Operating Procedures

Chapter 8

This Page Intentionally Left Blank

Table of Contents

Chapter 8 Operating Procedures

8.1 Flight Preparation Instructions

It is the Pilot in command's responsibility to ensure that the flight is planned to meet the following criteria:

- Safety and Security;
- Economy;
  Passenger's comfort, and
- Punctuality

Apart from checking the technical status of the aircraft, its components and its equipment including all safety equipment (†), flight preparation includes:

- Checking the technical status of the airplane in the aircraft technical log (ATL), its components and equipment according to MEL and CDL;
- Preparation of an Operational Flight Plan (OFP) considering all aspects such as minimum flight altitudes, routing, weather forecasts for en-route, destination and alternate airports, fuel planning, etc.;(*)
- Preparation of an ATC flight plan; (*)
- NOTAMS applicable to the en route phase of flight and to departure, destination and alternate airports;
- Aircraft performance, weight, mass and balance.
- Checking of the capability of the aircraft to achieve the All-Engine Climb Gradient (AECG).
- Preparation of a load and trim sheet; (‡)
- Determination of the usability of aerodromes. This includes the evaluation of possible performance limits, and the calculation of takeoff and landing speeds; (*)
- Relevant AIS-briefing, whether by appropriate AIS documentation, personal AIS-briefing or by a dispatcher; (*)
- Relevant MET-briefing, whether by MET documentation or by a dispatcher; (*)
- A check, special loads such as dangerous/hazardous goods or heavy cargo are to be carried, and if so whether safety handling instructions are being followed; (‡)
- Ensuring that commercial and/or other Company requirements are met;
- A check, de-icing/anti-icing procedures, if necessary, have been carried out properly;
- Ensuring the availability of maps, instrument approach, arrival and departure charts as required for the intended flight(s). (*)
- FMS and EGPWS validity for route and airports.(Refer to FCOM-PRO-NOR-SOP and GMM 4.22)

Notes: All the above-mentioned items shall be checked/reviewed by Pilot in Command for the intended flight(s) prior to the commencement of each flight.
Items marked with (*) shall be prepared by Operations Control (Dispatch office).
Items marked with (‡) shall be prepared by Ground Handling.

(-) Technical Status is the responsibility of the Technical Department, who is responsible for informing Operations Control with the latest Aircraft Technical Status to assure aircraft have:

- **i.** instrumentation and/or avionics necessary to conduct operations and meet applicable flight parameters, maneuvers and limitations;
- **ii.** equipment necessary to satisfy applicable operational communication requirements;
- **iii.** avionics, equipment and/or components necessary to satisfy applicable navigation requirements;
- **iv.** avionics, instrumentation and/or radio equipment necessary to satisfy applicable approach and landing requirements
- **v.** Other components and/or equipment necessary to conduct operations under applicable flight conditions, including instrument meteorological conditions.

8.1.1 Minimum Flight Altitudes

8.1.1.1 Minimum VFR Altitude Requirements

Nesma Airlines normally does not allow VFR operations for revenue flight. If VFR is required for a specific flight or part(s) of a flight, an authorization of the Director of Operations must be obtained. For VFR altitudes, requirements refer to national regulations applicable to the area over flown.

Except when necessary for take-off or landing, or except by special permission from the appropriate authority, a VFR aircraft shall not be flown:

- **a.** Over cities or densely populated areas and open-air assemblies of persons, unless at such a height as will permit, in the event of emergency arising, a landing to be made without undue hazard to persons or property on the surface. This height shall be at least 300 m (1000ft) above the highest obstacle within a radius of 600m from the aircraft.
- **b.** Elsewhere at a height inferior to 150m (500ft) above ground or water.

The responsible authority may fix superior heights to fly over certain parts of the territory.

8.1.1.2 Minimum IFR Altitude Requirements

When an aircraft is operated for the purpose of commercial air transport, the minimum altitude / flight level at, which it is permitted to fly may be governed by national regulations, air traffic control requirements, or by the need to maintain a safe height margin above any significant terrain or obstacle En-route. Whichever of these requirements produces the highest altitude/flight level for a particular route will determine the minimum flight altitude for that route.

The procedures outlined in the following paragraphs are to be followed when calculating the minimum altitude for the safe avoidance of en-route terrain and obstacles.

8.1.1.2.1. Minimum altitudes definitions

MEA (Minimum En-route IFR Altitude)
The lowest published altitude (or Flight Level) between radio fixes that meets obstacle clearance requirements between those fixes and in many countries assures acceptable navigational and radio signal coverage.
MORA (Minimum Off-Route Altitude)
A route MORA provides reference point clearance within 10 NM (18.5 km) of the route centerline (regardless of the route width) and end fixes.
A grid MORA altitude provides a reference point clearance within the section outlined by latitude and longitude lines.
MORA values clear all reference points by 1000 ft. (300 m) in areas where the highest reference points are 5000 ft. (1500 m) MSL, or lower.
MORA values clear all reference points by 2000 ft. (600 m) in areas where the reference points are above 5000 ft. (1500 m) MSL.
When a MORA is shown along a route as "unknown" or within a grid as "un-surveyed" a MORA is not shown due to incomplete or insufficient information.
MVA (Minimum Vectoring Altitude)
The lowest MSL altitude at which IFR aircraft will be vectored by a radar controller, except as otherwise authorized for radar approaches, departures and missed approaches. The altitude meets IFR obstacle clearance criteria. It may be lower than the published utilized for radar vectoring only upon the controller's determinations that an adequate radar return is being received from the aircraft controlled.
GRID MORA (Grid Minimum Off-Route Altitude)
An altitude derived by Jeppesen or State authorities. The GRID MORA altitude provides terrain and manmade structure clearance within the section outlined by latitude and longitude lines. MORA does not provide for NAVAID signal coverage or communication coverage.

- GRID MORA values derived by Jeppesen clear all terrain and manmade structure by 1000 ft. (300m) in areas where the highest reference points are 5000ft (1500m) MSL, or lower and by 2000ft (600m) in areas where the reference points are above 5000 ft. (1500m) MSL.
- GRID MORA (State) altitude supplied by the State authority provides 2000ft (600m) clearance in mountainous areas and 1000ft (300m) in non-mountainous areas.

MOCA (Minimum Obstruction Clearance altitude)
The lowest published altitude in effect between radios fixes on VOR airways, off airways routes, or route segments, which meets obstacle clearance requirements for the entire route segment.
MSA (Minimum Sector Altitude)
Altitude depicted on instrument approach, SID or STAR charts and identified as the minimum safe altitude which provides a 1000ft (300m) obstacle clearance within a 25 NM (46km) (or other value as stated) radius from the navigational facility upon which the MSA is predicated.
Minimum Descent Altitude/Height (MDA/H)
Ref. (Jeppesen Intr. P.14)

8.1.1.2.2 Terminal area

Except during IFR approach or departure when on track with a published minimum altitude on airport charts the minimum altitude must not be lower than the Minimum Sector Altitude (MSA).

Take-off obstacle clearance

(a) The net take-off flight path shall clear all obstacles by a vertical distance of at least 35 ft. or by a horizontal distance of at least 90 m plus 0.125 x D, where D is the horizontal distance the aircraft has traveled from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available.

(b) When showing compliance with sub-paragraph (a) above, an operator must take account of the following:

- **(1)** The weight of the aircraft at the commencement of the take-off run;
- **(2)** The pressure altitude at the aerodrome;
- **(3)** The ambient temperature at the aerodrome; and
- **(4)** Not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component.

(c) When showing compliance with sub-paragraph (a) above:

- **(1)** Track changes shall not be allowed up to the point at which the net take-off flight path has achieved a height equal to one half the wingspan but not less than 50 ft. above the elevation of the end of the take-off run available. Thereafter, up to a height of 400 ft. it is assumed that the aircraft is banked by no more than 15°. Above 400 ft. height bank angles greater than 15°, but not more than 25° may be scheduled;
- **(2)** Any part of the net take-off flight path in which the aircraft is banked by more than 15° must clear all obstacles within the horizontal distances specified in sub-paragraphs (a), (d) and (e) of this paragraph by a vertical distance of at least 50 ft.; and

(d) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does not require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:

- **(1)** 300m, if the pilot can maintain the required navigational accuracy through the obstacle accountability area; or (2) 600m, for flights under all other conditions.

(e) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:

- **(1)** 600m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area; or
- **(2)** 900m for flights under all other conditions.

8.1.1.2.3 En-Route Minimum Altitude

8.1.1.2.3.1 Normal Operation

En-route IFR flight levels or altitudes should be higher than the published Minimum En-route IFR Altitude (MEA) indicated on En-route charts.
The minimum safe En-route altitude should be the higher of the Minimum Off-Route Altitude (MORA) and the published Minimum Obstruction Clearance Altitude (MOCA). Both minimum altitudes are indicated on En-route charts when they exist.
In case of incomplete or lack of safety altitude information, obstacles and reference points must be located on Operational Navigation Charts (ONC) or topographic maps. The minimum safe En-route altitude must clear all obstacles within 5 NM (9.3km) of the route centerline by 1000ft (300m) if the reference point is not higher than 5000 ft (1500m) MSL or 2000 ft. (600m) if reference point is higher than 5000ft MSL.
If available and not limiting, the grid MORA may be used as minimum flight altitude. These minimum altitudes must be respected along the track with all engines operative unless a procedure has been approved to cope with depressurization.
During flight preparation, the En-route minimum altitudes must be established for all the route segments.

8.1.1.2.3.2 Abnormal operation

It may be necessary to establish diversion procedures for critical cases considering the topography along the route and the requirements mentioned below (engine(s) failure, depressurization).
It may be necessary to determine Point(s) of Non-Return (PNR) and establish appropriate procedures (drift down on course, turn back or diversion outside the track depending on the aircraft position).
When obstacle limited, the pilot should be reminded for correct drift down procedure as specified in the appropriate chapter of the FCOM (one engine inoperative).
Diversion procedure established for a particular route will be integrated in the Operations Manual Part C (Jeppesen Route Manual).

8.1.1.2.3.2.1 Engine failure

For engine failure, the net flight path as defined in the aircraft Flight Manual must be considered.
The net flight path is established considering a drift down procedure taking into account a given drift down speed associated with the expected aircraft weight, the remaining engine(s) being set at MCT (Maximum Continuous Thrust), and considering the effect of

- air conditioning,
- icing protection system if its use is expected,
- Wind and temperature (weather forecast.

En-route - One engine inoperative

(a) The operations committee will study all the routes and destinations to determine the applicability of escape routes and minimum En-route altitude

(b) The one engine inoperative En-route net flight path data shown in the Aircraft Flight Manual, appropriate to the meteorological conditions expected for the flight, shall comply with either sub-paragraph (b) or (c) at all points along the route. The net flight path must have a positive gradient at 1500ft above the aerodrome where the landing is assumed to be made after engine failure. In meteorological conditions requiring the operation of ice protection systems, the effect of their use on the net flight path must be considered.

(c) The gradient of the net flight path must be positive at least 1000ft above all terrain and obstructions along the route within 9.3km (5NM) on either side of the intended track.

(d) The net flight path must permit the aircraft to continue flight from the cruising altitude to an aerodrome where a landing can be made, the net flight path clearing vertically, by at least 2000ft, all terrain and obstructions along the route within 9.3km (5NM) on either side of the intended track in accordance with sub-paragraphs (1) to (4) below:

1. The engine is assumed to fail at the most critical point along the route;

2. Account is taken of the effects of winds on the flight path;

3. The aerodrome where the aircraft is assumed to land after engine failure must meet the following criteria:

(i) The performance requirements at the expected landing weight are met; and

(ii) Weather reports or forecasts, or any combination thereof, and field condition reports indicate that a safe landing can be accomplished at the estimated time of landing.

(e) The width margins of subparagraphs (b) and (c) above must be increased to 10 NM (18.5km) if the navigational accuracy does not meet the 95% containment level.

For Airbus aircraft this may be the case when at more than 2 hours after a radio update for non-GPS primary equipped aircraft.

8.1.1.2.3.2.2 Pressurization failure

For depressurization, it may be necessary to descend below the en-route minimum altitude determined for normal operation in order to cope with passenger oxygen requirements (refer to 8.8). At any time, the aircraft gross (actual) flight path must clear vertically all the obstacles by 2000ft.

8.1.1.2.3.2.3 Methods to Establish Escape Route Charts Depressurization/Drift Down)

Escape Route charts are produced to assist the crew in areas where high terrain may lead to a more complex navigation maneuver, i.e. the critical point and/or routing to safe height/enrooted alternate, may not be easily determined using the Jeppesen Enrooted Charts.

The published flight altitudes are calculated by considering all obstacles within a 15 NM buffer on each side of the charted track and 15NM radius at end fixes, except when diverting to an airport where the MSA covers 15 NM either side of the preferred arrival route. Obstacle data is usually extracted using the Grid MORA data published by Jeppesen. However, in areas. where the Grid MORA is limiting, more precise obstacle data are extracted from topographical charts.

The published altitudes provide a buffer of 2000ft above, rounded up to the next 100ft (For details refer to Operations Manual, Part ‘C’

For each single route flying over mounting area, the operations committee consists of:
- Director of Operations or his deputy,
- Chief Pilot,
- Flight Safety Manager, and
- OCC/Dispatch Manager.

Will prepare and establish escape route and published the procedure in case of drift down/ depressurization for all flying crew, this procedure shall be attached with the flight documents and kept into the flight envelop.

8.1.1.3 Minimum Flight Altitude Corrections

In order to determine adequate obstacle clearance, all minimum flight altitudes and flight levels described in paragraph 8.1.1., shall be corrected for the effects of pressure and temperature variations from standard, and for the effects of high wind speed in areas of high terrain as follows:

8.1.1.3.1 Temperature Correction

The calculated minimum safe altitudes/heights must be corrected when the OAT is much lower than that predicted by the standard atmosphere.
The correction has to be applied on the height above the elevation of the altimeter setting source. The altimeter setting source is generally the atmosphere pressure at an airport, and the correction on the height above the airport has to be applied on the indicated altitude. The same correction value is applied when flying at either QFE or at QNH.
Low altitude temperature corrections

- Approximate correction
  Increase obstacle elevation by 4% per 10°C below ISA of the height above the elevation of the altimeter setting source or decrease aircraft indicated altitude by 4% per 10°C below ISA of the height above the elevation of the altimeter setting source.
  This method is generally used to adjust minimum safe altitudes and may be applied for all altimeters setting source altitudes for temperatures above - 15°C.
- Tabulated corrections
  For colder temperatures, a more accurate correction should be obtained from the following table calculated for a sea level aerodrome. It is conservative when applied at higher aerodrome.
  Radar vectoring altitudes assigned by ATC are temperature compensated and require no corrective action by the Pilot in command.
  When altitude corrections are applied to a published final approach fix crossing altitude, procedure turn, or missed approach altitude, Pilot in commands should advise ATC how much of correction is being applied.

Values to be added by the pilot to minimum promulgated heights/altitudes (ft.)

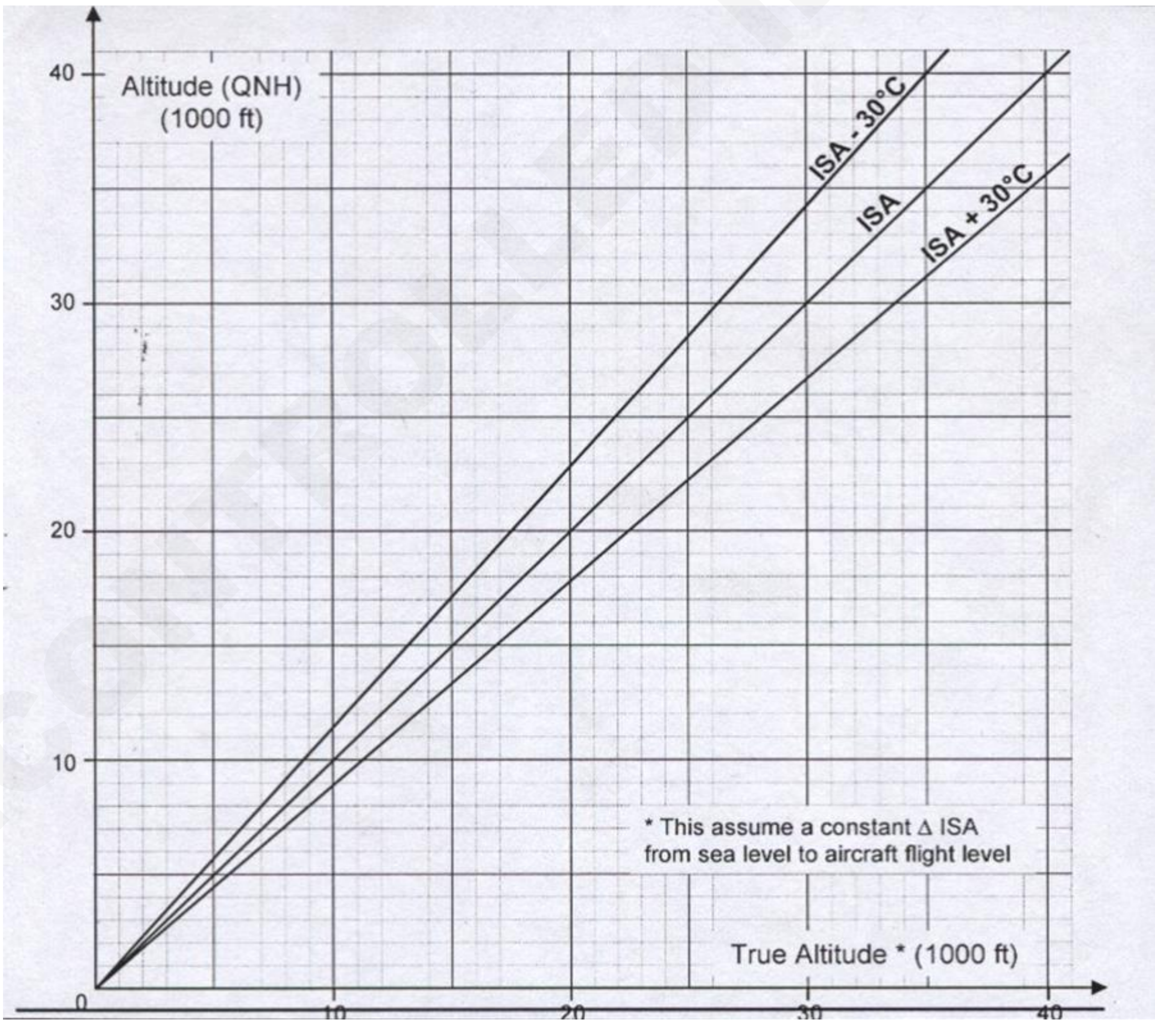
Aerodrome Temperature	Height above the elevation of the altimeter setting source (ft.)								
	200	300	400	500	1000	2000	3000	4000	5000
0°C	0	20	20	20	20	40	40	40	40
-10°C	20	20	40	40	40	60	80	80	80
-20°C	20	40	40	60	80	80	100	120	120
-30°C	40	40	60	80	100	120	140	140	160
-40°C	40	60	80	100	120	140	160	180	200
-50°C	40	80	100	120	140	180	200	220	240

Below is an example of how the correction will be applied:
Aerodrome Elevation 2262ft Aerodrome Temperature minus 50ºC

	PROCEDURE ALTITUDE	HAA	CORRECTION	INDICATED ALTITUDE
PROCEDURE TURN	4000 ft	1738 ft	Add + 420ft	4420 ft
FINAL APPROACH FIX	3300 ft	1038 ft	Add + 240 ft	3540 ft
MDA STRAIGHT IN APPROACH	2840ft	578 ft	Add + 140 ft	2980 ft
CIRCLING MDA	2840 ft	578 ft	Add +140 ft	2980 ft

High altitude temperature corrections
The graph given hereafter has to be used En-route for high altitude operation. It does not consider the elevation of the altimeter setting source.
In theory, this correction applies to the air column between the ground and the aircraft. When flying above high terrain, the use of this correction gives a conservative margin.

Altitude temperature correction for high altitude use



8.1.1.3.2 Pressure correction

When flying at levels with the altimeter set to 1013hPa, the minimum safe altitude must be corrected for deviations in pressure when the pressure is lower than the standard Atmosphere (1013hPa).

An appropriate correction is 28 ft per hPa below 1013hPa the following table gives more accurate data. The following correction is to be applied to the indicated altitude (reference 1013 hPa) to determine the geometrical aircraft altitude.

QNH correction

QNH of nearest station	Correction	QNH of nearest station	Correction
		1013	- 0000 ft
1050	+ 1000 ft	1010	- 0080 ft
1045	+ 0860 ft	1005	- 0220 ft
1040	+ 0720 ft	1000	- 0380 ft
1035	+ 0590 ft	995	- 0510 ft
1030	+ 0460 ft	990	- 0630 ft
1025	+ 0320 ft	985	- 0780 ft
1020	+ 0180 ft	980	- 0920 ft
1015	+ 0050 ft	975	- 1080 ft
1013	+ 0000 ft		

Example: Given: Indicated altitude = 20000 ft, ISA, local QNH = 995 hPa

Find: Geometrical (true) altitude = 20000 - 510 = 19490 ft.

When using the QNH or QFE altimeter setting (giving altitude or height above QFE datum respectively), a pressure correction is not required.

8.1.2 Criteria for Determining the Usability of Aerodromes

8.1.2.1 Usable Aerodrome

Alternate, departure and destination aerodromes considered to be used for operations must be adequate for the type of aircraft and operation concerned. To be selected for conducting an operation they should be usable, usable means it is adequate aerodrome as in 8.1.2.1.1 Adequate Aerodrome and complying with given weather minima at the time of the operation.

8.1.2.1.1 Adequate Aerodrome

Prior to operating on any route or to any airport, Nesma Airlines (**OCC as focal point**) shall complete a route and aerodrome analysis of destination and alternate airports (Flight Preparation), then the final analysis shall be disseminated to relevant departments/sections, that shall include:

1. Obstacle clearance for all phases of flight (minimum safe altitudes); (RTOLW, Route charts, SITA OFP and Aerodrome Charts "Jeppesen"), any Applicable performance requirements;
2. Runway characteristics (width, length, and pavement loading); Refer to 14.9 Takeoff and Landing Optimizations (TLO) (FCOM PRO – Limitations -, RTOLW and Jeppesen; Airport Directory)
3. Air Traffic Services and associated communications; (Jeppesen Enrooted, Area and Aerodrome charts)
4. Navigation aids and lighting (Jeppesen and NOTAMS)
5. Weather reporting and consideration including seasonal weather phenomena for Enroute, destinations and alternates.
6. Emergency services; (Jeppesen; Airport Directory, NOTAMs)
7. Fuel burn calculations; (Refer 8.1.7.1. Fuel Policy ., 8.1.2.3.3. Alternate Aerodrome and OFP)
8. Fuel freeze considerations; (FCOM PRO-NOR-SOP-02)
9. ETOPS (not applicable)
10. critical engine INOP operations; (FCOM-PRO-ABN-70 - Single Engine Operations)
11. depressurization over critical areas;
12. destination is not an isolated Airport
13. Prior permissions and Curfews
14. Airport Classification. Refer to 8.1.2.4 Aerodrome Categories.
15. Any other operational comments

In particular, an aerodrome is adequate if:

- The above analysis is satisfactory;
- The available runway length is sufficient to meet aircraft performance requirements (required take-off and landing distance). Refer to Chapter 14 Performance Engineering
- Rescue and firefighting aerodrome category is compatible with the aircraft (Refer to, Jeppesen Airport directory: Rescue and firefighting) or derogation is obtained from airport authority.

The following table gives the required Aerodrome Rescue and Fire Fighting (RFF) category for destination and alternates:

Aircraft type	Aerodrome category		
	Departure and Destination	Minimum (*)	
		Destination Alternate	Adequate
A320	6	5	4

(*) It is Nesma Airlines policy not to operate to, or nominate as alternates, aerodromes with a fire category less than the minimum category.
If during the flight, the Pilot in command becomes aware of a category downgrading, he may elect to continue or divert. If electing to continue, he may accept not lower than aerodrome category 4.
Notes: Most of the abovementioned information are furnished in (Jeppesen Manuals and/or Notes).
In case of emergency, Pilot in command shall take whatever action is deemed to be necessary taking into account the urgency of the situation. Aerodromes with reduced or inadequate facilities will accept an aircraft making an emergency landing or a landing where the Pilot in command judges that a diversion or holding delay may be a greater potential hazard.
Clearance to take off or land from an aerodrome implies that the aerodrome authorities have fulfilled their responsibilities.

- The pavement strength is compatible with aircraft weight (Refer to Jeppesen Airport Directory) or derogation is obtained from airport authority.

Furthermore, the following items should be considered when necessary:

- Landing and over-flying permission has been obtained.
- The flight crewmembers have the required qualification, experience and documentation including up-to-date approach and aerodrome charts for each pilot.
- At the expected time of use, the aerodrome is equipped with the necessary ramp handling facilities: refuel, tow bar, step, cargo loading, ground power unit, air starter, catering water services, toilet services.
- For international flight, police, custom and immigration services are available at the expected time of use.

8.1.2.1.2 Usable aerodrome

An aerodrome is usable if:

- The aerodrome is adequate for the operation; and
- The meteorological conditions satisfy the planning minima given here after for the expected landing time and meet the approach, runway and aircraft capabilities and crew qualifications (associated with meteorological conditions).

8.1.2.2 Planning Minima

Planning minima deals with forecast airport weather conditions (Refer to 8.1.3.1. Concept of Minima)

8.1.2.2.1 Planning Minima for Take-Off Alternate Aerodrome

An adequate aerodrome may be usable for take-off alternate if the weather reports or forecasts indicate that, during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima (Approach operating minima). The ceiling must be taken into account when the only approaches available are non-precision and/or circling approaches. Any limitation related to one-engine inoperative operation must be taken into account.
Note 2: The above criteria are only required at the planning stage. Once flight has commenced, an aircraft may use any airfield as a return alternate which is at or above applicable minima (the lowest minima available which the crew/aircraft can operate).

8.1.2.2.2 Planning Minima for Destination Aerodrome (Except Isolated Destination Aerodrome)

An adequate aerodrome may be suitable as destination (except if the aerodrome is isolated) if the weather reports or forecasts indicate that, during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions (RVR / visibility and for non-precision or circling approaches, ceiling at or above MDH) will be at or above the approach operating minima.

8.1.2.2.3 Planning Minima for En-Route and Destination Alternate Aerodromes

An adequate aerodrome may be suitable as destination alternate, en-route alternate or for destination aerodrome, if the weather reports or forecasts indicate that, during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima as follows:

1. For dispatch or flight release the Alternate Minima must be derived from the table below.

Approach Facility Configuration	Alternate Airport Weather Minima	
For airports with at least **One Operational Navigational Facility** providing a Straight-in Non-precision Approach Procedure, or Category I Precision Approach Procedure or When Applicable a circling maneuver from an instrument approach procedure.	A ceiling derived by **adding 400 ft** to the CAT I **HAT** or **HAA** as applicable.	A visibility derived by **adding 1600m**or**1sm**. To the Landing Minimum.
For airports with at least **Two Operational Navigational Facilities**, each providing a Straight-in Non-precision Approach Procedure, or a Category I Precision Approach Procedure to different suitable runways *	A ceiling derived by **adding200 ft** to the higher **HAT** or **HAA** of the Two approaches Used.	A visibility derived by **adding800m**or½ **sm**. to the Higher Authorized Landing Minima of the Two Approaches Used.
* Note: for ETOPS separate suitable runways must be used instead of different suitable runways. (NOT APPLICABLE)		

Note: For States that publish alternate minimums, the applicable minima are those specified under "Filing as alternate" on the airport chart or company alternate minima whichever is higher. (USA, Canada and Saudi Arabia are an example).

2. In case that the derived Alternate Minima using Two Operational Navigational Facilities (i.e. derived value from the second row of the table) is higher than the derived Alternate Minimum using One Operational Navigational Facility (i.e. derived from the first row of the table) the lower value should be used.

Type of approach	Planning minima
Cat II and Cat III	Cat I minima (RVR)
Cat I	Non-precision approach minima (ceiling / RVR)
Non-precision	Non-precision approach minima plus 200 ft/1000 m (MDH/MDA + 200 ft / RVR + 1000 m)
Circling	Circling minima

3. Nesma Airlines shall not use any airport as an alternate whenever it is stated by the state authority "NOT AUTHORIZED AS ALTERNATE AIRPORT".
"Non precision minima" mentioned in the table above, means the next highest minimum that is available in the prevailing wind and serviceability conditions; Localizer only approaches, if published, are considered to be "non precision" in this context.
Tables publishing planning minima should indicate values that are likely to be appropriate on most occasions (e.g. regardless of wind direction). Unserviceable must, however, be fully considered.

Examples

1) Airport XXX

Runway 07	DA (DH) / MDA (MDH) (ft)	Visibility (m)
ILS DME	222 (200)	RVR 550
LOC DME	410 (388)	2400
VOR DME	580 (558)	2800
Runway 25	DA (DH) / MDA (MDH) (ft)	Visibility (m)
CAT 2 ILS	216 (193)	RVR 500
ILS DME	292 (269)	RVR 650
LOC DME	410 (387)	2400
VOR DME	450 (431)	2400

- If Runway 07 is the expected runway to be used due to weather forecast:
  - Type of approach planned: CAT 1 ►planning minima Non precision (LOC DME)

  Apply: 410 (388) ft / 2400m
- If Runway 25 is the expected runway to be used due to weather forecast:
  - Type of approach planned: CAT 2 ►planning minima CAT 1 apply:

  292 (269) ft / RVR 650m

2) Airport YYY

Runway 07	DA (DH) / MDA (MDH) (ft)	Visibility (m)
LOC DME	410 (388)	2400
VOR DME	580 (558)	2800
Runway 25	DA (DH) / MDA (MDH) (ft)	Visibility (m)
ILS DME	292 (269)	RVR 650
LOC DME	410 (387)	2400
VOR DME	450 (431)	2400

- If **Runway 07** is the expected runway to be used due to weather forecast:
  - Type of approach planned: Non-Precision (LOC DME) ► planning minima Non precision (VOR DME) + 200 ft / + 1000 m apply: 780 (788) ft / 3800 m
- If Runway 25 is the expected runway to be used due to weather forecast:
  - Type of approach planned: CAT 1 ► planning minima Non precision (LOC DME) apply: **410 (387) ft / 2400m**

8.1.2.3 Selection of Aerodromes

8.1.2.3.1 Destination Aerodrome

An aerodrome may be selected as destination for an operation, if it is adequate for this operation.

8.1.2.3.2 Takeoff alternate aerodrome

When performance, operational or meteorological conditions preclude return to departure aerodrome or weather conditions at the airport of departure are at or below the applicable airport operating landing minima a take-off alternate aerodrome must be selected (in accordance with 8.1.2.1.2), specified in the OFP and located within:

- For two-engine aircraft:
- Not more than one hour flying time from the airport of departure calculated at the single-engine cruise speed, (max continuous power speed) determined from the aircraft operating manual in ISA and still air conditions using the actual takeoff mass.
- Take-off alternate distance

The following table gives conservative figures for aircraft type:

Aircraft type	Distance 60 minutes
A320	380 NM

8.1.2.3.3 Destination alternate aerodrome

Reference: ECAR 121.621

At least one suitable destination alternate aerodrome must be selected, specified on the OFP and the ATS flight plan for each flight. (See planning minima)

Two suitable destination alternates must be selected when:

- The appropriate weather reports or forecasts for the destination indicate that from 1 hr. before to 1 hr. after the ETA the weather conditions will be below the applicable planning minima; or
- No meteorological information is available.

Note: If planning minima at destination are not fulfilled, two destination alternate airports must be selected. (When two destination alternates are required, alternate fuel shall be sufficient to proceed to the alternate which requires the greater amount of alternate fuel).

In exceptions to the requirements above, no destination alternate is required in the following cases:

When either:

- The planned duration of the flight from take-off to landing does not exceed 6 hours; and
- Two separate runways are available at the destination and the meteorological conditions prevailing are such that, for the period from 1 Hr. before until 1 Hr. after the expected time of arrival at destination, the ceiling will be:
  - **I.** At least 1,500 feet above the lowest circling MDA, if a circling approach is required and authorized for that airport; or
  - **II.** At least 1,500 feet above the lowest published instrument approach minimum or 2,000 feet above the airport elevation, whichever is greater; and
  - **III.** The visibility at that airport will be at least 4800 meters, or 3200 meters more than the lowest applicable visibility minimums, whichever is greater, for the instrument approach procedures to be used at the destination airport;

OR

- The destination is isolated, and no usable destination alternate aerodrome exists (island hold). In this case the alternate fuel is replaced by the fuel necessary to fly for two hours at cruise speed (refer to 8.1.7.1.2. Isolated Airport Procedure).

Note: Runways on the same aerodrome are considered to be separate runways when:

- They are separate landing surfaces, which may overlay or cross such that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway; and
- Each of the landing surfaces has a separate approach procedure based on a separate aid.

8.1.2.3.4 En-route Alternate Selection Criteria

1. Over Remote Areas

Remote areas are defined as North Atlantic, Asia east of the Ural and north of the Himalayas and the Sahara Desert.

Two engines aircraft, which are not operating in accordance with ETOPS criteria, should be flown not more than 60 minutes flying time at the one engine inoperative cruising speed from an adequate aerodrome at which the weather conditions are forecast to be actor above the applicable landing minima at the expected time of arrival.

a. & (b) together constitute an adequate aerodrome.

(a) be available, and equipped with necessary ancillary services, such as ATC, sufficient lighting, communications, weather reporting, navigation aids and safety cover, and

(b) Have at least one letdown aid (ground radar would also qualify) available for an instrument approach.

Operations Control (Dispatch) – for planning purposes – shall make that the en-route alternate(s) are existed within a 380 NM radius, i.e. 60 minutes along any point of a route; i.e. from origin to destination/destination alternate.

2. Not over Remote Areas

Two engines aircraft, which are not operating in accordance with ETOPS criteria, should be flown not more than 60 minutes flying time at the one engine inoperative cruising speed from an approved airfield. When not operating over remote areas this requirement will be automatically satisfied

8.1.2.4 Aerodrome Categories

All Nesma Airlines destination and alternates are categorized in ascending order of difficulty from category A to category C.
Category (A) aerodromes satisfy all of the following requirements:

- An approved instrument approach procedure;
- At least one runway with no performance limited procedure for take-off and/or landing;
- Published circling minima not higher than 1000 ft AAL; and
- Night operations capability.

Category (B) aerodromes do not satisfy the Category a requirements or require extra considerations such as:

- Non-standard approach aids and/or approach patterns; or
- Unusual local weather conditions; or
- Unusual characteristics or performance limitations; or
- Any other relevant considerations including obstructions, physical layout, lighting etc., which in the opinion of the Operations director or Chief Pilot require particular briefing.

Category (C) aerodromes require additional considerations to Category B aerodromes

8.1.2.5 Use of Aerodrome Category B and C

8.1.2.5.1 Use of Aerodrome Category B

Prior to operating to a Category B aerodrome, the pilot in command should be briefed, or self-briefed by means of programmed instruction, on the Category B aerodrome(s).

8.1.2.5.2 Use of Aerodrome Category C

Prior to operating to a Category C aerodrome, the pilot in command should be briefed and visit the aerodrome as an observer and/or undertake instruction in a flight simulator approved by Nesma Airlines for that purpose. This instruction should be certified by Director of Operations. Take-off and landing at these airports must be done by the Pilot in command only.
It is a requirement that the qualification to act as pilot in command on a particular aerodrome shall not continue for a period in excess of 12 calendar months.
However, if revalidated within the final 3 calendar months of validity of previous Aerodrome Competence Qualification, the period of validity shall extend from the expiry date of the previous qualification until 12 calendar months.
Crew records will be kept of the aerodrome competence (class B &C) of pilots in command. Nevertheless, it is the responsibility of each Pilot in command to ensure that he is always operating as directed by this manual.

8.1.2.5.3 Required crew competencies.

There are special skills required within areas, on routes over difficult terrain and/or into special airports described above, PIC within the preceding 12 months has either:

i. Made at least one trip as a pilot flight crewmember, line check airman or observer on the Flight Crew on a route in close proximity and over similar terrain within the specified areas, on specified routes and/or into special airports, as applicable;
ii. Fulfilled special line qualification requirements

8.1.2.6 Emergency Airports

Off-line airports not typically used by Nesma Airlines for normal operations, which may be available for use in the event of an emergency.

Emergency airports are typically categorized by the level of support, facilities and risk to be expected, and are only used when a flight cannot continue either to its destination or to a suitable alternate due to a specific emergency.

8.1.2.7 Special Airports

Special airports will include but not limited to the following:

- Mountainous area airports,
- H-elevation airports,
- Limited Navigation Equipment airports,
- Short Runways,
- Narrow Runways.

A committee from operations department consists of:

- Director of Operations or his deputy,
- Chief Pilot,
- Flight Safety Manager, and
- OCC/Dispatch Manager.
- Performance Engineer
- Stations manager

Will study such airports and give recommendations how to use these airports using RTOW, CFIT check list (Chapter 13).

The PIC shall receive a deep briefing from operations committee for that airport or if it is available in-flight simulator to demonstrate the airport operations.

Note: -

Nesma Airlines does not operate to special airports

8.1.2.8 New Routes/Destinations

The Operations committee as mentioned above in 8.2.1.8 will study any new routes/destinations presented by the commercial department that needs special preparation and will have the decision to approve or disapprove the operations at these routes/destinations according to operationally technique criteria.

Prior to operating new routes/destinations, such study shall be completed for a route, destination and alternate airports in accordance with OM-A 8.1 and 8.1.2.1.1.

8.1.2.9 Uncontrolled Airspace/Airports

Nesma Airlines may conduct operations into/out uncontrolled airspace and/or airports.

8.1.3 Methods for the Determination of Aerodrome Operating Minima

8.1.3.1 Concept of Minima

The term minima refer to the aerodrome weather conditions and defines the minimum visibility (horizontal and vertical) prescribed for taking off from, or landing a civil aircraft to this particular aerodrome.

Different concepts of minima:

- **Aircraft capability** given in the Aircraft Flight Manual defines the lowest minima for which the aircraft has been certified.
- **Aerodrome operating minima** noted on the aerodrome chart, established in accordance with the national authorities of the aerodrome. They are depicted on Jeppesen approach charts and never below any State minima.

- **Nesma Airlines' minima** approved by the Egyptian Civil Aviation Authorities. They are the lowest minima that the Nesma Airlines is allowed to use on a specified aerodrome. They cannot be lower than the aircraft capability and the minima published on the aerodrome chart except when specifically approved by the national authority of the aerodrome.
- These operator's minima are also called "**aerodrome operating minima**" by the operator (but with a different meaning than in the previous case).
- **Crew minima** are the minima that the crew is authorized to operate. They are based upon the qualification of the flight crewmembers.

8.1.3.2 Aerodrome Operating Minima

As a rule, the aerodrome operating minima are the minima indicated on the instrument departure and approach charts (Jeppesen charts) established by the state in which the aerodrome is located.
However, at the Pilot in Command's discretion, if other factors indicate that the operation cannot be conducted with the required standard of safety the selected minima can be higher than the allowed operating minima. NOTAM may affect minima.
For operational further information refer to 8.4 All Weather Operations.

8.1.3.3 Take-Off Operating Minima (All Airports)

The Takeoff minima is mainly determined by the airport installation (runway lighting system, RVR measurement system,)
When weather conditions are more severe than the landing minima, a takeoff alternate is normally required:

- within one hour for twins
- Within the maximum approved diversion time for aircraft qualified for ETOPS, but not more than 2 hours.

Above time is determined at the one engine inoperative speed. Takeoff with RVR less than 400m is considered as LVTO.
The maximum RVR at Takeoff is quite independent of the aircraft type and aircraft equipment except for very low RVR.
Take-off minima are generally expressed as VIS or RVR. Where there is a specific need to see and avoid obstacles, a ceiling or climb gradient will be specified.

- Take-off shall not be commenced unless weather conditions at the airport of departure are equal to or better than applicable minima for landing at that airport, unless a suitable take-off alternate aerodrome is available.
- When the reported visibility is below that required for take-off and RVR is not reported, a take-off may only be commenced if the Captain can determine that the RVR/VIS along the take-off runway is equal to or better than the required minimum.
- When no report of VIS or RVR is available, a take-off may only be commenced if the Captain can determine that the RVR/VIS along the take-off runway is equal to or better than the required minima.
- The lowest RVR authorized for take-off is 400m, unless Low Visibility Procedures are in force.
- For all take-offs where the RVR is less than 400m (LVTO), the flight crew must be qualified and low visibility procedures must be in force.
- Applicable take-off minima: Operating minima for take-off from a specific airport are specified:

1. Jeppesen airport charts.
2. For States that have adopted the JAA Minimums concept with a JAR-OPS label in the minimums box heading.
3. On separate JAA Minimums listing page (10-9X, 20-9X etc.)
4. When none of the charts as in (1), (2) and (3) above are available for a specific airport, then the applicable take-off minima are those specified under Air Carrier (not to be confused with AIR CARRIER FAR 121) provided the chart is dated on or after 12 NOV 99.

- The limits below define the lowest Take-Off Minima authorized and are to be used by flight crew for establishing applicable take-off minima. Applicable take-off minima for specific airports are specified on the relevant Jeppesen chart.

A. Standard Take-Off Minima:

The standard takeoff minima is authorized for use at all airports unless a higher than standard minima is specified in the applicable instrument approach procedure

Two Engine Aircraft	1600 meters (1 mile)

B. Lower Than Standard Take-Off Minima:

On runways where standard takeoff minima are authorized, the following minima are also authorized:

1. 400 meters (1/4 mile) visibility or RVR 400 meters when any of the following visual aids are available:

a) HIRL, or
b) Runway Centerline Lights, or
c) Runway Centerline Markings, or
d) In unusual circumstances where neither (a), (b), nor (c) above are available, the runway is marked in such a manner that the pilot at all times has visual reference to the line of forward motion during the takeoff-roll.

Note: If takeoff is based on RVR, a touchdown Transmissometers is required and is controlling.

2. RVR 350 meters with RVR 300 meters on rollout and provided the runway has:

a) Operative centerline lights; and
b) Two operative Transmissometers, neither of which is capable of reading lower than RVR 300m. Both are controlling.

3. RVR 175 meters with MID RVR (175) meters (if operative) and RVR 175 meters on rollout, provided the runway has:

a) Operative Centerline Lights CL;
b) Runway Centerline Markings RCLM; and
c) Either two or three operative Transmissometers capable of reading as low as RVR 175m.

Note: Where only two Transomometers are installed, the touchdown and rollout RVRs are required and are controlling. If three Trans miss meters are installed; all are controlling, and the failure of any one Trans miss meters will not affect operations provided the remaining two RVR values are at or above appropriate minima.

Table 1: RVR conversion

RVR (Meters)	Operational Equivalent (Feet)	RVR (Meters)	Operational Equivalent (Feet)	RVR (Meters)	Operational Equivalent (Feet)
30	100	330	1100	690	2300
50	150	350	1200	720	2400
60	200	390	1300	750	2500
75	250	420	1400	780	2600
90	300	450	1500	900	3000
120	400	480	1600	980	3200
150	500	510	1700	1200	4000
180	600	540	1800	1380	4500
200	700	570	1900	1500	5000
240	800	600	2000	1800	6000
270	900	630	2100		
300	1000	670	2200		

Note: The distance equivalents in the table above are applicable to both TAKEOFF and LANDING minima

8.1.3.4 Aeroplan Categories

8.1.3.4.1 Classification of Airplanes

For approach, aircraft are classified in categories: A, B, C, D, and E.
The criteria taken into consideration for the classification of airplanes by categories is the indicated airspeed at threshold (V_{AT}) in landing configuration at the maximum certified landing weight.
V_{AT} = 1.3 VS or V_{AT} = 1.23 VS1G (fly-by-wire aircraft).
The Aeroplan categories corresponding to V_{AT} values are in the table 2 below:
Table 2: Aircraft category (multi-engine) Airplane

Category	VAT	Models
A	**VAT** < 91 kt	
B	91 kt ≤ **VAT** <121 kt	
C	121 kt ≤ **VAT** <141 kt	All Nesma Airlines aircraft
D	141 kt ≤ **VAT** <166 kt	
E	166 kt ≤ **VAT** < 211 kt	

8.1.3.4.2 Permanent Change of Category (Maximum Landing Mass)

- An operator may impose a permanent lower landing mass and use this mass for determining the V_{AT} if approved by the Authority.
- The category defined for a given airplane shall be a permanent value and thus independent of the changing conditions of day-to-day operations.

8.1.3.5 Approach Operating Minima

- Authorized Approaches & Landings

The approach procedures published in the letdown charts for ILS, LOC (GS inoperative), VOR, VOR/DME, NDB, NDB/DME and SRA are authorized, and the associated minima are applicable, provided the following requirements are met:

1. The required ground equipment's for the intended procedure are operative;
2. The aircraft systems required for the type of approach are operative;
3. The required aircraft performance criteria are met; and
4. The crew is qualified accordingly.

- Operating Minima

Operating minima for landing at a particular airport are specified:

1. Jeppesen approach charts.
2. For States that have adopted the JAA Minimums with a JAR-OPS label in the minimums box heading.
3. Collectively on a separate JAA Minimums listing page (10-9X, 20-9X etc) placed in front of the airport chart or alternatively in front of the first approach chart.

8.1.3.5.1 Commencement and Continuation of an Approach

Refer To 8.3.1.7

8.1.3.5.2 Non-Precision Approaches

8.1.3.5.2.1 System Minima

The system minima (weather conditions function of the approach aid) for "Non Precision Approach" shall not be lower than the Minimum Descent Height (MDH) value given in table 3 below:

Table 3 - System minima for non-precision approach aids

Facility (approach aid)	lowest MDH (ft)
ILS with no glide path (LLZ)	250
SRA (terminating at 1/2 NM.)	250
SRA (terminating at 1 NM.)	300
SRA (terminating at 2 NM.)	350
VOR	300
VOR/DME	250
NDB	300

8.1.3.5.2.2 Minimum Descent Height (MDH)

Non-precision approach procedures are based on the use of ILS without glide slope (LLZ only), VOR, VOR/DME, NDB, NDB/DME, SRA, VDF, RNAV or GPS. The MDH on a non-precision approach shall not be less than the highest of:

- the Obstacle Clearance Height (OCH) for the category of aircraft;
- the system minimum, as contained in table 3, or
- Any State minima if applicable.

8.1.3.5.2.3 Visual Reference

A pilot may not continue an approach below Minimum Descent Height/Altitude (MDH/MDA) unless at least one of the following visual references for the intended runway is distinctly visible to, and identifiable by the pilot:

- elements of the approach light system;
- the threshold, or its markings, lights or identification lights;
- the visual glide slope indicator(s);

- the touchdown zone, zone markings or zone lights;
- the runway edge lights; or
- Other visual references accepted by the Authority.

8.1.3.5.2.4 Required Runway Visual Range

The minimum RVR for a non-precision approach depends on the MDH and on the approach lighting and runway lighting/marking available as shown in table 4, below.
For night operations at least runway edge, threshold and runway end lights must be illuminated.
Table 4- RVR for Non-Precision Approaches

MDH (ft)	Facilities		Intermediate Facilities		Basic Facilities		Nil Approach Light Facilities	
	RVR – Required (m) For Aircraft Category							
	C	D	C	D	C	D	C	D
250-299	800	1200	1200	1400	1400	1600	1600	1800
300-449	1000	1400	1400	1600	1600	1800	1800	2000
450-649	1200	1600	1600	1800	1800	2000	2000	2000
650 & ABV	1400	1800	1800	2000	2000	2000	2000	2000

Facilities – Required (Lights Must Be On)				
Approach Lights	HIALS / MIALS 720m or More	HIALS / MIALS 420m – 719m	HIALS / MIALS 419m or Less or ALS any Length	Nil Approach Light
Threshold Lights	X	X	X	X *
RWY Edge Lights	X	X	X	X *
RWY End Lights	X	X	X	X *
RWY Markings	X	X	X	X

(*) Day Operations Only
Notes:

1. Full facilities comprise runway markings, 720 meters or more of high or medium intensity (HI/MI) approach lights, runway edge lights, and threshold and end lights. Lights must be on.
2. Intermediate facilities comprise runway markings, 420-719 meters of HI/MI approach lights, runway edge, and threshold and end lights. Lights must be on.
3. Basic facilities comprise runway markings, less than 420 meters of HI/MI approach lights, runway edge, threshold and end lights. Lights must be on.
4. Nil approach light facilities comprise runway markings, runway edge, threshold and end lights or no lights at all.

The following conditions also apply:

- Descent slopes greater than 4° (7%) are considered abnormal descent slopes, and will usually require visual slope guidance (e.g. PAPI) to be available at the MDA.
- For night operation at least runway edge, threshold and runway end lights must be ON and operational.
- The above figures are either reported RVR or MET visibility converted in accordance with the conversion table.
- Runway end lights may be substituted by color coded runway edge or runway centerline lights.

Note: Observe effects on landing minima of temporarily failed or down-graded equipment & maximum crosswind limitations according OM- B (planning and in-flight).

Table 5 - Converting reported visibility to RVR

Lighting element in operation	RVR = Reported Meteorological visibility multiplied by	
	Day	Night
HI approach and runway lighting	1.5	2.0
Any type of lighting installation other than above	1.0	1.5
No lighting	1.0	Not applicable

Table 5 may not be used for calculating take-off minima or Cat II/III minima nor when a reported RVR is available.

Table 5 must not be applied for Take-off or any other required RVR minimum less than 800m or when reported RVR is available.

Note: If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. “RVR more than 1500 meters”, it is not considered to be a reported RVR in this context and the Conversion Table may be used.

8.1.3.5.3 Precision Approach CAT I

8.1.3.5.3.1. Category I

A Category I operation is a precision instrument approach and landing using ILS, MLS or PAR with:

- a runway visual range (RVR) not less than 550 meters, and
- A decision height (DH) not lower than 200 feet.
- The DH shall be not less than the highest of:

- the OCH for the category of aircraft;
- the minimum DH in the Aircraft Flight Manual (AFM), if stated;
- the minimum height to which the precision approach aid can be used without the required visual reference;
- 200 feet; or
- Any State minima if applicable.

8.1.3.5.3.2 Visual Reference

No pilot may continue a precision approach Cat I below the DH unless at least one of the following visual references for the intended runway is distinctly visible to, and identifiable by the pilot:

- elements of the approach lighting system;
- the threshold, or its markings, lights or identification lights;
- the visual glide slope indicator(s);
- the touchdown zone, zone markings or zone lights; or
- The runway edge lights.

8.1.3.5.3.3 Runway Visual Range

The minimum RVR is governed by the DH and the approach lighting and runway lighting/marking available as shown in Table 6 below.
For night operations at least runway edge, threshold and runway end lights must be illuminated.
Table 6 - RVR for Category I

DH (ft)	Full Facilities	Intermediate Facilities	Basic Facilities	Nil Approach Light Facilities
	RVR – Required (m)			
200	550	700	800	1000
201-250	600	700	800	1000
251-300	650	800	900	1200
301 and above	800	900	1000	1200
	Facilities – Required (Lights Must be ON)			
Approach lights	HIALS / MIALS 720m or More	HIALS / MIALS 420m – 719m	HIALS / MMIALS 419m or Less or ALS any Length	Nil Approach Lights
Threshold lights	X	X	X	X *
RWY Edge Lights	X	X	X	X *
RWY End Lights	X	X	X	X *
RWY Markings	X	X	X	X *

* Day Operations Only

The above table is only applicable to conventional approaches with a maximum glide slope angle of 4°. For "steeper" glide slopes refer to AOM and/or Jeppesen approach chart. The above figures are either reported RVR or MET visibility converted in accordance with the Conversion table of VIS to RVR of this manual.
Runway end lights may be substituted by color coded runway edge or runway centerline lights.
Pilots-in-command who have not met the requirement of ECARS 121.652 i.e. less than 100 hrs. as pilot in command on the airplane type shall add to CAT 1 visibility / RVR an increment of 1/2 sm/800 meters and an increment of 100 ft above the DA (DH) or MDA (MDH). This may be reduced by 50% if the pilot-in-command had already gained 100-hour experience in command of another aircraft type in operation under the ECARS.

Use the high minimum pilot RVR landing minimum equivalents as determined from the following table:

RVR Landing minima Ft/m	RVR Landing minima for PIC with less than 100 Hrs on type Ft/m
RVR 1800 / 550	RVR 4500 / 1400
RVR 2000 / 600	RVR 4500 / 1400
RVR 2400 / 720	RVR 5000 / 1500
RVR 4000 / 1200	RVR 6000 / 1800
RVR 5000 / 1500	RVR 6000 / 1800

Notes:

(1) Full facilities comprise runway markings, 720 meters or more of high or medium intensity (HI/MI) approach lights, runway edge lights, and threshold and end lights. Lights must be on.

(2) Intermediate facilities comprise runway markings, 420-719 meters of HI/MI approach lights, runway edge, and threshold and end lights. Lights must be on.

(3) Basic facilities comprise runway markings, less than 420 meters of HI/MI approach lights, runway edge, threshold and end lights. Lights must be on.

(4) Nil approach light facilities comprise runway markings, runway edge, threshold and end lights or no lights at all.

Note 1: Observe effects on landing minima of temporarily failed or downgraded equipment), and maximum crosswind limitations according OM-B (planning and in-flight).

Note 2: Light must be serviceable and ON if required for night operations only

8.1.3.5.4 Precision Approach Cat II

Reference: EAC 91-11

8.1.3.5.4.1 Category II

Nesma Airlines is authorized for CAT II Operations

A category II operation is a precision instrument approach and landing using ILS with:

- a RVR of not less than 300 m, and
- A Decision Height below 200 ft. but not lower than 100 ft.

The DH shall be not lower than:

- the minimum DH specified in the AFM,
- the minimum height to which the precision approach aid can be used without the required visual reference
- the OCH for the category of the aircraft
- the DH to which the flight crew is authorized to operate
- 100 ft. (attached below the special authorization for 6 months).

8.1.3.5.4.2 Visual reference

No pilot may continue a precision approach Cat II below the DH unless following visual references is attained and can be maintained.

The visual reference must contain:

- a segment of at least 3 consecutive lights being:
- ➢ the center light of the approach lights, or

- touchdown zone lights, or
- runway center line lights, or
- runway edge lights, or
- a combination of these

– and a lateral element of the ground pattern:

- an approach lighting crossbar, or
- the landing threshold, or a barrette of the touchdown zone lighting.

8.1.3.5.4.3 Runway Visual Range

The minimum RVR is governed by the DH and the approach lighting and runway lighting/marking available as shown in table below.
RVR for Category II approach versus DH

Decision Height	Auto-coupled to below DH (1)	
	RVR aircraft category C	
100 - 120 ft	300 m	
121 - 140 ft	350 m	
141 ft and above	400 m	

(1) "auto-coupled to below DH" means continued use of the automatic flight control system down to a height which is not greater than 80% of applicable DH (through minimum engagement height for automatic flight control system, DH to be applied may be affected).

Reserved

8.1.3.5.5 Precision approach CAT III

Nesma Airlines is not authorized for CAT III Operation.

8.1.3.5.6 Visual maneuvering (Circling)

Visual maneuvering (circling) is the term used to describe the visual phase of an instrument approach required to position an aircraft for landing on a runway which is not suitably located for a straight-in approach.
Great care is required, with high terrain awareness. This is required whenever crews are completing this maneuver.

The Circling Minimum Altitude is designed to provide a terrain clearance of at least 300ft above the highest spot elevation within 4nm of the runway system of the airfield. It is permissible to eliminate from consideration a particular sector where a prominent obstacle exists in the circling area outside the final approach and missed approach areas. When this option is exercised, the published procedure prohibits circling within the total sector in which the obstacle exists.
Descent below Circling Minima should not be made until.

(a) visual reference has been established and can be maintained;
(b) the pilot has the landing threshold in sight;
(c) the required obstacle clearance can be maintained; and
(d) the aircraft is able to carry out a safe landing

A circling approach is a visual flight maneuver. Each circling situation is different because of variables such as runway layout, final approach track, wind velocity and meteorological conditions. Therefore, there can be no single procedure designed that will cater for conducting a circling approach in every situation.

After initial visual contact, the basic assumptions are that the runway environment, ie, the runway threshold or approach lighting aids or other markings identifiable with the runway, is kept in sight while at Circling Minima and that there is sufficient visual reference to the terrain to ensure clearance.

Missed Approach Procedure while Circling:

If visual reference is lost while circling to land from an instrument approach, the missed approach specified for the particular procedure must be followed. It is expected that the pilot will make an initial climbing turn toward the landing runway and overhead the aerodrome where he will establish the aircraft climbing on the missed approach track.

In as much as the circling maneuver may be accomplished in more than one direction, different patterns will be required to establish the aircraft on the prescribed missed approach course depending on its position at the time visual reference is lost.

The minimum MDH and visibility which are required for visual maneuvering are as given in Table 7 below.

Table 7 - Visibility and MDH for visual maneuvering

Aircraft category			C	
MDH			600 ft	
Minimum meteorological visibility			2400 m	

8.1.3.5.7 Visual approach

A Visual approach takes place when either part or all of an instrument approach is not completed and the approach is executed by visual reference to the terrain. Visual approaches are not permitted unless ATC authorization is received, and the weather conditions at the aerodrome are as follows:

- If circling minima is published, then the cloud ceiling must be at least the MDA (H) specified under “Circle-to-Land” but not less than the minima specified and reported visibility of at least 5 km.
- If no circling minimum is specified, then the cloud ceiling must be at least the MSA and reported visibility not less than 5 km.

Note: A pilot may request a visual approach if:

- Visual contact with the airport or surrounding terrain can be maintained until landing and the Pilot in command can satisfy himself that the ceiling and flight visibility allow a successful visual approach and landing;
- The weather conditions in terms of ceiling and visibility specified above exist; and
- ATC authorization is received.

For a visual approach, ATC clearance shall be received and RVR of less than 800 m shall not be used.

8.1.3.5.8 Effect of failed or downgraded ground equipment

These instructions are intended for pre-flight and pre-approach. It is not expected however that the Pilot in Command would consult such instructions after passing the outer marker or equivalent position. If ground aids failure is announced on final approach, the approach could be continued at the Pilot in Command's discretion. If, however, failures are announced before final, their effect on the approach should be considered as described in table 8, and the approach may have to be stopped to allow review.

- Conditions applicable to table 8

- Multiple failures of runway lights other than indicated in table 10 are not acceptable
- Deficiencies of approach and runway lights are treated separately
- Category II or III operations - A combination of deficiencies in runway lights and RVR assessment equipment is not allowed.
- Failures other than ILS affect RVR only and not DH.

