

737-700/-800/BCF

Quick Reference Handbook

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Revision 2

This Quick Reference Handbook (QRH) has been originally prepared by The Boeing Commercial Airplanes, Commercial Aviation Services organization, and further customized to reflect GOL Linhas Aéreas S.A. fleet and flight operations.

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This manual has been developed and is constantly updated based on AFM (Airplane Flight Manual).

Lights

Chapter Lights

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BOEING 737
NORMAL CHECKLIST



PREFLIGHT

OXYGEN	TESTED, 100% (BOTH)
NAV. TRANSFER & DISPLAY SWITCHES	NORMAL & AUTO (F/O)
WINDOW HEAT	ON (F/O)
PRESSURIZATION MODE SELECTOR	AUTO (F/O)
FLIGHT INSTRUMENTS	HEADING __ ALTIMETER __ (BOTH)
ENGINE START LEVERS	CUTOFF (C)

BEFORE START

FLIGHT DECK DOOR	CLOSED AND LOCKED (F/O)
FUEL	__ KG, PUMPS ON (BOTH)
DOORS / WINDOWS	LOCKED (BOTH)
MCP	V2 __, HEADING __, ALTITUDE __ (BOTH)
AUTOBRAKE	RTO (F/O)
TAKEOFF SPEEDS	V1 __, VR __, V2 __ (C)
OPT / CDU PREFLIGHT	COMPLETED (C)
RUDDER AND AILERON TRIM	FREE AND 0 (C)
TAXI AND TAKEOFF BRIEFING	COMPLETED (BOTH)
FASTEN BELTS SWITCH	ON (F/O)
ANTICOLLISION LIGHT	ON (F/O)
PARKING BRAKE	AS REQUIRED (C)

SINGLE ENGINE BEFORE TAXI

GENERATOR (Operating Engine Only)	ON (F/O)
PACKS	AUTO (F/O)
ISOLATION VALVE	__ (F/O)
FLAPS / RATE / STAB TRIM	__ GREEN LIGHT / __ K / __ UNITS (C)
FLIGHT CONTROLS	CHECKED (C)
GROUND EQUIPMENT	CLEAR (BOTH)

Single Engine with:	PACKS	Isolation Valve	Engine Bleeds	APU Bleed
APU and ENG No.2	AUTO	CLOSED	ON	ON
APU and ENG No.1	AUTO	OPEN	OFF	ON
APU OFF (Any Eng)	AUTO	CLOSED	ON	OFF

DUAL ENGINE BEFORE TAXI

GENERATORS	ON (F/O)
ANTI-ICE	__ (F/O)
APU	__ (F/O)
ENGINE START SWITCHES	CONT (F/O)
RECALL	CHECKED (BOTH)
FLAPS / RATE / STAB TRIM	__ GREEN LIGHT / __ K / __ UNITS (C)
ENGINE START LEVERS	IDLE DETENT (C)
FLIGHT CONTROLS	CHECKED (C)
GROUND EQUIPMENT	CLEAR (BOTH)

SHUTDOWN

ANTICOLLISION LIGHT	OFF (F/O)
WEATHER RADAR	OFF (BOTH)
ENGINE START LEVERS	CUTOFF (C)
PARKING BRAKE	AS REQUIRED (C)
TRANSPONDER	STBY (F/O)

SECURE

IRS	OFF (F/O)
EMERGENCY EXIT LIGHTS	OFF (F/O)
WINDOW HEAT	OFF (F/O)
PACKS	OFF (F/O)

RUNWAY CHANGE

FLAPS	GREEN LIGHT (C)
RATE	__ K, FULL/REDUCED (C)
IAS BUGS	V1 __, VR __, V2 __ (C)
STABILIZER TRIM	UNITS (C)
OPT / TAKEOFF BRIEFING	COMPLETED (BOTH)
CDU / SID UPDATE	COMPLETED (F/O)



**BOEING 737 BCF
NORMAL CHECKLIST**



PREFLIGHT

INTERIOR INSPECTION	COMPLETED (C)
MAIN DECK VISUAL INSPECTION	AS REQUIRED (C)
OXYGEN	TESTED, 100% (BOTH)
NAV. TRANSFER & DISPLAY SWITCHES	NORMAL & AUTO (F/O)
WINDOW HEAT	ON (F/O)
PRESSURIZATION MODE SELECTOR	AUTO (F/O)
FLIGHT INSTRUMENTS	HEADING ____ ALTIMETER ____ (BOTH)
ENGINE START LEVERS	CUTOFF (C)

BEFORE START

ESCAPE SLIDES	CONNECTED (C)
SUPERNUMERARY BRIEFING	AS REQUIRED (C)
FLIGHT DECK DOOR	CLOSED AND LOCKED (F/O)
FUEL	____ KG, PUMPS ON (BOTH)
DOORS / WINDOWS	LOCKED (BOTH)
MCP	V2 ____, HEADING ____, ALTITUDE ____ (BOTH)
AUTOBRAKE	RTO (F/O)
TAKEOFF SPEEDS	V1 ____, VR ____, V2 ____ (C)
OPT / CDU PREFLIGHT	COMPLETED (C)
RUDDER AND AILERON TRIM	FREE AND 0 (C)
TAXI AND TAKEOFF BRIEFING	COMPLETED (BOTH)

FASTEN BELTS SWITCH	ON (F/O)
ANTICOLLISION LIGHT	ON (F/O)
PARKING BRAKE	AS REQUIRED (C)

SINGLE ENGINE BEFORE TAXI

GENERATOR (Operating Engine Only)	ON (F/O)
PACKS	AUTO (F/O)
ISOLATION VALVE	____ (F/O)
FLAPS / RATE / STAB TRIM	____ GREEN LIGHT / ____ K / ____ UNITS (C)
FLIGHT CONTROLS	CHECKED (C)
GROUND EQUIPMENT	CLEAR (BOTH)

Single Engine with:	PACKS	Isolation Valve	Engine Bleeds	APU Bleed
APU and ENG No.2	AUTO	CLOSED	ON	ON
APU and ENG No.1	AUTO	OPEN	OFF	ON
APU OFF (Any Eng)	AUTO	CLOSED	ON	OFF

DUAL ENGINE BEFORE TAXI

GENERATORS	ON (F/O)
ANTI-ICE	____ (F/O)
APU	____ (F/O)
ENGINE START SWITCHES	CONT (F/O)
RECALL	CHECKED (BOTH)
FLAPS / RATE / STAB TRIM	____ GREEN LIGHT / ____ K / ____ UNITS (C)
ENGINE START LEVERS	IDLE DETENT (C)
FLIGHT CONTROLS	CHECKED (C)
GROUND EQUIPMENT	CLEAR (BOTH)

SHUTDOWN

ANTICOLLISION LIGHT	OFF (F/O)
WEATHER RADAR	OFF (BOTH)
ENGINE START LEVERS	CUTOFF (C)
PARKING BRAKE	AS REQUIRED (C)
TRANSPONDER	STBY (F/O)
ESCAPE SLIDES	DISCONNECTED (F/O)

SECURE

IRS	OFF (F/O)
EMERGENCY EXIT LIGHTS	OFF (F/O)
WINDOW HEAT	OFF (F/O)
PACKS	OFF (F/O)

RUNWAY CHANGE

FLAPS	____ GREEN LIGHT (C)
RATE	____ K, FULL/REDUCED (C)
IAS BUGS	V1 ____, VR ____, V2 ____ (C)
STABILIZER TRIM	____ UNITS (C)
OPT / TAKEOFF BRIEFING	COMPLETED (BOTH)
CDU / SID UPDATE	COMPLETED (F/O)



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Emergency Descent.....0.1



Intentionally
Blank

Emergency Descent

Condition: One or more of these occur:

- Cabin altitude cannot be controlled
- A rapid descent is needed.

- 1 Announce the emergency descent. The pilot flying will advise the cabin crew, on the PA system, of impending rapid descent. The pilot monitoring will advise ATC and obtain the area altimeter setting.
- 2 Passenger signs ON
- 3 **Without delay**, descend to the lowest safe altitude or 10,000 feet, whichever is higher.
- 4 ENGINE START switches (both) CONT
- 5 Thrust levers (both) Reduce thrust to minimum or as needed for anti-ice
- 6 Speedbrake FLIGHT DETENT

If structural integrity is in doubt, limit speed as much as possible and avoid high maneuvering loads.

- 7  Set target speed to Mmo/Vmo.

737-700 with winglets

Caution! When gross weight is greater than 64,864 kgs, speed brake will autostow to the 50% flight detent if airspeed exceeds 320 knots. Do not override autostow function unless airspeed is less than 320 knots.

- 8 **When** approaching the level off altitude:
Smoothly lower the SPEED BRAKE lever to the DOWN detent and level off. Add thrust and stabilize on altitude and airspeed.
- 9 Crew oxygen regulators Normal
Flight crew must use oxygen when cabin altitude is above 10,000 feet. To conserve oxygen, move the regulator to Normal.
- 10 ENGINE START switches (both) As needed

▼ Continued on next page ▼

▼Emergency Descent continued▼

11 The new course of action is based on weather, oxygen, fuel remaining and available airports. Use of long range cruise may be needed.

12 Choose one:

◆Pressurization mode selector is in **MAN**:

▶▶ **Go to step 13**

◆Pressurization mode selector is **not** in MAN:



13 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.



Pressurization **Move to OPEN or CLOSE as needed to control cabin altitude and rate**

Recall Checked

Autobrake ____

Landing data VREF ____, Minimums ____

Approach briefing Completed

Approach Checklist

Altimeters ____

At Pattern Altitude

Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

Landing Checklist

ENGINE START switches. CONT

Speedbrake ARMED

▼ Continued on next page ▼

▼Emergency Descent continued▼

Landing gear Down
Flaps ____, Green light



Bomb Threat In Flight

Condition: A bomb threat exists in flight.

Objective: To take the required actions after an amber/red bomb threat.

Note: No action is required for green alerts.

- 1 Aircraft (if climbing) Level off
It will prevent the CABIN ALT from increasing, in order to avoid the activation of an altitude-sensitive bomb.
- 2 ATC. Inform
- 3 Airline Operations Control Center Notify
An advisory risk assessment will be set up and will classify the bomb threat.
- 4 Seat belts ON
- 5 Cabin crew. Notify
Determine to start a search for the suspicious device.
- 6 Perform a speech to the passengers.
- 7 Choose one:
 - ◆ The device is found:
▶▶ **Go to step 8**
 - ◆ The device is not found:
▶▶ **Go to step 11**
- 8 Choose one:
 - ◆ The device is safe to be moved:
▶▶ **Go to step 9**
 - ◆ The device is not safe to be moved:
▶▶ **Go to step 10**
- 9 Move it to the rear of the airplane, to the lowest risk bomb position and cover it with wet pillows, blankets, etc.
▶▶ **Go to step 11**

▼ Continued on next page ▼

▼ Bomb Threat In Flight continued ▼

10 Leave it in place and cover with wet pillows, blankets. Move the passenger away from the device.

11 Plan to land at the nearest suitable airport.

12 Descend to the CABIN ALT or lowest safe altitude.

This will reduce the cabin differential pressure to zero, which will cause less damage to the aircraft, ensuring the blast goes outwards, in case of an explosion.

13 Avoid abrupt maneuvers, turbulence and do not use speedbrakes, in order to prevent the bomb from moving.

14 When at CABIN ALT or lowest safe altitude:

Configure for landing as soon as possible (below 20,000 feet and considering fuel). This will ensure gear is down in case of explosion and damaging the systems. The reduced speed will also minimize the stress on the aircraft fuselage.

15 After landing, choose one:

◆ The device was found:

▶▶ **Go to step 16**

◆ The device was not found:

▶▶ **Go to step 17**

16 Taxi to a remote stand and advise the cabin crew to disembark the passengers without delay. Perform an evacuation only if necessary.

The passengers must leave their personal belongings on board.



17 Taxi to a remote stand and instruct the passengers to disembark with their personal belongings.



Bomb Threat On Ground

Condition: A bomb threat exists while on the ground.

Objective: To take the required actions after an amber/red bomb threat.

Note: No action is required for green alerts.

1 ATC. Inform

2 Airline Operations Control Center Notify

An advisory risk assessment will be set up and will classify the bomb threat.

3 Cabin crew. Notify

Determine to start a search for the suspicious device.

4 Perform a speech to the passengers.

5 Choose one:

◆ The device was found:

▶▶ **Go to step 6**

◆ The device was not found:

▶▶ **Go to step 7**

6 Advise the cabin crew to disembark the passengers without delay. Perform an evacuation only if disembarking procedures can NOT be made.

The passengers must leave their personal belongings on board.



7 Advise the cabin crew to disembark the passengers with their personal belongings.

8 If the alert is received during taxi out, taxi the aircraft to a remote stand and disembark the passengers. Perform an evacuation only if disembarking procedures can NOT be made.



Ditching

Condition: Airplane ditching and evacuation are needed.

- 1 Send distress signals. Determine position, course, speed, altitude, situation, intention, time and position of intended touchdown and transmit mayday. Report type of aircraft and request intercept.
- 2 Alert supernumeraries or cabin crew to prepare for ditching and seat passengers as far forward as possible.
- 3 Burn off fuel to reduce touchdown speed and increase buoyancy.
- 4 Plan to touch down on the windward side and parallel to waves and swells.
- 5 Plan a flaps 40 landing unless another configuration is needed.
- 6 Set VREF 40.
- 7 Do **not** arm the autobrake.
- 8 Do **not** accomplish the normal landing checklist.
- 9 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization LAND ALT ____
 Recall Checked
 Autobrake **OFF**
 Landing data **VREF 40** ____
 Approach briefing Completed

Approach Checklist

Altimeters ____

▼ Continued on next page ▼

▼ Ditching continued ▼

Below 5000 feet

LANDING GEAR AURAL WARN
circuit breaker (P6-3:D18) Pull

This prevents the warning horn with gear retracted and landing flaps selected.

The flight deck chime for an incoming call from the cabin crew is unavailable.

Passenger signs ON

Engine BLEED air switches (both) OFF

This allows the airplane to be depressurized with the outflow valve closed.

Pressurization mode selector MAN

Outflow VALVE switch Hold in CLOSE
until the outflow VALVE
indication shows fully closed

This prevents water from entering the airplane.

Note: The outflow valve takes up to 20 seconds to close.

APU switch OFF

GROUND PROXIMITY GEAR
INHIBIT switch GEAR INHIBIT

GROUND PROXIMITY TERR
INHIBIT switch TERR INHIBIT

Life vests, shoulder harnesses and seat belts . . . On

Confirm that passenger cabin preparations are complete.

Caution! Do not open aft entry or service doors as they may be partially submerged.

Transmit all pertinent information regarding final ditching position.

▼ Continued on next page ▼

▼ Ditching continued ▼

After Impact Procedure Review

Set both engine start levers to CUTOFF. This closes fuel shutoff valves to prevent discharge of fuel from ruptured fuel lines.

Open flight deck windows. This ensures no cabin differential pressure prevents the opening of the doors or emergency exits.

Start the evacuation.

Proceed to assigned ditching stations, launch rafts and evacuate the airplane as soon as practicable.

The airplane may stay afloat indefinitely if fuel load is minimal and no serious damage was sustained during landing.

Ditching Final

LANDING GEAR lever. UP and OFF

Flaps ____, Green light

At **500 feet**, advise the cabin crew that ditching is imminent.

At **50 feet**, advise the cabin crew to brace for impact.

Maintain airspeed at VREF. Flare the airplane to achieve the minimum rate of descent at touchdown. Maintain 200-300 fpm rate of descent until the start of the flare.

At flare, rotate smoothly to a touchdown attitude of 10-12°. Maintain airspeed and rate of descent with thrust.

At touchdown, reduce thrust to idle.



EFB Failure

Condition: One or more of these occur:

- An EFB is inoperative or unavailable, resulting in a single operational EFB
- All EFBs are inoperative or unavailable
- A required application has failed.

1 Choose one:

◆ A **single** failure occurs:

▶▶ **Go to step 2**

◆ A **dual** failure occurs **on ground**:

▶▶ **Go to step 3**

◆ A **dual** failure occurs **in flight**:

▶▶ **Go to step 4**

2 Continue normal operation with single EFB.



3 Consider to return to gate in order to request maintenance personnel assistance to fix EFB failure or dispatch according to MEL or use paper charts available in the cockpit.



4 Use paper charts available in the cockpit.

Note: If OPT landing data was intended to use, check the QRH's Normal Configuration Landing Distance.



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Intentionally
Blank

AUTO
UNLK

AUTOMATIC UNLOCK

Condition: The correct emergency access code is entered.

Objective: To deny unauthorized access to the flight deck before the door automatically unlocks.

- 1 FLT DK DOOR lock selector Rotate to DENY and hold for 1 second



CARGO DOOR

FWD
CARGO

AFT
CARGO

Condition: One or more cargo doors are not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.
Continue normal operation.



◆ Pressurization is **not** normal:

▶▶ **Go to step 2**

2 Don oxygen masks.

3 Establish crew communications.

4 Passenger signs ON

5 Choose one:

◆ Airplane **has** reached the planned cruise altitude:

▶▶ **Go to step 6**

◆ Airplane has **not** reached the planned cruise altitude:

Do **not** continue the climb.

Reset the FLT ALT indicator to the actual airplane altitude.

▶▶ **Go to step 6**

6 LAND ALT indicator 9000 feet

▼ Continued on next page ▼

▼ CARGO DOOR continued ▼

7 Choose one:

◆ Minimum safe altitude is **at or below 9,000 feet:**

▶▶ Go to step 8

◆ Minimum safe altitude is **between 9,000 feet and 13,000 feet:**

▶▶ Go to step 10

◆ Minimum safe altitude is **at or above 13,000 feet:**

▶▶ Go to step 12

8 Descend to 9,000 feet.

9 Maintain a cabin differential pressure of 0 psi by limiting flight altitude to 9,000 feet.

▶▶ Go to step 15

10 Descend to the minimum safe altitude.

11 LAND ALT indicator Select a higher altitude (maximum 13,000 feet) to maintain a cabin differential pressure of 0 psi

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

▶▶ Go to step 15

12 Descend to the minimum safe altitude.

13 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

14 ⚠ Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

▼ Continued on next page ▼

▼ CARGO DOOR continued ▼

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

15 Plan to land at the nearest suitable airport.

16 **When** the cabin altitude is at or below 10,000 feet:
Oxygen masks may be removed.



Condition: The emergency locator transmitter is on.



Condition: The emergency exit lights switch is not ARMED.

1 Choose one:

◆ EMER EXIT LIGHTS switch is **ON**:
Individual emergency exit light batteries supply a minimum of 10 minutes of lighting.



◆ EMER EXIT LIGHTS switch is **OFF**:
Emergency lighting is not available.



ENTRY DOOR

737-700, 737-800

FWD
ENTRY

AFT
ENTRY

Condition: One or more entry doors are not closed and secure.

- 1 Instruct the cabin crew to verify that the door handle is in the closed position or to move the handle to the closed position if possible.
- 2 Choose one:
 - ◆ Handle is in the **closed** position:
 - ▶▶ **Go to step 3**
 - ◆ Handle is **not** in the closed position:
 - Plan to land at the nearest suitable airport.
 - ■ ■ ■
- 3 Choose one:
 - ◆ Pressurization is **normal**:
 - The door is in a safe configuration.
Continue normal operation.
 - ■ ■ ■
 - ◆ Pressurization is **not** normal:
 - Plan to land at the nearest suitable airport.
 - ■ ■ ■

ENTRY DOOR

737-800 BCF

**FWD
ENTRY**

Condition: Entry door is not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.
Continue normal operation.

◆ Pressurization is **not** normal:

Plan to land at the nearest suitable airport.



EQUIP

EQUIPMENT DOOR

Condition: The equipment door is not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.
Continue normal operation.



◆ Pressurization is **not** normal:

▶▶ **Go to step 2**

2 Don oxygen masks.

3 Establish crew communications.

4 Passenger signs ON

5 Choose one:

◆ Airplane **has** reached the planned cruise altitude:

▶▶ **Go to step 6**

◆ Airplane has **not** reached the planned cruise altitude:

Do **not** continue the climb.

Reset the FLT ALT indicator to the actual airplane altitude.

▶▶ **Go to step 6**

6 LAND ALT indicator 9000 feet

▼ Continued on next page ▼

▼ EQUIPMENT DOOR continued ▼

7 Choose one:

◆ Minimum safe altitude is **at or below 9,000 feet:**

▶▶ Go to step 8

◆ Minimum safe altitude is **between 9,000 feet and 13,000 feet:**

▶▶ Go to step 10

◆ Minimum safe altitude is **at or above 13,000 feet:**

▶▶ Go to step 12

8 Descend to 9,000 feet.

9 Maintain a cabin differential pressure of 0 psi by limiting flight altitude to 9,000 feet.

▶▶ Go to step 15

10 Descend to the minimum safe altitude.

11 LAND ALT indicator Select a higher altitude (maximum 13,000 feet) to maintain a cabin differential pressure of 0 psi

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

▶▶ Go to step 15

12 Descend to the minimum safe altitude.

13 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

14 ⚠ Outflow VALVE switch. Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

▼ Continued on next page ▼

▼ EQUIPMENT DOOR continued ▼

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

15 Plan to land at the nearest suitable airport.

16 **When** the cabin altitude is at or below 10,000 feet:
Oxygen masks may be removed.



LOCK
FAIL

LOCK FAIL

Condition: One or more of these occur:

- The FLIGHT DECK ACCESS SYSTEM switch is OFF
- The lock is failed.

Objective: To remove electrical power from the lock to prevent a possible overheat.

Do **if** conditions allow a crew member to leave the seat.

1  FLIGHT DECK ACCESS SYSTEM switch OFF

Note: The door can be locked with the dead bolt.



MAIN
CARGO

MAIN CARGO DOOR

737-800 BCF

Condition: The main cargo door is not closed and secure.

- 1 Choose one:

◆MAIN CARGO light is illuminated on **takeoff**:

PACK switches (both) OFF
Plan to land at the nearest suitable airport.

■ ■ ■ ■

◆MAIN CARGO light is illuminated at a time **other than takeoff**:

▶▶Go to step 2
- 2 Don oxygen masks.
- 3 Establish crew communications.
- 4 Passenger signs ON
- 5 Choose one:

◆Airplane **has** reached the planned cruise altitude:

▶▶Go to step 6

◆Airplane has **not** reached the planned cruise altitude:

Do **not** continue the climb.
Reset the FLT ALT indicator to the actual airplane altitude.

▶▶Go to step 6
- 6 LAND ALT indicator 9000 feet

▼ Continued on next page ▼

▼ MAIN CARGO DOOR continued ▼

7 Choose one:

◆ Minimum safe altitude is **at or below 9,000 feet:**

▶▶ Go to step 8

◆ Minimum safe altitude is **between 9,000 feet and 13,000 feet:**

▶▶ Go to step 10

◆ Minimum safe altitude is **at or above 13,000 feet:**

▶▶ Go to step 12

8 Descend to 9,000 feet.

9 Maintain a cabin differential pressure of 0 psi by limiting flight altitude to 9,000 feet.

▶▶ Go to step 15

10 Descend to the minimum safe altitude.

11 LAND ALT indicator Select a higher altitude (maximum 13,000 feet) to maintain a cabin differential pressure of 0 psi

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

▶▶ Go to step 15

12 Descend to the minimum safe altitude.

13 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

14 ⚠ Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

▼ Continued on next page ▼

▼ MAIN CARGO DOOR continued ▼

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

15 Plan to land at the nearest suitable airport.

16 **When** the cabin altitude is at or below 10,000 feet:
Oxygen masks may be removed.



OVERWING DOOR

737-700

LEFT
OVERWING

RIGHT
OVERWING

737-800

LEFT FWD
OVERWING

RIGHT FWD
OVERWING

LEFT AFT
OVERWING

RIGHT AFT
OVERWING

Condition: One or more overwing doors are not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.
Continue normal operation.



◆ Pressurization is **not** normal:

Plan to land at the nearest suitable airport.



PASS OXY
ON

PASSENGER OXYGEN ON

737-700, 737-800

Condition: The passenger oxygen system is on.



PASS OXY
ON

PASSENGER OXYGEN ON

737-800 BCF

Condition: The DON OXYGEN sign and supernumerary horn are on.



SERVICE DOOR

737-700, 737-800

**FWD
SERVICE****AFT
SERVICE**

Condition: One or more service doors are not closed and secure.

- 1 Instruct the cabin crew to verify that the door handle is in the closed position or to move the handle to the closed position if possible.
- 2 Choose one:
 - ◆ Handle is in the **closed** position:
▶▶ **Go to step 3**
 - ◆ Handle is **not** in the closed position:
Plan to land at the nearest suitable airport.
■ ■ ■ ■
- 3 Choose one:
 - ◆ Pressurization is **normal**:
The door is in a safe configuration.
Continue normal operation.
■ ■ ■ ■
 - ◆ Pressurization is **not** normal:
Plan to land at the nearest suitable airport.
■ ■ ■ ■

SERVICE DOOR

737-800 BCF

**FWD
SERVICE**

Condition: Service door is not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.
Continue normal operation.

◆ Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

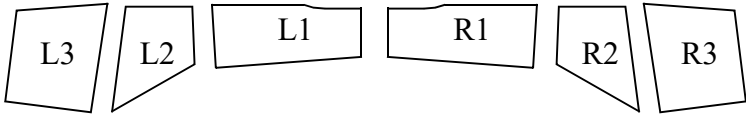


**Window Damage - Forward
(L1, L2, R1, R2)**

Condition: A forward flight deck window has one or more of these:

- An electrical arc
- A delamination
- A crack
- Is shattered.

Objective: To remove electrical power, if needed, to prevent arcing. To reduce differential pressure and descend if the inner pane is shattered or cracked.



- 1 Choose one:
- ◆ Window is **delaminated** only:
Continue normal operation.
■ ■ ■ ■
 - ◆ Window is **arcing**:
▶▶ **Go to step 2**
 - ◆ Window is **cracked** or **shattered**:
▶▶ **Go to step 5**
- 2 WINDOW HEAT switch
(affected window) OFF
Limit airspeed to 250 knots maximum below
10,000 feet.
- 3 Pull both WINDSHIELD AIR controls. This vents
conditioned air to the inside of the windshield for
defogging.
- 4 Continue normal operation.
■ ■ ■ ■
- 5 Don seat belts and shoulder harnesses.

▼ Window Damage - Forward (L1, L2, R1, R2) continued ▼

- 6 WINDOW HEAT switch
(affected window). OFF
Limit airspeed to 250 knots maximum below
10,000 feet.
- 7 Pull both WINDSHIELD AIR controls. This vents
conditioned air to the inside of the windshield for
defogging.
- 8 Choose one:
 ◆ Damage is on the **outer** pane:
 ▶▶ **Go to step 9**
 ◆ Damage is on the **inner** pane:
 ▶▶ **Go to step 11**
- 9 Continue normal operation.
- 10 Shoulder harnesses may be removed.
 ■ ■ ■ ■
- 11 Don oxygen masks.
- 12 Establish crew communications.
- 13 Passenger signs ON
- 14 Choose one:
 ◆ Airplane **has** reached the planned cruise altitude:
 ▶▶ **Go to step 15**
 ◆ Airplane has **not** reached the planned cruise
 altitude:
 Do **not** continue the climb.
 Reset the FLT ALT indicator to the actual
 airplane altitude.
 ▶▶ **Go to step 15**
- 15 LAND ALT indicator 9000 feet
- 16 Start a normal descent to below 14,000 feet or to
the minimum safe altitude, whichever is higher.
- 17 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼Window Damage - Forward (L1, L2, R1, R2) continued▼

18 **When** cabin differential pressure is 2 psi or less:

Oxygen masks and shoulder harnesses may be removed.

19 Sustained flight below 10,000 feet is not recommended due to the greater risk of a bird strike.

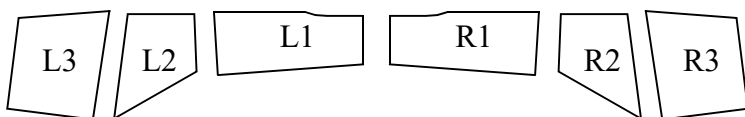


Window Damage - Heated Side (L3, R3)

Condition: A heated side flight deck window has one or more of these:

- An electrical arc
- A delamination
- A crack
- Is shattered.

Objective: To remove electrical power, if needed, to prevent arcing. To reduce differential pressure and descend if the inner pane is shattered or cracked.



Note: Heated windows are made of glass panes laminated and have Thermal Switch.

1 Choose one:

◆ Window is **delaminated** only:

Continue normal operation.



◆ Window is **arcing**:

▶▶ **Go to step 2**

◆ Window is **cracked** or **shattered**:

▶▶ **Go to step 5**

2 WINDOW HEAT switch
(affected window). OFF

Limit airspeed to 250 knots maximum below
10,000 feet.

3 Pull both WINDSHIELD AIR controls. This vents
conditioned air to the inside of the windshield for
defogging.

▼ Continued on next page ▼

▼ Window Damage - Heated Side (L3, R3) continued ▼

- 4 Continue normal operation.

■ ■ ■ ■

- 5 Don seat belts and shoulder harnesses.
- 6 WINDOW HEAT switch
(affected window) OFF

Limit airspeed to 250 knots maximum below
10,000 feet.
- 7 Pull both WINDSHIELD AIR controls. This vents
conditioned air to the inside of the windshield for
defogging.
- 8 Choose one:
 - ◆ Damage is on the **outer** pane:

▶▶ **Go to step 9**
 - ◆ Damage is on the **inner** pane:

▶▶ **Go to step 11**
- 9 Continue normal operation.
- 10 Shoulder harnesses may be removed.

■ ■ ■ ■
- 11 Don oxygen masks.
- 12 Establish crew communications.
- 13 Passenger signs ON
- 14 Choose one:
 - ◆ Airplane **has** reached the planned cruise altitude:

▶▶ **Go to step 15**
 - ◆ Airplane has **not** reached the planned cruise
altitude:

Do **not** continue the climb.
Reset the FLT ALT indicator to the actual
airplane altitude.
▶▶ **Go to step 15**
- 15 LAND ALT indicator 9000 feet

▼ Continued on next page ▼

▼ Window Damage - Heated Side (L3, R3) continued ▼

- 16 Start a normal descent to below 14,000 feet or to the minimum safe altitude, whichever is higher.
- 17 Plan to land at the nearest suitable airport.
- 18 **When** cabin differential pressure is 2 psi or less:
Oxygen masks and shoulder harnesses may be removed.
- 19 Sustained flight below 10,000 feet is not recommended due to the greater risk of a bird strike.

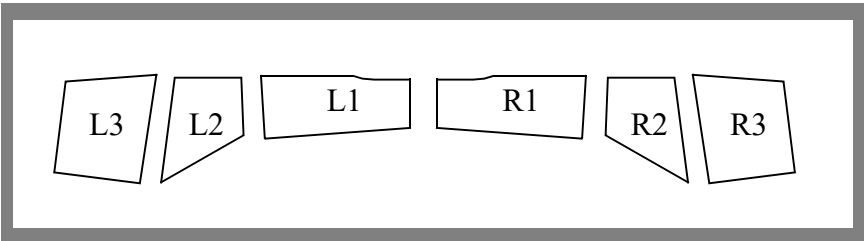


**Window Damage - Unheated Side
(L3, R3)**

Condition: An unheated side flight deck window has one or more of these:

- A crack
- Is shattered.

Objective: To reduce differential pressure to 0 psi if both panes are shattered or cracked.



Note: Unheated windows are made of two acrylic panes and do NOT have Thermal Switch.

- 1 Don seat belts and shoulder harnesses.
- 2 Choose one:
 - ◆ Damage is **only** on the inner **or** outer pane:
▶▶ **Go to step 3**
 - ◆ Damage is on **both** the inner **and** outer panes:
▶▶ **Go to step 5**
- 3 Continue normal operation.
- 4 Shoulder harnesses may be removed.
■ ■ ■ ■
- 5 Don oxygen masks.
- 6 Establish crew communications.
- 7 Passenger signs ON

▼ Continued on next page ▼

▼ Window Damage - Unheated Side (L3, R3) continued ▼

8 Choose one:

◆ Airplane **has** reached the planned cruise altitude:

▶▶ **Go to step 9**

◆ Airplane has **not** reached the planned cruise altitude:

Do **not** continue the climb.

Reset the FLT ALT indicator to the actual airplane altitude.

▶▶ **Go to step 9**

9 LAND ALT indicator 9000 feet

10 Choose one:

◆ Minimum safe altitude is **at or below 9,000 feet**:

▶▶ **Go to step 11**

◆ Minimum safe altitude is **between 9,000 feet and 13,000 feet**:

▶▶ **Go to step 13**

◆ Minimum safe altitude is **at or above 13,000 feet**:

▶▶ **Go to step 15**

11 Descend to 9,000 feet.

12 Maintain a cabin differential pressure of 0 psi by limiting flight altitude to 9,000 feet.

▶▶ **Go to step 18**

13 Descend to the minimum safe altitude.

14 LAND ALT indicator Select a higher altitude (maximum 13,000 feet) to maintain a cabin differential pressure of 0 psi

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

▼ Continued on next page ▼

▼ Window Damage - Unheated Side (L3, R3) continued ▼

►► Go to step 18

15 Descend to the minimum safe altitude.

16 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

17  Outflow VALVE switch. Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

18 **When** the cabin altitude is at or below 10,000 feet:
Oxygen masks may be removed.

19 Shoulder harnesses may be removed.



I

Window Open

Condition: A side window opens during takeoff or in flight.

- 1 Maintain the maneuvering speed for the existing flap setting until the window is closed.
- 2 The force needed to close the window increases with airspeed. It may not be possible to close the window at speeds above 250 knots.
- 3 Close and lock the window.
- 4 Choose one:
 - ◆ Window **locks and** the pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■
 - ◆ Window does **not** lock **or** the pressurization is **not** normal:

Level off at the lowest safe altitude.

The airplane can fly unpressurized and land safely with the window open.

■ ■ ■ ■



Intentionally
Blank

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CABIN ALTITUDE WARNING or Rapid Depressurization

**CABIN
ALTITUDE**

(If installed and operative)

Condition: One or more of these occur:

- A cabin altitude exceedance
- In flight, the intermittent cabin altitude/configuration warning horn sounds or a CABIN ALTITUDE light (if installed and operative) illuminates.

- 1 Don oxygen masks and set regulators to 100%.
- 2 Establish crew communications.
- 3 Pressurization mode selector MAN
- 4 Outflow VALVE switch Hold in CLOSE
until the outflow VALVE
indication shows fully closed
- 5 **If** cabin altitude is **uncontrollable**:
 Passenger signs ON
 PASS OXYGEN switch ON
**►► Go to the Emergency Descent checklist
on page 0.1**



-
- 6 **If** cabin altitude is **controllable**:
 Continue manual operation to maintain correct
cabin altitude.
When the cabin altitude is at or below 10,000
feet:
 Oxygen masks may be removed.

7 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ CABIN ALTITUDE WARNING or Rapid Depressurization continued ▼

Deferred Items

Descent Checklist

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.



Pressurization . . **Move outflow VALVE switch to OPEN or CLOSE as needed to control cabin altitude and rate**

- Recall Checked
- Autobrake ____
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

At Pattern Altitude

- Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps ____, Green light



AUTO FAIL **or** **Unscheduled Pressurization Change**

**AUTO
FAIL**

May or may not be illuminated

Condition: One or more of these occur:

- Automatic pressurization mode has failed
- The cabin altitude is uncontrollable.

Objective: To maintain control of cabin altitude.

- 1 Increasing thrust may ensure sufficient air supply to control cabin altitude.
- 2 Pressurization mode selector ALTN
- 3 Choose one:

◆AUTO FAIL light is **extinguished and** cabin altitude is **controllable**:

Continue normal operation.



◆AUTO FAIL light is **illuminated or** cabin altitude is **uncontrollable**:

▶▶ **Go to step 4**

- 4 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

- 5  Outflow VALVE switch Move to OPEN or CLOSE as needed to control cabin altitude and rate

- 6 Choose one:

◆Cabin altitude is **controllable**:

▶▶ **Go to step 11**

◆Cabin altitude is **uncontrollable**:

▶▶ **Go to step 7**

- 7 Don oxygen masks and set regulators to 100%.
- 8 Establish crew communications.

▼ Continued on next page ▼

▼ **AUTO FAIL or Unscheduled Pressurization Change continued** ▼

- 9 Passenger signs ON
- 10 PASS OXYGEN switch ON

▶▶ **Go to the Emergency Descent checklist on page 0.1**



11 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.



Pressurization . . **Move outflow VALVE switch to OPEN or CLOSE as needed to control cabin altitude and rate**

- Recall Checked
- Autobrake ____
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

At Pattern Altitude

- Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps ____, Green light



**BLEED
TRIP OFF**

BLEED TRIP OFF

Condition: One or more of these occur:

- An engine bleed air overheat
- An engine bleed air overpressure.

- 1 WING ANTI-ICE switch OFF
- 2 TRIP RESET switch Push

The BLEED TRIP OFF light extinguishes if the bleed air temperature has cooled below limits.

- 3 Choose one:

◆ BLEED TRIP OFF light **stays illuminated:**

PACK switch (affected side) OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

Avoid icing conditions where wing anti-ice is needed.



◆ BLEED TRIP OFF light **extinguishes:**

►► **Go to step 4**

- 4 WING ANTI-ICE switch As needed

Caution! Use of wing anti-ice above approximately FL350 may cause bleed trip off and possible loss of cabin pressure.



Cabin Temperature Hot

737-700, 737-800

Condition: Flight deck or passenger cabin temperature is excessively hot. The temperature can cause incapacitation.

Objective: To regain temperature control. If unable to regain control, to descend and configure to provide alternate ventilation.

737-700

- 1 Choose one:
 - ◆ **Flight deck** temperature is too high:
 - ▶▶ **Go to step 3**
 - ◆ **Passenger cabin** temperature is too high:
 - ▶▶ **Go to step 11**

737-800

- 2 Choose one:
 - ◆ **Flight deck** temperature is too high:
 - ▶▶ **Go to step 5**
 - ◆ **Passenger cabin** temperature is too high:
 - ▶▶ **Go to step 13**

737-700

- 3 CONT CABIN temperature selector **MANUAL**

737-700

- 4 CONT CABIN temperature selector Hold in **COOL** until the **AIR MIX VALVE** indication shows full **COLD**

737-800

- 5 TRIM AIR switch **OFF**
- 6 **Wait** 1 minute.

▼ Continued on next page ▼

▼ Cabin Temperature Hot continued ▼

7 Choose one:

◆ Air from the flight deck outlets is still too **warm**:

▶▶ **Go to step 8**

◆ Air from the flight deck outlets is **cool**:

The flight deck temperature gradually cools.



8 L PACK switch OFF

9 **Wait** 1 minute.

10 Choose one:

◆ Air from the flight deck outlets is still too **warm**:

▶▶ **Go to step 19**

◆ Air from the flight deck outlets is **cool**:

The flight deck temperature gradually cools.



737-700

11 PASS CABIN temperature selector MANUAL

737-700

12 PASS CABIN temperature selector Hold in COOL until the AIR MIX VALVE indication shows full COLD

737-800

13 TRIM AIR switch OFF

14 **Wait** 1 minute.

▼ Continued on next page ▼

▼ Cabin Temperature Hot continued ▼

15 Choose one:

◆ Air from the passenger cabin outlets is still too **warm**:

▶▶ **Go to step 16**

◆ Air from the passenger cabin outlets is **cool**:

The passenger cabin temperature gradually cools.



16 R PACK switch OFF

17 **Wait** 1 minute.

18 Choose one:

◆ Air from the passenger cabin outlets is still too **warm**:

▶▶ **Go to step 19**

◆ Air from the passenger cabin outlets is **cool**:

The passenger cabin temperature gradually cools.



19 Start a descent to the lowest safe altitude, or 10,000 feet, whichever is higher. Use the speedbrakes to increase the rate of descent, if needed. Monitor cabin altitude and rate.

737-800

20 R RECIRC FAN switch AUTO

737-800

21 L RECIRC FAN switch OFF

22 Minimize the flight deck lighting intensity.

23 Open the flight deck door.

24 **During** daylight:

Use flight deck window shades, as needed.
Instruct the cabin crew to close cabin window shades.

▼ Continued on next page ▼

▼ Cabin Temperature Hot continued ▼

25 Instruct the cabin crew to dim cabin lighting.

26 Advise the cabin crew that the cabin lighting may be extinguished, but passenger reading lights will continue to work.

27 CAB/UTIL switch (as installed) OFF

28 IFE/PASS SEAT switch (as installed) OFF

29 GALLEY switch (as installed) OFF

30 **When** at level off:

Maintain 290 knots minimum. Flight deck and passenger cabin temperatures can increase rapidly at speeds below 290 knots.

31 Choose one:

◆ Airplane altitude is **at or below 10,000 feet**:

▶▶ **Go to step 32**

◆ Airplane altitude is **above 10,000 feet**:

Don oxygen masks.

Establish crew communications.

▶▶ **Go to step 32**

32 PACK switch (operating pack) OFF

33 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

34  Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open

This increases airplane ventilation.

35 Plan to land at the nearest suitable airport.



Cabin Temperature Hot

737-800 BCF

Condition: Flight deck or supernumerary area temperature is excessively hot. The temperature can cause incapacitation.

Objective: To regain temperature control. If unable to regain control, to descend and configure to provide alternate ventilation.

- 1 Choose one:
 - ◆Flight deck temperature is too high:
 - ▶▶ Go to step 2
 - ◆Supernumerary area temperature is too high:
 - ▶▶ Go to step 8
- 2 TRIM AIR switch OFF
- 3 Wait 1 minute.
- 4 Choose one:
 - ◆Air from the flight deck outlets is still too warm:
 - ▶▶ Go to step 5
 - ◆Air from the flight deck outlets is cool:

The flight deck temperature gradually cools.

■ ■ ■ ■
- 5 L PACK switch OFF
- 6 Wait 1 minute.
- 7 Choose one:
 - ◆Air from the flight deck outlets is still too warm:
 - ▶▶ Go to step 14
 - ◆Air from the flight deck outlets is cool:

The flight deck temperature gradually cools.

■ ■ ■ ■

▼ Continued on next page ▼

▼ Cabin Temperature Hot continued ▼

8 TRIM AIR switch OFF

9 **Wait** 1 minute.

10 Choose one:

- ◆ Air from the supernumerary area outlets is still too **warm**:
 ►► **Go to step 11**
- ◆ Air from the supernumerary area outlets is **cool**:
 The supernumerary area temperature gradually cools.
 ■ ■ ■ ■

11 R PACK switch OFF

12 **Wait** 1 minute.

13 Choose one:

- ◆ Air from the supernumerary area outlets is still too **warm**:
 ►► **Go to step 14**
- ◆ Air from the supernumerary area outlets is **cool**:
 The supernumerary area temperature gradually cools.
 ■ ■ ■ ■

14 Start a descent to the lowest safe altitude, or 10,000 feet, whichever is higher. Use the speedbrakes to increase the rate of descent, if needed. Monitor cabin altitude and rate.

15 Minimize the flight deck lighting intensity.

16 Open the flight deck door.

17 **During** daylight:

Use flight deck window shades, as needed.

18 CAB/UTIL switch OFF

▼ Continued on next page ▼

▼ Cabin Temperature Hot continued ▼

19 **When** at level off:

Maintain 290 knots minimum. Flight deck and supernumerary area temperatures can increase rapidly at speeds below 290 knots.

20 Choose one:

◆ Airplane altitude is **at or below 10,000 feet**:

▶▶ **Go to step 21**

◆ Airplane altitude is **above 10,000 feet**:

Don oxygen masks.

Establish crew communications.

▶▶ **Go to step 21**

21 PACK switch (operating pack) OFF

22 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

23 ⚠ Outflow VALVE switch. . . . Move to OPEN until the outflow VALVE indication shows fully open

This increases airplane ventilation.

24 Plan to land at the nearest suitable airport.



DUAL BLEED

Condition: The APU bleed valve is open and one of these occurs:

- BLEED 1 air switch is on
- BLEED 2 air switch is on and the ISOLATION VALVE is open.

Objective: To prevent possible backpressure of the APU.

1 Limit engine thrust to idle while the light is illuminated.

2 **After** engine start:

APU BLEED air switch OFF



DUCT
OVERHEAT

DUCT OVERHEAT

737-700

Condition: A duct overheat occurs.

- 1 Temperature selector
(affected side) Select cooler
temperature

This prevents the air mix valves from returning to an overheat condition.

- 2 TRIP RESET switch Push

The DUCT OVERHEAT light extinguishes if the duct temperature has cooled below limits.

- 3 Monitor duct temperature.

If the duct temperature increases rapidly or the air mix valve indicator moves toward full hot, set the temperature selector to MANUAL. Adjust the air mix valve position as needed.



OFF

EQUIPMENT COOLING OFF

Condition: The equipment cooling supply or exhaust fan is failed.

- 1 EQUIP COOLING SUPPLY or EXHAUST
switch (affected side) ALTN

Note: Illumination of the EQUIP COOLING SUPPLY or EXHAUST OFF light may be an indication of a pressurization problem. Ensure the pressurization system is operating normally.

- 2 No further action is necessary in flight if the equipment cooling OFF light does not extinguish.



INOP

HIGH ALTITUDE LANDING
INOPERATIVE

Condition: The high altitude landing system is inoperative.

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.



OFF SCHED
DESCENT

OFF SCHEDULE DESCENT

Condition: A descent is started before reaching the planned cruise altitude set in the FLT ALT indicator.

1 Choose one:

◆ **Landing** at airport of departure:

Continue normal operation.



◆ **Not** landing at airport of departure:

FLT ALT indicator Reset to actual
airplane altitude



PACK

PACK

737-800

Condition: One or more of these occur:

- The primary and standby pack controls are failed
- A pack overheat.

- 1 Temperature selectors (all) Select warmer temperature

This reduces the workload on the affected air conditioning pack.

- 2 TRIP RESET switch Push

If the PACK light illuminated as a result of the pack temperature exceeding limits, the light extinguishes if the pack temperature has cooled below limits.

- 3 Choose one:

◆ **Both** PACK lights are **extinguished**:

Continue normal operation.



◆ **A single** PACK light **stays illuminated**:

ISOLATION VALVE switch CLOSE

PACK switch (affected side) OFF



◆ **Both** PACK lights **stay illuminated**:

Note: Both pack valves may have closed resulting in a gradual loss of cabin pressure and an eventual CABIN ALTITUDE warning.

►► **Go to step 4**

- 4 Descend to the lowest safe altitude, or 10,000 feet, whichever is higher. Monitor cabin altitude and rate.

- 5 **When** at level off:

Maintain 290 knots minimum. Flight deck and cabin temperatures may increase rapidly at speeds below 290 knots.

▼ PACK continued ▼

6 Choose one:

◆ Airplane altitude is **at or below 10,000 feet**:

▶▶ **Go to step 7**

◆ Airplane altitude is **above 10,000 feet**:

Don oxygen masks.

Establish crew communications.

▶▶ **Go to step 7**

7 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

8  Outflow VALVE switch. Move to OPEN until the outflow VALVE indication shows fully open

This increases airplane ventilation.

9 R RECIRC FAN switch AUTO

10 L RECIRC FAN switch OFF

11 Minimize the flight deck lighting intensity.

12 Open the flight deck door.

13 **During** daylight:

Use flight deck window shades, as needed.

Instruct the cabin crew to close cabin window shades.

14 Instruct the cabin crew to dim cabin lighting.

15 Advise the cabin crew that the cabin lighting may be extinguished, but passenger reading lights will continue to work.

16 CAB/UTIL switch (as installed) OFF

17 IFE/PASS SEAT switch (as installed) OFF

18 Plan to land at the nearest suitable airport.



PACK

PACK

737-800 BCF

Condition: One or more of these occur:

- The primary and standby pack controls are failed
- A pack overheat.

- 1 Temperature selectors (all) Select warmer temperature

This reduces the workload on the affected air conditioning pack.

- 2 TRIP RESET switch Push

If the PACK light illuminated as a result of the pack temperature exceeding limits, the light extinguishes if the pack temperature has cooled below limits.

- 3 Choose one:

◆ **Both** PACK lights are **extinguished**:

Continue normal operation.



◆ **A single** PACK light **stays illuminated**:

ISOLATION VALVE switch CLOSE

PACK switch (affected side) OFF



◆ **Both** PACK lights **stay illuminated**:

Note: Both pack valves may have closed resulting in a gradual loss of cabin pressure and an eventual CABIN ALTITUDE warning.

►► **Go to step 4**

- 4 Descend to the lowest safe altitude, or 10,000 feet, whichever is higher. Monitor cabin altitude and rate.

- 5 **When** at level off:

Maintain 230 knots.

▼ Continued on next page ▼

▼ PACK continued ▼

6 Choose one:

◆ Airplane altitude is **at or below 10,000 feet**:

▶▶ **Go to step 7**

◆ Airplane altitude is **above 10,000 feet**:

Don oxygen masks.

Establish crew communications.

▶▶ **Go to step 7**

7 Pressurization mode selector MAN

Initially use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

8  Outflow VALVE switch. Move towards OPEN or CLOSE to control airplane temperature

Note: Moving towards OPEN increases airplane ventilation and reduces airplane temperature. Moving towards CLOSE reduces airplane ventilation and increases airplane temperature.

Do **not** fully close the outflow valve.

9 Minimize the flight deck lighting intensity, if needed.

10 Open the flight deck door.

11 **During** daylight:

Use flight deck window shades, as needed.

12 CAB/UTIL switch. OFF

13 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼ PACK continued ▼

Deferred Items

Note: Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

Descent Checklist

Pressurization **Move outflow VALVE switch to OPEN or CLOSE as needed to control cabin altitude and rate**

Recall Checked

Autobrake _____

Landing data VREF _____, Minimums _____

Approach Checklist

Altimeters _____

At Pattern Altitude

Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

Landing Checklist

ENGINE START switches CONT

Speedbrake ARMED

Landing gear Down

Flaps _____, Green light



PACK
TRIP OFF

PACK TRIP OFF

737-700

Condition: A pack overheat occurs.

- 1 Temperature
selectors (affected side) Select warmer
temperature

This reduces the workload on the affected air
conditioning pack.

- 2 TRIP RESET switch Push
The PACK TRIP OFF light extinguishes if the pack
temperature has cooled below limits.

- 3 Choose one:

◆ **Both** PACK TRIP OFF lights are **extinguished**:

Continue normal operation.



◆ **A single** PACK TRIP OFF light **stays
illuminated**:

Continue normal operation.



◆ **Both** PACK TRIP OFF lights **stay illuminated**:

Note: Both pack valves may have closed
resulting in a gradual loss of cabin
pressure and an eventual CABIN
ALTITUDE warning.

►► **Go to step 4**

- 4 Descend to the lowest safe altitude, or 10,000 feet,
whichever is higher. Monitor cabin altitude and
rate.

- 5 **When** at level off:

Maintain 290 knots minimum. Flight deck and
cabin temperatures may increase rapidly at
speeds below 290 knots.

▼ Continued on next page ▼

▼ PACK TRIP OFF continued ▼

6 Choose one:

◆ Airplane altitude is **at or below 10,000 feet:**

►► **Go to step 7**

◆ Airplane altitude is **above 10,000 feet:**

Don oxygen masks.

Establish crew communications.

►► **Go to step 7**

7 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

8  Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open

This increases airplane ventilation.

9 Minimize the flight deck lighting intensity.

10 Open the flight deck door.

11 **During** daylight:

Use flight deck window shades, as needed.

Instruct the cabin crew to close cabin window shades.

12 Instruct the cabin crew to dim cabin lighting.

13 Advise the cabin crew that the cabin lighting may be extinguished, but passenger reading lights will continue to work.

14 CAB/UTIL switch (as installed) OFF

15 IFE/PASS SEAT switch (as installed) OFF

16 GALLEY switch (as installed) OFF

17 Plan to land at the nearest suitable airport.



WING-BODY OVERHEAT

WING-BODY OVERHEAT

737-700

Condition: An overheat from a bleed duct leak occurs.

Objective: To isolate the bleed duct leak.

- 1 ISOLATION VALVE switch. CLOSE
- 2 Choose one:

◆ **Right** WING-BODY OVERHEAT light illuminated:

▶▶ **Go to step 3**

◆ **Left** WING-BODY OVERHEAT light illuminated:

▶▶ **Go to step 7**
- 3 R PACK switch OFF

This causes the operating pack to regulate to high flow in flight with the flaps up.
- 4 BLEED 2 air switch OFF
- 5 WING ANTI-ICE switch OFF

This prevents possible asymmetrical ice buildup on the wings.
- 6 Avoid icing conditions where wing anti-ice is needed.

■ ■ ■ ■
- 7 L PACK switch OFF

This causes the operating pack to regulate to high flow in flight with the flaps up.
- 8 BLEED 1 air switch OFF
- 9 WING ANTI-ICE switch OFF

This prevents possible asymmetrical ice buildup on the wings.
- 10 Avoid icing conditions where wing anti-ice is needed.

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

11 Choose one:

◆ WING-BODY OVERHEAT light **extinguishes:**

■ ■ ■ ■

◆ WING-BODY OVERHEAT light **stays illuminated:**

▶▶ **Go to step 12**

12 Choose one:

◆ APU is **running:**

▶▶ **Go to step 13**

◆ APU is **not** running:

■ ■ ■ ■

13 Choose one:

◆ APU BLEED air switch is **ON:**

APU BLEED air switch OFF

This stops the flow of bleed air from the APU to the left side of the pneumatic ducting.

▶▶ **Go to step 14**

◆ APU BLEED air switch is **OFF:**

APU switch OFF

▶▶ **Go to step 15**

14 Choose one:

◆ WING-BODY OVERHEAT light **extinguishes:**

▶▶ **Go to step 16**

◆ WING-BODY OVERHEAT light **stays illuminated:**

APU switch OFF

▶▶ **Go to step 15**

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

15 Choose one:

- ◆ WING-BODY OVERHEAT light **extinguishes**:
▶▶ **Go to step 16**
- ◆ WING-BODY OVERHEAT light **stays illuminated**:
■ ■ ■ ■

16 ISOLATION VALVE switch. AUTO

17 BLEED 1 air switch ON

18 L PACK switch AUTO

19 WING ANTI-ICE switch As needed

20 Choose one:

- ◆ WING-BODY OVERHEAT light **stays extinguished**:
▶▶ **Go to step 21**
- ◆ WING-BODY OVERHEAT light **illuminates again**:
▶▶ **Go to step 22**

21 Choose one:

- ◆ APU switch is **ON**:
The APU can be used during the rest of the flight, as an electrical source only, if needed.
■ ■ ■ ■
- ◆ APU switch is **OFF**:
Do **not** start the APU for the rest of the flight.
■ ■ ■ ■

22 ISOLATION VALVE switch. CLOSE

23 L PACK switch OFF

24 BLEED 1 air switch OFF

25 WING ANTI-ICE switch OFF

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

- 26 Avoid icing conditions where wing anti-ice is needed.
- 27 The APU can be used during the rest of the flight, as an electrical source only, if needed.



WING-BODY OVERHEAT

WING-BODY OVERHEAT

737-800, 737-800 BCF

Condition: An overheat from a bleed duct leak occurs.

Objective: To isolate the bleed duct leak.

- 1 ISOLATION VALVE switch. CLOSE
- 2 Choose one:

◆ **Both** WING-BODY OVERHEAT lights illuminated:

TRIM AIR switch OFF

737-800

Note: Passenger cabin temperature control may be less accurate.

737-800 BCF

Note: Main Deck Cargo compartment temperature control may be less accurate.

■ ■ ■ ■

◆ **Only right** WING-BODY OVERHEAT light illuminated:

▶▶ **Go to step 3**

◆ **Only left** WING-BODY OVERHEAT light illuminated:

▶▶ **Go to step 8**

- 3 R PACK switch OFF
This causes the operating pack to regulate to high flow in flight with the flaps up.
- 4 BLEED 2 air switch OFF
- 5 WING ANTI-ICE switch OFF
This prevents possible asymmetrical ice buildup on the wings.
- 6 Avoid icing conditions where wing anti-ice is needed.

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

7 Choose one:

◆ WING-BODY OVERHEAT light **extinguishes:**



◆ WING-BODY OVERHEAT light **stays illuminated:**

TRIM AIR switch OFF

737-800

Note: Passenger cabin temperature control may be less accurate.

737-800 BCF

Note: Main Deck Cargo compartment temperature control may be less accurate.



8 L PACK switch OFF

This causes the operating pack to regulate to high flow in flight with the flaps up.

9 BLEED 1 air switch OFF

10 WING ANTI-ICE switch OFF

This prevents possible asymmetrical ice buildup on the wings.

11 Avoid icing conditions where wing anti-ice is needed.

12 Choose one:

◆ WING-BODY OVERHEAT light **extinguishes:**



◆ WING-BODY OVERHEAT light **stays illuminated:**

►► Go to step 13

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

13 Choose one:

◆APU is **running**:

▶▶ **Go to step 14**

◆APU is **not** running:

TRIM AIR switch OFF

737-800

Note: Passenger cabin temperature control may be less accurate.

737-800 BCF

Note: Main Deck Cargo compartment temperature control may be less accurate.



14 Choose one:

◆APU BLEED air switch is **ON**:

APU BLEED air switch OFF

This stops the flow of bleed air from the APU to the left side of the pneumatic ducting.

▶▶ **Go to step 15**

◆APU BLEED air switch is **OFF**:

APU switch OFF

▶▶ **Go to step 16**

15 Choose one:

◆WING-BODY OVERHEAT light **extinguishes**:

▶▶ **Go to step 17**

◆WING-BODY OVERHEAT light **stays illuminated**:

APU switch OFF

▶▶ **Go to step 16**

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

16 Choose one:

◆ WING-BODY OVERHEAT light **extinguishes:**

▶▶ **Go to step 17**

◆ WING-BODY OVERHEAT light **stays illuminated:**

TRIM AIR switch OFF

737-800

Note: Passenger cabin temperature control may be less accurate.

737-800 BCF

Note: Main Deck Cargo compartment temperature control may be less accurate.



17 ISOLATION VALVE switch AUTO

18 BLEED 1 air switch ON

19 L PACK switch AUTO

20 WING ANTI-ICE switch As needed

21 Choose one:

◆ WING-BODY OVERHEAT light **stays extinguished:**

▶▶ **Go to step 22**

◆ WING-BODY OVERHEAT light **illuminates again:**

▶▶ **Go to step 23**

▼ Continued on next page ▼

▼ WING-BODY OVERHEAT continued ▼

22 Choose one:

◆APU switch is **ON**:

The APU can be used during the rest of the flight, as an electrical source only, if needed.



◆APU switch is **OFF**:

Do **not** start the APU for the rest of the flight.



- 23 ISOLATION VALVE switch. CLOSE
- 24 L PACK switch OFF
- 25 BLEED 1 air switch OFF
- 26 WING ANTI-ICE switch OFF
- 27 Avoid icing conditions where wing anti-ice is needed.
- 28 The APU can be used during the rest of the flight, as an electrical source only, if needed.



ZONE
TEMP

ZONE TEMP

737-800, 737-800 BCF

Condition: One or more of these occur:

- A zone duct overheat
- Flight deck temperature control is failed.

- 1 Temperature selector
(affected cabin) Select a cooler temperature

This prevents the trim air modulating valve from returning to an overheat condition.

- 2 TRIP RESET switch Push

The ZONE TEMP light extinguishes if the duct temperature has cooled below limits.

- 3 Monitor duct temperature.

If the duct temperature increases rapidly, set the TRIM AIR switch to OFF.

737-800

- 4 Choose one:

◆ Affected cabin temperature is excessively high:

►► **Go to the Cabin Temperature Hot checklist on page 2.6**



◆ Affected cabin temperature is normal:



737-800 BCF

- 5 Choose one:

◆ Affected cabin temperature is excessively high:

►► **Go to the Cabin Temperature Hot checklist on page 2.10**



◆ Affected cabin temperature is normal:





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**COWL
ANTI-ICE**

ENGINE COWL ANTI-ICE

Condition: An engine cowl anti-ice duct overpressure occurs.

Objective: To reduce cowl duct pressure by reducing thrust.

- 1 Reduce thrust only when flight conditions allow.
- 2 Autothrottle (if engaged) Disengage
- 3 Thrust lever
(affected engine) . . . Confirm . . . Retard until the
COWL ANTI-ICE
light extinguishes
- 4 Run the engine at reduced thrust to keep the light
extinguished.

Note: Do not use FMC performance predictions.

- 5 Transponder mode selector TA or TA ONLY
This step prevents climb commands which can
exceed reduced thrust performance capability.
- 6 Plan to land at the nearest suitable airport.

**►► Go to the One Engine Inoperative
Landing checklist on page 7.23**



COWL VALVE
OPENENGINE COWL VALVE OPEN
OR TAI INDICATION

Condition: One or both of the following occurs:

- An engine COWL VALVE OPEN light stays illuminated bright blue
- An amber TAI indication is shown.

1 Choose one:

◆ ENG ANTI-ICE switch is **ON**:

The cowl anti-ice valve is failed closed.

Avoid icing conditions.

◆ ENG ANTI-ICE switch is **OFF**:

The cowl anti-ice valve is failed open.

If TAT is **above 10°C**, limit thrust on the affected engine to 80% N1 if possible.



Ice Crystal Icing

Condition: Engine ice crystal or TAT probe icing is suspected. Ice crystal icing conditions exist when in visible moisture, and one or more of the following indications are present:

- Amber or red weather radar returns below the airplane
- Appearance of liquid water on the windshield at temperatures too cold for rain (the sound is different than rain)
- The autothrottle is unable to maintain the selected airspeed
- TAT indication stays near 0°C

(Additional items that can indicate ice crystal icing are listed in the Additional Information section).

Objective: To exit the ice crystal icing conditions and reduce the operational effects of the icing.

Note: TAT probe icing can cause the reference N1 bugs to increase or decrease while flying at a constant altitude and airspeed.

Caution! Do not use engine anti-ice when TAT is above 10°C.

- 1 ENGINE START switches (both) CONT
- 2 ENG ANTI-ICE switches (both) ON
- 3 Minimize time above amber and red weather radar returns.
- 4 If conditions allow, exit the ice crystal icing conditions laterally. Climbing or descending to exit ice crystal icing conditions is not recommended.
- 5 Choose one:
 - ◆ Autothrottle response **or** TAT indication is normal:
▶▶ **Go to step 8**
 - ◆ Autothrottle is **unable** to maintain the selected airspeed and TAT indication stays near 0°C:
▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ Ice Crystal Icing continued ▼

- 6 Autothrottle (if engaged) Disengage
- 7 Thrust levers (both) Set to maintain
airspeed and
airplane flight path
- 8 **When** in ice crystal icing conditions, the following
can be unreliable:

Reference N1 bugs and reference N1 readouts
TAS, TAT, SAT, ECON SPD, and LRC.
- 9 **When** ice crystal icing conditions are no longer
present:

Use engine anti-ice normally.

The autothrottle can be re-engaged, if needed.



Additional Information

One or more of the following can indicate ice crystal icing:

- Light to moderate turbulence
- Static discharge around the windshield (St. Elmo’s fire)
- Smell of sulfur
- Smell of ozone
- Humidity increase

An erroneous TAT indication can occur as a result of ice crystals blocking the sensor. The erroneous indication can last from one minute to more than 20 minutes. TAT normally should increase approximately 2°C per 1000 ft of descent.

Vibration indication due to fan hub icing can be 4 units or greater. Fan ice removal procedures have no effect on fan hub icing. When clear of clouds, fan hub ice evaporates and engine vibration decreases over time. Fan hub ice can remain into descent.

PROBE HEAT

CAPT PITOT	L ELEV PITOT	L ALPHA VANE	TEMP PROBE
F/O PITOT	R ELEV PITOT	R ALPHA VANE	AUX PITOT

Condition: One or more probe heats are failed.

- 1 Avoid icing conditions.

Note: Flight in icing conditions may result in erroneous flight instrument indications.



OFF

WINDOW HEAT OFF

Condition: One of the following occurs:

- An overheat due to high ambient temperature
- A system failure
- Window temperature has reached normal limit.

1 Choose one:

◆On the **ground**:

WINDOW HEAT switches (all) ON
WINDOW HEAT TEST switch PWR

▶▶ **Go to step 2**

◆In flight:

▶▶ **Go to step 3**

2 Choose one:

◆**All** WINDOW HEAT OFF lights are **extinguished**:

Continue normal operation. Power has been removed from the window for overheat protection.



◆**Any** WINDOW HEAT OFF light **stays illuminated**:

The window heat system is inoperative.



3 Choose one:

◆**All** window OVERHEAT lights are **extinguished**:

Continue normal operation. Electrical power has been temporarily removed to control window temperature.



◆**Any** window OVERHEAT light **is illuminated**:

▶▶ **Go to the WINDOW OVERHEAT checklist on page 3.7**



OVERHEAT

WINDOW OVERHEAT

Condition: A window overheat occurs.

- 1 WINDOW HEAT switch (affected window) . . . OFF
- 2 **Wait** 2 - 5 minutes.
- 3 WINDOW HEAT switch (affected window) ON
- 4 Choose one:
 - ◆ Window OVERHEAT light **stays extinguished:**
Continue normal operation.
■ ■ ■ ■
 - ◆ Window OVERHEAT light **illuminates again:**
►► **Go to step 5**
- 5 WINDOW HEAT switch (affected window) . . . OFF
Limit airspeed to 250 knots maximum below 10,000 feet.
- 6 Pull both WINDSHIELD AIR controls. This vents conditioned air to the inside of the windshield for defogging.



WING ANTI-ICE VALVE OPEN

L VALVE OPEN	R VALVE OPEN

Condition: A wing anti-ice L VALVE OPEN or R VALVE OPEN light stays illuminated bright blue. The wing anti-ice valve is not in the commanded position.

1 Choose one:

- ◆ WING ANTI-ICE switch is **ON**:
The wing anti-ice valve is failed closed.
WING ANTI-ICE switch OFF
Avoid icing conditions where wing anti-ice is needed.

■ ■ ■ ■
- ◆ WING ANTI-ICE switch is **OFF**:
The wing anti-ice valve is failed open.
▶▶ **Go to step 2**

- 2 ISOLATION VALVE switch. CLOSE
- 3 PACK switch (affected side) OFF
This causes the operating pack to regulate to high flow in flight with the flaps up.

4 Choose one:

- ◆ WING ANTI-ICE **is** needed:
▶▶ **Go to step 5**
- ◆ WING ANTI-ICE is **not** needed:
▶▶ **Go to step 8**

- 5 Engine BLEED air switch (affected side) ON
- 6 WING ANTI-ICE switch ON
- 7 **When** wing anti-ice is no longer needed:
▶▶ **Go to step 8**

- 8 WING ANTI-ICE switch Verify OFF

▼ Continued on next page ▼

▼ WING ANTI-ICE VALVE OPEN continued ▼

9 Engine BLEED air switch (affected side) OFF

Wing anti-ice is not available on the affected side with the ISOLATION VALVE switch closed.

Note: Repeat steps 4 through 9 as needed.





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Non-Normal Checklists

Automatic Flight

Chapter NNC

Section 4

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AUTOTHROTTLE DISENGAGE 4.1

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NO LAND 3.....4.1



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AUTOPILOT DISENGAGE

A/P
P/RST

Condition: All autopilots are disengaged. The red light flashes and the aural tone sounds.

- 1 Fly the airplane manually or re-engage an autopilot.



AUTOTHROTTLE DISENGAGE

A/T
P/RST

Condition: The autothrottle is disengaged. The red light flashes.

- 1 Control thrust manually or re-engage the autothrottle.



NO AUTOLAND

Condition: Autoland is not available.



NO LAND 3

Condition: The autoland system does not have the redundancy needed for LAND 3 operations.





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ACARS Electrical Power Loss

Condition: ACARS AC power is lost.

Note: The ACARS automatically reverts to VOX MODE. The DATA MODE is inoperative.



ACARS MU Fail or DU Fail

Condition: The ACARS system is failed.

- 1 Use normal voice procedures for reporting.



Radio Transmit Continuous (Stuck Microphone Switch)

Condition: A radio transmits continuously without crew input.

- 1 MIC SELECTOR switches
(all audio selector panels) FLT INT

This deselects radios and stops radio transmissions.

Note: The microphone/interphone with the stuck switch continuously transmits on flight interphone.

- 2 The associated audio selector panel should stay on flight interphone. All other audio selector panels may be used normally.



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**BAT
DISCHARGE**

BATTERY DISCHARGE

Condition: A battery discharge exceedance occurs.

Note: In a Single Battery aircraft, which does NOT have the AUX BAT position on the DC Meters Selector, the fully charged battery supplies a minimum of 30 minutes of standby power.

Note: In a Dual Battery aircraft, which has the AUX BAT position on the DC Meters Selector, the fully charged batteries supply a minimum of 60 minutes of standby power.



DRIVE

DRIVE

Condition: A generator drive malfunction occurs.

Action is irreversible.

- 1  Generator drive DISCONNECT switch (affected side) Confirm Hold in the DISCONNECT position momentarily

This prevents generator drive damage.

