal and/or emergency checklist is available for such a procedure, Company procedures recommend to follow the normal approach and landing procedure taking the following observations and/or limitations into account:

1. Choose the longest runway available;
2. Choose the highest appropriate flap setting;
3. Minimize sink rate at touchdown;
4. Apply the maximum reverse thrust available;
5. Report the overweight landing for the appropriate maintenance inspection.

***CAUTION***

***Any overweight landing shall be recorded in the Aircraft Technical Log (ATL) and a proper maintenance release shall be obtained before continuation of any flight(s).***

## 3.5 Exceeding cosmic radiation limits

► *Refer to the Operations Manual Part A Section 8.3.18 – Cosmic or solar radiation detection*

The Company conducts quarterly radiation samplings using the Air Support PPS data. With the current type of operation the Company is conducting, no Flight Crew Member is likely to exceed the exposure of more than 1 mSv per year.

# 3.6 Lightning strikes

► *Refer to the Operations Manual Part A Section 8.3.8 – Adverse and potentially hazardous atmospheric conditions*

► *Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45*

## 3.6.1 General

Even though the aircraft is adequately protected against lightning strikes effects, operating procedures shall be established in an attempt to avoid such phenomenon.

Avoid penetration of thunderstorms. In-flight lightning avoidance is closely associated with thunderstorm avoidance. Maintain visual contact with thunderstorms during the daytime and lightning at night.

Check the radar for precipitation, review all available types of weather information, examine other pilot reports and follow ATC instructions. Even with a good weather report received and understood, pay close attention to those storms that develop rapidly along the route in a given area and that cannot be predicted.

While en-route, constantly update the previous weather briefing through radio contact and airborne equipment for actual storm avoidance.

Remember that radar detects only liquid droplets, not the cloud itself. Only rain suspended in the cloud will produce a radar echo, which may lead to occasional encounters with hail and lightning.

Circumnavigate the detected thundercloud or area, if possible, by more than 25 NM when traffic conditions permit. Flying over the top of the thunderclouds is preferable. Be aware that lightning may strike an aircraft miles away from the extreme side of a developed thunderstorm. Reports of aircraft receiving strikes in clear air at 25 or more miles from the nearest storm are common.

Direct effects, which result from lightning current attachment to and flow through the aircraft may be:

1. Pit marks are often seen along the fuselage or holes in the trailing edge of wing and tail tips;
2. Melting of rivets;
3. Puncturing of non-metallic structures;
4. Puncturing and de-lamination of composites;
5. Slight deformation of metal skins and structure;
6. Welding or roughening of moveable hinges and bearings;
7. Damage to other parts that may conduct lightning current other than the airframe, such as bonding or diverted straps and pitot tubes.

Effects caused by the flash-induced electromagnetic field and the increase of the voltage due to the current at the aircraft structure are defined as indirect effects and may be:

1. Interruption of instruments and navigation equipment;
2. Damage to electronic and electrical equipment;
3. Popping of circuit breakers;
4. Loss of electrical power;
5. Engine flame-out.

### 3.6.2 Lightning strike likely to occur

An imminent lightning strike event may be indicated to crews by the build-up of static discharge, which causes interference on ADF indicators or noise in communication receivers. Another indication is St. Elmo's fire, which is visible at night as small electrical discharges running across the windshields and sparking on the wings. Consider wearing sunglasses to protect your eyes from the flash or have one pilot keep his eyes downward. Approaching an aircraft during a thunderstorm is not recommended. The human body may provide the grounding that is otherwise lacking. If you are in the cockpit, do not attempt to communicate with ground personnel through a wire handset and stay inside the aircraft until the storm has passed.

No fuelling shall take place as long as thunderstorms or lightning are occurring at or near the aerodrome.

### 3.6.3 Aircraft hit by lightning

Since no procedure is available from the Manufacturer, it is recommended to follow the following procedure once the situation in the aircraft is under control:

1. Circuit breakers.....Check all in
2. Compass and heading system.....Check for normal indication
3. Engine indications.....Check for normal indication
4. Pressurisation.....Check for normal indication
5. Flight controls.....Check free movement
6. Fuel system.....Check for normal operation and no fuel leaks
7. EFB system.....Check for normal operation
8. All other systems.....Check for normal operation and indication

### 3.6.4 After landing procedures

After landing an aircraft, which was hit by lightning, the Commander (PIC) shall:

1. Check for holes, punctures, discoloration and de-lamination throughout the whole airframe;
2. Verify for loose, melted or missing rivets;
3. Check that all static dischargers are in place;
4. Verify the integrity of the lights installed on tail, wing, fuselage and landing gear;
5. Verify all antennas, pitot tubes, angle-of attack vanes, TAT probes and static ports for condition.

An occurrence report (OR) shall be completed and an entry into the Aircraft Technical Log (ATL) shall be made.

# 3.7 Distress communications

► *Refer to the Operations Manual Part A Section 12.3.2 – Distress and urgency communication procedures*

Distress communications and communications failure procedures are published in the emergency section of the Jeppesen Airway Manual for the area of operation.

## 3.7.1 Frequencies and codes

Any distress call shall be done on the frequency in use for the normal communications. The following frequencies shall be used worldwide in order to maintain a uniform monitoring of emergency frequencies:

1. VHF – 121,5 MHz,
2. UHF – 243,0 MHz,
3. HF – 500 KHz, 2.182 KHz or 8.364 KHz.

*NOTE*
*This type of aircraft is equipped with HF and VHF communication equipment.*

To indicate that an aircraft is in a state of emergency, the following transponder codes shall be used:

1. Mode A Code 7700 in case of an emergency;
2. Mode A Code 7600 in case of radio failure when continuing your IFR flightplan;
3. Mode A Code 7601 in case of radio failure when you are in VMC and you decide to land at the nearest suitable aerodrome instead of continuing the flight;
4. Mode A Code 7500 in the case of an unlawful interference.

The distress message made via radiotelephony shall be made on the air-ground frequency in use at the time and should include as much of the following elements as possible:

1. Name of the station addressed;
2. The identification of the aircraft;
3. The nature of the distress condition;
4. Intention of the person in command;
5. Present position, level (i.e. flight level, altitude…) and heading.

## 3.7.2 Distress signals

Using the following signals, either together or separately, means that the aircraft is threatened by imminent danger and that it needs immediate assistance:

1. A signal made by radiotelegraphy or by any other communication method consisting of the letters SOS (. . . - - - . . . in Morse Code);
2. A radiotelephony message containing the spoken word MAYDAY (3 times);
3. Rockets or shells throwing red lights, fired one at a time at short intervals;
4. A flare showing a red light.

### 3.7.3 Urgency signals

Using the following signals, either together or separately, means that the aircraft is experiencing difficulties, which compel it to land, but does not need immediate assistance:

1. The repeated switching on and off of the landing lights;
2. The repeated switching on and off of the navigation lights in such a manner as to be different from the normal flashing of the navigation lights.

Using the following signals, either together or separately, means that the aircraft has an urgent message to transmit, concerning the safety of a ship, aircraft or other vehicle, or of some person onboard or within sight:

1. A signal made by radiotelegraphy or by any other communication method consisting of the letters XXX;
2. A radiotelephony message containing the spoken word PANPAN (3 times).

### 3.7.4 Communication failure

An aircraft operated as a controlled flight shall at all times maintain continuous listening watch on the frequency currently in use or 121,5 MHz and establish two-way communications with the appropriate ATC unit.

If a communication failure makes it impossible to establish contact with ATC, the transponder shall be switched to 7600 or 7601 depending on the flight conditions and the decision to continue with the flight or divert to the nearest suitable aerodrome.

When the decision is made to divert to the nearest suitable aerodrome while **in VMC conditions**, the transponder code 7601 shall be selected and:

1. Continue to fly in VMC;
2. Land at the nearest suitable aerodrome;
3. Report its arrival by the most expeditious means to the appropriate air traffic control unit.

When the decision is made to **continue with the IFR flight plan (even in VMC**), the transponder code 7600 shall be selected and:

1. Unless otherwise prescribed on the basis of regional air navigation agreements, maintain last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;
2. Proceed according to the current flight plan to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with point below, hold over this aid until commencement of descent;
3. Commence descent from the navigation aid specified in the point above at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;
4. Complete a normal instrument approach procedure as specified for the designated navigation aid;
5. Land, if possible, within thirty minutes after the estimated time of arrival specified above or the last acknowledged expected approach time, whichever is later.

# 3.8 Engine failure

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures: Engine Failure*

## 3.8.1 $V_1$ concept

$V_1$ is the maximum speed at which, if an engine fails, a rejected take-off may be decided. A rejected take-off after $V_1$ will result in an overrun if the field does not have a balanced length.

## 3.8.2 Engine failure below $V_1$

When the runway length is limited, with a rejected take-off at $V_1$, the aircraft performance is calculated so that the aircraft is able to stop on the available accelerate stop distance with maximum braking effort. The number of accidents involving aircraft making an overrun after a rejected take-off indicates that the safety margin is extremely small.

Statistics show that, in a recent period, more take-off's were rejected due to landing gear problems than due to engine failures. Calculated take-off performance does not cover tire, brake or landing gear malfunctions during take off roll.

Either Flight Crew Member has the authority to call for rejection of take-off. The Flight Crew Member deciding to reject the take-off shall call "STOP" in a loud and clear voice. Once the decision has been made to reject the take-off, it is mandatory that the reject procedure is strictly adhered to without delay.Use the following procedures and callouts when making a rejected take-off:

1. The person deciding to reject the take-off shall call "STOP" in a loud and clear voice. Without delay, the PF shall apply maximum braking without skidding, close the thrust levers and select spoilers & maximum reverse on the available engine(s) while keeping directional control with the rudder and the nose wheel steering;
2. The PM shall monitor the rejected take-off procedure. When the PM is the CM1 and the PF gives the command "EMERGENCY BRAKING" due to a possible loss of normal brake pressure, he shall assist the PF with stopping the aircraft with manual emergency braking while the PF maintains directional control;
3. When time permits, the PM shall contact ATC;
4. When the aircraft is completely stopped with the parking brake set (if still available), the Commander (PIC) shall order "CLEAR THE EMERGENCY". The PM performs the required items. If the emergency is not cleared by performing these items, an emergency evacuation may be initiated at the discretion of the Commander (PIC). If performing the required items however clears the emergency and engines are still running with the possibility to safely taxi the aircraft, vacate the runway.

Continue with any other required checklist as soon as the runway is vacated.

## 3.8.3 Engine failure at or above $V_1$

The Flight Crew Member recognising such an event shall call out "ENGINE FAILURE" as appropriate. Confirmation of loss of thrust or mechanical failure shall be sought from 2 or more instruments in order to distinguish between a single instrument failure and an engine failure.

# 3.9 System failures

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures*

► *Refer to the Aircraft Flight Manual Section 4 – Abnormal procedures*

## 3.9.1 General

Some systems and/or equipment however may require some more detailed explanation (e.g. specific abnormal and/or emergency procedures for a certain system and/or equipment); hence they shall be detailed below.

## 3.9.2 Medical equipment

► Refer to the Operations Manual Part B Annex 2 – Supplementary Company checklist – LJ45 (Learjet 45)

### 3.9.2.1 Electrically isolating the patient loading and utility system (PLUS)

To isolate the PLUS, open AC OUTLET 1/2 amp circuit breaker located on the P10 CM2 circuit breaker panel. For load shedding procedures, refer to the applicable procedures in the AFM.

### 3.9.2.2 Evacuation of a non-ambulatory passenger

In the event that an emergency evacuation is required, the Attendant as described in the limitations section above, shall be responsible for evacuating the non-ambulatory passenger.

The forward left side cabin door shall be the primary exit. If this exit is used, remove the passenger with the stretcher.

If the emergency exit is to be used, allow for one of the Flight Crew Members to exit first. Without stretcher, evacuate the passenger’s legs through the exit first. Lift the upper body from the inside and allow it to slide through the exit. The Flight Crew Member on the exterior shall lower the body to the ground.

### 3.9.2.3 PLUS oxygen system

If the oxygen system of the PLUS needs to be de-activated, the bottle valves shall require manual closing by one of the Flight Crew Members.

# 3.10 Guidance for diversion in case of serious technical failure

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures*

► *Refer to the Aircraft Flight Manual Section 4 – Abnormal procedures*

► *Refer to the Operations Manual Part A Section 2.3.6.4 – Diversion of flight en-route*

► *Refer to the Operations Manual Part B Section **11.2.2 – Unplanned or planned emergency landing or ditching***

## 3.10.1 General

The Commander (PIC) may decide to land as soon as practicable or as soon as possible in case of serious technical troubles to safeguard the integrity of the aircraft and the safety of his passengers. Any aerodrome that fits, according to the judgement of the Commander (PIC), shall be agreed with.

## 3.10.2 Secondary considerations

In spite of the Commander's (PIC's) final authority concerning the possible diversion of any flight, many parameters may influence his decision:

1. Aircraft system status: The crew should ascertain the status of not only the failed system but also any other aircraft system(s) that have may have been affected by the failure;
2. Approach speeds and landing distance: In many cases, a failure shall have impact on approach and landing speeds, crosswind limitations and landing distance required;
3. Weather requirements: Some failures may result in a loss or reduction of the aircraft's weather capabilities;
4. Range and endurance considerations: Certain failures may result in a higher than normal rate of fuel consumption. It may also be necessary to operate at a lower than normal altitude.

## 3.10.3 Post landing procedures

Once the aircraft is safely parked, the Commander (PIC) shall in the first place ensure coordination so that the passengers are being taken care of, hence arrange technical actions for the aircraft.

# 3.11 Ground proximity warning

CAT.OP.MPA.290

► *Refer to the Aircraft Flight Manual Supplement W1462 – Enhanced Ground Proximity Warning System with windshear detection and terrain display*

► *Refer to the Operations Manual Part A Section 8.3.5 – Ground proximity warning system procedures*

The ground proximity warning system (GPWS) is designed to alert Flight Crew Members that the aircraft position in relation to the terrain is abnormal and, if not corrected, could result in a controlled flight into terrain (CFIT). It is the responsibility of the Commander (PIC) to develop and implement a plan, which employs all available sources to ensure adequate terrain clearance. The GPWS system shall be on for take-off until landing provided the system does not require any other procedure.

When a warning occurs during daylight VMC conditions, if positive visual verification is made that no hazard exists or if it is the result of an intentionally chosen configuration or position as part of a standard procedure, the warning may be considered cautionary.

A go-around shall be initiated, whenever a GPWS warning is observed and if the cause of warning cannot be identified immediately. If a GPWS warning occurs (unless operating in VMC and/or the pilot determines, based on all available information, that a turn in addition to the procedures established below is the safest course of action), proceed as follows:

1. Disconnect the autopilot;
2. Apply maximum thrust;
3. Roll wings level and rotate to increase pitch attitude to the highest possible value;
4. Retract the spoilers if extended;
5. When stick shaker is encountered, reduce pitch attitude to keep the shaker speed as minimum;
6. Do not change gear or flaps configuration until terrain separation is assured;
7. Monitor radio altitude for sustained or increasing terrain separation;
8. When clear of terrain, slowly decrease the pitch attitude and accelerate;
9. Do not attempt to engage the autopilot during recovery.

Any GPWS activation shall be reported in writing using an occurrence report (OR) whether genuine or spurious. When such activation indicates a technical malfunction of the system an appropriate entry shall also be made in the technical log.

The GPWS may not be deactivated except when specified by an approved procedure. As a general policy no GPWS warning signals / announcements shall be ignored and proper action shall be taken immediately. However, there may be aerodromes located in difficult terrain where one or more warning envelopes may be exceeded, resulting in constant warnings at a given approach position or at take-off. For these aerodromes it is an absolute must to include the discussion of the GPWS-warnings into the approach and departure procedure briefing. With the consent of the Flight Operations Manager (as published in the aerodrome qualification briefing), the GPWS system may temporarily be muted.

# 3.12 TCAS warning

CAT.OP.MPA.295

► *Refer to the Aircraft Flight Manual Supplement W1618 – TCAS II: Traffic Alert & Collision Avoidance System*

► *Refer to the Operations Manual Part A Section 8.3.6 – TCAS / ACAS policy and procedures*

This section contains the aircraft specific TCAS / ACAS operational procedures. The general procedures shall be depicted in the relevant sections of the OM Part A as detailed in the references above.

*NOTE*

*No aircraft specific operational procedures required for this type of aircraft besides the procedures already depicted in the OM Part A as mentioned in the reference above.*

# 3.13 Windshear

► *Refer to the Aircraft Flight Manual Supplement W1462 – Honeywell EPWS with windshear detection and terrain*

► *Refer to the Operations Manual Part A Section 8.3.8.5 – Windshear*

## 3.13.1 General

Windshear, microbursts or downbursts may develop within an unstable air mass, during frontal passage and in the vicinity of thunderstorms. These conditions may create rapidly changing wind directions and velocities. An even more dangerous condition may result from high velocity down flows that may force the aircraft into ground impact unless very prompt and drastic actions are being taken.

Windshear may be defined as a violent change in wind direction and/or speed. The determination is subjective and based on the pilots' judgement. Windshear is characterised by changes greater than:

1. 15 KIAS,
2. 500 ft/min,
3. 5 degrees pitch attitude,
4. 1 dot displacement from the glideslope / glidepath.

***WARNING***

***The first indication of a windshear event occurring to any Flight Crew Member may only be the red WIND SHR message on the PFD accompanied by the aural warning "WINDSHEAR, WINDSHEAR, WINDSHEAR". Immediately initiate the windshear recovery procedure as described below.***

### 3.13.2 Precautions

Any Flight Crew Member should search for any clues to the presence of windshear along the intended flight path.

Stay clear of thunderstorm cells and heavy precipitation and areas of known windshear. Windshear conditions are usually associated with the following weather situations:

1. Jet streams,
2. Mountain waves,
3. Frontal surfaces,
4. Thunderstorms and convective clouds,
5. Microbursts.

Presence of windshear may be indicated by:

1. Thunderstorm activity,
2. Virga (rain that evaporates before reaching the ground),
3. Pilot reports,
4. Low-level windshear alerting system (LLWAS) warnings.

Basic precautions to be taken, shall be:

1. Delay take-off;
2. Use the longest runway and the full length;
3. Always use maximum take-off thrust;
4. If there is insufficient runway left to stop, initiate a normal rotation at least 600m before the end of the runway even if airspeed is low;
5. Delay approach until improvement of the weather conditions;
6. Use of the autopilot for the approach may provide more monitor and recognition time.

### 3.13.3 Windshear recovery procedure

The following immediate actions shall be taken upon windshear encounter:

1. Thrust - Increase thrust to maximum available;
2. Pitch attitude - Smoothly rotate to an initial pitch attitude as per flight director go- around pitch command and use the onset of the stick shaker as upper limit;

*NOTE*

*Pitch attitude shall be increased smoothly and in small increments, bleeding airspeed as necessary to stop the descent. Stop rotation immediately if stick shaker or buffet occurs. Flight at intermittent stick shaker may be required to obtain a positive rate of climb.*

3. Spoilers – Confirm retracted;
4. Do not change gear or flap configuration until a safe climb-out is assured;

After a positive rate of climb is established with an airspeed of at least 1,3 Vs, the procedure shall be continued as follows:

5. Flaps – 8°;
6. Climb speed – As required;
7. Landing gear – Up (ground contact no longer probable);
8. Flaps – As required;
9. Thrust – As required.

The decision to execute the windshear recovery procedure shall unambiguous; hence the first Flight Crew Member to notice windshear shall call “WINDSHEAR RECOVERY”. The above windshear recovery procedure shall be executed without any delay by the PF.

While executing the recovery procedure, the PM shall:

1. Check for maximum thrust;
2. Monitor the flight path by giving continuous callouts of the vertical speed, speed trend and IAS;
3. Keep continuous outside lookout to complement the callouts with visual information;
4. Inform ATC.

*NOTE*

*When ground or water contact is most likely due to a windshear encounter, the Commander (PIC) shall announce “THIS IS YOUR CAPTAIN SPEAKING, THIS IS AN EMERGENY, BRACE BRACE BRACE”.*

It is imperative that all control inputs during a windshear recovery shall be as smooth as possible. The aim shall be to attain the maximum possible performance from the aircraft in order to avoid any ground or water contact. To do this, attempt to hold the aircraft at maximum angle of attack (AoA). Whilst operating in this regime, control inputs shall be as smooth as possible to avoid any intentional stall or spin. Any additional loading caused by rough handling may be enough to exceed the maximum angle of attack.

# 3.14 Severe turbulence and/or gust encounter

► *Refer to the Operations Manual Part A Section 8.3.8.4 – Turbulence*

## 3.14.1 General

Turbulence penetration procedures shall apply to flying at altitude and shall not be confused with the low level windshear recovery procedures.

## 3.14.2 Operating procedures

When encountering severe turbulence in flight, the crew shall:

1. Immediately alert the passengers to fasten their seatbelts;
2. Try to leave the turbulent area (consider a lower level);
3. Reduce thrust to fly at turbulence penetration speed;
4. Use the autopilot as much as possible;
5. Avoid rapid thrust adjustments;
6. Inform ATC.

***CAUTION***

***In severe conditions, engine(s) flameout may be possible.***

Continued use of the autopilot may reduce pilot workload. However, use of the flight director vertical modes shall not be advised in severe turbulence. The basic pitch attitude and heading hold autopilot modes will reduce excessive control surface motion and attitude changes in severe turbulence. Aircraft pitch motions and ride qualities are aggravated when flight director vertical modes are engaged during these flight conditions.

If the autopilot is off or disengaged, fly the aircraft using basic attitude control. Pitch and roll attitudes may best be controlled with only the control yoke. Using the rudder shall not be recommended and may actually aggravate the situation.

## 3.14.3 Yaw damper

The yaw damper shall be engaged at all times. If however the yaw damper is inoperative or disengaged, avoid chasing aircraft motion with the rudder. Attempt to hold the rudder pedals stationary with the wings level.

## 3.15 Emergency landing & ditching

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures: Ditching*

► *Refer to the Operations Manual Part A Section 8.3.16 – Cabin safety requirements*

► *Refer to the Operations Manual Part A Section 8.3.17 – Passenger briefing procedures and relations with the Passengers*

► *Refer to the Operations Manual Part B Section **11 – Emergency evacuation procedures***

Section 11 of this manual describes the Company evacuation procedures to be known by every Flight Crew Member.

## 3.16 Departure contingency procedures

► *Refer to the Aircraft Flight Manual Section 3 – Emergency procedures*

► *Refer to the Operations Manual Part B Section **3.8 – Engine failure***

► *Refer to the Operations Manual Part C Section 4.2.3.2 – Special departure procedure charts*

In case of any occurrence, the Commander (PIC) shall make all decisions necessary to proceed according to the specific procedures as set out in the AFM.

*NOTE*

*Flight Crew Members shall be reminded of the importance of reviewing the one engine inoperative (OEI) net climb gradient for the aircraft before take-off is commenced.*

SECTION 4 - PERFORMANCE

► *Refer to the Aircraft Flight Manual Section 5 – Performance*

► *Refer to Operations Manual Part A Section 8.1.2.4 – Performance considerations*

► *Refer to Operations Manual Part C Section 4 – Runway data and aerodrome facilities*

# 4.1 General

CAT.POL.A.100 (a), CAT.POL.A.200

The aircraft shall be considered as a performance class A aircraft.

Every Flight Crew Member shall ensure that the mass of the aircraft at the start of the take-off or in the event of in-flight re-planning, at the point from which the revised operational flight plan applies, is not greater than the mass at which the requirements as detailed in the OM Part A can be complied with for the flight to be undertaken, allowing for the expected reductions in mass as the flight proceeds. Performance data as described in the Aircraft Flight Manual shall be used to calculate any desired performance.

# 4.2 Use of EFB performance application

► *Refer to Operations Manual Part A Section 8.1.2.5 – Landing distance assessment procedures*

► *Refer to Operations Manual Part C Section 4.2 – Flygprestanda runway analysis*

Performance calculations shall be conducted strictly in accordance with AFM limitations and procedures. Runway condition performance data for this aircraft type are provided in the applicable AFM or AFM supplements. These are fully integrated into the Guru2 performance application. The application provides the flight crew with access only to those runway and performance conditions applicable to the aircraft type. The flight crew shall ensure that all performance data inputs, including runway condition, weight, and environmental factors, are correctly entered. Incorrect input may result in unsafe takeoff or landing performance calculations.

Crew shall use the RCR provided to determine the expected performance of their aircraft by correlating the RWYCC and/or the reported runway condition description with performance data provided via Guru2. This helps the crew to correctly carry out their landing and take-off performance calculations for wet or contaminated runways.

For runways that have been downgraded, consider using the most conservative corresponding contaminant. Guru2 provides data for the following runway conditions which correlates with the following RWYCC's for this type of aircraft:

*Table: Determination of Runway Condition Code (RCC)*

| RCC | Surface Description | Braking Action Report |
|---|---|---|
| 6 | • **Dry** | N/A |
| 5 | • **Frost**<br>• **Damp or Wet**<br>• **≤ 1/8 inch (3 mm) of:**<br>  ◦ **Water**<br>  ◦ **Slush**<br>  ◦ **Dry or Wet Snow** | Good |
| 4 | • **Cold (below -15°C)**<br>• **Compacted Snow** | Good to Medium |
| 3 | • **Slippery when Wet**<br>• **Dry or Wet snow over Compacted Snow**<br>• **> 1/8 inch (3 mm) of:**<br>  ◦ **Dry Snow**<br>  ◦ **Wet Snow**<br>• **Less Cold (above -15°C) Compacted Snow** | Medium |
| 2 | • **> 1/8 inch (3 mm) of:**<br>  ◦ Water<br>  ◦ Slush | Medium to Poor. |
| 1 | • **Ice** | Poor |
| 0 | • **Wet Ice**<br>• **Water over Compacted Snow**<br>• **Dry or Wet Snow Over Ice** | Prohibited |

## 4.3 Additional performance data

Whereas the EFB performance application provides the necessary performance data for compliance with the performance requirements as depicted in the various sections of the OM Part A, additional performance data is available.

The table below gives an overview on where to find what performance data in the aircraft flight manual (AFM) or aircraft operating manual (AOM).

*Table: Additional performance data cross-reference list*

| **Additional performance data cross-reference list** | | |
|---|---|---|
| AIR-OPS reference | Manufacturer's Aircraft Flight Manual (AFM) or Pilot's Manual (PM) | |
| All engine climb gradient | Maximum continuous thrust for climb | AFM 5-40 |
| Drift-down data | Engine out drift down | PM 8-74 (LJ40)<br>PM 8-72 (LJ45) |
| Effect of de-icing / anti-icing fluids | No data published | |
| Flight with landing gear down | No data published | |

SECTION 5 - FLIGHT PLANNING

# 5.1 Flight planning

► *Refer to the Aircraft Flight Manual Section 5 – Performance*

► *Refer to the Operations Manual Part A Section 8.1 – Flight preparation instructions*

► *Refer to the Operations Manual Part A Section 8.3 – Flight procedures*

► *Refer to **10.1.12 - Life raft** and to Operations Manual Part A Annex 22 – Risk assessment form life raft SPO / NCC*

Data and instructions necessary for pre-flight and in-flight planning including factors such as speed schedules and power settings are to be found in the Aircraft Flight Manual. PPS flight planning software shall be used to complete pre-flight planning. It includes aircraft performance data from the Aircraft Flight Manual (AFM).

In case of engine-out operations the crew shall refer to the applicable performance data in the Aircraft Flight Manual (AFM) or Pilot's Manual (PM).

# 5.2 Fuel policy

► *Refer to the Operations Manual Part A Section 8.1.7 – Quantities of fuel / energy carried*

► *Refer to the Operations Manual Part A Section 8.3 – Flight procedures*

► *Refer to the Operations Manual Part B Section **2.7.2 - In-flight fuel management policy and procedures***

PPS flight planning software shall be used to complete pre-flight fuel planning. It includes aircraft fuel consumption data from the Aircraft Flight Manual. Legal reserve, contingency and taxi fuel are included in the overall PPS calculation for the required fuel.

The standard value for taxi fuel is as follows (to be adjusted if required):

- For the LJ40: 113 kg / 250 lbs
- For the LJ45: 91 kg / 200 lbs

SECTION 6 - MASS AND BALANCE

# 6.1 General

AMC1 CAT.POL.MAB.100 (a), CAT.POL.MAB.100 (a)

► *Refer to the Aircraft Flight Manual Section 6 – Weight and balance data*

► *Refer to the Operations Manual Part A Section 8.1.8 – Mass and center of gravity*

► *Refer to the Operations Manual Part B Section **1.6 – Mass and balance limitation***

This section complements the general rules established in the Operations Manual Part A Section 8 and the mass and balance information contained in the Aircraft Flight Manual.

# 6.2 Aircraft specific mass and balance values

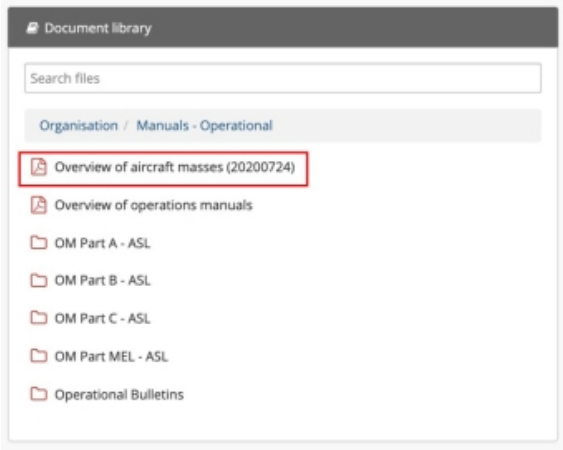
► *Refer to the Overview of Aircraft Masses*

## 6.2.1 General

The Company uses a separate overview referred to as 'Overview of Aircraft Masses' to keep track of the aircraft specific mass and balance values such as basic empty mass (BEM), dry operating mass(es) (DOM), indexes, etc and this of the different Company aircraft.

The overview is kept up to date under the responsibility of the Flight Operations Manager (FOM) and is distributed making it available in the digital Company library accessible to all Personnel via the Company secured website or via the Company electronic flight bag (EFB) system. The overview is stored in the 'Manuals – Operational' folder together with all parts of the Operations Manual (OM) and Operational Bulletins (OB's).

*Figure: Location of the Overview of Aircraft Masses*




The Competent Authority shall be provided with an electronic copy every time the overview has been updated. It shall be presented to the Competent or any Inspecting Authority when so requested.

*NOTE*

*Other mass and balance related values specific to this type of aircraft or the type of operation such as for example required to determine the dry operating mass (DOM) shall remain part of this manual and are not included in the overview. It may be hence required to present both the overview and this section of the manual to the Competent or Inspecting Authority when so requested.*

*NOTE*

*Basic empty mass (BEM) depicted in the overview may differ slightly from the published values as depicted on the aircraft weighing form (part of the AFM) as masses may be rounded up to the nearest unit and this for easier calculation purposes (e.g. 20,9 kg becomes 21 kg / 50.9 lbs becomes 51 lbs) and/or Company planning software limitations. All other values (i.e. DOM, indexes, etc) are calculated as such to meet the round-up of the aircraft basic empty mass.*

## 6.2.2 Determination of dry operating mass

► *Refer to the Operations Manual Part A Section 8.1.8.6 – Mass values for Passengers, Task Specialists and Crew*

► *Refer to the Operations Manual Part A Section 8.1.8.7 – Mass values for operational equipment*

The dry operating mass (DOM) for this type of aircraft is based on the aircraft specific basic empty mass (BEM) including 2 Flight Crew Members of 85 kg / 190 lbs each.

The operational equipment, as described in the Operations Manual Part A, part of the aircraft is determined as being 55 kg / 122 lbs with an average flight station (arm) of :

- 6.719 mm for the Learjet 45
- 7.400 mm for the Learjet 40 – OO-HRG
- 291.34 inch for the Learjet 40 – OO-JGK

SECTION 7 - LOADING

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: Centre of gravity limitations*

► *Refer to the Aircraft Flight Manual Section 6 – Weight and balance data*

► *Refer to the Operations Manual Part A Section 8.2.2 – Aircraft, Passengers, Task Specialist and cargo handling procedures related to safety*

► *Refer to the Operations Manual Part B Section **6 – Mass and balance***

# 7.1 General

The aircraft shall be loaded in compliance with the centre of gravity location limits. Luggage in the cargo compartment shall be properly loaded and secured to prevent any shift of position that could result in a CG change.

# 7.2 Procedures for loading specific aircraft configurations

There are no specific configurations (e.g. cargo configuration) that shall need special attention and/or procedures when loading the aircraft.

## SECTION 8 - CONFIGURATION DEVIATION LIST

► *Refer to the Operations Manual Part A Section 8.6 – Use of the minimum equipment list and configuration deviation list*

No Configuration Deviation List (CDL) for this type of aircraft is produced by the Manufacturer, hence this section shall not be applicable.

## SECTION 9 - MINIMUM EQUIPMENT LIST

► *Refer to the Operations Manual Part A Section 8.6 – Use of the minimum equipment list and configuration deviation list*

► *Refer to the Minimum Equipment List (MEL)*

For practical reasons, the Minimum Equipment List (MEL) is published as a separate manual.

SECTION 10 - SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN

# 10.1 Emergency and safety equipment

AMC1 CAT.GEN.MPA.145, CAT.GEN.MPA.145

## 10.1.1 General

It is the responsibility of the Commander (PIC) to ensure that all required emergency and safety equipment (E&SE) is carried, located and inspected as indicated below. The equipment as listed below shall be carried unless exceptions are covered by the MEL.

The table below shall detail all the emergency and safety equipment that is required to be on board the aircraft. The exact location of all the applicable equipment is depicted in the figure further down below.

In case of a conflict in contents (i.e. amount of specific equipment installed) between this section and the Minimum Equipment List (MEL), the MEL shall prevail.