Table 8 - Failed or downgraded equipment - Effect on landing minima

Failed or downgraded equipment	Effect on landing minima				
	CAT IIB	CAT IIIA	CAT II	CAT I	Non precision
ILS standby transmitter	Not allowed		No effect		
Outer Marker	No effect if replaced by published equivalent position				Not applicable
Middle Marker	No effect				No effect unless used as MAPT
Touch down zone RVR assessment system	May be temporarily replaced with midpoint RVR if approved by the state of the airport. RVR may be reported by human observation			No effect	
Midpoint or Stop end RVR	No effect				
Anemometer for runway in use	No effect if other round source available				
Ceilometer	No effect				
Approach lights	Not allowed for operations with DH > 50 ft		Not allowed	Minima as for basic facilities	
Approach lights except the last 210 m	No effect		Not allowed	Minima as for basic facilities	
Approach lights except the last 420 m	No effect			Minima as for intermediate facilities	
Standby power for approach lights	No effect		RVR as for CAT I basic facilities		No effect
Whole runway light System	Not allowed			Minima as for basic facilities day only	
Centerline lights spacing increased to 30 m	RVR 150 m	No effect			
Touch down zone lights	Day: RVR 200 m Night: RVR300 m	Day: RVR 300 m Night: RVR 550 m		No effect	
Standby power for runway lights	Not allowed			No effect	
Taxiway light system	No effect – except delays due to reduced movement rate				

8.1.4 VFR En-Route Operating Minima

VFR flights are **not** allowed unless authorized by Director of Operations (refer to 8.3.1). VFR flights and VFR portions of an IFR-flight shall be conducted accordance with the visual flight rules and in accordance with the table below:

AIRSPACE	Height above GND	TAS Below 250 Kts		TAS Below 250 Kts	
		VIS	CLOUD DIST. Horizontal/Vertical	VIS	Cloud Dist. Horizontal/vertical
B, C, D, F	Above 2500 ft	8 km	1.5 km/1000 ft	10 km	3 km/2000 ft
	Below 2500 ft	5 km	1.5 km/1000 ft	5 km	2 km/1500 ft
E	------------	8 km	1.5 km/1000 ft	10 km	3 km/2000 ft
G	Above 2500 ft	5 km	1.5 km/1000 ft	10 km	3 km/2000 ft
	Below 2500 ft	2 km	Clear of clouds	5 km	1.5 km/1000 ft

Note 1: Except when authorized by ATC, VFR flights shall not take off or land at an airfield within a control zone, or enter the airfield traffic zone or traffic pattern;

- When the ceiling is less than 1500ft (450m); or
- When the ground visibility is less than 5km.

Note 2: Unless cleared for "VFR-on-top-flight", visual reference to ground shall always be maintained during IFR flight

Note 3: For State differences refer to Operations Manual Part 'C', Jeppesen Text "Air Traffic Control".

8.1.5 Presentation and Application of Aerodrome and En-Route Operating Minima

Aerodrome and en-route operating minima for each departure, destination or alternate aerodrome authorized for the type(s) of aircraft and operations of Nesma Airlines are published in the Jeppesen Route Manual.

These operating minima presented in the Jeppesen Route Manual must be used as long as they do not conflict with the basic minima as presented

Furthermore, the operating minima are applicable if:

- The ground equipment shown on the respective chart required for the intended procedure is operative
- The airplane systems required for the type of approach are operative
- The required airplane performance criteria are met
- The crew is qualified accordingly.

8.1.5.1 Standard Routing

Standard routings are prepared by Flight Dispatch in accordance with Nesma Airlines and governmental regulations. These are shown on:

- The Operational Flight Plan (OFP)
- Other approved maps, charts or listings distributed by Nesma Airlines e.g. Jeppesen Charts.

Nesma Airlines shall not operate an aircraft at a distance away from land, which is suitable for making an emergency landing, greater than that corresponding to 30 minutes at cruse speed or 100 NM, whichever is the lesser, for all other aircraft, unless the following equipment's are on board:

a) life savings rafts in sufficient numbers to carry all persons on board stowed so as to facilitate their ready use in emergency including means of sustaining life and

b) Equipment for making the pyrotechnical distress signals (ELT).

8.1.5.2 Deviation from Standard Routing or Flight Level

When, for any reason, it becomes necessary to deviate from standard routings or assigned Flight Level the following shall be taken into consideration:

- All flights shall, whenever possible, be conducted within controlled airspace or, if not practicable, within airspace where air traffic advisory service or any similar service is available
- Ground facilities (radio, navigation aids, communication facilities, emergency aerodromes)
- Terrain to be over flown and airplane performance as contained in the AOM
- Special regulations issued by States responsible for the airspace to be traversed
- Meteorological conditions and meteorological services
- Search and rescue facilities
- Reliability of maps and charts
- Fuel load with respect to increased consumption and/or fuel dumping.

8.1.6 Meteorological Information

All flight crews are required to develop and maintain a sound working knowledge of the system used for reporting aerodrome actual and forecast weather conditions and for the codes associated with it.
The information provided in the Operations Manual Part ‘C’, Jeppesen Text Book, section Meteorology highlights the various types of weather reports and their interpretation. The following additional rules shall be applied:

1. For planning purposes an aerodrome shall be considered to be below minimum if;
- The requirements of aerodrome planning selection minima are not met;
- The steady crosswind component exceeds the prescribed limitations.
- For destination alternate, whenever a forecast contains a meteorological condition indicating below planning minimum at ETA ± 1 hr. conditions which is prefixed by TEMPO, the aerodrome may be considered for designation as alternate if:

– The meteorological conditions are above the applicable landing minima;
– The meteorological conditions at destination is at or above destination alternate planning minima; and
– Additional 30 minutes holding fuel is carried.

2. For In-flight purposes the aerodrome shall be considered below minima if a forecast contains meteorological conditions indicating "below minimum" at ETA which are prefixed by BECMG or TEMPO, the aerodrome shall be considered below minimum. Conditions prefixed by PROB - either used alone or in combination with the prefix TEMPO - may be considered whenever judged operationally significant.

8.1.6.1 En-route Meteorological Data

Meteorological charts are issued four times a day at fixed intervals 00:00, 06:00, 12:00 and 18:00 UTC and are normally available at least 9 hours before such times.
Flight crewmembers are required to monitor meteorological conditions during En-route phase of the flight, to include current weather and forecasts for:

I. Destination airport
II. Destination alternate airport(s)
III. En route alternate airport(s), if applicable.

This shall assist flight crewmembers to early set their course of action(s) regarding many points of view; such as safety, operations and commercial … etc.

8.1.6.1.1 Wind Charts

The following wind charts are available to determine the wind en-route and to the alternate(s):

Pressure Surface	Approx. Altitude	Flight Level
700 hPa	9,900 feet	100
500 hPa	18,300 feet	180
400 hPa	24,000 feet	240
300 hPa	30,100 feet	300
200 hPa	38,700 feet	390

8.1.6.1.2 Significant Weather Charts

The charts cover two layers, between FL 100 – FL 250 and FL 250 – FL 450
The charts show significant en-route weather phenomena such as;

- Thunderstorms;
- Tropical cyclones;
- Severe squalls;
- Moderate or severe turbulence;
- Moderate or severe icing;
- Type of clouds – particularly cumulonimbus type clouds;
- Surface position of convergence zones ;
- Surface position of frontal systems;
- Tropopause height;
- Jet streams;
- Information on the location and times of volcanic eruptions.

These charts will be used to determine hazardous weather conditions en-route and to check route planning.

8.1.6.2 Airport Meteorological Data

METARS and TAFS are produced by airport meteorological offices and used by Captains to decide whether actual/forecast conditions would allow a safe landing within the permitted aerodrome operating minima.
METARS, (Aviation routine weather reports), are compiled half-hourly or hourly and contain the following coded information:

- Type of report **(METAR)** or **SPECI** (special report);
- ICAO station identifier;
- Time of observation;
- Wind direction (normally degrees true, occasionally degrees magnetic) and speed (Kts or km/h);
- Gusts;
- Horizontal visibility;
- RVR, if visibility is less than 1.500m;
- Weather phenomena (if any);
- Clouds.

Clouds are reported in six character groups. The first three characters indicate the cloud amount.

FEW = 1 to 2 OKTAS
SCT (Scattered) = 3 to 4 OKTAS
BKN (Broken) = 5 to 7 OKTAS
OVC (Overcast) = 8 OKTAS
SKC = Sky clear
The next three characters indicate base of the cloud layer in hundreds of feet above aerodrome level.
Note: In some countries the cloud amount may still be given in OKTAS instead of FEW, SCT, BKN, and OVC.

- CB (cumulonimbus) or TCB, (towering cumulus) if any;-
- temperature and dew point (T, DT);
- QNH;
- supplemental information, if applicable, such as recent weather, wind shear etc.;
- trend
- BECMG (. becoming.) indicates an expected permanent change;
- TEMPO (. temporarily.) indicates a temporary fluctuation in weather conditions;
- PROB (. probably.) indicates a probable (given in percent) change;
- AT – at a specific time;
- FM – from
- TL – until
- CAVOK (Cloud And Visibility OK) – if visibility is to 10 km or more, if no clouds are reported/expected below 1500m, (5,000 ft), or below the highest minimum sector altitude, whichever is the greater, and no cumuli-nimbus is reported or expected;
- SKC – sky clear.
- NSC – no significant clouds;
- NSW – no significant weather.

TAFS (Terminal Aerodrome Forecast) are usually valid for a period of not less than 9 HR but no more than 24 hrs. Routine aerodrome forecasts valid for less than 12 hours should normally be issued every 3 hours, all others every 6 hours.
The structure is similar to the METAR but lists forecast weather conditions without dew point Temperature and QNH

8.1.6.3 Non-Routine Aeronautical Information

The following "non-routine" meteorological information is provided when applicable;

- as a SPECI, a special report amending a METAR
- amended TAFs
- SIGMET (significant meteorological reports) when significant weather phenomena occur.
- Aerodrome Warnings, such as microburst or wind shear.
- **Note:** Full details of weather reports and meteorological data presentation are available in the Operations Manual Part ‘C’ Jeppesen Text Book, section Meteorology.

Application Of Airport Forecast (TAF & TREND) To Preflight Planning (ICAO Annex 3 Refers

(1) Application of Initial Part of TAF (for airport planning minima see 8.1.2)

a. Applicable time period: From start of TAF validity up to time of applicability of first subsequent “FM...” OR “BECMG” or if none given up to end of validity of TAF.

b. Application of forecast: The prevailing weather conditions forecast in initial part of TAF should be fully applied with the exception of mean wind and gusts (and x wind) which should be applied in accordance with the policy in column “BECMG AT and FM” in table below. This may however be overruled temporarily be a “TEMPO” or “PROB” if applicable according to table below.

(2) Application Of Forecast Following Change Indicators In TAF And Trend

<table>
<tr><td>TAF or TREND for airport planned as</td><td>FM (alone) and BECMG AT</td><td colspan="2">BECMG (alone), BECMG FM, BECMG TL, BECMG FM..TL..</td><td colspan="3">TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM… TL…, PROB 30/40 (alone)</td><td>PROB TEMPO</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Deterioration and Improvement</td><td rowspan="2">Deterioration</td><td rowspan="2">Improvement</td><td colspan="2">Deterioration</td><td>Imp.</td><td>Deter. and Improv.</td></tr>
<tr><td>Transient/Showery conditions in connection with short lived conditions.
e.g.
- thunderstorms,
- showers</td><td>Persistent conditions in connection with
e.g.
- haze,
- mist,
- fog,
- dust/ sandstorm,
- continuous precipitation</td><td rowspan="2">Should be disregarded</td><td rowspan="2">Deterioration may be disregarded, Improvement should be disregarded including mean wind and gusts.</td></tr>
<tr><td>▪ Destination
▪ Take-off alt</td><td colspan="2">Applicable
From the start of change.
Mean wind should be within Aircraft limit.
Gusts may be disregarded</td><td>Applicable
From end of change.
Mean wind should be within Aircraft limit.</td><td>Not applicable
Mean wind and gusts exceeding Aircraft limit may be disregarded</td><td>Applicable
Mean wind should be within Aircraft limit.
Gusts may be disregarded.</td></tr>
</table>

ernate ▪ Destination alternate ▪ Enroute alternate at ▪ At ETA ± 1 HR		Gusts may be disregarded		(for destination alternate refer to 8.1.6)		
ETOPS Enroute Alternate at earliest / latest ETA ± 1HR	Applicable From the **start** of change. Mean wind should be within aircraft limit. Gusts exceeding x wind limits should be fully applied.	Applicable From the **end** of change. Mean wind should be within aircraft limit. Gusts exceeding x wind limits should be fully applied.	Applicable If below applicable landing minima. Mean wind should be within aircraft limit. Gusts exceeding x wind limits should be fully applied.			

8.1.6.4 Commonly Used Abbreviations in Meteorological Messages

ABV	Above	FM	From
AC	Altocumulus	FRONT	Front
ALT	Altitude	FT	Feet
AMD	Amend or amended	FU	Smoke
APCH	Approach	FZ	Freezing
ARFOR	Area forecast	FZDZ	Freezing drizzle
AS	Altostratus	FZFG	Freezing fog
AT	At	FZRA	Freezing rain
ATS	Air traffic services	GAMET	Area forecast for low-level
BC	Patches	GR	Hail
BCFG	Fog patches	GRIB	Processed meteorological data in form of grid point values expressed in binary form
BECMG	Becoming	GS	Small hail and/or snow pellets
BKN	Broken	HPA	Hectopascals
BL	Blowing	HR	Hours
BLW	Below	HURCN	Hurricane
BR	Mist	HVY	Heavy
BTB	Between	HZ Haze	
C	Centre	IC	Ice crystal
C	Degrees Celsius	ICE	Icing
CALM	Calm	INC	In Cloud
CAT	Clear Air Turbulence	INTSF	Intensify/Intensifying
CAVOK	Ceiling And Visibility OK	ISOL	Isolated
CB	Cumulonimbus	KM	Kilometers
CC	Cirrocumulus	KMH	Kilometers per hour
CI	Cirrus	KT	Knots
CLD	Cloud	LAT	Latitude
COR	Correct/correction/corrected	LOC	Local/locally/location/located
CS	Cirrostratus	LONG	Longitude
CTA	Control area	LYR	Layer/layered
CU	Cumulus	M	Meters
D	Downward	MAX	Maximum
DEG	Degrees	MBST	Microburst
DIF	Diffuse	MET	Meteorological/meteorology
DP	Dew point temperature	METAR	Aviation routine weather report
DR	Low drifting	MI…	Shallow
DS	Dust storm	MID	Mid-point
DZ	Drizzle	MIFG	Shallow fog
EMBD	Embedded in a layer	MNM	Minimum
END	Stop end	MOD	Moderate
FBL	Light	MOV	Move/moving/movement
FC	Funnel cloud	MS	Minus
FCST	Forecast	MSL	Mean sea level
FEW	Few	MT	Mountain
FG	Fog	MTW	Mountain waves

FIR	Flight Information Region	MWO	Meteorological watch office
FL	Flight Level	N	North or northern latitude
FLUC	Fluctuating/fluctuation/ fluctuated	N	No distinct tendency (RVR)
NC	No change	SN	Snow
NE	North-east	SQ	Squall
NIL	None or nothing to send	SQL	Squall line
NM	Nautical miles	SS	Sandstorm
NS	Nimbostratus	SST	Supersonic transport
NSC	Nil Significant Cloud	ST	Stratus
NSW	Nil Significant Weather	STNR	Stationary
NW	North-west	SW	South-west
OBS	Observe/observed/observation	T	Temperature
OBSC	Obscure/obscured/obscuring	TC	Tropical cyclone
OCNL	Occasional/occasionally	TCU	Towering cumulus
OPMET	Operational meteorological	TDO	Tornado
OTLK	Outlook (SIGMET)	TEMPO	Temporary/temporarily
OVC	Overcast	TEND	Trend forecast
PE	Ice pellets	TL…	Till
PO	Dust/sand whirls (dust devils)	TO	To
PR	Partial	TOPS	Cloud tops
PRFG	Airport partially covered by fog	TS	Thunderstorms
PROB		URB	Turbulence
PS	Plus	U	Upward
QFE	Atmospheric pressure at aerodrome elevation	UIR	Upper flight information region
QNH	Altimeter setting to obtain elevation when on the ground	UTC	Coordinated Universal Time
RA	Rain	VA	Volcanic ash
RAFC	Regional area forecast centre	VC	Vicinity of the aerodrome
RAG	Ragged	VER	Vertical
RE…	Recent	VIS	Visibility
ROFOR	Route forecast	VOLMET	Meteorological information for aircraft in flight
RTD	Delayed	VRB	Variable
RVR	Runway Visual Range	W	West or western longitude
RWY	Runway	WAFC	World area forecast center
S	South or southern latitude	WAFS	World area forecast system
SA	Sand	WI	Within
SC	Stratocumulus	WINTEM	Forecast upper wind and temperature for aviation
SCT	Scattered	WKN	Weaken/weakening
SEV	Severe	WRNG	Warning
SFC	Surface	WS	Wind shear
SG	Snow grains	WSPD	Wind speed
SH…	Showers	WX	Weather
SIGWX	Significant weather	Z	Coordinated Universal time
SKC	Sky clear		

8.1.6.5 Operational Practices for Interpretation of Meteorological Information

For planning purposes an aerodrome shall be considered to be below minimum if:

- The RVR or meteorological visibility is below the applicable minima (precision approach)
- The ceiling or vertical visibility is below the applicable decision height or minimum descent height (non-precision approach / or circling only) the steady crosswind component exceeds the prescribed limitation for the airplane type. The steady (mean) wind should be used and the gusts may be disregarded.
- The head wind or tail wind component exceeds the prescribed limitation for the airplane type.

Whenever a forecast contains meteorological conditions indicating "below minimum" at ETA which are prefixed by:

BECMG AT

- Deterioration or improvement:

Applicable from the time of start of the change. Mean wind must be within limits. Gusts may be disregarded.

BECMG FM, BECMG TL, BECMG FM...TL

- Deterioration:

Applicable from the time of start of the change. Mean wind must be within required limits. Gusts may be disregarded.

- Improvement:

Applicable from the time of end of the change. Mean wind must be within required limits. Gusts may be disregarded.

TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM...TL, PROB 30/40 (alone)

- Deterioration:
- Transient / showery conditions: Not applicable. Mean wind and gusts exceeding required limits may be disregarded.
- Persistent conditions in connection with e.g. haze, mist, fog, dust/sandstorm, continuous precipitation: Applicable. Mean wind should be within required limits. Gusts may be disregarded.
- Improvement: In any case should be disregarded

PROB TEMPO

Deterioration: May be disregarded

- Improvement: Should be disregarded.

It is Nesma Airlines policy that flight crew shall record and report the following:-

- Routine meteorological observation during: en-route, and climb-out phases of the flight;
- Special and other non-routine observations during any phase of the flight; and
- Volcanic activity

That could be achieved by pilot report or by any other means of communication to ATC or the authority.

8.1.7 Determination of the Quantities of Fuel and Oil Carried

8.1.7.1 Fuel Policy

Adequate fuel quantity (block fuel) to cover the requirements of trip, contingency, alternate, reserve and taxi must be loaded prior to departure based on the following data and operating conditions for each planned flight.

- Routings
- The anticipated aircraft mass
- Notices to airmen (NOTAM)
- Current meteorological reports or a combination of current reports and forecasts;
- Air traffic services procedures, restrictions and anticipated delays
- The effects of deferred maintenance items and/or configuration deviations
- Any other conditions the might cause increased fuel consumption.
- Procedures contained in the Operations Manual
- Realistic, current aircraft fuel consumption data based on data provided by the aircraft manufacturer (A performance factor may be eventually determined for an aircraft to correct the fuel planning data given by the manufacturer).

At any time during a flight the fuel quantity remaining on board must be enough to deal with the planned operation and the possible deviations.

The final authority and responsibility for fuel to be carried and the fuel management in flight rests with the Pilot in Command. For in-flight fuel management refer to 8.3.7.1.3. In-Flight Fuel Management.

8.1.7.2 Standard Fuel Planning

Before departure, the minimum fuel load required for the flight must be calculated using the Operational Flight Plan (OFP). If no OFP is available a manual aircraft fuel planning shall be prepared.

OFP calculations are based on the expected take-off weight for a specific flight on a specific day. Up to date fuel costs and forecast weather are used to determine the amount of fuel required and the flight levels to be flown.

Nesma Airlines policy is to provide a fuel flight plan providing the required amount of fuel necessary to complete the intended flight in normal circumstances. To achieve this, the alternates are chosen from a list of preferential alternates and it is the responsibility of Pilot In Command to select the alternate for the actual diversion.

It is the responsibility of the Pilot in Command to determine if the weather forecast for the destination and alternate airports meet or are better than the planning minima.

When weather or other factors dictate the use of an alternate other than that used for OFP calculations, the Pilot in Command must request another OFP with the alternate used or take the necessary additional fuel to enable a suitable alternate to be reached with normal reserves.

The minimum fuel in tanks at departure should not be normally reduced below that required for the flight by the OFP or manual calculations.

Nevertheless the arbitrary addition of fuel without good reason is wasteful and should be avoided.

The pre-flight calculation of usable fuel required for a flight includes taxi fuel, trip fuel reserve fuel and extra fuel if required by the Pilot in Command. Reserve fuel consists of contingency fuel, alternate fuel, final reserve fuel and additional fuel if required by the type of operation.

Therefore, the fuel planning must be sufficient to cover the following requirements:

8.1.7.2.1 Taxi fuel

Fuel expected to be used prior to take-off, including engine start, taxi and APU consumption.
The minimum amount of taxi fuel planned by the Company is 200 kg.
Fuel calculation is based on a consumption of 11.5 Kg/Min (Refer to PER-FPL-GEN-MFR).
Note: Maximum ramp weight may not be exceeded with taxi fuel on board.

8.1.7.2.2 Trip fuel

The amount of fuel required to enable the aircraft to fly from take-off or the point of in-flight re-planning (ref 8.1.7.1.3) until landing at the destination airport including climb to cruise altitude, departure procedure, cruise including step climbs if any, descent, an instrument approach and landing procedure at the destination the runway taking into account the operating conditions specified in 8.1.7.1.1. Standard Fuel Planning.

This amount shall include:

1) Take-off and Climb fuel:

Fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing

2) Cruise Fuel:

Fuel from TOC to TOD, including any step climb/descent.

3) Descent Fuel :

Fuel from TOD to the point where the approach is initiated, taking into account the expected arrival procedure.

4) Approach and Landing Fuel :

Fuel for approach and landing at the destination aerodrome.
Fuel calculation is based on a consumption of 20 Kg/Min (Refer to PER-FPL-GEN-MFR).

8.1.7.2.3 Contingency fuel

Fuel to cover deviations from the planned operating conditions such as unfavorable variations in cruise altitude or track, deviations from the forecast wind values or any other unforeseen adverse circumstances.
Contingency fuel shall be the higher of a) or b):-

a) **5%** of the planned trip fuel.
b) Amount required flying at holding speed at 1500 ft (450 m) above the destination aerodrome in ISA conditions for 5 minutes.

Note: - in exceptional cases e.g. unforeseeable taxi delay, contingency fuel maybe used on ground based on the operational judgment of the Pilot in command.

8.1.7.2.4 Alternate fuel

Fuel to reach the alternate aerodrome, covering and taking into account the following:

- A missed approach at the destination airport.
- Climb to the expected cruising altitude and speed
- Fly the expected routing to the destination alternate airport
- Descend to (alternate airport) the point where the expected approach is initiated
- Conduct the approach and landing at the destination alternated airport
- When two destination alternates are required, alternate fuel should be sufficient to proceed to the alternate, which requires the greater amount of alternate fuel.

8.1.7.2.5 Final Reserve Fuel

Fuel to fly for **30 minutes** at holding speed at 1500 ft. (450 m) above destination alternate airport elevation in standard conditions, calculated with estimated weight on arrival at the alternate or the destination when no alternate is required

- With an Alternate:

30 minutes of holding fuel at the estimated landing weight at alternate, at 1500 feet above alternate aerodrome elevation and in ISA conditions

- With No Destination Alternate:

45 minutes of holding fuel at the estimated landing weight at destination, at 1500 feet above aerodrome elevation and in ISA conditions (i.e. 30 minutes Final Reserve Fuel + 15 minutes Additional Fuel).

8.1.7.2.6 Additional fuel

Fuel, which should permit:

- Holding for 15 minutes at 1500 ft. (450 m) above aerodrome elevation in ISA conditions, when the flight is operated **without a destination alternate** and
- Following the possible engine failure or loss of pressurization at the most critical point along the route the airplane to:

i) descent as necessary and proceed to an adequate aerodrome; and
ii) hold there for **15 minutes** at 1500 ft. (450 m) above aerodrome elevation in ISA conditions; and
iii) make an approach and landing

Additional fuel for engine failure or loss of pressurization is only required if the fuel calculated above (from trip fuel up to final reserve fuel) is not sufficient for such an event.

8.1.7.2.7 Extra fuel

At the discretion of the Pilot in Command.
The Pilot in Command may decide for example to add fuel to the minimum required fuel quantity defined above if he expects significant deviations from present flight planning.
However it should remember that carrying unnecessary extra fuel increases the fuel consumption for that sector and therefore reduces the economy of the operation (lower flex temperature, more tire and brake wear, more time in climb phase, lower optimum flight level etc.).
Note: - When asking for extra fuel more than 500 Kgs the Pilot in command must be able to support his fuel decision making with definable reasoning in the voyage report.

8.1.7.2.8 Fuel Transportation (Tankering)

When a difference in fuel price exists between different stations, fuel transportation could be considered.
The flight planning system has been set up with up to date fuel costs to give tinkering information to achieve savings.
It is function of flight dispatch to ensure that the effective savings achieved are correct and prepare fuel plan suitably.
Tinkering is not recommended when:

1. It will result in additional delays (i.e. an On-Time Departure takes priority over Tinkering), or
2. The runway for take-off is wet or contaminated and runway length is marginal, or
3. Landing runway is expected to be contaminated, or

4. The Pilot in Command believes that due to flight safety the landing weight needs to be restricted
   - (E.g. adverse weather such as tailwind, wet runways or aircraft technical status such as brake reverse inoperative, spoiler inoperative … etc.).

Tankering fuel must not be done at the expense of an on-time departure.
If Tankering, and to avoid an overweight landing, plan to land at 500 kgs below maximum landing weight in case of fuel savings En-route by subtracting 500 kgs from the maximum Tankering fuel determined. In normal operations, landing above maximum landing weight is not authorized, and any excess fuel must be consumed.
Note: The Pilot in Command can modify the tankered amount based on prevailing conditions, being aware of the impact on payload and possible LMC.

8.1.7.3 Oil

Adequate oil quantity to cover the requirements of trip, contingency, alternate, reserve and taxi must be loaded prior to departure.
The minimum oil quantity requested for any flight is equal to the minimum quantity specifies for a particular engine, plus the estimated oil consumption.
The estimated oil consumption should cover the flight time the aircraft can be operated with the minimum quantity of fuel requested by the fuel planning plus 15 minutes.
The minimum and maximum oil quantities and the maximum average estimated oil consumption (if no data from maintenance available) are indicated in FCOM "Standard Operating Procedure - Preliminary Cockpit preparation" for the related aircraft/engine concerned.

8.1.7.4 Fuel and Oil Records

Fuel records will be retained in the OFP, the aircraft technical log and journey report (voyage report).
Oil loaded and consumed data will be entered into the aircraft technical log (refer to 8.1.11. Operator's Aircraft Technical Log).

8.1.7.5 Isolated Airport Procedure

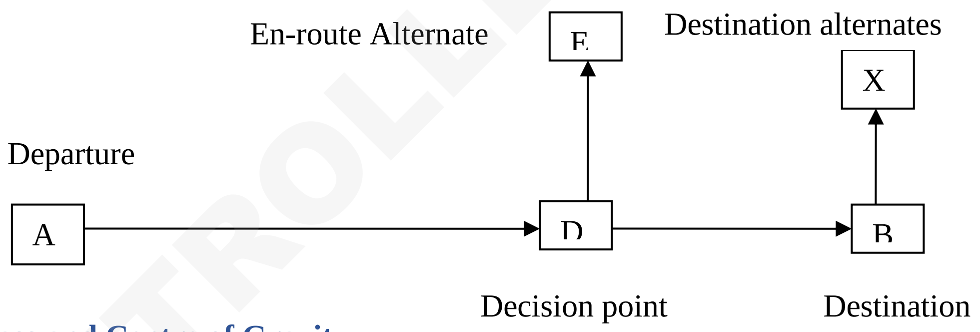
It is Nesma Airlines policy not to operate to isolated aerodromes.

8.1.7.6 Decision Point Procedure (Re-Clearance)

When planning to a destination aerodrome via a Decision Point along the route, the amount of fuel required should be greater of condition a) or b) below:

a) The sum of: – Taxi fuel; – Trip fuel to the destination aerodrome, via the decision point; – Contingency fuel of not less than 5% of the estimated fuel used from the decision point to the destination aerodrome; – Alternate fuel, if a destination alternate is required; – Final Reserve fuel; – Additional fuel of 15 minutes if no destination alternate is plan, and – Extra fuel, at the discretion of the Pilot in Command.	- or -	**b)** The sum of: – Taxi fuel; – Trip fuel from the departure to a suitable en-route alternate via the decision point; – Contingency fuel equal to not less than 3% of the estimate fuel consumption (trip fuel) from the departure airport to the en-route alternate, via the decision point; – Final Reserve fuel; – Additional fuel, if required; and – Extra fuel, at the discretion of the Pilot in Command.

The decision point (preclearance) fuel planning is the greater of F1 or F2:
F1 = Taxi + Trip AB + 5% DB + BX + Hold + Additional fuel + Extra fuel
F2 = Taxi + Trip AE + 3% AE + Hold + Additional fuel + Extra fuel
The contingency fuel from departure airport (A) to the decision point (D) may be omitted on segment AD, provided decision to B or diversion to E is taken before or when reaching D.



8.1.8 Mass and Centre of Gravity

In accordance with ICAO Annex 5 -Units of Measurement to be Used in Air and Ground Operations- and the International System of Units (SI), the actual and limiting masses of airplanes, the payload and its constituent elements, the fuel load etc., are expressed in units of mass (kg for Nesma Airlines fleet). However, in most approved flight manuals and other operational documentation, these quantities are published as weights in accordance with the common language. In the SI system, a weight is a force rather than a mass. Since the use of term "weight" does not cause any problem in the day to day handling of airplanes, its continued use in operational applications and publications is acceptable.
All details regarding mass and balance and loading for a particular aircraft type are found in the Weight and Balance Manual (WBM).

8.1.8.1 Definitions

8.1.8.1.1 Weights

Minimum Weight: the minimum weight at which the aircraft can operate.
Manufacturer's Empty Weight (MEW): The weight of the structure, power plant, furnishings, systems and other items of equipment that are considered an integral part of the aircraft. It is essentially a "dry" weight, including only those fluids contained in closed systems (e.g. hydraulic fluid).
Operational Empty Weight (OEW): The manufacturer's weight empty plus the operator's items, i.e. the flight and cabin crew and their baggage, unusable fuel, engine oil, emergency equipment, toilet chemicals and fluids, galley structure, catering equipment, seats, documents, etc…
Dry Operating Weight (DOW): The total weight of an aircraft ready for a specific type of operation excluding all usable fuel and traffic load. Operational Empty Weight plus items specific to the type of flight, i.e. catering, newspapers, pantry equipment, extra crew etc…
Zero Fuel Weight (ZFW): The weight obtained by addition of the total traffic load and the dry operating weight.
Landing Weight (LW): The weight at landing at the destination airport. It is equal to the Zero Fuel Weight plus the fuel reserves.
Takeoff Weight (TOW): The weight at takeoff at the departure airport. It is equal to the landing weight at destination plus the trip fuel (fuel needed for the trip), or to the zero fuel weight plus the takeoff fuel (fuel needed at the brake release point including reserves).
Take-off fuel: The weight of the fuel on board at take-off.
Trip fuel: The weight of the fuel necessary to cover the normal leg without reserves.
Traffic load: The total weight of the passengers, baggage and cargo, including non-revenue loads.
TOW = DOW + Traffic load + Reserve fuel* + trip fuel
LW = DOW + Traffic load + Reserve fuel*
ZFW = DOW + Traffic load
*Reserve fuel = Contingency + alternate + final reserve + additional fuel
Refer to 8.1.7.1.1. Standard Fuel Planning
Maximum weights
There are two different categories of "Maximum Weights", which shall be never exceeded:

- Maximum Gross Weights are the maximum weight for zero fuel, maximum weight for take-off and maximum weight for landing. These weights are fixed weights established by the manufacturer based on structural limitations.
- Performance-limited weights: like the operational-RTOW, are the maximum weight for take-off and the maximum weight for landing for a particular flight sector. This weight is always limited by aircraft structural weights established in the AFM and represents the limitation of the aircraft performance at given conditions. Refer to Chapter 14 Performance Engineering for elaboration on performance limitation.

8.1.8.1.2 Passengers and Baggage

Nesma Airlines policy regarding passenger and baggage is established following the IATA Reference Manual, 5th edition of July 2014. Every person onboard shall be assigned to at least one definition in the official documents and every item inside the cargo compartments shall also be classified following these definitions.

- **Baggage:** The personal property or other articles of a passenger or crewmember that is transported on an aircraft. It can be either checked or carry-on. Interchangeable with **Luggage**.
- **Cabin Baggage:** Baggage that is or is intended to be brought onto an aircraft in the custody of a passenger or crewmember for stowage in the cabin. Interchangeable with **Unchecked Baggage**, **Carry-on Baggage** and **Hand Baggage**.
- **Checked Baggage:** Passenger baggage that has been taken into custody by the Operator, and for which a baggage claim check has been issued to the passenger.
- **Cargo:** Any revenue or non-revenue shipment of goods or property, that is transported on an aircraft and is not consumed or used during flight. It is classified to either revenue or non-revenue cargo.
- **COMAT (Company Materials):** Any non-revenue cargo that is owned by or is for use by the operator, and is transported on the operator's aircraft.
- **Crewmember:** A member of either the flight crew or the cabin crew who has duties onboard during flight.
- **Passenger:** A person that is transported onboard an aircraft by an operator, mostly for commercial purposes, who is not an operating crewmember or a supernumerary.
- **Deadhead Crew (DHC):** a non-operating crewmember that is being transported in a passenger seat, and not a part of the working crew, typically for positioning purposes.
- **Supernumerary:** A person who is not a cabin crewmember, but is on board an aircraft during commercial or non-commercial operations, and is not classified as a passenger by the operator or the Authority. Such person is typically any of the following:
  - Assigned to the flight by the operator as necessary for the safety of operations and has certain knowledge and abilities gained through selection and mandatory training (e.g. ground engineer, loadmaster, security personnel, cargo handler, security guard)
  - An inspector, auditor or observer authorized by the operator and the State to be on board the aircraft in the performance of his or her duties (e.g. CAA inspector, IOSA auditor).
  - Assigned to a passenger flight by the operator to conduct certain customer service activities (e.g. serving beverages, conducting customer relations, selling tickets) in the cabin and not designated to perform any safety duties.
  - Any other individual that has a relationship with the operator, is not classified as a passenger by the Authority and authorized by the operator and the State to be on board the aircraft

- Assigned to the flight by the operator as necessary for the safety of operations and has certain knowledge and abilities gained through selection and mandatory training (e.g. ground engineer, loadmaster, security personnel, cargo handler, security guard).

8.1.8.1.3 Technical Terms

- **Centre of Gravity (CG):** the point where the aircraft weight is applied (center of mass). It has to be maintained within certain limits because it affects aircraft maneuverability, stability and structural weight limits as per WBM.
- **Datum:** the point on the longitudinal axis (or extension thereof) from which the centers of gravities of all masses are referenced.
- **Reference Chord:** the chord at which the location of aircraft CG is expressed as a percentage of. Values of reference chords are found in WBM.

- **H-arm:** the length between the datum and the center of gravity of each mass component onboard.
- **Certified Envelope:** the manufacturer certified CG limits for all flight phases.
- **Operational Envelope:** a curtailed certified envelope to account for uncertainties in balance calculations
- **Load and Trim Sheet (LTS):** a legal document which states the weight data and the balance condition of the loaded aircraft for each individual flight. LTS shall clarify the operational envelope. LTS could be in manual format or computerized format.
  - **Dry Operating Index (DOI):** a dimensionless unit used to facilitate CG calculations and representation on diagrams. Its formula can be obtained from WBM.

8.1.8.1.4 Passenger Classification

- Adults, male and female, are defined as persons of an age of 12 years and above
- Children are defined as persons of an age of 2 years and above but who are less than 12 years of age
- Infants are defined as persons who are less than 2 years of age

8.1.8.2 Methods, Procedures and Responsibilities for Preparation and Acceptance of Mass and Centre of Gravity Calculations

8.1.8.2.1 Process for Establishment of DOW/DOI

DOW/DOI are established through standard aircraft weighing and calculations in accordance with WBM and manufacturer instructions.
As per the WBM, the OEW serves as the basis of aircraft weight and CG calculations. It is the responsibility of Nesma Airlines to account for:

- Items not included in the OEW which are installed after aircraft weighing
- Replacements of onboard items after proper weighing and arm determination.

And in all cases, Nesma Airlines is permitted to re-establish the weight and the CG from the OEW by calculation if Nesma Airlines is able to provide the necessary justification to prove the validity of the selected method of calculation in accordance with AFM and WBM.
Weighing of an aircraft is carried out by the technical department in coordination with the operations engineering department and copies of official weighing report should be sent to the operations engineering department and archived at the operations library.
Establishment of DOW/DOI is carried out at the operations engineering department in accordance with the aforementioned manuals through the addition of operational items.
In accordance with ECAR part 91, attachment 1, Nesma Airlines shall not re-establish its DOW calculations and as long as the change in DOW does not exceed ± 0.5% of the maximum landing weight or the cumulative change in CG position does not exceeds 0.5% of the mean aerodynamic chord.

8.1.8.2.2 Production of LTS and Operational Envelope

LTS and operational envelope represent the stability characteristics of the airplane, and they should be furnished exclusively from the manufacturer, an organization approved by the manufacturer or generated in-house using tools provided by the manufacturer by trained personnel.
In case of EFB operations, LTS should be presented in manual form and electronically available for EFB load sheet setup.
In case LTS is produced in-house, it shall be generated by trained personnel using the manufacturer approved application. Development of LTS passes through these steps:

- Receiving of cabin configuration from the technical department
- Setting up of operational margin based on the calculation of operational errors
- Setting up of cabin configuration (including PAX seats, galleys, lavatories, ... etc.)
- Production of manual LTS in printable forma
- Production of electronic LTS for EFB setup if applicable.

Nesma Airlines used the Airbus LTS software for the generation of its load and trim sheet both the paper and EFB formats.

8.1.8.2.3 Establishment of Balance Calculations:

LTS is issued in triplicate and distributed as follows:

- Original for Pilot-in-Command
- Copy into the station trip file and
- Copy for Cabin Senior.

The Pilot-in-Command shall ensure that before each flight a “Load and Trim Sheet” is prepared on the correct form and complies with the aircraft weights and CG certified limitations as referenced to in 13.1 Operations Forms. Aircraft mass and Centre of Gravity are calculated using a "Load and Trim sheet form" or a "computerized Load and Trim sheet".

For EFB operations, data retrieval and calculations are done in accordance with 8.12.11.2 EFB Training Program – Fly Smart.

The correct loading of the aircraft is the legal responsibility of the Pilot-in-Command.

In practice, station officers complete the LTS preparation. The person preparing the LTS confirms the correct distribution of the load with his signature on the form.

The Pilot-in-Command must satisfy himself that the load is distributed in a correct and safe manner and that it is properly stowed and secured.

The Pilot-in-Command considers the following assumptions:

- The weighing report showing the weight and the basic index of the empty aircraft has been correctly compiled.
- The freight has been correctly weighed and loaded in accordance with the Load and Trim sheet.

The Pilot-in-Command is personally responsible for:

- Checking that sufficient fuel and oil are on board and correctly loaded and distributed.
- Checking the Load and Trim sheet Calculation.
- Accepting and signing the Load and Trim

If deemed necessary, the Pilot-in-Command has full authority to modify the aircraft loading such as number of passengers, usable cabin seats and cargo compartments loading and distribution.

The method for preparation of the Load and Trim sheet is given in FCOM – LOADING chapter.

The CG limits given in the Load and Trim sheet include tolerances to cope with the combination of the following independent errors:

- Error on initial conditions (Dry operating weight and index)
- Error on cargo loading (weight and distribution)
- Error on passenger boarding (weight and distribution)
- Error on fuel (quantity and distribution)
- Error due to graphical method and the following movements:
- • landing gear, flaps and slats movements
- • movements in the cabin

Fuel weight determination
The weight of fuel on board the aircraft is directly given by the Fuel Quantity Indication (FQI) of the aircraft.
The Pilot-in-Command should assess this quantity by comparing this figure with the quantity on board before refueling plus the quantity delivered by the tanker. A small discrepancy may be evidenced due to the fuel quantity consumed by the APU during this time period and the respective FQI and tanker accuracies.
In such a case, it is not advisable to perform additional fuel measurement through magnetic fuel level indicators (dipsticks) to cross check FQI indication, as the accuracy of dipsticks is less than FQI accuracy.
Dipsticks have to be used only in case of FQI failure (dispatch under MEL)

8.1.8.3 Policy for Determining Crew Masses

The standard masses of crewmembers and crew baggage included in the OEW are standards masses (85 kg for flight crew, 75 kg for cabin crew - including hand baggage).
Actual masses including any crew additional baggage may be used.
The OEW will be corrected for any additional baggage and the aircraft CG position will take into account their position.

8.1.8.4 Method for Determining Passengers, Baggage and Cargo Mass

Actual or standard masses may be used for passengers and baggage when determining the aircraft traffic load. Actual masses shall be used when taking freight into account.

- **Passengers plus hand baggage**: standard masses used
- **DHC**: standard passenger mass including baggage
- **Supernumerary**: standard passenger mass including baggage.
- **Baggage**: weighed at check-in. If not, possible standard masses are used
- **Freight**: must be always weighed.

8.1.8.5 Passenger and Baggage

8.1.8.5.1 Standard Passenger and Baggage Masses

To avoid having to weigh each passenger and baggage, a standard weight is used for Load and Trim sheet calculation.
For **charter flights**, the standard weight of passengers including hand baggage is the following:
Table 1: Mass values for passengers including hand baggage
For charter flights

Passenger seats	30 and more
Adult	76 kg
Children	35 kg
Infant	0 kg

For **scheduled flights**, the standard weight of passengers including hand baggage is the following:
Table 2: Mass values for passengers including hand baggage
For scheduled flights

Passenger seats	30 and more
Adult	84 kg
Children	35 kg
Infant	0 kg

Corrections have to be made if the actual weight of passengers with their hand baggage is known or if the average weight can be estimated as obviously different from the standard weight given above.

When the passenger checked baggage (loaded in the cargo compartment) is not weighed, the following standard weight per piece of checked baggage is used:

Table 3: Mass values for each piece of check baggage

Type of flight	Baggage standard mass
Domestic flights	15 kg
All others	15 kg

Note:

(1) Domestic flight means a flight with origin and destination within the borders of one State;

The cargo must be weighed and positioned to respect both individual Unit Load device position weight limitation and total cargo compartment weight limitation as given in FCOM - LOADING chapter and in the Weight and Balance Manual.

8.1.8.6 General Instruction for Load and Trim Sheet Verification

The Pilot-in-Command shall recalculate the LTS starting from the established DOW and considering possible last-minute changes in paying particular attention to:

- Flight number, destination, aircraft registration
- Date and time of the flight
- Correct DOW and index
- Number and the distribution of passengers
- Cargo loading which should be in accordance with the cargo manifest
- Fuel quantity and distribution.

The fuel index given by the manual LTS takes into account the fuel specific gravity and assumes that the fuel is loaded normally (as mentioned in the AFM) and does not apply in case of unusual loading. For electronic LTS on the EFB, different fuel densities could be accounted for if the interface of the application allows.

For aircraft fitted with a trim tank, particular care should be taken to the actual fuel quantity in the trim tank as any deviation of fuel quantity in the trim tank has a tremendous effect on the CG.

Check fuel imbalance is within prescribed limits.

- the MTOW, MZFW and associated CG
- The expected landing weight below MLW.

In case a computerized Load and Trim sheet is produced, above data should be checked, computation is assumed to be correct.

The Pilot-in-Command shall sign the Load and Trim sheet after having checked it.

8.1.8.7 Last Minute Change Procedures

Last Minute Change means any change concerning traffic load: passengers, baggage, cargo, fuel (usable or not) occurring after the issuance of the Load and Trim sheet.

A Last-Minute Change is permitted only if the changes of the load are within the following prescribed limits:

Aircraft Type	LMC Limit
A320 Family	500 kg

In case of Last-Minute Change, it is mandatory to check that:

- none of the maximum operational limiting weight are exceeded (ZFW, TOW, LW)
- no loading limitation is exceeded

- ZFW CG and TOW CG remain within allowed limits

In case of Last-Minute Change loading, the Pilot-in-Command will correct the previous Load and Trim sheet. A copy of the corrected Load and Trim sheet must be left to the flight operations.

Whenever any Last-Minute Change is necessary after the load sheet has been handed over to Pilot-in-Command and the aircraft doors are closed, the Ramp Agent informs the Pilot in Command about these changes via head set. The Pilot-in-Command then records the LMC in his load sheet copy. The person responsible for LMC handling enters the LMC into the original of the load sheet.

Take-off fuel adjustment:

In case of Take-off fuel change or a difference between the requested and the actual block fuel the following procedure apply:

1) Take-off fuel decrease are only possible up to:

- 500 kg for A320 family

If the Actual Take-off fuel is lower than requested, the person responsible for the load sheet enters the take-off fuel adjustment in the LMC Box.

2) Take-off fuel increase are only possible up to:

- 500 kg for A320 family

The person responsible for the load sheet corrects the Actual take-off fuel figure and re-calculates the Actual Take-off Weight and Actual Landing Weight.

The additional Take-off Fuel shall not be shown in the LMC box of the load sheet.

For EFB operations, Nesma Airlines advises its pilots to recalculate the DOW and DOI.

8.1.8.8 Specific Gravity of Fuel and Oil

The fuel and oil supplier generally provide the specific gravity of fuel and oil to be used. If not known, the following values are used:

Fuel:

JET A/A1:	0.785 kg/l
JET B, JP4:	0.76 kg/l
AVGAS:	0.71 kg/l
Oil:	0.88 kg/l

8.1.8.9 Load and Trim Sheet Description

8.1.8.9.1 EDP/DCS Load and Trim Sheet

Most Load and Trim Sheets used by Nesma Airlines are produced by contracted Handling Agents by inputting last revision of AHM560 and sending test of load and trim sheet for verification and final approval of the DCS (Departure Control System) to generate the Load and Trim Sheet for the specific aircraft. Where DCS systems are used, the data input and electronic generation of the load and trim sheet may be carried out at a regional center and merely printed off - together with corresponding Loading Instructions - by the aircraft operator or the contracted handling agent employees.

TABLE OF FORMAT

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
Part 1. Heading					

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
1	From	Three-letter IATA airport code of airport of movement	e.g. JFK LHR	M	
2	To	Three-letter IATA airport code of station of first intended landing		M	
3	Flight	Flight number/identifier	Format: two- or three-character airline code followed by up to eight characters. Maximum 11 characters for flight identifier. A two-character date may be included in these 11 characters preceded by an oblique	M	
			e.g. LH402/06 SR504		
4	A/C reg.	Aircraft registration	Format: 2–10 characters. No hyphen to be shown and/or transmitted	M	
			e.g. 4XAXA GAWNA N12345	M	
5	Version	Version/Configuration code of aircraft used by carrier	Format: 1–12 characters		
			e.g. 10A/Q 20/124 8065	M	
6	Crew	Number of crew, excluding crew travelling as passengers For passengers occupying crew seats see AHM 533	Format: 3–7 characters	M	Crew figures must be separated by an oblique
		Option 1: Cockpit crew followed by cabin crew	e.g. 2/5 or 3/15	C	

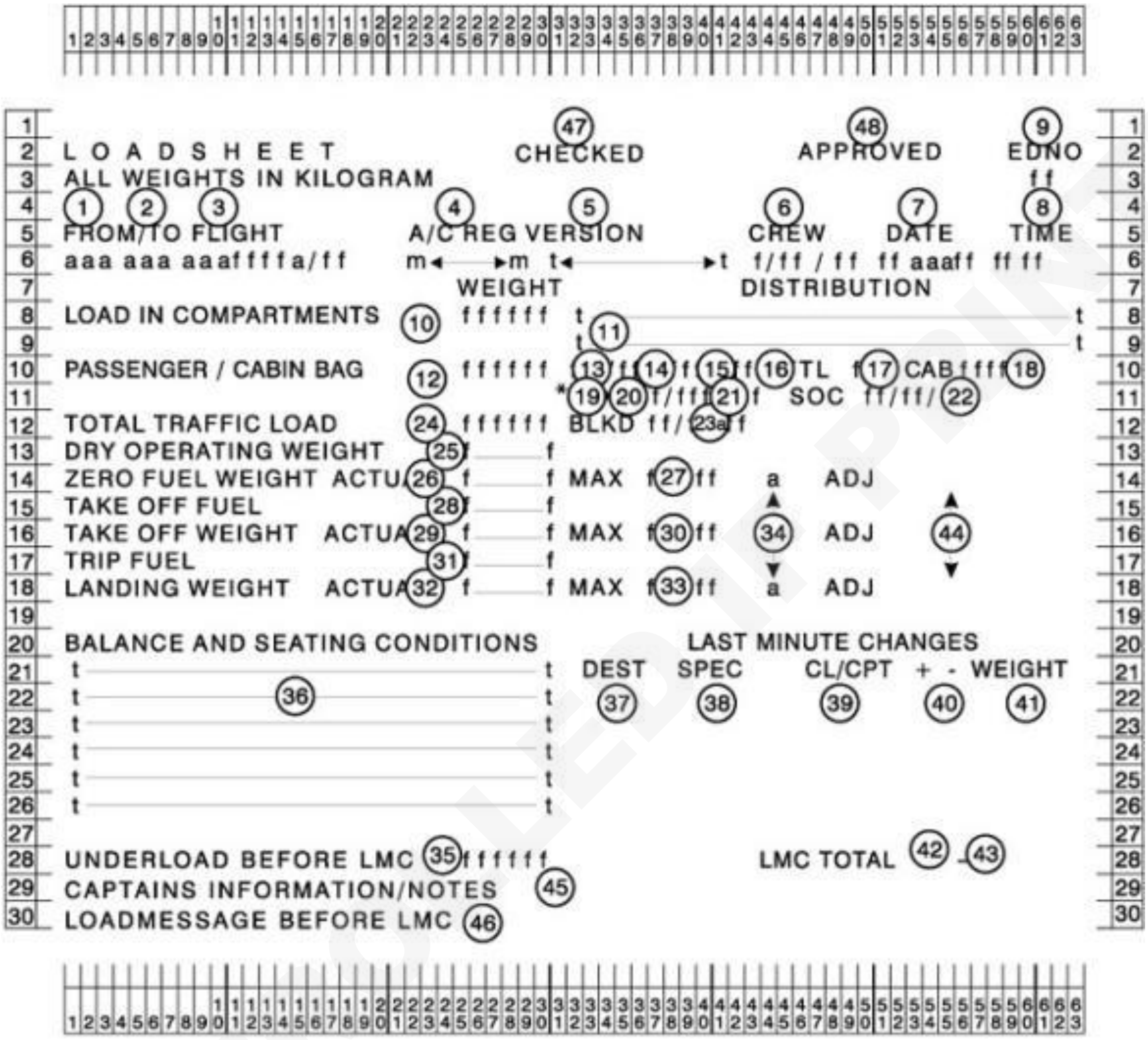
Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
		Option 2: Cockpit crew/cabin crew male/cabin crew female	e.g. 2/2/5 or 3/5/10	C	
7	Date	Self-explanatory	e.g. 05 JUN 89	M	Local date
8	Time	Four-digit value of local time this edition was produced	e.g. 0920 1215	O	
9	Ed. No.	Edition number	Maximum two figures	O	
			e.g. 01 12		
Part 2. Load and Distribution					
10	Total weight	Total of weight of dead load in compartments		M	
11	Load in compartments	Total weight of dead load per compartment and/or position of unitized load		C	
12	Total weight	Total passenger weight calculated according to company procedures based on the figures of items 13, 14, 15, 16 and 18		M	
13	M	Total number of males		M	
14	F/Adults	Total number of female or adult passengers		C	
15	CHD	Total number of children		M	
16	INF	Total number of infants		M	
17	Total No.	Total number of passengers on board. Sum of items 13, 14, 15 and 16		O	
18	Cabin Bag	Weight of cabin baggage not included in passenger weight		O	
19	PAX	Passenger Identifier		O	
20		Actual class of service designator(s)		O	
21		Total number of seats, per class, occupied by		M	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
		outgoing passengers including PAD. Maximum of three classes.			
22	SOC	Seats occupied by cargo, baggage and/or mail per class		C	
23	Blocked	Fitted seats not available for passengers or dead load		O	
23a	BLKD				
24	Total Traffic Load	The total weight of passengers, baggage, cargo and mail. Operational items not included in DOW, e.g. pallets, nets, must be added to the cargo weight figures		M	
Part 3. Gross Weight Calculation					
25	Dry Operating Weight	The “Basic Weight” plus “Operational Items”, e.g. crew, crew baggage, flight equipment and pantry, company specification and is equal to “Operation Empty Weight”		M	
26	Actual Zero Fuel Weight	Sum of Ref. Nos. 24 and 25		M	
27	Maximum Zero Fuel Weight	Equal to “Maximum Design Zero Fuel Weight”		M	
28	Take-off Fuel	The amount of fuel on board less the fuel consumed before take-off		M	
29	Actual Take-off Weight	Sum of Ref. Nos. 26 and 28		M	
30	Maximum Take-off Weight	The “Maximum Design Take-off Weight”, or “Operational Take-off Weight”, whichever is lower		M	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
31	Trip Fuel	The amount of fuel planned to be consumed from take-off to the station of first intended landing		M	
32	Actual Landing Weight	Ref. No. 29 minus Ref. No.31		M	
33	Maximum Landing Weight	The “Maximum Design Landing Weight” or the “Operational Landing Weight”, whichever is the lower		M	
34		Indicator showing which of the maximum weights is limiting the allowed traffic load	L	M	
35	Under load before LMC	Difference between maximum and actual gross weight indicated by L		M	
Note: For aircraft operating with injection water or water methanol, the weight of this is to be included in the take-off and trip fuel entries. For captain's information a specification, e.g. “Injection Water 1,500 kg” to be shown under “Captain's Information Part” (Ref. No. 45).					
Part 4. Balance and Seating Conditions					
36	Balance and Seating Conditions	**According to carriers requirements. Use standard abbreviations for balance according to** AHM 516 **and** AHM 560		C	
37	Dest.	Destination of LMC		C	
38	Specification	Kind of LMC		C	
39	CL/CPT	Class/Compartment and/or position of unitized load		C	
40	+/-	Identification of on or off-load		C	
41	Weight	Weight of LMC stated in Ref. No. 38		C	
42	LMC total +/-	Identification of LMC sum total		C	
43	(LMC total weight)	Total weight of all LMC		C	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
44	ADJ	Ref. No. 43 affects Ref. No. 44. Entry to be made according to company regulations		C	
Note: Completion to be in accordance with AHM 551**.**					
Part 5. Captain's Information/Notes					
45	Captain's Information/Notes	Any entries or remarks the company requires to be printed in this area		O	
Part 6. Load message Before LMC					
46	Load message	If Load message is shown it must be in standardized format		O	**Refer to** AHM 583 **for conditions of dispatch**
Part 7. Signatures					
47	Checked	Load sheet agent's signature or electronic identification		M	
48	Approved	Signature of authorized person, if required		C	

Description with reference numbers.



8.1.8.9.2 Manual Load sheets

You can find on the blank load sheet printed the aircraft MTOW, MZFW, MLW and index correction table for crew, and index correction for fuel, obtained from aircraft manufacture, and CG limits must be within the trim envelop.

The load sheet shall be prepared according to the following instructions:

The reference No. refer to those as stated in the specimen Load sheets;

M/C/O refers to this item as mandatory/conditional/optional;

The description is divided in eight parts.