- 2 Choose one:

◆ APU is **available** for start:

APU START

When APU is running:

APU GEN switch (affected side) ON



◆ APU is **not** available:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.





Condition: A standby power or DC system fault occurs.

Note: The ELEC light illuminates on the ground only.

- 1 Do **not** takeoff.



LOSS OF BOTH ENGINE DRIVEN GENERATORS

GEN 1 & 2

GEN 1 & 2

GEN 1 & 2

TRANSFER
BUS OFF

SOURCE
OFF

GEN OFF
BUS

Condition: Both engine driven generators are off.

Note: At high altitude, thrust deterioration or engine flameout can occur.

1 Engine GEN switches (both). . . ON, one at a time

2 Choose one:

◆ **A single SOURCE OFF light stays illuminated:**

▶▶ **Go to step 3**

◆ **Both SOURCE OFF lights stay illuminated:**

▶▶ **Go to step 5**

◆ **Both SOURCE OFF lights extinguish:**

YAW DAMPER switch ON

▶▶ **Go to step 17**

A single SOURCE OFF light stays illuminated

3 YAW DAMPER switch ON

4 Choose one:

◆ APU is **available** for start:

Note: APU start attempts are not recommended above 25,000 feet.

APU START

When APU is running:

APU GEN switch
(affected side) ON

▶▶ **Go to step 17**

◆ APU is **not** available:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.

▶▶ **Go to step 17**

▼ Continued on next page ▼

▼ LOSS OF BOTH ENGINE DRIVEN GENERATORS continued ▼

Both SOURCE OFF lights stay illuminated

5 Choose one:

◆APU is **available** for start:

BUS TRANSFER switch OFF

ELEC HYD PUMP switches (both) OFF

Note: APU start attempts are not recommended above 25,000 feet. With both buses off, only one start attempt is recommended. Multiple start attempts reduce standby power capacity.

APU START

▶▶ **Go to step 6**

◆APU is **not** available:

▶▶ **Go to step 14**

6 **When** APU is running:

APU GEN
switches (both) ON,
one at a time

7 Check for the REMOTE CONTROL Circuit Breaker (RCCB Remote P6-SPCU-A-4).

8 Choose one:

◆RCCB REMOTE circuit breaker **is** tripped:

Reset circuit breaker. Only one reset is allowed.

▶▶ **Go to step 9**

◆RCCB REMOTE circuit breaker is **not** tripped:

▶▶ **Go to step 9**

▼ Continued on next page ▼

▼ LOSS OF BOTH ENGINE DRIVEN GENERATORS continued ▼

9 Choose one:

◆ **A single or both SOURCE OFF lights extinguish:**

▶▶ **Go to step 10**

◆ **Both SOURCE OFF lights stay illuminated:**

▶▶ **Go to step 14**

10 BUS TRANSFER switch AUTO

This restores power to the remaining transfer bus if one SOURCE OFF light stays illuminated.

11 ELEC HYD PUMP

switches (both) ON, one at a time

12 YAW DAMPER switch ON

13 Plan to land at the nearest suitable airport. Only one main AC power source remains.

▶▶▶ **Go to step 17**

Both SOURCE OFF lights stay illuminated

14 Avoid icing conditions.

Note: Flight in icing conditions can result in erroneous flight instrument indications.

15 Plan to land at the nearest suitable airport.

Note: In a Single Battery aircraft, which does NOT have the AUX BAT position on the DC Meters Selector, a fully charged battery supplies a minimum of 30 minutes of standby power.

Note: In a Dual Battery aircraft, which has the AUX BAT position on the DC Meters Selector, the fully charged batteries supply a minimum of 60 minutes of standby power.

16 The right IRS will operate on DC power for 5 minutes.

▼ Continued on next page ▼

▼ LOSS OF BOTH ENGINE DRIVEN GENERATORS continued ▼

17 Choose one:

- ◆ **Both** the captain's and first officer's primary attitude displays are **operative and** ATT flags are **not** shown:



- ◆ **Both** the captain's and first officer's primary attitude displays are **failed**:

►► **Go to step 19**

- ◆ **Only** the **first officer's** primary attitude display is **failed**:

IRS TRANSFER switch. BOTH ON L

Do **not** engage either autopilot.

►► **Go to step 18**

18 Choose one:

- ◆ **A single** SOURCE OFF light is **illuminated**:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.



- ◆ **Both** SOURCE OFF lights are **extinguished**:



- ◆ **Both** SOURCE OFF lights are **illuminated**:

The left IRS will operate as long as battery power remains.

Plan to land at the nearest suitable airport.



Action is irreversible. Do this step only if **both** the captain's and first officer's primary attitude displays are **failed**.

19  IRS MODE selectors (both). ATT

Maintain straight and level, constant airspeed flight until attitude displays recover (approximately 30 seconds).

▼ Continued on next page ▼

▼ LOSS OF BOTH ENGINE DRIVEN GENERATORS continued ▼

The primary attitude displays stay failed and the SET IRS HDG prompt on the POS INIT page is blank until the attitude mode alignment is complete.

20 Enter magnetic heading on the POS INIT page or on the overhead IRS display unit by selecting HDG/STS.

Note: The MAP display is not available.

Note: Periodically enter updated heading on the POS INIT page or on the overhead IRS display unit by selecting HDG/STS.

21 Do **not** engage either autopilot.



SOURCE OFF

SOURCE OFF

Condition: The transfer bus is not powered by the last selected source.

- 1 Choose one:
- ◆Both SOURCE OFF lights are illuminated:

▶▶Go to the LOSS OF BOTH ENGINE DRIVEN GENERATORS checklist on page 6.3

■ ■ ■ ■
- ◆Only one SOURCE OFF light is illuminated:

▶▶Go to step 2
- 2 Engine GEN switch (affected side) ON
- 3 Choose one:
- ◆SOURCE OFF light **extinguishes**:

■ ■ ■ ■
- ◆SOURCE OFF light **stays illuminated**:

▶▶Go to step 4
- 4 Choose one:
- ◆APU is **available** for start:

APU START

When APU is running:

APU GEN switch (affected side) ON

▶▶Go to step 5
- ◆APU is **not** available:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.

■ ■ ■ ■

▼ Continued on next page ▼

▼ SOURCE OFF continued ▼

5 Choose one:

◆ SOURCE OFF light **extinguishes:**



◆ SOURCE OFF light **stays illuminated:**

Plan to land at the nearest suitable airport.
Only one main AC power source remains.



STANDBY
PWR OFF

STANDBY POWER OFF

Condition: One or more of these busses are not energized:

- AC standby bus
- DC standby bus
- Battery bus.

1 STANDBY POWER switch BAT



TR UNIT

TR UNIT

Condition: One or more transformer rectifiers are failed.

1 Do not use the AFDS approach mode during an ILS approach.

Note: Autoland is not available.

Note: The AFDS approach mode can be used during an instrument approach using IAN.



TRANSFER
BUS OFF

TRANSFER BUS OFF

Condition: The transfer bus is not energized.

1 Engine GEN switch (affected side) ON

2 Choose one:

◆TRANSFER BUS OFF light **extinguishes**:



◆TRANSFER BUS OFF light **stays illuminated**:

▶▶Go to step 3

3 Choose one:

◆APU is **available** for start:

APU START

When APU is running:

APU GEN switch
(affected side) ON

▶▶Go to step 4

◆APU is **not** available:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.



4 Choose one:

◆TRANSFER BUS OFF light **extinguishes**:



◆TRANSFER BUS OFF light **stays illuminated**:

Plan to land at the nearest suitable airport.
Only one main AC power source remains.



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Volcanic Ash 7.29

Aborted Engine Start

Condition: On the ground, an aborted engine start is needed.

Objective: To shut down the engine and motor it.

1 Engine start lever (affected engine) CUTOFF

2 Choose one:

◆ENGINE START switch is in **GRD**:

Motor the engine for 60 seconds.

ENGINE START switch
(affected engine) OFF



◆ENGINE START switch is in **OFF**:

►►Go to step 3

3 **After** N2 decreases below 20%:

ENGINE START switch
(affected engine) GRD

Motor the engine for 60 seconds.

ENGINE START switch
(affected engine) OFF



Engine Limit or Surge or Stall

Condition: One or more of these occur:

- Engine indications are abnormal
- Engine indications are rapidly approaching or exceeding limits
- Abnormal engine noises are heard, possibly with airframe vibration
- There is no response to thrust lever movement or the response is abnormal
- Flames in the engine inlet or exhaust are reported.

Objective: To attempt to recover normal engine operation or shut down the engine if recovery is not possible.

- 1 Autothrottle (if engaged) Disengage
 - 2 Thrust lever
(affected engine) Confirm Retard until
engine indications
stay within limits or
the thrust lever is closed
-

3 Choose one:

◆ Engine indications are **stabilized and** EGT is **stabilized or decreasing**:

▶▶ Go to step 4

◆ Engine indications are **abnormal or** EGT continues to **increase**:

▶▶ Go to step 8

Check that RPM and EGT follow thrust lever movement.

- 4  Thrust lever
(affected engine) Advance slowly
- 5 Run the engine normally or at a reduced thrust setting that is surge and stall free.

▼ Continued on next page ▼

▼ Engine Limit or Surge or Stall continued ▼

6 Choose one:

◆ Engine runs **normally**:



◆ Engine runs at **reduced** thrust:

Note: Do not use FMC performance predictions.
Transponder mode selector . TA or TA ONLY

This step prevents climb commands which can exceed reduced thrust performance capability.

►► **Go to step 7**

7 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►► **Go to the One Engine Inoperative Landing checklist on page 7.23**



8 Engine start lever
(affected engine) Confirm CUTOFF

9 PACK switch (affected side) OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

10 Choose one:

◆ APU is **available** for start:

APU START

When APU is running:

APU GEN switch
(affected side) ON

►► **Go to step 11**

◆ APU is **not** available:

►► **Go to step 11**

▼ Continued on next page ▼

▼ Engine Limit or Surge or Stall continued ▼

11 Balance fuel as needed.

12 Transponder mode selector TA or TA ONLY

This prevents climb commands which can exceed single engine performance capability.

13 ISOLATION VALVE switch. Verify AUTO

This ensures bleed air is available to both wings if wing anti-ice is needed.

14 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

15 Choose one:

◆ Restart **will** be attempted:

▶▶ **Go to the Engine In-Flight Start checklist on page 7.18**



◆ Restart will **not** be attempted:

▶▶ **Go to step 16**

16 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**



Loss Of Thrust On Both Engines

Condition: Both of these occur:

- Both engines have a loss of thrust
- Both ENG FAIL alerts show.

Objective: To restart at least one engine.

- 1 ENGINE START switches (both) FLT
- 2 Engine start levers (both) CUTOFF
- 3 **When** EGT decreases:

Engine start levers (both) IDLE detent

- 4 **If** EGT reaches a redline or there is no increase in EGT within 30 seconds:

Engine start lever
(affected engine) Confirm CUTOFF,
then IDLE detent

If EGT again reaches a redline or there is no increase in EGT within 30 seconds, repeat as needed.

- 5 At or above FL270, set airspeed to 275 knots.
Below FL270, set airspeed to 300 knots.
- 6 Engines can accelerate to idle very slowly, especially at high altitudes or in heavy precipitation. If N2 is steadily increasing and EGT stays within limits, do not interrupt the start.
- 7 Do **not** wait for a successful engine start before starting the APU.
- 8 Choose one:
 - ◆ APU is **available** for start:
 - APU START
 - ▶▶ **Go to step 9**
 - ◆ APU is **not** available:
 - ▶▶ **Go to step 10**
- 9 **When** APU is running:
 - APU GEN switches
(both). ON, one at a time

▼ Continued on next page ▼

▼ Loss Of Thrust On Both Engines continued ▼

10 Choose one:

◆ **One or both engines start:**

▶▶ **Go to step 15**

◆ **Neither engine starts:**

▶▶ **Go to step 11**

11 Choose one:

◆ **N2 is at or above 11%:**

Attempt a windmill start.

▶▶ **Go to step 13**

◆ **N2 is below 11%:**

▶▶ **Go to step 12**

12 Choose one:

◆ **APU bleed air is available:**

Attempt a starter assist start.

▶▶ **Go to step 16**

◆ **APU bleed air is not available:**

Attempt a windmill start.

▶▶ **Go to step 13**

13 Thrust levers (both) Close

14 Engine start
lever (**either**) Confirm. CUTOFF,
then IDLE detent

The engine can accelerate to idle very slowly especially at high altitudes or in heavy precipitation. If N2 is steadily increasing and EGT stays within limits, do not interrupt the start.

▼ Continued on next page ▼

▼ Loss Of Thrust On Both Engines continued ▼

15 **When** engine parameters have stabilized:

ENGINE START switch
(operating engine) As needed

Thrust lever
(operating engine) Advance slowly

Engine GEN switch
(operating engine side) ON

►► **Go to step 25**

16 Thrust levers (both) Close

17 WING ANTI-ICE switch OFF

18 PACK switches (both) OFF

19 APU BLEED air switch ON

20 Ignition select switch BOTH

21 Engine start
lever (**either**) Confirm. CUTOFF

22 ENGINE START switch GRD

23 **When** N2 is at or above 11%:

Engine start lever IDLE detent

The engine can accelerate to idle very slowly especially at high altitudes or in heavy precipitation. If N2 is steadily increasing and EGT stays within limits, do not interrupt the start.

24 **When** engine parameters have stabilized:

APU BLEED air switch OFF

ENGINE START switch
(operating engine) As needed

Thrust lever
(operating engine) Advance slowly

Engine GEN switch
(operating engine side) ON

PACK switch
(operating engine side) AUTO

▼ Continued on next page ▼

▼ Loss Of Thrust On Both Engines continued ▼

25 Choose one:

◆ **Both** the captain's and first officer's primary attitude displays are **operative and** ATT flags are **not** shown:

▶▶ **Go to step 30**

◆ **Both** the captain's and first officer's primary attitude displays are **failed**:

▶▶ **Go to step 26**

◆ **Only** the **first officer's** primary attitude display is **failed**:

IRS TRANSFER switch. BOTH ON L

Do **not** engage either autopilot.

▶▶ **Go to step 30**

Action is irreversible. Do this step only if **both** the captain's and first officer's primary attitude displays are **failed**.

26  IRS MODE selectors (both). ATT

Maintain straight and level, constant airspeed flight until attitude displays recover (approximately 30 seconds).

The primary attitude displays stay failed and the SET IRS HDG prompt on the POS INIT page is blank until the attitude mode alignment is complete.

27 Enter magnetic heading on the POS INIT page or on the overhead IRS display unit by selecting HDG/STS.

28 The MAP display is not available.

Note: Periodically enter updated heading on the POS INIT page or on the overhead IRS display unit by selecting HDG/STS.

29 Do **not** engage either autopilot.

▼ Continued on next page ▼

▼ Loss Of Thrust On Both Engines continued ▼

30 Choose one:

◆ **Both** engines are **running**:

Run the APU as needed.



◆ **One** engine stays **failed**:

►► **Go to the Engine In-Flight Start checklist on page 7.18**



FAULT

APU FAULT

Condition: An APU malfunction occurs.

Note: The APU shuts down automatically.

1 APU switch OFF

If the APU FAULT light extinguishes after 5 minutes, restarts may be attempted.



LOW OIL PRESSURE

APU LOW OIL PRESSURE

Condition: The APU oil pressure is low.

Note: The APU shuts down automatically.

1 APU switch OFF

The LOW OIL PRESSURE light extinguishes in 5 minutes.



OVER SPEED

APU OVERSPEED

Condition: One of these occurs:

- An APU RPM limit exceedance causes automatic shutdown
- During a normal APU shutdown the overspeed shutdown protection logic fails a self-test.

1 APU switch OFF

The APU OVERSPEED light extinguishes in 5 minutes.



ALTN

EEC ALTERNATE MODE

Condition: An EEC operates in the alternate control mode.

- 1 Autothrottle (if engaged) Disengage
- 2 Thrust levers (both) Retard to mid position
This prevents exceeding thrust limits when switching to the EEC alternate mode.
- 3 EEC mode switches (one at a time). ALTN
This ensures both engines operate in alternate mode.
- 4 Autothrottle (if needed). Engage

Note: Maximum thrust limiting is available with autothrottle engaged.

- 5 Do not exceed engine limits. Engine limit protection in alternate mode is not the same as in normal mode.

- 6 Choose one:

◆ **DSPLY SOURCE or DSPLY SOURCE 1 or DSPLY SOURCE 2** annunciation is **shown**:

►► **Go to step 7**

◆ **DSPLY SOURCE and DSPLY SOURCE 1 and DSPLY SOURCE 2** annunciations are **not** shown:



- 7 Choose one:

◆ **DISPLAY SOURCE** checklist **has** been completed:



◆ **DISPLAY SOURCE** checklist has **not** been completed:

►► **Go to the DISPLAY SOURCE checklist on page 10.11**



ENGINE
CONTROL

ENGINE CONTROL

Condition: An engine control system fault occurs.

Note: An ENGINE CONTROL light illuminates on the ground only.

- 1 Do **not** takeoff.



Engine Failure or Shutdown

Condition: One of these occurs:

- An engine failure
- An ENG FAIL alert shows
- An engine flameout
- Another checklist directs an engine shutdown.

1 Choose one:

◆ **Airframe vibrations with abnormal engine indications** exist:

▶▶ **Go to the ENGINE FIRE or Engine Severe Damage or Separation checklist on page 8.6**



◆ An engine has **separated**:

▶▶ **Go to the ENGINE FIRE or Engine Severe Damage or Separation checklist on page 8.6**



◆ Airframe vibrations with abnormal engine indications do **not** exist **and** an engine has **not** separated:

▶▶ **Go to step 2**

2 Do an engine shutdown only when flight conditions allow.

3 Autothrottle (if engaged) Disengage

4 Thrust lever
(affected engine) Confirm Close

5 **When** the affected engine is at idle thrust:

Engine start lever
(affected engine) Confirm CUTOFF

6 PACK switch (affected side) OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

▼ Continued on next page ▼

▼ Engine Failure or Shutdown continued ▼

7 Choose one:

◆ APU is **available** for start:

APU START

When APU is running:

APU GEN switch
(affected side) ON

▶▶ **Go to step 8**

◆ APU is **not** available:

▶▶ **Go to step 8**

8 Balance fuel as needed.

9 Transponder mode selector TA or TA ONLY

This prevents climb commands which can exceed single engine performance capability.

10 ISOLATION VALVE switch Verify AUTO

This ensures bleed air is available to both wings if wing anti-ice is needed.

11 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

12 Choose one:

◆ A restart will be **attempted**:

▶▶ **Go to the Engine In-Flight Start checklist on page 7.18**



◆ A restart will **not** be attempted:

▶▶ **Go to step 13**

13 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**



Engine High Oil Temperature

Condition: The engine oil temperature is high.

1 Choose one:

◆ Temperature is **at or above** the **redline**:

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.12**



◆ Temperature is in the **amber band**:

▶▶ **Go to step 2**

2 Autothrottle (if engaged) Disengage

3 Thrust lever
(affected engine) Confirm Retard
slowly until the
engine oil temperature
is within the normal operating range
or the thrust lever is closed

▼ Continued on next page ▼

▼ Engine High Oil Temperature continued ▼

4 Choose one:

- ◆ Oil temperature is in the **amber** band for **45 minutes or less**:

Note: Run the affected engine at a thrust setting that keeps the engine oil temperature within the normal operating range.

Do not use FMC performance predictions.

Transponder mode selector . TA or TA ONLY

This step prevents climb commands which can exceed reduced thrust performance capability.

►► **Go to step 5**

- ◆ Oil temperature is in the **amber** band for **more than 45 minutes**:

►► **Go to the Engine Failure or Shutdown checklist on page 7.12**



5 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►► **Go to the One Engine Inoperative Landing checklist on page 7.23**



Engine High Vibration

Condition: The vibration level is 4.0 units or greater.
Airframe vibration may or may not be felt.

1 Choose one:

◆ In **icing** conditions:

▶▶ **Go to step 2**

◆ **Not** in icing conditions:

▶▶ **Go to step 8**

2 ENGINE START switches (both) FLT

3 Autothrottle (if engaged) Disengage

Do the next two steps on one engine at a time.

4  Thrust lever
(selected engine) Retard to 45% N1
for five seconds,
then slowly advance
to a minimum of 80% N1
for approximately 1 second

5 Thrust lever
(selected engine) Reduce as needed
for flight conditions

6 **Wait** 15 seconds. This allows the engine vibration
level to stabilize.

7 Choose one:

◆ Vibration level is **less than** 4 units:

Continue normal operation.



◆ Vibration level is 4 units **or greater**:

▶▶ **Go to step 9**

8 Autothrottle (if engaged) Disengage

9 Thrust lever
(affected engine) Confirm Retard to
maintain vibration
levels below 4 units or
until the thrust lever is closed

▼ Continued on next page ▼

▼ Engine High Vibration continued ▼

Note: If the VIB indication does not decrease when the thrust lever is retarded, check other engine indications on the affected engine. If other engine indications are normal, run the engine at reduced thrust.

Note: Do not use FMC performance predictions.

10 Transponder mode selector TA or TA ONLY

This step prevents climb commands which can exceed reduced thrust performance capability.

11 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►► **Go to the One Engine Inoperative Landing checklist on page 7.23**



Engine In-Flight Start

Condition: An engine start is needed and all of the following are true:

- There was **no** engine fire
- There is N1 rotation
- There is **no** abnormal airframe vibration.

Note: Oil quantity indication as low as zero is normal if windmilling N2 RPM is below approximately 8%.

- 1 Do this checklist **only** after completion of the Engine Failure or Shutdown checklist or as directed by the Engine Limit or Surge or Stall checklist or by the Loss of Thrust on Both Engines checklist.
- 2 Check the In-Flight Start Envelope. X-BLD, XB or X-BLD START indication may not match the envelope. Starts are not assured outside of the In-flight Start Envelope.

Note: If the N2 is less than 8%, ENGINE START switch must be in CONT to display the EGT.

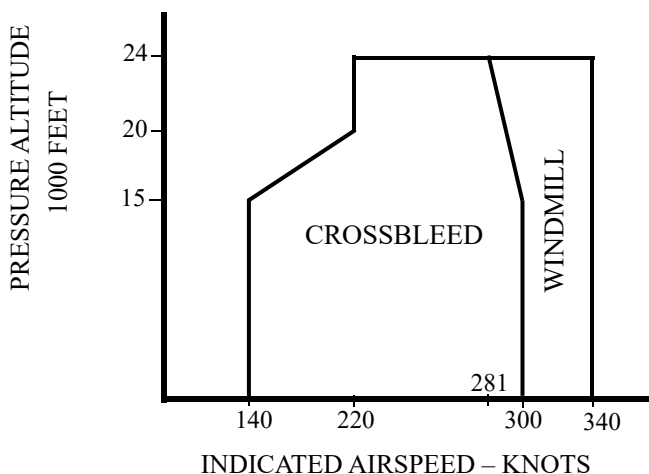
Note: For engines shut down one hour or more, or if EGT is less than 30°C, attempt a restart:

- At an altitude at or below 20,000 feet
- With airspeed at or above 220 knots
- Using a crossbleed start.

▼ Continued on next page ▼

▼ Engine In-Flight Start continued ▼

IN-FLIGHT START ENVELOPE



- 3 Thrust lever
(affected engine) Confirm Close
- 4 Engine start lever
(affected engine) Confirm CUTOFF
- 5 Engines can accelerate to idle very slowly,
especially at high altitudes or in heavy
precipitation. If N2 is steadily increasing and EGT
stays within limits, do not interrupt the start.
- 6 Choose one:

◆ **Windmill** start:

ENGINE START switch
(affected engine) FLT

▶▶ **Go to step 7**

◆ **Crossbleed** start:

PACK switch (affected side) OFF

DUCT PRESSURE Minimum 30 PSI

Advance the thrust lever to increase
duct pressure if needed.

ENGINE START switch
(affected engine) GRD

▶▶ **Go to step 7**

- 7 **When** N2 is at or above 11%:

Engine start lever
(affected engine) IDLE detent

▼ Continued on next page ▼

▼ Engine In-Flight Start continued ▼

Monitor EGT to ensure it does not rise rapidly or exceed the start limit during the start attempt.

8 Choose one:

◆ EGT **increases** within 30 seconds **and** a normal start occurs:

▶▶ **Go to step 10**

◆ EGT does **not** increase within 30 seconds **or** another abort start condition as listed in the Normal Procedures occurs:

Engine start lever
(affected engine) . . . Confirm . . . CUTOFF
ENGINE START switch
(affected engine) OFF

Note: If the engine has been shutdown for more than one hour, multiple start attempts can be needed.

▶▶ **Go to step 9**

9 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**



- 10 Engine GEN switch (affected side) ON
- 11 PACK switch (affected side) AUTO
- 12 ENGINE START switch As needed
- 13 APU As needed
- 14 Transponder mode selector TA/RA



ENGINE LOW OIL PRESSURE

LOW OIL
PRESSURE

May or may not be shown

Condition: The engine oil pressure is low.

1 Choose one:

◆ Engine oil pressure is in the **amber band** with **takeoff thrust** set:

Do **not** takeoff.



◆ Engine oil pressure is **at or below** the **redline**:

►► **Go to the Engine Failure or Shutdown checklist on page 7.12**



**OIL FILTER
BYPASS****ENGINE OIL FILTER BYPASS**

Condition: The OIL FILTER BYPASS alert indicates oil filter contamination can cause oil to bypass the oil filter.

- 1 Autothrottle (if engaged) Disengage
 - 2 Thrust lever
(affected engine) Confirm Retard
slowly until the
OIL FILTER BYPASS
alert extinguishes or
the thrust lever is closed
 - 3 Choose one:
 - ◆ OIL FILTER BYPASS alert **extinguishes**:
 - ▶▶ **Go to step 4**
 - ◆ OIL FILTER BYPASS alert **stays illuminated**:
 - ▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.12**
 - ■ ■ ■
 - 4 Run the engine at reduced thrust to keep the alert extinguished.
- Note:** Do not use FMC performance predictions.
- 5 Transponder mode selector TA or TA ONLY
This step prevents climb commands which can exceed reduced thrust performance capability.
 - 6 Plan to land at the nearest suitable airport.
- Note:** Do not use FMC performance predictions.
- ▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**
- ■ ■ ■

One Engine Inoperative Landing

Condition: Landing must be made with one engine inoperative or at a reduced thrust.

- 1 Plan a flaps 15 landing.
- 2 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

- 3 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
- 4 Maintain VREF 15 + wind additive or VREF ICE + wind additive on final approach to assure sufficient maneuver margin and speed for go-around. The minimum wind additive is 5 knots.
- 5 When engine anti-ice is needed, use on the operating engine only.
- 6 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization LAND ALT ____

Recall Checked

Autobrake ____

Landing data **VREF 15 or VREF ICE** ____,
Minimums ____

Approach briefing Completed

▼ Continued on next page ▼

▼ One Engine Inoperative Landing continued ▼

Additional Go-Around Thrust

Choose one:

- ◆ Additional go-around thrust is **needed**:
 - ▶▶ **Go to No Engine Bleed Landing below**
- ◆ Additional go-around thrust is **not** needed:
 - ▶▶ **Go to Go-Around Procedure Review below**

No Engine Bleed Landing

When below 10,000 feet:

- WING ANTI-ICE switch OFF
- ISOLATION VALVE switch CLOSE
- BLEED 1 air switch OFF

- Do not open the APU bleed air valve if the engine fire switch is illuminated.
- ⚠ APU BLEED air switch ON
 - Left PACK switch AUTO
 - BLEED 2 air switch OFF

Go-Around Procedure Review

Do the normal go-around procedure except:

- Use flaps 1.
- Maintain VREF 15 + 5 knots or VREF ICE + 5 knots until reaching flap retraction altitude.
- Limit bank angle to 15° when airspeed is less than VREF 15 + 15 knots or VREF ICE + 5 knots or the minimum maneuver speed, whichever is lower.
- Accelerate to flaps 1 maneuvering speed before flap retraction.

▼ Continued on next page ▼

▼ One Engine Inoperative Landing continued ▼

Approach Checklist

Altimeters _____

Additional Deferred Item

GROUND PROXIMITY
FLAP INHIBIT switch FLAP INHIBIT

Landing Checklist

ENGINE START switch
(operating engine) CONT
Speedbrake ARMED
Landing gear Down
Flaps **15, Green light**



REVERSER

REVERSER

Condition: A fault occurs in the thrust reverser system.

- 1 Expect normal reverser operation after landing.



REVERSER UNLOCKED (IN FLIGHT)

Condition: The amber REV indication shows with uncommanded reverse thrust.

Note: Only multiple failures could allow the engine to go into reverse thrust.

Unstowed reverser sleeves produce buffet, yaw, roll and increased airplane drag.

- 1 Check movement of the forward thrust lever on the affected engine.

The EECs prevent power above idle if the related thrust reverser has moved from the stowed position.

Warning! Do not actuate the reverse thrust lever.

- 2 Choose one:

◆ Engine **responds** to forward thrust lever movement **and no** buffet or yaw exists:

Continue normal operation.



◆ Engine does **not** respond to forward thrust lever movement **or** buffet or yaw **exists**:

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.12**



START VALVE
OPEN

START VALVE OPEN

Condition: The START VALVE OPEN alert indicates the start valve fails to close.

1 ENGINE START switch OFF

2 Choose one:

◆ START VALVE OPEN alert **extinguishes:**



◆ START VALVE OPEN alert **stays illuminated:**

►► **Go to step 3**

3 ISOLATION VALVE switch CLOSE

4 PACK switch (affected side) OFF

This causes the operating pack to regulate to high flow in flight with flaps up.

5 Engine BLEED air switch
(affected side) OFF

6 Choose one:

◆ START VALVE OPEN alert stays illuminated for **engine 1:**

APU BLEED air switch OFF

►► **Go to step 7**

◆ START VALVE OPEN alert stays illuminated for **engine 2:**

►► **Go to step 7**

◆ START VALVE OPEN alert **extinguishes:**

►► **Go to step 7**

▼ Continued on next page ▼

▼ START VALVE OPEN continued ▼

7 Choose one:

◆ In flight:

WING ANTI-ICE switch OFF

This prevents possible asymmetrical ice buildup on the wings.

Avoid icing conditions where wing anti-ice is needed.



◆ On the **ground**:

Ground air source
(if in use) Disconnect

Engine start lever
(affected engine) CUTOFF



Volcanic Ash

Condition: Volcanic ash is suspected when one or more of these occur:

- A static discharge around the windshield
- A bright glow in the engine inlets
- Smoke or dust on the flight deck
- An acrid odor.

Objective: To exit the ash cloud and restart engines if needed.

Caution! Exit the volcanic ash as quickly as possible. Consider a 180° turn. Consider a descending turn.

- 1 Don oxygen masks and smoke goggles, as needed.
- 2 Establish crew communications, as needed.
- 3 Autothrottle (if engaged). Disengage

If conditions allow, run the engines at idle thrust.

- 4  Thrust levers (both). Close

This reduces possible engine damage or flameout, or both, by decreasing EGT.

- 5 ENGINE START switches (both) FLT
- 6 PACK switches HIGH
- 7 ENG ANTI-ICE switches (both). ON
- 8 WING ANTI-ICE switch ON
- 9 APU switch
(if APU available) START

This supplies backup electrical and pneumatic sources, if needed.

Note: Volcanic ash can cause non-normal system reactions such as:

- Engine malfunctions, increasing EGT, engine stall or flameout
- Decrease in indicated airspeed or loss of airspeed indications
- Equipment cooling OFF light.

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

10 If failed, engines can accelerate to idle very slowly, especially at high altitudes. If N2 is steadily increasing and EGT stays within limits, the start is progressing normally.

11 Plan to land at the nearest suitable airport.

12 Choose one:

◆ Engines run **normally**:



◆ Engines do **not** run normally:

►► **Go to the Loss Of Thrust On Both Engines checklist on page 7.5**



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Intentionally
Blank

APU FIRE

Condition: Fire is detected in the APU.

- 1 APU fire switch . . . Confirm Pull, rotate to the
stop, and hold
for 1 second
- 2 APU switch OFF

- 3 Choose one:
 - ◆APU fire switch **extinguishes:**
 ■ ■ ■ ■
 - ◆APU fire switch **stays illuminated:**
 ▶▶ **Go to step 4**
- 4 Plan to land at the nearest suitable airport.
 ■ ■ ■ ■

CARGO FIRE (MAIN)

737-800 BCF

MAIN

Condition: Fire is detected in the main deck cargo compartment.

Objective: To suppress the fire. To land at the nearest suitable airport.

- 1 Don oxygen masks and set regulators to 100%, as needed.
- 2 Don smoke goggles, as needed.
- 3 Close the flight deck door. This step prevents smoke or fumes contamination from other compartments.
- 4 Establish crew and cabin communications.

Warning! One pack must be operating to prevent excessive smoke accumulation on the flight deck.

- 5 L PACK switch Verify AUTO
- 6 R PACK switch OFF

This step causes the operating pack to regulate to high flow in flight with the flaps up.

Note: If the L PACK light illuminates any time during the rest of the flight:

- Set the R PACK switch to AUTO
- Set the L PACK switch to OFF.

- 7 MAIN CARGO FIRE ARMED switch Confirm. Push, Verify ARMED

▼ Continued on next page ▼

▼ CARGO FIRE (MAIN) continued ▼

8 CARGO FIRE

DEPR/DISCH switch Push and hold
for 1 second

This step ensures closure of the main deck air distribution shut-off valves.

Note: DEPR light can take several seconds to illuminate.

9 CAB/UTIL switch OFF

10 Choose one:

◆ On the **ground**:

**Warning! Inform ground personnel
NOT to open any cargo door
until all supernumeraries
and crew have exited the
airplane and fire fighting
equipment is nearby.**



◆ In **flight**:

►► **Go to step 11**

11 Pressurization mode selector MAN

Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

12 ⚠ Outflow VALVE

switch Move to OPEN until
the outflow valve
indication is at the
1/4 open position

Note: The airplane depressurizes within 6 to 9 minutes.

The intermittent cabin altitude/configuration warning horn sounds and the CABIN ALTITUDE lights (if installed and operative) illuminate at a cabin altitude of approximately 10,000 feet.

13 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼ **CARGO FIRE (MAIN) continued** ▼

- 14 If the fire situation becomes uncontrollable, consider an immediate landing.
- 15 Distances in the following steps assume airport elevation at sea level and no wind. Adjust distances for actual conditions.

16 Choose one:

◆ The distance to the nearest suitable airport is **50 nm or less:**

Start an expedited uninterrupted descent to the lowest safe altitude or 3,000 feet AFE, whichever is higher.

►► **Go to step 17**

◆ The distance to the nearest suitable airport is **more than 50 nm:**

Expedite a climb or descent to 25,000 feet when conditions and terrain allow.

Plan to stay at 25,000 feet until approximately 50 nm from the runway.

At approximately 50 nm from the runway start an expedited, uninterrupted descent to the lowest safe altitude or 3,000 feet AFE, whichever is higher.

►► **Go to step 17**

17 Descend at VMO/MMO with the speedbrakes extended.

Note: Maintain VMO/MMO until 15 nm from the runway.

18 Plan to level off 15 nm from the runway.

19 Do not delay the approach and landing.

20 Use autobrake MAX for landing.

21 **Checklist Complete Except Deferred Items**

———— **Deferred Items** ————

Descent Checklist

Pressurization LAND ALT__

Recall Checked

▼ **Continued on next page** ▼

▼ CARGO FIRE (MAIN) continued ▼

Autobrake **MAX**

Landing data VREF ____, Minimums ____

Approach briefing Completed

Approach Checklist

Altimeters ____

Warning! Inform ground personnel NOT to open any cargo door after landing until all supernumeraries and crew have exited the airplane and fire fighting equipment is nearby.

Approximately 15nm from the runway

Extend the speedbrakes, reduce speed, and configure for landing. Retract the speedbrakes, as needed.

Landing Checklist

Engine start switches CONT

Speedbrake ARMED

Landing gear Down

Flaps ____, Green light



ENGINE FIRE
or
Engine Severe Damage or Separation

Condition: One or more of these occur:

- Engine fire warning
- Airframe vibrations with abnormal engine indications
- Engine separation.
- Engine failure with smoke or fumes in the flight deck or cabin.

- 1

Autothrottle (if engaged) Disengage
- 2

Thrust lever
(affected engine) Confirm Close
- 3

Engine start lever
(affected engine) Confirm CUTOFF
- 4

Engine fire switch
(affected engine) Confirm Pull

To manually unlock the engine fire switch, press the override and pull.
- 5

If the engine fire switch or ENG OVERHEAT light is illuminated:

Engine fire switch
(affected engine) Rotate to the stop
and hold for 1 second

- 6

Choose one:

◆On the **ground**:

▶▶**Go to the Engine Fire on the Ground checklist on page Back Cover.2**

■ ■ ■ ■

◆In **flight**:

▶▶**Go to step 7**

▼ Continued on next page ▼

▼ **ENGINE FIRE or Engine Severe Damage or Separation continued** ▼

7 **If** after 30 seconds the engine fire switch or ENG OVERHEAT light stays illuminated:

Engine fire switch
(affected engine) Rotate to the
other stop and
hold for 1 second

8 Choose one:

◆ High airframe vibration **occurs** and **continues** after the engine is shut down:

Without delay, reduce airspeed and descend to a safe altitude which results in an acceptable vibration level.

Note: If high vibration returns and further airspeed reduction and descent are not practical, increasing airspeed can reduce the vibration.

▶▶ **Go to step 9**

◆ High airframe vibration does **not** occur or does **not** continue after the engine is shut down:

▶▶ **Go to step 9**

9 ISOLATION VALVE switch CLOSE

10 PACK switch (affected side) OFF

This step causes the operating pack to regulate to high flow in flight with the flaps up.

11 APU BLEED air switch OFF

12 Choose one:

◆ APU is **available** for start:

APU START

When APU is running:

APU GEN switch
(affected side) ON

▶▶ **Go to step 13**

◆ APU is **not** available:

▶▶ **Go to step 13**

▼ Continued on next page ▼

▼ ENGINE FIRE or Engine Severe Damage or Separation continued ▼

- 13 Balance fuel as needed.
- 14 Transponder mode selector TA or TA ONLY
This prevents climb commands which can exceed single engine performance capability.
- 15 ISOLATION VALVE switch
(after the fire has been extinguished) AUTO
This step ensures bleed air is available to both wings if wing anti-ice is needed.
- 16 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

►► Go to the One Engine Inoperative Landing checklist on page 7.23



ENGINE OVERHEAT

ENG 1
OVERHEAT

ENG 2
OVERHEAT

Condition: An overheat is detected in the engine.

- 1 Autothrottle (if engaged). Disengage
- 2 Thrust lever
(affected engine) Confirm Close
- 3 **If the ENG OVERHEAT light *stays illuminated*:**

▶▶ **Go to the ENGINE FIRE or Engine Severe Damage or Separation checklist on page 8.6**



-
- 4 **If the ENG OVERHEAT light *extinguishes*:**

Run the engine at reduced thrust to keep the light extinguished.

Note: Do not use FMC performance predictions.

- 5 Transponder mode selector TA or TA ONLY
This step prevents climb commands which can exceed reduced thrust performance capability.

- 6 Plan to land at the nearest suitable airport.

Note: Do not use FMC performance predictions.

- ▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**



Engine Tailpipe Fire

Condition: An engine tailpipe fire occurs on the ground with no engine fire warning.

- 1 Engine start lever
(affected engine) CUTOFF
- 2 Advise the cabin.
- 3 Choose one:
 - ◆Bleed air is **available**:
 - ▶▶ **Go to step 4**
 - ◆Bleed air is **not** available:
 - Advise ATC.
 - ■ ■ ■
- 4 PACK switches (both) OFF
- 5 ISOLATION VALVE switch. AUTO
- 6 Engine BLEED air switches (both) ON
- 7 Choose one:
 - ◆APU is **running**:
 - APU BLEED air switch ON
 - ▶▶ **Go to step 8**
 - ◆APU is **not** running:
 - ▶▶ **Go to step 8**
- 8 Choose one:
 - ◆Affected ENGINE START switch is in **GRD**:
 - ▶▶ **Go to step 9**
 - ◆Affected ENGINE START switch is **not** in GRD:
 - Allow the affected N2 to decrease below 20%.
 - ENGINE START switch
(affected engine) GRD
 - ▶▶ **Go to step 9**
- 9 Advise ATC.

▼ Continued on next page ▼

▼Engine Tailpipe Fire continued▼

10 **When** the tailpipe fire is extinguished:

ENGINE START switch
(affected engine) OFF



Smoke, Fire or Fumes

Condition: Smoke, fire or fumes occur.

- 1 Diversion may be needed.
- 2 Don oxygen masks and set regulators to 100%, as needed.
- 3 Don smoke goggles, as needed.
- 4 Establish crew and cabin communications.
- 5 Choose one:

◆ **Engine failure or airframe vibrations with abnormal engine indications** exist:

▶▶ **Go to the ENGINE FIRE or Engine Severe Damage or Separation checklist on page 8.6**



◆ Engine has **not** failed **and** airframe vibrations with abnormal engine indications do **not** exist:

▶▶ **Go to step 6**

- 6 BUS TRANSFER switch OFF
- 7 Advise the cabin crew that the cabin lighting will be extinguished, but passenger reading lights will continue to work.
- 8 CAB/UTIL switch (as installed) OFF
- 9 IFE/PASS SEAT switch (as installed) OFF
- 10 GALLEY switch (as installed). OFF
- 11 RECIRC FAN switches (as installed). OFF
- 12 Instruct the cabin crew to turn off the IFE and PC power switches (as installed).
- 13 APU BLEED air switch OFF
- 14 **Anytime** the smoke or fumes become the greatest threat:

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.21**

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

15 Choose one:

- ◆ Source of the smoke, fire or fumes is **obvious and** can be **extinguished quickly**:

Isolate and extinguish the source.

If possible, remove power from the affected equipment by switch or circuit breaker in the flight deck or cabin.

▶▶ **Go to step 16**

- ◆ Source of the smoke, fire or fumes is **not** obvious **or cannot** be extinguished quickly:

▶▶ **Go to step 17**

16 Choose one:

- ◆ Source is **visually confirmed** to be extinguished **and** the smoke or fumes are **decreasing**:

Continue the flight at the captain's discretion.

Restore unpowered items at the captain's discretion.

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.21, if needed**



- ◆ Source is **not** visually confirmed to be extinguished **or** smoke or fumes are **not** decreasing:

▶▶ **Go to step 17**

17 EQUIP COOLING SUPPLY

and EXHAUST switches (both) ALTN

737-700, 737-800

18 Instruct the cabin crew to:

Turn on cabin reading lights.

Turn on galley attendants work lights.

Turn off cabin fluorescent light switches (as installed).

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

- 19 Divert to the nearest suitable airport while continuing the checklist.
- 20 Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.
- 21 Do **not** delay landing in an attempt to complete all of the following steps.
- 22 ISOLATION VALVE switch. CLOSE
- 23 R PACK switch OFF
- 24 **Wait** 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.

25 Choose one:

◆ Smoke or fumes are **decreasing**:

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.21, if needed**



◆ Smoke or fumes **continue or are increasing**:

R PACK switch AUTO

L PACK switch OFF

▶▶ **Go to step 26**

- 26 **Wait** 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.

27 Choose one:

◆ Smoke or fumes are **decreasing**:

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.21, if needed**



◆ Smoke or fumes **continue or are increasing**:

L PACK switch AUTO

Consider an immediate landing.

▶▶ **Go to the Smoke or Fumes Removal checklist on page 8.21, if needed**



APU BOTTLE
DISCHARGED

**APU BOTTLE
DISCHARGED**

Condition: The APU fire extinguisher bottle has discharged or pressure is low.



APU DET
INOP

**APU DETECTION
INOPERATIVE**

Condition: APU fire detection is inoperative.

1 APU switch OFF

Caution! Do not run the APU. An APU fire would not be detected and the APU would continue to run.



CARGO FIRE (FWD/AFT)

FWD

AFT

Condition: Fire is detected in the related cargo compartment.

Objective: To suppress the cargo fire.

- 1 CARGO FIRE ARM switch (affected compartment) . . . Confirm Push, Verify ARMED
- 2 CARGO FIRE DISCH switch Push and hold for 1 second

Note: DISCH light may need up to 30 seconds to illuminate.

Note: Halon or residual smoke can cause flight deck cargo fire indications to remain or occur again. More information is found in the Additional Information section.

3 Choose one:

◆ On the **ground**:

Warning! Inform ground personnel NOT to open any cargo door until all passengers and crew have exited the airplane and fire fighting equipment is nearby.



◆ In flight:

►► Go to step 4

- 4 RECIRC FAN switches OFF
- 5 PACK switches (both) HIGH
- 6 Plan to land at the nearest suitable airport.
- 7 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ CARGO FIRE continued ▼

Deferred Items

Descent Checklist

Pressurization LAND ALT ____
 Recall Checked
 Autobrake ____
 Landing data VREF ____, Minimums ____
 Approach briefing Completed

Approach Checklist

Altimeters ____

Warning! Inform ground personnel NOT to open any cargo door after landing until all passengers and crew have exited the airplane and fire fighting equipment is nearby.

Landing Checklist

ENGINE START switches CONT
 Speedbrake ARMED
 Landing gear Down
 Flaps ____, Green light



▼ Continued on next page ▼

▼ CARGO FIRE continued ▼

Additional Information

The red FWD/AFT cargo fire warning light(s) can extinguish, remain illuminated, or re-illuminate over the remainder of the flight. If the FWD/AFT cargo fire warning light(s) re-illuminate, both master FIRE WARN lights also re-illuminate and the fire warning bell sounds. These flight deck indications alone of a cargo fire within the **same** compartment do not indicate the fire is uncontrolled.

Illumination of the cargo fire DISCH light indicates the fire suppression system has been fully activated.

DEPR

CARGO FIRE DEPR

737-800 BCF

Condition: The main deck suppression system is armed and the air distribution shutoff valves are closed.



**DETECTOR
FAULT**

CARGO FIRE DETECTOR FAULT

Condition: Fire detection is inoperative in one or more cargo compartments.



DISCH

CARGO FIRE DISCHARGE

737-800 BCF

Condition: There is low pressure in one or more cargo fire extinguisher bottles.

- 1 One or more cargo fire extinguisher bottles have discharged.



DISCH

DISCH

Condition: A cargo fire extinguisher bottle has discharged or pressure is low.



FAULT

**ENGINE FIRE/OVERHEAT
DETECTOR FAULT**

Condition: Engine fire and overheat detection is inoperative in one or both engines.



L/R BOTTLE DISCHARGED

**L BOTTLE
DISCHARGED**

**R BOTTLE
DISCHARGED**

Condition: The engine fire extinguisher bottle has discharged or pressure is low.



SMOKE

LAVATORY SMOKE

Condition: Smoke is detected in one or more lavatories.

- 1 Verify that the lavatory fire is contained.



Smoke or Fumes Removal

Condition: Smoke or fumes removal is needed.

- 1 Do this checklist **only** when directed by the Smoke, Fire or Fumes checklist.
- 2 Do **not** delay landing in an attempt to complete the following steps.
- 3 Close the flight deck door.
- 4 Choose one:

◆ **Both** PACK switches are **OFF**:

▶▶ **Go to step 5**

◆ **A single or both** PACK switch(es) are in **AUTO**:

▶▶ **Go to step 6**

- 5 Choose one:

◆ Smoke or fumes source is confirmed to be **outside** the flight deck:



◆ Smoke or fumes source is confirmed to be **on** the flight deck:

Caution! Window should not be opened unless the source is confirmed to be on the flight deck.

Establish normal holding speed. High airspeed may prevent opening the window.

Open the first officer's sliding window.

▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.12 and do the remaining steps**



Do **not** turn on any PACK switch that was turned off by the Smoke, Fire or Fumes checklist.

- 6  Operating PACK switch(es) HIGH
- 7 LAND ALT indicator 10000 feet

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

Note: The intermittent cabin altitude/configuration warning horn will sound and the CABIN ALTITUDE lights (if installed and operative) will illuminate at a cabin altitude of approximately 10,000 feet.

- 8 Engine BLEED air switches (both) Verify ON
- 9 Set thrust to maximum practical N1 (minimum 45%).
- 10 Open flight deck air conditioning and gasper outlets.

Caution! Do not open any flight deck window. Keep the flight deck door closed.

11 Choose one:

◆ Smoke or fumes are **controllable**:

▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.12 and do the remaining steps**



◆ Smoke or fumes are **uncontrollable**:

▶▶ **Go to step 12**

12 Descend to the lowest safe altitude or 10,000 feet, whichever is higher.

13 **When** at 14,000 feet or below:

Pressurization mode selector MAN

Outflow VALVE switch Hold in OPEN
until the outflow VALVE
indication shows fully OPEN

This causes the cabin airflow to carry smoke or fumes aft.

Note: The outflow valve can take up to 20 seconds to open.

▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.12 and do the remaining steps**



WHEEL
WELL

WHEEL WELL FIRE

Condition: Fire is detected in the main wheel well.

- 1  270K/.82M maximum. LANDING GEAR lever. DN

This attempts to remove and extinguish the fire source.

- 2 Plan to land at the nearest suitable airport.

Note: Do **not** use FMC performance predictions with gear extended.

- 3 Choose one:

◆ Gear **must be retracted** for airplane performance:

▶▶ **Go to step 4**

◆ Gear does **not** need to be retracted for airplane performance:



- 4 **When** the WHEEL WELL light extinguishes:

Wait 20 minutes.

- 5  235K maximum. LANDING GEAR lever. UP

After landing gear retraction is complete:

LANDING GEAR lever OFF





Intentionally
Blank

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Intentionally
Blank

Runaway Stabilizer

Condition: Uncommanded stabilizer trim movement occurs continuously or in a manner not appropriate for flight conditions.

- 1 Control column. Hold firmly
 - 2 Autopilot (if engaged) Disengage
 - 3 Autothrottle (if engaged) Disengage
 - 4 Control column and
thrust levers Control airplane pitch
attitude and airspeed
 - 5 Main Electric
Stabilizer trim Reduce control
column forces
 - 6 **If** the runaway **stops** after the autopilot is
disengaged:
Do **not** re-engage the autopilot or autothrottle.
■ ■ ■ ■
 - 7 **If** the runaway **continues** after the autopilot is
disengaged:
STAB TRIM cutout
switches (both) CUTOUT
If the runaway **continues**:
Stabilizer
trim wheel Grasp and hold
- - - - -
 - 8 Stabilizer. Trim manually
A two-pilot effort may be used to correct an out
of trim condition.
- Note:** Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim.
- 9 Anticipate trim requirements.
 - 10 Do **not** re-engage the autopilot or autothrottle.
 - 11 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼



▼ Runaway Stabilizer continued ▼

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

Landing Configuration and Trim

Establish landing configuration and in-trim condition early on final approach.

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps ____, Green light



All Flaps Up Landing

Condition: The leading edge devices fail to extend and trailing edge flaps are less than 1.

Objective: To configure for a landing with leading edge devices retracted and trailing edge flaps less than 1.

- 1 Do this checklist **only** when directed by the Trailing Edge Flaps Up Landing checklist.
- 2 Consider burning off fuel to reduce touchdown speed.
- 3 Set VREF 40 + 55 knots.
- 4 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
- 5 Maintain flaps up maneuvering speed until established on final approach.
- 6 Limit bank angle to 15° when airspeed is less than the flaps up maneuvering speed.
- 7 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ All Flaps Up Landing continued ▼

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data **VREF 40 + 55 knots** ____,
Minimums ____
- Approach briefing Completed

Go-Around Procedure Review

- Do the normal go-around procedure except:
 - Limit bank angle to 15° when the airspeed is less than the flaps up maneuvering speed.
 - Accelerate to flaps up maneuvering speed.

Approach Checklist

- Altimeters ____

Additional Deferred Items

- FASTEN BELTS switch ON
- GROUND PROXIMITY
- FLAP INHIBIT switch FLAP INHIBIT

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED

Note: The SPEED BRAKE lever may not move beyond the FLIGHT DETENT on landing and the spoilers will not fully deploy.

- Landing gear Down
- Flaps. ____, **No lights**



**AUTO SLAT
FAIL**

AUTO SLAT FAIL

Condition: The auto slat system is failed.

- 1 Continue normal operation.



Elevator Tab Vibration

Condition: An elevator tab vibration occurs in flight. One or more of the following may be an indication of an elevator tab vibration:

- Vibration that originates, and is strongest, in the aft part of the airplane but can be felt throughout the airplane
- Vibration that is felt in the control wheel and rudder pedals
- Vibration that causes items attached to the airplane, such as sun visors, to move.

- 1 Passenger signs ON

Do **not** use speedbrakes or change aircraft configuration to reduce airspeed. Do **not** reduce airspeed below the minimum speed for the existing flap setting and gross weight.

- 2  Smoothly reduce airspeed until the vibration stops.

- 3 Consider landing at the nearest suitable airport.

- 4 Stay at or below the reduced airspeed at which the vibration stopped for the rest of the flight. Limit bank angle to 15° until below 20,000 feet.

- 5 Do **not** deploy speedbrakes in flight.

Note: Flaps and landing gear can be extended normally for the approach.

The speedbrakes can be armed for landing.



FEEL
DIFF PRESS

FEEL DIFFERENTIAL
PRESSURE

Condition: High differential pressure is measured by the elevator feel computer.

Note: Column forces can be significantly higher than normal, particularly during landing flare.

The autopilot can disengage when pitch changes are commanded.

Do not attempt an autoland.

- 1 Continue normal operation.



FLAP LOAD
RELIEF

FLAP LOAD RELIEF

Condition: Flap load relief occurs.

- 1 Check flap position and maintain the appropriate airspeed.



LOW
PRESSURE

FLIGHT CONTROL LOW
PRESSURE

Condition: Hydraulic system pressure to the ailerons, elevators and rudder is low.

Objective: To activate the standby hydraulic system and standby rudder PCU.

- 1 FLT CONTROL switch
(affected side) Confirm. STBY RUD



Jammed or Restricted Flight Controls

Condition: A flight control is jammed or restricted in roll, pitch, or yaw.

- 1 Autopilot (if engaged) Disengage
- 2 Autothrottle (if engaged) Disengage
- 3 Verify that the thrust is symmetrical.
- 4 Overpower the jammed or restricted system. Use maximum force, including a combined effort of both pilots, if needed. A maximum two-pilot effort on the controls will not cause a cable or system failure.
- 5 Do **not** turn off any flight control switches.
- 6 Choose one:
 - ◆ The failure could be **due** to freezing water **and** conditions **allow**:

Consider a descent to a warmer temperature and attempt to overpower the jammed or restricted system again.

▶▶ Go to step 7
 - ◆ The failure could **not** be due to freezing water **or** conditions do **not** allow:

▶▶ Go to step 7
- 7 Choose one:
 - ◆ Controls are **normal**:

■ ■ ■ ■
 - ◆ Controls are **not** normal:

▶▶ Go to step 8
- 8 Use stabilizer or rudder trim to offload control forces. If electric stabilizer trim is needed, move the Stabilizer Trim Override switch to OVERRIDE.
- 9 Do not make abrupt thrust changes. Extend or retract speedbrake slowly and smoothly.
- 10 Limit bank angle to 15°.
- 11 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼ Jammed or Restricted Flight Controls continued ▼

12 Plan a flaps 15 landing.

13 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

14 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

15 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

Descent Checklist

Approach briefing Completed

Advance thrust to go-around smoothly and slowly to avoid excessive pitch-up.

Altimeters

GROUND PROXIMITY
FLAP INHIBIT switch FLAP INHIBIT

Flaps..... **15, Green light**



LE FLAPS TRANSIT

LEADING EDGE FLAPS TRANSIT

Condition: One or more of these occur:

- The leading edge devices are not in the commanded position
- A leading edge device asymmetry is detected
- A leading edge device skew is detected.

Note: Do not use FMC performance predictions with any flaps or slats extended.

1 Choose one:

- ◆ **Trailing** edge flaps are **extended** and the trailing edge flap position indication **disagrees** with the flap handle position:
 - ▶▶ **Go to the Trailing Edge Flap Disagree checklist on page 9.23**
 - ■ ■ ■
- ◆ **Trailing** edge flaps are **extended** and the trailing edge flap position indication **agrees** with the flap handle position:
 - ▶▶ **Go to step 7**
- ◆ **Trailing** edge flaps are **up**:
 - Limit airspeed to 230 knots maximum.
 - ▶▶ **Go to step 2**

2 Choose one:

- ◆ Roll is **encountered**:
 - ▶▶▶ **Go to step 7**
- ◆ Roll is **not** encountered:
 - Note:** Roll may be difficult to identify with the autopilot engaged.
 - ▶▶▶ **Go to step 3**

3 

Maximum flap extension altitude 20,000 feet.

 Flaps Extend to flaps 1, then retract to flaps up

▼ Continued on next page ▼

▼ LEADING EDGE FLAPS TRANSIT continued ▼

4 Choose one:

◆ LE FLAPS TRANSIT light **extinguishes** after the flaps are up:

Continue normal operation.



◆ LE FLAPS TRANSIT light **stays illuminated** after the flaps are up:

►► **Go to step 5**

5 Check LE DEVICES annunciator panel.

6 Choose one:

◆ Light(s) for **only one** leading edge device is illuminated:

Limit airspeed to 300 knots (280 knots for turbulent air penetration) or 0.65 Mach, whichever is lower.

►► **Go to step 7**

◆ Light(s) for **more than one** leading edge device is illuminated:

Limit airspeed to 230 knots maximum.

►► **Go to step 7**

7 Plan a flaps 15 landing.

8 Set VREF 15 + 15 knots.

9 Limit bank angle to 15° when airspeed is less than the flaps up maneuvering speed.

10 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

11 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization. LAND ALT ____

Recall Checked

Autobrake ____

▼ Continued on next page ▼

▼ LEADING EDGE FLAPS TRANSIT continued ▼

Landing data **VREF 15 + 15 knots** ____,
Minimums ____

Approach briefing Completed

Approach Checklist

Altimeters ____

Additional Deferred Item

GROUND PROXIMITY
FLAP INHIBIT switch FLAP INHIBIT

Note: The amber LE FLAPS TRANSIT light may be illuminated. Operation within the lower amber airspeed band for landing is normal for this condition.

Note: V/S and VNAV PTH modes can revert to LVL CHG mode.

Landing Checklist

ENGINE START switches. CONT
Speedbrake ARMED
Landing gear Down
Flaps **15, Green or amber light**

Note: The light may be green or amber depending on the cause of the failure.



MACH TRIM FAIL — **MACH TRIM FAIL** —

Condition: The mach trim system is failed.

- 1 Limit airspeed to 280 knots/0.82 Mach.



**SPEED BRAKE
DO NOT ARM**

SPEED BRAKE DO NOT ARM

Condition: An automatic speedbrake fault occurs.

Note: Speedbrakes may be used in flight.

1 Choose one:

- ◆ SPEED BRAKE DO NOT ARM light illuminates **before** the flaps are retracted:
Retract the flaps on schedule.
▶▶ **Go to step 2**
- ◆ SPEED BRAKE DO NOT ARM light illuminates with the flaps **up**:
Limit airspeed to 320 knots maximum.
▶▶ **Go to step 3**
- ◆ SPEED BRAKE DO NOT ARM light is illuminated **after** flap extension for landing:
▶▶ **Go to step 3**

2 Choose one:

- ◆ SPEED BRAKE DO NOT ARM light **stays illuminated** after the flaps are retracted:
Limit airspeed to 320 knots maximum.
▶▶ **Go to step 3**
- ◆ SPEED BRAKE DO NOT ARM light **extinguishes** after the flaps are retracted:
▶▶ **Go to step 3**

3 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

**SPEED TRIM
FAIL**

SPEED TRIM FAIL

Condition: Speed Trim function is inoperative.

Note: The Speed Trim System will not provide stabilizer trim inputs when deviating from a trimmed airspeed.

- 1 Continue normal operation.



**SPEEDBRAKES
EXTENDED**

SPEEDBRAKES EXTENDED

Condition: In flight, the speedbrakes are extended beyond the ARMED position and one or more of these occur:

- The radio altitude is below 800 feet
- The flap lever setting is more than flaps 10.

On the ground, the SPEED BRAKE lever is down and the speedbrakes are extended.

- 1 Choose one:

◆ **In flight:**

SPEED BRAKE lever ARMED



◆ **On the ground:**

SPEED BRAKE lever DOWN detent

Note: If the light stays illuminated, do **not** takeoff.



STABILIZER OUT OF TRIM

STAB
OUT OF
TRIM

Condition: The autopilot does not set the stabilizer trim correctly.

Note: During large changes in trim requirements, the STAB OUT OF TRIM light can illuminate momentarily.

1 Choose one:

◆ Stabilizer is **trimming**:

Continue normal operation.



◆ Stabilizer is **not** trimming:

▶▶ **Go to step 2**

2 Control column. Hold firmly

3 Autopilot Disengage

4 Autothrottle (if engaged) Disengage

5 Main Electric
Stabilizer trim As needed

6 Choose one:

◆ Stabilizer **responds** to electric trim inputs:

Do **not** re-engage the autopilot or autothrottle.



◆ Stabilizer does **not** respond to electric trim inputs:

▶▶ **Go to the Stabilizer Trim Inoperative checklist on page 9.17**



Stabilizer Trim Inoperative

Condition: Loss of electric trim through the main electric stabilizer trim switches, or as directed by the STAB OUT OF TRIM checklist.

Objective: To land the airplane using manual trim or, if manual trim is not available, to land the airplane using elevator control only.

- 1 Autothrottle (if engaged) Disengage
Do **not** re-engage the autothrottle.
- 2 STAB TRIM cutout switches (both) CUTOUT
The autopilot is not available.
- 3 Stabilizer. Trim manually
A two-pilot effort may be used and will not cause system damage.

Note: Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim.

If the failure could be due to ice accumulation, descend to a warmer temperature and attempt again to trim manually.

- 4 Choose one:
 - ◆ Stabilizer **can** be trimmed manually:
▶▶ **Go to step 5**
 - ◆ Stabilizer **cannot** be trimmed manually:
▶▶ **Go to step 6**
- 5 Anticipate trim requirements.
▶▶ **Go to step 8**
- 6 Expect higher than normal elevator forces during approach and landing.
- 7 The thrust reduction at flare will cause a nose down pitch.
- 8 Plan a flaps 15 landing.

▼ Continued on next page ▼

▼ Stabilizer Trim Inoperative continued ▼

9 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

10 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

11 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data **VREF 15 or VREF ICE** ____,
Minimums ____
- Approach briefing Completed

Go-Around Procedure Review

- Do the normal go-around procedure.
- Advance thrust to go-around smoothly and slowly to avoid excessive pitch-up.

Approach Checklist

- Altimeters ____

▼ Continued on next page ▼

▼ Stabilizer Trim Inoperative continued ▼

Landing Configuration

Establish landing configuration early on final approach.

Additional Deferred Item

GROUND PROXIMITY

FLAP INHIBIT switch FLAP INHIBIT

Landing Checklist

ENGINE START switches CONT

Speedbrake ARMED

Landing gear Down

Flaps. **15, Green light**



STBY
RUD ON

STANDBY RUDDER ON

Condition: The standby rudder hydraulic system is commanded on.

1 Choose one:

- ◆ STBY RUD ON light is illuminated with **no other flight deck indications:**

Avoid large or abrupt rudder pedal inputs.



- ◆ STBY RUD ON light is illuminated due to the **pilot moving** the FLT CONTROL A or B switch to STBY RUD:



- ◆ STBY RUD ON light is illuminated in response to a hydraulic system **non-normal** situation:



Trailing Edge Flap Asymmetry

Condition: One or more of these occur:

- An uncommanded roll occurs when the flaps change position
- The left and right flap indications disagree.

Objective: To configure the airplane for landing.

- 1 Set the flap lever to the nearest detent that is equal to or less than the smallest indicated flap position.

Caution! Do not attempt to move the trailing edge flaps with the ALTERNATE FLAPS switch because there is no asymmetry protection.

Note: Do not use FMC performance predictions with any flaps or slats extended.

- 2 Choose one:

◆ Flap **lever** is set to **30**:

Set VREF 30.

Note: VREF + wind additive must not exceed the flap placard speed for flaps 40.

▶▶ **Go to step 4**

◆ Flap **lever** is set to **15 or 25**:

▶▶ **Go to step 3**

◆ Flap **lever** is set to **1 or greater and less than 15**:

Consider burning off fuel to reduce touchdown speed.

Set VREF 40 + 30 knots.

▶▶ **Go to step 4**

◆ Flap **lever** is set to **UP**:

▶▶ **Go to the Trailing Edge Flaps Up Landing checklist on page 9.28**



▼ Continued on next page ▼

▼ Trailing Edge Flap Asymmetry continued ▼

3 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set $VREF\ ICE = VREF\ 15 + 10$ knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

$VREF\ 15 +$ wind additive, or $VREF\ ICE +$ wind additive if needed, must not exceed the flap placard speed for the next larger flap setting.

4 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

5 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼Trailing Edge Flap Asymmetry continued▼

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data **VREF ____ as directed by checklist, Minimums ____**
- Approach briefing Completed

Approach Checklist

- Altimeters ____

Additional Deferred Item

Choose one:

- ◆ Flap **lever** is set to **30**:
 - ▶▶ **Go to Landing Checklist below**
- ◆ Flap **lever** is set to **less than 30**:
 - GROUND PROXIMITY FLAP
 - INHIBIT switch FLAP INHIBIT
 - ▶▶ **Go to Landing Checklist below**

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps **____, Green or amber light**

Note: The light can be green or amber depending on the cause of the failure.



Trailing Edge Flap Disagree

Condition: The trailing edge flaps are not in the commanded position.

Objective: To configure the airplane for landing.

1 Choose one:

◆ Trailing edge flap asymmetry **exists**:

▶▶ **Go to the Trailing Edge Flap Asymmetry checklist on page 9.20**



◆ Trailing edge flap asymmetry does **not** exist:

▶▶ **Go to step 2**

2 Choose one:

◆ Indicated flap position is **30 or greater and less than 40**:

Land using existing flaps.

▶▶ **Go to step 3**

◆ Indicated flap position is **15 or greater and less than 30**:

Land using existing flaps.

▶▶ **Go to step 5**

◆ Indicated flap position is **less than 15**:

▶▶ **Go to step 4**

3 Set VREF 30.

Note: VREF 30 + wind additive must not exceed the flap placard speed for flaps 40.

▶▶ **Go to step 6**

4 Plan to extend flaps to 15 using alternate flap extension.

Note: Alternate flap extension time to flaps 15 is approximately 2 minutes.

The drag penalty with the leading edge devices extended can make it impossible to reach an alternate field.

▼ Continued on next page ▼

▼Trailing Edge Flap Disagree continued▼

5 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.
VREF 15 + wind additive, or VREF ICE + wind additive if needed, must not exceed the flap placard speed for the next larger flap setting.

6 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

7 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data**VREF ____ as directed by checklist, Minimums ____**
- Approach briefing Completed

Approach Checklist

- Altimeters ____

▼ Continued on next page ▼

▼ Trailing Edge Flap Disagree continued ▼

Additional Deferred Item

Choose one:

- ◆ Indicated flap position is **30 or greater**:
 - ▶▶ **Go to Landing Checklist below**
- ◆ Indicated flap position is **15 or greater and less than 30**:
 - GROUND PROXIMITY FLAP
INHIBIT switch FLAP INHIBIT
 - ▶▶ **Go to Landing Checklist below**
- ◆ Indicated flap position is **less than 15**:
 - GROUND PROXIMITY FLAP
INHIBIT switch FLAP INHIBIT
 - ▶▶ **Go to Alternate Flap Extension below**

▼ Continued on next page ▼

▼Trailing Edge Flap Disagree continued ▼

Alternate Flap Extension

During flap extension, set the flap lever to the desired flap position.

 230K maximum during alternate flap extension.
ALTERNATE FLAPS master switch ARM

Note: The landing gear configuration warning can sound if the flaps are between 10 and 15 and the landing gear are retracted.

Note: The amber LE FLAPS TRANSIT light stays illuminated until the flaps approach the flaps 10 or 15 position.

Note: Operation within the lower amber airspeed band can be needed until the LE FLAPS TRANSIT light extinguishes.

 If flap asymmetry occurs, release the switch immediately. There is no asymmetry protection.
ALTERNATE FLAPS
position switch Hold DOWN
to extend flaps
to 15 on schedule

As flaps are extending, slow to respective maneuvering speed.

▼ Continued on next page ▼

▼ Trailing Edge Flap Disagree continued ▼

Choose one:

- ◆ Trailing edge flaps **asymmetry** occurs:
 - ▶▶ **Go to the Trailing Edge Flap Asymmetry checklist on page 9.20**
 - ■ ■ ■
- ◆ Trailing edge flaps extend to **15**:
 - ▶▶ **Go to Landing Checklist below**
- ◆ Indicated flap position is **less than 1** after attempting alternate flap extension:
 - ▶▶ **Go to the Trailing Edge Flaps Up Landing checklist on page 9.28**
 - ■ ■ ■
- ◆ Indicated flap position is **1 or greater and less than 15** after attempting alternate flap extension:
 - Land using existing flaps.
 - Consider burning off fuel to reduce touchdown speed.
 - Set VREF 40 + 30 knots.
 - Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
 - ▶▶ **Go to Landing Checklist below**

Landing Checklist

ENGINE START switches CONT
 Speedbrake ARMED
 Landing gear Down
 Flaps. , **Green or amber light**

Note: The light can be green or amber depending on the cause of the failure.



