Boeing 737-700/800
Flight Crew Operation Manual

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Index

Introduction

Limitations, Normal Procedures and Supplementary Procedures based on a complete FCOM of Boeing.

Some parts of the following procedures are shorted (for example: Oxygen mask microphone test..).

Performance Dispatch, Performance Inflight and System Description are excluded.

Do not use this FCOM if you are flying in areas with airports higher than 8400 feet.

Limitations

Operational Limitations

Maximum Take Off and Landing Tailwind Component	15 kts
Maximum Operation Altitude	41,000 ft
Maximum Takeoff and Landing Altitude	8,400 ft

Maximum demonstrated take off and landing crosswind is 33 kts (with winglets) or 36 kts (no winglets).

Maximum difference between Captain and First Officer altitude is 75 feet.

Maximum cabin pressure is 9.1 psi.

Weight Limitations

737-700

Weights	Pounds /Kilogram
Maximum Taxi Weight	133,500 / 60,554
Maximum Takeoff Weight	133,000 / 60,327
Maximum Landing Weight	128,000 / 58,059
Maximum Zero Fuel Weigh	120,500 / 54,657

737-800

Weights	Pounds /Kilogram

Maximum Taxi Weight	133,500 / 60,554
Maximum Takeoff Weight	133,000 / 60,327
Maximum Landing Weight	128,000 / 58,059
Maximum Zero Fuel Weigh	120,500 / 54,657

Autopilot/Flight Director System

Don't engage the autopilot below 400 ft AGL.

For single channel approach, the autopilot shall disengaged below 50 ft AGL.

Maximum wind speeds for landing with autopilot (for example in case of CAT III conditions):

Headwind	25 kts
Crosswind	20 kts
Tailwind	10 kts

Maximum angle for autoland: 3.25°

Minimum angle for autoland: 2.5°

Engines and APU

Maximum and minimum limits are shown red in the displays.

Engine Ignition must be on for:

- takeoff
- landing
- operation in heavy rain
- anti ice operation

Maximum altitude for using APU is 10,000 ft

Flight Controls

Maximum altitude for flap extensions is 20,000 ft

Maximum airplane speed for using speedbrakes is 300 KIAS

Fuel System

Maximum tank fuel temperature: 49°C

Minimum tank fuel temperature: 3°C above freezing point of gas or -43°C, whichever is higher

Imbalance between main tank 1 and 2 must be scheduled to be zero

Random fuel imbalance must not exceed 1000 lbs / 453 kg

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Normal Procedures

Philosophy

Normal procedures (NP) shall verify a satisfaction and correct flight. They shall assume that all systems operate normally. NPs also assume coordination between ground crew and cockpit. NPs do not include steps for flight deck lightning and crew comfort items.

Configuration Check

Before start of a flight check all lights to verify that all systems are running correctly. If there is any incorrect configuration verify that all system controls are set correctly. If while or after engine start a red light illuminate continue with Non Normal Procedures.

Crew Duties

Before flight crew duties are divided between captain and first officer. In flight duties are divided in Pilot Flying (PF) and Pilot Monitoring (PM).

In general PF is responsible for:

- taxiing
- flight path and airspeed control
- airplane configuration
- navigation

In general PM is responsible for:

- checklist reading
- communications

- tasks asked for by the PF
- monitoring the complete flight, including taxiing

PF and PM duties can change during flight. For example, the PM can taxi the aircraft and PF can communicate in this time.

NPs show who does the step in headline or in every item.

The captain is the final authority for all tasks!

Control Display Unit (CDU) Procedures

All entries in CDU should be done before starting taxi.

All entries must verify by the other pilot. In case of changing any item in CDU the other pilot must verify them.

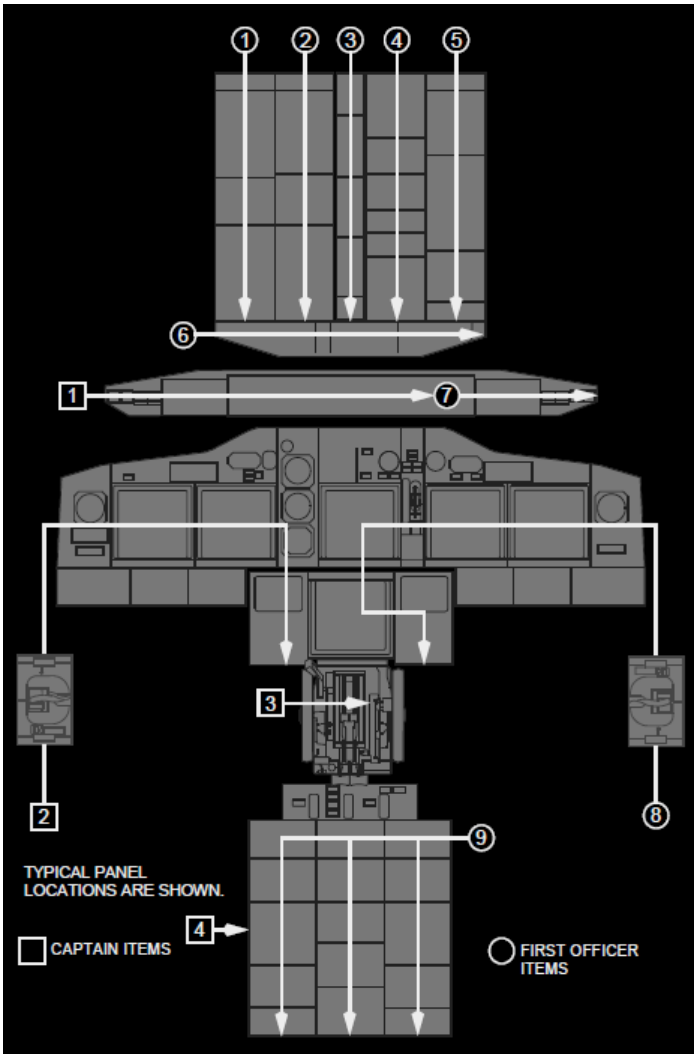
Entries in CDU should be reduced in high workload times (Take Off or Landing). Its easier to use MCP for entries like heading or altitude.

Autopilot Flight Director System (AFDS) Procedures

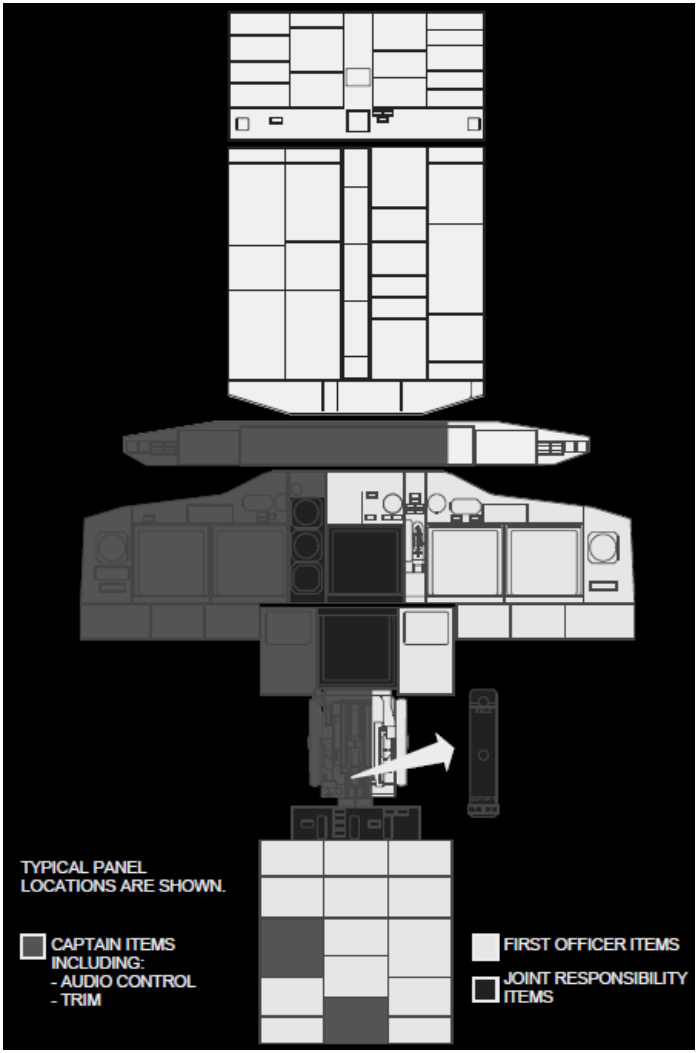
The crew must always monitor:

- course
- vertical path
- speed and thrust

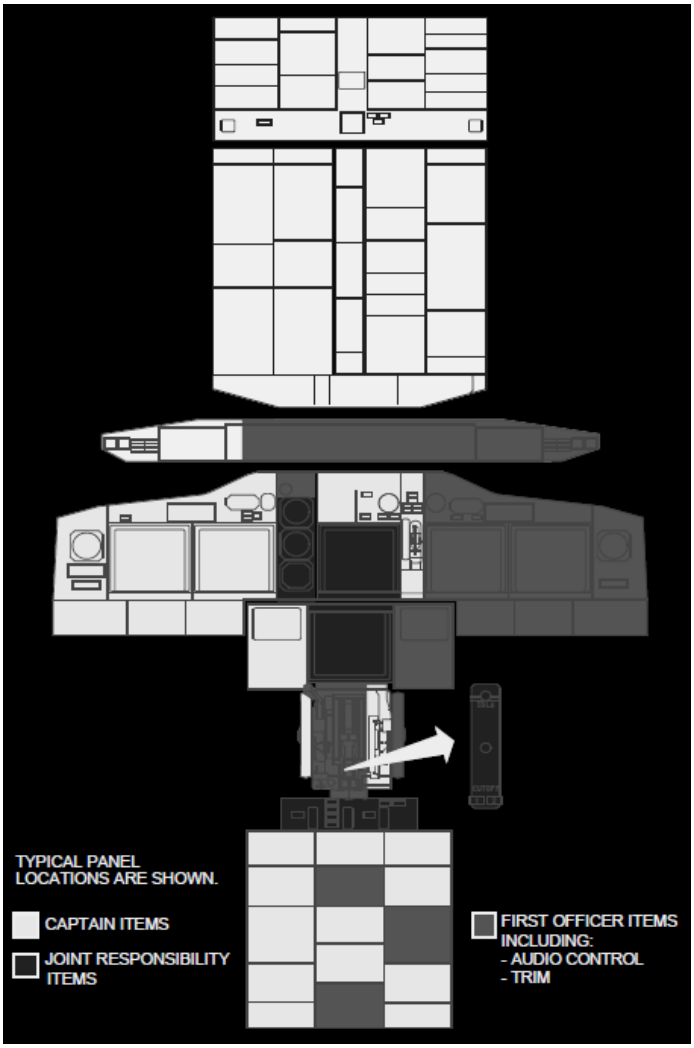
Preflight and Postflight Scan Flow



Areas of Responsibility – Captain as PF



Areas of Responsibility – First Officer as PF



Preliminary Preflight Procedure – Captain or First Officer

Start Preliminary Preflight Procedure when electrical power is on (after power up procedure or when another crew left the cockpit with power on).

IRS mode selectors..... ….....Off, then NAV
Voice recorder switch..... ….....On
Maintenance documents..... ….....Check
Emergency equipment..... ….....Check
PSEU light..... Verify extinguished
GPS light..... Verify extinguished
INTERPHONE switch..... ….....Off
ENGINE panel..... ….....Set

- Verify reverser lights are extinguished
- Verify ENGINE CONTROL lights are extinguished
- EEC switches - ON

Oxygen Panel..... ….....Set

- PASSENGER OXYGEN switch – guard closed
- Verify PASS OXY ON light is extinguished

Landing gear indicator lights..... ….Verify illuminated
Manual gear extension access door..... ….....Closed
Parking Brake..... ….....Set
Do the SAFETY INSPECTION checklist on captains command

CDU Preflight Procedure – Captain or First Officer

Captain or First Officer can start the CDU Preflight Procedure any time after the Preliminary Preflight Procedure. All entries must verify by the other pilot. In general CDU Preflight Procedure will be done between Preflight Procedure.

Enter data in all the boxed items on the following CDU pages.

Initial Data..... …..Set

- IDENT page:
  - Verify that the Model is correct
  - Verify that the ENG Rating is correct
  - Verify that the data base is correct
- POS INIT page:
  - Verify that the time is correct
  - Enter current position

Navigation Data..... .....Set

- Route Page:
  - Enter ORIGIN
  - Enter route
  - Enter FLIGHT NUMBER
  - Activate and execute Route
- DEPARTURES page:
  - Select runway and execute entry
- Verify that the route is correct. Check LEGS page to avoid any problems with the flight plan

Performance Data..... .....Set

- PERF INIT page:
  - Enter ZFW
  - Verify Fuel on the CDU, the papers and fuel quantity indicators
  - Verify that gross weight and cruise CG in the CDU and the dispatch papers agree
- N1 LIMIT Page
  - Select and assumed temperature, a fixed derated takeoff or both as needed
  - Select a full or derated climb thrust as needed
- TAKE OFF REF page
  - Make data entries on page 2/2 before ½
  - Enter the CG
  - Verify trim
  - Select or enter the takeoff V speeds
  - Verify or enter a thrust reduction altitude

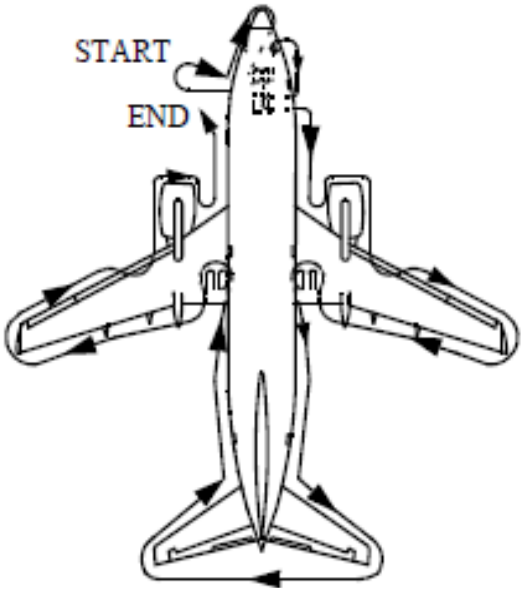
- Verify that preflight is complete

Exterior Inspection

Before each flight captain, first officer or maintenance crew must verify that the airplane is able for a safe flight.

Check that nothing is damaged, full compressed and each inlet is clear of dirt.

Walk along shown way and check all necessary items like engine inlets, gear and lights.



In MSFS it's not necessary to do this test. Outside damages are not simulated.

Preflight Procedure – First Officer

Flight control panel.....Check

- FLIGHT CONTROL switches – Guards closed
  - Verify LOW PRESSURE lights are illuminated
- Flight SPOILER switches – Guards closed
- YAW DAMPER switch – ON
  - Verify YAW DAMPER light is extinguished
  - Verify standby hydraulic LOW QUANTITY light is extinguished
  - Verify standby hydraulic LOW PRESSURE light is extinguished
  - ALTERNATE FLAPS master switch – Guard closed
  - ALTERNATE FLAPS position switch – OFF
  - Verify FEEL DIFF PRESS light is extinguished
  - Verify SPEED TRIM FAIL light is extinguished
  - Verify MACH TRIM FAIL light is extinguished
  - Verify AUTO SLAT FAIL light is extinguished

NAVIGATION panel.....Set

- VHF NAV transfer switch – NORMAL
- IRS transfer switch – NORMAL

DISPLAYS panel.....Set

- SOURCE selector – AUTO
- CONTROL PANEL select switch – NORMAL

Fuel panel.....Set

- Verify ENG VALVE CLOSED lights are illuminated
- Verify SPAR VALVE CLOSED lights are illuminated

- Verify FILTER BYPASS lights are extinguished
- CROSSFEED selector – Closed
  - Verify VALVE OPEN lights is extinguished
- FUEL PUMP switches – OFF
  - Verify center tank fuel pump LOW PRESSURE lights are extinguished
  - Verify main tank fuel pump LOW PRESSURE lights are illuminated

Electrical panel.....Set

- BATTERY switch – Guard closed
- CAB/UTIL power switch – ON
- STANDBY POWER switch – Guard closed
  - Verify STANDBY PWR OFF light is extinguished
  - Verify BAT DISCHARGE light is extinguished
  - Verify TR UNIT light is extinguished
  - Verify ELEC light is extinguished
- Generator drive DISCONNECT switches – Guards closed
  - Verify DRIVE lights are illuminated
- BUS TRANSFER switch – Guard closed
  - Verify TRANSFER BUS OFF lights are extinguished
  - Verify SOURCE OFF lights are extinguished
  - Verify GEN OFF BUS lights are illuminated

Overheat and fire protection panel.....Check

- Do this check only if the crew did not ELECTRICAL POWER

UP supplementary procedure. This supplementary procedure contains an overheat and fire protection check

- Verify that ENG no. 1. ENG no. 2 and APU fire switches are in.
- OVERHEAT DETECTOR switches – NORMAL
- TEST switch – Hold to FAULT/INOP
  - Verify MASTER CAUTION lights are illuminated
  - Verify OVHT/DET annunciator is illuminated
  - Verify FAUL light is illuminated
  - Verify APU DET INOP light is illuminated
- TEST switch – Hold to OVHT/FIRE
  - Verify fire warning bell sounds
  - Verify master FIRE WARN lights are illuminated
  - Verify MASTER CAUTION lights are illuminated
  - Verify OVHT/DET annunciator is illuminated
  - Master FIRE WARN light – Push
    - Verify FIRE WARN lights are extinguished
    - Verify fire warning bell cancels
    - Verify ENG 1, ENG 2 and APU fire switches stay illuminated
    - Verify ENG 1 OVERHEAT and ENG 2 OVERHEAT lights stay illuminated
    - Verify WHEEL WELL lights stays illuminated
- EXTINGUISHER TEST switch – Check
  - TEST switch – Position 1 and hold

        - Verify test lights are green illuminated
    - TEST switch – Release
        - Verify test lights are extinguished
    - Repeat for test position 2

APU switch (as needed).....START

- When APU GEN OFF BUS light is illuminated
    - APU GENERATOR bus switches – ON
    - Verify SOURCE OFF lights are extinguished
    - Verify TRANSFER BUS OFF lights are extinguished

EQUIPMENT COOLING switches.....NORM

- Verify OFF lights are extinguished

EMERGENCY EXIT LIGHTS switch.....Guard closed

- Verify NOT ARMED lights is extinguished

Passenger signs.....Set

- NO SMOKING switch – AUTO or ON
- FASTEN BELTS switch – AUTO or ON

Windshield WIPER selectors.....PARK

- Verify windshield wipers are stowed

WINDOW HEAT switches.....ON

- Position switches ON at least 10 minutes before takeoff
    - verify OVERHEAT lights are extinguished