Table of Format

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
Part 1. Addresses and Heading					
1	Priority	Priority indicator	e.g. QU or QX	C	As required by carrier

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
2	Address(ES)	Teletype address(ES) for load message as required	e.g. FRAKLLH	C	
3	Originator	Teletype address of originator	e.g. LISKLTP	M	Always to be shown
4	Recharge	Recharge facility	e.g. AF/	C	
5	Date/time	Date and time group	e.g. 120111	M	
6	Operators initials	Self-explanatory		O	
7	LDM	Standard message indicator	Format: LDM	M	Pre-printed
8	Flight	Flight number/identifier	Format: Two- or three-character airline code followed by up to eight characters. Maximum 11 characters for flight identifier. A two-character date may be included in the 11 characters preceded by an oblique (/). e.g. LH402/06 SR504	M	
9	A/C rec.	Aircraft registration	Format: 2–10 characters. No hyphen to be shown and/or transmitted. e.g. 4XAXA GAWNA N12345	M	
10	Version	Version/configuration code of aircraft used by carrier	Format: 1–12 characters e.g. 10A/Q 20/124 8065	M	
11	Crew	Number of crew excluding crew travelling as passengers	Format: 3–7 characters	M	Crew figures must be separated by an oblique
		For passengers occupying crew seats see AHM 533			

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
		Option 1: Cockpit crew followed by cabin crew	e.g. 2/5 or 3/15	C	
		Option 2: Cockpit crew/cabin crew male/cabin crew female	e.g. 2/2/5 or 3/5/10	C	
12	Date	Self-explanatory	e.g. 05 JUN 89	M	Local date
Note: Address and communication references (Ref. Nos. 1–7) must be in accordance with ATA/IATA Interline Communications Manual or AFTN if required.					
Part 2. Operating Weight Calculation					
13	Basic Weight	The "Basic Empty Weight" or "Fleet Empty Weight" and includes all fixed equipment, system fluids, unusable fuel and configuration equipment including galley structure		C	No entries to be made if carrier is publishing dry operating weights
14	Crew	Weight of crewmembers shown under Ref. No. 11		C	
15	Pantry	Weight of pantry and additional manifested catering material transported in the galley		C	No entries to be made if carrier is publishing dry operating weights
16		Spare line for adjustments to the basic weight		C	
17	Dry Operating	The "Basic Weight" plus "Operational Items", e.g. crew, crew baggage, flight equipment and pantry, as per company specification and is equal to "Operational Pantry Weight"		M	**Sum of items 13, 14, 15 and 16 (see also** AHM 540**)**
18	Take-off Fuel	The amount of fuel on board less the fuel consumed before take-off		M	
19	Operating Weight	Sum of Ref. Nos. 17 and 18		M	
Part 3. Allowed Traffic Load Calculation — Optional — (if used complete as below)					

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
20	Maximum weight for Zero Fuel	Equal to "Maximum Design Zero Fuel Weight"		M	
21	Maximum weight for Take-off	The "Maximum Design Take-off Weight" or "Operational Take-off Weight", whichever is lower		M	
22	Maximum weight for Landing	The "Maximum Design Landing Weight" or the "Operational Landing Weight", whichever is the lower		M	
23	Trip Fuel	The amount of fuel planned to be consumed from take-off to the station of first intended landing		M	
24	Allowed Weight for Take-off	Self-explanatory, use lowest of items 24a, b or c		M	
25	Allowed Traffic Load	Difference between 19 and the lowest of 24a, b or c		M	
Note: For aircraft operating with injection water or water methanol, the weight of this is to be included in the take-off and trip fuel entries. For Captain's information the note box shall include specification, e.g. "Injection Water 1,500 kg". On EDP-Load sheet same information to be shown under "Captain's Information Part".					
Part 4. Load Information per Destination and Totals					
26	Dest.	Airport of destination	e.g. JFK	M	Ref. Nos. 26–44 referring to an individual destination
27	No. of Passengers	Total number of transit passenger(s), including PAD(s)	Format according Ref. No. 29	C	
28	No. of Passengers	Total number of joining passenger(s), including PAD(s)	Format according Ref. No. 29	C	
29	No. of Passengers	Total number of outgoing passenger(s). Sum of Ref. Nos. 27 and 28 and LMC		C	Load message

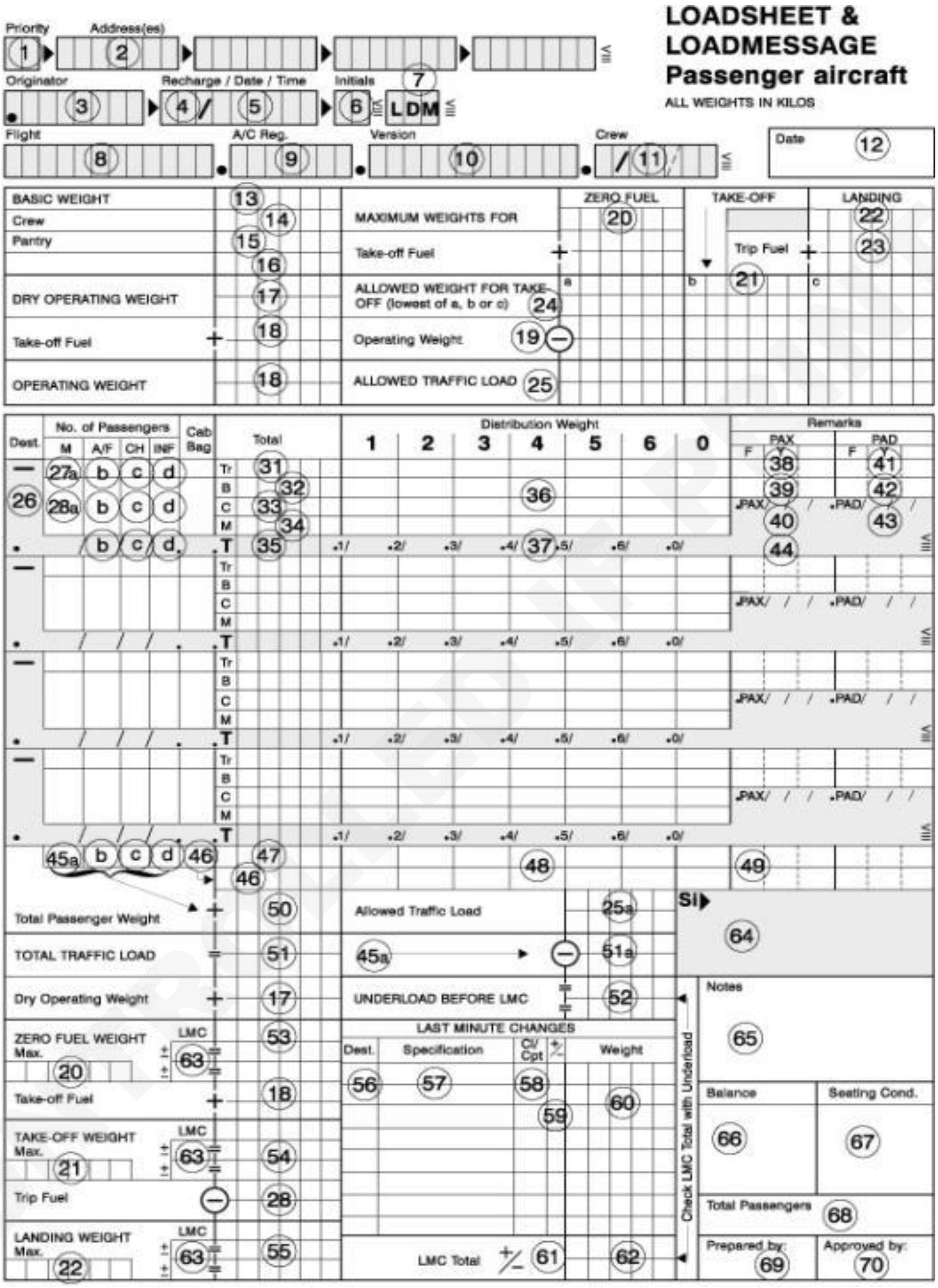
Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
		Option 1: Adult/Children/Infant (Boxes b, c and d must be used)	e.g. 123/22/3		
		Option 2: Male/Female/Children/Infant (Boxes a, b, c and d must be used)	e.g. 76/94/22/3		
		Note: If there is a dead load to this destination but no passengers, zeros must be filled in.	e.g. 0/0/0 0/0/0/0		
		If there is no traffic load to this destination, enter NIL	e.g. NIL		
		Note: On cargo aircraft load sheets include the weight of any passenger, e.g. cargo attendants carried in specially fitted seats in a cargo bay, in the appropriate bay position. Use SI-box to notify onward station (format according to AHM 510)			
30	Cab Bag	Cabin baggage not included in standard passenger weight. Split-up in: Transit, Joining and Total, including LMC		O	
31	Total Tr.	Weight of transit dead load (to be obtained from incoming LDM or load sheet)		C	
32	Total B	Weight of joining baggage excluding Ref. No. 30		C	
33	Total C	Weight of joining cargo		C	**To be in accordance with** AHM 540
34	Total M	Weight of joining mail		C	
35	Total T	Total weight of dead load. Sum of Ref. Nos. 31–34 and LMC		C	Load message
35a	TW	Total weight of dead load per destination, Ref. No. 37		C	Cargo aircraft only

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
36	Distribution	Weight distribution of the different load categories per compartment and/or position(s) of unitized load.		C	
37		Total weight of dead load (transit dead load plus joining baggage, cargo, mail and LMC) per compartment and/or position(s) of unitized load. Entries to be made only for compartment(s) holding load		C	Load message
	REMARKS				
38	PAX	Seat(s) occupied by transit passenger(s) per class, including PAD(s) (Ref. Nos. 27a, b and c)			
39		Seat(s) occupied by joining passenger(s) per class, including PAD(s) (Ref. Nos. 28a, b and c)		C	
40	.PAX/	Total seat(s) occupied by outgoing passenger(s) per class, including PAD(s) and LMC. Sum of Ref. Nos. 38 and 39	e.g. .PAX/2/111 .PAX/19/93	C	Load message on a one class aircraft PAX information may be omitted. If transmitted it must be in the standard format
41	PAD	Seat(s) occupied by transit PAD(s) per class		C	
42		Seat(s) occupied by joining PAD(s) per class		C	
43	.PAD/	Total seats occupied by outgoing PAD(s) by class, including LMC. Figure group of each class to be separated by an oblique. All PAD(s) are included in the FY distribution	e.g. .PAD/3/2 .PAD/5/16	C	Load message. If no PAD(s) are on board, PAD

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
					information may be omitted. If transmitted it must be in the standard format, e.g. PAD/0/0
44		**Additional remarks as per** AHM 510	e.g. .RRY/1/6 .HUM/4/258	C	
45		Total number of passenger(s)		C	
46		Total weight of cabin baggage		C	Ref. Nos. 45–50 referring to the totals of all destinations
47		Total weight of dead load. Sum of Ref. Nos. 31, 32, 33 and 34		C	
48		Total weight of dead load per compartment and/or position of unitized load		C	
49		Total number of seats occupied by passengers per class. Sum of Ref. Nos. 38 and 39		C	
50	Total Passenger Weight	Total passenger weight is calculated according to company procedures based on the figures of items 45a, b, c and d		C	
51	Total Traffic Load	The total weight of passengers, baggage, cargo and mail. Operational items not included in DOW, e.g. pallets, nets, must be added to the cargo weight figures		M	
52	Under load	Under load before LMC. Ref. Nos. 25 minus 51		M	
Part 5. Actual Gross Weight Calculation					

Ref. No.	Printed Heading	Definition/Description		Format/Example	M/C/O	Remarks
53	Zero Fuel Weight	Actual zero fuel weight. Sum of Ref. Nos. 17 and 51			M	
54	Take-off Weight	Actual take-off weight. Sum of Ref. Nos. 18 and 53			M	
55	Landing Weight	Actual landing weight. Ref. No. 54 minus Ref. No. 23			M	
Part 6.Last Minute Changes						
56	Dest.	Destination of LMC			C	
57	Specification	Kind of LMC			C	
58	CL/CPT	Compartment and/or position of unitized load			C	
59	+/-	Identification of on or off-load			C	
60	Weight	Weight of LMC stated in REF.NO. 57			C	
61	LMC total +/-	Identification of LMC, sum total			C	
62	(LMC total weight)	Resultant weight of all LMC			C	
63	LMC	Ref. No. 63 equals Ref. No. 62. Entry to be made according to company regulation			O	
Note: Completion to be in accordance with AHM 551**.**						
Part 7. Supplementary Information and Notes						
64	SI	Supplementary Information to be included in LDM. Free format			O	
65	Notes	Information not transmitted with LDM			O	
Part 8. Balance and Seating Conditions						
66	Balance	Balance conditions according to carriers requirements. Use the following abbreviations:			O	
		Basic Index	BI			
		Dry Operating Index	DOI			
		Dead load Index	DLI			

Ref. No.	Printed Heading	Definition/Description		Format/Example	M/C/O	Remarks
		Loaded Index at zero fuel weight	LIZFW			
		Loaded Index at take-off weight	LITOW			
		Loaded Index at landing weight	LILAW			
		% MAC — at dead load weight	MACDLW			
		% MAC — at zero fuel weight	MACZFW			
		% MAC — at take-off weight	MACTOW			
		% MAC — at landing weight	MACLAW			
		Stabilizer trim setting at take-off	STAB TO or TOANU TOAND			
		Stabilizer trim setting at landing	STAB LA or LAANU LAAND			
67	Seating Conditions	Seating conditions according to carriers requirements			O	
68	Total Passengers	Total number of passengers on board. Sum of Ref. No. 45a, b, c, d and LMC		O		
69	Prepared by	Load sheet agent's signature			M	
70	Approved by	Signature of authorized person, if required			C	**Refer to** AHM 550



8.1.8.9.3 EFB Load and Trim Sheet

EFB LTS depends on the application used and the interface provided, and it is highly customizable as per manufacturer specifications. Generally, customization of EFB LTS includes general formats and data addition/removal in accordance with the input data but the general theme of the LTS does not change significantly.

General outline of the EFB LTS is depicted in this table:

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
Part 1. Heading					

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
1	From	Three-letter IATA airport code of airport of movement	e.g. JFK LHR	M	
2	To	Three-letter IATA airport code of station of first intended landing		M	
3	Flight	Flight number/identifier	Format: two- or three-character airline code followed by up to eight characters. Maximum 11 characters for flight identifier. A two-character date may be included in these 11 characters preceded by an oblique	M	
			e.g. LH402/06 SR504		
4	A/C reg.	Aircraft registration	Format: 2–10 characters. No hyphen to be shown and/or transmitted	M	
			e.g. 4XAXA GAWNA N12345	M	
5	Version	The only available version for EFB LTS is the configuration of the seats. It could be written by hand by the Pilot-in-command and signed.	Format: 1–12 characters	O	
6	Crew	Number of crew, excluding crew travelling as passengers For passengers occupying	Format: 3–7 characters	M	Crew figures must be separated

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
		crew seats see AHM 533			by an oblique
		Option 1: Cockpit crew followed by cabin crew	e.g. 2/5 or 3/15	C	
		Option 2: Cockpit crew/cabin crew male/cabin crew female	e.g. 2/2/5 or 3/5/10	C	
7	Date	Self-explanatory	e.g. 05 JUN 89	M	Local date
8	Time	Four-digit value of local time this edition was produced	e.g. 0920 1215	O	
9	Ed. No.	Edition number	Maximum two figures	O	
			e.g. 01 12		
10	A/C Type	Aircraft Type and model	Dependent on the manufacturer notation	O	A320-232
Part 2. Load and Distribution					
10	Total weight	Total of weight of dead load in compartments		M	
11	Load in compartments	Total weight of dead load per compartment and/or position of unitized load		C	
12	Passenger/Cabin Bag	Total passenger weight calculated according to company procedures based on the figures of items 13, 14, 15, 16 and 18		M	
13		Passenger distribution. It takes the form Adult Male / Adult Female/ Child/ Infant	82/18/10/5	M	
14		Passenger distribution per aircraft zone	30/35/42	C	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
15	TTL	Total number of passengers onboard including infants		M	
16	Cargo Distribution	Distribution of cargo in compartments. It is arranged from the first cargo compartment to the latest	CP1 1100/CP3 800/ CP4 750	M	
17		No. of Supernumerary and DHC		M	
18	Dry Operating Weight	The “Basic Weight” plus “Operational Items”, e.g. crew, crew baggage, flight equipment and pantry, company specification and is equal to “Operation Empty Weight”		M	
19	Actual Zero Fuel Weight	Sum of Ref. Nos. 24 and 25		M	
20	Maximum Zero Fuel Weight	Equal to “Maximum Design Zero Fuel Weight”		M	
21	Take-off Fuel	The amount of fuel on board less the fuel consumed before take-off		M	
22	Actual Take-off Weight	Sum of Ref. Nos. 26 and 28		M	
23	Maximum Take-off Weight	The “Maximum Design Take-off Weight”, or “Operational Take-off Weight”, whichever is lower		M	
24	Trip Fuel	The amount of fuel planned to be consumed from take-off to the station of first intended landing		M	
25	Actual Landing Weight	Ref. No. 29 minus Ref. No.31		M	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
26	Maximum Landing Weight	The "Maximum Design Landing Weight" or the "Operational Landing Weight", whichever is the lower		M	
27		Indicator showing which of the maximum weights is limiting the allowed traffic load	L	M	
28	Taxi Fuel	Fuel used for taxiing as indicated in the flight plan		M	
29	Under load before LMC	Difference between maximum and actual gross weight indicated by L		M	
Note: For aircraft operating with injection water or water methanol, the weight of this is to be included in the take-off and trip fuel entries. For captain's information a specification, e.g. "Injection Water 1,500 kg" to be shown under "Captain's Information Part" (Ref. No. 45).					
Part 4. Balance and Seating Conditions					
30	Deist	Destination of LMC		C	
31	Specification	Kind of LMC		C	
32	CL/CPT	Class/Compartment and/or position of unitized load		C	
33	+/-	Identification of on or off-load		C	
34	Weight	Weight of LMC stated in Ref. No. 38		C	
35	LMC total	Identification of LMC sum total		C	
36	ADJ	Ref. No. 43 affects Ref. No. 44. Entry to be made according to company regulations		C	
37	DOI	Dry Operating Index		C	
38	LIZFW	Loaded Index Zero Fuel Weight		C	

Ref. No.	Printed Heading	Definition/Description	Format/Example	M/C/O	Remarks
39	LITOW	Loaded Index Takeoff Weight		C	
40	LILAW	Loaded Index Landing Weight		C	
41	MACZFW	Zero Fuel Weight CG Location		C	
42	MACTOW	Takeoff Weight CG Location		C	
43	MACLAW	Landing Weight CG Location		C	
44	STAB TO	THS Angle		C	
Part 5. Captain Notes					
45	CG LIMITS MACTOW	Forward and Aft limit for Takeoff CG Location		O	
46	CG LIMITS MACZFW	Forward and Aft limit for Zero fuel weight CG Location		O	
47	FUEL Density	Self-explanatory		O	
48	Load Message	Standard Format Load message		O	
49	Checked By	Person who prepared the load sheet		C	
50	Approved By	Person in command		C	

8.1.8.10 Seating Policy

Free seating might require a repositioning of passengers in the cabin. The Pilot-in-Command may instruct the cabin crew to re-seat passengers to create the actual seating distribution in compliance with the aircraft operational envelope.

8.1.8.11 Distribution of DOW/DOI

After the establishment of the DOW/DOI, it shall be distributed to the following personnel using 13.1.15 Generic Document Distribution Form , email and/or one of the communication tools cited in 1.6.2 Communication Systems to the following personnel:

1. OCC
2. Operations records officer
3. Technical Pilot.

8.1.9 ATC Flight Plan

8.1.9.1 ATC Flight Plan

Flights are normally operated on an instrument flight rules plan. Certain short flights (ferry, non-revenue) may be dispatched under visual flight rules. For safety reasons, the ATC must be informed of the expected operation before each flight, and an ATC flight plan must to be filed for each flight (IFR and VFR), and special procedures or maneuverability limitation must be indicated.
An ATC flight plan shall be submitted for every flight in order to permit alerting services to be activated if required.

Two different methods are applied for the submission of the ATC flight plan:

- The ATC flight plan for an individual flight shall be submitted on an appropriate form designated by the State concerned and being generally identical or similar to the ICAO Model Flight Plan
- ATC flight plans for regularly operated flights with identical basic features may be submitted in the form of repetitive ('stored') flight plans (RPL) as far as relevant provisions are observed. The repetitive flight plans are retained by air traffic services units for repetitive use for a series of individual flights.

Information submitted in the individual ATC flight plan shall be based on the OFP for the respective flight. The RPL data shall refer to the standard flight planning data of the OFP concerned.

8.1.9.2 Filling and Filing ATC Flight Plan

The procedure to fill an ATC flight plan is defined in the Jeppesen Manual under "AIR TRAFFIC CONTROL".
The ATC flight plan must be filed at least 1 hour before the expected take off time, unless national regulations state otherwise (In Egypt the ATC flight plan must be filed at least 50 minutes before the expected take off time).
When a flight is subject to flow control measures, a time slot should be requested early enough.
The dispatcher on duty or if not, the flight crew has in charge to file the ATC flight plan and request a slot departure when needed.
The flight plan should be amended, or a new flight plan submitted, and the old flight plan cancelled, whichever is applicable in the event of a delay for which a flight plan has been submitted:

- of 30 minutes in excess of the estimated off-block time for a controlled flight (15 minutes in Egypt)
- of one hour for an uncontrolled flight

The Pilot in Command is responsible for ensuring that a plan has been filed, and that he is fully aware of the details including the routing selected. This should always be compared to the Computerized Flight Plan routing.
A copy of the accepted ATC flight plan with, any modifications to the filed flight plan, must be given to the Pilot in Command and be carried aboard.

8.1.9.3 Description of an ATC Flight Plan

Refer to Operations Manual Part C (Air traffic control-Appendix2-flight plan)

8.1.9.4 Pilot and ATC Agreement

A clearance issued by ATC and accepted by a pilot constitutes an agreement between ATC and the Pilot in Command as to the planned execution of the flight. This agreement is the current flight plan, whether it is the same as the originally filed flight plan.
If at any point after take-off the Pilot in Command wishes to change the flight plan, he must request the change and obtain the concurrence of ATC in the form of an amended clearance.
Likewise, ATC may initiate an amended clearance for traffic requirement and if concurrence between the Pilot in Command and an ATC controller is not possible, the flight is continued under the emergency authority of the Pilot in Command.
Any request for an amended clearance should be made considering traffic and the planning and co-ordination requirements of the ATC.
A pilot must not accept a clearance with which he cannot safely comply or which exceeds the capabilities of the aircraft. The Pilot in Command is the final authority as to the operation of the aircraft; he is directly responsible for the operation of the aircraft.
An ATC clearance is not an authorization for a pilot to deviate from any regulation or to conduct an unsafe operation. If, due to severe weather, an immediate deviation is required, the pilot's emergency authority will be exercised.
A pilot should question any clearance or any part of a clearance that he does not understand.
Time Slot's (CTOTs) - Calculated Take-Off Time - European Operations
For flights into areas or aerodromes with limited acceptance rate a departure CTOT will be assigned by CFMU (Central Flow Management System), i.e. a specified time or time period at/during which the flight may take-off. The CTOT begins 5 Minutes before and ends 10 minutes after the predetermined Take-Off Time. The arrangement for departure shall ensure that the flight will be ready for departure at the runway at the assigned CTOT minus 5 Minutes.
Note: Pilots will be informed of their assigned CTOT by station personnel or the DISPATCH via the handling agent.
The flight crew will immediately inform the station about the assignment of a CTOT, or a revised CTOT as received.
Since assigned CTOTs are frequently improved (see Ready Message-below) at short notice, flights shall be prepared for departure from the parking position/gate as follows:
When it becomes apparent that for unforeseen reasons the deadline for passenger boarding/airplane handling cannot be accomplished a revised deadline shall be agreed between the station and the Captain who will then determine if the assigned CTOT can still be complied with or if a new one has to be requested.
Ready-Message
When the CTOT is clearly behind schedule and the flight is able to depart within the MINLINEUP period (-5 /+10 min), a ready message may be dispatched by the stations via JATE Operations Control. A ready message may lead to an improvement.
CTOT Revision Request Message
If a CTOT cannot be operationally met, it is important to instruct the handling agents to contact Flight DISPATCH immediately to request a revised CTOT.

8.1.9.5 ATC Clearance

The clarification of such clearance to ensure understanding is necessary, and include as minimum:

i. A requirement for at least two flight crewmembers to monitor and confirm clearance to ensure a mutual (flight crew) understanding of accepted clearance;

a) A crosscheck that the assigned altitude is above the minimum safe altitude;
b) In areas of high terrain;
c) That includes heading, altitude/flight level, frequency, route/waypoint changes;
d) That includes instructions for holding short of a runway.

ii. A requirement to clarify clearance with ATC whenever any flight crew is in doubt regarding the clearance or instruction received.

Direct clearance does not relieve Captain from ensuring terrain clearance

8.1.9.5.1 Clearance Limits

An ATC clearance issued before take-off normally includes the destination airport as the clearance limit. A flight may be cleared to a point short of the destination if ATC has no assurance that co-ordination with a subsequent area control center will be accomplished before that flight enters its FIR.
A flight must not continue beyond its clearance limit without further clearance. It is the controller's responsibility to furnish further clearance before a flight reaches the clearance limit. This clearance may change the clearance limit to a point beyond or it may include holding instruction at the clearance limit. In the latter case the controller should provide the pilot with an expected further clearance time.

8.1.9.5.2 Departure Procedure

The departure procedure includes the routing and any altitude restrictions during after take-off to the En-route phase.
At some airports, Standard Instrument Departures (SID) have been established which identify each departure procedure with a name and a number. At airports where they are used, these SIDs are charted and used routinely to simplify and shorten clearance delivery. A pilot is to accept a SID as part of the ATC clearance only if the SID number in the clearance corresponds with his charted information.

8.1.9.5.3 Route of Flight

If the route of flight is different from that filed, or if the flight is an oceanic flight, or if a clearance is issued En-route, the clearance must include a description of the route using airway designations, radio fixes, or latitude and longitude.
When ATC includes the Mach number as part of the clearance, that Mach number must be maintained as closely as possible; any change in Mach number must be approved by ATC. Additionally, ETA amendments and/or TAS changes must be reported to ATC.

8.1.9.5.4 Altitude

A cleared altitude means an assigned altitude or flight level including any restrictions.
A new clearance is required to leave that altitude or flight level.
At airport without an approved instrument approach procedure, the destination clearance authorizes the pilot to proceed to the destination airport, descend, and land.
The clearance does not permit the pilot to descent below the MEA or MOCA unless the descent and landing are made in accordance with Visual reference Flight Rules.
In some part of the world, altitude clearances are based on separation from known air traffic and may not provide separation from terrain and obstructions. The Pilot in Command is responsible for ensuring that any clearance issued by ATC provides terrain and obstruction separation.

Upon receiving a clearance containing altitude information, the Pilot in Command must verify that the clearance does not violate any altitude restriction for the route to be flown.

8.1.9.5.5 Holding Instructions

If a flight is cleared to hold, ATC holding instructions must be complied with. These instructions may be issued by the controller or they may be required on the charts.

8.1.9.5.6 Arrival Route

Clearance for an arrival route is not issued until a flight is approaching the terminal area. This is a detailed clearance that fully describes the routing to a point from which the flight will be maneuvered for the approach to the airport.
At some airports, Standard Terminal Arrival Routes (STAR) has been established.

They identify each airport arrival route with a name and a number. STARs are charted and used routinely to simplify and shorten clearance delivery. A pilot is to accept a STAR as part of the ATC clearance only if the STAR number in the clearance corresponds with his charted information.

8.1.9.5.7 Communications

The frequency of departure control or the next en-route facility may be included with the clearance.

8.1.9.5.8 Approach Clearance

An approach clearance is authorization to conduct an approach and missed approach. If the type of approach is not specified, the pilot may execute any type of instrument approach approved for the runway to be used. In this case, the pilot must announce his intended choice of approach procedure. An approach clearance does not include clearance to land.

8.1.9.5.9 Complying with a Clearance

When ATC issues a clearance, a pilot is expected to comply promptly after acceptance.
ATC may use the term "immediate" to communicate urgency and the requirement for expeditious compliance.

8.1.9.5.10 Clearance Recording

A written record of the initial airway clearance, any significant re-clearance and deviations from planned figures shall be annotated on the OFP.
All ATC clearances, altimeter settings, runway in use, flight level, route/waypoint changes and any hold short instructions Taxi, Take off clearances must be read back including the full callsign.
After read back the clearance acceptance must be acknowledged and a requirement for at least two flight crew members to monitor and confirm clearances to ensure a mutual (flight crew) understanding of clearances accepted. Standard phraseology must be used.
Wording must be clear, precise and unmistakable. If any flight crew member is in doubt regarding any clearance or instruction received a clarification is required from ATC.
The PM must read back to the air traffic controller all safety-related parts of ATC clearances and/or instructions which are transmitted by voice.
Read back of a clearance should never be replaced using terms such as

"**ROGER**", "**WILCO**" or "**COPIED**".

All requested/received CPDLCs shall be printed.
ATC clearances must be clearly understood especially during time of increased operational risks.
Note: The above refers to situations when a missed or misunderstood clearance could pose a safety risk to the flight (e.g. inadequate terrain clearance, runway incursion, loss of separation) includes the following:

- Heading, altitude/flight level, route/waypoint change.
- Frequency changes during critical phases of flight.
- Instructions for any operation on or near a runway.

The Commander is responsible to ensure that:
–he Commander is responsible to ensure that:runway.ge.clearance, runwaynwayedof ATCC.t and en-route, and

–en-route, andandresponsible to ensure that:runway.ge.clearance, runwaynwayedof ATCC.tth night curfew).

8.1.9.5.11 Canceling an IFR Flight Plan

The flight plan is normally cancelled by the "tower". After a landing on a non-controlled airport the Pilot in Command must ensure that the flight plan is cancelled.

8.1.10 Operational Flight Plan

8.1.10.1 General

Before each flight an operational flight plan must be prepared by dispatchers. It is normally obtained through a computerized process (Air support (PPS) Flight planning system). For this reason, Operational Flight Plan are also called Computerized Flight Plan (CFP).
The operational flight plan must be checked by the flight crew and approved by the Pilot In Command before the departure.
Dispatcher must sign the Operational flight plan by mentioning his name on it and Pilot In Command must sign the original Operational flight plan.
Amendments due to flight crew requirements, ATC clearance or limitations such as aircraft MEL or CDL items may require the operational flight plan to be updated by the flight crew.
The operational flight plan will be calculated with updated performance of the aircraft, ATC cleared route, the weather forecast on the route and the actual aircraft weights.
Aircraft limitations must be considered and indicated. Minimum flight altitudes shall be considered in accordance with 8.1.1 Minimum Flight Altitudes in all phases of flight.
Operational Flight Plan used by the flight crew must be in accordance with the approved ATC Flight Plan.
The content of the OFP consist of, as a minimum, the following elements:

- **i.** Aircraft registration
- **ii.** EFB version
- **iii.** Aircraft type and variant
- **iv.** Date of flight and flight identification
- **v.** Departure airport, STD, STA, destination airport
- **vi.** Route and route segments with check points/waypoints, distances and time
- **vii.** Types of operation (IFR, VFR, ETOPS etc.)
- **viii.** Planned cruising speed and flight times between waypoints/check points
- **ix.** Planned altitude and flight levels;
- **x.** Fuel calculations
- **xi.** Fuel on-board when starting engines
- **xii.** Alternate(s) for destination and, when applicable, takeoff and en route
- **xiii.** Relevant meteorological information (or attached separate)

According to the computerized flight plan (refer to 8.1.10.2.2. Computerized Flight Plan Explanation) the following must be filled in:

- **a)** Time
- **b)** Remaining fuel approximately every 30 minutes.

Note: Any en route amendments to the OFP due to unforeseen condition that may effect on flight such as diversion or reroute effect on original schedule, PIC to inform dispatcher on duty using AFIRS audio and to record these changes in the OFP.

8.1.10.2 Description of a Computerized Flight Plan

Example: Computerized flight plan for an A320 from HRG to CAI.

All Messages for flight **NMA171-OEJN-HECA** (STD 270415)

(Message search performed 2017-12-04 17:23:46 UTC)

EFB VERSION

Msg Sender: NMAADMIN Msg Sent: 2017-11-28 21:09 UTC

NMA271117A

End of message information

8.1.10.2.1 Computerized Flight Plan Sample

```
(01)Log Nr.:    1 Page  1                                   HECA-OEYN  NMA1234

(02)ATC ID: NMA1234            PIC : A          FLIGHT-MET : 033012       WEIGHT UNIT: Kg
(03)DATE  : 31.03.2016         F/O : B                                    DISP : TRANBJERG
(04)                           ACM : C          C/V : 3/4                 CALC : 302003 UTC
(05)-------------- FLIGHT INFO --------------   ------------------ TIME ------------------
(06)ACFT  : Airbus 320-232      REG : SU-NMA    STD         13:00         STA       14:21
(07)FLTNO : NMA1234             FL  :   370     CTOT       ___:___
(08)FROM  : HECA CAI  CAIRO INTL      467 ft    ON BLOCK   ___:___        LANDING   ___:___
(09)TO    : OEYN YNB  YENBO/PRINCE AB  26 ft    OFF BLOCK  ___:___        T/O       ___:___
(10)ALTN  : OEJN JED  JEDDAH/KING ABD  48 ft    BLOCK TIME ___:___        FLT TIME  ___:___
(11)ALTN  :                             0 ft    LAND FUEL  _______( 3016) BURN OFF  _______

(12)T/O ALTN :           ERA ALTN:              TOTAL PAX (SPLIT): 130  ( 60/ 60/ 10/  0 )
(13)---------------- WEIGHTS ----------------   ------------------- FUEL -----------------
(14)                                 STRUCT
(15)DOW  SCHEDULED 43939 __________             TRIP      :  1:21  3301  __________
(16)PAYLOAD     :  12380 __________             CONT MCF  :         400  __________
(17)ZFW         :  56319 __________   61000     TAXI      :         500  __________
(18)T/O FUEL    :   6317 __________             FINAL RES :  0:30   986  __________
(19)TOW         :  62636 __________   77000     ALT (OEJN):  0:37  1630  __________
(20)TRIP FUEL   :   3301 __________             COMP FUEL :  0:00     0  __________
(21)ELW         :  59335 __________   64500     MIN REQ   :  2:33  6817  __________
(22)                                            EXTRA     :  0:00     0  __________
(23)CMR         :   2616 __________
(24)                                            RAMP FUEL :  2:33  6817  __________

(25)----------------- MISC ------------------   --------------- CORRECTIONS --------------
(26)GAIN / LOSS    : (not available)            FL      WC   TIME   TRIP  10KT  1TON  D/C
(27)RTE / GC DIST :   581 NM /   504 NM           0      0             0     0     0    0
(28)AIR DIST       :   547 NM                   390     24   82.3   3330    75    40   22
(29)AVG WC / TRACK:   29 KTS TAIL  / 134       |370     29   82.0   3301    74    44    0|
(30)TEMP AT TOC    :   -58                      350     29   82.3   3300    74    32    1
(31)COST INDEX     :  CI25                      330     28   81.8   3354    75    31   33
(32)                                            310     26   82.7   3376    76    35   56

(33)DEP. ATIS:                          RVSM  CAPT ALT(ft) F/O ALT(ft)  STBY ALT(ft) TIME
                                        CHK

                                        GND
(34)DEST. ATIS:
                                        FL

                                        FL
(35)ALTN. ATIS:
                                        FL

                                        FL

(36)FL PROFILE: HECA/FL370/

(37)ATC ROUTE : CVO L315 HGD UM872 WEJ UT510 VEDAX V22 YEN




(38)ATC CLEARANCE:

(39)RWY _____ FLEX TEMP ________  FLAP SET ________  V1 ________  Vr ________  V2 ________

(40)RWY _____ FLEX TEMP ________  FLAP SET ________  V1 ________  Vr ________  V2 ________

(41)ENG FAIL PROC:


(42)                              COMMANDER SIGNATURE: ..............................
```

```
(43)Log Nr.:    1 Page  2                                     HECA-OEYN  NMA1234

(44)MFA  AIRWAY     LAT/LON    WIND      SR    WC  TAS  DIST   TIME   ETA   ATA  F-REQ  DIFF   DIFF
(45)FL   WAYPOINT   N30:06.7   TEMP            ISA GS   REM    TRACK               REM   TIME   FUEL
(46)HECA            E031:24.8                           581                        6317
    24     DCT      N30:05.5   298/021   1   T 20  362   12       2                5783
   CLB     CVO      E031:23.3  VAR             6  382   569     229                6183

    76     L315     N28:10.0   315/043   2   T 43  446  143      21                4186
   370     -TOC-    E032:59.9  VAR            -2  489   426     143                4586

   107     L315     N28:01.3   315/043   2   T 43  446   10       2                4142
   370     OBTAV    E033:06.9  -58            -2  489   416     143                4542

   107     L315     N27:10.6   309/034   3   T 33  448   63       8                3858
   370     HGD      E033:47.8  -56             0  481   353     144                4258

    83     UM872    N26:34.0   279/031   1   T 30  448   97      12                3419
   370     SILKA    E035:29.0  -55             1  478   256     112                3819

    49     UM872    N26:10.8   268/036   3   T 32  449   59       7                3154
   370     WEJ      E036:29.3  -54             2  481   197     113                3554

    75     UT510    N25:48.2   248/060   1   T 35  449   47       6                2945
   370     KULKI    E037:14.7  -54             2  484   150     119                3345

    75     UT510    N25:15.2   246/074   0   T  7  449   40       5                2756
   370     -TOD-    E037:39.7  -54             2  456   110     146                3156

    95     UT510    N24:14.4   240/045   0   T  7  347   73      12                2663
   DSC     VEDAX    E038:24.7  VAR            10  334    37     146                3063

    95     V22      N24:09.0   240/045   3   T 10  347   21       3                2636
   DSC     YEN      E038:02.3  VAR            10  334    16     255                3036

    95     YEN      N24:08.7   240/045       T 10  347   16       3                2616
           OEYN     E038:03.8  VAR            10  334     0     103                3016

(47)Alternate OEJN DCT YEN V44 RBG B412 JDW

    95     DCT      N24:09.0   243/070   1         433   11       2                2536
   CLB     YEN      E038:02.3  -33             6  377           283                2936

    95     V44      N23:40.8   243/070   1         433   35       6                2284
   CLB     DARES    E038:24.5  -33             6  438           144                2684

    73     V44      N22:47.5   243/070   1         433   65      10                1815
   270     RBG      E039:05.8  -33             6  438           144                2215

    73     B412     N22:42.7   243/070   1         433    5       1                1779
   270     LAGBO    E039:06.1  -33             6  400           177                2179

    73     B412     N21:42.6   243/070   1         433   60      10                1347
   DSC     JDW      E039:09.8  -33             6  400           177                1747

    43     STAR     N21:53.5   243/070   1         433   12       2                1260
   DSC     R023L    E039:15.3  -33             6  486           025                1660

    43     STAR     N21:53.9   243/070   1         433    9       1                1195
   DSC     MEDGO    E039:05.3  -33             6  371           273                1595

    43     DCT      N21:40.9   243/070   1         433   29       5                 986
   DSC     OEJN     E039:09.3  -33             6  414           164                1386

(48)Climb  :155 NM in 0:23 hrs  2230 Kg   Descent:110 NM in 0:18 hrs   140 Kg
```

```
(49)Log Nr.:   1 Page 2 PPS  8. 0. 519. 0 3 To be continued next page.....
```

```
(50)Log Nr.:    1 Page  3                                         HECA-OEYN  NMA1234

(51)                            ENROUTE WINDS
(52)IDENT     FL 330       FL 350       FL 370       FL 390       FL 410
(53)            W/V   TMP    W/V   TMP    W/V   TMP    W/V   TMP    W/V   TMP
    CVO       324/044 -50  324/045 -56  321/044 -58  318/044 -61  303/040 -63
    -TOC-     320/030 -48  320/034 -54  309/034 -56  298/036 -59  283/042 -61
    OBTAV     320/030 -48  320/034 -54  309/034 -56  298/036 -59  283/042 -61
    HGD       292/023 -48  292/031 -53  296/033 -55  300/040 -57  284/047 -60
    SILKA     280/025 -47  280/033 -53  268/036 -54  256/043 -57  255/056 -58
    WEJ       280/025 -47  280/033 -53  268/036 -54  256/043 -57  255/056 -58
    KULKI     250/052 -46  250/059 -52  248/060 -54  246/066 -56  247/070 -58
    -TOD-     244/074 -46  244/076 -51  244/078 -53  244/081 -55  244/082 -58
    VEDAX     236/086 -45  236/087 -50  240/088 -52  244/092 -54  244/093 -58
    YEN       236/086 -45  236/087 -50  240/088 -52  244/092 -54  244/093 -58

(54)FL300 240/089  FL240 252/056  FL180 240/045  FL100 350/013  FL050 020/013

(55)(FPL-NMA1234-IS
    -A320/M-SDFHIRWY/S
    -HECA1300
    -N0446F370 CVO L315 HGD UM872 WEJ UT510 VEDAX V22 YEN
    -OEYN0121 OEJN
    -PBN/B3B4B5 COM/DPDLCX DAT/V DOF/160331 REG/SUNMA
     EET/OEJD0045 SEL/QRCF CODE/010140 RVR/550 OPR/NMA PER/C
    -E/0232 P/137 R/V J/L
     A/WHITE
     C/)
```

8.1.10.2.2 Computerized Flight Plan Explanation

(01) Flight Plan number / page number / city pair / flight number
(02) ATC call sign / pilot in command / weather based on forecasted winds at MMDDTT / weight unit

(43) Flight Plan number / page number / city pair / flight number
(44) Grid mora for the actual leg / airway name / latitude - longitude / wind direction and velocity / wind shear rate / wind component / true air speed / distance from previous waypoint to this waypoint / time in minutes from previous waypoint to this waypoint / estimated time overhead (for pilots to fill in)/ actual time overhead (for pilots to fill in) / minimum required fuel from this waypoint to destination + alternate + final reserve / difference in time (for pilots to fill in) / difference in fuel (for pilots to fill in)
(45) Flight level / waypoint or airport / latitude - longitude / temperature / ISA temperature deviation / ground speed / distance remaining / true track / fuel remaining / difference in time (for pilots to fill in) / difference in fuel (for pilots to fill in)
(46) Departure airport / latitude - longitude / total distance in nm / take off fuel
(47) Alternate route section
(48) Climb distance in nm to TOC (TOC= top of climb) / climb time in minutes to TOC / used fuel at TOC (taxi + climb fuel) / descent distance in nm from TOD (TOD= top of descent) / descent time in minutes from TOD / fuel amount from TOD to destination
(49) Flight Plan number / page number / PPS version number / flight plan continues next page
(50) Flight Plan number / page number / city pair / flight number
(51) Enroute winds info section below
(52) Waypoint, TOC or TOD info below / info for filed flight level plus 2 levels below and 2 levels above
(53) Wind direction and velocity / temperature (shown at all 5 flight levels)
(54) Descent winds fixed at flight level 300, 240, 180, 100 and 050 showing wind and velocity
(55) Short ICAO Flight Plan

(39) RWY / FLEX TEMP / FLAP SET / V1 / Vr / V2 (all for pilots to fill in)
(40) RWY / FLEX TEMP / FLAP SET / V1 / Vr / V2 (all for pilots to fill in)
(41) Engine fail procedure (for pilots to fill in)
(42) Pilot in command signature

8.1.11 Operator's Aircraft Technical Log

8.1.11.1 Aircraft Technical Log System

The aircraft technical log system is a system for recording defects and malfunctions discovered during the operation and for recording details of all maintenance carried out on the particular aircraft to which the aircraft technical log applies whilst that aircraft is operating between scheduled visits to the base maintenance facility. In addition, it is used for recording operating information relevant to flight safety and must contain maintenance data that the operating crew needs to know.

It is the legal medium for written communication between flight crews and maintenance personnel.

All irregularities should be recorded even though they may be regarded as items that are "always that way". Recording these items is necessary until flight crews are advised by an insert in the appropriate aircraft operating manual that maintenance is aware of the problem and that no further recording of that particular defect is necessary.

The aircraft technical log system allows the Pilot in Command to satisfy himself that the aircraft is airworthy in accordance with MEL and CDL.

The Aircraft Technical log system is made of:

- Aircraft Maintenance logbook
- Acceptable Deferred Defect List (DDL - Hold Items List)
- Configuration Deviation List (CDL)
- Cabin logbook

8.1.11.2 Aircraft Technical (Maintenance) Logbook (ATL)

The aircraft technical (maintenance) logbook is a three-page manifold form serialized and bound in sets of 50 each. The logbook is designed to provide flight crew and maintenance personnel with a means of recording malfunctions, corrective action and other information that is of value to the operation:

- one white original
- one yellow copy and
- One blue copy.

8.1.11.2.1 Flight Crew Procedures for Aircraft Technical (Maintenance) Logbook Handling

The Pilot in Command is responsible for completing the aircraft technical logbook, however, he may delegate this to another crewmember.

The flight crew will verify that the aircraft technical logbook is on board the aircraft and that it contains a enough pages for the flights scheduled.

Pilot in Command or his delegate, will review the aircraft technical logbook for corrective action taken on prior flight irregularities, type of service performed, and airworthiness release, when required. At this time, any aircraft placards on the logbook will be reviewed for information and conformance with the Minimum Equipment List. If the airworthiness requirements of the Minimum Equipment List are not satisfied, PIC will request that the condition be corrected.

Discrepancies will be recorded in the aircraft technical logbook. Verbal reporting to maintenance personnel is unacceptable.

Each entry shall contain sufficient detail to assist maintenance personnel in making the necessary corrective action. The Pilot in Command must sign each flight crew entry.

8.1.11.2.2 Maintenance Procedures - Log Review

Maintenance personnel in duty shall review the technical logbook at all stations.
In reviewing the logbook, maintenance personnel is responsible for:

- Assuring that any log entries completed are accurate and complete.
- Removing all completes yellow log pages from aircraft and send them to Maintenance Control Centre (MCC).
- Upon completion of a maintenance action, enter date, local time, type of check, and signature and approval number in the block titled "Certificate" located in the right-hand corner of the log sheet.

8.1.11.2.3 Acceptable Log

a) General

- All entries will be printed in black or blue ink and must be legible.
- Engineer's full signature will be entered immediately following the description of inspection or work accomplished, in a legible manner and in ink, pencil is not allowed.
- If an error is made, a line will be drawn through the entry and a new entry must be made. Erasures are not permitted.
- Note: Never remove or destroy a log page because of an error.
- Maintenance action entries will list any or all work done to correct, defer or describe troubleshooting accomplished to correct a malfunction or pilot report. Such statements are necessary for record purposes and to eliminate repeating the work unnecessarily. The person making the corrective action entry is required to ensure that all work, checks or inspections were performed in accordance with manuals and procedures.

Civil Aviation Regulations require a complete description of the corrective action taken to correct a discrepancy and release an aircraft in airworthy status. Therefore use of words such as "Repairs", "Fixed" or "Corrected" as the sole entry for corrective action is not acceptable. The logbook entry should also include a description of the trouble-shooting procedure and/or reference to the manual that was used to correct the discrepancy.

8.1.11.2.4 Distribution of Log Sheet

- The original log page (white) is the permanent record of all maintenance accomplished on the aircraft. It is of the utmost importance that the white log pages are kept in good condition.
- Yellow to the technical department
- Blue to Handling Agent

8.1.11.2.5 Ordering Aircraft Technical (Maintenance) Logs

- It is the responsibility of the person accomplishing the maintenance service actions to determine that sufficient unused sheets are available in the Aircraft Technical Logbook.
- It is the responsibility of the person performing the post flight maintenance walk around check to determine that the Aircraft Technical Logbook is on board the aircraft.

8.1.11.3 Cabin Logbook

As for the Technical Logbook, the Cabin Logbook provides a means for in flight personnel to report to maintenance all pertinent information relative to cabin discrepancies.
Cabin Logbook format: See example
Cabin Logbook handling

- Specificity: the Chief De-Cabin will verify all Cabin Logbook entries and if he notes an airworthy discrepancy he will inform the Pilot in Command of the flight.

- For all other recommendations refer to Technical Logbook

8.1.11.4 Guideline to Fill in the Aircraft Technical or the Cabin Logbook

The following guidelines shall be applied on the aircraft technical or cabin logbook

- The aircraft technical logbook shall be filled in for each flight leg.
- If more than one defect exists for the same flight leg, each defect shall be entered in one defect description space but the flight information (except airplane identification and flight number) will be not repeated and the crew shall sign
- Each defect shall be clearly described by the flight crew or the certifying person and the defect description space shall be dated and signed
- If a certifying person takes the decision to defer the rectification of a defect, the cross reference on the Acceptable Deferred Defect (Hold item) sheet shall be mentioned on the corrective action space (with the station, date, name and signature information)
- The corrective action shall be clearly mentioned with all references used (manuals, repair drawing, SB, AD/CN, others…)
- If the corrective action taken requires additional work or re-inspection, the corrective action space shall be sign off. A new item shall be initiated through the deferred defect procedure to cover the additional work or re-inspection required.
- The corrective action may be carried-out during a schedule maintenance check.
- Therefore, this maintenance check reference shall be mentioned in the corrective action space.

Notes: The white original sheet of the aircraft technical or cabin log sheet shall remain in the logbook until the corrective(s) action(s) of the same flight leg has (have) been mentioned, answered and accepted by the certifying person.
Once completed, it shall be detached and sent to MCC for records updating within 24 hours. It shall be archived by Technical Records.

8.1.11.5 Acceptable Deferred Defect List (DDL)

8.1.11.5.1 Scope

This procedure shall be considered as exceptional.
For specific case, a certifying person may take the decision to defer the rectification of a discrepancy after determining the need and propriety for such deferral.
The Acceptable Deferred Defect List (DDL) is the document that lists all deferred defects still open.
Note: It shall be highly recommended to rectify any deferred defect as early as practical to avoid exposure to additional failure during continued operation with inoperative items.
If a Nesma Airlines aircraft develops a defect away from base, and the defect is allowable per MEL, the Pilot in Command shall check if the aircraft can be dispatched with defect can be deferred without any maintenance action being required.

8.1.11.5.2 Guideline to How Deferred Defect List (DDL) Is Filled In

DDL shall be filled in only by Maintenance personnel:
As one deferred defect is issued, a copy shall be sent immediately to Maintenance Engineering for action. Maintenance Engineering is responsible for the rectification planning for specific deferred defect (provisioning delay, lease-contract requirements, and configuration change…)
The following guideline shall be applied on the Acceptable Deferred sheet:

The DDL sheet shall be filled in for each defect deferred open on the aircraft technical or cabin logbook.
The cross reference (technical Log sheet number and item) with the aircraft technical or cabin logbook which has initiated the defect shall be mentioned (with date and signature)
The aircraft technical or cabin logbook's defect description shall be transferred word-to-word to the DDL defect description space.
For each deferred defect, the certifying person shall give at which maintenance check, in how many flight times or how many cycles and at which date, the corrective action shall be taken.
The rectification of a deferred defect shall be launched only by Certifying Staff against signature.

8.1.11.5.3 Certificate of Release to Service

The stamp or signature of the certifying person shall be taken as a declaration of the release statement.
No individual is entitled to sign such release unless:

- He is duly qualified by the quality assurance – Technical Department - of Nesma Airlines
- He is certifying personnel of an approved operator subcontractor.

8.1.11.6 Technical Log Book

Description: Refer to 13.1 Operation Forms.

8.1.11.7 Cabin Log Book

Description: Refer to 13.1 Operation Forms

8.1.12 Onboard Library

For each flight, following documents and forms must be carried on board:
Note1: In case of loss or theft of documents mentioned below and marked with (*), the operation is allowed to continue until the flight reaches the base or a place where a replacement document can be provided.
Aircraft documents

- The Certificate of Registration (*)
- The Certificate of Airworthiness (*)
- The original or a copy of the Noise Certificate (in English Language) (*)
- The original or a copy of the Air Operator Certificate (*)
- The Aircraft Radio License (in English Language) (*)
- The original or a copy of the third-party liability insurance certificate (*)
- Copy of Operation Specifications Certificate

Crew documents
Each flight crewmember shall carry:

- A valid flight crew license with appropriate ratings for the purpose of the flight. (*)
- Valid passport with appropriate visas (if applicable)
- Certificates of vaccination (if applicable)

Onboard documents (library)
A list of the following documents (up-to-date) available onboard each Nesma Airlines Aircraft as part of Nesma Airlines' EFB suite.

- EFB type A include:
  - ➢ Operations Manual (Part C –electronic Jeppesen FD Pro)
  - ➢ Operations Manual (Part A – Volume 1)

- ➢ Operations Manual (Part C – Company route manual)
- ➢ Weight and Balance Manual
- ➢ Security Manual
- ➢ CMEL

- EFB type B Include:
- ➢ EQRH
- ➢ Load sheet calculation
- ➢ Take-off performance
- ➢ Landing performance
- ➢ Operational Library Browser (OLB)
  - Approved Flight Manual (AFM)
  - Flight Crew Operating Manual (FCOM)
  - Flight Crew Techniques Manual (FCTM)
  - MMEL
  - Quick Reference Handbook (QRH)
- Quick Reference Handbook (QRH) (2 set hardcopies)
- DDL
- CCM (6 set)
- Blank Manual load sheet calculation forms (Blank binder, if manual Load sheet is used)
- Bomb Search Check-list (1 set)
- Security check-list (1 set)
- Pre-flight check list, and
- Post flight check list.

Technical Pilot shall issue – up to date – list for onboard documents, then pass it to dispatch office. The later shall re-print or send; when applicable, a copy of that list to deck crewmembers together with Flight specific documents.
Deck crewmembers are requested to check this list against check list available onboard.
Any deficiency shall be reported to Technical Pilot for corrective action and follow up.
Flight specific documentation
The following documents shall be available and/or prepared for each flight:

- Operational flight plan
- Aircraft Technical Log
- Journey log (voyage report) (see "Forms" Section)
- Filed ATS flight plan
- Appropriate NOTAM/AIS briefing documentation
- Appropriate Meteorological information (Terminal and alternate forecasts valid for the time of flights, appropriate upper wind charts and significant weather charts)
- Load and Trim sheet
- Notification of special categories of passengers such as handicapped persons, in-admissible passengers, deportees and persons in custody, security personnel.
- Notification of special loads.
- Current maps and charts covering the area of the operations (Jeppesen Manuals)
- Cargo manifest, passenger manifest, over flight permission (if applicable).
- Any other documents required by the states concerned with the flight (General Declaration etc.….)
- Take-off and Landing Data Cards (if applicable)
- Special Reports forms (Pilot in Command’s Discretion report, Occurrence/ Incident Reports, Bird-strikes etc.) may be at the a/c library.

- Crew briefing document.
- Cabin Defect Log.

Flight Envelopes

All flight documentation required to be retained will be placed in a “flight envelope” and returned to Company Operations.

All Documents that do not need signature could be replaced by an electronic copy on the relevant EFB application and shall be stored, archived and backed up on company server as per (EAC 121-15)

Documents that need signatures shall be signed.

8.2 Fueling Procedures

8.2.1 Safety Precautions

Safety precautions must be always taken to preclude the possibility of fire during refueling and de-fueling procedures.

The main causes of risk of fire with fuel deal with sparks due to static electricity and hot point (engines, APU, ground installations, smoking).

The fuel generally does not catch fire easily, but the risk of fire is increased when the fuel is sprayed (link, disconnecting pipe) and in the presence of fuel vapor especially when low flash point fuels are used.

The list of approved fuel types and additives are given in Aircraft Maintenance Manual (AMM) - servicing chapter.

General safety precautions for fueling procedures are given in the FCOM.

The following precautions apply during any fueling operations:

- Engine ignition system must be "OFF".
- The weather radar must be switched OFF
- Radio is not transmitting on HF
- Electrical circuits in the tanks area must not been connected or disconnected
- For A320, APU starts or shutdowns are permitted during refuel/de-fuel procedures. An APU start is not permitted during refuel/de-fuel if the APU has failed to start or an automatic shutdown has occurred
- A normal APU shutdown must be completed if a fuel spill has occurred during their fuel/de-fuel procedure
- No open flame, or smoking is permitted around the aircraft fueling / de-fueling is considered to start as soon as the filler hoses are connected to the aircraft and pressurized.

Fueling / de-fueling shall only be considered terminated after all filler hoses have been disconnected from the aircraft.

The engineer or flight crew, as appropriate, shall ensure adherence to safety precautions by spot checks.

During fueling / de-fueling the following safety precautions shall be adhered to:

- Fuel hoses shall be positioned by the shortest way to the fuel inlets. A sufficient safety distance shall be kept from wheel-brakes (at least 1 meter) and from APU Air inlet.
- Bonding connections from the fueling truck to the aeroplane must be established to discharge any static electricity before fuel hoses are connected.
- Ground Service Equipment, not immediately required for the handling of the flight shall not be positioned within the Fueling Zone (Refer to “fueling Zone” below)
- Spilled fuel shall be removed or dried up immediately in the presence of the fire brigade before passengers are boarded.
- During thunderstorms fueling/de-fueling is strictly prohibited

In the event of an emergency (e.g. APU fire), during fueling / de-fueling, the operation must be stopped, and an immediate disembarkation initiated. The flight crew will decide whether this should be an expeditious “normal” disembarkation or an “emergency evacuation”.

Fueling Zone

The Fueling Zone is an area of 3 meters around the aircraft tank filling or venting points, the fueling browser or hydrant and the hydrant pit used for refueling.

The venting points are located at the wing tips.

8.2.1.1 Refueling and Defueling When Passengers Are Embarking, On Board or Disembarking

Fueling is not permitted with passengers boarding, on board or disembarking with wide cut gasoline type fuel (JET B, JP4 or equivalent) or when a mixture with these types of fuel might occur.
Fueling with Kerosene (JET A, JET A1 JP8, TS1, RT, TH or equivalent as approved by the AFM), when passengers are embarking, on board, or disembarking is allowed.
However, when passengers are involved, precautions must be taken to ensure that they can be evacuated in the unlikely event that fire does occur. These precautions involve the ramp agent, the engineer (qualified ground crewmember), the cabin crew and the pilot(s). Refer also to 8.3.15.3. Fueling With Passengers On Board, Embarking Or Disembarking
The following special safety regulations have to be strictly adhered to:

- In principle, two main passenger doors shall be opened and passenger stairs/jet-ways shall be positioned at these doors, with all other doors remaining closed. All other exit doors must be attended by cabin crew and free of obstacles on the ramp within an area of at least 12 meters from the aircraft.
- If only one passenger stair / jet way is available, the requirement for the second exit (3L) may be met by positioning a qualified Cabin Crew, who will remain at (3L) throughout the refueling process and be readily available to arm the door and deploy the slide if necessary;
- In the cabin, the required emergency exits as well as the aircraft aisle(s) must never be blocked (stationery) by catering or cleaning materials.
- Passenger stairs / Jet ways must never be blocked (stationery) by catering or cleaning materials. If passengers are embarking during fueling, the aircraft may only be fueled from the right side and the embarkation process must be coordinated by station personnel in such a way that congestion in front of the aircraft doors is avoided.
- If passengers are embarking during fueling, the embarkation process must be coordinated by station personnel in such a way that congestion in front of the aircraft doors is avoided.
- De-fueling with passengers on board, embarking or disembarking is prohibited.

The start of re-fueling must be coordinated with the Pilot in Command to allow him to brief the entire crew concerning safety regulations and procedures. After re-fueling is completed, the Pilot in Command must be informed as well.

Notes:

- Local airport regulations may be more restrictive (e.g. fire trucks during fueling).

In the event of an emergency, (e.g. APU fire), during fueling/de-fueling, the operation must be stopped, and an immediate disembarkation initiated. The flight crew will decide whether this should be an expeditious "normal" disembarkation or an emergency evacuation.
The ramp agent must ensure that:

- A flight crewmember, cabin crew and ground engineer/re-fueling supervisor are at their stations,
- the area around emergency exits is kept clear,
- the fire service is alerted
- Passenger boarding / disembarkation is carried out in a controlled manner.

The pilot(s) must:

- Inform the cabin crew of the beginning and ending of fueling,("Fasten seat belt" sign must be "OFF"),("no smoking" sign must be "ON"),
- Listen for fire warning from the engineer.

Continuous communication between the flight/cabin crew and the ground engineer/re-fueling supervisor is not required. In the event of an incident requiring prompt disembarkation or rapid evacuation of the passengers the ground engineer/re-fueling supervisor will use the quickest available means of communication to notify the flight/cabin crew. (Flight or service interphone, Passenger steps, suitable aural or visual signals etc.)

- Be prepared to initiate passenger evacuation if necessary.
- Ensure that the Emergency Lights Switch is in the armed position.

The engineer must:

- establish communications with the pilot(s),
- inform the pilot(s) of the beginning and ending of fueling,
- alert pilot(s) if fire occurs,
- Stop fueling upon pilot request.

The cabin crew must:

- establish communication with the pilots,
- warn passengers not to smoke ("no smoking" sign must be "ON"),
- instruct passengers to unfasten their seat belts ("Fasten seat belt" sign must be "OFF"),
- Ensure that emergency exits are unobstructed and attended by a cabin crewmember ready to arm and open the exit in case emergency evacuation is imminent.
- ensure that "EXIT" sign is "ON"
- Ensure that ground servicing such as catering or cleaning don't risk creating hazard or hindering an emergency evacuation.

If presence of fuel vapor is detected inside the aircraft or any other hazard arises, re/de-fueling must be stopped immediately.

The fueling process must be interrupted immediately if it is observed that any of the safety regulations are not adhered to.

Rapid Deplaning/ Emergency Evacuation

In the event a situation on ground develops which could compromise safety, PIC shall decide whether a rapid deplaning or full-scale emergency evacuation is required.