*NOTE*

*For several emergency and safety equipment items, Flight Crew Members shall check the expiration date to be within limits as part of their pre-flight inspection as depicted in several subsections below. If such an item is however labelled 'DO NOT LABEL – COMPONENT TRACKED BY CAMO', the Flight Crew Member is waived from his responsibility to check for any expiration date as one is not present and the item is monitored by Company CAMO Personnel. If any date is still present on the item with the Company label placarded, this date shall be ignored as it may be another type of date (e.g. issue date) or date not relevant to the Company type of operations.*

*Table: Emergency and safety equipment list*

| Emergency and safety equipment list | |
|---|---|
| Equipment | Quantity |
| Emergency locater transmitter (ELT)(2) | 1 |
| Hand fire extinguisher | 3 |
| Crash axe | 1 |
| First aid kit | 1 |
| Universal precaution kit (UPK) | 1 |
| Supplemental personal protective equipment (PPE)(2) | As required(1) |
| Flashlight | 2 |
| Life jacket cabin (adult / child) | One per installed cabin seat and/or PLUS |
| Life jacket cabin (infant)(2) | As required(1) |
| Life jacket cockpit | 2 |
| Life raft(2) | As required(1) |
| Protective breathing equipment (PBE) | 1 |
| Battery risk management system | 1 |
| Smoke goggle | 2 |
| Survival equipment(2) | As required(1) |
| Cabin seatbelt (adult / child)(2) | One per installed cabin seat and/or PLUS |
| Cabin seatbelt (infant)(2) | As required(1) |
| Cabin oxygen mask(2+3) | 10 (Learjet 40) / 12 (Learjet 45) |
| Cockpit oxygen mask(2) | 2 |
| Passenger safety briefing card(2) | One per installed cabin seat and/or PLUS |
| ***Note 1**: Only when required, not part of the standard equipment.*<br>***Note 2**: Not depicted on the layout figure as detailed below.*<br>***Note 3**: Refer to section 12.3.1 of this manual for a more detailed description on the cabin oxygen system installed in this type of aircraft.* | |

*Figure: Emergency and safety equipment layout – VIP configuration (OO-DOC and OO- MED)*

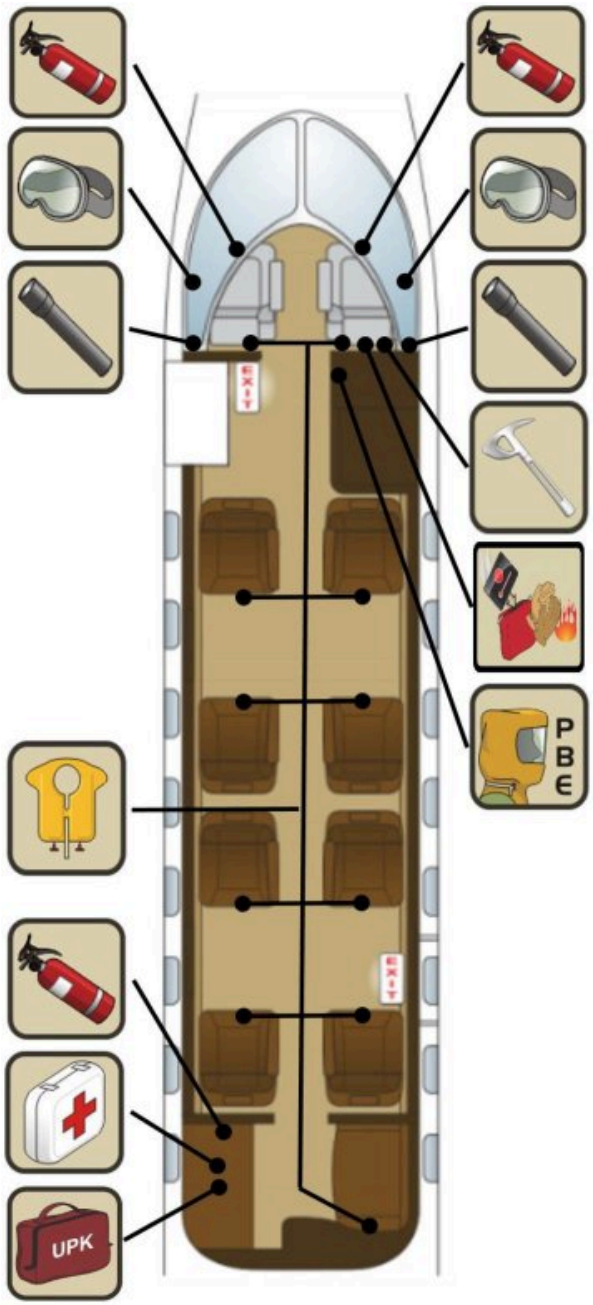


*Figure: Emergency and safety equipment layout – VIP configuration (OO-HRG & OO-JGK)*

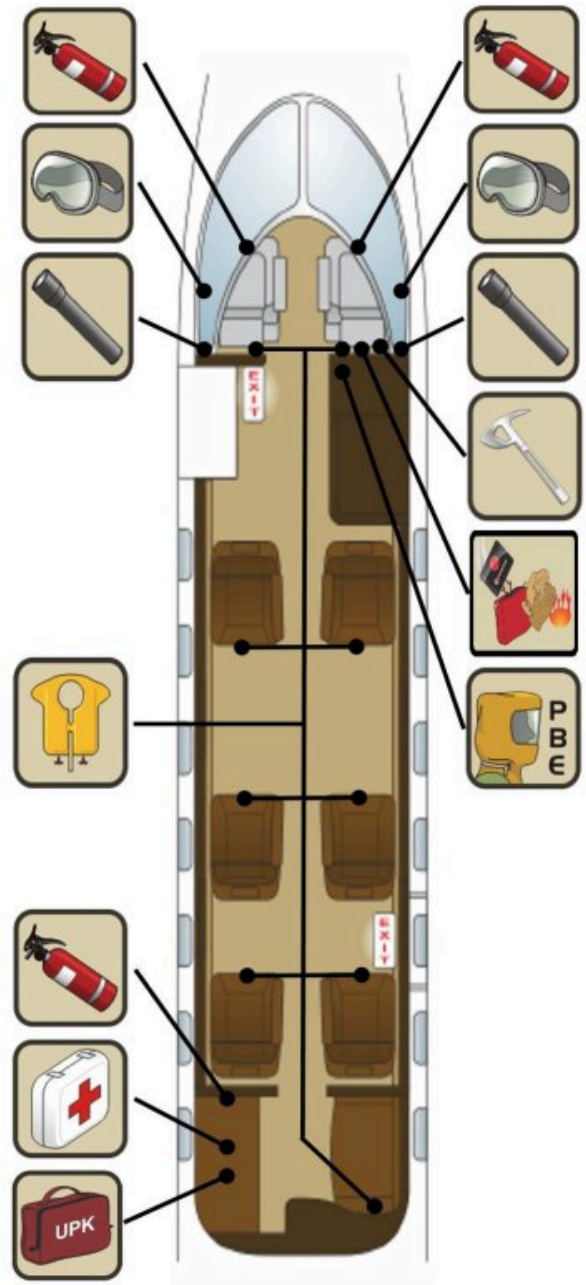


*Figure: Emergency and safety equipment layout – Single stretcher configuration (OO-DOC)*

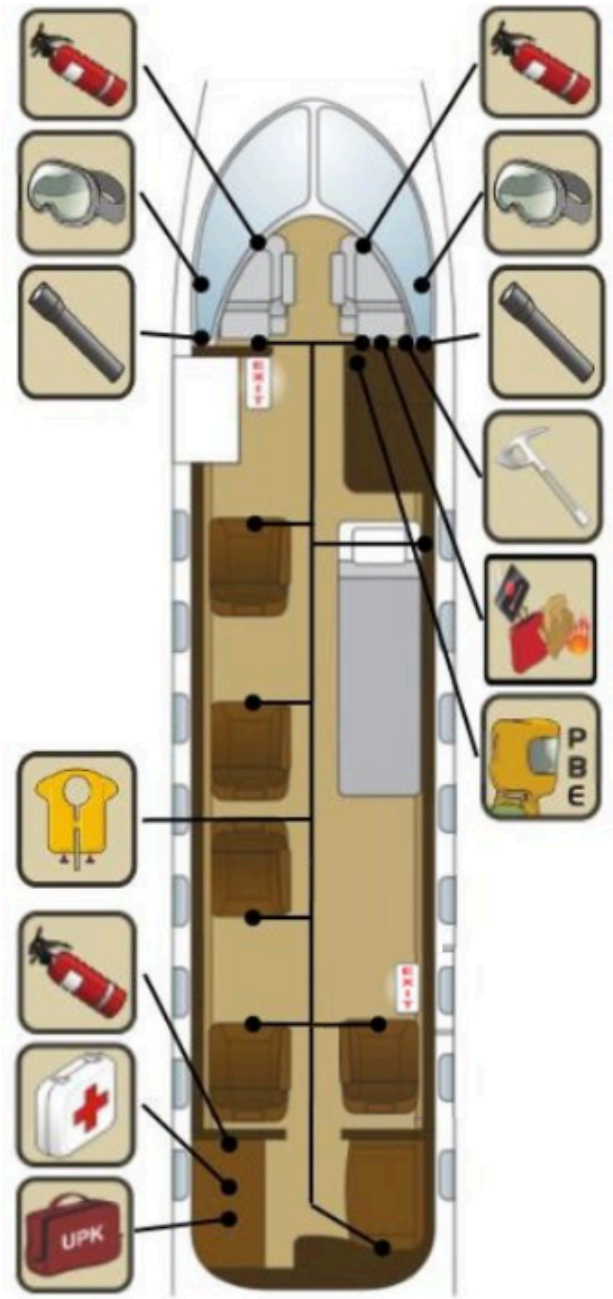


*Figure: Emergency and safety equipment layout – Two-stretcher configuration (OO-DOC)*

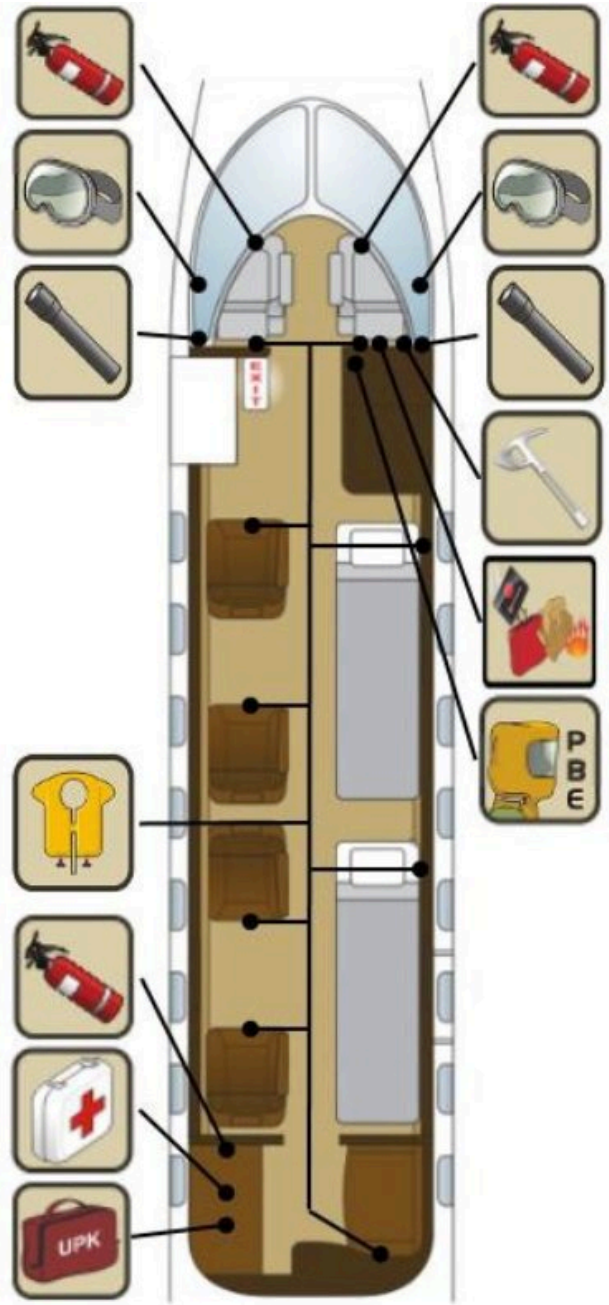
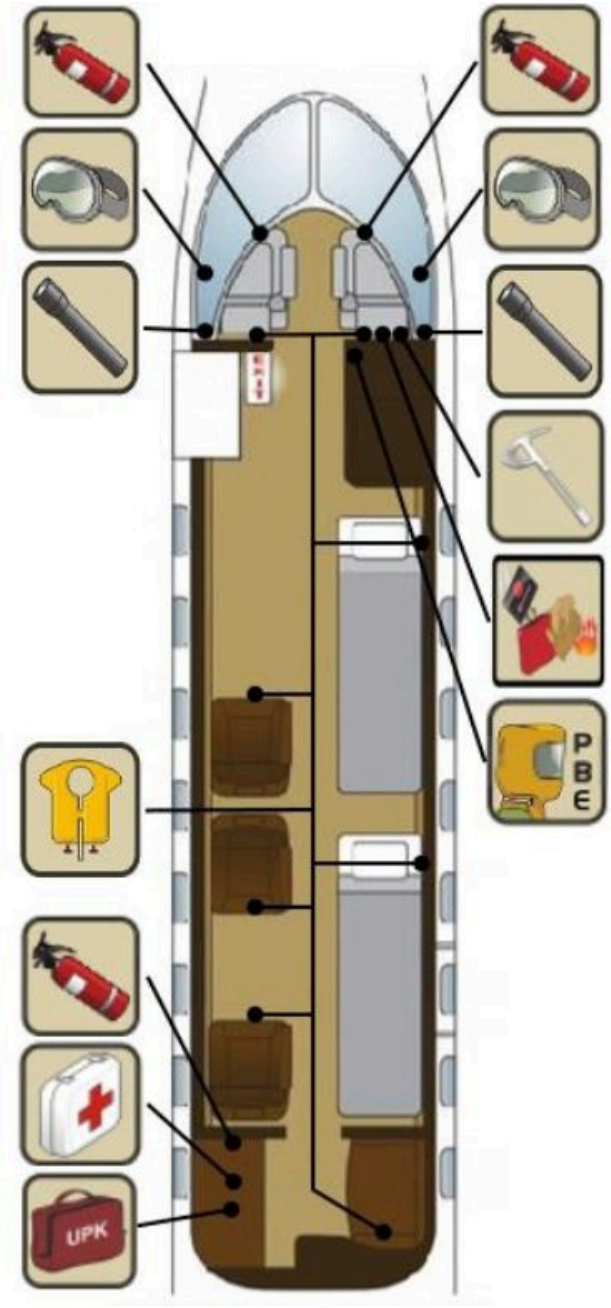


*Figure: Emergency and safety equipment layout – Two-stretcher configuration (OO-MED)*



## 10.1.2 Emergency locater transmitter

CAT.IDE.A.280, NCC.IDE.A.215

### 10.1.2.1 General

The aircraft is equipped with an automatic fixed emergency locator transmitter (ELT(AF)). The ELT is designed to assist in locating an aircraft needing emergency service.

The unit is self-contained and battery powered. An indicator light provides a visual indication of ELT operation. The unit's internal battery allows transmission of the emergency signal for at least 50 hours. In the cockpit, a flashing indicator light indicates operation.

### 10.1.2.2 Location

The transmitter and antenna are installed in the airplane tail section located in the rear fuselage compartment.

### 10.1.2.3 Operation

A switch mounted in the unit and a cockpit switch provides control of the ELT. An inertia switch located within the ELT unit automatically activates the ELT unit. Should an accident occur, the ELT unit would automatically transmit alert tones on the international distress frequencies of 121,5 and 406 MHz. These frequencies are monitored by government monitoring stations, military and Coast Guard aircraft.

A reset switch, located in the cockpit, shall be used to stop ELT transmissions by electronically resetting the G switch, should the ELT be inadvertently triggered following a hard landing, sudden stop or other reason.

### 10.1.2.4 Pre-flight inspection

The pre-flight check of the ELT is part of the normal cockpit inspection.

## 10.1.3 Hand fire extinguisher

CAT.IDE.A.250, NCC.IDE.A.205

► *Refer to the Operations Manuals Part B Section **3.2 – Fire and smoke drills***

### 10.1.3.1 General

The aircraft is equipped with 3 hand fire extinguishers. Each fire extinguisher is portable and is pressurized containing a Halotron BrX (non-halon) extinguishing agent. Each bottle has an actuating valve operated by hand. The extinguisher is rated for class B and C fires. The extinguishing agent is not suitable for use against class K (burning fat, oil) fires.

### 10.1.3.2 Location

Two fire extinguishers shall be located in the cockpit one under each cockpit seat (within reach of the Flight Crew Member). The third fire extinguisher is mounted in the cabin baggage compartment (i.e. aft cabin across the lavatory).

### 10.1.3.3 Operation

To operate a fire extinguisher:

1. Open both latch hooks and remove the fire extinguisher.
2. Hold the fire extinguisher upright with one hand and remove the safety pin with the other hand.
3. Aim the nozzle of the fire extinguisher at the base of the fire. The optimal distance to the fire-base is between 1.5 – 2 meters.
4. Push the lever of the fire extinguisher. This will immediately start the flow of agent. Releasing the lever will interrupt the flow.
5. Sweep the agent stream from side to side, until the fire is extinguished. Once the fire goes out, keep an eye on the area, and be prepared to repeat the process if the fire re-ignites.
6. Operating time: approx. 9 -10 seconds.

Refer to the figure below for a graphical presentation on the components of the fire extinguisher.

*Figure: Components of the Halotron fire extinguisher*




### 10.1.3.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if all are secured accordingly. Check that the pressure gauge is in the green band and the locking pin is in place. Check that the expiration date is within limits.

## 10.1.4 Crash axe

CAT.IDE.A.255, NCC.IDE.A.206

### 10.1.4.1 General

The aircraft is equipped with one crash axe. It shall be used to break in or out during an emergency. It may also be used to open doors (e.g. toilet door) or cut holes into aircraft panelling in case of fire.

The handle of the crash axe is insulated against electrical shocks.

### 10.1.4.2 Location

The crash axe shall be secured to the partition in the cockpit behind the right-hand cockpit seat (within reach of at least one Flight Crew Member).

### 10.1.4.3 Operation

When using the crash axe as a means of getting out of the aircraft, use the blade of the axe first to make a horizontal cut in the insulation along the top boundary of the evacuation area. After tearing away the insulation, the pick of the axe should be used to make the initial puncture through the fuselage, starting in the upper left-hand corner. The blade of the axe should then be used to chop through the top and two sides, forming an ‘n’. The skin of the aircraft should then be kicked outward, resulting in an emergency exit free of a jagged edge along the bottom boundary.

### 10.1.4.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if secured accordingly.

## 10.1.5 First aid kit

CAT.IDE.A.220, NCC.IDE.A.190

### 10.1.5.1 General

The aircraft is equipped with a first aid kit (FAK) easily accessible in the cabin area and inspected on regular basis. All 3 parts of the first aid kit shall be sealed so it is easily detectable that something from the kit was used and thus needs to be replaced.

### 10.1.5.2 Location

The first aid kit is located in the cabin baggage compartment (i.e. aft cabin across the lavatory).

### 10.1.5.3 Operation

The first aid kit (FAK) is tailored to the operational requirements applicable to the Company.

*Figure : Company first aid kit (FAK)*



The items in the kit are stored in 3 different parts of the red softbag depending on its use which are classified as follows:

1. Left pouch being the ‘bandages section’;
2. Central pouch being the ‘general section’; and
3. Right pouch being the ‘medication section’.

A complete list of items may be found in the table below depicting the type of item, its location and any additional remarks if required.

*Table: First aid kit (FAK) content and description*

| First aid kit (FAK) content and description | | | |
|---|---|---|---|
| **Item** | **Pouch** | **Amount** | **Remarks** |
| **Equipment** | | | |
| Bandages | Left | 3 | Assorted sizes including triangular bandages |
| Burns dressings | Center | 2 | |
| Wound dressings | Left | 2 | Large and small |
| Adhesive dressings | Center | 30 | Assorted sizes |
| Adhesive tape | Center | 1 | |
| Adhesive wound closures | Left | 5 | |
| Safety pins | Center | 12 | |
| Safety scissors | Center | 1 | |
| Antiseptic wound cleaner | Center | 1 | |
| Disposable resuscitation aid | Center | 1 | |
| Disposable gloves | Center | 2 x 2 | Additional equipment in UPK |
| Splinter tweezers | Center | 1 | |
| Non-mercury thermometer | Center | 1 | |
| Surgical masks | Center | 2 | Additional equipment in UPK |
| **Medication** | | | |
| Simple analgesic (including pediatric form) | Right | 1 x 20 | Paracetamol 500 mg |
| | | 1 x 10 | Paracetamol 120 mg |
| Antiemetic (non-injectable and including pediatric form) | Right | 1 x 25 | Cinnarizine 25 mg |
| Nasal decongestant | Right | 1 x 10 ml | Xylometazoline nose drops 0,1 % |
| Gastrointestinal antacid | Right | 1 x 24 | Rennie |
| Anti-diarrhoeal medication | Right | 1 x 10 | Loperamide 2 mg |
| Antihistamine (including pediatric form) | Right | 1 x 10 | Cetirizine 10 mg |
| **Other content** | | | |
| Content list + due dates | Center | 1 | Drafted in English and Dutch and includes the amount carried and its due date (if any) |
| List of effects | Center | 1 | Drafted in English and Dutch and includes information on the effects and side effects of medications carried |
| Search and rescue signals | Center | 1 | For use by survivors in ground / air communication |
| First aid handbook | Center | 1 | Current edition |
| Basic life support instruction cards | Center | 2 | Summarising and depicting the current algorithm for basic life support |
| Medical incident report form | Center | 2 | To be completed whenever a medical incident occurs onboard and to be handed over to the ground medical services. |

| First aid kit (FAK) content and description | | | |
|---|---|---|---|
| **Item** | **Pouch** | **Amount** | **Remarks** |
| **Additional equipment** | | | |
| Bag-valve masks | Center | 1 x 3 | 1 mask for adults, 1 mask for children and 1 mask for infants |
| Supraglottic airway device | Center | 1 x 5 | |
| Eye irrigator | Center | 2 | |
| Biohazard disposal bags | Center | 2 | Additional equipment in UPK |
| Absorbent dry powder (i.e. granules) | Center | 1(1) | To convert liquid spill into gel |
| Absorbent tablets | Center | 4(1) | To remove spill from carpet |
| Skin wipes | Center | 8(1) | |
| ***Note 1**: Items moved from the UPK to the FAK as these items have an expiration date allowing for easier follow-up and replacement when due.* | | | |

When using the first aid kit, the use (and preferable what has been used) shall be entered in the airplane technical log (ATL). It shall be replenished after use in-flight at the first opportunity where replacement items are available.

### 10.1.5.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the seals are present and are not tampered with. Check  the expiration date to be within limits.

## 10.1.6 Universal precaution kit

### 10.1.6.1 General

The aircraft is equipped with a universal precaution kit (UPK) easily accessible in the cabin area and inspected on regular basis. It serves to protect a Flight Crew Member or Passenger while treating an unwell Passenger.

The kit shall be sealed so it is easily detectable that something from the kit was used and thus needs to be replaced.

### 10.1.6.2 Location

The universal precaution kit is located in the cabin baggage compartment (i.e. aft cabin across the lavatory) together with the first aid kit (FAK).

### 10.1.6.3 Operation

► *Refer to the Operations Manuals Part A Section 6.2 – Managing a suspected case of communicable disease onboard*

► *Refer to the Operations Manuals Part B Section **10.1.7 – Supplemental personal protective equipment***

The universal precaution kit serves to protect a Flight Crew Member or Passenger while treating an unwell Passenger. The kit is most likely to be used as a supplement to the use of the first aid kit (FAK) and contains amongst others the disposable personal protective equipment (PPE) described in the table below.

*Table: Universal precaution kit (UPK) content and description*

| Universal precaution kit (UPK) content and description(1) | | |
|---|---|---|
| Item | Amount | Remarks |
| Gown with long sleeves | 2 | To enhance protection from potential spillage |
| Disposable apron | 1 | |
| Biohazard bag | 1 | To dispose of waste and used protective gear |
| Bio scoop with detachable scraper | 1 | |
| Shoe covers | 1 x 2 | To protect from contact with infected material Responders might have stepped over |
| Non-latex gloves | 2 x 1 | |
| Hand sanitizer | 1 | To be used when standard hand washing facilities are not available |
| Lavatory label 'do not use' | 3 | |
| Mask with face shield | 1 | |
| Mask type N95 | 2 | |
| Mask type surgical | 2 | |
| Odor eliminator | 1 | |
| Disposable container | 1 | Contaminated sharps only |
| Disinfectant wipes | 1 x 20 | Germicidal disinfectant wipes for surface cleaning purposes. Do not use on oxidation- sensitive materials such as bronze, copper, brass, nickel or aluminium. |
| Instructions for use | 1 | Instructions on how to properly don, remove and dispose of personal protective equipment |
| ***Note 1:*** *The universal precaution kit (UPK) contains personal protective equipment (PPE) that is most likely to be required when treating an unwell Passenger. The Company also provides supplemental personal protective equipment for more day-to- day use which is carried on request of the crew or when the situation so requires (i.e. flights to / from high-risk infection areas, pandemic outbreak, etc). For a list of this available equipment, and how to use it, please refer to the section below.* | | |

When using the universal precaution kit, the use (and preferable what has been used) shall be entered in the airplane technical log (ATL).

### 10.1.6.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the seal is present and is not tampered with.

## 10.1.7 Supplemental personal protective equipment

### 10.1.7.1 General

► *Refer to the Operations Manuals Part B Section **10.1.6 – Universal precaution kit***

The Company provides optional personal protective equipment (PPE) for each aircraft supplementary to the equipment already contained in the universal precaution kit (UPK) and first aid kit (FAK) and this to protect Flight Crew Members in case of dealing with a suspected case of communicable disease onboard or when operating to / from high-risk infection areas.

The amount and type carried shall depend on the risks involved (i.e. type of flight, destination, etc) and extra equipment may be provided on request of the crew. The equipment is considered non-safety related equipment and hence not depicted in the MEL. If not being used, the equipment shall be carried in a ‘personal protective equipment bag’ provided by the Company for each aircraft.

### 10.1.7.2 Location

All carried supplemental personal protective equipment, when not being used, shall be stored in a Company personal protective equipment bag. This bag shall be carried being accessible in flight by the crew and preferably located together with the first aid kit and/or universal precaution kit.

### 10.1.7.3 Operation

The following personal protective equipment (PPE) is typically carried in the Company personal protective equipment bag.

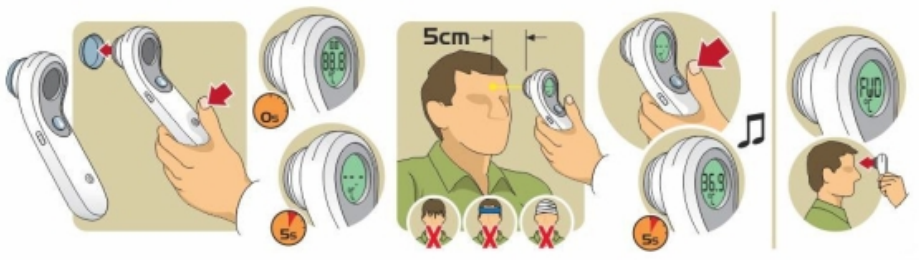
#### 10.1.7.3.1 Digital thermometer

The Company provides a supplemental digital thermometer that measures infrared energy radiated from the skin at the center of the forehead area without actually touching it. This type of thermometer allows for a quick and precise body temperature measurement of, if required, both crew and passengers. To properly measure a temperature:

1. Remove the cap;
2. Press and release the power button once. When the device is ready and correctly positioned (see below), a horizontal line of dashes will appear;
3. Position the device on or up to 5 cm away from the forehead just between the eyebrows. For no touch readings, a guidance light will show you where you are aiming. If the eyebrow area is covered with hair, sweat or dirt, clean the area first;
4. Press the temperature button. The display will show the temperature. If the device was positioned too far away, it will prompt you to move closer by displaying the letters ‘FWD’. Slowly move the device toward the forehead until the line of dashes appears;
5. Press the power button to turn off. The device will also shut off automatically after 60 seconds of no use. Re-install the protective cap.

Refer to the figure below for a graphical presentation on the operation of the digital thermometer.

*Figure: Operation of the digital thermometer*




The digital thermometer is considered non-safety related equipment and hence not depicted in the MEL. In case the thermometer is missing or inoperative (e.g. due to a flat battery), the Company shall be contacted without delay to have the item replaced. If not being used, it shall be stored in the Company personal protective equipment bag.

### 10.1.7.3.2 Face masks

The Company has several types of face masks available for use to protect Flight Crew Members in case of dealing with a suspected case of communicable disease onboard or when operating to / from high-risk infection areas.

There are 2 types of face masks available with the following characteristics:

1. Type I (i.e. surgical / medical) disposable face masks which can help protect wearers from getting others sick or reduce the risk of the wearer becoming sick. Flight Crew Members should wear this type of face mask:
    a. When treating an unwell Passenger who is not expected to have a communicable disease;
    b. When being in direct contact with Passengers from high-risk infection areas (e.g. on repatriating flights following a pandemic outbreak) and who don't appear to be unwell;
    c. When performing pre-flight and post-flight duties in and around the aircraft in high-risk infection areas;
2. N95 / FFP2 disposable respirator masks which are typically used by Responders in medical / environmental emergencies. Flight Crew Members shall wear this type of mask when taking care in-flight of an unwell Passenger with a possible communicable disease.

*NOTE*

'N95' is an American standard for face masks which means that at least 95 % of all air particles are blocked. The norm is similar to the European standard being 'FFP2'.

For any type of face mask, appropriate use and disposal is essential to ensure their effectiveness and to avoid any increase in transmission. The following information on the correct use of a face mask is derived from practices in health care settings:

1. Before putting on a mask, clean hands with alcohol-based hand rub or soap and water;
2. Cover mouth and nose with a mask and make sure there are no gaps between your face and the mask;
3. Avoid touching the mask while using it but if you do, clean your hands with alcohol-based hand rub or soap and water;
4. Replace the mask with a new one as soon as it is damp and do not re-use single-use masks.
5. To remove the mask, remove it from behind (i.e. do not touch the front of mask) by placing a finger or thumb under the straps;
6. Discard immediately and safely in a biohazard bag or equivalent after use;

*NOTE*

*If no biohazard bag is available, place all contaminated PPE in a sealable plastic bag, spray it with disinfecting spray, seal the bag and label it as 'biohazard'.*

7. Clean hands with alcohol-based hand rub or soap and water.

Refer to the figures below for a graphical presentation on how to put on and remove the different types of facial masks.

*Figure: Putting on a type I face mask*



*Figure Removing a type I face mask*



*Figure: Putting on a N95 / FFP2 face mask*

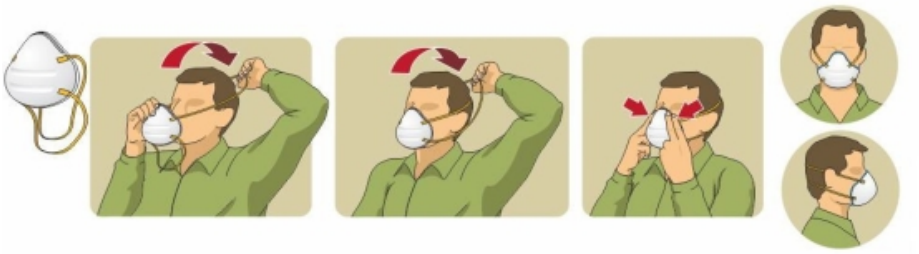


*Figure: Removing a N95 / FFP2 face mask*



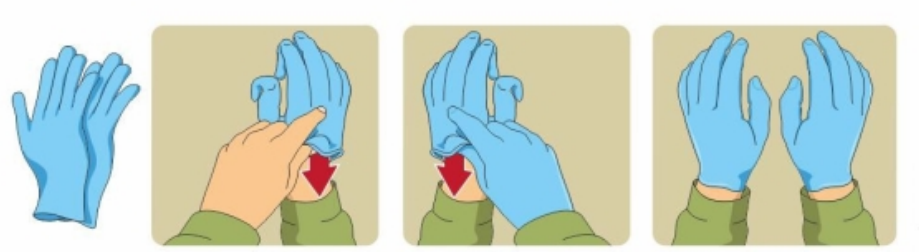
The face masks are considered non-safety related equipment and hence not depicted in the MEL. In case the masks are missing, the Company shall be contacted without delay to have those replaced. If not being used, they shall be stored in the Company personal protective equipment bag.

### 10.1.7.3.3 Disposable gloves

The Company provides disposable latex gloves which are available for use to protect Flight Crew Members in case of dealing with a suspected case of communicable disease onboard or when operating to / from high-risk infection areas.

When putting on the gloves it is important to extend the glove to cover the wrist of each hand.

*Figure: Putting on disposable gloves*



When wearing several pieces of personal protective equipment (PPE), the gloves shall be removed first as they are considered a heavily contaminated item. Use of alcohol-based hand rub should be considered before removing the gloves. Remove the gloves by using the following steps:

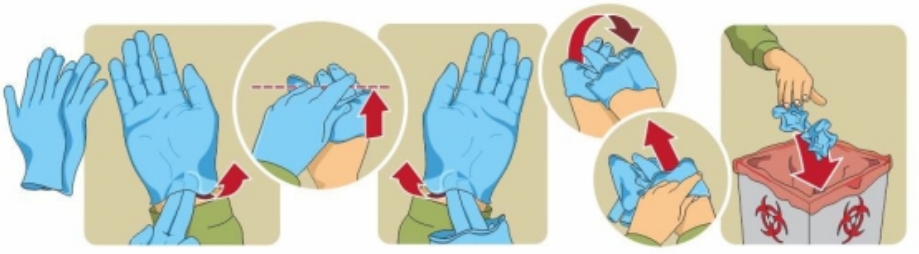
1. Start by pinching and holding the glove (with the other gloved hand) between the palm and wrist area;
2. Peele the glove away from the wrist until it turns inside out covering the fingers;
3. With the now half-gloved hand, pinch and hold the fully gloved hand between the palm and wrist;
4. Peel the glove away from the wrist until it turns inside out and covers the fingers;
5. Now that both hands are half-gloved, remove the glove from one hand completely by grabbing the inside part of the glove and peeling it away from the hand, and do the same for the remaining half-gloved hand using the non- gloved hand, while always grabbing the inside part of the glove;
6. Discard immediately and safely in a biohazard bag or equivalent after use;

*NOTE*

*If no biohazard bag is available, place all contaminated PPE in a sealable plastic bag, spray it with disinfecting spray, seal the bag and label it as 'biohazard'.*

7. Clean hands with alcohol-based hand rub or soap and water.

*Figure: Removing disposable gloves*



The disposable gloves are considered non-safety related equipment and hence not depicted in the MEL. In case the gloves are missing, the Company shall be contacted without delay to have those replaced. If not being used, they shall be stored in the Company personal protective equipment bag.

#### 10.1.7.3.4 Alcohol-based hand rub

The Company provides alcohol-based hand rub (i.e. hand disinfectant) which is available for use to protect Flight Crew Members in case of dealing with a suspected case of communicable disease onboard or when operating to / from high risk infection areas. This alcohol-based hand rub shall assist in maintaining the required hand hygiene when regularly washing your hand with water and soap is not possible.

The hand rub is considered non-safety related equipment and hence not depicted in the MEL. In case the hand rub is missing or almost depleted, the Company shall be contacted without delay to have it replaced. If not being used, they shall be stored in the Company personal protective equipment bag.

### 10.1.7.4 Pre-flight inspection

As the amount and type of personal protective equipment to be carried is optional, the crew shall determine if the provided equipment is sufficient. Check that the equipment is properly stowed in the Company personal protective equipment bag and that the bag is accessible to the crew during flight.

## 10.1.8 Flashlight

### 10.1.8.1 General

There are 2 flashlights (torches) on board. They are normal flashlight with an ON/OFF switch powered by regular batteries for daily use.

### 10.1.8.2 Location

A flashlight shall be secured to a bracket next to each cockpit seat (within reach of the applicable Flight Crew Member).

### 10.1.8.3 Operation

When using a flashlight in the cabin being (partially) filled with smoke, keep the flashlight as close as possible to the cabin floor for optimum use.

### 10.1.8.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if all are secured accordingly. Check if they are working properly still giving enough light.

## 10.1.9 Life jacket cabin (adult / child)

AMC1 CAT.IDE.A.285 (a), AMC2 CAT.IDE.A.285 (a), CAT.IDE.A.285 (a), CAT.IDE.A.285 (b), NCC.IDE.A.220 (a), NCC.IDE.A.220 (b)

### 10.1.9.1 General

Life jackets are for use in the event of an over-water emergency landing. For every person on board a life jacket shall be carried:

1. When the initial climb out and/or final approach of the aircraft is over water;
2. When flying over water more than 50 NM away from land.

Each life jacket shall be stowed in a position that is readily accessible from the seat or berth of the person, with his safety belt or restraint system fastened, for whose use it shall be provided. Each jacket shall be equipped with a means of electric illumination for the purpose of facilitating the location of the person.

### 10.1.9.2 Location

Cabin life jackets shall be accessible to the cabin occupant underneath, next to each seat or next to the patient loading and utility system (PLUS) equipment (within reach of the applicable passenger while his seatbelt is fastened).

### 10.1.9.3 Operation

The life jacket has two independent inflatable chambers each providing enough buoyancy to keep a person afloat. The jacket is equipped with a light to locate survivors in the darkness.

The jacket shall be inflated outside the aircraft (when leaving the door), in order not to hinder evacuation and to protect the life jacket from possible damage. To put on the jacket, proceed as follows:

1. Slip your head through the neck-opening;
2. Connect the strap around your back by fastening the buckle;
3. Tighten the strap by pulling the loose end;
4. To inflate the jacket, pull both red inflation tags at the bottom of the jacket (oral inflation is possible by means of two inflation tubes);
5. To activate the light, pull the yellow battery tag (the battery works only when emerged in water).

To put on a life jacket on a child, proceed as follows:

1. Put on the life jacket;
2. Bring the strap between the legs of the child. Tighten the strap(s) but not too tight;
3. Pull the red tags standing in the doorway or on the wing.

Refer to the figure below for a graphical presentation on the operation of the adult / child life jacket.

*Figure: Operation of the life jacket (adult / child)*



### 10.1.9.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the life jacket hasn't been used and/or the bag containing the life jacket hasn't been opened. Check the expiration date to be within limits.

## 10.1.10 Life jacket cabin (infant)

### 10.1.10.1 General

Life jackets for infants shall not be part of the standard equipment on board. However, when an infant is on board and a life jacket is required for an adult / child to be available, a jacket shall be provided for every infant.

### 10.1.10.2 Location

Life jackets for infants, when required, shall be located in the cabin baggage compartment (i.e. aft cabin across the lavatory).

When an infant is on board, the adult travelling with the infant shall be provided with the infant life jacket and shall be briefed on its operation.

### 10.1.10.3 Operation

To put on the jacket, proceed as follows:

1. Put both arms in the provided holes;
2. Close the 3 buckles on the back and adjust;
3. Pull down the 2 toggles to inflate.

Please also note that:

1. Infant life jackets are inflated after the complete standstill of the aircraft before evacuation;
2. An adult shall carry the infant while evacuating the aircraft;
3. The adult has to attach the lifeline to his own life jacket outside the aircraft.

Refer to the figure below for a graphical presentation on the operation of the infant life jacket.

*Figure: Operation of the life jacket (infant)*



### 10.1.10.4 Pre-flight inspection

Check the correct amount on board (if required) and if distributed accordingly to every passenger carrying an infant. Check if the life jacket hasn't been used and/or the bag containing the life jacket hasn't been opened. Check the expiration date to be within limits.

## 10.1.11 Life jacket cockpit

### 10.1.11.1 General

Life jackets for Flight Crew Members shall be available when life jackets for cabin occupants are required.

### 10.1.11.2 Location

A jacket for every Flight Crew Member is located behind each cockpit seat (within reach of the applicable passenger while his seatbelt is fastened).

### 10.1.11.3 Operation

The use shall be the same as life jackets in the cabin to be used by cabin occupants (adult / child).

### 10.1.11.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the life jacket hasn’t been used and/or the bag containing the life jacket hasn’t been opened. Check the expiration date to be within limits.

## 10.1.12 Life raft

CAT.IDE.A.285 (d), NCC.IDE.A.220 (d)

► *Refer to the Operations Manual Part B Section* ***2.20 - ETOPS operation***

► *Refer to the Operations Manual Part A Annex 22 – Risk assessment form life raft SPO / NCC*

### 10.1.12.1 General

► *Refer to the Operations Manual Part A Annex 22 – Risk assessment form life raft SPO / NCC*

Life rafts are for use in the event of an over-water emergency landing.