PROBE HEAT switches.....OFF

- Verify all lights are illuminated

WING ANTI-ICE switch.....OFF

- Verify VALVE OPEN lights are extinguished

ENGINE ANTI-ICE switches.....OFF

- Verify COWL ANTI-ICE lights are extinguished
- Verify COWL VALVE OPEN lights are extinguished

Hydraulic panel.....Set

- ENGINE HYDRAULIC PUMPS switches – ON
  - verify LOW PRESSURE lights are illuminated
- ELECTRICAL HYDRAULIC PUMPS switches – OFF
  - Verify OVERHEAT lights are extinguished
  - Verify LOW PRESSURE lights are illuminated

Air conditioning panel.....Set

- AIR TEMPERATURE source selector – As needed
- TRIM AIR switch – ON (737-800)
- Verify DUCT OVERHEAT lights are extinguished (737-700)
- Verify ZONE TEMP lights are extinguished (737-800)
- Temperature selectors – As needed
- Verify RAM DOOR FULL OPEN lights are illuminated
- RECIRCULATION FAN switch(es) – AUTO
- Air conditioning PACK switches – AUTO or HIGH
- ISOLATION VALVE switch – OPEN
- Engine BLEED air switches – ON
- APU BLEED air switch – ON

    - Verify DUAL BLEED light is illuminated
- Verify PACK TRIP OFF lights are extinguished (737-700)
- Verify PACK lights are extinguished (737-800)
- Verify WING-BODY OVERHEAT lights are extinguished
- Verify BLEED TRIP off lights are extinguished

Cabin pressurization panel.....Set

- Verify AUTO FAIL light is extinguished
- Verify OFF SCHED DESCENT light is extinguished
- FLIGHT ALTITUDE indicator – Cruise altitude
- LANDING ALTITUDE indicator – Destination field elevation
- Pressurization mode selector – AUTO
    - Verify ALTN light is extinguished
    - Verify MANUAL light is extinguished

Lightning panel.....Set

- LANDING light switches – OFF
- RUNWAY TURNOFF light switches – OFF
- TAXI light switch – OFF

Ignition select switch.....IGN L or R

ENGINE START switches.....OFF

Lightning panel.....Set

- LOGO light switch – ON
- POSITION light switch – ON
- ANTI COLLISION light switch – OFF

- STROBE light switch - OFF
- WING light switch – OFF

Mode control panel.....Set

- COURSE(S) – Set
- FLIGHT DIRECTOR switch – ON
  - Move the switch for PF first

EFIS control panel.....Set

- MINIMUMS reference selector – RADIO or BARO
- MINIMUMS selector – Set decision height or altitude reference
- METERS switch – As needed
- BAROMETRIC reference selector – IN or HPA
- BAROMETRIC selector – Set local altimeter setting
- VOR/ADF switches – As needed
- Mode selector – MAP
- CENTER switch – As needed
- Range Selector – As needed
- TRAFFIC switch – As needed
- WEATHER RADAR – Off
  - Verify weather radar indications are not shown on MAP
  - Map switches – As needed

Oxygen.....Test and set

- Crew oxygen pressure – Check
- Oxygen mask – Stowed and doors closed

- REST/TEST switch – push and hold
  - Verify yellow cross shows momentarily in the flow indicator
- EMERGENCY/Test selector – Push and hold

Clock.....Set

Display select panel.....Set

- MAIN PANEL DISPLAY UNITS selector – NORM
- LOWER DISPLAY UNIT selector – NORM

TAKEOFF CONFIG light (if installed).....Verify extinguished

CABIN ALTITUDE (if installed).....Verify extinguished

Disengage light TEST switch.....Hold to 1

- Verify A/P light is illuminated steady amber
- Verify A/T light is illuminated steady amber
- Verify FMC light is illuminated steady amber

Disengage light TEST switch.....Hold to 2

- Verify A/P light is illuminated steady red
- Verify A/T light is illuminated steady red
- Verify FMC light is illuminated steady amber

Do the Initial Data and Navigation Data steps from CDU Preflight Procedure. Verify IRS alignment is complete.

Flight instruments.....Check

- Verify flight instrument indications are correct.
- Verify that only these flags are shown
  - TCAS OFF

- NO VSPD
- expected RMI flags

- Verify flight mode annunciations are correct
  - autothrottle mode is blank
  - roll mode is blank
  - pitch mode is blank
  - AFDS status is FD
- Select map mode

BRAKE TEMP light.....Verify extinguished

GROUND PROXIMITY panel.....Check

- FLAP INHIBIT switch – Guard closed
- GEAR INHIBIT switch – Guard closed
- TERRAIN INHIBIT switch – Guard closed
- Verify INOP light is extinguished

Landing gear panel.....Set

- LANDING GEAR lever -DN
- Verify green landing gear indicator lights are illuminated
- Verify red landing gear indicator lights are extinguished

AUTO BRAKE selector.....RTO

- Verify AUTO BRAKE DISARM light is extinguished

ANTISKID INOP light.....Verify extinguished

Engine display control panel.....Set

- N1 SET selector – AUTO

- SPEED REFERENCE selector – AUTO
- FUEL FLOW switch – RATE
  - Move switch to RESET, then RATE

Engine instruments.....Check

- Verify that the primary and secondary engine indications show existing conditions
- Verify that no exceedance is shown
- Verify hydraulic quantity indications do not show RF

CARGO FIRE panel.....Check

- This check is needed once per flight day or following a crew change
- DETECTOR SELECT switches – NORM
- TEST switch – Push
  - Verify fire warning bell sounds
  - Verify FIRE WARN lights are illuminated
- Master FIRE WARN light – Push
  - Verify FIRE WARN lights are extinguished
  - Verify fire warning bell cancels
  - Verify FWD and AFT lights stays extinguished
  - Verify green EXTINGUISHER test lights stay illuminated
  - Verify DISCH light stays illuminated

Radio tuning panel.....Set

- Verify OFF light is extinguished

VHF communications radios.....Set

VHF NAVIGATION radios.....Set for departure

Audio control panel.....Set

ADF radios.....Set

WEATHER RADAR panel.....Set

Transponder panel.....Set

STABILIZER TRIM override switch.....Guard closed

Seat.....Adjust

- Adjust seat for optimum eye reference
- Verify positive horizontal seat lock

Rudder pedals.....Adjust

Seat belt shoulder harness.....Adjust

Preflight Procedure – Captain

In general the captain does this procedure. First officer can do this procedure if needed.

Lights.....Test

- Master LIGHTS TEST and DIM switch – TEST
  - Fire warning lights are not checked with this test
- Master LIGHTS TEST and DIM switch – As needed

EFIS control panel.....Set

- MINIMUMS reference selector- RADIO or BARO
- MINIMUMS selector – Set decision height or altitude reference
- FLIGHT PATH VECTOR switch – As needed
- METERS switch – As needed

- BAROMETRIC reference selector – IN or HPA
- BAROMETRIC selector – Set local altimeter setting
- VOR/ADF switches – As needed
- Mode selector – MAP
- CENTER switch – As needed
- Range selector – As needed
- TRAFFIC switch – As needed
- WEATHER RADAR – Off
  - Verify weather radar indications are not shown on the MAP
- Map switches – As needed

Mode control panel.....Set

- COURSE(S) – Set
- FLIGHT DIRECTOR switch – ON
  - Move switch for pilot flying ON first
- Bank angle selector – As needed
- Autopilot DISENGAGE bar – UP

Oxygen.....Test and set

- Crew oxygen pressure – Check
- Oxygen mask – Stowed and doors closed
- REST/TEST switch – push and hold
  - Verify yellow cross shows momentarily in the flow indicator
- EMERGENCY/Test selector – Push and hold

Clock.....Set

Display select panel.....Set

- MAIN PANEL DISPLAY UNITS selector – NORM
- LOWER DISPLAY UNIT selector – NORM

TAKEOFF CONFIG light (if installed).....Verify extinguished

CABIN ALTITUDE (if installed).....Verify extinguished

Disengage light TEST switch.....Hold to 1

- Verify A/P light is illuminated steady amber
- Verify A/T light is illuminated steady amber
- Verify FMC light is illuminated steady amber

Disengage light TEST switch.....Hold to 2

- Verify A/P light is illuminated steady red
- Verify A/T light is illuminated steady red
- Verify FMC light is illuminated steady amber

Do the Initial Data and Navigation Data steps from CDU Preflight Procedure. Verify IRS alignment is complete.

STAB OUT OF TRIM light.....Verify extinguished

Flight instruments.....Check

- Verify flight instrument indications are correct.
- Verify that only these flags are shown
  - TCAS OFF
  - NO VSPD
  - expected RMI flags
- Verify flight mode annunciations are correct

- autothrottle mode is blank
- roll mode is blank
- pitch mode is blank
- AFDS status is FD

- Select map mode

Standby instruments.....Check

- Standby horizon – Set
  - Gyro caging control – Pull, then release
  - Approach mode selector – As needed
  - Verify flight instruments are correct
  - Verify no flags are shown
- Standby altimeter -Set
  - Verify flight indications are correct
  - Verify no flags are shown

SPEED BRAKE lever.....Down detent

- Verify SPEED BRAKE ARMED light is extinguished
- Verify SPEED BRAKE DO NOT ARM light is extinguished
- Verify SPEED BRAKES EXTENDED light is extinguished

Reverse thrust levers.....Down

Forward thrust levers.....Closed

FLAP lever.....Set

- Set the flap lever to agree with the flap position

Parking brake.....Set

- Verify parking brake warning light is illuminated

Engine start levers.....CUTOFF

STABILIZER TRIM cutout switches.....NORMAL

Radio tuning panel.....Set

- Verify OFF light is extinguished

VHF communications radios.....Set

VHF NAVIGATION radios.....Set for departure

Audio control panel.....Set

Seat.....Adjust

- Adjust seat for optimum eye reference
- Verify positive horizontal seat lock

Rudder pedals.....Adjust

Before Start Procedure

Start Before Start Procedure after papers are on board.