Rapid deplaning is an expeditious disembarkation from the aircraft via the Aerobridge or stairs e.g. (in case of emergency hazard arises during refueling with passenger on board).

Emergency Evacuation is the immediate egress of passengers from an aircraft via the escape slides.

Method of communication to initiate rapid deplaning/emergency evacuation

- The first Crewmember aware of the situation shall immediately advise the Flight Crew (via Interphone). The Flight Crew will evaluate the situation and if necessary, initiates the deplaning or the evacuation by commanding Cabin Crew via PA **"DEPLANE, DEPLANE"** for Deplaning or **"EVACUATE, EVACUATE"** for evacuation.
- The Flight Crew aware of any emergency hazard arises during refueling with passengers on board, will evaluate the situation and immediately will notify the cabin crew and ground handling personnel involved in the refueling. Flight crew initiate the deplaning or the evacuation by commanding Cabin Crew via PA **"DEPLANE, DEPLANE"** for Deplaning or **"EVACUATE, EVACUATE"** for evacuation.
- Ground handling personnel or engineer involved in the refueling with passengers on board process aware of any external hazard arises when fueling operations shall be discontinued, shall notify the flight crew, who in turn shall notify the cabin crew.
- In case of a rapid deplaning or an emergency evacuation is required, cabin crew shall act as follows:

In case of a rapid deplaning is required, All Cabin Crew shall:

- Stop passenger boarding if boarding is in process.

- Order all passengers and ground staff using PA announcement in an orderly manner to leave personal items behind and disembark via doors connected with aerobridge or stairs as soon as possible.
- Assist with disembarkation.
- Check cabin and lavatories are clear in their designated areas.
- When cabin is clear, leave the aircraft.

8.2.1.2 Precautions with Mixed Fuels

8.2.1.2.1 Safety Precautions

The various types of jet engine fuels are miscible, in all proportions:
- the density varies proportional to the percentage of the mixture
- The flash point of the mixture vary in function of non-straight laws.

JET A, JET A1 JP8, TS1, RT and TH are kerosene type fuel.
JET B and JP4 are wide-cut gasoline type fuel with a low flash point which are not widely used. JP4 is used in military aviation but is being replaced by JP8 (kerosene type fuel) which provide more safety.
More stringent precautions must be observed when re-fuelling an aircraft with JET B or JP4 fuel where the fuel tanks already contain JET B or JP4 or a mixture of JET B / JP4 and JET A, JET A1 JP8, TS1, RT or TH.
A major consideration when mixing fuels at normal temperatures is the fuel air mixture that develops in the space above the fuel inside the tank. JP4 and JET B develop an ignitable fuel air mixture at frequently encountered ambient temperatures.
When JP4 or JET B and JET A1 are being mixed, the fuel vapor mixture with air is in the explosive or ignitable envelope throughout the range of ground temperatures common at the majority of airports during all or part of the year.
Wide-cut fuel is considered to be "involved" when it is being supplied or when it is already present in aircraft fuel tanks (when loading JET B or JP4 into an aircraft with JET A1 or other kerosene type already on board and vice versa).
When wide-cut fuel has been used, this should be recorded in the technical log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.
Over-wing re-fueling is not permitted when wide-cut fuels are involved.
When re-fueling/de-fueling with fuels not containing anti-static additive, and where wide-cut fuel are involved, top-up at fuel filling rates reduced by 50% of the normal filling rate.

8.2.1.2.2 Fuel Freezing Point Determination

The freezing point of a fuel mixture varies in function of non-straight laws. Therefore, the only reliable way to obtain an accurate freeze point of a mixture of fuels is to make an actual freeze point measurement.
When this is not possible, consider the freezing point of the mixture to be the same as the highest freezing point when the fuel type in lowest quantity reaches 10% of the mixture.
Determination of the fuel freezing point of fuel mixtures may be particularly a concern when operating transatlantic or transpacific routes and when very low OAT are expected as the aircraft will have to continuously cope with the mixture of JET A generally delivered in USA and JET A1 elsewhere.
On a practical point of view, in order to determine the fuel freezing point, apply the following:
- When the mixture contains less than 10% JET A, the fuel is considered as JET A1
- When the mixture contains more than 10% JET A, the fuel is considered as JET A

Mixing all the residual JET A with all the refuel JET A1 to achieve maximum dilution is not considered practical.
To practically achieve the best dilution, all the JET A should be placed in the inner wing tanks as these have the largest volume (by transfer of outer tanks JET A fuel into the inner tanks either during the previous flight or on ground before re-fueling).
Depending on the aircraft model, inner tanks will receive fuel from the centre tank early in the flight, further diluting the JET A.
Placing all the JET A into the inner wing tanks potentially enables a maximum dilution but does not guarantee that the mixture will be homogenous. In reality, due to the compartmental structure of the inner wing tank and the fact that the residual JET A fuel will start at the inboard end of the tank, the concentration of JET A will be greater near the tank's inboard end.
The poor dilution of the JET A in the inner wing tank and its concentration near the inboard end of the tank has a potentially positive consequence. This is because the fuel near the inboard end of the inner wing tank tends to be consumed first by the engines. Thus, the concentration of the remaining JET A fuel on board, later in flight, when low fuel temperatures might be encountered in the case of low OATs, will be less than at takeoff. This gives a higher confidence margin that low concentrations of JET an in JET A1 will have a freeze point similar to JET A1 and can thus be treated as JET A1 with respect to the cold fuel alert.
For in-flight fuel management of fuel freezing, refer to 8.3.7.2.

8.2.1.3 Refueling with One Engine Running

Re-fueling with one engine running is **not permitted** unless, authorized by the Manager Flight Operations.
Procedure for re-fueling with one engine running is given in FCOM "Loading" chapter.
This procedure may be used only if:

- No external ground pneumatic is available while APU is unserviceable.
- Airport authorization is obtained for this operation.
- Airport fire department stands by at the aircraft during the entire refueling procedure.
- One flight crewmember can manage the operation and monitor all systems and the engine running from the cockpit.
- A qualified ground crewmember is present at the fueling station.
- The re-fueling system is fully operational (over-wing filling is not permitted).

8.2.2 Aircraft, Passengers and Baggage Handling Procedures Related To Safety

8.2.2.1 Embarking, Disembarking Passengers

Before Embarking / Disembarking passengers, ground staff/flight crew must brief them on all relevant safety aspects (e.g. "No Smoking") to be observed whilst boarding/leaving the air-craft. When jet ways are in use, ground staff must be positioned at appropriate locations to provide supervision and assistance. When passengers are required to walk on the ramp they shall be escorted by ground staff to/from the aircraft or their approved transport. Passenger routes shall be clear of oil, ice, snow and other hazards and shall be selected in such a way as to prevent damage and accidents (e.g. no passing below wings or engines).
Boarding shall not commence until clearance has been given by the Pilot in Command or his representative.
Disembarkation shall not commence until the crew has received confirmation from the ground staff that passengers' steps/jet ways are safely in position and that ground equipment will not be a hazard.

For embarkation/disembarkation when refueling / de-fueling is in progress, refer to the relevant section.
Only in exceptional cases, and with the consent of the Pilot in Command, embarkation / disembarkation is permissible with any engine running. In this case, passengers shall be directed to leave/enter the aircraft on the side opposite to the running engine.
Before disembarking or embarking, cabin stair or Jet way and guard rail must be in position. The step between stair and aircraft should not be too high and the stair should be against the aircraft.
Remark: during refueling the weight of the aircraft increases and the shock absorbers settle down. In consequence the bottom of the door may touch the stair and may be damaged.

8.2.2.2 Seats Allocation

Refer to CCM 2.6 – Passengers Seat Allocation.
All persons on board aged 2 years or more must occupy a fixed seat fitted with a safety belt (or a berth fitted with a restraining belt). Seats layout must permit access to emergency evacuation doors and the assistance of the cabin crew.
Any infant (less than 2 years old) must be attended by an adult. This adult may hold the infant in his arms and the safety belt of this adult seat must not strap the infant but only the adult. A supplementary loop belt or other restraint device must be used for the infant.
The number of life vests and oxygen masks per seat row must not be less than the number of passengers of the seat row.
Any child (less than 12 years old) should be assisted by an adult seated near him.
One adult may assist a group of no more than twelve children. The adult attending children must be informed of safety instructions, the lay out of the emergency exits and of the use of the individual safety equipment. An adult may attend a group of children if he is not in charge during the flight of an infant less than 2 years old. This adult could be a flight attendant in addition of the minimum flight attendants' number and being not on safety duty during the flight.

If there are many infants booked on a flight, ensure that in every 4 rows, one side of a row equipped with 4 oxygen masks must be kept "infant-free" as cabin crew must be able to grab the nearest available oxygen mask (in the event of cabin depressurization)
Maximum Number of infants that can be carried onboard A-320 are 20 infants. Refer to CCM 2.26.4.1
Unaccompanied Minors (UM) are children at less than legal age traveling on their own, not being in custody of a person that has attained full legal age.
The prescribed seating of infants and Unaccompanied Minors (UM) and their maximum number, if any, are laid down in the Cabin crew manual (CCM 2.26.3.1).
When passengers are embarking required cabin crew must be on board able to give instruction about seat availability or allocation and hand baggage storage.
Cabin crew has to be informed by ground crew or flight crew about hazardous situation and must be able to manage emergency evacuation of passengers.
The number of passengers must be checked with the passenger manifest (list of passengers) established by the operations.
Before departure, a copy of the checked passenger manifest must be left to a ground agent and kept by Nesma Airlines.
In case a passenger is missing or disembarked for any reason, his checked baggage must be unloaded. If necessary all checked baggage should be unloaded and all passengers should be

disembarked and required to identify their baggage. The captain shall request airport security assistance should any unidentified baggage remain.
In case the number of passenger is higher than the number on the passenger manifest, a check of all passenger-boarding pass must be done.
At arrival copies of the checked passenger manifest must be available on board the aircraft to be given to the authorities (police, custom...).
An approved child restraint system on an extra seat booked by the passenger, bearing either a label showing approval of a foreign government or a label showing that the seat was manufactured under the standards of the United Nations for aircraft or automobile, may be used, provided the certificate holder complies with the following requirements:

1. The restraint system must be properly secured to an approved forward-facing seat or berth; and
2. The child must be properly secured in the restraint device and must not exceed the specified weight limit for the restraint device. However, an adult who is occupying a seat may hold an infant. In such case, and when oxygen dispensing units are prescribed, one unit each shall be installed and available for both the adult and the infant.

8.2.2.3 Exit Row Seating Assignments

Seats which permit direct access to emergency exits shall be assigned only to passengers who appear to be reasonably fit, strong and able to assist the rapid evacuation of the Aeroplan in an emergency after an appropriate briefing by the crew. In all cases, passengers who, because of their condition, might hinder other passengers during an evacuation or who might impede the crew in carrying out their duties, should not be allocated seats, which permit direct access to emergency exits.
The following categories of passengers are among those who should **not** be allocated to, or directed to seats, which permit direct access to emergency exits:

- Passengers suffering from obvious physical, or mental, handicap to the extent that they would have difficulty in moving quickly if asked to do so;
- Passengers who are either substantially blind or substantially deaf to the extent that they might not readily assimilate printed or verbal instructions given;
- Passengers who because of age or sickness are so frail that they have difficulty in moving quickly;
- Passengers who are so obese that they would have difficulty in moving quickly or reaching and passing through the adjacent emergency exit;
- Children (whether accompanied or not) and infants;
- Deportees or prisoners in custody; and,
- Passengers with animals.

Note: “Direct access” means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.
In addition, designated exit row seat will not be assigned to passengers who are unwilling to assist in the event of an emergency.

8.2.2.4 Multiple Occupancy of Aircraft Seats

No seat must be occupied by more than one person, except for infants hold in the arms of an adult.

8.2.2.5 Sick Passengers and Persons with Reduced Mobility

The acceptance for transportation of sick, disabled and handicapped passengers is restricted in the interest of their own safety and that of other passengers. A person with reduced mobility (PRM) is understood to mean a person whose mobility is reduced by physical incapacity, (sensory or locomotors), an intellectual deficiency, age, illness or any other cause of disability when using transport, and whose situation requires special attention and the adaptation, to his needs, of the service made available to all passengers. Nesma Airlines therefore, is entitled to insist upon the production of a written report on fitness for travel, issued by a medical practitioner (MEDIF or Medical form).

For sick passengers using the oxygen equipment due to medical need, it's not permitted to be onboard Nesma Airlines flights.

The Pilot in Command must be informed about presence on board of any sick passenger or persons with reduced mobility. If deemed necessary, he may request a medical examination by a qualified physician.

The Pilot in Command should satisfy himself that the carriage of such passengers will not cause inconvenience or discomfort to other passengers and that emergency evacuation and safety during the flight will be guaranteed.

Sick and disabled passengers and PRMs should be boarded separately, (normally prior to all other passengers), as well as disembarked separately, (normally after all other passengers have left the cabin). The Pilot in Command shall be notified by "Special Categories of Passenger Notification" form, when handicapped passengers and PRMs are to be carried on board and shall brief his crew accordingly. Information on passengers requiring any assistance at transit or destination airports, must be forwarded by telex, telefax or phone to the ground staff or handling agent at the respective down line stations(s).

Under no circumstances will transportation be provided to a person who:

- Has a contagious/infectious disease, e.g. open tuberculosis, infectious hepatitis; scarlet fever, diphtheria, chicken pox etc.
- Pregnant woman after 32 weeks.
- Has suffered a heart attack or stroke within the last eight weeks
- Requires medical treatment by pneumatically or electrically operated apparatus which for specific reasons, is not allowed to be operated on board.

For the carriage of gas cylinders, drugs, medicines, other medical material, dry cell or lithium battery powered wheel chairs refer to Chapter 9

The following definitions constitute commonly agreed indications for the degree of immobility and extent of the assistance required for the journey:

Stretcher patients (STCR)

A passenger who can only be transported on a stretcher.

Stretcher patients are not permitted to be carried onboard Nesma Airlines flights, unless special contracts and/or Accountable Executive approval are presented.

Carriage of any stretcher patient is subject to the approval of the patient's physician and should be accompanied by an able-bodied adult attendant qualified to provide him required En-route care.

The stretcher must be secured to the aircraft. The patient must be secured by an adequate harness to the stretcher or aircraft.

Refer to CCM 2.26.1.7

Wheelchair passengers

Wheelchair Ramp (WCHR): A passenger who can walk up and down stairs and move about in an aircraft cabin, but who requires a wheelchair or other mechanical means for movement between the aircraft and the terminal, in the terminal, and between arrival and departure points on the city side of the terminal.

Wheelchair Steps (WCHS): A passenger who cannot walk up or down stairs, but who can move about in a aircraft cabin and requires a wheelchair to move between the aircraft and the terminal, in the terminal, and between arrival and departure points on the city side of the terminal.

Wheelchair Cabin (WCHC): A passenger who is completely immobile, who can move about only with the help of a wheelchair or other mechanical means and who requires assistance at all times from arrival at the airport to seating in the aircraft, the process being inverted at arrival.

Acceptance restrictions:

WCHR, WCHS no restrictions on the number of passengers per flight.

The maximum number of individual **WCHC** passengers (i.e. not in group) that can be accepted is **two (2)**.

WCHC passengers traveling individually don't need to be accompanied unless required for medical reasons.

WCHC passengers should be seated near an exit but must **not** be allocated to, or directed to seats which permit direct access to emergency exits.

Note: "Direct access" means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.

WCHC, WCHS should be boarded separately, (normally prior to all other passengers), as well as disembarked separately, (normally after all other passengers have left the cabin).

It is therefore essential that, at the time of booking, the precise condition of the passenger is ascertained and the correct code is established. It is not acceptable to simply enter WCH or WCHR when in fact passenger is unable to walk at all and hence should be classified as WCHC.

In case WCHC passengers are traveling in an organized group, the Tour operator must inform Nesma Airlines in advance and a case-by-case study by the Flight Operations Department must be conducted.

The prescribed seating of WCHC passengers traveling in-group and their maximum number will be than determined.

Refer to the Cabin Crew Manual (CCM 2.26.1.6).

Blind, Deaf and Dumb Passenger

Refer to the Cabin Crew Manual (CCM 2.26.1.8).

Expectant Mothers

An expectant mother is a passenger who is expecting the birth of a child. Expectant mothers are normally not regarded as incapacitated. However certain restrictions apply, which are given below:

Up to 28 weeks of Pregnancy:

Passenger may be accepted for travel provided that they have completed the Expectant Pregnancy Declaration Form (CCM 11.2.8).

From 29th to 36th week of Pregnancy:

Passenger may be accepted for travel provided that they have:

a) Completed the Expectant Mother Pregnancy Declaration Form, and.
b) Is in possession of a "Fit for Air Travel" medical certificate. This certificate shall be signed by a Doctor and issued within 24 Hours before commencement of travel

After 36th week of Pregnancy (Ninth month):

Passenger with normal pregnancies and **"no previous history of premature labor"** can travel up to and including the 36th week. After that time pregnant women can be travel under the following conditions:

- Medical certificate by the treating physician that there is no sign of imminent delivery and confirmation about the expected delivery date.
- Is in possession of a "Fit for Air Travel" medical certificate. This certificate shall be signed by a Doctor and issued within 24 Hours before commencement of travel
- Completed the Expectant Mother Pregnancy Declaration Form,

Note:
Air travel is not accepted in Nesma Airlines for women within the last seven days prior to delivery and within the first seven days after delivery.
Serious passenger illness, injury or death in flight (ECAR 121.715)
Any action must be taken in case of serious illness, injury or death in flight, to avoid contagion for the other persons on board.
The ill person should be isolated for the comfort and the safety of the ill person and of the other passengers.
If the ill person is on board, first aid must be given by flight attendants or competent passengers.
It is the Pilot in Command responsibility to decide if an immediate landing is to be made.
Such a situation can be considered as an "Emergency".
In the event of a death in flight the Pilot In Command must advise the relevant ground authorities, through ATC, of the State's airspace in which the death occurred and also the destination State's authorities, if different, when entering their airspace.
Each medical emergency occurring during flight time resulting in use of the emergency medical kit, a diversion of the aircraft, or death of a passenger or crewmember, shall be recorded by a report. This report shall include a description of how the medical kit was used, by whom, and the outcome of the medical emergency.
The Pilot in Command must complete a report, which records the name of the deceased person, nationality, the time of the death, location and registration of the aircraft. One copy of this report is to be given to ground authorities at destination and another to the director of the flight operations. Nesma Airlines consequently shall submit these reports, or a summary thereof, to its assigned ECAA operations inspector within 30 days after the medical emergency date.

8.2.2.6 Transport of Inadmissible Passengers, Deportees or Persons in Custody

"Inadmissible Passengers" (INADs) are passengers who are refused admission to a country by authorities of such country, e.g. due to lack of a visa, expired passport, lack of funds or other reasons.
"Deportees" (DEPU - Unaccompanied or DEPA - Accompanied) are foreign persons who had legally been admitted to a country or who had entered a country illegally, and who at some later time are formally ordered by the authorities to be removed from that country for whatever reason.
Nesma Airlines has the right to refuse the transportation of such passengers if their carriage poses risk to the safety of the aircraft or its occupants.
At all time, it is the prerogative of the Pilot In Command to refuse to carry any inadmissible passenger, deportee or person in custody or to impose any additional restrictions as considered necessary.
Refer to CCM 2.26.2.2
Handling Procedures
Refer to Chapter 10 Security

8.2.2.7 Disorderly Passengers

Disorderly passengers should not be accepted on board at the discretion of the Pilot in Command (Refer to 10.1.11. Unruly Passengers)

8.2.2.8 Hand Baggage

Cabin baggage will normally be restricted to handbags, briefcases, coats and other items that can be reasonably stowed in approved stowage, unless the carriage in the cabin of other items has been cleared with the company at the time of booking.
The size and the placarded weight limitation of the overhead stowage depend on the aircraft type. This determines the weight and size limitations of hand baggage for a given cabin configuration:

- Each item carried in the cabin must be stowed and restrained in an approved stowage.
- Baggage placed in lockers must not be of a size such that they prevent latched doors from being securely closed.
- Hand baggage heavier than 5 kg (Maximum allowable is 7 kg) must be stored in overhead stowage, or under seats.
- Under seat stowage must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment and not obstruct exit from the seat row.
- Hand baggage must not impede access to emergency exits or emergency equipment e.g. life vests.

When boarding is in progress ground staff and crewmembers shall visually scan the hand baggage held by passengers, and, when any baggage exceeds the allowance, politely relieve the passenger of the baggage so that it can be stowed in a baggage/cargo hold.
Checks to ensure that baggage is correctly stowed must be made before take-off and before landing and when fasten seat belts signs are illuminated.

8.2.2.9. Loading and Securing the Items in the Aircraft

Nesma Airlines is not authorized to transport cargo and/or mail.
SPECIAL LOADS AND CLASSIFICATION OF LOAD COMPARTMENTS
Nesma Airlines does not accept to transport any kind of the special loads such as the following but not limited to:

a) Wet Cargo
b) Live Animals
c) Perishable Cargo
d) Human Remains

Live animals are not accepted to be loaded into passenger cabin except pets (dog, cat and eagle) according to the following requirements:

- The pet shall be accompanied by the passenger.
- The pet shall be kept in a cage.
- The pet shall have a seat.
- The pet shall be fastened by strap as applicable.

Note: See Eye Dogs is not accepted on board Nesma Airlines air crafts.
Classification of Load Compartments
Classification of load compartments is given in the Weight and Balance Manual of the aircraft and to the IATA "Airport Handling Manual".
Nesma Airlines aircraft cargo holds are designated as follows:
Category C for A320
Refer to relevant Load and Balance Manual for more information.
The cargo compartments are classified as follows:

1. **Class A**: A Class A cargo or baggage compartment is one in which:
a) The presence of a fire would be easily discovered by a crewmember while at his station; and

b) Each part of the compartment is easily accessible in flight.
2. **Class B**: A Class B cargo or baggage compartment is one in which:
a) There is sufficient access in flight to enable a crewmember to effectively reach any part of the compartment with the contents of a hand held fire extinguisher;
b) No hazardous quantity of smoke, flames or extinguishing agent will enter any compartment occupied by the crew or passengers when the compartment is accessed for firefighting; and
c) There is a separate approved smoke detector or fire detector system to give warning to the Pilot or flight engineer station.
3. **Class C**: A Class C cargo or baggage compartment is one not meeting the requirements for either a Class A or B compartment but in which:
a) There is a separate approved smoke detector or fire detector system to give warning at the Pilot or flight engineer station;
b) There is an approved built-in fire-extinguishing system controllable from the Pilot or flight engineer stations;
c) It is possible to exclude hazardous quantifies of smoke, flames, or extinguishing agent from any compartment occupied by the crew of passengers; and
d) It is possible to control ventilation and draughts within the compartment so that the extinguishing agent used can control any fire that may start within the compartment.
4. **Class D**: A Class D cargo or baggage compartment is one in which :
a) A fire occurring in it will be completely confined without endangering the safety of the aircraft or the occupants;
b) It is possible to exclude hazardous quantities of smoke, flames or other noxious gases, from any compartment occupied by the crew or passengers;
c) Ventilation and draughts are controlled within each compartment so that any fire likely to occur in the compartment will not progress beyond safe limits;
d) Consideration is given to the effect of heat within the compartment on adjacent critical parts of the aircraft.
e) The compartment volume does not exceed 1000 cubic ft. For compartments of 500 cubic ft. or less, an airflow rate of 1500 cubic ft per hour is acceptable.
5. **Class E**: A Class E cargo compartment is one on aircraft used only for the carriage of cargo and in which:
a) There is a separate approved smoke detector or fire detector System to give warning at the Pilot or flight engineer station;
b) It is possible for the crew to shut OFF the ventilating airflow to, or within, the compartment;
c) It is possible to exclude hazardous quantifies of smoke, flames, or noxious gases from the flight-crew compartment; and
d) The crew emergency exits are accessible under any cargo loading condition.

Some dangerous goods are not permitted in the cabin (Refer to Chapter 9 - Dangerous goods)

8.2.2.10 Positioning of Ground Equipment

Positioning of ground equipment for servicing is indicated in the relevant FCOM and in the CCM for each aircraft type.

The following rules shall be adhered for the Positioning of Ground Equipment":

- Ground Servicing Equipment (GSE) used to service QR aircraft shall only be operated by well-trained / licensed personnel.
- Ground Servicing Equipment must be of a construction and condition that is suitable and safe for the use for Nesma Airlines aircraft.

- Ground Servicing Equipment must not approach aircraft until the engines have come to a complete stop, anti-collision light switched off and the parking brake of the aircraft is set or the chocks are positioned respectively.
- Nesma Airlines must maintain a reasonable distance between the aircraft and G.SE, in order to avoid damage caused by vertical movements of the fuselage during loading, unloading and fueling.
- The maneuvering of equipment in the vicinity of aircraft must take place with utmost care and accuracy. If the equipment is parked in the vicinity of the aircraft, it must be secured against movement either by parking brakes of chocks.
- Hose lines and connecting cables must neither be crossed by Ground Servicing Equipment nor by any other kind of vehicle.
- Ground Servicing Equipment, excluding fuel trucks or hydrants, must not be positioned or maneuvered under the aircraft wings.
- Ground Servicing Equipment, excluding fuel trucks or fuel hydrants, must not be positioned within the venting areas during fueling and de-fueling (Refer to 8.2 Fueling Procedures).
- During start-up and after removing stairs or jet-ways, no Ground Servicing Equipment shall be positioned in the area below the emergency exit doors so that the emergency exit chutes can be deployed immediately.
- Exception: When starting the engines by means of air start units (ASU), a momentary blocking of a maximum of one emergency exit by the ASU is permitted. In this case a reduction of the maximum permissible number of passengers is not required.
- Aircraft and passengers have the right-of-way. Equipment should never move across the path of taxiing aircraft.
- Personnel shall not ride on elevating platforms of moving ground equipment.

8.2.2.11 Operation of Aircraft Doors

Operation of Cabin Doors

Before start-up or push-back, once all doors are closed and the area below the doors is clear, a cockpit crew, or the senior cabin attendant should request, through the aircraft PA, flight attendants to arm doors and cross-check (the opposite door).

Opening the doors must not be without the allowance of the Pilot in Command. Before opening the doors, no cabin differential pressure should exist. Some doors on some aircraft are fitted with a cabin differential pressure indicator and / or a warning.

All passenger and service doors may only be opened by staff trained to open doors or crewmembers.

Passenger jet-ways / steps or servicing equipment (e.g. catering trucks) shall be positioned at the aircraft prior to opening the respective doors. If passenger jet-ways / steps or servicing equipment's are used, which do not permit opening of the doors after positioning the equipment, the respective doors may only be opened immediately prior to the positioning of the equipment at the aircraft; the door safety strap must be attached in this case.

Before passengers are allowed to disembark, a clearance must be given for the respective passenger jet-ways or steps.

Passenger jet-ways / steps or servicing equipment (e.g. catering trucks) shall be removed from the aircraft only after the responsible ground handling staff has informed the respective crewmember responsible for the cabin door concerned and the door has been dosed. If passenger jet-ways / steps or servicing equipment are used, which do not permit closing of doors prior to the removal of the equipment, the respective doors must be secured with door safety strap and must be closed immediately after the equipment has been removed from the aircraft.

When escape slide deployment is not required, cabin doors must be disarmed before opening. Opening a door or emergency exit from the outside automatically deactivates the escape slide / raft, if armed.

Should the slide / raft, at this door location, be used for evacuation, the door must be first closed and the escape slide / raft re-armed and the door opened from inside.

Operation of Compartment Doors

Opening and closing of electrically / hydraulically operated lower compartment doors may only be performed by loading staff which have been instructed by training staff, authorized to instruct on the respective aircraft type.

For all other compartment doors no special instruction is necessary for opening or closing.

After the compartment doors are opened, make sure that the door net are not hanging out of the door opening.

In all cases it is the duty of the person conducting the Final walk around check to make sure that compartment doors are closed and locked properly after loading has been completed.

The AFM specifies maximum wind speeds for door operation. If difficulties occur when attempting to close doors in strong winds, the aircraft shall be moved in order to position the doors concerned on the downwind side

8.2.2.12 Safety on the Ramp

In addition to any local airport safety regulations, the following rules must be strictly adhered to for handling of Nesma Airlines aircraft:

- No unauthorized person shall be in the vicinity of or enter a Nesma Airlines aircraft
- Smoking and the use of open fire on the ramp are strictly forbidden
- Prior to arrival of the aircraft the ramp position has to be checked and cleared of any foreign objects in order to avoid damage to the aircraft.
- When passengers are required to walk on the ramp they shall be escorted by ground staff to and from aircraft. Passengers routes, as well as passenger stairs shall be clear of oil, ice, snow and other hazards and shall be selected in such a way that the risk of accidents is kept to a minimum (for example no passing below wings or engines),
- The responsible Engineer in charge or Ramp Agent must make sure that the engine blast and intake areas are clear of personnel and equipment before start-up clearance is given.

Nesma Airlines personnel shall wear high visibility clothing while on the ramp.

8.2.2.12.1 Engines Blast and Suction Areas

Normally engines are not running when passengers are embarking or disembarking.

However, if one engine is running, keep preferably a right-hand engine running for convenience of disembarkation and boarding of passengers. The way for embarking or disembarking passengers should avoid blast and suction areas. These danger areas are defined in FCOM - Standard Operating Procedures (SOP) chapter.

8.2.2.12.2 Fire Prevention

8.2.2.12.2.1 Protective Clothes / Protective Breathing Equipment

Hydraulic fluid leakage under high pressure (3000 psi) may result in serious injury and contamination. The use of protective clothes and protective breathing equipment is recommended whenever fighting an aircraft emergency.
Carbon fibers and other composite materials used in airframe structure and cabin furniture require the use of a protective breathing equipment whenever fighting any aircraft fire

8.2.2.12.2.2 Brakes Overheat / Fire

In case of smoke, protective breathing equipment should be wearing since the dense smoke generated by tire rubber results in major and irreversible lung damage.
Carbon brakes and steel brakes are to be treated using same techniques and agents.
In case of severe brake overheat, fuse plugs melting should result in tires deflating and should prevent tires and wheels burst. (Refer to AMM)

- If a tire is inflated, do not go near the area around the wheel for about one hour. When you do go near, go from the front or rear and not from the side of the wheel.
- Unless there is a fire, do not apply the extinguishing agent (liquid, water, mist, foam etc.) with a spray gun onto a hot tire if it is inflated.

Do not apply the extinguishing agent directly into the heat pack of the brake or into the wheel. This can cause thermal shock to the stressed parts. Especially,
Do not use CO2 as this has a strong cooling effect which is not the same in all areas. It can cause an explosion in the stressed parts.
Extinguishing on hot wheels can:

- increase the time necessary for the fuse(s) to melt, or
- Prevent operation of the fuse(s).

You must let the brake get cool by itself for at least one hour and use the cooling fans (if installed).
Note: You can use blowers or air conditioning equipment only after:

- the temperature of the fuses decreases (more than one hour after the aircraft stops) or
- The fuses are melted.

You must not use these if you can see flames or burning ambers.

- In the event of fire, immediately stop the fire. Do not wait until the tires are deflated. Come near the wheel only from the front or from the rear.

Note: It is not recommended to use multi-purpose powders as they may be changed into solid or enameled deposit. These agents stop the fire but they decrease the heat dissipation speed. This can cause permanent structural damages at the brake, the wheel or wheel axle.

- Do not apply the parking brake.
- Put a warning notice in the cockpit to tell persons not to operate the landing gear control lever.
- Put the wheel chocks in position
- Clean all the parts if extinguishing agents were used.

8.2.2.12.2.3 Cargo Compartment Fire

The appropriate flight crew procedures are given in FCOM - Emergency procedures. If case cargo compartment smoke warning occurred with cargo door closed, the ground crew should be informed not to open the door of the affected cargo compartment unless passengers have disembarked and fire services are present.

If the smoke warning is displayed on ground with cargo compartment door open, the aircraft extinguishing agent should not be discharged. Ground crew should be requested to investigate and to fight the smoke source.
Multi-purpose or specific foam or type B or type C powder or water, as a function of the burning cargo material (as known) should be used. If foam is used first, do not use powder afterwards. If powder is used first, foam may be used in addition, if required.

8.2.2.12.2.4 Engine or APU Compartment Fire

The appropriate flight crew procedures are given in FCOM - Emergency procedures.
If fire persists, ground firefighting using a Halon or CO2 spray gun is possible through the following external access:

- Engines: Oil tank, IDG and other service panels,
- APU: access panels

8.2.2.12.2.5 Engine Tailpipe Fire

The engine tailpipe fire being an internal engine fire, do not discharge the engine fire extinguishing agent. The agent has an effect on the nacelle fire only.
The appropriate flight crew procedure is given in FCOM - Abnormal procedures.
Engine motoring by the flight crew is the normal and most effective action.
External fire agents can cause severe corrosive damage and therefore should only be considered if fire persists after flight crew procedure application or if no bleed air source is available to motor the engine.
In such a case, Halon or CO2 should be sprayed in engine exhaust nozzle.

8.2.2.13 Start-Up, Ramp Departure and Arrival Procedures

All start-up, ramp departure and arrival procedures shall be applied as per aircraft type Standard Operating Procedures given in the FCOM.
Ground marshals and pilots should use hand signals defined in ICAO rules of the air - annex 2 and in the "Rules of the Air" and "Signals for Aerodrome Traffic" Chapters in the Jeppesen Manual, section "AIR TRAFFIC CONTROL".
Engine start clearance shall only be given after the staff member in charge has ascertained that the security zones around the suction and blast areas are clear.
The ground to Flight Crew communication shall normally be performed by means of a headset; or, if that is impossible, by hand signals.
Normally, engine starting during pushback and towing is permitted.

8.2.2.14 Servicing of the Aircraft

Refer to chapter 12 "Servicing" of the Aircraft Maintenance Manual" (AMM) of the aircraft.

- Oxygen

The following safety provisions shall be observed when oxygen bottles of the aircraft are being filled or exchanged:

- No passenger shall be on board
- No ground power unit shall be connected or disconnected
- The relevant FCOM specify regarding which electrical systems shall be "OFF" or, alternatively, not operating shall be followed;
- No fueling/de-fueling is permitted;
- Filling/exchanging is not permitted during a thunderstorm.

- Cleaning of Cabin

Cleaning should have been finished, and cleaning personnel should have left the aircraft before passenger embarkation. If passengers stay on board during transit, cabin cleaning should be performed in such a way as not to disturb the passengers.
The Flight Crew may only be cleaned under supervision of an authorized employee of Nesma Airlines.

8.2.2.15 Documents and Forms for Aircraft Handling

Refer to IATA "Airport Handling Manual".

8.2.3 Procedure for the Refusal of Embarkation

The Pilot in Command can refuse to carry or to off-load at any aerodrome any person if, in his opinion, the conduct, status, age or mental or physical condition of the person is such as to:

- Such action is necessary in the interest of safety of the aircraft or its occupants - Render him incapable of caring for himself without special assistance of cabin crew.
- Cause discomfort or make himself objectionable to other passengers.
- Involve any hazard or risk to himself or to other persons, to property or to the aircraft such action is necessary to prevent violation of laws, regulations or decrees of any country to be flown from, into or over - He fails to observe instructions of the crew.

Such persons could include those who are obviously under the influence of alcohol or drugs. However this does not apply to persons under the influence of drugs who are subject to such condition following emergency medical treatment after commencement of the flight, nor to persons under medical care accompanied by personnel trained for that purpose.
Note: Cabin crew shall be discreet in serving alcoholic beverages to passengers. No alcoholic beverages shall be served to passengers who appear to be on the verge of intoxication, or to inadmissible/deported passengers or their escorts.
No person shall be allowed to drink any alcoholic beverage unless a member of staff has served it to him.
Whenever it becomes necessary to remove a passenger from an aircraft, the flight crew shall inform the local company representative or the handling staff who, in turn, shall take the necessary actions, considering assistance of local law enforcement officers.
Passengers who have been refused embarkation or who has been disembarked are left with the airport authorities.
Responsibilities of persons other than the Pilot in Command
In order to assist the Pilot in Command in the proper exercise of his authority, all company personnel engaged in passenger handling and loading, including other crewmembers, handling agents and check-in personnel, should alert the Pilot in Command if at any time they consider that the condition of a passenger could jeopardize the safety of a flight.

8.2.4 De-Icing and Anti-Icing on the Ground

8.2.4.1 Glossary / Definitions

The terms more specific to this section are defined here.

Anti-icing is a precautionary procedure, which provides protection against the formation of frost or ice and the accumulation of snow on treated surfaces of the aircraft, for a limited period of time (holdover time).

Anti-icing code describes the quality of the treatment the aircraft has received and provides information for determining the holdover time.

Check is an examination of an item against a relevant standard by a trained and qualified person.

Clear ice is a coating of ice, generally clear and smooth, but with some air pockets. It is formed on exposed objects at temperatures below, or slightly above, freezing temperature, with the freezing of super-cooled drizzle, droplets or raindrops. See also "cold soak".

Cold soak: Even in ambient temperature between -2°C and at least +15°C, ice or frost can form in the presence of visible moisture or high humidity if the aircraft structure remains at 0°C or below. Anytime precipitation falls on a cold-soaked aircraft, while on the ground, clear icing may occur. This is most likely to occur on aircraft with integral fuel tanks, after a long flight at high altitude. Clear ice is very difficult to visually detect and may break loose during or after takeoff. The following can have an effect on cold soaked wings:

Temperature of fuel in fuel cells, type and location of fuel cells, length of time at high altitude flights, quantity of fuel in fuel cells, temperature of refueled fuel and time since refueling.

Contaminated runway: A runway is considered to be contaminated when more than 25% of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by the following:

- Surface water more than 3 mm (0.125 in) deep, or slush, or loose snow, equivalent to more than 3 mm (0.125 in) of water; or
- Snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow); or - Ice, including wet ice

Damp runway: A runway is considered damp when the surface is not dry, but when the moisture on it does not give it a shiny appearance.

De-icing is a procedure by which frost, ice, slush or snow is removed from the aircraft in order to provide clean surfaces. This may be accomplished by mechanical methods, pneumatic methods, or the use of heated fluids.

De/Anti-icing is a combination of the two procedures, de-icing and anti-icing, performed in one or two steps.

A de-/anti-icing fluid, applied prior to the onset of freezing conditions, protects against the buildup of frozen deposits for a certain period of time, depending on the fluid used and the intensity of precipitation. With continuing precipitation, holdover time will eventually run out and deposits will start to build up on exposed surfaces. However, the fluid film present will minimize the likelihood of these frozen deposits bonding to the structure, making subsequent de-icing much easier.

Dew point is the temperature at which water vapor starts to condense.

Dry runway: A dry runway is one which is neither we nor contaminated, and includes those paved runways which have been specially prepared with grooves or porous pavement and maintained to retain “effectively dry” braking action, even when moisture is present.

Fluids (de-icing and anti-icing)

- De-icing fluids are:

a) Heated water
b) Newtonian fluid (ISO or SAE or AEA Type I in accordance with ISO 11075 specification)
c) Mixtures of water and Type I fluid
d) Non-Newtonian fluid (ISO or SAE or AEA Type II or IV in accordance with ISO 11078 specification)
e) Mixtures of water and Type II or IV fluid

De-icing fluid is normally applied heated to ensure maximum efficiency

- Anti-icing fluids are:

a) Newtonian fluid (ISO or SAE or AEA Type I in accordance with ISO 11075 specification)
b) Mixtures of water and Type I fluid
c) Non-Newtonian fluid (ISO or SAE or AEA Type II or IV in accordance with ISO 11078 specification)
d) Mixtures of water and Type II or IV fluid

Anti-icing fluid is normally applied unheated on clean aircraft surfaces.

Freezing conditions are conditions in which the outside air temperature is below +3°C (37.4F) and visible moisture in any form (such as fog with visibility below 1.5 km, rain, snow, sleet or ice crystals) or standing water, slush, ice or snow is present on the runway.

Freezing fog (Meter code: FZFG) is a suspension of numerous tiny super cooled water droplets which freeze upon impact with ground or other exposed objects, generally reducing the horizontal visibility at the earth's

Surface to less than 1 km (5/8 mile).

Freezing drizzle (meter code: FZDZ) is a fairly uniform precipitation composed exclusively of fine drops - diameter less than 0.5 mm (0.02 inch) - very close together which freeze upon impact with the ground or other objects.

Freezing rain (meter code: FZRA) is a precipitation of liquid water particles which freezes upon impact with the ground or other exposed objects, either in the form of drops of more than 0.5 mm (0.02 inch) diameter or smaller drops which, in contrast to drizzle, are widely separated.

Friction coefficient: Relationship between the friction force acting on the wheel and the normal force on the wheel. The normal force depends on the weight of the aircraft and the lift of the wings.

Frost is a deposit of ice crystals that form from ice-saturated air at temperatures below 0°C (32°F) by direct sublimation on the ground or other exposed objects. **Hoar frost** (a rough white deposit of crystalline appearance formed at temperatures below freezing point) usually occurs on exposed surfaces on a cold and cloudless night. It frequently melts after sunrise; if it does not, an approved de-icing fluid should be applied in sufficient quantities to remove the deposit. Generally, hoar frost cannot be cleared by brushing alone.

Thin hoar frost is a uniform white deposit of fine crystalline texture, which is thin enough to distinguish surface features underneath, such as paint lines, markings, or lettering.

Glaze ice or rain ice is a smooth coating of clear ice formed when the temperature is below freezing and freezing rain contacts a solid surface. It can only be removed by de-icing fluid; hard or sharp tools should not be used to scrape or chip the ice off as this can result in damage to the aircraft.

Grooved runway: see dry runway.

Hail (Meter code: GR) is a precipitation of small balls or pieces of ice, with a diameter ranging from 5 to 50 mm (0.2 to 2.0 inches), falling either separately or agglomerated.

Holdover time is the estimated time anti-icing fluid will prevent the formation of frost or ice and the accumulation of snow on the protected surfaces of an aircraft, under (average) weather conditions mentioned in the guidelines for holdover time.
The ISO/SAE specification states that the start of the holdover time is from the beginning of the anti-icing treatment.
Ice Pellets (Meter code PE) is a precipitation of transparent (sleet or grains of ice) or translucent (small hail) pellets of ice, which are spherical or irregular, and which have a diameter of 5 mm (0.2 inch) or less. The pellets of ice usually bounce when hitting hard ground.
Icing conditions may be expected when the OAT (on the ground and for takeoff) or when TAT (in flight) is at or below 10°C, and there is visible moisture in the air (such as clouds, fog with low visibility of one mile or less, rain, snow, sleet, ice crystals) or standing water, slush, ice or snow is present on the taxiways or runways. (AFM definition)
Icy runway: A runway is considered icy when its friction coefficient is 0.05 or below.
Light freezing rain is a precipitation of liquid water particles which freezes upon impact with exposed objects, in the form of drops of more than 0.5 mm (0.02 inch) which, in contrast to drizzle, are widely separated.
Measured intensity of liquid water particles are up to 2.5mm/hour (0.10 inch/hour) or 25 grams/dm2/hour with a maximum of 2.5 mm (0.10 inch) in 6 minutes.
Non-Newtonian fluids have characteristics that are dependent upon an applied force. In this instance it is the viscosity of Type II and IV fluids which reduces with increasing shear force. The viscosity of Newtonian fluids depends on temperature only.
One step de-/anti-icing is carried out with an anti-icing fluid, typically heated. The fluid used to de-ice the aircraft remains on aircraft surfaces to provide limited anti-ice capability.
Precipitation: Liquid or frozen water that falls from clouds as rain, drizzle, snow, hail, or sleet.

- Continuous: Intensity changes gradually, if at all.
- Intermittent: Intensity changes gradually, if at all, but precipitation stops and starts at least once within the hour preceding the observation.

Precipitation intensity is an indication of the amount of precipitation falling at the time of observation. It is expressed as light, moderate or heavy. Each intensity is defined with respect to the type of precipitation occurring, based either on rate of fall for rain and ice pellets or visibility for snow and drizzle. The rate of fall criteria is based on time and does not accurately describe the intensity at the time of observation.
Rain (meter code: RA) is a precipitation of liquid water particles either in the form of drops of more than 0.5 mm (0.02 inch) diameter or of smaller widely scattered drops.
Rime (a rough white covering of ice deposited from fog at temperature below freezing). As the fog usually consists of super-cooled water drops, which only solidify on contact with a solid object, rime may form only on the windward side or edges and not on the surfaces. It can generally be removed by brushing, but when surfaces, as well as edges, are covered it will be necessary to use an approved de-icing fluid.
Saturation is the maximum amount of water vapor allowable in the air. It is about 0.5 g/m3 at - 30°C and 5 g/m3 at 0°C for moderate altitudes.
Shear force is a force applied laterally on an anti-icing fluid. When applied to a Type II or IV fluid, the shear force will reduce the viscosity of the fluid; when the shear force is no longer applied, the anti-icing fluid should recover its viscosity. For instance, shear forces are applied whenever the fluid is pumped, forced through an orifice or when subjected to airflow. If excessive shear force is applied, the thickener system could be permanently degraded and the anti-icing fluid viscosity may not recover and may be at an unacceptable level.

SIGMET is information issued by a meteorological watch office concerning the occurrence, or expected occurrence, of specified en-route weather phenomena, which may affect the safety of aircraft operations.

Sleet is a precipitation in the form of a mixture of rain and snow. For operation in light sleet treat as light freezing rain.

Slush is water saturated with snow, which spatters when stepping firmly on it. It is encountered at temperature around 5°C.

Snow (meter code SN): Precipitation of ice crystals, most of which are branched, star-shaped, or mixed with unbranched crystals. At temperatures higher than about -5°C (23°F), the crystals are generally agglomerated into snowflakes.

Dry snow: Snow which can be blown if loose or, if compacted by hand, will fall apart upon release; specific gravity: up to but not including 0.35.

Dry snow is normally experienced when temperature is below freezing and can be brushed off easily from the aircraft.

Wet snow: Snow which, if compacted by hand, will stick together and tend to or form a snowball. Specific gravity: 0.35 up to but not including 0.5.

Wet snow is normally experienced when temperature is above freezing and is more difficult to remove from the aircraft structure than dry snow being sufficiently wet to adhere.

Compacted snow: Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into chunks if picked up. Specific gravity: 0.5 and over.

Snow grains (meter code: SG) is a precipitation of very small white and opaque grains of ice. These grains are fairly flat or elongated. Their diameter is less than 1 mm (0.04 inch). When the grains hit hard ground, they do not bounce or shatter.

Snow pellets (meter code: GS) is a precipitation of white and opaque grains of ice. These grains are spherical or sometimes conical. Their diameter is about 2 to 5 mm (0.1 to 0.2 inch). Grains are brittle, easily crushed; they bounce and break on hard ground.

Super cooled water droplets are a condition where water remains liquid at negative Celsius temperature. Super cooled drops and droplets are unstable and freeze upon impact.

Two-step de-icing/anti-icing consists of two distinct steps. The first step (de-icing) is followed by the second step (anti-icing) as a separate fluid application. After de-icing a separate overspray of anti-icing fluid is applied to protect the relevant surfaces, thus providing maximum possible anti-ice capability.

Visible moisture: Fog, rain, snow, sleet, high humidity (condensation on surfaces), ice crystals or when taxiways and/or runways are contaminated by water, slush or snow.

Visual meteorological conditions: Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

Wet runway: A runway is considered wet when the runway surface is covered with water, or equivalent, less than or equal to 3 mm or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.

8.2.4.2. De-/Anti-Icing Awareness - The Basic Requirements

Responsibility

The person technically releasing the aircraft is responsible for the performance and verification of the results of the treatment. The responsibility of accepting the performed treatment lies, however, with the pilot in command. The transfer of responsibility takes place at the moment the aircraft starts moving under its own power.

Necessity

Icing conditions on ground can be expected when air temperatures approach or fall below freezing and when moisture or ice occurs in the form of either precipitation or condensation.

Aircraft-related circumstances could also result in ice accretion when humid air at temperatures above freezing comes in contact with cold structure.
Checks
Have you enough information and adequate knowledge in order to dispatch.

8.2.4.3 De-/Anti-Icing Aircraft on the Ground: "When, Why and How"

8.2.4.3.1 Communication

To get the highest possible visibility concerning de-/anti-icing, a good level of communication between ground and flight crews is necessary.
Any observations or points significant to the flight or ground crew should be reported between them.
These observations may concern the weather or aircraft-related circumstances or other factors important for the dispatch of the aircraft.
Several incidents have shown that increased awareness of one part of the flight/ground crew team could have avoided a critical situation.
The minimum requirements of communication must comprise the details of when the aircraft was de-iced and the quality of treatment (type of fluid).
This is summarized by the anti-icing code.
Remember: Uncertainty should not be resolved by transferring responsibility. The only satisfactory answer is clear communication.

8.2.4.3.2 Conditions Which Cause Aircraft Icing

- Weather-related conditions

Weather conditions dictate the "when" of the "when, why and how" of aircraft de-/anti-icing on the ground.
Icing conditions on the ground can be expected when air temperatures fall below freezing and when moisture or ice occurs in the form of either precipitation or condensation. Precipitation may be rain, sleet or snow. Frost can occur due to the condensation of fog or mist.
To these weather conditions must be added further phenomena that can also result in aircraft ice accretion on the ground.

- Aircraft-related conditions

The concept of icing is commonly associated only with exposure to inclement weather. However, even if the OAT is above freezing point, ice or frost can form if the aircraft structure is below 0° C (32° F) and moisture or relatively high humidity is present.
With rain or drizzle falling on sub-zero structure, a clear ice layer can form on the wing upper surfaces when the aircraft is on the ground. In most cases this is accompanied by frost on the under-wing surface.

8.2.4.3.3 Checks to Determine the Need to De-Ice/Anti-Ice

8.2.4.3.3.1 The Clean Wing Concept

Why de-ice/anti-ice on ground? The aircraft performance is certified based upon an uncontaminated or clean structure. Ice, snow or frost accumulations will disturb the airflow, affecting lift and drag and also increasing weight. The result on performance can be dramatic.
Aircraft preparation for service begins and ends with a thorough inspection of the aircraft exterior. The aircraft and especially its surfaces providing lift, controllability and stability must be aerodynamically clean. Otherwise, safe operation is not possible.
An aircraft ready for flight must not have ice, snow, slush or frost adhering to its surfaces. Exceptions are sometimes allowed. Refer to FCOM:

- For A320 Supplementary techniques chapter - Adverse weather - Cold weather

But the critical flying surfaces must be free of any contamination.

8.2.4.3.3.2 External Inspection

An aircraft exterior inspection (walk-around) shall be performed prior to each flight. This inspection shall be conducted by one of deck crewmembers or may be delegated to a licensed maintenance Engineer or technician. Pilot in Command must be notified with results of inspection prior to each flight.
An inspection of the aircraft must visually cover all critical parts of the aircraft and be performed from points offering a clear view of these parts ensuring that they are not damaged, obstructed, disabled or contaminated.
These parts are especially:

- wing surfaces including leading edges
- horizontal stabilizer upper and lower surface
- vertical stabilizer and rudder
- fuselage
- air data probes
- static vents
- angle-of-attack sensors
- flight control surfaces and cavities
- engines
- generally, intakes and outlets
- Landing gear and wheel base.
- Aircraft structure or structural components are free of damage.

8.2.4.3.3.3 Clear Ice Phenomenon

Under certain conditions, a clear ice layer or frost can form on the wing upper surfaces when the aircraft is on the ground. In most cases this is accompanied by frost on the under wing surface. Severe conditions occur with precipitation when subzero fuel is in contact with the wing upper surface skin panels.
The clear ice accumulations are very difficult to detect from ahead of the wing or behind during walk-around, especially in poor lighting and when the wing is wet. The leading edge may not feel particularly cold. The clear ice may not be detected from the cabin either because wing surface details show through.
The following factors contribute to the formation intensity and the final thickness of the clear ice layer:

- Low temperature of fuel that was added to the aircraft during the previous ground stop and/or the long airborne time of the previous flight resulting in a situation that the remaining fuel in the wing tanks is below 0° C.
- Abnormally large amount of remaining cold fuel in wing tanks causing the fuel level to be in contact with the wing upper surface panels as well as the lower surface, especially in the wing tank area.
- Temperature of fuel added to the aircraft during the current ground stop, adding (relatively) warm fuel can melt dry, falling snow with the possibility of re-freezing.

Drizzle/rain and ambient temperatures around 0°C on the ground is very critical. Heavy freezing has been reported during drizzle/rain even at temperatures of 8 to 14° C (46 to 57° F).
The use of thermal leading edge anti-icing may melt falling dry snow that re-freezes later.
The area's most vulnerable to freezing are:

- the wing root area between the front and rear spars,
- any part of the wing that will contain unused fuel after flight,
- The areas where different structures of the wing are concentrated (a lot of cold metal), such as areas above the spars and the main landing gear double plate.

8.2.4.3.3.4 General Checks

A recommended procedure to check the wing upper surface is to place high enough steps as close as possible to the leading edge and near the fuselage and climb the steps so that you can touch a wide sector of the tank area by hand. If clear ice is detected, the wing upper surface should be de-iced and then re-checked to ensure that all ice deposits have been removed.
It must always be remembered that below a snow / slush / anti-icing fluid layer there can be clear ice.
During checks on ground, electrical or mechanical ice detectors should only be used as a back-up advisory. They are not a primary system and are not intended to replace physical checks.
Ice can build up on aircraft surfaces when descending through dense clouds or precipitation during an approach.
When ground temperatures at the destination are low, it is possible that when flaps are retracted accumulations of ice may remain undetected between stationary and moveable surfaces. It is therefore important that these areas are checked prior to departure and any frozen deposits removed.
Under freezing fog conditions it is necessary for the rear side of the fan blades to be checked for ice build-up prior to start-up. Any deposits discovered should be removed by directing air from a low flow hot air source, such as a cabin heater, onto the affected areas.
When slush is present on runways, inspect the aircraft when it arrives at the ramp for slush/ice accumulations. If the aircraft arrives at the gate with flaps in a position other than fully retracted, those flaps which are extended must be inspected and, if necessary, de-iced before retraction.
The flight crew operating manual for individual aircraft types may allow take-off with a certain amount of frost on certain parts of the aircraft (refer to the individual FCOM).
It is important to note that the rate of ice formation is considerably increased by the presence of an initial depth of ice. Therefore, if icing conditions are expected to occur along the taxi and take-off path, it is necessary to ensure that all ice and frost is removed before flight. This consideration must extend the awareness of flight crew to include the condition of the taxiway, runway and adjacent areas since surface contamination and blown snow are potential causes for ice accretion equal to natural precipitation.

8.2.4.3.4 Responsibility: The De-Icing/Anti-Icing Decision

Maintenance responsibility
The information report (de-icing/anti-icing code - see 8.2.4.3.5.5) given to the cockpit is a part of the technical airworthiness of the aircraft. The person releasing the aircraft is responsible for the performance and verification of the results of the de/anti-icing treatment. The responsibility of accepting the performed treatment lies, however, with the Pilot in Command.
Operational responsibility
The general transfer of operational responsibility takes place at the moment the aircraft starts moving by its own power.

8.2.4.3.4.1 Maintenance / Ground Crew Decision

The responsible ground crewmember should be clearly nominated. He should check the aircraft for the need to de-ice. He will, based on his own judgment, initiate de-/anti-icing, if required, and he is responsible for the correct and complete de-icing and/or anti-icing of the aircraft.

8.2.4.3.4.2 Pilots Decision

As the final decision rests with the Pilot in Command regarding de-icing/anti-icing whenever deemed necessary, his request will supersede the ground crewmember's judgment not to de-ice/anti-ice.
As the Pilot in Command is responsible for the anti-icing condition of the aircraft during ground maneuvering prior to takeoff, he can request another anti-icing application with a different mixture ratio to have the aircraft protected for a longer period against accumulation of precipitation. Equally, he can simply request a repeat application.
Therefore the Pilot in Command should take into account forecasted or expected weather conditions, taxi conditions, taxi times, holdover time and other relevant factors. The Pilot in Command must, when in doubt about the aerodynamic cleanliness of the aircraft, perform (or have performed) an inspection or simply request a further de-/anti-icing.
Even when responsibilities are clearly defined and understood, enough communication between flight and ground crews is necessary. Any observation considered valuable should be mentioned to the other party to have redundancy in the process of decision making

8.2.4.3.5 The Procedures to De-Ice and Anti-Ice an Aircraft

When aircraft surfaces are contaminated by frozen moisture, they must be de-iced prior to dispatch. When freezing precipitation exists and there is a risk of precipitation adhering to the surface at the time of dispatch, aircraft surfaces must be anti-iced. If both anti-icing and de-icing are required, the procedure may be performed in one or two steps. The selection of a one or two step process depends upon weather conditions, available equipment, available fluids and the holdover time required to be achieved.
When a large holdover time is expected or needed, a two-step procedure using undiluted fluid should always be considered for the second step.

8.2.4.3.5.1 De-Icing

Ice, snow, slush or frost may be removed from aircraft surfaces by heated fluids or mechanical methods or any other approved methods such as infrared de-icing which is being developed.
For maximum effect, fluids shall be applied close to the aircraft surfaces to minimize heat loss.
Different methods to efficiently remove frost, snow, and ice are described in detail in the ISO method specification.

- General de-icing fluid application strategy

The following guidelines describe effective ways to remove snow and ice.
However, certain aircraft may require unique procedures to accommodate specific design features. The relevant aircraft maintenance or servicing manuals should be consulted.
Wings/horizontal stabilizers: Spray from the tip towards the root, from the highest point of the surface camber to the lowest.
Vertical surfaces: Start at the top and work downward.
Fuselage: Spray along the top centerline and then outboard; avoid spraying directly onto windows.
Landing gear and wheel base: Keep application of de-icing fluid in this area to a minimum. It may be possible to mechanically remove accumulations such as blown snow. However, where deposits have bonded to surfaces they can be removed using hot air or by careful spraying with hot de-icing fluids. It is not recommended to use a high-pressure spray.
Engines: Deposits of snow should be mechanically removed (for example using a broom or brush) from engine intakes prior to departure. Any frozen deposits that may have bonded to either the lower surface of the intake or the fan blades may be removed by hot air or other means recommended by the engine manufacturer.

8.2.4.3.5.2 Anti-Icing

Applying anti-icing protection means that ice, snow or frost will, for a period of time, be prevented from adhering to, or accumulating on, aircraft surfaces. This is done by the application of anti-icing fluids.
Anti-icing fluid should be applied to the aircraft surfaces when freezing rain, snow or other freezing precipitation is falling and adhering at the time of aircraft dispatch.
For an effective anti-icing protection an even film of undiluted fluid is required over the aircraft surfaces which are clean or which have been de-iced. For maximum anti-icing protection undiluted, unheated Type II or IV fluid should be used. The high fluid pressures and flow rates normally associated with de-icing are not required for this operation and, where possible, pump speeds should be reduced accordingly. The nozzle of the spray gun should be adjusted to give a medium spray.
The anti-icing fluid application process should be continuous and as short as possible. Anti-icing should be carried out as near to the departure time as is operationally possible in order to maintain holdover time.
In order to control the uniformity, all horizontal aircraft surfaces must be visually checked during application of the fluid. The amount required will be a visual indication of fluid just beginning to drip off the leading and trailing edges.
Most effective results are obtained by commencing on the highest part of the wing section and covering from there towards the leading and trailing edges. On vertical surfaces, start at the top and work down.
Surfaces to be protected during anti-icing are:

- Wing upper surface
- Horizontal stabilizer upper surface
- Vertical stabilizer and rudder
- Fuselage depending upon amount and type of precipitation

Type I fluids have limited effectiveness when used for anti-icing purposes. Little benefit is gained from the minimal holdover time generated.