Regulations for commercial air transport (CAT) operations require that sufficient life rafts shall be carried to carry all persons on board and being of sufficient size to accommodate all survivors in the event of a loss of 1 raft of the largest capacity when flying along a route that contains a point over water at a distance away from land greater than that corresponding to 120 minutes at cruising speed or 400 NM, whichever is lesser, from an adequate aerodrome for making an emergency landing with the critical engine failed. Each life raft shall be stowed in a position so as to facilitate their ready use in an emergency.

*NOTE*

*When a life raft is required to be carried, at least 2 life rafts shall be on board due to the loss of 1 raft requirement and the requirement to carry at least 2 survival ELT's.*

Regulations for non-commercial operations with complex motor-powered aircraft (NCC) allow however for some MEL rectification intervals. The PIC of an aircraft operated at a distance away from land where an emergency landing is possible  greater than that corresponding to 30 minutes at normal cruising speed or 50 NM, whichever is the lesser, shall determine the risks to survival of the occupants of the aircraft in the event of a ditching, based on which he shall determine the carriage of life rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency. OM-A annex 22 shall be used for this assessment.

### 10.1.12.2 Location

► *Refer to the Operations Manual Part B Section* ***1.6.2 - Baggage and storage limitations***

If required, the life raft(s) shall be stowed in the cabin baggage compartment (i.e. aft cabin across the lavatory).

### 10.1.12.3 Operation

Each life raft is composed of 2 identical buoyancy tubes mounted one above the other. An automatically inflatable triple arch supports the self-erecting canopy. The life raft features an inflatable double floor that provides insulation in cold water or, when deflated, maintains the life raft cool in tropical conditions. The canopy may be opened in 3 positions being open (convertible), closed or partially opened (sail).

A ballast system is installed under the floor to add stability in boarding the life raft. A righting line is provided in case the life raft inflates in an inverted position.

Two boarding ladders, one at either end of the life raft, are provided for ease of entering the life raft from the water. In addition, an internal boarding ladder is provided to further assist in boarding the life raft.

The life raft is equipped with an automatic deployable ELT (ELT(AD)), survivor locator light and life-saving equipment (e.g. floating raft knife, sea anchor, etc) to provide the means for sustaining life.

*Figure: Winslow life raft*




To deploy the life raft, proceed as follows:

1. When an over-water emergency occurs and ditching appears imminent, an Able-Bodied Passenger (ABP) shall remove the raft(s) from its stowage place and secures it convenient to an exit;
2. Open the Velcro painter / mooring line cover on top of the valise and release the snap-hook from the snap-hook loop and snap onto any solid anchor point adjacent to the door or window from which the raft will be launched;
3. Throw out the packed raft clear of the aircraft, it will float;
4. Pull on the painter / mooring line until all of the line has been paid out. A strong, quick pull will then inflate the raft;
5. The painter / mooring line is attached to the raft to keep it from drifting away;
6. After the raft inflates, survivors shall pull it into position at the exit for boarding;
7. If survivors are in the water, the raft may be inflated quickly (without paying out all the painter / mooring line) by pulling the inflation ripcord handle;
8. If the raft should inflate in the inverted position, right the raft according to the righting instructions printed on the lower tube adjacent to the inflation cylinder;
9. Board the raft at either end by using the boarding ladder and handles attached to the raft;
10. After boarding the raft, look for other survivors and assist them in reaching the raft using the heaving-trailing line with floating handle if necessary;
11. Use the hook knife located in the sheath at the entrance to cut the painter / mooring line and free the raft from the aircraft before it submerges;
12. Water inside the raft may be removed using the bailer and the sponge in the equipment pack;
13. Use the hand pump to inflate the inflatable floor. An inflated floor will keep the raft warm. An un-inflated floor will keep the raft cool;
14. Carefully read the instructions in the survival manual to assist your survival.

### 10.1.12.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the life raft hasn’t been used and/or the valise containing the raft hasn’t been opened. Check the expiration date to be within limits.

## 10.1.13 Protective breathing equipment

CAT.IDE.A.245

### 10.1.13.1 General

A flight shall not be operated unless it has one portable protective breathing equipment (PBE) on board to protect the eyes, nose and mouth of one Flight Crew Member. It shall provide breathing gas for a period of not less than 15 minutes.

The protective breathing equipment (type B/E Aerospace) consists of a hood with a visor that is placed over the head and seals around the neck. An oxygen-generating canister provides breathing oxygen for the user. This device permits inspection of the compartment in the event of fire that produces smoke or fumes and is only to be used by a trained Flight Crew Member.

### 10.1.13.2 Location

The protective breathing equipment shall be stored in a box in the galley behind the CM2 seat (within reach of at least one Flight Crew Member).

### 10.1.13.3 Operation

The PBE is vacuum sealed in a bag and stored in a box accessible to the crew. The PBE is designed to protect the user’s eyes and respiratory system from the harmful atmosphere that may be generated by a cabin fire. The PBE is a hood with a visor that is placed over the head and seals around the neck. An oxygen-generating canister provides breathing oxygen for the user. The PBE is a throw-away unit that shall be replaced when the vacuum seal is broken. It is imperative that the vacuum seal be maintained, since the oxygen- generating chemicals react with moisture.

To use the PBE, proceed as follows:

1. Remove mask from container by grasping the red access handle on the protective container firmly and pull forcibly to disengage the cover. When the cover is removed from the container, immediately drop it (the vacuum-sealed bag does not need to be removed from the container to open). The packaged unit may be removed from the stowage container prior to opening and carried to a remote location for use;
2. To remove the PBE from the vacuum-sealed bag, locate the red ID tag and pull sharply to tear open the vacuum-sealed bag. Reach into the opened vacuum-sealed bag and firmly grasp the PBE. Pull the PBE straight out of the bag. If necessary, hold the bag with the opposite hand;
3. Place both hands inside the neck seal opening with palms facing each other and PBE visor facing downward with the oxygen generating canister resting on the tip of the hands;
4. With the top of the head bent forward, guide the PBE neck seal over the top of the head and down over the face using the hands to shield the face and glasses from the oronasal mask cone;
5. With both hands, grasp the adjustment straps at the lower corners of the visor and pull outward sharply to actuate the starter candle. Within 1 to 5 seconds, a rushing noise of oxygen entering the hood will be heard and inflation will be evident;

***CAUTION***

***Human hair is highly flammable. Hair that protrudes through the neck seal could ignite if brought into direct contact with flame.***

6. With the straps still in hand and head bent forward, pull backward to secure the oronasal mask cone high on the nose for a tight seal;
7. If wearing glasses, adjust their position to rest on the tip of the oronasal mask cone by moving the sides of the frame through the hood fabric. Do not attempt to adjust through the neck seal, as this will result in infiltration of the surrounding atmosphere into the interior of the hood;
8. When the neck seal is positioned at the neck and the oxygen generating canister is resting on the nape of the neck, remove the hands, checking to see that clothing is not trapped in the seal and hair does not protrude between the seal and the neck. Pull the protective neck shield down to cover the collar and upper shoulder area.

Following actuation, the hood will inflate over a 15 to 20 second period. After this period, the starter candle will cease flowing and the only sound will be a slight rustling of the fabric on each inhalation and exhalation. Dependent upon breathing rate, there will be a slight exhalation resistance as the exhaled breath is forced through the oxygen generating canister. Inhalation resistance will be almost unrecognizable since inhalation is directly from the interior of the hood through a diaphragm-type check valve located at the base of the oronasal mask. The visor should remain clear of fogging or misting.

Heat is produced by both the chemical air regeneration process and transfer of body heat during the rebreathing cycle. Heat build-up within the hood is normal and is dependent upon the amount of work performed. There should be no irritating or strong unusual odors within the hood. Operational duration is variable dependent upon the amount of work performed by the user.

If the PBE is worn to exhaustion of the chemical regeneration system, this will be evidenced by a gradual reduction in the expended volume of the hood until the point that the hood is collapsed tightly around the head at the end of a full inhalation. Additionally, there will be a rapid buildup of heat and moisture in the hood as the canister loses its effectiveness. At this point, the wearer should immediately retire to a safe breathing area clear of flame and toxic fumes and remove the device.

### 10.1.13.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the equipment hasn’t been used and/or the bag containing the equipment hasn’t been opened. Check the expiration date to be within limits.

## 10.1.14 Battery risk management system

► *Refer to the Operations Manuals Part B Section **3.2 - Fire and smoke drills***

### 10.1.14.1 General

The Aircare battery risk management system ‘Firesock’ is made for the transport of lithium battery-powered appliances (laptops, phones, personal electronic devices, etc) in the aircraft. The Firesock system is designed to contain fire in single cell or multiple cell lithium battery packs. The system includes the Firesock containment bag and heat resistant gloves stored in a bag.

The Firesock system may also be used during a lithium battery fire. Water is used for dousing the appliance and stopping thermal runaway. The heat resistance gloves offer extra protection. The Firesock is then used to contain the appliance after the incident so that the crew can focus on emergency procedures surrounding the event.

### 10.1.14.2 Location

The battery risk management system shall be located behind the right–hand cockpit seat (within reach of at least one Flight Crew Member).

### 10.1.14.3 Operation

The Firesock may be used to place damaged PED’s into for the duration of the flight should they become damaged or crushed.

*Figure: Aircare battery risk management system ‘Firesock’*



If the device is suspected of going into thermal runaway, the BATTERY / PED FIRE / SMOKE procedures shall be followed first before putting it into the Firesock.

***CAUTION***

***It's important to understand that the Firesock does not stop thermal runaway nor does it 'smother' the fire. The Firesock is a containment device that contains heat, debris and reduces the likelihood of secondary fires caused by proximity.***

### 10.1.14.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly. Check if the system hasn't been used.

## 10.1.15 Smoke goggle

### 10.1.15.1 General

Smoke goggles are provided for each Flight Crew Member. The goggle lens is of high- grade optics with an anti-abrasion coating on the outside surface and an anti-mist coating on the inside surface.

The quick donning oxygen mask should be worn, if necessary, before the goggles are put on. The smoke goggles and the quick donning oxygen mask shall be designed in such a way that both are compatible to be worn by the Flight Crew Member as one protective breathing equipment unit providing oxygen to the Flight Crew Members on duty in the cockpit protecting eyes, nose and mouth.

Regulations require a minimum of at least 1 smoke goggle for at least every Flight Crew Member to be readily accessible to the Flight Crew Member when seated at his designated station.

### 10.1.15.2 Location

The goggles are enclosed in a soft bag made of self–extinguishing material and shall be stowed in the lower sidewall storage compartment. next to each cockpit seat (within reach of the applicable Flight Crew Member).

### 10.1.15.3 Operation

In case the lens has to be cleaned, a soft cloth shall be used. The equipment shall not be washed with any solvent or detergent. The window of the goggle shall not be wiped when moisture or water is present on the window and this to avoid damaging the anti-mist coating.

### 10.1.15.4 Pre-flight inspection

Check the correct amount on board, the location according to this section and if stowed properly.

## 10.1.16 Survival equipment

CAT.IDE.A.305, NCC.IDE.A.230

### 10.1.16.1 General

Survival equipment shall not be part of the standard equipment on board the aircraft. A flight shall not be operated across areas in which search and rescue would be especially difficult unless it has the following equipped:

1. Signaling equipment to make the pyrotechnical distress signals;
2. Additional survival equipment for the route to be flown taking account of the number of persons on board.

### 10.1.16.2 Location

► *Refer to the Operations Manual Part B Section **1.6.2 - Baggage and storage limitations***

If required to be on board, the equipment shall be stored in the cabin baggage compartment (i.e. aft cabin across the lavatory).

### 10.1.16.3 Operation

Prior to all flights requiring survival equipment on board the aircraft, every Flight Crew Member shall ensure complete awareness of the equipment, the location and the operating instructions.

### 10.1.16.4 Pre-flight inspection

Check if the equipment is on board (if required) and the location. The amount of equipment required for the route to be flown shall be checked for the number of passengers on board.

# 10.1.17 Cabin seatbelt (adult / child)

► *Refer to the Operations Manual Part B Section **1.2 - Seating configuration***

## 10.1.17.1 General

Every person on board aged 24 months or more shall be seated in a seat equipped with a seatbelt.

The Commander (PIC) shall decide when passengers shall fasten their belts during flight. Therefore, he shall turn on the fasten seatbelt sign in the cabin, visible to all passengers. In any case, the seatbelt sign shall be turned on and hence the seatbelts fastened during taxi, take-off and landing. As a Company policy, the seatbelt sign shall be on when the aircraft is below 10.000 ft MSL.

For MEL purposes, in case of a missing or inoperative seatbelt, refer to the rectification intervals for passenger seats.

## 10.1.17.2 Location

Every seat / stretcher in the cabin is equipped with a seatbelt. The toilet seat is also belted and may be used by an occupant during all phases of flight.

## 10.1.17.3 Operation

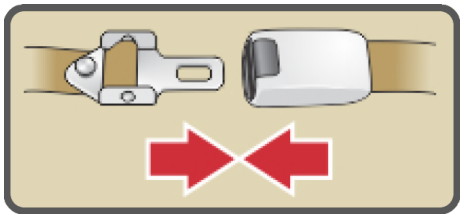
### 10.1.17.3.1 Two-point type seatbelt

The toilet seat is equipped with a two-point safety belt, which is attached to the seat structure with hooks.

The seatbelts are fastened by inserting the flat metal tab into the buckle until a click is heard. To open, press the button on the buckle to release the metal tab.

Refer to the figure below for a graphical presentation on the operation of the adult / child seatbelt.

*Figure: Operation of a 2-point seatbelt (adult / child)*



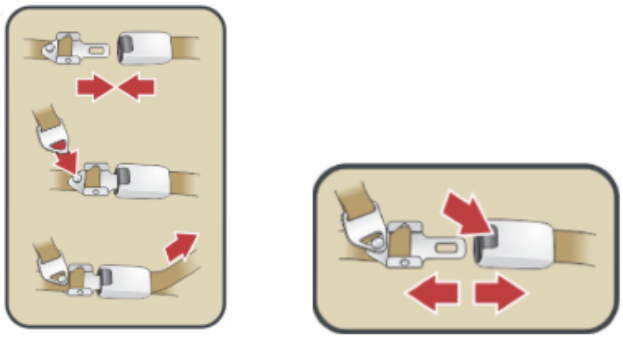
#### 10.1.17.3.2 Three-point type seatbelt

Cabin seats are equipped with a three-point safety belt and are attached to the seat structure and/or aircraft structure with hooks.

The seatbelt is fastened by fixing one end into the other (fixing the flat end into the buckle end). If not already attached, the upper torso restraint belt shall be attached by using the hook on the flat end of the seatbelt. To open, press the button to release the flat end. There is no requirement to unhook the upper torso restraint belt first in order to execute a quick aircraft evacuation.

Refer to the figure below for a graphical presentation on the operation of the adult / child seatbelt.

*Figure: Operation of a 3-point seatbelt (adult / child)*

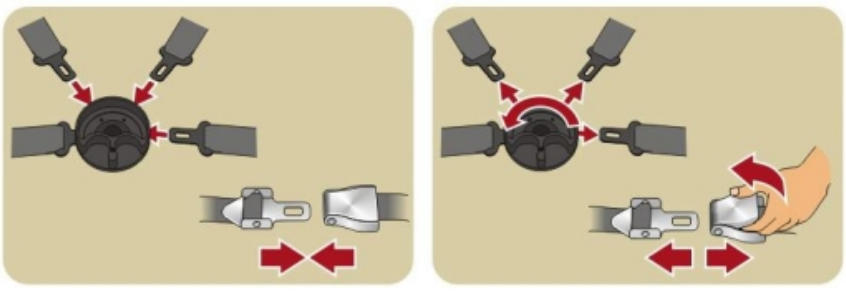


#### 10.1.17.3.3 Harness-type seatbelt

Stretchers (berths) are equipped with harness-type and two-point safety belts, which are attached to the LifePort patient loading and utility system.

Refer to the figure below for a graphical presentation on the operation of the harness-type seatbelt.

*Figure: Operation of a harness-type seatbelt*



### 10.1.17.4 Pre-flight inspection

Check that every seat and/or stretcher is equipped with the correct seatbelt, that it is properly attached to the seat and/or applicable structure and that the opening / closing mechanism is working properly. Check that every seatbelt sign required is operating accordingly.

## 10.1.18 Cabin seatbelt (infant)

► *Refer to the Operations Manual Part A Section 8.2.2.5 – Infant seating*

### 10.1.18.1 General

Cabin seatbelts for infants or kangaroo belts shall be used to secure infants. Kangaroo belts are however a second choice as they provide less safety than a child restraint device (CRD) on a separate seat.

Kangaroo belts are not part of the standard equipment on board. However, when an infant is to be on board and no CRD is to be used to secure the infant, a kangaroo belt shall be provided for every infant.

The equipment shall be available and serviceable for every infant carried unless a CRD is used.

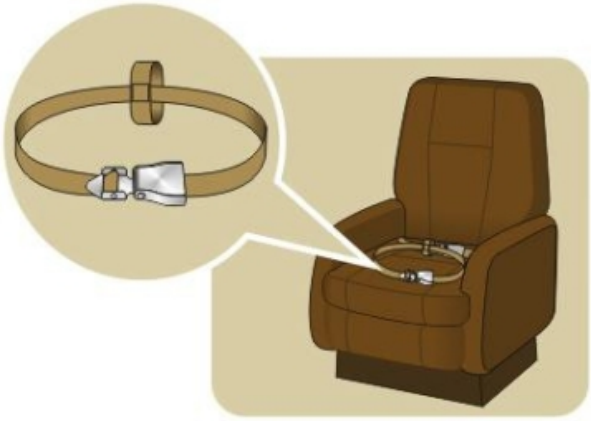
### 10.1.18.2 Location

Cabin seatbelts for infants, when required, shall be located in the cabin baggage compartment (i.e. aft cabin across the lavatory). When an infant is on board, the adult travelling with the infant shall be provided with an infant cabin seatbelt (if no CRD is being used) and shall briefed on its operation.

### 10.1.18.3 Operation

Refer to the figure below for a graphical presentation on the operation of the infant seatbelt.

*Figure: Operation of the seatbelt (infant)*



### 10.1.18.4 Pre-flight inspection

A check shall be performed to confirm the correct amount on board (if required) and if distributed accordingly to every passenger carrying an infant. As part of the check, it shall be confirmed that the opening / closing mechanism of the belt is working properly.

## 10.1.19 Cabin oxygen mask

► *Refer to the Operations Manual Part B Section **1.2.3 - Multiple occupancy of a seat***

► *Refer to the Operations Manual Part B Section **10.2 - Amount of oxygen required***

► *Refer to the Operations Manual Part B Section **12.3.1 - Cabin oxygen system***

### 10.1.19.1 General

In case of a rapid decompression, passenger service units (PSU's) shall provide oxygen masks, which hang down to be within reach of each passenger. When the mask is grabbed and pulled towards the face, the oxygen flow shall automatically be activated.

### 10.1.19.2 Location

Refer to section 12.3.1 of this manual for a detailed description on the location of the different passenger oxygen masks.

### 10.1.19.3 Operation

A passenger oxygen mask consists basically of:

1. A face cone with an inhale/exhaust valve,
2. An elastic head strap,
3. A reservoir bag,
4. A flexible hose.

The flexible hose is connected to the oxygen supply line in the passenger service unit. A lanyard is connected between the oxygen masks and the supply line. When one of the masks is pulled towards the user's face, a pull pin in the supply line is released and the oxygen flows into the masks connected to the unit.

When the mask is used, the inhaled oxygen is automatically mixed with ambient air. Mask design permits breathing even if the oxygen supply should become restricted.

Do not re-stow masks when no longer needed or after accidental opening of a PSU, as the generator could be hot and cause a fire. If a stowage compartment door does not open automatically, it may be opened manually.

*NOTE*

*The mask shall only be used in a decompression and must not be used in case of a smoke-filled environment.*

Refer to the figure below for a graphical presentation on the operation of the cabin oxygen mask.

*Figure: Operation of a cabin oxygen mask*




### 10.1.19.4 Pre-flight inspection

Check that the doors of the PSU's in the overhead panel are properly closed. The pre- flight check of the oxygen system itself is part of the normal cockpit and exterior inspection.

## 10.1.20 Cockpit oxygen mask

► *Refer to the Operations Manual Part B Section **10.2 - Amount of oxygen required***

### 10.1.20.1 General

Each cockpit seat shall be equipped with an oxygen mask of the quick donning type.

*NOTE*
*A quick donning mask is a type of mask that:*

1. *Can be placed on the face from its ready position, properly secured, sealed and supplying oxygen upon demand, with one hand and within 5 seconds and will thereafter remain in position, both hands being free;*
2. *Can be donned without disturbing eyeglasses and without delaying the Flight Crew Member from proceeding with assigned emergency duties;*
3. *Once donned, does not prevent immediate communication between the Flight Crew Members over the aircraft intercommunication system; and*
4. *Does not inhibit radio communications.*

### 10.1.20.2 Location

Cockpit oxygen masks shall be stored hanging next to each cockpit seat within reach of the applicable Flight Crew Member.

### 10.1.20.3 Operation

To don the mask, proceed as follows:

1. Remove the headset (if worn);
2. Firmly grasp the red ears between the thumb and forefinger and remove the mask from its box. The harness will inflate automatically;
3. While bending down, place the mask over your head and slide the harness on your neck. Raise your head to slide the mask down. If glasses are worn, press the harness against your neck to keep it away from your face, while sliding it down;
4. Release the red ears. The harness deflates, pulling the mask against your face. No further adjustment of the harness is required. It adapts automatically to your face.

Refer to the figure below for a graphical presentation on the operation of the cockpit oxygen mask.

*Figure: Operation of the cockpit oxygen mask*



For protection against smoke and noxious gases, don the mask as indicated above and then put on the smoke goggles.

### 10.1.20.4 Pre-flight inspection

Check the correct amount on board and the location. Check if the oxygen mask is stowed accordingly and set to 100 % so it may be used as quick donning. Check if the equipment is functioning properly by performing a pre-flight test.

## 10.1.21 Passenger safety briefing card

CAT.OP.MPA.170 (b), NCC.OP.140 (a)

► *Refer to the Operations Manual Part A Section 8.3.17.2 – Passenger briefing*

► *Refer to the Operations Manual Part B Annex 3 – Passenger safety briefing card*

### 10.1.21.1 General

A passenger safety briefing card is a visual means to inform passengers about their safety. It gives them picture-type instructions indicating the operation of safety and emergency equipment and emergency exits likely to be used by passengers.

*NOTE*

*The passenger safety briefing card only depicts the safety and emergency equipment that is available to the passengers in the cabin.*

### 10.1.21.2 Location

At least one passenger safety briefing card shall be available to each individual passenger carried and stowed in a location from where it is easily visible and reachable to the seated passenger and from where it cannot easily fall out.

*NOTE*

*Due to the layout of the cabin, some briefing cards may be in the seat back pocket of the passenger's seat or adjacent to the seat of that passenger. The location of the passenger safety briefing card shall for that reason be properly briefed to the passenger and if necessary, handed over to the passenger for review.*

### 10.1.21.3 Operation

Refer to the applicable annex of this manual for a graphical presentation of the passenger safety briefing card.

### 10.1.21.4 Pre-flight inspection

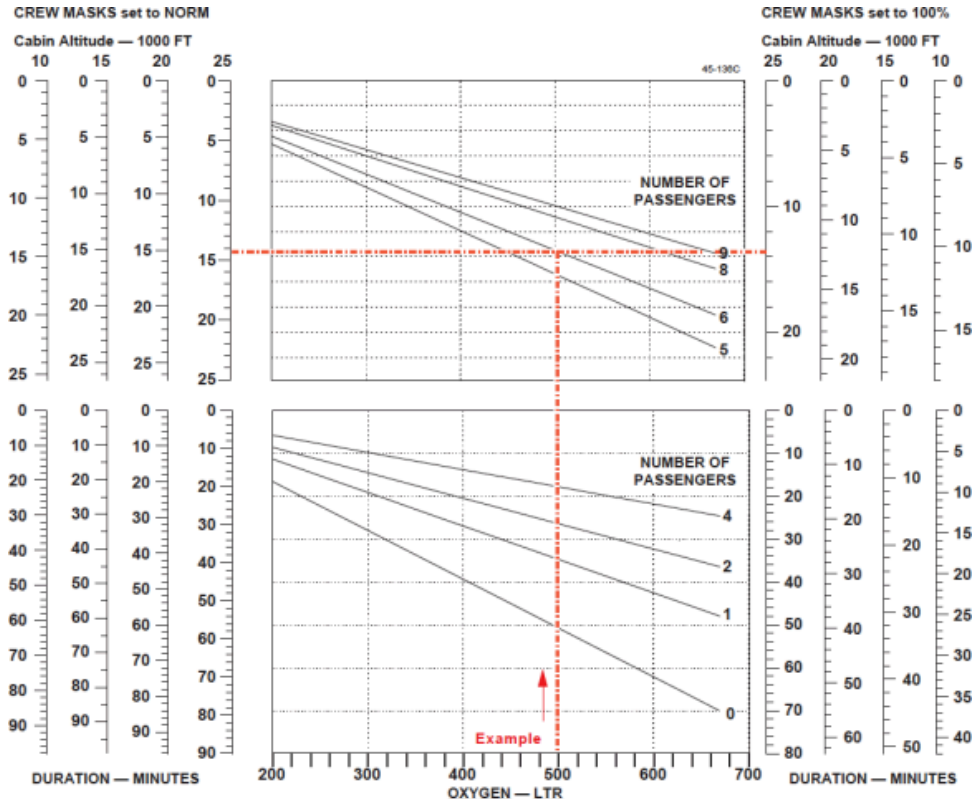
Check the correct amount on board and if stowed properly (i.e. as described above).

# 10.2 Amount of oxygen required

► *Refer to the Aircraft Flight Manual Section 4 – Abnormal procedures: Environmental / pressurisation*

Use the following graph to calculate the available time in minutes of oxygen based on the present cabin altitude:

*Figure: Oxygen supply chart*



SECTION 11 - EMERGENCY EVACUATION PROCEDURES

► *Refer to the Aircraft Flight Manual Section 3 - Emergency procedures: Emergency evacuation*

► *Refer to the Operations Manual Part A Section 8.3.16 – Cabin safety requirements*

► *Refer to the Operations Manual Part A Section 8.3.17 – Passenger briefing procedures and relations with passengers*

► *Refer to the Operations Manual* ***3.15 - Emergency landing & ditching***

This section describes the Company evacuation procedures to be known by every Flight Crew Member.

# 11.1 Instructions for preparation for an emergency evacuation

An emergency landing or ditching may be planned or unplanned depending on the time available to prepare the aircraft and to inform the passengers.

An unplanned emergency landing or ditching can arise as the result of an emergency either immediately after take-off or when a landing is imminent. There may not be any time to carry out all emergency landing or ditching procedures as described below.

It is at the discretion of the Commander (PIC) to omit certain procedures when deemed necessary due to the lack of time. The procedures below, assume that a reasonable time is available to secure the cabin and inform the passengers besides performing all required cockpit procedures.

## 11.1.1 Cockpit preparation

The Commander (PIC) shall brief the other Crew Member about the action plan before briefing the passengers or securing the cabin. It is of the utmost importance that both Flight Crew Members are fully aware on the actions to be taken. When preparing the emergency landing or ditching, both Flight Crew Members will perform individual task that shall lead to the same goals as set out in the briefing.

When giving the briefing, the following structure should be used:

1. **N** - Nature of the emergency;
2. **I** - Intention of the Commander (PIC);
3. **T** - Time available;
4. **S** - Special and/or specific instruction.

Once the briefing between the Flight Crew Members is completed, passengers may be briefed and the cabin may be secured.

### 11.1.2 Emergency landing or ditching briefing

To inform the passengers about the plan of action and the occurrence that took place, the Commander (PIC) shall address the passengers by speaking to them directly or by using the public address system.

To ease the briefing given and to make sure all items are covered during the emergency landing or ditching briefing, the following items shall be covered:

1. Current situation and course of action;
2. Time until the emergency landing or ditching;
3. Seats upright and seatbelts fastened;
4. Tables and other items stowed;
5. Sharp objects or loose restrictive clothing removed;
6. Leave all belongings behind;
7. Use of life jackets (in case of ditching);
8. Brace position(s).

After the announcement, the crew shall appear assertive and in control. When securing the cabin, brief passengers again on certain items if in case of doubt they fully understand the instructions given. Pay special attention to the brace position and the use of the seatbelt.

### 11.1.3 Able-bodied passenger briefing

When preparing the cabin for an emergency landing or ditching, at least one Able-Bodied Passenger (ABP) shall be selected. The Able-Bodied Passenger selected should:

1. Appear calm and in control;
2. Be physically able to open an exit.

If the Able-Bodied Passenger is reluctant to assist, he/she will have to be replaced by a willing Able-Bodied Passenger.

An Able-Bodied Passenger shall be briefed that he/she will be required to assist any Flight Crew Member by:

1. Holding passengers back whilst the exit is being opened;
2. Direct passengers away from the aircraft after exiting.

They shall also be briefed on the actions to be taken in case of crew incapacitation. This includes:

1. Checking for outside hazards before opening an exit;
2. How to open an exit;
3. How to evacuate the other passengers;
4. Location and operation of the survival equipment.

This briefing shall be given in a simple everyday language not using aviation terms. To confirm their understanding, the Able-Bodied Passenger should, time permitting, repeat the instructions given.

### 11.1.4 Brace position

These general instructions shall be applicable to all brace positions:

1. The lower torso shall be firmly against the seat back;
2. The safety belt shall be worn as tight and as low on the torso as possible. The more tightly the safety belt is adjusted, the better restraint it will provide;
3. If the safety belt includes a shoulder harness, the harness shall be adjusted so that it is tight but does not pull the lap portion of the safety belt upward;
4. The webbing of a safety belt and safety harness shall lie flat against the body and shall not be twisted;
5. Feet shall be flat on the floor and slightly in front of the edge of the occupant's seat, legs and feet shall not be placed under the occupied seat or the seat forward of it in order to prevent feet/leg injury should either seat collapse during impact.

Depending on the seat location of the passengers, they will be briefed on their particular brace position. Note that the aircraft has 3 seating positions:

1. Forward-facing seats,
2. Aft-facing seats,
3. Side-facing seats.

Depending on their position, the specific brace position requirements as described below, shall be briefed additionally to the requirements as set out above.

#### 11.1.4.1 Forward-facing seats

Passengers seated on forward facing seats shall take the following position:

*Figure: Forward-facing seats*



Bend forward and rest head and chest against the upper legs. Flailing may be reduced by grasping the ankles or legs, or if unable to do so, by wrapping the arms under and around the legs. The head shall be face down in the lap and not turned to one side.

### 11.1.4.2 Aft-facing seats

Passengers seated on aft facing seats shall take the following position:

*Figure: Brace position on aft-facing seats*



Sit upright with the head firmly against the seat back. Arms may be placed on the armrests. If armrests are not available, hands may be positioned on the lap.

Hands shall not be clasped behind head or neck because this may increase stress on the neck due to the mass of the arms and hands as they react during impact.

### 11.1.4.3 Side-facing seats

Wherever possible, passengers shall be relocated to forward-facing or aft-facing seats.

When forward facing or aft facing seats are not available, passengers seated on side facing seats shall take the following position:

*Figure: Brace position on side-facing seats*



Bend over and lean toward the front of the aircraft, then rest the upper torso and head against whatever might be contacted to help reduce the head flailing.

### 11.1.4.4 Brace position for children

Children shall be seated in aft facing seats when available.

If no aft facing seats are available, children occupying passenger seats facing forward or sideways shall adopt the same brace positions as adults. Because of their smaller stature, the flail envelope of children is smaller than that of adults.

The safety belt shall be placed low on the child's torso, just above the legs at the hips. If the safety belt cannot be adjusted so that it is tight on a small child, the child may sit on a pillow or blanket in order to raise the child so that the safety belt will fit securely. The pillow shall not be placed behind the child.

Children seated in a forward-facing seat shall bend forward over the safety belt and rest their head on the seat cushion between their legs or bend their head forward, over the edge of the cushion, as appropriate for their height. This is done to reduce head flailing.

### 11.1.4.5 Brace position for lap-held infants

► *Refer to the Operations Manual Part B Section **1.2.3 - Multiple occupancy of a seat***

***CAUTION***

***Passengers with lap-held infants shall not be seated on side-facing seats.***

Passengers with lap-held infants shall be seated in aft facing seats when available.

*Figure: Brace position for passengers with lap-held infants on aft-facing seats*



If no aft-facing seats are available, passengers with lap-held infants seated on seats facing forward shall take the following position:

*Figure: Brace position for passengers with lap-held infants on forward-facing seats*



### 11.1.4.6 Brace position for pregnant women

***CAUTION***

***Pregnant women shall not be seated on side-facing seats.***

Pregnant women shall be seated in aft facing seats when available.

*Figure: Brace position for pregnant women on aft-facing seats*



If no aft facing seats are available, pregnant women seated on seats facing forward shall take the following position:

*Figure: Brace position for pregnant women on forward-facing seats*



The brace position shall be the same as the normal brace positions. Pregnant women shall however be instructed to place the safety belt low, below the abdomen, so that it applies its forces to the pelvis.

# 11.2 Emergency evacuation procedures

## 11.2.1 Decision to evacuate

At any time that the Commander (PIC) deems an evacuation is necessary, he shall advise the other Flight Crew Member (SIC) by announcing “EVACUATE”.

It is the responsibility of the Commander (PIC) to assess the situation and execute sound judgment to determine the safest course of action.

Don't hesitate to decide, announce the decision and never interrupt an evacuation procedure. Time spent evaluating the situation should be kept to a minimum to improve chances of survival if an evacuation is required.

## 11.2.2 Unplanned or planned emergency landing or ditching

### 11.2.2.1 Unplanned emergency landing or ditching

An unplanned emergency landing or ditching may arise as the result of an emergency either immediately after take-off or when a landing is imminent. There may not be any time to carry out the fully planned emergency landing procedures as set out above.

For an emergency immediately after take-off or when landing or ditching is imminent, the Commander (PIC) shall announce

“THIS IS YOUR CAPTAIN SPEAKING, THIS IS AN EMERGENY, BRACE BRACE BRACE”.

### 11.2.2.2 Planned emergency landing or ditching

For a planned emergency landing or ditching, the amount of preparation shall depend on the time available. If time is available, it is important that the Commander (PIC) briefs the other Flight Crew Member about the action plan before briefing the passengers or securing the cabin. It is of the utmost importance that both Flight Crew Members are fully aware on the actions to be taken.

Once the briefing between the Flight Crew Members is completed, passengers may be briefed and the cabin may be secured.

At 1.000 ft, the Commander (PIC) shall announce

“TAKE YOUR SEATS FOR LANDING”.

At 200 ft or less than 10 seconds before landing, the announcement

“BRACE BRACE BRACE” shall be made.

## 11.2.3 ATC call when evacuating

The Commander (PIC) shall call ATC when he orders an evacuation, if not already done by the PM as part of the emergency landing preparation.

To avoid possible confusion with the standard words ‘vacating (the runway)’, the word ‘evacuation’ shall be used when calling ATC.

The call "MAYDAY MAYDAY MAYDAY, (callsign), POSITION ..., EVACUATION” shall be made.

## 11.2.4 Evacuation procedure

The emergency evacuation checklist memory items shall be completed with both Flight Crew Members at their station as some memory items may only be completed by the CM1 (e.g. switching off the batteries) and some may only be completed by the CM2 (e.g. shutting down the APU).

As soon as all required cockpit checklists are performed and the command is given to evacuate, the Flight Crew Member other than the Commander (PIC) shall leave his position to open the emergency exit as dedicated by the Commander (PIC).

In meantime, the Commander (PIC) shall order the evacuation by announcing to the passengers

"EVACUATE BY THE … EXIT".

The dedicated Flight Crew Member shall open the exit to direct and evacuate passengers trough that exit.

***CAUTION***

***After performing the emergency evacuation checklist memory items, the public address system (PA) and/or radios are no longer available to announce the evacuation to the passengers and/or ATC.***

The Flight Crew Member assigned to direct an evacuation through a specific exit, shall:

1. Check the outside conditions before opening an exit to ascertain that there is no external fire or smoke in the vicinity of the exit;
2. Open the door only when it is safe to use.

If a hazard exists near the exit, the Flight Crew Member shall redirect the passengers to an appropriate alternate exit.

An emergency evacuation is completed more rapidly when the danger is evident to passengers. Passengers will be more concerned with their possessions than with their own safety unless the danger is immediately apparent or the crew make them very conscious of the dangers.

For that reason, do not waste time using polite long sentences. Use whatever verbal measures required keeping passengers moving. Use even physical force where and if needed.

Stand to the side of an emergency exit so as not to block the available emergency exit area but close enough to the emergency exit to apply assistance or physical force to any passenger.

Once out the aircraft, direct passengers to a secure and protected area away from the aircraft preferably into the wind. Supply any aid that may be necessary and/or practicable. If aid is required, ascertain if there are any doctors among the passengers or passengers which can assist in providing first aid.

Pets shall remain on board until all passengers have evacuated the aircraft. The Commander (PIC) has the final decision when to start the evacuation of pets on board.

After an emergency evacuation and when the basic safety considerations have been completed, every Flight Crew Member shall immediately concern himself about the general welfare of the passengers.