Trailing Edge Flaps Up Landing

Condition: The trailing edge flaps are less than 1.

Objective: To configure for a landing with trailing edge flaps less than 1.

1 Choose one:

◆ Trailing edge flap asymmetry **exists**:

▶▶ **Go to step 2**

◆ Trailing edge flap asymmetry does **not** exist:

Do this checklist **only** when directed by the Trailing Edge Flap Disagree checklist.

▶▶ **Go to step 4**

230K maximum.

2  ALTERNATE FLAPS master switch ARM

Note: This procedure extends the leading edge devices only.

3 ALTERNATE FLAPS
position switch Momentary DOWN

Verify that the LE DEVICES annunciator indicates FULL EXT for all leading edge slats and flaps.

Note: The LE FLAPS TRANSIT light can stay illuminated after the LE devices are fully extended.

4 Choose one:

◆ LE DEVICES annunciator **shows** FULL EXT:

▶▶ **Go to step 5**

◆ LE DEVICES annunciator does **not** show FULL EXT:

▶▶ **Go to the All Flaps Up Landing checklist on page 9.3**



5 Consider burning off fuel to reduce touchdown speed.

▼ Continued on next page ▼

▼ Trailing Edge Flaps Up Landing continued ▼

- 6 Set VREF 40 + 40 knots.
- 7 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
- 8 Maintain flaps up maneuvering speed until on final.
- 9 Limit bank angle to 15° when airspeed is less than the flaps up maneuvering speed.
- 10 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization LAND ALT ____

Recall Checked

Autobrake ____

Landing data **VREF 40 + 40 knots** ____,
Minimums ____

Approach briefing Completed

Go-Around Procedure Review

Do the normal go-around procedure except:

Limit bank angle to 15° when the airspeed is less than the flaps up maneuvering speed.

Accelerate to flaps up maneuvering speed.

Do not exceed 230 knots with leading edge devices extended.

Approach Checklist

Altimeters ____

▼ Continued on next page ▼

▼ Trailing Edge Flaps Up Landing continued ▼

Additional Deferred Items

FASTEN BELTS switch ON

GROUND PROXIMITY

FLAP INHIBIT switch FLAP INHIBIT

Note: A nuisance stick shaker can occur when slowing to VREF 40 + 40 knots at high gross weights and/or bank angles greater than 15°.

Operation within the lower amber airspeed band for landing is normal for this condition.

Note: V/S and VNAV PTH modes can revert to LVL CHG mode.

Landing Checklist

ENGINE START switches. CONT

Speedbrake ARMED

Note: The SPEED BRAKE lever may not move beyond the FLIGHT DETENT on landing and the spoilers will not fully deploy.

Landing gear Down

Flaps ____, **Green or amber light**

Note: The light can be green or amber depending on the cause of the failure.



**YAW
DAMPER**

YAW DAMPER

Condition: The yaw damper is disengaged.

1 YAW DAMPER switch OFF then ON

2 Choose one:

◆ YAW DAMPER light **extinguishes:**



◆ YAW DAMPER light **stays illuminated:**

YAW DAMPER switch OFF

►► **Go to step 3**

3 Avoid areas of predicted moderate or severe turbulence. If turbulence is encountered and passenger or supernumerary comfort becomes affected, reduce airspeed and/or descend to a lower altitude.

4 Do not exceed flaps 30.





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Airspeed Unreliable

Condition: Airspeed or Mach indications are suspected to be unreliable. (Items which might indicate unreliable airspeed are listed in the Additional Information section.)

Objective: To identify a reliable airspeed indication, if possible, or to use the Flight With Unreliable Airspeed table in the Performance Inflight chapter for the remainder of the flight.

- 1 Autopilot (if engaged) Disengage
- 2 Autothrottle (if engaged) Disengage
- 3 F/D switches (both) OFF
- 4 Set the following gear up pitch attitude and thrust:
 - Flaps extended 10° and 80% N1
 - Flaps up 4° and 75% N1
-
- 5 PROBE HEAT switches Check ON
- 6 The following indications are **reliable**:
 - Attitude
 - N1
 - Ground speed
 - Radio altitude

Note: Stick shaker, overspeed warning and AIRSPEED LOW (as installed) alerts may sound erroneously or simultaneously.

Note: The Flight Path Vector and Pitch Limit Indicator may be unreliable.

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

7 Choose one:

- ◆ Reliable airspeed indication **can** be determined:
Use the reliable airspeed indication for the remainder of the flight.
▶▶ **Go to step 11**
- ◆ Reliable airspeed indication **cannot** be determined:
▶▶ **Go to step 8**

8 Refer to the Flight With Unreliable Airspeed table in the Performance Inflight chapter and set the pitch attitude and thrust setting for the current airplane configuration and phase of flight.

9 **When** in trim and stabilized:

Compare the captain, first officer and standby airspeed indicators with the airspeed shown in the table.

An airspeed indication that differs by more than 20 knots or 0.03 Mach from the airspeed shown in the table should be considered **unreliable**.

10 Choose one:

- ◆ Reliable airspeed indication **can** be determined:
Use the reliable airspeed indication for the remainder of the flight.
▶▶ **Go to step 11**
- ◆ Reliable airspeed indication **cannot** be determined:
▶▶ **Go to step 12**

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

11 Choose one:

◆ **Captain's or First Officer's** airspeed indication is **reliable**:

Flight director switch
(reliable side) ON

►► **Go to step 14**

◆ **Only** the **standby airspeed** indication is **reliable**:

Note: Do not use the autopilot,
autothrottle, or flight directors.

►► **Go to step 16**

12 Set pitch attitude and thrust from the Flight With Unreliable Airspeed table in the Performance Inflight chapter for the airplane configuration and phase of flight, as needed.

13 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

Note: Maintain visual conditions if possible.

Establish landing configuration early.

Radio altitude reference is available below 2,500 feet.

Use electronic and visual glideslope indicators, where available, for approach and landing.

Do not use the autopilot, autothrottle, or flight directors.

►► **Go to step 16**

14 Autopilot
(reliable side, if needed) Engage

Note: Autopilot may not engage or may disengage automatically.

15 Do not use the autothrottle.

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

16 Choose one:

◆ Captain’s **or** First Officer’s altitude indication **is reliable**:

Use the reliable altitude indication for the remainder of the flight.

▶▶ **Go to step 17**

◆ Captain’s **and** First Officer’s altitude indications **are unreliable**:

Note: Airplane does not meet RVSM airspace requirements.

▶▶ **Go to step 20**

17 Airplane may not meet RVSM airspace requirements.

18 Set transponder to provide reliable altitude reporting.

ALT selector (1 or 2) Select reliable side

19 Transponder mode selector TA or TA ONLY

▶▶ **Go to step 21**

20 Set transponder altitude reporting off.

Transponder mode selector ALT OFF or ALT RPTG OFF

21 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

Deferred Items**Review Before Descent**

For approach, only set the BARO minimums on the **reliable** PFD. Remove the BARO minimums from the **unreliable** PFD.

Note: If BARO minimums are set only on the First Officer's PFD, DA/MDA aural callouts are not provided.

Go-Around Procedure Review

Refer to the Performance Inflight chapter to determine the go-around pitch attitude and thrust setting:

For **pitch attitude**, refer to the Flight with Unreliable Airspeed Go-Around table.

For **thrust setting**, refer to the Go-Around %N1 table.

Choose one:

- ◆ **Captain's or First Officer's** airspeed indication is **reliable**:

When TO/GA is pushed, the flight director pitch bar may automatically be removed. An AFDS pitch mode change, such as LVL CHG, restores the flight director pitch bar.

Note: Only use flight director guidance on the reliable PFD.



- ◆ **Only the standby airspeed** indication is **reliable**:

Do not use TO/GA.



- ◆ **Captain's, First Officer's, and standby airspeed** indications are **unreliable**:

Do not use TO/GA.



▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

Additional Information

One or more of the following may be associated with unreliable airspeed or Mach indications:

- Difference between captain and first officer airspeed indications
- Speed/altitude information not consistent with pitch attitude and thrust setting
- Blank or fluctuating airspeed indication
- Continuous or intermittent stick shaker
- IAS DISAGREE alert
- ALT DISAGREE alert
- AOA DISAGREE alert
- SPD failure flag
- SPD LIM failure flag
- Erroneous minimum speed bars
- Erroneous maximum speed bars
- Airspeed low aural
- Airspeed low PFD indications on one side
- Overspeed warning
- Erroneous Flight Director (FD) pitch command
- EEC ALTN light(s)
- Radome damage or loss

If the AOA DISAGREE alert is shown, one or more of the following flight deck effects can occur:

- Erroneous Pitch Limit Indicator (PLI)
- Windshear alerts
- Autoslat operation

ALT DISAGREE

Condition: The ALT DISAGREE alert indicates the captain's and first officer's altitude indications disagree.

1 Choose one:

◆ IAS DISAGREE alert **is** shown:

▶▶ **Go to the Airspeed Unreliable checklist on page 10.1**



◆ IAS DISAGREE alert is **not** shown:

▶▶ **Go to step 2**

2 Verify all altimeters are set to correct barometric setting.

3 Choose one:

◆ ALT DISAGREE alert **extinguishes**:

Continue normal operation.



◆ ALT DISAGREE alert **stays illuminated**:

Note: Airplane does not meet RVSM airspace requirements.

▶▶ **Go to step 4**

4 Standby altimeter is available.

5 Do **not** use the flight path vector.

6 Maintain visual conditions if possible.

7 Choose one:

◆ A reliable altitude **can** be determined:

▶▶ **Go to step 8**

◆ A reliable altitude **cannot** be determined:

▶▶ **Go to step 9**

▼ Continued on next page ▼

▼ ALT DISAGREE continued ▼

- 8 Set transponder to provide reliable altitude reporting
- ALT selector (1 or 2) Select reliable side

▶▶ Go to step 10

- 9 Set transponder altitude reporting off.
- Transponder mode selector ALT OFF or ALT RPTG OFF

10 Checklist Complete Except Deferred Items

Deferred Items

Review Before Descent:

For approach, only set the BARO minimums on the **reliable** PFD. Remove the BARO minimums from the **unreliable** PFD.

Note: If BARO minimums are set only on the First Officer’s PFD, DA/MDA aural callouts are not provided.

- Establish landing configuration early
- Radio altitude reference is available below 2,500 feet
- Use electronic and visual glideslope indicators, where available, for approach and landing.



AOA DISAGREE

Condition: The AOA DISAGREE alert indicates the left and right angle of attack vanes disagree.

►► **Go to the Airspeed Unreliable checklist on page 10.1**

**CDS FAULT**

Condition: The CDS FAULT annunciation indicates a CDS fault occurs.

Note: CDS FAULT annunciates on the ground only, before the second engine start.

1 Do **not** takeoff.



Display Failure

Condition: A display in the common display system is failed.

- 1 Choose one:
 - ◆ A single display is not usable and automatic switching **has** occurred:
Continue normal operation.
■ ■ ■ ■
 - ◆ A single display is not usable and automatic switching has **not** occurred:
▶▶ **Go to step 2**
- 2 MAIN PANEL DUs selector As needed
- 3 LOWER DU selector. As needed
■ ■ ■ ■

DISPLAYS CONTROL PANEL

Condition: The DISPLAYS CONTROL PANEL annunciation indicates the EFIS control panel is failed.

Note: The altimeter blanks and an ALT flag illuminates on the side corresponding to the failed control panel.

- 1 CONTROL PANEL select switch BOTH ON 1 or BOTH ON 2
Select the operating control panel.
- 2 Verify that the DISPLAYS CONTROL PANEL annunciation and ALT flag extinguish.
■ ■ ■ ■

DISPLAY SOURCE

Condition: The DSPLY SOURCE, DSPLY SOURCE 1 or DSPLY SOURCE 2 annunciation indicates only one DEU is supplying display information. Indications may include:

- No hydraulic pressure indication on the failed side
- Speed limit flag shown on the failed side
- Minimum maneuver speed and stick shaker band removed on the failed side
- Both EEC ALTN lights illuminated.

Note: Flight director indications may be removed and autoflight mode reversions may occur.
Dual autopilot approach is not available.

1 Choose one:

◆ DEU fails on the **same** side as the engaged autopilot:

Verify that the correct flight director indications and flight mode annunciations are shown on the operating side.

Select autopilot on the operating side.

▶▶ **Go to step 2**

◆ DEU fails on the **opposite** side as the engaged autopilot:

▶▶ **Go to step 2**

2 Choose one:

◆ **EEC ALTN** lights are **illuminated**:

▶▶ **Go to step 3**

◆ **EEC ALTN** lights are **not** illuminated:



▼ Continued on next page ▼

▼ DISPLAY SOURCE continued ▼

3 Choose one:

◆ **EEC ALTERNATE MODE** checklist has been completed:



◆ **EEC ALTERNATE MODE** checklist has **not** been completed:

▶▶ **Go to the EEC ALTERNATE MODE checklist on page 7.10**



OFF

FLIGHT RECORDER OFF

Condition: The flight recorder is off.

1 Continue normal operation.



IAS DISAGREE

Condition: The IAS DISAGREE alert indicates the captain’s and first officer’s airspeed indications disagree.

▶▶ **Go to the Airspeed Unreliable checklist on page 10.1**



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ADS-B Out Failure

Condition: One or more of these occur:

- ATC reports ADS-B Out is lost or degraded
- GPS-L or GPS-R INVALID message is in the FMC scratchpad and the transponder is selected to the related side.
- Transponder is failed

- 1 Transponder selector. Select opposite transponder



CDU Display Fail

Condition: One or more of these occur with the route shown on the navigation display:

- CDU display is blank
- CDU is not responding to inputs.

- 1 Use the operating CDU.



M
S
G

FMC DISAGREE

FMC
P/RST

Condition: Data needed for dual FMC operation disagree.

- 1 Choose one:

- ◆Flying an approach with an **RNP alerting requirement**:

Go-around unless suitable visual references can be established and maintained.



- ◆Flying an approach **without** an RNP alerting requirement:

Verify position.



MSG

FMC DISAGREE - VERTICALFMC
P/RST

Condition: One of the following occur:

- Left FMC and right FMC target airspeeds disagree during descent
- Left FMC and right FMC vertical paths disagree during descent.

- 1 Do **not** move the FMC source select switch.

The FMC will attempt to correct the difference without crew action.

- 2 Monitor crossing altitudes to ensure compliance.

**Additional Information**

The disagreement will most likely be corrected when crossing a waypoint with an altitude constraint.

If the disagreement remains when entering the approach phase, the FMC DISAGREE - VERTICAL message will be replaced with the FMC DISAGREE message. An approach with an RNP alerting requirement is not authorized when the FMC DISAGREE message is shown.

FMC
P/RST

FMC FAIL (single FMC)

Condition: One or more of these occur:

- Loss of FMC data on a CDU
- Loss of FMC data on a navigation display map mode
- Illumination of the FMC alert light.

Note: A single FMC aircraft, is an aircraft that DOES NOT have the FMC Source Select Switch on the Navigation Control Panel (Forward Overhead Panel).

- 1 Resume conventional navigation. Without an operating FMC, LNAV and VNAV are not available.
- 2 Verify position relative to terrain using conventional navigation.

Note: EGPWS may use inaccurate GPS position data or an inappropriate value of RNP. This could result in a VSD terrain display that is incorrectly positioned relative to the airplane track.

- 3 **When** preparing for approach:

Use the SPD REF selector to set the current gross weight.

Use the SPD REF selector to set the reference airspeed bugs.

Use the N1 SET selector to set the N1 bugs.

Note: For additional information on using the N1 SET and SPD REF selectors refer to Supplementary Procedures.



FMC
P/RST**FMC FAIL (dual FMC)**

Condition: Display of VTK followed by MAP failure flags on one or both navigation displays.

Objective: To restore dual FMC operation, configure for single FMC operation or resume conventional navigation.

Note: Note: a dual FMC aircraft, is an aircraft that has the FMC Source Select Switch on the Navigation Control Panel (Forward Overhead Panel).

Note: LNAV/VNAV may disengage.

- 1 Check both navigation display MAP modes and FMC CDUs.
- 2 Choose one:
 - ◆ No FMC data on the captain's and first officer's navigation display MAP modes **and** no FMC data on both CDUs:
Both FMCs are failed.
▶▶ **Go to step 7**
 - ◆ No FMC data on the captain's navigation display MAP mode **and** no FMC data on both CDUs:
Left FMC is failed.
▶▶ **Go to step 3**
 - ◆ No FMC data on the first officer's navigation display MAP mode, MSG light is illuminated **and** SINGLE FMC OPERATION scratchpad message is shown:
Right FMC is failed.
▶▶ **Go to step 3**
- 3 FMC source
select switch BOTH ON L or BOTH ON R
Select the operating FMC.
- 4 **Wait** 1 minute.
- 5 Check for FMC-L and FMC-R bearing/distance information on POS SHIFT page 3/3.

▼ Continued on next page ▼

▼FMC FAIL continued▼

6 Choose one:

◆ Bearing/distance information for **both** FMCs are displayed:

FMC source select switch NORMAL



◆ Bearing/distance information for only a **single** FMC is displayed:

Continue with single FMC operation.



7 Resume conventional navigation. Without an operating FMC, LNAV and VNAV are not available.

8 Verify position relative to terrain using conventional navigation.

Note: EGPWS may use inaccurate GPS position data or an inappropriate value of RNP. This could result in a VSD terrain display that is incorrectly positioned relative to the airplane track.

9 **When** preparing for the approach:

Use the SPD REF selector to set the current gross weight.

Use the SPD REF selector to set the reference airspeed bugs.

Use the N1 SET selector to set the N1 bugs.

Note: For additional information on using the N1 SET and SPD REF selectors refer to Supplementary Procedures.



MSG

FMC
P/RST

FMC/CDU ALERTING MESSAGE

Condition: An alert message is in the FMC scratchpad.

- 1 Take action as needed by the message.



GLS

GLS

Condition: A GLS failure occurs.

- 1 Do not fly a GLS approach.
- 2 ILS and non-ILS approaches may be flown.



GPS

GPS

Condition: Both GPS receivers are failed.

Note: The FMC uses only IRS or radio inputs.
Look-ahead terrain alerting and display are unavailable due to position uncertainty.
ADS-B is inoperative.

- 1 Continue normal operation if ANP meets the requirements for the phase of flight.



GPS Data Unreliable

Condition: Erroneous or invalid GPS data is suspected.

Caution! GPS interference can alter the airplane flight path without obvious flight deck indications or effects.

1 **If** the GPS light is **illuminated**:

▶▶ **Go to the GPS checklist on page 11.6**



2 Choose one:

◆ On the **ground**:

Use Supplementary Procedures for intentional operations in areas of known GPS interference.



◆ In **flight**:

▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ GPS Data Unreliable continued ▼

3 Unreliable GPS data can be indicated by:

PULL UP alert that occurs with sufficient,
immediately verifiable terrain clearance

Slow increase in ANP

Change in terrain data on the ND and VSD (as
installed) that does not match aeronautical
charts

VSD TERR flag on the VSD (as installed)

TERR POS message shows on the ND

GPS-L INVALID and GPS-R INVALID FMC
alerting messages

VERIFY POS: FMC-FMC or VERIFY POS:
FMC-GPS alerting messages

Inaccurate UTC TIME/DATE and FMC-generated
ETA

Unable to log on to ATC datalink with inaccurate
UTC TIME/DATE

UNABLE REQD NAV PERF - RNP message shows
on the ND. This message must be considered
valid.

4 Choose one:

◆ Indications of unreliable GPS data **occur**:

▶▶ **Go to step 5**

◆ Indications of unreliable GPS data do **not** occur:



5 GPS data and GPWS look-ahead terrain alerting can be temporarily inhibited.

6 Choose one:

◆ GPS data inhibit is **needed**:

▶▶ **Go to step 7**

◆ GPS data inhibit is **not** needed:

▶▶ **Go to step 11**

▼ Continued on next page ▼

▼ GPS Data Unreliable continued ▼

- 7 PROG page Select
Observe NAV STATUS prompt displayed
- 8 NAV STATUS page Select
- 9 NAV OPTIONS page Select
(NEXT/PREV page)
- 10 GPS UPDATE OFF
Select DME UPDATE, VOR UPDATE, LOC UPDATE
ON as needed.
Monitor GPS FMC position updating for recovery.

Note: GPS data recovery can be indicated by verifying both of the following:

-GPS LAT/LON shows for GPS L or GPS R on POS REF page 2

-BRG/DST shown for GPS L or GPS R on POS SHIFT page 3 is less than current ANP shown on the ND

If GPS data appears to recover, turn GPS UPDATE ON at Captain's discretion.

11 Choose one:

◆ GPWS look-ahead terrain alerting inhibit is **needed:**

►► **Go to step 12**

◆ GPWS look-ahead terrain alerting inhibit is **not** needed:

►► **Go to step 13**

12 Ground Proximity Terrain
Inhibit switch TERR INHIBIT

Note: Basic GPWS alerts that occur are valid.

Note: Erroneous GPWS look-ahead terrain alerts may continue for the remainder of the flight if the Ground Proximity Terrain Inhibit switch is selected to NORM after flying through areas of unreliable GPS data.

▼ Continued on next page ▼

▼GPS Data Unreliable continued▼

13 Advise ATC of suspected GPS interference and any degraded navigation capability.



ILS

ILS

Condition: An ILS failure occurs.

- 1 Do not fly an ILS approach.
- 2 GLS and non-ILS approaches may be flown.



DC FAIL

IRS DC FAIL

Condition: IRS backup DC power is failed.

- 1 Choose one:

◆**One** IRS DC FAIL light is illuminated **and** all other IRS lights are **extinguished**:

Continue normal operation. The IRS is operating normally on AC power.



◆**Both** IRS DC FAIL lights are illuminated:

The IRS is operating normally on AC power.

The battery is nearly discharged or the switched hot battery bus is not powered.
The following systems may be inoperative:

Engine and APU fire extinguishing
APU start.



FAULT

IRS FAULT

Condition: One or more of these occur:

- An IRS fault occurs
- On the ground, if the ALIGN light is also illuminated, the present position entry is possibly incorrect.

1 Choose one:

◆ On the **ground**:

▶▶ **Go to step 2**

◆ **In flight**:

▶▶ **Go to step 6**

On the ground

2 Choose one:

◆ ALIGN light is **extinguished**:

Do not takeoff.



◆ ALIGN light is also **illuminated**:

IRS mode selector

(failed side) OFF

The FAULT light extinguishes immediately and the ALIGN light extinguishes after approximately 30 seconds.

▶▶ **Go to step 3**

3 **After** the ALIGN light extinguishes:

IRS mode selector

(failed side) NAV

Enter present position.

▼ Continued on next page ▼

▼ IRS FAULT continued ▼

4 Choose one:

- ◆ ALIGN light is **flashing**:
Re-enter present position using the most accurate latitude and longitude.
▶▶ **Go to step 5**
- ◆ ALIGN light is **not** flashing:
▶▶ **Go to step 5**

5 Choose one:

- ◆ FAULT light **illuminates** again:
Do not takeoff.
■ ■ ■ ■
- ◆ FAULT light does **not** illuminate again:
Verify IRS alignment is complete
■ ■ ■ ■

In flight

- 6 Autopilot (if engaged) Disengage
- 7 IRS transfer switch BOTH ON L or BOTH ON R
Select the operating IRS.

Note: The selected IRS is the source of:

- Attitude and heading for both PFDs and NDs
- AFDS guidance
- Weather radar information
- GPWS and Windshear alerts

Note: Autopilot(s) cannot be engaged.

- 8 Autothrottle (if engaged) Disengage
■ ■ ■ ■

ON DC

IRS ON DC

Condition: IRS AC power is failed.

1 Choose one:

◆ **Left** IRS ON DC light is illuminated:

The left IRS continues to operate as long as DC power is available.



◆ **Right** IRS ON DC light is illuminated:

Power to the right IRS is removed after 5 minutes.



UNABLE REQD NAV PERF - RNP

Condition: UNABLE REQD NAV PERF-RNP is shown. The actual navigation performance is not sufficient.

1 Choose one:

◆ On a procedure or airway with an **RNP alerting requirement**:

▶▶ **Go to step 2**

◆ On a procedure or airway **without** an RNP alerting requirement:

▶▶ **Go to step 3**

▼ Continued on next page ▼

▼UNABLE REQD NAV PERF - RNP continued▼

- 2 Select an alternate procedure or airway. During an approach, go-around unless suitable visual references can be established and maintained.

Note: The FMC uses inertial inputs only, unless radio updating is enabled.

If radio updating is allowed, consider doing the following steps:

- Select the FMC NAV OPTIONS page
- Select DME UPDATE ON
- Select VOR UPDATE ON



- 3 Verify position.

Note: The FMC uses inertial inputs only, unless radio updating is enabled.

If radio updating is allowed, consider doing the following steps:

- Select the FMC NAV OPTIONS page
- Select DME UPDATE ON
- Select VOR UPDATE ON





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CONFIG

Condition: All of these occur:

- Both center tank fuel pump switches are off or pressures are low
- There is more than 726 kgs of fuel in the center tank
- An engine is running.

- 1 Do not accomplish this procedure until established in a level flight attitude.
- 2 CTR FUEL PUMP switches (both). ON
Verify that the LOW PRESSURE lights extinguish.
- 3 Resume normal fuel management.



CROSSFEED SELECTOR INOPERATIVE

VALVE
OPEN

May or may not be illuminated

Condition: One of the following occurs:

- The crossfeed VALVE OPEN light stays illuminated bright blue
- The CROSSFEED selector is in the open position and the crossfeed VALVE OPEN light is extinguished
- When the CROSSFEED selector is rotated to a new position, the crossfeed VALVE OPEN light does not illuminate bright blue.

1 Check the FUEL CROSSFEED VALVE circuit breaker (P6-3:B7).

2 Choose one:

◆ FUEL CROSSFEED VALVE circuit breaker is **tripped**:

It is not possible to determine the position of the fuel crossfeed valve.

Note: Verify that sufficient fuel is available to both engines to complete the flight.

Do **not** accomplish the following checklist:

IMBAL



◆ FUEL CROSSFEED VALVE circuit breaker is **not** tripped:

▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ CROSSFEED SELECTOR INOPERATIVE continued ▼

3 Choose one:

◆ CROSSFEED selector is in the **closed** position:

Crossfeed **valve** is failed open.

Note: Maintain fuel balance with selective use of fuel pumps.



◆ CROSSFEED selector is in the **open** position:

Crossfeed **valve** is failed closed.

Note: As conditions allow, vary engine thrust as needed to maintain fuel balance.

Verify that sufficient fuel is available to both engines to complete the flight.



**FILTER
BYPASS**

FUEL FILTER BYPASS

Condition: Fuel contamination can cause fuel to bypass the engine fuel filter.

1 Choose one:

◆ Only **one** FILTER BYPASS light, ENG 1 or ENG 2, has illuminated during the flight:

Note: Erratic engine operation and flameout may occur on the affected engine due to fuel contamination.



◆ FILTER BYPASS lights for **both** engines illuminate or have illuminated at any time during the flight (either separately or at the same time):

►► **Go to step 2**

2 Plan to land at the nearest suitable airport.

Note: Erratic engine operation and flameout may occur on either or both engines due to fuel contamination.



Fuel Leak Engine

Condition: An engine fuel leak is suspected for the reasons listed in the Additional Information section of this checklist.

Objective: To confirm there is an engine fuel leak and shut down the affected engine if needed. This checklist does not address the unlikely possibility of a tank leak.

- 1 A diversion may be needed.
- 2 Main tank FUEL PUMPS switches (all) ON
- 3 CROSSFEED selector Close
- 4 CTR FUEL PUMPS switches (both) OFF

The fuel CONFIG alert may show with fuel in the center tank.

The following steps check for an engine fuel leak

- 5 Record the main tank fuel quantities and the current time.
- 6 An engine fuel leak is confirmed if one or both of the following are true:

Fuel spray is observed from an engine or strut

A change in fuel imbalance of 230 kgs within 30 minutes or less

- 7 Choose one:

◆ Engine fuel leak is **confirmed**:

▶▶ Go to step 11

◆ Engine fuel leak is **not** confirmed:

▶▶ Go to step 8

- 8 Choose one:

◆ The center tank **contains** usable fuel:

▶▶ Go to step 9

◆ The center tank does **not** contain usable fuel:

▶▶ Go to step 10

▼ Continued on next page ▼

▼ Fuel Leak Engine continued ▼

9 CTR FUEL PUMPS switches (both) ON

10 Resume normal fuel management.



An engine fuel leak is confirmed

11 The following steps shut down the engine to stop an engine fuel leak.

12 The engine to be shut down is the engine on the side where the fuel quantity decreased faster.

13 Autothrottle Disengage

14 Thrust lever
(affected engine) Confirm Close

15 **When** the affected engine is at idle thrust:

Engine start lever
(affected engine) Confirm CUTOFF

This closes the spar valve and stops an engine fuel leak.

16 PACK switch (affected side) OFF

This causes the operating pack to regulate to high flow in flight with the flaps up.

17 Choose one:

◆ APU is **available** for start:

APU START

When APU is running:

APU GEN switch
(affected side) ON

▶▶ **Go to step 18**

◆ APU is **not** available:

▶▶ **Go to step 18**

18 Transponder mode selector TA or TA ONLY

This prevents climb commands which can exceed single engine performance capability.

▼ Continued on next page ▼

▼ Fuel Leak Engine continued ▼

19 ISOLATION VALVE switch. Verify AUTO

This ensures bleed air is available to both wings if wing anti-ice is needed.

20 Choose one:

◆ Fuel LOW alert is **shown**:

▶▶ **Go to step 21**

◆ Fuel LOW alert is **not** shown:

▶▶ **Go to step 23**

21 CROSSFEED selector. Open

This ensures that all fuel is available to the running engine.

22 FUEL PUMPS switches (all). ON

This ensures that all fuel is available for use.

23 Plan to land at the nearest suitable airport.

Note: Balance fuel as needed. All remaining fuel can be used for the running engine.

Note: Do not use FMC performance predictions.

▶▶ **Go to the One Engine Inoperative Landing checklist on page 7.23**



Additional Information

Reasons that an engine fuel leak should be suspected:

- A visual observation of fuel spray
- The total fuel quantity is decreasing at an abnormal rate
- An engine has excessive fuel flow
- The fuel IMBAL alert shows
- The fuel LOW alert shows
- The USING RSV FUEL message shows on the FMC CDU
- The INSUFFICIENT FUEL message shows on the FMC CDU
- The CHECK FMC FUEL QUANTITY message shows on the FMC CDU.

**LOW
PRESSURE**

FUEL PUMP LOW PRESSURE

Condition: The fuel pump pressure is low.

Note: Fuel pump LOW PRESSURE lights may flicker when tank quantity is low and the airplane is in turbulent air or during climb or descent.

1 Choose one:

◆ **One main** tank fuel pump LOW PRESSURE light is illuminated:

Main tank FUEL PUMP switch
(affected pump) OFF

Sufficient fuel pressure is available
for normal operation.



◆ **Both main** tank fuel pump LOW PRESSURE lights are illuminated:

Note: At high altitude, thrust deterioration or engine flameout may occur.



◆ **One CTR** tank fuel pump LOW PRESSURE light is illuminated:

▶▶ **Go to step 2**

◆ **Both CTR** tank fuel pump LOW PRESSURE lights are illuminated:

▶▶ **Go to step 5**

2 CROSSFEED selector. Open

This prevents fuel imbalance.

3 CTR FUEL PUMP switch (affected side) OFF

4 **When** the other CTR tank fuel pump LOW PRESSURE light illuminates:

CROSSFEED selector Close

Remaining CTR FUEL PUMP switch OFF



Both CTR tank fuel pump LOW PRESSURE lights are illuminated

▼ Continued on next page ▼

▼ FUEL PUMP LOW PRESSURE continued ▼

- 5 CTR FUEL PUMP switches (both) OFF
- 6 Fuel CONFIG alert may show with fuel in the center tank.
- 7 Center tank fuel is unusable. Main tank fuel may not be sufficient for the planned flight.



Fuel Quantity Indication Inoperative

Condition: The fuel quantity indication is blank.

- 1 Enter and periodically update the manually calculated FUEL weight on the FMC PERF INIT page.



Fuel Temperature Low

Condition: Fuel temperature is near the minimum.

- 1 **When** fuel temperature is approaching the fuel temperature limit (3° C /5° F above the fuel freeze point or - 43° C /- 45° F whichever is higher):

Increase speed, change altitude and/or deviate to a warmer air mass to achieve a TAT equal to or higher than the fuel temperature limit.

TAT will increase approximately 0.5 to 0.7° C for each 0.01 Mach increase in speed. In extreme conditions, it may be necessary to descend as low as FL250.



IMBAL

Condition: There is a fuel imbalance between the main tanks.

Objective: To decide if a fuel leak is suspected. To balance fuel if a fuel leak is not suspected.

- 1 If an engine has low fuel flow and unusual engine indications, the IMBAL alert may show due to an engine malfunction instead of a fuel leak.
- 2 The IMBAL alert may be caused by a fuel leak, an inoperative crossfeed valve or a fuel imbalance.
- 3 A fuel leak should be suspected if one or more of the following are true:

The total fuel remaining is less than the planned fuel remaining

An engine has excessive fuel flow.

- 4 Choose one:

◆ A fuel leak is **suspected**:

▶▶ **Go to the Fuel Leak Engine checklist on page 12.4**



◆ A fuel leak is **not** suspected:

▶▶ **Go to step 5**

- 5 CROSSFEED selector. Open

Verify that the VALVE OPEN light illuminates bright, then dim. This indicates that the crossfeed valve is operating correctly.

- 6 Choose one:

◆ Crossfeed valve is operating **correctly**:

▶▶ **Go to step 7**

◆ Crossfeed valve is **not** operating correctly:

▶▶ **Go to the CROSSFEED SELECTOR INOPERATIVE checklist on page 12.2**



▼ Continued on next page ▼

▼IMBAL continued▼

7 Choose one:

◆**Main tank 1** quantity is low:

Main tank 1 FUEL PUMPS
switches (both) OFF

This allows fuel from the higher
quantity tank to feed both engines.

▶▶**Go to step 8**

◆**Main tank 2** quantity is low:

Main tank 2 FUEL PUMPS
switches (both) OFF

This allows fuel from the higher
quantity tank to feed both engines.

▶▶**Go to step 8**

8 **When** fuel balancing is complete:

Main tank FUEL PUMPS switches (all) ON

CROSSFEED selector. Close

■ ■ ■ ■

LOW

Condition: The fuel quantity is low in a main tank.

Objective: To decide if a fuel leak is suspected. To ensure that all fuel is available for use.

Note: Avoid high nose up attitude. Make thrust changes slowly and smoothly. This reduces the possibility of uncovering fuel pumps.

- 1 The fuel LOW alert may be caused by a fuel leak or low fuel.
- 2 A fuel leak should be suspected if one or more of the following are true:

The total fuel remaining is less than the planned fuel remaining.

An engine has excessive fuel flow.

One main tank is abnormally low compared to the other main tank and to the expected fuel remaining in the tanks.

- 3 Choose one:

◆ A fuel leak is **suspected**:

►► **Go to the Fuel Leak Engine checklist on page 12.4**



◆ A fuel leak is **not** suspected:

►► **Go to step 4**

- 4 CROSSFEED selector. Open
This ensures that fuel is available to both engines if the low tank empties.
- 5 FUEL PUMPS switches (all). ON
This ensures that all fuel is available for use.
- 6 Plan to land at the nearest suitable airport.





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Blank



Non-Normal Checklists
Hydraulics

Chapter NNC
Section 13

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LOW
PRESSURE

HYDRAULIC PUMP LOW
PRESSURE

Condition: The hydraulic pump pressure is low.

1 HYD PUMP switch (affected side) OFF

Note: Loss of an engine-driven hydraulic pump and a high demand on the system may result in an intermittent illumination of the LOW PRESSURE light for the remaining electric motor-driven hydraulic pump.



OVERHEAT

HYDRAULIC PUMP OVERHEAT

Condition: The hydraulic pump temperature is high.

1 ELEC HYD PUMP switch (affected side) OFF

Note: One pump supplies sufficient pressure for normal system operation.

2 MFD SYS switch Push

3 Choose one:

◆ Affected side hydraulic pressure is 3300 psi **or less:**



◆ Affected side hydraulic pressure is **greater than** 3300 psi:

ENG HYD PUMP switch
(affected side) OFF

▶▶ **Go to step 4**

4 Choose one:

◆ **System A** HYD PUMPS switches are OFF:

▶▶ **Go to the LOSS OF SYSTEM A checklist on page 13.3**



◆ **System B** HYD PUMPS switches are OFF:

▶▶ **Go to the LOSS OF SYSTEM B checklist on page 13.5**



LOSS OF SYSTEM A

FLT CONTROL

A

**LOW
PRESSURE**

A HYD PUMPS

ENG 1

**LOW
PRESSURE**

ELEC 2

**LOW
PRESSURE**

Condition: Hydraulic system A pressure is low.

- 1 System A
FLT CONTROL switch . . . Confirm STBY RUD
- 2 System A
HYD PUMP switches (both) OFF
- 3 Check the Non-Normal Configuration Landing
Distance tables in the Performance Inflight-QRH
chapter or other approved source.
- 4 NOSE WHEEL STEERING switch ALT
- 5 Plan for manual gear extension.

Note: When the gear has been lowered manually, it cannot be retracted. The drag penalty with gear extended may make it impossible to reach an alternate field.

Note: Inoperative Items

Autopilot A inop

Autopilot B is available.

Flight spoilers (two on each wing) inop

Roll rate and speedbrake effectiveness may be reduced in flight.

Normal landing gear extension and retraction inop

Manual gear extension is needed.

Ground spoilers inop

Landing distance will be increased.

Alternate brakes inop

Normal brakes are available.

Engine 1 thrust reverser normal hydraulic pressure inop

Thrust reverser will deploy and retract at a slower rate and some thrust asymmetry can be anticipated during thrust reverser deployment.

Normal nose wheel steering inop

Alternate nose wheel steering is available.

6 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ LOSS OF SYSTEM A continued ▼

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake ____
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

Manual Gear Extension

- LANDING GEAR lever OFF
- Manual gear extension handles Pull

The uplock is released when the handle is pulled to its limit.

The related red landing gear indicator light illuminates, indicating uplock release.

Wait 15 seconds after the last manual gear extension handle is pulled:

- LANDING GEAR lever DN

Landing Checklist

- ENGINE START switches CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps ____, Green light



LOSS OF SYSTEM B

FLT CONTROL

B

LOW
PRESSURE

B HYD PUMPS

ELEC 1

LOW
PRESSURE

ENG 2

LOW
PRESSURE

Condition: Hydraulic system B pressure is low.

- 1 System B
FLT CONTROL switch. . . . Confirm STBY RUD
- 2 System B
HYD PUMP switches (both) OFF
- 3 Plan a flaps 15 landing.
- 4 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

- 5 Plan to extend flaps to 15 using alternate flap extension.

Note: The drag penalty with the leading edge devices extended may make it impossible to reach an alternate field.

- 6 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
- 7 Do **not** arm the autobrake for landing. Use manual braking.

▼ Continued on next page ▼

▼ LOSS OF SYSTEM B continued ▼
Note: Inoperative Items
Autopilot B inop Autopilot A is available.
Flight spoilers (two on each wing) inop Roll rate and speedbrake effectiveness may be reduced in flight.
Yaw damper inop
Trailing edge flaps normal hydraulic system inop The trailing edge flaps can be operated with the alternate electrical system. Alternate flap extension time to flaps 15 is approximately 2 minutes.
Leading edge flaps and slats normal hydraulic system inop The leading edge flaps and slats can be extended with standby pressure. Once extended, they can not be retracted.
Autobrake inop Use manual braking.
Normal brakes inop Alternate brakes are available.
Engine 2 thrust reverser normal hydraulic pressure inop Thrust reverser will deploy and retract at a slower rate and some thrust asymmetry can be anticipated during thrust reverser deployment.
Alternate nose wheel steering inop Normal nose wheel steering is available.

8 Checklist Complete Except Deferred Items

Deferred Items
Descent Checklist
Pressurization LAND ALT ____
Recall Checked
Autobrake OFF
Landing data VREF 15 or VREF ICE ____, Minimums ____
Approach briefing Completed

▼ LOSS OF SYSTEM B continued ▼

Approach Checklist

Altimeters

Alternate Flap Extension

During flap extension, set the flap lever to the desired flap position.

230K maximum during alternate flap extension.

! ALTERNATE FLAPS master switch ARM

Note: The landing gear configuration warning may sound if the flaps are between 10 and 15 and the landing gear are retracted.

Note: The amber LE FLAPS TRANSIT light stays illuminated until the flaps approach the flaps 10 or 15 position.

Note: Operation within the lower amber airspeed band may be needed until the LE FLAPS TRANSIT light extinguishes.

If flap asymmetry occurs, release the switch immediately. There is no asymmetry protection.

 **ALTERNATE FLAPS**
position switch Hold DOWN
to extend flaps
to 15 on schedule

As flaps are extending, slow to respective maneuvering speed.

Additional Deferred Item

GROUND PROXIMITY FLAP
INHIBIT switch FLAP INHIBIT

▼ Continued on next page ▼



▼ LOSS OF SYSTEM B continued ▼

Landing Checklist

- ENGINE START switches. CONT
 - Speedbrake ARMED
 - Landing gear Down
 - Flaps **15, Green light**
- ■

■

■

MANUAL REVERSION or **LOSS OF SYSTEM A AND SYSTEM B**

FLT CONTROL

A

B

**LOW
PRESSURE**

**LOW
PRESSURE**

HYD PUMPS

ENG 1 ELEC 2

ELEC 1 ENG 2

**LOW
PRESSURE**

**LOW
PRESSURE**

Condition: Hydraulic system A and B pressures are low.

- 1 System A and B FLT CONTROL switches (both) Confirm. STBY RUD
- 2 YAW DAMPER switch ON
- 3 System A and B HYD PUMPS switches (all) OFF
- 4 Plan to land at the nearest suitable airport.
- 5 Plan a flaps 15 landing.
- 6 Set VREF 15 or VREF ICE.

Note: If any of the following conditions apply, set VREF ICE = VREF 15 + 10 knots:

- Engine anti-ice will be used during landing
- Wing anti-ice has been used any time during the flight
- Icing conditions were encountered during the flight and the landing temperature is below 10° C.

Note: When VREF ICE is needed, the wind additive should not exceed 5 knots.

- 7 Plan to extend flaps to 15 using alternate flap extension.

Note: The drag penalty with the leading edge devices extended may make it impossible to reach an alternate field.

- 8 Plan for manual gear extension.

Note: When the gear has been lowered manually, it cannot be retracted. The drag penalty with gear extended may make it impossible to reach an alternate field.

▼ Continued on next page ▼

▼ **MANUAL REVERSION or LOSS OF SYSTEM A AND SYSTEM B**
continued ▼

- 9 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.

Note: The crosswind capability of the airplane is greatly reduced.

- 10 Do **not** arm the autobrake for landing.
- 11 Do **not** arm the speedbrakes for landing.
- 12 On touchdown, apply steady brake pressure without modulating the brakes.
- 13 Do not attempt to taxi the airplane after stopping.

Note: Inoperative Items

Autopilots A and B inop

All flight spoilers inop

Roll rate will be reduced and speedbrakes will not be available in flight.

Trailing edge flaps normal hydraulic system inop

The trailing edge flaps can be operated with the alternate electrical system. Alternate flap extension time to flaps 15 is approximately 2 minutes.

Leading edge flaps and slats normal hydraulic system inop

The leading edge flaps and slats can be extended with standby hydraulic pressure. Once extended, they can not be retracted.

Normal landing gear extension and retraction inop

Manual gear extension is needed.

Autobrake inop

Ground spoilers inop

Landing distance will be increased.

Normal and alternate brakes inop

Inboard and outboard brakes have accumulator pressure only. On landing, apply steady brake pressure without modulating the brakes.

Both thrust reversers normal pressure inop

Thrust reversers will deploy and retract at a slower rate.

Nose wheel steering inop

Do not attempt to taxi the airplane after stopping.

▼ Continued on next page ▼

14 Checklist Complete Except Deferred Items

Descent Checklist

Pressurization LAND ALT ____

Recall Checked

Autobrake **OFF**

Landing data **VREF 15 or VREF ICE** ____,
Minimums ____

Approach briefing Completed

Do the normal go-around procedure except:

Advance thrust to go-around smoothly and slowly to avoid excessive pitch-up.

Be prepared to trim.

Limit bank angle to 15° when airspeed is less than the minimum maneuver speed.

Approach Checklist

Altimeters

Alternate Flap Extension

During flap extension, set the flap lever to the desired flap position.

! 230K maximum during alternate flap extension.
! ALTERNATE FLAPS master switch ARM

Note: The landing gear configuration warning may sound if the flaps are between 10 and 15 and the landing gear are retracted.

▼ Continued on next page ▼

▼ **MANUAL REVERSION or LOSS OF SYSTEM A AND SYSTEM B**
continued ▼

Note: The amber LE FLAPS TRANSIT light stays illuminated until the flaps approach the flaps 10 or 15 position.

Note: Operation within the lower amber airspeed band may be needed until the LE FLAPS TRANSIT light extinguishes.



If flap asymmetry occurs, release the switch immediately. There is no asymmetry protection.

ALTERNATE FLAPS
position switch Hold DOWN
to extend flaps
to 15 on schedule

As flaps are extending, slow to respective maneuvering speed.

Manual Gear Extension

- LANDING GEAR lever OFF
- Manual gear extension handles Pull

The uplock is released when the handle is pulled to its limit.

The related red landing gear indicator light illuminates, indicating uplock release.

Wait 15 seconds after the last manual gear extension handle is pulled:

- LANDING GEAR lever DN

Additional Deferred Item

- GROUND PROXIMITY FLAP
INHIBIT switch FLAP INHIBIT

▼ Continued on next page ▼

▼ MANUAL REVERSION or LOSS OF SYSTEM A AND SYSTEM B
continued ▼

Landing Checklist

ENGINE START switches CONT
Speedbrake **DOWN detent**
Landing gear Down
Flaps. **15, Green light**



**LOW
PRESSURE**

**STANDBY HYDRAULIC LOW
PRESSURE**

Condition: The standby hydraulic pump pressure is low.

Note: With a loss of hydraulic system A or B, the thrust reverser on the affected side is inoperative.

Note: With a loss of hydraulic system A and B, the rudder is inoperative.



**LOW
QUANTITY**

**STANDBY HYDRAULIC LOW
QUANTITY**

Condition: The standby hydraulic quantity is low.

- 1 Continue normal operation.





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ANTISKID
INOP

ANTISKID INOPERATIVE

Condition: An antiskid system fault occurs.

Caution! Locked wheel protection is not available.

- 1 AUTO BRAKE select switch. OFF
The autobrake system is inoperative.
- 2 Do **not** arm the speedbrakes for landing. Manually deploy the speedbrakes immediately upon landing.
Automatic speedbrake extension may be inoperative.
- 3 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter or other approved source.
- 4 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ ANTISKID INOPERATIVE continued ▼

Deferred Items

Landing Procedure Review

Use minimum braking consistent with runway length and conditions to reduce the possibility of a tire blowout.

Do **not** apply the brakes until the nose wheel is on the ground and the speedbrakes have been manually deployed.

Brake initially using light steady pedal pressure. Increase pressure as ground speed decreases. Do **not** pump the brakes.

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake **OFF**
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake **DOWN detent**
- Landing gear Down
- Flaps ____, Green light



**AUTO BRAKE
DISARM**

AUTO BRAKE DISARM

Condition: The autobrake system disarms after being set.

1 Choose one:

◆ On the **ground**:

AUTO BRAKE select switch OFF

▶▶ **Go to step 2**

◆ **In flight**:

▶▶ **Go to step 3**

2 Choose one:

◆ AUTO BRAKE DISARM light **extinguishes**:



◆ AUTO BRAKE DISARM light **stays illuminated**:

Do not takeoff.



3 AUTO BRAKE select switch. . . . OFF, then reselect

4 Choose one:

◆ AUTO BRAKE DISARM light **stays extinguished**:



◆ AUTO BRAKE DISARM light **illuminates again**:

AUTO BRAKE select switch OFF

Use manual brakes for landing.

▶▶ **Go to step 5**

5 Checklist Complete Except Deferred Items

▼ Continued on next page ▼



▼ AUTO BRAKE DISARM continued ▼

Deferred Items

Descent Checklist

- Pressurization LAND ALT ____
- Recall Checked
- Autobrake **OFF**
- Landing data VREF ____, Minimums ____
- Approach briefing Completed

Approach Checklist

- Altimeters ____

Landing Checklist

- ENGINE START switches. CONT
- Speedbrake ARMED
- Landing gear Down
- Flaps ____, Green light



Brake Pressure Indicator Zero PSI

Condition: The brake accumulator has no nitrogen precharge.

- 1 Accumulator braking is not available.

Note: If hydraulic systems indications are normal, brake operation is unaffected.



**BRAKE
TEMP**

BRAKE TEMPERATURE

Condition: One or more brake temperatures are high.

1 Choose one:

◆ On the **ground**:

▶▶ Go to step 2

◆ In flight:

▶▶ Go to step 6

2 Minimize taxiing.

3 Unless needed, do not set the parking brake.

4 Wheel fuse plugs can melt.

5 Check the Recommended Brake Cooling Schedule in the Advisory Information section of the Performance Inflight chapter for needed cooling time and precautions.



270K/.82M maximum.

6  LANDING GEAR lever. DN
This allows cooling air to flow around the brakes.

7 **When** the BRAKE TEMP light is **extinguished**:

Wait 7 minutes. This ensures sufficient cooling time.

235K maximum.

8  LANDING GEAR lever. UP
After landing gear retraction is complete:

LANDING GEAR lever OFF



GEAR DISAGREE

LEFT
GEAR

NOSE
GEAR

RIGHT
GEAR

Condition: The landing gear position disagrees with the LANDING GEAR lever position.

Note: Do not exceed the gear EXTEND limit speed (270K/.82M).

Do not use FMC performance predictions with gear extended.

1 Choose one:

◆ LANDING GEAR lever is **UP**:

▶▶ **Go to step 5**

◆ LANDING GEAR lever is **OFF**:

▶▶ **Go to step 2**

◆ LANDING GEAR lever is **DN**:

▶▶ **Go to step 9**

2 Choose one:

◆ LANDING GEAR lever **moved** to the UP position after takeoff:

▶▶ **Go to step 3**

◆ LANDING GEAR lever did **not** move to the UP position after takeoff:

▶▶ **Go to the Landing Gear Lever Will Not Move Up After Takeoff checklist on page 14.12**



235K maximum

3  LANDING GEAR lever UP

▼ Continued on next page ▼

▼ GEAR DISAGREE continued ▼

4 Choose one:

◆ **All red and green** landing gear indicator lights are **extinguished**:

The landing gear lever should be kept in the UP position to keep the landing gear retracted.



◆ **Any red** landing gear indicator light is **illuminated**:

▶▶ **Go to step 8**

5 Choose one:

◆ **All red and green** landing gear indicator lights are **illuminated**:

Open and close the manual gear extension access door. Verify the door is fully closed.

▶▶ **Go to step 6**

◆ **Any other combination** of landing gear indicator lights is **illuminated**:

▶▶ **Go to step 8**

235K maximum

6  LANDING GEAR lever. DN, then UP

7 Choose one:

◆ **All** landing gear indicator lights **extinguish**:

LANDING GEAR lever. OFF



◆ **Any red** landing gear indicator light is **illuminated**:

▶▶ **Go to step 8**

8 Flight with gear down increases fuel consumption and decreases climb performance. Refer to the Gear Down performance tables in the Performance Inflight section.



▼ Continued on next page ▼

▼GEAR DISAGREE continued▼

9 Check landing gear indicator lights.

Note: If a green landing gear indicator light is illuminated on either the center main panel or the overhead panel, the related landing gear is down and locked.

10 Choose one:

◆**All** landing gear indicate **down and locked** and one or more **red** landing gear indicator lights are also **illuminated**:

▶▶ **Go to step 11**

◆**Any** landing gear is **not** down and locked:

▶▶ **Go to the Manual Gear Extension checklist on page 14.15**



11 Verify landing gear lever is pushed in and fully in the DN detent.

12 Choose one:

◆**All red** landing gear indicator lights **extinguish**:



◆**One or more red** landing gear indicator lights stay **illuminated**:

GROUND PROXIMITY GEAR
INHIBIT switch GEAR INHIBIT
Land normally.



Landing Gear Lever Jammed in the Up Position

Condition: The LANDING GEAR lever will not move from the UP position.

Note: Start this checklist **only** when ready to extend the gear for landing.
Once the gear is extended, do **not** retract.

270K/.82M maximum.

- 1  LANDING GEAR override trigger Pull
- 2 LANDING GEAR lever DN
- 3 Choose one:

- ◆ LANDING GEAR **lever** moves to the **DN** position:

▶▶ **Go to step 4**
- ◆ LANDING GEAR **lever** does **not** move to the DN position:

▶▶ **Go to step 6**

- 4 Check landing gear indicator lights.

Note: If a green landing gear indicator light is illuminated on either the center main panel or the overhead panel, the related landing gear is down and locked.

- 5 Choose one:

- ◆ **All** landing gear **indicate** down and locked:

Plan to land at the nearest suitable airport.

■ ■ ■ ■
- ◆ **One or more** landing gear do **not** indicate down and locked:

▶▶ **Go to the Manual Gear Extension checklist on page 14.15**

■ ■ ■ ■

- 6 NOSE WHEEL
STEERING switch Verify NORM
Nose wheel steering is not available.

▼ Continued on next page ▼

▼ Landing Gear Lever Jammed in the Up Position continued ▼

Warning! Do not use alternate nose wheel steering because the landing gear may retract on the ground.

- 270K/.82M maximum.
- 7  Manual gear extension handles (all). Pull
The uplock is released when the handle is pulled to its limit. The related red landing gear indicator light illuminates, indicating uplock released.

Note: With the LANDING GEAR lever in the UP or OFF position, the red landing gear indicator lights will stay illuminated.

- 8 Check landing gear indicator lights.

Note: If a green landing gear indicator light is illuminated on either the center main panel or the overhead panel, the related landing gear is down and locked.

- 9 Choose one:
- ◆ **All** landing gear **indicate** down and locked:
▶▶ **Go to step 10**
 - ◆ **One or more** landing gear do **not** indicate down and locked:
▶▶ **Go to the Partial or All Gear Up Landing checklist on page 14.17**
■ ■ ■ ■

10 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ Landing Gear Lever Jammed in the Up Position continued ▼

Deferred Items

Descent Checklist

Pressurization LAND ALT ____
 Recall Checked
 Autobrake ____
 Landing data VREF ____, Minimums ____
 Approach briefing Completed

Approach Checklist

Altimeters ____

Additional Deferred Item

GROUND PROXIMITY GEAR
 INHIBIT switch GEAR INHIBIT

Landing Checklist

ENGINE START switches CONT
 Speedbrake ARMED
 Landing gear **Down, Three green**
 Flaps ____, Green light

Note: Nose wheel steering is not available.

Warning! Do not use alternate nose wheel steering because the landing gear may retract on the ground.



Landing Gear Lever Will Not Move Up After Takeoff

Condition: The LANDING GEAR lever cannot be moved to the UP position due to one of the following:

- Failure of the landing gear lever lock solenoid
- Failure of the air/ground system
- Failure of the ground spoiler interlock valve to close.

Note: Do not use FMC performance predictions.

- 1 LANDING GEAR lever DN
- 2 Retract the flaps on schedule.
- 3 Choose one:

◆ Intermittent cabin altitude/configuration warning horn **stays silent** and the TAKEOFF CONFIG lights (if installed and operative) do **not illuminate** after the flaps are fully retracted and the thrust levers are advanced beyond the vertical position:

Note: This indicates a failure of the landing gear lever lock solenoid.

▶▶ **Go to step 4**

◆ Intermittent cabin altitude/configuration warning horn **sounds** or the TAKEOFF CONFIG lights (if installed and operative) **illuminate** when the flaps are fully retracted:

Note: This indicates either a failure of the air/ground system or a failure of the ground spoiler interlock valve to close.

Do **not** retract the gear.

▶▶ **Go to step 7**

235K maximum.

- 4  LANDING GEAR override trigger Pull

▼ Landing Gear Lever Will Not Move Up After Takeoff continued ▼

5 LANDING GEAR lever UP

After landing gear retraction is complete:

LANDING GEAR lever OFF

6 Continue normal operation.



7 LANDING GEAR
TAKEOFF WARNING CUTOFF
circuit breaker (P6-3:C18) Pull

Note: The intermittent cabin altitude/configuration warning horn may still sound and the TAKEOFF CONFIG lights (if installed and operative) may still illuminate depending on thrust lever and flap position.

Caution! Do not use the speedbrakes in flight.

- 8 Plan to land at the nearest suitable airport.
- 9 Do **not** arm the autobrake for landing. Use manual braking.
- 10 Do **not** arm the speedbrakes for landing. Manually deploy the speedbrakes immediately upon landing.
- 11 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization LAND ALT ____
Recall Checked
Autobrake **OFF**
Landing data VREF ____, Minimums ____
Approach briefing Completed

Approach Checklist

Altimeters ____

▼ Continued on next page ▼

▼ Landing Gear Lever Will Not Move Up After Takeoff continued ▼

Gear Down Verification

LANDING GEAR lever. Verify DN

Landing Checklist

ENGINE START switches. CONT
Speedbrake **DOWN detent**
Landing gear **Down (previously verified)**
Flaps ____, Green light

Note: Manually deploy the speedbrakes immediately upon touchdown. Use manual braking.



Manual Gear Extension

Condition: One of these occurs:

- Any landing gear is not down and locked when the LANDING GEAR lever is down
- The LANDING GEAR lever is jammed in the OFF position.

Note: If a green landing gear indicator light is illuminated on either the center main panel or the overhead panel, the related landing gear is down and locked.

1 LANDING GEAR lever OFF (if possible)

2  **270K/.82M maximum.**
Manual gear extension handles (affected gear) Pull
The uplock is released when the handle is pulled to its limit. The related red landing gear indicator light illuminates, indicating uplock released.

3 **Wait** 15 seconds after the last manual gear extension handle is pulled:

LANDING GEAR lever DN (if possible)

4 Check landing gear indicator lights.

Note: If the LANDING GEAR lever is in the OFF position, the red landing gear indicator lights will also be illuminated.

5 Choose one:

◆ **All** landing gear **indicate** down and locked:

▶▶ **Go to step 6**

◆ **One or more** landing gear do **not** indicate down and locked:

▶▶ **Go to the Partial or All Gear Up Landing checklist on page 14.17**



▼ Continued on next page ▼

▼ Manual Gear Extension continued ▼

6 Choose one:

◆ LANDING GEAR **lever** is in the **DN** position:
Land normally.
■ ■ ■ ■

◆ LANDING GEAR **lever** is in the **OFF** position:
GROUND PROXIMITY GEAR
INHIBIT switch GEAR INHIBIT
Land normally.
Note: Nose wheel steering is not available.
■ ■ ■ ■

Partial or All Gear Up Landing

Condition: All landing gear are not down and locked after attempting manual gear extension.

1 Choose one:

◆ Manual gear extension **has** been attempted:

▶▶ **Go to step 2**

◆ Manual gear extension has **not** been attempted:

▶▶ **Go to the Manual Gear Extension checklist on page 14.15**



2 Brief the crew and passengers or supernumeraries on emergency landing and evacuation procedures.

3 Consider burning off fuel to reduce touchdown speed.

4 Plan a flaps 40 landing.

5 Set VREF 40.

6 LANDING GEAR

AURAL WARN circuit breaker (P6-3:D18). . . . Pull

This prevents the landing gear warning horn with gear retracted and landing flaps selected.

The flight deck chime for an incoming call from the cabin crew is unavailable.

7 FLIGHT CONTROL

AUTO SPEED BRAKE

circuit breaker (P6-2:B9). Pull

This prevents inadvertent deployment of ground spoilers after landing.

8 Do **not** arm the autobrake for landing. Use manual braking.

9 Do **not** arm the speedbrakes for landing.

10 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization. LAND ALT ____

Recall Checked

▼ Continued on next page ▼

▼ Partial or All Gear Up Landing continued ▼

Autobrake**OFF**
Landing data **VREF 40**____, **Minimums** ____
Approach briefing Completed

Approach Checklist

Altimeters ____

Landing Procedure Review

Do not extend the speedbrakes unless stopping distance is critical. When stopping distance is critical, extend the speedbrakes after all landing gear, the nose or the engine nacelle have contacted the runway.

Do not use the thrust reversers unless stopping distance is critical.

Turn all fuel pump switches OFF just before the flare.

After stopping, do the Evacuation checklist, if needed.

Additional Deferred Items

APU switch OFF
GROUND PROXIMITY GEAR
INHIBIT switch GEAR INHIBIT

When on approach:

Engine BLEED air switches. OFF

This ensures the airplane is depressurized at touchdown.

Landing Checklist

ENGINE START switches. CONT
Speedbrake**DOWN detent**
Landing gear ____ **Down**
Flaps.....**40, Green light**





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LANDING CONFIGURATION

Condition: In flight, the steady warning horn sounds.

- 1 Assure correct airplane landing configuration.



TAKEOFF CONFIGURATION

**TAKEOFF
CONFIG**

(If installed and operative)

Condition: On the ground, the intermittent cabin altitude/configuration warning horn sounds or a TAKEOFF CONFIG light (if installed and operative) illuminates when advancing the thrust levers to takeoff thrust.

- 1 Assure correct airplane takeoff configuration.



**WARNING HORN (INTERMITTENT)
or
WARNING LIGHT - CABIN ALTITUDE
OR TAKEOFF CONFIGURATION**

(If installed and operative)

Left Forward Panel		Right Forward Panel	
TAKEOFF CONFIG	CABIN ALTITUDE	CABIN ALTITUDE	TAKEOFF CONFIG

- Condition: One of these occurs:
- In flight, at an airplane flight altitude above 10,000 feet MSL, the intermittent warning horn sounds or a CABIN ALTITUDE light (if installed and operative) illuminates
 - On the ground, the intermittent warning horn sounds or a TAKEOFF CONFIG light (if installed and operative) illuminates when advancing the thrust levers to takeoff thrust.

- 1 **If** the intermittent warning horn sounds or a CABIN ALTITUDE light (if installed and operative) illuminates **in flight** at an airplane flight altitude above 10,000 feet MSL:

Don the oxygen masks and set the regulators to 100%.

Establish crew communications.

►► **Go to the CABIN ALTITUDE WARNING or Rapid Depressurization checklist on page 2.1**



- 2 **If** the intermittent warning horn sounds or a TAKEOFF CONFIG light (if installed and operative) illuminates **on the ground** when advancing the thrust levers to takeoff thrust:

Assure correct airplane takeoff configuration.



ALTITUDE ALERT

Condition: The ALT ALERT indication shows that one of these occurs:

- The airplane is about to reach the MCP altitude
- A deviation from the MCP altitude.

- 1 Reset the selected altitude (if needed).
- 2 Maintain the correct altitude.



INOP

GROUND PROXIMITY GPWS INOPERATIVE

Condition: A ground proximity warning system (GPWS) fault occurs.

Note: Some or all GPWS alerts are not available. GPWS alerts which occur are valid.



Overspeed

Condition: Airspeed is more than Vmo/Mmo.



PSEU

PSEU

Condition: A proximity switch electronics unit fault occurs.

Note: The PSEU light illuminates on the ground only.

- 1 Choose one:
- ◆PSEU light **stays illuminated** when the Master Caution system is reset:

▶▶ Go to step 2

◆PSEU light **extinguishes** when the Master Caution system is reset:

■ ■ ■ ■
- 2 Choose one:
- ◆PSEU light **stays illuminated** when the parking brake is set or when both engines are shut down:

Do **not** takeoff.

■ ■ ■ ■

◆PSEU light **extinguishes** when the parking brake is set or when both engines are shut down:

■ ■ ■ ■

Tail Strike

Condition: A tail strike is suspected or confirmed.

Caution! Continued pressurization of the airplane can cause further structural damage.

- 1 Pressurization mode selector MAN
- Use momentary actuation of the outflow valve switch to avoid large and rapid pressurization changes.

2  Outflow VALVE switch Move to OPEN until the outflow VALVE indication shows fully open to depressurize the airplane

3 Plan to land at the nearest suitable airport.

■ ■ ■ ■



Quick Review
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Introduction

This section contains tables and procedures not listed in other airline manuals that are routinely performed.

The only exception is the Supplementary Procedures “Electrical Power Up” since the aircraft may have its EFBs unpowered.

Check FCOM Vol. 1 for all Supplementary Procedures.



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Electrical Power Up

The following procedure is accomplished to permit safe application of electrical power.

BATTERY switch Guard closed

Note: Do not move the airplane until Integrated Standby Flight Display (ISFD) alignment is complete.

STANDBY POWER switch Guard closed

ALTERNATE FLAPS master switch Guard closed

Windshield WIPER selector(s) PARK

ELECTRIC HYDRAULIC PUMPS switches OFF

LANDING GEAR lever DN

Verify that the green landing gear indicator lights are illuminated.

Verify that the red landing gear indicator lights are extinguished.

If external power is needed:

Verify that the GRD POWER AVAILABLE light is illuminated.

GRD POWER switch – ON

Verify that the SOURCE OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the STANDBY PWR OFF light is extinguished.

If APU power is needed:

Verify that the engine No. 1, APU and the engine No. 2 fire switches are in.

Alert ground personnel before the following test is accomplished.

OVERHEAT DETECTOR switches – NORMAL

TEST switch – Hold to FAULT/INOP

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Verify that the FAULT light is illuminated.

If the FAULT light fails to illuminate, the fault monitoring system is inoperative.

Verify that the APU DET INOP light is illuminated.

Do not operate the APU if the APU DET INOP light fails to illuminate.

TEST switch – Hold to OVHT/FIRE

Verify that the fire warning bell sounds.

Verify that the master FIRE WARN lights are illuminated.

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Master FIRE WARN light – Push

Verify that the master FIRE WARN lights are extinguished.

Verify that the fire warning bell cancels.

Verify that the engine No. 1, APU and the engine No. 2 fire switches stay illuminated.

Verify that the ENG 1 OVERHEAT and ENG 2 OVERHEAT lights stay illuminated.

Note: The WHEEL WELL fire warning light on the overheat and fire protection panel may or may not illuminate when testing on DC electrical power only. For accurate testing, do the wheel well fire detection system test after AC electrical power is established.

EXTINGUISHER TEST switch – Check

TEST Switch - Position to 1 and hold

Verify that the three green extinguisher test lights are illuminated.

TEST Switch - Release

Verify that the three green extinguisher test lights are extinguished.

Repeat for test position 2.

APU - Start

Note: If extended APU operation is needed on the ground and the airplane busses are powered by AC electrical power, position an AC powered fuel pump ON. This will extend the service life of the APU fuel control unit.

Note: If fuel is loaded in the center tank, position the left center tank fuel pump switch ON to prevent a fuel imbalance before takeoff.

CAUTION: Center tank fuel pump switches should be positioned ON only if the fuel quantity in the center tank exceeds 453 kgs.

CAUTION: Do not operate the center tank fuel pumps with the flight deck unattended.

When the APU GEN OFF BUS light is illuminated:

APU GENERATOR bus switches - ON

Verify that the SOURCE OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the STANDBY PWR OFF light is extinguished.

Verify that the APU MAINT light is extinguished.

Verify that the APU LOW OIL PRESSURE light is extinguished.

Verify that the APU FAULT light is extinguished.

Verify that the APU OVERSPEED light is extinguished.

Wheel well fire detection system Test

Test switch – Hold to OVHT/FIRE

Verify fire warning bell sounds, master FIRE WARN lights, MASTER CAUTION lights and OVHT/DET annunciator illuminate.

Fire warning BELL CUTOUT switch – Push

Verify that the master FIRE WARN lights extinguish.

Verify that the fire warning bell cancels.

Verify that the WHEEL WELL fire warning light is illuminated.