8.2.4.3.5.3 Limits and Precautions

- Aircraft related limits

The use of Type II or IV fluids in 100% concentration or 75/25 mixture is limited to aircraft with a rotation speed (VR) higher than 85kt. This is to assure the sufficient flow-off of the fluid during take-off.

- Temperature limits

When performing two-step de-icing / anti-icing, the freezing point of the heated fluid used for the first step must not be more than 3°C above ambient temperature.
The freezing point of the Type I fluid mixture used for either one-step de-icing / anti-icing or as the second step in a two-step operation shall be at least 10°C below the ambient temperature.
Type II and IV fluids used as de-icing / anti-icing agents have a lower temperature application limit of -25°C.
The application limit may be lower, provided that a 7°C buffer is maintained between the freezing point of the undiluted fluid and the outside air temperature. Freezing points are provided in the fluid manufacturer's documentation.

- Application limits under no circumstances can an aircraft that has been anti-iced receive a further coating of anti-icing fluid directly on top of the existing film.

In continuing precipitation, the original anti-icing coating will be diluted at the end of the holdover time and re-freezing could begin. Also a double anti-ice coating should not be applied because the flow-off characteristics during take-off may be compromised. Should it be necessary for an aircraft to be re-protected prior to the next flight, the external surfaces must first be de-iced with a hot fluid mix before a further application of anti-icing fluid is made.

- Precautions

The fluids used should be limited to those complying respectively with standards AMS 1424B/ISO 11075 and AMS 1428C/ISO 11078 for Type I, Type II and Type IV.
AMS 1428C reflects the additional requirements for fluid dry out and flow off behavior for type IV fluids.
With specific regard to the application of Type IV fluids, and indeed Type II fluids, special care needs to be taken. Repeated application in dry conditions, as a preventive measure, may leave a residue that when exposed to precipitation can dehydrate.
This takes the form of a high freeze point gel in aerodynamically quiet areas of the aircraft. This gel could lead to the restricted movement of control surfaces. To date this has only been reported on aircraft types with empowered flying controls and has not been reported on Airbus aircraft.
Therefore the aircraft should be frequently cleaned of any residue and/or de-iced using a heated Type I fluid or hot water prior to the application of Type II or Type IV fluids (two-step process).
De/anti-icing activities should only be carried out by personnel that are fully trained to ISO, SAE or AEA standards and furthermore that those persons understand their responsibilities and are authorized/approved to carry out such activities.
For de/anti-icing activities the following standards should be followed:

- ISO 11076 aircraft de-icing/anti-icing methods with fluids.
- SAE ARP 4737E aircraft de-icing/anti-icing methods with fluids.
- AEA recommendations for the de-icing/anti-icing of aircraft on ground,

In order to fully benefit from the longer hold over times of Type IV fluids, they must be used undiluted. Diluted Type IV are only tested to the same specification as a Type II fluid.
The aircraft must always be treated symmetrically - the left hand and right-hand sides (e.g. left wing/right wing) must receive the same and complete treatment.

Engines are usually not running or are at idle during treatment. Air conditioning should be selected OFF. The APU may be run for electrical supply but the bleed air valve should be closed.

All reasonable precautions must be taken to minimize fluid entry into engines, other Intakes / outlets and control surface cavities.

Do not spray de-icing / anti-icing fluids directly onto exhausts or thrust reversers.

De-icing / anti-icing fluid should not be directed into the orifices of pitot heads, static vents or directly onto angle-of-attack sensors.

Do not direct fluids onto Flight Crew or cabin windows because this can cause Cracking of acrylics or penetration of the window sealing.

All doors and windows must be closed to prevent:

- galley floor areas being contaminated with slippery de-icing/anti-icing fluids
- Upholstery becoming soiled.

Any forward area from which fluid may blow back onto windscreens during taxi or subsequent take-off should be free of fluid residues prior to departure. If Type II or IV fluids are used, all traces of the fluid on flight deck windows should be removed prior to departure, particular attention being paid to windows fitted with wipers.

De-icing/anti-icing fluid can be removed by rinsing with clear water and wiping with a soft cloth. Do not use the windscreen wipers for this purpose. This will cause smearing and loss of transparency.

Landing gear and wheel bays must be kept free from build-up of slush, ice or accumulations of blown snow.

Do not spray de-icing fluid directly onto hot wheels or brakes.

When removing ice, snow or slush from aircraft surfaces, care must be taken to prevent it entering and accumulating in auxiliary intakes or control surface hinge areas, i.e. remove snow from wings and stabilizer surfaces forward towards the leading edge and remove from ailerons and elevators back towards the trailing edge.

Do not close any door until all ice has been removed from the surrounding area.

A functional flight control check using an external observer may be required after de-icing / anti-icing. This is particularly important in the case of an aircraft that has been subjected to an extreme ice or snow covering.

8.2.4.3.5.4 Checks

- Final check before aircraft dispatch

No aircraft should be dispatched for departure under icing conditions or after a deicing / anti-icing operation unless the aircraft has received a final check by a responsible authorized person. The inspection must visually cover all critical parts of the aircraft and be performed from points offering sufficient visibility on these parts (e.g. from the de-icier itself or another elevated piece of equipment). It may be necessary to gain direct access to physically check (e.g. by touch) to ensure that there is no clear ice on suspect areas.

- Pre takeoff check

When freezing precipitation exists, it may be appropriate to check aerodynamic surfaces just prior to the aircraft taking the active runway or initiating the take-off roll in order to confirm that they are free of all forms of frost, ice and snow. This is particularly important when severe conditions are experienced, or when the published holdover times have either been exceeded or are about to run out.

When deposits are in evidence it will be necessary for the de-icing operation to be repeated.

If the take-off location cannot be reached within a reasonable time and/or a reliable check of the wing upper surface status cannot be made from inside the aircraft, consider a repeat aircraft treatment.
If aircraft surfaces cannot adequately be inspected from inside the aircraft, it is desirable to provide a means of assisting the flight crew in determining the condition of the aircraft. The inspection should be conducted as near as practical to the beginning of the departure runway.
When airport configuration allows, it is desirable to provide de-icing/anti-icing and inspection of aircraft near the beginning of departure runways to minimize the time interval between aircraft de-icing / anti-icing and take-off, under conditions of freezing precipitation.

8.2.4.3.5.5 Flight Crew Information - Communication

No aircraft should be dispatched for departure after a de-icing / anti-icing operation unless the flight crew has been notified of the type of de-icing / anti-icing operation performed. The ground crew must make sure that the flight crew has been informed. The flight crew should make sure that they have the information.
This information includes the results of the final inspection by qualified personnel, indicating that the aircraft critical parts are free of ice, frost and snow. It also includes the necessary anti-icing codes to allow the flight crew to estimate the holdover time to be expected under the prevailing weather conditions.

- Anti-icing codes

It is essential that flight crew receives clear information from ground personnel as to the treatment applied to the aircraft.
This gives flight crew the minimum details to assess holdover times. The use of local time is preferred but, in any case, statement of the reference is essential. This information must be recorded and communicated to the flight crew by referring to the last step of the procedure.
Examples of anti-icing codes:
AEA Type II/75/16.43 local/FRA 19 Jan 02
AEA Type II: Type of fluid used
75: Percentage of fluid/water mixtures by volume 75% fluid/25% water
16.43: Local time of start of last application
19 Jan 02: Date

ISO Type I/50:50/06.30 UTC/ 19 Jan 02
50:50: 50% fluid / 50 % water
06.30: Time (UTC) of start of last application
Standard communication terminology

- De-icing/anti-icing supervisor:

"Set parking brakes, confirm aircraft is ready for treatment, inform any special requests"

- Pilot In Command:

"Brakes are set, you may begin treatment and observe… (Any special requests like: ice under wing/flaps, clear ice on top of wing, snow on fuselage, ice on landing gear, anti-ice type IV…)"

- De-icing/anti-icing supervisor:

"We begin treatment and observe… (Special requests mentioned above). I will call you back when ready".
Only after equipment is cleared from aircraft and all checks are made:

- De-icing/anti-icing supervisor:

"De-icing/anti-icing completed. Anti-icing code is… (Plus any additional info needed). I am disconnecting, standby for clear signal at right/left and/or contact ground/tower for taxi clearance".

- Pilot in Command:

"De-icing/anti-icing completed, anti-icing code is…"

- Fluid application and holdover time guidelines

Holdover protection is achieved by anti-icing fluids remaining on and protecting aircraft surfaces for a period of time.

With a one-step de/anti-icing operation holdover begins at the start of the operation and with two-step, at the start of the second (anti-icing) step. Holdover time will have effectively run out, when frozen deposits start to form/accumulate on aircraft surfaces.

Due to its properties Type I fluid forms a thin liquid wetting film, which gives a rather limited holdover time, depending on weather conditions. With this type of fluid increasing the concentration of fluid in the fluid/water mix would provide no additional holdover time.

Type II and Type IV fluids contain a thickener which enables the fluid to form a thicker liquid wetting film on external surfaces. This film provides a longer holdover time, especially in conditions of freezing precipitation. With this type of fluid additional holdover time will be provided by increasing the concentration of fluid in the fluid/water mix, with maximum holdover time available from undiluted fluid.

The tables 3, 4 and 5 hereafter give an indication of the time frame of protection that could reasonably be expected under conditions of precipitation.

However, due to the many variables that can influence holdover times, these times should not be considered as minimum or maximum as the actual time of protection may be extended or reduced, depending upon the conditions existing at the time.

The lower limit of the published time span is used to indicate the estimated time of protection during heavy precipitation and the upper limit, the estimated time of protection during light precipitation

> Caution
>
> The times of protection represented in these tables are for general information purposes only. They are taken from the ISO/SAE specification, however local authority requirements may differ.
>
> The time of protection will be shortened in severe weather conditions. Heavy precipitation rates or high moisture content, high wind velocity and jet blast may cause a degradation of the protective film. If these conditions occur, the time of protection may be shortened considerably. This is also the case when the aircraft skin temperature is significantly lower than the outside air temperature.
>
> The indicated times should therefore only be used in conjunction with a pre-takeoff check.

Table 1 -Guidelines for the application of Type I fluid/water mixtures (minimum concentrations)

As a function of OAT

OAT	One-Step Procedure	Two-Step Procedure	
	De-icing/Anti-icing	First step: De-icing	Second step: Anti-icing (1)
-3 °C (27 °F) and above	Heated fluid/water mixture with a	Heated water or a heated fluid/water mixture	Heated fluid/water mixture with a freezing point of at least 10 °C (18 °F) below OAT

below -3 ˚C (27 ˚F) down to LOUT	freezing point of at least 10 °C (18 ˚F) below OAT	Heated fluid/water mixture with a freezing point not more than 3 ˚C (5 ˚F) above OAT	
(1) To be applied before first step fluid freezes.			
NOTE 1: Temperature of water or fluid/water mixtures shall be at least 60 °C (140 °F) at the nozzle. Upper temperature limit shall not exceed fluid and aircraft manufacturer's recommendations. **NOTE 2:** This table is applicable for the use of Type I Holdover Time Guidelines. If holdover times are not required, a temperature of 60 °C (140 °F) at the nozzle is desirable. **NOTE 3:**To use Type I Holdover Time Guidelines, at least 1 liter/m^2 (~2 Gals/100ft^2) must be applied To the de-iced surfaces. **CAUTION:** Wing skin temperatures may be lower than OAT. If this condition is identified, a stronger Mixture (more glycol) may need to be used to ensure a sufficient freezing point buffer.			

Table 2 -Guidelines for the application of Type II, Type III, and Type IV fluid/water mixtures (Minimum concentrations) as a function of OAT

OAT (1)	Concentration of neat fluid/water mixture in Vol%/Vol%		
	One-Step Procedure	Two-Step Procedure	
	De-icing/ Anti-icing	First step: De-icing	Second step: Anti-icing (2)
-3 ~C (27 ~F) and above	50/50 Heated (3) Type II, III, or IV fluid/water mixture	Heated water or a heated Type I, II, III, or IV fluid/water mixture	**50/50** Type II, III, or IV fluid/water mixture
below -3 ~C (27 ~F) to -14 ~C (7 ~F)	**75/25** Heated **(3)** Type II, III **(4)**, or IV fluid/water mixture	Heated Type I, II, III, or IV fluid/water mixture with a freezing point not more than 3 ~C (5 ~F) above OAT	**75/25** Type II, III **(4)**, or IV fluid/water mixture
below -14 ~C (7 ~F) to -25 ~C (- 13 ~F)	**100/0** Heated **(3)** Type II, III **(4)**, or IV	Heated Type I, II, III, or IV fluid/water mixture with a freezing point not more than 3 ~C (5 ~F) above OAT	**100/0** Type II, III **(4)**, or IV

below -25 °C (- 13 ˚F)	Type II/Type III/Type IV fluid may be used below -25 ˚C (-13 ˚F) provided that the freezing point of the fluid is at least 7 ˚C (13 ˚F) below OAT and that aerodynamic acceptance criteria are met (LOUT). NOTE: Type II/Type III/Type IV fluid may not be used below -25°C (-13°F) in active frost conditions Consider the use of Type I fluid/water mixture when Type II, III, or IV fluid cannot be used (see Table 1).
	1) Fluids must only be used at temperatures above their LOUT. 2) To be applied before first step fluid freezes. 3) Clean airplanes may be anti-iced with unheated fluid. Type III fluid may be used below -10 ˚C (14 ˚F) provided that the freezing point of the fluid is at least 7 ˚C (13 ˚F) below OAT and that aerodynamic

NOTE: For heated fluid and fluid mixtures, a temperature not less than 60 ˚C (140 ˚F) at the Nozzle is desirable. When the first step is performed using a fluid/water mixture with A freezing point above OAT, the temperature at the nozzle shall be at least 60 °C (140 °F) and at least 1 liter/m^2 (~2 Gals/100 ft^2) must be applied to the surfaces to be de-iced.
Upper temperature limit shall not exceed fluid and aircraft manufacturer's recommendations.
CAUTION: Wing skin temperatures may be lower than OAT. If this condition is identified, it shall Be verified if a stronger mixture (more glycol) may need to be used to ensure a sufficient freezing point buffer. As fluid freezing may occur, 50/50 Type II, III, or IV fluid shall not be used for the anti-icing step of a cold soaked wing as indicated by frost or ice on the lower surface of the wing in the area of the fuel tank.
CAUTION: An insufficient amount of anti-icing fluid, especially in the second step of a two step Procedure, may cause a substantial loss of holdover time.
This is particularly true when using a Type I fluid mixture for the first step (de-icing).
CAUTION: Some fluids shall only be used undiluted. For some fluids the lowest operational use Temperature (LOUT) may differ. For details refer to fluid manufacturer's documentation.

Table 3 - Guidelines for holdover times anticipated for Type I, II, III and IV fluid mixtures in Active Frost Conditions as a function of OAT (Valid for metallic and composite surfaces)

Approximate Holdover Time (hours: minutes) Active Frost	OAT	Type II, III, and IV Fluid	Approximate Holdover Times (hours: minutes) Active Frost

Type I (1) (2)	°C	°F	Concentration Neat Fluid/Water	Type II (3)	Type III (3)	Type IV (3)
00:35	-1 and above	30 and above	100/0	8:00	2:00	12:00
			75/25	5:00	1:00	5:00
			50/50	3:00	0:30	3:00
	below -1 to -3	below 30 to 27	100/0	8:00	2:00	12:00
			75/25	5:00	1:00	5:00
			50/50	1:30	0:30	3:00
	below -3 to -10	below 27 to 14	100/0	8:00	2:00	10:00
			75/25	5:00	1:00	5:00
	below -10 to -14	below 14 to 7	100/00	6:00	2:00	6:00
			75/25	1:00	1:00	1:00
	below -14 to -21	below 7 to -6	100/0	6:00	2:00	6:00
	below -21 to -25	below -6 to -13	100/0	2:00	2:00	4:00

1. Type I fluid/water mixture is selected so that the freezing point of the mixture is at least 10 °C (18 °F) below the outside air temperature.
2. May be used below -25 °C (-13 °F) provided the lowest operational use temperature (LOUT) of the fluid is respected.
3. These fluids may not be used below -25 °C (-13 °F) in active frost conditions.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight

Table 4 - Guidelines for holdover times anticipated for Type I fluid mixtures as a function of weather conditions and OAT (Valid for metallic and composite surfaces)

OAT (1)		Approximate Holdover Times under various weather conditions (hours: minutes)					
°C	°F	Freezing Fog	Snow/ Snow Grains/ Snow Pellets **(2)**	Freezing Drizzle	Light Freezing Rain	Rain on Cold Soaked Wing	Other(4) (5)
-3 and above	27 and above	00:09 - 0:16	0:03 - 0:06	0:08 - 0:13	0:02 - 0:05	0:01 - 0:05 **(6)**	
below-3 to -6	below 27 to 21	0:06 - 0:08	0:02 - 0:05	0:05 - 0:09	0:02 - 0:05		

below-6 to -10	below 21 to 14	0:04 - 0:08	0:02 - 0:05	0:04 - 0:07	0:02 - 0:05	
below-10	below14	0:04- 0:07	0:02 - 0:04	CAUTION No Holdover Time Guidelines exist		

1. Ensure that the lowest operational use temperature (LOUT) is respected.
2. In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times
3. If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times
4. Other conditions are: Heavy snow, ice pellets, hail, moderate freezing rain and heavy freezing rain
5. For holdover times under active frost conditions see the separate frost table (Table 3)
6. No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

Type I Fluid/water Mixture is selected so that the Freezing Point of the mixture is at least 10 °C (18 °F) below actual OAT

CAUTION: The time of protection will be shortened in heavy weather conditions. Heavy precipitation rates or high moisture content, high wind velocity or jet blast may reduce holdover time below the lowest time stated in the range.

Holdover time may also be reduced when the aeroplane skin temperature is lower than OAT. Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Table 5 -Guidelines for holdover times anticipated for Type II fluid mixtures as a function of weather conditions and OAT
(Valid for metallic and composite surfaces)

OAT (1)		**Type II Fluid Concentration** Neat-Fluid/ Water (Vol %/Vol %)	Approximate Holdover Times under various weather conditions (hours: minutes)					
°C	°F		Freezing Fog	Snow/ Snow Grains/ Snow (Pellets 2	Freezing Dry (3)	Light Freezing Rain	Rain on Cold Soaked Wing	Other (4)(5)
-3 and above	27 and above	100/0	0:35 - 1:30	0:20 - 0:45	0:30 - 0:55	0:15 - 0:30	0:08 - 0:40 (6)	
		75/25	0:25 - 1:00	0:15 - 0:30	0:20 - 0:45	0:10 - 0:25	0:05 - 0:25 (6)	
		50/50	0:15 - 0:30	0:05 - 0:15	0:08 - 0:15	0:05 - 0:09		
below -3 to -14	below 27 to 7	100/0	0:20 - 1:05	0:15 - 0:30	0:20 - 0:45 (7)	0:10 - 0:20 (7)		

		75/25	0:25 - 0:50	0:10 - 0:20	0:15 - 0:30 (7)	0:08 - 0:15 (7)		
below -14 to -25 or LOUT	below 7 to -13 or LOUT	100/0	0:15 - 0:35	0:15 - 0:30	CAUTION No Holding Time Guidelines exist			

1. Ensure that the lowest operational use temperature (LOUT) is respected. Consider the use of Type I fluid when Type II fluid cannot be used.
2. In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times
3. If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times
4. Other conditions are: Heavy snow, ice pellets, moderate and heavy freezing rain, hail
5. For holdover times under Active Frost conditions see the separate frost table (Table 3)
6. No holdover time guidelines exist for this condition for 0 °C (32 °F) and below
7. No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTION: The time of protection will be shortened in heavy weather conditions. Heavy precipitation rates or high moisture content, high wind velocity or jet blast may reduce holdover time below the lowest time stated in the range.

Holdover time may also be reduced when the aeroplane skin temperature is lower than OAT. Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Table 6 -Guidelines for holdover times anticipated for Type III fluid mixtures as a function of weather conditions and OAT

(Valid for metallic and composite surfaces)

OAT (1)		**Type III Fluid Concentration**	Approximate Holdover Times under various weather conditions (hours: minutes)					
°C	°F	Neat Fluid/ Water (Vol %/Vol %)	Freezing Fog	Snow/ Snow Grains/ Snow Pellets **(2)**	Freezing Drizzle (3)	Light Freezing Rain	Rain on Cold Soaked Wing	Other (4) (5)
-3 and above	27 and above	100/0	0:20 - 0:40	0:10 - 0:20	0:10 -0:20	0:08 - 0:10	0:06 - 0:20 **(6)**	CAUTION No Holdover Time Guidelines exist
		75/25	0:15 - 0:30	0:08 - 0:15	0:08 -0:15	0:06 - 0:10	0:02 - 0:10 **(6)**	
		50/50	0:10 - 0:20	0:04 - 0:08	0:05 -0:09	0:04 - 0:06		
below -3 to -10	below 27 to 14	100/0	0:20 - 0:40	0:09 - 0:15	0:10 -0:20	0:08 - 0:10		
		75/25	0:15 - 0:30	0:07 - 0:10	0:09 -0:12	0:06 - 0:09		

below -10	below 14	100/0	0:20 - 0:40	0:08 - 0:15	

1. Ensure that the lowest operational use temperature (LOUT) is respected. Consider the use of Type I fluid when Type III fluid cannot be used.
2. In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times
3. If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times
4. Other conditions are: Heavy snow, ice pellets, moderate and heavy freezing rain, hail
5. For holdover times under active frost conditions see the separate frost table (Table 3)
6. No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

CAUTION: The time of protection will be shortened in heavy weather conditions. Heavy precipitation rates or high moisture content, high wind velocity or jet blast may reduce holdover time below the lowest time stated in the range.

Holdover time may also be reduced when the aeroplane skin temperature is lower than OAT. Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Table 7 -Guidelines for holdover times anticipated for Type IV fluid mixtures as a function of weather conditions and OAT

(Valid for metallic and composite surfaces)

OAT (1)		**Type IV Fluid Concentration**	Approximate Holdover Times under various weather conditions (hours: minutes)					
°C	°F	Neat Fluid/ Water (Vol %/Vol %)	Freezing Fog	Snow/ Snow Grains/ Snow Pellets	Freezing Drizzle (3)	Light Freezing Rain	Rain on Cold Soaked Wing	Other (4) (5)
-3 and above	27 and above	100/0	1:55 -3:10	0:35 - 1:15	0:45 – 1:30	0:25 - 0:40	0:10 - 1:15 (6)	
		75/25	1:05 - 1:45	0:30 - 0:55	0:45 – 1:10	0:30 – 0:45	0:09 - 0:50 (6)	
		50/50	0:15 - 0:35	0:07 - 0:15	0:15 - 0:20	0:08 - 0:10		
below -3 to -14	below 27 to 7	100/0	0:20 - 1:20	0:25 - 0:50	0:20 - 1:00 (7)	0:10 - 0:25 (7)		
		75/25	0:25 - 0:50	0:20 - 0:35	0:15 – 1:05 (7)	0:10 - 0:25 (7)		
below -14 to -25 or LOUT	below 7 to -13 or LOUT	100/0	0:15 - 0:40	0:15 - 0:30	CAUTION No Holdover Time Guidelines exist			

1. Ensure that the lowest operational use temperature (LOUT) is respected. Consider the use of Type I fluid when Type IV fluid cannot be used.
2. In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times
3. If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times
4. Other conditions are: Heavy snow, ice pellets, moderate and heavy freezing rain, hail
5. For holdover times under Active Frost conditions see the separate frost table (Table 3)
6. No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

7. No holdover time guidelines exist for this condition below -10 °C (14 °F)

CAUTION: The time of protection will be shortened in heavy weather conditions. Heavy precipitation rates or high moisture content, high wind velocity or jet blast may reduce holdover time below the lowest time stated in the range.
Holdover time may also be reduced when the aeroplane skin temperature is lower than OAT. Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.
De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

8.2.4.3.6. Pilot Techniques

The purpose of this section is to deal with the issue of ground de-icing/anti-icing from the pilot's point of view. The topic is covered in the order it appears on cockpit checklists and is followed through, step by step, from flight preparation to take-off.
The focus is on the main points of decision-making, flight procedures and pilot techniques.
For additional information refer to FCOM:

- For A320

Supplementary techniques chapter - Adverse weather - Cold weather
8.2.4.3.6.1. Receiving Aircraft
When arriving at the aircraft, local advice from ground maintenance staff may be considered because they may be more familiar with local weather conditions. If there is nobody available or if there is any doubt about their knowledge concerning de-icing/anti-icing aspects, pilots have to determine the need for de-icing/anti-icing by themselves.
Checks for the need to de-ice/anti-ice are presented in section 8.2.4.3.3 and the methods in section 8.2.4.3.5.
If the prevailing weather conditions call for protection during taxi, pilots should try to determine «off block time» to be in a position to get sufficient anti-icing protection regarding holdover time.
This message should be passed to the de-icing/anti-icing units, the ground maintenance, the boarding staff, dispatch office and all other units involved.
8.2.4.3.6.2. Cockpit Preparation
Before treatment, avoid pressurizing or testing flight control systems. Try to make sure that all flight support services are completed prior to treatment to avoid any delay between treatment and start of taxiing.
During treatment observe that:

- engines are shut down or at idle
- APU may be used for electrical supply, bleed air OFF
- air conditioning should be OFF
- All external lights of treated areas must be OFF.

Consider whether communication and information with the ground staff is/has been adequate.
The minimum requirement is to receive the anti-icing code in order to figure out the available protection time from the holdover timetable.
Do not consider the information given in the holdover timetables as precise. There are several parameters influencing holdover time.
The time frames given in the holdover timetables consider the very different weather situations world-wide. The view of the weather is rather subjective; experience has shown that a certain snowfall can be judged as light, medium or heavy by different people. If in doubt, a pre-take-off check should be considered.
As soon as the treatment of the aircraft is completed, proceed to engine starting.
Regarding responsibility and decision, see section 8.2.4.3.4.

8.2.4.3.6.3. Taxiing
During taxiing, the flight crew should observe the intensity of precipitation and keep an eye on the aircraft surfaces visible from the cockpit. Ice warning systems of engines and wings or other additional ice warning systems must be considered.
Sufficient distance from the preceding aircraft must be maintained as blowing snow or jet blasts can degrade the anti-icing protection of the aircraft.
The extension of slats and flaps should be delayed, especially when operating on slushy areas. However, in this case slat/flap extension should be verified prior to take-off.
8.2.4.3.6.4. Take-off
Recommendations given in FCOM of individual aircraft types regarding performance corrections (effect of engine bleeds) or other procedures applied when operating in icing conditions should be considered.
8.2.4.3.6.5. General Remarks
In special situations, flight crews must be encouraged not to allow operational or commercial pressures to influence decisions. The minimum requirements have been presented here, as well as the various precautions.
If there is any doubt as to whether the wing is contaminated or the performance and/or controllability of the aircraft is affected – DO NOT commence take off.
As in any other business, the key factors to keep procedures efficient and safe are awareness, understanding and communication.
If there is any doubt or question at all, ground and flight crews must communicate with each other.

8.2.4.4.1. Aerodynamics and the Contaminated Wing

Aircraft designers do their best to ensure airframes have smooth surfaces to ease the surrounding airflow. This rule is applied with special care to the wing leading edge and upper surface, because smoothness in these areas produces the best lift force.
Any type of ice accretion is an obstacle to smooth airflow. Any obstacle will slow the airflow down and introduce turbulence. That will degrade the lifting performance of the wing.
Both the maximum lift and the maximum achievable angle of attack have been decreased. The mechanism by which lift is affected has to do with the evolution of the boundary layer along the wing chord.
The boundary layer is thicker and more turbulent along the wing chord, and therefore, flow separation will occur at a lower angle of attack. Stall speed will be increased. Note how insidious that effect is, because at a moderate angle of attack, lift is about the same, as seen in figure 1.
As it is not possible to take into account the whole possible variety of ice shapes, Airbus has defined procedures based on the worst possible ice shapes, as tested in flight with artificial ice shapes. As a consequence, in case of icing conditions, minimum speeds are defined allowing keeping adequate margins in terms of maneuverability relative to the actual stall with ice accretions. For example, when landing in configuration FULL with ice shapes, speed must be above VREF+5 kt. However, for the Airbus Fly-By-Wire system, the settings of the alpha protection system have been adjusted with ice shapes. This means that the aircraft remains protected in case of ice accretions. In turn, this means also that there is an increased margin relative to the stall in the normal clean wing status.
In the case of ground icing, a similar result will be reached because the boundary layer will thicken more rapidly along the chord. Earlier separation will occur, resulting in lower max angle of attack and max lift. As a relatively high angle of attack is normally reached during the takeoff rotation, it is easy to understand that wings must be cleaned prior to takeoff.

Even the very thin layer of velvet morning frost must be cleared. Thickness may be very small, but it covers 100% of the upper wing surface and the rate of thickening of the boundary layer along the wing chord is still considerable. That is a threat for takeoff, as nothing tells the pilot that he might not have the desirable lift for lift-off.
This also applies to the tail plane. Ice deposits must be cleared off tail plane before takeoff to provide the expected rotation efficiency.
If the lower airframe structure has been extensively slushed during taxi time, it might be advisable not to takeoff. The slush would freeze in flight, and an incident on landing gear Retraction might occur. Upon return to the gate, braking should be cautious and slats and flaps should not be retracted prior to cleaning.
Frost initially forms as individual grains about 0.004 inch (0.1 mm) in diameter.
Additional build-up comes through grain growth to 0.010/0.015 inch (0.25/0.38 mm) in diameter, grain layering, and the formation of frost needles.
Available test data indicate that a limited thickness of frost on the wing lower surface will have no significant effect on lift. Airbus aircraft may be dispatched for flight with slight amounts (less than 3 mm) of frost adhering to the fuel tank areas of wing undersurfaces (Refer to FCOM).
During these conditions, clear ice will form on the upper side of the wing, especially if there is cold fuel in contact with the upper wing skin.

8.2.4.4.2. Fluid Characteristics and Handling

8.2.4.4.2.1. De-Icing/Anti-Icing Fluids - Characteristics

Although numerous fluids are offered by several manufacturers worldwide, fluids can be principally divided in two classes, Type I and Type II/IV fluids.

- ➢ Type I fluid characteristics
- No thickener system
- Minimum 80 percent glycol content
- Viscosity depends on temperature
- Newtonian fluid
- Relatively short holdover time

Depending on the respective specification, they contain at least 80 percent per volume of either monoethylene-, ethylene- or monopropyleneglycol or a mixture of these glycols. The rest comprises water, inhibitors and wetting agents. The inhibitors act to restrict corrosion, to increase the flash point or to comply with other requirements regarding materials' compatibility and handling. The wetting agents allow the fluid to form a uniform film over the aircraft's surfaces.
Type I fluids show a relatively low viscosity which only changes depending on temperature. Glycols can be well diluted with water.
The freezing point of a water/glycol mixture varies with the content of water, whereas the concentrated glycol does not show the lowest freezing point; this is achieved with a mixture of approximately 60 percent glycol and 40 percent water (freezing point below -50°C). The Freezing point of the concentrated monoethylene, ethylene or propylene glycol is in the range of -10°C.
Therefore Type I fluids are normally diluted with water of the same volume. This 50/50 mixture has a lower freezing point than the concentrated fluid and, due to the lower viscosity, it flows off the wing much better.

- ➢ Type II/IV fluid characteristics
- With thickener system
- Minimum 50 percent glycol
- Viscosity depends on temperature and shear rates to which the fluid is exposed

- Pseudo-plastic or non-Newtonian fluid
- Relatively long holdover time

Type II/IV fluids contain at least 50 percent per volume monoethylene-, ethylene- or propylene glycol, different inhibitors, wetting agents and a thickener system giving the fluid a high viscosity. The rest is water.
Although the thickener content is less than one percent, it gives the fluid particular properties. The viscosity of the fluid and the wetting agents causes the fluid to disperse onto the sprayed aircraft surface, and acts like a protective cover.
The fundamental idea is a lowering of the freezing point. Due to precipitation such as snow, freezing rain or any other moisture, there is a dilution effect on the applied fluid. This leads to a gradual increase of the freezing point until the diluted fluid layer is frozen due to the low ambient temperature. By increasing the viscosity, a higher film thickness exists having a higher volume which can therefore absorb more water before freezing point is reached. In this way the holdover time is increased.
The following summarizes the properties of particular constituents of Type II and IV fluids:

- The **glycol** in the fluid reduces the freezing point to negative ambient temperatures.
- The **wetting agent** allows the fluid to form a uniform film over the aircraft's surfaces.
- The **thickening agent** in Type II and IV fluids enables the film to remain on the aircraft's surfaces for longer periods.

Type II and IV fluids can be diluted with water. Because of the lower glycol content, compared to the Type I fluids, the freezing point rises all the time as water is added.
The viscosity of Type II and IV fluids is a function of the existing shear forces. Fluids showing decreasing viscosity at increasing shear forces have pseudo-plastic or non-Newtonian flow properties.
During aircraft take-off, shear forces emerge parallel to the airflow at the fluid and aircraft surface. With increasing speed, the viscosity decreases drastically and the fluid flows off the wing.
The protective effect of the Type II and IV fluids is much better when compared to the Type I fluids. Therefore, they are most efficient when applied during snowfall, freezing rain and/or with long taxiways before take-off.
Type II/IV and Type I fluids can all be diluted with water. This may be done if due to weather conditions, no long conservation time is needed or higher freezing points are sufficient.
All above types of fluid have to meet the specified anti-icing performance and aerodynamic performance requirements as established in the respective specifications (ISO, SAE, AEA). This has to be demonstrated by the fluid manufacturer.

82.4.4.2.2. Fluid Handling

General
De-icing/anti-icing fluids are chemical products with an environmental impact. During fluid handling, avoid any unnecessary spillage, comply with local environmental and health laws and the manufacturer's safety data sheet.
Mixing of products from different suppliers is generally not allowed and needs extra qualification testing.
Slippery conditions due to the presence of fluid may exist on the ground or on equipment following the de-icing/anti-icing procedure. Caution should be exercised due to increased slipperiness, particularly under low humidity or non-precipitating weather conditions.
Fluid handling equipment
The following information is generally valid for all types of fluid, but especially for Type II and IV fluids.

As the structure of Type II and IV fluids is relatively complicated to comply with several requirements, they are rather sensitive with regard to handling.
The holdover time, as one of the most important criteria, is gained essentially by viscosity. The viscos-elastic property of the fluid can be adversely affected by overheating, mechanical shearing and contamination by corroded tanks in such a manner that the expected and required holdover times cannot be achieved.
Therefore trucks, storage tanks and dressing plants have to be adequately conceived and maintained to comply with these requirements.
Fluid shearing occurs when adjacent layers of fluid are caused to move relative to one another, whether in opposite directions or in the same direction at different speeds. This condition is unavoidable when pumping a fluid. For example, when merely moving a fluid through a pipe, fluid velocity ranges from zero at the pipe wall to a maximum at the centre. Type II and IV fluids are damaged when the magnitude of shear is sufficient to break the long-polymer chains that make up the thickener.
Therefore specific equipment must be used.
Storage
Tanks dedicated to storage of the de-icing/anti-icing fluid are required. The tanks should be of a material of construction compatible with the de-icing/anti-icing fluid, as specified by the fluid manufacturer. They should be conspicuously labeled to avoid contamination.
Tanks should be inspected annually for corrosion and/or contamination. If corrosion or contamination is evident, tanks should be maintained to standard or replaced. To prevent corrosion at the liquid/vapor interface and in the vapor space, a high liquid level in the tanks is recommended.
The storage temperature limits must comply with the manufacturer's guidelines. The
Stored fluid shall be checked routinely to ensure that no degradation or contamination has taken place.
Pumping
De-icing/anti-icing fluids may show degradation caused by excessive mechanical shearing. Therefore, only compatible pumps as well as compatible spraying nozzles should be used. The design of the pumping systems must be in accordance with the fluid manufacturer's recommendations.
Transfer lines
Dedicated transfer lines must be conspicuously labeled to prevent contamination and must be compatible with the de-icing/anti-icing fluids to be transferred. An in-line filter, constructed according to the fluid manufacturer's recommendations, is recommended to remove any solid contaminant.
Heating
De-icing/anti-icing fluids must be heated according to the fluid manufacturer's guidelines. The integrity of the fluid following heating in storage should be checked periodically, by again referring to the fluid manufacturer's guidelines. Such checks should involve at least checking the refractive index and viscosity.
Application
Application equipment shall be cleaned thoroughly before the first fill with de-icing/anti-icing fluid in order to prevent fluid contamination. Fluid in trucks should not be heated in confined or poorly ventilated areas such as hangars. The integrity (viscosity) of the Type II and IV fluids at the spray nozzle should be checked annually, preferably at the beginning of the winter season.

8.2.4.4.2.3. Environment and Health

Besides water, de-icing/anti-icing fluids contain glycols and different additives as main ingredients. Type II and IV fluids also contain a thickener system.
The glycols used are bivalent alcohols. Glycols are colorless fluids with a sweet taste (not recommended to try).
Regarding environmental compatibility, the most important criteria are biodegradability and toxicity.
Biological degradation
The single glycols, like monoethylene, ethylene and propyleneglykol, are entirely biodegradable. Biodegradable means that a conversion is achieved by aerobe bacteria changing glycol to water and carbon dioxide by the aid of oxygen.
For the different glycols there are minor differences with regard to the rapidity of biodegradation and the oxygen used. Also, the temperature is an important parameter. Biodegradation results faster at higher temperatures and slower at lower temperatures.
The best way to handle waste fluids is to drain them into local waste water treatment plants. Fluids can be drained into surface waters during winter as the oxygen content will be higher than during summer. The colder the water, the more oxygen is available.
Substantial drainage into surface waters during summer is not ideal as the biodegradation occurs faster and, moreover, less oxygen is available. The overall effect on surface waters can be adverse in such a case.
The glycols mentioned are practically non-toxic versus bacteria. Exceptionally high amounts (10 to 20 grams per liter water) would be necessary to adversely affect the biodegradation. These concentrations are effectively never reached; therefore, biodegradation generally does occur. Nevertheless, caution in this matter should be exercised.
The thickener system of Type II and IV fluids, approximately one percent of volume of the fluid, is totally neutral to the environment. It will not be degraded but has no negative effects to the environment; it may be compared to a pebble.
The additives and inhibitors can have an effect on the overall biodegradability.
In any case, the fluids have to meet local regulations concerning biodegradability and toxicity.
Toxicity
Although biodegradable, monoethylene-glycol should be considered as harmful if swallowed. The principal toxic effects of ethylene glycol are kidney damage, in most cases with fatal results.
Several reports concerning the toxicity of diethyleneglycol showed that it can be compared to glycerin in this matter; glyceride is considered to be non-toxic.
Propylene glycol is classified as non-toxic. A special pure quality is used in the pharmaceutical, cosmetic, tobacco and beverages industry. Propylene glycol is not irritating and the conversion in the human body occurs via intermediate products of the natural metabolism.
However, precautions generally usual in relation with chemicals should be considered also when handling glycols.
Protective clothes
Precautions include preventive skin protection by use of suitable skin ointment and thick protective clothes as well as waterproof gloves.
Because of the possibility of atomization, protective glasses should be worn. Soaked clothes should be changed and, after each de-icing / anti-icing activity, the face and hands should be washed with water.
Further details are available from the fluid manufacturers and the material data sheets for their products.
8.2.4.4.2.4. De-Anti/Anti-Icing Equipment

De-icing/anti-icing trucks

Most of the equipment used today are trucks consisting of a chassis on which the fluid tanks, pumps, heating and lifting components are installed.

Although in older equipment centrifugal pumps are installed, more modern equipment is fitted with cavity pumps or diaphragm pumps showing very low degradation of Type II and IV fluids.

Most of the trucks have an open basket from which the operator de-ices/anti-ices the aircraft. Closed cabins are also available, offering more comfort to the operator in a severe environment.

Stationary equipment

Stationary de-icing/anti-icing facilities, currently available at a limited number of airports, consist of a gantry with spraying nozzles moving over the aircraft and similar in concept to a car-wash.

The advantage of such a system is a fast and thorough treatment of the surface of the aircraft. As these systems can be operated by computers, working errors are practically excluded and consistent quality can be ensured.

The disadvantage, however, is the operational bottleneck. If only one system is available and de/anti-icing is necessary, the take-off capacity of the respective runway will be limited by the productivity of the gantry.

8.3 VFR/IFR Policy

8.3.1 General

1. VFR flights are not permitted. It is Nesma Airlines policy that all Commercial flights shall be conducted under IFR, in accordance with an IFR clearance and that full use of air traffic control services or advisory services shall be made. In special cases VFR Non-Commercial flights may be approved by Director of Operations on case by case basis (Refer to Jeppesen Text General A.T.C Chapter 4)
2. An IFR flight plan must be filed for all flights. It must not be cancelled at any time.
3. Clearances to maintain 'VMC on top' or '1000 ft on top' must not be accepted.
4. Clearances to maintain 'own separation in VMC' in order to avoid undue fuel penalties or delays may be accepted by the Captain for limited portions of climb, descent or approach under the following conditions:
   - Relevant traffic can be clearly identified and kept in sight
   - It is assured that sufficient separation will exist at all times
   - During hours of daylight
   - VMC can be maintained
   - Traffic information is provided by ATS.
5. Visual approaches are permitted

Caution: TCAS advisories may be triggered. TCAS RAs must be followed.

6. No person may operate an aircraft under IFR conditions unless it is equipped with the following instruments and equipment:
   - **a)** An airspeed-indicating system with heated Pitot tube or equivalent means for preventing malfunctioning due to icing;
   - **b)** Two sensitive altimeters; and
   - **c)** Instrument lights providing enough light to make each required instrument, switch, or similar instrument, easily readable and so installed that the direct rays are shielded from the flight crewmembers' eyes and that no objectionable reflections are visible to them, and a means of controlling the intensity of illumination unless it is shown that non-dimming instrument lights are satisfactory.
7. Flights within class F airspace must comply with the provisions of 2 to 4 above and make full use of the advisory service.
8. Flights within class G airspace must comply with the provisions of 2 to 4 above and apply the following IFR procedures:
   - Maintain communication with the appropriate ATS unit
   - Make position reports at specified reporting points or time intervals
   - Request traffic information prior to any level change
   - Report changes to the filed flight plan and request traffic information in relation to such changes.
9. Flights taking off from VFR Airports expecting an IFR Clearance for the Enroute Portion of the Flight

No airplane shall take-off from a VFR airport unless able to maintain full VMC or national VFR- minima) until the IFR clearance becomes effective.

10. Flights which are planned to terminate at a VFR airport.

No airplane shall cancel IFR unless observed and reported Met-conditions permit the maintenance of full VMC from that point where IFR is cancelled until landing.

11. Pure VFR - Flights, VFR-Portions En-route

VFR flights shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the conditions along the route or along that part of the route to be flown under VFR are, and will continue to be such as to make it possible for the flight to be conducted in accordance with VFR. (Refer to 8.1.4 for en-route operating minima).

12. Lookout

The flight crew has to maintain a constant lookout and avoid other traffic during all phases of flight. Flight crews are urged to maintain vigilance for conflicting visual traffic even when under radar maintaining a see and avoid policy. TCAS display and radar service may be helpful in detecting other traffic. Within an airspace deemed critical by the flight crew, any activity diverting attention (e.g. paper work, FMS insertions) must be reduced to a minimum. Particularly critical airspace is the vicinity of aerodromes, high density terminal areas and the airspaces below 10.000ft. It is the direct responsibility of the Captain to avoid collision in airspace where VFR flights are not subject to air traffic control service (class E, F, and G).

8.3.1.1. Change from IFR to VFR

An aircraft electing to change the conduct of its flight from compliance with the IFR to compliance with the VFR shall notify the appropriate ATS unit to specify that IFR flight is cancelled. No reply other than the acknowledgement "IFR flight cancelled at... (Time)" should normally be made by the ATC.

When an aircraft operating under IFR is flown in or encounters VMC, it shall not cancel its IFR flight unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted VMC.

8.3.1.2. Simulated Abnormal Situations in Flight

Simulation of abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC conditions by artificial means are forbidden during a revenue flight.

8.3.1.3. In-Flight Fuel Management

Procedure to ensure that in-flight fuel checks and fuel management are carried out are defined in 8.3.7.1.

A Pilot in Command shall ensure that the amount of usable fuel remaining in flight is not less than the fuel required to proceed to an aerodrome where a safe landing can be made, with final reserve fuel remaining.

8.3.1.4. Meteorological Conditions / Minima

On an IFR flight a Pilot in Command shall not:

- Commence take-off; nor continue beyond the point from which a revised flight plan applies in the event of in-flight re-planning, unless information is available indicating that the expected weather conditions at the destination and/or required alternate aerodrome(s) prescribed in 8.1.2.3 Selection of Aerodromes are at or above the planning minima, prescribed in 8.1.2.2 Planning Minima.
- Continue beyond:
  - The decision point when using the decision point procedure (refer to 8.1.7.1.3. Re-Dispatch (Preclearance)); or
  - The pre-determined point when using the pre-determined point procedure (refer to 8.1.7.1.4. Decision Point Procedure (Preclearance)), unless information is available indicating that the expected weather conditions at the destination and/or required alternate aerodrome(s) prescribed in 8.1.2.3 Selection of Aerodromes are at or above

the applicable aerodrome operating minima prescribed in 8.1.3.5.This will be achieved by monitoring weather information while Enroute to cover destination, destination alternate and/or Enroute alternate(s).

- Continue towards the planned destination aerodrome unless the latest information available indicates that, at the expected time of use, the weather conditions at the destination, or at least one destination alternate aerodrome, are at or above the applicable aerodrome operating minima.

On a VFR flight a Pilot in Command shall:
Not commence take-off unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under VFR will, at the appropriate time, be such as to render compliance with these rules possible.
Inform ATC and follow ATC instruction If VMC cannot be maintained abort the VMC approach, if visual reference is lost.

8.3.1.5. Instrument Departure and Approach Procedures

Instrument departure and approach procedures established by the State in which the aerodrome is located have to be used (Jeppesen approach charts)
However, a Pilot in Command may accept an ATC clearance which deviates from above, provided obstacle clearance criteria are observed and full account is taken of the operating conditions. The final approach must be flown visually or in accordance with the established instrument approach procedure.
Different procedures (e.g. EOSID) may be implemented if approved by the Authority.
An aircraft shall not descend in IMC below the minimum (sector) safe altitude (MSA) as shown on the instrument approach chart until it is established in the approved approach or holding procedure.
In the vicinity of the airport, an approach may be conducted by visual maneuvering(circling) under IFR rules if this type of approach is cleared by the ATC and if weather conditions permit it (refer to 8.1.3.2. Aerodrome Operating Minima). If visual reference is lost, the circling approach must be aborted.
The minima for a specific type of approach and landing procedure are considered applicable if:

- The ground equipment shown on the respective chart required for the intended procedure is operative;
- The airplane systems required for the type of approach are operative;
- The required airplane performance criteria are met; and
- The crew is qualified accordingly.

8.3.1.5.1. Climb and Descent Speed Limit
It is the policy of Nesma Airlines to fly 250 KIAS below 10,000 ft. (FL100) unless otherwise required by ATC (faster or slower than 250 KIAS), IAS must be 250 KIAS below 5000ft (FL050), regardless of ATC restrictions.

8.3.1.5.2. Descent and Approach Procedures

ATC Clearances
An ATC clearance does not guarantee terrain or obstruction clearance, and does not constitute authority to descent below the relevant MSA.
IMC Descent below Minimum Safe/Sector Altitude (MSA)
Undue reliance must not be placed on any one radio navigation aid or navigation system when establishing position for the purpose of descent below MSA.

Descent to radar cleared altitude is permitted when under positive radar control.

The aircraft must be navigated in accordance with the Flight Plan, even when under the control of an approved radar unit, until identified by radar and instructed to deviate from the planned route. The term "radar contact" must not be misunderstood as an indication that the aircraft is under radar control. Pilots in Command are authorized to accept radar clearances, subject to the following conditions:

- The Pilot In Command retains the responsibility for ensuring adequate obstacle clearance
- The Pilot in Command must check the initial identification of the aircraft by the radar unit and confirm the aircraft position by independent navigational aids e.g. IRS, SSR, VOR/DME, and NDB.
- The Pilot in Command must check the aircraft position as frequently as necessary by independent navigational aids, as being within the area covered by the relevant MEA, before and during the period of radar control.
- The Pilot in Command may use his discretion when requested by the radar unit to descend to Radar Cleared Altitudes, and if in doubt about the standard of the radar control, must climb the aircraft to the relevant MSA.

Further descent is permitted using a published instrument approach or arrival procedure.

Visual Descent below Minimum Safe/Sector Altitude (MSA)

Visual Descent below MSA to the circuit altitude (1500 ft AGL) is permitted only by Day if the descent can be continued so as to ensure clearance from all obstacles on the intended track, provided that, on reaching the circuit altitude, sufficient visual reference is maintained to fix position continuously and accurately within the specified radius and any specified sector. If this condition cannot be satisfied, the aircraft must be climbed to MSA immediately.

Aerodrome and Runway Identification

Navigation procedures must not be considered complete until the aircraft has landed at the intended aerodrome on the correct runway. Positive identification can best be achieved by proper use of radio navigation facilities for cross-checking and establishing the aircraft position right down to the touch-down point. Radio facilities must be checked for frequency, identification and, whenever possible, location in relation to other known facilities or positions. At an aerodrome with no radio facilities, positive identification of the aerodrome and runway must be made visually.

Approach Briefing

Before starting an approach to land the Pilot in Command must satisfy himself that according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe approach, landing or missed approach. He will brief his Flight crew on his intentions, the type of approach, method to be used to identify the aerodrome and landing runway, and the go-around checklist, before an instrument approach, the briefing must include reference to all radio aids to be used and the relevant go around procedure. During the approach each Flight Crewmember must monitor that all heading and altitudes are consistent with the appropriate facilities and runway.

Stabilized Approach

All approaches must be planned to meet the stabilized criteria by 1000 formatter what the conditions at the airfield are.

During the approach the following criteria must be met.

- **In IMC, at 1000 AAL** the aircraft must be stabilized on the correct profile, speed brakes down in the planned landing configuration within the flight parameters, approach power set with the landing checklist completed.

- **In VMC, at 500 AAL** the aircraft must be stabilized on the correct profile, speed brakes down in the planned landing configuration within the flight parameters, approach power set with the landing checklist completed.
- **On final approach**, 360 degrees turns or any other maneuvers for profile adjustments are not permitted.

If the above criteria are not met either pilot must announce 'Go-around' then a Go-around must be carried out.
No disciplinary action what so ever will be taken against any crew that elects Togo Around for the above reasons?
8.3.1.6. Takeoff Conditions
Before commencing take-off, a Pilot in Command must satisfy himself that:

- The RVR or visibility in the take-off direction of the airplane is equal to or better than the applicable minimum and

The condition of the runway intended to be used should not prevent a safe takeoff and departure (refer to 8.1.2.4 Aerodrome Categories).

8.3.1.7. Commencement and Continuation of an Approach

Before commencing an approach to land, the Pilot In Command must satisfy himself that, according to the information available to him, the weather at the aerodrome, the condition of the runway intended to be used, ground equipment, on-board equipment, operating minima and crew qualification(s) should not prevent a safe approach, landing or missed approach, having regard to the performance information contained in the Operations Manual (refer to 8.1.2.4.3).
The in-flight determination of the landing distance should be based on the latest available report, preferably not more than 30 minutes before expected landing time.
The Pilot in Command or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/visibility but the approach shall not be continued beyond the outer marker, or equivalent position, if the reported RVR/visibility is less than the applicable minima.
Where RVR is not available, RVR values may be derived by converting the reported visibility in accordance with table 5 of chapter 8.1.3.5. However, approach and landing operations are not authorized when the airport operating landing visibility minimum is below 800m unless RVR reporting is available for the runway of intended use.
If, after passing the outer marker or equivalent position in accordance with above, the reported RVR/visibility falls below the applicable minimum, the approach may be continued to DA/H or MDA/H.
Where no outer marker or equivalent position exists, the Pilot In Command or the pilot to whom conduct of the flight has been delegated shall make the decision to continue or abandon the approach before descending below 1000 ft above the aerodrome on the final approach segment.
The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the required visual reference is established at the DA/H or MDA/H and is maintained.
The touch-down zone RVR is always controlling. If reported and relevant, the midpoint and stop end RVR are also controlling. The minimum RVR value for the midpoint is 125 m or the RVR required for the touch-down zone if less, and 75 m for the stop-end. For airplanes equipped with a roll-out guidance or control system, the minimum RVR value for the mid-point is 75 m.
Note1: "Relevant", in this context, means that part of the runway used during the high-speed phase of the landing down to a speed of approximately 60 kt.

Note2: The equivalent position referred above can be established by means of a DME distance, a suitably located NDB or VOR, or any other fix that independently establishes the position of the aircraft, if published on the instrument approach chart.

8.3.1.8. Noise Abatement Procedure

Refer to –JEPPESEN- flight Procedure (DOC 8168) - Noise abatement Procedures.

8.3.2. Navigation Procedures

An aircraft shall not be operated unless the required navigation equipment is installed. The failure of a single navigation unit may not result in the inability to operate safely on the route to be flown. Detailed information about the required operational status of equipment is provided in the MEL.

Nesma Airlines ensure electronic navigation data products acquired from suppliers, prior to being used as a means for navigation in operations:

- **i.** Are assessed for a level of data integrity commensurate with the intended application; Are compatible with the intended function of equipment in which it is installed; are distributed in a manner to allow insertion of current and unaltered electronic navigation data into all aircraft that require it.

The specifications in items i) and ii) are satisfied, in accordance with State approved or State-accepted methods for assuring data integrity and compatibility, such as:

- Obtaining a letter of acceptance from an applicable authority stating the data supplier conforms to a recognized standard for data integrity and compatibility that provides an assurance level of navigation data integrity and quality sufficient to support the intended application.

Pilots are responsible for ensure the validation of the data base prior to the flight (ref. OM-A 1.4.4), the correct use of the navigation and communication equipment installed in the aircraft. Continuous monitoring of the equipment and its performance is mandatory during its use. Special attention must be paid to the engagement status of system used in order to avoid late recognition of mode or configuration changes which could result in abnormal situation (e.g. unscheduled disengagement).

Any degradation of on-board equipment which occurs must be taken into consideration for any in-flight planning/re-planning with regard to destination and alternate weather, and for fuel planning for en-route conditions.

Any downgrading of ground facilities which occurs must be assessed with regard to possible increased landing minima at destination and/or alternate airports.

The processes of downloading the data and distributing it in a manner to allow insertion of current and unaltered electronic navigation data into all aircraft that require it **(ref. GMM 4.22)**

8.3.2.1. In-Flight Procedures

Standard navigational procedures and system requirements including policy for carrying out independent cross checks of keyboard entries where these affect the flight path followed by the aircraft are detailed in FCOM-PRO-NOR-SRP-01 "FMGC PILOT'S GUIDE”

8.3.2.2. Routes and Areas of Operation

Operations shall only be conducted along such routes or within such areas, for which:

- Ground facilities and services, including meteorological services, are provided which are adequate for the planned operation;
- The performance of the airplane intended to be used is adequate to comply with minimum flight altitude requirements;

- The equipment of the airplane intended to be used meets the minimum requirements for the planned operation;
- Appropriate maps and charts are available (refer to 8.1.12. Onboard Library);
- If two-engine airplanes are used, adequate aerodromes are available within the time/distance limitations.

Operations shall be conducted in accordance with any restriction on the routes or the areas of operation, imposed by the Authority.

8.3.2.3. Required Navigation Performance - RNP

8.3.2.3.1. General Concept

Basic navigation procedures are based on the availability of satisfactory ground navigation aids, infrastructures (VOR, DME, NDB...), and aircraft navigation systems, which enable Nevoid to Nevoid navigation. Large safety margins mandated with respect to aircraft separation contribute to airspace saturation in certain areas.

This air navigation structure of airways, SIDs, STARs, etc. doesn't consider the availability of modern navigation systems, with enhanced performance, nor the availability of glass cockpits, which provide crews with improved awareness when flying such procedures.

The ICAO has recognized the need to benefit from available RNAV technology to improve existing air navigation systems, in the interest of increasing airspace capacity, and offering such advantages as fuel savings, direct tracks, etc. The introduction of RNP and RNAV will enable each country to design and plan routes that are not necessarily located over radio-nevoid installations.

8.3.2.3.2. Definitions

Required Navigation Performance (RNP)

RNP is a statement on navigation performance accuracy, essential to operations within a defined airspace.

RNP Airspace

Generic terms referring to airspace, route(s), procedures where minimum navigation performance requirements (RNP) have been established. Aircraft must meet or exceed these performance requirements in order to fly in that airspace.

RNP-X

A designator is used to indicate the minimum navigation system requirements needed to operate in an area, on a route, or on a procedure (e.g. RNP-1, RNP-4).

The designator invokes all of the navigation system requirements, specified for the considered RNP RNAV type, and is indicated by the value of X (in NM).

8.3.2.3.3. Performance Requirements

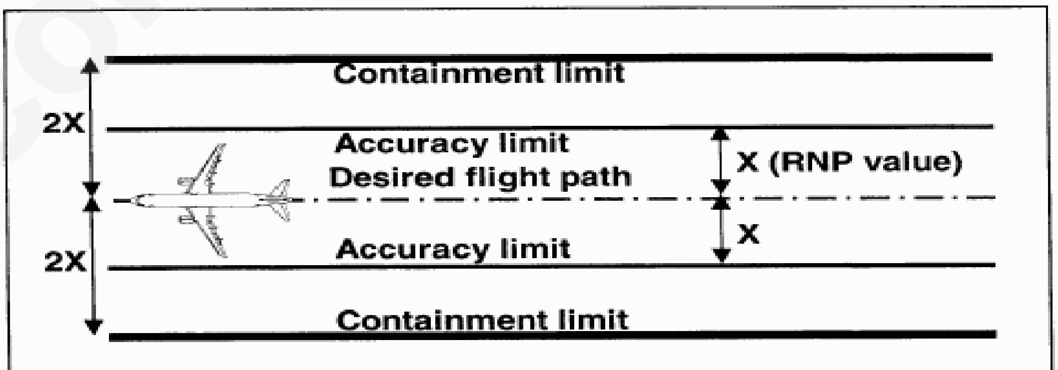


Fig. 1 RNP-X accuracy and containment limit

RNP – Cross track error accuracy and containment limit

Navigation accuracy

Each aircraft operating in RNP airspace shall have a total system navigation position error equal to, or less than, the RNP value for 95 % of the flight time. See Figure 1.