Flight Deck door.....Closed and locked F/O

- Verify LOCK FAIL light is extinguished

Do CDU Preflight Procedure – Performance Data Step before completing this procedure

CDU display.....Set C, F/O

- Normally PF selects TAKEOFF REF page
- Normally PM selects LEGS page

N1 bugs.....Check C, F/O

- Verify N1 reference bugs are correct

IAS bugs.....Set C, F/O

MCP.....Set C

- AUTOTHROTTLE ARM switch – ARM
- IAS/MACH selector – Set V2
- Arm LNAV as needed
- Initial heading – Set
- Initial altitude – Set

Taxi and Takeoff briefing.....Complete C, F/O

The pilot who will do the takeoff does the taxi and takeoff briefings.

Exterior doors.....Verify closed F/O

Flight Deck windows.....Closed and locked C, F/O

Start clearance.....Obtain C, F/O

- Obtain a clearance to start the engines

Fuel panel.....Set F/O

If center tank fuel quantity exceeds 1000lbs/460kg:

- LEFT and RIGHT CENTER FUEL PUMPS switches – ON
  - Verify LOW PRESSURE lights illuminate momentarily and then extinguish
  - If LOW PRESSURE light stays illuminated turn off CENTER FUEL PUMPS switch
- AFT and FORWARD FUEL PUMPS switches – ON
  - Verify LOW PRESSURE lights are extinguished

Hydraulic panel.....Set F/O

If pushback is needed:

- System A HYDRAULIC PUMP switches – OFF
  - Verify system A pump LOW PRESSURE lights are illuminated
- System B electric HYDRAULIC PUMP switch – ON
  - Verify system B electric pump LOW PRESSURE light is extinguished
- Verify brake pressure is 2,800 psi minimum
- Verify system B pressure is 2,800 psi minimum

If pushback is not needed:

- Electric HYDRAULIC PUMP switches – ON
  - Verify electric pump LOW PRESSURE lights are extinguished
- Verify brake pressure is 2,800 psi minimum
- Verify system A and B pressure are 2,800 psi minimum

ANTI COLLISION LIGHT switch.....ON F/O

Trim.....Set C

- Check each trim for freedom movement
- Stabilizer trim - __ UNITS
  - Set trim for takeoff
  - Verify trim is in green band
  - Aileron trim – 0 units
  - Rudder trim – 0 units

Pushback or Towing Procedure

The Engine Start procedure may be done during pushback or towing.

Establish communications with ground handling personnel C

CAUTION: Do not use airplane brakes to stop the airpline while pushback. This can damage the nose gear

Set or release parking brake as directed by ground handling personnel C or F/O

When pushback is complete:

- Verify tow bar is disconnected C
- Verify nose gear steering pin is removed C
- System A HYDRAULIC PUMPS switches – ON F/O
  - Verify system A pump LOW PRESSURE lights are extinguished

- Verify system A pressure is 2,800 psi minimum

Engine Start Procedure

Select secondary engine indications	F/O
Air conditioning PACK switches.....OFF	F/O
Start sequence.....Announce	C
Call “Start ___ ENGINE”	C
ENGINE START switch.....GRD	F/O
Verify N2 RPM is increases	C,FO
When N1 rotation is seen and N2 is at 25%, or (if 25% N2 is not possible), at maximum motoring and a minimum of 20% N2:	
Engine start lever.....IDLE	C
Monitor fuel flow and EGT indications	C,F/O
At 56% N2, verify ENGINE START switch moves to OFF. If not move ENGINE START switch to OFF	F/O
Verify START VALVE OPEN alert extinguished when ENGINE START switch moves to OFF	F/O
Call “STARTER CUTOUT”	F/O
Monitor N1, N2, EGT, fuel flow and oil pressure for normal indications while engine accelerates to a stable idle	C,F/O
After engine is stable at idle, start other engine	

Starter duty cycle:

- Do not exceed 2 minutes during each start attempt
- A minimum of 10 seconds is required between start attempts

Normal engine start considerations:

- do not move an engine start lever to idle early
- keep a hand on the engine start lever while monitoring RPM, EGT and fuel flow until stable
- if fuel is shutoff accidentally do not reopen the engine start lever in an attempt to restart the engine

Do the ABORTED ENGINE START checklist for one or more of the following abort start conditions:

- N1 or N2 does not increase or increases very slowly
- no oil pressure indication
- EGT does not increase by 10 seconds after engine start lever is moved to idle
- EGT quickly nears or exceed the start limit

Before Taxi Procedure

Generator 1 and 2 switches	ON	F/O
PROBE HEAT switches	ON	F/O
WING ANTI-ICE switch	As needed	F/O
ENGINE ANTI-ICE switches	As needed	F/O
PACK switches	AUTO	F/O
ISOLATION VALVE switch	AUTO	F/O
APU BLEED air switch	OFF	F/O
APU switch	OFF	F/O
ENGINE START switches	CONT	F/O
Engine start levers	IDLE detent	C

Verify that the ground equipment is clear C, F/O

Call “FLAPS_” as needed for takeoff C

Flap lever.....Set takeoff flaps F/O

Flight controls.....Check C

- Move Yoke in all directions
  - Verify free movement
  - Verify controls return to center
- Move rudder pedals
  - Verify free movement
  - Verify rudder pedals return to center

Blank lower display unit F/O

Transponder.....As needed F/O

Recall.....Check C, F/O

- Verify all system annunciator panel lights illuminate and then extinguish

Update changes to taxi briefing as needed C or PF

Call and do AFTER START checklist

Before Takeoff Procedure

Engine warm up requirement:

- Verify increasing oil temperature before takeoff

Engine warm up recommendations:

- run engines for at least 2 minutes
- use a thrust setting normally used for taxi operations

Pilot Flying	Pilot Monitoring
	Check center fuel quantity. Center tank fuel pump switches

	must be OFF for takeoff if center tank fuel is less than 5000lbs/ 2300kg
	Notify cabin crew to prepare for takeoff. Verify cabin is secure
The pilot who will do the take off updates changes to the takeoff briefing as needed	
Set weather radar display as needed	
Call “BEFORE TAKEOFF CHECKLIST”	Do the BEFORE TAKEOFF checklist part 1

Takeoff Procedure

Pilot Flying	Pilot Monitoring
	Enter runway offset on CDU TAKEOFF REF page Enter RWY REMAIN on CDU TAKEOFF REF page Update FMC position to the runway threshold on CDU TAKEOFF REF page
	When entering runway, set STROBE light switch ON. Other lights as required
Verify brakes are released Align the airplane wit the runway	When cleared for takeoff, set LANDING light switches to ON Set transponder to TA/RA
Advance thrust levers to approximately 40% N1	

Allow engines to stabilize	
Push TO/GA switch	
Verify correct takeoff thrust set	
	Monitor engine instruments during takeoff. Call out abnormal indications Adjust takeoff thrust before 60kts as needed
	During strong headwinds, if the thrust levers do not advance to planned takeoff thrust by 60kts, manually advance the thrust levers.
After takeoff thrust is set, captains hand must be on thrust levers until V1.	
Monitor airspeed Maintain light forward pressure on the control column	Monitor airspeed and call out any abnormal indications
Verify 80 knots and call “CHECK”	Call “80 KNOTS”
Verify V1 speed	Verify the automatic V1 callout or call “V1”
At VR, rotate 15° pitch attitude. After liftoff, follow F/D commands Establish positive rate of climb	At VR call “ROTATE” Monitor airspeed and vertical speed

Verify a positive rate of climb and call “GEAR UP”	Verify a positive rate of climb and call “POSITIVE RATE” Set landing gear lever to UP
Above 400 ft radio altitude, call for a roll mode as needed	Select or verify the roll mode
At thrust reduction height verify climb thrust is set	
At acceleration height, call “SET FLAPS UP SPEED”	Set flaps up maneuvering speed
Verify acceleration Call “FLAPS__” according to the flap retraction schedule	Set FLAP lever as directed. Monitor flaps and slats retraction
After flaps and slats retraction is complete, call “VNAV”	Push VNAV switch
Engage autopilot when above minimum altitude for autopilot engagement	
	After flap retraction is complete: • Set or verify engine bleeds and air conditioning packs are operating • Set engine start switches OFF • Set AUTO BRAKE selector OFF

	• Set landing gear lever to OFF after landing gear retraction is complete
Call “AFTER TAKEOFF CHECKLIST”	Do AFTER TAKEOFF checklist

Takeoff Flap Retraction Speed Schedule

Takeoff Flaps	At Speed (display)	Select Flaps
25	V2+15 “15” “5” “1”	15 5 1 UP
15 or 10	V2+15 “5” “1”	5 1 UP
5	V2+15 “1”	1 UP
1	“1”	UP
Limit bank angle to 15° until reaching V2+15		

Climb and Cruise Procedure

Complete After Takeoff Chechklist before starting Climb and Cruise Procedure.