When rescue assistance arrives, ensure an orderly transfer of responsibility of passenger handling. Until such time, the primary responsibility of any Flight Crew Member is the general welfare of the passengers. This responsibility has priority over all other possible duties and responsibilities.

SECTION 12 - AIRCRAFT SYSTEMS

# 12.1 General

The description of the different aircraft systems may be found in the Aircraft Flight Manual.

Some systems and/or equipment however may require some more detailed explanation (e.g. specific description of a certain system and/or equipment); hence they shall be detailed below structured according to the ATA number system.

# 12.2 ATA 25 – EQUIPMENT AND FURNISHINGS

## 12.2.1 LifePort patient loading and utility system

► *Refer to EASA STC IM.A.S.01199 - Installation of emergency medical stretchers and bases, oxygen and electrical systems and associated LifePort Inc.*

► *Refer to LifePort PLUS supplement AFMS Learjet 45 (Doc. No. EGR-644-11) – Patient loading and utility system*

► *Refer to the Operations Manual Part B Section **1.2.2.2 - Medical configuration***

► *Refer to the Operations Manual Part B Section **1.15.2 – Medical equipment***

► *Refer to the Operations Manual Part B Section **2.26.2 – Medical equipment***

► *Refer to the Operations Manual Part B Section **3.9.2 – Medical equipment***

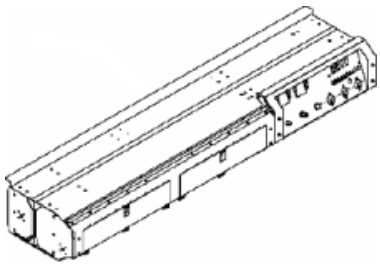
### 12.2.1.1 Definitions

The following definitions shall be applicable for the purpose of describing the medical equipment / configuration:

A **non-ambulatory passenger** means a passenger who is not able to move about within the aircraft unassisted.

**Patient loading and utility system (PLUS)** is a structural module that mounts directly to the existing aircraft seat tracks with standard track fittings. The PLUS provides a latching station for AeroSleds, both personnel and equipment configurations, as well as houses various medical systems. The PLUS module may be configured as a single or tandem system.

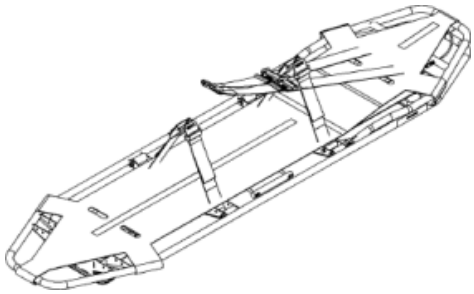
*Figure: Patient loading utility system*



**AeroSled** is the brand name used by LifePort being known as a medical stretcher. There are two types of AeroSleds:

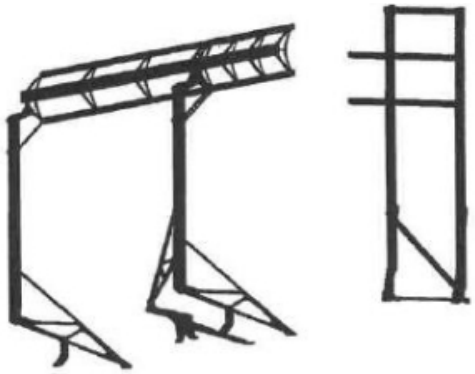
1. The personnel AeroSled is a structural stretcher that latches to the top of the PLUS and provides patient restraint and support;
2. The equipment AeroSled provides hard points for the restraint of cargo and equipment. Use of additional equipment mounted on the equipment AeroSleds may require further Authority approval.

*Figure: AeroSled stretcher*



Directly adjacent to the patient loading and utility system, an **aero medical equipment rack** is installed. This medical equipment mounting system is attached directly to the existing seat tracks for use in conjunction with the existing PLUS installation.

*Figure: Aero medical equipment rack*

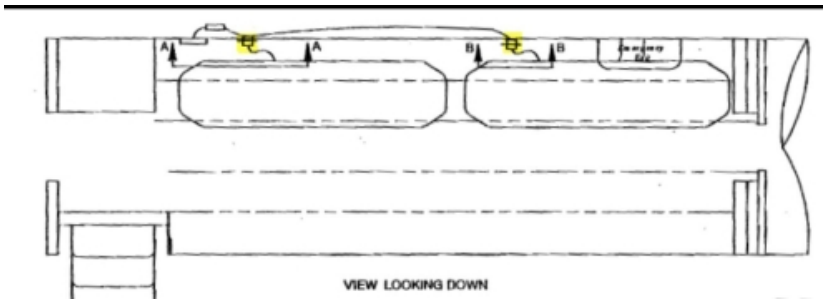


The mounting system is a standard double rail system allowing mounting of several mobile medical equipment. The system does not interfere with the stretcher installation and does not obstruct the aisle and emergency exit.

## 12.2.2 Aircraft installation

The aircraft is equipped with 2 connectors in the cabin to plug in the LifePort patient loading and utility systems (PLUS). The connectors are located on the right-hand side of the cabin.

*Figure: Cabin schematic of the PLUS connectors*




The PLUS obtains power from the existing aircraft cabin inverter. To isolate the PLUS, open AC OUTLET 1/2 amp circuit breaker located on the P10 CM2 circuit breaker panel.

# 12.3 ATA 35 – OXYGEN

## 12.3.1 Cabin oxygen system

► *Refer to the Aircraft Flight Manual Section 1 – Limitations: System Limits: Oxygen system*

► *Refer to the Operations Manual Part B Section **1.2.3 - Multiple occupancy of a sea***

► *Refer to the Operations Manual Part B Section **10.1.19 - Cabin oxygen mask***

### 12.3.1.1 Aircraft with registration OO-DOC and OO-MED

The aircraft is equipped with 6 PSU's located across the cabin overhead as follows:

1. 1 unit containing 2 passenger oxygen masks above the main entrance / galley;
2. 2 units each containing 2 passenger oxygen masks in the forward seating area;
3. 2 units each containing 2 passenger oxygen masks in the aft seating area;
4. 1 unit containing 2 passenger oxygen masks in the lavatory area.

Refer to the figures below for a more detailed description.

*Figure: Passenger oxygen masks location (OO-DOC)*

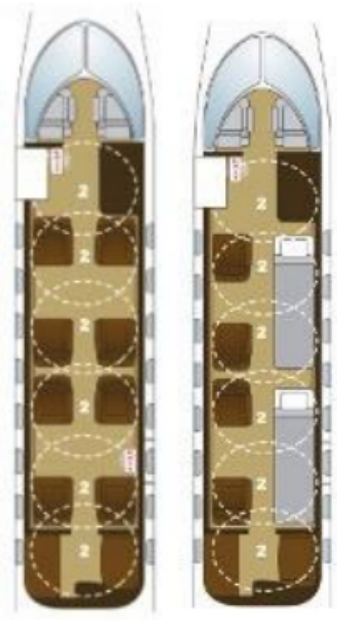
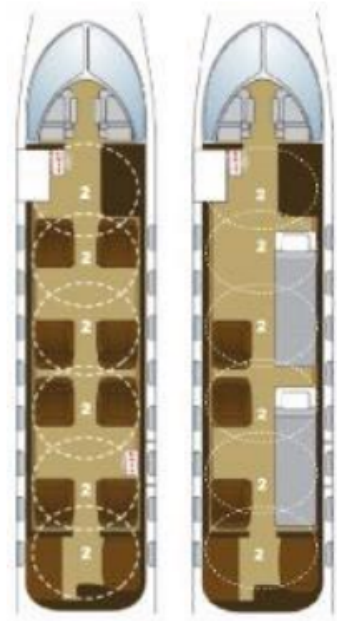


*Figure: Passenger oxygen masks location (OO-MED)*



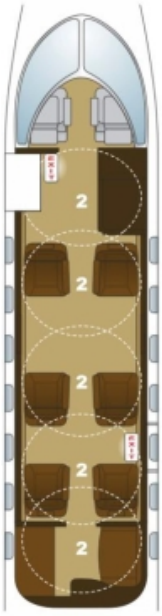
### 12.3.1.2 Aircraft with registration OO-HRG and OO-JGK

The aircraft is equipped with 5 PSU's located across the cabin overhead as follows:

1. 1 unit containing 2 passenger oxygen masks above the main entrance / galley;
2. 2 units each containing 2 passenger oxygen masks in the forward (club) seating area;
3. 1 unit containing 2 passenger oxygen masks in the aft seating area;
4. 1 unit containing 2 passenger oxygen masks in the lavatory area.

Refer to the figure below for a more detailed description.

*Figure: Passenger oxygen masks location (OO-HRG & OO-JGK)*



## ANNEX

| Annex number | Title | Edition and/or date |
|---|---|---|
| 1 | Abbreviated Company checklist LJ45 (Learjet 40) | Edition 2 of 01-Jan-25 |
| | Abbreviated Company checklist LJ45 (Learjet 45) | Edition 2 of 01-Jan-25 |
| 2 | Supplementary Company checklist LJ45 (Learjet 40) | Edition 4 of 17-Aug-26 |
| | Supplementary Company checklist LJ45 (Learjet 45) | Edition 4 of 17-Aug-26 |
| 3 | Passenger safety briefing card OO-DOC – VIP configuration | July 2021 |
| | Passenger safety briefing card<br>OO-DOC – Two Stretcher configuration | January 2022 |
| | Passenger safety briefing card<br>OO-DOC – Single Stretcher configuration | November 2025 |
| | Passenger safety briefing card OO-MED – VIP configuration | July 2021 |
| | Passenger safety briefing card<br>OO-MED – Two Stretcher configuration | January 2022 |
| | Passenger safety briefing card OO-HRG – VIP configuration | May 2021 |
| | Passenger safety briefing card OO-JGK – VIP configuration | November 2025 |
| 4 | AFM take-off and landing performance extract LJ45<br>(Learjet 40 – OO-HRG) | Edition 3 of 11-Jun-26 |
| | AFM take-off and landing performance extract LJ45<br>(Learjet 40 – OO-JGK) | Edition 1 of 11-Jun-26 |
| | AFM take-off and landing performance extract LJ45 (Learjet 45) | Edition 1 of 01-Feb-22 |

## ANNEX 1: ABBREVIATED COMPANY CHECKLIST LJ45

## COCKPIT PREPARATION

1. Pre-flight inspection ..... COMPLETED
2. Documents, manuals and equipment ..... SIGNED / CHECKED
3. EFB ..... CHECKED / SET
4. Crew oxygen masks ..... CHECKED / 100 %
5. WX radar ..... STBY
6. ELEV DISC handle & ROLL DISC lever ..... CHECK STOWED
7. Flights controls ..... CHECKED
8. Circuit breakers ..... CHECKED
9. L & R BATT switches ..... ON simultaneously (check 24 volts minimum)
10. EMER BATT switch ..... EMER
11. NAV light switch ..... AS REQUIRED
12. Parking brake ..... SET
13. GPU (if used) ..... CONNECTED
14. Transponder ..... STBY
15. FMS ..... ON / CHECKED / INITIALISED
16. LTS ..... TESTED
17. DU & REVERSION panels ..... NORM
18. EICAS ..... CHECKED
19. L & R PROBES switches ..... OFF
20. L & R WSHLD switches ..... OFF
21. PACK switch ..... OFF
22. LDG ALT selector ..... SET (for landing field elevation)
23. Master CAUT ..... INHIBIT
24. Standby instruments ..... UNCAGED / CHECKED
25. Throttles ..... CUTOFF
26. ENG SYNC switch ..... OFF
27. Other cockpit switches, buttons and handles ..... CHECKED / SET

## BEFORE START

1. Parking brake ..... VERIFIED SET
2. Wheel chocks ..... REMOVED
3. Cabin door ..... CLOSED / LATCHED
4. Passenger briefing ..... COMPLETED
5. Seats / belts / harnesses / pedals ..... ADJUSTED / SECURED
6. Aft divider door ..... LATCHED OPEN
7. EMER LIGHTS switch ..... ON / CHECKED / ARM
8. NO SMOKING BELTS switch ..... ON
9. BCN / STROBE switch ..... BCN

## BEFORE TAXI

1. GPU (if applicable) ..... DISCONNECTED
2. L & R AV MSTR switches ..... ON
3. SYSTEM TEST panel ..... TESTED
4. Trim system ..... CHECKED
5. Altimeters ..... SET
6. PACK switch ..... ON
7. Electrical system ..... CHECKED
8. Flight controls / rudder boost ..... CHECKED
9. Anti-ice systems (if required) ..... CHECKED / SET
10. Bleed air system (first flight of day)..... ..... CHECKED
11. Emergency pressurisation system ..... CHECKED
12. Take-off data .....SET / CONFIRMED
13. Manual mode governor ..... CHECKED
14. L & R WSHLD switches ..... ON
15. SPOILER lever .....EXT / CHECKED /ARM
16. ATIS / clearance / FMS ..... CHECKED / SET
17. EFB ..... SET ACCORDING CLEARANCE
18. Flight ID ..... CHEKED / SET
19. EICAS ..... CHECKED
20. NOSE STEER switch ..... ON
21. B-ACUM pressure ..... 2610-3600 psi

***READY FOR TAXI***

22. Cabin ..... READY
23. Transponder .....ATC ON
24. LDG-TAXI light switches ..... TAXI

## BEFORE TAKE-OFF

1. Brakes & nose wheel steering ..... CHECKED
2. Thrust reversers (if required) ..... CHECKED
3. Engine instruments & N1 bugs ..... CHECKED
4. Flaps ..... SET FOR TAKE-OFF
5. Trims (3) ..... SET FOR TAKE-OFF
6. HI FLOW switch..... OFF
7. WING / STAB and L & R NAC buttons ..... AS REQUIRED
8. WX radar..... AS REQUIRED
9. Take-off data ..... CHECKED
10. Take-off briefing ..... COMPLETED
11. EFB Jeppesen screen lock ..... ENGAGED
12. RECOG light switch .....ON (when entering the runway)
13. BCN / STROBE switch ..... STROBE (when entering the runway)
14. Transponder / TCAS .....TA/RA (when entering the runway)
15. QFU and RWY elevation ..... CHECKED (when aligned on the runway)

*** CLEARED FOR TAKE-OFF ***

15. L & R PROBES switches..... ON
16. LDG-TAXI light switches ..... LDG
17. AUX HYD switch ..... ON
18. APR switch ..... ARM
19. EICAS / SUMRY or FLT page ..... CHECKED / DISPLAYED

## AFTER TAKE-OFF

1. Landing gear ..... UP
2. Flaps ..... UP
3. Throttles ..... AS REQUIRED
4. Yaw damper / autopilot ..... AS REQUIRED
5. L & R IGN ..... OFF
6. SPOILER lever ..... RET
7. Anti-ice systems ..... AS REQUIRED
8. Pressurisation ..... CHECKED
9. Altimeters ..... CHECKED
10. LDG-TAXI light switches ..... OFF
11. APR switch ..... OFF
12. EICAS ..... CHECKED

## PASSING FL100 / 10.000 ft

1. RECOG light switch ..... OFF
2. NO SMOKING BELTS switch ..... AS REQUIRED

## CRUISE

1. Engine instruments ..... CHECKED
2. Pressurisation ..... CHECKED
3. Anti-ice systems ..... AS REQUIRED
4. Fuel quantity / balance ..... CHECKED
5. EICAS ..... CHECKED

## DESCENT

1. LDG ALT selector ..... SET (for landing field elevation)
2. Anti-ice systems ..... AS REQUIRED
3. ATIS / clearance / FMS ..... CHECKED / SET
4. EFB ..... SET ACCORDING CLEARANCE
5. Avionics / flight instruments ..... SET / CHECKED
6. Fuel quantity / balance ..... CHECKED
7. Landing data ..... SET / CONFIRMED
8. Cabin ..... READY
9. NO SMOKING BELTS switch ..... ON
10. Seats / belts / harnesses / pedals ..... ADJUSTED / SECURED
11. Approach, landing and go-around briefing ..... COMPLETED
12. RECOG light switch ..... ON

## APPROACH

1. Altimeters ..... SET / CHECKED
2. EFB Jeppesen screen lock ..... ENGAGED
3. FUEL XFLOW switch ..... CLOSED
4. ENG SYNC switch ..... OFF

## BEFORE LANDING

1. SPOILER lever ..... ARM
2. Flaps ..... AS REQUIRED
3. AUX HYD switch ..... ON
4. Landing gear handle ..... DN / 3 GREENS
5. Anti-ice systems ..... AS REQUIRED
6. G/A altitude ..... SET
7. EICAS / SUMRY or FLT page ..... CHECKED / DISPLAYED
8. LDG-TAXI light switches ..... LDG (when cleared to land)

## AFTER LANDING

1. L & R PROBES switches..... OFF
2. LDG-TAXI light switches ..... TAXI
3. BCN / STROBE switch ..... BCN
4. RECOG light switch ..... OFF
5. B-ACUM pressure ..... CHECKED
6. AUX HYD switch ..... OFF
7. Flaps ..... AS REQUIRED
8. Thrust reversers ..... STOWED
9. SPOILER lever ..... RET
10. Anti-ice systems ..... AS REQUIRED
11. WX radar ..... AS REQUIRED

## SHUTDOWN

1. Parking brake ..... SET
2. Anti-ice systems ..... OFF
3. Standby attitude indicator ..... CAGE
4. L & R AV MSTR switches ..... OFF
5. L & R WSHLD switches ..... OFF
6. EMER LIGHTS switch ..... OFF
7. NOSE STEER switch ..... OFF
8. PACK switch ..... OFF
9. FMS (both) ..... OFF
10. Throttles ..... CUTOFF
11. LDG-TAXI light switches ..... OFF
12. BCN / STROBE switch ..... OFF
13. NO SMOKING BELTS switch ..... OFF
14. EMER BATT switch ..... OFF
15. NAV light switch ..... OFF
16. L & R BATT switches ..... OFF
17. GUST LOCK ..... INSTALLED (unless aircraft will be towed)
18. READY TO TOW / DO NOT TOW card ..... VISIBLE FROM THE OUTSIDE
19. EFB ..... DISCONNECTED / SECURED

## COCKPIT PREPARATION

1. Pre-flight inspection ..... COMPLETED
2. Documents, manuals and equipment ..... SIGNED / CHECKED
3. EFB ..... CHECKED / SET
4. Crew oxygen masks ..... CHECKED / 100 %
5. WX radar ..... STBY
6. ELEV DISC handle & ROLL DISC lever ..... CHECK STOWED
7. Flights controls ..... CHECKED
8. Circuit breakers ..... CHECKED
9. L & R BATT switches ..... ON simultaneously (check 24 volts minimum)
10. EMER BATT switch ..... EMER
11. NAV light switch ..... AS REQUIRED
12. Parking brake ..... SET
13. APU ..... STARTED
14. Transponder ..... STBY
15. FMS ..... ON / CHECKED / INITIALISED
16. LTS ..... TESTED
17. DU & REVERSION panels ..... NORM
18. EICAS ..... CHECKED
19. L & R PROBES switches ..... OFF
20. L & R WSHLD switches ..... OFF
21. PACK switch ..... OFF
22. LDG ALT selector ..... SET (for landing field elevation)
23. Master CAUT ..... INHIBIT
24. Standby instruments ..... UNCAGED / CHECKED
25. Throttles ..... CUTOFF
26. ENG SYNC switch ..... OFF
27. Other cockpit switches, buttons and handles ..... CHECKED / SET

## BEFORE START

1. Parking brake ..... VERIFIED SET
2. Wheel chocks ..... REMOVED
3. Cabin door ..... CLOSED / LATCHED
4. Passenger briefing ..... COMPLETED
5. Seats / belts / harnesses / pedals ..... ADJUSTED / SECURED
6. Aft divider door ..... LATCHED OPEN
7. EMER LIGHTS switch ..... ON / CHECKED / ARM
8. NO SMOKING BELTS switch ..... ON
9. BCN / STROBE switch ..... BCN

## BEFORE TAXI

1. L & R AV MSTR switches ..... ON
2. SYSTEM TEST panel ..... TESTED
3. Trim system ..... CHECKED
4. Altimeters ..... SET
5. PACK switch ..... ON
6. Electrical system ..... CHECKED
7. Flight controls / rudder boost ..... CHECKED
8. Anti-ice systems (if required) ..... CHECKED / SET
9. Bleed air system ..... CHECKED
10. Emergency pressurisation system ..... CHECKED
11. Take-off data .....SET / CONFIRMED
12. Manual mode governor ..... CHECKED
13. L & R WSHLD switches ..... ON
14. SPOILER lever .....EXT / CHECKED /ARM
15. ATIS / clearance / FMS ..... CHECKED / SET
16. EFB ..... SET ACCORDING CLEARANCE
17. Flight ID ..... CHEKED / SET
18. EICAS ..... CHECKED
19. NOSE STEER switch ..... ON
20. B-ACUM pressure ..... 2610-3600 psi
21. APU ..... SHUTDOWN

***READY FOR TAXI***

22. Cabin ..... READY
23. Transponder ..... ATC ON
24. LDG-TAXI light switches ..... TAXI

## BEFORE TAKE-OFF

1. Brakes & nose wheel steering ..... CHECKED
2. Thrust reversers (if required) ..... CHECKED
3. Engine instruments & N1 bugs ..... CHECKED
4. Flaps ..... SET FOR TAKE-OFF
5. Trims (3) ..... SET FOR TAKE-OFF
6. HI FLOW switch..... OFF
7. WING / STAB and L & R NAC buttons ..... AS REQUIRED
8. WX radar..... AS REQUIRED
9. APU master ..... OFF
10. Take-off data ..... CHECKED
11. Take-off briefing ..... COMPLETED
12. EFB Jeppesen screen lock ..... ENGAGED
13. RECOG light switch .....ON (when entering the runway)
14. BCN / STROBE switch ..... STROBE (when entering the runway)
15. Transponder / TCAS ..... TA/RA (when entering the runway)
16. QFU and RWY elevation ..... CHECKED (when aligned on the runway)

*** CLEARED FOR TAKE-OFF ***

16. L & R PROBES switches..... ON
17. LDG-TAXI light switches ..... LDG
18. AUX HYD switch ..... ON
19. APR switch ..... ARM
20. EICAS / SUMRY or FLT page ..... CHECKED / DISPLAYED

## AFTER TAKE-OFF

1. Landing gear ..... UP
2. Flaps ..... UP
3. Throttles ..... AS REQUIRED
4. Yaw damper / autopilot ..... AS REQUIRED
5. L & R IGN ..... OFF
6. SPOILER lever ..... RET
7. Anti-ice systems ..... AS REQUIRED
8. Pressurisation ..... CHECKED
9. Altimeters ..... CHECKED
10. LDG-TAXI light switches ..... OFF
11. APR switch ..... OFF
12. EICAS ..... CHECKED

## PASSING FL100 / 10.000 ft

1. RECOG light switch ..... OFF
2. NO SMOKING BELTS switch ..... AS REQUIRED

## CRUISE

1. Engine instruments ..... CHECKED
2. Pressurisation ..... CHECKED
3. Anti-ice systems ..... AS REQUIRED
4. Fuel quantity / balance ..... CHECKED
5. EICAS ..... CHECKED

## DESCENT

1. LDG ALT selector ..... SET (for landing field elevation)
2. Anti-ice systems ..... AS REQUIRED
3. ATIS / clearance / FMS ..... CHECKED / SET
4. EFB ..... SET ACCORDING CLEARANCE
5. Avionics / flight instruments ..... SET / CHECKED
6. Fuel quantity / balance ..... CHECKED
7. Landing data ..... SET / CONFIRMED
8. Cabin ..... READY
9. NO SMOKING BELTS switch ..... ON
10. Seats / belts / harnesses / pedals ..... ADJUSTED / SECURED
11. Approach, landing and go-around briefing ..... COMPLETED
12. RECOG light switch ..... ON

## APPROACH

1. Altimeters ..... SET / CHECKED
2. EFB Jeppesen screen lock ..... ENGAGED
3. FUEL XFLOW switch ..... CLOSED
4. ENG SYNC switch ..... OFF

## BEFORE LANDING

1. SPOILER lever ..... ARM
2. Flaps ..... AS REQUIRED
3. AUX HYD switch ..... ON
4. Landing gear handle ..... DN / 3 GREENS
5. Anti-ice systems ..... AS REQUIRED
6. G/A altitude ..... SET
7. EICAS / SUMRY or FLT page ..... CHECKED / DISPLAYED
8. LDG-TAXI light switches ..... LDG (when cleared to land)

## AFTER LANDING

1. L & R PROBES switches..... OFF
2. LDG-TAXI light switches ..... TAXI
3. BCN / STROBE switch ..... BCN
4. RECOG light switch ..... OFF
5. B-ACUM pressure ..... CHECKED
6. AUX HYD switch ..... OFF
7. Flaps ..... AS REQUIRED
8. Thrust reversers ..... STOWED
9. SPOILER lever ..... RET
10. Anti-ice systems ..... AS REQUIRED
11. WX radar ..... AS REQUIRED
12. APU ..... AS REQUIRED

## SHUTDOWN

1. Parking brake ..... SET
2. Anti-ice systems ..... OFF
3. Standby attitude indicator ..... CAGE
4. L & R AV MSTR switches ..... OFF
5. L & R WSHLD switches ..... OFF
6. EMER LIGHTS switch ..... OFF
7. NOSE STEER switch ..... OFF
8. PACK switch ..... OFF
9. FMS (both) ..... OFF
10. Throttles ..... CUTOFF
11. LDG-TAXI light switches ..... OFF
12. BCN / STROBE switch ..... OFF
13. NO SMOKING BELTS switch ..... OFF
14. APU ..... SHUTDOWN / 30 SEC / MASTER OFF
15. EMER BATT switch ..... OFF
16. NAV light switch ..... OFF
17. L & R BATT switches ..... OFF
18. GUST LOCK ..... INSTALLED (unless aircraft will be towed)
19. READY TO TOW / DO NOT TOW card ..... VISIBLE FROM THE OUTSIDE
20. EFB ..... DISCONNECTED / SECURED

## ANNEX 2 : SUPPLEMENTARY COMPANY CHECKLIST LJ45

TAKE-OFF BRIEFING ..... 2
APPROACH, LANDING AND GO-AROUND BRIEFING ..... 3
EFB PROCEDURES ..... 4
RNAV 10 NAT HLA MNPS OPERATION ..... 4
RVSM OPERATION ..... 4
RNAV 5 OPERATION ..... 5
RNAV 1 / RNP 1 OPERATION ..... 5
RNP APCH OPERATION ..... 5
ADS-B OPERATION ..... 5

BATTERY / PED CHECKLIST ..... 6
EMERGENCY CABIN PREPARATION CHECKLIST ..... 6
SERIOUS INCIDENT / ACCIDENT 'MANIFEST' CHECKLIST ..... 7

LIGHTNING STRIKE ..... 8

## TAKE-OFF BRIEFING

*Required items to be covered*

1. ATIS, NOTAM's and weather;
2. MEL and DDL items affecting performance;
3. Receiver autonomous integrity monitoring (RAIM) availability (if required);
4. Take-off and landing dispatch conditions;
5. Take-off alternates (if weather required) including return procedures depending on the weather (i.e. VMC or IMC) and aircraft performance (e.g. maximum landing mass) in case of an occurrence after $V_1$ including occurrences other than an engine failure;
6. Mass and balance;
7. Runway conditions and wind;
8. Take-off data including gross error check;
9. Noise abatement procedure NADP 1 "Noise one" or NADP2 "Noise two";
10. SID;
11. Engine failure procedures, including engine failure flap retraction altitude (EFFRA) and minimum sector altitude (MSA);
12. Navigation aid setup;
13. Rejected take-off procedures;
14. Taxi routing;
15. Use of EFB;
16. 'TWO-C' threats.

## APPROACH, LANDING AND GO-AROUND BRIEFING

*Required items to be covered*

1. Aircraft status;
2. Fuel status;
3. ATIS and weather;
4. NOTAM's;
5. Receiver autonomous integrity monitoring (RAIM) availability (if required);
6. Landing distance at time of arrival (LDTA);
7. Top of descent;
8. Appropriate aerodrome charts;
9. Use of automation;
10. Use of aircraft systems;
11. Landing and stopping;
12. Taxi to gate or stand;
13. Go-around;
14. Alternate;
15. Use of EFB;
16. 'TWO-C' threats.

## EFB PROCEDURES

### COCKPIT PREPARATION

1. Status EFB's ..... CHECKED / CLEANED
2. Status accessories ..... CHECKED
3. Screen brightness ..... AS DESIRED
4. Status EFB battery ..... CHECKED
5. Software and applications ..... UPDATED
6. Operational documents ..... RETREIVED
7. Moving map & ownship position ..... OFF
8. Airplane mode ..... ENGAGED
   a. Cellular mode..... OFF
   b. Wi-Fi mode ..... OFF
   c. Bluetooth mode ..... OFF

### BEFORE TAKE-OFF

1. Jeppesen screen lock ..... ENGAGED

### APPROACH

1. Jeppesen screen lock ..... ENGAGED

### SHUTDOWN

1. EFB power cables ..... DISCONNECTED

## RNAV 10 NAT HLA MNPS OPERATION

*Refer to MEL for more details*

1. AHRS ..... 2
2. FMS ..... 2
3. FMS current navigation database ..... 1
4. GPS ..... 2
5. HF ..... 1
6. TCAS II ..... 1

## RVSM OPERATION

*Refer to MEL for more details*

1. ADC including primary altimeter indication ..... 2
2. ATC transponder ..... 1
3. Autopilot with altitude (ALT) hold ..... 1
4. Altitude alerting system ..... 1
5. Pitot-static probe heater ..... 2

## RNAV 5 OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. VOR ..... 1
4. DME ..... 1
5. AHRS ..... 2
6. GPS ..... 1
7. Autopilot in LNAV mode (PF) ..... 1
8. Flight director in LNAV mode (PF) ..... 1
9. Lateral deviation display mode (PF) ..... 1
10. ADC including primary altimeter indication ..... 2

## RNAV 1 / RNP 1 OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. VOR ..... 1
4. DME ..... 1
5. AHRS ..... 2
6. GPS ..... 1
7. Autopilot in LNAV mode (PF) ..... 1
8. Flight director in LNAV mode (PF) ..... 1
9. Lateral deviation display mode (PF) ..... 1
10. ADC including primary altimeter indication ..... 2

## RNP APCH OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. AHRS ..... 2
4. GPS ..... 1
5. Autopilot in LNAV mode (PF) ..... 1
6. Flight director in LNAV mode (PF) ..... 1
7. Lateral deviation display mode (PF) ..... 1
8. ADC including primary altimeter indication ..... 2
9. TAWS ..... 1

## ADS-B OPERATION

*Refer to MEL for more details*

1. GPS ..... 1
2. ATC transponder Mode S with ADS-B ..... 1

## BATTERY / PED CHECKLIST

*Refer to Part A and B for more details*

### DAMAGED / CRUSHED (NO FIRE / SMOKE)

1. Item ..... IDENTIFY
2. Electrical power ..... REMOVE
3. Thermal runaway ..... NO RISK
4. Item ..... STOW IN FIRESOCK

### FIRE / SMOKE

1. Item ..... IDENTIFY
2. Fire fighting ..... PERFORM
3. Electrical power ..... REMOVE
4. Item ..... DOUSE / COOL
5. Item ..... MONITOR (10 to 15 min)
6. Thermal runaway ..... NO MORE RISK
7. Item ..... STOW IN CONTAINER / FIRESOCK

### THERMAL RUNAWAY COCKPIT (NO FIRE / SMOKE)

1. Item ..... IDENTIFY
2. Electrical power ..... REMOVE
3. Fire / smoke ..... NOT VISIBLE
4. Item ..... STOW IN FIRESOCK
5. Item ..... REMOVE FROM COCKPIT
6. Item ..... DOUSE / COOL

## EMERGENCY CABIN PREPARATION CHECKLIST

*Refer to Part B for more details*

### STANDARD

1. Passengers ..... INFORMED
2. Exits ..... OBSTACLES REMOVED
3. ABP ..... ADJACENT TO EXITS
4. Emergency equipment ..... ACCESSIBLE
5. FASTEN SEAT BELT SIGN ..... ON
6. Seat belts ..... FASTENED
7. Seat backs ..... UPRIGHT
8. Head rests ..... EXTENDED
9. Tables ..... STOWED
10. Luggage ..... STOWED
11. Personal items ..... REMOVED

### DITCHING EXPECTED

1. Life jackets ..... DISTRIBUTED / DO NOT INFLATE
2. Life rafts ..... READY NEAR OVERWING
3. EMERGENCY LIGHT ..... ON

## SERIOUS INCIDENT / ACCIDENT 'MANIFEST' CHECKLIST

*Refer to Part A for more details*

### MAYDAY

1. Declare an emergency. Acknowledge the seriousness of the situation.

### ABANDON AIRCRAFT

1. Evacuate the aircraft in accordance with AFM and OM procedures.

### NOTIFY AUTHORITIES

1. Inform responding Authorities of passenger and crew injuries and arrange medical treatment.

### ISOLATE

1. With Authority assistance, isolate and secure the scene.

### FIRST AID

1. Render first aid to any injured person. Arrange for medical treatment for passengers and crew whether they appear injured or not.

### EYEWITNESS

1. Observe anyone in the area who may be an eyewitness.

### SILENCE

1. Other than responding to emergency medical treatment inquiries, do not speak to anyone at the scene.

### TEAM

1. Contact the Operational Control Center (OCC) via +31 20 405 66 01.

## LIGHTNING STRIKE

*Refer to Part B for more details*

### AIRCRAFT HIT BY LIGHTNING

1. Circuit breakers ..... CHECK ALL IN
2. Compass & heading ..... NORMAL
3. Engine indications ..... NORMAL
4. Pressurisation ..... NORMAL
5. Flight controls ..... FREE MOVEMENT
6. Fuel system ..... NORMAL / NO LEAKS
7. EFB system ..... NORMAL
8. All other systems ..... NORMAL

TAKE-OFF BRIEFING ..... 2
APPROACH, LANDING AND GO-AROUND BRIEFING ..... 3
EFB PROCEDURES ..... 4
RNAV 10 NAT HLA MNPS OPERATION ..... 4
RVSM OPERATION ..... 4
RNAV 5 OPERATION ..... 5
RNAV 1 / RNP 1 OPERATION ..... 5
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BATTERY / PED CHECKLIST ..... 6
DE-ACTIVATION OF PLUS OXYGEN SYSTEM ..... 6
ELECTRICALLY ISOLATING THE PATIENT LOADING AND UTILITY SYSTEM (PLUS) ..... 6
EMERGENCY CABIN PREPARATION CHECKLIST ..... 7
SERIOUS INCIDENT / ACCIDENT 'MANIFEST' CHECKLIST ..... 8

LIGHTNING STRIKE ..... 9

## TAKE-OFF BRIEFING

*Required items to be covered*

1. ATIS, NOTAM's and weather;
2. MEL and DDL items affecting performance;
3. Receiver autonomous integrity monitoring (RAIM) availability (if required);
4. Take-off and landing dispatch conditions;
5. Take-off alternates (if weather required) including return procedures depending on the weather (i.e. VMC or IMC) and aircraft performance (e.g. maximum landing mass) in case of an occurrence after $V_1$ including occurrences other than an engine failure;
6. Mass and balance;
7. Runway conditions and wind;
8. Take-off data including gross error check;
9. Noise abatement procedure NADP 1 "Noise one" or NADP2 "Noise two";
10. SID;
11. Engine failure procedures, including engine failure flap retraction altitude (EFFRA) and minimum sector altitude (MSA);
12. Navigation aid setup;
13. Rejected take-off procedures;
14. Taxi routing;
15. Use of EFB;
16. 'TWO-C' threats.

## APPROACH, LANDING AND GO-AROUND BRIEFING

*Required items to be covered*

1. Aircraft status;
2. Fuel status;
3. ATIS and weather;
4. NOTAM's;
5. Receiver autonomous integrity monitoring (RAIM) availability (if required);
6. Landing distance at time of arrival (LDTA);
7. Top of descent;
8. Appropriate aerodrome charts;
9. Use of automation;
10. Use of aircraft systems;
11. Landing and stopping;
12. Taxi to gate or stand;
13. Go-around;
14. Alternate;
15. Use of EFB;
16. 'TWO-C' threats.