Containment integrity

The probability that the total system navigation position error in RNP airspace exceeds the specified cross-track containment limit without annunciation, should be less than 10-5 per flight hour. The cross-track containment limit is twice the RNP v value.

Containment continuity

The probability of an annunciated loss of RNP-X capability (true or false annunciation) shall be less than 10^{-5}per flight hour.

8.3.2.3.3.1. RNP Routes Supported by Radio Nevoid Coverage

Such airspace is mainly implemented, or will be implemented for en-route navigation over continental areas.

Typical RNP values are RNP-5 and RNP-4, but RNP-2 is considered for US domestic airspace.

In Europe, Basic RNAV (BRNAV) airspace (RNP-5) was implemented in April 1998. RNP-1 is progressively introduced for RNAV SIDs and STARs in Europe. (Nesma Airlines is approved for RNP-5

8.3.2.3.3.2. RNP Routes outside Radio NAVAID Coverage

This airspace is implemented, or will be implemented, for en-route oceanic navigation or for continental areas outside radio NAVAID coverage.

Typical RNP values are RNP-10 and RNP-12, but RNP-4 is also envisaged in the future.

In particular, the navigation system must be certified as the sole means of navigation with the adequate level of redundancy.

8.3.2.3.3.3. RNAV Non-Precision Approaches with RNP

RNAV approaches with RNP-0.3 have been published by some states, and these will undoubtedly become more frequent in the future.

8.3.2.3.4. RNP Operations

Prior to beginning operations within a RNP airspace, Nesma Airlines is responsible for addressing the following steps:

1. Verify aircraft certification status.
2. Establish MEL repercussions.
3. Implement adequate flight crew training and verify Operations Manual repercussions.
4. Collect adequate flight crew information.
5. Apply for operational approval, if required by national authorities.
6. Verify that the intended route is possible, if the navigation system is time limited.

Aircraft certification status:

For all Nesma Airlines aircraft, the AFM has appropriate reference to justify the type of RNP capability.

8.3.2.3.5. Aircraft Navigation Systems

8.3.2.3.5.1. Aircraft without GPS PRIMARY

For these aircraft, navigation performance depends on radio NAVAID updating and on the time since the last radio update or INS/IRS ground alignment. This assumes that the ground radio Nevoid infrastructure supports the level of accuracy.

Outside radio Nevoid coverage, navigation performance is determined by the INS/IRS drift rate, which implies a time limitation in direct relation to the RNP value to be achieved. Refer to FCOM-PRO-SPO-15

(2 hours for Basic RNAV in Europe).

8.3.2.3.5.2. Aircraft with GPS

When GPS is available in flight, on-board navigation performance exceeds the currently known requirements for any kind of route.
The availability of GPS, on any given route, is a function of the:

- Satellite constellation configuration
- Aircraft equipment
- Aircraft's geographical position
- Required navigation accuracy

Therefore, a temporary loss of GPS PRIMARY may be acceptable, depending on the RNP value desired.
Depending on which type of RNP value is envisaged, and which type of navigation mode is available, a pre-flight verification of 100% GPS PRIMARY availability may be required when part of the planned route is outside radio Navaid coverage.
For example,

- For Airbus models, IRS navigation is available as an ultimate means of navigation. Therefore, a temporary loss of GPS PRIMARY may be acceptable, depending on the RNP value desired.
- If GPS accuracy is needed for a Non Precision Approach, at destination or at alternate, then GPS availability at the ETA at this airport must be checked prior to departure.

8.3.2.3.5.3. Flight Crew Training and Operations Manual Complement
Use of the RNAV system (FMS, FMGS, and GPS) is integrated in the A320 flight crew type rating training course. No additional crew training is required on RNAV systems knowledge and procedures.
The FCOM provides the necessary RNAV system (FMS, INS, GPS) description and procedural information.
Nesma Airlines shall collect, in the appropriate AIP, the routes and airspace vertical and lateral limits where RNP capability and procedures are implemented.
Also refer to the ICAO Doc 7030 "Regional Supplementary Procedures", and to the information published by the CAA, administering the specific airspace where flights are intended.
Ex: Euro control Standard Document 03-93 for Basic RNAV in Europe.
Particular contingency procedures, in the event of a RNP-X capability loss, may also be published in the above documents.
In most cases, crew action will be to inform the ATC, which may require the aircraft to leave the RNP airspace or to use routes that are based on conventional radio navigation.
Nesma Airlines may have to complement their route manual or operations manual with the above information.

8.3.2.4. RNAV

8.3.2.4.1. RNAV Introduction
Area Navigation (RNAV) is a navigation method that enables aircraft operations on any desired flight path within station-referenced navigation aids or within capability limits self-contained aids, or a combination of both.
Aircraft position is determined by processing data from one or more sensors (VOR, DME, INS, GPS, etc.). Navigation parameters such as distance and bearing to away point are computed from the aircraft position and the location of waypoint.
An RNAV system may be used in the horizontal plane, which is known as lateral navigation (LNAV), but may also include functional capabilities for operations in the vertical plane, known as vertical navigation (VNAV).

In order to comply with the above requirement, the aircraft must be certified for BRNAV operations in order to file an IFR flight plan in the B-RNAV FIRs/UIRs. See MEL requirements and applicable aircraft procedures related to navigation accuracy.
When filing flight plan for an aircraft fitted with RNAV, having a navigation accuracy meeting RNP-5, insert the designator "R" in item 10 of the flight plan.
The navigation database installed in the aircraft must be checked for its validity before the flight.
It is the crew's responsibility to ensure that the navigation accuracy is maintained. In particular, the utmost care will be taken to avoid the following mistakes:

- **a)** Insertion errors: The pilot has the correct co-ordinates or way-points of his cleared route, but he inserts incorrect data into the system; particular care should be exercised in case of re-clearance.
- **b)** De-coupling: The pilot allows the Autopilot to become de-coupled from the equipment which he thinks is providing steering output.
- **c)** Using faulty equipment: The pilot might continue to use a navigation system which was becoming inaccurate.

8.3.2.4.2. RNAV system / FMS
For system description and procedures to be used with RNAV or any Flight Management System (FMS) refer to FCOM DSC-22-US-20-20-20 PAGE 01-6 (FMGS pilot's guide) for A320.

8.3.2.4.3. BRNAV (RNP-5) Based on Radio Nevoid

It is normally the responsibility of the airspace administration to support the required navigation performance by providing the adequate nevoid infrastructure. NOTAMs are expected to be published when a nevoid failure may affect the navigation performance on a given route.
8.3.2.4.3.1. Aircraft Equipment

Aircraft	Equipment
A320	IRS+FMS updated by - GPS - DME/DME - VOR/DME

8.3.2.4.3.2. MEL Repercussion
MEL requirements are based on the type of RNP airspace:

- For airspace within radio Nevoid coverage: one RNAV system is required, considering that conventional navigation from Nevoid to Nevoid and radar guidance remain available in case of system failure.
- For airspace outside radio Nevoid coverage: two RNAV systems are required to ensure the appropriate redundancy level

Specific MEL requirements for BRNAV (RNP-5) airspace are covered by Nesma Airlines MEL`s.
8.3.2.4.3.3. Loss of BRNAV Capability
Except for aircraft with GPS PRIMARY when GPS PRIMARY is available, the normal FMS position monitoring with Nevoid raw data as described in FCOM must be observed.
Any discrepancy, between Nevoid raw data and FMS position, with a magnitude of the order of the RNP-X value shall be considered as a loss of RNP capability.
For A320 the RNP-X capability should be considered as lost if the system stays in IRS ONLY navigation (without GPS available) for more than the approved time limit (2 hours for Basic RNAV in Europe).

A320 equipped with GPS PRIMARY fulfill all RNP requirements up to RNP-1 when GPS PRIMARY is available. When GPS PRIMARY LOST indication is displayed; the RNP capability is maintained in the conditions described above for aircraft without GPS.
MCDU Messages like FMS1/FMS2 POS DIFF or CHECK A/C POSITION, may also indicate a RNP capability loss except if the faulty system has been identified and the healthy system is used for navigation and is monitored.
If RNP-X capability is lost the crew must advise the ATC, which may require the aircraft to leave the RNP airspace.
As a result of a failure or degradation of the RNAV system below RNP 5, an aircraft shall not enter the B-RNAV airspace, nor continue operations in accordance with the current air traffic control clearance. ATC must be advised and a revised clearances hall, whenever possible, be obtained by the pilot. Subsequent air traffic control action in respect of that aircraft will be dependent upon nature of the reported failure and the overall traffic situation. Continued operation in accordance with the current ATC clearance may be possible.
When this cannot be achieved, a revised clearance may be required to revert to VOR/DME navigation. The crew will then, on each ATC frequency change, report the situation by announcing "NEGATIVE-RNAV" on initial contact.
For ad hoc in-flight re-planning, pilots must not only check if the fuel requirements for in-flight re-planning will be met, but also if the available navigational aids for their planned route and/or the re-planned destination, as well as the airborne equipment, will be sufficient for a safe conclusion of the flight.
8.3.2.4.3.4. Conditions to Enter the BRNAV Airspace
RNP airspace can be entered only if the required equipment is operative.
Only one RNAV system is required to enter RNP airspace within radio nevoid coverage, which means basically for A320 that the following equipment is operative:

- 1 FMGC
- 1 MCDU
- 1 VOR
- 1 DME
- ND with flight plan data
- 1 IRS

The expected RNP-X capability must be available. This is done by verifying that the conditions of RNP capability loss (see above) are not present.

8.3.2.5. Reduced Vertical Separation Minimum - RVSM

8.3.2.5.1. General Concept
RVSM airspace is defined as an airspace or route where aircraft are vertically separated by 1000 feet (rather than 2000 feet) between FL 290 and FL 410 inclusive.
The objective is to increase the route capacity of saturated airspace, while maintaining (at least) the same level of safety.
This can be achieved by imposing strict requirements on equipment and on the training of personnel, flight crews and ATC controllers. As part of the RVSM program, the aircraft "altitude-keeping performance" is monitored, overhead specific ground-based measurement units, to continuously verify that airspace users are effectively applying the approved criteria and that overall safety objectives are maintained.

ICAO NON-RVSM	
180^{O}-359^{O}	000^{O}-179^{O}

RVSM AIRSPACE	
180^{O}-359^{O}	000^{O}-179^{O}

FL430		FL430	
	FL410		FL410
		FL 400	
FL 390			FL 390
		FL 380	
	FL 370		FL 370
		FL 360	
FL 350			FL 350
		FL 340	
	FL 330		FL 330
		FL 320	
FL 310			FL 310
		FL 300	
	FL 290		FL 290
FL 280		FL 280	

8.3.2.5.2. Aircraft Certification Status

All Nesma Airlines aircraft have RVSM capability.

The minimum required equipment for RVSM is:

- Two independent altitude measurement systems
- One secondary surveillance radar transponder with altitude reporting
- One altitude alert system
- One automatic altitude control system.

8.3.2.5.3. MEL Requirements

The MEL for all Nesma Airlines aircraft has also been revised to refer to the list of required equipment published in the AFM.

8.3.2.5.4. RVSM Operations

8.3.2.5.4.1. Operational Approval

An operational approval has been given to Nesma Airlines for RVSM operations.

8.3.2.5.4.2. RVSM Procedures

General RVSM procedures valid in any RVSM airspace are published in FCOM-PRO-SPO-50, a generic summary of these procedures is provided below.

Use of RVSM airspace

Except for State Aircraft operating as Operational Air Traffic (military flights that are not conducted based on ICAO rules), only IFR flights are permitted in RVSM airspace.

Except for State Aircraft and except the FIR/ UIR within which transition from RVSM ton on-RVSM or from non-RVSM to RVSM airspace is carried out, climbing from below FL290 to above FL410 and descending from above FL410 to FL290 is not permitted for non-RVSM aircraft.

Flight Planning

The letter "W" is to be inserted in item 10 of the ICAO Flight Plan for RVSM approved aircraft regardless of the requested flight level.

During flight planning pay particular attention to conditions that may affect operation in RVSM airspace. These include:

- Verifying that the airframe is approved for RVSM.
- Reported and forecast weather.
- MEL requirements pertaining to height keeping and alerting systems.
- Any operating restrictions related to RVSM.

Pre-Flight Procedures
Review Technical Log to determine the condition of equipment required for RVSM.
During the external inspection of the aircraft particular attention must be paid to the condition of static sources, condition of the fuselage skin near each static source and any other component that affects altimetry accuracy.
Before take-off, the altimeters should be set to airfield QNH and should display the known altitude within the limits specified in the Aircraft Operations Manual.
Prior to entry into RVSM airspace
The required minimum equipment must be operative, otherwise a new clearance to avoid RVSM airspace must be obtained:
For A320

- Two ADRs, and two main altitude indications#
- One ATC transponder.
- One AP in ALT and OPEN CLB/DES (or LVL/CH) modes
- FCU altitude selection and OPEN CLB/DES (or LVL/CH) selection
- One FWC for altitude alert function.

At least two main altimeter indications on the STD setting must be within 200 feet.
If only two ADRs (or two ADCs) are operative, record significant main and standby altimeter indications for reference, in case of subsequent altimeter failure.
Within RVSM airspace

- Ensure compliance with any operating restrictions e.g. limits on indicated Mach number.
- All ATC clearances must be confirmed by both crewmembers to ensure prompt compliance.
- Ensure that the aircraft is flown in level cruise at the cleared flight level. The aircraft should not intentionally depart from a cleared flight level without clearance unless conducting emergency maneuvers.
- When changing levels, the aircraft should not be allowed to over or undershoot the cleared level by more than 150ft. The autopilot and automatic altitude capture should always be used. Caution should be exercised to ensure that autopilot failure, or mode reversion does not result in altitude deviation.
- The autopilot altitude control system should be engaged during level flight, except when circumstances such as the need to re-trim the aircraft or turbulence required is engagement. Flight management system inputs allowing variations of ± 130ft under non-turbulent, non-gust conditions ("Soft Altitude" mode) may be used.
- In normal operation, the altimetry system being used to control the aircraft (Autopilot 1 or 2) should be used for the input to the altitude reporting transponder. See the aircraft specific procedures in aircraft operating manual.
- At intervals of approximately 1 hour, cross checks between the primary altimeters should be made. The minimum of two will need to agree within ± 200ft. Failure to meet this condition will require that the altimetry system be reported as defective to ATC. A normal scan of flight instruments will suffice for most flights.
- If the aircrew is notified by ATC of an assigned altitude deviation which exceeds ±300ft then action must be taken to return to the cleared level as quickly as possible.

Aircraft separated by only 300m (1000ft) may appear to be at the same level. This is particularly true during darkness or during a turn. Whenever possible use TCAS to provide positive identification of aircraft separation and maintain visual contact with traffic. For opposite direction traffic use "constant bearing" method to determine possible conflict.
Transition procedures

Aircraft entering non-RVSM airspace from the EUR RVSM airspace or exiting the EURRVSM airspace to non-RVSM airspace shall be established with a minimum separation of 2000ft.

Post flight

Report any malfunction or deviation in relation to the altitude keeping capability, and any failure of the required RVSM equipment.

When making Technical Log entries against malfunctions that may affect RVSM operation, the Pilot in Command should provide sufficient detail to enable maintenance to effectively troubleshoot and repair the system. As a guide the following information should be recorded when appropriate:

- Primary and standby altimeter readings and subscale settings.
- Altitude selector setting.
- Autopilot used to control the aircraft and any differences when an alternative autopilot is used.
- Differences in altimeter readings if alternate static ports selected.
- Use of air data computer selector for fault diagnosis procedure.
- The transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was selected.

8.3.2.5.5. In-Flight Contingency Procedures

An in-flight contingency refers to unforeseen circumstances that may have a direct impact on the ability of one or more aircraft to operate in accordance with the RVSM performance requirements. Such situations may be equipment and/ or weather related.

The aircrew must immediately inform ATC if such a situation occurs and obtain, whenever possible, a revised clearance prior to initiating any deviation from the last clearance.

If due to equipment failure (e.g. failure of automatic altitude control, failure of altimetry system loss of thrust on an engine requiring descent) an aircraft cannot operate any longer in accordance with RVSM performance requirements. ATC will consider it as non-RVSM and will take immediate action to provide 2000ft separation and if possible clear it out of RVSM airspace.

When an aircraft operating in RVSM airspace encounters severe turbulence that is believed to impact the aircraft's ability to maintain its cleared flight level, the crew will inform ATC who will establish either the appropriate horizontal separation or an increased minimum vertical separation.

When a met forecast predicts severe turbulence within RVSM airspace, ATC will determine whether RVSM should be temporarily suspended in specific areas or flights.

The following contingency procedures should not be interpreted in any way that prejudice's the final authority and responsibility of the pilot in command for the safe operation of the aircraft.

If the pilot is unsure of the vertical or lateral position of the aircraft, or the aircraft deviates intentionally from its assigned track, without prior ATC clearance, then the pilot must act to mitigate the potential for collision with aircraft on adjacent routes or flight levels.

The pilot should notify ATC of contingencies (equipment failures, weather) which affect the ability to maintain the cleared flight level and co-ordinate an appropriate plan of action.

Examples of equipment failures which should be notified to ATC are:

- Failure of all automatic altitude control systems aboard the aircraft.
- Loss of redundancy of altimeter systems.
- Loss of thrust on an engine requiring descent.

- Any other equipment failure affecting the ability to maintain a cleared flight level.

Air Traffic Control shall take immediate action to provide a minimum of 2000ft vertical separation, or an appropriate horizontal separation from all other aircraft. An aircraft rendered non-RVSM shall normally be cleared out of RVSM airspace when it is possible to do so.

Pilots shall inform ATC as soon as possible of any restoration of the proper functioning of equipment required to meet RVSM specification.

The pilot should notify ATC when encountering greater than moderate turbulence.

If unable to contact ATC continue with standard ICAO radio failure procedure. Climb /Descend as required by the procedure to maintain flight planned levels.

There are no additional RVSM procedures following a TCAS Traffic alert "or" Resolution Advisory." Follow the normal procedures as laid down in the aircraft operating manual.

TCAS TA's may be experienced when passing opposite direction traffic with 1000ft separation. TCAS RA's will not normally be generated but should be complied with unless positive visual separation is assured.

TCAS failure

- Continue flight in accordance with ATC RVSM clearance.
- Listen out for traffic on ATC frequency and 121.5 MHz
- Maintain an extra vigilant lookout.

Note:

NESAMA AIRLINES should report height-keeping deviations to the responsible Authority within 72 hours when the deviation exceeds:

- A total Vertical Error of 300 feet (for example, measured by an HMU).
- An Altimetry System Error of 245 feet.
- An Assigned Altitude Deviation of 300 feet.

These errors, caused by equipment failures or operational errors, may lead the responsible Authority to suspend or revoke the Airline's RVSM approval.
It is therefore important to report any poor height-keeping performance and to indicate which corrective actions have been taken.

8.3.2.6. FUTURE AIR NAVIGATION SYSTEM (FANS)

8.3.2.6.1 GENERAL

Fundamentals of the CNS/ATM (Communication, Navigation, Surveillance/Air Traffic Management) Concept:

- It is mainly built on satellite technology and digital communications;
- It aims at increasing the air space capacity;
- It aims on enhancing the operational flexibility and global safety of air traffic.

8.3.2.6.2 COMMUNICATION

The CNS/ATM Concept is a global end-to-end concept. Therefore, proper interoperability of all participants (e.g. Air Traffic Services organizations, communication service providers or ATC) is essential for the correct operation of the system.

CONTROLLER-PILOT DATA LINK COMMUNICATION (CPDLC)
Implementing this concept, Controller-Pilot Data Link Communication (CPDLC) will become the primary source of communication instead of the classical VHF and HF voice communication between Pilot and controllers.
Especially in oceanic and remote areas or in congested airspace, CPDLC is a powerful means for communication and for reducing congestion on VHF frequencies.
CPDLC messages will be displayed to the crew in-flight and can be stored and printed.
In addition to air-to-ground communication, ground-to-ground communication is also part of this concept. The purpose is, to link different ATC service organizations (or services of the same ATC) and AOC (Airline Operational Centre).
For more details refer to FCOM DSC-46-10.

8.3.2.6.3 NAVIGATION

Aircraft are required to fulfil a certain RNP level, to benefit from the CNS/ATM concept. This statement on the navigation performance accuracy is necessary for operation in the respective airspace and will be defined by the relevant ATS of the concerned area.
The combination of CPDLC, RNP and ADS-B (see 8.3.2.6.4)
enables the reduction of procedural separations (longitudinal and lateral) down to 30 NM, hereby increasing airspace capacity.

8.3.2.6.4 SURVEILLANCE

Common types of surveillance are: SSR modes A, C and S. All these types require radar coverage. In addition to the mentioned SSR modes, ATC can receive the aircraft position and other surveillance data via the Automatic Dependent Surveillance (ADS).

ADS-B (AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST)
ADS-B enables SSR like surveillance services, as ADS-B capable aircraft use an ordinary GNSS receiver to derive its precise position from the GNSS constellation.

The position and other aircraft parameters as speed, heading, altitude and flight number are then simultaneously broadcasted to other ADS-B capable aircraft and to ADS-B ground stations, or satellite communication transceivers which then relay the aircraft's position and additional information to Air Traffic Control centers in real time.
ADS-B ground stations can easily be installed and are cheaper in terms of installation and maintenance.

8.3.2.6.5 AIR TRAFFIC MANAGEMENT (ATM)

As Air Traffic Management becomes more and more important due to the increasing amount of air traffic, a close co-operation of ATS, crews and airline operational centers is required and expected to be reached through data communications and automated sharing of real-time information. CPDLC, ADS and AOC/ATC inter-facility link are some of the tools used to support new ATM methods such as Collaborative Decision Making (CDM).
The aim of CDM is to enable the corresponding actors (crews, controllers and airline operations) involved in ATM system, to improve mutual knowledge of the forecast/current situations, of each other constraints, preferences and capabilities, to resolve potential problems.

8.3.2.7 Minimum Navigation Performance Specification – MNPS

Nesma Airlines is not authorized for MNPS or AMU.

8.3.2.8 BRNAV Procedures

For BRNAV procedures ref. to FCOM PRO-SPO-51.

8.3.3. Altimeter Setting Procedures

8.3.3.1 General

Aircraft altimeter system is described in FCOM systems description volume -"Instruments" and associated procedures are given in FCOM Standard Operating Procedures (SOP) or Normal Procedures.
Altimeter tolerances are given in FCOM "Procedures and Techniques/Supplementary Techniques".
All altimeter misreading are to be treated as reportable incidents.

8.3.3.2 Type of Altimeter Settings

The three different types of altimeter settings are “Standard” (1013.25 hPa / 29.92inHg), QNH and QFE.
As indicated below, each setting will result in a altimeter indication which provide a measure of the vertical distance with regard to the ICAO Standard Atmosphere (ISA) above the particular reference datum shown.

Altimeter setting	Reference Datum	Altimeter indication
Standard (QNE)	1013.25 hPa / 29.92 in Hg	Flight Level
QNH	Local mean sea level pressure	Altitude
QFE	Aerodrome elevation	Height above aerodrome

8.3.3.3 Setting Procedure

All Nesma Airline Flight Crewmembers are required to use QNH for takeoff, approach and landing phases of flight.
When changing an altimeter setting, each pilot will call out the new setting and check altitudes. (Refer to FCOM Supplementary Techniques –PRO SUP)
Altimeter Serviceability Checks

1. During cockpit preparation the pressure scales of all altimeters shall be set to the actual QNH of the aerodrome, they must read to be within the type specific tolerances.

2. The altimeter indications thus obtained shall be observed and checked against the elevation of the aerodrome at the location of the aircraft.
3. When the altimeter does not indicate the reference elevation or height exactly, but is within the tolerance specified in the relevant FCOM, no adjustment of this indication shall be made at any stage of the flight. Furthermore, any error that is within tolerance noted during pre-flight check on the ground shall be ignored by the Pilot during flight.
4. After each setting of altimeters, the readings on the flight deck shall be compared. This shall include the standby altimeters.
5. If an altimeter indication is not within the specified tolerance follow the procedure outlined in the FCOM or MEL.

The required altimeters must be set to QNH at or below the transition altitude; QNH should be the sole reference for takeoff, approach and landing phases. The transition altitude specified for an aerodrome is shown on the relevant charts.

Take-off and climb

- All take-off will be performed with altimeters set on QNH.
- When passing the transition altitude, altimeters will be set to standard (1013.25hPa) and bare settings and altitude readings will be cross-checked

Cruise

- If cruising below or at transition altitude, both pilot altimeters will be on QNH of the nearest station available.
- If cruising above the transition altitude, both altimeters will be on Standard (1013.25 hPa)

Descent

- At transition level both pilots reset their altimeter on the appropriate QNH and check altitudes.

8.3.3.4. Temperature Correction

Temperature deviation from ISA results in erroneous readings on pressure altimeters.
When the temperature is lower than standard, the true altitude is less than indicated altitude.
Depending on the amount of temperature deviation (on the colder side) and amount of height to be corrected for, significant deviations between indicated and true altitude can occur in conditions of extreme cold weather where terrain clearance is a consideration, corrections should be calculated and a higher indicated altitude established and flown.
Values to be added to the published altitudes are given in 8.1.1.3.1

8.3.3.5. Altimeter Discrepancies in Flight

When a different altimeter reading occurs during the descent and approach phases, the lower reading altimeter will be used to determine safety heights and critical heights. However, the glide path height check at the outer markers will be used as a further check, bearing in mind that the glide slope itself may be inaccurate.

8.3.3.6. IFR Flight Level Tables - Semi Circular Rules

Not applicable for RVSM spaces (refer to 8.3.2.5. Reduced Vertical Separation Minimum - RVSM)

Table 1 - Flight levels ICAO rule

180º - 359º	360º - 179º
ft (x100)	ft (x100)
	10
20	30
40	50
60	70
80	90
100	110
120	130
140	150
160	170
180	190
200	210
220	230
240	250
260	270
280	290
310	330
350	370
390	410

8.3.3.7. Flying with Metric Altimetry Procedure:

When a flight is to be conducted in or through metric altimetry airspace, pilots are required to carry out the following preparation:

1. Review the specific State's Rules and Procedures and the differences to Standard ICAO procedures in the Jeppesen Supplementary Text Manual (Air Traffic Control section).
2. Conduct a thorough flight crew briefing before the commencement of a flight, or series of flights, into 'metric' airspace.

The briefing should cover the following: -

Any differences to the standard ICAO procedures FIR boundary crossing (entry/exit); ATC communication and obtaining early clearances, decompression descending level (meter), request (hPa) for altimeter pressure setting 'Approach Chart Briefing' with particular attention to the ALT/HEIGHT conversion table.

Note: Conversion tables for feet/meter are provided in Jeppesen – General – Tables and Codes.

8.3.3.7.1. Metric Altitude Indications Applicable To A320:

- Metric altitude indications can be directly obtained on the Lower ECAM by pressing the METRIC ALT PD to the left of the Altitude selector knobs on the FCU.
- When selected, the target altitude, i.e. the altitude selected in the Altitude window on the FCU, is displayed in meters on the bottom of the lower ECAM
- The actual aircraft altitude in Feet is displayed in (cyan/magenta) at the bottom/top of the altitude scale on the right side of the PFD during descent/climb.

8.3.3.7.2. Procedure

- Contact the appropriate ATC as early as possible and obtain the required cruising altitude in meters.

- Approaching the changeover point (FIR boundary), the PF will press the Metric ALT PD on the FCU, inform the PM that "All Altitude Calls will now be read in Meters" and adjust the aircraft cruising level to correspond to the metric FL obtained from ATC.
- Adjust the altitude in meters using the altitude selector knobs on the FCU and read the selected altitude in meters on the bottom of the lower ECAM.
- Initiate a climb or descent as required using CLB/OPEN, CLB/VS or DES/OPEN, DES/VS.
- When ALT CRZ is displayed on the FMA, confirm that the FL is correct with reference to the actual altitude indication at the bottom of ECAM.
- Make all calls to ATC giving the cruising FL in meters.
- When exiting the area (FIR boundary) and reverting to altitude reporting in feet as per ATC instruction, adjust the FL in feet. The PF can deselect the Metric ALT Pb on the FCU and inform the PM that "All Altitude calls are reverting back to feet".

8.3.3.7.3. Landing at an En-Route Alternate Airport in a Metric Altimeter-Setting Region

If a landing has to be made at an authorized Enroute alternate airport in a metric altimeter-setting region, adopt the following procedure:

- Descend using the metric altitude setting procedure described above. Transition level is displayed on the Jeppesen chart in both meters and feet. Changeover to QNH at the appropriate Transition Level.
- Set up the approach on the MCDU using standard procedures. If the approach is not in the database, ensure that at least the RWY in use is selected as guidance.
- Note that, even in a metric altimeter-setting region, the DH/MDA is still depicted in feet on the Jeppesen chart. A table giving ALT/HEIGHT Conversion in QNH and QFE is displayed on the chart. This table can be used in conjunction with the metric altitude indications on the lower ECAM for gross error checks of altitudes.
- In the event of QFE being passed, pilots are to request ATC for the actual QNH.
- Refer to the relevant Jeppesen approach plate, plan and brief the approach, paying particular attention to brief that, although the initial part of the approach may be flown with reference to the metric system, all the minima entered in the FMGCs are in feet, and all call-outs of "100 ABOVE" and "MINIMUM" are based on altitude indication in feet.
- If radar vectors are provided, and clearances are given in meters, use the metric indications of selected altitudes in meters from the Lower ECAM until established on final approach descent profile.
- Fly the approach down to the minimum as indicated in feet and land or go-around as appropriate.
- Go-around altitudes are given in feet on the Jeppesen approach charts. Later, if required by ATC, adjust the altitude to comply with clearances given in metric unit.

8.3.3.8. Flight Levels

Flight above the Transition Altitude is conducted at “Flight Levels” which are surfaces of constant atmospheric pressure based on the “Standard” altimeter setting of 1013.2hPa/29.92 in. The Flight Level is the altimeter reading divided by 100 (e.g.23000ft = FL230)

Note: In several Eastern Europe and a few Asian countries, Flight Levels are metric and the complete altimeter reading is used so that 5000 meters (16400ft) is stated as “Flight Level 5000 meters Standard.

8.3.4. Altitude Alerting System Procedures

Altitude Alert system operational functioning is described in FCOM systems description volume - "Instruments" chapter for A320.

The purpose of the altitude alerting system is to alert the flight crew by the automatic activation of a visual and/or an aural signal when the aircraft is about to reach or is leaving the pre-selected altitude / flight level. The system and its operation shall ensure an accurate altitude adherence during all phases of the flight.

The altitude alert system is to be used to record cleared altitudes and not as a reminder device for transition levels or reporting altitudes.

When climb / descent constraints are part of a departure / arrival clearance, constraint altitude(s) should be set in the altitude alert system (selected altitude window) even though such constraints are also entered in the FMS (as applicable).

When it is necessary to change the selected altitude, the PM will make the change cross-checked by the PF.

In the case of an instrument approach the missed approach altitude must be set in the altitude alert system once cleared for final or at the commencement of final approach.

The use of the altitude alerting system does not in any way release the flight crew from the responsibility of ensuring that the aircraft levels off or will be leveled off at the correct altitude or flight level.

8.3.5. Ground Proximity Warning System Procedures

The Ground Warning Proximity System (GPWS) is designed to alert pilots that the aircraft position in relation to the terrain is abnormal and, if not corrected, could result in a controlled flight into terrain (CFIT). Pilots must keep in mind that CFIT escape maneuver is an aggressive pitch up maneuver that maximizes the performance of the aircraft.

For A320 family, GPWS operational functioning is described in FCOM - systems description volume - "Navigation" chapter. Associated procedures are given in FCOM "Emergency procedures" and in the QRH.

It is the responsibility of the Pilot in Command to develop and implement a plan which employs all available resources to ensure adequate terrain clearance.

When undue proximity to the ground is detected by any flight crewmember or by a ground proximity warning system, the Pilot in Command or the pilot to whom conduct of the flight has been delegated shall ensure that corrective action is initiated immediately to establish safe flight conditions The GPWS must be “ON” from take-off until landing.

The GPWS may not be deactivated (by pulling the circuit breaker or use of the relevant switch) except when specified by approved procedures.

When a warning occurs during daylight VMC conditions, if positive visual verification is made that no hazard exists, the warning may be considered cautionary.

When a “Whoop Pull up”-“Terrain Terrain” warning occurs during the night or in IMC conditions a go-around shall be initiated in any case without delay .

Any GPWS activation must be reported in writing to the flight operations whether genuine or spurious.

Where such activation indicates a technical malfunction of the system an appropriate entry should also be made in the technical log.

Pilots shall be aware of the possibility that a nuisance warning may be generated by an aircraft flying below (up to 6500 ft.) e.g. during a holding.

Only Enhanced GPWS (EGPWS) also called TAWS (Terrain Avoidance and Warning System) have a forward-looking facility, therefore including a predictive terrain hazard warning

function so that some cautions and warnings may be given if the aircraft is approaching sharply rising terrain.
Basic or so-called advanced GPWS do not have this facility, so that the time between the receipt of a warning and contact with the ground if no corrective action is taken will be around 20 seconds. This will be lessened if the rate of descent is excessive or if there is rising terrain below the aircraft.
Nesma Airlines may require an update process for GPWS terrain and, if applicable, obstacle databases, for the purposes of reducing false warnings and ensuring actual hazards are properly identified.
Nesma Airlines ensure that terrain and, obstacle data acquired from an external vendor or supplier is distributed in a manner to allow the timely insertion of current and unaltered data into all aircraft for which it is required by the following process.

1. The Performance Engineer receives a release note for the EGPWS from the service provider (Honeywell).
2. The Performance Engineer revises the applicability of the released notification for Nesma Airlines operation, then to introduce it to the Operation Director for approval.
3. Technical department is responsible for the distribution of the TDB into all aircraft.

8.3.6. Policy and Procedures for the Use of TCAS/ACAS

Traffic and Collision Avoidance System (TCAS) / Airborne Collision Avoidance System (ACAS) description is given in FCOM DSC - "Navigation" chapter.
Associated procedures are given in FCOM "Emergency procedures" and in "Procedures and Techniques / Supplementary Techniques".
TCAS is designed to act as a back-up to the ATS system and to the "see and avoid" concept and is fitted to the Company's aircraft. It assists the Pilot in Command, who, with the aid of the ATS system has the primary responsibility for avoiding collision.
It generated both Resolution Advisories (RA) and Traffic Advisories (TA) in respect of aircraft predicted to enter the TCAS "collision area" only when these aircraft are fitted with transponders replying in Mode C and Mode S.
It can generate only Traffic Advisories against intruder aircraft whose transponders reply in Mode a (non-altitude reporting).
Operating Procedures
If a TA or an RA is received, the following action should be taken:
TA: a TA is intended to alert the crew that an RA, requiring a change in flight path, may follow. A visual search should immediately be concentrated on that part of the sky where the TA indicates the conflicting traffic to be. If the potential threat cannot be seen and gives cause for concern, air traffic control assistance should be requested in deciding whether a change of flight path is required. If the potential threat is seen, no action should be taken unless it is considered to pose a definite risk of collision. In this case the Pilot should maneuver his aircraft as necessary to avoid the threat, making sure that the area into which he is maneuvering is dear; or an RA is received.
Once clear of the potential threat, and any other subsequent conflicts, the Pilot should resume his previously cleared flight path and advise ATC of any deviation from his clearance. There is, however, a temptation in these circumstances for pilots to play air traffic controller and take avoiding action which is unnecessary. This temptation should be avoided, especially in areas of high traffic density, since it can jeopardize the traffic separation plan made by the air traffic controller on the ground.
RA an RA is intended to advise pilots on the maneuver they should carry out in order to achieve or maintain adequate separation from an established threat. The required maneuver should be

Initiated immediately, and crewmembers not involved in its execution should ensure that the sky ahead is clear of other traffic and continue the visual search for the established threat. Once the TCAS indicates that adequate separation has been achieved, or visual acquisition or ATC information shows that there is no longer a conflict, the aircraft should be promptly returned to its intended flight path, and ATC informed.

Note: To inform the ATC the following phraseology should be used “TCAS climb”, “TCAS descent” and “clear of conflict”.

Important Notes:

- An RA may be disregarded only when the pilots visually identify the potentially conflicting traffic and decide that no deviation from the current flight path is necessary.
- Do not maneuver in a direction opposite to that specified by an RA unless a visually acquired aircraft presents an immediate threat since TCAS to TCAS coordination may have occurred.
- If an instruction to maneuver is received simultaneously from an RA and from ATC, and the instructions conflict, the guidance given by the RA shall be followed without any delay.
- Maneuvers based on TA only are not advised - they may only increase collision threat.
- STALL, GPWS and Wind-shear warnings override all RAs.
- The majority of TCAS RAs that require a deviation in current flight path are usually resolved with vertical movements of 300 to 500 ft.
- TRAs do not require violent maneuvers. Promptly and smoothly adjust the aircraft's V/S to keep the V/S needle just outside the red zone on the VSI - this satisfies the TCAS advisory and minimizes ATS clearance deviation.
- Even if TAs and RAs are suspected of being nuisance or false advisories, they should be treated as genuine unless the intruder has been positively identified and shown visually to be no longer a threat.
- During approach to closely-spaced parallel runways or to converging or intersecting runways, use of TA Only mode is recommended once the aircraft is established on final approach course and glide path intercept has occurred. Continued operation in TA/RA mode may result in RAs for aircraft on approach for the adjacent runway, and may cause unnecessary go-around. Furthermore, RAs may be received for aircraft that may be on the airport surface, with their transponders operating, and thus may also cause unnecessary go-around.
- Pilots should limit vertical speed to 1500 ft/min in the last 2000 ft of climb or descent and 1000 ft/min in the last 1000 ft/min of climb or descent especially in the RVSM and busy airspace unless otherwise instructed by air traffic control.

Reporting Requirement

Whenever, as a result of a TCAS warning, an aircraft has been maneuvered such that it has departed from its air traffic control clearance, the appropriate ATC unit is to be informed as soon as possible of the departure, and of the return to the previously cleared flight conditions. Whenever an aircraft has departed from an air traffic control clearance to comply with an RA, the Pilot is to report the circumstances to the Flight Safety Office.

8.3.7. Policy and Procedures for the In-Flight Fuel Management

8.3.7.1. Fuel Quantity Checks

8.3.7.1.1. General

The fuel on board when starting the engines must not be less than the minimum fuel quantity defined by the fuel policy. Refer to 8.1.7.1.
The fuel on board must be periodically checked in flight to determine if the remaining fuel is not less than the minimum fuel required to continue the intended flight. This will help the Pilot in Command to detect possible fuel consumption higher than anticipated or a fuel leak.

8.3.7.1.2. In-Flight Fuel Checks

The remaining fuel must be recorded and evaluated to:

- Compare actual consumption with planned consumption;
- Check that the remaining fuel is sufficient to complete the flight; and
- Determine the expected fuel remaining on arrival at the destination.

In-flight fuel monitoring is made using the operational flight plan.
The crew must carry out regular fuel checks (at waypoints and at least every 30minutes) noting:

- Time of observation
- Fuel used (Burn Off)
- Remaining fuel on board (Actual FOB)

Subtract "Fuel used" from the block fuel (recorded before engine start) and compare this figure with the "Remaining fuel on board". If there is no major discrepancy, the figures read on the aircraft should be used.
This type of monitoring would detect fuel leaks and provide a more reliable basis of calculation in case of either Fuel Quantity Indicator (FQI) or Fuel Used (FU) failure during flight.
However, without any failure or fuel leak, some discrepancies, which may be considered large (more than 1000 kg on some aircraft), can be evidenced. There may be due to:

- APU consumption (up to 150 kg/h) which is not recorded by FU
- FQI errors on block fuel and on FOB
- FU indication tolerance
- Water freezing in the tanks may also affect the FQI indications.

8.3.7.1.3. In-Flight Fuel Management.

The Pilot in Command shall ensure that the amount of usable fuel remaining in flight is not less than the fuel required to proceed to an aerodrome where a safe landing can be made, with final reserve fuel remaining.
If, as a result of an in-flight fuel check, the expected fuel remaining on arrival at the destination is less than the required alternate fuel plus final reserve fuel, the Pilot In Command must take into account the traffic and the operational conditions prevailing at the destination aerodrome, along the diversion route to an alternate aerodrome and at the destination alternate aerodrome, when deciding whether to proceed to the destination aerodrome or to divert, so as to land with not less than final reserve fuel.
In particular, where an aerodrome has fewer than two separate and suitable runways available, a decision to continue to it must be carefully considered.
When the aircraft is holding for approach at destination, it is permissible to convert alternate fuel into holding fuel provided the following conditions are met:

- The maximum delay is known

- The landing at destination is assured
- At least FINAL RESERVE FUEL will remain at touchdown at destination.

Where an aerodrome has fewer than two separate and suitable runways available, a decision to convert alternate fuel into holding fuel at destination must be carefully considered.
Note: Landing is assured means weather at destination is at or above circling minima (if circling minima is not published Non-Precision approach minima) until 1 hour after ETA.
On a flight to an isolated aerodrome
The last possible point of diversion to any available en-route alternate aerodrome shall be determined.
Before reaching this point, the Pilot in Command shall assess the fuel expected to remain overhead the isolated aerodrome, the weather conditions, and the traffic and operational conditions prevailing at the isolated aerodrome and at any of the en-route aerodromes before deciding whether to proceed to the isolated aerodrome or to divert to an en-route aerodrome.
When approaching the last possible point of diversion to an available en-route aerodrome, unless the fuel expected to remain overhead the isolated aerodrome is at least equal to the additional fuel calculated as being required for the flight, or unless two separate runways are available at the isolated aerodrome and the expected weather conditions at that aerodrome comply with those specified for planning minima for isolated destination aerodromes (refer to 8.1.2.2.3), the Pilot In Command should not proceed to the isolated aerodrome.
In such circumstances, the Pilot In Command should instead proceed to the en-route alternate unless according to information he has at that time, such a diversion appears inadvisable.
Required minimum remaining fuel
The minimum fuel expected to be available on arrival at the destination aerodrome is the sum of the alternate fuel and the final reserve fuel as defined in chapter 8.1.7.1.1.
If it appears en route that the fuel remaining is such that the fuel at destination will be less than expected above, the Pilot in Command should consider the following: -

- Decrease aircraft speed (down to Max Range Speed / Cost Index minimum)
- Obtain a more direct route
- Fly closer to the optimum FL (taking the wind into account)
- Select a closer alternate aerodrome
- Land and refuel

8.3.7.1.4. Re-Planning in Flight

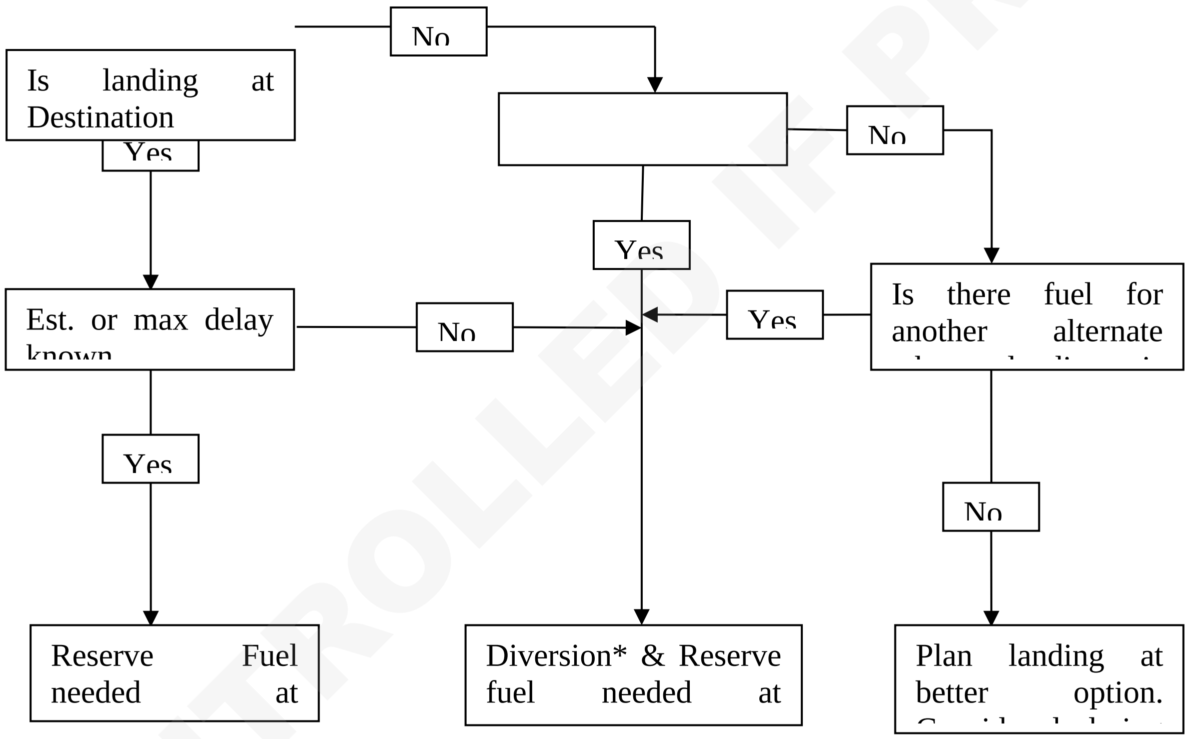
Re-planning in flight may be done when planned operating conditions have change or other reasons make further adherence to the original flight plan unacceptable or impractical, for example:

- Bad weather conditions or runway condition at the planned destination and alternate.
- Fuel penalties due to ATC constraints or unfavorable wind.
- Degraded aircraft performance.

If fuel is consumed during a flight for purposes other than originally intended during pre-flight planning, such flight is not continued without a re-analysis and, if applicable, adjustment of the planned operation to ensure sufficient fuel remains to complete the flight safely
Approaching Destination
Pre-flight, the best estimate of fuel required is Diversion fuel added to the Reserve Fuel. However, when in flight and approaching destination, it is necessary to review the fuel requirements according to the following: -
Within one hour of planned flying time to destination, check weather at destination and alternate as well as anticipated delays, If:

1. No significant ATC delays are likely until 1 hour after ETA, or EAT or maximum delay is known, and
2. The landing at destination is assured (see note below), and
3. At least Final Reserve Fuel will remain at touchdown at destination and
4. Two independent runways are available.

Then it is permissible to continue to destination without an alternate being available. An adjacent airfield may be counted as an additional runway, e.g. TIP may be counted as an additional runway for MTG or SHJ as an additional runway for DXB.
Otherwise, Diversion and Reserve Fuel is required on arrival at destination.
When the aircraft is holding, it is permissible to continue to hold, without an alternate being available provided conditions 1, 2, 3, and 4 above can be satisfied. See flow chart below.
Note: Landing assured means weather at destination is at or above circling minima (if circling minima is not published, Non-precision approach minima).



* At this point, Diversion fuel is that estimated by the Captain to be required to complete a diversion from the destination considering the likely diversion route and cruise flight level which may be achieved, following a go-around from the runway in use.

8.3.7.1.5 Minimum Fuel Operation

1) The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

Final Reserve Fuel is the amount of fuel calculated using the estimated mass on arrival at destination alternate aerodrome or destination aerodrome, when no destination alternate aerodrome is required.
For a turbine engine aeroplane: the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1500 ft.) above aerodrome elevation in standard conditions.

2) The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome

3) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

Note — The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

It should be noted that Pilots should not expect any form of priority handling as a result of a “MINIMUM FUEL” declaration. ATC will, however, advise the flight crew of any additional expected delays as well as coordinate when transferring control of the aeroplane to ensure other ATC units are aware of the flight’s fuel state.

4) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY, MAYDAY, MAYDAY, FUEL, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

Note 1. — The planned final reserve fuel refers to the value calculated in 8.1.7.1 and is the minimum amount of fuel required upon landing at any aerodrome.

Note 2. — The words **“**MAYDAY FUEL” describe the nature of the distress conditions as required in Annex 10, Volume II,

If the aircraft has landed with less than final Reserves Fuel remaining, an incident report must be made to the Director of Operations and Flight Safety Manager.

8.3.7.2. Fuel Freezing Limitations

The minimum fuel temperature, published in the operational documentation, may be more restrictive than the certified aircraft environmental envelope. It includes two different limitations both linked to engine operation: Fuel freezing point limitation and fuel heat management system limitation.

(a) Fuel freezing point limitation

This limitation provides an operating margin to prohibit operations under fuel temperature conditions that could result in the precipitation of waxy products in the fuel. The resulting limitation varies with the freezing point of the fuel being used.

Aside from this, engines have a fuel warming (oil cooling) system at their inlet.

Because of the architecture of this system and the fact that the fuel inlet hardware varies from one engine type to another, the specification of what fuel temperature is acceptable at the inlet of the engine varies from one engine type to the other.

Therefore, engine manufacturers sometime require a temperature margin to fuel freezing point to guarantee correct operation.

The engine manufacturer’s margins relative to the fuel freezing point are as follows:

- CFM (A320) : 4°C
- V2500 (A320): x °C

(b) Fuel heat management system limitation

This limitation reflects the engine capability to warm-up a given water-saturated fuel flow to such a point that no accumulation of ice crystals may clog the fuel filter.

Such a limitation does not appear in the documentation for some engine types when outside the environmental envelope.
When applicable (refer to FCOM Fuel limitations) the resulting limitation is a fixed temperature below which, flight (or takeoff only, if high fuel flows only cannot be warmed-up enough) is not permitted.
The most restrictive of the two limitations above (a) and (b) should be considered.
Note: The fuel anti-icing additives authorized by engine manufacturers decrease the freezing temperature of the water contained in the fuel (decrease the fuel heat management system temperature limitation), but have no effect on the fuel freezing temperature itself.
Therefore, the minimum fuel temperature should be:

FUEL FREEZING POINT
+ ENGINE MANUFACTURER MARGIN

The fuel freezing point to be considered is the actual fuel freezing point. (Refer to 8.2.1.3.2. - Fuel freezing point determination).
If the actual freezing point of the fuel being used is unknown, the minimum fuel specification values as indicated below should be used as authorized by the AFM/FCOM.

JET A	JP5	JET A1/JP8	RT/TS-1	JET B	TH	JP4
-40°C	-46°C	-47°C	-50°C	-50°C	-53°C	-58°C

The procedures dealing with low fuel temperature vary with the aircraft type. Refer to FCOM.
Whenever necessary the TAT has to be increased. This is achieved by an aircraft speed increase and/or an altitude decrease.
Increasing the aircraft speed provides a marginal TAT increase (in the order of 0.5 to1°C for 0.01 M increase) and thus a small fuel temperature increase, at the expense of a significant increase in fuel consumption.
Decreasing the altitude generally provides a SAT increase (about 2°C per 1000ft).
Nevertheless, whenever the tropopause is substantially low, decreasing the altitude may not provide the corresponding expected SAT and, thus, TAT increase.

8.3.8 Adverse and Potentially Hazardous Atmospheric Conditions

8.3.8.1. Thunderstorms
8.3.8.1.1. General
There is no useful correlation between the external visual appearance of thunderstorms and their severity.
Knowledge and weather radar have modified attitudes toward thunderstorms, but one rule continues to be true:
"Any thunderstorm should be considered hazardous"
8.3.8.1.2. Weather Information
Meteorological observations/forecasts messages or charts contain thunderstorm and associated hazards information.
But, when thunderstorms are, or are expected to be, sufficiently widespread to make their avoidance by aircraft difficult, e.g. a line of thunderstorms associated with a front or squall line or extensive high-level thunderstorms, the Meteorological Office issues warnings, in the form of SIGMET messages, of "active thunderstorm area".
In addition, pilots are required to send a special air report when conditions are encountered which are likely to affect the safety of aircraft. Such a report would be the basis of a SIGMET warning.

The Meteorological Office does not issue SIGMET messages in relation to isolated thunderstorm activity and the absence of SIGMET warnings does not therefore necessarily indicate the absence of thunderstorms.
Refer to 8.1.6 and Jeppesen- Meteorological information - for description of weather messages and for the meaning of the associated codes.

8.3.8.1.3. Thunderstorm Hazards

Thunderstorms concentrate every weather hazard to aviation into one vicious package. The most important hazards are:

8.3.8.1.3.1. Turbulence

Potentially hazardous turbulence is present in all thunderstorms. Strongest turbulence within the cloud occurs with shear between updrafts and downdrafts.
Outside the cloud, shear turbulence has been encountered several thousand feet above and 20 NM laterally from a severe storm. A low-level turbulent area is the shear zone associated with the gust front. Often, a "roll cloud" on the leading edge of storm marks the top of the eddies in this shear and it signifies an extremely turbulent zone. Gust fronts often move far ahead (up to 15 NM) of associated precipitation. The gust front causes a rapid and sometimes drastic change in surface wind ahead of an approaching storm.
It is almost impossible to hold a constant altitude in a thunderstorm, and maneuvering in an attempt to do so produces greatly increased stress on the aircraft. It is understandable that the speed of the aircraft determines the rate of turbulence encounters. Stresses are least if the aircraft is held in a constant attitude and allowed to "ride the waves". (Refer to FCOM "Flight in severe turbulence")
Turbulence Drill

A. Cabin crew procedures in the case of turbulence

LIGHT TURBULENCE	MODERATE TURBULENCE	SEVERE TURBULENCE
- Visually check that all passengers are seated with their seat belts fastened and hand baggage is stowed. - Infants must be removed from bassinets and secured with an infant seat belt (if applicable) on the guardians lap, or secured in an approved car seat. - Give the "cabin secure" to the Purser. - Purser informs the flight crew that the cabin is secure.(via Interphone)	- When the cabin crew are returning to their crew seats, check that all passengers are seated with their seat belts securely fastened and hand baggage is stowed. - Infants must be removed from Bassinets (if applicable) and secured with an infant seat belt on the guardians lap, or secured in an approved car seat. - Give the "cabin secure" to the Purser.	- The cabin crew must not attempt to visually check passenger compliance. - If trolleys are in the cabin, set the brakes on all trolleys that are in use in the current location. - Place jugs/pots of hot beverages on the floor. - The cabin crew must immediately sit down, Take the nearest seat (including passenger seat) and fasten seatbelt/harness.

<table>
<tr><td></td><td>- Purser informs the flight crew that the cabin is secure. (via Interphone)</td><td></td></tr>
<tr><td colspan="3">GALLEY AREAS</td></tr>
<tr><td>- Ensure that trolleys and galley equipment that is not in use are correctly stowed and secured.</td><td>- Ensure that trolleys and galley equipment that is not in use are correctly stowed and secured.

- If the turbulence is expected for a long duration, stow and secure galley items.

- Cabin crewmembers working in the galley areas must take their seats when the galley is secured.</td><td>- Set the brakes on all trolleys that are in use in their current location.

- Place jugs/pots of hot beverages on the floor.

- The cabin crew must immediately sit down. Fasten seat belt/harness.

<table><tr><td>WARNING</td><td>Cabin crew Shall not risk personal injury by continuing service during turbulent conditions. The personal safety of the cabin crew is the priority.</td></tr></table></td></tr>
</table>

B. Communication and coordination for anticipated turbulence

If flight into forecast turbulence is unavoidable, timely notification to the cabin crew is crucial.

Event	Expected Turbulence	
Flight Crew	Purser	Cabin Crew
- Inform Purser on the expected turbulence level and its duration. - Clearly articulate expectations from Cabin Crew (as defined in Cabin Crew duties) and confirmation of completed actions. Switch on Seat Belt sign. - Make a PA to passenger: “We are entering an area of turbulence please fasten your seatbelt”. - If above light: “Cabin Crew stow all applicable service items and take your seats” Note: PA may be delegated to cabin Purser.	- Read-back information and inform Cabin Crew according to fight deck brief. - If PA is delegated: Make a PA: “We are entering an area of turbulence, please be seated with seatbelt fastened”. - On receiving cabin secured by Cabin Crew, report back to flight deck: Cabin Secured	- Receive information from Purser. - Perform visual check as defined in seatbelt compliance and confirm to Purser “Cabin secured”. - On hearing the PA, Cabin Crew will perform cabin, galley and seatbelt compliance checks as defined in Cabin Crew Procedures.

C. Communication and coordination for unanticipated moderate turbulence

Event	Unexpected Light to Moderate Turbulence	
Flight Deck	Purser	Cabin Crew
- Switch on FSB sign. - Make a PA: "Please be seated with seatbelt fastened" Please fasten your seatbelt. - If turbulence above light: "Cabin Crew please take your Seats"	- Receive "Cabin secure" from Cabin Crew and report back to flight deck: Via Interphone: "Cabin secured".	- Confirm Purser "Cabin secured".

D. Communication and coordination for unanticipated severe turbulence

Event	Unexpected Severe Turbulence	
Flight Deck	Purser	Cabin Crew
- Switch on the Fasten Seatbelt signs and make a PA to passengers and cabin crew to "Fasten Seatbelts Immediately" Or Recycle the Seat Belt Sign OFF/ON (2 chimes)	- On hearing the PA, cease all duties, sit down immediately fasten seatbelt and fit full harness. - If no PA from PIC, the Purser must immediately make a PA for passengers and crew to be seated and fasten seatbelt - Remain seated until advised by the flight crew or the "fasten seatbelt" sign is switched off.	- On hearing the PA, cease all duties; set brakes on all carts and wedge between seats. - Place hot liquids, water jug/pots on the floor. - Take the nearest available seat, fit full harness or fasten seatbelt. - Sit down immediately. - Remain seated until advised by the flight crew or the "fasten seatbelt" sign is switched off.

Note: Cabin Crew may carry on with normal Cabin Services only on PIC's advice

E. . Post Turbulence Duties

FLIGHT CREW	PURSER	CABIN CREW
- Advice cabin crew when it is safe to resume duties.	- Resume duties. - Report any passenger injuries and/or cabin damage to the flight crew.	- Check for passenger injuries, give first aid if necessary - Calm and reassure passengers - Check for cabin damage - Report to Purser any passenger injuries and/or cabin damage.

8.3.8.1.3.2. Icing

Super cooled water freezes on impact with an aircraft. Clear icing can occur at any altitude above the freezing level; but at high levels, icing from smaller droplets maybe rime or mixed rime and clear. The abundance super cooled water droplets make clear icing very rapid between 0°C and -15°C.

8.3.8.1.3.3. Hail

Hail competes with turbulence as the greatest thunderstorm hazard to aircraft.
Super cooled drops above the freezing level begin to freeze. Once a drop has frozen, other drops latch on and freeze to it, so the hailstone grows. Large hail occurs with severe thunderstorms with strong updrafts that have built to great heights. Eventually, the hailstones fall, possibly some distance from the storm core. Hail may be encountered in clear air several miles from dark thunderstorm clouds. 8.3.8.1.3.4. Low ceiling and visibility
Generally, visibility is near zero within a thunderstorm cloud. The hazards and restrictions created by low ceiling and visibility are increased many fold when associated with the other thunderstorm hazards.

8.3.8.1.3.4. Effect on Altimeters

Pressure usually falls rapidly with the approach of a thunderstorm, then rises sharply with the onset of the first gust and arrival of the cold downdraft and heavy rain showers, failing back to normal as the storm moves on. This cycle of pressure change may occur in 15 minutes. If the pilot does not receive a corrected altimeter setting, the altimeter may be more than 1000 feet in error.