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**Quick Review****Chapter QR****ILS CAT II / CAT I Autoland Crew Review Card****Section 3****ILS CAT II / CAT I AUTOLAND CREW REVIEW CARD****REQUIREMENTS**

QUALIFIED CREW

CERTIFIED AIRCRAFT

"NO AUTOLAND" ANNUNCIATION NOT SHOWN AT THE CANCEL/RECALL (C/R) SWITCH

MINIMUM EQUIPMENT LIST

DUAL CHANNEL AUTOPILOT

RADIO ALTIMETER AND DISPLAY FOR EACH PILOT

DECISION HEIGHT (DH) DISPLAY FOR EACH PILOT

AUTOTHROTTLE

WINDSHIELD WIPERS FOR EACH PILOT

ILS RECEIVER AND DISPLAY FOR EACH PILOT

FLIGHT MODE ANNUNCIATOR FOR EACH PILOT

TWO ADIRU IN NAV MODE

BOTH MAIN HYDRAULIC SYSTEMS OPERATING

BOTH ENGINES OPERATING

TWO INDEPENDENT SOURCES OF AC POWER (APU MAY BE USED)

ADDITIONAL POLICIES AND PROCEDURES

NOTIFY CABIN CREW TO TURN OFF ANY PED

NOTIFY ATC ABOUT ILS CRITICAL AREAS

ROLLOUT MODE AFTER TOUCHDOWN IS NOT ALLOWED (AS INSTALLED)

ATTENTION TO AFDS PERFORMANCE

CALLOUTS

PF	PM
1,000 ft AFE	
ACKNOWLEDGE "GO-AROUND"	"ONE THOUSAND, STABILIZED" "ONE THOUSAND, NOT STABILIZED, GO-AROUND"
500 ft AFE	
ACKNOWLEDGE "GO-AROUND"	"FIVE HUNDRED, FLARE ARMED" "FIVE HUNDRED, FLARE NOT ARMED, GO-AROUND"
100 ft above DA(H)	
"HEAD UP"	"APPROACHING MINIMUMS"
DA(H)	
"CONTINUE" OR "GO-AROUND"	"MINIMUMS"
50 ft (RA)	
ACKNOWLEDGE "GO-AROUND"	"FLARE" "NO FLARE"
27 ft (RA)	
ACKNOWLEDGE	"RETARD"

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**Quick Review**
RNP-AR Crew Review Card**Chapter QR**
Section 4**DEPARTURE****PREFLIGHT**

ALLOWED OAT RANGE.....5 °C ≤ OAT ≤ 45 °C
RNP-AR AIRCRAFT STATUS.....CHECK
IRS.....PERFORM FULL ALIGNMENT
LNAV.....ARM
VNAV.....ARM
MAP DISPLAY RANGE.....5 NM OR LESS
QNH SETTING.....SET
LATERAL RNP.....VERIFY / SET
VOR AND DME UPDATE.....OFF
CONTINGENCY CHART.....REVIEW

BEFORE TAKEOFF

UNABLE REQD NAV PERF - RNP,
FMC DISAGREE, VER. POSITION.....NOT DISPLAYED
BOTH GPS OPERATING AND UPDATING THE FMC.....CHECK

REQUIRED EQUIPMENT

1 EGPWS	2 GPS Receivers	2 Radio Altimeters
2 FMCs	2 CDUs	2 ADIRUs, IRSs in NAV mode
Speed Trim System	2 Flight Directors	2 PFD/ND Displays
1 Autopilot	2 FMC Alert Lights	-

CONTINGENCY AND REPORTS

UNABLE REQ NAV PERF - RNP, FMC DISAGREE or VERIFY POSITION message
RNP exceedances (Lateral > 1x RNP)
EGPWS warnings
Flight Director failure
Navigation data errors
Required equipment failure



APPROACH		
PRIOR TO IAF		
RNP-AR AIRCRAFT STATUS.....CHECK		
DECISION ALTITUDE (DA) SETTING.....VERIFY / SET		
FMC DESCENT FORECAST PAGE.....UPDATED		
CONTINGENCY CHART.....REVIEW		
VERTICAL RNP (as installed).....SET 125 FT		
LATERAL RNP.....VERIFY / SET		
QNH SETTING.....SET		
VOR AND DME UPDATE.....OFF		
BOTH GPS OPERATING AND UPDATING THE FMC.....CHECK		
UNABLE REQD NAV PERF - RNP, FMC DISAGREE, VER. POSITION.....NOT DISPLAYED		
APPROACHING FAP		
QNH SETTING.....CHECK		
AT FAP		
RNP.....CHECK		
MAXIMUM ALTIMETERS DIFFERENCE 100 FT		
MAP DISPLAY RANGE.....10 NM OR LESS		
VNAV PATH MODE.....MONITOR		
REQUIRED EQUIPMENT		
1 EGPWS	2 GPS Receivers	2 Radio Altimeters
2 FMCs	2 CDUs	2 ADIRUs, IRSs in NAV mode
1 Autopilot	2 PFD/ND Displays	2 FMC Alert Lights
1 Flight Director for RNP > 0.10 2 Flight Directors for RNP = 0.10		Speed Trim System
CONTINGENCY AND REPORTS		
UNABLE REQ NAV PERF - RNP, FMC DISAGREE or VERIFY POSITION message		
RNP exceedances (Lateral > 1x RNP, Vertical after FAP > 75ft)		
EGPWS warnings		
Autopilot system disconnection		
Navigation data errors		
Required equipment failure		

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MEL NO.		SYSTEM
NG	MAX	
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Quick Review**Chapter QR****Passenger Address and Communication****Section 5**

General procedures

- Communication with cabin crew must be available at least half of the stations;
- Flight Deck CALL light may be inoperative if communication between pilots and cabin crew is effective;
- Visual/aural alert systems may be inoperative if the Passenger Address System is operating.

Alternate procedures

- Megaphone should be used for passenger communication;
- All communications from the cockpit to passengers must be done through cabin crew;
- All communications from the cockpit to ground personnel must be done through visual signals;
- One-chime call on Attendant Call (ATTEND) switch for cabin crew to go to the cockpit.

Emergency procedures

- Three-chime call on Attendant Call (ATTEND) switch to confirm an emergency.

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Performance Inflight - QRH

Chapter PI-QRH

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General

The following performance inflight data was chosen to represent the 737-700 fleet.



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Performance Inflight - QRH

Chapter PI-QRH

General

Section 10

Flight Crew Requirements for Chemical Passenger Oxygen System
Required Pressure (PSI) for 114/115 Cubic Ft. Cylinder

BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN		
°C	°F	2	3	4
50	122	530	735	945
45	113	520	725	930
40	104	510	715	915
35	95	505	700	900
30	86	495	690	885
25	77	485	680	870
20	68	480	670	860
15	59	470	655	840
10	50	460	645	830
5	41	455	635	815
0	32	445	620	800
-5	23	440	610	785
-10	14	430	600	770

V1 (MCG)
Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)						
°C	°F	-2000	0	2000	4000	6000	8000	10000
70	158	102	99					
60	140	102	99	97	96			
50	122	104	101	98	96	94	92	90
40	104	109	106	102	99	95	92	90
30	86	112	111	107	103	99	95	92
20	68	112	112	109	107	103	99	96
-60	-76	114	113	110	108	105	102	100

Flight With Unreliable Airspeed / Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

CLIMB (280/.76)
Flaps Up, Set Max Climb Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT V/S (FT/MIN)	4.0 1700	4.0 1100			
30000	PITCH ATT V/S (FT/MIN)	4.0 2600	4.0 2000	4.0 1500	4.0 1100	4.0 800
20000	PITCH ATT V/S (FT/MIN)	7.0 4100	6.5 3200	6.0 2500	6.0 2000	6.0 1600
10000	PITCH ATT V/S (FT/MIN)	10.5 5400	9.0 4200	8.5 3400	8.0 2800	7.5 2300
SEA LEVEL	PITCH ATT V/S (FT/MIN)	14.5 6600	12.5 5200	11.0 4200	10.0 3500	9.5 3000

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CRUISE (.76/280)

Flaps Up, %N1 for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT %N1	2.0 82.8	2.5 85.8	3.5 91.1		
35000	PITCH ATT %N1	1.0 80.9	2.0 82.5	2.5 84.8	3.0 87.8	3.5 93.7
30000	PITCH ATT %N1	1.0 80.3	1.5 81.2	2.0 82.6	2.5 84.4	3.0 86.7
25000	PITCH ATT %N1	1.0 76.6	1.5 77.6	2.0 78.9	2.5 80.6	3.5 82.7
20000	PITCH ATT %N1	1.0 73.0	1.5 73.9	2.0 75.2	3.0 76.7	3.5 78.8
15000	PITCH ATT %N1	1.0 69.2	1.5 70.2	2.5 71.5	3.0 72.9	3.5 74.8

DESCENT (.76/280)

Flaps Up, Set Idle Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT V/S (FT/MIN)	-1.5 -2800	-0.5 -2600	0.0 -2600	0.5 -2800	1.0 -3100
30000	PITCH ATT V/S (FT/MIN)	-3.0 -3000	-2.0 -2500	-1.0 -2300	-0.5 -2100	0.5 -2000
20000	PITCH ATT V/S (FT/MIN)	-3.0 -2700	-2.0 -2300	-1.0 -2000	0.0 -1900	0.5 -1800
10000	PITCH ATT V/S (FT/MIN)	-3.0 -2400	-2.0 -2000	-1.0 -1800	0.0 -1700	1.0 -1600
SEA LEVEL	PITCH ATT V/S (FT/MIN)	-3.5 -2200	-2.0 -1800	-1.0 -1600	0.0 -1500	0.5 -1400

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

HOLDING (VREF40 + 70)

Flaps Up, %N1 for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
15000	PITCH ATT	5.0	5.0	5.0	5.0	5.0
	%N1	56.5	62.3	66.5	70.5	74.0
	KIAS	177	196	215	233	250
10000	PITCH ATT	5.0	5.0	5.0	5.0	5.0
	%N1	52.8	57.9	62.8	66.5	69.8
	KIAS	177	196	214	232	248
5000	PITCH ATT	5.5	5.5	5.0	5.0	5.0
	%N1	49.1	54.2	58.5	62.6	66.1
	KIAS	177	194	214	231	247

TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = -2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT	5.0	5.5	6.0	6.5	6.5
	%N1	47.8	52.5	56.8	60.5	64.2
	KIAS	177	190	202	212	222
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT	5.0	5.5	6.0	6.0	6.5
	%N1	49.7	54.6	58.9	63.0	66.5
	KIAS	157	170	182	192	202
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT	5.5	6.0	6.5	6.5	7.0
	%N1	50.0	55.3	60.0	64.3	68.0
	KIAS	137	150	162	172	182
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT	5.0	5.5	6.0	6.0	6.5
	%N1	52.9	58.2	63.1	67.3	71.0
	KIAS	137	150	162	172	182
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT	5.5	6.0	6.5	6.5	7.0
	%N1	53.2	58.8	63.7	67.9	71.8
	KIAS	127	140	152	162	172
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT	7.0	7.0	7.5	7.5	7.5
	%N1	54.1	59.9	65.0	69.2	73.2
	KIAS	117	130	142	152	162
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT	6.0	6.0	6.5	6.5	7.0
	%N1	57.5	63.3	68.1	72.5	76.4
	KIAS	127	140	152	162	172

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = -1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 48.5 177	5.5 53.2 190	6.0 57.5 202	6.0 61.3 212	6.5 65.0 222
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 50.4 157	5.5 55.3 170	6.0 59.7 182	6.0 63.8 192	6.5 67.3 202
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 50.6 137	6.0 56.0 150	6.5 60.8 162	6.5 65.1 172	7.0 68.8 182
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 53.6 137	5.5 59.0 150	6.0 63.9 162	6.0 68.1 172	6.5 71.9 182
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 53.9 127	6.0 59.6 140	6.5 64.5 152	6.5 68.7 162	6.5 72.7 172
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 54.9 117	7.0 60.7 130	7.5 65.8 142	7.5 70.0 152	7.5 74.0 162
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 58.2 127	6.0 64.1 140	6.5 69.0 152	6.5 73.4 162	7.0 77.2 172

Airport Altitude = SEA LEVEL

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 49.2 177	5.5 53.9 190	6.0 58.2 202	6.0 62.1 213	6.5 65.8 222
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 51.1 157	5.5 56.1 170	6.0 60.5 182	6.0 64.6 193	6.5 68.1 202
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 51.4 137	6.0 56.7 150	6.5 61.6 162	6.5 65.9 173	7.0 69.6 182
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 54.3 137	5.5 59.8 150	6.0 64.7 162	6.0 68.9 173	6.5 72.8 182
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 54.6 127	6.0 60.4 140	6.5 65.4 152	6.5 69.6 163	6.5 73.5 172
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 55.6 117	7.0 61.5 130	7.0 66.5 142	7.5 70.9 153	7.5 74.9 162
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 59.0 127	6.0 64.9 140	6.5 69.8 152	6.5 74.3 163	7.0 78.0 172

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 50.0 177	5.5 54.6 190	6.0 58.9 202	6.0 63.0 213	6.5 66.5 223
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 51.8 157	5.5 56.8 170	6.0 61.3 182	6.0 65.3 193	6.5 68.8 203
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 52.1 137	6.0 57.5 150	6.5 62.5 162	6.5 66.7 173	7.0 70.4 183
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 55.1 137	5.5 60.6 150	6.0 65.5 162	6.0 69.7 173	6.5 73.6 183
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 55.3 127	6.0 61.2 140	6.0 66.2 152	6.5 70.4 163	6.5 74.4 173
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 56.4 117	7.0 62.3 130	7.0 67.3 142	7.5 71.7 153	7.5 75.7 163
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 59.8 127	6.0 65.7 140	6.5 70.6 152	6.5 75.1 163	7.0 78.9 173

Airport Altitude = 2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 50.6 177	5.5 55.4 190	6.0 59.7 202	6.0 63.8 213	6.5 67.2 223
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 52.5 157	5.5 57.6 170	6.0 62.1 182	6.0 66.1 193	6.5 69.6 203
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 52.9 137	6.0 58.3 150	6.5 63.3 162	6.5 67.5 173	7.0 71.2 183
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 55.8 137	5.5 61.5 150	6.0 66.3 162	6.0 70.6 173	6.5 74.4 183
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 56.1 127	6.0 62.0 140	6.0 66.9 152	6.5 71.3 163	6.5 75.2 173
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 57.2 117	7.0 63.2 130	7.0 68.1 142	7.5 72.6 153	7.5 76.5 163
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 60.6 127	6.0 66.5 140	6.5 71.6 152	6.5 75.9 163	7.0 79.8 173

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 3000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 51.3 177	5.5 56.1 190	6.0 60.5 203	6.0 64.6 214	6.5 68.0 223
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 53.3 157	5.5 58.3 170	6.0 63.0 183	6.0 66.8 194	6.5 70.5 203
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 53.6 137	6.0 59.1 150	6.5 64.0 163	6.5 68.2 174	7.0 72.1 183
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 56.6 137	5.5 62.3 150	6.0 67.1 163	6.0 71.4 174	6.5 75.2 183
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 56.8 127	6.0 62.8 140	6.0 67.7 153	6.5 72.2 164	6.5 76.0 173
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 58.0 117	7.0 64.0 130	7.0 68.9 143	7.0 73.4 154	7.5 77.3 163
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 61.4 127	6.0 67.3 140	6.5 72.4 153	6.5 76.8 164	6.5 80.7 173

Airport Altitude = 4000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 51.9 177	5.5 56.8 190	6.0 61.3 203	6.0 65.4 214	6.5 68.8 224
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 54.0 157	5.5 59.1 170	6.0 63.8 183	6.0 67.6 194	6.5 71.3 204
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 54.3 137	6.0 59.9 150	6.5 64.8 163	6.5 69.0 174	7.0 73.0 184
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 57.3 137	5.5 63.1 150	6.0 67.9 163	6.0 72.3 174	6.5 76.0 184
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 57.6 127	6.0 63.6 140	6.0 68.6 153	6.5 73.1 164	6.5 76.8 174
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 58.7 117	7.0 64.8 130	7.0 69.8 143	7.0 74.3 154	7.5 78.1 164
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 62.2 127	6.0 68.1 140	6.5 73.3 153	6.5 77.6 164	6.5 81.6 174

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Flight With Unreliable Airspeed / Turbulent Air Penetration

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 5000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT %N1	5.0 52.6	5.5 57.6	6.0 62.2	6.0 66.1	6.5 69.6
VREF40+70	KIAS	177	190	203	214	224
FLAPS 1 (GEAR UP)	PITCH ATT %N1	5.0 54.8	5.5 59.9	6.0 64.5	6.0 68.4	6.5 72.2
VREF40+50	KIAS	157	170	183	194	204
FLAPS 5 (GEAR UP)	PITCH ATT %N1	5.5 55.0	6.0 60.8	6.5 65.7	6.5 69.9	7.0 73.7
VREF40+30	KIAS	137	150	163	174	184
FLAPS 10 (GEAR UP)	PITCH ATT %N1	5.0 58.1	5.5 63.9	6.0 68.8	6.0 73.2	6.0 76.8
VREF40+30	KIAS	137	150	163	174	184
FLAPS 15 (GEAR UP)	PITCH ATT %N1	5.5 58.5	6.0 64.5	6.0 69.4	6.5 73.9	6.5 77.6
VREF40+20	KIAS	127	140	153	164	174
FLAPS 25 (GEAR UP)	PITCH ATT %N1	7.0 59.6	7.0 65.6	7.0 70.7	7.0 75.1	7.5 79.0
VREF40+10	KIAS	117	130	143	154	164
FLAPS 15 (GEAR DOWN)	PITCH ATT %N1	6.0 63.1	6.0 68.9	6.5 74.2	6.5 78.5	6.5 82.4
VREF40+20	KIAS	127	140	153	164	174

Airport Altitude = 6000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT %N1	5.0 53.3	5.5 58.3	6.0 63.1	6.0 66.9	6.5 70.4
VREF40+70	KIAS	177	191	203	215	225
FLAPS 1 (GEAR UP)	PITCH ATT %N1	5.0 55.5	5.5 60.8	5.5 65.3	6.0 69.3	6.5 73.0
VREF40+50	KIAS	157	171	183	195	205
FLAPS 5 (GEAR UP)	PITCH ATT %N1	5.5 55.8	6.0 61.7	6.5 66.4	6.5 70.7	7.0 74.5
VREF40+30	KIAS	137	151	163	175	185
FLAPS 10 (GEAR UP)	PITCH ATT %N1	5.0 59.0	5.5 64.8	5.5 69.6	6.0 74.0	6.0 77.6
VREF40+30	KIAS	137	151	163	175	185
FLAPS 15 (GEAR UP)	PITCH ATT %N1	5.5 59.3	6.0 65.2	6.0 70.3	6.5 74.7	6.5 78.5
VREF40+20	KIAS	127	141	153	165	175
FLAPS 25 (GEAR UP)	PITCH ATT %N1	7.0 60.4	7.0 66.4	7.0 71.5	7.0 75.9	7.0 79.9
VREF40+10	KIAS	117	131	143	155	165
FLAPS 15 (GEAR DOWN)	PITCH ATT %N1	6.0 63.9	6.0 69.8	6.0 75.0	6.5 79.4	6.5 83.3
VREF40+20	KIAS	127	141	153	165	175

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 7000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 54.1 177	5.5 59.1 191	6.0 63.9 204	6.0 67.6 215	6.5 71.2 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 56.3 157	5.5 61.6 171	5.5 66.1 184	6.0 70.1 195	6.5 73.9 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 56.6 137	6.0 62.5 151	6.5 67.2 164	6.5 71.6 175	6.5 75.4 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 59.8 137	5.5 65.6 151	5.5 70.5 164	6.0 74.8 175	6.0 78.5 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 60.1 127	6.0 66.0 141	6.0 71.2 154	6.0 75.5 165	6.5 79.4 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 61.2 117	7.0 67.2 131	7.0 72.4 144	7.0 76.8 155	7.0 80.8 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 64.7 127	6.0 70.8 141	6.0 75.8 154	6.5 80.3 165	6.5 84.2 175

Airport Altitude = 8000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 54.8 177	5.5 60.0 191	6.0 64.6 204	6.0 68.4 215	6.5 72.1 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 57.0 157	5.5 62.5 171	5.5 66.9 184	6.0 71.0 195	6.5 74.7 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 57.4 137	6.0 63.3 151	6.0 68.0 164	6.5 72.5 175	6.5 76.2 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 60.7 137	5.5 66.4 151	5.5 71.4 164	6.0 75.6 175	6.0 79.4 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 60.9 127	6.0 66.9 141	6.0 72.1 154	6.0 76.3 165	6.5 80.2 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 62.1 117	7.0 68.0 131	7.0 73.3 144	7.0 77.7 155	7.0 81.6 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 65.5 127	6.0 71.6 141	6.0 76.7 154	6.5 81.2 165	6.5 85.2 175

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Flight With Unreliable Airspeed / Turbulent Air Penetration

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 9000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 55.6 177	5.5 60.9 191	6.0 65.4 204	6.0 69.2 216	6.5 72.8 226
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 57.8 157	5.5 63.3 171	5.5 67.7 184	6.0 71.9 196	6.5 75.5 206
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 58.2 137	6.0 64.1 151	6.0 68.9 164	6.5 73.2 176	6.5 77.0 186
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 61.5 137	5.5 67.2 151	5.5 72.3 164	6.0 76.4 176	6.0 80.3 186
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 61.7 127	6.0 67.7 141	6.0 72.9 154	6.0 77.2 166	6.5 81.2 176
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 62.9 117	7.0 68.9 131	7.0 74.1 144	7.0 78.5 156	7.0 82.5 166
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 66.3 127	6.0 72.5 141	6.0 77.6 154	6.5 82.1 166	6.5 86.1 176

Airport Altitude = 10000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 56.3 178	5.5 61.8 192	5.5 66.1 204	6.0 70.0 216	6.5 73.6 226
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 58.6 158	5.5 64.0 172	5.5 68.6 184	6.0 72.8 196	6.5 76.3 206
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 59.1 138	6.0 64.9 152	6.0 69.8 164	6.5 74.1 176	6.5 77.9 186
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 62.3 138	5.5 68.1 152	5.5 73.1 164	6.0 77.3 176	6.0 81.2 186
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 62.6 128	6.0 68.6 142	6.0 73.8 154	6.0 78.1 166	6.5 82.0 176
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 63.7 118	7.0 69.8 132	7.0 74.9 144	7.0 79.4 156	7.0 83.4 166
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 67.2 128	6.0 73.4 142	6.0 78.6 154	6.0 83.0 166	6.5 87.1 176

Flight With Unreliable Airspeed / Turbulent Air Penetration

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 11000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 57.1 178	5.5 62.6 192	5.5 66.8 205	6.0 70.9 216	6.5 74.4 227
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 59.6 158	5.5 64.9 172	5.5 69.6 185	6.0 73.6 196	6.0 77.1 207
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 60.2 138	6.0 65.8 152	6.0 70.8 165	6.5 74.9 176	6.5 78.8 187
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 63.3 138	5.5 69.1 152	5.5 74.0 165	6.0 78.3 176	6.0 82.2 187
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 63.7 128	6.0 69.7 142	6.0 74.7 155	6.0 79.1 166	6.0 83.0 177
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 64.8 118	7.0 70.9 132	7.0 75.9 145	7.0 80.4 156	7.0 84.4 167
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	6.0 68.4 128	6.0 74.4 142	6.0 79.6 155	6.0 84.1 166	6.5 88.2 177

Airport Altitude = 12000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 58.0 178	5.5 63.4 192	5.5 67.6 205	6.0 71.7 217	6.5 75.2 227
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 60.7 158	5.5 65.7 172	5.5 70.5 185	6.0 74.4 197	6.0 78.0 207
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 61.2 138	6.0 66.8 152	6.0 71.7 165	6.5 75.8 177	6.5 79.8 187
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 64.3 138	5.5 70.2 152	5.5 74.9 165	6.0 79.3 177	6.0 83.1 187
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 64.7 128	6.0 70.8 142	6.0 75.6 155	6.0 80.1 167	6.0 84.0 177
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 65.9 118	7.0 72.0 132	7.0 77.0 145	7.0 81.4 157	7.0 85.4 167
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 69.6 128	6.0 75.4 142	6.0 80.6 155	6.0 85.1 167	6.5 89.2 177

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 13000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 58.8 178	5.5 64.1 192	5.5 68.5 205	6.0 72.5 217	6.5 76.0 228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 61.6 158	5.5 66.6 172	5.5 71.4 185	6.0 75.2 197	6.0 78.9 208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 62.1 138	6.0 67.7 152	6.0 72.6 165	6.5 76.7 177	6.5 80.6 188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 65.3 138	5.5 71.2 152	5.5 75.8 165	5.5 80.2 177	6.0 84.0 188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 65.7 128	6.0 71.7 142	6.0 76.6 155	6.0 81.0 167	6.0 84.9 178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 67.0 118	7.0 73.0 132	6.5 78.0 145	6.5 82.4 157	7.0 86.4 168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 70.6 128	6.0 76.5 142	6.0 81.7 155	6.0 86.1 167	6.5 90.3 178

Airport Altitude = 14000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 59.7 178	5.5 64.8 192	5.5 69.3 205	6.0 73.4 217	6.5 76.9 228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 62.4 158	5.5 67.5 172	5.5 72.2 185	6.0 76.0 197	6.0 79.8 208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 63.0 138	6.0 68.7 152	6.0 73.5 165	6.5 77.7 177	6.5 81.5 188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 66.3 138	5.5 72.0 152	5.5 76.8 165	6.0 81.1 177	6.0 84.9 188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 66.8 128	6.0 72.7 142	6.0 77.6 155	6.0 82.0 167	6.0 85.9 178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	7.0 68.2 118	7.0 73.9 132	6.5 79.0 145	7.0 83.4 157	7.0 87.5 168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 71.6 128	6.0 77.6 142	6.0 82.6 155	6.0 87.2 167	6.5 91.7 178

Flight With Unreliable Airspeed / Turbulent Air Penetration

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TERMINAL AREA (5000 FT)

%N1 for Level Flight

Airport Altitude = 14500 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT	5.0	5.5	5.5	6.0	6.5
	%N1	60.2	65.2	69.8	73.8	77.4
	KIAS	178	192	206	217	228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT	5.0	5.5	5.5	6.0	6.0
	%N1	62.8	67.9	72.6	76.5	80.2
	KIAS	158	172	186	197	208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	63.4	69.2	73.9	78.1	82.0
	KIAS	138	152	166	177	188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	66.8	72.5	77.3	81.6	85.4
	KIAS	138	152	166	177	188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT	5.5	6.0	6.0	6.0	6.0
	%N1	67.3	73.1	78.1	82.4	86.4
	KIAS	128	142	156	167	178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT	7.0	7.0	6.5	6.5	7.0
	%N1	68.8	74.4	79.5	83.9	88.0
	KIAS	118	132	146	157	168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	72.1	78.1	83.1	87.7	92.5
	KIAS	128	142	156	167	178

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = -2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	41.3	45.8	49.7	53.2	56.4
	KIAS	124	137	149	160	169
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	45.4	50.1	54.4	58.1	61.5
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	1.0
	%N1	51.2	56.4	61.0	65.0	68.4
	KIAS	117	130	141	151	160

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = -1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	41.9	46.4	50.3	53.9	57.1
	KIAS	124	137	149	160	169
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	46.1	50.8	55.1	58.8	62.3
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	1.0
	%N1	51.9	57.2	61.8	65.9	69.3
	KIAS	117	130	141	151	161

Flap placard speed exceeded in shaded area.

Airport Altitude = SEA LEVEL

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	42.4	47.1	51.0	54.6	57.8
	KIAS	124	137	149	160	170
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	46.7	51.5	55.8	59.6	63.1
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	1.0
	%N1	52.6	57.9	62.6	66.6	70.1
	KIAS	117	130	141	152	161

Flap placard speed exceeded in shaded area.

Airport Altitude = 1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	43.0	47.7	51.6	55.3	58.5
	KIAS	124	137	149	160	170
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	47.3	52.2	56.5	60.4	63.8
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	1.0
	%N1	53.3	58.7	63.4	67.4	70.9
	KIAS	117	130	141	152	161

Flap placard speed exceeded in shaded area.

Airport Altitude = 2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	43.6	48.3	52.3	56.0	59.2
	KIAS	124	137	149	160	170
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	47.9	52.9	57.2	61.2	64.6
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	54.0	59.5	64.2	68.2	71.8
	KIAS	117	130	142	152	162

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 3000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	44.2	48.9	53.1	56.7	60.0
	KIAS	124	137	149	160	170
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	48.5	53.6	58.0	62.0	65.4
	KIAS	120	133	144	155	164
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	54.8	60.3	65.1	69.0	72.7
	KIAS	117	130	142	152	162

Flap placard speed exceeded in shaded area.

Airport Altitude = 4000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	44.9	49.6	53.8	57.4	60.8
	KIAS	124	137	149	161	170
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	49.2	54.3	58.7	62.8	66.2
	KIAS	120	133	145	155	165
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	55.5	61.1	65.8	69.9	73.6
	KIAS	117	130	142	152	162

Flap placard speed exceeded in shaded area.

Airport Altitude = 5000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	45.5	50.2	54.5	58.2	61.6
	KIAS	124	137	150	161	171
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	49.9	55.0	59.5	63.5	67.0
	KIAS	120	133	145	155	165
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	56.3	61.8	66.6	70.8	74.5
	KIAS	117	130	142	153	162

Flap placard speed exceeded in shaded area.

Airport Altitude = 6000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	46.2	50.9	55.2	58.9	62.4
	KIAS	124	137	150	161	171
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	50.6	55.7	60.3	64.3	67.7
	KIAS	120	133	145	156	165
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	57.0	62.6	67.4	71.7	75.3
	KIAS	117	130	142	153	163

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 7000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.5
	%N1	46.9	51.6	55.9	59.7	63.3
	KIAS	124	137	150	161	171
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	51.4	56.5	61.2	65.1	68.5
	KIAS	120	133	145	156	165
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	57.8	63.5	68.2	72.5	76.1
	KIAS	117	130	142	153	163

Flap placard speed exceeded in shaded area.

Airport Altitude = 8000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	47.5	52.4	56.6	60.5	64.0
	KIAS	124	137	150	161	171
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	52.0	57.2	62.0	65.9	69.4
	KIAS	120	133	145	156	165
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.5	0.5	0.5
	%N1	58.6	64.3	69.1	73.4	77.0
	KIAS	117	130	143	154	163

Flap placard speed exceeded in shaded area.

Airport Altitude = 9000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	48.1	53.1	57.4	61.3	64.7
	KIAS	124	137	150	162	172
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.5	2.5
	%N1	52.7	58.0	62.8	66.7	70.2
	KIAS	120	133	145	156	166
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.5	0.5
	%N1	59.4	65.1	70.0	74.3	77.9
	KIAS	117	130	143	154	164

Flap placard speed exceeded in shaded area.

Airport Altitude = 10000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	48.8	53.8	58.1	62.2	65.4
	KIAS	124	137	150	162	172
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	53.5	58.9	63.6	67.5	71.1
	KIAS	120	133	145	156	166
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.5
	%N1	60.2	65.9	70.9	75.1	78.8
	KIAS	117	130	143	154	164

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 11000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	49.5	54.5	59.0	62.9	66.1
	KIAS	124	138	151	162	172
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	54.2	59.7	64.4	68.3	71.9
	KIAS	120	133	146	157	166
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.5
	%N1	61.0	66.7	71.8	76.0	79.7
	KIAS	117	131	143	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 12000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	50.2	55.3	59.8	63.6	66.9
	KIAS	124	138	151	162	172
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	54.9	60.5	65.2	69.2	72.7
	KIAS	120	133	146	157	166
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.5
	%N1	61.8	67.6	72.7	76.9	80.6
	KIAS	117	131	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 13000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	4.0	4.0	4.0	4.0
	%N1	50.9	56.0	60.6	64.4	67.6
	KIAS	124	138	151	163	173
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	55.7	61.3	66.0	70.0	73.5
	KIAS	120	133	146	157	167
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.0
	%N1	62.7	68.5	73.6	77.8	81.5
	KIAS	117	131	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 14000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	3.5	4.0	4.0	4.0
	%N1	51.8	56.9	61.6	65.2	68.5
	KIAS	124	138	151	163	173
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	56.6	62.2	66.9	71.0	74.3
	KIAS	120	134	146	157	167
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.0
	%N1	63.6	69.5	74.5	78.8	82.5
	KIAS	117	131	144	156	166

Flap placard speed exceeded in shaded area.



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Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 14500 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 VREF15+10	PITCH ATT	3.5	3.5	4.0	4.0	4.0
	%N1	52.2	57.4	62.0	65.6	69.0
	KIAS	124	138	151	163	173
FLAPS 30 VREF30+10	PITCH ATT	2.0	2.0	2.0	2.0	2.5
	%N1	57.2	62.7	67.4	71.4	74.7
	KIAS	120	134	146	157	167
FLAPS 40 VREF40+10	PITCH ATT	0.0	0.0	0.0	0.0	0.0
	%N1	64.1	70.1	75.0	79.3	83.0
	KIAS	118	131	144	156	166

Flap placard speed exceeded in shaded area.

GO-AROUND

Flaps 1, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	16.5	13.5	11.5	10.5	9.5
	V/S (FT/MIN)	4000	3100	2400	1900	1500
	KIAS	157	171	184	196	206
10000	PITCH ATT	18.5	15.5	13.0	11.5	10.5
	V/S (FT/MIN)	4400	3500	2800	2300	1800
	KIAS	157	170	183	194	204
5000	PITCH ATT	21.0	17.5	15.0	13.0	12.0
	V/S (FT/MIN)	4900	3900	3200	2600	2100
	KIAS	157	170	182	193	202
SEA LEVEL	PITCH ATT	23.0	19.0	16.0	14.5	13.0
	V/S (FT/MIN)	5100	4100	3400	2800	2300
	KIAS	157	170	181	192	201
-2000	PITCH ATT	23.5	19.0	16.5	14.5	13.0
	V/S (FT/MIN)	5000	4000	3300	2700	2300
	KIAS	157	170	181	191	200

Flaps 5, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	17.5	14.5	12.0	11.0	10.0
	V/S (FT/MIN)	3600	2800	2200	1700	1300
	KIAS	137	151	164	176	186
10000	PITCH ATT	19.5	16.0	13.5	12.0	11.0
	V/S (FT/MIN)	4000	3100	2500	2000	1600
	KIAS	137	150	163	174	184
5000	PITCH ATT	22.0	18.0	15.5	13.5	12.5
	V/S (FT/MIN)	4400	3500	2800	2300	1900
	KIAS	137	150	162	173	182
SEA LEVEL	PITCH ATT	24.5	20.0	17.0	15.0	13.5
	V/S (FT/MIN)	4600	3700	3000	2500	2100
	KIAS	137	150	161	172	181
-2000	PITCH ATT	24.5	20.0	17.0	15.0	13.5
	V/S (FT/MIN)	4500	3600	3000	2500	2000
	KIAS	137	150	161	171	180

Only authorized operators may use Flaps 5 for a Go-Around in conjunction with the Alternate Go-Around and Missed Approach Procedure.

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GO-AROUND

Flaps 15, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	17.0	13.5	11.5	10.0	9.0
	V/S (FT/MIN)	3200	2400	1800	1400	1000
	KIAS	127	141	154	166	176
10000	PITCH ATT	19.0	15.5	13.0	11.5	10.0
	V/S (FT/MIN)	3600	2800	2200	1700	1300
	KIAS	127	140	153	164	174
5000	PITCH ATT	21.5	17.5	14.5	13.0	11.5
	V/S (FT/MIN)	3900	3100	2500	2000	1600
	KIAS	127	140	152	163	172
SEA LEVEL	PITCH ATT	24.0	19.0	16.0	14.0	12.5
	V/S (FT/MIN)	4200	3300	2700	2200	1800
	KIAS	127	140	151	162	171
-2000	PITCH ATT	24.0	19.5	16.5	14.5	13.0
	V/S (FT/MIN)	4100	3200	2600	2100	1700
	KIAS	127	140	151	161	170

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Max Climb %N1

Based on engine bleed for packs on or off and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (FT)/SPEED (KIAS/MACH)									
	0	5000	10000	15000	20000	25000	30000	35000	37000	41000
	280	280	280	280	280	280	280	.78	.78	.78
60	88.4	88.6	88.5	88.2	88.9	91.3	92.9	94.3	94.4	92.7
55	89.2	89.4	89.3	89.1	89.3	90.6	92.3	93.6	93.7	92.0
50	90.0	90.1	90.1	89.9	90.2	90.7	91.6	92.9	93.0	91.3
45	90.7	90.8	90.9	90.7	91.1	91.6	91.6	92.2	92.3	90.6
40	91.5	91.6	91.6	91.4	92.0	92.4	92.4	91.5	91.6	89.9
35	92.0	92.3	92.3	92.2	92.8	93.2	93.2	92.3	91.6	90.0
30	91.3	93.0	93.0	92.9	93.6	94.0	93.9	93.1	92.5	91.0
25	90.5	93.0	93.8	93.6	94.3	94.8	94.6	93.9	93.3	92.0
20	89.8	92.3	94.5	94.3	95.1	95.5	95.3	94.6	94.1	92.9
15	89.1	91.5	93.9	95.1	95.8	96.2	96.0	95.4	94.9	93.9
10	88.3	90.8	93.1	95.3	96.7	96.9	96.6	96.1	95.7	94.8
5	87.5	90.0	92.4	94.5	97.7	97.8	97.3	96.9	96.5	95.7
0	86.8	89.2	91.6	93.7	97.1	98.9	98.3	97.8	97.4	96.6
-5	86.0	88.4	90.8	92.9	96.3	98.8	99.3	98.5	98.2	97.7
-10	85.2	87.6	89.9	92.1	95.5	98.0	99.6	99.4	99.1	98.6
-15	84.4	86.8	89.1	91.2	94.7	97.3	98.8	100.4	100.1	99.6
-20	83.6	86.0	88.3	90.4	93.9	96.5	98.0	100.1	100.6	100.2
-25	82.8	85.2	87.5	89.6	93.1	95.7	97.2	99.2	99.8	99.4
-30	82.0	84.3	86.6	88.7	92.3	94.9	96.4	98.4	98.9	98.6
-35	81.2	83.5	85.8	87.9	91.4	94.0	95.5	97.6	98.1	97.7
-40	80.4	82.6	84.9	87.0	90.6	93.2	94.7	96.7	97.2	96.9

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)					
	0	10	20	30	35	41
ENGINE ANTI-ICE	-0.6	-0.8	-0.9	-0.9	-0.8	-0.8
ENGINE & WING ANTI-ICE*	-1.8	-2.1	-2.5	-2.7	-3.0	-3.0

*Dual bleed sources

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Go-around %N1

Based on engine bleed for packs on, engine and wing anti-ice on or off

AIRPORT OAT		TAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F		-2000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
57	134	60	88.5	89.3	89.4									
52	125	55	89.2	90.1	90.3	90.4	90.5							
47	116	50	90.0	90.9	91.0	91.2	91.3	91.4	91.4	91.3				
42	108	45	90.9	91.7	91.9	92.0	92.1	92.2	92.2	92.1	91.8	91.4		
37	99	40	91.8	92.6	92.7	92.8	92.9	93.0	93.0	92.9	92.6	92.2	92.1	92.0
32	90	35	91.9	93.5	93.6	93.7	93.7	93.8	93.7	93.7	93.4	93.0	93.0	92.9
27	81	30	91.2	93.4	94.1	94.5	94.6	94.6	94.6	94.5	94.1	93.8	93.8	93.7
22	72	25	90.5	92.6	93.3	94.0	94.7	95.5	95.4	95.3	95.0	94.6	94.5	94.5
17	63	20	89.7	91.9	92.6	93.3	94.0	94.7	95.2	95.8	96.0	95.7	95.3	95.3
12	54	15	89.0	91.1	91.8	92.5	93.2	93.9	94.5	95.0	95.6	96.2	96.8	96.5
7	45	10	88.3	90.4	91.0	91.7	92.4	93.2	93.7	94.2	94.8	95.4	96.1	96.7
2	36	5	87.5	89.6	90.3	90.9	91.6	92.4	92.9	93.4	94.0	94.6	95.3	95.9
-3	27	0	86.7	88.8	89.5	90.1	90.9	91.6	92.1	92.6	93.2	93.8	94.5	95.1
-8	18	-5	86.0	88.0	88.7	89.4	90.1	90.8	91.3	91.8	92.4	93.0	93.7	94.3
-13	9	-10	85.2	87.2	87.9	88.5	89.2	89.9	90.5	91.0	91.6	92.2	92.9	93.5
-17	1	-15	84.4	86.4	87.1	87.7	88.4	89.1	89.7	90.2	90.8	91.4	92.0	92.7
-22	-8	-20	83.6	85.6	86.3	86.9	87.6	88.3	88.8	89.3	90.0	90.5	91.2	91.9
-27	-17	-25	82.8	84.8	85.4	86.1	86.8	87.5	88.0	88.5	89.1	89.7	90.4	91.1
-32	-26	-30	82.0	84.0	84.6	85.2	85.9	86.6	87.1	87.6	88.3	88.9	89.5	90.2
-37	-35	-35	81.2	83.1	83.8	84.4	85.1	85.8	86.3	86.8	87.4	88.0	88.7	89.4
-42	-44	-40	80.3	82.3	82.9	83.5	84.2	84.9	85.4	85.9	86.5	87.1	87.8	88.5
-47	-53	-45	79.5	81.4	82.1	82.7	83.4	84.0	84.5	85.0	85.7	86.3	87.0	87.6
-52	-62	-50	78.6	80.6	81.2	81.8	82.5	83.1	83.6	84.1	84.8	85.4	86.1	86.8

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)											
	-2000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
PACKS OFF	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
A/C HIGH	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2



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VREF

WEIGHT (1000 KG)	FLAPS		
	40	30	15
80	154	156	162
75	149	151	157
70	144	146	152
65	139	141	147
60	133	135	140
55	127	129	134
50	120	123	127
45	114	117	121
40	107	110	114



Intentionally
Blank



Performance Inflight - QRH
Advisory Information

Chapter PI-QRH
Section 11

ADVISORY INFORMATION
Runway Surface Condition Correlation

RUNWAY CONDITION CODE	RUNWAY SURFACE CONDITION DESCRIPTION	REPORTED BRAKING ACTION
6	Dry	Dry
5	Wet (Smooth, Grooved or PFC) or Frost 3 mm (0.12 inches) or less of: Water, Slush, Dry Snow or Wet Snow	Good
4	Compacted Snow at or below -15°C OAT	Good to Medium
3	Wet (Slippery), Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 3 mm (0.12 inches) of : Dry Snow or Wet Snow Compacted Snow at OAT warmer than -15°C	Medium
2	Greater than 3 mm (0.12 inches) of: Water or Slush	Medium to Poor
1	Ice	Poor
0	Wet Ice, Water on top of Compacted Snow, Dry Snow or Wet Snow over Ice	Nil

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ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF15	ONE REV	NO REV

Dry Runway

MAX MANUAL	1200	75/-60	25/30	-35/125	10/-10	25/-25	35	15	40
AUTOBRAKE MAX	1470	70/-70	30/40	-45/160	0/0	30/-30	65	0	0
AUTOBRAKE 3	1980	110/-115	45/70	-80/265	0/0	45/-45	105	0	0
AUTOBRAKE 2	2500	155/-175	70/100	-110/375	15/-35	65/-65	115	30	30
AUTOBRAKE 1	2770	195/-205	85/120	-125/445	60/-75	75/-75	110	215	235

Good Reported Braking Action

MAX MANUAL	1580	80/-85	35/50	-65/220	35/-30	35/-35	50	75	165
AUTOBRAKE MAX	1660	85/-90	40/50	-65/225	30/-25	35/-35	65	80	185
AUTOBRAKE 3	1985	110/-115	45/70	-80/270	5/0	45/-45	105	5	15
AUTOBRAKE 2	2500	155/-175	70/100	-110/375	15/-35	65/-65	115	30	30
AUTOBRAKE 1	2770	195/-205	85/120	-125/445	60/-75	75/-75	110	215	235

Good To Medium Reported Braking Action

MAX MANUAL	1845	105/-110	45/65	-80/295	60/-50	40/-45	60	145	345
AUTOBRAKE MAX	1890	110/-110	50/70	-85/295	55/-45	45/-45	70	145	350
AUTOBRAKE 3	2085	120/-125	50/80	-90/320	35/-20	50/-50	105	90	255
AUTOBRAKE 2	2525	160/-175	70/100	-115/395	35/-45	65/-65	115	50	125
AUTOBRAKE 1	2775	195/-205	85/120	-130/450	70/-80	75/-75	110	220	270

Medium Reported Braking Action

MAX MANUAL	2105	130/-130	60/80	-100/370	85/-70	45/-50	70	215	525
AUTOBRAKE MAX	2120	130/-130	60/85	-105/370	80/-65	50/-50	80	205	520
AUTOBRAKE 3	2190	130/-140	60/85	-105/375	70/-40	50/-50	105	175	490
AUTOBRAKE 2	2555	160/-175	70/100	-120/420	50/-50	65/-70	115	75	225
AUTOBRAKE 1	2785	195/-205	85/120	-130/460	80/-80	75/-75	110	230	305

Medium To Poor Reported Braking Action

MAX MANUAL	2410	160/-160	70/100	-125/475	150/-105	55/-60	80	340	905
AUTOBRAKE MAX	2420	160/-160	70/105	-130/475	145/-100	60/-60	85	335	905
AUTOBRAKE 3	2450	160/-165	70/105	-130/475	140/-85	60/-60	100	320	890
AUTOBRAKE 2	2710	180/-185	80/110	-140/510	120/-85	65/-70	110	215	690
AUTOBRAKE 1	2895	205/-215	90/125	-150/540	140/-110	75/-80	110	325	680

Poor Reported Braking Action

MAX MANUAL	2715	190/-190	80/120	-155/580	215/-140	65/-70	85	465	1290
AUTOBRAKE MAX	2715	190/-190	85/120	-155/580	215/-140	65/-70	85	465	1290
AUTOBRAKE 3	2715	190/-190	85/120	-155/580	215/-130	65/-70	90	465	1290
AUTOBRAKE 2	2865	195/-200	85/125	-160/600	190/-120	70/-75	110	355	1155
AUTOBRAKE 1	3005	215/-225	90/130	-165/620	195/-140	75/-80	110	420	1060

Reference distance is based on sea level, standard day, no wind or slope, VREF15, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 65 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF30	ONE REV	NO REV

Dry Runway

MAX MANUAL	1165	65/-50	25/30	-35/125	10/-10	15/-15	35	15	40
AUTOBRAKE MAX	1405	65/-70	30/35	-45/155	0/0	30/-30	60	0	0
AUTOBRAKE 3	1890	100/-110	45/65	-75/260	0/0	45/-45	100	0	0
AUTOBRAKE 2	2360	145/-155	65/90	-105/360	15/-35	65/-65	105	35	35
AUTOBRAKE 1	2600	180/-185	80/110	-125/425	60/-70	70/-70	100	190	225

Good Reported Braking Action

MAX MANUAL	1530	75/-80	35/45	-65/220	35/-30	30/-35	50	70	155
AUTOBRAKE MAX	1615	80/-85	35/50	-65/225	30/-25	35/-35	65	75	165
AUTOBRAKE 3	1890	105/-110	45/65	-75/265	5/0	45/-45	100	5	15
AUTOBRAKE 2	2390	145/-160	65/90	-110/385	35/-45	65/-65	105	35	35
AUTOBRAKE 1	2600	180/-185	80/110	-125/425	60/-70	70/-70	100	190	225

Good To Medium Reported Braking Action

MAX MANUAL	1780	100/-105	45/60	-80/290	60/-45	35/-40	60	130	310
AUTOBRAKE MAX	1825	105/-105	45/65	-80/295	55/-40	40/-40	70	130	315
AUTOBRAKE 3	1990	115/-120	50/70	-90/315	35/-20	50/-50	100	85	230
AUTOBRAKE 2	2390	165/-160	65/90	-110/410	35/-45	65/-65	105	55	120
AUTOBRAKE 1	2610	180/-185	80/110	-125/435	70/-70	70/-70	100	200	260

Medium Reported Braking Action

MAX MANUAL	2025	120/-125	50/75	-100/355	80/-65	45/-45	70	190	460
AUTOBRAKE MAX	2040	125/-125	60/80	-100/360	80/-60	45/-45	80	190	460
AUTOBRAKE 3	2095	125/-125	60/80	-105/370	70/-40	50/-50	100	160	445
AUTOBRAKE 2	2425	150/-160	65/90	-115/410	50/-50	65/-65	105	75	205
AUTOBRAKE 1	2620	180/-190	80/110	-125/445	80/-75	70/-70	100	205	295

Medium To Poor Reported Braking Action

MAX MANUAL	2305	150/-150	65/95	-125/465	140/-100	55/-60	75	300	780
AUTOBRAKE MAX	2310	150/-150	65/100	-125/465	145/-95	55/-60	80	300	780
AUTOBRAKE 3	2340	150/-150	65/100	-125/470	135/-85	60/-60	95	285	775
AUTOBRAKE 2	2570	165/-175	70/105	-135/495	120/-85	65/-65	105	200	600
AUTOBRAKE 1	2725	185/-195	85/115	-145/525	135/-105	70/-70	100	295	610

Poor Reported Braking Action

MAX MANUAL	2580	180/-180	75/115	-150/570	200/-130	65/-70	80	410	1100
AUTOBRAKE MAX	2585	180/-180	75/115	-150/570	205/-130	65/-70	80	410	1105
AUTOBRAKE 3	2585	180/-180	75/115	-150/570	200/-125	65/-70	90	410	1105
AUTOBRAKE 2	2715	185/-185	80/115	-155/585	185/-120	65/-70	105	320	990
AUTOBRAKE 1	2830	195/-200	85/120	-160/605	190/-130	70/-75	100	380	925

Reference distance is based on sea level, standard day, no wind or slope, VREF30, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 60 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF40	ONE REV	NO REV

Dry Runway

MAX MANUAL	1145	65/-50	15/30	-35/120	10/-10	15/-15	40	15	35
AUTOBRAKE MAX	1375	60/-65	30/40	-45/150	0/0	25/-30	60	0	0
AUTOBRAKE 3	1830	100/-105	45/65	-75/255	0/0	40/-40	100	0	0
AUTOBRAKE 2	2285	140/-150	65/90	-105/350	10/-35	60/-60	105	25	25
AUTOBRAKE 1	2525	175/-180	75/105	-120/420	50/-65	70/-65	100	165	200

Good Reported Braking Action

MAX MANUAL	1515	75/-80	35/50	-65/220	35/-30	30/-30	50	65	150
AUTOBRAKE MAX	1595	80/-85	35/50	-65/225	30/-25	35/-35	65	70	160
AUTOBRAKE 3	1835	100/-105	45/65	-75/260	10/-5	40/-40	100	5	15
AUTOBRAKE 2	2285	140/-150	65/90	-105/350	10/-35	60/-60	105	25	25
AUTOBRAKE 1	2525	175/-180	75/105	-120/420	50/-65	70/-65	100	165	200

Good To Medium Reported Braking Action

MAX MANUAL	1750	100/-100	45/65	-80/290	60/-45	35/-35	60	120	290
AUTOBRAKE MAX	1800	100/-105	45/65	-80/290	55/-40	40/-40	70	125	295
AUTOBRAKE 3	1945	110/-115	50/70	-85/310	40/-25	45/-45	100	85	220
AUTOBRAKE 2	2320	140/-150	65/90	-110/375	30/-45	60/-60	105	45	110
AUTOBRAKE 1	2535	175/-180	75/105	-125/430	65/-70	65/-65	100	175	235

Medium Reported Braking Action

MAX MANUAL	1985	120/-120	50/75	-100/355	80/-65	45/-45	70	180	430
AUTOBRAKE MAX	2005	120/-125	50/80	-100/355	80/-60	45/-45	80	180	425
AUTOBRAKE 3	2050	120/-125	60/80	-100/360	70/-45	45/-50	100	160	425
AUTOBRAKE 2	2355	145/-155	65/90	-115/405	50/-50	60/-60	105	70	200
AUTOBRAKE 1	2540	175/-180	75/110	-125/435	80/-75	65/-70	100	185	270

Medium To Poor Reported Braking Action

MAX MANUAL	2255	145/-145	65/90	-125/460	140/-95	50/-55	75	280	720
AUTOBRAKE MAX	2265	145/-150	65/100	-125/460	140/-95	50/-55	80	280	715
AUTOBRAKE 3	2290	150/-150	65/100	-125/465	135/-85	50/-60	95	270	715
AUTOBRAKE 2	2500	160/-165	70/105	-130/490	115/-85	60/-65	100	185	560
AUTOBRAKE 1	2645	180/-185	80/115	-140/515	135/-105	65/-70	100	265	565

Poor Reported Braking Action

MAX MANUAL	2520	175/-175	75/110	-150/565	200/-125	60/-65	80	380	1005
AUTOBRAKE MAX	2525	175/-175	75/115	-150/565	200/-130	60/-65	80	380	1005
AUTOBRAKE 3	2535	180/-175	75/115	-150/565	200/-125	60/-65	90	380	1005
AUTOBRAKE 2	2650	180/-180	80/115	-150/575	180/-120	65/-70	100	300	915
AUTOBRAKE 1	2750	190/-195	80/120	-155/590	190/-130	70/-75	100	350	855

Reference distance is based on sea level, standard day, no wind or slope, VREF40, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 60 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Airspeed Unreliable (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1100	75/-55	20/30	-35/115	10/-10	20/-20	N/A	20	45
AUTOBRAKE MAX	1380	65/-65	30/40	-45/150	0/0	30/-30	N/A	0	5
AUTOBRAKE 2	2345	150/-160	70/95	-100/340	30/-45	60/-60	N/A	105	105

Good Reported Braking Action

MAX MANUAL	1450	75/-75	35/45	-55/195	30/-25	30/-30	N/A	75	175
AUTOBRAKE MAX	1535	80/-80	35/50	-60/205	25/-20	35/-35	N/A	85	190
AUTOBRAKE 2	2345	150/-160	70/95	-100/340	30/-45	60/-60	N/A	105	105

Good To Medium Reported Braking Action

MAX MANUAL	1690	100/-100	45/60	-75/260	55/-45	40/-40	N/A	145	350
AUTOBRAKE MAX	1745	100/-100	45/65	-75/265	50/-40	40/-45	N/A	150	360
AUTOBRAKE 2	2370	150/-165	70/95	-105/360	45/-55	60/-65	N/A	125	190

Medium Reported Braking Action

MAX MANUAL	1925	120/-120	55/75	-90/325	75/-60	45/-45	N/A	210	525
AUTOBRAKE MAX	1950	120/-120	55/75	-90/325	70/-55	45/-50	N/A	210	525
AUTOBRAKE 3	2065	120/-125	55/80	-95/340	50/-35	50/-50	N/A	135	445

Medium To Poor Reported Braking Action

MAX MANUAL	2190	145/-145	65/95	-115/420	130/-90	55/-55	N/A	330	890
AUTOBRAKE MAX	2205	145/-145	65/95	-115/420	125/-90	55/-60	N/A	325	890
AUTOBRAKE 3	2270	145/-150	65/95	-115/425	115/-70	55/-60	N/A	290	850

Poor Reported Braking Action

MAX MANUAL	2455	170/-170	75/110	-135/510	180/-120	60/-65	N/A	445	1250
AUTOBRAKE MAX	2455	170/-170	75/110	-135/510	180/-120	60/-65	N/A	440	1250
AUTOBRAKE 3	2470	170/-170	75/110	-135/510	175/-105	60/-65	N/A	440	1250

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Airspeed Unreliable (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1070	65/-50	20/25	-35/115	10/-10	20/-20	N/A	20	40
AUTOBRAKE MAX	1325	60/-60	25/35	-45/145	0/0	25/-25	N/A	0	0
AUTOBRAKE 2	2215	135/-145	65/85	-95/325	35/-40	60/-60	N/A	100	100

Good Reported Braking Action

MAX MANUAL	1415	70/-75	35/45	-55/195	30/-25	30/-30	N/A	70	165
AUTOBRAKE MAX	1500	75/-80	35/50	-60/200	25/-25	30/-30	N/A	80	180
AUTOBRAKE 2	2215	135/-145	65/85	-95/325	35/-40	60/-60	N/A	100	100

Good To Medium Reported Braking Action

MAX MANUAL	1635	90/-95	45/60	-70/260	50/-40	40/-40	N/A	130	315
AUTOBRAKE MAX	1695	95/-100	45/60	-75/260	45/-40	40/-40	N/A	135	325
AUTOBRAKE 2	2240	140/-150	65/90	-100/350	50/-50	60/-60	N/A	120	180

Medium Reported Braking Action

MAX MANUAL	1855	110/-115	50/70	-85/320	70/-55	45/-45	N/A	190	465
AUTOBRAKE MAX	1885	115/-115	50/70	-90/320	65/-55	45/-45	N/A	190	470
AUTOBRAKE 3	1980	115/-115	55/75	-90/330	50/-35	50/-50	N/A	125	405

Medium To Poor Reported Braking Action

MAX MANUAL	2095	135/-135	60/85	-110/410	120/-85	50/-55	N/A	290	770
AUTOBRAKE MAX	2115	140/-140	60/85	-110/410	120/-85	50/-55	N/A	290	770
AUTOBRAKE 3	2170	140/-140	65/90	-110/415	110/-70	55/-55	N/A	260	740

Poor Reported Braking Action

MAX MANUAL	2335	160/-155	70/100	-130/500	170/-115	55/-60	N/A	390	1070
AUTOBRAKE MAX	2340	160/-160	70/100	-130/500	175/-115	55/-60	N/A	390	1070
AUTOBRAKE 3	2360	160/-160	70/100	-130/500	165/-100	55/-60	N/A	390	1075

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Airspeed Unreliable (Flaps 40)

VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1060	60/-45	20/25	-35/110	10/-10	20/-20	N/A	20	40
AUTOBRAKE MAX	1295	55/-60	25/35	-40/140	0/0	25/-25	N/A	0	0
AUTOBRAKE 2	2145	135/-140	60/85	-95/320	30/-40	55/-55	N/A	90	90

Good Reported Braking Action

MAX MANUAL	1400	70/-70	35/45	-55/195	30/-25	30/-30	N/A	70	155
AUTOBRAKE MAX	1485	75/-80	35/50	-60/200	25/-25	30/-30	N/A	75	170
AUTOBRAKE 2	2145	135/-140	60/85	-95/320	35/-40	55/-55	N/A	90	90

Good To Medium Reported Braking Action

MAX MANUAL	1615	90/-90	45/60	-70/255	50/-45	35/-40	N/A	125	295
AUTOBRAKE MAX	1670	95/-100	45/65	-75/260	45/-40	40/-40	N/A	130	305
AUTOBRAKE 2	2175	135/-145	65/85	-100/345	50/-50	55/-55	N/A	110	170

Medium Reported Braking Action

MAX MANUAL	1825	110/-110	50/70	-85/315	70/-60	40/-45	N/A	180	435
AUTOBRAKE MAX	1855	115/-115	50/75	-90/320	65/-55	45/-45	N/A	180	440
AUTOBRAKE 3	1935	110/-115	50/75	-90/330	50/-40	45/-50	N/A	125	390

Medium To Poor Reported Braking Action

MAX MANUAL	2060	135/-135	60/85	-110/405	120/-85	50/-55	N/A	275	705
AUTOBRAKE MAX	2075	135/-135	60/90	-110/410	120/-85	50/-55	N/A	270	710
AUTOBRAKE 3	2125	135/-135	60/90	-110/415	110/-75	50/-55	N/A	245	690

Poor Reported Braking Action

MAX MANUAL	2290	155/-155	70/100	-130/495	170/-110	55/-60	N/A	365	975
AUTOBRAKE MAX	2295	155/-155	70/100	-130/495	170/-110	55/-60	N/A	360	975
AUTOBRAKE 3	2315	160/-155	70/100	-130/495	165/-105	55/-60	N/A	365	985

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

All Flaps Up Landing

VREF40 + 55

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1390	170/-80	30/80	-40/145	15/-15	30/-30	40	40	85
AUTOBRAKE MAX	1880	95/-80	45/60	-55/185	5/-5	45/-45	70	5	15
AUTOBRAKE 2	3240	195/-215	105/145	-120/405	70/-75	95/-95	95	275	320

Good Reported Braking Action

MAX MANUAL	1785	85/-90	45/65	-65/220	35/-30	40/-45	45	105	240
AUTOBRAKE MAX	2010	90/-95	50/70	-70/235	25/-20	50/-50	65	80	215
AUTOBRAKE 2	3240	195/-215	105/145	-120/405	70/-75	95/-95	95	275	320

Good To Medium Reported Braking Action

MAX MANUAL	2120	115/-120	60/85	-85/290	65/-55	55/-55	55	200	490
AUTOBRAKE MAX	2270	120/-125	65/90	-90/300	55/-45	60/-60	70	190	490
AUTOBRAKE 2	3265	200/-220	105/145	-125/425	85/-85	95/-95	95	295	415

Medium Reported Braking Action

MAX MANUAL	2455	145/-150	75/105	-100/360	90/-75	65/-65	60	295	735
AUTOBRAKE MAX	2530	145/-150	75/110	-105/365	85/-70	65/-65	70	300	760
AUTOBRAKE 3	2870	140/-160	85/120	-115/395	55/-50	80/-80	105	150	485

Medium To Poor Reported Braking Action

MAX MANUAL	2830	180/-185	95/130	-130/465	155/-115	75/-80	70	470	1280
AUTOBRAKE MAX	2865	180/-185	95/135	-130/470	150/-105	75/-80	80	470	1285
AUTOBRAKE 3	3095	175/-185	100/140	-135/490	125/-90	85/-90	105	355	1120

Poor Reported Braking Action

MAX MANUAL	3200	215/-215	110/155	-155/570	215/-150	85/-90	75	640	1825
AUTOBRAKE MAX	3200	215/-215	110/155	-155/570	215/-140	85/-90	85	635	1810
AUTOBRAKE 3	3315	205/-210	110/155	-155/580	190/-130	90/-95	105	555	1750

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
ANTISKID INOPERATIVE (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1720	95/-100	40/60	-75/265	45/-40	35/-40	60	125	295
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1910	115/-115	50/70	-90/325	70/-55	40/-45	65	185	460
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2155	140/-140	60/90	-115/415	120/-85	50/-55	70	295	800
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2400	165/-160	70/105	-135/505	170/-110	55/-60	75	400	1135
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2785	205/-200	85/130	-180/720	765/-185	60/-75	85	695	2430
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3165	240/-235	100/150	-220/935	1360/-260	65/-90	90	985	3725
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

ANTISKID INOPERATIVE (Flaps 30)

VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1660	90/-95	40/55	-75/260	45/-40	35/-35	60	110	265
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1835	105/-110	45/65	-85/320	65/-55	40/-40	65	165	405
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2065	130/-130	55/80	-110/410	115/-80	45/-50	70	260	690
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2290	150/-150	65/95	-130/495	165/-105	50/-55	75	350	970
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2645	190/-185	80/120	-175/705	715/-175	55/-70	80	610	2040
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	2995	225/-215	90/140	-215/915	1265/-245	60/-85	85	865	3105
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
ANTISKID INOPERATIVE (Flaps 40)
VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1630	90/-90	40/55	-75/260	45/-40	35/-35	60	105	250
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1800	105/-105	45/65	-85/315	65/-55	40/-40	65	155	375
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2020	130/-125	55/80	-110/405	115/-80	45/-50	70	240	630
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2240	150/-145	65/95	-130/490	165/-105	50/-55	75	325	885
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2580	185/-180	80/115	-170/700	695/-175	55/-70	80	565	1850
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	2915	215/-210	90/135	-210/905	1220/-240	60/-80	80	805	2815
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Jammed or Restricted Flight Controls (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1035	70/-50	20/25	-30/110	10/-10	20/-20	30	20	40
AUTOBRAKE MAX	1275	60/-60	25/35	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2150	140/-150	60/85	-95/320	20/-30	55/-55	100	45	45

Good Reported Braking Action

MAX MANUAL	1360	70/-70	30/45	-55/190	25/-25	30/-30	45	70	155
AUTOBRAKE MAX	1430	75/-80	35/45	-55/195	25/-20	30/-30	50	75	170
AUTOBRAKE 2	2150	140/-150	60/85	-95/320	20/-30	55/-55	100	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1585	90/-90	40/60	-70/255	50/-40	35/-40	55	130	320
AUTOBRAKE MAX	1625	95/-100	45/60	-70/255	45/-35	35/-40	60	135	325
AUTOBRAKE 2	2175	140/-150	60/85	-100/345	35/-40	55/-60	100	65	130

Medium Reported Braking Action

MAX MANUAL	1805	110/-110	50/70	-85/315	70/-55	40/-45	60	190	480
AUTOBRAKE MAX	1815	115/-115	50/70	-85/315	65/-50	40/-45	70	190	475
AUTOBRAKE 3	1885	115/-115	50/70	-90/325	55/-35	45/-45	90	145	440

Medium To Poor Reported Braking Action

MAX MANUAL	2055	140/-135	60/90	-110/410	125/-85	50/-55	70	305	825
AUTOBRAKE MAX	2060	140/-140	60/90	-110/410	120/-85	50/-55	75	305	825
AUTOBRAKE 3	2095	140/-140	60/90	-110/415	115/-75	50/-55	85	280	805

Poor Reported Braking Action

MAX MANUAL	2305	165/-160	70/105	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE MAX	2305	165/-160	70/105	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE 3	2305	165/-160	70/105	-130/500	175/-110	55/-60	75	415	1170

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LEADING EDGE FLAPS TRANSIT (Flaps 15)

VREF15 + 15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1150	80/-60	20/30	-35/120	10/-10	20/-20	35	25	55
AUTOBRAKE MAX	1440	65/-70	30/40	-45/150	0/0	30/-30	60	0	5
AUTOBRAKE 2	2495	155/-170	75/100	-105/350	30/-45	70/-65	100	95	95

Good Reported Braking Action

MAX MANUAL	1535	80/-80	35/50	-60/205	30/-30	35/-35	50	90	205
AUTOBRAKE MAX	1615	85/-85	40/55	-60/210	30/-25	35/-35	55	95	220
AUTOBRAKE 2	2495	155/-170	75/100	-105/350	30/-45	70/-65	100	95	95

Good To Medium Reported Braking Action

MAX MANUAL	1795	105/-105	50/70	-80/270	55/-50	45/-45	60	165	410
AUTOBRAKE MAX	1840	110/-110	50/70	-80/275	55/-45	45/-45	65	170	415
AUTOBRAKE 2	2520	160/-175	75/105	-110/375	45/-55	70/-70	100	115	200

Medium Reported Braking Action

MAX MANUAL	2050	125/-130	60/85	-95/335	80/-65	50/-50	65	240	610
AUTOBRAKE MAX	2065	130/-130	60/85	-95/335	75/-60	50/-50	70	240	610
AUTOBRAKE 3	2175	125/-130	60/85	-95/350	55/-35	55/-55	95	165	540

Medium To Poor Reported Braking Action

MAX MANUAL	2335	155/-155	75/105	-120/430	140/-100	60/-60	70	375	1035
AUTOBRAKE MAX	2345	160/-155	75/105	-120/430	135/-95	60/-60	75	375	1035
AUTOBRAKE 3	2400	155/-155	75/105	-120/440	125/-75	60/-65	95	335	1000

Poor Reported Braking Action

MAX MANUAL	2620	185/-180	85/120	-140/525	195/-130	65/-70	75	510	1460
AUTOBRAKE MAX	2620	185/-180	85/120	-140/525	195/-130	65/-70	75	510	1460
AUTOBRAKE 3	2625	185/-180	85/125	-140/525	195/-115	65/-70	90	505	1460

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM A (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1115	65/-50	20/30	-35/120	15/-10	20/-20	40	25	40
AUTOBRAKE MAX	1275	60/-60	25/35	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2200	135/-145	60/80	-95/325	0/-5	60/-60	125	0	0

Good Reported Braking Action

MAX MANUAL	1545	85/-85	40/55	-60/210	40/-35	35/-35	60	110	220
AUTOBRAKE MAX	1545	85/-90	40/55	-60/210	35/-25	35/-35	65	105	215
AUTOBRAKE 2	2200	135/-145	60/80	-95/325	0/-5	60/-60	125	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1810	110/-110	50/70	-80/280	70/-55	45/-45	70	205	465
AUTOBRAKE MAX	1800	110/-115	50/70	-80/280	70/-50	45/-45	75	200	455
AUTOBRAKE 2	2240	135/-145	60/85	-100/350	30/-20	60/-60	125	55	245

Medium Reported Braking Action

MAX MANUAL	2070	135/-135	60/85	-95/345	95/-75	50/-50	80	295	705
AUTOBRAKE MAX	2055	135/-135	60/85	-95/345	100/-75	50/-50	80	290	695
AUTOBRAKE 3	2055	135/-135	60/85	-95/345	100/-75	50/-50	80	290	695

Medium To Poor Reported Braking Action

MAX MANUAL	2360	165/-165	75/105	-120/445	160/-110	60/-60	90	450	1235
AUTOBRAKE MAX	2350	165/-165	75/105	-120/445	165/-115	60/-60	90	450	1230
AUTOBRAKE 3	2350	165/-165	75/105	-120/445	165/-115	60/-60	90	450	1230

Poor Reported Braking Action

MAX MANUAL	2645	195/-190	85/125	-145/540	220/-145	65/-70	95	605	1765
AUTOBRAKE MAX	2640	195/-190	85/125	-145/540	225/-150	65/-70	95	605	1765
AUTOBRAKE 3	2640	195/-190	85/125	-145/540	225/-150	65/-70	95	605	1765

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM A (Flaps 30)

VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1085	60/-45	20/30	-35/115	15/-10	20/-20	45	25	35
AUTOBRAKE MAX	1220	55/-60	25/30	-40/135	0/0	25/-25	50	5	5
AUTOBRAKE 2	2080	125/-135	55/75	-95/315	0/0	55/-55	120	0	0

Good Reported Braking Action

MAX MANUAL	1500	80/-80	35/50	-60/210	40/-35	30/-35	65	100	200
AUTOBRAKE MAX	1500	80/-85	35/50	-60/210	30/-30	30/-35	65	100	195
AUTOBRAKE 2	2080	125/-135	55/75	-95/315	0/0	55/-55	120	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1740	105/-105	45/65	-80/275	65/-55	40/-45	75	180	410
AUTOBRAKE MAX	1735	105/-105	45/65	-80/275	65/-55	40/-45	75	180	405
AUTOBRAKE 2	2120	125/-135	55/80	-100/340	30/-15	55/-55	120	50	215

Medium Reported Braking Action

MAX MANUAL	1980	125/-125	55/80	-95/340	90/-70	45/-50	80	260	615
AUTOBRAKE MAX	1970	125/-125	55/80	-95/340	95/-75	45/-50	80	260	610
AUTOBRAKE 3	1970	125/-125	55/80	-95/340	95/-75	45/-50	80	260	610

Medium To Poor Reported Braking Action

MAX MANUAL	2245	155/-150	70/100	-120/435	150/-105	55/-60	85	395	1045
AUTOBRAKE MAX	2240	155/-150	70/100	-120/435	155/-110	55/-60	85	395	1045
AUTOBRAKE 3	2240	155/-150	70/100	-120/435	155/-110	55/-60	85	395	1045

Poor Reported Braking Action

MAX MANUAL	2510	180/-175	80/115	-140/530	210/-135	60/-65	90	530	1475
AUTOBRAKE MAX	2505	180/-175	80/115	-140/530	215/-140	60/-65	90	530	1475
AUTOBRAKE 3	2510	180/-175	80/115	-140/530	215/-140	60/-65	90	530	1475

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM A (Flaps 40)

VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1080	60/-45	20/30	-35/115	15/-10	20/-20	45	25	35
AUTOBRAKE MAX	1195	55/-55	25/35	-40/135	5/0	25/-25	50	10	20
AUTOBRAKE 2	2010	120/-130	55/75	-90/310	0/0	50/-50	115	0	0

Good Reported Braking Action

MAX MANUAL	1480	80/-80	35/50	-60/210	40/-35	30/-30	65	95	190
AUTOBRAKE MAX	1485	80/-85	35/55	-60/210	35/-30	30/-30	70	95	185
AUTOBRAKE 2	2010	120/-130	55/75	-90/310	0/0	50/-50	115	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1710	105/-100	45/65	-80/275	65/-55	40/-40	75	170	375
AUTOBRAKE MAX	1710	105/-105	45/70	-80/275	65/-55	40/-40	75	170	375
AUTOBRAKE 2	2055	125/-130	55/80	-95/335	30/-15	50/-55	115	55	205

Medium Reported Braking Action

MAX MANUAL	1940	125/-120	55/80	-95/335	90/-70	45/-45	80	240	560
AUTOBRAKE MAX	1935	125/-120	55/80	-95/335	95/-75	45/-45	80	240	560
AUTOBRAKE 3	1935	125/-120	55/80	-95/335	95/-75	45/-45	80	240	560

Medium To Poor Reported Braking Action

MAX MANUAL	2190	150/-145	65/100	-120/430	150/-105	55/-55	85	360	935
AUTOBRAKE MAX	2190	150/-145	65/100	-120/430	155/-110	55/-55	85	360	935
AUTOBRAKE 3	2190	150/-145	65/100	-120/430	155/-110	55/-55	85	360	935

Poor Reported Braking Action

MAX MANUAL	2435	175/-170	75/115	-140/525	205/-135	60/-65	90	480	1305
AUTOBRAKE MAX	2440	175/-170	75/115	-140/525	210/-140	60/-65	90	480	1305
AUTOBRAKE 3	2440	175/-170	75/115	-140/525	210/-140	60/-65	90	480	1305

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
LOSS OF SYSTEM A AND SYSTEM B (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1525	75/-75	35/50	-55/190	35/-30	30/-35	70	-10	60
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1755	90/-95	40/60	-70/235	55/-45	40/-40	80	10	150
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2070	120/-120	55/80	-90/310	90/-70	50/-50	90	80	410
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2380	145/-145	65/95	-110/380	120/-95	55/-60	100	150	670
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2710	180/-175	80/120	-135/485	195/-135	65/-70	110	305	1300
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3040	215/-205	95/140	-160/585	265/-175	70/-80	115	455	1925
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM B (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1165	50/-55	25/30	-40/135	15/-15	20/-20	40	35	55
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1430	75/-75	35/45	-55/195	30/-25	30/-30	50	80	155
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	1670	100/-100	45/60	-75/260	55/-45	40/-40	60	155	335
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	1905	120/-120	50/75	-90/325	80/-60	45/-45	65	225	510
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2170	150/-145	65/95	-115/420	135/-95	50/-55	75	350	900
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	2435	175/-170	75/110	-135/515	190/-125	55/-65	80	475	1290
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
MANUAL REVERSION (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1525	75/-75	35/50	-55/190	35/-30	30/-35	70	-10	60
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1755	90/-95	40/60	-70/235	55/-45	40/-40	80	10	150
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2070	120/-120	55/80	-90/310	90/-70	50/-50	90	80	410
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2380	145/-145	65/95	-110/380	120/-95	55/-60	100	150	670
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2710	180/-175	80/120	-135/485	195/-135	65/-70	110	305	1300
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3040	215/-205	95/140	-160/585	265/-175	70/-80	115	455	1925
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
One Engine Inoperative Landing (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1035	75/-55	20/30	-35/115	10/-10	20/-20	35	0	20
AUTOBRAKE MAX	1275	65/-60	30/40	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2195	135/-145	65/90	-95/325	0/-10	60/-60	120	0	0

Good Reported Braking Action

MAX MANUAL	1410	75/-75	35/50	-55/200	30/-30	30/-30	50	0	85
AUTOBRAKE MAX	1490	80/-85	40/50	-60/205	30/-25	30/-30	55	0	90
AUTOBRAKE 2	2195	135/-145	65/90	-95/325	0/-10	60/-60	120	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1680	100/-100	50/65	-75/270	60/-50	40/-40	60	0	180
AUTOBRAKE MAX	1730	105/-105	50/70	-80/275	60/-45	40/-40	70	0	180
AUTOBRAKE 2	2235	140/-150	70/95	-100/355	25/-20	60/-60	120	0	60

Medium Reported Braking Action

MAX MANUAL	1950	120/-125	60/80	-95/340	90/-70	45/-50	70	0	270
AUTOBRAKE MAX	1965	125/-125	60/85	-95/345	85/-65	50/-50	80	0	270
AUTOBRAKE 3	1995	125/-130	60/85	-95/345	85/-55	50/-50	85	0	275

Medium To Poor Reported Braking Action

MAX MANUAL	2285	155/-155	75/105	-125/450	170/-115	55/-60	80	0	480
AUTOBRAKE MAX	2295	155/-155	75/105	-125/455	170/-115	60/-60	85	0	480
AUTOBRAKE 3	2310	160/-160	75/105	-125/455	170/-105	60/-60	90	0	480

Poor Reported Braking Action

MAX MANUAL	2620	185/-185	90/125	-150/560	245/-155	65/-70	85	0	685
AUTOBRAKE MAX	2620	185/-185	90/125	-150/560	250/-160	70/-70	85	0	685
AUTOBRAKE 3	2625	190/-190	90/125	-150/560	250/-150	70/-70	95	0	685

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
One Engine Inoperative Landing (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1005	60/-50	20/25	-30/110	10/-10	15/-20	35	0	20
AUTOBRAKE MAX	1220	55/-60	25/35	-40/135	0/0	25/-25	50	0	0
AUTOBRAKE 2	2070	125/-130	60/85	-95/315	5/-10	55/-55	115	0	0

Good Reported Braking Action

MAX MANUAL	1365	70/-75	35/45	-55/195	30/-25	30/-30	50	0	75
AUTOBRAKE MAX	1445	75/-80	35/50	-60/205	30/-25	30/-30	60	0	85
AUTOBRAKE 2	2070	125/-130	60/85	-95/315	5/-10	55/-55	115	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1615	95/-95	45/60	-75/265	60/-50	40/-40	60	0	155
AUTOBRAKE MAX	1665	95/-100	45/65	-80/270	55/-45	40/-40	70	0	160
AUTOBRAKE 2	2110	130/-135	65/90	-100/340	30/-25	55/-55	115	0	50

Medium Reported Braking Action

MAX MANUAL	1860	115/-115	55/75	-90/335	90/-70	45/-45	65	0	235
AUTOBRAKE MAX	1880	115/-120	55/75	-95/335	80/-60	45/-45	75	0	235
AUTOBRAKE 3	1905	115/-120	55/80	-95/335	85/-55	45/-45	85	0	245

Medium To Poor Reported Braking Action

MAX MANUAL	2165	145/-145	70/95	-120/440	160/-110	55/-55	75	0	405
AUTOBRAKE MAX	2175	145/-145	70/95	-120/440	160/-105	55/-55	80	0	405
AUTOBRAKE 3	2195	145/-150	70/100	-120/440	160/-100	55/-55	90	0	415

Poor Reported Braking Action

MAX MANUAL	2465	170/-170	80/115	-145/545	230/-145	65/-65	80	0	575
AUTOBRAKE MAX	2465	170/-170	80/115	-145/545	235/-150	65/-65	85	0	575
AUTOBRAKE 3	2480	175/-175	80/115	-145/545	230/-140	65/-65	90	0	580

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Stabilizer Trim Inoperative (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1035	70/-50	20/25	-30/110	10/-10	20/-20	30	20	40
AUTOBRAKE MAX	1275	60/-60	25/35	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2150	140/-150	60/85	-95/320	20/-30	55/-55	100	45	45

Good Reported Braking Action

MAX MANUAL	1360	70/-70	30/45	-55/190	25/-25	30/-30	45	70	155
AUTOBRAKE MAX	1430	75/-80	35/45	-55/195	25/-20	30/-30	50	75	170
AUTOBRAKE 2	2150	140/-150	60/85	-95/320	20/-30	55/-55	100	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1585	90/-90	40/60	-70/255	50/-40	35/-40	55	130	320
AUTOBRAKE MAX	1625	95/-100	45/60	-70/255	45/-35	35/-40	60	135	325
AUTOBRAKE 2	2175	140/-150	60/85	-100/345	35/-40	55/-60	100	65	130

Medium Reported Braking Action

MAX MANUAL	1805	110/-110	50/70	-85/315	70/-55	40/-45	60	190	480
AUTOBRAKE MAX	1815	115/-115	50/70	-85/315	65/-50	40/-45	70	190	475
AUTOBRAKE 3	1885	115/-115	50/70	-90/325	55/-35	45/-45	90	145	440

Medium To Poor Reported Braking Action

MAX MANUAL	2055	140/-135	60/90	-110/410	125/-85	50/-55	70	305	825
AUTOBRAKE MAX	2060	140/-140	60/90	-110/410	120/-85	50/-55	75	305	825
AUTOBRAKE 3	2095	140/-140	60/90	-110/415	115/-75	50/-55	85	280	805

Poor Reported Braking Action

MAX MANUAL	2305	165/-160	70/105	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE MAX	2305	165/-160	70/105	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE 3	2305	165/-160	70/105	-130/500	175/-110	55/-60	75	415	1170

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (1 ≤ Flap Lever <15)
VREF40 + 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1170	95/-65	25/35	-35/125	10/-10	25/-25	35	25	55
AUTOBRAKE MAX	1550	70/-70	35/50	-50/160	5/-5	35/-35	65	0	5
AUTOBRAKE 2	2645	160/-175	90/125	-110/360	45/-55	75/-70	95	155	160

Good Reported Braking Action

MAX MANUAL	1560	75/-80	40/60	-60/205	30/-25	35/-35	45	85	195
AUTOBRAKE MAX	1690	80/-85	45/65	-60/215	25/-20	40/-40	60	90	215
AUTOBRAKE 2	2650	160/-175	90/125	-110/360	45/-55	75/-70	95	155	160

Good To Medium Reported Braking Action

MAX MANUAL	1835	100/-105	55/80	-80/270	55/-45	45/-45	55	160	395
AUTOBRAKE MAX	1920	105/-110	60/85	-80/280	50/-40	45/-50	65	165	410
AUTOBRAKE 2	2675	165/-180	90/125	-115/385	60/-65	75/-75	95	175	250

Medium Reported Braking Action

MAX MANUAL	2105	125/-125	65/95	-95/335	80/-65	50/-55	60	235	590
AUTOBRAKE MAX	2150	125/-130	70/100	-95/340	75/-60	50/-55	70	240	600
AUTOBRAKE 3	2330	125/-130	70/105	-100/360	50/-35	60/-60	100	135	450

Medium To Poor Reported Braking Action

MAX MANUAL	2405	155/-155	80/120	-120/435	140/-100	60/-65	70	370	1010
AUTOBRAKE MAX	2430	155/-155	85/120	-120/435	135/-95	60/-65	75	370	1010
AUTOBRAKE 3	2540	155/-155	85/125	-120/450	115/-75	65/-70	100	310	930

Poor Reported Braking Action

MAX MANUAL	2705	185/-185	95/140	-140/530	195/-130	70/-75	75	505	1425
AUTOBRAKE MAX	2705	185/-180	95/140	-140/530	195/-130	70/-75	75	500	1420
AUTOBRAKE 3	2745	180/-180	95/140	-140/535	180/-110	70/-75	95	485	1410

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (Flap Lever 15 or 25)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1025	70/-50	20/30	-30/110	10/-10	20/-20	30	20	40
AUTOBRAKE MAX	1275	60/-60	30/40	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2150	140/-150	70/90	-95/320	20/-30	55/-55	100	45	45

Good Reported Braking Action

MAX MANUAL	1360	70/-70	35/50	-55/190	25/-25	30/-30	45	70	155
AUTOBRAKE MAX	1430	75/-80	35/50	-55/195	25/-20	30/-30	50	75	170
AUTOBRAKE 2	2150	140/-150	70/90	-95/320	20/-30	55/-55	100	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1585	90/-90	45/65	-70/255	50/-40	35/-40	55	130	320
AUTOBRAKE MAX	1625	95/-100	45/65	-70/255	45/-35	35/-40	60	135	325
AUTOBRAKE 2	2175	140/-150	70/95	-100/345	35/-40	55/-60	100	65	130

Medium Reported Braking Action

MAX MANUAL	1805	110/-110	55/75	-85/315	70/-55	40/-45	60	190	480
AUTOBRAKE MAX	1815	115/-115	55/80	-85/315	65/-50	40/-45	70	190	475
AUTOBRAKE 3	1885	115/-115	55/80	-90/325	55/-35	45/-45	90	145	440

Medium To Poor Reported Braking Action

MAX MANUAL	2055	140/-135	70/95	-110/410	125/-85	50/-55	70	305	825
AUTOBRAKE MAX	2060	140/-140	70/100	-110/410	120/-85	50/-55	75	305	825
AUTOBRAKE 3	2095	140/-140	70/100	-110/415	115/-75	50/-55	85	280	805

Poor Reported Braking Action

MAX MANUAL	2305	165/-160	80/115	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE MAX	2305	165/-160	80/115	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE 3	2305	165/-160	80/115	-130/500	175/-110	55/-60	75	415	1170

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (Flap Lever 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	995	60/-45	20/25	-30/110	10/-10	15/-15	30	15	35
AUTOBRAKE MAX	1220	55/-60	25/35	-40/135	0/0	25/-25	50	0	0
AUTOBRAKE 2	2035	125/-135	60/85	-90/310	20/-30	50/-50	90	45	45

Good Reported Braking Action

MAX MANUAL	1325	65/-70	30/45	-55/185	25/-25	25/-25	45	65	145
AUTOBRAKE MAX	1390	70/-75	35/50	-55/195	25/-20	30/-30	55	70	155
AUTOBRAKE 2	2035	125/-135	60/85	-90/310	20/-30	50/-50	90	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1530	85/-90	40/60	-70/250	50/-40	35/-35	55	120	285
AUTOBRAKE MAX	1570	90/-95	45/65	-70/255	45/-35	35/-35	60	120	290
AUTOBRAKE 2	2065	130/-140	65/90	-95/335	35/-40	50/-55	90	65	125

Medium Reported Braking Action

MAX MANUAL	1735	105/-105	50/70	-85/310	70/-55	40/-40	60	170	425
AUTOBRAKE MAX	1750	110/-110	50/75	-85/310	65/-50	40/-40	65	170	420
AUTOBRAKE 3	1805	105/-110	50/75	-85/315	55/-35	40/-45	85	135	400

Medium To Poor Reported Braking Action

MAX MANUAL	1965	130/-130	60/90	-105/400	120/-85	45/-50	65	270	715
AUTOBRAKE MAX	1975	130/-130	60/90	-105/400	120/-80	45/-50	70	270	710
AUTOBRAKE 3	2005	130/-130	65/90	-105/400	115/-70	45/-50	85	250	705

Poor Reported Braking Action

MAX MANUAL	2195	150/-150	70/105	-125/485	165/-110	50/-55	70	365	1000
AUTOBRAKE MAX	2200	150/-150	70/105	-125/485	170/-110	50/-55	70	365	1000
AUTOBRAKE 3	2200	155/-150	75/105	-125/485	170/-100	50/-55	80	365	1005

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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Non-Normal Configuration Landing Distance
Trailing Edge Flap Disagree (1 ≤ Indicated Flaps <15)
VREF40 + 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1170	95/-65	25/35	-35/125	10/-10	25/-25	35	25	55
AUTOBRAKE MAX	1550	70/-70	35/50	-50/160	5/-5	35/-35	65	0	5
AUTOBRAKE 2	2645	160/-175	90/125	-110/360	45/-55	75/-70	95	155	160

Good Reported Braking Action

MAX MANUAL	1560	75/-80	40/60	-60/205	30/-25	35/-35	45	85	195
AUTOBRAKE MAX	1690	80/-85	45/65	-60/215	25/-20	40/-40	60	90	215
AUTOBRAKE 2	2650	160/-175	90/125	-110/360	45/-55	75/-70	95	155	160

Good To Medium Reported Braking Action

MAX MANUAL	1835	100/-105	55/80	-80/270	55/-45	45/-45	55	160	395
AUTOBRAKE MAX	1920	105/-110	60/85	-80/280	50/-40	45/-50	65	165	410
AUTOBRAKE 2	2675	165/-180	90/125	-115/385	60/-65	75/-75	95	175	250

Medium Reported Braking Action

MAX MANUAL	2105	125/-125	65/95	-95/335	80/-65	50/-55	60	235	590
AUTOBRAKE MAX	2150	125/-130	70/100	-95/340	75/-60	50/-55	70	240	600
AUTOBRAKE 3	2330	125/-130	70/105	-100/360	50/-35	60/-60	100	135	450

Medium To Poor Reported Braking Action

MAX MANUAL	2405	155/-155	80/120	-120/435	140/-100	60/-65	70	370	1010
AUTOBRAKE MAX	2430	155/-155	85/120	-120/435	135/-95	60/-65	75	370	1010
AUTOBRAKE 3	2540	155/-155	85/125	-120/450	115/-75	65/-70	100	310	930

Poor Reported Braking Action

MAX MANUAL	2705	185/-185	95/140	-140/530	195/-130	70/-75	75	505	1425
AUTOBRAKE MAX	2705	185/-180	95/140	-140/530	195/-130	70/-75	75	500	1420
AUTOBRAKE 3	2745	180/-180	95/140	-140/535	180/-110	70/-75	95	485	1410

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Disagree (15 ≤ Indicated Flaps <30)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1025	70/-50	20/30	-30/110	10/-10	20/-20	30	20	40
AUTOBRAKE MAX	1275	60/-60	30/40	-40/140	0/0	25/-25	55	0	0
AUTOBRAKE 2	2150	140/-150	70/90	-95/320	20/-30	55/-55	100	45	45

Good Reported Braking Action

MAX MANUAL	1360	70/-70	35/50	-55/190	25/-25	30/-30	45	70	155
AUTOBRAKE MAX	1430	75/-80	35/50	-55/195	25/-20	30/-30	50	75	170
AUTOBRAKE 2	2150	140/-150	70/90	-95/320	20/-30	55/-55	100	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1585	90/-90	45/65	-70/255	50/-40	35/-40	55	130	320
AUTOBRAKE MAX	1625	95/-100	45/65	-70/255	45/-35	35/-40	60	135	325
AUTOBRAKE 2	2175	140/-150	70/95	-100/345	35/-40	55/-60	100	65	130

Medium Reported Braking Action

MAX MANUAL	1805	110/-110	55/75	-85/315	70/-55	40/-45	60	190	480
AUTOBRAKE MAX	1815	115/-115	55/80	-85/315	65/-50	40/-45	70	190	475
AUTOBRAKE 3	1885	115/-115	55/80	-90/325	55/-35	45/-45	90	145	440

Medium To Poor Reported Braking Action

MAX MANUAL	2055	140/-135	70/95	-110/410	125/-85	50/-55	70	305	825
AUTOBRAKE MAX	2060	140/-140	70/100	-110/410	120/-85	50/-55	75	305	825
AUTOBRAKE 3	2095	140/-140	70/100	-110/415	115/-75	50/-55	85	280	805

Poor Reported Braking Action

MAX MANUAL	2305	165/-160	80/115	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE MAX	2305	165/-160	80/115	-130/500	175/-115	55/-60	75	415	1170
AUTOBRAKE 3	2305	165/-160	80/115	-130/500	175/-110	55/-60	75	415	1170

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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Non-Normal Configuration Landing Distance

Trailing Edge Flap Disagree (30 ≤ Indicated Flaps <40)

VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	995	60/-45	20/25	-30/110	10/-10	15/-15	30	15	35
AUTOBRAKE MAX	1220	55/-60	25/35	-40/135	0/0	25/-25	50	0	0
AUTOBRAKE 2	2035	125/-135	60/85	-90/310	20/-30	50/-50	90	45	45

Good Reported Braking Action

MAX MANUAL	1325	65/-70	30/45	-55/185	25/-25	25/-25	45	65	145
AUTOBRAKE MAX	1390	70/-75	35/50	-55/195	25/-20	30/-30	55	70	155
AUTOBRAKE 2	2035	125/-135	60/85	-90/310	20/-30	50/-50	90	45	45

Good To Medium Reported Braking Action

MAX MANUAL	1530	85/-90	40/60	-70/250	50/-40	35/-35	55	120	285
AUTOBRAKE MAX	1570	90/-95	45/65	-70/255	45/-35	35/-35	60	120	290
AUTOBRAKE 2	2065	130/-140	65/90	-95/335	35/-40	50/-55	90	65	125

Medium Reported Braking Action

MAX MANUAL	1735	105/-105	50/70	-85/310	70/-55	40/-40	60	170	425
AUTOBRAKE MAX	1750	110/-110	50/75	-85/310	65/-50	40/-40	65	170	420
AUTOBRAKE 3	1805	105/-110	50/75	-85/315	55/-35	40/-45	85	135	400

Medium To Poor Reported Braking Action

MAX MANUAL	1965	130/-130	60/90	-105/400	120/-85	45/-50	65	270	715
AUTOBRAKE MAX	1975	130/-130	60/90	-105/400	120/-80	45/-50	70	270	710
AUTOBRAKE 3	2005	130/-130	65/90	-105/400	115/-70	45/-50	85	250	705

Poor Reported Braking Action

MAX MANUAL	2195	150/-150	70/105	-125/485	165/-110	50/-55	70	365	1000
AUTOBRAKE MAX	2200	150/-150	70/105	-125/485	170/-110	50/-55	70	365	1000
AUTOBRAKE 3	2200	155/-150	75/105	-125/485	170/-100	50/-55	80	365	1005

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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Non-Normal Configuration Landing Distance
Trailing Edge Flaps Up Landing
VREF40 + 40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	60000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 60000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1235	115/-65	30/45	-40/130	10/-10	25/-25	40	30	60
AUTOBRAKE MAX	1680	80/-75	40/55	-50/170	5/-5	40/-40	65	0	5
AUTOBRAKE 2	2845	175/-190	100/135	-110/375	60/-65	80/-80	90	215	250

Good Reported Braking Action

MAX MANUAL	1630	80/-85	45/60	-60/205	30/-30	35/-35	45	90	200
AUTOBRAKE MAX	1805	80/-85	50/70	-65/220	25/-20	40/-40	65	75	195
AUTOBRAKE 2	2845	175/-190	100/135	-110/375	60/-65	80/-80	90	215	250

Good To Medium Reported Braking Action

MAX MANUAL	1920	105/-110	60/80	-80/275	55/-50	45/-45	55	170	410
AUTOBRAKE MAX	2040	105/-110	65/90	-85/285	50/-40	50/-50	65	165	415
AUTOBRAKE 2	2870	175/-190	100/140	-115/400	75/-75	80/-80	90	235	335

Medium Reported Braking Action

MAX MANUAL	2205	130/-135	70/100	-95/345	80/-65	55/-55	60	245	615
AUTOBRAKE MAX	2275	130/-135	75/105	-100/350	75/-60	55/-60	65	255	630
AUTOBRAKE 3	2535	130/-145	80/110	-105/375	50/-45	65/-70	100	130	420

Medium To Poor Reported Braking Action

MAX MANUAL	2530	160/-165	90/125	-120/445	140/-100	65/-70	70	390	1055
AUTOBRAKE MAX	2565	160/-165	90/130	-125/445	135/-95	65/-70	75	390	1055
AUTOBRAKE 3	2740	160/-170	95/130	-125/465	115/-80	70/-75	100	305	935

Poor Reported Braking Action

MAX MANUAL	2850	190/-190	105/150	-145/540	195/-135	75/-80	75	530	1490
AUTOBRAKE MAX	2855	190/-190	105/150	-145/540	195/-125	75/-80	80	525	1480
AUTOBRAKE 3	2940	185/-190	105/150	-145/550	175/-115	75/-80	100	475	1445

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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Recommended Brake Cooling Schedule
Reference Brake Energy Per Brake (Millions of Foot Pounds)

		WIND CORRECTED BRAKES ON SPEED (KIAS)*																	
		80			100			120			140			160			180		
WEIGHT (1000 KG)	OAT (°C)	PRESSURE ALTITUDE (1000 FT)																	
		0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10
80	0	15.3	17.2	19.4	22.9	25.8	29.3	31.7	35.8	40.9	41.5	47.1	54.2	52.2	59.6	69.0	62.4	71.4	83.3
	10	15.8	17.7	20.0	23.6	26.6	30.2	32.7	37.0	42.2	42.8	48.7	55.9	53.9	61.5	71.2	64.4	73.7	86.0
	15	16.0	18.0	20.3	24.0	27.1	30.7	33.2	37.6	42.9	43.5	49.4	56.8	54.7	62.4	72.3	65.3	74.8	87.3
	20	16.3	18.3	20.6	24.4	27.5	31.1	33.7	38.1	43.5	44.1	50.1	57.6	55.6	63.4	73.4	66.3	75.9	88.6
	30	16.7	18.8	21.2	25.0	28.2	32.0	34.6	39.2	44.7	45.4	51.5	59.3	57.1	65.1	75.4	68.2	78.0	91.0
	40	16.8	18.9	21.3	25.2	28.5	32.3	35.0	39.6	45.3	46.0	52.3	60.2	58.0	66.3	77.0	69.5	79.7	93.3
50	16.8	19.0	21.4	25.3	28.6	32.5	35.2	40.0	45.8	46.4	52.9	61.1	58.8	67.4	78.5	70.7	81.3	95.6	
70	0	13.9	15.6	17.6	20.6	23.3	26.3	28.4	32.1	36.5	37.1	42.1	48.2	46.6	53.0	61.2	56.4	64.4	74.8
	10	14.4	16.2	18.2	21.3	24.0	27.2	29.3	33.1	37.7	38.3	43.4	49.7	48.1	54.7	63.1	58.2	66.5	77.2
	15	14.6	16.4	18.5	21.6	24.4	27.6	29.8	33.6	38.3	38.9	44.1	50.2	48.8	55.6	64.1	59.1	67.5	78.4
	20	14.8	16.7	18.8	22.0	24.8	28.0	30.2	34.2	38.9	39.5	44.7	51.3	49.5	56.4	65.1	60.0	68.5	79.6
	30	15.2	17.1	19.3	22.6	25.5	28.8	31.1	35.1	40.0	40.6	46.0	52.7	50.9	58.0	66.9	61.6	70.4	81.8
	40	15.3	17.2	19.4	22.7	25.6	29.1	31.3	35.5	40.4	41.0	46.6	53.5	51.7	58.9	68.1	62.7	71.8	83.6
50	15.3	17.2	19.4	22.8	25.8	29.2	31.5	35.7	40.8	41.4	47.1	54.2	52.3	59.7	69.3	63.7	73.1	85.4	
60	0	12.6	14.1	15.9	18.4	20.7	23.4	25.1	28.3	32.2	32.5	36.9	42.1	40.7	46.3	53.1	49.6	56.5	65.3
	10	13.0	14.6	16.4	19.0	21.4	24.2	25.9	29.2	33.2	33.6	38.0	43.4	42.0	47.7	54.9	51.2	58.3	67.4
	15	13.2	14.8	16.6	19.3	21.7	24.6	26.3	29.7	33.7	34.1	38.6	44.1	42.7	48.5	55.7	51.9	59.2	68.4
	20	13.4	15.0	16.9	19.6	22.1	24.9	26.7	30.1	34.2	34.6	39.2	44.8	43.3	49.2	56.5	52.7	60.1	69.5
	30	13.7	15.4	17.4	20.1	22.7	25.6	27.4	31.0	35.2	35.6	40.3	46.0	44.5	50.6	58.1	54.2	61.7	71.4
	40	13.8	15.5	17.5	20.3	22.8	25.8	27.7	31.3	35.6	36.0	40.8	46.6	45.1	51.3	59.0	55.0	62.8	72.8
50	13.8	15.5	17.5	20.3	22.9	25.9	27.8	31.5	35.8	36.2	41.1	47.1	45.6	51.9	59.9	55.7	63.8	74.2	
50	0	11.2	12.6	14.1	16.2	18.2	20.5	21.8	24.6	27.9	28.0	31.7	36.1	34.8	39.5	45.1	42.1	47.9	55.1
	10	11.6	13.0	14.6	16.7	18.8	21.2	22.5	25.4	28.8	28.9	32.7	37.2	35.9	40.7	46.6	43.5	49.4	56.8
	15	11.7	13.2	14.8	16.9	19.1	21.5	22.8	25.8	29.2	29.4	33.2	37.8	36.5	41.4	47.3	44.2	50.2	57.7
	20	11.9	13.4	15.1	17.2	19.4	21.9	23.2	26.2	29.6	29.8	33.7	38.4	37.0	42.0	48.0	44.8	50.9	58.6
	30	12.3	13.8	15.5	17.7	19.9	22.5	23.8	26.9	30.5	30.7	34.7	39.4	38.1	43.2	49.4	46.1	52.4	60.2
	40	12.3	13.8	15.6	17.8	20.0	22.6	24.0	27.1	30.7	30.9	35.0	39.9	38.5	43.7	50.0	46.7	53.1	61.2
50	12.3	13.8	15.6	17.8	20.1	22.7	24.1	27.2	30.9	31.1	35.2	40.2	38.8	44.1	50.6	47.2	53.8	62.1	
40	0	9.9	11.1	12.5	14.0	15.7	17.7	18.5	20.8	23.5	23.5	26.5	30.1	28.9	32.7	37.3	34.8	39.4	45.1
	10	10.2	11.5	12.9	14.4	16.2	18.2	19.1	21.5	24.3	24.3	27.4	31.1	29.9	33.8	38.5	35.9	40.7	46.5
	15	10.4	11.7	13.1	14.6	16.5	18.5	19.4	21.8	24.7	24.6	27.8	31.5	30.3	34.3	39.1	36.4	41.3	47.2
	20	10.6	11.9	13.3	14.9	16.7	18.8	19.7	22.2	25.1	25.0	28.2	32.0	30.8	34.8	39.7	37.0	41.9	47.9
	30	10.9	12.2	13.7	15.3	17.2	19.3	20.2	22.8	25.8	25.7	29.0	32.9	31.7	35.8	40.8	38.0	43.1	49.3
	40	10.9	12.2	13.7	15.3	17.3	19.5	20.4	22.9	26.0	25.9	29.3	33.2	31.9	36.2	41.2	38.4	43.6	50.0
50	10.9	12.2	13.8	15.4	17.3	19.5	20.4	23.0	26.1	26.0	29.4	33.4	32.1	36.4	41.6	38.7	44.0	50.5	

*To correct for wind, enter table with the brakes on speed minus one half the headwind or plus 1.5 times the tailwind. If ground speed is used for brakes on speed, ignore wind and enter table with sea level, 15°C.

Adjusted Brake Energy Per Brake (Millions of Foot Pounds)
No Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
EVENT		10	20	30	40	50	60	70	80	90
RTO MAX MAN		10	20	30	40	50	60	70	80	90
LANDING	MAX MAN	7.5	15.8	24.6	33.8	43.5	53.5	63.6	73.9	84.2
	MAX AUTO	7.3	15.0	23.2	31.9	41.2	51.0	61.3	72.2	83.7
	AUTOBRAKE 3	7.0	14.2	21.8	29.7	38.1	47.1	56.7	67.1	78.3
	AUTOBRAKE 2	6.6	13.3	20.2	27.3	34.7	42.6	51.0	59.9	69.6
	AUTOBRAKE 1	6.3	12.4	18.6	24.9	31.6	38.6	46.2	54.4	63.5

Two Engine Detent Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
EVENT		10	20	30	40	50	60	70	80	90
RTO MAX MAN		10	20	30	40	50	60	70	80	90
LANDING	MAX MAN	6.9	14.5	22.7	31.4	40.4	49.7	59.3	68.9	78.5
	MAX AUTO	6.0	12.6	19.8	27.6	36.0	45.1	54.8	65.3	76.5
	AUTOBRAKE 3	4.5	9.5	15.1	21.3	28.1	35.6	43.7	52.5	62.0
	AUTOBRAKE 2	2.6	5.9	9.7	14.1	19.1	24.7	31.0	37.9	45.4
	AUTOBRAKE 1	1.8	3.8	6.3	9.1	12.5	16.4	21.0	26.3	32.5



737-700/-800/BCF Quick Reference Handbook

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Cooling Time (Minutes) - Category A Steel and Carbon Brakes

Braking data presented for the steel brakes is applicable to the corresponding Category M carbon brakes.

EVENT ADJUSTED BRAKE ENERGY (MILLIONS OF FOOT POUNDS)									
16 & BELOW	17	19	20.9	23.5	26.9	29.4	30 TO 41	41 & ABOVE	
BRAKE TEMPERATURE MONITOR SYSTEM INDICATION ON CDS									
UP TO 2.5	2.6	3	3.3	3.8	4.5	4.9	5.0 TO 7.1	7.1 & ABOVE	
INFLIGHT GEAR DOWN GROUND	NO SPECIAL PROCEDURE REQUIRED	1	4	5	6	7	7.6	CAUTION	FUSE PLUG MELT ZONE
		6.7	16.0	24.1	34.2	45.9	53.3		

Observe maximum quick turnaround limit.

Table shows energy per brake added by a single stop with all brakes operating. Energy is assumed to be equally distributed among the operating brakes. Total energy is the sum of residual energy plus energy added.

Add 1.0 million foot pounds per brake for each taxi mile.

When in caution zone, wheel fuse plugs may melt. Delay takeoff and inspect after one hour. If overheat occurs after takeoff, extend gear soon for at least 7 minutes.

When in fuse plug melt zone, clear runway immediately. Unless required, do not set parking brake. Do not approach gear or attempt to taxi for one hour. Tire, wheel and brake replacement may be required. If overheat occurs after takeoff, extend gear soon for at least 12 minutes.

Brake temperature monitor system (BTMS) indication on CDS systems page may be used 10 to 15 minutes after airplane has come to a complete stop or inflight with gear retracted to determine recommended cooling schedule.



Intentionally
Blank



Performance Inflight - QRH
Engine Inoperative

Chapter PI-QRH
Section 12

ENGINE INOP

Initial Max Continuous %N1
Based on .79M, A/C high and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)								
	25	27	29	31	33	35	37	39	41
20	96.0	95.8	95.6	95.4	95.1	94.7	94.2	93.9	93.1
15	96.6	96.4	96.1	96.0	95.9	95.4	95.0	94.7	94.0
10	97.2	97.1	96.7	96.6	96.6	96.2	95.7	95.5	94.9
5	97.4	97.8	97.5	97.3	97.3	96.9	96.5	96.3	95.8
0	96.7	98.0	98.4	98.2	98.1	97.7	97.4	97.1	96.7
-5	95.9	97.2	98.4	99.1	99.0	98.5	98.2	98.0	97.7
-10	95.1	96.4	97.6	98.9	99.8	99.4	99.1	98.9	98.6
-15	94.3	95.7	96.9	98.1	99.4	100.3	100.0	99.8	99.6
-20	93.5	94.9	96.1	97.3	98.6	99.8	100.3	100.1	99.9
-25	92.7	94.1	95.3	96.5	97.8	98.9	99.5	99.3	99.1
-30	91.8	93.3	94.5	95.7	96.9	98.1	98.6	98.4	98.2
-35	91.0	92.5	93.6	94.8	96.1	97.2	97.8	97.6	97.4
-40	90.1	91.7	92.8	94.0	95.3	96.4	96.9	96.7	96.5

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)								
	25	27	29	31	33	35	37	39	41
ENGINE ANTI-ICE	-1.2	-1.1	-1.0	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE	-4.2	-4.4	-4.5	-4.7	-5.0	-4.8	-4.8	-4.8	-4.8

ENGINE INOP

Max Continuous %N1
37000 FT to 29000 FT Pressure Altitudes

37000 FT PRESS ALT													TAT (°C)	
KIAS	M	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	
160	.51	96.0	96.9	97.8	98.7	99.5	98.9	98.0	96.8	95.5	93.9	92.4	91.1	
200	.63	95.3	96.2	97.1	98.0	98.8	99.7	99.4	98.6	97.7	96.7	95.5	94.4	
240	.74	94.4	95.3	96.1	97.0	97.9	98.7	99.6	100.0	99.2	98.4	97.6	96.6	
280	.86	93.6	94.5	95.4	96.3	97.1	98.0	98.8	99.6	100.4	100.1	99.2	98.4	
35000 FT PRESS ALT													TAT (°C)	
KIAS	M	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	
160	.49	95.8	96.7	97.6	98.5	99.4	99.1	98.3	97.2	96.0	94.6	93.2	92.0	
200	.60	95.4	96.4	97.2	98.1	99.0	99.9	99.8	98.8	97.9	96.9	95.7	94.6	
240	.71	94.3	95.2	96.1	97.0	97.9	98.7	99.6	100.1	99.4	98.8	97.9	96.9	
280	.82	93.1	94.0	94.8	95.7	96.5	97.4	98.2	99.0	99.8	99.6	98.8	98.0	
33000 FT PRESS ALT													TAT (°C)	
KIAS	M	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	
160	.47	96.7	97.6	98.4	99.3	100.1	99.3	98.4	97.2	95.9	94.5	93.1	91.9	
200	.58	96.3	97.2	98.1	99.0	99.8	100.7	99.8	98.9	97.9	96.7	95.5	94.4	
240	.68	95.2	96.1	97.0	97.8	98.7	99.5	100.4	100.1	99.5	98.6	97.6	96.6	
280	.79	93.6	94.4	95.3	96.1	97.0	97.8	98.6	99.4	99.8	99.0	98.1	97.3	
320	.89	92.9	93.8	94.7	95.5	96.3	97.2	98.0	98.8	99.6	100.3	100.0	99.1	
31000 FT PRESS ALT													TAT (°C)	
KIAS	M	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	
160	.45	96.7	97.5	98.4	99.3	100.2	100.3	99.5	98.4	97.2	95.8	94.4	93.1	
200	.55	96.4	97.3	98.1	99.0	99.9	100.7	100.9	100.0	99.0	97.9	96.6	95.4	
240	.66	94.9	95.8	96.7	97.5	98.4	99.2	100.1	100.6	99.8	99.0	98.0	97.0	
280	.76	93.1	94.0	94.8	95.6	96.5	97.3	98.1	98.9	99.7	99.0	98.1	97.2	
320	.85	91.7	92.5	93.4	94.2	95.0	95.8	96.6	97.4	98.2	99.0	99.2	98.3	
29000 FT PRESS ALT													TAT (°C)	
KIAS	M	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	
160	.43	97.4	98.3	99.2	100.0	100.9	100.5	99.5	98.4	97.1	95.6	94.3	93.0	
200	.53	96.8	97.7	98.6	99.4	100.3	101.1	100.6	99.6	98.6	97.4	96.2	95.0	
240	.63	95.6	96.4	97.3	98.1	99.0	99.8	100.6	100.3	99.4	98.5	97.4	96.5	
280	.73	93.5	94.3	95.2	96.0	96.8	97.6	98.4	99.2	99.3	98.4	97.4	96.7	
320	.82	91.3	92.2	93.0	93.8	94.6	95.4	96.2	97.0	97.7	98.5	97.7	96.9	
360	.91	91.3	92.2	93.0	93.8	94.6	95.4	96.2	97.0	97.7	98.5	99.2	99.3	

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	29	31	33	35	37
ENGINE ANTI-ICE ON	-0.9	-0.9	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE ON	-4.1	-4.3	-4.5	-4.7	-4.7

ENGINE INOP

Max Continuous %N1
27000 FT to 20000 FT Pressure Altitudes

27000 FT PRESS ALT			TAT (°C)										
KIAS	M	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
160	.41	97.3	98.1	99.0	99.9	100.7	101.5	100.5	99.5	98.3	96.9	95.6	94.3
200	.51	96.2	97.1	98.0	98.8	99.7	100.5	101.0	100.1	99.1	98.0	96.8	95.6
240	.60	94.9	95.8	96.7	97.5	98.3	99.2	100.0	100.6	99.6	98.6	97.6	96.7
280	.70	92.9	93.7	94.6	95.4	96.2	97.0	97.8	98.6	99.4	98.6	97.6	96.8
320	.79	90.8	91.6	92.5	93.3	94.1	94.9	95.6	96.4	97.2	97.9	97.8	97.1
360	.88	90.0	90.9	91.7	92.5	93.4	94.2	95.0	95.7	96.5	97.3	98.0	98.6
25000 FT PRESS ALT			TAT (°C)										
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
160	.39	98.1	98.9	99.8	100.7	101.5	101.6	100.6	99.5	98.3	96.9	95.7	94.4
200	.49	96.7	97.6	98.5	99.3	100.1	100.9	100.8	99.8	98.8	97.6	96.5	95.4
240	.58	95.0	95.8	96.7	97.5	98.3	99.1	99.9	99.7	98.8	97.8	96.8	95.9
280	.67	93.1	94.0	94.8	95.6	96.4	97.2	98.0	98.7	98.8	97.8	96.8	96.1
320	.76	90.8	91.7	92.5	93.3	94.1	94.9	95.7	96.5	97.2	97.8	97.1	96.4
360	.85	89.5	90.3	91.2	92.0	92.9	93.7	94.5	95.3	96.1	96.9	97.6	97.4
24000 FT PRESS ALT			TAT (°C)										
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
160	.38	97.3	98.2	99.1	99.9	100.7	101.5	100.4	99.3	98.1	96.8	95.6	94.4
200	.48	96.1	96.9	97.8	98.6	99.4	100.2	100.6	99.6	98.6	97.4	96.3	95.3
240	.57	94.5	95.3	96.1	96.9	97.8	98.6	99.3	99.7	98.7	97.6	96.7	95.8
280	.66	92.7	93.5	94.3	95.1	95.9	96.7	97.5	98.3	98.8	97.7	96.7	96.0
320	.75	90.2	91.1	91.9	92.7	93.5	94.4	95.2	95.9	96.7	97.5	96.9	96.2
360	.83	88.7	89.6	90.4	91.2	92.1	92.9	93.7	94.5	95.3	96.1	96.9	96.9
22000 FT PRESS ALT			TAT (°C)										
KIAS	M	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
160	.37	96.7	97.6	98.4	99.2	100.1	100.2	99.0	97.8	96.6	95.5	94.4	93.3
200	.46	95.5	96.4	97.2	98.0	98.8	99.6	99.3	98.1	97.0	96.0	95.0	94.0
240	.55	94.1	94.9	95.8	96.5	97.3	98.1	98.9	98.5	97.3	96.4	95.5	94.7
280	.63	92.5	93.3	94.1	94.9	95.7	96.4	97.2	97.9	97.6	96.7	95.8	95.1
320	.72	90.1	91.0	91.8	92.7	93.5	94.3	95.1	95.9	96.7	96.8	96.0	95.3
360	.80	88.4	89.2	90.1	90.9	91.7	92.6	93.4	94.2	95.0	95.8	96.3	95.8
20000 FT PRESS ALT			TAT (°C)										
KIAS	M	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
160	.35	95.3	96.1	97.0	97.8	98.6	99.4	98.8	97.4	96.2	95.2	94.2	93.2
200	.44	94.2	95.0	95.8	96.6	97.4	98.2	98.9	97.8	96.4	95.5	94.6	93.7
240	.53	92.8	93.6	94.4	95.2	96.0	96.8	97.5	98.2	97.0	95.9	95.1	94.3
280	.61	91.1	92.0	92.8	93.6	94.4	95.2	96.0	96.8	97.4	96.5	95.6	94.9
320	.69	89.1	90.0	90.8	91.6	92.5	93.3	94.1	94.9	95.7	96.5	95.8	95.1
360	.77	87.4	88.3	89.1	90.0	90.8	91.6	92.4	93.2	94.0	94.8	95.6	95.4

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	20	22	24	25	27
ENGINE ANTI-ICE ON	-0.9	-0.9	-1.0	-1.0	-1.0
ENGINE & WING ANTI-ICE ON	-3.6	-3.8	-3.8	-3.9	-4.0

ENGINE INOP

Max Continuous %N1
18000 FT to 12000 FT Pressure Altitudes

18000 FT PRESS ALT												TAT (°C)	
KLAS	M	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
160	.34	94.5	95.3	96.1	96.9	97.7	98.4	97.3	95.9	94.9	94.0	93.0	92.1
200	.42	93.4	94.2	95.0	95.8	96.6	97.3	97.6	96.3	95.2	94.4	93.5	92.6
240	.51	91.9	92.7	93.5	94.3	95.1	95.9	96.7	96.7	95.6	94.7	94.0	93.2
280	.59	90.4	91.3	92.1	92.9	93.8	94.6	95.4	96.1	96.1	95.2	94.4	93.7
320	.67	88.9	89.7	90.5	91.4	92.2	93.0	93.8	94.6	95.4	95.5	94.8	94.1
360	.75	87.3	88.2	89.0	89.8	90.7	91.5	92.3	93.1	93.9	94.7	95.1	94.5
16000 FT PRESS ALT												TAT (°C)	
KLAS	M	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
160	.33	93.0	93.8	94.6	95.4	96.1	96.9	97.2	96.0	94.8	94.0	93.1	92.2
200	.41	91.6	92.4	93.2	94.0	94.8	95.6	96.4	96.1	95.0	94.1	93.3	92.5
240	.49	90.3	91.1	92.0	92.8	93.6	94.4	95.2	96.0	95.4	94.5	93.7	92.9
280	.57	89.0	89.9	90.7	91.5	92.4	93.2	94.0	94.8	95.6	94.9	94.1	93.4
320	.64	87.8	88.6	89.5	90.3	91.1	91.9	92.7	93.5	94.3	95.1	94.5	93.8
360	.72	86.5	87.3	88.2	89.0	89.8	90.6	91.4	92.2	93.0	93.8	94.6	94.2
14000 FT PRESS ALT												TAT (°C)	
KLAS	M	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
160	.31	92.4	93.2	94.1	94.9	95.7	96.4	96.4	95.5	94.6	93.8	92.9	92.0
200	.39	91.0	91.9	92.7	93.5	94.3	95.1	95.9	95.1	94.2	93.4	92.6	91.8
240	.47	90.0	90.9	91.7	92.5	93.3	94.1	94.9	95.4	94.6	93.7	93.0	92.3
280	.54	88.9	89.8	90.6	91.4	92.3	93.1	93.9	94.7	94.9	94.1	93.4	92.7
320	.62	87.8	88.7	89.5	90.3	91.2	92.0	92.8	93.5	94.3	94.5	93.8	93.1
360	.69	86.7	87.5	88.3	89.1	90.0	90.8	91.5	92.3	93.1	93.9	94.2	93.6
12000 FT PRESS ALT												TAT (°C)	
KLAS	M	-20	-15	-10	-5	0	5	10	15	20	25	30	35
160	.30	91.8	92.6	93.4	94.2	95.0	95.8	95.5	94.8	94.0	93.2	92.4	91.5
200	.38	90.7	91.5	92.3	93.1	93.9	94.7	95.2	94.3	93.5	92.7	92.0	91.2
240	.45	89.8	90.7	91.5	92.3	93.1	93.9	94.7	94.7	93.8	93.1	92.4	91.6
280	.52	88.9	89.8	90.6	91.4	92.2	93.0	93.8	94.6	94.2	93.5	92.8	92.1
320	.60	87.9	88.8	89.6	90.4	91.2	92.0	92.8	93.6	94.3	93.9	93.2	92.5
360	.67	86.8	87.7	88.5	89.3	90.1	90.9	91.6	92.4	93.2	93.9	93.5	92.9

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)			
	12	14	16	18
ENGINE ANTI-ICE ON	-0.9	-0.9	-0.9	-0.9
ENGINE & WING ANTI-ICE ON	-3.2	-3.4	-3.4	-3.5

ENGINE INOP

Max Continuous %N1
10000 FT to 1000 FT Pressure Altitudes

10000 FT PRESS ALT			TAT (°C)										
KIAS	M	-20	-15	-10	-5	0	5	10	15	20	25	30	35
160	.29	90.5	91.4	92.2	93.0	93.8	94.6	95.4	94.7	94.1	93.3	92.5	91.7
200	.36	89.6	90.4	91.3	92.1	92.9	93.7	94.5	94.5	93.7	92.9	92.2	91.4
240	.43	88.9	89.7	90.6	91.4	92.2	93.0	93.8	94.5	94.0	93.1	92.4	91.7
280	.51	88.1	89.0	89.8	90.6	91.4	92.2	93.0	93.8	94.4	93.6	92.8	92.2
320	.58	87.2	88.0	88.8	89.6	90.4	91.2	92.0	92.8	93.5	93.9	93.2	92.5
360	.65	86.2	87.0	87.8	88.6	89.4	90.2	91.0	91.7	92.5	93.2	93.6	92.9
5000 FT PRESS ALT			TAT (°C)										
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40	45
160	.26	89.1	89.9	90.7	91.5	92.3	93.1	93.7	93.5	93.2	92.5	91.8	91.0
200	.33	88.7	89.5	90.3	91.1	91.8	92.6	93.4	93.3	92.9	92.3	91.6	90.8
240	.40	88.1	88.9	89.7	90.5	91.3	92.0	92.8	93.3	92.5	91.8	91.1	90.3
280	.46	87.5	88.3	89.1	89.8	90.6	91.4	92.2	92.9	92.9	92.1	91.4	90.7
320	.53	86.8	87.6	88.3	89.1	89.9	90.7	91.4	92.2	92.9	92.5	91.8	91.1
360	.59	86.0	86.7	87.5	88.3	89.1	89.8	90.6	91.3	92.0	92.8	92.2	91.5
3000 FT PRESS ALT			TAT (°C)										
KIAS	M	-5	0	5	10	15	20	25	30	35	40	45	50
160	.26	88.8	89.6	90.4	91.2	91.9	92.7	93.1	92.9	92.6	91.8	91.1	90.3
200	.32	88.5	89.3	90.0	90.8	91.6	92.3	93.1	92.8	92.5	91.8	91.1	90.3
240	.38	87.9	88.7	89.5	90.3	91.0	91.8	92.5	92.6	91.8	91.0	90.3	89.6
280	.45	87.4	88.1	88.9	89.7	90.5	91.2	92.0	92.7	92.2	91.4	90.7	90.0
320	.51	86.7	87.5	88.3	89.0	89.8	90.5	91.3	92.0	92.5	91.8	91.1	90.4
360	.57	85.9	86.7	87.5	88.2	89.0	89.7	90.5	91.2	91.9	92.2	91.5	90.7
1000 FT PRESS ALT			TAT (°C)										
KIAS	M	-5	0	5	10	15	20	25	30	35	40	45	50
160	.25	87.7	88.5	89.3	90.0	90.8	91.6	92.3	92.3	91.8	91.2	90.5	89.7
200	.31	87.4	88.2	89.0	89.7	90.5	91.3	92.0	92.4	92.0	91.5	90.8	90.0
240	.37	86.9	87.7	88.5	89.3	90.0	90.8	91.5	92.3	91.9	91.2	90.4	89.7
280	.43	86.4	87.2	87.9	88.7	89.5	90.2	90.9	91.7	92.1	91.4	90.7	89.9
320	.49	85.8	86.6	87.4	88.1	88.9	89.6	90.4	91.1	91.8	91.8	91.1	90.3
360	.55	85.1	85.9	86.7	87.4	88.1	88.9	89.6	90.3	91.1	91.8	91.4	90.7

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)			
	1	3	5	10
ENGINE ANTI-ICE ON	-0.6	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE ON	-2.9	-3.0	-3.1	-3.2

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude
100 ft/min residual rate of climb

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFTDOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
80	76	261	16000	13800	11500
75	71	253	18600	16600	14100
70	67	245	21100	19500	17200
65	62	237	23600	22200	20400
60	57	228	26000	24900	23500
55	53	219	28300	27300	26200
50	48	209	30500	29700	28600
45	43	198	32700	31900	31000
40	38	187	35000	34300	33400
35	33	175	37600	36900	36100
30	29	162	40700	39900	39100

Includes APU fuel burn.

ENGINE INOP

MAX CONTINUOUS THRUST

**Driftdown/LRC Cruise Range Capability
Ground to Air Miles Conversion**

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
140	129	120	113	106	100	95	90	85	82	78
279	259	241	226	212	200	189	180	171	163	156
418	388	361	338	318	300	284	270	256	245	234
558	517	482	451	424	400	379	359	342	326	312
697	646	602	564	530	500	473	449	428	408	390
836	775	722	676	636	600	568	539	513	490	468
975	904	843	789	742	700	663	629	599	571	546
1114	1033	963	902	848	800	757	719	684	653	624
1253	1162	1083	1014	954	900	852	809	770	734	702
1392	1291	1204	1127	1060	1000	947	899	855	816	780
1532	1420	1324	1240	1166	1100	1041	989	941	898	858
1671	1550	1444	1353	1272	1200	1136	1078	1026	979	936
1811	1679	1565	1465	1378	1300	1231	1168	1112	1061	1014
1951	1809	1686	1578	1484	1400	1325	1258	1197	1142	1092
2091	1938	1806	1691	1590	1500	1420	1348	1283	1223	1169
2231	2068	1927	1804	1696	1600	1514	1437	1368	1305	1247
2372	2198	2048	1917	1802	1700	1609	1527	1453	1386	1325
2513	2329	2169	2030	1908	1800	1703	1617	1538	1467	1402

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 KG)								TIME (HR:MIN)
	WEIGHT AT START OF DRIFTDOWN (1000 KG)								
	35	40	45	50	55	60	65	70	
100	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0:17
200	0.7	0.8	0.8	0.9	0.9	1.0	1.1	1.1	0:34
300	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	0:51
400	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.5	1:08
500	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.2	1:24
600	2.3	2.5	2.7	3.0	3.2	3.4	3.7	3.9	1:41
700	2.6	2.9	3.2	3.4	3.7	4.0	4.3	4.6	1:58
800	3.0	3.3	3.6	3.9	4.2	4.6	4.9	5.2	2:15
900	3.3	3.7	4.0	4.4	4.8	5.1	5.5	5.9	2:32
1000	3.7	4.1	4.5	4.9	5.3	5.7	6.1	6.5	2:49
1100	4.0	4.5	4.9	5.4	5.8	6.2	6.7	7.1	3:06
1200	4.4	4.8	5.3	5.8	6.3	6.8	7.3	7.8	3:23
1300	4.7	5.2	5.8	6.3	6.8	7.3	7.9	8.4	3:40
1400	5.0	5.6	6.2	6.7	7.3	7.9	8.4	9.0	3:57
1500	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.7	4:14
1600	5.7	6.3	7.0	7.6	8.3	8.9	9.6	10.3	4:31
1700	6.0	6.7	7.4	8.1	8.8	9.4	10.1	10.9	4:48
1800	6.4	7.1	7.8	8.5	9.2	10.0	10.7	11.5	5:05

Includes APU fuel burn.

Driftdown at optimum driftdown speed and cruise at LRC speed.



ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
80	10000	7400	4800
75	12800	10300	7800
70	15800	13300	10800
65	19900	16600	13800
60	23200	20500	17600
55	26100	24500	21700
50	28900	27600	25800
45	31300	30400	29100
40	33700	32900	31800
35	36300	35600	34500
30	39400	38500	37500

With engine anti-ice on, decrease altitude capability by 2000 ft.
With engine and wing anti-ice on, decrease altitude capability by 7000 ft.



737-700/-800/BCF Quick Reference Handbook

ENGINE INOP

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)									
		10	15	17	19	21	23	25	27	29	31
75	%N1	88.5	92.6								
	MACH	.528	.579								
	KIAS	293	293								
	FF/ENG	2693	2723								
70	%N1	86.6	90.8	92.5	94.2						
	MACH	.510	.562	.582	.595						
	KIAS	282	284	283	278						
	FF/ENG	2499	2529	2532	2500						
65	%N1	84.5	88.8	90.5	92.3	94.2					
	MACH	.491	.542	.563	.584	.596					
	KIAS	271	274	274	273	268					
	FF/ENG	2306	2334	2339	2341	2313					
60	%N1	82.3	86.6	88.4	90.1	92.0	94.0	96.8			
	MACH	.471	.521	.543	.564	.585	.597	.614			
	KIAS	261	263	263	263	258	258	254			
	FF/ENG	2120	2141	2145	2148	2152	2131	2175			
55	%N1	80.0	84.2	86.0	87.8	89.6	91.5	93.6	96.6		
	MACH	.453	.498	.520	.541	.563	.585	.597	.614		
	KIAS	250	251	252	252	253	252	247	244		
	FF/ENG	1945	1948	1952	1954	1959	1966	1953	1997		
50	%N1	77.6	81.6	83.4	85.2	87.0	88.8	90.8	92.9	96.1	
	MACH	.434	.475	.495	.516	.538	.561	.583	.596	.613	
	KIAS	240	239	239	240	241	241	241	236	233	
	FF/ENG	1777	1759	1760	1763	1767	1771	1783	1776	1815	
45	%N1	75.2	78.9	80.5	82.3	84.1	86.0	87.8	89.8	92.0	95.2
	MACH	.415	.452	.469	.489	.511	.533	.556	.578	.593	.610
	KIAS	229	227	227	227	228	229	229	229	225	222
	FF/ENG	1617	1585	1576	1573	1577	1581	1588	1604	1601	1630
40	%N1	72.5	76.0	77.6	79.2	80.9	82.8	84.6	86.5	88.4	90.8
	MACH	.395	.429	.445	.462	.480	.502	.525	.548	.571	.589
	KIAS	218	215	215	214	214	215	216	216	216	214
	FF/ENG	1462	1421	1406	1395	1388	1393	1400	1411	1424	1428
35	%N1	69.4	73.0	74.4	75.9	77.6	79.2	81.0	82.8	84.7	86.6
	MACH	.375	.406	.420	.435	.452	.469	.490	.513	.536	.560
	KIAS	207	203	202	202	201	201	201	202	203	203
	FF/ENG	1314	1266	1247	1230	1217	1209	1212	1224	1233	1243
30	%N1	66.2	69.5	71.0	72.4	73.8	75.4	77.1	78.7	80.6	82.5
	MACH	.355	.382	.394	.407	.422	.438	.455	.474	.496	.520
	KIAS	196	191	190	189	188	187	186	186	187	187
	FF/ENG	1173	1117	1097	1078	1059	1042	1037	1040	1048	1055

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
314	283	256	234	216	200	190	180	172	164	157
634	570	514	470	433	400	379	360	343	327	313
957	859	775	706	650	600	569	540	513	489	468
1283	1150	1036	943	867	800	758	719	684	652	623
1611	1443	1298	1181	1085	1000	947	898	853	814	778
1942	1737	1561	1419	1302	1200	1135	1076	1023	975	933
2276	2034	1825	1658	1520	1400	1324	1255	1193	1136	1087
2612	2332	2090	1897	1739	1600	1513	1434	1362	1297	1240
2951	2631	2356	2137	1957	1800	1702	1613	1531	1459	1394

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		26	
	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)
200	1.3	0:46	1.1	0:43	1.0	0:41	0.9	0:39	0.8	0:38
400	2.6	1:30	2.4	1:25	2.2	1:20	2.0	1:15	1.8	1:12
600	3.9	2:14	3.6	2:07	3.3	2:00	3.0	1:52	2.9	1:46
800	5.2	2:59	4.8	2:50	4.4	2:39	4.1	2:29	3.9	2:21
1000	6.5	3:45	6.0	3:33	5.5	3:20	5.2	3:07	4.8	2:56
1200	7.8	4:31	7.2	4:16	6.7	4:01	6.2	3:45	5.8	3:31
1400	9.0	5:18	8.3	5:00	7.7	4:42	7.2	4:23	6.8	4:07
1600	10.2	6:05	9.5	5:45	8.8	5:24	8.2	5:02	7.7	4:43
1800	11.5	6:53	10.7	6:30	9.9	6:06	9.2	5:41	8.7	5:19

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)				
	30	40	50	60	70
1	-0.1	-0.1	0.0	0.1	0.3
2	-0.3	-0.2	0.0	0.3	0.7
3	-0.5	-0.2	0.0	0.4	1.0
4	-0.6	-0.3	0.0	0.6	1.4
5	-0.8	-0.4	0.0	0.7	1.7
6	-1.0	-0.5	0.0	0.8	2.0
7	-1.1	-0.6	0.0	1.0	2.3
8	-1.3	-0.6	0.0	1.1	2.6
9	-1.4	-0.7	0.0	1.2	2.9
10	-1.6	-0.8	0.0	1.3	3.2
11	-1.8	-0.9	0.0	1.4	3.4
12	-1.9	-1.0	0.0	1.5	3.6
13	-2.1	-1.0	0.0	1.6	3.8
14	-2.3	-1.1	0.0	1.7	4.0

Includes APU fuel burn.

ENGINE INOP
MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)								
		1500	5000	10000	15000	20000	25000	30000	35000	40000
80	%N1	80.1	83.1	87.4	91.9					
	KIAS	247	247	248	250					
	FF/ENG	2640	2640	2650	2700					
75	%N1	78.3	81.2	85.5	90.0					
	KIAS	239	240	240	242					
	FF/ENG	2470	2460	2470	2510					
70	%N1	76.5	79.2	83.6	88.0	93.4				
	KIAS	231	231	232	233	235				
	FF/ENG	2310	2300	2300	2320	2370				
65	%N1	74.4	77.2	81.5	85.8	90.6				
	KIAS	223	223	223	224	226				
	FF/ENG	2140	2130	2120	2140	2160				
60	%N1	72.1	75.1	79.2	83.6	88.2	95.3			
	KIAS	214	214	215	215	217	218			
	FF/ENG	1980	1960	1950	1960	1970	2070			
55	%N1	69.7	72.7	76.8	81.1	85.7	91.2			
	KIAS	204	205	206	206	207	208			
	FF/ENG	1820	1800	1790	1790	1790	1830			
50	%N1	67.2	70.0	74.3	78.5	83.0	87.8	96.4		
	KIAS	195	195	196	197	197	198	200		
	FF/ENG	1670	1640	1630	1620	1610	1630	1770		
45	%N1	64.5	67.2	71.4	75.6	80.1	84.8	91.0		
	KIAS	185	185	186	186	187	188	189		
	FF/ENG	1510	1490	1470	1460	1440	1450	1510		
40	%N1	61.3	64.2	68.2	72.6	76.9	81.5	86.4	96.0	
	KIAS	177	177	177	177	177	177	178	179	
	FF/ENG	1360	1340	1310	1300	1280	1280	1300	1430	
35	%N1	58.0	60.8	64.9	69.0	73.4	77.9	82.6	88.8	
	KIAS	171	171	171	171	171	171	171	171	
	FF/ENG	1210	1190	1170	1150	1130	1110	1130	1170	
30	%N1	54.8	57.3	61.4	65.4	70.0	74.1	78.7	83.5	93.6
	KIAS	164	164	164	164	164	164	164	164	164
	FF/ENG	1070	1050	1030	1010	990	970	980	990	1090

This table includes 5% additional fuel for holding in a racetrack pattern.

ENGINE INOP

ADVISORY INFORMATION

Gear Down Landing Rate of Climb Available
Flaps 15

TAT (°C)	RATE OF CLIMB (FT/MIN)						
	PRESSURE ALTITUDE (FT)						
	-2000	0	2000	4000	6000	8000	10000
52	-290	-350					
50	-270	-330	-420				
48	-250	-310	-390				
46	-220	-280	-370	-460			
44	-200	-260	-350	-440			
42	-170	-230	-330	-420	-520		
40	-140	-210	-300	-390	-500		
38	-120	-180	-270	-370	-470	-600	
36	-100	-150	-250	-350	-450	-580	
34	-100	-130	-220	-320	-430	-560	-660
32	-100	-110	-200	-300	-410	-540	-640
30	-100	-110	-170	-280	-390	-520	-620
20	-90	-100	-160	-210	-290	-390	-520
10	-90	-100	-160	-210	-290	-360	-440
0	-80	-100	-150	-210	-290	-360	-440
-20	-80	-100	-160	-210	-290	-370	-460
-40	-80	-100	-160	-220	-300	-380	-470

Rate of climb capability shown is valid for 60000 kg, gear down at VREF15+5.
Decrease rate of climb 110 ft/min per 5000 kg greater than 60000 kg.
Increase rate of climb 150 ft/min per 5000 kg less than 60000 kg.

Flaps 30

TAT (°C)	RATE OF CLIMB (FT/MIN)						
	PRESSURE ALTITUDE (FT)						
	-2000	0	2000	4000	6000	8000	10000
52	-450	-510					
50	-430	-490	-580				
48	-410	-470	-560				
46	-380	-450	-540	-630			
44	-360	-430	-520	-610			
42	-330	-400	-490	-590	-690		
40	-310	-380	-470	-560	-670		
38	-290	-350	-450	-540	-650	-770	
36	-270	-330	-420	-520	-630	-760	
34	-270	-300	-400	-500	-610	-740	-840
32	-270	-280	-370	-480	-590	-720	-820
30	-270	-280	-350	-450	-570	-700	-810
20	-260	-280	-340	-390	-470	-580	-710
10	-260	-280	-340	-400	-470	-550	-630
0	-260	-280	-340	-400	-480	-560	-640
-20	-270	-290	-350	-410	-490	-570	-660
-40	-280	-300	-360	-420	-500	-590	-680

Rate of climb capability shown is valid for 60000 kg, gear down at VREF30+5.
Decrease rate of climb 110 ft/min per 5000 kg greater than 60000 kg.
Increase rate of climb 150 ft/min per 5000 kg less than 60000 kg.