## EFB PROCEDURES

### COCKPIT PREPARATION

1. Status EFB's ..... CHECKED / CLEANED
2. Status accessories ..... CHECKED
3. Screen brightness ..... AS DESIRED
4. Status EFB battery ..... CHECKED
5. Software and applications ..... UPDATED
6. Operational documents ..... RETREIVED
7. Moving map & ownship position ..... OFF
8. Airplane mode ..... ENGAGED
   a. Cellular mode..... OFF
   b. Wi-Fi mode ..... OFF
   c. Bluetooth mode ..... OFF

### BEFORE TAKE-OFF

1. Jeppesen screen lock ..... ENGAGED

### APPROACH

1. Jeppesen screen lock ..... ENGAGED

### SHUTDOWN

1. EFB power cables ..... DISCONNECTED

## RNAV 10 NAT HLA MNPS OPERATION

*Refer to MEL for more details*

1. AHRS ..... 2
2. Flight phone ..... 1
3. SATCOM ..... 1
4. FMS ..... 2
5. FMS current navigation database ..... 1
6. GPS ..... 2
7. HF ..... 1
8. TCAS II ..... 1

## RVSM OPERATION

*Refer to MEL for more details*

1. ADC including primary altimeter indication ..... 2
2. ATC transponder ..... 1
3. Autopilot with altitude (ALT) hold ..... 1
4. Altitude alerting system ..... 1
5. Pitot-static probe heater ..... 2

## RNAV 5 OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. VOR ..... 1
4. DME ..... 1
5. AHRS ..... 2
6. GPS ..... 1
7. Autopilot in LNAV mode (PF) ..... 1
8. Flight director in LNAV mode (PF) ..... 1
9. Lateral deviation display mode (PF) ..... 1
10. ADC including primary altimeter indication ..... 2

## RNAV 1 / RNP 1 OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. VOR ..... 1
4. DME ..... 1
5. AHRS ..... 2
6. GPS ..... 1
7. Autopilot in LNAV mode (PF) ..... 1
8. Flight director in LNAV mode (PF) ..... 1
9. Lateral deviation display mode (PF) ..... 1
10. ADC including primary altimeter indication ..... 2

## RNP APCH OPERATION

*Refer to MEL for more details*

1. FMS ..... 1
2. FMS current navigation database ..... 1
3. AHRS ..... 2
4. GPS ..... 1
5. Autopilot in LNAV mode (PF) ..... 1
6. Flight director in LNAV mode (PF) ..... 1
7. Lateral deviation display mode (PF) ..... 1
8. ADC including primary altimeter indication ..... 2
9. TAWS ..... 1

## ADS-B OPERATION

*Refer to MEL for more details*

1. GPS ..... 1
2. ATC transponder Mode S with ADS-B ..... 1

## BATTERY / PED CHECKLIST

*Refer to Part A and B for more details*

### DAMAGED / CRUSHED (NO FIRE / SMOKE)

1. Item ..... IDENTIFY
2. Electrical power ..... REMOVE
3. Thermal runaway ..... NO RISK
4. Item ..... STOW IN FIRESOCK

### FIRE / SMOKE

1. Item ..... IDENTIFY
2. Fire fighting ..... PERFORM
3. Electrical power ..... REMOVE
4. Item ..... DOUSE / COOL
5. Item ..... MONITOR (10 to 15 min)
6. Thermal runaway ..... NO MORE RISK
7. Item ..... STOW IN CONTAINER / FIRESOCK

### THERMAL RUNAWAY COCKPIT (NO FIRE / SMOKE)

1. Item ..... IDENTIFY
2. Electrical power ..... REMOVE
3. Fire / smoke ..... NOT VISIBLE
4. Item ..... STOW IN FIRESOCK
5. Item ..... REMOVE FROM COCKPIT
6. Item ..... DOUSE / COOL

## DE-ACTIVATION OF PLUS OXYGEN SYSTEM

*Refer to the Patient loading and utility system AFM supplement for more details*

If the oxygen system of the PLUS needs to be de-activated, the bottle valves shall require manual closing by one of the Flight Crew Members.

1. PLUS BOTTLE VALVE ..... CLOSE MANUAL

## ELECTRICALLY ISOLATING THE PATIENT LOADING AND UTILITY SYSTEM (PLUS)

*Refer to the Patient loading and utility system AFM supplement for more details*

To isolate the PLUS, open AC OUTLET 1/2 amp circuit breaker located on the P10 CM2 circuit breaker panel. For load shedding procedures, refer to the applicable procedures in the AFM.

1. AC OUTLET ½ amp circuit breaker ..... PULL

## EMERGENCY CABIN PREPARATION CHECKLIST

*Refer to Part B for more details*

### STANDARD

1. Passengers ..... INFORMED
2. Exits ..... OBSTACLES REMOVED
3. ABP ..... ADJACENT TO EXITS
4. Emergency equipment ..... ACCESSIBLE
5. FASTEN SEAT BELT SIGN ..... ON
6. Seat belts ..... FASTENED
7. Seat backs ..... UPRIGHT
8. Head rests ..... EXTENDED
9. Tables ..... STOWED
10. Luggage ..... STOWED
11. Personal items ..... REMOVED

### DITCHING EXPECTED

1. Life jackets ..... DISTRIBUTED / DO NOT INFLATE
2. Life rafts ..... READY NEAR OVERWING
3. EMERGENCY LIGHT ..... ON

### EVACUATION OF A NON-AMBULATORY PASSENGER

In the event that an emergency evacuation is required, the Attendant as described in the limitations section of the OM Part B, shall be responsible for evacuating the non-ambulatory passenger.

The forward left side cabin door shall be the primary exit. If this exit is used, remove the passenger with the stretcher.

If the emergency exit is to be used, allow for one of the Flight Crew Members to exit first. Without stretcher, evacuate the passenger's legs through the exit first. Lift the upper body from the inside and allow it to slide through the exit. The Flight Crew Member on the exterior shall lower the body to the ground.

1. Attendant of non-ambulatory passenger ..... BRIEF

## SERIOUS INCIDENT / ACCIDENT 'MANIFEST' CHECKLIST

*Refer to Part A for more details*

### MAYDAY

1. Declare an emergency. Acknowledge the seriousness of the situation.

### ABANDON AIRCRAFT

1. Evacuate the aircraft in accordance with AFM and OM procedures.

### NOTIFY AUTHORITIES

1. Inform responding Authorities of passenger and crew injuries and arrange medical treatment.

### ISOLATE

1. With Authority assistance, isolate and secure the scene.

### FIRST AID

1. Render first aid to any injured person. Arrange for medical treatment for passengers and crew whether they appear injured or not.

### EYEWITNESS

1. Observe anyone in the area who may be an eyewitness.

### SILENCE

1. Other than responding to emergency medical treatment inquiries, do not speak to anyone at the scene.

### TEAM

1. Contact the Operational Control Center (OCC) via +31 20 405 66 01.

## LIGHTNING STRIKE

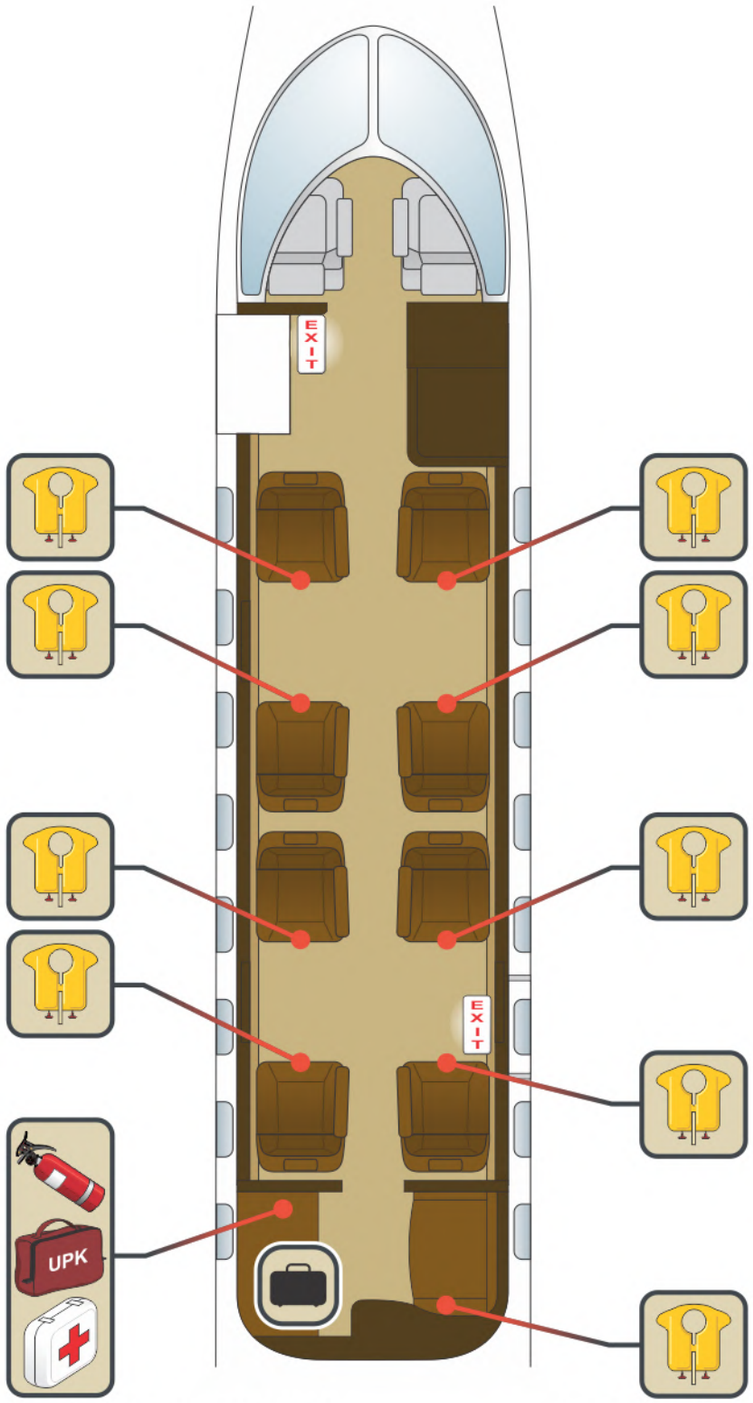
*Refer to Part B for more details*

### AIRCRAFT HIT BY LIGHTNING

1. Circuit breakers ..... CHECK ALL IN
2. Compass & heading ..... NORMAL
3. Engine indications ..... NORMAL
4. Pressurisation ..... NORMAL
5. Flight controls ..... FREE MOVEMENT
6. Fuel system ..... NORMAL / NO LEAKS
7. EFB system ..... NORMAL
8. All other systems ..... NORMAL

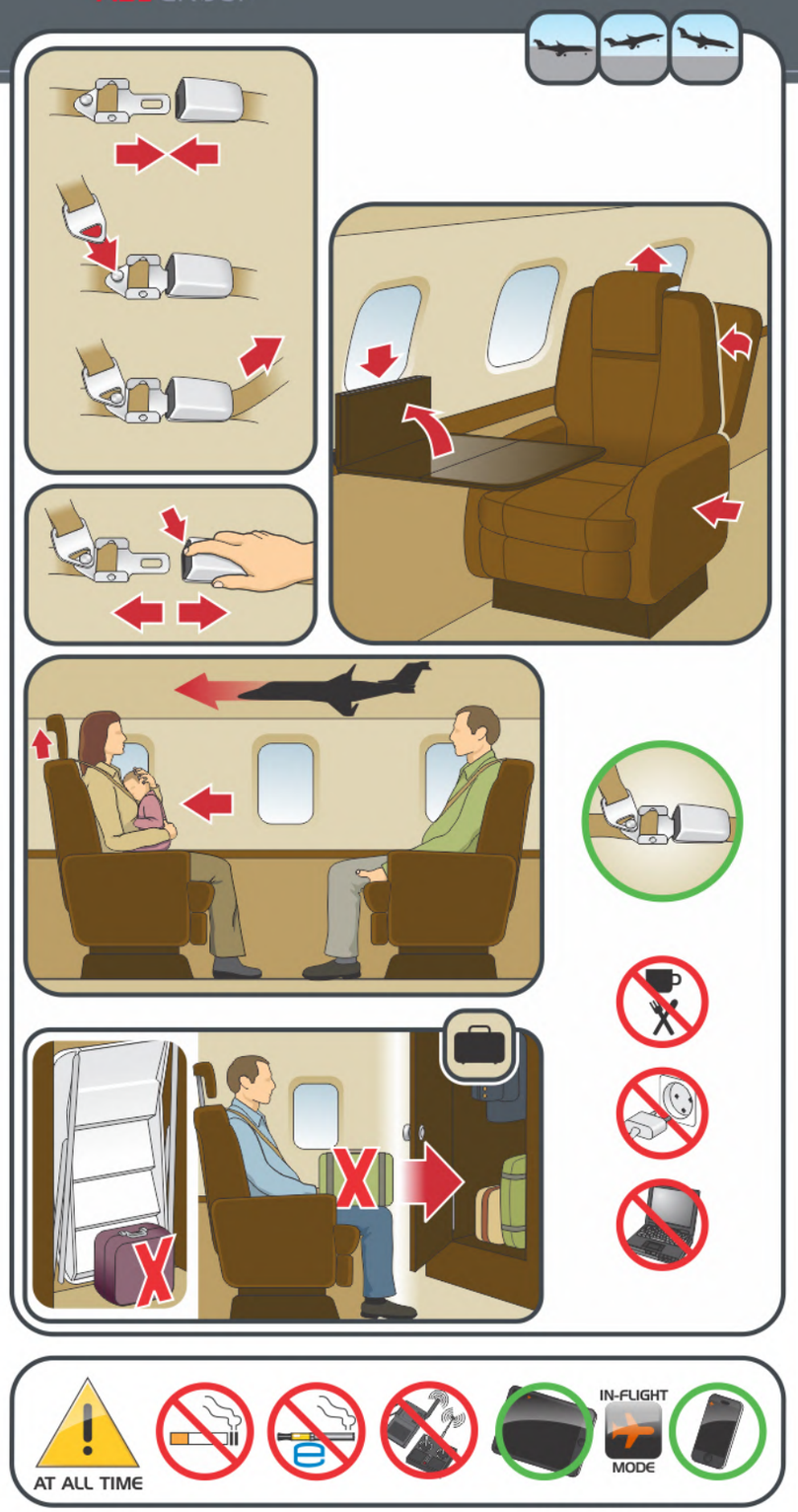
## ANNEX 3 : PASSENGER SAFETY BRIEFING CARD

ASL GROUP




Produced by Aeroglyphes, Montreal, Canada

www.aeroglyphes.com




SIC_LR45_45-167-I

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BOMBARDIER
LEARJET 45

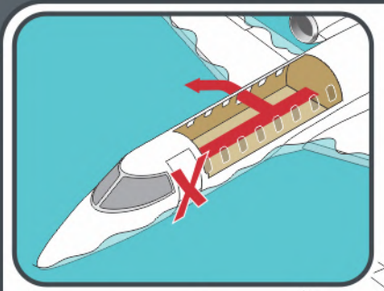
# SAFETY INFORMATION

DO NOT REMOVE FROM AIRCRAFT

ASL n. v. Voogdijstraat 29, 3500 Hasselt, Belgium

Initial Release, July 2021

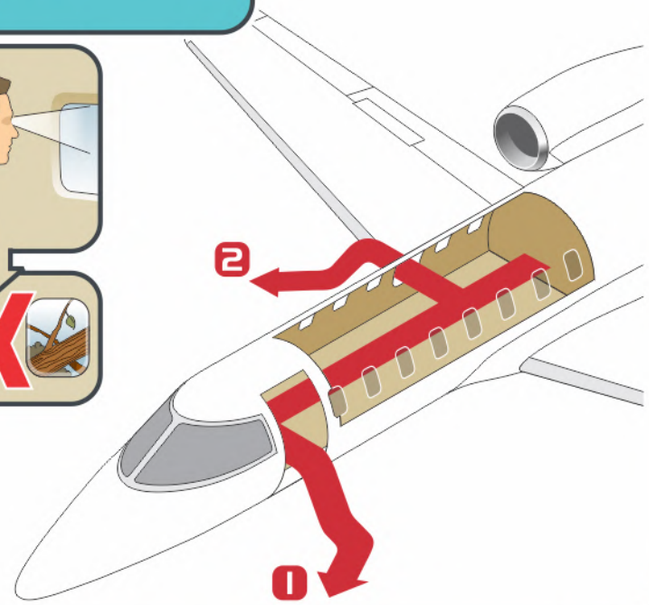
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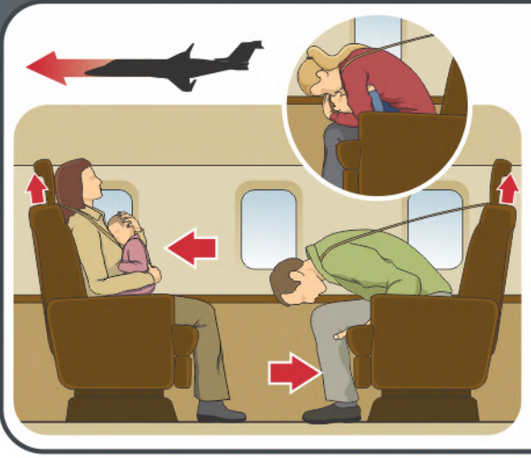




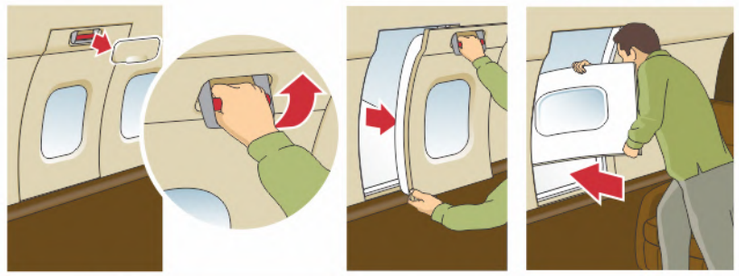




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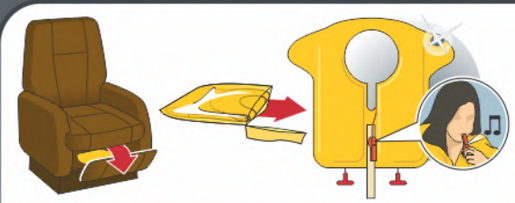


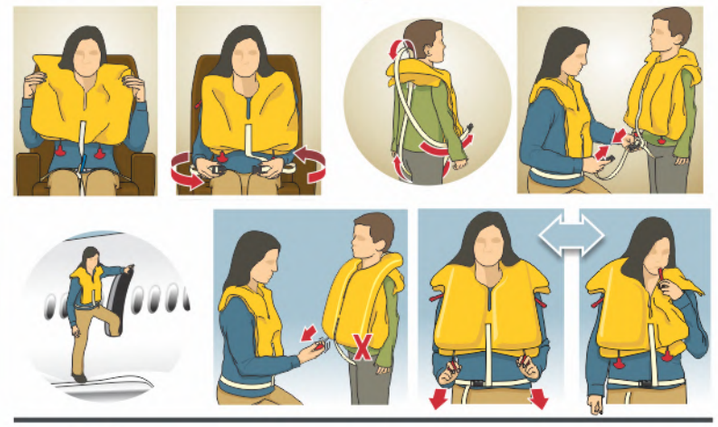


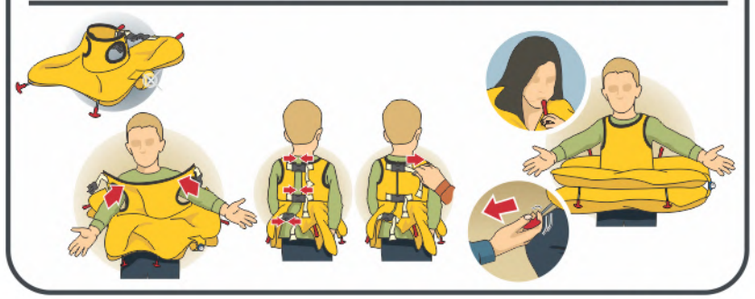




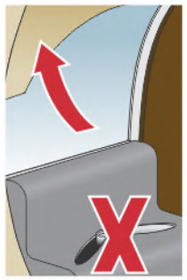
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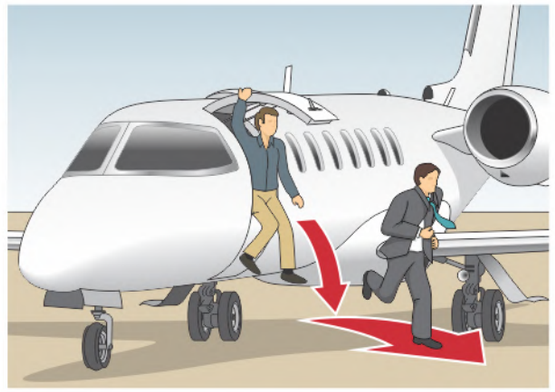


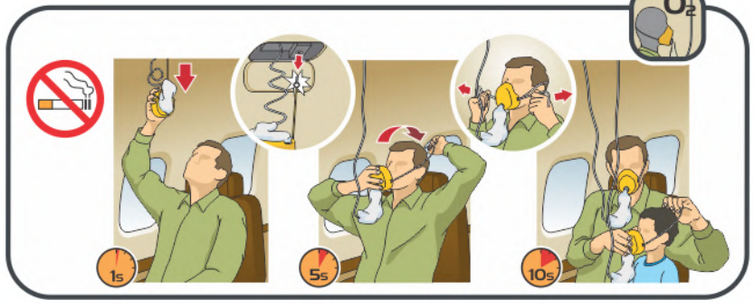


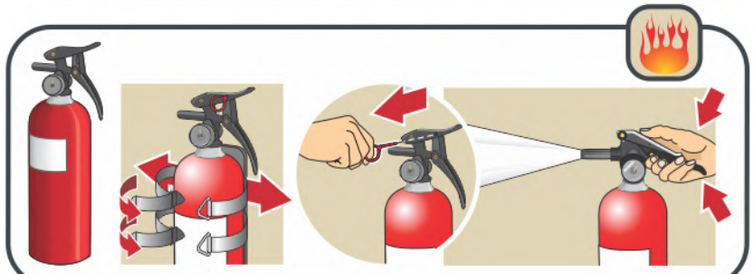




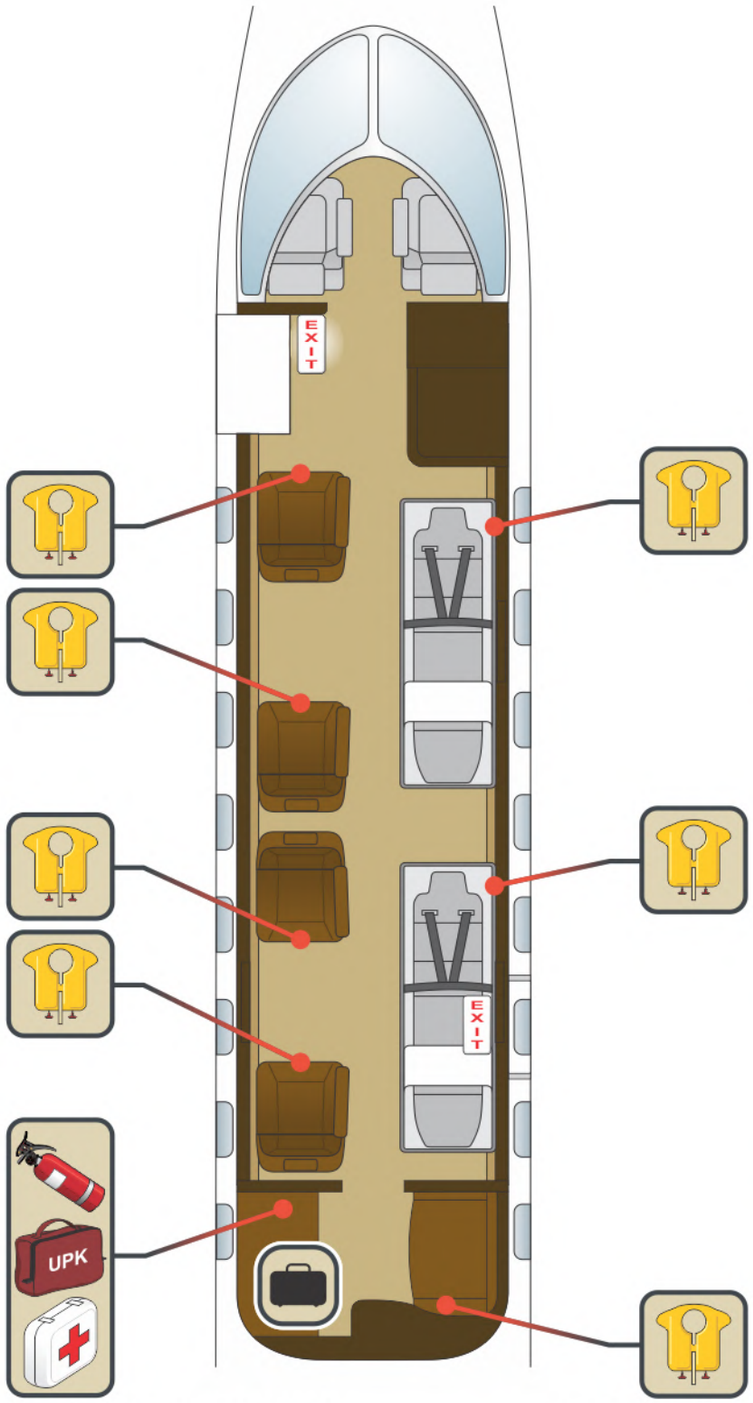


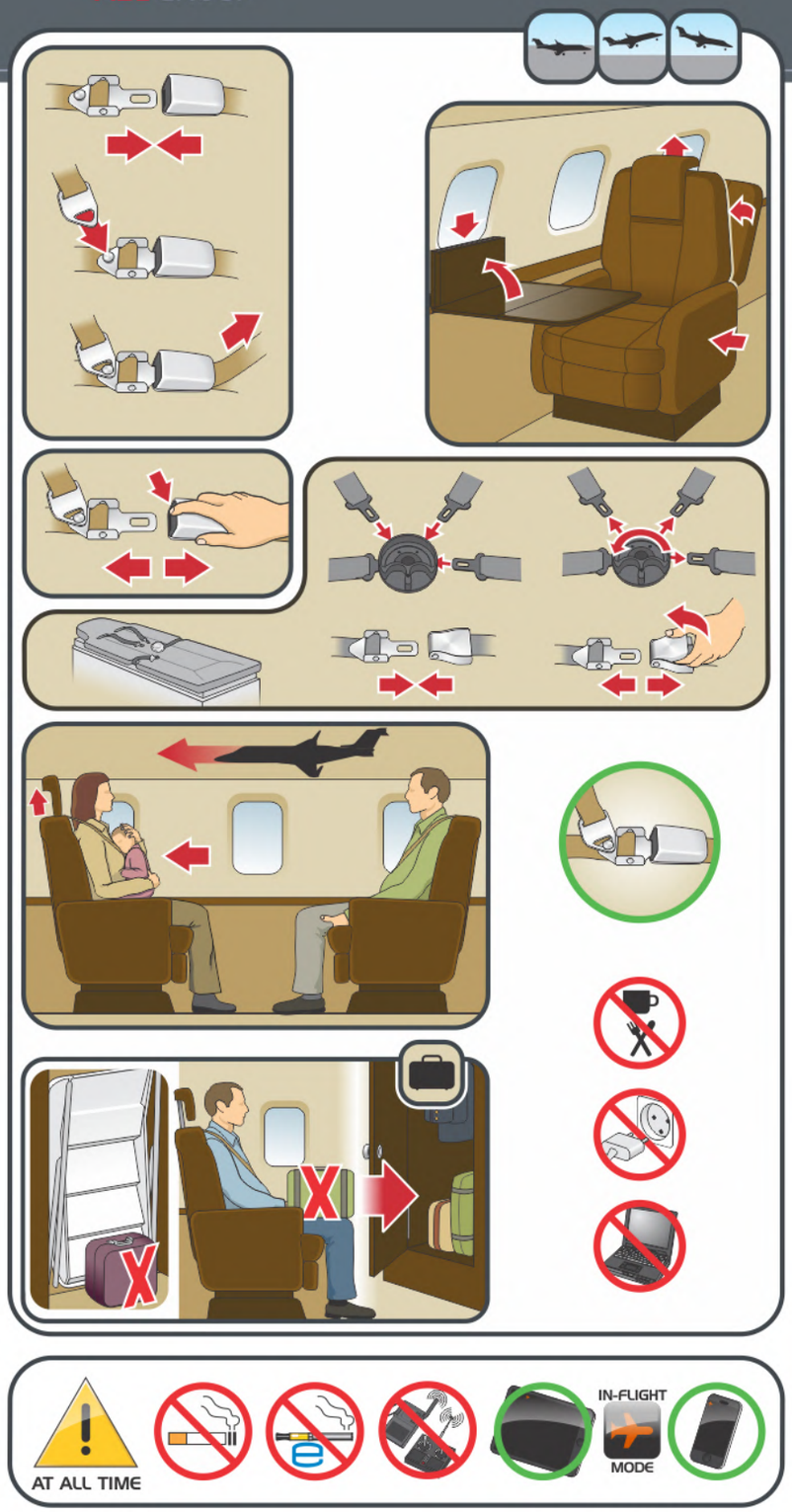






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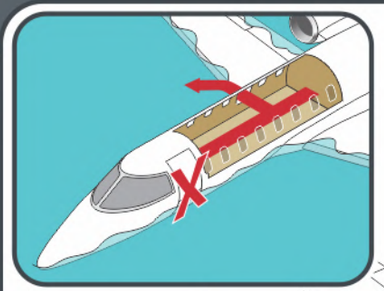
# SAFETY INFORMATION

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ASL n. v. Voogdijstraat 29, 3500 Hasselt, Belgium

Revision A, January 2022

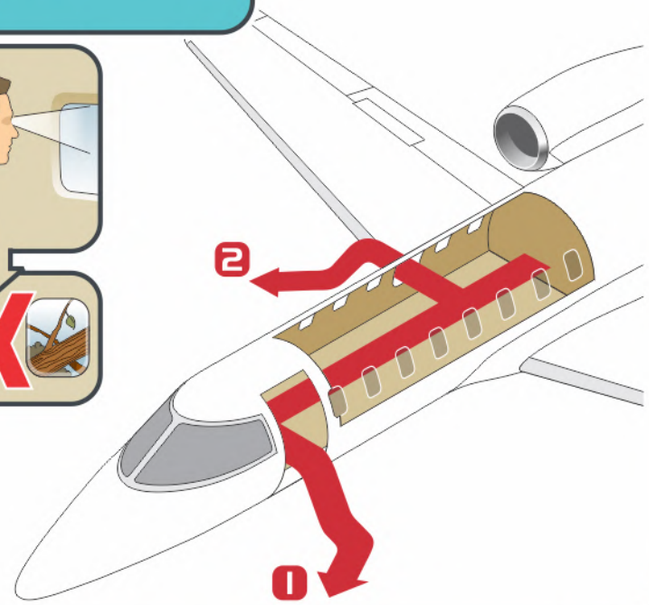
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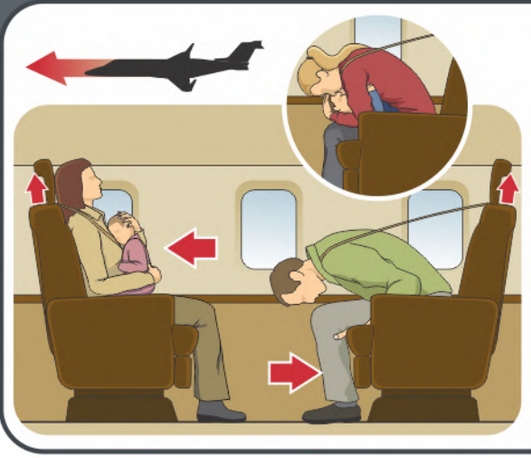




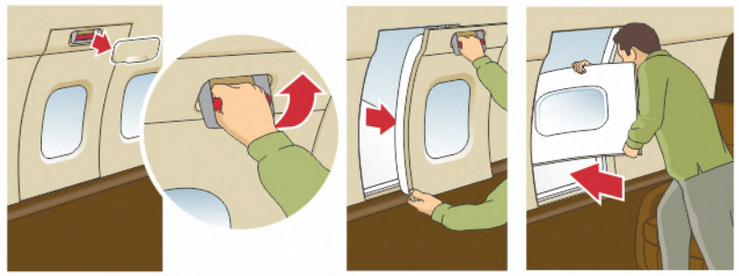




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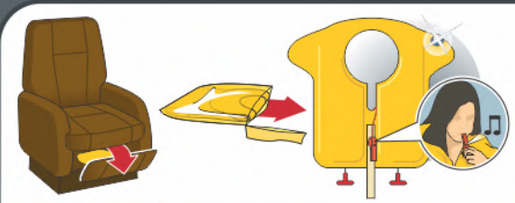


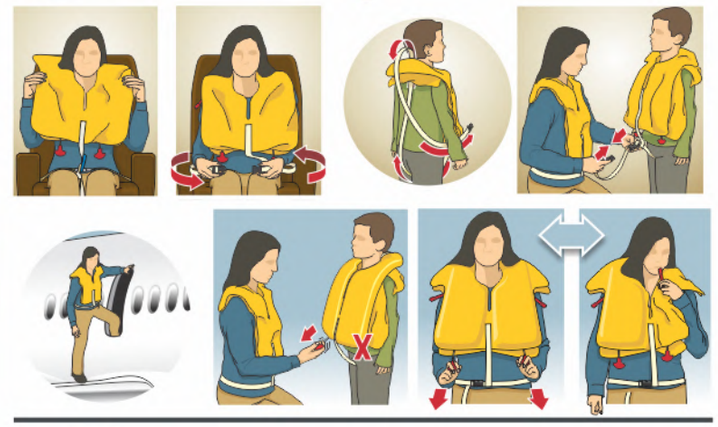


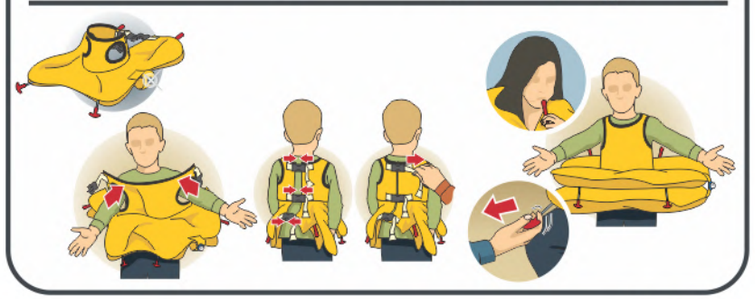




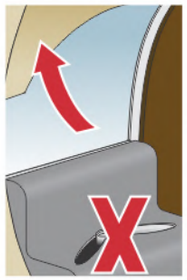
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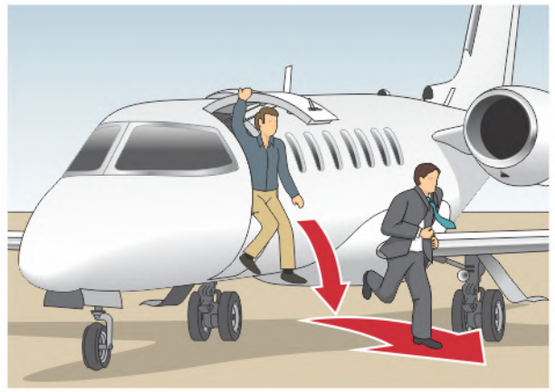