Pilot Flying	Pilot Monitoring
	If center fuel pump switches were OFF for takeoff and contains more than 1000lbs/500kg, set both center tank fuel pump switches ON

	above 10,000ft.
	During climb, set both center tank fuel pump switches OFF when center tank fuel quantity reaches approximately 1000lbs/500kg
	At or above 10,000ft MSL, set LANDING light switches OFF
	Set passenger signs as needed
At transition altitude, set and crosscheck altimeters to standard	
	When established in a level attitude at cruise, if center tank contains more than 1000lbs/500kg and the center tank fuel pump switches are OFF, set center tank fuel pump switches ON Set both center tank fuel pump switches OFF when center tank fuel quantity reaches approximately 1000lbs/500kg
	During the last hour of cruise on ETOPS flights, do a Fuel Crossfeed Valve check Verify or center the correct RNP for arrival

Descent Procedure

Start Descent Procedure before airplane descends below cruise altitude for arrival at destination.

Complete Descent Procedure by 10,000ft MSL.

Pilot Flying	Pilot Monitoring
	Set one center tank fuel pump switch OFF when center tank fuel quantity reaches approximately 3000lbs/1400kg. Open crossfeed valve to minimize fuel imbalance Turn the remaining center tank fuel pump switch OFF without delay and close the crossfeed valve when Master Caution and FUEL system annunciator illuminate
	If established in level flight for an extended period of time prior to approach and landing with more than 2000lbs/950kg in the center tank and the center tank fuel pump switches OFF, one center tank fuel pump switch may be turned On. Open crossfeed valve to minimize fuel imbalance Turn remaining center tank fuel pump switch OFF without delay and close crossfeed valve when Master Caution and FUEL system annunciator illuminate
	Verify pressurization is set to landing altitude
Review system annunciator lights	Recall and review system annunciator lights

Verify VREF on the APPROACH REF page	Enter VREF on APPROACH REF page
Set RADIO/BARO minimums for approach	
Set or verify navigation radios and course for approach	
	Set AUTO BRAKE selector to the needed brake setting
Do approach briefing	
Call “DESCENT CHECKLIST”	Do the DESCENT checklist

Approach Procedure

In general Approach Procedure started at transition level.

Complete Approach Procedure before:

- initial approach fix
- start of radar vectors to final
- start of visual approach

For ILS, LOC, BCRS, SDF or LDA approach, select appropriate localizer frequency.

If a flaps 15 landing is needed: GROUND PROXIMITY flap inhibit switch.....FLAP INHIBIT F/O

Pilot Flying	Pilot Monitoring
	Set passenger signs as needed
	At or above 10,000ft MSL, set LANDING light switches to ON
At transition level, set and crosscheck altimeters	
Update arrival and approach procedures as needed. Update RNP as needed	

Update approach briefing as needed	
Call “APPROACH CHECKLIST”	Do APPROACH checklist

Flap Extension Schedule

Current Flap Position	At Speedtape “Display”	Select Flaps	Command Speed for Selected Flaps
UP	“UP”	1	“1”
1	“1”	5	“5”
5	“5”	15	“15”
15	“15”	30 or 40	(VREF30 or VREF40) + wind additives

Landing Procedure – ILS

Landing Procedure – ILS based on an short approach in USA (~5 miles final).

It is not necessary that flaps set to 15 and gear down when alive at glide slope.

Procedure is for a complete ILS landing, including autoland.

Pilot Flying	Pilot Monitoring
	Notify cabin crew to prepare for landing. Verify cabin is secure
Call “FLAPS_” according to flap extension schedule	Set flap lever as directed. Monitor flaps and slats extension
When on localizer intercept heading: • verify ILS is tuned and indetified • verify LOC and and G/S pointers are shown	

Arm APP mode Engage other autopilot	
Use HDG SEL to intercept final approach course as needed	
Verify localizer is captured	
	Call “GLIDE SLOPE ALIVE”
At glide slope alive, call • “GEAR DOWN” • “FLAPS 15”	Set landing gear lever to DN Verify green landing gear indicator lights are illuminated Set flap lever to 15 Set engine start switches to CONT
Set speed brake lever to ARM Verify SPEED BRAKE ARMED light is illuminated	
At glide slope capture, call “FLAPS_” as needed for landing	Set flap lever as directed
Set missed approach altitude on the MCP	
Call “LANDING CHECKLIST”	Do LANDING checklist
At final approach fix or OM, verify crossing altitude	
Monitor approach	
Verify callouts and autoland status at 500ft	

Landing Procedure – Instrument Approach using VNAV

Use autopilot during approach to give:

- autopilot alerts and mode fail indications
- more accurate course and glide path tracking
- lower RNP limits

This procedure is not authorized using QFE.

Pilot Flying	Pilot Monitoring
	Notify cabin crew to prepare for landing. Verify cabin is secure
Call “FLAPS_” according to flap extension schedule	Set flap lever as directed. Monitor flaps and slats extension
The recommended roll modes for final approach are: • for RNAV or GPS approach use LNAV • for a LOC-BC, VOR or NDB approach us LNAV • for a LOC, SDF or LDA approach use LNAV or VOR/LOC	
	Verify VNAV glide path angle is shown on the final approach segment of LEGS page
When on final approach course intercept heading for LOC, LOC-BC, SDF or LDA approaches • verify localizer is tuned and identified • verify LOC pointer is shown	
Select LNAV or arm VOR/LOC mode	
Use LNAV or HDG SEL to intercept final approach course as needed	
Verify LNAV engaged or VOR/LOC is captured	
Approximately 2 NM beforeal approach fix and after ALT HOLD or VNAV PTH or VNAV ALT is	Call “APPROACH GLIDE PATH”

annunciated • verify autopilot is engaged • set DA(H) or MDA(H) on MCP • select or verify speed • select or verify VNAV	
Approaching glide path, call • “GEAR DOWN” • “FLAPS 15”	Set landing gear lever to DN Verify green landing gear indicator lights are illuminated Set flap lever to 15 Set engine start switches to CONT
Set speed brake lever to ARM Verify SPEED BRAKE ARMED light is illuminated	
At glide slope capture, call “FLAPS_” as needed for landing	Set flap lever as directed
Call “LANDING CHECKLIST”	Do LANDING checklist
When at least 300ft below missed approach altitude, set missed approach altitude on MCP	
At final approach fix, verify crossing altitude and crosscheck altimeters	
Monitor approach	
If suitable visual reference is established at DA(H), MDA(H) or missed approach point,	

disengage autopilot and autothrottle Maintain glide path to landing	

Go-Around and Missed Approach Procedure

Pilot Flying	Pilot Monitoring
At the same time: • push TO/GA switch • call “FLAPS 15”	Position the FLAP lever to 15 and monitor flap retraction
Verify: • rotation to go-around altitude • thrust increases	
	Verify thrust is sufficient for go-around or adjust as needed
Verify a positive rate of climb on the altimeter and call “GEAR UP”	Verify a positive rate of climb on the altimeter and call “POSITIVE RATE”. Set landing lever to UP
	Verify missed approach altitude is set
If airspeed is below top of amber band, limit bank angle to 15°	
Above 400 ft, verify LNAV or select HDG SEL as appropriate Above 400 ft, select appropriate roll mode and verify proper mode annunciation	Observe annunciation
Verify missed approach route is tracked	

At acceleration height, call “FLAPS_” according to the flap retraction schedule	Set FLAP lever as directed Monitor flaps and slats retraction
After flap retraction to planned flap setting, select LVL CHG. VNAV may be selected if flaps are up	
Verify climb thrust is set	
Verify missed approach altitude is captured	
	Set landing gear lever OFF after landing gear retraction is complete Set engine start switches as needed
Call “AFTER TAKEOFF CHECKLIST”	Do AFTER TAKEOFF checklist

Landing Roll Procedure

Pilot Flying	Pilot Monitoring
Disengage autopilot. Control airplane manually	
Verify thrust levers are closed Verify SPEED BRAKE lever is UP Without delay, fly the nose wheel smoothly onto runway	Verify SPEED BRAKE lever is UP Call “SPEED BRAKES UP” If the SPEED BRAKE lever is not UP, call “SPEED BRAKES NOT

	UP” Monitor rollout progress
Verify correct auto brake operation	
Without delay, move reverse thrust levers to interlocks and hold light pressure until the interlocks are release. Then apply reverse thrust as needed	
By 60kts, start movement of the reverse thrust levers to be at the reverse idle detent before taxi speed	Call “60 KNOTS”
After engines are at revere idle, move the reverse thrust levers full down	
Before taxi speed, disarm auto brakes. Use manual braking as needed	

After Landing Procedures

Start After Landing Procedure when clear of runway.

Engine cooldown recommendations:

- run engines for at least 3 minutes
- use a thrust setting normally used for taxi
- routine cooldown times less than 3 minutes are not recommended

Pilot Flying	Pilot Monitoring
The captain moves or verifies SPEED BRAKE lever is DOWN	

	Start APU
	Set: • LANDING lights switches OFF • TAXI light switch ON • STROBE light switch OFF
	Set ENGINE START switches OFF
Set weather radar OFF	
	Set AUTO BRAKE selector OFF
	Set flap lever UP
	Set transponder mode selector as needed.