Performance Inflight - QRH

Chapter PI-QRH

Gear Down

Section 13

GEAR DOWN

Long Range Cruise Altitude Capability
Max Cruise Thrust, 100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
80	14800	12300	9600
75	19000	15100	12600
70	22500	19300	15700
65	25400	23300	19600
60	27900	26400	24400
55	30200	29100	27400
50	32400	31400	30200
45	34600	33600	32500
40	37000	36100	35000
35	39700	38800	37800

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)									
		10	21	23	25	27	29	31	33	35	37
80	%N1	84.7									
	MACH	.468									
	KIAS	259									
	FF/ENG	2307									
75	%N1	82.9	92.5								
	MACH	.454	.554								
	KIAS	251	248								
	FF/ENG	2154	2148								
70	%N1	81.0	90.4	92.5							
	MACH	.440	.541	.557							
	KIAS	243	242	240							
	FF/ENG	2003	1998	1995							
65	%N1	79.0	88.4	90.1	92.5						
	MACH	.425	.524	.543	.560						
	KIAS	235	234	233	231						
	FF/ENG	1856	1845	1841	1846						
60	%N1	76.8	86.2	88.0	89.8	92.2	95.6				
	MACH	.409	.504	.525	.544	.562	.580				
	KIAS	226	225	225	224	222	220				
	FF/ENG	1712	1689	1690	1691	1701	1746				
55	%N1	74.6	83.8	85.5	87.3	89.2	91.8	95.2			
	MACH	.393	.484	.504	.525	.545	.562	.581			
	KIAS	217	216	216	216	215	213	211			
	FF/ENG	1570	1537	1536	1540	1546	1556	1600			
50	%N1	72.1	81.2	82.9	84.7	86.5	88.4	91.0	94.5		
	MACH	.376	.463	.482	.502	.523	.544	.561	.580		
	KIAS	207	206	206	206	206	205	203	201		
	FF/ENG	1431	1388	1386	1389	1397	1402	1409	1451		
45	%N1	69.3	78.3	80.1	81.8	83.6	85.4	87.4	90.0	93.5	
	MACH	.358	.441	.458	.477	.498	.520	.541	.559	.578	
	KIAS	197	196	196	196	196	196	195	193	191	
	FF/ENG	1297	1244	1238	1240	1247	1253	1258	1263	1299	
40	%N1	66.3	75.2	76.9	78.7	80.4	82.2	84.1	86.0	88.5	92.3
	MACH	.340	.417	.434	.452	.471	.491	.513	.535	.554	.573
	KIAS	187	185	185	185	185	185	185	185	183	181
	FF/ENG	1169	1106	1095	1095	1102	1106	1109	1113	1118	1151
35	%N1	63.2	71.9	73.5	75.2	77.0	78.7	80.5	82.3	84.3	86.9
	MACH	.321	.392	.408	.425	.442	.461	.481	.503	.526	.547
	KIAS	177	174	174	173	173	173	173	173	173	172
	FF/ENG	1044	974	959	955	961	962	965	966	969	978

GEAR DOWN

Long Range Cruise Enroute Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
324	290	260	236	217	200	188	178	168	160	153
655	584	523	474	435	400	377	357	338	321	307
990	881	787	713	653	600	566	535	507	483	461
1330	1181	1054	953	871	800	755	713	676	642	613
1676	1486	1323	1195	1091	1000	943	891	844	803	766
2027	1793	1594	1437	1310	1200	1131	1069	1013	962	918
2385	2106	1868	1681	1531	1400	1319	1246	1180	1121	1069
2749	2422	2143	1926	1751	1600	1507	1423	1347	1279	1220
3120	2742	2421	2172	1973	1800	1695	1600	1514	1437	1370

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		20		24		28	
	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)
200	2.4	0:49	2.2	0:47	1.9	0:44	1.8	0:42	1.6	0:41
400	5.0	1:36	4.6	1:31	4.1	1:25	3.8	1:20	3.6	1:17
600	7.4	2:25	6.9	2:17	6.2	2:06	5.8	1:59	5.5	1:54
800	9.9	3:14	9.2	3:03	8.3	2:48	7.7	2:38	7.3	2:31
1000	12.2	4:05	11.4	3:51	10.3	3:31	9.6	3:18	9.2	3:08
1200	14.5	4:56	13.6	4:39	12.2	4:14	11.5	3:59	10.9	3:46
1400	16.8	5:49	15.7	5:28	14.2	4:59	13.3	4:40	12.7	4:24
1600	19.0	6:43	17.8	6:19	16.1	5:44	15.1	5:22	14.3	5:04
1800	21.2	7:39	19.8	7:10	17.9	6:30	16.8	6:05	16.0	5:43

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)				
	40	50	60	70	80
2	-0.3	-0.2	0.0	0.3	0.7
4	-0.7	-0.3	0.0	0.7	1.5
6	-1.0	-0.5	0.0	1.0	2.2
8	-1.4	-0.7	0.0	1.2	2.8
10	-1.8	-0.9	0.0	1.5	3.4
12	-2.1	-1.1	0.0	1.8	4.0
14	-2.5	-1.2	0.0	2.0	4.5
16	-2.8	-1.4	0.0	2.2	4.9
18	-3.2	-1.6	0.0	2.3	5.3
20	-3.6	-1.8	0.0	2.5	5.7
22	-3.9	-1.9	0.0	2.6	6.0



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GEAR DOWN

Descent
VREF40 + 70 KIAS

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
41000	21	270	88
39000	20	260	84
37000	20	260	79
35000	19	260	75
33000	18	250	71
31000	18	250	67
29000	17	240	63
27000	16	230	59
25000	15	230	55
23000	14	220	51
21000	14	210	47
19000	13	210	43
17000	12	200	39
15000	11	190	35
10000	9	160	25
5000	6	130	16
1500	4	100	9

Allowances for a straight-in approach are included.



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GEAR DOWN

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)								
		1500	5000	10000	15000	20000	25000	30000	35000	40000
80	%N1	74.5	77.3	81.5	85.8	90.5				
	KIAS	224	224	224	224	224				
	FF/ENG	2140	2130	2120	2130	2150				
75	%N1	72.8	75.7	79.8	84.1	88.7				
	KIAS	219	219	219	219	219				
	FF/ENG	2010	2000	1990	2000	2000				
70	%N1	71.0	74.0	78.0	82.3	86.9	92.7			
	KIAS	214	214	214	214	214	214			
	FF/ENG	1890	1880	1870	1870	1870	1920			
65	%N1	69.1	72.1	76.2	80.5	84.9	89.9			
	KIAS	209	209	209	209	209	209			
	FF/ENG	1780	1760	1740	1740	1730	1760			
60	%N1	67.2	70.0	74.2	78.3	82.8	87.5	95.4		
	KIAS	203	203	203	203	203	203	203		
	FF/ENG	1660	1630	1620	1610	1600	1610	1720		
55	%N1	65.1	67.9	72.1	76.2	80.6	85.2	91.2		
	KIAS	197	197	197	197	197	197	197		
	FF/ENG	1540	1520	1500	1480	1470	1480	1530		
50	%N1	62.8	65.6	69.7	73.9	78.2	82.8	87.7		
	KIAS	190	190	190	190	190	190	190		
	FF/ENG	1420	1400	1380	1360	1340	1340	1370		
45	%N1	60.3	63.3	67.2	71.5	75.7	80.2	84.9	92.3	
	KIAS	184	184	184	184	184	184	184	184	
	FF/ENG	1310	1290	1270	1250	1220	1220	1240	1300	
40	%N1	57.9	60.6	64.7	68.8	73.1	77.5	82.0	87.4	
	KIAS	177	177	177	177	177	177	177	177	
	FF/ENG	1200	1180	1160	1140	1110	1090	1110	1130	
35	%N1	55.3	57.9	62.0	66.0	70.5	74.7	79.1	83.8	93.3
	KIAS	170	170	170	170	170	170	170	170	170
	FF/ENG	1090	1070	1050	1030	1000	980	990	1000	1090

This table includes 5% additional fuel for holding in a racetrack pattern.



Performance Inflight - QRH

Chapter PI-QRH

Gear Down, Engine Inop

Section 14

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude
100 ft/min residual rate of climb

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFTDOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
70	66	213	2500	300	
65	62	208	5800	4000	2100
60	57	202	9100	7300	5700
55	52	196	12400	10600	8800
50	48	190	15600	14100	12300
45	43	184	18900	17500	15900
40	38	177	22200	21000	19700
35	34	170	25400	24600	23600

Includes APU fuel burn.

Long Range Cruise Altitude Capability
100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
60	3600	500	
55	8100	5800	3200
50	12300	10100	8000
45	16500	14800	12500
40	20700	19300	17400
35	24500	23400	22100



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GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)									
		5	7	9	11	13	15	17	19	21	23
60	%N1	90.6									
	MACH	.364									
	KIAS	220									
	FF/ENG	3238									
55	%N1	88.1	89.7	91.5							
	MACH	.351	.362	.374							
	KIAS	212	211	210							
	FF/ENG	2958	2950	2951							
50	%N1	85.5	87.0	88.6	90.4	92.2					
	MACH	.338	.348	.359	.371	.384					
	KIAS	204	203	202	201	200					
	FF/ENG	2694	2675	2664	2665	2675					
45	%N1	82.8	84.2	85.7	87.3	89.0	90.8	93.4			
	MACH	.325	.334	.344	.355	.367	.380	.393			
	KIAS	196	195	193	192	191	190	189			
	FF/ENG	2442	2416	2396	2384	2383	2387	2401			
40	%N1	79.8	81.2	82.6	84.1	85.6	87.3	89.2	91.4	94.9	
	MACH	.311	.320	.329	.339	.349	.361	.374	.387	.402	
	KIAS	188	186	184	183	182	181	180	179	179	
	FF/ENG	2206	2171	2143	2123	2110	2103	2098	2099	2150	
35	%N1	76.7	78.0	79.3	80.7	82.1	83.7	85.5	87.5	89.4	92.7
	MACH	.296	.305	.313	.322	.331	.342	.354	.369	.384	.400
	KIAS	179	178	176	174	172	171	170	170	170	170
	FF/ENG	1973	1943	1906	1877	1856	1838	1828	1832	1839	1872

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
178	155	135	121	110	100	93	87	81	77	73
361	314	274	244	220	200	186	174	163	154	146
546	473	412	366	331	300	279	260	244	230	218
732	634	551	489	441	400	372	347	325	306	290
920	796	692	613	552	500	465	434	407	383	362
1109	958	832	737	663	600	558	520	487	458	434
1300	1122	973	861	774	700	651	607	568	534	505
1493	1287	1115	986	885	800	744	693	648	610	577
1688	1453	1257	1110	997	900	836	779	729	685	648
1884	1620	1400	1235	1108	1000	929	865	809	760	719

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)							
	6		10		14		18	
	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)
100	1.1	0:29	1.0	0:28	0.9	0:27	0.8	0:26
200	2.4	0:56	2.2	0:54	2.0	0:52	1.9	0:50
300	3.6	1:24	3.3	1:21	3.1	1:17	3.0	1:14
400	4.8	1:52	4.4	1:47	4.2	1:42	4.1	1:37
500	6.0	2:20	5.6	2:14	5.2	2:08	5.1	2:02
600	7.1	2:49	6.7	2:41	6.3	2:34	6.1	2:26
700	8.3	3:18	7.7	3:09	7.3	3:00	7.1	2:50
800	9.4	3:47	8.8	3:37	8.3	3:26	8.0	3:15
900	10.5	4:16	9.9	4:05	9.3	3:52	9.0	3:40
1000	11.7	4:46	10.9	4:33	10.3	4:19	9.9	4:06

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)				
	30	40	50	60	70
1	-0.2	-0.1	0.0	0.2	0.4
2	-0.4	-0.2	0.0	0.4	0.9
3	-0.6	-0.3	0.0	0.7	1.3
4	-0.8	-0.4	0.0	0.9	1.8
5	-1.0	-0.5	0.0	1.1	2.3
6	-1.2	-0.6	0.0	1.3	2.7
7	-1.4	-0.7	0.0	1.5	3.1
8	-1.6	-0.8	0.0	1.7	3.6
9	-1.8	-0.9	0.0	1.9	4.0
10	-2.0	-1.0	0.0	2.1	4.4
11	-2.2	-1.1	0.0	2.3	4.8
12	-2.4	-1.2	0.0	2.5	5.2

Includes APU fuel burn.

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)			
		1500	5000	10000	15000
70	%N1	89.7			
	KIAS	214			
	FF/ENG	3640			
65	%N1	87.6	90.8		
	KIAS	209	209		
	FF/ENG	3380	3410		
60	%N1	85.4	88.4		
	KIAS	203	203		
	FF/ENG	3120	3130		
55	%N1	83.0	86.0	90.6	
	KIAS	197	197	197	
	FF/ENG	2870	2870	2900	
50	%N1	80.4	83.5	87.9	93.2
	KIAS	190	190	190	190
	FF/ENG	2630	2620	2630	2690
45	%N1	77.8	80.7	85.1	89.9
	KIAS	184	184	184	184
	FF/ENG	2400	2380	2380	2410
40	%N1	75.1	77.9	82.2	86.7
	KIAS	177	177	177	177
	FF/ENG	2180	2160	2150	2160
35	%N1	72.1	75.0	79.1	83.6
	KIAS	170	170	170	170
	FF/ENG	1960	1940	1920	1920

This table includes 5% additional fuel for holding in a racetrack pattern.

Introduction

This chapter contains information to supplement performance data from the Flight Management Computer (FMC). In addition, sufficient inflight data is provided to complete a flight with the FMC inoperative. In the event of conflict between data presented in this chapter and that contained in the approved Airplane Flight Manual, the Flight Manual shall always take precedence.

General

Flight with Unreliable Airspeed / Turbulent Air Penetration

Pitch attitude and average %N1 information is provided for use in all phases of flight in the event of unreliable airspeed/Mach indications resulting from blocking or freezing of the pitot system. Loss of radome or turbulent air may also cause unreliable airspeed/Mach indications. The cruise table in this section may also be used for turbulent air penetration. The Flight with Unreliable Airspeed – FINAL APPROACH table includes a 10 knot margin for landing.

Pitch attitude is shown in bold type for emphasis since altitude and/or vertical speed indications may also be unreliable.

Max Climb %N1

This table shows Max Climb %N1 for a 280/.78 climb speed schedule, normal engine bleed for packs on or off and anti-ice off. Enter the table with airport pressure altitude and TAT and read %N1. %N1 adjustments are shown for anti-ice operation.

Go-around %N1

To find Max Go-around %N1 based on normal engine bleed for packs on (AUTO) and anti-ice on or off, enter the Go-around %N1 table with airport pressure altitude and reported OAT or TAT and read %N1. For packs OFF or HIGH operation, apply the %N1 adjustment shown below the table.

VREF

This table contains flaps 40, 30 and 15 reference speeds for a given weight.

Advisory Information

Runway Surface Condition Correlation

When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. A table is provided that correlates runway condition code to runway surface condition description and reported braking action that can then be used to determine the appropriate Normal Configuration Landing Distance or Non-Normal Configuration Landing Distance.

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distances on dry runways and runways with good, good-to-medium, medium, medium-to-poor, and poor reported braking action. Landing distances (reference distances plus adjustments) are 115% of the actual landing distance. The Normal Configuration Landing Distance tables should be used enroute to make a landing distance assessment for time of arrival.

The reference landing distance is the distance from threshold to complete stop. It includes an air distance allowance of 1500 ft from threshold to touchdown. The reference distance is based on a reference landing weight and speed at sea level, standard day, zero wind, zero slope, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

To use these tables, determine the reference landing distance for the selected braking configuration and reported braking action. Adjust this reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers. Each correction is applied independently to the reference landing distance. A correction for use of manual speedbrakes is provided in the table notes.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" reported braking action, the airplane may not be able to achieve these deceleration rates. In these cases, runway slope and inoperative reversers influence the stopping distance. Since it cannot be determined quickly when this becomes a factor, it is appropriate to add the effects of slope and inoperative reversers when using the autobrake system.

Non-normal Configuration Landing Distance

Advisory information is provided to support non-normal configurations that affect landing. Landing distances and adjustments are provided for dry runways and runways with good, good-to-medium, medium, medium-to-poor, and poor reported braking action. Landing distances (reference distances plus adjustments) are representative of the actual landing distance, and are not factored. The Non-Normal Configuration Landing Distance tables should be used enroute to make a landing distance assessment for time of arrival.

The reference landing distance is the distance from threshold to complete stop. It includes an air distance allowance of 1500 ft from threshold to touchdown. The reference distance is based on a reference landing weight and speed at sea level, standard day, zero wind, zero slope, and maximum available reverse thrust.

Tables for Non-Normal Configuration Landing Distance in this section are similar in format and used in the same manner as tables for the Normal Configuration Landing Distance previously described.

Recommended Brake Cooling Schedule

Advisory information is provided to assist in avoiding the problems associated with hot brakes. For normal operation, most landings are at weights below the AFM quick turnaround limit weight.

Use of the recommended cooling schedule will help avoid brake overheat and fuse plug problems that could result from repeated landings at short time intervals or a rejected takeoff.

Enter the Recommended Brake Cooling Schedule table with the airplane weight and brakes on speed, adjusted for wind at the appropriate temperature and altitude condition. Instructions for applying wind adjustments are included below the table. Linear interpolation may be used to obtain intermediate values. The resulting number is the reference brake energy per brake in millions of foot-pounds, and represents the amount of energy absorbed by each brake during a rejected takeoff. Notes providing adjustments for wind are included below the table.

To determine the energy per brake absorbed during landing, enter the appropriate Adjusted Brake Energy Per Brake table (No Reverse Thrust or 2 Engine Reverse) with the reference brake energy per brake and the type of braking used during landing (Max Manual, Max Auto, or Autobrake). The resulting number is the adjusted brake energy per brake and represents the energy absorbed in each brake during the landing.

The recommended cooling time is found in the appropriate (steel or carbon brakes) final table by entering with the adjusted brake energy per brake. Times are provided for ground cooling and inflight gear down cooling.

Brake Temperature Monitor System (BTMS) indications are also shown. If brake cooling is determined from the BTMS, use the hottest brake indication 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted to determine recommended cooling schedule.

Engine Inoperative

Initial Max Continuous %N1

The Initial Max Continuous %N1 setting for use following an engine failure is shown. The table is based on the typical all engine cruise speed of .79M to provide a target %N1 setting at the start of driftdown. Once driftdown is established, the Max Continuous %N1 table should be used to determine %N1 for the given conditions.

Max Continuous %N1

Power setting is based on one engine operating with one A/C pack operating and all anti-ice bleeds off. Enter the table with pressure altitude, TAT, and IAS or Mach to read %N1.

It is desirable to maintain engine thrust level within the limits of the Max Cruise thrust rating. However, where thrust level in excess of Max Cruise rating is required, such as for meeting terrain clearance, ATC altitude assignments, or to attain maximum range capability, it is permissible to use the thrust needed up to the Max Continuous thrust rating. The Max Continuous thrust rating is intended primarily for emergency use at the discretion of the pilot and is the maximum thrust that may be used continuously.

Driftdown Speed/Level Off Altitude

The table shows optimum driftdown speed as a function of cruise weight at start of driftdown. Also shown are the approximate weight and pressure altitude at which the airplane will level off considering 100 ft/min residual rate of climb.

The level off altitude is dependent on air temperature (ISA deviation).

Driftdown/LRC Range Capability

This table shows the range capability from the start of driftdown. Driftdown is continued to level off altitude. As weight decreases due to fuel burn, the airplane is accelerated to Long Range Cruise speed. Cruise is continued at level off altitude and Long Range Cruise speed.

To determine fuel required, enter the Ground to Air Miles Conversion table with the desired ground distance and adjust for anticipated winds to obtain air distance to destination. Then enter the Driftdown/Cruise Fuel and Time table with air distance and weight at start of driftdown to determine fuel and time required. If altitudes other than the level off altitude is used, fuel and time required may be obtained by using the Engine Inoperative Long Range Cruise Enroute Fuel and Time table.

Long Range Cruise Altitude Capability

The table shows the maximum altitude that can be maintained at a given weight and air temperature (ISA deviation), based on Long Range Cruise speed, Max Continuous thrust, and 100 ft/min residual rate of climb.

Long Range Cruise Control

The table provides target %N1, engine inoperative Long Range Cruise Mach number, IAS and fuel flow for the airplane weight and pressure altitude. The fuel flow values in this table reflect single engine fuel burn.

APU Operation During Flight

For APU operation during flight, increase fuel flow according to the following table. These increments include the APU fuel flow and the effect of increased drag from the APU door.

PRESSURE ALTITUDE (1000 FT)	APU FUEL FLOW (KG/HR)
39	45
35	45
31	50
25	60
20	65
15	75
10	85
5	95

Long Range Cruise Diversion Fuel and Time

Tables are provided for crews to determine the fuel and time required to proceed to an alternate airfield with one engine inoperative. The data is based on single engine Long Range Cruise speed and .78/280/250 descent. Enter with Air Distance as determined from the Ground to Air Miles Conversion table and read Fuel and Time required at the cruise pressure altitude. Adjust the fuel obtained for deviation from the reference weight at checkpoint as required by entering the off reference fuel adjustments table with the fuel required for the reference weight and the actual weight at checkpoint. Read fuel required and time for the actual weight.

Holding

Target %N1, indicated airspeed and fuel flow per engine information is tabulated for holding with flaps up based on the FMC optimum holding speed schedule. This is the higher of the maximum endurance speed and the maneuvering speed. Small variations in airspeed will not appreciably affect the overall endurance time. Enter the table with weight and pressure altitude to read %N1, IAS and fuel flow per engine.



Gear Down Landing Rate of Climb Available

Rate of climb data is provided as guidance information in the event an engine inoperative landing (manual or autoland) is planned. The tables show gear down rate of climb available for Flaps 15 and Flaps 30. Enter the table with TAT and pressure altitude to read rate of climb available. Apply adjustments shown to correct for weight.

Gear Down

This section contains performance for airplane operation with the landing gear extended. The data is based on engine bleeds for normal air conditioning.

Note: The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS may generate inappropriate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA), maximum altitude, and compute overly shallow descent path. An accurate estimated time of arrival (ETA) is available if current speed or Mach is entered into the VNAV cruise page.

Tables for gear down performance in this section are identical in format and used in the same manner as tables for the gear up configuration previously described.



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Pkg Model Identification PI-QRH.ModID.20.1

General PI-QRH.20.1

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CLIMB (280/.76) PI-QRH.20.3

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HOLDING (VREF40 + 70) PI-QRH.20.4

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Airport Altitude = -1000 FT PI-QRH.20.5

Airport Altitude = SEA LEVEL PI-QRH.20.5

Airport Altitude = 1000 FT PI-QRH.20.6

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Airport Altitude = 3000 FT PI-QRH.20.7

Airport Altitude = 4000 FT PI-QRH.20.7

Airport Altitude = 5000 FT PI-QRH.20.8

Airport Altitude = 6000 FT PI-QRH.20.8

Airport Altitude = 7000 FT PI-QRH.20.9

Airport Altitude = 8000 FT PI-QRH.20.9

Airport Altitude = 9000 FT PI-QRH.20.10

Airport Altitude = 10000 FT PI-QRH.20.10

Airport Altitude = 11000 FT PI-QRH.20.11

Airport Altitude = 12000 FT PI-QRH.20.11

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FINAL APPROACH (1500 FT) PI-QRH.20.13

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Airport Altitude = -1000 FT PI-QRH.20.14

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Airport Altitude = 1000 FT PI-QRH.20.14

Airport Altitude = 2000 FT PI-QRH.20.14

Airport Altitude = 3000 FT PI-QRH.20.15

Airport Altitude = 4000 FT PI-QRH.20.15

Airport Altitude = 5000 FT PI-QRH.20.15

Airport Altitude = 6000 FT.	PI-QRH.20.15
Airport Altitude = 7000 FT.	PI-QRH.20.16
Airport Altitude = 8000 FT.	PI-QRH.20.16
Airport Altitude = 9000 FT.	PI-QRH.20.16
Airport Altitude = 10000 FT.	PI-QRH.20.16
Airport Altitude = 11000 FT.	PI-QRH.20.17
Airport Altitude = 12000 FT.	PI-QRH.20.17
Airport Altitude = 13000 FT.	PI-QRH.20.17
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General

The following performance inflight data was chosen to represent the 737-800 and 737-800 BCF fleet.



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Performance Inflight - QRH

Chapter PI-QRH

General

Section 20

Flight Crew Requirements for Chemical Passenger Oxygen System
Required Pressure (PSI) for 114/115 Cubic Ft. Cylinder

BOTTLE TEMPERATURE		NUMBER OF CREW USING OXYGEN		
°C	°F	2	3	4
50	122	530	735	945
45	113	520	725	930
40	104	510	715	915
35	95	505	700	900
30	86	495	690	885
25	77	485	680	870
20	68	480	670	860
15	59	470	655	840
10	50	460	645	830
5	41	455	635	815
0	32	445	620	800
-5	23	440	610	785
-10	14	430	600	770

Flight Crew and Supernumerary Requirements for Freighter Oxygen System

Table 1
Crew and Supernumerary Oxygen

NUMBER OF CREW AND SUPERNUMERARIES	LITERS OF UNDILUTED (100%) OXYGEN				
	TIME (MINUTES)				
	30	60	90	120	180
2	1210	1740	2100	2450	3150
3	1560	2350	2880	3410	4470
4	1900	2960	3660	4370	5780
5	2240	3560	4440	5330	7090
6	2580	4170	5230	6280	8400
7	2920	4770	6010	7240	9710
8	3260	5380	6790	8200	11030

For more extensive than normal crew usage, add 2.05 liters/person/minute for each crew member at 8000 ft cabin altitude when regulator setting is NORMAL; or 13 liters/person/minute when regulator setting is 100%.

Table 2
Volume to Pressure Conversion for Two 115 Cubic Ft. Cylinders

OXYGEN VOLUME (1000 LITERS)	CYLINDER PRESSURE AT 21°C (PSI)
0.3	200
0.7	300
1.0	400
1.4	500
1.7	600
2.1	700
2.4	800
2.8	900
3.1	1000
3.5	1100
3.8	1200
4.2	1300
4.5	1400
4.9	1500
5.2	1600
5.5	1700
5.9	1800
6.2	1900
6.6	2000

Check maximum pressure in shaded area. Maximum cylinder pressure = 1850 PSI at 21°C. For maximum cylinder pressure at hotter or colder temperatures, add or subtract 32 PSI per 5°C, respectively.



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Table 3
Temperature Corrections

CYLINDER PRESSURE AT 21°C (PSI)	PRESSURE CORRECTION FOR EACH 5°C ABOVE/BELOW 21°C (PSI)
400	+7/-7
600	+11/-11
800	+14/-14
1000	+17/-17
1200	+21/-21
1400	+24/-24
1600	+28/-28
1800	+31/-31
2000	+34/-34

V1 (MCG)
Max Takeoff Thrust

TEMP		PRESSURE ALTITUDE (FT)						
°C	°F	-2000	0	2000	4000	6000	8000	10000
70	158	97	94					
60	140	97	94	93	92			
50	122	100	97	93	92	90	88	85
40	104	104	102	98	94	91	88	85
30	86	106	105	101	97	94	90	87
20	68	106	106	103	99	95	91	88
-60	-76	108	107	105	102	98	95	91

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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

CLIMB (280/.76)

Flaps Up, Set Max Climb Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT V/S (FT/MIN)	4.0 1700	4.0 1000			
30000	PITCH ATT V/S (FT/MIN)	4.0 2500	4.0 1900	3.5 1400	3.5 1100	4.0 800
20000	PITCH ATT V/S (FT/MIN)	7.0 4200	6.5 3200	6.0 2600	6.0 2100	6.0 1700
10000	PITCH ATT V/S (FT/MIN)	11.0 5600	9.5 4400	8.5 3600	8.0 3000	8.0 2500
SEA LEVEL	PITCH ATT V/S (FT/MIN)	14.5 6700	12.5 5300	11.0 4300	10.0 3600	9.5 3100

CRUISE (.76/280)

Flaps Up, %N1 for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT %N1	2.0 83.3	2.5 86.2	3.5 91.0		
35000	PITCH ATT %N1	1.0 81.4	2.0 83.0	2.5 85.2	3.0 88.0	3.5 93.5
30000	PITCH ATT %N1	1.0 80.7	1.5 81.7	2.0 83.2	2.5 84.9	3.0 87.1
25000	PITCH ATT %N1	1.0 77.2	1.5 78.0	2.0 79.5	2.5 81.2	3.0 83.1
20000	PITCH ATT %N1	1.0 73.6	1.5 74.4	2.0 75.7	2.5 77.3	3.5 79.1
15000	PITCH ATT %N1	1.0 69.8	1.5 70.7	2.0 72.0	3.0 73.5	3.5 75.1

DESCENT (.76/280)

Flaps Up, Set Idle Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
40000	PITCH ATT V/S (FT/MIN)	-2.0 -2700	-0.5 -2500	0.0 -2500	0.5 -2700	1.0 -3000
30000	PITCH ATT V/S (FT/MIN)	-3.5 -3100	-2.0 -2600	-1.0 -2300	-0.5 -2100	0.0 -2100
20000	PITCH ATT V/S (FT/MIN)	-3.5 -2900	-2.0 -2400	-1.0 -2200	-0.5 -2000	0.5 -1900
10000	PITCH ATT V/S (FT/MIN)	-3.5 -2500	-2.0 -2100	-1.0 -1800	0.0 -1700	0.5 -1600
SEA LEVEL	PITCH ATT V/S (FT/MIN)	-3.5 -2300	-2.5 -1900	-1.0 -1700	-0.5 -1500	0.5 -1400

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

HOLDING (VREF40 + 70)
Flaps Up, %N1 for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
15000	PITCH ATT	5.0	5.0	5.0	5.0	5.0
	%N1	56.7	62.4	66.7	70.6	74.0
	KIAS	178	195	214	231	247
10000	PITCH ATT	5.0	5.0	5.0	5.0	5.0
	%N1	53.0	58.1	62.9	66.6	69.9
	KIAS	178	194	213	230	246
5000	PITCH ATT	5.0	5.0	5.0	5.0	5.0
	%N1	49.5	54.5	58.7	62.8	66.2
	KIAS	178	193	212	229	245

TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = -2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT	4.5	5.0	5.5	6.0	6.5
	%N1	48.2	52.9	57.0	60.8	64.5
	KIAS	178	192	204	215	225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT	5.0	5.0	5.5	6.0	6.0
	%N1	50.2	55.1	59.5	63.5	66.9
	KIAS	158	172	184	195	205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	50.5	55.9	60.5	64.7	68.4
	KIAS	138	152	164	175	185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT	5.0	5.0	5.5	5.5	6.0
	%N1	53.7	59.1	64.0	68.1	71.8
	KIAS	138	152	164	175	185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT	5.5	5.5	6.0	6.0	6.5
	%N1	53.8	59.4	64.3	68.6	72.4
	KIAS	128	142	154	165	175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT	6.5	6.5	6.5	7.0	7.0
	%N1	54.7	60.5	65.6	69.8	73.8
	KIAS	118	132	144	155	165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	58.0	63.9	68.8	73.2	77.0
	KIAS	128	142	154	165	175

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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flights

Airport Altitude = -1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 48.9 178	5.0 53.6 192	5.5 57.7 204	6.0 61.6 215	6.5 65.2 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 50.9 158	5.0 55.9 172	5.5 60.3 184	6.0 64.3 195	6.0 67.7 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 51.3 138	6.0 56.6 152	6.0 61.4 164	6.5 65.5 175	6.5 69.2 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 54.4 138	5.5 59.9 152	5.5 64.8 164	5.5 68.9 175	6.0 72.7 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 54.5 128	5.5 60.2 142	6.0 65.2 154	6.0 69.4 165	6.5 73.3 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 55.4 118	6.5 61.3 132	6.5 66.3 144	7.0 70.6 155	7.0 74.6 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 58.8 128	6.0 64.7 142	6.0 69.6 154	6.0 74.0 165	6.5 77.8 175

Airport Altitude = SEA LEVEL

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 49.6 178	5.0 54.3 192	5.5 58.4 204	6.0 62.5 215	6.5 66.0 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 51.6 158	5.0 56.6 172	5.5 61.1 184	6.0 65.0 195	6.0 68.5 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 52.0 138	6.0 57.4 152	6.0 62.2 164	6.5 66.4 175	6.5 70.1 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 55.1 138	5.5 60.7 152	5.5 65.6 164	5.5 69.7 175	6.0 73.6 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 55.3 128	5.5 61.0 142	6.0 66.0 154	6.0 70.2 165	6.5 74.1 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 56.2 118	6.5 62.1 132	6.5 67.1 144	7.0 71.5 155	7.0 75.5 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 59.6 128	6.0 65.5 142	6.0 70.5 154	6.0 74.9 165	6.5 78.6 175

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = 1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 50.3 178	5.0 55.0 192	5.5 59.2 204	6.0 63.3 215	6.5 66.7 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 52.3 158	5.0 57.3 172	5.5 61.9 184	6.0 65.8 195	6.0 69.2 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 52.8 138	6.0 58.1 152	6.0 63.1 164	6.5 67.2 175	6.5 70.9 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 55.8 138	5.5 61.6 152	5.5 66.4 164	5.5 70.5 175	6.0 74.3 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 56.0 128	5.5 61.8 142	6.0 66.8 154	6.0 71.1 165	6.5 75.0 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 57.0 118	6.5 62.9 132	6.5 67.9 144	7.0 72.4 155	7.0 76.3 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 60.4 128	6.0 66.3 142	6.0 71.3 154	6.0 75.7 165	6.5 79.5 175

Airport Altitude = 2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 51.0 178	5.0 55.8 192	5.5 59.9 204	6.0 64.1 215	6.5 67.5 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 53.0 158	5.0 58.1 172	5.5 62.7 184	6.0 66.5 195	6.0 70.1 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 53.4 138	6.0 58.9 152	6.0 63.8 164	6.5 67.9 175	6.5 71.7 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 56.6 138	5.5 62.4 152	5.5 67.2 164	5.5 71.4 175	6.0 75.2 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 56.8 128	5.5 62.6 142	6.0 67.5 154	6.0 72.0 165	6.5 75.8 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 57.8 118	6.5 63.8 132	6.5 68.7 144	7.0 73.2 155	7.0 77.1 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 61.2 128	6.0 67.1 142	6.0 72.2 154	6.0 76.5 165	6.5 80.3 175

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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flights

Airport Altitude = 3000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT	4.5	5.0	5.5	6.0	6.5
	%N1	51.6	56.5	60.8	64.9	68.2
VREF40+70	KIAS	178	192	205	216	225
FLAPS 1 (GEAR UP)	PITCH ATT	5.0	5.0	5.5	6.0	6.0
	%N1	53.8	58.9	63.5	67.3	70.9
VREF40+50	KIAS	158	172	185	196	205
FLAPS 5 (GEAR UP)	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	54.2	59.7	64.6	68.7	72.6
VREF40+30	KIAS	138	152	165	176	185
FLAPS 10 (GEAR UP)	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	57.4	63.2	68.0	72.3	76.0
VREF40+30	KIAS	138	152	165	176	185
FLAPS 15 (GEAR UP)	PITCH ATT	5.5	5.5	6.0	6.0	6.5
	%N1	57.5	63.4	68.4	72.9	76.6
VREF40+20	KIAS	128	142	155	166	175
FLAPS 25 (GEAR UP)	PITCH ATT	6.5	6.5	6.5	7.0	7.0
	%N1	58.6	64.6	69.6	74.1	77.9
VREF40+10	KIAS	118	132	145	156	165
FLAPS 15 (GEAR DOWN)	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	62.0	67.9	73.1	77.4	81.2
VREF40+20	KIAS	128	142	155	166	175

Airport Altitude = 4000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT	4.5	5.0	5.5	6.0	6.5
	%N1	52.3	57.2	61.6	65.6	69.0
VREF40+70	KIAS	178	192	205	216	225
FLAPS 1 (GEAR UP)	PITCH ATT	5.0	5.0	5.5	6.0	6.0
	%N1	54.5	59.6	64.3	68.1	71.8
VREF40+50	KIAS	158	172	185	196	205
FLAPS 5 (GEAR UP)	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	54.9	60.6	65.4	69.6	73.4
VREF40+30	KIAS	138	152	165	176	185
FLAPS 10 (GEAR UP)	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	58.2	64.0	68.8	73.1	76.7
VREF40+30	KIAS	138	152	165	176	185
FLAPS 15 (GEAR UP)	PITCH ATT	5.5	5.5	6.0	6.0	6.5
	%N1	58.3	64.3	69.2	73.7	77.4
VREF40+20	KIAS	128	142	155	166	175
FLAPS 25 (GEAR UP)	PITCH ATT	6.5	6.5	6.5	7.0	7.0
	%N1	59.4	65.4	70.4	74.9	78.8
VREF40+10	KIAS	118	132	145	156	165
FLAPS 15 (GEAR DOWN)	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	62.8	68.7	73.9	78.2	82.1
VREF40+20	KIAS	128	142	155	166	175

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = 5000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 53.0 178	5.0 57.9 192	5.5 62.5 205	6.0 66.4 216	6.5 69.8 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 55.3 158	5.0 60.5 172	5.5 65.0 185	6.0 68.9 196	6.0 72.6 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 55.6 138	6.0 61.4 152	6.0 66.3 165	6.5 70.4 176	6.5 74.2 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 59.0 138	5.5 64.8 152	5.5 69.7 165	5.5 73.9 176	6.0 77.5 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 59.1 128	5.5 65.1 142	6.0 70.1 155	6.0 74.6 166	6.5 78.2 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 60.2 118	6.5 66.2 132	6.5 71.3 145	7.0 75.7 156	7.0 79.7 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 63.7 128	6.0 69.6 142	6.0 74.7 155	6.0 79.1 166	6.5 83.0 175

Airport Altitude = 6000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 53.7 178	5.0 58.7 192	5.5 63.3 205	6.0 67.1 216	6.5 70.6 225
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 56.0 158	5.0 61.3 172	5.5 65.8 185	6.0 69.7 196	6.0 73.5 205
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 56.4 138	6.0 62.3 152	6.0 67.0 165	6.5 71.3 176	6.5 75.0 185
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 59.8 138	5.5 65.6 152	5.5 70.5 165	5.5 74.8 176	6.0 78.4 185
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 60.0 128	5.5 65.9 142	6.0 71.0 155	6.0 75.3 166	6.5 79.1 175
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 61.0 118	6.5 67.0 132	6.5 72.2 145	7.0 76.6 156	7.0 80.6 165
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 64.5 128	6.0 70.5 142	6.0 75.6 155	6.0 80.0 166	6.5 83.9 175

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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flights

Airport Altitude = 7000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT	4.5	5.0	5.5	6.0	6.5
	%N1	54.5	59.5	64.1	67.9	71.5
VREF40+70	KIAS	178	192	205	216	226
FLAPS 1 (GEAR UP)	PITCH ATT	5.0	5.0	5.5	6.0	6.0
	%N1	56.8	62.1	66.6	70.6	74.3
VREF40+50	KIAS	158	172	185	196	206
FLAPS 5 (GEAR UP)	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	57.2	63.1	67.8	72.2	75.9
VREF40+30	KIAS	138	152	165	176	186
FLAPS 10 (GEAR UP)	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	60.7	66.4	71.4	75.5	79.3
VREF40+30	KIAS	138	152	165	176	186
FLAPS 15 (GEAR UP)	PITCH ATT	5.5	5.5	6.0	6.0	6.5
	%N1	60.8	66.7	71.9	76.1	80.0
VREF40+20	KIAS	128	142	155	166	176
FLAPS 25 (GEAR UP)	PITCH ATT	6.5	6.5	6.5	7.0	7.0
	%N1	61.8	67.8	73.1	77.4	81.5
VREF40+10	KIAS	118	132	145	156	166
FLAPS 15 (GEAR DOWN)	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	65.3	71.3	76.4	80.9	84.8
VREF40+20	KIAS	128	142	155	166	176

Airport Altitude = 8000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP)	PITCH ATT	4.5	5.0	5.5	6.0	6.5
	%N1	55.2	60.3	64.8	68.7	72.3
VREF40+70	KIAS	178	192	205	216	226
FLAPS 1 (GEAR UP)	PITCH ATT	5.0	5.0	5.5	6.0	6.0
	%N1	57.5	63.0	67.4	71.5	75.1
VREF40+50	KIAS	158	172	185	196	206
FLAPS 5 (GEAR UP)	PITCH ATT	5.5	6.0	6.0	6.5	6.5
	%N1	58.0	63.9	68.7	73.0	76.7
VREF40+30	KIAS	138	152	165	176	186
FLAPS 10 (GEAR UP)	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	61.5	67.2	72.3	76.4	80.2
VREF40+30	KIAS	138	152	165	176	186
FLAPS 15 (GEAR UP)	PITCH ATT	5.5	5.5	6.0	6.0	6.0
	%N1	61.6	67.5	72.7	77.0	80.9
VREF40+20	KIAS	128	142	155	166	176
FLAPS 25 (GEAR UP)	PITCH ATT	6.5	6.5	6.5	7.0	7.0
	%N1	62.7	68.7	73.9	78.4	82.3
VREF40+10	KIAS	118	132	145	156	166
FLAPS 15 (GEAR DOWN)	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	66.1	72.2	77.3	81.8	85.7
VREF40+20	KIAS	128	142	155	166	176

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
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TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = 9000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 55.9 178	5.5 61.2 192	5.5 65.6 205	6.0 69.5 216	6.5 73.1 226
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 58.3 158	5.0 63.7 172	5.5 68.2 185	6.0 72.3 196	6.0 75.9 206
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 58.9 138	6.0 64.7 152	6.0 69.5 165	6.5 73.8 176	6.5 77.5 186
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 62.3 138	5.5 68.1 152	5.5 73.1 165	5.5 77.2 176	6.0 81.1 186
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 62.5 128	5.5 68.4 142	6.0 73.6 155	6.0 77.8 166	6.0 81.8 176
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 63.5 118	6.5 69.6 132	6.5 74.7 145	7.0 79.2 156	7.0 83.2 166
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 66.9 128	6.0 73.1 142	6.0 78.2 155	6.0 82.7 166	6.5 86.6 176

Airport Altitude = 10000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 56.7 178	5.5 62.1 192	5.5 66.3 205	6.0 70.3 216	6.5 73.9 227
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 59.1 158	5.0 64.5 172	5.5 69.1 185	6.0 73.2 196	6.0 76.7 207
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 59.7 138	6.0 65.5 152	6.0 70.4 165	6.0 74.6 176	6.5 78.4 187
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 63.1 138	5.5 69.0 152	5.5 73.9 165	5.5 78.1 176	6.0 82.0 187
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 63.3 128	5.5 69.3 142	6.0 74.4 155	6.0 78.8 166	6.0 82.7 177
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 64.3 118	6.5 70.5 132	6.5 75.6 145	7.0 80.1 156	7.0 84.1 167
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 67.8 128	6.0 73.9 142	6.0 79.1 155	6.0 83.6 166	6.5 87.6 177

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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)

%N1 for Level Flights

Airport Altitude = 11000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	4.5 57.5 178	5.5 62.9 192	5.5 67.1 205	6.0 71.2 217	6.5 74.7 227
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 60.2 158	5.0 65.3 172	5.5 70.0 185	6.0 74.0 197	6.0 77.6 207
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 60.9 138	6.0 66.4 152	6.0 71.4 165	6.0 75.5 177	6.5 79.4 187
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 64.1 138	5.5 70.0 152	5.5 74.8 165	5.5 79.1 177	6.0 83.0 187
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 64.3 128	5.5 70.4 142	6.0 75.3 155	6.0 79.8 167	6.0 83.7 177
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 65.4 118	6.5 71.6 132	6.5 76.6 145	6.5 81.1 157	7.0 85.1 167
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 68.9 128	6.0 74.9 142	6.0 80.1 155	6.0 84.6 167	6.5 88.7 177

Airport Altitude = 12000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 58.3 178	5.5 63.7 192	5.5 67.9 205	6.0 72.0 217	6.5 75.5 228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 61.1 158	5.5 66.2 172	5.5 70.9 185	6.0 74.8 197	6.0 78.5 208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 61.8 138	6.0 67.4 152	6.0 72.3 165	6.0 76.4 177	6.5 80.3 188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 65.1 138	5.5 71.0 152	5.5 75.7 165	5.5 80.1 177	6.0 83.9 188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 65.4 128	5.5 71.4 142	6.0 76.3 155	6.0 80.7 167	6.0 84.6 178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 66.6 118	6.5 72.6 132	6.5 77.7 145	6.5 82.2 157	6.5 86.1 168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 70.1 128	6.0 75.9 142	6.0 81.1 155	6.0 85.6 167	6.0 89.8 178

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = 13000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 59.2 178	5.5 64.4 192	5.5 68.7 205	6.0 72.8 217	6.5 76.3 228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 62.0 158	5.5 67.1 172	5.5 71.8 185	6.0 75.7 197	6.0 79.3 208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 62.7 138	6.0 68.4 152	6.0 73.2 165	6.0 77.3 177	6.5 81.2 188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 66.1 138	5.5 71.9 152	5.5 76.7 165	5.5 81.0 177	6.0 84.8 188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 66.4 128	5.5 72.4 142	6.0 77.3 155	6.0 81.7 167	6.0 85.6 178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 67.7 118	6.5 73.6 132	6.5 78.7 145	6.5 83.1 157	6.5 87.2 168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 71.1 128	6.0 77.0 142	6.0 82.2 155	6.0 86.7 167	6.0 91.1 178

Airport Altitude = 14000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT %N1 KIAS	5.0 60.1 179	5.5 65.1 192	5.5 69.6 205	6.0 73.6 217	6.5 77.2 228
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT %N1 KIAS	5.0 62.8 159	5.5 68.0 172	5.5 72.6 185	6.0 76.5 197	6.0 80.2 208
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.5 63.6 139	6.0 69.3 152	6.0 74.0 165	6.0 78.3 177	6.5 82.1 188
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT %N1 KIAS	5.0 67.1 139	5.5 72.8 152	5.5 77.6 165	5.5 81.9 177	6.0 85.8 188
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT %N1 KIAS	5.5 67.5 129	5.5 73.3 142	6.0 78.3 155	6.0 82.7 167	6.0 86.6 178
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT %N1 KIAS	6.5 68.9 119	6.5 74.6 132	6.5 79.7 145	6.5 84.1 157	6.5 88.2 168
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT %N1 KIAS	5.5 72.1 129	6.0 78.0 142	6.0 83.1 155	6.0 87.7 167	6.0 92.6 178

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

TERMINAL AREA (5000 FT)
%N1 for Level Flights
Airport Altitude = 14500 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS UP (GEAR UP) VREF40+70	PITCH ATT	5.0	5.5	5.5	6.0	6.5
	%N1	60.6	65.5	70.0	74.0	77.7
	KIAS	179	192	206	218	229
FLAPS 1 (GEAR UP) VREF40+50	PITCH ATT	5.0	5.5	5.5	6.0	6.0
	%N1	63.2	68.4	73.0	77.0	80.7
	KIAS	159	172	186	198	209
FLAPS 5 (GEAR UP) VREF40+30	PITCH ATT	5.5	6.0	6.0	6.0	6.5
	%N1	64.0	69.8	74.5	78.8	82.5
	KIAS	139	152	166	178	189
FLAPS 10 (GEAR UP) VREF40+30	PITCH ATT	5.0	5.5	5.5	5.5	6.0
	%N1	67.6	73.2	78.2	82.4	86.2
	KIAS	139	152	166	178	189
FLAPS 15 (GEAR UP) VREF40+20	PITCH ATT	5.5	5.5	6.0	6.0	6.0
	%N1	68.0	73.7	78.8	83.1	87.1
	KIAS	129	142	156	168	179
FLAPS 25 (GEAR UP) VREF40+10	PITCH ATT	6.5	6.5	6.5	6.5	6.5
	%N1	69.5	75.1	80.2	84.6	88.8
	KIAS	119	132	146	158	169
FLAPS 15 (GEAR DOWN) VREF40+20	PITCH ATT	5.5	6.0	6.0	6.0	6.0
	%N1	72.6	78.5	83.6	88.3	93.5
	KIAS	129	142	156	168	179

FINAL APPROACH (1500 FT)
Gear Down, %N1 for 3° Glideslope
Airport Altitude = -2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	42.8	47.5	51.4	55.0	58.0
	KIAS	130	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	46.9	51.7	56.1	59.8	63.2
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	51.5	56.9	61.7	65.8	69.2
	KIAS	118	132	144	155	164

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
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FINAL APPROACH (1500 FT)
Gear Down, %N1 for 3° Glideslope
Airport Altitude = -1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	43.4	48.1	52.0	55.6	58.7
	KIAS	130	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	47.5	52.4	56.8	60.6	64.0
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	52.2	57.7	62.5	66.6	70.0
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = SEA LEVEL

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	44.0	48.7	52.7	56.3	59.4
	KIAS	130	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	48.1	53.1	57.5	61.4	64.7
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	52.9	58.4	63.3	67.3	70.8
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 1000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	44.6	49.3	53.5	57.0	60.1
	KIAS	130	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	48.7	53.8	58.2	62.2	65.5
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	53.6	59.2	64.1	68.1	71.6
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 2000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	45.2	49.9	54.2	57.7	60.9
	KIAS	130	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	49.4	54.5	59.0	63.0	66.3
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	54.3	60.0	64.9	68.9	72.5
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

737-700/-800/BCF Quick Reference Handbook

Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 3000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	45.9	50.6	54.9	58.5	61.8
	KIAS	131	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	50.1	55.2	59.8	63.7	67.1
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	55.1	60.8	65.7	69.7	73.3
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 4000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	46.6	51.3	55.6	59.2	62.5
	KIAS	131	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	50.8	55.9	60.6	64.5	67.8
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	55.8	61.6	66.4	70.5	74.1
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 5000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	47.2	52.0	56.3	60.0	63.3
	KIAS	131	145	159	171	181
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	51.5	56.7	61.4	65.3	68.6
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	56.6	62.3	67.2	71.4	75.0
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 6000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	47.8	52.7	57.0	60.8	64.1
	KIAS	131	145	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	52.2	57.4	62.2	66.1	69.4
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	57.3	63.1	68.0	72.2	75.7
	KIAS	118	132	144	155	165

Flap placard speed exceeded in shaded area.

737-700/-800/BCF Quick Reference Handbook

Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)
Gear Down, %N1 for 3° Glideslope
Airport Altitude = 7000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	48.4	53.4	57.7	61.6	64.7
	KIAS	131	146	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	52.9	58.2	62.9	66.8	70.2
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	58.1	64.0	68.8	73.1	76.5
	KIAS	118	132	144	156	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 8000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	49.1	54.1	58.5	62.4	65.5
	KIAS	131	146	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	53.6	59.0	63.7	67.6	71.0
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	58.9	64.8	69.6	73.9	77.3
	KIAS	118	132	145	156	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 9000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	49.8	54.8	59.3	63.2	66.2
	KIAS	131	146	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	54.3	59.8	64.5	68.4	71.8
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	59.7	65.5	70.5	74.7	78.2
	KIAS	118	132	145	156	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 10000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	50.5	55.6	60.1	63.9	66.9
	KIAS	131	146	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	55.1	60.6	65.3	69.2	72.7
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	60.5	66.3	71.4	75.5	79.1
	KIAS	118	132	145	156	165

Flap placard speed exceeded in shaded area.

737-700/-800/BCF Quick Reference Handbook

Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)

Gear Down, %N1 for 3° Glideslope

Airport Altitude = 11000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	51.2	56.3	60.9	64.6	67.7
	KIAS	131	146	159	171	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	55.8	61.4	66.1	70.0	73.4
	KIAS	125	139	152	163	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	61.3	67.1	72.2	76.3	79.9
	KIAS	118	132	145	156	165

Flap placard speed exceeded in shaded area.

Airport Altitude = 12000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	52.0	57.0	61.7	65.3	68.4
	KIAS	131	146	159	172	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	56.6	62.2	66.9	70.9	74.2
	KIAS	125	139	152	164	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	62.2	67.9	73.1	77.2	80.8
	KIAS	118	132	145	156	166

Flap placard speed exceeded in shaded area.

Airport Altitude = 13000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	52.7	57.8	62.5	66.0	69.3
	KIAS	131	146	160	172	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	57.4	63.0	67.7	71.7	75.0
	KIAS	125	139	152	164	173
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	63.0	68.8	73.9	78.0	81.7
	KIAS	118	132	145	156	166

Flap placard speed exceeded in shaded area.

Airport Altitude = 14000 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	53.4	58.7	63.2	66.8	70.1
	KIAS	131	146	160	172	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	58.4	63.9	68.6	72.5	75.8
	KIAS	125	139	152	164	174
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	63.9	69.8	74.7	79.0	82.7
	KIAS	118	132	145	156	166

Flap placard speed exceeded in shaded area.

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Flight With Unreliable Airspeed/ Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

FINAL APPROACH (1500 FT)
Gear Down, %N1 for 3° Glideslope
Airport Altitude = 14500 FT

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 KG)				
		40	50	60	70	80
FLAPS 15 (VREF15 + 10)	PITCH ATT	2.5	2.5	2.5	2.5	3.0
	%N1	53.9	59.3	63.6	67.3	70.5
	KIAS	131	146	160	172	182
FLAPS 30 (VREF30 + 10)	PITCH ATT	1.0	1.0	1.0	1.0	1.5
	%N1	58.9	64.4	69.0	73.0	76.2
	KIAS	125	139	152	164	174
FLAPS 40 (VREF40 + 10)	PITCH ATT	-0.5	-0.5	-0.5	0.0	0.0
	%N1	64.4	70.4	75.2	79.5	83.2
	KIAS	118	132	145	156	167

Flap placard speed exceeded in shaded area.

GO-AROUND
Flaps 1, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	17.0	14.0	12.0	11.0	10.0
	V/S (FT/MIN)	4200	3300	2600	2100	1700
	KIAS	158	172	185	196	206
10000	PITCH ATT	19.5	16.0	13.5	12.0	11.0
	V/S (FT/MIN)	4800	3800	3100	2500	2100
	KIAS	158	172	185	196	205
5000	PITCH ATT	22.0	18.0	15.5	13.5	12.5
	V/S (FT/MIN)	5200	4200	3400	2900	2400
	KIAS	158	172	184	195	205
SEA LEVEL	PITCH ATT	24.5	20.0	17.0	15.0	13.5
	V/S (FT/MIN)	5600	4500	3700	3100	2700
	KIAS	158	172	184	195	205
-2000	PITCH ATT	25.0	20.0	17.0	15.0	13.5
	V/S (FT/MIN)	5500	4400	3700	3100	2600
	KIAS	158	172	184	195	204

Flaps 5, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	18.0	14.5	12.5	11.0	10.0
	V/S (FT/MIN)	3800	3000	2400	1900	1500
	KIAS	138	152	165	176	186
10000	PITCH ATT	20.5	16.5	14.0	12.5	11.5
	V/S (FT/MIN)	4300	3400	2800	2300	1900
	KIAS	138	152	165	176	185
5000	PITCH ATT	23.0	19.0	16.0	14.0	13.0
	V/S (FT/MIN)	4700	3800	3100	2600	2200
	KIAS	138	152	164	175	185
SEA LEVEL	PITCH ATT	26.0	21.0	17.5	15.5	14.0
	V/S (FT/MIN)	5000	4100	3400	2900	2400
	KIAS	138	152	164	175	185
-2000	PITCH ATT	26.0	21.0	18.0	15.5	14.0
	V/S (FT/MIN)	5000	4000	3400	2800	2400
	KIAS	138	152	164	175	184

Only authorized operators may use Flaps 5 for a Go-Around in conjunction with the Alternate Go-Around and Missed Approach Procedure.



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Flight With Unreliable Airspeed/ Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

GO-AROUND

Flaps 15, Gear Up, Set Go-Around Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 KG)				
		40	50	60	70	80
14000	PITCH ATT	17.0	14.0	11.5	10.0	9.0
	V/S (FT/MIN)	3300	2500	2000	1500	1100
	KIAS	128	142	155	166	176
10000	PITCH ATT	19.5	16.0	13.5	11.5	10.5
	V/S (FT/MIN)	3800	3000	2400	1900	1500
	KIAS	128	142	155	166	175
5000	PITCH ATT	22.5	18.0	15.0	13.0	11.5
	V/S (FT/MIN)	4200	3400	2700	2200	1800
	KIAS	128	142	154	165	175
SEA LEVEL	PITCH ATT	25.0	20.0	16.5	14.5	13.0
	V/S (FT/MIN)	4500	3700	3000	2500	2000
	KIAS	128	142	154	165	175
-2000	PITCH ATT	25.5	20.5	17.0	14.5	13.0
	V/S (FT/MIN)	4500	3600	3000	2500	2000
	KIAS	128	142	154	165	174

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Max Climb %N1

Based on engine bleed for packs on or off and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (FT)/SPEED (KIAS/MACH)									
	0	5000	10000	15000	20000	25000	30000	35000	37000	41000
	280	280	280	280	280	280	280	.78	.78	.78
60	89.4	89.7	89.7	89.8	89.6	91.4	93.0	94.4	94.5	92.8
55	90.2	90.5	90.5	90.7	90.0	90.8	92.4	93.7	93.8	92.1
50	90.9	91.2	91.3	91.5	91.0	90.8	91.7	93.0	93.1	91.4
45	91.6	91.9	92.1	92.3	91.9	91.7	91.7	92.3	92.4	90.7
40	92.4	92.6	92.9	93.1	92.7	92.5	92.5	91.6	91.7	90.0
35	92.9	93.3	93.6	93.8	93.6	93.3	93.3	92.4	91.7	90.1
30	92.2	94.1	94.3	94.6	94.4	94.1	94.0	93.2	92.6	91.1
25	91.5	94.1	95.0	95.2	95.2	94.8	94.7	94.0	93.4	92.1
20	90.7	93.3	95.8	96.0	95.9	95.6	95.4	94.7	94.2	93.0
15	90.0	92.5	95.2	96.8	96.7	96.3	96.1	95.5	95.0	94.0
10	89.2	91.8	94.4	97.1	97.6	97.0	96.7	96.2	95.8	94.9
5	88.4	91.0	93.6	96.3	98.5	97.9	97.4	97.0	96.6	95.8
0	87.7	90.2	92.8	95.5	97.9	99.0	98.4	97.8	97.5	96.7
-5	86.9	89.4	92.0	94.7	97.2	98.9	99.4	98.6	98.3	97.7
-10	86.1	88.6	91.2	93.9	96.4	98.1	99.7	99.5	99.2	98.7
-15	85.3	87.8	90.3	93.1	95.6	97.4	98.9	100.5	100.1	99.7
-20	84.5	87.0	89.5	92.3	94.8	96.6	98.1	100.2	100.7	100.3
-25	83.7	86.1	88.7	91.4	94.1	95.8	97.3	99.3	99.9	99.5
-30	82.9	85.3	87.8	90.6	93.3	95.0	96.5	98.5	99.0	98.7
-35	82.0	84.5	87.0	89.8	92.4	94.1	95.6	97.6	98.2	97.8
-40	81.2	83.6	86.1	88.9	91.6	93.3	94.8	96.8	97.3	96.9

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)					
	0	10	20	30	35	41
ENGINE ANTI-ICE	-0.6	-0.8	-0.9	-0.9	-0.8	-0.8
ENGINE & WING ANTI-ICE*	-1.8	-2.1	-2.5	-2.7	-3.0	-3.0

*Dual bleed sources



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Go-around %N1

Based on engine bleed for packs on, engine and wing anti-ice on or off

AIRPORT OAT		TAT (°C)	AIRPORT PRESSURE ALTITUDE (FT)											
°C	°F		-2000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
57	134	60	91.0	91.8	91.8									
52	125	55	91.7	92.6	92.6	92.5	92.5							
47	116	50	92.5	93.3	93.3	93.3	93.3	93.3	93.2	93.2				
42	108	45	93.3	94.1	94.1	94.1	94.0	94.0	94.0	93.9	93.9	93.8		
37	99	40	94.1	94.9	94.9	94.8	94.8	94.7	94.7	94.6	94.6	94.6	94.5	94.4
32	90	35	94.3	95.8	95.8	95.7	95.7	95.6	95.5	95.5	95.4	95.3	95.3	95.2
27	81	30	93.5	95.7	96.3	96.5	96.5	96.4	96.4	96.3	96.2	96.2	96.1	96.0
22	72	25	92.8	94.9	95.5	96.1	96.7	97.3	97.3	97.2	97.1	97.0	97.0	96.9
17	63	20	92.0	94.2	94.7	95.3	95.9	96.5	97.2	97.9	98.3	98.2	98.1	98.0
12	54	15	91.3	93.4	94.0	94.5	95.1	95.8	96.5	97.2	97.9	98.7	99.4	99.4
7	45	10	90.5	92.6	93.2	93.8	94.4	95.0	95.7	96.4	97.1	97.9	98.7	99.5
2	36	5	89.7	91.8	92.4	93.0	93.6	94.2	94.9	95.6	96.4	97.1	98.0	98.8
-3	27	0	89.0	91.0	91.6	92.2	92.8	93.4	94.1	94.8	95.6	96.4	97.2	98.1
-8	18	-5	88.2	90.2	90.8	91.4	92.0	92.6	93.3	94.0	94.8	95.6	96.4	97.3
-13	9	-10	87.4	89.4	90.0	90.6	91.1	91.8	92.5	93.2	94.0	94.8	95.7	96.5
-17	1	-15	86.6	88.6	89.2	89.7	90.3	90.9	91.7	92.4	93.2	94.0	94.9	95.8
-22	-8	-20	85.8	87.8	88.3	88.9	89.5	90.1	90.8	91.6	92.3	93.2	94.1	95.0
-27	-17	-25	84.9	86.9	87.5	88.1	88.6	89.3	90.0	90.7	91.5	92.3	93.3	94.2
-32	-26	-30	84.1	86.1	86.7	87.2	87.8	88.4	89.2	89.9	90.7	91.5	92.5	93.4
-37	-35	-35	83.3	85.2	85.8	86.3	86.9	87.6	88.3	89.0	89.8	90.7	91.6	92.6
-42	-44	-40	82.4	84.4	84.9	85.5	86.1	86.7	87.4	88.2	89.0	89.8	90.8	91.8
-47	-53	-45	81.6	83.5	84.1	84.6	85.2	85.8	86.6	87.3	88.1	89.0	90.0	90.9
-52	-62	-50	80.7	82.6	83.2	83.7	84.3	84.9	85.7	86.4	87.2	88.1	89.1	90.1

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)											
	-2000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
PACKS OFF	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	0.9
A/C HIGH	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1



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VREF

Based on 10000 ft reference pressure altitude

WEIGHT (1000 KG)	FLAPS		
	40	30	15
85	160	168	177
80	155	163	172
75	151	158	167
70	146	153	161
65	141	148	156
60	135	142	149
55	128	136	143
50	122	129	136
45	115	122	128
40	108	115	121



Performance Inflight - QRH
Advisory Information

Chapter PI-QRH
Section 21

ADVISORY INFORMATION

Runway Surface Condition Correlation

RUNWAY CONDITION CODE	RUNWAY SURFACE CONDITION DESCRIPTION	REPORTED BRAKING ACTION
6	Dry	Dry
5	Wet (Smooth, Grooved or PFC) or Frost 3 mm (0.12 inches) or less of: Water, Slush, Dry Snow or Wet Snow	Good
4	Compacted Snow at or below -15°C OAT	Good to Medium
3	Wet (Slippery), Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 3 mm (0.12 inches) of : Dry Snow or Wet Snow Compacted Snow at OAT warmer than -15°C	Medium
2	Greater than 3 mm (0.12 inches) of: Water or Slush	Medium to Poor
1	Ice	Poor
0	Wet Ice, Water on top of Compacted Snow, Dry Snow or Wet Snow over Ice	Nil

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF15	ONE REV	NO REV

Dry Runway

MAX MANUAL	1335	80/-70	30/35	-40/145	15/-10	30/-30	40	30	60
AUTOBRAKE MAX	1670	75/-85	35/45	-50/180	0/0	35/-35	70	0	5
AUTOBRAKE 3	2325	120/-140	60/75	-90/300	0/0	65/-65	115	0	0
AUTOBRAKE 2	2920	180/-195	85/110	-120/415	35/-50	80/-80	115	80	80
AUTOBRAKE 1	3210	215/-230	105/130	-145/490	80/-100	90/-90	110	275	385

Good Reported Braking Action

MAX MANUAL	1780	90/-100	45/60	-70/240	40/-35	40/-40	60	85	200
AUTOBRAKE MAX	1885	100/-105	45/65	-75/245	35/-30	40/-45	65	100	220
AUTOBRAKE 3	2325	120/-140	60/75	-90/305	5/0	65/-65	115	5	15
AUTOBRAKE 2	2920	180/-195	85/110	-120/415	35/-50	80/-80	115	80	80
AUTOBRAKE 1	3210	215/-230	105/130	-145/490	80/-100	90/-90	110	275	385

Good To Medium Reported Braking Action

MAX MANUAL	2085	120/-125	60/75	-90/320	70/-60	50/-50	65	165	400
AUTOBRAKE MAX	2160	125/-130	60/80	-95/325	65/-50	50/-55	75	175	410
AUTOBRAKE 3	2440	135/-150	65/85	-105/360	40/-25	65/-65	115	90	265
AUTOBRAKE 2	2950	185/-200	85/110	-125/440	55/-65	80/-85	115	105	185
AUTOBRAKE 1	3220	215/-230	105/135	-145/495	90/-100	90/-90	110	285	420

Medium Reported Braking Action

MAX MANUAL	2395	145/-150	70/90	-110/395	105/-80	65/-65	75	245	600
AUTOBRAKE MAX	2435	150/-155	70/100	-115/405	100/-75	65/-65	85	245	600
AUTOBRAKE 3	2550	150/-160	70/100	-115/415	75/-50	70/-70	115	175	520
AUTOBRAKE 2	2980	185/-200	85/115	-130/465	75/-75	80/-85	115	130	290
AUTOBRAKE 1	3230	215/-230	105/140	-150/505	105/-105	90/-90	110	295	455

Medium To Poor Reported Braking Action

MAX MANUAL	2750	175/-180	85/115	-140/515	175/-120	70/-75	85	390	1015
AUTOBRAKE MAX	2770	180/-185	85/120	-140/520	175/-120	70/-75	90	390	1015
AUTOBRAKE 3	2835	180/-185	85/120	-140/525	160/-100	75/-80	110	355	980
AUTOBRAKE 2	3150	200/-215	95/130	-155/560	150/-110	85/-90	115	280	770
AUTOBRAKE 1	3345	225/-240	110/145	-165/590	170/-135	90/-95	110	400	850

Poor Reported Braking Action

MAX MANUAL	3100	205/-215	100/140	-165/635	245/-160	80/-85	90	535	1430
AUTOBRAKE MAX	3100	215/-215	105/140	-165/635	255/-165	80/-85	90	535	1430
AUTOBRAKE 3	3120	215/-215	105/140	-165/635	240/-150	80/-85	110	535	1445
AUTOBRAKE 2	3315	220/-230	105/145	-180/650	230/-150	85/-90	115	430	1255
AUTOBRAKE 1	3460	235/-245	115/155	-185/675	235/-165	90/-100	110	505	1240

Reference distance is based on sea level, standard day, no wind or slope, VREF15, two-engine detent No. 2 reverse thrust, and auto speedbrakes.
For max manual braking and manual speedbrakes, increase reference landing distance by 70 m.
For autobrake and manual speedbrakes, increase reference landing distance by 65 m.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF30	ONE REV	NO REV

Dry Runway

MAX MANUAL	1280	65/-65	25/35	-40/140	10/-10	25/-25	40	25	45
AUTOBRAKE MAX	1575	70/-75	35/40	-50/175	0/0	35/-35	65	0	5
AUTOBRAKE 3	2160	110/-125	50/70	-85/290	0/0	60/-60	110	0	0
AUTOBRAKE 2	2695	160/-175	75/105	-115/395	35/-45	75/-75	110	70	70
AUTOBRAKE 1	2955	190/-205	90/120	-140/465	75/-85	80/-80	100	225	335

Good Reported Braking Action

MAX MANUAL	1705	85/-90	40/50	-70/235	40/-35	40/-40	60	80	180
AUTOBRAKE MAX	1805	90/-100	45/60	-70/240	35/-30	40/-40	70	85	195
AUTOBRAKE 3	2160	110/-125	50/70	-85/290	5/0	60/-60	110	5	15
AUTOBRAKE 2	2695	160/-175	75/105	-115/395	35/-45	75/-75	110	70	70
AUTOBRAKE 1	2955	190/-205	90/120	-140/465	75/-85	80/-80	100	225	335

Good To Medium Reported Braking Action

MAX MANUAL	1985	110/-115	50/70	-90/310	70/-55	50/-50	65	150	350
AUTOBRAKE MAX	2055	115/-120	55/70	-90/315	65/-50	50/-50	80	150	360
AUTOBRAKE 3	2275	125/-135	60/80	-100/340	40/-25	60/-60	110	85	245
AUTOBRAKE 2	2725	160/-175	80/105	-120/425	55/-60	75/-75	110	95	165
AUTOBRAKE 1	2960	190/-205	90/120	-140/475	85/-90	80/-85	100	235	370

Medium Reported Braking Action

MAX MANUAL	2265	130/-140	65/85	-110/385	100/-75	60/-60	75	220	520
AUTOBRAKE MAX	2305	140/-145	65/85	-110/390	90/-70	60/-60	85	220	525
AUTOBRAKE 3	2390	140/-145	65/85	-110/395	75/-50	65/-65	110	160	470
AUTOBRAKE 2	2755	160/-180	80/105	-125/450	75/-70	75/-75	110	120	260
AUTOBRAKE 1	2970	190/-205	90/120	-140/485	100/-90	80/-85	100	240	405

Medium To Poor Reported Braking Action

MAX MANUAL	2580	160/-165	80/105	-135/495	165/-115	65/-70	80	340	860
AUTOBRAKE MAX	2600	165/-170	80/105	-135/500	165/-110	65/-70	90	340	865
AUTOBRAKE 3	2655	165/-170	80/105	-135/505	150/-100	70/-70	105	310	840
AUTOBRAKE 2	2920	180/-195	90/120	-145/540	145/-105	80/-80	105	255	660
AUTOBRAKE 1	3085	200/-215	95/130	-155/565	160/-125	85/-90	100	340	735

Poor Reported Braking Action

MAX MANUAL	2895	190/-195	90/125	-160/610	235/-155	75/-80	85	460	1200
AUTOBRAKE MAX	2900	190/-195	90/125	-160/610	235/-155	75/-80	90	460	1210
AUTOBRAKE 3	2920	195/-195	90/125	-160/615	230/-145	75/-80	100	460	1215
AUTOBRAKE 2	3080	200/-205	100/130	-165/635	220/-145	80/-85	105	385	1065
AUTOBRAKE 1	3200	215/-220	100/140	-175/650	225/-155	85/-90	100	435	1070

Reference distance is based on sea level, standard day, no wind or slope, VREF30, two-engine detent No. 2 reverse thrust, and auto speedbrakes.
For max manual braking and manual speedbrakes, increase reference landing distance by 70 m.
For autobrake and manual speedbrakes, increase reference landing distance by 65 m.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF40	ONE REV	NO REV

Dry Runway

MAX MANUAL	1230	65/-60	25/30	-40/130	10/-10	25/-25	40	15	40
AUTOBRAKE MAX	1480	65/-70	30/40	-45/160	0/0	30/-30	65	0	0
AUTOBRAKE 3	2005	100/-115	45/65	-80/270	0/0	50/-50	105	0	0
AUTOBRAKE 2	2510	145/-160	70/90	-110/380	25/-40	70/-70	110	40	40
AUTOBRAKE 1	2775	175/-190	85/110	-130/450	65/-75	75/-75	100	180	255

Good Reported Braking Action

MAX MANUAL	1635	80/-85	40/50	-65/230	40/-35	35/-35	60	75	160
AUTOBRAKE MAX	1730	85/-90	40/50	-70/235	35/-30	40/-40	70	80	175
AUTOBRAKE 3	2015	100/-115	45/65	-80/275	10/-5	50/-50	110	5	15
AUTOBRAKE 2	2510	145/-160	70/90	-110/380	25/-40	70/-70	110	40	40
AUTOBRAKE 1	2775	175/-190	85/110	-130/450	65/-75	75/-75	100	180	255

Good To Medium Reported Braking Action

MAX MANUAL	1900	100/-110	50/65	-85/305	70/-55	45/-45	65	135	315
AUTOBRAKE MAX	1960	105/-115	50/65	-85/310	60/-50	45/-50	80	140	320
AUTOBRAKE 3	2130	110/-125	55/70	-95/335	45/-30	55/-55	105	90	235
AUTOBRAKE 2	2545	145/-165	70/95	-115/405	45/-50	70/-70	110	65	130
AUTOBRAKE 1	2785	175/-190	85/110	-130/455	80/-80	75/-75	100	185	285

Medium Reported Braking Action

MAX MANUAL	2165	120/-130	60/80	-105/380	100/-75	50/-50	75	195	465
AUTOBRAKE MAX	2190	125/-140	65/80	-105/385	85/-70	50/-60	85	195	465
AUTOBRAKE 3	2245	125/-140	65/80	-110/390	80/-50	60/-60	105	175	450
AUTOBRAKE 2	2580	150/-165	70/100	-120/430	65/-65	70/-70	110	85	220
AUTOBRAKE 1	2790	175/-190	85/110	-130/465	90/-85	75/-75	100	195	315

Medium To Poor Reported Braking Action

MAX MANUAL	2460	150/-160	70/100	-130/490	165/-110	60/-65	80	305	770
AUTOBRAKE MAX	2475	150/-160	75/100	-130/490	160/-110	60/-65	85	305	770
AUTOBRAKE 3	2510	150/-165	75/100	-135/495	150/-100	65/-65	100	295	760
AUTOBRAKE 2	2740	165/-180	80/110	-140/525	140/-100	70/-75	105	210	585
AUTOBRAKE 1	2905	185/-200	90/120	-150/550	155/-120	80/-80	100	290	625

Poor Reported Braking Action

MAX MANUAL	2755	180/-185	85/115	-160/600	230/-150	70/-75	85	415	1070
AUTOBRAKE MAX	2765	180/-185	85/120	-160/600	230/-150	70/-75	85	415	1070
AUTOBRAKE 3	2775	180/-190	85/120	-160/605	225/-145	70/-75	100	415	1075
AUTOBRAKE 2	2900	185/-190	85/120	-160/615	215/-140	75/-80	105	335	955
AUTOBRAKE 1	3015	195/-205	90/125	-165/635	220/-150	80/-85	100	385	935

Reference distance is based on sea level, standard day, no wind or slope, VREF40, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

For max manual braking and manual speedbrakes, increase reference landing distance by 65 m.