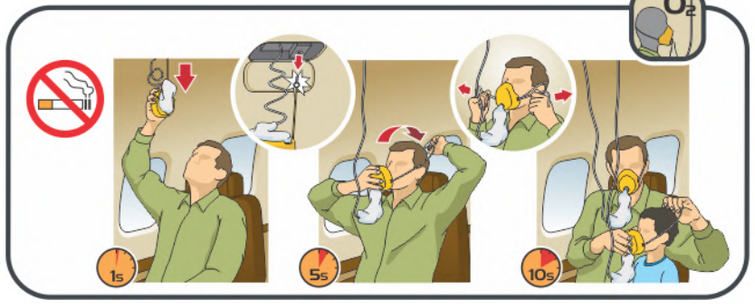


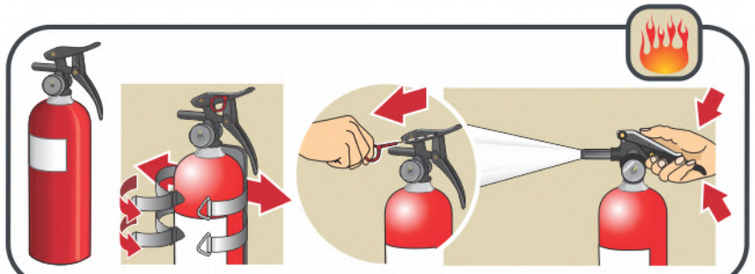




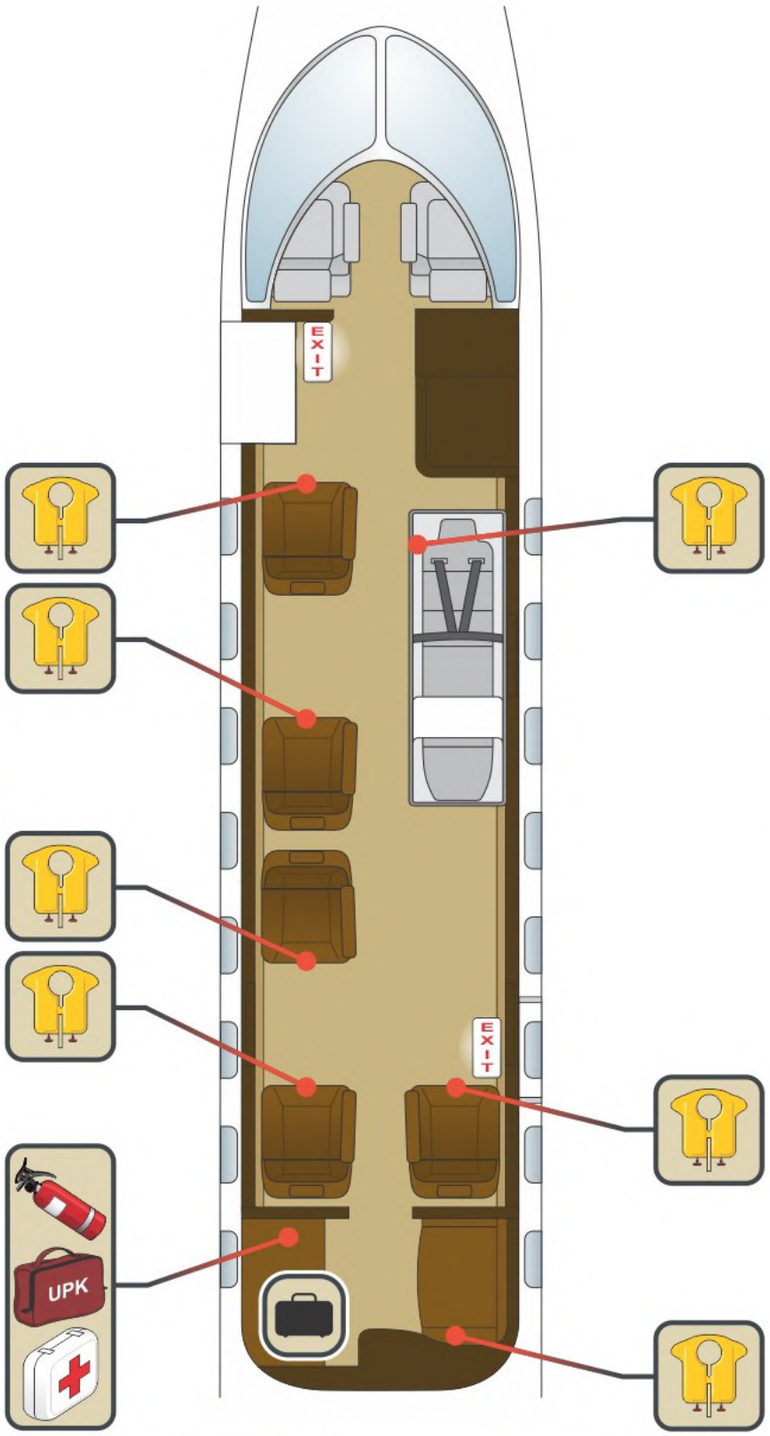








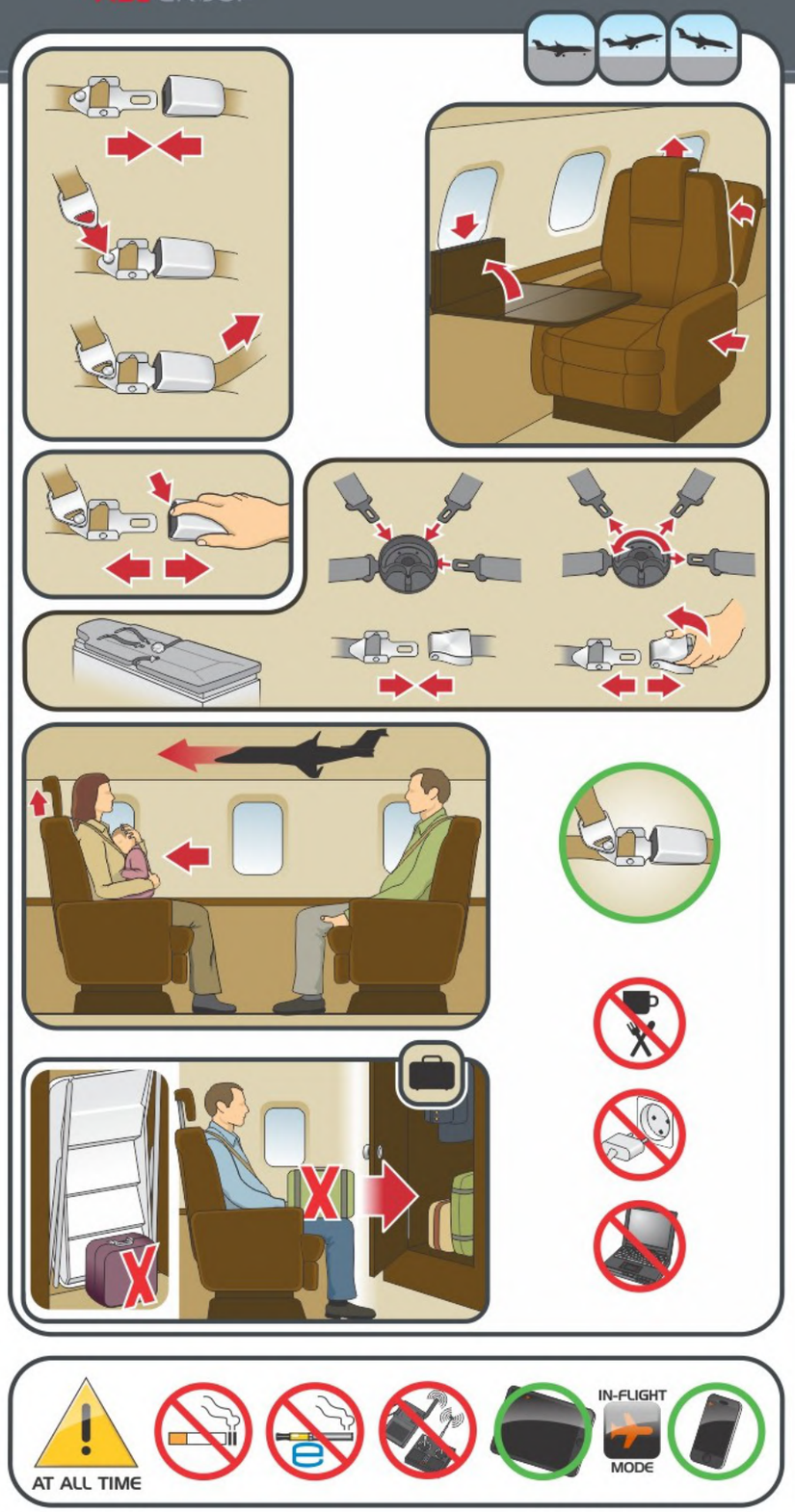
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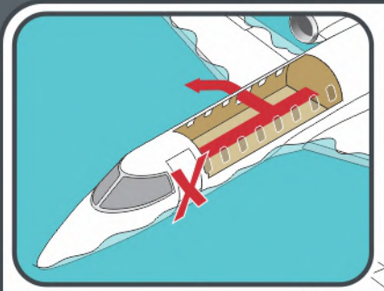
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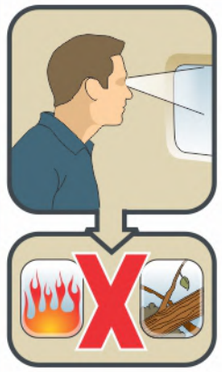
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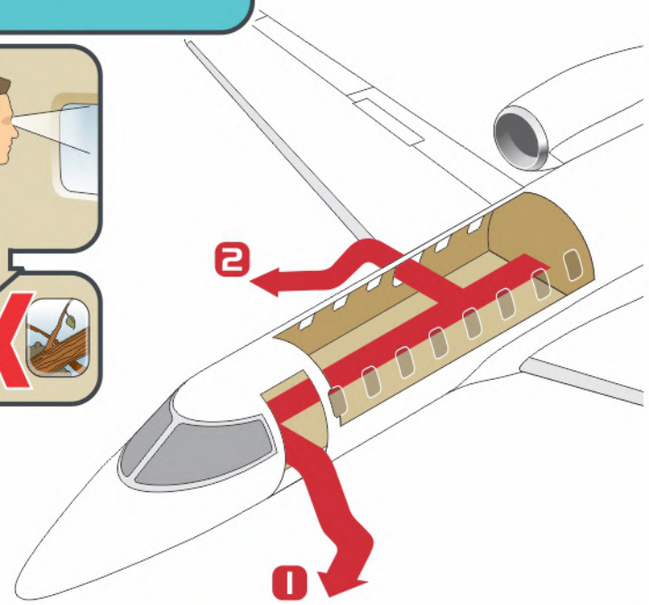
ASL n. v. Voogdijstraat 29, 3500 Hasselt, Belgium

November 2025

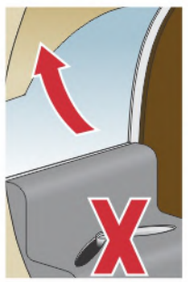
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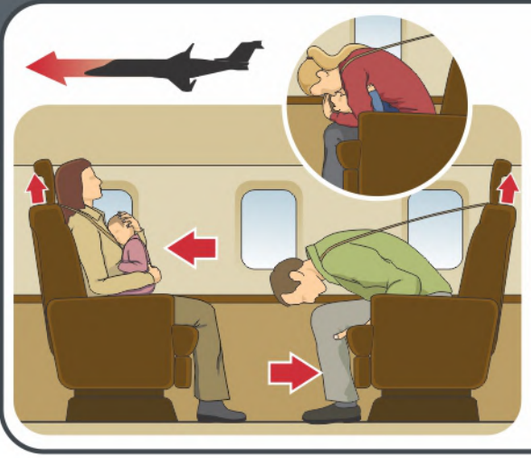




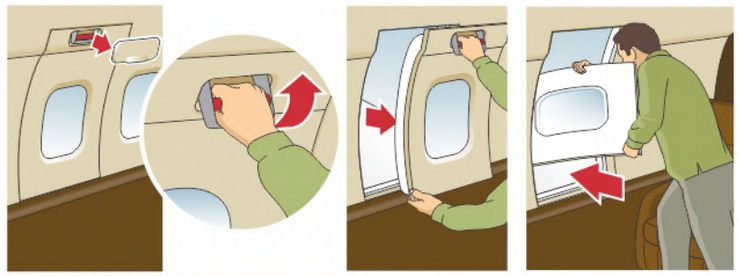





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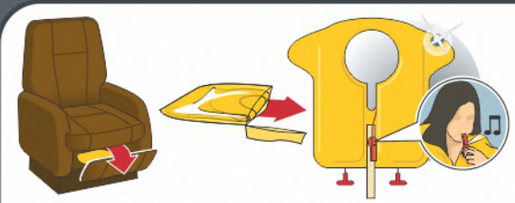


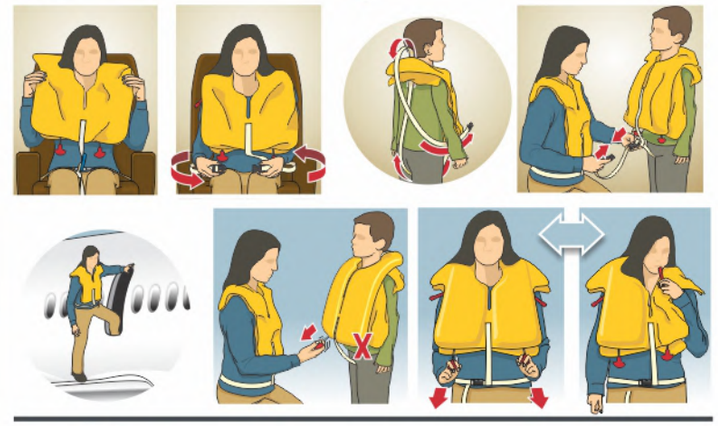


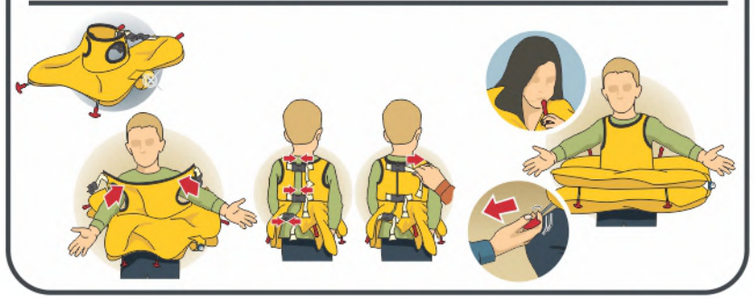


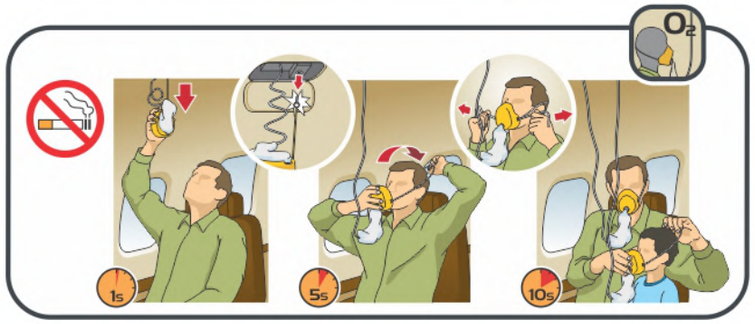


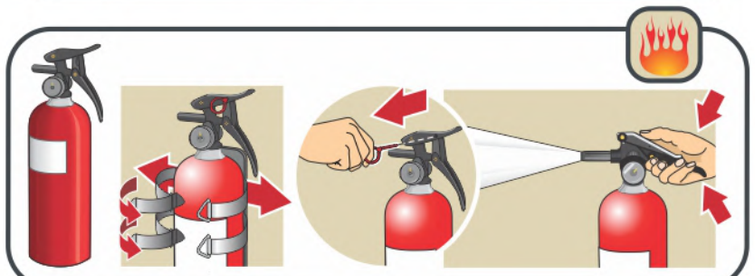

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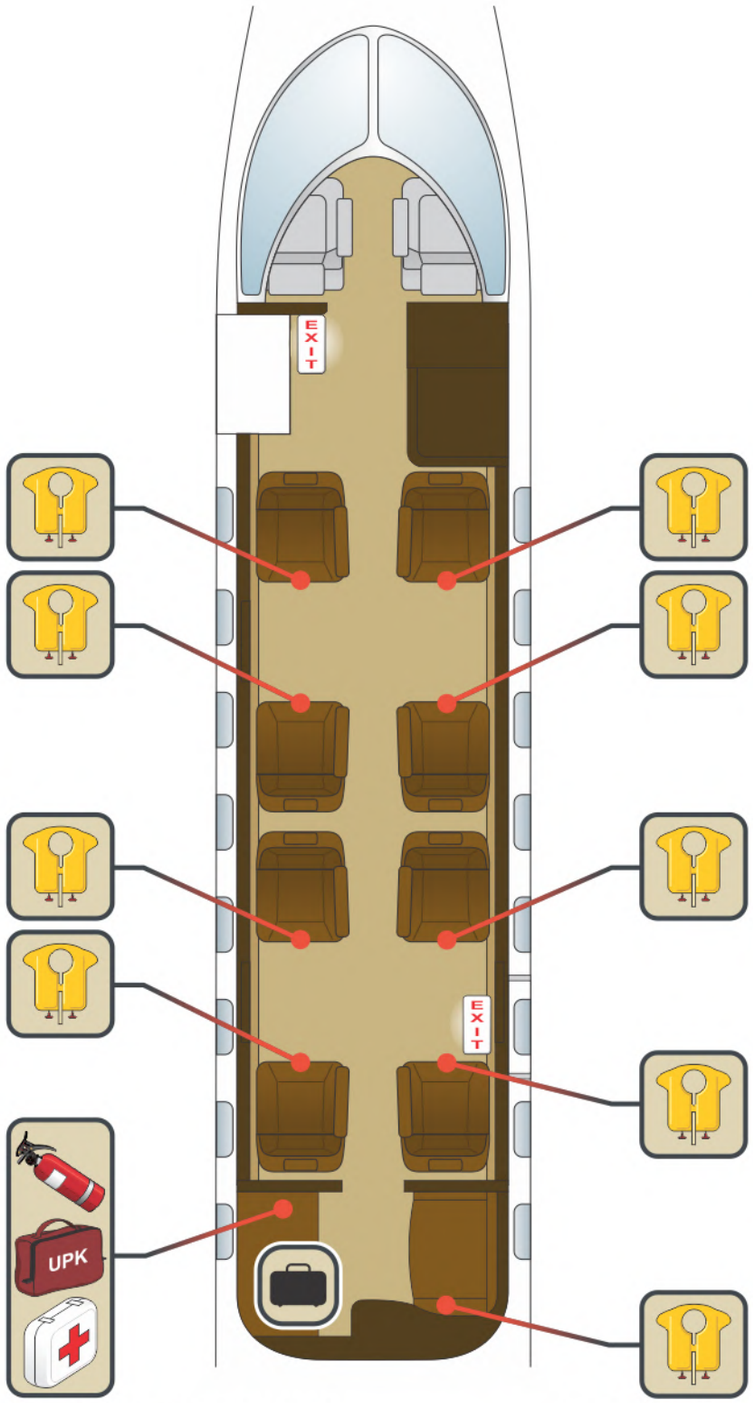






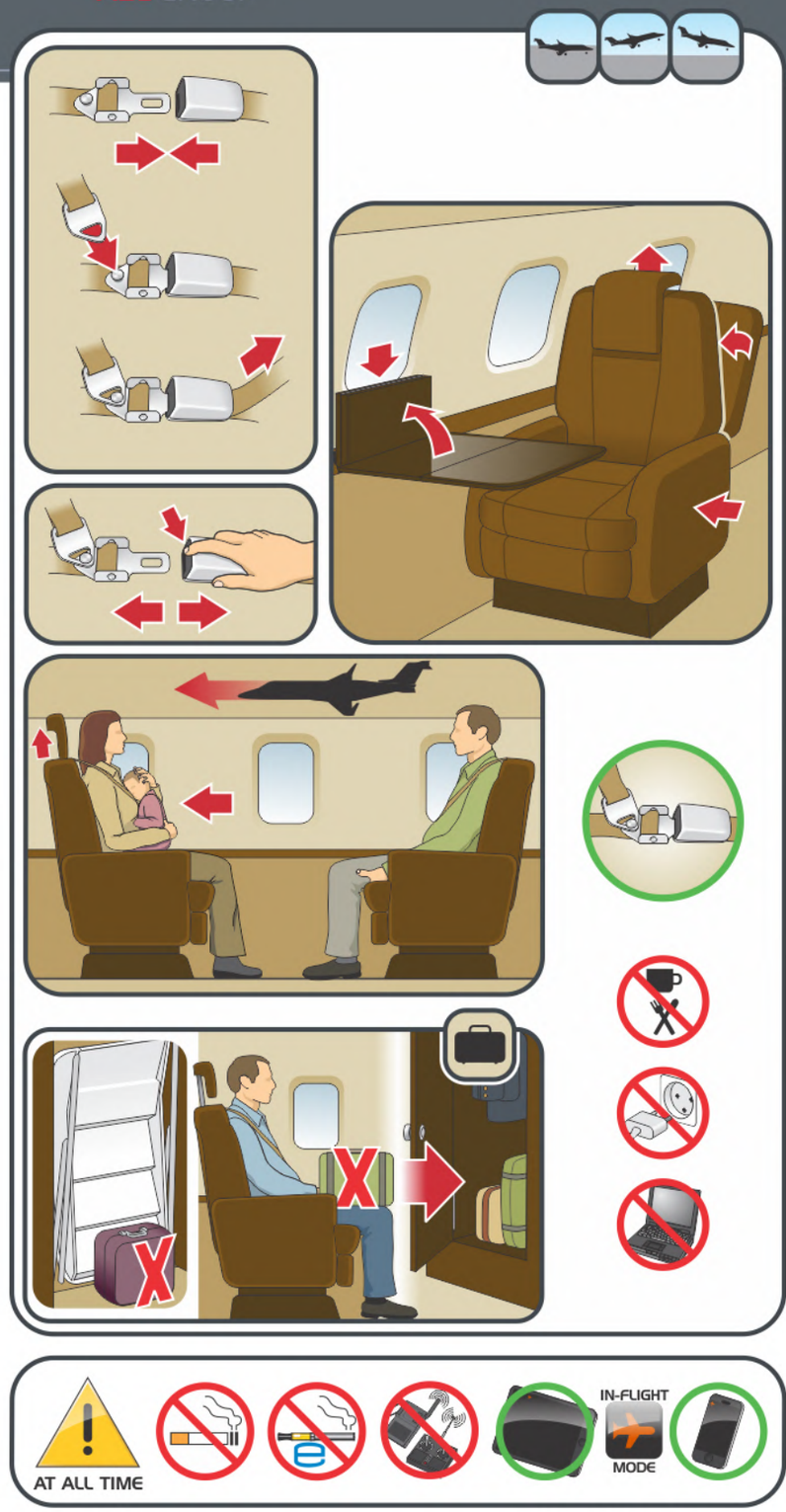
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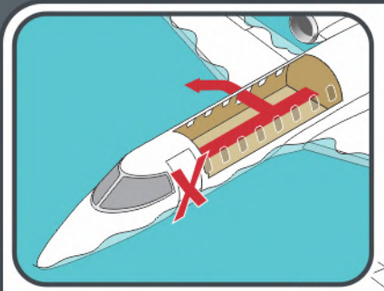
# SAFETY INFORMATION

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ASL n. v. Voogdijstraat 29, 3500 Hasselt, Belgium

Initial Release, July 2021

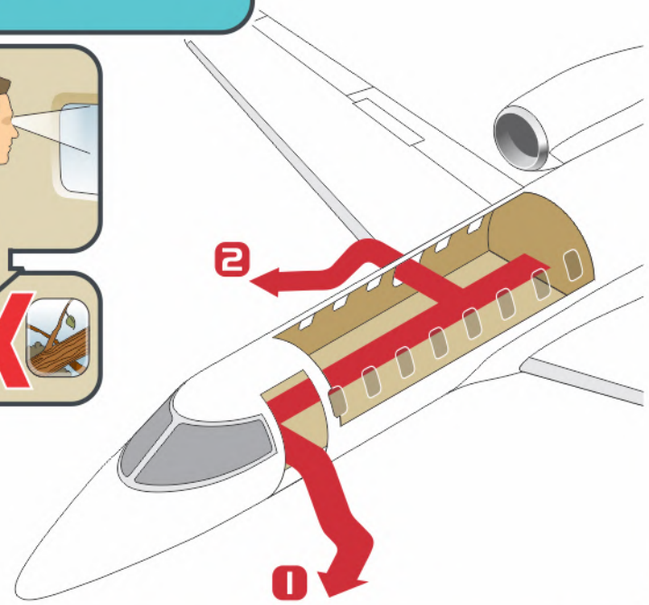
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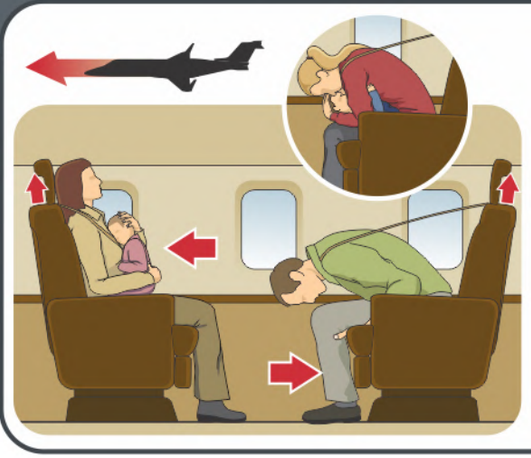




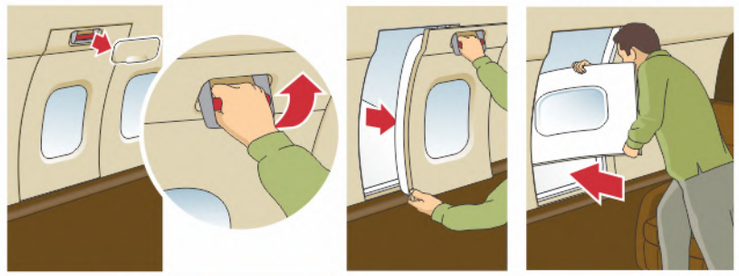




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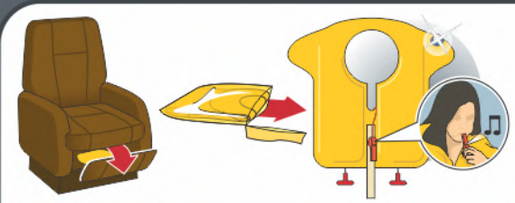


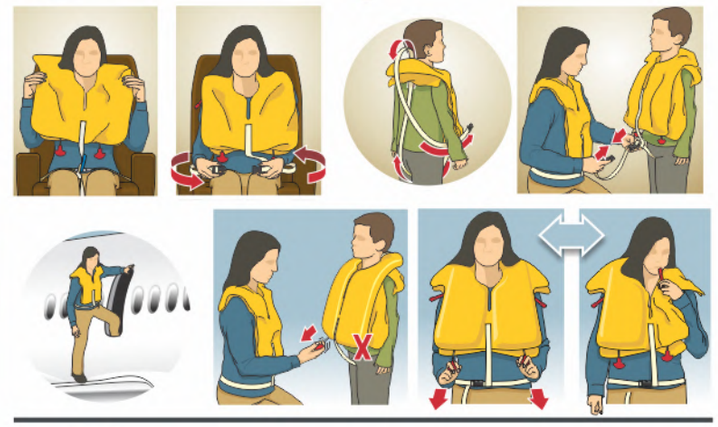


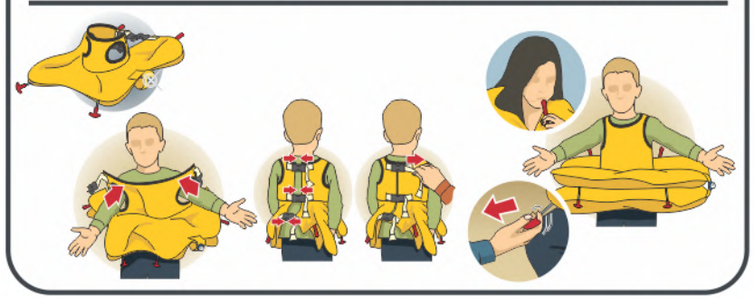




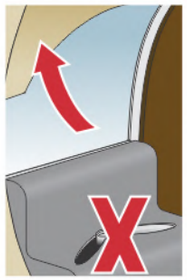
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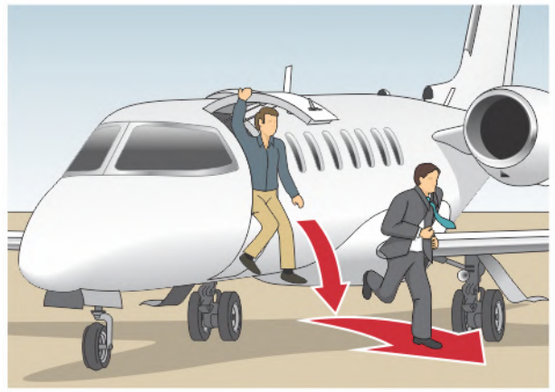


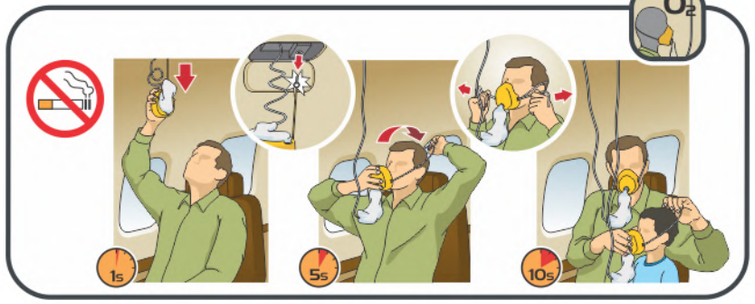


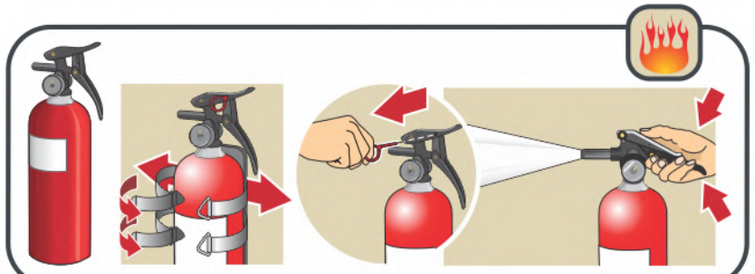


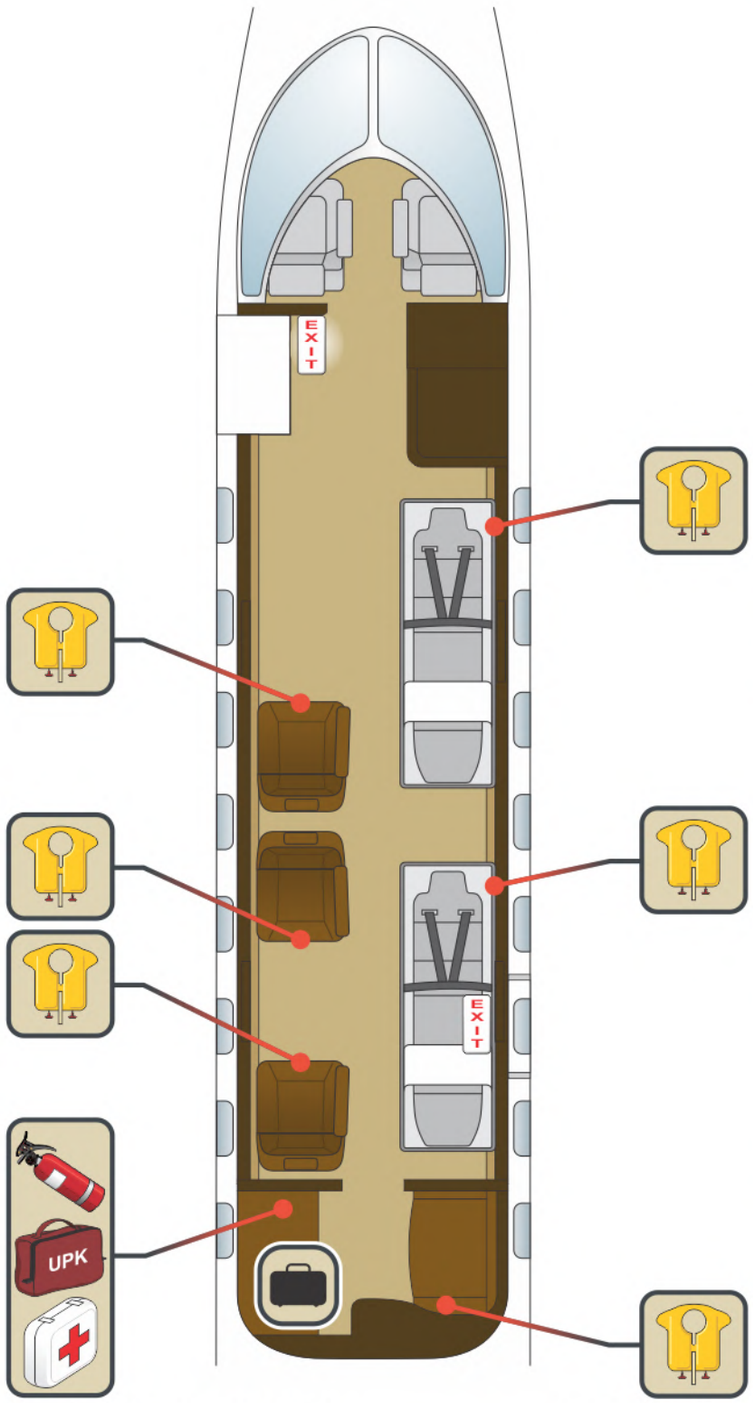


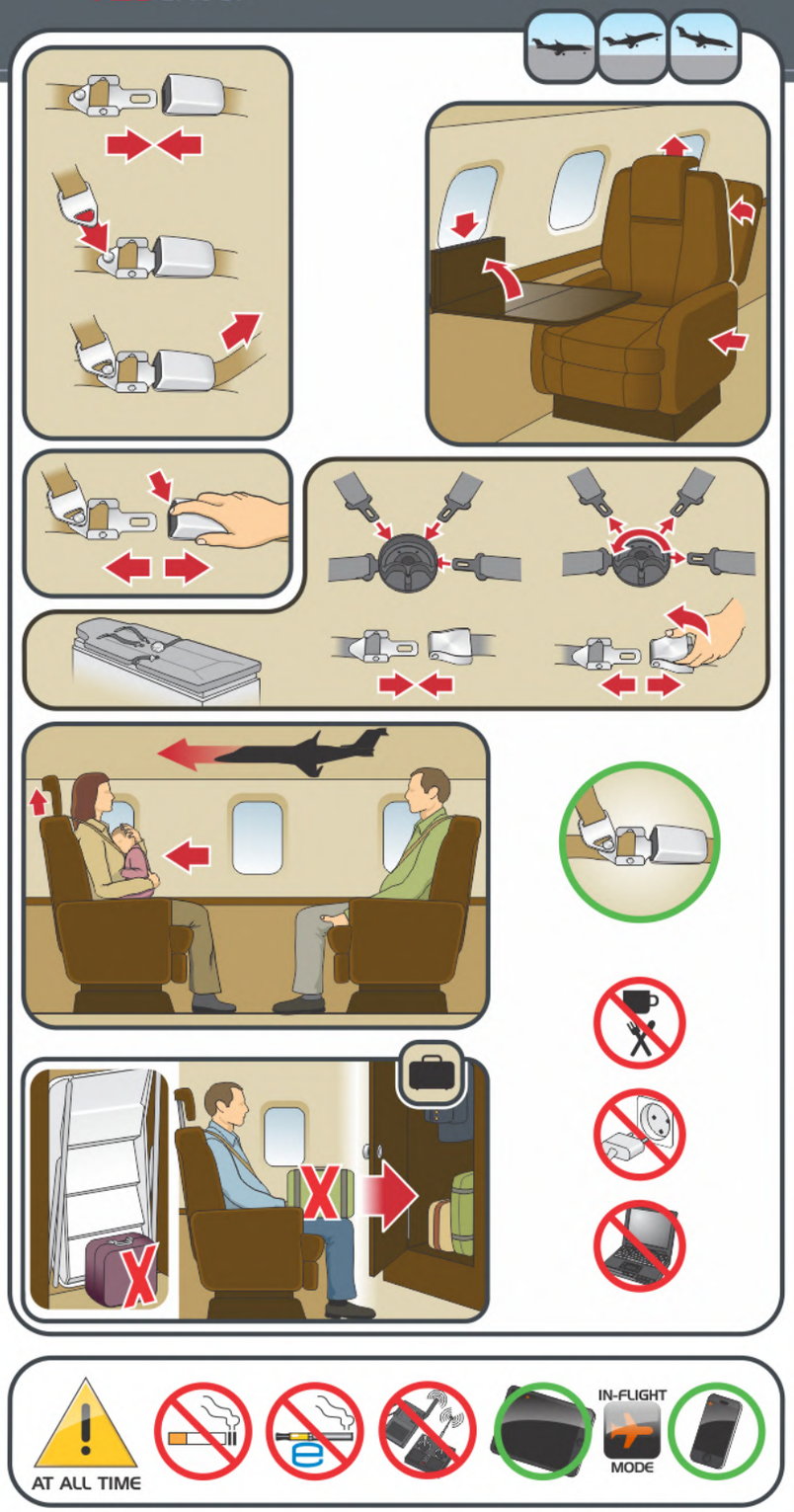











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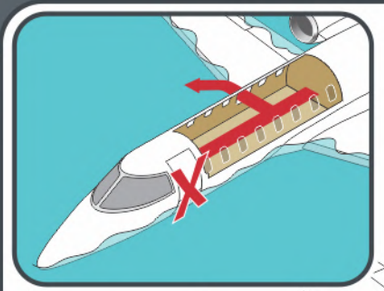
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ASL n. v. Voogdijstraat 29, 3500 Hasselt, Belgium

Revision A, January 2022

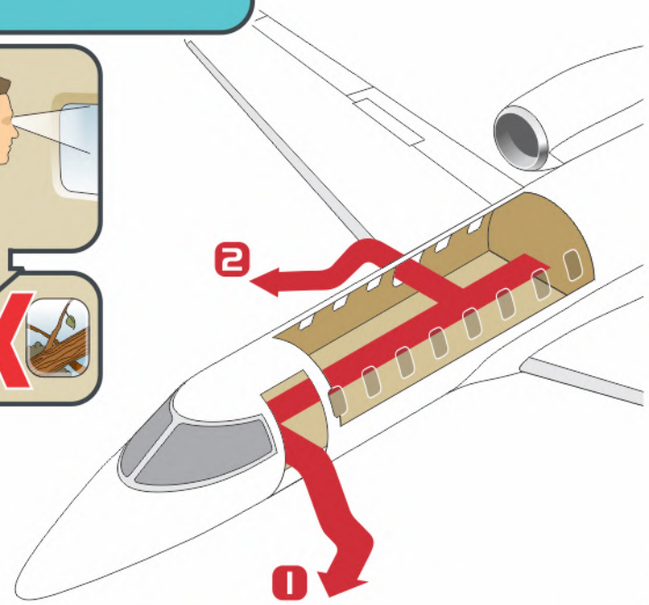
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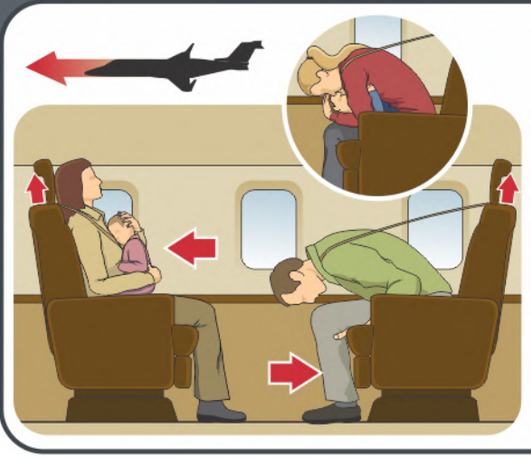