Shutdown Procedure

Start Shutdown Procedure after taxi is complete

Parking brake.....Set C or F/O

- Verify parking brake light is illuminated

Electrical power.....Set F/O

- If APU power is needed:
  - Verify APU GENERATOR OFF BUS light is illuminated
  - APU GENERATOR bus switches – ON
    - Verify SOURCE OFF lights are extinguished
- If external power is needed
  - Verify GRD POWER AVAILABLE light is illuminated
  - GRD POWER switch – ON
    - Verify SOURCE OFF lights are extinguished

Engine start levers.....CUTOFF C

- If possible, after high thrust operation, including reverse thrust, run engines at or near idle for three minutes before shutdown. Time near idle includes taxiing

If towing is needed

- Establish communications with ground handling personnel C
  - System A HYDRAULIC PUMP switches – OFF
    - Verify system A pump LOW PRESSURE lights are illuminated
- Set or release parking brake as directed by ground handling personnel. C or F/O

FASTEN BELTS switch.....OFF F/O

ANTI COLLISION light switch.....OFF F/O

FUEL PUMP switches.....OFF F/O

CAB/UTIL power switch.....as needed F/O

WING ANTI-ICE switch.....OFF F/O

ENGINE ANTI-ICE switches.....OFF F/O

Hydraulic panel.....Set F/O

- ENGINE HYDRAULIC PUMPS switches – ON
- ELECTRIC HYDRAULIC PUMPS switches - OFF

RECIRCULATION FAN switch (737-700).....As needed F/O

RECIRCULATION FAN switches (737-800).....As needed F/O

Air conditioning PACK switches.....AUTO F/O

ISOLATION VALVE switch.....OPEN F/O

Engine BLEED air switches.....ON F/O

APU BLEED air switch.....ON F/O

Exterior lights switches.....As needed	F/O
FLIGHT DIRECTOR switches.....OFF	C, F/O
After wheel chocks are in place: • Parking brake - Release	C or F/O
APU switch.....As needed	F/O
Call “SHUTDOWN CHECKLIST”	C
Do SHUTDOWN checklist	F/O

Secure Procedure

IRS mode selectors.....OFF	F/O
EMERGENCY EXIT LIGHTS switch.....OFF	F/O
WINDOW HEAT switches.....OFF	F/O
Air conditioning PACK switches.....OFF	F/O
Call “SECURE CHECKLIST”	C
Do SECRURE checklist	F/O

Supplementary Procedures - Introduction

General

This section contains procedures that are accomplished as required rather than routinely performed on each flight.

Supplementary procedures may be required because of weather or unscheduled maintenance.

At discretion of captain, procedures may be performed.

Interior Inspection

Emergency exit lights.....Check

Passenger signs.....Check

Service and entry doors.....Check

Escapes slides.....Check pressure

Emergency exits.....Check

Wing upper surfaces.....Check

Lavatory fire extinguishers.....Check

Emergency equipment.....Check

- Check availability and condition of emergency equipment, as required

Isolated Pack Operation during Engine Start

To improve cabin air quality between starting first and second engine.

CAUTION: Do not move engine BLEED air switch wile starter is

on. This can damage the starter.

Engine No. 2.....Start

After engine No. 2 stabilized:

- ISOLATION VALVE switch.....CLOSE
- Right PACK switch.....AUTO
- Duct pressure.....Stabilized

Engine No. 1.....Start

After engine No. 2 stabilized:

- ISOLATION VALVE switch.....AUTO

Pressurization System Manual Mode Test

PACK switches.....OFF

Pressurization mode selector.....MAN

- AUTO FAIL and ALTN lights – extinguished
- MANUAL light – illuminated

Outflow valve switch.....CLOSE

- Verify outflow valve position indicator moves toward CLOSE

Outflow valve switch.....OPEN

- Verify outflow valve position indicator moves toward OPEN

Pressurization mode selector.....AUTO

- Verify outflow valve position indicator moves toward OPEN
- MANUAL light – extinguished

Pressurization System Manual Mode Operation

Pressurization mode selector.....MAN

- MANUAL light – illuminated

CABIN/FLIGHT ALTITUDE placard.....Check

- Determine desired cabin altitude

If a higher cabin altitude is desired:

- Outflow valve switch (momentarily).....OPEN
  - Verify cabin altitude climbs

If lower cabin altitude is desired

- Outflow valve switch (momentarily).....CLOSE
  - Verify cabin altitude descends

Pressurization Control Operation – Landing at Alternate Airport

At top of descent:

- LAND ALT Indicator.....Reset
  - Reset to new destination field elevation

Unpressurized Takeoff and Landing

When making a no engine bleed takeoff or landing with APU inoperative.

Takeoff

PACK switches.....AUTO

ISOLATION VALVE switch.....CLOSE

Engine BLEED air switches.....OFF

After Takeoff

In case of engine failure, do not turn engine BLEED air switches ON until reaching 1500ft.

Engine No. 2 BLEED air switch.....ON

When CABIN rate of CLIMB indicator stabilizes:

Engine No. 1 BLEED air switch.....ON

ISOLATION VALVE switch.....AUTO

Landing

When below 10,000ft:

Engine BLEED air switches.....OFF

Avoid higher rates of descent for passenger comfort

No Engine Bleed Takeoff

When making a no engine bleed takeoff or landing with APU running.

Takeoff

If anti-ice is needed for takeoff, configure for a “No Engine Bleed Takeoff” just prior to take-off. If it is not needed, configure just after engine start.

Right PACK switch.....AUTO

ISOLATION VALVE switch.....CLOSE

Left PACK switch.....AUTO

Engine No. 1 BLEED air switch.....OFF

APU BLEED air switch.....ON

Engine No. 2 BLEED air switch.....OFF

Trim Air switch (737-800).....ON

WING ANTI-ICE switch.....OFF

- WING ANTI-ICE switch must be off until engine BLEED air switches are ON and the ISOLATION VALVE switch is set to AUTO

After Takeoff

In case of engine failure, do not switch engine BLEED air switches to ON until reaching 1500 feet.

Engine No. 2 BLEED air switch.....ON

APU BLEED air switch.....OFF

When CABIN rate of climb indicator stabilizes:

- Engine No. 1 BLEED air switch.....ON
- ISOLATION VALVE switch.....AUTO

Landing

When below 10.000 feet:

WING ANTI-ICE switch.....OFF

Right PACK switch.....AUTO

ISOLATION VALVE switch.....CLOSE

Left PACK switch.....AUTO

Engine No. 1 BLEED air switch.....OFF

APU BLEED air switch.....ON

Engine No. 2 BLEED air switch.....OFF

Anti-Ice, Rain

Window Heat System Tests

Overheat Test

WINDOW HEAT switches.....ON

WINDOW HEAT TEST switch.....OVHT

- OVERHEAT lights – ON
- MASTER CAUTION – ON
- ANTI-ICE system annunciator – ON

WINDOW HEAT switches.....Reset

Power Test

WINDOW HEAT switches.....ON

- Do not perform power test when all ON lights are illuminated

WINDOW HEAT TEST switch.....PWR

WINDOW HEAT ON lights.....Illuminated

- If an ON light remains extinguished, the window heat system is inoperative

Automatic Flight

Some of following items are not listed yet. Most procedures are easy MCP inputs, like “LVG CHG switch – Push”.

VOR Navigation

VHF NAV radio(s).....Tune and Identify

COURSE selector.....Set desired course

When on an intercept heading to VOR course:

- VOR LOC mode switch – Push
  - Verify VOR LOC armed mode annunciates
  - A/P automatically captures VOR course
  - Verify VOR LOC engaged mode annunciates upon course capture

Instrument Approach using Vertical Speed (V/S)

Autopilot use is recommended until visual reference is established.

RNP appropriate for approach.....Verify/Enter

Before descent to MDA(H):

- MCP altitude – Set
  - If MDA(H) altitude do not end in zero zero (1820), set MCP ALTITUDE to closest 100 foot increment above the constraint

At descent point:

- Desired V/S – Set
  - Verify V/S mode annunciates

Approximately 300 ft above MDA(H):

- MCP altitude – Set to missed approach altitude

At MDA(H) missed approach point:

- A/P disengage switch – Push
  - Disengage autopilot before descending below MDA(H)
- A/T disengage switch – Push

- Disengage autothrottle before descending below MDA(H)

Circling Approach

Autopilot is recommended until intercepting landing profile.

MCP altitude selector.....Set

- If MDA(H) altitude do not end in zero zero (1820), set MCP ALTITUDE to closest 100 foot increment above the constraint

Accomplish an instrument approach, establish suitable visual reference and level off at MCP altitude.

MCP altitude selector.....Set missed approach altitude

HDG SEL switch.....Push

- Verify HDG SEL mode annunciates

Intercepting the landing profile:

- Autopilot disengage switch – Push
- Autothrottle disengage switch – Push

Communications

All supplementary procedures for the use of ACARS are not listed. There is no Aircraft in MSFS 9 or MSFS 10 which uses an ACARS system.

The cockpit voice recorder test is not listed yet.

Electrical

Electrical Power Up

The following procedure is accomplished to permit safe application of electrical power.