For autobrake and manual speedbrakes, increase reference landing distance by 50 m.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

All reference distances and adjustments shown have been increased by 15%.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Airspeed Unreliable (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1225	80/-65	25/35	-40/130	15/-10	25/-25	N/A	30	60
AUTOBRAKE MAX	1585	70/-80	35/45	-50/165	5/-5	35/-35	N/A	0	5
AUTOBRAKE 2	2700	165/-180	85/110	-110/370	50/-55	75/-75	N/A	165	180

Good Reported Braking Action

MAX MANUAL	1625	80/-85	40/55	-60/215	35/-30	40/-40	N/A	90	205
AUTOBRAKE MAX	1750	85/-95	45/60	-65/225	30/-25	40/-40	N/A	100	230
AUTOBRAKE 2	2700	165/-180	85/110	-110/370	55/-55	75/-75	N/A	165	180

Good To Medium Reported Braking Action

MAX MANUAL	1900	105/-110	55/70	-80/285	65/-50	50/-50	N/A	165	400
AUTOBRAKE MAX	1990	110/-120	55/75	-85/290	60/-45	50/-50	N/A	175	420
AUTOBRAKE 2	2730	170/-185	85/110	-115/395	70/-65	75/-80	N/A	185	270

Medium Reported Braking Action

MAX MANUAL	2175	130/-135	65/85	-100/350	90/-70	55/-55	N/A	240	595
AUTOBRAKE MAX	2230	130/-140	65/90	-100/355	85/-65	55/-60	N/A	245	605
AUTOBRAKE 3	2405	135/-145	70/90	-105/370	60/-45	65/-65	N/A	145	460

Medium To Poor Reported Braking Action

MAX MANUAL	2480	160/-165	80/105	-125/450	150/-105	65/-70	N/A	375	990
AUTOBRAKE MAX	2510	160/-165	80/110	-125/455	150/-100	65/-70	N/A	375	995
AUTOBRAKE 3	2620	160/-170	80/110	-130/465	130/-85	70/-75	N/A	315	920

Poor Reported Braking Action

MAX MANUAL	2785	185/-190	90/125	-145/550	210/-140	75/-80	N/A	505	1385
AUTOBRAKE MAX	2785	185/-190	90/125	-145/550	210/-135	75/-80	N/A	500	1380
AUTOBRAKE 3	2835	185/-190	90/125	-150/555	195/-125	75/-80	N/A	485	1375

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Airspeed Unreliable (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1175	60/-60	25/30	-35/125	15/-10	25/-25	N/A	25	55
AUTOBRAKE MAX	1485	60/-70	30/40	-45/155	5/-5	30/-35	N/A	0	5
AUTOBRAKE 2	2495	150/-160	75/95	-105/355	45/-50	70/-70	N/A	140	160

Good Reported Braking Action

MAX MANUAL	1565	75/-80	40/50	-60/210	35/-30	35/-35	N/A	80	185
AUTOBRAKE MAX	1675	80/-90	40/55	-65/220	30/-30	40/-40	N/A	90	205
AUTOBRAKE 2	2495	150/-160	75/95	-105/355	45/-50	70/-70	N/A	140	160

Good To Medium Reported Braking Action

MAX MANUAL	1815	100/-105	50/65	-80/275	60/-50	45/-45	N/A	150	355
AUTOBRAKE MAX	1895	100/-110	50/70	-80/285	55/-50	50/-50	N/A	155	370
AUTOBRAKE 2	2525	150/-165	75/100	-110/380	65/-60	70/-70	N/A	160	245

Medium Reported Braking Action

MAX MANUAL	2065	120/-125	60/80	-95/340	85/-70	50/-55	N/A	215	520
AUTOBRAKE MAX	2115	120/-130	60/80	-95/345	80/-65	55/-55	N/A	215	530
AUTOBRAKE 3	2250	120/-135	60/85	-100/360	60/-50	60/-60	N/A	135	420

Medium To Poor Reported Braking Action

MAX MANUAL	2340	145/-150	75/100	-120/440	145/-100	60/-65	N/A	325	845
AUTOBRAKE MAX	2370	145/-155	75/100	-120/440	140/-95	65/-65	N/A	325	845
AUTOBRAKE 3	2455	145/-155	75/100	-125/450	125/-90	65/-70	N/A	280	795

Poor Reported Braking Action

MAX MANUAL	2610	170/-170	85/115	-140/535	200/-130	65/-70	N/A	435	1165
AUTOBRAKE MAX	2620	170/-175	85/115	-140/535	200/-125	70/-75	N/A	430	1160
AUTOBRAKE 3	2660	170/-175	85/115	-145/540	190/-125	70/-75	N/A	425	1165

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Airspeed Unreliable (Flaps 40)
VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1135	55/-55	20/30	-35/120	15/-10	20/-20	N/A	20	45
AUTOBRAKE MAX	1395	55/-65	30/35	-45/150	5/0	30/-30	N/A	0	0
AUTOBRAKE 2	2345	135/-150	70/90	-100/340	40/-45	65/-65	N/A	105	110

Good Reported Braking Action

MAX MANUAL	1510	70/-80	35/50	-60/205	35/-30	35/-35	N/A	75	170
AUTOBRAKE MAX	1605	75/-85	40/50	-60/215	30/-25	35/-35	N/A	85	185
AUTOBRAKE 2	2345	135/-150	70/90	-100/340	40/-45	65/-65	N/A	105	110

Good To Medium Reported Braking Action

MAX MANUAL	1745	90/-100	45/65	-80/270	60/-50	45/-45	N/A	135	320
AUTOBRAKE MAX	1815	95/-105	50/65	-80/280	55/-45	45/-45	N/A	140	330
AUTOBRAKE 2	2375	140/-155	70/90	-105/365	55/-55	65/-65	N/A	125	195

Medium Reported Braking Action

MAX MANUAL	1980	110/-120	55/75	-95/335	85/-65	50/-50	N/A	195	465
AUTOBRAKE MAX	2020	115/-125	60/80	-95/340	80/-60	50/-50	N/A	195	475
AUTOBRAKE 3	2115	115/-125	60/80	-100/350	60/-50	55/-55	N/A	135	405

Medium To Poor Reported Braking Action

MAX MANUAL	2240	135/-145	70/95	-120/430	140/-100	60/-60	N/A	295	750
AUTOBRAKE MAX	2265	140/-145	70/95	-120/435	140/-95	60/-60	N/A	295	755
AUTOBRAKE 3	2325	140/-145	70/95	-120/440	125/-90	60/-65	N/A	265	725

Poor Reported Braking Action

MAX MANUAL	2495	160/-165	80/110	-140/525	195/-130	65/-70	N/A	395	1035
AUTOBRAKE MAX	2505	160/-165	80/110	-140/525	195/-125	65/-70	N/A	390	1035
AUTOBRAKE 3	2530	160/-165	80/110	-140/530	190/-125	65/-70	N/A	395	1045

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
All Flaps Up Landing
VREF40 + 55

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1480	185/-85	50/105	-45/205	20/-15	35/-35	45	45	95
AUTOBRAKE MAX	2005	85/-90	45/70	-60/195	5/-5	50/-50	75	5	20
AUTOBRAKE 2	3510	195/-225	115/150	-130/430	75/-85	105/-105	100	280	330

Good Reported Braking Action

MAX MANUAL	1905	85/-95	50/65	-65/230	40/-35	45/-50	45	110	255
AUTOBRAKE MAX	2150	90/-100	55/75	-75/245	30/-25	55/-55	70	85	225
AUTOBRAKE 2	3510	195/-225	115/150	-130/430	75/-85	105/-105	100	280	330

Good To Medium Reported Braking Action

MAX MANUAL	2275	115/-125	65/90	-90/310	75/-60	60/-65	55	215	515
AUTOBRAKE MAX	2440	120/-130	70/95	-95/320	65/-55	65/-65	75	205	515
AUTOBRAKE 2	3540	200/-225	115/150	-135/455	90/-95	105/-105	100	305	435

Medium Reported Braking Action

MAX MANUAL	2645	145/-155	80/110	-110/385	105/-85	70/-75	65	315	775
AUTOBRAKE MAX	2730	150/-160	85/115	-110/390	100/-80	75/-75	75	325	800
AUTOBRAKE 3	3100	145/-170	90/120	-120/420	65/-60	90/-90	110	165	510

Medium To Poor Reported Braking Action

MAX MANUAL	3060	185/-190	100/140	-140/495	180/-130	85/-90	75	505	1345
AUTOBRAKE MAX	3105	185/-195	105/140	-140/500	175/-120	90/-90	85	505	1355
AUTOBRAKE 3	3350	180/-200	105/145	-145/520	145/-105	95/-100	110	385	1175

Poor Reported Braking Action

MAX MANUAL	3470	220/-225	120/165	-165/605	250/-170	95/-100	80	690	1915
AUTOBRAKE MAX	3475	215/-225	120/165	-165/605	245/-160	100/-100	90	685	1905
AUTOBRAKE 3	3595	210/-225	120/165	-170/615	220/-150	100/-105	110	600	1840

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
ANTISKID INOPERATIVE (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1945	105/-110	50/65	-80/290	55/-45	45/-45	60	145	345
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	2165	125/-130	60/80	-100/350	85/-65	50/-55	70	215	530
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2450	155/-155	75/100	-125/450	145/-100	60/-65	75	340	905
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2735	180/-180	85/120	-145/545	200/-135	70/-75	80	460	1280
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	3170	220/-220	105/150	-195/775	415/-220	80/-90	90	780	2600
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3600	260/-260	120/175	-245/1005	625/-305	85/-105	95	1100	3915
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
ANTISKID INOPERATIVE (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1845	95/-105	45/60	-80/280	55/-45	40/-45	60	125	300
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	2045	115/-120	55/75	-95/340	80/-65	50/-50	65	185	455
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2305	140/-145	70/90	-120/435	135/-95	60/-60	75	290	765
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2565	165/-165	80/105	-140/530	190/-125	65/-70	80	395	1075
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2960	200/-200	95/130	-190/755	390/-205	70/-85	85	670	2145
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3355	235/-235	110/155	-235/980	590/-285	75/-100	90	945	3215
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
ANTISKID INOPERATIVE (Flaps 40)
VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1765	90/-100	45/60	-80/275	55/-45	40/-40	60	115	265
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1955	105/-115	50/70	-95/335	80/-60	45/-45	65	170	405
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2200	130/-135	60/85	-120/430	135/-90	55/-55	75	265	680
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2440	150/-155	70/100	-140/520	185/-120	60/-65	80	355	950
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2815	185/-190	85/125	-185/740	380/-200	65/-80	85	610	1905
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3190	220/-225	100/145	-230/960	575/-275	70/-95	85	860	2860
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Jammed or Restricted Flight Controls (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1155	70/-60	25/30	-35/125	10/-10	20/-25	35	25	50
AUTOBRAKE MAX	1460	65/-75	30/40	-45/155	5/-5	30/-30	65	0	5
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good Reported Braking Action

MAX MANUAL	1530	75/-80	35/50	-60/205	35/-30	35/-35	50	80	185
AUTOBRAKE MAX	1635	85/-90	40/55	-60/215	30/-25	35/-35	55	90	205
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good To Medium Reported Braking Action

MAX MANUAL	1790	100/-105	50/65	-80/275	60/-50	45/-45	60	155	370
AUTOBRAKE MAX	1860	105/-110	50/70	-80/280	55/-45	45/-45	65	160	380
AUTOBRAKE 2	2540	160/-175	75/100	-110/380	50/-60	70/-70	95	120	190

Medium Reported Braking Action

MAX MANUAL	2050	125/-130	60/80	-95/340	85/-65	50/-55	65	225	550
AUTOBRAKE MAX	2085	125/-130	60/80	-95/345	80/-65	50/-55	75	225	555
AUTOBRAKE 3	2205	125/-135	60/85	-100/355	60/-40	55/-60	100	145	465

Medium To Poor Reported Braking Action

MAX MANUAL	2340	155/-155	75/100	-120/440	145/-100	60/-65	70	350	930
AUTOBRAKE MAX	2360	155/-155	75/100	-120/445	145/-100	60/-65	80	350	930
AUTOBRAKE 3	2430	155/-160	75/105	-125/450	130/-80	65/-70	100	310	890

Poor Reported Braking Action

MAX MANUAL	2630	180/-180	85/120	-145/540	205/-135	70/-75	75	475	1310
AUTOBRAKE MAX	2630	180/-180	85/120	-145/540	205/-135	70/-75	80	475	1305
AUTOBRAKE 3	2650	180/-180	85/120	-145/540	200/-120	70/-75	95	475	1310

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
LEADING EDGE FLAPS TRANSIT (Flaps 15)
VREF15 + 15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1280	80/-70	25/35	-40/135	15/-15	25/-25	35	30	70
AUTOBRAKE MAX	1650	70/-80	35/45	-50/170	5/-5	40/-40	65	0	5
AUTOBRAKE 2	2875	175/-190	90/115	-115/385	50/-60	85/-85	100	155	160

Good Reported Braking Action

MAX MANUAL	1720	85/-95	45/60	-65/220	40/-35	40/-40	50	105	240
AUTOBRAKE MAX	1840	90/-100	45/60	-65/230	35/-30	45/-45	60	115	260
AUTOBRAKE 2	2880	175/-190	90/115	-115/385	50/-60	85/-85	100	160	160

Good To Medium Reported Braking Action

MAX MANUAL	2020	115/-120	60/80	-85/295	70/-55	50/-50	60	190	470
AUTOBRAKE MAX	2100	115/-125	60/80	-85/300	65/-50	55/-55	70	200	480
AUTOBRAKE 2	2910	180/-195	90/120	-120/410	65/-70	85/-85	100	185	270

Medium Reported Braking Action

MAX MANUAL	2320	140/-145	70/95	-100/365	95/-75	60/-60	70	275	695
AUTOBRAKE MAX	2360	140/-150	70/95	-105/365	90/-70	60/-65	75	280	700
AUTOBRAKE 3	2525	140/-150	75/100	-110/380	65/-45	70/-70	110	175	570

Medium To Poor Reported Braking Action

MAX MANUAL	2650	170/-175	85/120	-130/470	160/-115	70/-75	75	430	1160
AUTOBRAKE MAX	2670	170/-180	85/120	-130/470	160/-115	70/-75	80	430	1160
AUTOBRAKE 3	2765	170/-175	90/120	-135/475	140/-90	75/-80	105	370	1095

Poor Reported Braking Action

MAX MANUAL	2975	200/-205	100/140	-155/570	225/-150	80/-85	80	580	1620
AUTOBRAKE MAX	2975	200/-205	100/140	-155/570	230/-155	80/-85	85	575	1615
AUTOBRAKE 3	3005	200/-200	100/140	-155/570	215/-130	80/-85	100	565	1615

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM A (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1270	70/-65	25/35	-40/135	15/-15	25/-25	45	35	60
AUTOBRAKE MAX	1450	65/-75	30/40	-45/155	0/0	30/-30	60	0	10
AUTOBRAKE 2	2615	150/-175	75/95	-110/365	0/-10	75/-75	140	0	0

Good Reported Braking Action

MAX MANUAL	1770	95/-100	45/60	-70/235	50/-40	40/-45	70	135	275
AUTOBRAKE MAX	1780	95/-105	45/65	-70/235	40/-35	45/-45	75	135	275
AUTOBRAKE 2	2615	150/-175	75/95	-110/365	0/-10	75/-75	140	0	0

Good To Medium Reported Braking Action

MAX MANUAL	2080	125/-130	60/80	-90/310	85/-65	50/-55	80	245	560
AUTOBRAKE MAX	2075	125/-130	60/85	-90/310	80/-65	55/-55	85	240	555
AUTOBRAKE 2	2655	155/-175	75/100	-115/390	30/-25	75/-75	140	55	270

Medium Reported Braking Action

MAX MANUAL	2385	150/-155	75/100	-110/380	115/-90	60/-65	90	350	840
AUTOBRAKE MAX	2370	150/-155	75/100	-105/380	120/-95	60/-65	90	345	830
AUTOBRAKE 3	2370	150/-155	75/100	-105/380	120/-85	60/-65	90	345	830

Medium To Poor Reported Braking Action

MAX MANUAL	2720	185/-185	90/125	-135/485	190/-135	70/-75	100	530	1435
AUTOBRAKE MAX	2710	185/-185	90/125	-135/485	195/-140	70/-75	100	530	1430
AUTOBRAKE 3	2710	185/-185	90/125	-135/485	195/-135	70/-75	100	530	1430

Poor Reported Braking Action

MAX MANUAL	3055	215/-215	105/145	-160/590	265/-175	80/-85	105	710	2025
AUTOBRAKE MAX	3050	215/-215	105/150	-160/590	265/-180	80/-85	105	710	2025
AUTOBRAKE 3	3050	215/-215	105/150	-160/590	265/-180	80/-85	105	710	2025

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
LOSS OF SYSTEM A (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1210	65/-55	25/35	-40/130	15/-15	25/-25	45	30	50
AUTOBRAKE MAX	1365	60/-65	30/35	-45/145	0/0	30/-30	55	10	15
AUTOBRAKE 2	2410	135/-155	65/85	-105/350	0/-10	70/-70	135	0	0

Good Reported Braking Action

MAX MANUAL	1685	85/-95	45/60	-65/225	45/-40	40/-40	70	120	240
AUTOBRAKE MAX	1700	90/-95	45/60	-65/230	40/-35	40/-40	75	120	240
AUTOBRAKE 2	2410	135/-155	65/85	-105/350	0/-10	70/-70	135	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1965	110/-120	55/75	-85/300	80/-65	50/-50	80	215	475
AUTOBRAKE MAX	1970	115/-120	60/75	-85/300	80/-65	50/-50	85	210	475
AUTOBRAKE 2	2450	140/-155	70/90	-110/375	30/-25	70/-70	135	55	235

Medium Reported Braking Action

MAX MANUAL	2240	135/-140	65/90	-105/370	110/-85	55/-60	85	305	710
AUTOBRAKE MAX	2235	135/-140	70/90	-105/370	115/-90	55/-60	90	300	705
AUTOBRAKE 3	2235	135/-140	70/90	-105/370	115/-80	55/-60	90	300	705

Medium To Poor Reported Braking Action

MAX MANUAL	2545	165/-170	80/110	-130/470	180/-125	65/-70	95	455	1180
AUTOBRAKE MAX	2540	165/-170	85/115	-130/470	185/-130	65/-70	95	455	1180
AUTOBRAKE 3	2540	165/-170	85/115	-130/470	185/-125	65/-70	95	455	1180

Poor Reported Braking Action

MAX MANUAL	2845	195/-195	95/130	-155/570	250/-165	75/-80	100	605	1650
AUTOBRAKE MAX	2845	195/-195	95/135	-155/570	250/-165	75/-80	100	605	1650
AUTOBRAKE 3	2845	195/-195	95/135	-155/570	250/-165	75/-80	100	605	1650

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM A (Flaps 40)

VREF40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1165	60/-55	25/30	-35/125	15/-15	25/-25	50	30	45
AUTOBRAKE MAX	1290	55/-60	25/35	-40/140	5/0	25/-25	55	10	20
AUTOBRAKE 2	2225	125/-140	60/80	-100/335	0/-5	60/-60	130	0	0

Good Reported Braking Action

MAX MANUAL	1610	80/-90	40/55	-65/225	45/-40	35/-40	70	105	210
AUTOBRAKE MAX	1620	85/-90	40/55	-65/225	40/-35	40/-40	75	105	210
AUTOBRAKE 2	2225	125/-140	60/80	-100/335	0/-5	60/-60	130	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1865	105/-115	50/70	-85/295	75/-65	45/-50	80	185	415
AUTOBRAKE MAX	1870	105/-115	50/70	-85/295	75/-60	50/-50	80	185	415
AUTOBRAKE 2	2265	125/-145	60/85	-105/360	30/-20	60/-65	130	55	220

Medium Reported Braking Action

MAX MANUAL	2120	125/-135	60/85	-100/360	105/-85	55/-55	85	265	615
AUTOBRAKE MAX	2120	125/-135	60/85	-100/360	110/-85	55/-55	85	265	615
AUTOBRAKE 3	2120	125/-135	60/85	-100/360	110/-80	55/-55	90	265	615

Medium To Poor Reported Braking Action

MAX MANUAL	2400	155/-160	75/105	-125/460	175/-120	65/-65	90	395	1010
AUTOBRAKE MAX	2400	155/-160	75/105	-125/460	180/-125	65/-65	90	400	1010
AUTOBRAKE 3	2400	155/-160	75/105	-125/460	180/-120	65/-65	95	400	1010

Poor Reported Braking Action

MAX MANUAL	2675	180/-185	85/120	-150/560	240/-155	70/-75	95	525	1400
AUTOBRAKE MAX	2680	180/-185	90/125	-150/560	245/-160	70/-75	95	530	1405
AUTOBRAKE 3	2680	180/-185	90/125	-150/560	245/-160	70/-75	95	530	1405

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
LOSS OF SYSTEM A AND SYSTEM B (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1720	80/-90	40/50	-60/195	35/-35	40/-40	75	-10	65
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	2440	135/-145	65/90	-100/335	100/-80	60/-60	105	95	440
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2815	170/-180	85/115	-125/430	160/-120	70/-75	115	230	930
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	3185	200/-210	100/140	-150/525	215/-160	80/-85	120	365	1415
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	3555	240/-245	120/165	-180/655	345/-215	90/-100	125	590	2400
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3920	275/-275	135/190	-210/785	475/-270	100/-110	130	815	3380
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

LOSS OF SYSTEM B (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1290	55/-60	25/35	-45/145	20/-15	25/-25	40	40	70
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	1780	95/-100	45/65	-75/255	50/-45	45/-45	60	140	285
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2075	125/-130	60/85	-95/335	90/-70	55/-55	70	240	550
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	2365	150/-155	70/100	-115/410	125/-95	60/-65	75	340	815
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	2675	180/-185	85/120	-145/525	210/-140	70/-75	85	505	1345
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	2985	210/-210	100/140	-170/640	295/-180	75/-85	90	665	1870
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
MANUAL REVERSION (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1720	80/-90	40/50	-60/195	35/-35	40/-40	75	-10	65
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good Reported Braking Action

MAX MANUAL	2440	135/-145	65/90	-100/335	100/-80	60/-60	105	95	440
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Good To Medium Reported Braking Action

MAX MANUAL	2815	170/-180	85/115	-125/430	160/-120	70/-75	115	230	930
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 2	Autobrake Inoperative								

Medium Reported Braking Action

MAX MANUAL	3185	200/-210	100/140	-150/525	215/-160	80/-85	120	365	1415
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Medium To Poor Reported Braking Action

MAX MANUAL	3555	240/-245	120/165	-180/655	345/-215	90/-100	125	590	2400
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Poor Reported Braking Action

MAX MANUAL	3920	275/-275	135/190	-210/785	475/-270	100/-110	130	815	3380
AUTOBRAKE MAX	Autobrake Inoperative								
AUTOBRAKE 3	Autobrake Inoperative								

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

One Engine Inoperative Landing (Flaps 15)

VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1170	75/-65	25/30	-35/130	15/-10	25/-25	35	0	25
AUTOBRAKE MAX	1450	70/-75	30/40	-45/155	0/0	30/-30	60	0	0
AUTOBRAKE 2	2600	150/-170	75/95	-110/365	10/-25	75/-75	120	0	0

Good Reported Braking Action

MAX MANUAL	1590	80/-85	40/50	-65/215	40/-35	40/-40	50	0	100
AUTOBRAKE MAX	1695	85/-95	40/55	-65/225	35/-30	40/-40	60	0	110
AUTOBRAKE 2	2600	150/-170	75/95	-110/365	10/-25	75/-75	120	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1910	110/-115	55/70	-85/295	75/-60	50/-50	60	0	205
AUTOBRAKE MAX	1980	110/-120	55/70	-85/300	70/-55	50/-50	70	0	215
AUTOBRAKE 2	2640	155/-175	75/100	-115/395	35/-40	75/-75	120	0	65

Medium Reported Braking Action

MAX MANUAL	2225	135/-140	65/85	-105/370	110/-85	60/-60	70	0	310
AUTOBRAKE MAX	2265	135/-145	65/85	-105/375	105/-80	60/-60	80	0	315
AUTOBRAKE 3	2315	135/-150	65/85	-105/380	90/-65	60/-65	100	0	295

Medium To Poor Reported Braking Action

MAX MANUAL	2615	170/-175	80/110	-135/490	200/-135	75/-75	80	0	540
AUTOBRAKE MAX	2635	170/-180	80/110	-135/490	200/-135	75/-75	90	0	540
AUTOBRAKE 3	2670	170/-180	80/110	-135/495	185/-125	75/-75	100	0	535

Poor Reported Braking Action

MAX MANUAL	3000	200/-210	95/130	-165/605	290/-185	85/-85	90	0	765
AUTOBRAKE MAX	3000	200/-210	95/130	-165/605	290/-185	85/-85	95	0	765
AUTOBRAKE 3	3025	205/-210	95/130	-165/610	280/-180	85/-85	100	0	775

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
One Engine Inoperative Landing (Flaps 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1120	60/-55	20/30	-35/125	15/-10	20/-20	35	0	25
AUTOBRAKE MAX	1365	60/-65	30/35	-45/150	0/0	30/-30	55	0	0
AUTOBRAKE 2	2390	135/-150	65/85	-105/350	10/-25	65/-65	110	0	0

Good Reported Braking Action

MAX MANUAL	1520	75/-80	35/50	-60/210	35/-30	35/-35	50	0	90
AUTOBRAKE MAX	1615	80/-90	40/50	-65/220	35/-30	35/-40	60	0	100
AUTOBRAKE 2	2390	135/-150	65/85	-105/350	10/-25	65/-65	110	0	0

Good To Medium Reported Braking Action

MAX MANUAL	1805	100/-105	50/65	-80/285	70/-55	45/-45	60	0	180
AUTOBRAKE MAX	1870	105/-115	50/65	-85/295	65/-55	45/-50	70	0	185
AUTOBRAKE 2	2430	140/-155	70/90	-110/375	35/-40	70/-70	110	0	55

Medium Reported Braking Action

MAX MANUAL	2090	120/-130	60/80	-100/360	105/-80	55/-55	70	0	265
AUTOBRAKE MAX	2125	125/-135	60/80	-100/365	95/-75	55/-55	80	0	270
AUTOBRAKE 3	2165	125/-135	60/80	-105/365	90/-65	55/-60	90	0	260

Medium To Poor Reported Braking Action

MAX MANUAL	2435	150/-160	75/100	-130/475	185/-125	65/-70	80	0	450
AUTOBRAKE MAX	2450	155/-165	75/100	-130/475	185/-120	65/-70	85	0	455
AUTOBRAKE 3	2485	155/-165	75/100	-135/475	175/-120	65/-70	90	0	450

Poor Reported Braking Action

MAX MANUAL	2775	180/-190	85/115	-155/585	265/-170	75/-80	85	0	635
AUTOBRAKE MAX	2775	180/-190	85/115	-155/585	270/-165	75/-80	90	0	635
AUTOBRAKE 3	2805	185/-190	90/120	-160/585	260/-170	75/-80	90	0	640

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Stabilizer Trim Inoperative (Flaps 15)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1155	70/-60	25/30	-35/125	10/-10	20/-25	35	25	50
AUTOBRAKE MAX	1460	65/-75	30/40	-45/155	5/-5	30/-30	65	0	5
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good Reported Braking Action

MAX MANUAL	1530	75/-80	35/50	-60/205	35/-30	35/-35	50	80	185
AUTOBRAKE MAX	1635	85/-90	40/55	-60/215	30/-25	35/-35	55	90	205
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good To Medium Reported Braking Action

MAX MANUAL	1790	100/-105	50/65	-80/275	60/-50	45/-45	60	155	370
AUTOBRAKE MAX	1860	105/-110	50/70	-80/280	55/-45	45/-45	65	160	380
AUTOBRAKE 2	2540	160/-175	75/100	-110/380	50/-60	70/-70	95	120	190

Medium Reported Braking Action

MAX MANUAL	2050	125/-130	60/80	-95/340	85/-65	50/-55	65	225	550
AUTOBRAKE MAX	2085	125/-130	60/80	-95/345	80/-65	50/-55	75	225	555
AUTOBRAKE 3	2205	125/-135	60/85	-100/355	60/-40	55/-60	100	145	465

Medium To Poor Reported Braking Action

MAX MANUAL	2340	155/-155	75/100	-120/440	145/-100	60/-65	70	350	930
AUTOBRAKE MAX	2360	155/-155	75/100	-120/445	145/-100	60/-65	80	350	930
AUTOBRAKE 3	2430	155/-160	75/105	-125/450	130/-80	65/-70	100	310	890

Poor Reported Braking Action

MAX MANUAL	2630	180/-180	85/120	-145/540	205/-135	70/-75	75	475	1310
AUTOBRAKE MAX	2630	180/-180	85/120	-145/540	205/-135	70/-75	80	475	1305
AUTOBRAKE 3	2650	180/-180	85/120	-145/540	200/-120	70/-75	95	475	1310

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (1 ≤ Flap Lever <15)
VREF40 + 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1260	90/-65	25/40	-40/135	15/-15	25/-25	35	30	60
AUTOBRAKE MAX	1660	70/-75	35/45	-50/170	5/-5	40/-40	65	0	5
AUTOBRAKE 2	2880	165/-185	90/115	-115/385	55/-60	85/-85	100	165	175

Good Reported Braking Action

MAX MANUAL	1675	80/-85	40/55	-60/215	35/-30	40/-40	45	90	210
AUTOBRAKE MAX	1815	80/-90	45/60	-65/225	30/-25	45/-45	65	95	225
AUTOBRAKE 2	2885	160/-185	90/115	-115/385	55/-65	85/-85	95	165	175

Good To Medium Reported Braking Action

MAX MANUAL	1975	105/-110	55/75	-80/290	65/-55	50/-50	55	175	420
AUTOBRAKE MAX	2075	105/-115	60/80	-85/295	60/-50	55/-55	70	180	435
AUTOBRAKE 2	2915	165/-190	90/120	-120/410	70/-75	85/-85	95	190	270

Medium Reported Braking Action

MAX MANUAL	2275	125/-135	70/90	-100/360	90/-75	60/-60	65	255	625
AUTOBRAKE MAX	2330	130/-140	70/95	-100/360	85/-70	60/-60	75	260	640
AUTOBRAKE 3	2535	125/-140	70/95	-110/380	60/-45	70/-70	110	150	470

Medium To Poor Reported Braking Action

MAX MANUAL	2610	160/-165	85/115	-125/465	155/-115	70/-75	75	400	1070
AUTOBRAKE MAX	2635	160/-170	85/115	-125/465	155/-110	70/-75	80	400	1070
AUTOBRAKE 3	2765	155/-165	85/115	-135/475	135/-90	75/-80	110	340	985

Poor Reported Braking Action

MAX MANUAL	2945	190/-195	100/135	-150/565	220/-150	80/-85	80	545	1510
AUTOBRAKE MAX	2940	185/-195	100/135	-150/565	220/-145	80/-85	85	540	1500
AUTOBRAKE 3	2995	185/-190	100/135	-155/570	205/-130	80/-85	105	525	1495

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (Flap Lever 15 or 25)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1155	70/-60	25/30	-35/125	10/-10	20/-25	35	25	50
AUTOBRAKE MAX	1460	65/-75	30/40	-45/155	5/-5	30/-30	65	0	5
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good Reported Braking Action

MAX MANUAL	1530	75/-80	35/50	-60/205	35/-30	35/-35	50	80	185
AUTOBRAKE MAX	1635	85/-90	40/55	-60/215	30/-25	35/-35	55	90	205
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good To Medium Reported Braking Action

MAX MANUAL	1790	100/-105	50/65	-80/275	60/-50	45/-45	60	155	370
AUTOBRAKE MAX	1860	105/-110	50/70	-80/280	55/-45	45/-45	65	160	380
AUTOBRAKE 2	2540	160/-175	75/100	-110/380	50/-60	70/-70	95	120	190

Medium Reported Braking Action

MAX MANUAL	2050	125/-130	60/80	-95/340	85/-65	50/-55	65	225	550
AUTOBRAKE MAX	2085	125/-130	60/80	-95/345	80/-65	50/-55	75	225	555
AUTOBRAKE 3	2205	125/-135	60/85	-100/355	60/-40	55/-60	100	145	465

Medium To Poor Reported Braking Action

MAX MANUAL	2340	155/-155	75/100	-120/440	145/-100	60/-65	70	350	930
AUTOBRAKE MAX	2360	155/-155	75/100	-120/445	145/-100	60/-65	80	350	930
AUTOBRAKE 3	2430	155/-160	75/105	-125/450	130/-80	65/-70	100	310	890

Poor Reported Braking Action

MAX MANUAL	2630	180/-180	85/120	-145/540	205/-135	70/-75	75	475	1310
AUTOBRAKE MAX	2630	180/-180	85/120	-145/540	205/-135	70/-75	80	475	1305
AUTOBRAKE 3	2650	180/-180	85/120	-145/540	200/-120	70/-75	95	475	1310

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Asymmetry (Flap Lever 30)
VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1110	55/-55	20/30	-35/120	10/-10	20/-20	35	20	45
AUTOBRAKE MAX	1365	60/-65	30/35	-45/150	5/0	30/-30	60	0	5
AUTOBRAKE 2	2315	140/-150	65/90	-100/340	30/-45	65/-65	90	85	85

Good Reported Braking Action

MAX MANUAL	1465	70/-75	35/45	-60/200	30/-30	35/-35	50	75	165
AUTOBRAKE MAX	1560	75/-85	35/50	-60/210	30/-25	35/-35	60	80	185
AUTOBRAKE 2	2315	140/-150	65/90	-100/340	35/-45	65/-65	90	85	85

Good To Medium Reported Braking Action

MAX MANUAL	1705	95/-100	45/60	-75/265	55/-50	45/-45	60	135	325
AUTOBRAKE MAX	1765	95/-105	45/65	-80/275	55/-45	45/-45	65	140	335
AUTOBRAKE 2	2345	140/-155	70/90	-105/365	50/-55	65/-65	90	105	170

Medium Reported Braking Action

MAX MANUAL	1940	115/-120	55/75	-90/330	80/-65	50/-50	65	195	480
AUTOBRAKE MAX	1970	115/-120	55/75	-95/335	75/-60	50/-50	70	200	480
AUTOBRAKE 3	2060	115/-125	55/75	-95/345	60/-40	50/-55	95	140	425

Medium To Poor Reported Braking Action

MAX MANUAL	2205	140/-145	70/90	-115/430	140/-95	55/-60	70	305	790
AUTOBRAKE MAX	2220	140/-145	70/95	-120/430	135/-95	60/-60	75	305	790
AUTOBRAKE 3	2275	140/-145	70/95	-120/435	125/-80	60/-65	95	275	770

Poor Reported Braking Action

MAX MANUAL	2465	160/-165	80/105	-140/525	195/-125	60/-65	75	410	1100
AUTOBRAKE MAX	2470	165/-165	80/110	-140/525	195/-130	65/-70	75	410	1100
AUTOBRAKE 3	2485	165/-165	80/110	-140/525	190/-115	65/-70	90	410	1110

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Disagree (1 ≤ Indicated Flaps <15)
VREF40 + 30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1260	90/-65	25/40	-40/135	15/-15	25/-25	35	30	60
AUTOBRAKE MAX	1660	70/-75	35/45	-50/170	5/-5	40/-40	65	0	5
AUTOBRAKE 2	2880	165/-185	90/115	-115/385	55/-60	85/-85	100	165	175

Good Reported Braking Action

MAX MANUAL	1675	80/-85	40/55	-60/215	35/-30	40/-40	45	90	210
AUTOBRAKE MAX	1815	80/-90	45/60	-65/225	30/-25	45/-45	65	95	225
AUTOBRAKE 2	2885	160/-185	90/115	-115/385	55/-65	85/-85	95	165	175

Good To Medium Reported Braking Action

MAX MANUAL	1975	105/-110	55/75	-80/290	65/-55	50/-50	55	175	420
AUTOBRAKE MAX	2075	105/-115	60/80	-85/295	60/-50	55/-55	70	180	435
AUTOBRAKE 2	2915	165/-190	90/120	-120/410	70/-75	85/-85	95	190	270

Medium Reported Braking Action

MAX MANUAL	2275	125/-135	70/90	-100/360	90/-75	60/-60	65	255	625
AUTOBRAKE MAX	2330	130/-140	70/95	-100/360	85/-70	60/-60	75	260	640
AUTOBRAKE 3	2535	125/-140	70/95	-110/380	60/-45	70/-70	110	150	470

Medium To Poor Reported Braking Action

MAX MANUAL	2610	160/-165	85/115	-125/465	155/-115	70/-75	75	400	1070
AUTOBRAKE MAX	2635	160/-170	85/115	-125/465	155/-110	70/-75	80	400	1070
AUTOBRAKE 3	2765	155/-165	85/115	-135/475	135/-90	75/-80	110	340	985

Poor Reported Braking Action

MAX MANUAL	2945	190/-195	100/135	-150/565	220/-150	80/-85	80	545	1510
AUTOBRAKE MAX	2940	185/-195	100/135	-150/565	220/-145	80/-85	85	540	1500
AUTOBRAKE 3	2995	185/-190	100/135	-155/570	205/-130	80/-85	105	525	1495

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flap Disagree (15 ≤ Indicated Flaps <30)
VREF15

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1155	70/-60	25/30	-35/125	10/-10	20/-25	35	25	50
AUTOBRAKE MAX	1460	65/-75	30/40	-45/155	5/-5	30/-30	65	0	5
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good Reported Braking Action

MAX MANUAL	1530	75/-80	35/50	-60/205	35/-30	35/-35	50	80	185
AUTOBRAKE MAX	1635	85/-90	40/55	-60/215	30/-25	35/-35	55	90	205
AUTOBRAKE 2	2510	155/-170	75/100	-105/355	35/-50	70/-70	95	100	100

Good To Medium Reported Braking Action

MAX MANUAL	1790	100/-105	50/65	-80/275	60/-50	45/-45	60	155	370
AUTOBRAKE MAX	1860	105/-110	50/70	-80/280	55/-45	45/-45	65	160	380
AUTOBRAKE 2	2540	160/-175	75/100	-110/380	50/-60	70/-70	95	120	190

Medium Reported Braking Action

MAX MANUAL	2050	125/-130	60/80	-95/340	85/-65	50/-55	65	225	550
AUTOBRAKE MAX	2085	125/-130	60/80	-95/345	80/-65	50/-55	75	225	555
AUTOBRAKE 3	2205	125/-135	60/85	-100/355	60/-40	55/-60	100	145	465

Medium To Poor Reported Braking Action

MAX MANUAL	2340	155/-155	75/100	-120/440	145/-100	60/-65	70	350	930
AUTOBRAKE MAX	2360	155/-155	75/100	-120/445	145/-100	60/-65	80	350	930
AUTOBRAKE 3	2430	155/-160	75/105	-125/450	130/-80	65/-70	100	310	890

Poor Reported Braking Action

MAX MANUAL	2630	180/-180	85/120	-145/540	205/-135	70/-75	75	475	1310
AUTOBRAKE MAX	2630	180/-180	85/120	-145/540	205/-135	70/-75	80	475	1305
AUTOBRAKE 3	2650	180/-180	85/120	-145/540	200/-120	70/-75	95	475	1310

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Trailing Edge Flap Disagree (30 ≤ Indicated Flaps <40)

VREF30

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1110	55/-55	20/30	-35/120	10/-10	20/-20	35	20	45
AUTOBRAKE MAX	1365	60/-65	30/35	-45/150	5/0	30/-30	60	0	5
AUTOBRAKE 2	2315	140/-150	65/90	-100/340	30/-45	65/-65	90	85	85

Good Reported Braking Action

MAX MANUAL	1465	70/-75	35/45	-60/200	30/-30	35/-35	50	75	165
AUTOBRAKE MAX	1560	75/-85	35/50	-60/210	30/-25	35/-35	60	80	185
AUTOBRAKE 2	2315	140/-150	65/90	-100/340	35/-45	65/-65	90	85	85

Good To Medium Reported Braking Action

MAX MANUAL	1705	95/-100	45/60	-75/265	55/-50	45/-45	60	135	325
AUTOBRAKE MAX	1765	95/-105	45/65	-80/275	55/-45	45/-45	65	140	335
AUTOBRAKE 2	2345	140/-155	70/90	-105/365	50/-55	65/-65	90	105	170

Medium Reported Braking Action

MAX MANUAL	1940	115/-120	55/75	-90/330	80/-65	50/-50	65	195	480
AUTOBRAKE MAX	1970	115/-120	55/75	-95/335	75/-60	50/-50	70	200	480
AUTOBRAKE 3	2060	115/-125	55/75	-95/345	60/-40	50/-55	95	140	425

Medium To Poor Reported Braking Action

MAX MANUAL	2205	140/-145	70/90	-115/430	140/-95	55/-60	70	305	790
AUTOBRAKE MAX	2220	140/-145	70/95	-120/430	135/-95	60/-60	75	305	790
AUTOBRAKE 3	2275	140/-145	70/95	-120/435	125/-80	60/-65	95	275	770

Poor Reported Braking Action

MAX MANUAL	2465	160/-165	80/105	-140/525	195/-125	60/-65	75	410	1100
AUTOBRAKE MAX	2470	165/-165	80/110	-140/525	195/-130	65/-70	75	410	1100
AUTOBRAKE 3	2485	165/-165	80/110	-140/525	190/-115	65/-70	90	410	1110

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.

MAX MANUAL assumes maximum achievable manual braking.

Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.

Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.



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ADVISORY INFORMATION

Non-Normal Configuration Landing Distance
Trailing Edge Flaps Up Landing
VREF40 + 40

	LANDING DISTANCE AND ADJUSTMENTS (M)								
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ	SLOPE ADJ	TEMP ADJ	APP SPD ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	65000 KG LANDING WEIGHT	PER 5000 KG ABV/BLW 65000 KG	PER 1000 FT STD/HIGH*	PER 10 KTS HEAD/ TAIL WIND	PER 1% DOWN/ UP HILL	PER 10°C ABV/ BLW ISA	PER 5 KTS ABOVE VREF	ONE REV	NO REV

Dry Runway

MAX MANUAL	1335	110/-70	30/70	-40/140	15/-15	30/-30	45	30	70
AUTOBRAKE MAX	1795	75/-80	40/55	-55/180	5/-5	40/-45	70	5	10
AUTOBRAKE 2	3120	175/-195	100/130	-120/400	65/-70	90/-90	95	205	235

Good Reported Braking Action

MAX MANUAL	1750	80/-90	45/60	-65/220	35/-30	40/-45	45	90	205
AUTOBRAKE MAX	1945	85/-95	50/65	-70/235	25/-25	45/-50	65	80	200
AUTOBRAKE 2	3120	175/-195	100/130	-120/400	65/-70	90/-90	95	205	235

Good To Medium Reported Braking Action

MAX MANUAL	2080	110/-115	60/80	-85/295	65/-55	55/-55	55	175	415
AUTOBRAKE MAX	2215	110/-120	65/85	-90/305	60/-50	55/-60	70	175	425
AUTOBRAKE 2	3145	180/-200	100/130	-125/425	80/-80	90/-90	95	225	325

Medium Reported Braking Action

MAX MANUAL	2405	135/-140	70/95	-105/365	95/-75	65/-65	65	260	625
AUTOBRAKE MAX	2480	135/-145	75/100	-105/370	90/-75	65/-65	70	265	645
AUTOBRAKE 3	2755	135/-155	80/105	-115/395	60/-55	75/-80	105	145	435

Medium To Poor Reported Braking Action

MAX MANUAL	2775	170/-175	90/120	-130/475	165/-115	75/-80	75	415	1080
AUTOBRAKE MAX	2815	165/-175	90/125	-130/475	160/-115	75/-80	80	415	1085
AUTOBRAKE 3	2995	165/-180	95/125	-140/490	135/-100	85/-90	105	335	965

Poor Reported Braking Action

MAX MANUAL	3140	200/-205	105/145	-155/580	230/-155	85/-90	80	565	1530
AUTOBRAKE MAX	3145	195/-205	105/145	-155/580	230/-150	85/-90	90	560	1520
AUTOBRAKE 3	3230	190/-205	105/145	-160/585	210/-140	90/-95	100	520	1495

Reference distance is based on sea level, standard day, no wind or slope, and maximum available reverse thrust.
MAX MANUAL assumes maximum achievable manual braking.
Reference Distance includes an air distance allowance of 455 m from threshold to touchdown.
Actual (unfactored) distances are shown.

*For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft then apply the HIGH adjustment to this new reference distance.

ADVISORY INFORMATION

Recommended Brake Cooling Schedule
Reference Brake Energy Per Brake (Millions of Foot Pounds)

		WIND CORRECTED BRAKES ON SPEED (KIAS)*																	
		80			100			120			140			160			180		
WEIGHT (1000 KG)	OAT (°C)	PRESSURE ALTITUDE (1000 FT)																	
		0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10
80	0	15.1	17.0	19.3	22.4	25.3	28.9	30.9	35.0	40.2	40.4	45.9	53.0	50.8	57.9	67.3	60.8	69.6	81.2
	10	15.6	17.6	20.0	23.1	26.1	29.8	31.9	36.2	41.5	41.8	47.5	54.8	52.5	59.9	69.5	62.8	71.9	83.9
	15	15.8	17.8	20.2	23.5	26.5	30.3	32.4	36.7	42.1	42.4	48.2	55.6	53.3	60.7	70.5	63.7	72.9	85.1
	20	16.0	18.1	20.5	23.8	26.9	30.7	32.8	37.2	42.7	42.9	48.8	56.3	54.0	61.5	71.4	64.6	73.9	86.2
	30	16.4	18.5	21.1	24.4	27.6	31.5	33.7	38.2	43.8	44.0	50.0	57.7	55.3	63.1	73.2	66.2	75.7	88.4
	40	16.6	18.7	21.3	24.7	27.9	31.9	34.1	38.7	44.4	44.7	50.9	58.8	56.3	64.3	74.8	67.5	77.4	90.5
50	16.6	18.7	21.3	24.8	28.0	32.1	34.3	39.0	44.9	45.2	51.5	59.7	57.1	65.4	76.3	68.7	79.0	92.9	
70	0	13.7	15.4	17.5	20.2	22.8	26.0	27.7	31.3	35.9	36.1	41.0	47.2	45.3	51.6	59.7	54.9	62.7	72.9
	10	14.2	15.9	18.1	20.8	23.5	26.8	28.6	32.4	37.1	37.3	42.3	48.7	46.8	53.3	61.6	56.7	64.8	75.4
	15	14.4	16.2	18.4	21.1	23.9	27.2	29.0	32.8	37.6	37.8	43.0	49.4	47.5	54.0	62.5	57.5	65.7	76.4
	20	14.6	16.4	18.6	21.4	24.2	27.6	29.4	33.3	38.1	38.4	43.5	50.1	48.1	54.8	63.4	58.3	66.5	77.4
	30	14.9	16.8	19.1	22.0	24.8	28.3	30.2	34.1	39.1	39.3	44.6	51.4	49.3	56.1	64.9	59.8	68.2	79.4
	40	15.1	17.0	19.3	22.2	25.1	28.6	30.5	34.6	39.6	39.9	45.3	52.2	50.1	57.1	66.2	60.9	69.6	81.2
50	15.1	17.0	19.3	22.3	25.2	28.8	30.7	34.8	40.0	40.2	45.8	52.9	50.7	58.0	67.4	61.8	70.9	83.0	
60	0	12.3	13.9	15.7	18.0	20.3	23.1	24.4	27.6	31.6	31.7	35.9	41.2	39.6	45.0	51.8	48.1	54.8	63.5
	10	12.7	14.3	16.3	18.5	20.9	23.8	25.2	28.5	32.6	32.7	37.1	42.6	40.9	46.5	53.6	49.7	56.6	65.6
	15	12.9	14.6	16.5	18.8	21.2	24.2	25.6	29.0	33.1	33.2	37.6	43.2	41.5	47.1	54.4	50.4	57.4	66.5
	20	13.1	14.8	16.7	19.1	21.5	24.5	26.0	29.4	33.5	33.6	38.1	43.8	42.0	47.8	55.1	51.1	58.2	67.4
	30	13.4	15.1	17.2	19.6	22.1	25.1	26.6	30.1	34.4	34.5	39.1	44.9	43.1	49.0	56.5	52.3	59.6	69.1
	40	13.6	15.3	17.3	19.8	22.3	25.4	26.9	30.5	34.9	35.0	39.7	45.6	43.8	49.8	57.5	53.2	60.7	70.5
50	13.5	15.3	17.3	19.8	22.4	25.5	27.0	30.6	35.1	35.2	40.0	46.0	44.2	50.4	58.3	53.9	61.7	71.9	
50	0	11.0	12.3	14.0	15.7	17.7	20.2	21.2	23.9	27.3	27.2	30.8	35.3	33.8	38.3	44.1	40.9	46.4	53.6
	10	11.3	12.7	14.4	16.3	18.3	20.8	21.9	24.7	28.2	28.1	31.8	36.5	34.9	39.6	45.5	42.2	48.0	55.4
	15	11.5	12.9	14.7	16.5	18.6	21.1	22.2	25.1	28.6	28.6	32.3	37.0	35.4	40.2	46.2	42.8	48.7	56.2
	20	11.6	13.1	14.9	16.7	18.9	21.4	22.5	25.4	29.0	28.9	32.8	37.5	35.9	40.7	46.8	43.4	49.3	56.9
	30	11.9	13.4	15.2	17.2	19.3	22.0	23.1	26.1	29.7	29.7	33.6	38.4	36.8	41.8	48.0	44.5	50.6	58.4
	40	12.1	13.6	15.4	17.3	19.5	22.2	23.4	26.4	30.1	30.1	34.0	39.0	37.4	42.4	48.8	45.2	51.4	59.4
50	12.0	13.6	15.4	17.3	19.6	22.3	23.4	26.5	30.3	30.2	34.2	39.3	37.6	42.8	49.3	45.7	52.1	60.3	
40	0	9.6	10.8	12.3	13.5	15.2	17.3	17.9	20.2	23.0	22.8	25.8	29.4	28.1	31.8	36.4	33.7	38.2	43.9
	10	10.0	11.2	12.7	14.0	15.8	17.9	18.5	20.9	23.8	23.6	26.6	30.4	29.0	32.8	37.6	34.8	39.5	45.4
	15	10.1	11.4	12.9	14.2	16.0	18.1	18.8	21.2	24.1	23.9	27.0	30.8	29.4	33.3	38.2	35.3	40.0	46.0
	20	10.2	11.5	13.1	14.4	16.2	18.4	19.1	21.5	24.5	24.2	27.4	31.3	29.8	33.8	38.7	35.8	40.6	46.6
	30	10.5	11.8	13.4	14.8	16.6	18.9	19.6	22.1	25.1	24.9	28.1	32.1	30.6	34.6	39.7	36.7	41.6	47.8
	40	10.6	11.9	13.5	14.9	16.8	19.1	19.8	22.3	25.4	25.2	28.4	32.5	31.0	35.1	40.2	37.2	42.2	48.6
50	10.6	11.9	13.5	14.9	16.8	19.1	19.8	22.3	25.5	25.2	28.6	32.7	31.1	35.3	40.6	37.5	42.6	49.1	

*To correct for wind, enter table with the brakes on speed minus one half the headwind or plus 1.5 times the tailwind. If ground speed is used for brakes on speed, ignore wind and enter table with sea level, 15°C.

Adjusted Brake Energy Per Brake (Millions of Foot Pounds)
No Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
EVENT		10	20	30	40	50	60	70	80	90
RTO MAX MAN		10	20	30	40	50	60	70	80	90
LANDING	MAX MAN	7.8	16.3	25.3	34.7	44.7	55.0	65.7	76.6	87.9
	MAX AUTO	7.5	15.4	23.6	32.4	41.8	51.8	62.5	74.1	86.5
	AUTOBRAKE 3	7.3	14.7	22.3	30.2	38.6	47.6	57.4	68.1	80.0
	AUTOBRAKE 2	7.0	13.8	20.5	27.4	34.8	42.7	51.5	61.3	72.4
	AUTOBRAKE 1	6.7	13.1	19.2	25.3	31.8	38.8	46.6	55.4	65.5

Two Engine Detent Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
EVENT		10	20	30	40	50	60	70	80	90
RTO MAX MAN		10	20	30	40	50	60	70	80	90
LANDING	MAX MAN	7.0	14.6	22.8	31.4	40.5	49.9	59.7	69.8	80.0
	MAX AUTO	5.8	12.3	19.5	27.2	35.6	44.5	53.9	63.7	74.1
	AUTOBRAKE 3	4.3	9.2	14.7	20.7	27.2	34.4	42.0	50.2	59.0
	AUTOBRAKE 2	2.5	5.6	9.1	13.1	17.8	23.0	28.8	35.2	42.3
	AUTOBRAKE 1	1.8	3.8	6.1	8.8	11.9	15.5	19.6	24.4	29.8



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ADVISORY INFORMATION

Recommended Brake Cooling Schedule
Cooling Time (Minutes)

EVENT ADJUSTED BRAKE ENERGY (MILLIONS OF FOOT POUNDS)									
16 & BELOW	17	19	20.9	23.5	26.9	29.4	30 TO 41	41 & ABOVE	
BRAKE TEMPERATURE MONITOR SYSTEM INDICATION ON CDS									
UP TO 2.5	2.6	3	3.3	3.8	4.5	4.9	5.0 TO 7.1	7.1 & ABOVE	
INFLIGHT GEAR DOWN GROUND	NO SPECIAL PROCEDURE REQUIRED	1	4	5	6	7	7.6	CAUTION	FUSE PLUG MELT ZONE
		6.7	16.0	24.1	34.2	45.9	53.3		

Observe maximum quick turnaround limit.

Table shows energy per brake added by a single stop with all brakes operating. Energy is assumed to be equally distributed among the operating brakes. Total energy is the sum of residual energy plus energy added.

Add 1.0 million foot pounds per brake for each taxi mile.

When in caution zone, wheel fuse plugs may melt. Delay takeoff and inspect after one hour. If overheat occurs after takeoff, extend gear soon for at least 7 minutes.

When in fuse plug melt zone, clear runway immediately. Unless required, do not set parking brake. Do not approach gear or attempt to taxi for one hour. Tire, wheel and brake replacement may be required. If overheat occurs after takeoff, extend gear soon for at least 12 minutes.

Brake temperature monitor system (BTMS) indication on CDS systems page may be used 10 to 15 minutes after airplane has come to a complete stop or inflight with gear retracted to determine recommended cooling schedule.



Intentionally
Blank



Performance Inflight - QRH
Engine Inoperative

Chapter PI-QRH
Section 22

ENGINE INOP

Initial Max Continuous %N1
Based on .79M, A/C high and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)								
	25	27	29	31	33	35	37	39	41
20	96.1	95.9	95.6	95.5	95.2	94.8	94.3	94.0	93.2
15	96.7	96.5	96.2	96.1	96.0	95.5	95.1	94.8	94.1
10	97.3	97.2	96.8	96.7	96.7	96.2	95.8	95.6	95.0
5	97.5	97.9	97.6	97.4	97.4	97.0	96.6	96.4	95.9
0	96.8	98.1	98.5	98.3	98.2	97.8	97.5	97.2	96.8
-5	96.0	97.3	98.5	99.2	99.1	98.6	98.3	98.1	97.8
-10	95.2	96.5	97.7	99.0	99.9	99.5	99.2	99.0	98.7
-15	94.4	95.8	96.9	98.2	99.5	100.4	100.1	99.9	99.7
-20	93.6	95.0	96.2	97.4	98.7	99.8	100.4	100.2	100.0
-25	92.8	94.2	95.4	96.6	97.9	99.0	99.6	99.4	99.2
-30	91.9	93.4	94.6	95.8	97.0	98.2	98.7	98.5	98.3
-35	91.1	92.6	93.7	94.9	96.2	97.3	97.9	97.7	97.5
-40	90.3	91.8	92.9	94.1	95.3	96.5	97.0	96.8	96.6

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)								
	25	27	29	31	33	35	37	39	41
ENGINE ANTI-ICE	-1.2	-1.1	-1.0	-0.9	-0.8	-0.8	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE	-4.2	-4.4	-4.5	-4.7	-5.0	-4.8	-4.8	-4.8	-4.8

ENGINE INOP

Max Continuous %N1
37000 FT to 29000 FT Pressure Altitudes

37000 FT PRESS ALT													TAT (°C)	
KLAS	M	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	
160	.51	96.0	97.0	97.9	98.7	99.6	98.9	98.1	96.9	95.6	94.0	92.5	91.1	
200	.63	95.4	96.3	97.2	98.1	98.9	99.8	99.5	98.7	97.8	96.8	95.6	94.5	
240	.74	94.4	95.3	96.2	97.1	98.0	98.8	99.7	100.1	99.3	98.5	97.7	96.7	
280	.86	93.7	94.6	95.5	96.4	97.2	98.1	98.9	99.7	100.5	100.2	99.3	98.5	
35000 FT PRESS ALT													TAT (°C)	
KLAS	M	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	
160	.49	95.9	96.8	97.7	98.6	99.5	99.2	98.4	97.3	96.1	94.7	93.3	92.0	
200	.60	95.5	96.4	97.3	98.2	99.1	100.0	99.9	98.9	98.0	97.0	95.8	94.7	
240	.71	94.4	95.3	96.2	97.1	98.0	98.8	99.6	100.2	99.5	98.9	98.0	97.0	
280	.82	93.2	94.0	94.9	95.8	96.6	97.5	98.3	99.1	99.9	99.7	98.9	98.1	
33000 FT PRESS ALT													TAT (°C)	
KLAS	M	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	
160	.47	96.8	97.7	98.5	99.4	100.2	99.3	98.5	97.3	96.0	94.6	93.2	92.0	
200	.58	96.4	97.3	98.2	99.1	99.9	100.8	99.9	99.0	98.0	96.8	95.6	94.5	
240	.68	95.3	96.2	97.1	97.9	98.8	99.6	100.4	100.2	99.6	98.7	97.7	96.7	
280	.79	93.6	94.5	95.4	96.2	97.1	97.9	98.7	99.5	99.9	99.1	98.2	97.4	
320	.89	93.0	93.9	94.7	95.6	96.4	97.2	98.1	98.9	99.7	100.4	100.0	99.2	
31000 FT PRESS ALT													TAT (°C)	
KLAS	M	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	
160	.45	96.7	97.6	98.5	99.4	100.3	100.4	99.5	98.5	97.3	95.9	94.5	93.2	
200	.55	96.5	97.3	98.2	99.1	100.0	100.8	101.0	100.1	99.1	98.0	96.7	95.5	
240	.66	95.0	95.9	96.8	97.6	98.5	99.3	100.2	100.7	99.9	99.1	98.1	97.1	
280	.76	93.2	94.0	94.9	95.7	96.6	97.4	98.2	99.0	99.8	99.1	98.2	97.3	
320	.85	91.8	92.6	93.5	94.3	95.1	95.9	96.7	97.5	98.3	99.1	99.3	98.4	
29000 FT PRESS ALT													TAT (°C)	
KLAS	M	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	
160	.43	97.5	98.4	99.3	100.1	101.0	100.5	99.6	98.5	97.2	95.7	94.4	93.1	
200	.53	96.9	97.8	98.7	99.5	100.4	101.2	100.7	99.7	98.7	97.5	96.2	95.1	
240	.63	95.7	96.5	97.4	98.2	99.1	99.9	100.7	100.4	99.5	98.6	97.5	96.6	
280	.73	93.6	94.4	95.2	96.1	96.9	97.7	98.5	99.3	99.4	98.5	97.5	96.8	
320	.82	91.4	92.3	93.1	93.9	94.7	95.5	96.3	97.0	97.8	98.6	97.8	97.0	
360	.91	91.4	92.3	93.1	93.9	94.7	95.5	96.3	97.0	97.8	98.6	99.3	99.4	

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	29	31	33	35	37
ENGINE ANTI-ICE ON	-0.9	-0.9	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE ON	-4.1	-4.3	-4.5	-4.7	-4.7

ENGINE INOP

Max Continuous %N1
27000 FT to 20000 FT Pressure Altitudes

27000 FT PRESS ALT			TAT (°C)										
KIAS	M	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
160	.41	97.3	98.2	99.1	100.0	100.8	101.5	100.6	99.6	98.4	97.0	95.7	94.4
200	.51	96.3	97.2	98.1	98.9	99.8	100.6	101.1	100.2	99.2	98.1	96.9	95.7
240	.60	95.0	95.9	96.7	97.6	98.4	99.2	100.1	100.7	99.7	98.7	97.7	96.8
280	.70	93.0	93.8	94.6	95.5	96.3	97.1	97.9	98.7	99.4	98.7	97.7	96.9
320	.79	90.9	91.7	92.6	93.4	94.2	95.0	95.7	96.5	97.3	98.0	97.9	97.2
360	.88	90.2	91.0	91.8	92.7	93.5	94.3	95.1	95.9	96.6	97.4	98.2	98.7
25000 FT PRESS ALT			TAT (°C)										
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
160	.39	98.2	99.0	99.9	100.7	101.6	101.7	100.7	99.6	98.4	97.0	95.8	94.5
200	.49	96.8	97.7	98.5	99.4	100.2	101.0	100.9	99.9	98.9	97.7	96.6	95.5
240	.58	95.1	95.9	96.8	97.6	98.4	99.2	100.0	99.8	98.9	97.9	96.9	96.0
280	.67	93.2	94.1	94.9	95.7	96.5	97.3	98.1	98.8	98.9	97.9	96.9	96.2
320	.76	90.9	91.8	92.6	93.4	94.2	95.0	95.8	96.6	97.3	97.9	97.2	96.5
360	.85	89.6	90.5	91.3	92.1	93.0	93.8	94.6	95.4	96.2	97.0	97.7	97.5
24000 FT PRESS ALT			TAT (°C)										
KIAS	M	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15
160	.38	97.7	98.5	99.4	100.3	101.1	101.9	100.8	99.7	98.5	97.2	96.0	94.7
200	.46	96.4	97.2	98.1	98.9	99.7	100.6	101.0	99.9	98.9	97.8	96.7	95.6
240	.57	94.7	95.6	96.4	97.2	98.0	98.8	99.6	99.9	99.0	97.9	97.0	96.1
280	.66	93.0	93.8	94.6	95.4	96.2	97.0	97.8	98.6	99.1	98.0	97.0	96.3
320	.75	90.6	91.4	92.3	93.1	93.9	94.7	95.5	96.3	97.1	97.8	97.2	96.5
360	.83	89.0	89.8	90.7	91.5	92.4	93.2	94.0	94.8	95.6	96.4	97.2	97.2
22000 FT PRESS ALT			TAT (°C)										
KIAS	M	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
160	.37	97.5	98.4	99.2	100.1	100.9	101.0	99.9	98.7	97.5	96.3	95.2	94.0
200	.46	96.3	97.1	98.0	98.8	99.6	100.4	100.1	98.9	97.8	96.8	95.8	94.8
240	.55	94.8	95.6	96.4	97.2	98.0	98.8	99.6	99.1	98.1	97.1	96.2	95.4
280	.63	93.2	94.0	94.8	95.6	96.4	97.1	97.9	98.7	98.4	97.4	96.6	95.8
320	.72	90.9	91.8	92.6	93.4	94.2	95.0	95.8	96.6	97.4	97.5	96.8	96.1
360	.80	89.0	89.9	90.7	91.6	92.4	93.2	94.0	94.8	95.6	96.4	97.0	96.4
20000 FT PRESS ALT			TAT (°C)										
KIAS	M	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
160	.35	96.5	97.4	98.2	99.0	99.8	100.6	100.2	98.9	97.7	96.6	95.5	94.4
200	.44	95.4	96.2	97.0	97.9	98.7	99.4	100.2	99.1	97.8	96.8	95.8	94.9
240	.53	93.9	94.7	95.5	96.3	97.1	97.9	98.7	99.3	98.2	97.1	96.2	95.4
280	.61	92.4	93.3	94.1	94.8	95.6	96.4	97.2	97.9	98.5	97.6	96.7	95.9
320	.69	90.3	91.1	92.0	92.8	93.6	94.4	95.2	96.0	96.8	97.6	96.9	96.2
360	.77	88.5	89.3	90.2	91.0	91.8	92.6	93.5	94.3	95.1	95.8	96.6	96.4

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	20	22	24	25	27
ENGINE ANTI-ICE ON	-0.9	-0.9	-1.0	-1.0	-1.0
ENGINE & WING ANTI-ICE ON	-3.6	-3.8	-3.8	-3.9	-4.0

ENGINE INOP

Max Continuous %N1
18000 FT to 12000 FT Pressure Altitudes

18000 FT PRESS ALT												TAT (°C)	
KIAS	M	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
160	.34	96.0	96.8	97.6	98.4	99.2	100.0	98.9	97.5	96.5	95.5	94.5	93.5
200	.42	95.1	95.9	96.7	97.5	98.2	99.0	99.3	98.0	96.7	95.9	95.0	94.1
240	.51	93.7	94.5	95.2	96.0	96.8	97.6	98.3	98.2	97.1	96.2	95.4	94.6
280	.59	92.0	92.9	93.7	94.5	95.3	96.1	96.8	97.6	97.5	96.6	95.8	95.1
320	.67	90.3	91.1	92.0	92.8	93.6	94.4	95.2	96.0	96.8	96.9	96.2	95.5
360	.75	88.7	89.5	90.4	91.2	92.0	92.8	93.6	94.4	95.2	96.0	96.4	95.8
16000 FT PRESS ALT												TAT (°C)	
KIAS	M	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25
160	.33	95.0	95.8	96.6	97.4	98.2	99.0	99.4	98.2	97.0	96.1	95.2	94.2
200	.41	93.9	94.7	95.5	96.3	97.1	97.8	98.6	98.2	97.0	96.0	95.2	94.4
240	.49	92.5	93.3	94.1	94.9	95.7	96.5	97.2	98.0	97.3	96.3	95.5	94.7
280	.57	91.0	91.8	92.6	93.5	94.3	95.1	95.9	96.6	97.4	96.7	95.8	95.1
320	.64	89.4	90.3	91.1	91.9	92.8	93.6	94.4	95.2	95.9	96.7	96.1	95.5
360	.72	88.0	88.9	89.7	90.6	91.4	92.2	93.0	93.8	94.6	95.4	96.2	95.8
14000 FT PRESS ALT												TAT (°C)	
KIAS	M	-25	-20	-15	-10	-5	0	5	10	15	20	25	30
160	.31	94.9	95.7	96.5	97.3	98.0	98.8	99.2	98.2	97.3	96.4	95.5	94.6
200	.39	93.6	94.4	95.2	96.0	96.7	97.5	98.3	97.5	96.5	95.7	94.9	94.1
240	.47	92.1	92.9	93.8	94.6	95.4	96.2	96.9	97.4	96.5	95.6	94.8	94.1
280	.54	90.9	91.7	92.5	93.4	94.2	95.0	95.8	96.5	96.8	96.0	95.2	94.5
320	.62	89.6	90.4	91.2	92.1	92.9	93.7	94.5	95.3	96.1	96.2	95.5	94.8
360	.69	88.3	89.1	89.9	90.7	91.6	92.4	93.2	94.0	94.8	95.5	95.8	95.2
12000 FT PRESS ALT												TAT (°C)	
KIAS	M	-20	-15	-10	-5	0	5	10	15	20	25	30	35
160	.30	94.8	95.6	96.4	97.1	97.9	98.6	97.9	96.8	95.9	95.2	94.4	93.5
200	.38	92.7	93.5	94.3	95.1	95.9	96.7	97.1	96.1	95.1	94.4	93.6	92.8
240	.45	91.6	92.5	93.3	94.1	94.9	95.7	96.4	96.4	95.5	94.7	94.0	93.2
280	.52	90.6	91.4	92.2	93.0	93.8	94.6	95.4	96.2	95.9	95.1	94.4	93.7
320	.60	89.5	90.3	91.2	92.0	92.8	93.6	94.4	95.2	96.0	95.5	94.8	94.1
360	.67	88.3	89.1	90.0	90.8	91.6	92.4	93.2	93.9	94.7	95.5	95.1	94.4

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)			
	12	14	16	18
ENGINE ANTI-ICE ON	-0.9	-0.9	-0.9	-0.9
ENGINE & WING ANTI-ICE ON	-3.2	-3.4	-3.4	-3.5

ENGINE INOP

Max Continuous %N1
10000 FT to 1000 FT Pressure Altitudes

10000 FT PRESS ALT						TAT (°C)								
KIAS	M	-20	-15	-10	-5	0	5	10	15	20	25	30	35	
160	.29	92.7	93.5	94.4	95.2	95.9	96.7	97.5	96.5	95.6	94.9	94.2	93.4	
200	.36	91.3	92.1	93.0	93.8	94.6	95.4	96.1	96.1	95.2	94.4	93.7	92.9	
240	.43	90.3	91.1	92.0	92.8	93.6	94.4	95.2	95.9	95.4	94.6	93.8	93.1	
280	.51	89.5	90.3	91.1	91.9	92.7	93.5	94.3	95.1	95.7	95.0	94.2	93.5	
320	.58	88.6	89.4	90.2	91.0	91.8	92.6	93.4	94.2	95.0	95.4	94.7	93.9	
360	.65	87.5	88.3	89.2	90.0	90.8	91.6	92.3	93.1	93.9	94.7	95.0	94.3	
5000 FT PRESS ALT						TAT (°C)								
KIAS	M	-10	-5	0	5	10	15	20	25	30	35	40	45	
160	.26	90.5	91.4	92.2	93.0	93.8	94.5	95.1	94.4	93.6	92.9	92.2	91.4	
200	.33	90.0	90.8	91.6	92.4	93.2	93.9	94.7	94.4	93.7	93.0	92.3	91.5	
240	.40	89.2	90.0	90.8	91.6	92.4	93.2	93.9	94.4	93.7	92.9	92.2	91.5	
280	.46	88.5	89.3	90.1	90.9	91.7	92.5	93.3	94.0	94.0	93.2	92.5	91.8	
320	.53	87.8	88.6	89.4	90.2	90.9	91.7	92.5	93.2	94.0	93.6	92.9	92.2	
360	.59	86.9	87.7	88.5	89.3	90.1	90.8	91.6	92.3	93.1	93.8	93.3	92.6	
3000 FT PRESS ALT						TAT (°C)								
KIAS	M	-5	0	5	10	15	20	25	30	35	40	45	50	
160	.26	90.5	91.3	92.1	92.8	93.6	94.4	94.6	93.9	93.2	92.4	91.6	90.7	
200	.32	89.9	90.7	91.5	92.3	93.1	93.8	94.6	94.0	93.3	92.5	91.8	91.0	
240	.38	88.8	89.6	90.4	91.2	92.0	92.7	93.5	93.5	92.8	92.0	91.3	90.6	
280	.45	88.3	89.1	89.9	90.6	91.4	92.2	92.9	93.7	93.1	92.4	91.7	91.0	
320	.51	87.6	88.4	89.2	90.0	90.7	91.5	92.2	93.0	93.5	92.8	92.0	91.3	
360	.57	86.8	87.6	88.4	89.1	89.9	90.6	91.4	92.1	92.8	93.1	92.4	91.7	
1000 FT PRESS ALT						TAT (°C)								
KIAS	M	-5	0	5	10	15	20	25	30	35	40	45	50	
160	.25	89.0	89.8	90.6	91.4	92.2	92.9	93.7	93.4	92.7	91.9	91.2	90.3	
200	.31	88.7	89.5	90.3	91.0	91.8	92.6	93.3	93.7	93.0	92.2	91.5	90.7	
240	.37	87.8	88.6	89.4	90.2	90.9	91.7	92.5	93.2	92.8	92.0	91.3	90.6	
280	.43	87.3	88.1	88.8	89.6	90.4	91.1	91.9	92.6	93.1	92.3	91.6	90.9	
320	.49	86.7	87.5	88.2	89.0	89.8	90.5	91.3	92.0	92.7	92.7	91.9	91.2	
360	.55	85.9	86.7	87.5	88.2	89.0	89.7	90.5	91.2	91.9	92.6	92.3	91.6	

%N1 Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)			
	1	3	5	10
ENGINE ANTI-ICE ON	-0.6	-0.8	-0.8	-0.8
ENGINE & WING ANTI-ICE ON	-2.9	-3.0	-2.7	-3.2

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude
100 ft/min residual rate of climb

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFTDOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
85	81	269	16300	14700	12300
80	76	262	18400	16800	14900
75	72	254	20400	19000	17300
70	67	246	22500	21200	19700
65	62	238	24700	23500	22100
60	57	229	26800	25800	24600
55	53	219	29100	28100	27000
50	48	209	31200	30400	29400
45	43	199	33300	32600	31700
40	38	187	35600	34900	34000

Includes APU fuel burn.