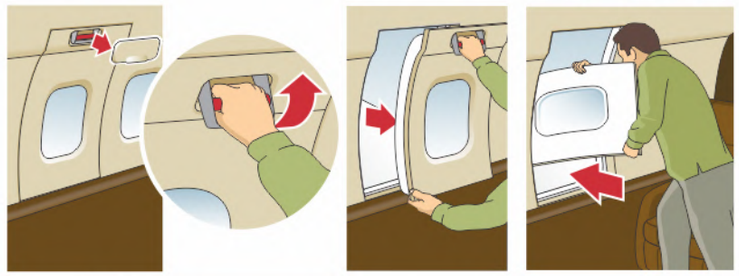




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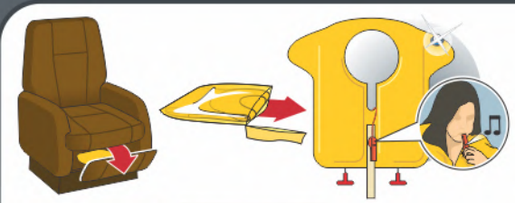


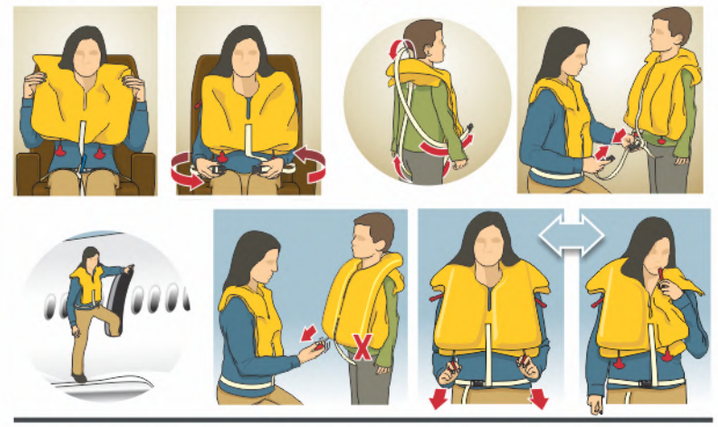


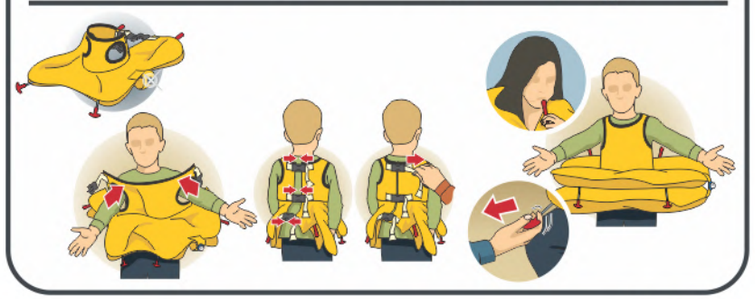




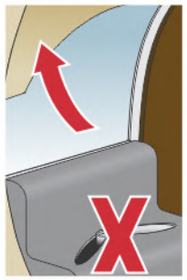
ASL GROUP

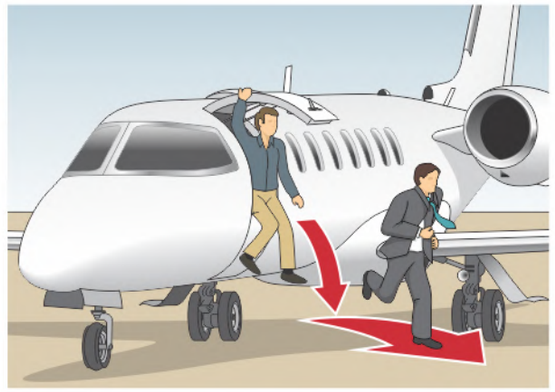


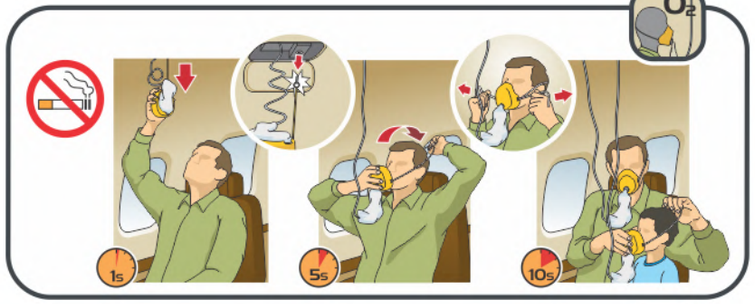


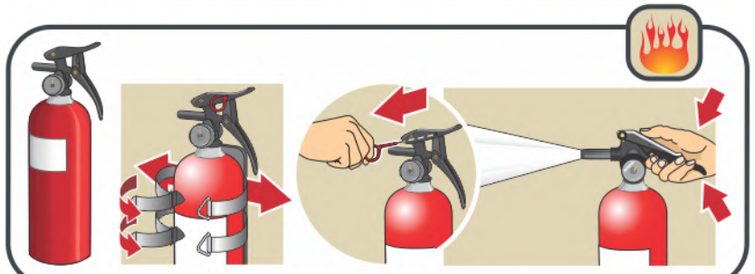




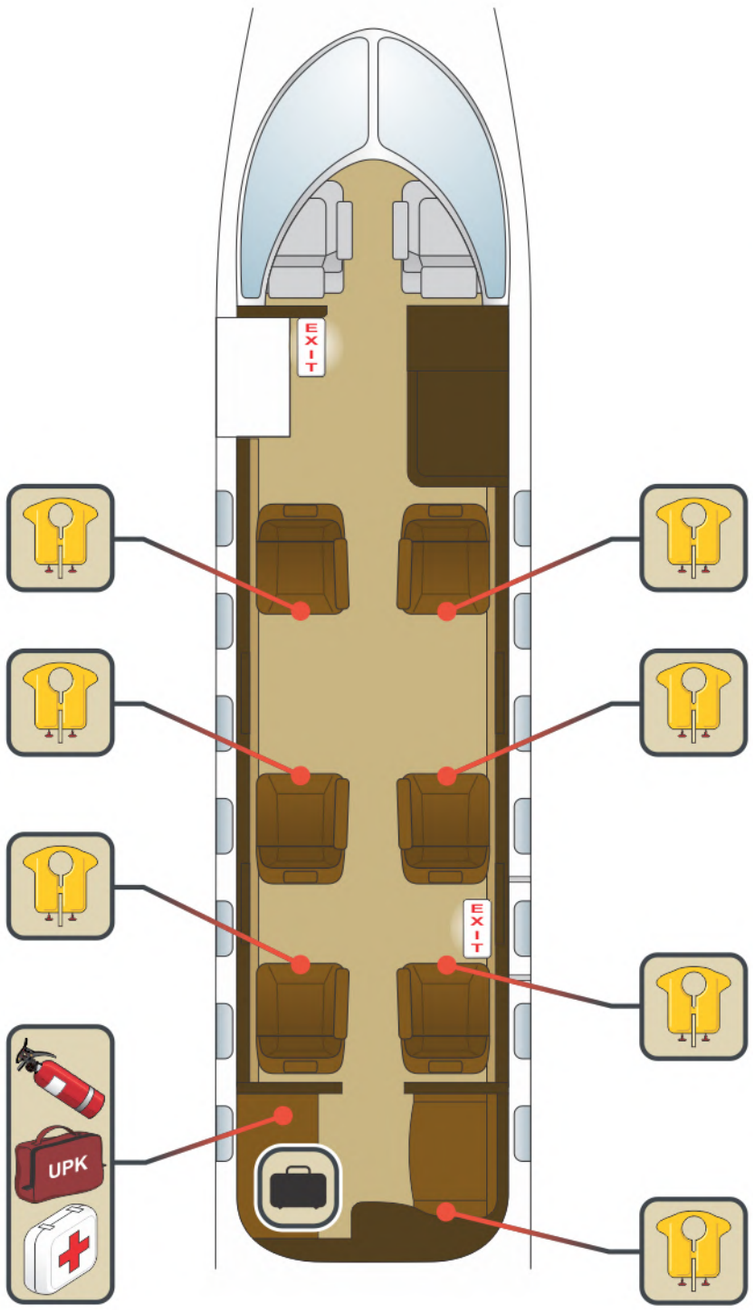


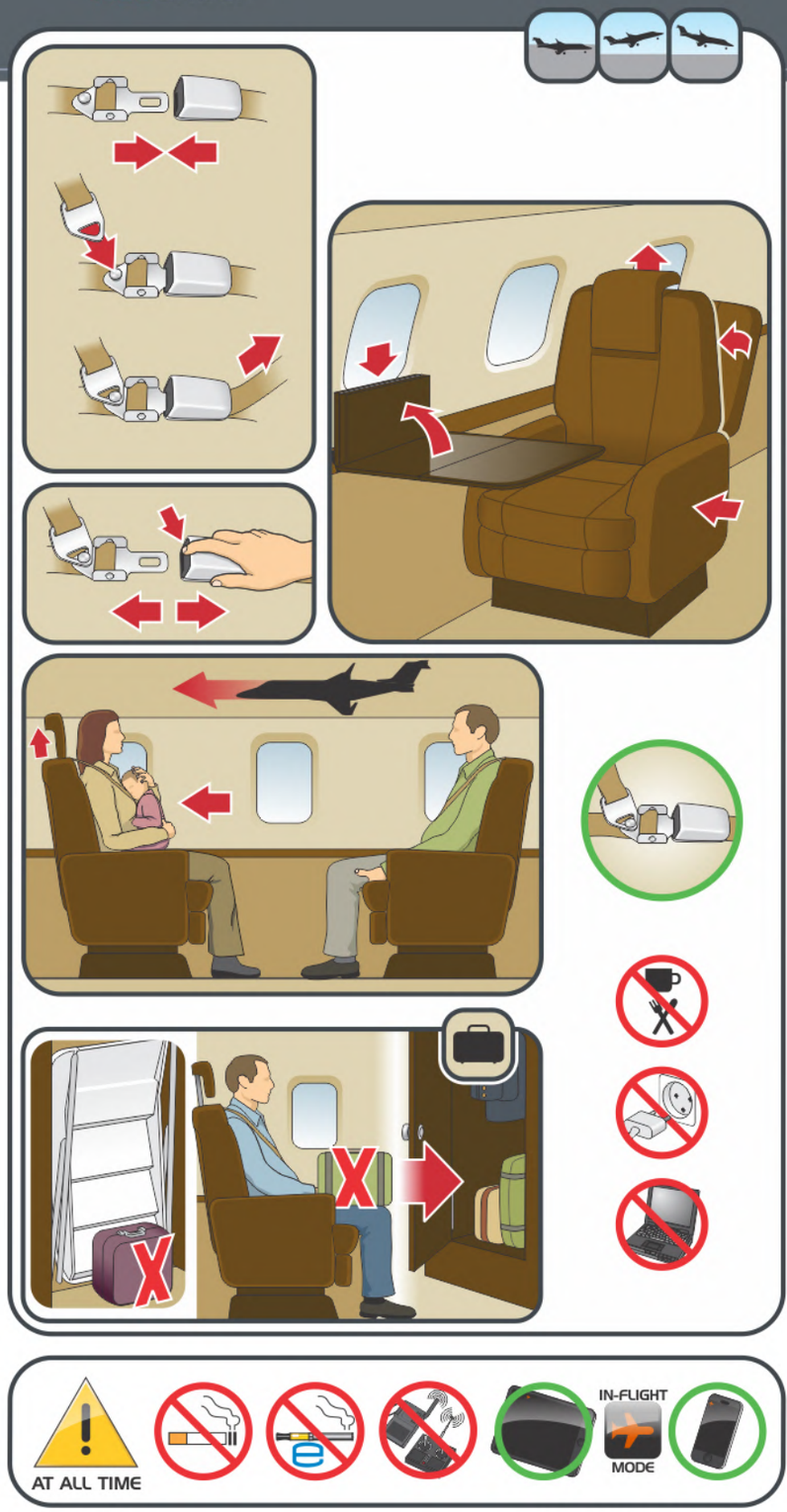






ASL GROUP




ASL GROUP

00-HRG

45-2064




BOMBARDIER
LEARJET 40

# SAFETY INFORMATION

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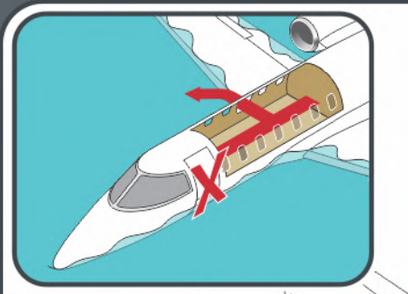
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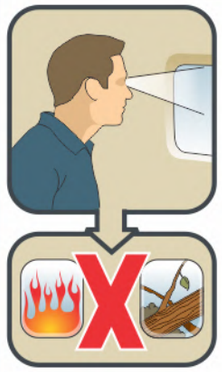
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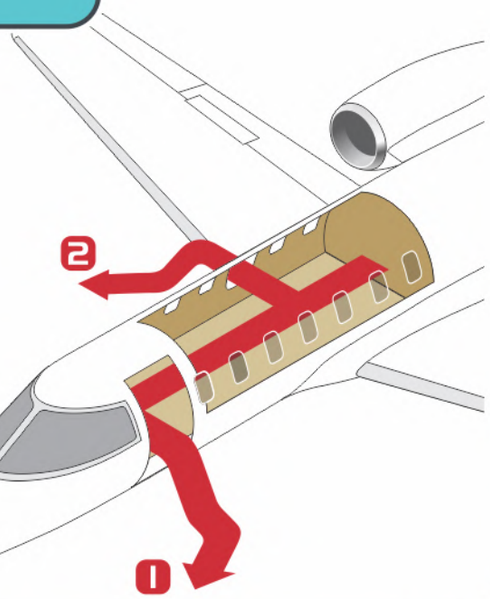
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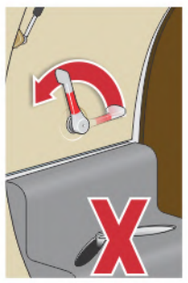
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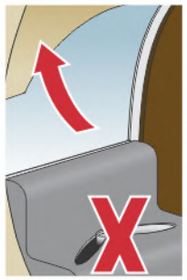
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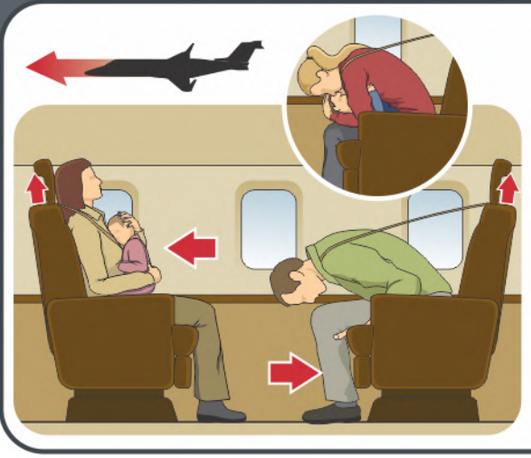


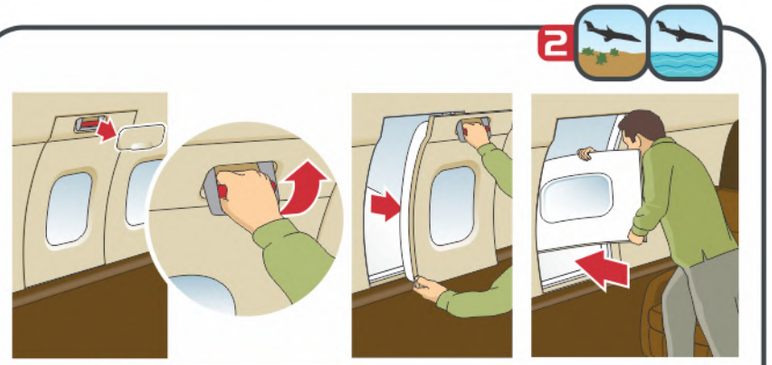




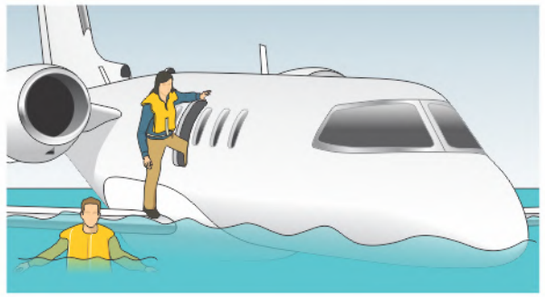

ASL GROUP





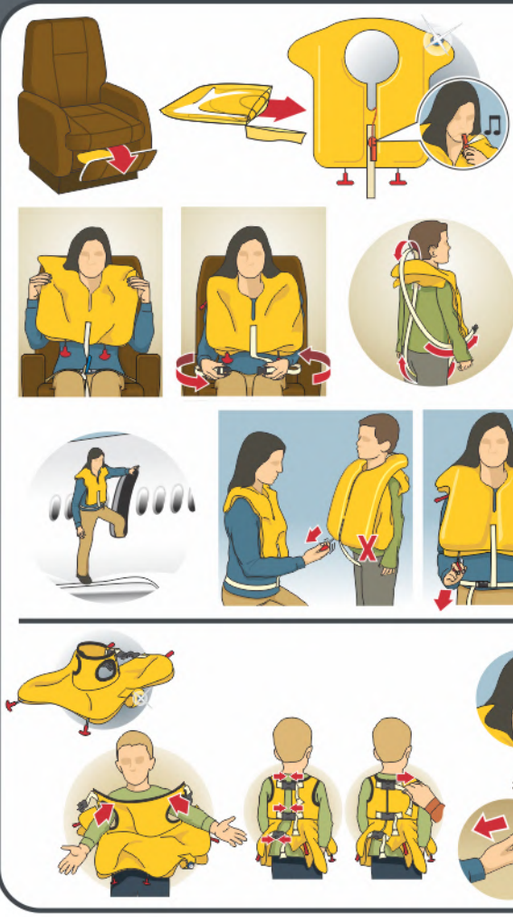


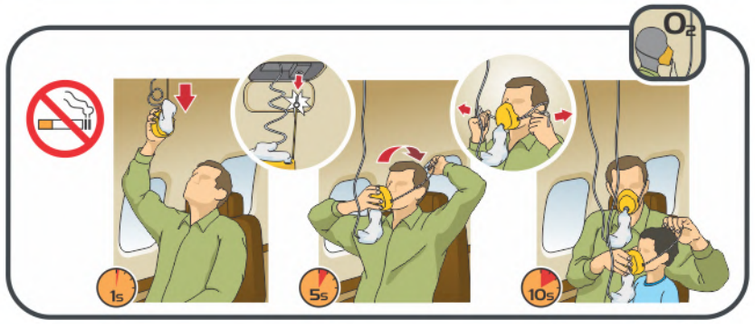


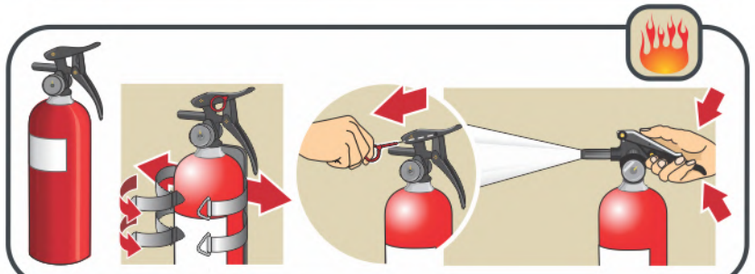





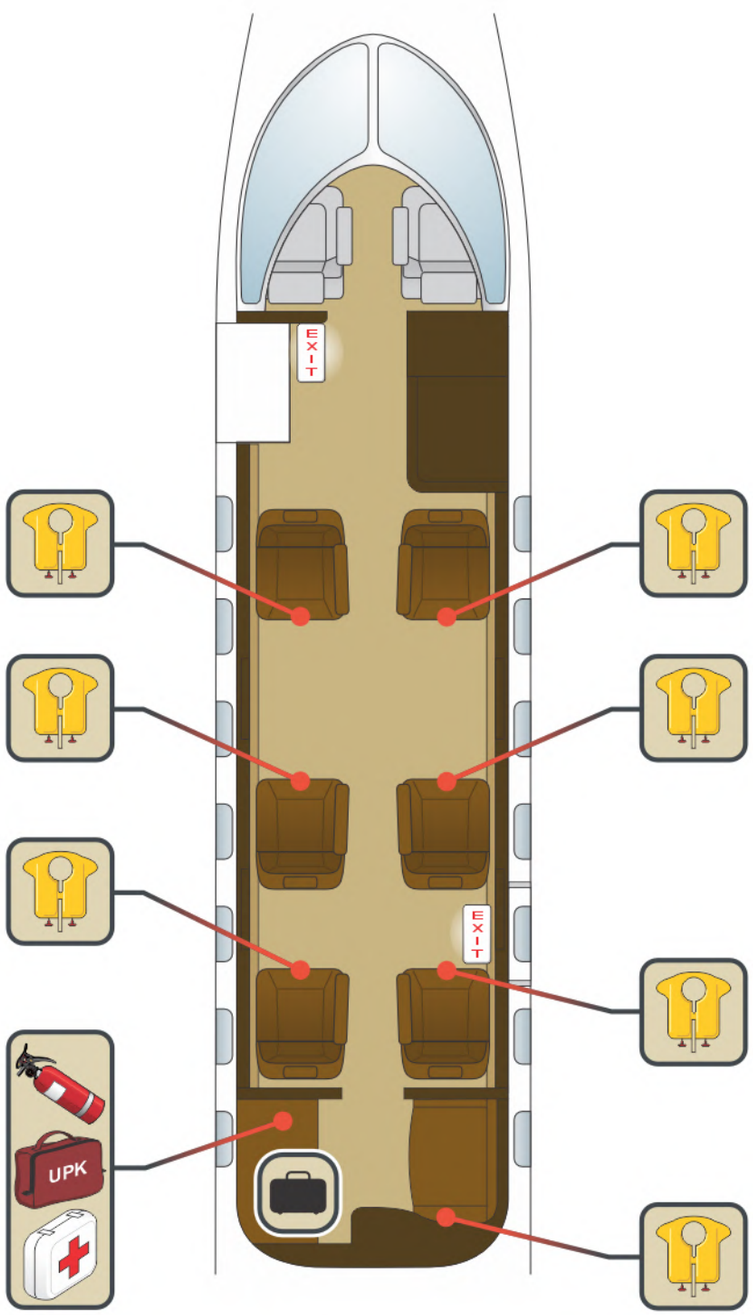
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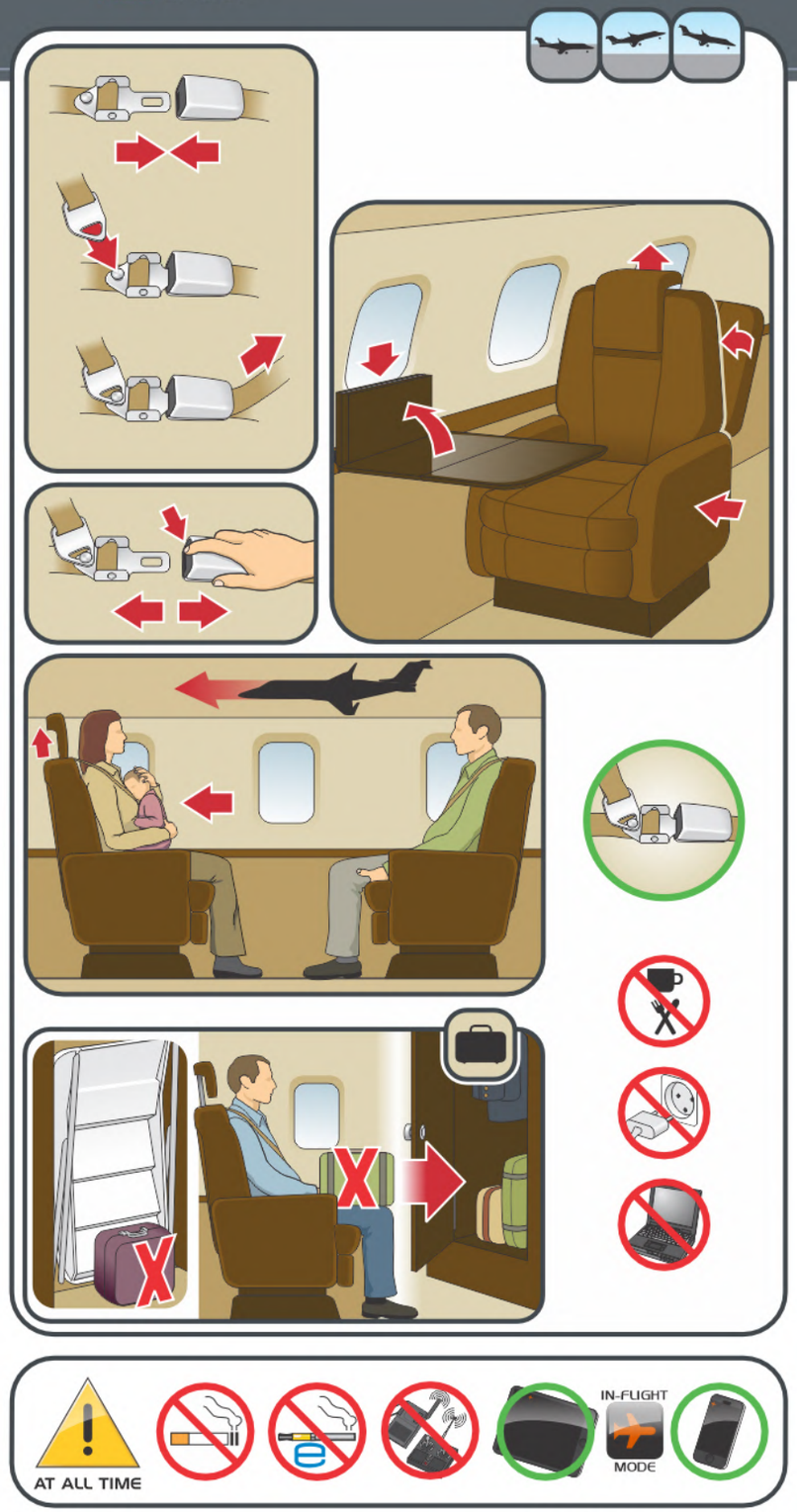




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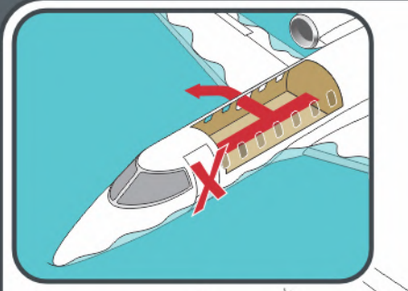
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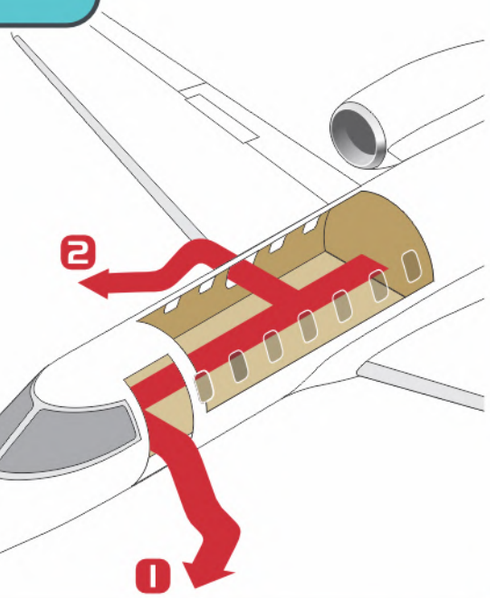
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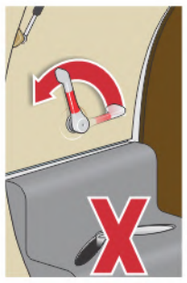
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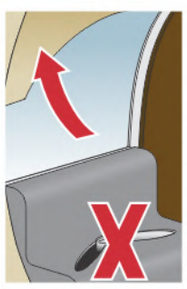






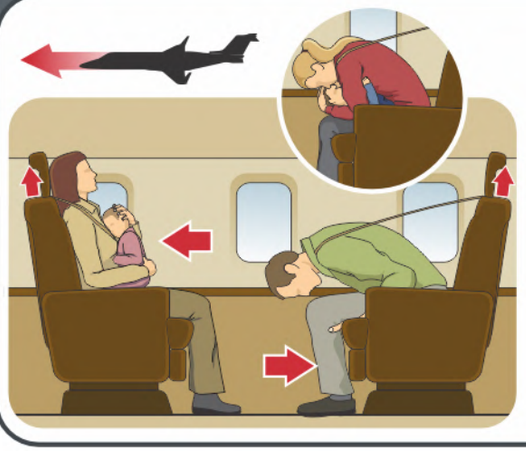


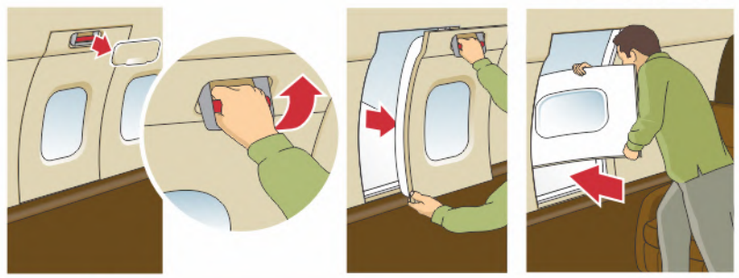




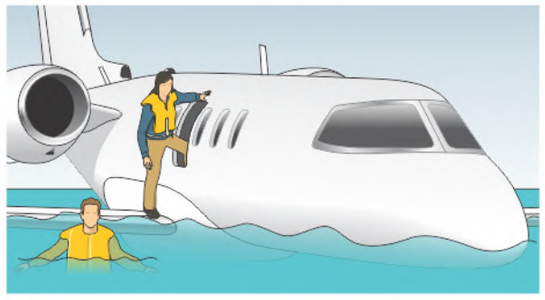




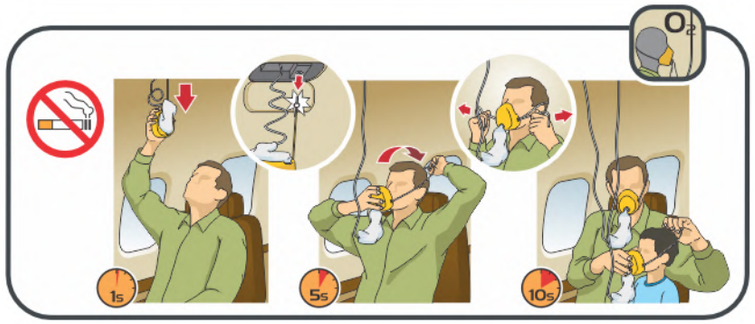


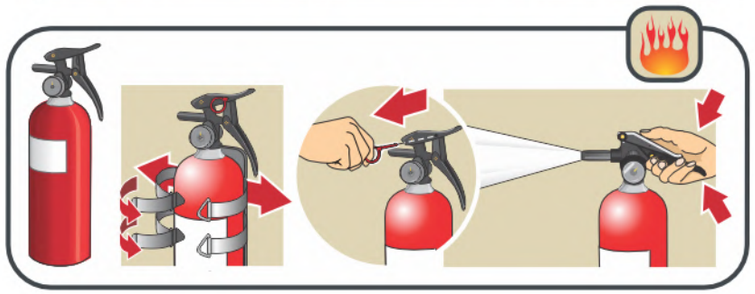








## ANNEX 4 : AFM TAKE-OFF AND LANDING PERFORMANCE EXTRACT LJ45

*Based on Manufacturer Crew Checklist & Quick Reference Handbook CL-132B*

*Change 4 dated February 2016*

# TAKEOFF — FLAPS 8°
## APR Armed
## Sea Level

45M-1207TP
45M-1215TP
45M-1217TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 127 | 127 | 127 | 127 | 127 | 127 | 127 |
| | PITCH | 12 | 12 | 11 | 11 | 11 | 12 | 9 |
| | DIST | 1205 | 1250 | 1290 | 1335 | 1380 | 1425 | 1825 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 112 | 116 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 12 | 11 | 11 | 11 | 12 | 9 |
| | DIST | 1145 | 1185 | 1225 | 1265 | 1310 | 1355 | 1685 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 108 | 112 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 13 | 13 | 12 | 10 |
| | DIST | 1035 | 1070 | 1110 | 1145 | 1180 | 1215 | 1445 |
| 8000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 108 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 975 | 1005 | 1040 | 1070 | 1105 | 1135 | 1275 |
| 7500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 955 | 985 | 1020 | 1050 | 1080 | 1110 | 1190 |
| 7000 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 935 | 965 | 1000 | 1030 | 1060 | 1090 | 1165 |
| 6500 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 920 | 950 | 980 | 1010 | 1040 | 1070 | 1135 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 87.8 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 31 | 35 | 40 |
| %$N_1$ | 81.6 | 83.3 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 89.6 | 88.6 | 87.3 |

# TAKEOFF — FLAPS 8°
## APR Armed
## 1000 Feet

45M-1207TP
45M-1215TP
45M-1217TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 116 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 127 | 127 | 127 | 127 | 127 | 127 | 127 |
| | PITCH | 12 | 11 | 11 | 11 | 12 | 10 | 9 |
| | DIST | 1245 | 1285 | 1335 | 1385 | 1430 | 1555 | 2085 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 114 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 11 | 11 | 12 | 11 | 9 |
| | DIST | 1180 | 1220 | 1265 | 1310 | 1360 | 1460 | 1940 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 109 | 113 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 12 | 12 | 12 | 10 |
| | DIST | 1065 | 1105 | 1145 | 1180 | 1220 | 1305 | 1620 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 106 | 109 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 13 | 14 | 13 | 11 |
| | DIST | 1005 | 1040 | 1070 | 1105 | 1140 | 1195 | 1380 |
| 7500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 985 | 1020 | 1050 | 1085 | 1115 | 1160 | 1260 |
| 7000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 865 | 1000 | 1030 | 1060 | 1095 | 1135 | 1220 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 950 | 980 | 1015 | 1045 | 1075 | 1115 | 1190 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 82.4 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 28 | 30 | 35 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.4 | 89.8 | 88.4 | 87.1 |

# TAKEOFF — FLAPS 8°
## APR Armed
## 2000 Feet

45M-1207TP
45M-1215TP
45M-1217TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | $V_1$ | 114 | 114 | 115 | 115 | 115 | 117 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 127 | 127 | 127 | 127 | 127 | 127 | 127 |
| | PITCH | 12 | 11 | 11 | 12 | 12 | 9 | 9 |
| | DIST | 1285 | 1330 | 1385 | 1430 | 1480 | 1710 | 2375 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 115 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 11 | 12 | 12 | 9 | 9 |
| | DIST | 1220 | 1265 | 1310 | 1360 | 1405 | 1590 | 2200 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 111 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1100 | 1140 | 1180 | 1220 | 1260 | 1410 | 1860 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 106 | 110 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 13 | 14 | 14 | 13 | 10 |
| | DIST | 1035 | 1070 | 1105 | 1140 | 1175 | 1270 | 1550 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 11 |
| | DIST | 1015 | 1050 | 1085 | 1120 | 1155 | 1215 | 1355 |
| 7000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 995 | 1030 | 1065 | 1095 | 1130 | 1185 | 1285 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 980 | 1015 | 1045 | 1075 | 1110 | 1160 | 1250 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 75.2 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 24 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.1 | 91.0 | 89.6 | 88.2 | 86.9 |

# TAKEOFF — FLAPS 20°
## APR Armed
## Sea Level

45M-1237TP
45M-1245TP
45M-1247TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | V1 | 111 | 111 | 111 | 111 | 111 | 111 | 113 |
| | VR | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | V2 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |
| | PITCH | 9 | 9 | 9 | 9 | 9 | 9 | 8 |
| | DIST | 1175 | 1220 | 1260 | 1300 | 1345 | 1385 | 1910 |
| 9000 | V1 | 109 | 109 | 109 | 109 | 109 | 109 | 112 |
| | VR | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | V2 | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 1105 | 1145 | 1185 | 1225 | 1265 | 1305 | 1730 |
| 8500 | V1 | 106 | 105 | 105 | 105 | 105 | 105 | 108 |
| | VR | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| | V2 | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1015 | 1050 | 1085 | 1115 | 1150 | 1190 | 1430 |
| 8000 | V1 | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 10 |
| | DIST | 995 | 1030 | 1060 | 1095 | 1130 | 1160 | 1255 |
| 7500 | V1 | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 975 | 1010 | 1040 | 1075 | 1105 | 1140 | 1220 |
| 7000 | V1 | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 960 | 990 | 1025 | 1055 | 1085 | 1120 | 1190 |
| 6500 | V1 | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 950 | 980 | 1010 | 1040 | 1070 | 1100 | 1165 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 87.8 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 31 | 35 | 40 |
| %N1 | 81.6 | 83.3 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 89.6 | 88.6 | 87.3 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 1000 Feet

45M-1237TP
45M-1245TP
45M-1247TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | V1 | 111 | 111 | 111 | 111 | 111 | 112 | 113 |
| | VR | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | V2 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |
| | PITCH | 9 | 9 | 9 | 9 | 9 | 8 | 8 |
| | DIST | 1215 | 1255 | 1300 | 1345 | 1390 | 1535 | 2290 |
| 9000 | V1 | 109 | 109 | 109 | 109 | 109 | 110 | 112 |
| | VR | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | V2 | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| | DIST | 1145 | 1180 | 1225 | 1265 | 1305 | 1420 | 2040 |
| 8500 | V1 | 105 | 105 | 105 | 105 | 105 | 106 | 109 |
| | VR | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | V2 | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 10 | 8 |
| | DIST | 1045 | 1080 | 1120 | 1150 | 1190 | 1270 | 1640 |
| 8000 | V1 | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1025 | 1060 | 1095 | 1130 | 1165 | 1215 | 1355 |
| 7500 | V1 | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 10 |
| | DIST | 1005 | 1040 | 1075 | 1110 | 1145 | 1190 | 1285 |
| 7000 | V1 | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 990 | 1025 | 1055 | 1090 | 1125 | 1165 | 1250 |
| 6500 | V1 | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 975 | 1010 | 1040 | 1070 | 1105 | 1145 | 1220 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 82.4 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 28 | 30 | 35 | 40 |
| %N1 | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.4 | 89.8 | 88.4 | 87.1 |

# TAKEOFF — FLAPS 20°
## APR Armed
## 2000 Feet

45M-1237TP
45M-1245TP
45M-1247TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9231 | V1 | 111 | 111 | 111 | 111 | 111 | 113 | |
| | VR | 113 | 113 | 113 | 113 | 113 | 113 | |
| | V2 | 122 | 122 | 122 | 122 | 122 | 122 | |
| | PITCH | 9 | 9 | 9 | 9 | 9 | 8 | |
| | DIST | 1250 | 1300 | 1345 | 1390 | 1440 | 1745 | |
| 9000 | V1 | 109 | 109 | 109 | 109 | 109 | 112 | 112 |
| | VR | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | V2 | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| | DIST | 1180 | 1220 | 1265 | 1310 | 1355 | 1595 | 2470 |
| 8500 | V1 | 105 | 105 | 105 | 105 | 105 | 108 | 110 |
| | VR | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | V2 | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 10 | 8 |
| | DIST | 1080 | 1120 | 1155 | 1190 | 1230 | 1370 | 1930 |
| 8000 | V1 | 105 | 105 | 105 | 105 | 105 | 105 | 108 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 8 |
| | DIST | 1060 | 1095 | 1130 | 1170 | 1205 | 1270 | 1530 |
| 7500 | V1 | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | VR | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1040 | 1075 | 1110 | 1145 | 1180 | 1245 | 1380 |
| 7000 | V1 | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1025 | 1055 | 1090 | 1125 | 1160 | 1215 | 1320 |
| 6500 | V1 | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | VR | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | V2 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1005 | 1040 | 1075 | 1110 | 1140 | 1190 | 1285 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 75.2 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 24 | 25 | 30 | 35 | 40 |
| %N1 | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.1 | 91.0 | 89.6 | 88.2 | 86.9 |

## Takeoff Pitch Trim Setting

| CENTER-OF-GRAVITY — % MAC | | | | | | |
|---|---|---|---|---|---|---|
| 7 to 10 | 12 | 14 | 16 | 18 | 20 | 22 to aft limit |
| 8.7 | 8.1 | 7.6 | 7.0 | 6.4 | 5.9 | 5.3 |

## Landing Speeds Below 4000 Feet

| | WEIGHT — 1000 KG | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPEED | 6.5 | 7 | 7.5 | 8 | 8.5 | 8.709 | 9 | 9.525 |
| VREF | 108 | 111 | 115 | 118 | 121 | 123 | 124 | 137 |
| VAPP | 116 | 120 | 124 | 128 | 131 | 132 | 134 | 127 |

## Landing Distances

| | TEMP °F | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| | TEMP °C | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| | WT — KG | LANDING DISTANCE — METERS | | | | | | |
| SEA LEVEL | 8,709 | 735 | 760 | 780 | 800 | 825 | 845 | 870 |
| | 8,500 | 725 | 745 | 765 | 790 | 810 | 830 | 855 |
| | 8,000 | 695 | 720 | 735 | 755 | 775 | 800 | 815 |
| | 7,500 | 670 | 690 | 705 | 725 | 740 | 760 | 780 |
| | 7,000 | 645 | 665 | 680 | 695 | 710 | 725 | 745 |
| | 6,500 | 620 | 635 | 650 | 665 | 680 | 695 | 710 |
| 2000 ft | 8,709 | 780 | 805 | 830 | 855 | 875 | 900 | 925 |
| | 8,500 | 765 | 790 | 815 | 835 | 860 | 885 | 905 |
| | 8,000 | 735 | 760 | 780 | 800 | 820 | 845 | 865 |
| | 7,500 | 705 | 725 | 745 | 765 | 785 | 805 | 825 |
| | 7,000 | 680 | 700 | 715 | 735 | 750 | 770 | 785 |
| | 6,500 | 650 | 670 | 685 | 700 | 715 | 735 | 750 |
| 4000 ft | 8,709 | 830 | 855 | 880 | 910 | 935 | 960 | 990 |
| | 8,500 | 815 | 840 | 865 | 890 | 915 | 945 | 970 |
| | 8,000 | 780 | 805 | 830 | 850 | 875 | 900 | 925 |
| | 7,500 | 745 | 770 | 790 | 810 | 835 | 855 | 880 |
| | 7,000 | 715 | 735 | 755 | 775 | 795 | 815 | 835 |
| | 6,500 | 685 | 705 | 720 | 740 | 755 | 775 | 790 |

These speeds & distances were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, & autospoilers deployed.