BATTERY switch.....Guard closed

STANDBY POWER switch.....Guard closed

ALTERNATE FLAPS master switch.....Guard closed

Windshield WIPER selector(s).....PARK

ELECTRICAL HYDRAULIC PUMPS switches.....OFF

LANDING GEAR lever.....DN

- Verify green landing gear indicator lights are illuminated
- Verify red landing gear indicator lights are extinguished

If external power is needed:

- Verify GRD POWER AVAILABLE light is illuminated
- GRD POWER switch – ON
  - Verify SOURCE OFF lights are extinguished
  - Verify TRANSFER BUS OFF lights are extinguished
  - Verify STANDBY PWR OFF lights is extinguished

If APU power is needed:

- Verify engine No. 1, APU and engine No. 2 fire switches are in
- OVERHEAT DETECTOR switches – NORMAL
- TEST switch – Hold to FAULT/INOP

- Verify MASTER CAUTION lights are illuminated
- Verify OVHT/DET annunciator is illuminated
- Verify FAUL light is illuminated
- Verify APU DET INOP light is illuminated

- TEST switch – Hold to OVHT/FIRE
  - Verify fire warning bell sounds
  - Verify master FIRE WARN lights are illuminated
  - Verify MASTER CAUTION lights are illuminated
  - Verify OVHT/DET annunciator is illuminated
  - Master FIRE WARN light – Push
    - Verify FIRE WARN lights are extinguished
    - Verify fire warning bell cancels
    - Verify ENG 1, ENG 2 and APU fire switches stay illuminated
    - Verify ENG 1 OVERHEAT and ENG 2 OVERHEAT lights stay illuminated
    - Verify WHEEL WELL lights stays illuminated
- EXTINGUISHER TEST switch – Check
  - TEST switch – Position 1 and hold
    - Verify test lights are green illuminated
  - TEST switch – Release
    - Verify test lights are extinguished
  - Repeat for test position 2

APU – Start

If extended APU operation I needed on ground, position an AC operated fuel pump ON. If fuel is loaded in center tank, position left center tank fuel pump switch ON to avoid fuel imbalance.

When APU GEN OFF BUS light is illuminated:

- APU GENERATOR bus switches – ON
  - Verify SOURCE OFF lights are extinguished
  - Verify TRANSFER BUS OFF lights are extinguished
  - Verify STANDBY PWR OFF light is extinguished
- Verify APU MAINT light is extinguished
- Verify APU LOW OIL PRESSURE light is extinguished
- Verify APU FAUL lights is extinguished
- Verify APU OVERSPEED light is extinguished

Wheel well fire wearing 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 master FIRE WARN lights extinguish
  - Verify fire warning bell cancels
  - Verify WHEEL WELL fire warning light is illuminated

Electrical Power Down

This procedure assumes the Secure procedure is complete.

APU switch and/or GRD POWER switch.....OFF

- IF APU was operating:
  - Delay approximately 2 minutes after APU GEN OFF BUS light extinguishes before placing BATTERY switch OFF

BATTERY switch.....OFF

Standby Power Test

Battery switch.....ON

AC-DC meter selectors.....STBY PWR

If APU generator is on-line:

- BUS TRANSFER switch – OFF

APU GEN No. 2 switch.....OFF

STANDBY POWER switch.....OFF

- Check STANDBY PWR OFF light illuminated

AC-DC voltmeters.....ZERO

STANDBY POWER switch.....BAT

- Check STANDBY PWR OFF light extinguished

AC-DC voltmeters.....Check

- AC voltmeter 115 +/- 5V
- DC voltmeter 24 +/- 2V

Frequency meter.....Check

- Check frequency meter for normal indication: 400 +/- 10 CPS

STANDBY POWER switch.....AUTO

BUS TRANS switch.....AUTO

APU GEN No. 2 switch or GRD PWR switch.....ON

Engines, APU

(With APU bleed or ground air available.)

Maintenance documents.....Check

BATTERY switch.....Guard closed

ELECTRICAL HYDRAULIC PUMPS switches.....OFF

LANDING GEAR lever.....DN

- Verify green landing gear indicator lights are illuminated
- Verify red landing gear indicator lights are extinguished

Emergency equipment.....Check

Flight recorder switch.....Guard closed

Accomplish Interior and Exterior Inspection if required.

- Verify:
  - oxygen pressure
  - hydraulic quantity
  - engine oil quantity

Accomplish the following Preflight Procedures – First Officer items:

- Overheat and fire protection panel.....Check
  - OVERHEAT DETECTOR switches – NORMAL
  - TEST switch – Hold to FAULT/INOP
  - TEST switch – Hold to OVHT/FIRE
  - EXTINGUISHER TEST switch – Check

- APU switch (bleed air source, if available).....START

On captains command, the first officer reads and the captain does the following items:

- Oxygen.....Test and set
- CAB/UTIL power switch.....ON
- EMERGENCY EXIT LIGHTS switch.....Guard closed
- Passenger signs.....Set
- HYDRAULIC PUMP switches.....ON
- Air conditioning panel.....Set
  - PACK switches – AUTO or HIGH
  - Engine BLEED air switches – ON
  - APU BLEED air switch – ON
- SPEED BRAKE lever.....DOWN detent
- Reverse thrust levers.....Down
- Forward thrust levers.....Closed
- Parking brake.....Set
  - Wheels should be chocked in case the brake pressure has bled down
- Engine start levers.....CUTOFF
- Papers.....Aboard

When cleared for Engine Start, do the following:

- Air conditioning PACK switches.....OFF
- ANTICOLLISION light switch.....ON
- Ignition select switch.....IGN-R

Engine Start

- Engine No. 1 start.....Accomplish
- Generator 1 switch.....ON
- IRS mode selectors.....OFF, then NAV
  - Verify ON DC lights illuminate, then extinguish
  - Verify ALIGN lights are illuminated
- FMC/CDU.....Set IRS position
- Engine No. 2 start.....Accomplish
- Generator 2 switch.....ON
- Cabin pressurization panel.....Set
  - FLIGHT ALTITUDE indicator – Cruise altitude
  - LANDING ALTITUDE indicator – Destination field elevation
  - Pressurization mode selector – AUTO

Complete Preliminary Preflight Procedure – Captain or First Officer by doing the following items:

- PSEU light.....Verify extinguished
- GPS light.....Verify extinguished
- SERVICE INTERPHONE switch.....OFF
- ENGINE panel.....Set
  - Verify REVERSER lights are extinguished
  - Verify ENGINE CONTROL lights are extinguished
  - EEC switch – ALTN then ON
- Oxygen panel.....Set

- CREW OXYGEN pressure indicator – Check
  - Verify pressure meets dispatch requirements
- PASSENGER OXYGEN switch – Guard closed
  - Verify PASS OXY ON light is extinguished

- Landing gear indicator lights.....Verify illuminated
- Manual gear extension access door.....Closed

Accomplish normal CDU Preflight Procedure, both Preflight Procedure, Before Start Procedure and Before Taxi Procedure to ensure that flight deck preparation is complete.

- AFTER START checklist.....Accomplish
- IRS alignment.....Complete

Airplane is ready for taxi. Refer to the normal checklist.

Starting with Ground Air Source (AC electrical power available)

Engine No. 1 must be started first.

When cleared to start:

- APU BLEED air switch.....OFF
- Engine No. 1 start.....Accomplish
  - Use normal start procedures

Engine Crossbleed Start

Prior using this procedure, ensure that area to the rear is clear.

ENGINE BLEED air switches.....ON

APU BLEED air switches.....OFF

PACK switches.....OFF

ISOLATION VALVE switch.....AUTO

- Ensure bleed air supply for engine start

Engine thrust lever (operating engine).....Advance thrust lever

- Advance thrust lever until bleed duct pressure indicates 30 PSI

Non-operating engine.....Start

- Use normal start procedure with crossbleed air.

After starter cutout, adjust thrust on both engines, as required

Setting N1 Bugs with No Operative FMC (Manual N1 Bug Setting)

N1 SET outer knob.....BOTH

N1 SET inner knob.....Set N1

Fire Protection

The Supplementary Fire Protection Procedures is not necessary for MSFS 9 or MSFS 10.

Use the normal Fire Protection Procedure (Preflight Procedure – First Officer)

Flight Instruments, Displays

Setting Airspeed Bugs with No Operative FMC (Manual Airspeed Bug Setting)

To set reference airspeed bugs for takeoff:

- Speed reference selector (outer).....V1
  - Default speed of 80 knots is displayed
- Speed reference selector (inner).....Set V1 speed
- Speed reference selector (outer).....VR
- Speed reference selector (inner).....Set VR speed
- MCP speed selector.....Set V2
- Speed reference selector (outer).....WT
  - Default weight of 32,000 kgs / 70,000 lbs is displayed
- Speed reference selector (inner).....Set takeoff gross weight
  - Flaps up maneuver speed bug is displayed

Flight Management, Navigation

Transponder Test

Transponder mode selector.....TEST

- Check FAIL light illuminates
- Check all code segments illuminate. Verify no error code exist
- Verity aural indicates TCAS system test passed

AURAL ALERTS	DEFINITION
“TCAS SYSTEM TEST FAIL”	Test failed. Maintenance required
“TCAS SYSTEM TEST OK”	Test complete. System operable

Weather Radar Test

EFIS mode selector.....MAP, MAP CTR, VOR, or APP

Weather Radar Mode.....TEST

STAB.....ON

WXR (EFIS control panel).....ON

- Verify colours appears (green, yellow, red and magenta)

IRS

Alight Lights Flashing

Do not move IRS Mode selector to OFF except where called for in procedure.

POS INIT page.....Select

Set IRS position.....Enter present position

If ALIGN light continues to flash:

- Set IRS position.....Enter present position
  - Re-enter same present position

If ALIGN light continues to flash after re-entry:

- IRS.....OFF
  - Rotate IRS Mode Selector to OFF and verify ALIGN light extinguished
- IRS.....NAV
  - Rotate IRS Mode Selector to NAV and verify ALIGN light illuminated
- Set IRS position.....Enter present position

If ALIGN light continues to flash, maintenance s required.

Fast Realignment

Prior to commencing procedure airplane must be parked and not moved until procedure is complete and ALIGN lights extinguish.