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown/LRC Cruise Range Capability
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
138	128	120	112	106	100	95	90	86	82	78
275	256	239	225	212	200	190	180	172	164	157
413	384	359	337	317	300	284	270	258	246	235
551	512	479	449	423	400	379	360	344	328	314
689	640	598	562	529	500	474	451	429	410	392
826	768	718	674	635	600	569	541	515	492	471
964	896	838	786	741	700	664	631	601	574	549
1102	1025	957	898	846	800	758	721	687	656	628
1240	1153	1077	1011	952	900	853	811	773	738	706
1377	1281	1197	1123	1058	1000	948	901	859	820	785
1515	1409	1317	1235	1164	1100	1043	991	945	902	863
1653	1537	1436	1348	1270	1200	1138	1081	1030	984	942
1792	1666	1556	1460	1375	1300	1232	1171	1116	1066	1020
1930	1794	1676	1573	1481	1400	1327	1261	1202	1148	1098
2068	1922	1796	1685	1587	1500	1422	1351	1288	1230	1177
2207	2051	1916	1798	1693	1600	1517	1441	1373	1312	1255
2345	2180	2036	1910	1799	1700	1611	1531	1459	1393	1333
2484	2309	2156	2023	1905	1800	1706	1621	1545	1475	1411

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 KG)										TIME (HR:MIN)
	WEIGHT AT START OF DRIFTDOWN (1000 KG)										
	40	45	50	55	60	65	70	75	80	85	
100	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0:17
200	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	0:33
300	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	0:50
400	1.6	1.8	1.9	2.0	2.2	2.3	2.4	2.6	2.7	2.9	1:06
500	2.0	2.2	2.4	2.6	2.8	3.0	3.1	3.3	3.5	3.7	1:23
600	2.4	2.7	2.9	3.1	3.3	3.6	3.8	4.0	4.2	4.5	1:39
700	2.8	3.1	3.4	3.6	3.9	4.2	4.4	4.7	5.0	5.2	1:56
800	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.4	5.7	6.0	2:12
900	3.6	4.0	4.3	4.7	5.0	5.4	5.7	6.0	6.4	6.8	2:29
1000	4.0	4.4	4.8	5.2	5.6	6.0	6.3	6.7	7.1	7.6	2:46
1100	4.4	4.8	5.3	5.7	6.1	6.6	6.9	7.4	7.8	8.3	3:02
1200	4.8	5.3	5.7	6.2	6.7	7.1	7.6	8.1	8.6	9.1	3:19
1300	5.2	5.7	6.2	6.7	7.2	7.7	8.2	8.7	9.3	9.8	3:36
1400	5.5	6.1	6.6	7.2	7.7	8.3	8.8	9.4	10.0	10.6	3:52
1500	5.9	6.5	7.1	7.7	8.3	8.9	9.4	10.0	10.7	11.3	4:09
1600	6.3	6.9	7.5	8.2	8.8	9.4	10.0	10.7	11.3	12.1	4:26
1700	6.6	7.3	8.0	8.6	9.3	10.0	10.6	11.3	12.0	12.8	4:43
1800	7.0	7.7	8.4	9.1	9.8	10.5	11.2	12.0	12.7	13.5	4:59

Includes APU fuel burn.

Driftdown at optimum driftdown speed and cruise at long range cruise speed.



ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
85	9500	6400	3400
80	12400	9500	6500
75	15300	12800	9800
70	18400	15800	13200
65	21100	18600	16300
60	23700	21800	19400
55	26300	24700	22400
50	29000	27700	25800
45	31400	30500	29200
40	33800	33000	31800

With engine anti-ice on, decrease altitude capability by 2000 ft.

With engine and wing anti-ice on, decrease altitude capability by 6500 ft.



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ENGINE INOP

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)									
		10	15	17	19	21	23	25	27	29	31
85	%N1	91.8									
	MACH	.561									
	KIAS	311									
	FF/ENG	3067									
80	%N1	90.1	94.0								
	MACH	.545	.590								
	KIAS	302	299								
	FF/ENG	2875	2870								
75	%N1	88.4	92.5	94.0							
	MACH	.528	.579	.593							
	KIAS	293	293	288							
	FF/ENG	2684	2709	2674							
70	%N1	86.5	90.7	92.3	94.0						
	MACH	.510	.562	.582	.595						
	KIAS	282	284	283	278						
	FF/ENG	2494	2518	2520	2481						
65	%N1	84.5	88.7	90.4	92.2	93.9					
	MACH	.491	.542	.563	.584	.596					
	KIAS	271	274	274	273	268					
	FF/ENG	2306	2327	2330	2330	2295					
60	%N1	82.3	86.5	88.3	90.0	91.9	93.7	96.4			
	MACH	.471	.521	.543	.564	.585	.597	.614			
	KIAS	261	263	263	263	263	258	254			
	FF/ENG	2124	2137	2139	2140	2143	2114	2146			
55	%N1	80.2	84.2	85.9	87.7	89.5	91.4	93.3	96.2		
	MACH	.453	.498	.520	.541	.563	.585	.597	.614		
	KIAS	250	251	252	252	253	252	247	244		
	FF/ENG	1954	1948	1950	1950	1953	1958	1938	1971		
50	%N1	77.8	81.6	83.4	85.2	87.0	88.7	90.7	92.7	95.7	
	MACH	.434	.475	.495	.516	.538	.561	.583	.596	.613	
	KIAS	240	239	239	240	241	241	241	236	233	
	FF/ENG	1791	1764	1762	1762	1764	1767	1777	1765	1793	
45	%N1	75.5	79.1	80.6	82.3	84.1	85.9	87.7	89.7	91.8	94.8
	MACH	.415	.452	.469	.489	.511	.533	.556	.578	.593	.610
	KIAS	229	227	227	227	228	229	229	229	225	222
	FF/ENG	1636	1594	1582	1575	1577	1580	1586	1600	1593	1613
40	%N1	73.0	76.2	77.8	79.4	81.0	82.8	84.6	86.4	88.3	90.7
	MACH	.395	.429	.445	.462	.480	.502	.525	.548	.571	.589
	KIAS	218	215	215	214	214	215	216	216	216	214
	FF/ENG	1485	1434	1416	1402	1392	1394	1400	1410	1421	1424

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
298	272	249	230	214	200	190	180	172	164	158
600	547	501	462	429	400	379	361	344	328	315
903	823	753	694	644	600	570	542	517	494	473
1209	1100	1005	926	859	800	759	721	687	657	630
1516	1379	1259	1159	1075	1000	949	902	859	820	786
1825	1659	1513	1393	1290	1200	1139	1082	1031	984	943
2137	1940	1768	1626	1506	1400	1328	1262	1202	1147	1099
2450	2222	2024	1860	1722	1600	1518	1442	1373	1311	1256
2766	2507	2281	2095	1938	1800	1707	1622	1544	1474	1412
3083	2792	2539	2331	2155	2000	1896	1801	1715	1637	1568

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		26	
	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME
	(1000 KG)	(HR:MIN)	(1000 KG)	(HR:MIN)	(1000 KG)	(HR:MIN)	(1000 KG)	(HR:MIN)	(1000 KG)	(HR:MIN)
200	1.4	0:43	1.2	0:41	1.1	0:39	1.0	0:38	0.9	0:37
400	2.8	1:23	2.6	1:19	2.4	1:14	2.2	1:11	2.1	1:09
600	4.3	2:04	3.9	1:57	3.6	1:50	3.4	1:45	3.2	1:42
800	5.7	2:46	5.2	2:36	4.9	2:26	4.5	2:19	4.4	2:14
1000	7.1	3:28	6.6	3:15	6.1	3:03	5.7	2:53	5.5	2:47
1200	8.5	4:10	7.9	3:55	7.3	3:40	6.8	3:28	6.6	3:21
1400	9.8	4:53	9.1	4:36	8.5	4:18	8.0	4:02	7.7	3:54
1600	11.2	5:36	10.4	5:16	9.7	4:55	9.1	4:38	8.7	4:28
1800	12.5	6:20	11.7	5:58	10.9	5:34	10.2	5:13	9.8	5:02
2000	13.9	7:05	12.9	6:39	12.0	6:13	11.3	5:49	10.8	5:36

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)									
	40	45	50	55	60	65	70	75	80	
1	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.3	
2	-0.3	-0.2	-0.1	-0.1	0.0	0.2	0.3	0.6	0.8	
3	-0.4	-0.3	-0.2	-0.1	0.0	0.3	0.5	0.9	1.2	
4	-0.6	-0.4	-0.3	-0.1	0.0	0.3	0.7	1.2	1.6	
5	-0.7	-0.5	-0.4	-0.2	0.0	0.4	0.9	1.4	2.0	
6	-0.8	-0.6	-0.4	-0.2	0.0	0.5	1.1	1.7	2.4	
7	-1.0	-0.8	-0.5	-0.3	0.0	0.6	1.2	2.0	2.8	
8	-1.1	-0.9	-0.6	-0.3	0.0	0.6	1.4	2.2	3.2	
9	-1.3	-1.0	-0.7	-0.3	0.0	0.7	1.5	2.4	3.5	
10	-1.4	-1.1	-0.7	-0.4	0.0	0.7	1.6	2.6	3.8	
11	-1.6	-1.2	-0.8	-0.4	0.0	0.8	1.7	2.8	4.1	
12	-1.7	-1.3	-0.9	-0.4	0.0	0.8	1.9	3.0	4.4	
13	-1.9	-1.4	-0.9	-0.5	0.0	0.9	2.0	3.2	4.7	
14	-2.0	-1.5	-1.0	-0.5	0.0	0.9	2.0	3.4	4.9	

Includes APU fuel burn.



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ENGINE INOP
MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)							
		1500	5000	10000	15000	20000	25000	30000	35000
85	%N1	81.1	84.1	88.3	92.8				
	KIAS	250	251	252	253				
	FF/ENG	2740	2730	2750	2800				
80	%N1	79.5	82.4	86.5	91.0				
	KIAS	242	243	244	245				
	FF/ENG	2580	2570	2570	2610				
75	%N1	77.8	80.5	84.7	89.1	95.0			
	KIAS	235	236	236	238	239			
	FF/ENG	2420	2400	2400	2420	2490			
70	%N1	76.0	78.6	82.8	87.1	92.1			
	KIAS	227	227	228	229	231			
	FF/ENG	2260	2240	2230	2250	2270			
65	%N1	74.0	76.7	80.8	85.0	89.7	97.7		
	KIAS	219	219	220	221	222	224		
	FF/ENG	2100	2090	2070	2070	2080	2230		
60	%N1	71.7	74.6	78.5	82.8	87.4	93.7		
	KIAS	210	210	211	212	213	214		
	FF/ENG	1950	1930	1910	1910	1910	1970		
55	%N1	69.4	72.3	76.3	80.5	84.9	90.0		
	KIAS	200	201	202	203	204	205		
	FF/ENG	1800	1770	1750	1740	1730	1760		
50	%N1	66.9	69.7	73.8	77.8	82.3	87.0	94.9	
	KIAS	192	192	192	193	194	195	196	
	FF/ENG	1650	1620	1600	1580	1570	1570	1680	
45	%N1	64.2	66.9	70.9	75.0	79.4	84.0	89.6	
	KIAS	185	185	185	185	185	185	186	
	FF/ENG	1500	1470	1440	1420	1400	1400	1450	
40	%N1	61.1	64.0	67.8	72.0	76.2	80.7	85.4	94.0
	KIAS	178	178	178	178	178	178	178	178
	FF/ENG	1350	1330	1300	1270	1250	1240	1260	1360

This table includes 5% additional fuel for holding in a racetrack pattern.

ENGINE INOP

ADVISORY INFORMATION

Gear Down Landing Rate of Climb Available
Flaps 15

TAT (°C)	RATE OF CLIMB (FT/MIN)					
	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
52	-220	-290				
50	-200	-270	-370			
48	-170	-240	-350			
46	-140	-210	-320	-430		
44	-120	-190	-300	-410		
42	-90	-160	-270	-380	-490	
40	-60	-130	-250	-360	-470	
38	-30	-110	-220	-330	-450	-560
36	-20	-80	-190	-310	-420	-540
34	-10	-50	-160	-280	-400	-520
32	-10	-30	-140	-260	-370	-490
30	-10	-30	-110	-230	-350	-470
20	0	-30	-100	-170	-240	-340
10	0	-20	-90	-170	-240	-320
0	10	-20	-90	-160	-240	-320
-20	10	-10	-90	-160	-250	-330
-40	10	-10	-90	-170	-250	-340

Rate of climb capability shown is valid for 60000 kg, gear down at VREF15+5.
Decrease rate of climb 130 ft/min per 5000 kg greater than 60000 kg.
Increase rate of climb 180 ft/min per 5000 kg less than 60000 kg.

Flaps 30

TAT (°C)	RATE OF CLIMB (FT/MIN)					
	PRESSURE ALTITUDE (FT)					
	-2000	0	2000	4000	6000	8000
52	-400	-470				
50	-370	-440	-550			
48	-350	-420	-530			
46	-320	-400	-500	-610		
44	-300	-370	-480	-590		
42	-270	-340	-460	-570	-680	
40	-250	-320	-430	-540	-660	
38	-220	-290	-410	-520	-640	-750
36	-200	-270	-380	-500	-610	-730
34	-200	-240	-360	-470	-590	-710
32	-200	-220	-330	-450	-570	-690
30	-200	-220	-300	-420	-540	-660
20	-200	-220	-290	-360	-440	-540
10	-190	-220	-290	-370	-440	-530
0	-190	-220	-290	-370	-450	-530
-20	-200	-220	-300	-380	-460	-550
-40	-200	-230	-310	-390	-480	-570

Rate of climb capability shown is valid for 60000 kg, gear down at VREF30+5.
Decrease rate of climb 130 ft/min per 5000 kg greater than 60000 kg.
Increase rate of climb 180 ft/min per 5000 kg less than 60000 kg.



Performance Inflight - QRH

Chapter PI-QRH

Gear Down

Section 23

GEAR DOWN

Long Range Cruise Altitude Capability
Max Cruise Thrust, 100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
85	14600	11500	8500
80	17400	14600	11700
75	20300	17600	14900
70	22800	20500	17800
65	25400	23500	20900
60	27800	26300	24400
55	30200	29000	27300
50	32300	31300	30100
45	34500	33500	32400
40	36900	36000	34900

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)								
		10	21	23	25	27	29	31	33	35
85	%N1	85.9								
	MACH	.482								
	KIAS	267								
	FF/ENG	2421								
80	%N1	84.2								
	MACH	.468								
	KIAS	259								
	FF/ENG	2271								
75	%N1	82.5	91.7							
	MACH	.454	.554							
	KIAS	251	248							
	FF/ENG	2123	2101							
70	%N1	80.6	89.8	91.7						
	MACH	.440	.541	.557						
	KIAS	243	242	240						
	FF/ENG	1977	1960	1950						
65	%N1	78.6	87.9	89.5	91.6	94.5				
	MACH	.425	.524	.543	.560	.578				
	KIAS	235	234	233	231	229				
	FF/ENG	1835	1812	1806	1805	1836				
60	%N1	76.5	85.6	87.4	89.1	91.3	94.5			
	MACH	.409	.504	.525	.544	.562	.580			
	KIAS	226	225	225	224	222	220			
	FF/ENG	1696	1661	1661	1658	1664	1696			
55	%N1	74.4	83.3	85.0	86.8	88.5	90.9	94.1		
	MACH	.393	.484	.504	.525	.545	.562	.581		
	KIAS	217	216	216	216	215	213	211		
	FF/ENG	1559	1515	1512	1515	1517	1523	1555		
50	%N1	71.9	80.7	82.5	84.2	86.0	87.8	90.2	93.5	
	MACH	.376	.463	.482	.502	.523	.544	.561	.580	
	KIAS	207	206	206	206	206	205	203	201	
	FF/ENG	1424	1371	1367	1368	1374	1377	1381	1411	
45	%N1	69.1	78.0	79.7	81.4	83.1	85.0	86.8	89.1	92.5
	MACH	.358	.441	.458	.477	.498	.520	.541	.559	.578
	KIAS	197	196	196	196	196	196	195	193	191
	FF/ENG	1294	1231	1224	1224	1230	1235	1237	1239	1265
40	%N1	66.2	74.9	76.6	78.3	80.0	81.8	83.6	85.5	87.7
	MACH	.340	.417	.434	.452	.471	.491	.513	.535	.554
	KIAS	187	185	185	185	185	185	185	185	183
	FF/ENG	1170	1098	1085	1083	1089	1092	1094	1096	1097

GEAR DOWN

Long Range Cruise Enroute Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
324	290	260	236	217	200	188	178	168	160	153
654	583	523	474	435	400	377	357	338	321	307
989	880	787	713	653	600	566	535	507	483	461
1329	1181	1054	953	871	800	754	713	676	643	614
1674	1484	1322	1194	1090	1000	943	891	844	803	766
2024	1791	1593	1436	1310	1200	1131	1069	1013	962	918
2381	2103	1865	1680	1530	1400	1320	1247	1181	1122	1070
2743	2417	2140	1924	1751	1600	1508	1424	1348	1280	1221
3113	2737	2418	2171	1972	1800	1695	1600	1514	1438	1371

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		20		24		28	
	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)
200	2.4	0:49	2.2	0:47	1.9	0:44	1.7	0:42	1.6	0:41
400	4.9	1:36	4.5	1:31	4.0	1:25	3.7	1:20	3.5	1:17
600	7.4	2:25	6.8	2:17	6.1	2:06	5.7	1:59	5.4	1:54
800	9.8	3:14	9.1	3:03	8.1	2:48	7.6	2:38	7.2	2:31
1000	12.1	4:04	11.3	3:50	10.1	3:30	9.5	3:18	9.0	3:08
1200	14.4	4:56	13.5	4:39	12.1	4:14	11.3	3:58	10.7	3:46
1400	16.7	5:49	15.6	5:28	14.0	4:58	13.1	4:40	12.4	4:24
1600	18.9	6:43	17.7	6:18	15.9	5:44	14.9	5:22	14.1	5:03
1800	21.1	7:38	19.7	7:10	17.7	6:30	16.6	6:05	15.7	5:43

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)				
	40	50	60	70	80
2	-0.3	-0.2	0.0	0.3	0.7
4	-0.7	-0.3	0.0	0.6	1.3
6	-1.0	-0.5	0.0	0.9	2.0
8	-1.3	-0.7	0.0	1.2	2.6
10	-1.7	-0.8	0.0	1.4	3.2
12	-2.0	-1.0	0.0	1.6	3.7
14	-2.4	-1.2	0.0	1.8	4.2
16	-2.7	-1.3	0.0	2.0	4.6
18	-3.0	-1.5	0.0	2.2	5.0
20	-3.4	-1.7	0.0	2.4	5.3
22	-3.7	-1.8	0.0	2.5	5.6



737-700/-800/BCF Quick Reference Handbook

GEAR DOWN

Descent
VREF40 + 70 KIAS

PRESSURE ALTITUDE (FT)	TIME (MIN)	FUEL (KG)	DISTANCE (NM)
41000	21	280	91
39000	20	270	86
37000	19	270	81
35000	19	260	77
33000	18	260	72
31000	17	250	68
29000	17	250	64
27000	16	240	60
25000	15	230	56
23000	14	230	52
21000	13	220	48
19000	13	210	44
17000	12	200	40
15000	11	190	36
10000	8	170	26
5000	6	140	16
1500	4	110	9

Allowances for a straight-in approach are included.

GEAR DOWN

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)							
		1500	5000	10000	15000	20000	25000	30000	35000
85	%N1	75.8	78.5	82.7	87.0	92.0			
	KIAS	230	230	230	230	230			
	FF/ENG	2240	2230	2220	2240	2260			
80	%N1	74.2	77.0	81.1	85.4	90.0			
	KIAS	225	225	225	225	225			
	FF/ENG	2120	2110	2100	2100	2110			
75	%N1	72.5	75.4	79.4	83.7	88.3	94.8		
	KIAS	220	220	220	220	220	220		
	FF/ENG	2000	1990	1970	1970	1970	2050		
70	%N1	70.8	73.7	77.6	81.9	86.4	91.8		
	KIAS	216	216	216	216	216	216		
	FF/ENG	1890	1870	1850	1840	1840	1870		
65	%N1	69.0	71.9	75.9	80.1	84.5	89.3		
	KIAS	211	211	211	211	211	211		
	FF/ENG	1770	1750	1730	1720	1710	1730		
60	%N1	67.1	69.8	74.0	78.0	82.5	87.1	94.3	
	KIAS	204	204	204	204	204	204	204	
	FF/ENG	1660	1630	1610	1600	1580	1590	1670	
55	%N1	65.1	67.8	71.9	75.9	80.3	84.8	90.4	
	KIAS	198	198	198	198	198	198	198	
	FF/ENG	1540	1520	1490	1480	1460	1460	1500	
50	%N1	62.8	65.6	69.6	73.7	78.0	82.4	87.1	
	KIAS	192	192	192	192	192	192	192	
	FF/ENG	1430	1400	1380	1360	1330	1330	1350	
45	%N1	60.3	63.3	67.1	71.4	75.5	79.9	84.5	91.5
	KIAS	185	185	185	185	185	185	185	185
	FF/ENG	1310	1290	1270	1250	1220	1210	1220	1270
40	%N1	57.9	60.6	64.6	68.7	72.9	77.3	81.7	86.8
	KIAS	178	178	178	178	178	178	178	178
	FF/ENG	1200	1180	1160	1130	1110	1090	1100	1110

This table includes 5% additional fuel for holding in a racetrack pattern.



Performance Inflight - QRH

Chapter PI-QRH

Gear Down, Engine Inop

Section 24

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude
100 ft/min residual rate of climb

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFTDOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
75	70	218	1500		
70	66	213	4700	2200	
65	61	208	8000	5900	3400
60	57	202	11100	9300	7100
55	52	196	14000	12900	10900
50	47	190	16900	16000	14800
45	43	183	19800	18700	17600
40	38	176	22800	21700	20600

Includes APU fuel burn.

Long Range Cruise Altitude Capability
100 ft/min residual rate of climb

WEIGHT (1000 KG)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
65	1600		
60	6300	3200	
55	10600	8200	5300
50	14400	13000	10400
45	18000	16900	15700
40	21700	20500	19300



GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 KG)		PRESSURE ALTITUDE (1000 FT)									
		5	7	9	11	13	15	17	19	21	23
60	%N1	90.2	91.9								
	MACH	.364	.375								
	KIAS	220	219								
	FF/ENG	3192	3191								
55	%N1	87.8	89.3	91.0	92.8						
	MACH	.351	.362	.374	.387						
	KIAS	212	211	210	209						
	FF/ENG	2924	2909	2906	2913						
50	%N1	85.3	86.7	88.2	89.9	91.7	94.2				
	MACH	.338	.348	.359	.371	.384	.398				
	KIAS	204	203	202	201	200	199				
	FF/ENG	2672	2647	2630	2626	2633	2657				
45	%N1	82.7	84.0	85.4	86.9	88.6	90.4	92.7	96.6		
	MACH	.325	.334	.344	.355	.367	.380	.393	.408		
	KIAS	196	195	193	192	191	190	189	189		
	FF/ENG	2432	2400	2374	2356	2351	2352	2359	2417		
40	%N1	79.8	81.1	82.5	83.9	85.4	87.0	88.8	90.8	94.1	98.4
	MACH	.311	.320	.329	.339	.349	.361	.374	.387	.402	.418
	KIAS	188	186	184	183	182	181	180	179	179	178
	FF/ENG	2206	2166	2133	2107	2088	2076	2069	2065	2101	2201



737-700/-800/BCF Quick Reference Handbook

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
172	151	134	120	109	100	93	88	83	78	75
352	308	270	242	219	200	187	175	165	156	148
533	465	408	364	330	300	280	262	246	232	220
716	623	545	486	440	400	373	349	328	309	293
900	783	684	609	551	500	466	436	409	385	365
1086	943	823	733	661	600	559	523	490	462	438
1273	1105	964	856	772	700	652	610	572	538	510
1462	1267	1103	980	883	800	745	696	652	614	581
1653	1431	1245	1104	994	900	838	782	733	690	653
1845	1595	1386	1228	1105	1000	931	868	813	765	724

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)					
	6		10		14	
	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)	FUEL (1000 KG)	TIME (HR:MIN)
100	1.3	0:27	1.1	0:26	1.0	0:26
200	2.6	0:53	2.4	0:50	2.3	0:48
300	3.9	1:18	3.7	1:15	3.6	1:11
400	5.2	1:44	4.9	1:39	4.8	1:35
500	6.5	2:10	6.1	2:04	6.0	1:58
600	7.8	2:37	7.3	2:29	7.1	2:22
700	9.1	3:03	8.5	2:55	8.3	2:46
800	10.3	3:30	9.7	3:20	9.4	3:10
900	11.6	3:58	10.9	3:46	10.5	3:35
1000	12.8	4:25	12.0	4:12	11.6	3:59

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	WEIGHT AT CHECK POINT (1000 KG)				
	40	50	60	70	80
1	-0.2	-0.1	0.0	0.1	0.3
2	-0.3	-0.2	0.0	0.3	0.6
3	-0.5	-0.3	0.0	0.5	1.0
4	-0.6	-0.3	0.0	0.7	1.3
5	-0.8	-0.4	0.0	0.9	1.7
6	-1.0	-0.5	0.0	1.0	2.0
7	-1.1	-0.6	0.0	1.2	2.4
8	-1.3	-0.7	0.0	1.4	2.7
9	-1.5	-0.7	0.0	1.6	3.1
10	-1.6	-0.8	0.0	1.8	3.5
11	-1.8	-0.9	0.0	1.9	3.8
12	-1.9	-1.0	0.0	2.1	4.2
13	-2.1	-1.1	0.0	2.3	4.5
14	-2.3	-1.1	0.0	2.5	4.9

Includes APU fuel burn.

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 KG)		PRESSURE ALTITUDE (FT)			
		1500	5000	10000	15000
70	%N1	89.4			
	KIAS	216			
	FF/ENG	3610			
65	%N1	87.4	90.5		
	KIAS	211	211		
	FF/ENG	3360	3380		
60	%N1	85.2	88.2	92.9	
	KIAS	204	204	204	
	FF/ENG	3110	3110	3150	
55	%N1	82.9	85.9	90.4	
	KIAS	198	198	198	
	FF/ENG	2860	2860	2880	
50	%N1	80.4	83.4	87.7	92.8
	KIAS	192	192	192	192
	FF/ENG	2630	2620	2620	2670
45	%N1	77.8	80.7	85.0	89.6
	KIAS	185	185	185	185
	FF/ENG	2400	2380	2380	2400
40	%N1	75.1	77.8	82.1	86.5
	KIAS	178	178	178	178
	FF/ENG	2180	2160	2140	2140

This table includes 5% additional fuel for holding in a racetrack pattern.



Performance Inflight - QRH
Text

Chapter PI-QRH
Section 25

Introduction

This chapter contains information to supplement performance data from the Flight Management Computer (FMC). In addition, sufficient inflight data is provided to complete a flight with the FMC inoperative. In the event of conflict between data presented in this chapter and that contained in the approved Airplane Flight Manual, the Flight Manual shall always take precedence.

General

Flight with Unreliable Airspeed / Turbulent Air Penetration

Pitch attitude and average %N1 information is provided for use in all phases of flight in the event of unreliable airspeed/Mach indications resulting from blocking or freezing of the pitot system. Loss of radome or turbulent air may also cause unreliable airspeed/Mach indications. The cruise table in this section may also be used for turbulent air penetration. The Flight with Unreliable Airspeed – FINAL APPROACH table includes a 10 knot margin for landing.

Pitch attitude is shown in bold type for emphasis since altitude and/or vertical speed indications may also be unreliable.

Max Climb %N1

This table shows Max Climb %N1 for a 280/.78 climb speed schedule, normal engine bleed for packs on or off and anti-ice off. Enter the table with airport pressure altitude and TAT and read %N1. %N1 adjustments are shown for anti-ice operation.

Go-around %N1

To find Max Go-around %N1 based on normal engine bleed for packs on (AUTO) and anti-ice on or off, enter the Go-around %N1 table with airport pressure altitude and reported OAT or TAT and read %N1. For packs OFF or HIGH operation, apply the %N1 adjustment shown below the table.

VREF

This table contains flaps 40, 30 and 15 reference speeds for a given weight.

Advisory Information

Runway Surface Condition Correlation

When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. A table is provided that correlates runway condition code to runway surface condition description and reported braking action that can then be used to determine the appropriate Normal Configuration Landing Distance or Non-Normal Configuration Landing Distance.

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distances on dry runways and runways with good, good-to-medium, medium, medium-to-poor, and poor reported braking action. Landing distances (reference distances plus adjustments) are 115% of the actual landing distance. The Normal Configuration Landing Distance tables should be used enroute to make a landing distance assessment for time of arrival.

The reference landing distance is the distance from threshold to complete stop. It includes an air distance allowance of 1500 ft from threshold to touchdown. The reference distance is based on a reference landing weight and speed at sea level, standard day, zero wind, zero slope, two-engine detent No. 2 reverse thrust, and auto speedbrakes.

To use these tables, determine the reference landing distance for the selected braking configuration and reported braking action. Adjust this reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers. Each correction is applied independently to the reference landing distance. A correction for use of manual speedbrakes is provided in the table notes.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" reported braking action, the airplane may not be able to achieve these deceleration rates. In these cases, runway slope and inoperative reversers influence the stopping distance. Since it cannot be determined quickly when this becomes a factor, it is appropriate to add the effects of slope and inoperative reversers when using the autobrake system.

Non-normal Configuration Landing Distance

Advisory information is provided to support non-normal configurations that affect landing. Landing distances and adjustments are provided for dry runways and runways with good, good-to-medium, medium, medium-to-poor, and poor reported braking action. Landing distances (reference distances plus adjustments) are representative of the actual landing distance, and are not factored. The Non-Normal Configuration Landing Distance tables should be used enroute to make a landing distance assessment for time of arrival.

The reference landing distance is the distance from threshold to complete stop. It includes an air distance allowance of 1500 ft from threshold to touchdown. The reference distance is based on a reference landing weight and speed at sea level, standard day, zero wind, zero slope, and maximum available reverse thrust.

Tables for Non-Normal Configuration Landing Distance in this section are similar in format and used in the same manner as tables for the Normal Configuration Landing Distance previously described.

Recommended Brake Cooling Schedule

Advisory information is provided to assist in avoiding the problems associated with hot brakes. For normal operation, most landings are at weights below the AFM quick turnaround limit weight.

Use of the recommended cooling schedule will help avoid brake overheat and fuse plug problems that could result from repeated landings at short time intervals or a rejected takeoff.

Enter the Recommended Brake Cooling Schedule table with the airplane weight and brakes on speed, adjusted for wind at the appropriate temperature and altitude condition. Instructions for applying wind adjustments are included below the table. Linear interpolation may be used to obtain intermediate values. The resulting number is the reference brake energy per brake in millions of foot-pounds, and represents the amount of energy absorbed by each brake during a rejected takeoff. Notes providing adjustments for wind are included below the table.

To determine the energy per brake absorbed during landing, enter the appropriate Adjusted Brake Energy Per Brake table (No Reverse Thrust or 2 Engine Reverse) with the reference brake energy per brake and the type of braking used during landing (Max Manual, Max Auto, or Autobrake). The resulting number is the adjusted brake energy per brake and represents the energy absorbed in each brake during the landing.

The recommended cooling time is found in the appropriate (steel or carbon brakes) final table by entering with the adjusted brake energy per brake. Times are provided for ground cooling and inflight gear down cooling.

Brake Temperature Monitor System (BTMS) indications are also shown. If brake cooling is determined from the BTMS, use the hottest brake indication 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted to determine recommended cooling schedule.

Engine Inoperative

Initial Max Continuous %N1

The Initial Max Continuous %N1 setting for use following an engine failure is shown. The table is based on the typical all engine cruise speed of .79M to provide a target %N1 setting at the start of driftdown. Once driftdown is established, the Max Continuous %N1 table should be used to determine %N1 for the given conditions.

Max Continuous %N1

Power setting is based on one engine operating with one A/C pack operating and all anti-ice bleeds off. Enter the table with pressure altitude, TAT, and IAS or Mach to read %N1.

It is desirable to maintain engine thrust level within the limits of the Max Cruise thrust rating. However, where thrust level in excess of Max Cruise rating is required, such as for meeting terrain clearance, ATC altitude assignments, or to attain maximum range capability, it is permissible to use the thrust needed up to the Max Continuous thrust rating. The Max Continuous thrust rating is intended primarily for emergency use at the discretion of the pilot and is the maximum thrust that may be used continuously.

Driftdown Speed/Level Off Altitude

The table shows optimum driftdown speed as a function of cruise weight at start of driftdown. Also shown are the approximate weight and pressure altitude at which the airplane will level off considering 100 ft/min residual rate of climb.

The level off altitude is dependent on air temperature (ISA deviation).

Driftdown/LRC Range Capability

This table shows the range capability from the start of driftdown. Driftdown is continued to level off altitude. As weight decreases due to fuel burn, the airplane is accelerated to Long Range Cruise speed. Cruise is continued at level off altitude and Long Range Cruise speed.

To determine fuel required, enter the Ground to Air Miles Conversion table with the desired ground distance and adjust for anticipated winds to obtain air distance to destination. Then enter the Driftdown/Cruise Fuel and Time table with air distance and weight at start of driftdown to determine fuel and time required. If altitudes other than the level off altitude is used, fuel and time required may be obtained by using the Engine Inoperative Long Range Cruise Enroute Fuel and Time table.

Long Range Cruise Altitude Capability

The table shows the maximum altitude that can be maintained at a given weight and air temperature (ISA deviation), based on Long Range Cruise speed, Max Continuous thrust, and 100 ft/min residual rate of climb.

Long Range Cruise Control

The table provides target %N1, engine inoperative Long Range Cruise Mach number, IAS and fuel flow for the airplane weight and pressure altitude. The fuel flow values in this table reflect single engine fuel burn.

APU Operation During Flight

For APU operation during flight, increase fuel flow according to the following table. These increments include the APU fuel flow and the effect of increased drag from the APU door.

PRESSURE ALTITUDE (1000 FT)	APU FUEL FLOW (KG/HR)
39	45
35	45
31	50
25	60
20	65
15	75
10	85
5	95

Long Range Cruise Diversion Fuel and Time

Tables are provided for crews to determine the fuel and time required to proceed to an alternate airfield with one engine inoperative. The data is based on single engine Long Range Cruise speed and .78/280/250 descent. Enter with Air Distance as determined from the Ground to Air Miles Conversion table and read Fuel and Time required at the cruise pressure altitude. Adjust the fuel obtained for deviation from the reference weight at checkpoint as required by entering the off reference fuel adjustments table with the fuel required for the reference weight and the actual weight at checkpoint. Read fuel required and time for the actual weight.

Holding

Target %N1, indicated airspeed and fuel flow per engine information is tabulated for holding with flaps up based on the FMC optimum holding speed schedule. This is the higher of the maximum endurance speed and the maneuvering speed. Small variations in airspeed will not appreciably affect the overall endurance time. Enter the table with weight and pressure altitude to read %N1, IAS and fuel flow per engine.



Gear Down Landing Rate of Climb Available

Rate of climb data is provided as guidance information in the event an engine inoperative landing (manual or autoland) is planned. The tables show gear down rate of climb available for Flaps 15 and Flaps 30. Enter the table with TAT and pressure altitude to read rate of climb available. Apply adjustments shown to correct for weight.

Gear Down

This section contains performance for airplane operation with the landing gear extended. The data is based on engine bleeds for normal air conditioning.

Note: The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS may generate inappropriate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA), maximum altitude, and compute overly shallow descent path. An accurate estimated time of arrival (ETA) is available if current speed or Mach is entered into the VNAV cruise page.

Tables for gear down performance in this section are identical in format and used in the same manner as tables for the gear up configuration previously described.



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Checklist Instructions

Chapter CI

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**Checklist Instructions**
Model Identification**Chapter CI**
Section ModID**General**

This manual applies to the 737 fleet operated by Gol Linhas Aéreas S.A.
The airplane model(s) listed in the table below are covered in this Quick Reference Handbook.

Model
737-700
737-800
737-800 BCF

Model numbers are used to distinguish information peculiar to one or more, but not all of the airplanes. Where information applies to all models, no reference is made to individual model numbers.

If information is applicable to multiple models a comma (,) is used in the model designator. For example, if information is applicable to only 737-700 and 737-800 models, the model designator will show 737-700, 737-800.



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Checklist Instructions
Revision Record

Chapter CI
Section RR

Revision Transmittal Letter

To: All holders of Gol 737 Quick Reference Handbook.

Subject: Gol 737 Quick Reference Handbook Manual Revision.

This revision reflects the most current information available to Gol Linhas Aéreas S.A. through the subject revision date. The following revision highlights explain changes in this revision. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed
0	May 1, 2023	
1	January 30, 2024	
2	May 30, 2025	

No.	Revision Date	Date Filed

General

The Gol 737 QRH revisions are issued to provide new or revised procedures and information. Formal revisions also incorporate appropriate information from previously issued FCOM bulletins.

The revision date is the approximate date the manual is approved for printing. The revision is mailed a few weeks after this date. This manual is effective upon receipt and supersedes any manual (with the same document number) with a previous revision number.

Formal revisions include a Transmittal Letter, a new Revision Record, Revision Highlights, and a current List of Effective Pages. Use the information on the new Revision Record and List of Effective Pages to verify the QRH content.

Pages containing revised technical material have revision bars associated with the changed text or illustration. Editorial revisions (for example, spelling corrections) may have revision bars with no associated highlight.

The Revision Record should be completed by the person incorporating the revision into the manual.

Filing Instructions

Consult the List of Effective Pages (CI.LEP). Pages identified with an asterisk (*) are either replacement pages or new (original) issue pages. Remove corresponding old pages and replace or add new pages. Remove pages that are marked DELETED; there are no replacement pages for deleted pages.

Revision Highlights

Be careful when inserting changes not to throw away pages from the manual that are not replaced. Using the List of Effective Pages (CI.LEP) can help determine the correct content of the manual.



Throughout the manual, airplane effectivity may be updated to reflect coverage as listed on the Preface - Model Identification page, or to show service bulletin airplane effectivity. Highlights are not supplied.

This manual is published from a database; the text and illustrations are marked with configuration information. Occasionally, because the editors rearrange the database markers, or mark items with configuration information due to the addition of new database content, some customers may receive revision bars on content that appears to be unchanged. Pages may also be republished without revision bars due to slight changes in the flow of the document.

Checklist Instructions

Revision Highlights

Chapter CI

Section RR

Chapter NC - Normal Checklists

Section - Normal Checklists

File Highlight

NC.1 - Updated Normal Checklist.

Chapter NNC - Non-Normal Checklists

Section 1 - Airplane General, Emer. Equip., Doors, Windows

Window Damage - Unheated Side (L3, R3)

NNC.1.24 - Deleted NNC "Window Damage - Upper (L4, L5, R4, R5)".

Section 2 - Air Systems

WING-BODY OVERHEAT

NNC.2.26 - Added Note with references to Main Deck Cargo compartment, instead of passengers, for 737-800BCF aircraft.

NNC.2.27 - Added Note with references to Main Deck Cargo compartment, instead of passengers, for 737-800BCF aircraft.

NNC.2.28 - Added Note with references to Main Deck Cargo compartment, instead of passengers, for 737-800BCF aircraft.

NNC.2.29 - Added Note with references to Main Deck Cargo compartment, instead of passengers, for 737-800BCF aircraft.

Section 8 - Fire Protection

ENGINE FIRE or Engine Severe Damage or Separation

NNC.8.6 - Added "Engine failure with smoke or fumes in the flight deck or cabin." to condition statement for ENGINE FIRE or Engine Severe Damage or Separation NNC.

Smoke, Fire or Fumes

NNC.8.12 - Added "choose one" to Smoke, Fire or Fumes NNC, directing flight crew to ENGINE FIRE or Engine Severe Damage or Separation checklist if an engine failure or airframe vibrations with abnormal engine indications exist.

CARGO FIRE (FWD/AFT)

NNC.8.16 - Deleted text specifying airplanes with Galley Chiller and the CAB/UTIL switch.

NNC.8.16 - Deleted text specifying airplanes with Galley Chiller and the GALLEY power switch.

Smoke or Fumes Removal

NNC.8.22 - Moved the checklist complete symbol from the GoTo Step to a single step. No content change.

Section 11 - Flight Management, Navigation

CDU Display Fail

NNC.11.1 - Added CDU Display Fail NNC to address failure of a single CDU display.

GPS Data Unreliable

NNC.11.7 - Added GPS Data Unreliable checklist for inadvertent flight into areas of GPS interference.

Chapter QR - Quick Review

Section 5 - Passenger Address and Communication

File Highlight

QR.5.1 - Removed Dangerous Goods Guide from Quick Review Section 5.
Updated Passenger Address and Communication from Section 6 to Section 5.

Performance Package 10

737-700

Section 10 - General

Flight With Unreliable Airspeed / Turbulent Air Penetration

PI-QRH.10.17 - Added Flaps 1 and Flaps 5 Unreliable Airspeed Go-Around tables for additional go-around flaps options.

PI-QRH.10.17 - Added Flaps 1 and Flaps 5 Unreliable Airspeed Go-Around tables for additional go-around flaps options.

Section 11 - Advisory Information

Normal Configuration Landing Distance

PI-QRH.11.5 - Updated LOSS OF SYSTEM A AND SYSTEM B, MANUAL REVERSION, and LOSS OF SYSTEM B non-normal landing configurations to use constant braking coefficients of friction and to be consistent with current standard Boeing calculation methods. Updated All Flaps Up Landing and Trailing Edge Flaps Up Landing non-normal landing configurations to use Flaps Up reverse thrust effectiveness factor for all runway conditions. Due to publishing system limitations, the revision bar was applied to all the non-normal landing tables. Other non-normal landing tables not mentioned in this highlight had no data change.

Section 15 - Text

General

PI-QRH.15.1 - Added clarification on VREF in Flight with Unreliable Airspeed Final Approach table.

Performance Package 20

737-800

Section "90" moved to "20".

Section 20 - Pkg Model Identification

Section "90" moved to "20". Updated tables to match the most restrictive performance.

Section 20 - General

Flight With Unreliable Airspeed/ Turbulent Air Penetration

PI-QRH.20.18 - Added Flaps 1 and Flaps 5 Unreliable Airspeed Go-Around tables for additional go-around flaps options.

PI-QRH.20.18 - Added Flaps 1 and Flaps 5 Unreliable Airspeed Go-Around tables for additional go-around flaps options.

PI-QRH.20.19 - Updated Go-Around F15 table for airport altitude 14000 ft for cross model consistency.

VREF

PI-QRH.20.22 - Updated header to show VREF reference altitude.

Section 21 - Advisory Information

Section "91" moved to "21". Updated tables to match the most restrictive performance.

Non-Normal Configuration Landing Distance

PI-QRH.21.30 - Updated Brake Cooling table in order to provide the most restrictive aircraft configuration.

Section 22 - Engine Inoperative

Section "92" moved to "22". Updated tables to match the most restrictive performance.

Section 23 - Gear Down

Section "93" moved to "23". Updated tables to match the most restrictive performance.

Section 24 - Gear Down, Engine Inop

Section "94" moved to "24". Updated tables to match the most restrictive performance.

Section 25 - Text

Section "95" moved to "25".

General

PI-QRH.25.1 - Added clarification on VREF in Flight with Unreliable Airspeed Final Approach table.



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Checklist Instructions

QRH List of Effective Pages

Chapter CI

Section LEP

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* QA.Index.1-2 May 30, 2025

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* Lights.Index.1-6 May 30, 2025

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* Unann.Index.1-2 May 30, 2025

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* PI-QRH.11.22	May 30, 2025	* PI-QRH.20.22	May 30, 2025
* PI-QRH.11.23	May 30, 2025	* PI-QRH.91.1-32	Deleted
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* PI-QRH.25.2	May 30, 2025
* PI-QRH.25.3	May 30, 2025
* PI-QRH.25.4	May 30, 2025
* PI-QRH.25.5	May 30, 2025
* PI-QRH.25.6	May 30, 2025

Checklist Instructions (tab)

CI.TOC.1-2	May 1, 2023

Model Identification

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Revision Record

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Revision Highlights

* CI.RR.3	May 30, 2025
* CI.RR.4	May 30, 2025
* CI.RR.5	May 30, 2025
* CI.RR.6	May 30, 2025

List of Effective Pages

* CI.LEP.1-6	May 30, 2025

**Checklist Instructions - Normal
Checklists**

CI.1.1	May 1, 2023
CI.1.2	May 1, 2023

**Checklist Instructions - Non-Normal
Checklists**

CI.2.1	May 1, 2023
CI.2.2	May 1, 2023
CI.2.3	May 1, 2023
CI.2.4	January 30, 2024
CI.2.5	May 1, 2023
CI.2.6	May 1, 2023
CI.2.7	May 1, 2023
CI.2.8	May 1, 2023

Engine Fire on the Ground

Back Cover.1	May 1, 2023
Back Cover.2	May 1, 2023

Evacuation

Back Cover.3	May 1, 2023
Back Cover.4	May 1, 2023

* = Revised, Added, or Deleted



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* = Revised, Added, or Deleted

Checklist Instructions

Normal Checklists

Chapter CI

Section 1

Introduction

This introduction gives guidelines for use of the Normal Checklist (NC).

The NC is organized by phase of flight.

The NC is used to verify that critical items have been done.

Normal Checklist Operation

Normal checklists are used after doing all respective procedural items.

The following table shows which pilot calls for the checklist and which pilot reads the checklist. Both pilots visually verify that each item is in the needed configuration or that the step is done. The far right column shows which pilot gives the response. This is different than the normal procedures where the far right column can show which pilot does the step.

Checklist	Call	Read	Verify	Respond
PREFLIGHT	Captain	First officer	Both	Area of responsibility
BEFORE START	Captain	First officer	Both	Area of responsibility
BEFORE TAXI	Captain	First officer	Both	Area of responsibility
BEFORE TAKEOFF	Captain	First officer	Both	Area of responsibility
AFTER TAKEOFF	Pilot flying	Pilot monitoring	Both	Pilot monitoring
DESCENT	Pilot flying	Pilot monitoring	Both	Area of responsibility
APPROACH	Pilot flying	Pilot monitoring	Both	Area of responsibility
LANDING	Pilot flying	Pilot monitoring	Both	Pilot flying
SHUTDOWN	Captain	First officer	Both	Area of responsibility
SECURE	Captain	First officer	Both	Area of responsibility

If the airplane configuration does not agree with the needed configuration:

- stop the checklist
- complete the respective procedure steps
- continue the checklist

If it becomes apparent that a procedure was not completed:

- stop the checklist
- complete the procedure
- do the checklist from the start

Try to do checklists before or after high work load times. The flight crew may need to stop a checklist for a short time to do other tasks. If the interruption is short, continue the checklist with the next step. If a pilot is not sure where the checklist was stopped, do the checklist from the start. If the checklist is stopped for a long time, also do the checklist from the start.

After completion of each checklist, the pilot reading the checklist calls, " ____ CHECKLIST COMPLETE."

Checklist Content

The checklist has the minimum items needed to operate the airplane safely.

Normal checklists have items that meet any of the following criteria:

- items essential to safety of flight that are not monitored by an alerting system, or
 - items essential to safety of flight that are monitored by an alerting system but if not done, would likely result in a catastrophic event if the alerting system fails, or
 - items needed to meet regulatory requirements, or
 - items needed to maintain fleet commonality between the 737, 747, 757, 767, 777, and 787, or
 - items that enhance safety of flight and are not monitored by an alerting system (for example the autobrake), or
 - during shutdown and secure, items that could result in injury to personnel or damage to equipment if not done.
-

Checklist Construction

When a checklist challenge does not end with “switch” or “lever”, then the challenge refers to system status. For example, “Landing Gear...Down” refers to the status of the landing gear, not just the position of the lever.

When a checklist challenge ends with “switch” or “lever”, then the challenge refers to the position of the switch or lever. For example, “Engine start levers...CUTOFF” refers to the position of the levers.

Because normal checklists are done routinely, some checklist items are simplified to be more conversational such as “Autobrake.....RTO” instead of “AUTOBRAKE select switch.....RTO”.

Checklist Instructions

Non-Normal Checklists

Chapter CI

Section 2

Introduction

The non-normal checklists chapter contains checklists used by the flight crew to manage non-normal situations. The checklists are grouped in sections which match the system description chapters in Volume 2.

Annunciated Checklist

Most checklists correspond to a light, alert or other indication. In most cases, the MASTER CAUTION and system annunciator lights also illuminate to indicate the non-normal condition. These lights, alerts and other indications are the cues to select and do the associated checklist.

Unannunciated Checklists

Checklists without a light, alert or other indication (such as Ditching) are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, Fuel Leak Engine is in section 12, Fuel. Unannunciated checklists with no associated system are in section 0, Miscellaneous.

Quick Action Index

Checklists that need a quick response are listed in the Quick Action Index. In each system section, Quick Action Index checklists are listed first, followed by checklists that are not in the Quick Action Index. The titles of Quick Action Index checklists are printed in **bold** type. Checklist titles in upper case (such as AUTO BRAKE DISARM) are annunciated by a light, alert, or other indication. Checklist titles in upper and lower case (such as Window Damage) are not annunciated.

Airplane Effectivity Statement

If a checklist or a step in a checklist is not applicable to all airplanes, airplane effectivity information is included in the checklist. Airplane effectivity can be listed by airplane number, registry number, serial number or tabulation number. If a checklist is applicable to some but not all airplanes, airplane effectivity is centered below the checklist title. If a step in a checklist is applicable to some but not all airplanes, airplane effectivity is included above the step. If a checklist or a step in a checklist is applicable to all airplanes, airplane effectivity information is not included.

Condition Statement

All checklists have condition statements. The condition statement briefly describes the situation that caused the light, alert or other indication. Unannunciated checklists also have condition statements to help in understanding the reason for the checklist.

Objective Statement

Some checklists have objective statements. The objective statement briefly describes the expected result of doing the checklist or briefly describes the reason for steps in the checklist.

Memory Items vs. Reference Items

Checklists can have both memory and reference items. Memory items are immediate actions that must be done before reading the rest of the checklist. These actions must be done from memory or from an approved, immediately accessible reference such as a Quick Reference Checklist (QRC) and need to be done prior to doing reference items. The last memory item is followed by a dashed horizontal line. Reference items are actions to be done while reading the checklist.

Additional Information Section

Some checklists have additional information at the end of the checklist. The additional information provides data the flight crew may wish to consider. The additional information does not need to be read.

Non-Normal Checklist Operation

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. When special items are needed to configure the airplane for landing, the items are included in the Deferred Items section of the checklist. Flight patterns for some engine-out situations are located in the Maneuvers chapter and show the sequence of configuration changes.

Start a Checklist

Non-normal checklist use starts when the airplane flight path and configuration are correctly established. Only a few situations need an immediate response (such as CABIN ALTITUDE WARNING or Rapid Depressurization). Usually, time is available to assess the situation before corrective action is started. All actions must then be coordinated under the captain's supervision and done in a deliberate, systematic manner. Flight path control must never be compromised.

Do Memory Items

When a non-normal situation occurs, at the direction of the pilot flying, both crewmembers do all memory items in their areas of responsibility without delay.

Call for Checklist and Do Initial Actions

The pilot flying calls for the checklist when:

- the flight path is under control
- the airplane is not in a critical phase of flight (such as takeoff or landing)
- all memory items are complete.

The pilot monitoring reads aloud:

- the checklist title
- the airplane effectivity (if applicable) as needed to verify the correct checklist
- as much of the condition statement as needed to verify that the correct checklist has been selected
- as much of the objective statement (if applicable) as needed to understand the expected result of doing the checklist.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

For checklists with memory items, the pilot monitoring first verifies that each memory item has been done. The checklist is normally read aloud during this verification. The pilot flying does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Do Reference Items

Non-memory items are called reference items. The pilot monitoring reads aloud the reference items, including:

- the precaution (if any)
- the response or action
- any amplifying information.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood. The item numbers do not need to be read. It is recommended that the flight crew read aloud all the choices in a "Choose one" step before taking action, to reduce the chance of error.

The pilot flying may also direct reference checklists to be done by memory if no hazard is created by such action, or if the situation does not allow reference to the checklist.

"Confirm" Step

The word "Confirm" is added to checklist items when both flight crewmembers must verbally agree before action is taken. During an inflight non-normal situation, verbal confirmation is required for:

- an engine thrust lever
- an engine start lever
- an engine, APU or cargo fire switch
- a generator drive disconnect switch
- an IRS mode selector, when only one IRS is failed
- a flight control switch

This does not apply to the Loss of Thrust on Both Engines checklist.

Confirmation is not needed for completion of non-normal checklist items when on the ground.

There is no requirement for specific words to say during a confirm step or for physical actions such as touching or pointing to a control.

Areas of Responsibility: Ground vs. In Flight

With the airplane stationary on the ground:

- the captain and the first officer take action based on preflight and postflight areas of responsibility
- during an evacuation, the first officer sets the flap lever to 40.

With the airplane in flight or in motion on the ground:

- the pilot flying and the pilot monitoring take action based on each crewmember's Areas of Responsibility.

After moving the control, the flight crewmember taking the action also states the checklist response.

Inoperative Items

Checklists include an Inoperative Items table only when the condition of the items is needed for planning the rest of the flight. The inoperative items, including the consequences (if any), are read aloud by the pilot monitoring. The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

Deferred Items

After completion of the non-normal checklist, normal procedures are used to configure the airplane for each phase of flight.

When there are no deferred items, the DESCENT, APPROACH and LANDING normal checklists are used to verify that the configuration is correct for each phase of flight.

When there are deferred items, the non-normal checklist will include the item “**Checklist Complete Except Deferred Items.**” The pilot flying is to be made aware when there are deferred items. These items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach, or landing.

The deferred items are read aloud by the pilot monitoring. The pilot flying or the pilot monitoring takes action based on each crewmember’s area of responsibility. After moving the control, the flight crewmember taking the action also states the response.

The Deferred Items section of the non-normal checklist includes the Descent, Approach and Landing normal checklists if one or more of the following occur:

- an item is deferred until after the Descent Checklist
- a normal checklist response is changed as a result of the non-normal situation. (The changed response is printed in **bold** type.)

Use these checklists instead of the usual DESCENT, APPROACH and LANDING normal checklists. The pilot flying or the pilot monitoring responds to the deferred normal checklist items based on each crewmember’s area of responsibility. However, during the deferred Landing normal checklist, the pilot flying responds to all deferred normal checklist items.

Checklist Complete

Each checklist has a checklist complete symbol at the end.

The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non-normal checklist, the pilot monitoring states “ CHECKLIST COMPLETE.”

Special Situations

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. In some smoke, fire or fumes situations, the flight crew may need to move between the Smoke, Fire or Fumes checklist and the Smoke or Fumes Removal checklist. In some multiple failure situations, the flight crew may need to perform several checklists or combine the elements of more than one checklist. Consider doing memory items first followed by reference steps. Upon completion of a non-normal checklist, review all warning lights, caution lights and other alerts to determine the need to do other non-normal checklists. In all situations, the captain must assess the situation and use good judgment to determine the safest course of action.

Troubleshooting

It should be noted that, in determining the safest course of action, troubleshooting (taking steps beyond published non-normal checklist steps) may cause further loss of system function or system failure. Troubleshooting should only be considered when completion of the published non-normal checklist results in an unacceptable situation.

Land At Nearest Suitable Airport

There are some situations where the flight crew must land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- the non-normal checklist includes the item “Plan to land at the nearest suitable airport.”
- fire or smoke continues
- only one AC power source remains (engine or APU generator)
- only one hydraulic system remains (the standby system is considered a hydraulic system)
- any other situation determined by the flight crew to have a significant adverse effect on safety if the flight is continued.

Immediate Landing

It must be stressed that for smoke that continues or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes situation becomes uncontrollable, the flight crew should consider an immediate landing. Immediate landing implies immediate diversion to a runway. However, in a severe situation, the flight crew should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

Engine Shutdown

Checklists directing an engine shutdown must be evaluated by the captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

Loss of Indications

There are no non-normal checklists for the loss of engine indications or automatic display of the secondary engine indications. Automatic display of secondary engine parameters due to engine oil quantity is for flight crew awareness and does not require pilot action. Continue normal system or engine operation unless a limit is exceeded or a non-normal situation occurs.

Assumptions

Non-normal checklists also assume:

- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, the Minimum Equipment List (MEL) is consulted to determine if dispatch relief is available.
- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- If the MASTER CAUTION and system annunciator lights illuminate, all related amber lights are reviewed to assist in recognizing the cause(s) of the alert.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks and goggles to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. Normal boom microphone operation is restored when oxygen is no longer in use.

- Indicator lights are tested to verify suspected faults.
- In flight, reset of a tripped circuit breaker is not recommended unless directed by a non-normal checklist. However, a tripped circuit breaker may be reset once, after a short cooling period (approximately 2 minutes), if in the judgment of the captain, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. On the ground, flight crew reset of a tripped circuit breaker should only be done after maintenance has determined that it is safe to reset the circuit breaker.
- Flight crew cycling (pulling and resetting) of a circuit breaker to clear a non-normal condition is not recommended, unless directed by a non-normal checklist.

Configuration Check

After engine start and before takeoff, illumination of a red warning light, an amber caution light, an alert or other indication requires completion of the associated checklist. In certain cases, amber caution lights illuminate during MASTER CAUTION recall to inform the flight crew of the failure of one element in a system with redundant elements. If system operation is maintained by a second element, the amber caution light will extinguish when MASTER CAUTION is reset. In these situations, the amber caution light alerts the flight crew that normal system operation will be affected if another element fails. If an amber caution light illuminates during MASTER CAUTION recall, but extinguishes after MASTER CAUTION reset, completion of the associated checklist is not required.

Use of Captain's Discretion

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the captain's discretion, deviation from a checklist can be needed.

Non-Normal Situation Guidelines Overview

This is a general overview of how non-normal situations should be conducted.

Consider maximum use of autoflight system to reduce workload, if available and appropriate. If flight directors are selected on, ensure the proper flight director modes are selected.

Pilot Flying	Pilot Monitoring
Recognizes and announces the non-normal situation. Other pilot acknowledges.	
MAINTAIN AIRPLANE CONTROL Ensure that the flight path is under control.	Monitor the flight path.
	ANALYZE THE SITUATION Review all warning lights, caution lights and other alert lights to identify the non-normal situation. Prioritize alerts and recommend course of action.
Acknowledges and confirms the Pilot Monitoring's identification or recommendation.	
TAKE THE PROPER ACTION Do the NNC memory items based on each crewmember's area of responsibility.	
Call for the appropriate NNC.	
	Completes the NNC.
Review all warning lights, caution lights and other alerts, and do other NNCs as needed.	
EVALUATE THE NEED TO LAND Review options for diversion or continued flight.	

Non-Normal Checklist Legend

Redirection Symbol



The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word "Go to", to direct the flight crew to a different checklist or to a different step in the current checklist.

Separator Symbol



The separator symbol is used in two ways:

- In the Table of Contents of a system section, to separate the Quick Action Index checklists from the checklists that are not in the Quick Action Index.
- In a non-normal checklist, to separate the memory items from the reference items.

Task Divider Symbol



The task divider symbol is used to indicate the end of one task and the beginning of another task.

Decision Symbol



The decision symbol is used to identify possible choices.

Precaution Symbol



The precaution symbol is used to identify information that the flight crew must consider before taking the action.

Checklist Complete Symbol



The checklist complete symbol indicates that the checklist is complete.

**Engine Fire on the Ground Checklist
is on the reverse side of this page.**

Engine Fire on the Ground

Condition: One or more of these occur on the ground:

- An engine fire is observed
- Engine fire warning

- 1 Thrust levers (both)

Close

C
- 2 PARKING BRAKE.

Set

C
- 3 Advise the cabin.

C
- 4 Engine start lever
(affected engine)

CUTOFF

C
- 5 Engine fire switch
(affected engine)

Pull

F/O

To manually unlock the engine fire switch, press the override and pull.

- 6 Engine fire switch
(affected engine)

Rotate to the stop
and hold for 1 second

F/O

7 Choose one:

◆Evacuation is **needed**:

▶▶Go to the Evacuation checklist on
page Back Cover.4

■ ■ ■ ■

◆Evacuation is **not** needed:

▶▶Go to step 8

- 8 Advise the cabin.

C
- 9 Advise ATC.

F/O
- ■ ■ ■

**Evacuation Checklist is on the
reverse side of this page.**



Evacuation

Condition: Evacuation is needed.

- 1 PARKING BRAKE. Set C
 - 2 Speedbrake lever DOWN C
 - 3 FLAP lever 40 F/O
 - 4 Pressurization mode selector MAN F/O
 - 5 Outflow VALVE
switch Hold in OPEN
until the outflow VALVE
indication shows fully open
to depressurize the airplane F/O
 - 6 If time allows, verify that the flaps are 40
before the engine start levers are moved
to CUTOFF. C
 - 7 Engine start levers (both) CUTOFF C
 - 8 Advise the cabin to evacuate. C
 - 9 Advise ATC. F/O
 - 10 Engine and APU
fire switches (all) Override and pull F/O
 - 11 **If** an engine or APU fire is **observed or indicated**:
Related fire
switch Rotate to the stop
and hold for 1 second F/O
- 