*Based on Manufacturer Crew Checklist & Quick Reference Handbook CL-132B*

*Change 5 dated October 2024*

# TAKEOFF — FLAPS 8°

## APR Armed
## Sea Level

45-2310TP
45-2312TP
45-2302TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 4200 | 4350 | 4500 | 4670 | 4840 | 4980 | 5130 |
| 20,000 | $V_1$ | 113 | 114 | 113 | 113 | 113 | 113 | 113 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 11 | 11 | 11 | 12 | 12 | 12 | 12 |
| | DIST | 3800 | 3940 | 4080 | 4230 | 4370 | 4510 | 4650 |
| 19,000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 124 | 124 | 124 | 124 | 124 | 124 | 124 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 11 |
| | DIST | 3450 | 3580 | 3700 | 3820 | 3940 | 4060 | 4190 |
| 18,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3200 | 3310 | 3420 | 3520 | 3630 | 3740 | 3850 |
| 17,000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3140 | 3250 | 3350 | 3460 | 3560 | 3670 | 3770 |
| 16,000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3090 | 3190 | 3290 | 3400 | 3500 | 3600 | 3700 |
| 15,000 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3040 | 3140 | 3240 | 3340 | 3440 | 3540 | 3630 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 81.6 | 83.2 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 90.3 | 91.0 |

# TAKEOFF — FLAPS 8°

## APR Armed
## 1000 Feet

45-2310TP
45-2312TP
45-2302TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 4340 | 4500 | 4680 | 4850 | 4990 | 5150 | 5700 |
| 20,000 | $V_1$ | 113 | 113 | 113 | 113 | 113 | 113 | 115 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 3930 | 4070 | 4230 | 4370 | 4520 | 4660 | 5000 |
| 19,000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 110 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 124 | 124 | 124 | 124 | 124 | 124 | 124 |
| | PITCH | 12 | 12 | 12 | 12 | 11 | 11 | 11 |
| | DIST | 3560 | 3690 | 3820 | 3950 | 4070 | 4200 | 4520 |
| 18,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 14 | 14 | 13 | 14 | 14 | 14 | 11 |
| | DIST | 3300 | 3410 | 3530 | 3640 | 3750 | 3860 | 4060 |
| 17,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3240 | 3350 | 3460 | 3570 | 3680 | 3790 | 3940 |
| 16,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3190 | 3290 | 3400 | 3500 | 3610 | 3710 | 3860 |
| 15,000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3130 | 3240 | 3340 | 3440 | 3550 | 3650 | 3790 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 100.4 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 38 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.7 | 91.5 | 92.0 | 91.2 |

# TAKEOFF — FLAPS 8°
## APR Armed
## 2000 Feet

45-2310TP
45-2312TP
45-2302TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 4460 | 4660 | 4830 | 5000 | 5170 | 5340 | 6400 |
| 20,000 | $V_1$ | 113 | 113 | 113 | 113 | 113 | 113 | 116 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 11 | 11 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 4080 | 4210 | 4370 | 4530 | 4680 | 4830 | 5510 |
| 19,000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 112 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 124 | 124 | 124 | 124 | 124 | 124 | 124 |
| | PITCH | 12 | 12 | 12 | 11 | 11 | 12 | 11 |
| | DIST | 3680 | 3810 | 3950 | 4080 | 4210 | 4360 | 4920 |
| 18,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 107 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 14 | 14 | 14 | 14 | 13 | 13 | 12 |
| | DIST | 3410 | 3520 | 3640 | 3760 | 3870 | 3990 | 4380 |
| 17,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3350 | 3460 | 3570 | 3690 | 3800 | 3910 | 4120 |
| 16,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3290 | 3400 | 3510 | 3620 | 3730 | 3840 | 4040 |
| 15,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 3230 | 3340 | 3450 | 3560 | 3660 | 3770 | 3950 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.2 | 92.0 | 92.8 | 91.2 |

# TAKEOFF — FLAPS 20°

## APR Armed

## Sea Level

45-2340TP
45-2342TP
45-2332TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 4170 | 4310 | 4460 | 4610 | 4750 | 4900 | 5100 |
| 20,000 | $V_1$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | DIST | 3680 | 3810 | 3940 | 4070 | 4210 | 4340 | 4480 |
| 19,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | DIST | 3330 | 3440 | 3560 | 3680 | 3800 | 3910 | 4030 |
| 18,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| | DIST | 3270 | 3380 | 3490 | 3600 | 3710 | 3820 | 3930 |
| 17,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| | DIST | 3210 | 3320 | 3430 | 3540 | 3640 | 3750 | 3860 |
| 16,000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 11 | 11 | 11 |
| | DIST | 3160 | 3270 | 3370 | 3480 | 3580 | 3690 | 3790 |
| 15,000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 3120 | 3220 | 3320 | 3420 | 3530 | 3630 | 3730 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

### TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 81.6 | 83.2 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 90.3 | 91.0 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 1000 Feet

45-2340TP
45-2342TP
45-2332TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 4280 | 4450 | 4600 | 4770 | 4920 | 5100 | 5750 |
| 20,000 | $V_1$ | 110 | 110 | 110 | 110 | 110 | 110 | 111 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 3800 | 3930 | 4070 | 4210 | 4350 | 4500 | 4870 |
| 19,000 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 107 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | PITCH | 11 | 10 | 10 | 10 | 10 | 10 | 10 |
| | DIST | 3440 | 3550 | 3670 | 3800 | 3920 | 4040 | 4350 |
| 18,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 3370 | 3490 | 3600 | 3720 | 3830 | 3950 | 4110 |
| 17,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 3320 | 3430 | 3540 | 3650 | 3760 | 3870 | 4030 |
| 16,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 11 | 11 | 11 | 11 |
| | DIST | 3260 | 3370 | 3480 | 3590 | 3700 | 3810 | 3950 |
| 15,000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 3220 | 3320 | 3430 | 3530 | 3640 | 3740 | 3880 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

### TAKEOFF THRUST — ANTI-ICE OFF

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 100.4 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 38 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.7 | 91.5 | 92.0 | 91.2 |

45-2000TP

# TAKEOFF — FLAPS 20°
## APR Armed
## 2000 Feet

45-2340TP
45-2342TP
45-2332TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (LB) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (FEET) | | | | | | |
| 21,000 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 4430 | 4590 | 4760 | 4940 | 5130 | 5280 | 6580 |
| 20,000 | $V_1$ | 110 | 110 | 110 | 110 | 110 | 110 | 112 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 3920 | 4060 | 4210 | 4370 | 4510 | 4650 | 5540 |
| 19,000 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 108 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | PITCH | 11 | 10 | 10 | 10 | 10 | 10 | 10 |
| | DIST | 3550 | 3670 | 3800 | 3930 | 4060 | 4180 | 4710 |
| 18,000 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 3480 | 3600 | 3720 | 3840 | 3960 | 4080 | 4310 |
| 17,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 3420 | 3540 | 3660 | 3770 | 3890 | 4000 | 4220 |
| 16,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 3370 | 3480 | 3590 | 3710 | 3820 | 3930 | 4130 |
| 15,000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 3320 | 3430 | 3540 | 3650 | 3760 | 3860 | 4050 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.2 | 92.0 | 92.8 | 91.2 |

## Takeoff Pitch Trim Setting

| CENTER-OF-GRAVITY — % MAC | | | | | | |
|---|---|---|---|---|---|---|
| 7 to 10 | 12 | 14 | 16 | 18 | 20 | 22 to aft limit |
| 8.7 | 8.1 | 7.6 | 7.0 | 6.4 | 5.9 | 5.3 |

## Landing Speeds Below 4000 Feet

| SPEED | WEIGHT — 1000 LB | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 14 | 15 | 16 | 17 | 18 | 19 | 19.2 | 20 | 21 |
| VREF | 106 | 110 | 113 | 116 | 119 | 122 | 123 | 125 | 127 |
| VAPP | 115 | 119 | 122 | 125 | 129 | 132 | 132 | 134 | 137 |

## Landing Distances

| | TEMP °F | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| | TEMP °C | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| | WT — LB | LANDING DISTANCE — FEET | | | | | | |
| SEA LEVEL | 19,200 | 2410 | 2480 | 2550 | 2620 | 2700 | 2770 | 2840 |
| | 19,000 | 2390 | 2460 | 2530 | 2600 | 2680 | 2750 | 2820 |
| | 18,000 | 2310 | 2380 | 2440 | 2510 | 2580 | 2650 | 2710 |
| | 17,000 | 2230 | 2290 | 2350 | 2410 | 2470 | 2540 | 2600 |
| | 16,000 | 2160 | 2220 | 2270 | 2320 | 2380 | 2430 | 2490 |
| | 15,000 | 2080 | 2140 | 2190 | 2240 | 2290 | 2340 | 2400 |
| | 14,000 | 2000 | 2050 | 2100 | 2150 | 2200 | 2240 | 2290 |
| 2000 ft | 19,200 | 2550 | 2630 | 2710 | 2790 | 2870 | 2950 | 3030 |
| | 19,000 | 2530 | 2610 | 2690 | 2760 | 2840 | 2920 | 3000 |
| | 18,000 | 2440 | 2520 | 2590 | 2660 | 2730 | 2810 | 2880 |
| | 17,000 | 2350 | 2420 | 2480 | 2550 | 2620 | 2690 | 2760 |
| | 16,000 | 2270 | 2330 | 2390 | 2450 | 2510 | 2570 | 2640 |
| | 15,000 | 2190 | 2250 | 2300 | 2360 | 2410 | 2470 | 2520 |
| | 14,000 | 2100 | 2150 | 2200 | 2260 | 2310 | 2360 | 2410 |
| 4000 ft | 19,200 | 2710 | 2800 | 2880 | 2970 | 3060 | 3150 | 3240 |
| | 19,000 | 2690 | 2770 | 2860 | 2950 | 3030 | 3120 | 3210 |
| | 18,000 | 2590 | 2670 | 2750 | 2830 | 2910 | 2990 | 3080 |
| | 17,000 | 2490 | 2560 | 2640 | 2710 | 2790 | 2860 | 2940 |
| | 16,000 | 2390 | 2460 | 2520 | 2590 | 2660 | 2730 | 2800 |
| | 15,000 | 2310 | 2370 | 2430 | 2490 | 2550 | 2610 | 2670 |
| | 14,000 | 2210 | 2270 | 2320 | 2380 | 2440 | 2490 | 2550 |

These speeds & distances were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, & autospoilers deployed.

# TAKEOFF — FLAPS 8°

## APR Armed

## Sea Level

45M-614TP
45M-615TP
45M-606TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 10 | 10 | 9 | 9 | 9 |
| | DIST | 1370 | 1415 | 1460 | 1510 | 1565 | 1615 | 2150 |
| 9500 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1275 | 1320 | 1365 | 1410 | 1460 | 1510 | 2000 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 112 | 116 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 12 | 11 | 11 | 11 | 12 | 9 |
| | DIST | 1145 | 1185 | 1225 | 1265 | 1310 | 1355 | 1685 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 108 | 112 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 13 | 13 | 12 | 10 |
| | DIST | 1035 | 1070 | 1110 | 1145 | 1180 | 1215 | 1445 |
| 8000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 108 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 975 | 1005 | 1040 | 1070 | 1105 | 1135 | 1275 |
| 7500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 955 | 985 | 1020 | 1050 | 1080 | 1110 | 1190 |
| 7000 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 935 | 965 | 1000 | 1030 | 1060 | 1090 | 1165 |
| 6500 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 920 | 950 | 980 | 1010 | 1040 | 1070 | 1135 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 87.8 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 31 | 35 | 40 |
| %$N_1$ | 81.6 | 83.3 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 89.6 | 88.6 | 87.3 |

# TAKEOFF — FLAPS 8°

## APR Armed

## 1000 Feet

45M-614TP
45M-615TP
45M-606TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 10 | 9 | 9 | 9 | 9 |
| | DIST | 1405 | 1460 | 1510 | 1570 | 1620 | 1805 | 2445 |
| 9500 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 9 | 9 |
| | DIST | 1310 | 1360 | 1410 | 1465 | 1515 | 1675 | 2245 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 114 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 11 | 11 | 12 | 11 | 9 |
| | DIST | 1180 | 1220 | 1265 | 1310 | 1360 | 1460 | 1940 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 109 | 113 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 12 | 12 | 12 | 10 |
| | DIST | 1065 | 1105 | 1145 | 1180 | 1220 | 1305 | 1620 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 106 | 109 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 13 | 14 | 13 | 11 |
| | DIST | 1005 | 1040 | 1070 | 1105 | 1140 | 1195 | 1380 |
| 7500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 985 | 1020 | 1050 | 1085 | 1115 | 1160 | 1260 |
| 7000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 965 | 1000 | 1030 | 1060 | 1095 | 1135 | 1220 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 13 |
| | DIST | 950 | 980 | 1015 | 1045 | 1075 | 1115 | 1190 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 82.4 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 28 | 30 | 35 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.4 | 89.8 | 88.4 | 87.1 |

# TAKEOFF — FLAPS 8°

## APR Armed

## 2000 Feet

45M-614TP
45M-615TP
45M-606TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 9 | 9 | 9 | 9 | 9 |
| | DIST | 1455 | 1505 | 1565 | 1620 | 1670 | 2030 | 2815 |
| 9500 | $V_1$ | 117 | 117 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 9 | 9 |
| | DIST | 1355 | 1405 | 1465 | 1520 | 1565 | 1865 | 2580 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 115 | 117 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 11 | 12 | 12 | 9 | 9 |
| | DIST | 1220 | 1265 | 1310 | 1360 | 1405 | 1590 | 2200 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 111 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1100 | 1140 | 1180 | 1220 | 1260 | 1410 | 1860 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 106 | 110 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 13 | 14 | 14 | 13 | 10 |
| | DIST | 1035 | 1070 | 1105 | 1140 | 1175 | 1270 | 1550 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 11 |
| | DIST | 1015 | 1050 | 1085 | 1120 | 1155 | 1215 | 1355 |
| 7000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 995 | 1030 | 1065 | 1095 | 1130 | 1185 | 1285 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 12 |
| | DIST | 980 | 1015 | 1045 | 1075 | 1110 | 1160 | 1250 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 75.2 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 24 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.1 | 91.0 | 89.6 | 88.2 | 86.9 |

# TAKEOFF — FLAPS 20°

## APR Armed

## Sea Level

45M-636TP
45M-635TP
45M-627TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1370 | 1415 | 1460 | 1520 | 1570 | 1620 | 2315 |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1260 | 1305 | 1350 | 1395 | 1440 | 1485 | 2130 |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 112 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 1105 | 1145 | 1185 | 1225 | 1265 | 1305 | 1730 |
| 8500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 108 |
| | $V_R$ | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1015 | 1050 | 1085 | 1115 | 1150 | 1190 | 1430 |
| 8000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 10 |
| | DIST | 995 | 1030 | 1060 | 1095 | 1130 | 1160 | 1255 |
| 7500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 975 | 1010 | 1040 | 1075 | 1105 | 1140 | 1220 |
| 7000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 960 | 990 | 1025 | 1055 | 1085 | 1120 | 1190 |
| 6500 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 950 | 980 | 1010 | 1040 | 1070 | 1100 | 1165 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 87.8 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 31 | 35 | 40 |
| %$N_1$ | 81.6 | 83.3 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 89.6 | 88.6 | 87.3 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 1000 Feet

45M-636TP
45M-635TP
45M-627TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1405 | 1455 | 1515 | 1570 | 1625 | 1850 | 3445 |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1300 | 1345 | 1390 | 1440 | 1485 | 1685 | 2610 |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 110 | 112 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| | DIST | 1145 | 1180 | 1225 | 1265 | 1305 | 1420 | 2040 |
| 8500 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 106 | 109 |
| | $V_R$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 10 | 8 |
| | DIST | 1045 | 1080 | 1120 | 1150 | 1190 | 1270 | 1640 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1025 | 1060 | 1095 | 1130 | 1165 | 1215 | 1355 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 10 |
| | DIST | 1005 | 1040 | 1075 | 1110 | 1145 | 1190 | 1285 |
| 7000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 990 | 1025 | 1055 | 1090 | 1125 | 1165 | 1250 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 975 | 1010 | 1040 | 1070 | 1105 | 1145 | 1220 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 82.4 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 28 | 30 | 35 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.4 | 89.8 | 88.4 | 87.1 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 2000 Feet

45M-636TP
45M-635TP
45M-627TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | |
| | DIST | 1450 | 1515 | 1570 | 1625 | 1680 | 2105 | |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | |
| | DIST | 1340 | 1390 | 1440 | 1490 | 1550 | 1925 | |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 112 | 112 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| | DIST | 1180 | 1220 | 1265 | 1310 | 1355 | 1595 | 2470 |
| 8500 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 108 | 110 |
| | $V_R$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 10 | 8 |
| | DIST | 1080 | 1120 | 1155 | 1190 | 1230 | 1370 | 1930 |
| 8000 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 108 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 8 |
| | DIST | 1060 | 1095 | 1130 | 1170 | 1205 | 1270 | 1530 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1040 | 1075 | 1110 | 1145 | 1180 | 1245 | 1380 |
| 7000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1025 | 1055 | 1090 | 1125 | 1160 | 1215 | 1320 |
| 6500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1005 | 1040 | 1075 | 1110 | 1140 | 1190 | 1285 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-129TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 75.2 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 24 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.1 | 91.0 | 89.6 | 88.2 | 86.9 |

## Takeoff Pitch Trim Setting

| CENTER-OF-GRAVITY — % MAC | | | | | | |
|---|---|---|---|---|---|---|
| 1 to 10 | 12 | 14 | 16 | 18 | 20 | 22 to aft limit |
| 8.7 | 8.1 | 7.6 | 7.0 | 6.4 | 5.9 | 5.3 |

## Landing Speeds Below 4000 Feet

| | WEIGHT — 1000 KG | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SPEED | 6.5 | 7 | 7.5 | 8 | 8.5 | 8.709 | 9 | 9.299 | 9.752 |
| VREF | 108 | 111 | 115 | 118 | 121 | 123 | 124 | 127 | 128 |
| VAPP | 116 | 120 | 124 | 128 | 131 | 132 | 134 | 137 | 138 |

## Landing Distances

| | TEMP °F | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| | TEMP °C | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| | WT — KG | LANDING DISTANCE — METERS | | | | | | |
| SEA LEVEL | 8,709 | 735 | 760 | 780 | 800 | 825 | 845 | 870 |
| | 8,500 | 725 | 745 | 765 | 790 | 810 | 830 | 855 |
| | 8,000 | 695 | 720 | 735 | 755 | 775 | 800 | 815 |
| | 7,500 | 670 | 690 | 705 | 725 | 740 | 760 | 780 |
| | 7,000 | 645 | 665 | 680 | 695 | 710 | 725 | 745 |
| | 6,500 | 620 | 635 | 650 | 665 | 680 | 695 | 710 |
| 2000 ft | 8,709 | 780 | 805 | 830 | 855 | 875 | 900 | 925 |
| | 8,500 | 765 | 790 | 815 | 835 | 860 | 885 | 905 |
| | 8,000 | 735 | 760 | 780 | 800 | 820 | 845 | 865 |
| | 7,500 | 705 | 725 | 745 | 765 | 785 | 805 | 825 |
| | 7,000 | 680 | 700 | 715 | 735 | 750 | 770 | 785 |
| | 6,500 | 650 | 670 | 685 | 700 | 715 | 735 | 750 |
| 4000 ft | 8,709 | 830 | 855 | 880 | 910 | 935 | 960 | 990 |
| | 8,500 | 815 | 840 | 865 | 890 | 915 | 945 | 970 |
| | 8,000 | 780 | 805 | 830 | 850 | 875 | 900 | 925 |
| | 7,500 | 745 | 770 | 790 | 810 | 835 | 855 | 880 |
| | 7,000 | 715 | 735 | 755 | 775 | 795 | 815 | 835 |
| | 6,500 | 685 | 705 | 720 | 740 | 755 | 775 | 790 |

These speeds & distances were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, & autospoilers deployed.

# TAKEOFF — FLAPS 8°

## APR Armed

## Sea Level

45M-2022TP
45M-2024TP
45M-2010TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 10 | 10 | 9 | 9 | 9 |
| | DIST | 1370 | 1415 | 1465 | 1515 | 1570 | 1620 | 1665 |
| 9500 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 1275 | 1320 | 1365 | 1420 | 1470 | 1510 | 1560 |
| 9000 | $V_1$ | 112 | 113 | 112 | 112 | 112 | 112 | 112 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 11 | 11 | 11 | 12 | 12 | 12 | 12 |
| | DIST | 1145 | 1185 | 1225 | 1270 | 1315 | 1355 | 1395 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 13 | 13 | 12 | 12 |
| | DIST | 1035 | 1070 | 1110 | 1145 | 1180 | 1215 | 1250 |
| 8000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 970 | 1005 | 1035 | 1070 | 1100 | 1135 | 1165 |
| 7500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 950 | 985 | 1015 | 1050 | 1080 | 1110 | 1140 |
| 7000 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 935 | 965 | 995 | 1030 | 1060 | 1090 | 1120 |
| 6500 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 920 | 950 | 980 | 1010 | 1040 | 1070 | 1095 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 81.6 | 83.2 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 90.3 | 91.0 |

# TAKEOFF — FLAPS 8°

## APR Armed

## 1000 Feet

45M-2022TP
45M-2024TP
45M-2010TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 10 | 9 | 9 | 9 | 9 |
| | DIST | 1410 | 1460 | 1510 | 1575 | 1620 | 1670 | 1855 |
| 9500 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1320 | 1365 | 1420 | 1470 | 1515 | 1565 | 1730 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 112 | 114 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 12 | 11 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 1180 | 1225 | 1270 | 1315 | 1360 | 1400 | 1505 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 108 | 109 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 12 | 13 | 12 | 12 | 11 |
| | DIST | 1065 | 1105 | 1145 | 1180 | 1215 | 1255 | 1345 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 13 | 14 | 14 | 14 | 12 |
| | DIST | 1000 | 1035 | 1070 | 1105 | 1140 | 1170 | 1225 |
| 7500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 985 | 1015 | 1050 | 1080 | 1115 | 1145 | 1190 |
| 7000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 965 | 995 | 1030 | 1060 | 1090 | 1125 | 1165 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 945 | 980 | 1010 | 1040 | 1070 | 1105 | 1145 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 100.4 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 38 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.7 | 91.5 | 92.0 | 91.2 |

# TAKEOFF — FLAPS 8°

## APR Armed

## 2000 Feet

45M-2022TP
45M-2024TP
45M-2010TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_R$ | 119 | 119 | 119 | 119 | 119 | 119 | 119 |
| | $V_2$ | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| | PITCH | 10 | 10 | 9 | 9 | 9 | 9 | 9 |
| | DIST | 1455 | 1510 | 1570 | 1625 | 1675 | 1725 | 2095 |
| 9500 | $V_1$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_R$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | $V_2$ | 129 | 129 | 129 | 129 | 129 | 129 | 129 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 9 |
| | DIST | 1355 | 1415 | 1465 | 1520 | 1570 | 1620 | 1940 |
| 9000 | $V_1$ | 112 | 112 | 112 | 112 | 112 | 112 | 115 |
| | $V_R$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | $V_2$ | 126 | 126 | 126 | 126 | 126 | 126 | 126 |
| | PITCH | 11 | 11 | 12 | 12 | 12 | 11 | 9 |
| | DIST | 1220 | 1265 | 1315 | 1360 | 1405 | 1450 | 1655 |
| 8500 | $V_1$ | 108 | 108 | 108 | 108 | 108 | 108 | 111 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 13 | 13 | 13 | 12 | 12 | 12 | 11 |
| | DIST | 1100 | 1140 | 1180 | 1220 | 1260 | 1300 | 1460 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| | $V_2$ | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | PITCH | 14 | 14 | 14 | 14 | 13 | 13 | 13 |
| | DIST | 1035 | 1070 | 1105 | 1140 | 1175 | 1210 | 1310 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 1015 | 1050 | 1080 | 1115 | 1150 | 1185 | 1245 |
| 7000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 995 | 1030 | 1060 | 1095 | 1125 | 1160 | 1220 |
| 6500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| | DIST | 975 | 1010 | 1040 | 1075 | 1105 | 1135 | 1190 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.0 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.2 | 92.0 | 92.8 | 91.2 |

# TAKEOFF — FLAPS 20°

## APR Armed

## Sea Level

45M-2059TP
45M-2057TP
45M-2045TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1370 | 1420 | 1470 | 1525 | 1575 | 1625 | 1680 |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1265 | 1305 | 1355 | 1400 | 1440 | 1485 | 1545 |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | DIST | 1105 | 1145 | 1185 | 1225 | 1265 | 1305 | 1345 |
| 8500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 109 | 109 | 109 | 109 | 109 | 109 | 109 |
| | $V_2$ | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 1010 | 1045 | 1080 | 1120 | 1155 | 1185 | 1225 |
| 8000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| | DIST | 990 | 1025 | 1060 | 1095 | 1125 | 1160 | 1190 |
| 7500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| | DIST | 975 | 1005 | 1040 | 1075 | 1105 | 1135 | 1170 |
| 7000 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 960 | 990 | 1020 | 1055 | 1085 | 1115 | 1145 |
| 6500 | $V_1$ | 106 | 106 | 106 | 106 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 945 | 975 | 1005 | 1035 | 1070 | 1100 | 1125 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 81.6 | 83.2 | 84.0 | 84.8 | 85.6 | 86.3 | 87.1 | 87.9 | 88.7 | 89.5 | 90.3 | 91.0 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 1000 Feet

45M-2059TP
45M-2057TP
45M-2045TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1415 | 1465 | 1525 | 1580 | 1630 | 1680 | 1905 |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1300 | 1350 | 1395 | 1445 | 1490 | 1545 | 1740 |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 110 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 1145 | 1180 | 1225 | 1265 | 1305 | 1350 | 1460 |
| 8500 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 106 |
| | $V_R$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 1045 | 1080 | 1115 | 1155 | 1190 | 1225 | 1310 |
| 8000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 1025 | 1060 | 1095 | 1130 | 1160 | 1195 | 1245 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 1005 | 1040 | 1075 | 1105 | 1140 | 1175 | 1220 |
| 7000 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 990 | 1020 | 1055 | 1085 | 1120 | 1150 | 1195 |
| 6500 | $V_1$ | 106 | 106 | 106 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 975 | 1005 | 1040 | 1070 | 1100 | 1130 | 1175 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 100.4 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 38 | 40 |
| %$N_1$ | 82.8 | 84.5 | 85.2 | 86.0 | 86.8 | 87.6 | 88.4 | 89.2 | 90.0 | 90.7 | 91.5 | 92.0 | 91.2 |

# TAKEOFF — FLAPS 20°

## APR Armed

## 2000 Feet

45M-2059TP
45M-2057TP
45M-2045TP

| TEMP °F | | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| TEMP °C | | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| WT (KG) | DATA | TAKEOFF SPEEDS (KIAS), TARGET PITCH ATTITUDE (°) AND DISTANCE (METERS) | | | | | | |
| 9752 | $V_1$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_R$ | 115 | 115 | 115 | 115 | 115 | 115 | 115 |
| | $V_2$ | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1455 | 1520 | 1580 | 1630 | 1690 | 1740 | 2205 |
| 9500 | $V_1$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_R$ | 114 | 114 | 114 | 114 | 114 | 114 | 114 |
| | $V_2$ | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| | PITCH | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| | DIST | 1345 | 1390 | 1445 | 1500 | 1555 | 1600 | 1990 |
| 9000 | $V_1$ | 109 | 109 | 109 | 109 | 109 | 109 | 111 |
| | $V_R$ | 112 | 112 | 112 | 112 | 112 | 112 | 112 |
| | $V_2$ | 121 | 121 | 121 | 121 | 121 | 121 | 121 |
| | PITCH | 10 | 10 | 10 | 10 | 10 | 10 | 8 |
| | DIST | 1180 | 1220 | 1265 | 1315 | 1355 | 1395 | 1650 |
| 8500 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 107 |
| | $V_R$ | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| | $V_2$ | 118 | 118 | 118 | 118 | 118 | 118 | 118 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| | DIST | 1080 | 1115 | 1155 | 1195 | 1230 | 1270 | 1405 |
| 8000 | $V_1$ | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 1055 | 1095 | 1130 | 1165 | 1200 | 1235 | 1305 |
| 7500 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| | DIST | 1040 | 1075 | 1110 | 1145 | 1180 | 1210 | 1275 |
| 7000 | $V_1$ | 106 | 105 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 1020 | 1055 | 1090 | 1125 | 1155 | 1190 | 1245 |
| 6500 | $V_1$ | 106 | 106 | 105 | 105 | 105 | 105 | 105 |
| | $V_R$ | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| | $V_2$ | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| | PITCH | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| | DIST | 1005 | 1040 | 1070 | 1105 | 1135 | 1170 | 1220 |

These data were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, autospoilers armed, & APR armed. The shaded areas are for interpolation only.

## TAKEOFF THRUST — ANTI-ICE OFF

45-2000TP

| TEMP °F | -4 | 14 | 23 | 32 | 41 | 50 | 59 | 68 | 77 | 86 | 95 | 104 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMP °C | -20 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| %$N_1$ | 84.8 | 85.7 | 86.4 | 87.2 | 88.0 | 88.8 | 89.6 | 90.4 | 91.2 | 92.0 | 92.8 | 91.2 |

## Takeoff Pitch Trim Setting

| CENTER-OF-GRAVITY — % MAC | | | | | | |
|---|---|---|---|---|---|---|
| 1 to 10 | 12 | 14 | 16 | 18 | 20 | 22 to aft limit |
| 8.7 | 8.1 | 7.6 | 7.0 | 6.4 | 5.9 | 5.3 |

## Landing Speeds Below 4000 Feet

| | WEIGHT — 1000 KG | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPEED | 6.5 | 7 | 7.5 | 8 | 8.5 | 8.709 | 9 | 9.299 |
| VREF | 108 | 111 | 115 | 118 | 121 | 123 | 124 | 125 |
| VAPP | 116 | 120 | 124 | 128 | 131 | 132 | 134 | 136 |

## Landing Distances

| | TEMP °F | -4 | 14 | 32 | 50 | 68 | 86 | 104 |
|---|---|---|---|---|---|---|---|---|
| | TEMP °C | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| | WT — KG | LANDING DISTANCE — METERS | | | | | | |
| SEA LEVEL | 8,709 | 735 | 760 | 780 | 800 | 825 | 845 | 870 |
| | 8,500 | 725 | 745 | 765 | 790 | 810 | 830 | 855 |
| | 8,000 | 695 | 720 | 735 | 755 | 775 | 800 | 815 |
| | 7,500 | 670 | 690 | 705 | 725 | 740 | 760 | 780 |
| | 7,000 | 645 | 665 | 680 | 695 | 710 | 725 | 745 |
| | 6,500 | 620 | 635 | 650 | 665 | 680 | 695 | 710 |
| 2000 ft | 8,709 | 780 | 805 | 830 | 855 | 875 | 900 | 925 |
| | 8,500 | 765 | 790 | 815 | 835 | 860 | 885 | 905 |
| | 8,000 | 735 | 760 | 780 | 800 | 820 | 845 | 865 |
| | 7,500 | 705 | 725 | 745 | 765 | 785 | 805 | 825 |
| | 7,000 | 680 | 700 | 715 | 735 | 750 | 770 | 785 |
| | 6,500 | 650 | 670 | 685 | 700 | 715 | 735 | 750 |
| 4000 ft | 8,709 | 830 | 855 | 880 | 910 | 935 | 960 | 990 |
| | 8,500 | 815 | 840 | 865 | 890 | 915 | 945 | 970 |
| | 8,000 | 780 | 805 | 830 | 850 | 875 | 900 | 925 |
| | 7,500 | 745 | 770 | 790 | 810 | 835 | 855 | 880 |
| | 7,000 | 715 | 735 | 755 | 775 | 795 | 815 | 835 |
| | 6,500 | 685 | 705 | 720 | 740 | 755 | 775 | 790 |

These speeds & distances were determined for dry runway, zero wind, zero runway gradient, anti-ice off, anti-skid on, & autospoilers deployed.