IRS mode selectors.....ALIGN

- Observe ALIGN lights illuminate steadily

CDU.....Set

- Enter present position on SET IRS POS line of the POS INIT page

IRS mode selector.....NAV

- Observe ALIGN light extinguished within 30 seconds

IRS Entries

Present Position Entry:

- IRS mode selector.....NAV
  - ALIGN lights must be illuminated
- IRS display selector.....PPOS
- Latitude.....Enter
- Longitude.....Enter

Heading – Enter through CDU:

- FMC/CDU POS INIT page.....Select

Heading – Enter through ISDU

- IRS display selector.....HDG
  - Press H key to initiate a heading entry

The following CDU procedures are not listed yet.

Fuel Balancing

If an engine fuel leak is suspected:

- Accomplish the ENGINE FUEL LEAK checklist

Maintain main tank No. 1 and No. 2 fuel balance within limitations.

If center tank contains fuel:

- Center tank fuel pump switches.....OFF
- Crossfeed selector.....OPEN
- Fuel pump switches (low tank).....OFF
- When quantities are balanced:
  - Fuel pump switches (main tank).....ON
  - Center tank fuel pump switches.....ON
  - Crossfeed selector.....Close

If center tank contains no fuel

- Crossfeed selector.....Open
- Fuel pump switches (low tank).....OFF
- When quantities are balanced:
  - Fuel pump switches.....ON
  - Crossfeed selector.....Close

The Refueling Items are not listed because it is not simulated in MSFS to refuel an aircraft with using a fuel truck to refill.

Adverse Weather

Takeoff – Wet or Contaminated Runway Conditions

The following information applies to takeoffs on wet or contaminated runways:

- Do not use reduced thrust for takeoff if runway is contaminated by slush, snow, standing water or ice
- Reduced thrust is allowed for takeoff on a wet runway
- V1 may be reduced to minimum
- Takeoffs are not recommended when slush, wet snow or standing water depth is more than ½ inch (13mm) or dry snow depth is more than 4 inches (102mm)

Cold Weather Operations

Icing conditions exist when OAT or TAT is 10°C or below. Do not use engine or wing anti ice when OAT or TAT is above 10°C.

Preflight Procedure – First Officer

Do the following step after completing normal Preflight Procedure – First Officer:

- PROBE HEAT switches.....ON
  - Verify that all probe heat lights are extinguished

Engine Start Procedure

Do the normal Engine Start Procedure with following modifications:

- In case of temperatures below -40°C do not start engines. Call maintenance.

- If temperature is below -35°C idle engine for two minutes

Engine Anti-ice Operation – On the Ground

Engine anti-ice must be selected ON immediately after both engines are started. Do not use engine anti-ice when OAT is above 10°C.

When engine anti-ice is needed:

ENGINE START switches.....CONT F/O

ENGINE ANTI-ICE switches.....ON F/O

- Verify COWL VALVE OPEN lights illuminate bright, then dim
- Verify COWL ANTI-ICE lights are extinguished

When engine anti-ice is no longer needed:

ENGINE ANTI-ICE switches.....OFF F/O

- Verify COWL VALVE OPEN lights illuminate bright, then extinguish

Wing Anti-ice Operation – On the Ground

Use wing anti-ice during all ground operations between engine start and takeoff when icing conditions exist or are anticipated.

Do not use wing anti-ice when OAT is above 10°C.

When wing anti ice is needed:

WING ANTI-ICE switch.....ON F/O

- Verify that L and R VALVE OPEN lights illuminate bright, then dim

When wing anti-ice is no longer needed:

WING ANTI-ICE switch.....OFF F/O

- Verify that L and R VALVE OPEN lights illuminate bright, then extinguish

Before Taxi Procedure

Do the normal Before Taxi Procedure with the following modifications:

GENERATOR 1 and 2 switches.....ON F/O

Flight controls.....Check C

Flaps.....Check F/O

- Move flaps from Flaps up to Flaps 40 back to Flaps up to ensure free movement

If taxi through ice, snow slush etc. taxi with flaps up

Call “Flaps__” as needed C

Flap lever.....Set flaps, as needed F/O

Taxi-Out

Taxi at a reduced speed.

If temperature is 3°C or below, do an engine run up with 70% N1 for approximately 30 seconds.

De-icing/Anti-icing

If de-icing/anti-icing is needed;

APU.....As needed F/O

- APU should down unless APU operation is necessary

Call “FLAPS UP” C

Flaps.....UP F/O

- Prevents ice and slush from accumulating flap

cavities during de-icing

Thrust levers.....Idle C
- Reduces possibility of injury to personnel at inlet or exhaust areas

Stabilizer trim.....Full APL NOSE DOWN C

Engine BLEED air switches.....OFF F/O

APU BLEED air switch.....OFF F/O

After de-icing/anti-icing is completed:

APU.....As needed F/O
Wait one minute after de-icing is completed to turn engine BLEED air switches to on

- Engine BLEED air switches.....ON F/O

Stabilizer trim.....__UNITS C
- Verify stabilizer trim is set for takeoff

Before Takeoff Procedure

Do the normal Before Takeoff Procedure with the following modifications:

Call “FLAPS__” as needed for takeoff PF

Flap lever.....Set takeoff flaps, as needed PM
- Verify LE FLAPS EXT green light is illuminated

Engine Anti-Ice Operation – In flight

Engine anti-ice must be ON during all flight operations when icing conditions exist or are anticipated.

When engine anti-ice is needed:

ENGINE START switches.....CONT PM

ENGINE ANTI-ICE switches.....ON PM

- Verify COWL VALVE OPEN lights illuminate bright, then dim
- Verify COWL ANTI-ICE lights are extinguished

When engine anti-ice is no longer needed:

ENGINE ANTI-ICE switches.....OFF PM

- Verify COWL VALVE OPEN lights illuminate bright, then extinguish

ENGINE START switches.....OFF PM

Wing Anti-ice Operation – In Flight

When wing anti ice is needed:

WING ANTI-ICE switch.....ON PM

- Verify that L and R VALVE OPEN lights illuminate bright, then dim

When wing anti-ice is no longer needed:

WING ANTI-ICE switch.....OFF PM

- Verify that L and R VALVE OPEN lights illuminate bright, then extinguish

Approach and Landing

Use normal procedures and reference speeds unless a flaps 15 landing is planned.

If a flaps 15 landing will be made:

- Set VREF15

- If any of the following conditions apply, set VREF ICE=VREF15+10
  - engine anti-ice will be used during landing
  - wing anti-ice has been used any time during flight
  - icing conditions were encountered during flight and landing temperature is below 10°C

After Landing Procedure

Same procedure as Wing Anti-ice and Engine Anti-ice procedures.

Taxi at a reduced speed.

Shutdown Procedure

Do the following step before starting normal Shutdown Procedure:

After lading in icing conditions:

- Stabilizer trim.....Set 0 to 2 units

Secure Procedure

Do the normal Secure Procedures with the following modifications:

If the airplane will be attended in warm air circulation:

APU	Start	F/O
APU GENERATOR bus switches	ON	F/O
PACK switches	AUTO	F/O
ISOLATION VALVE switch	OPEN	F/O
Pressurization mode selector	MAN	F/O
Outflow valve switch	OPEN	F/O

- Prevents aircraft pressurization

APU BLEED air switch.....ON F/O

If the airplane will not be attended:

Pressurization mode selector.....MAN F/O

Outflow valve switch.....CLOSE F/O

- Position the outflow valve fully closed to inhibit the intake of snow or ice.

Wheel chocks.....Verify in place C or F/O

Parking brake.....Released C

Hot Weather Operation

During ground operation the following considerations will help keep the airplane as cool as possible:

- While airplane is electrically powered, packs should be run
- Keep all doors and windows, including cargo doors, closed as much as possible
- Electronic components which contribute to a high temperature in the flight deck should be turned off

If these actions do not reduce cabin temperatures sufficiently:

- PASSENGER CABIN temperature selector.....AUTO COOL
- PACK switches.....HIGH
- If the cabin temperature remains hight:
  - PASSENGER CABIN temperature selector...MAN COOL

Moderate to Heavy Rain, Hail or Sleet

If moderate to heavy rain, hail or sleet is encountered:

- ENGINE START switches.....CONT
- Autothrottle.....Disengage
- Thrust Levers.....Adjust Slowly
- IAS/MACH.....Use a slower speed
  - Using a slower speed improves engine tolerance to heavy precipitation intake
- Consider starting the APU (if available)

Turbulence

During flight in light or moderate turbulence, autopilot and/or autothrottle may remain engaged unless performance is objectionable.

Passenger signs.....ON

Severe Turbulence

Yaw Damper.....ON

Autothrottle.....Disengage

AUTOPILOT.....CWS

- A/P status annunciators display CWS for pitch and roll

ENGINE START switches.....FLT

Thrust.....Set

- Set thrust as needed for the phase of flight. Change thrust setting only if needed to modify an unacceptable speed trend.

PHASE OF FLIGHT	AIRSPEED
CLIMB	280 knots or .76 Mach

CRUISE	Use FMC recommended thrust settings
DESCENT	.76 Mach/280/250 knots

Windshear

Windshear is change of wind speed and/or direction.

Avoidance

Flight crew should search for any clues to the presence of windshear along the route and on departure airport and destination.

Precautions

If windshear is suspected, be especially alert to any of the danger signals.

Following precautionary actions are recommended if windshear is suspected:

- Takeoff:
  - Use maximum takeoff thrust
  - Use the longest suitable runway
- Approach and Landing:
  - Use flaps 30 for landing
  - Establish a stabilized approach no lower than 1000 feet.
  - Use most suitable runway to avoids the areas of suspected windshear.
  - Use ILS G/S, VNAV path or VASI/PAPI indications to detect flight patch
  - Add an appropriate airspeed correction (Max. 20 knots)