8.3.8.1.3.5. Lightning

A lightning strike can puncture the skin of an aircraft. Lightning has been suspected of igniting fuel vapors causing explosion; however, serious accidents due to lightning strikes are extremely rare.
Nearby lightning can blind the pilot rendering him momentarily unable to navigate either by instrument or by visual reference.
Lightning can also induce permanent errors in the magnetic compass and lightning discharges, even distant ones, can disrupt radio communications on low and medium frequencies.

- In the event of lightning strike conduct the following procedure:
- In flight, check of all radio communication and navigational equipment and the weather radar.
- Record the lighting strike in the technical logbook
- On ground, check
  - compensation of the (standby) compass
  - signs of damage on fuselage, wings, Radom, empennage
  - antennas, Pitot heads
  - all control trailing edges and static dischargers
  - Radio and navigation equipment.

Lightning intensity and frequency have no simple relationship to other storm parameters. But, as a rule, severe storms have a high frequency of lightning.

8.3.8.1.3.6. Engine Water Ingestion

Jet engines have a limit on the amount of water they can ingest. Updrafts are present in many thunderstorms, particularly those in the development stages. If the updraft velocity in the thunderstorms approaches or exceeds the terminal velocity of the falling raindrops, very high concentrations of water may occur. It is possible that these concentrations can be excess of the quantity of water engines are designed to ingest. Therefore, severe thunderstorms may contain areas of high water concentration which could result in flameout and/or structural failure of one or more engines. (Refer to FCOM "operation in or near to heavy rain, hail or sleet").
8.3.8.1.4. Avoiding Thunderstorms
8.3.8.1.4.1. General Rule
Never regard a thunderstorm lightly. Avoiding thunderstorms is the best policy

- Don't land or takeoff in the face of an approaching thunderstorm. Turbulence wind reversal or wind shear could cause loss of control.
- Don't attempt to fly under a thunderstorm even if you can see through to the other side. Turbulence and wind shear under the storm could be disastrous.
- Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Scattered thunderstorms not embedded usually can be visually circumnavigated.
- Don't trust the visual appearance to be a reliable indicator of the turbulence inside a thunderstorm
- Do avoid by at least 20 NM any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of large cumulonimbus.
- Do circumnavigate the entire area if the area has 6/10 thunderstorm coverage.
- Do remember that vivid and frequent lightning indicates the probability of a severe thunderstorm.
- Do regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher whether the top is visually sighted or determined by radar.

8.3.8.1.4.2. Departure and arrival

When significant thunderstorm activity is approaching within 15 NM of the airport, the Pilot in Command should consider conducting the departure or arrival from different direction or delaying the take-off or landing. Use all available information for this judgment, including PIREPs, ground radar, aircraft radar, tower-reported winds, and visual observations. In the terminal area thunderstorms should be avoided by no less than 3 NM. Many ATC radars are specifically designed to reduce or exclude returns from "weather" and in these cases little or no assistance can be given by ATC.
It is recommended that any guidance given by ATC should be used in conjunction with the aircraft own weather radar, in order to guard against possible inaccuracies in the ground radars interpretation of the relative severity of different parts of a storm area. Any discrepancies should be reported to ATC.
Gust fronts in advance of a thunderstorm frequently contain high winds and strong vertical and horizontal wind shears, capable of causing an upset near the ground. A gust front can affect an approach corridor or runway without affecting other areas of the airport. Under such conditions, tower-reported winds and the altimeter setting could be misleading.
Microburst may also accompany thunderstorms. 2 NM or less in diameter, microburst are violent short-lived descending columns of air capable of producing horizontal winds sometimes exceeding 60 kt within 150 ft of the ground. Microburst commonly last one to five minutes and

may emanate from high-based cumulus clouds accompanied by little or no precipitation, or may be associated with large cumulonimbus build-ups and be accompanied by heavy rainfall. Because of their relatively small diameter, airport anemometers and low-level wind shear alert systems may not sense this phenomenon in time to provide an adequate warning of nearby microburst activity.

8.3.8.1.4.3. En-Route

A. Weather Radar Principle

A knowledge of the radar principle is essential in order to accurately interpret the weather radar display.

Weather Radar Detection Capability

The weather radar only detects precipitation droplets. How much it detects depends upon the size, composition and number of droplets. Water particles are five times more reflective than ice particles of the same size.

The radar does detect:

- Rainfall
- Wet hail and wet turbulence
- Ice crystals, dry hail and dry snow. However, these three elements give small reflections, as explained below.

The radar does not detect:

- Clouds, fog or wind (droplets are too small, or no precipitation at all)
- Clear air turbulence (no precipitation)
- Wind shear (no precipitation except in microburst)
- Sandstorms (solid particles are almost transparent to the radar beam)
- Lightning.

B. Refer to FCOM "Weather avoidance - Optimum use of weather radar"

8.3.8.1.4.3.1. Over Flight

Avoid overlying thunderstorms unless a minimum of 5000 ft clearance above the storm top is ensured. When possible, detour between the storm cells of a squall line rather than directly above them. Keep the radar antenna tilted down during over flight to properly assess the most severe cells, which may be masked by clouds formations.

8.3.8.1.4.3.2. Lateral Avoidance

At altitudes above the freezing level, super cooled rain and hail may indicate as only weak radar echoes, which can mask extreme thunderstorm intensity. Avoid weak radar echoes associated with thunderstorms by the following minimum distances:

Altitude	Lateral avoidance
20 000 ft	10 NM
25 000 ft	15 NM
30 000 ft	20 NM

8.3.8.1.4.3.3. Flight near Thunderstorms

If flight closer than the minimum recommended distances is unavoidable, observe the following precaution:

- When it is necessary to fly parallel to a line of cells, the safest path is on the upwind side (the side away from the direction of storm travel). Although severe turbulence and hail can be encountered in any direction outside a thunderstorm, strong drafts and hail are more often encountered outside the body of the cell on

- The downwind side.
- Avoid flight under the anvil. The greatest possibility of encountering hail is downwind of the cell, where hail falls from the anvil or is tossed out from the side of the storm. Hail has been encountered as much as 20 NM downwind from large thunderstorms.
- Avoid Cirrus and Cirrostratus layers downwind from the storm tops. Such layer may be formed by cumulonimbus tops and may contain hail, even though the radar scope shows little or no return echoes.
- If ATC requirements make flight into unsafe conditions imminent, the Pilot In Command should request a change of routing and if necessary use his emergency authority to avoid the severe weather conditions.
- Any flight in the vicinity of thunderstorms carries the risk of a sudden onset of moderate or severe turbulence.

8.3.8.1.4.3.4. Thunderstorm Penetration

If thunderstorm penetration is unavoidable, the following guidelines will reduce the possibility of entering the worst areas of turbulence and hail:

- Use the radar to determine the areas of least precipitation. Select a course affording a relatively straight path through the storm. Echoes appearing hooked, finger-like, or scalloped indicate areas of extreme turbulence, hail and possibly tornadoes, and must be avoided.
- Penetrate perpendicular to the thunderstorm line, if not possible maintain the original heading. Once inside the cell, continue ahead, a straight course through the storm most likely get the aircraft out of the hazards most quickly. The likelihood of an upset is greatly increased when a turn is attempted in severe turbulence and turning maneuvers increase the stress on the aircraft.
- Pressure changes may be encountered in strong drafts and may conduct to an altitude error of 1000 ft.
- Gyro-stabilized instruments supply the only accurate flight instrument indications.
- Avoid level near the 0°C isotherm. The greatest probability of severe turbulence and lightning strikes exist near the freezing level.
- Generally, the altitudes between 10 000 ft. and 20 000 ft. encompass the more severe turbulence, hail, and icing conditions, although violent weather may be encountered at all level inside and outside an active thunderstorm.
- Due to very high concentration of water, massive water ingestion can occur which could result in engine flameout and/or structural failure of one or more engines. Changes in thrust should be minimized.

8.3.8.1.5. Operational Procedures

In general, Pilot in Command or his delegate, shall report all hazardous flight conditions to the appropriate ATC without delay.

If is not possible to avoid flying through or near to a thunderstorm, the following procedures and techniques are recommended:

- Approaching the thunderstorm area ensures that crewmembers' safety belts are firmly fastened and secure any loose articles.
- Switch on the Seat Belt signs and make sure that all passengers are securely strapped in and that loose equipment (e.g. cabin trolleys and galley containers) are firmly

secured. Pilots (particularly of long bodied aircraft) should remember that the effect of turbulence is normally worse in the rear of the aircraft that on the flight deck.

- One pilot should fly the aircraft and control aircraft attitude regardless of all else and the other monitor the flight instruments continuously.
- Height for penetration must be selected bearing in mind the importance of insuring adequate terrain clearance. Due to turbulence, wind shear, local pressure variations the maintenance of a safe flight path can be difficult.
- The recommended speed for flight in turbulence must be observed (see FCOM chapter: "Flight in severe turbulence") and the position of the adjusted trim must be noted.
- As indicated in FCOM procedure "Flight in severe turbulence" the autopilot should be engaged. The autopilot is likely to produce lower structural loads and smaller oscillations than would result from manual flight. The auto-thrust should be disconnected to avoid unnecessary and frequent thrust variations.
- Check the operation of all anti-icing equipment and operate all these systems in accordance with FCOM instructions: "Operation in icing conditions". Icing can be very rapid at any altitude.
- Flight crew must apply or be prepared to apply the FCOM procedures:
- "Operations in or near to heavy rain, hail or sleet", and "Operation in wind shear/downburst conditions".
- Turn the cockpit lighting fully on to minimize the blinding effect of lightning.
- Continue monitoring the weather radar in order to pick out the safest path. Tilt the antenna up and down occasionally to detect thunderstorm activity at altitudes other than that being flown. See FCOM instructions: "Use of weather radar"

8.3.8.2. Icing Conditions

Icing conditions occur when low temperatures are accompanied by precipitation.
Icing of the aircraft is one of the most dangerous flight hazards.
Procedures for “operating in icing conditions” are developed in FCOM - "PRO SUP / Supplementary Techniques".

8.3.8.3. Turbulence

Turbulence is defined as a disturbed, irregular flow of air with embedded irregular whirls or eddies and waves. An aircraft in turbulent flow is subjected to irregular and random motions while, more or less, maintaining the intended flight path.
Procedures for “Flight in severe turbulence” are developed in FCOM - "Procedures and Techniques / Supplementary Techniques".
If the weather conditions and route forecast indicate that turbulence is likely, the cabin crew should be pre-warned, and passenger advised to return to, and/or remain seated and to ensure that their seat belts are securely fastened. Catering and other loose equipment should be stowed and secured until it is evident that the risk of further turbulence has passed. When encountering turbulence, pilots are urgently requested to report such conditions to ATC as soon as practicable
Classification of intensity may be defined as follows:

INTENSITY	AIRCRAFT REACTION	REACTION INSIDE AIRCRAFT

LIGHT	Turbulence that momentarily causes slight, erratic changes in altitude And/or attitude.	Occupants may feel a slight strain against seat belts or shoulder straps. Unsecured objects may be displaced slightly. Food service may be conducted and little or no difficulty is encountered in walking.
MODERATE	Similar to light turbulence but of greater intensity. Changes in altitude and/or attitude occur but the aircraft Remains in positive control at all times. It usually causes variations in indicated airspeed.	Occupants feel definite strains against seat belts or shoulder straps. Unsecured objects are dislodged. Food service and walking are difficult.
SEVERE	Turbulence that causes large, abrupt changes in altitude and/or attitude. It usually causes large variation in indicated airspeed. Aircraft may be momentarily out of control.	Occupants are forced violently against seat belts or shoulder straps. Unsecured objects are Tossed about. Food service and walking is impossible.
EXTREME	Turbulence in which the aircraft is violently tossed about and is practically impossible to control. It may cause structural damage.	Occupants forced violently against seat belts. Unsecured objects tossed about or lifted from the floor. Walking is impossible as is standing without holding on to something for support

8.3.8.4. wind shear

wind shear is a rapid variation in wind velocity and/or direction along the flight path of the aircraft.
Procedures for "operation in wind shear / downburst conditions" are developed in FCTM-NP-SP-10(10-2) Operational Recommendations & FCOM PRO-ABN-SURV (MEM)
When encountering wind shear conditions, pilots are urgently requested to report such conditions to ATC as soon as practicable in stating the loss or gain of speed and the altitude at which it was encountered.

8.3.8.5. Jetstream

Jet streams are narrow bands with extreme high wind speeds up to 300 kt. They can extend up to several thousand miles, the width can be several miles.
Avoid flying along the edge of jet streams due to possible associated turbulence.
Pilots should also be aware of the effect of increased fuel consumption due to unexpected significant head wind components that can be encountered.

8.3.8.6. Volcanic Ash Clouds

Flying through an ash cloud should be avoided by all means due to the extreme hazard for the aircraft. Volcanic ash can cause extreme abrasion to all forward-facing parts of the aircraft, to the extent that visibility through the windshields may be totally impaired, airfoil and control surface leading edges may be severely damaged, airspeed indication may be completely unreliable through blocking of the Pitot heads and engines may even shut down.
Procedures for "Operation in areas contaminated by volcanic ash" are developed in FCOM - "Procedures and Techniques / Supplementary Techniques".

8.3.8.7. Heavy Precipitation

Heavy precipitation may occur as rain showers, snow showers and hail. The greatest impairment to flight is the reduced visibility and the risk of in combination with low temperature. Heavy precipitation can be associated with significant downdrafts and wind shear.
Effect from water ingested by jet engines
Under given weather conditions, the water / air ratio absorbed by jet engines is directly related to its performance and aircraft speed.
This ratio is considerably increased at a high aircraft speed and engines at flight idle (typical descent conditions).
This means that during descent, under heavy rainfall conditions, or hail, significant ingestion of water may cause surging or extinction of jet engines.
Procedures for “Operation in or near to heavy rain, hail or sleet” are developed in FCOM - "Procedures and Techniques / Supplementary Techniques".
Heavy precipitation can quickly lead to high levels of runway contamination so runway clearance / drainage rate must be closely monitored in order to assess if a diversion is necessary.

8.3.8.8. Sandstorms

Avoid flying in active sandstorms whenever possible. When on ground, aircraft should ideally be kept under cover if dust storms are forecast or in progress.
Alternatively, all engine blanks and cockpit cover should be fitted, as well as the blanks for the various system and instrument intakes and probes. They should be carefully removed before flight to ensure that accumulation of dust is not deposited in the orifices which the covers are designed to protect.
Procedures for “operation from / to airports contaminated with loose (abrasive) particles” are developed in FCOM - "Procedures and Techniques / Supplementary Techniques".
8.3.8.9. Mountain Waves
Mountain waves are caused by a significant airflow crossing a mountain range.
On some airports, relief or obstacles may cause special wind conditions with severe turbulence and wind shear on approach or during take-off.
Special procedures or recommendations are indicated on airport charts when appropriate. They must be considered by the flight crews for the choice of the landing or take off runway.

8.3.8.10. Significant Temperature Inversion

8.3.8.10.1. Temperature Inversion, the Weather Phenomenon

8.3.8.10.1.1. General

In meteorology, air temperature at the earth’s surface is normally measured at a height of about 1.20 meter (4ft) above the ground. From that temperature, which is reported by Air Traffic Control, takeoff performance will be defined.
All along the takeoff flight path, aircraft performance is computed considering the altitude gained, the speed increase, but also implicitly considering a standard evolution of temperature, i.e. temperature is considered to decrease by 2°C for each1000 ft.
However, although most of the time, temperature will decrease with altitude in quite a standard manner, specific meteorological conditions may lead the temperature evolution to deviate from this standard rule. With altitude increasing, marked variations of the air temperature from the standard figure may be encountered. In that way, air temperature may decrease in a lower way than the standard rule or may be

Constant or may even increase with altitude. In this last case, the phenomenon is called a temperature inversion.
As described below, this may particularly affect the very lower layer of the atmosphere near the earth's surface.
There are many parameters, which influence air temperature and may lead to a temperature inversion. Close to the ground, air temperature variations mainly result from the effects of:

- seasonal variations
- diurnal / nocturnal temperature variations
- weather conditions (effect of clouds and wind)
- humidity of the air
- geographical environment such as:
- − mountainous environment
- − water surface (sea)
- − nature of the ground (arid, humid)
- − latitude
- − local specificity

As a general rule, valid for everywhere, low wind conditions and clear skies at night, will lead to rapid cooling of the earth and a morning temperature inversion at ground level.

8.3.8.10.1.2. Morning Temperature Inversion

In the absence of wind or if the wind is very low, the air, which is in contact with a "cold" earth surface will cool down by heating transfer from the "warm" air to the "cold" ground surface. This transfer of heat occurs by conduction only and consequently leads to a temperature inversion which is limited in altitude. This process needs stable weather conditions to develop. Schematically, during the day, the air is very little heated by solar radiation and the earth is very much. But the lower layer of the atmosphere is also heated by contact with the ground, which is more reactive to solar radiation than the air, and by conduction between earth and atmosphere.
At night, in the absence of disturbing influences, ground surface cools down due to the absence of solar radiation and will cool the air near the ground surface. In quiet conditions, air cooling is confined to the lowest levels. Typically, this effect is the biggest at the early hours of the day and sunshine subsequently destroys the inversion during the morning. Similarly, wind will mix the air and destroy the inversion.
Magnitude of temperature inversion
This kind of inversion usually affects the very lowest levels of the atmosphere. The surface inversion may exceed 500 ft but should not exceed 1000 to 2000 ft. The magnitude of the temperature inversion cannot be precisely quantified. However, a temperature inversion of about +10°C is considered as quite an important one.
Usually, within a temperature inversion, temperature regularly increases with altitude until it reaches a point where the conduction has no longer any effect.
Where can they be encountered?
This kind of inversion may be encountered world-wide. However, some areas are more exposed to this phenomenon such as arid and desert regions. It may be also encountered in temperate climate particularly during winter season (presence of fog).
Tropical regions are less sensitive due to less stable weather conditions.
In some northern and continental areas (Canada, Siberia) during winter in anti-cyclonic conditions, the low duration of sunshine during the day could prevent the inversion from destruction. Thus, the temperature of the ground may considerably reduce and amplify the

inversion phenomenon. In a lower extent, this may also occur in temperate climate during winter, if associated with cold anti-cyclonic conditions.
Another important aspect of an inversion is wind change. The air-mass in the inversion layer is so stable that winds below and above, tends to diverge rapidly.
Therefore, the wind change, in force and direction, at the upper inversion surface may be quite high. This may add to the difficulty of flying through the inversion surface. In some conditions, the wind change may be so high as to generate a small layer of very marked turbulence.

8.3.8.10.1.3. Other Types of Temperature Inversion

The Morning temperature inversion process is considered as the most frequent and the most sensitive. However, as also mentioned above, other meteorological conditions, of a less frequent occurrence and magnitude, may lead to temperature inversions.
For instance, the displacement of a cold air mass over a cold ground surface may lead to turbulence resulting in a transfer of heat to the lower levels of this mass, thus, also creating a temperature inversion in the lower levels of the atmosphere below this air mass. Usually, this kind of inversion has lower magnitude than the previous case described above.
In any case, pilot experience, weather reports or pilot reports will be the best way in identifying such weather conditions.

8.3.8.10.2 The Effect on Aircraft Performance and Recommendations

A temperature inversion will result in a reduction of the thrust only when performing a maximum takeoff thrust during hot days, i.e., the actual ambient temperature is above T.REF (Flat rating temperature).

8.3.8.10.2.1 Effect on Aircraft Performance

In the event of temperature inversion, the climb performance will be affected in the cases where the thrust is affected.
However, to affect the aircraft performance, a temperature inversion must be combined with other factors.
During a normal takeoff with all engines operative, the inversion will have no effect since the actual aircraft performance is already far beyond the minimum required performance.
Then, the actual aircraft performance could be affected only in the event of an engine failure at takeoff.
However, conservatism in the aircraft certified performance is introduced by the FAR/JAR Part 25 rules, to take account for inaccuracy of the data that are used for performance calculations. Although not specifically mentioned, temperature inversions can be considered as part of this inaccuracy.
Therefore, a temperature inversion could become a concern during the takeoff only in the following worst case with all of these conditions met together:

- The engine failure occurs at V1, and
- Takeoff is performed at maximum takeoff thrust, and
- OAT is close to or above T.REF, and
- The takeoff weight is limited by obstacles, and
- The temperature inversion is such that it results in the regulatory net flight path margin cancellation and leads to fly below the regulatory net flight path.

In all other cases, even if the performance is affected (inversion above T.REF), the only detrimental effect will be the climb performance to be lower than the nominal one

8.3.8.11. Operations on Slippery Surfaces

8.3.8.11.1. Runway Friction Characteristics

The stopping performance of aircraft is to a greater degree dependent on the available friction between the aircraft tires and the runway surface, their landing and take-off speeds. In some conditions the runway length required for landing or take-off could be critical in relation to the runway length available.
Adequate runway friction characteristics / braking action is mainly needed for three distinct purposes:

- deceleration of the aircraft after landing or a rejected take-off;- directional control during the ground roll on take-off or landing, in particular in the presence of cross-wind, asymmetric engine power or technical malfunctions;
- Wheel spin-up at touchdown.

To compensate for the reduced stopping and directional control capability for adverse runway conditions (such as wet or slippery conditions) performance corrections are applied in the form of:

- runway length increment;
- reduction in allowable take-off or landing weight;
- Reduction of allowable cross-wind component.

8.3.8.11.2 Measuring and Expressing Friction Characteristics

The friction coefficient is defined as the ratio of the maximum available tire friction force and the vertical load acting on the tire. This coefficient is named "Mu" or "μ".
Various systems are used to measure the runway friction coefficient /conditions:

- Skidoo meter High pressure tire (SKH)
- Skidoo meter Low pressure tire (SKL)
- Surface Friction Tester (SFT)
- Mu-meter (MUM)
- Diagonal braked vehicle (DBV)
- Talley meter (TAP)
- James Brake Decelerometer (JBD)

The results of the friction measuring equipment do not generally correlate with each other for all surface conditions and no correlation has been established between these results and the stopping performance of an aircraft.
The only perfect way of measuring the friction coefficient "Mu" for a specific aircraft is by using that specific aircraft braking system on the surface concerned.
When friction measurement are not available but can be only estimated, the pilot is informed only of the estimated braking action reported as "good" - "medium" - "poor"- "unreliable (nil)" or a combination of these terms.
Pilots should treat **reported braking action measurements with caution** and interpret them conservatively.
Practically the following correlation may be used as a guideline:

Estimated braking action	Mu values
good	0.40 and above
medium/good	0.36 to 0.39
medium	0.30 to 0.35
medium/poor	0.26 to 0.29
poor	0.25 and below

unreliable	-

8.3.8.11.3 Braking Action Reporting

Friction measurements or braking action estimation may be reported:

- in plain language by the tower
- by the routine weather broadcast
- by snow tam

When necessary, ATC issues the latest braking action report for the runway in use to each arriving and departing aircraft. Pilots should also be prepared to provide a descriptive runway condition report to ATC after landing.

8.3.8.11.4 Meteorological Observations

Meteorological observations in connection with knowledge of previous runway conditions will, in many cases, permit a fair estimate to be made of braking action.
On snow- or ice-covered runways not treated with, e.g. sand, the coefficient of friction varies from as low as 0.05 to 0.30. It is very difficult to state exactly how and why the runway conditions vary. The braking action is very much dependent upon the temperature especially near the freezing point. However, when it is freezing, the braking action could be fairly good, it will so remain if the temperature decreases but if the temperature rises to the freezing point or above, the braking action will decrease rapidly. Sometimes very low friction coefficient values occur when humid air is drifting in over an icy runway even though the temperature may be well below the freezing point.
Some of the various conditions which are expected to influence the braking action are given below:

8.3.8.11.4.1 Friction Coefficient between 0.10 And 0.30 (Poor-Medium/Poor)

- slush or rain on snow- or ice-covered runway;
- runway covered with wet snow or standing water;
- change from frost to temperature above freezing point;
- change mild to frost (not always);
- the type of ice which is formed after long periods of cold;
- a thin layer of ice formed:
- by frozen ground having been exposed to humidity or rain at 0°C or above;
- When due to radiation, e.g. when the sky clears, the runway surface temperature drops below freezing point and below the dew point (this ice formation can take place very suddenly and occur while the reported air temperature may still be quite a few degrees above the freezing point.)

8.3.8.11.4.2 Friction Coefficient between 0.25 And 0.35 (Medium/Poor-Medium)

snow conditions at temperature just below freezing point;

- snow-covered runways at temperatures below freezing point, exposed to sun;
- Slush-covered runway.

8.3.8.11.4.3 Friction Coefficient between 0.35 And 0.45 (Medium/Good-Good)

- Snow-covered runways which have not been exposed to temperatures higher than about -2°C to -4°C.
- damp or wet runway without risk of hydroplaning (less than 3 mm water depth)

8.3.8.11.5 Aircraft Performance on Wet or Contaminated Runways

Take-off performance from wet or contaminated runways (refer to 0.1.3 - Definitions) are given in FCOM "Special Operations - Fluid contaminated runway" chapter.
Landing distances on wet or contaminated runways are given in FCOM "Landing “chapter.
As no accurate correlation can be made between the aircraft friction coefficient on a given runway and the reported friction coefficient or braking action, these performances given in the FCOM have been established for given depths of water or contaminant (slush, snow).
Therefore, the only way to determine the applicable take-off and landing performance is to obtain the depth and type of contaminant.
It is not recommended to land or take off on a runway for which the braking action is reported as "POOR" or the friction coefficient is 0.25 or less.
Take off runway covered with more than 5 cm (2 inches) of dry snow or 2.5 cm (1inch) of wet snow is not recommended.

8.3.8.11.6. Guidelines for Operations on Slippery Surfaces

8.3.8.11.6.1. General Consideration

The use of thrust reversers is mandatory on contaminated runways.
The two most important variables confronting the pilot when runway coefficient of friction is low and/or conditions for hydroplaning exist are length of runway and crosswind magnitude.
The total friction force of the tires is available for two functions - braking and cornering. If there is a crosswind, some friction force (cornering) is necessary to keep the aircraft on the centerline. Tire cornering capability is reduced during braking or when wheels are not fully spun up. Locked wheels eliminate cornering. Therefore in crosswind conditions, a longer distance will be required to stop the aircraft.
According to the runway conditions the following cross wind values indicated in FCOM should not be exceeded for take-off and landing.

Reported braking action	Reported friction coefficient	Maximum crosswind (kt)
Good	0.40 and above	Maximum (*)
medium/good	0.36 to 0.39	30
medium	0.30 to 0.35	25
medium/poor	0.26 to 0.29	20
poor	0.25 and below	15
unreliable	-	5

(*) maximum cross wind value indicated in individual FCOM

8.3.8.11.6.2 Taxiing

Aircraft may be taxed at the Pilot in Command discretion on ramps and taxiways not cleared of snow and slush. More power than normal may be required to commence and continue taxi so care should be taken to avoid jet blast damage to buildings, equipment and other aircraft. Be aware of the possibility of ridges or ruts of frozen snow that might cause difficulties. The boundaries/edges of maneuvering areas and taxiway should be clearly discernible. If in doubt, request "Follow me" guidance.
When executing sharp turns while taxiing or parking at the ramp, remember that braking and steering capabilities are greatly reduced with icy airport conditions; reduce taxi speed accordingly.
Slat/flap selection should be delayed until immediately before line up to minimize contamination.

8.3.8.11.6.3. Take-Off

Severe retardation may occur in slush or wet snow.
In most cases, lack of acceleration will be evident early on the take-off run. Maximum permissible power must be used from the start.
Large quantities of snow or slush, usually containing sand or other anti-skid substances may be thrown into the engines, static ports and onto the airframe. Pod and engine clearance must be watched when the runway is cleared and snow is banked at the sides of runways or taxiway.

8.3.8.11.6.4. Landing

Pilots should be aware that where rain, hail, sleet or snow showers are encountered on the approach or have been reported as having recently crossed the airfield, there is a high probability of the runway being contaminated. The runway state should be checked with ATC before commencing or continuing the approach. Very often a short delay is sufficient to allow the runway to drain or the contaminant to melt.
Use of reverse thrust on landing on dry snow in very low temperatures will blow the dry snow forward especially at low speed. The increase in temperature may melt this snow and form clear ice on re-freezing on static ports.
The required landing field length for dry runways is defined as 1.67 times the demonstrated dry landing distance. For wet runways, this landing distance requirement is increased by 15%. The required landing field length for contaminated runways is defined as 1.15 times the demonstrated contaminated landing distance.
The shortest stopping distances on wet runways occur when the brakes are fully applied as soon as possible after main wheel spin up with maximum and immediate use of reverse thrust. Landing on contaminated runways without antiskid should be avoided. It is strongly recommended to use the auto-brake (if available) provided that the contaminant is evenly distributed.
The factors and considerations involved in landing on a slippery surface are quite complex and depending on the circumstances, the pilot may have to make critical decisions almost instinctively. The following list of items summarizes the key points to be borne in mind. Several may have to be acted upon simultaneously.

- Do not land where appreciable areas of the runway are flooded or covered with1/2 inch or more of water or slush.
- Limit crosswind components when runway conditions are poor and runway length short.
- Establish and maintain a stabilized approach.
- Consider the many variables involved before landing on a slippery runway.
- – Landing weather forecast
- – Aircraft weight and approach speed
- – Landing distance required
- – Hydroplaning (aquaplaning) speed
- – Condition of tires
- – Brake characteristics (anti-skid, auto-brake mode)
- – Wind effects on the directional control of the aircraft on the runway
- – Runway length and slope
- – Glide path angle
- Do not exceed VAPP at the threshold. An extended flare is more likely to occur if excess approach speed is present.
- Be prepared to go-around.

- Flare the aircraft firmly at the 1000 ft. aiming point. Avoid buildup of drift in the flare and runway consuming float. A firm landing, by facilitating a prompt wheel spin up, also ensures efficient antiskid braking.
- Select reverse thrust as soon as possible.
- Get the nose of the aircraft down quickly. Do not attempt to hold the nose off aerodynamic braking. Aim to have the nose wheel on the ground by the time reverse thrust reaches the target level.
- If the auto-brake is not available, and if remaining runway length permits, allow the aircraft to decelerate to less than dynamic hydroplaning speed before applying wheel brakes. If however maximum braking is required apply and hold full brake pedal deflection. Continue to apply rudder and aileron inputs while braking. The brakes are the primary means for stopping the aircraft but if necessary the full reverse thrust may be maintained until the aircraft is fully stopped.
- Excessive braking in crosswinds will lead to the aircraft drifting away from the centerline. Do not apply completely as the aircraft will yaw on the slippery runway due to its weather cock stability.
- Keep the aircraft aligned with the runway centerline. Use rudder and aileron inputs. As rudder effectiveness decreases, reduce aileron deflection proportionately.

Caution: Do not allow large deviations from the runway heading to develop as recovery can become very difficult. Use of the nose wheel steering is not recommended. Under slippery conditions, the nose wheels must be closely aligned with the aircraft track or they will scrub.

- If directional or lateral control difficulties are experienced, disconnect the auto-brake, if necessary, reduce reverse thrust levels symmetrically, and regain directional control with rudder, aileron and differential braking. Once under control, reapply manual braking and increase symmetrical reverse levels as required while easing the aircraft back towards the runway centerline.
- After landing in heavy slush do not retract the slats and flaps. Allow ground personnel to clear ice and slush from slats and flaps before full retraction. Taxi with caution to parking area as flaps extended provides a much-reduced ground clearance.

8.3.8.11.6.5. Wind Limitations

Refer to FCOM procedure limitation -LIM -12 page 2/2.

8.3.9. Wake Turbulence

Every aircraft in flight generates wake turbulence caused primarily by a pair of counter rotating vortices trailing from the wing tips.
Wake turbulence generated from heavy aircraft, even from those fitted with wing tip fences, can create potentially serious hazards to following aircraft.
For instance, vortices generated in the wake of large aircraft can impose rolling movements exceeding the counter-roll capability of small aircraft.

8.3.9.1. Takeoff and Landing

Turbulence encountered during approach or take off may be due to wake turbulence.
Aircraft turbulence categorization and wake turbulence separation minima are defined as follows:
(H) Heavy: MTOW ≥ 136000 kg
(M) Medium: 7000 kg < MTOW < 136000 kg
(L) Light: MTOW ≤ 7000 kg
8.3.9.1.1. Separation by Time (Non Radar)

Wake turbulence separation minima given below define a minimum separation time between two aircraft during take-off and landing to cope with wake turbulence:
Arriving aircraft
- Medium behind Heavy aircraft: 2 minutes
- Light behind Medium or Heavy aircraft: 3 minutes

Departing aircraft
The minimum separation time is 2 minutes (or 3 minutes if take off is from an intermediate part of the runway) for a Light or Medium aircraft behind a Heavy aircraft or for a Light aircraft behind a Medium aircraft.
Two parallel runways have no influence each other's if they are separated by more than 760 m (2500 ft) and if the flight path of the second aircraft does not cross the flight path of the preceding aircraft by less than 300 m (1000 ft).
Departing and landing in opposite direction
The minimum separation time is 2 minutes.

8.3.9.1.2. Radar Separation

Leading aircraft category	Following aircraft category	Separation minimum
Heavy	Heavy	4 NM
Heavy	Medium	5 NM
Heavy	Light	6 NM
Medium	Heavy	3 NM
Medium	Medium	3 NM
Medium	Light	4 NM
Light	Heavy	3 NM
Light	Medium	3 NM
Light	Light	3 NM

8.3.9.2. In Cruise

Wake turbulence may be encountered in cruise, especially where the aircraft flying in the same direction are vertically separated by 1000ft.
Avoidance of Vortices
The most important characteristic to remember at all times is that all wake formations are subject to a strong, downward vertical displacement. This displacement continues until the wake either dissipates or reaches the ground.
This downward displacement gives rise to the following general rules for avoidance of vortex turbulence:
- In crossing the flight path of a preceding aircraft, it is preferable to cross at a slightly higher, rather than a slightly lower altitude. This avoids crosswise penetration of the wake.
- In following a large aircraft on approach, it is desirable to fly the same, or a slightly higher path, never a lower path. For this reason, the use of a common ILS or VASI glide slope by all aircraft is a desirable practice.
- Flight directly under, and parallel to, the wake of another aircraft should be avoided, because of the inherent sinking characteristic of the wake.
- Parallel flight directly under and close on either side of the flight-path of another aircraft should be avoided because of the possibility of partial penetration of the wake.

- Certain noise abatement and emergency turn procedures require a sharp turn immediately after takeoff. When heavy aircraft are operating, the maximum practical separation time should be allowed between takeoffs to permit dissipation of the high intensity vortices which develop in such circumstances. It can be appreciated how hazardous it could be for an aircraft to penetrate such a vortex while banked at such a relatively low altitude.

8.3.9.3 Super-heavy Wake Turbulence

Non-Radar Wake Turbulence Longitudinal Separation Minima.
Arriving Aircraft
The following non-radar separation minima should be applied to aircraft landing behind an A380-800 aircraft :

- MEDIUM aircraft behind an A380-800 aircraft — 3 minutes ;
- LIGHT aircraft behind an A380-800 aircraft — 4 minutes .

Departing Aircraft
A minimum separation of 3 minutes should be applied for a LIGHT or MEDIUM aircraft and 2 minutes for a non-A380-800 HEAVY aircraft taking off behind an A380-800 aircraft when the aircraft are using :

1. the same runway ;
2. Parallel runways separated by less than 760 m (2500 ft.)
3. crossing runways if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1000 ft.) below ;
4. Parallel runways separated by 760 m (2500 ft.) or more, if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1000 ft.) below .

A separation minimum of 4 minutes should be applied for a LIGHT or MEDIUM aircraft when taking off behind an A380-800 aircraft from :

1. an intermediate part of the same runway; or
2. An intermediate part of a parallel runway separated by less than 760 m (2500 ft.)
3. Radar Wake Turbulence Separation Minima

The following wake turbulence radar separation minima should be applied to aircraft in the approach and departure phases of flight.

Preceeding aircraft	Succeeding aircraft	Wake turbulence radar separation minima
A380-800/ non-A380-800 HEAVY	A380-800	Not required*
A380-800	Non-A380-800 HEAVY	11.1 km (6.0 NM)
A380-800	MEDIUM	13 km (7.0 NM)
A380-800	LIGHT	14.8 km (8.0 NM)
*When a wake turbulence restriction is not required then separation reverts to radar separation minimum as prescribed by the appropriate ATS authority. The recommendation of the ad hoc group (safety case) indicated that no wake constraint exists for the A380-800 either following another A380-800 or a non-A380-800 HEAVY aircraft.		

A380 Wake Vortex Turbulence Chart

The minima should be applied when :

- an aircraft is operating directly behind an A380-800 aircraft at the same altitude or less than 300 m (1000 ft.) below; or
- both aircraft are using the same runway, or parallel runways separated by less than 760 m; or
- An aircraft is crossing behind an A380-800 aircraft, at the same altitude or less than 300 m (1000 ft.) below.

8.3.10. Crewmembers at Their Stations

8.3.10.1. Flight Crew

During take-off and landing each flight, crewmember required to be on flight deck duty shall be at his station.
During all other phases of flight, each flight crewmember required to be on flight deck duty shall remain at his station unless his absence is necessary for the performance of his duties in connection with the operation, or for physiological needs provided at least, one suitably qualified pilot must be announced clearly to him you have control and acknowledge, and continuously maintains:

1. unobstructed access to the flight controls;
2. Alertness and situational awareness.

Except for crew entry/exit, the cockpit door should remain closed and locked during the whole flight.
The task of each flight crewmember is defined in the FCOM for all flight phases.
Non-essential activities should be avoided during phases of flight where workload is high. At any other time, if these activities are being performed, the Pilot In Command should ensure that only one flight crewmember is so occupied at any one time and that careful attention is being paid to normal operational duties by other crewmember(s).

One pilot should always be in a position to maintain a lookout. Meals, tea or coffee etc, should normally be partaken separately, so that one pilot can keep watch until the other is ready, thus maintaining an adequate lookout.
Pilot Flight crew members should not vacated an aircraft control seat below 10,000 feet (AFE/AAL) for the purpose of transferring duties to another plot flight crew member.

8.3.10.2 Cabin Crew

During take-off and landing, and whenever deemed necessary by the Pilot In Command in the interest of safety, the minimum legal number of cabin crew must be positioned in seats designated for the purpose. Any additional cabin staff that cannot be accommodated in seats provided for the purpose will normally occupy passenger seats, or at Pilot in Command's discretion, any spare seat in the cockpit.

8.3.11. Use of Shoulder Harness and Safety Belts for Crew and Passengers

Any occupant should fasten his seat belt during takeoff and landing and en-route in case of turbulence and as a general rule each time the SEAT BELT sign is illuminated. Unless otherwise briefed by the Pilot in Command, the SEAT BELT sign does not indicate a requirement for flight attendants to be seated.
Pilots in Command must ensure that all crewmembers are strapped in for take-off and landing with all safety belts and harnesses provided. Flight crewmembers must keep their seat belt and shoulder harness during climb phase, from take-off till 10,000 ft. AAL and during descent phase, from top of descent till landing. During other phases of the flight, each flight crewmember in the flight deck should keep his safety belt fastened while at his station. Other flight crewmembers to keep their safety harness fastened during the take-off and landing phases of flight, unless the shoulder straps interfere with the performance of duties, in which case the shoulder straps may be unfastened but the seat belt shall remain fastened.
As long as the SEAT BELT signs are illuminated, cabin crew should make frequent checks that passenger seat belts remain fastened.
Seat belt and shoulder harness must be worn by all crewmembers and passengers under the following conditions:

- during take-off and landing
- during an instrument approach
- when the aircraft is flying at an altitude of less than 1000 ft. above terrain
- in turbulent conditions
- at the Pilot In Command's discretion or as required by abnormal or emergency procedures

When the seat belts must be fasten, each infant must be kept in the supplementary loop belt of the accompanying person or strapped in a dedicated restraining device.
The SEAT BELT switch is to be selected to the "ON" position:

- During the cockpit preparation. Once airborne the SEAT BELT switch should be selected to the "OFF" position. An announcement should be made noting that although the seat belt sign has been turned off, passengers should keep their seat belts fastened whenever they are in their seats.
- When turbulence is anticipated or encountered. In addition, a flight crew must make an appropriate PA announcement requiring the passengers to fasten their seat belts.
- For descent and no later than FL100.

Refer also to 8.03.15 "Cabin Safety Requirement”.

8.3.12. Admission to Flight Deck

Admission to the flight deck is under the authority of the Pilot in Command.
No person, other than the flight crewmembers assigned to a flight, should be admitted to, or carried in, the flight deck unless this person is an operating crewmember or a representative of the authority responsible for certification, licensing or inspection, or if this person is required for performance of his official duties.
The final decision regarding the admission to the flight deck of any person, rest s with the Pilot in Command who shall request identification of such persons before granting such admission.
Persons duly authorized by the Authority, entitled to enter and remain on the flight deck in order to be able to perform their duties, and shall only be denied access by the Pilot in Command if he deems this necessary in the interest of safety.
A person shall only be carried on the flight deck provided that a seat with safety belt / safety harness is available and that requirements concerning supplemental oxygen are met.
The person shall be instructed to:

- not distract and / or interfere with the operation of the flight
- not touch any controls, switches, instruments, circuit breakers
- not smoking
- not talking unless invited to do so by the Pilot In Command

The person must be briefed about the use of all flight deck relevant emergency equipment and all relevant emergency procedures to:

- keep the safety belt / safety harness fastened at all times
- use emergency exits, life jacket and oxygen

The flight deck door must be kept closed from engine start to engine shutdown.
Sterile Cockpit Policy
During Critical Phases of flight, the Captain shall enforce a Sterile Cockpit Policy. Nesma Airlines declares Critical Phases of flight to be:

- All taxi operations;
- The take-off run;
- The take-off flight path;
- The final approach;
- The landing roll;
- The last 2,000 ft prior to level off at an assigned altitude;
- All flight below 10000ft AGL;
- When accomplishing any normal or abnormal checklists;
- When anticipating/copying pre-flight and in-flight ATC clearances; and
- Any other phases of flight, at the discretion of the Captain.
- The Sterile Cockpit Policy comprises the following:
- Cockpit door closed and locked;
- The mandatory use of headsets and boom microphones for communication with ATC;
- Seatbelt ON, distracting non-operational activities or visits to the flight deck are not permitted; and conversation about non-flight related matters,
- Flight Attendant in the flight deck shall address active flight crewmembers 'PF or PM' only when necessary for the safe conduct of the flight.

Sterile Flight Deck Procedure
The Sterile Flight Deck is a time when communications between flight crew and Cabin Crew is kept to a minimum and shall be related directly with the operation of the aircraft (Safety).
Apart from the phases of flight involving take-off, landing and taxi, it is impossible for crewmembers outside the flight deck to know for certain when the sterile flight deck policy is

being enforced. Therefore, the following requirements shall be adopted by Cabin Crew prior to contact the flight crew over the interphone:

- Take off: From the closing of last cabin door until seatbelt sign off or (recycled seatbelt sign)
- Landing: From the call chime (recycled seatbelt sign) at 10,000 ft. until engine shutdown and seat belt sign off

No calls except when required by the flight Secure Procedure.

- During these periods, Cabin Crew shall initially try to contact the Flight Crew via interphone for emergency matters and shall not enter the Flight Deck unless called to do so by the PIC.
- During Take Off after the call chime (recycle seatbelt sign) at 10,000 ft., it is permitted for cabin crew to release seatbelts and to move from their assigned seats.

Cabin Crew to Flight Crew communication during critical stages of flight:
During the critical phases of flight, the Sterile Flight Deck Procedures is applied. Therefore, calls from the Cabin Crew or entry into the Flight deck are restricted to safety and security related matters.
The following are some examples of safety-related situations:
– Fire or smoke in the cabin.
– Abnormal noises or vibrations.
– Observation of fuel or other fluid leaks.
Note: In normal operations the Purser communicates with the Flight Crew on behalf of the Cabin Crew. In the case of an abnormal or emergency situation being discovered, the first Cabin Crewmember to discover a safety related situation shall report it to the Flight Crew.
No contact Periods: Cabin crew shall not contact flight deck by any means even in case of safety-related situations as in these periods flight deck crew shall not be distracted:

1) From the start of the take-off run (aircraft is accelerating) on the runway until the air crafts airborne with landing gear retract.
2) From gears down until aircraft is exiting the runway.

8.3.12.1 Leaving Flight Deck during Flight

Based on ECAA Safety & Security instructions regarding flight crewmembers leaving the flight deck due to operational or physiological needs during non-critical phases.
The cockpit crewmember who intends to leave the cockpit has to assign one of the crewmembers to enter the flight deck and remain inside until the cockpit crewmember returns and is seated;
Cabin crew should be briefed on the use of flight deck O_2 masks and use of the manual and electric flight deck controls for door locking
This is to ensure that during unforeseen situations (e.g. cockpit door lock failure, pilot incapacitation…etc.) the absent cockpit crewmember can easily gain access to the flight deck.
Note: During the flight, at least one qualified cockpit crewmember must be in the flight deck at all times of the flight.

8.3.13. Use of Vacant Crew Seats

The carriage of revenue passengers on vacant crew seats (“jump-seats”) is not permitted.
The use and occupancy by staff of vacant flight crew seats is entirely at the discretion of the Pilot in Command, except in the case of training or of a duly authorized State inspector. Such an Operations inspector traveling on duty has authority to occupy any spare flight deck seat and has precedence over any other person requesting "jump seal" facilities.

The Pilot in Command may decline such a request only if in his considered opinion the inspector's presence on the flight deck would be prejudicial to the safety of the flight.
Any person allowed to occupy a vacant crew seat must be informed about the use of safety equipment associated with this crew seat.
All staff members carried on a Company aircraft must be in possession of a valid ticket unless they have been properly assigned to duty on the flight as part of the operating crew or in a training capacity.
The occupancy of a vacant crew seat on the flight deck or crew seat in the cabin by a person who is not member of the operating flight or cabin crew is permitted provided:

- Any relevant FCOM limitation is observed
- The person is part of the ECAA authorized personnel to access flight deck
- The person has the authorization of the Captain
- The Captain is satisfied that the person is properly briefed on safety procedures and equipment and relevant operating procedures prior to any departure and approach.
- The person is assessed as having enough strength and dexterity to operate and open emergency exit, to exit expeditiously, and to assist others in getting off an escape slide (if any)
- The following persons may travel in the flight deck, when on duty or in possession of a valid extra crew authorization or licensed pilots with tickets and/or boarding pass with prior approval.

8.3.13.1. Jump Seat

Flight Deck Jump Seat

- The Captain has the authority to approve one jump seat for flight deck crew as long as the flight is not designated as training flight and a prior approval from Director of Operations is obtained
- (In special circumstances only) If training is being conducted, an approval from the Director of Operations must be obtained.

Cabin Crew Jump seat
The Captain may authorize the cabin jump seat with the Director of Operations prior approval as follows:

- Positioning crew, extra crew, crew with duty ticket and/or boarding pass, any Nesma Airlines staff or relative with 100% free ticket.
- The Director of Operations prior approval is required when the cabin crew rest seat is involved for T/O and landing only and in extreme necessary situations.

The Captain has the final authority as to the approval and the allocation of any jump seat for operational reasons.

8.3.14. Incapacitation of Crewmembers

8.3.14.1. General

Incapacitation of a crewmember is defined as any condition which affects the health of a crewmember during the performance of duties which renders him incapable of performing the assigned duties.
Incapacitation is a real air safety hazard which occurs more frequently than many of the other emergencies which are the subject of routing training. Incapacitation can occur in many forms varying from obvious sudden death to subtle, partial loss of function. It occurs in all age groups and during all phases of flight and may not be preceded by any warning.

8.3.14.2. Detection

In order to help with the early detection of flight crew incapacitation, the Crew Resource Management (CRM) principles should be applied:
- Correct crew coordination that involves routine monitoring and aural crosschecks. The absence of standard callouts at the appropriate time may indicate incapacitation of one flight crewmember.
The critical operational problem is early recognition of the incapacitation. The keys to early recognition of incapacitation are:

- Routine monitoring and crosschecking of flight instruments, particularly during critical phases of flight, such as takeoff, climb out, descent, approach, and landing and go around.
  - flight crewmembers should have a very high index of suspicion of a "subtle incapacitation":
- if a crewmember does not respond appropriately to two verbal communications, or
- If a crewmember does not respond to a verbal communication associated with a significant deviation from a standard flight profile.
- If one flight crewmember does not feel well, he must inform the other flight crewmember.

Other symptoms of the beginning of an incapacitation are:

- incoherent speech
- strange behavior
- irregular breathing
- pale fixed facial expression
- jerky motions that are either delayed or too rapid.

8.3.14.3. Action

In the case of flight crew incapacitation, the fit flight crewmember should apply the following Actions:
First Step
Take over and ensure a safe flight path:

- Announce ″I have control″
- If the incapacitated flight crewmember causes interference with the handling of the aircraft, press the sides tick pushbutton for 40 seconds
- Keep or engage the onside AP, as required
- Perform callouts (challenge and response included) and checklists aloud.

Second Step

- Take any steps possible to contain the incapacitated flight crewmember. These steps may involve cabin attendants.
- The simplest and most effective way to summon help is via the PA system:
  (ATTENTION, PURSER TO COCKPIT PLEASE)
- The nearest cabin crewmember, must immediately proceed to the cockpit.
- Inform the ATC of the emergency

Third Step
In order to reduce the workload, consider:

- Early approach preparation and checklists reading
- Automatic Landing
- Use of radar vectoring and long approach.
- Land at the nearest suitable airport after consideration of all pertinent factors

- Arrange medical assistance onboard and after landing, providing as many details as possible about the condition of the affected flight crewmember
- Request assistance from any medically qualified passenger, except for flight with only two flight crewmembers onboard (i.e. freighter or ferry flight).

8.3.15. Cabin Safety Requirements

Flight Deck/Cabin Crew joint briefing
Before the flight, a cabin crew briefing shall be conducted by the Captain or the F/O if the Captain not yet available; the following guidelines are recommended to summarize the briefing preparations and briefing points:

1. The purser is responsible to avail three seats at the head of the briefing table for himself, the Captain and the F/O along with rest of the crew around the table.
2. The purser should handover the Captain, a copy of the cabin crew names and assigned emergency positions.
3. The purser shall introduce the Captain, the F/O and himself, then ask the cabin crew to introduce themselves and their emergency position. The Captain will introduce any new unfamiliar pilot to the cabin crew.
4. The Captain briefing should include, but is not limited, to the following:-

a. Confirm that all crew is legal to perform the flight to the best of their knowledge.
b. Flight duration and altitude.
c. En-route and destination forecasted weather, anticipated turbulence.
d. Coordination service time and cabin crew rest time in case of augmented or double operation.
e. Confirm if all crewmembers are conversant with the location of all safety equipment and emergency exits.
f. Discuss sterile cockpit and cockpit door procedures; security matters and emphasize on vigilance.
g. Any defects affecting the cabin (i.e. APU INOP)
h. Emphasize the importance of open line communication between flight deck and cabin crew
i. Confirm if training is being conducted on this flight and if there are any questions.
j. Any special instructions related to the flight; e.g. Security, Safety issues, new procedure.
k. The Captain is not limited to the items above, he is free to add any information that may deem fit for the situation
l. any useful information such as deficiency of cabin/safety equipment, special passengers/load, special procedures e.g. de-icing

The briefing must be short and to the point, not exceeding 5-10 minutes, except in exceptional circumstances. Every effort must be made to put all the team members at ease and emphasize teamwork and cooperation to ensure safe Flight Operations.
Time of Departure Minus:

- 75 minutes (1:15) reporting time for all flight deck
- 70 to 60 minutes (1:10 - 1:00) to conduct joint briefing
- 60 minutes cockpit and cabin crew should proceed to the aircraft

Note:

1. If neither the Captain nor the F/O show up in the briefing room sixty five minutes prior to STD, purser or his representative should proceed to Dispatch and introduce himself to the Captain or any available operating crew; and inform that cabin briefing has been completed and they ready to proceed to the aircraft.

2. In the absence of the cockpit crew, dispatcher of the flight should be informed; and then cabin crew should proceed to the aircraft
3. Crewmembers shall be onboard the aircraft not later than 45 minutes prior to the departure time. Aircraft preparation shall be carried out and the preflight checklist (including Safety-critical items such as: oxygen, medical and emergency equipment) shall be completed 30 minutes before departure. If the aircraft is ready, allow passenger boarding not later than 25 minutes prior to scheduled departure time.

8.3.15.1. Cabin Preparation and Passengers Seating

The PURSER or senior cabin crewmember is responsible to the Pilot in Command for cabin safety from the time the aircraft is accepted for flight, until all the passengers have been offloaded at the end of the flight. The senior cabin crewmember must also ensure that relevant emergency equipment remains easily accessible for immediate use.

Unless the weight and balance for the flight and passenger category will be such that the random occupation of seats is permissible, passengers will be shown or conducted to their allocated seats.

Before take-off and landing the cabin, preparation must be completed as follows:

- All passengers have correctly fastened their seat belts.
- All reclining seats are in an upright position and folding tables stowed.
- All hand baggage secured
- All trolleys are stowed and galleys closed
- Exits and escape paths are unobstructed
- Exit doors armed
- Passenger briefing completed
- Cabin lights dimmed at night in order to improve the night vision of cabin crew and passengers

Cabin preparation completion should be reported to the Pilot in Command.

Before takeoff and before landing a recycle of seat belt sign or a public address (PA) announcement should be made to request cabin crewmembers to be seated at their station.

When turbulence conditions are likely to be encountered, the Pilot in Command should Endeavour to give early warning by switching "ON" the "Seat Belt" signs and making a PA announcement.

The paramount requirements are to have the passengers strapped in good time and to ensure they remain strapped in. Both objectives can be met by making a suitable public address announcement at the same time as the "Seat Belt" signs are illuminated.

The senior cabin crew must ensure that all passengers have conformed to the Pilot in Command's instructions on fastening of seat belts.

The Pilot in Command must instruct him whether catering and bar service may continue or whether cabin staff must fasten their own belts.

As long as the "Seat Belt" signs are illuminated, cabin crew should make frequent checks that passenger's seat belts remain fastened and that baggage is well stowed to not cause injury by moving. When a passenger is seen to unfasten his seat belt or attempts to leave his seat, the passenger should be asked to remain seated and strapped in.

As a matter of policy, if passenger insists on moving, he should not be prevented, but should be warned by cabin crew to take particular care.

8.3.15.2. Smoking Onboard

Smoking is not permitted onboard Nesma Airlines flights.

8.3.15.3. Fueling with Passengers on Board, Embarking or Disembarking

Refer also to 8.2.1.1 Refueling and Defueling When Passengers Are Embarking, On Board or Disembarking.

At stops where passengers remain on board, 100% of cabin crewmembers must remain on board and they must be spaced throughout the cabin to provide the most effective assistance for the evacuation in case of an emergency.

When fueling is made with passengers on board, embarking or disembarking, passengers should be notified that fueling is to take place and that if they are remaining in the aircraft they must not smoke, operate electrical switches, or otherwise produce sources of ignition.

The "No Smoking" and "Exit" signs must be illuminated. "Fasten seat belts" sign must be "OFF"

The ground area beneath the exits intended for emergency evacuation and slide deployment must be kept clear.

Ground servicing activities and work inside the airplane, such as catering and cleaning should be conducted in such a manner that they do not create hazard and the aisles and emergency doors are unobstructed.

When it is desired to move passengers to or from the aircraft during fueling, it must be ensure that the passengers are moved through the fueling zone under the supervision of a responsible person and are not allowed to stay near the aircraft.

Rigidly enforce the "No Smoking" rules during all such movements.

8.3.15.4. Electronic Devices

Electronic devices may cause Electro Magnetic Interferences (EMI) with navigation or communication system of the aircraft on which they are used.

To avoid any risk of interference, the operation of the following electronic devices is prohibited on board:

- cellular telephones
- portable televisions
- portable videotape recording and playback devices
- radio receivers
- radio transmitters
- toys with remotely controlled units
- Any electronic devices that have not been determined as not causing interferences with aircraft systems.

Operation of the following electronic devices is permitted:

- electronic shavers
- electronic calculators/computers
- electronic games without remote control
- hearing aids
- heart pacemakers
- portable personal listening devices (compact disc, cassette players)
- Portable voice recorders.

However portable computers, calculators, electronic games and as a general rule any electronic device should not be used during take-off and landing. They should be properly stowed similar to other carry-on baggage.

8.3.15.5. Medical Kits

8.3.15.5.1. First-Aid Kits

The following number of first-aid kits, should be readily accessible for use in the aircraft.

Number of passenger seats installed	Number of First-Aid Kits required
0 to 50	1
51 to 150	2
151 to 250	3
250 and more	4

The first-aid kits must be inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use; and replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

The following should be included in the first-aid kits:

Medicine	Usage	Quit.
1. Bandages 1 inch …..	رباط ضاغط	1
2. Bandages 3 INC…..	رباط ضاغط	1
3. Triangular Compresses 40 inch…	رباط للكسور (جبيرة)	1
4. Antiseptic swabs ………….	مظهر	20
5. Burn compound (jelonet dressing)	للحروق	2
6. Arm splint ……….	جبيرة لليد	1
7. Leg splint ……….	جبيرة للرجل	1
8. Roller bandage 4 inch….	شاش	4
9. Scissor	مقص	1
10. 1Ophthalmic ointment (funcithalmic / termaycian)…	مطهر للعين للحالات القوية	1
11. 1Nasal decongestant (otrivin/ a frin) …….	لأحتقان الأنف	1
12. 1Artificial plastic air way	جهاز للتنفس الصناعي	1
13. 1Insect repellent	طارد للحشرات	1
14. 1Emollient eye drops (Brizaliene)	مطهر للعين	1
15. 1Sunburn cream (Dermazin)	كريم للحروق السطحية	1
16. 1Antiseptic wound cleaner (detol/ savlon)	مطهر سائل للجروح	1
17. Adhesive Tape, safety pins	لاصق للجرو ح	1
18. 1For air sickness (Dreamenes)	لدوار الجو	10
19. 1Anti-diarrhoeal medication (Imodium)	لحالات الإسهال	20
20. 2Simple analgesic (abimol)	لتخفيض الحرارة ومسكن للألم	20
21. 2First Aid handbook	كتاب الإسعافات الأولية	1
22. 2Cotton	قطن	1
23. 2Ear drops (optician)	نقط للأذن	1

Bandages (unspecified)

A list of contents in at least 2 languages (English and Arabic). This should include information on the effects and side effects of drugs carried

8.3.15.5.2. Emergency Medical Kit

An emergency medical kit must be carried by any airplane with a maximum approved passenger seating configuration of more than 30 seats if any point on the planned route is more than 60 minutes flying time (at normal cruising speed) from an aerodrome at which qualified medical assistance could be expected to be available.

The Pilot in Command shall ensure that drugs are not administered except by qualified doctors, nurses or similarly qualified personnel.

The emergency medical kit must be dust and moisture proof and shall be carried under security conditions, where practicable, on the flight deck.

The emergency medical kit must be inspected periodically to confirm, to the extent possible, that the contents are maintained in the condition necessary for their intended use; and replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

The following should be included in the emergency medical kit carried in the airplane:

Equipment	Usage	Quit.
1- Mercurial Sphygmomanometer	جهاز قياس الضغط	1
2- Stethoscope	سماعة	1
3- Surgical Gloves	قفاز طبى	10
4- Sterile Scissors	مقص شرياني	1
5- Hemostatic Forceps	جفت شرياني لإيقاف النزيف	1
6- Hemostatic Bandages (or tourniquet)	جهاز لإيقاف النزيف	1
7- Sterile equipment's for suturing wounds	عدة خياطة الجرو	1
8- Disposable Syringes and needles	سرنجات مقاسين	10
9- Disposable Scaled Handle and Blade	مشرط جراحة	1
10- Airway aropharyneal	أنبوبة حنجرية 3 مقاسات	3
11- Tracial Tube	أنبوب التنفس الصناعي	1

Usage	Medicine Name	Qty.	Exp. date
1- 50% Dextrose injection	جلوكوز	1	
2- Nitroglycerin tablet (for heart attack.) للذبحة الصدرية	Dinitra	20	
3- Coronary vasodilator مقوى لعضلة القلب	Cardixin	20	
4- Analgesics مسكن للألم	Abimol extra	20	
5- Diuretics مدر للبول (لعلاج الضغط العالى)	Lasix	20	
6- Anti spasmodic للمغص الشديد و التقلصات	Bus Copan	20	
7- Anti allergies للحساسية	Avil	20	
8- Central nervous system stimulant للإغماء	Ammonia	1	
9- Atropine لحالات هبوط القلب		1	
10- Ventolin inhaler لأزمات الربو		1	
11- Epinephrine 1:1000 singel dose ample.	Adrenaline (effedrein)	1	
12- For low blood pressure الضغط المنخفض	Effortil drops	1	

A list of contents in at least 2 languages (English and Arabic). This should include information on the effects and side effects of drugs carried.

8.3.15.6. Procedures and Checklist System

Procedures and checklist system for use of cabin crew must at least consider the following items:

ITEM	PRE TAKE-OFF	IN FLIGHT	PRE LANDING	POST LANDING
1. Brief of cabin crew by the senior cabin crewmember prior to commencement of a flight or series of flight	x			

2. Check of safety equipment in accordance with operators' policies and procedures	X			
3. Security checks: searching for concealed weapon, explosives or other dangerous devices	X			x
4. Supervision of passenger embarkation and disembarkation	X			X
5. Securing of passenger cabin (e.g. seatbelt, cabin cargo/baggage)	X		x	
6. Securing of galleys and stowage of equipment	X		X	
7. Arming of door slides	X			
8. Safety information to passengers	X	X	X	x
9. "Cabin secure" report to flight crew	X	If required	X	
10. Operation of cabin lights	X	If required	X	
11. Cabin crew at crew stations for take-off and landing	X		x	x
12. Surveillance of passenger cabin	X	X	x	x
13. Prevention and detection of fire in the cabin, galley, crew rest areas and toilet and instructions for action to be taken	X	X	x	x
14. Action to be taken when turbulence is encountered or in-flight incidents (pressurization failure, medical emergency etc.)		X		
15. Disarming of door slides				x
16. Reporting of any deficiency and/or un-serviceability of equipment and/or any incident	x	X	x	x

8.3.15.7. Emergency Locator Transmitter – ELT 96

Description:
Nesma Airlines aircraft are equipped with a signaling device (1) ELT 96 (Ref. 3.17), for areas in which search and rescue would be rather difficult.
The ELT 96 equipment is an emergency locator transmitter which is automatically or manually activated at impact using standard means through emergency frequencies 121.5 MHz, 243 MHz, and 406 MHz and which can be identified by the system of COSPAS-SARSAT satellites allowing to localize it more precisely for approximately 48 hours.
The ELT 96 radio beacon consists of an orange sealed case.
It is fitted with a flexible antenna located around the case to which it is linked by a cord. It comprises the following elements on the front face:

- a three-position switch "MAN/RESET-OFF-AUTO",
- a red warning light,
- an "ANT' plug to connect rigid or flexible antenna feeder,
- 26-pin connector (J1).

The shock crash sensor "g-switch" located in the upper part of the case, starts automatically ELT transmission when deceleration, undergone by the ELT,
A flexible antenna, supplied with the ELT, allows a portable mode use.
The transmission range of the signal depends on the type of terrain the beacon is operating from, and then height of the search aircraft. The signal from a beacon on high and open ground will be transmitted more directly than from the one placed in land depression or densely wooded area.

At 5,000 ft (1.542 m)	80 NM
At 10,000 ft (3,048 m)	120 NM
At 20,000 ft (6,096 m)	170 NM
At 40,000 ft (12,192 m)	245 NM

A. Operation in fixed mode

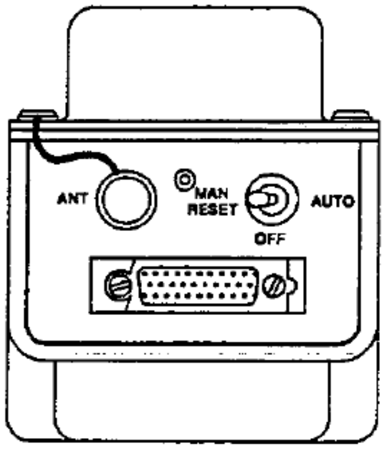
Automatic operation of the ELT 96 does not require any manual action after preliminary setting into service operations.

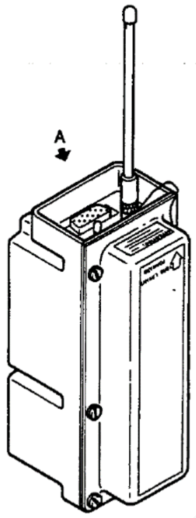
B. Operation in portable mode

Perform the following operations:

1) Release the quick-opening fireproof straps to remove the ELT from its compartment and from its optional fireproof protecting box (if installed).
2) Disconnect the fixed antenna coaxial plug from the ELT "ANT' connector.
3) Connect the flexible antenna to the ELT "ANT" connector.
4) Set the switch to "MAN/RESET".

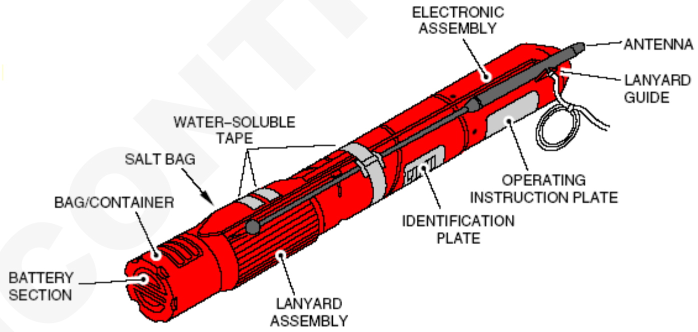
Note: Any flight that will be operated by Nesma Airlines over areas where it is known that search and rescue would be especially difficult, Nesma OCC shall check with Nesma Airlines maintenance department that the aircraft is equipped with signaling devices and life-saving equipment that ensure a mean of sustaining life.
In such case both cockpit & cabin crew operating this flight shall be briefed accordingly prior the flight is conducted





8.3.15.8 Emergency Locator Transmitter (ELT – RESCU 406)

Nesma Airlines aircraft is equipped with a fixed Emergency Locator Transmitter**.**
Pre-flight check:
1) Correct stowage and quantity. 2) Check validity.
Description:
This beacon is powered by a water-activated battery and will operate automatically as soon as the antenna is erected and salt water (or other suitable liquid) enters the intake holes. The antenna will erect automatically when placed in the sea. A plastic bag, attached to the beacon is used to hold liquid in the standing beacon when operating on land. When activated the beacon transmits a signal in all directions on International Civil (121.5 MHz), Military (243 MHz) and Satellite (406.025 MHz) distress frequencies. The beacon will transmit for approx. **24 hours** minimum for 406.025 MHz and **50 Hrs.** minimum with 121.5 MHz and 243 MHz transmissions.



To Operate: -
In Water: -

- **a.** Unroll Lanyard.
- **b.** Tie the lanyard to the slide raft or lifejacket.
- **c.** Place the ELT in sea-water allow it to drift away.
- **d.** The water-soluble tapes will dissolve releasing the antenna. The water will enter the water intake holes and the beacon will operate after a few seconds.

On Land: -

a. To erect the antenna, break or cut the water-soluble tapes – Care should be taken, as the antenna is spring loaded.

b. Unroll plastic bag. Put salt in the plastic bag and fill the plastic bag with 1 liter of water or any non-alcoholic liquid. Aircraft fuel and alcohol are unsuitable.

c. Stand the beacon upright in the bag with the mixed salt solution. Ensure the solution covers the two vent holes at all times.

d. Tie the lanyard / mooring line round the neck of the bag.

e. Place the ELT on high ground to improve the range of the transmission. Support the beacon and check the fluid level regularly.

To Turn Unit OFF: -

a. Remove the unit from the bag containing the liquid.

Re-stow the antenna and place the ELT inverted

8.3.16. Passengers Briefing Procedures

8.3.16.1. General

Nesma Airlines is required to provide all passengers, supernumeraries with appropriate briefing, or equipment demonstration, for the various stages of the flight, in particular:

- Passengers must be given a verbal briefing about safety matters. Parts or all of the briefing may be provided by an audio-visual presentation.
- Passengers must be provided with a safety briefing card on which picture type instructions indicate the operation of emergency equipment and exits likely to be used by passengers.

Prior to embarkation, passengers must be briefed on which articles are prohibited to be carried on board (on their person, in hand baggage or in checked baggage).

For Dangerous goods, refer to Chapter 9 Dangerous Goods and Weapons.

The permissible size and weight of their hand baggage must be indicated to passengers (Refer to 8.2.2.8. Hand Baggage).

Prior to boarding passengers must be briefed on the "No smoking" requirement and on all provisions relevant to their safety before and during their embarkation (Refer to 8.2.2. Aircraft, Passengers and Baggage Handling Procedures Related To Safety).

8.3.16.2. Before Takeoff

Prior to take-off, cabin crew must brief all passengers and/or supernumeraries on applicable safety rules and procedures. The briefing is not required before every take-off on a multi-stop flight with no additional passenger. It is necessary only for a change of aircraft and/or applicability of information (e.g. first segment overland, second segment over water, change of seat location).

Passengers must be briefed on the following items:

- Smoking regulations: observation of "NO SMOKING" signs on the ground, prohibition of smoking during flight in non-smoker section, in lavatories and aisles and during the whole flight on non-smoking flights.
- Back of the seat to be in the upright position and tray table stowed
- Location of emergency exits
- Location and use of floor proximity escape path markings
- Stowage of hand baggage
- Restrictions on the use of portable electronic devices (refer to 8.3.15.4. Electronic Devices)
- The location and the contents of the safety briefing card

Passengers must also receive a demonstration of the following:

- The use of safety belts and/or safety harnesses, including how to fasten and unfasten the safety belts and/or safety harnesses
- The location and use of oxygen equipment if required. Passengers must also be briefed to extinguish all smoking materials when oxygen is being used
- The location and use of life jackets (rafts) if flight over water is anticipated.

8.3.16.3. After Takeoff

Passengers must be reminded of:

- Smoking regulations: observation of “NO SMOKING” signs, prohibition of smoking during flight in non-smoker section, in lavatories and aisles and during the whole flight on non-smoking flights.
- Fastening their safety belts and/or safety harnesses, when the “FASTENSEAT BELT” sign is ON. Furthermore, it must be recommended to passengers to keep their seat belt fasten at all time during the flight.

8.3.16.4. During Descent / Before Landing

Passengers must be reminded of:

- Smoking ban
- The requirement to keep or refasten safety belts and/or safety harnesses
- Backing their seat in the upright position and stowing their tray table
- Re-stowing their hand baggage
- Restrictions on the use of portable electronic devices (refer to 8.3.15.4. Electronic Devices).

8.3.16.5. After Landing

Passengers must be reminded:

- Smoking ban
- To keep their safety belt fastened until the aircraft has come to a full stop and the engines have been shut down.

8.3.16.6. Emergency Situations

If an emergency occurs during flight, the passengers shall be instructed in such emergency action as may be appropriate to the circumstances (Refer to FCOM and CCM).

8.3.16.7. Public Address (PA) Announcements

Although the Pilot in Command may delegate the use of the PA system to any other crewmember, he remains responsible for its proper use.
The Pilot in Command should discuss his plan for routine announcements with the purser.
The following should be considered before each announcement:

- plan the content of the announcement
- speak clearly in simple language to encourage a friendly and formal mood
- Keep it short. Avoid exploiting a captive audience with lengthy or too-frequent announcements
- avoid the use of aviation jargon

When the take-off is imminent, the passengers are to be advised by making an announcement over the PA.
After take-off, immediately after turning the seat belt sign off, an announcement is required recommending that the passengers keep their seat belts fastened while seated, even though the seat belt sign is off.
When noticeable turbulence is anticipated or encountered, advise the cabin occupants of the duration and intensity expected.
If deemed appropriate request all flight attendants to be seated with their seat belts fastened.
Advise passengers of any delays (take-off, landing) or diversions and the reasons.

8.3.17. Cosmic or Solar Radiation Detection Procedures

An operator shall ensure that aircraft intended to be operated above 15 000 m (49 000 ft) are equipped with an instrument to measure and indicate continuously the dose rate of total cosmic radiation being received and the cumulative dose on each flight.
Not applicable on Nesma Airlines aircraft as maximum operating altitude is below 49 000 ft.
Refer also 6.2. Cosmic Radiation.

8.4 All Weather Operations

Nesma Airlines is authorized for CAT I and CAT II but not authorized for CAT III Operations. Therefore all references CAT III operations are considered pending until Nesma Airlines and Crew are approved for such operation.

8.4.1 Concepts

All Weather Operations (AWO) consist in operating an aircraft in low visibility conditions. The term AWO includes Low Visibility Take-Off (LVTO), landing Category II (Cat II), landing Category III (Cat III) and Low Visibility Taxi (LV TAXI).
Weather limitations (visibility) applied for AWO are called minima.
For each airport procedure, approved minima are indicated in the associated Jeppesen charts.
A Take-off or a Landing cannot be operated with minima below which the aircraft is certified, the crew is rated and the usable runway aids are certified.
The limits of the aircraft are indicated in the FCOM.
The limit of usable landing aids is the value of the DH/DA for the approach landing category.
These limits or operating minima must not be less than those imposed by the country concerned and the Operations Manual according to the type of flight.

8.4.1.1 CAT II

A category II approach is a precision instrument approach and landing with:

- A decision height lower than 200ft (60m) but not lower than 100ft (30m), and
- A runway visual range not less than 300m (1000ft).

The main objective of CAT II operations is to provide a level of safety equivalent to other operations, but in more adverse weather conditions and lower visibility.
CAT II weather minima have been established to provide sufficient visual references at DH to permit a manual landing (or a missed approach) to be executed (this does not mean that the landing must be made manually).

8.4.1.2 CAT III

Nesma Airlines is not authorized for CAT III operations.

CAT II / CAT III definitions according to ICAO, JAA

		ICAO		**JAA**	
		DH	**RVR**	**DH**	**RVR**
CAT II		100ft ≤DH < 120ft	300m	100ft ≤DH < 120ft	300m
		121ft ≤DH < 140ft	400m	121ft ≤DH < 140ft	400m
		141ft ≤DH	450m	141ft ≤DH	450m
CAT III A	**DH**	No DH or DH < 100ft (1)		DH < 100ft (1)	
	RVR	200m ≤RVR 700ft ≤RVR		200m ≤RVR 700ft ≤RVR	
CAT III B	**DH**	No DH or DH < 50ft		No DH or DH < 50ft	
	RVR	50m ≤RVR < 200m 150ft ≤RVR < 700ft		75m ≤RVR < 200m 250ft ≤RVR < 700ft	
CAT III C	**DH**	No DH			
	RVR	No RVR limitation			

(1) DH ≥50ft if fail passive

Acceptable operational correspondence meter/feet (according to ICAO)

15m	= 50ft	30m = 100ft	50m = 150ft	5m = 250ft
100m	= 300ft	150m = 500ft	175m = 600ft	200m = 700ft
300m	= 1000ft	350m = 1200ft	500m = 1600ft	550m = 1800ft
600m	= 2000ft	800m = 2400ft	1000m = 3000ft	1200m = 4000ft

1600m = 5000f

8.4.1.3 Decision Height (DH) and Alert Height (Ah)

In CAT II / CAT III regulations, two different heights are defined:
- The Decision Height (DH),
- The Alert Height (AH).

8.4.1.3.1 Decision Height Definition

A specified height in a 3D instrument approach operation at which a missed approach must be initiated if the required visual reference to continue the approach has not been established. (ECAR Part 1)
Decision height is the wheel height above the runway elevation by which a go-around must be initiated unless adequate visual reference has been established and the aircraft position and approach path have been assessed as satisfactory to continue the approach and landing in safety. In this definition, runway elevation means the elevation of the highest point in the touchdown zone. According to the regulation, the DH recognition must be by means of height measured by radio-altimeter.

Visual references at DH

Because the term of adequate visual reference could be differently interpreted, the regulation has defined criteria for CAT II and CAT III for visual reference at DH which are now commonly accepted.
For CAT II and CAT III A, a pilot may not continue the approach below DH unless a visual reference containing not less than a 3 light segments of the centre line of the approach lights or runway center line or touchdown zone lights or runway edge lights is obtained. For CAT III B the visual reference must contain at least one centerline light.

8.4.1.3.2 Alert Height Definition

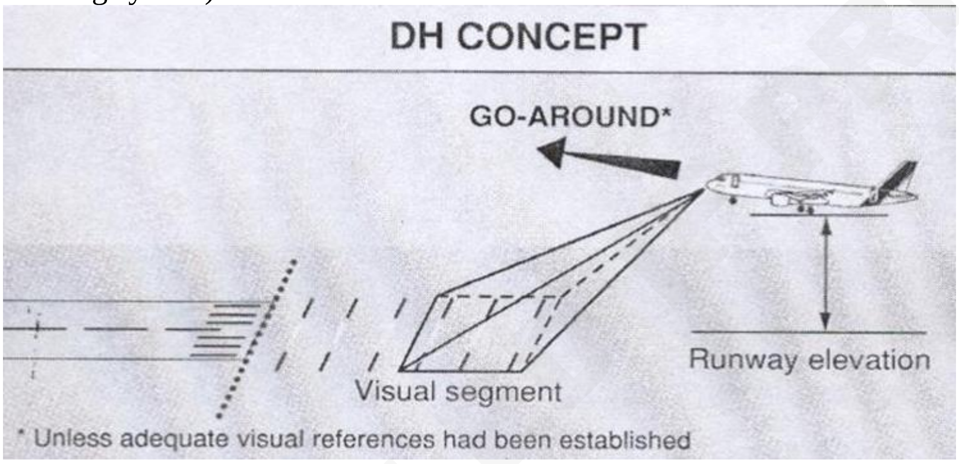
An Alert Height is a height above the runway, based on the characteristics of the aeroplane and its fail-operational automatic landing system, above which a Category III approach would be discontinued and a missed approach initiated if a failure occurred in one of the redundant parts of the automatic landing system, or in the relevant ground equipment (ICAO).
In other AH definitions, it is generally stated that if a failure occurred below the Alert Height, it would be ignored and the approach continued.

8.4.1.3.3 Decision Height and Alert Height Concept Decision Height concept

Decision height is a specified point in space at which a pilot must make an operational decision. The pilot must decide if the visual references adequate to safely continue the approach have been established.

- If the visual references have not been established, a go-around must be executed.
- If the visual references have been established, the approach can be continued. However, the pilot may always decide to execute a go-around if sudden degradations in the visual references or a sudden flight path deviation occur.

In Category II operations, DH is always limited to 100ft or Obstacle Clearance Height (OCH), whichever is higher. In Category III operations with DH, the DH is lower than 100ft (typically equal to 50ft for a fail-passive automatic landing system and 15-20ft for a fail-operational automatic landing system).

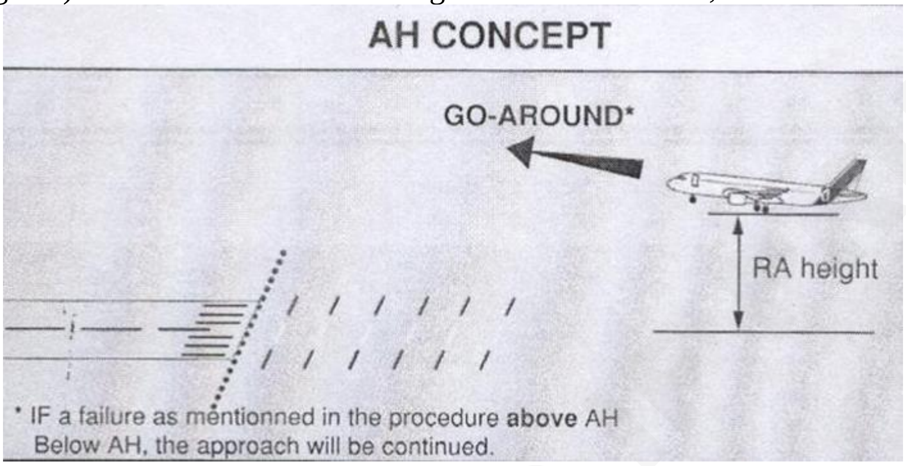


The DH is measured by means of radio-altimeter. When necessary, the published DH takes into account the terrain profile before runway threshold.

Alert Height concept

Alert height is a height defined for Category III operations with a fail-operational landing system.

- Above AH, a go-around must be initiated if a failure (*) affects the fail-operational landing system.
  (*) The list of these failures is mentioned in the AFM.
- Below AH, the approach will be continued (except if AUTOLAND warning is triggered). The AH is evaluated during aircraft certification; it is set at 100ft for A320.



The AH is only linked to the probability of failure(s) of the automatic landing system.

Operators are free to select an AH lower than the AH indicated in the AFM but not a higher value. Airbus procedures include both AH and DH concepts for all Fail-operational Category III operations.

8.4.1.4 Runway Visual Range

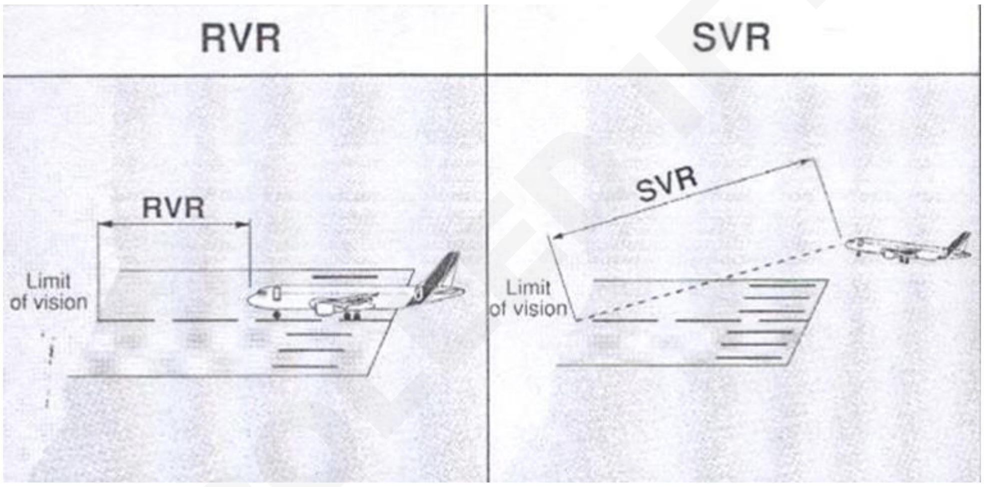
8.4.1.4.1 RVR Definition

Runway Visual Range (RVR) is the range over which a pilot of an aircraft on the centre line of the runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

8.4.1.4.2 RVR Concept

Categories II and III operations require rapidly updated and reliable reports of the visibility conditions which a pilot may expect to encounter in the touchdown zone and along the runway. RVR measurements replace the use of Reported Visibility Values (RVV) which is not appropriate for conditions encountered during the final approach and landing in low visibility, because the visibility observations are often several miles away from the touchdown zone of the runway.

Note: RVR is not the Slant Visual Range (SVR). SVR is the range over which a pilot of an aircraft in the final stages of approach or landing can see the markings or the lights as described in RVR definition.



Note: A too low seat position will reduce the SVR considerably.

8.4.1.4.3 Runway Visual Range Measurements

For Category II and Category III operations, the RVR measurements are provided by a system of calibrated Transmissometers and account for the effects of ambient background light and the intensity of runway lights.
Transmissometers systems are strategically located to provide RVR measurements associated with three basic portions of a runway:

- the touchdown zone (TDZ),
- the mid-runway portion (MID), and
- The rollout portion or stop end.

For Category II operations the TDZ measurement is required, and for Category III operations the TDZ and MID measurements are mandatory. For CAT III without DH regulation requires only one RVR measuring point on the runway.

8.4.1.5 Minimum Approach Break-Off Height (MABH)

The Minimum Approach Break-off Height (MABH) is the lowest height above the ground, measured by radio altimeter, such that if a missed approach is initiated without external references:

- in normal operation, the aircraft does not touch the ground during the procedure
- With an engine failure during a missed approach, it can be demonstrated that taking this failure probability, an accident is extremely improbable.

8.4.1.6 Operating Minima

8.4.1.6.1 Cat II

- Refer to 8.1.3.5.4. Precision Approach Cat II.

8.4.1.6.2 Cat III

- Refer to 8.1.3.5.5. Precision approach CAT III

8.4.2 Flight Crew Procedures

8.4.2.1 Flight Preparation

In addition to normal flight preparation, the following planning and preparation must be performed when CAT II or CAT III approaches are envisaged.

Review NOTAMS to make sure that the destination airport still meets visual or non-visual CAT II or CAT III requirements:

- Runway and approach lighting,
- Radio Nevoid availability,
- RVR equipment availability, etc.

Aircraft status: check that required equipment for CAT II or CAT III approach is operative. The required equipment list is given in the FCOM and in the QRH.

Although CAT II / CAT III required equipment is not listed in the MMEL, in case of failure Nesma Airlines MEL indicates whenever the required equipment list shall be checked.

When the aircraft log book is available, confirm that no write-up during previous flights affects equipment required for CAT II / CAT III.

Crew Qualification: Crew qualification and currency must be reviewed (both CAPT and F/O must be qualified and current).

Weather information: check that the weather forecast at destination is within Nesma Airlines and crew operating minima. If the forecast is below CAT I minima, verify that alternate weather forecasts are appropriate to the available approach means and at least equal to or better than CAT I minima.

Fuel planning: additional extra fuel should be considered for possible approach delays.

- **Taxiing**: Additional fuel of 30 minutes of taxiing should be carried, whenever the forecast weather for the departure airport is below 400m
- **Holding**: Addition of 30 minutes of holding fuel or the expected delays should be carried, whenever forecast weather for destination is below CAT I

Cabin Crew Briefing: Brief cabin crew not to enter the Flight Deck, or call on the intercom during taxi or approach unless safety dictates for such calls.

8.4.2.2 Approach Preparation

8.4.2.2.1 Aircraft Status

Check on ECAM STATUS page that the required landing capability is available.
Although it is not required to check equipment which is not monitored by the system, if any of these equipment's is seen inoperative (flag), the landing capability will be reduced.

8.4.2.2.2 Weather

Check weather conditions at destination and at alternates. Required RVR values must be available for CAT II/III approaches. The selected alternate must have weather conditions equal to or better than CAT I.

8.4.2.2.3 Approach Ban

Policy regarding an approach ban may differ from country to country (Refer to Jeppesen Manual, Chapter “AIR TRAFFIC CONTROL”). Usually the final approach segment may not be continued beyond the OM or equivalent DME distance if the reported RVR is below the published minima for the required Transmissometers. After OM or equivalent, if RVR becomes lower than the minima, the approach may be continued.

8.4.2.2.4 ATC Calls

Unless LVP are reported active by ATIS, clearance to carry out a CAT II or CAT III approach must be requested from ATC, who will check the status of the ILS and lighting and protect the sensitive areas from incursion by aircraft or vehicles. Such an approach may not be undertaken until the clearance has been received.
Before the outer marker, the required RVR values should be transmitted.

8.4.2.2.5 Seat Position

The pilots must realize the importance of eye position during low visibility approaches and landing. A too-low seat adjustment may greatly reduce the visual segment. When the eye reference position is lower than intended, the already short visual segment is further reduced by the cut-off angle of the glare shield or nose.
The seat is correctly adjusted when the pilot's eyes are in line with the red and white balls located above the glare shield.

8.4.2.2.6 Use of Landing Lights

At night in low visibility conditions, landing lights can be detrimental to the acquisition of visual references.
Reflected light from water droplets or snow may actually reduce visibility.
Landing lights would therefore not normally be used in CAT II or CAT III weather conditions.

8.4.2.2.7 Cat II or Cat III Crew Briefing

The briefing should include the normal items as for any IFR arrival and in addition the following subjects should be covered prior to the first approach:

- destination and alternate weather,
- Airfield and runway operational status CAT II / CAT III, etc.
- aircraft systems status and capacity,
- brief review of task sharing,
- review approach procedure (stabilized approach),

- review applicable landing minima -performance page- (RA value in DH Field)
- review go-around procedure, ATC calls,
- brief review of procedure in case of malfunction below 1000ft,
- optimum seat position and reminder to set cockpit lights when appropriate

8.4.2.3 Approach Procedures

8.4.2.3.1 Task Sharing

The procedures given in FCOM for CAT II and CAT III approaches make the best use of the automatic system of the aircraft.
The task sharing for a CAT II / CAT III approach is that **CM1 is PF** and **CM2 is PM**.
The workload is distributed in such a way that the CM1 primary tasks are supervising and decision making, and the CM2 primary task is monitoring operation of the automatic system.
In summary the tasks are shared as follows:
CM1:

All CAT II and CAT III operations

- has hands on controls and thrust levers throughout the approach, landing or go-around ;
- makes FCU selections (if any) ;
- takes manual control in the event of AP disconnection ;
- Monitors flight instruments.

Approaching DH:

- Starts to look for visual references, progressively increasing external scanning as DH is approached. If no DH procedures are used, the CM1 will nevertheless look for visual references.

At or before DH (if his decision is to continue):

- calls "LANDING" ;
- scans mostly head-up to monitor the flight path and flare (in CAT II or
- CAT III A) or the track (in CAT III B) by visual references ;
- monitors thrust reduction and for A320, at "RETARD" call-out, sets thrust levers to idle ;
- selects and controls reverse thrust ;
- Disengages autopilot when taxi speed is reached.

CM2:

- monitors flight instruments head-down throughout approach, go-around
- or landing until roll-out is completed ;
- calls any deviation or failure warning ;
- calls barometric heights as required, and monitors auto call-out or calls radio heights including "100 above";
- Monitors FMA and calls mode changes as required.

At DH (identified by aural and visual warning):

- if decision is not announced by CM1, calls "MINIMUM";
- If no response from CM1, initiates a go-around.

CAT III operations without DH

CM1:

- if no failure by AH, calls "LANDING";
- monitors flare by flight instruments;
- monitors lateral guidance during flare by yaw bar on PFD;
- monitors automatic ground roll by scanning alternately instruments and external references

IF DECISION IS TO GO AROUND (All CAT II and CAT III operations) CM1

- calls "GO AROUND - FLAPS";
- initiates go-around by setting thrust levers to TOGA;
- monitors rotation on PFD;
- checks positive climb (V/S and RA);
- Commands configuration changes.

CM2

- Standard Operating Procedures

8.4.2.3.2 Visual References

8.4.2.3.2.1. Operations with DH

It should be stressed that the DH is the lower limit of the decision zone during which, in limiting conditions, the CM1 will be assessing the visual references. CM1 should come to this zone prepared for a go around but with no pre-established judgment.
CM1 should make a decision according to the quality of the approach and the way the visual references develop as DH is approached.

CAT II Operations

In CAT II operations the conditions required at DH to continue the approach are that the visual references should be adequate to monitor the continued approach and landing, and that the flight path should be acceptable. If both these conditions are not satisfied, it is mandatory to initiate a go around.
The visual references required at DH in CAT II operations to continue the approach may be any of the following:

- a segment of the approach light system,
- the runway threshold,
- The touchdown zone.

CAT III Operations

In CAT III operations with DH, the condition required at DH is that there should be visual references which confirm that the aircraft is over the touchdown zone. Go-around is mandatory if the visual references do not confirm this.

8.4.2.3.2.2. CAT III without DH

For this category of operation, the decision to continue does not depend on visual references, even though a minimum RVR is specified.
It is nevertheless good airmanship to confirm aircraft position with available visual references. However, the decision depends only on the operational status of the aircraft and ground equipment. If a failure occurs prior to reaching the AH, a go-around will be made. A go-around must nevertheless be performed if the auto-land warning is triggered below AH.

8.4.2.3.3 Loss of Visual References

8.4.2.3.3.1 Operations with DH - Before Touchdown

If the decision to continue has been made and the visual references subsequently become insufficient (for the appropriate category), or the flight path deviates unacceptably, a go-around must be initiated (a go-around initiated below the MABH, whether auto or manual, may result in ground contact).
Note: If the touchdown occurs after GA is engaged the AP remains engaged in that mode, and ATHR remains in TOGA. Ground spoilers and auto brake are inhibited.

8.4.2.3.3.2 Operations With and Without DH - After Touchdown

If the visual references are lost after touchdown, a go-around should not be attempted. The roll-out should be continued with AP in ROLL-OUT mode down to taxi speed.

8.4.2.3.4 Flight Parameters Deviation Calls

The following calls would normally be made by the PM and acknowledged by the PF.
However, any crewmember who sees a deviation outside the following limits should make the appropriate call.
If any of these limits are exceeded approaching DH, a go-around should be considered.

PARAMETERS	IF DEVIATION EXCEEDS		CALL REQUIRED
IAS	+ 10 kt - 5 kt		"SPEED"
Rate of descent	- 1000 ft/min		"SINK RATE"
Pitch attitude	10° nose up - 2.5° nose down (A320)		"PITCH"
Bank angle	7°		"BANK"
Localizer	Excess deviation warning	1/4 DOT (PFD)	"LOCALIZER"
Glide slope		1 DOT (PFD)	"GLIDESLOPE"

8.4.2.4 Failures and Associated Actions

8.4.2.4.1 General

In general there are three possible responses to the failure of any system, instrument or element during the approach.

- CONTINUE the approach to the planned minima.
- REVERT to higher minima and proceed to a new DH (above 1000ft).
- GO AROUND and reassess the capability.

The nature of the failure and the point of its occurrence will determine which response is appropriate.

As a general rule, if a failure occurs above 1000ft AGL the approach may be continued reverting to a higher DH, providing the appropriate conditions are met (refer to "downgrading condition" here after).

Below 1000ft (and down to AH when in CAT III DUAL) the occurrence of any failure implies a go-around, and a reassessment of the system capability.

Another approach may then be undertaken to the appropriate minima for the given aircraft status. It has been considered that below 1000ft, not enough time is available for the crew to perform the necessary switching, to check system configuration and limitations and brief for minima.

In CAT III DUAL, in general, a single failure (for example one AP failure or one engine failure) below AH does not necessitate a go-around. But a go-around is required if the auto-land warning is triggered.

8.4.2.4.2 Abnormal Procedures

The required procedures following failures during CAT II or CAT III approaches are provided in the FCOM. These procedures have been established and approved during the aircraft CAT II / CAT III certification.

The abnormal procedures can be classified into two groups:

1) Failures leading to a downgrading of capability as displayed on FMA and ECAM with an associated specific audio warning (triple click).
2) Failures that do not trigger a downgrading of capability but are signaled by other effects (Flag, ECAM warning, amber caution and associated audio warnings).

It should be noted that some failures might trigger ECAM warnings, cautions and a downgrading of capability.

The FCOM describes what should be the crew responses to failures in function to the height:

Above 1000ft: Downgrading conditions

(a) Downgrading from CAT III to CAT II is permitted only if :
- ECAM (check-list) actions are completed,
- RVR is at least equal to CAT II minima,
- Briefing is amended to include CAT II procedure and DH.
- decision to downgrade is completed above 1000ft AGL,

(b) Downgrading from CAT II to CAT I permitted only if:
- ECAM (check-list) actions are completed,
- at least one FD is available,
- RVR is at least equal to CAT I minima,

- briefing is amended to include CAT I procedure and DH,
- the decision to downgrade is completed above 1000ft AGL

Note: switching from one AP to another before 1000ft AGL is permitted.

Below 1000ft and above DH (for CAT II or CAT III SINGLE) or above AH (for CAT III DUAL) A go-around must be performed in case of:

- ALPHA FLOOR activation,
- loss of AP (cavalry charge),
- downgrading of capability (triple click),
- amber caution (single chime),
- Engine failure.

At 350ft RA (✝)

LAND must be displayed on FMA and runway course must be checked.
If runway course is incorrect or LAND does not appear, a go-around must be performed. If conditions permit, a CAT II approach with AP disconnection no later than 80ft may be continued.
LAND is displayed if LOC and GS track modes are active and at least one RA is available. These conditions need to be obtained no later than 350ft AGL to allow a satisfactory automatic landing.
(✝) Depending on terrain profile before the runway LAND mode may appear at lower height. This can be acceptable provided it has been demonstrated that automatic landing is satisfactory.

At 200ft RA and below

Any AUTOLAND warning requires an immediate go-around.
If visual references are sufficient and a manual landing is possible, the PF (CM1) may decide to land manually.

At flare height

If FLARE does not come up on FMA, a go-around must be performed.
If visual references are sufficient and a manual landing is possible, the PF (CM1) may decide to complete the landing.

After touchdown

- In case of anti-skid or nose wheel steering failure, disconnect AP and take manual control.
- If automatic roll-out control is not satisfactory, disconnect the AP immediately.

8.4.3 ATC Procedures

CAT II and CAT III operations require special procedures for the ATC and all services on the aerodrome (maintenance, security). They are often referred to under the generic name of Low Visibility Procedures. Each aerodrome authority develops its own procedures with the ICAO All Weather Document or ECAC n 17 as a possible aid.
Main procedures to be established are:

- procedures for ATC to be quickly informed of all degradations in ILS performance and to inform the pilot if necessary,
- procedures for ATC to be quickly informed of all degradations in visual aids and to inform the pilot if necessary,
- procedures for the protection of the obstacle free zone (OFZ) by the control of ground movements,
- procedures for the protection of the ILS critical area and the ILS sensitive area by control of ground movements and adequate separation between two aircraft on approach or one aircraft on approach and another taking-off,
- procedures for meteorological services,
- procedures for maintenance,
- Procedures for security.

ATC clearance

Clearance to carry out a CAT II or III approach must be requested from ATC, who will activate the Low Visibility Procedures, i.e. prepare the airfield and assure appropriate aircraft separation. Such an approach may not be undertaken until the clearance has been received. It is also recommended that ATC be informed when an automatic landing is intended to be performed, to ensure, whenever possible, the same protection even in CAT I or better conditions.

8.4.4 Continuous Monitoring

After obtaining the authorization, Nesma Airlines must continue to provide reports of in-line service.

The Flight Safety Officer, the Director of Operations and the Maintenance Director will be in charge to collect the following information:

- The total number of approaches, by aircraft type, where the airborne CAT II or III equipment was utilized to make satisfactory, actual or practice, approaches to the applicable CAT II or III minima.
- The total number of unsatisfactory approaches by airfield and aircraft registration in the following categories.
  (a) Airborne equipment faults
  (b) Ground facility difficulties
  (c) Missed approaches because of ATC instructions
  (d) Other reasons

The continuous monitoring should permit the detection of any decrease in the level of safety before it becomes hazardous.

The Flight Safety Officer, the Director of Operations and the Maintenance Director must continue to check these results and to take adequate actions by modifying the operating or maintenance procedures if necessary.

The monitoring may also permit problems to be detected on a specified airfield (ILS, ATC procedures, etc.).

The data must be retained for a period of 12 months.

8.4.5 Low Visibility Take-off (LVTO)

8.4.5.1 LVTO Approval

The ECAA approval is required to conduct LVTO with RVR below 150 m. Nesma Airlines has been approved by the ECAA to conduct LVTO with RVR 150 m and this approval is shown in the OPS SPEC of the AOC.
To conduct LVTO, crewmembers shall be qualified. Takeoff with RVR less than 400m is considered as LVTO.
No operational approval is required to perform LVTO with RVR between 400m and 150m.
The takeoff minima is mainly determined by the airport installation (runway lighting system, RVR measurement system,).
When weather conditions are more severe than the landing minima, a takeoff alternate is required within one hour for twin-engine aircraft. This time is determined at the one engine inoperative speed.
Refer to 8.1.2.3.2 Takeoff alternate aerodrome.

8.4.5.2 Low Visibility Takeoff Briefing

Takeoff briefings should preferably be completed prior to engine start. During Low Visibility Takeoff briefing, the Pilot in command shall satisfy himself that:

- The status of the visual and non-visual facilities is sufficient;
- LVPs are in force;
- Flight crewmembers are qualified;
- Minimum required RVR for take-off is obtained;
- Takeoff alternate weather, if required, is obtained;
- Use of aircraft anti-icing procedures are reviewed; and
- Taxi route and the runway CAT II / III holding points are reviewed.

8.4.5.3 Low Visibility Taxi - LV Taxi

The following guidelines shall be used during Low Visibility Taxi:

- Before taxiing for take-off in low visibility, check that the crew are familiar with CAT II / CAT III holding points for the take-off runway, and with any taxiway routing that should be used.
- The centerline taxiway lighting with its reduced spacing, coded space into indicate curves, and facilitate taxing in low visibility;
- Close attention should be paid to taxi speed **(max 10 kts)** and taxi routes. The CM2 should make full use of taxi charts and ground speeds and headings to feed the required information to CM1. Both pilots should give their undivided attention to taxi phase;
- Any checklist, clearance or action (i.e. F/CTL check) must only be done while the aircraft is stationary **with the parking brake ON**;
- Remember that ground equipment, aircraft wingtips, and tails may not be as readily seen as the taxiway lights, therefore taxi with utmost caution;
- Make full use of all aircraft lights, i.e. Taxi and turnoff etc., unless they cause restricted visibility due to glare;
- Make certain that correct CAT II / CAT III holding points, runways and sensitive areas are not violated; and
- On entering the runway and lining up for take-off, double check runway heading reference and ensure that the aircraft is on the runway centerline. This could be verified by ILS localizer and markings on runway centerline.

8.4.5.4 General

Normally the lowest RVR authorized for takeoff is 400 m, below 400 m takeoff requires Low Visibility Procedures (LVP) to be in force; the Commander shall ensure that LVP are in force. Table 8.4.5.5 which defines the lowest takeoff minima authorized.
Line up on the runway centerline. Use the centerline lights or marking for directional control guidance during takeoff roll. As speed increases the streaming effect of the lights and markings improve tracking. In addition, the noise of the nose wheel running over the centerline lights is further confirmation that takeoff run is straight.

8.4.5.5 LVTO with RVR between 400m and 150m

The minimum RVR in this range of value is a function of the aircraft category and of the runway equipment.
A320 are in category C.
No operational approval is required to perform LVTO with these minima.
Table 8.4.5.5 – RVR minima

Facilities	RVR/Visibility (m) (Note 1,2)
Takeoff Without Approval for Low Visibility Takeoff (LVTO)	
Day only: Nil **(Note 2)**	500R/500V (1600 ft.)
Day: REDL or RCLM or RCLL	400R/400V (1300 ft.)
Night: (REDL or RCLL) and RENL	
Takeoff With Approval for Low Visibility Takeoff (LVTO) (Note 4)	
Day: REDL and (RCLM or RCLL) and LVP	300R/300V (1000 ft.)
Night:(REDL or RCLL) and RENL and LVP	
REDL and RCLL and LVP	200R/200V (700 ft.)
REDL and RCLL and LVP and multiple RVR	150R (500 ft.) **(Note 3)**
HI RCLL spaced 15m or less and HI REDL spaced 60m or less and LVP and multiple RVR	125R (400 ft.) **(Note 3 & 5)**

Note 1: The reported RVR/VIS value representative of the initial part of the takeoff run can be replaced by pilot assessment.
Note 2: The pilot is able to continuously identify the take-off surface and maintain directional control.
Note 3: The required RVR value to be achieved for all relevant RVRs - TDZ, MID, Rollout – TDZ equivalent to the initial part of the TKOF run.

Note 4: Low Visibility Procedures (LVP) must be in force for Low Visibility Takeoff (LVTO).
REDL Runway Edge Lighting RCLM Runway Center Line Marking RCLL Runway Center Line Lighting RENL Runway End Lighting
HI REDL High Intensity Runway Edge Lighting
HI RCLL High Intensity Runway Center Line Lighting
LVP Low Visibility Procedure

Note 5: ECAA has granted Nesma Airlines approval to reduce the take-off minima to 150m provided the requirements below be fulfilled:

- Low Visibility Procedures are in force,
- High intensity CL spaced 15m or less and HIRL spaced 60m or less are in operation,
- Crew must have satisfactorily completed initial and recurrent training in an approved simulator,
- A 90 meters visual segment must be available from the cockpit at the start of the takeoff run,
- The required RVR value has been achieved for all of the relevant RVR reporting points.

8.5 ETOPS

Nesma Airlines is not approved for such operations

8.6 Use of the Minimum Equipment List (Mel) and Configuration Deviation List (CDL)

The Minimum Equipment List (MEL) is a document established by Nesma Airlines and approved by Egyptian ECAA. Nesma Airlines MEL is developed on the base of Airbus Master MEL (MMEL) and customized as a function of its own operational policies and national operational requirements.

The Configuration Deviation List (CDL) is a document approved by the Airworthiness Authority having certified the aircraft. The CDL is included in the Airplane Flight Manual.

These documents allow operations with certain items, systems, equipment, instruments or components inoperative or missing as it has been demonstrated that an acceptable level of safety is maintained by appropriate operating limitations, by the transfer of the function to another operating component(s) or by reference to other instruments or components providing the required information. Accordingly, all defects shall be processed in accordance with MEL / CDL reference(s).

In the MEL, an equipment is declared inoperative when:

- It does not work.
- It does not ensure all functions for which it was designed.
- It does not work within its operational limits.

Whilst operating within the limits of the MEL / CDL, the aircraft is deemed to be airworthy and capable of operating within the specified environment. However, Pilot Command has the authority to reject an aircraft if, prior to each flight, he is dissatisfied with any aspect of airworthiness and maintenance.

The MEL is not intended to provide for continued operation of an aircraft for an unlimited period of time. Repairs should be made as soon as possible within the time limit imposed by Rectification Intervals.

Rectification Intervals (A, B, C, and D) have been introduced in accordance with definitions of DGAC approved MEL.

Dispatch of the aircraft is not allowed after expiry of the Rectification Interval specified in the MEL unless the Rectification Interval is extended in accordance with the following:

A one-time extension of the applicable Rectification Interval B, C, or D, may be permitted for the same duration as that specified in the MEL provided:

- Only one hold item is open
- Or two hold items are open, provided the second item has no relationship with the primary item and this will not result in a degradation in the level of safety and/or an undue increase in crew workload

Any extension will be subject to prior approval of the ECAA

Although the concept of Rectification Interval does not exist for the CDL, all CDL items are not allowed to be left un-rectified for an unlimited period of time as stated in the Flight Manual. However, a specific time limit is required in the dispatch condition itself for some items. Decision for repair is under Nesma Airlines responsibility.

It is Nesma Airlines policy that every effort should be made to maintain 100 % serviceability with rectification being initiated at the first practical opportunity.

An aircraft must not be dispatched with multiple MEL / CDL items inoperative without the Pilot in Command having first determined that any interface or interrelationship between inoperative systems or components will not result in degradation in the level of safety and/or undue increase in crew workload.

The exposure to additional failures during continued operation with inoperative systems or components must also be considered in determining that an acceptable level of safety is maintained.

In case of defect, engineering personnel will certify in the Technical Log adjacent to the appropriate defect the MEL / CDL subject title, system and item number together with any operational limitations (RVSM, etc...).

At the completion of any engineering tasks associated with the particular MEL item, engineering personnel will placard the inoperative instrument, switch, light, etc.

When applicable, operational flights plan, take-off and landing performance and fuel requirement penalties must be taken into account due to inoperative equipment or component.

When a MEL / CDL item is rectified, engineering personnel should make an entry in the Technical Log identifying the item and details of the rectification, including a statement that the MEL / CDL item has been removed. Appropriate MEL placards must then be removed from the cockpit.

The MEL legally applies until the moment the aircraft starts moving under its own means for the purpose of taking off.

Operations department is responsible for the customization of the operational procedures in the MMEL through the duties of the technical pilot (ref. 1.3.4.4 Technical Pilot), the customization procedures are:

1. Operations department receives the MEL after the technical department has done the customization of the MEL items and entries.
2. The technical pilot carries out the customization of the MEL operational procedures in accordance with local regulations and standards.
3. The operations department compiles the customization of the MEL and delivers the final version to the chief inspector.
4. After the approval of the CMEL, it is distributed to the operations department for distribution on board.
5. Announce to pilots by e-mail.

8.7 Non-Revenue Flights

8.7.1 Definitions

The following flights are considered as non-revenue flights:

- Training flights,
- Test flights,
- Delivery flights,
- Ferry flights,
- Demonstration flights,
- Positioning flights with or without passengers.

8.7.2 Training Flights

Training flights are under the responsibility of the Training Manager with the purpose of:

- Pilot In Command / pilot qualification / re-qualification
- Training the abilities of pilots under normal and abnormal conditions
- In flight proficiency check.

However, the final decision to carry out the actual training flight and the responsibility for adherence to Company instructions described in the Operation Manual in general and the Part D in particular, remains with the designated Pilot in Command.

8.7.3 Test Flights

A test flight must be performed after special maintenance/or repair work on an aircraft (if required and authorized) and on special request of the Authority. Test flights shall be performed according to programs issued by the technical department in agreement the flight operations department.

Those flights shall be performed by the minimum flight crew according to the Operations Manual. The crew should be assigned by the Director of Operations.

If it is required by the kind of test flight, there might be, in addition to the minimum crew, engineers, mechanics or inspectors on board who are directly involved in the preceding work/inspection of the aircraft. They must be recorded in the journey log as additional crewmembers.

The technical department shall give the flight crew a briefing on:

- The reason for the test flight.
- The test program.
- How the preceding work may influence the airworthiness of the aircraft.

8.7.4 Delivery Flights

Delivery flights are flights where an aircraft is flown from the seller’s facility to the airline or vice versa.

Provided all normal requirements are fulfilled, non-revenue passengers may be carried if this is not excluded on the certificate of airworthiness and certificate of registration. Full insurance coverage must be assured. For some delivery flights, the Authority might only issue a “ferry permit” in lieu of the certificate of airworthiness and the certificate of registration. This ferry permit may exclude the carriage of persons other than flight crew and engineers.

Flights with passengers aboard require full and normal crew complement.

8.7.5 Ferry Flights

Ferry flights are flights to position aircraft for maintenance. They may be conducted with minimum crew and reduced airworthiness as permitted by Operations Manual or the Authority. The Director of Operations shall give his consent to the Pilot in Command prior to commencing ferry flight after the approval of the authority.

8.7.6 Positioning Flights

A positioning flight is a flight to position an aircraft to an aerodrome for commercial operations. Positioning flights must be performed with the minimum flight crew and must follow the standard procedures described on the Operations Manual.
All flights whether revenue or non-revenue (i.e. ferry flights, Positioning flight) can be conducted without cabin crew *Refer ECAR 121.583 Carriage of persons without compliance with the passenger-carrying requirements of this Part.*

8.8 Oxygen Requirements

ECAR 121.329 And 121.333

8.8.1 Condition under Which Oxygen Must Be Provided and Used

Adequate breathing oxygen must be provided to the crew and passengers for sustenance in case of depressurization, smoke or toxic gas emission.
The Pilot in Command shall ensure that flight crewmembers engaged in performing duties essential to safe operation in flight use supplemental oxygen continuously whenever cabin altitude exceeds 10000ft for a period in excess of 30 minutes and whenever cabin altitude exceeds 13000ft
Additional "First Aid Oxygen" is required for passengers when the flight is planned to fly above 25000 ft. This First Aid Oxygen must still be available after a depressurization.
Description and use of Oxygen system and equipment are indicated in the FCOM “System Description” part for A320.

8.8.2 Requirement for Crew and Passengers

8.8.2.1 First Aid Oxygen

The quantity of oxygen required as first aid must be enough to provide 2% of passengers and not less than 2 passengers with undiluted oxygen at a flow rate of at least 3 liters per minute (Standard Temperature Pressure Dry) for the part of the flight above 8000 ft following a depressurization.
This quantity of oxygen must be added to the required oxygen quantity for the case of emergency descent.
The first-aid oxygen equipment shall be capable of generating a mass flow to each user of at least 4 liters per minute (STPD).
Means may be provided to decrease the flow to not less than 2 liters per minute (STPD) at any altitude.

8.8.2.2 Supplemental Oxygen for Sustenance

To operate a pressurized aircraft above 10000 ft, the quantity of supplemental oxygen on board for sustenance must be established for the most critical point of the flight from the standpoint of oxygen need in case of depressurization.
The cabin pressure altitude being considered the same as the aircraft altitude following a cabin depressurization.
The quantity of supplemental oxygen must be determined as required by the following table:

SUPPLY FOR:	DURATION AND CABIN PRESSURE ALTITUDE
All occupants of flight deck seats on flight deck duty	Entire flight time when the cabin pressure altitude exceeds 13 000 ft and entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at those altitudes, but in no case less than: i. 30 minutes for airplanes certificated to fly at altitudes not exceeding 25,000 ft (Note 2) ii. (ii) 2 hours for airplanes certificated to fly at altitudes more than 2000 ft (Note 3).
All required cabin crew members	Entire flight time when cabin pressure altitude exceeds 13,000 ft but not less than 30 minutes (Note 2), and entire flight time when cabin pressure altitude is greater than 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at these altitudes.
100% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 15,000 ft but in no case less than 10 minutes.(Note 4)
30% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 14,000 ft but does not exceed 15,000 ft.
10% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 14,000 ft after the first 30 minutes at these altitudes.

Minimum Requirements for Supplemental Oxygen for Pressurized Airplanes

Note 1: The supply provided must take account of the cabin pressure altitude and descent profile for the routes concerned.

Note 2: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the airplane's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 20 minutes at 10,000 ft.

Note 3: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the airplane's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 110 minutes at 10,000 ft.

Note 4: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the airplane's maximum certificated operating altitude to 15,000 ft in 10 minutes.

Note 5: For the purpose of this table "passengers" means passengers actually carried and includes infants.

8.8.2.3 Crew Protective Breathing Equipment

An easily accessible quick donning type of breathing equipment for immediate use is required for each cockpit crewmember.
Portable protective breathing equipment is required at each cabin crew station, in galleys and cargo compartments.
This equipment must protect the eyes, nose and mouth of each crewmember while on duty and to provide oxygen for a period of not less than 15 minutes at a pressure altitude of 8000 feet.
The oxygen required for breathing protection can be included in oxygen required for sustenance, for depressurization and in first aid oxygen.
The equipment shall allow the flight crew to communicate using the aircraft radio equipment and to communicate by interphone with each other while at their assigned duty stations;
Note: when the flight crew is more than one person and a cabin crewmember is not on board, a portable unit of PBE shall be carried.

8.9 Operating Procedure

Operating Limitations

Nesma Airlines is authorized for the below operations:-

Type Of Operation	Authorization	Reference
Dangerous goods	N/A	**Chapter 09**
Low Visibility Operations ▪ Approach And Landing ▪ Takeoff	**YES** (CAT I RVR 550m DH200 ft CAT II RVR 300m DH100 ft **No** 150 M	**OMA 8.4**
RVSM	**Yes**	**OMA 8.3.2.5**
PBN	**YES** ▪ B-RNAV (RNAV 5) ▪ P-RNAV (ICAO RNAV1) ▪ RNP APCH	**OMA 8.3.2.3 OMA 8.3.2.4**
EFB	**YES Class II Type A&B**	8.12 Electronic Flight Bag (EFB)

8.10 Nesma Airlines Operating Philosophy and Procedures

8.10.1 Flight Documentation and Data Recording

8.10.1.1 Airways and Approach Charts:

Only Company approved Airway Manuals, Jeppesen, will be used. On all sectors the relevant en-route chart will be readily available to each pilot.

8.10.2 Flight Procedures

8.10.2.1 Basic Performance of Flight Crew

To assure a safe and efficient operation, each flight crewmember must be proficient in three areas of competence: Technical, Procedural and Interpersonal. Each area consists of vital elements. Optimum overall performance is achieved by integrated application of these elements:
Note: Interpersonal competence according to JAR-OPS: CRM-Skills. FARs and elsewhere referred to as Non-Technical Standards (NONTECHS**).**

8.10.2.1.1 Technical

Elements	Descriptions
Manual Airplane Control; Pilots are able to control the airplane in all maneuvers. They endeavor to make the flight as accurate and smooth as possible.	**Ability** ▪ Be able to control the airplane manually at all times. ▪ Stabilize the airplane in all phases of flight. ▪ Maintain horizontal and vertical profile. ▪ Operate the airplane accurately and smoothly. ▪ Apply basic pitch & power values. ▪ Coordinate control inputs and trim. ▪ Recognize trends by instrument scan and react as appropriate. ▪ Adhere to applicable limitations and tolerances according to OM-B and OM-D.
Knowledge of Systems; Crewmembers know their airplane well, with special emphasis on operation, limits and interaction of systems.	**System Design** ▪ Know the structure and function. ▪ Know the limitations. ▪ Be familiar with the documentation Application. ▪ Know how to operate systems. ▪ Know the behavior and interaction of systems.
Use of Automation; Crewmembers are able to operate their airplane in the optimum mode of automation. They have the flexibility needed to change from one level of automation to another.	**Handling** ▪ Be able to manage and monitor all modes of automation. ▪ Use optimum mode of automation. ▪ Use automation to reduce workload Monitoring. ▪ Be aware of mode changes. ▪ Be flexible in changing level of automation.

8.10.2.1.2 Procedural

Elements	Descriptions
Knowledge of Procedures; It is essential for crewmembers to be thoroughly familiar with published procedures.	**Normal and Abnormal procedures** ▪ Know normal procedures for all phases of flight. ▪ Be thoroughly familiar with all relevant standards. ▪ Abnormal procedures. ▪ Know how to handle an abnormal situation ▪ Know memory actions by heart. ▪ Be familiar with relevant abnormal procedures and the appropriate checklist.
Adherence to Procedures; Disciplined use and accurate application of procedures is Vital Only if a higher degree of safety is achieved, deviation from Standard Procedures may be necessary.	**Discipline** Strictly apply required published procedures Perform procedures accurately and in a disciplined manner. ▪ Deviate from procedures only if a higher degree of Safety is achieved.

8.10.2.1.3 Interpersonal

Elements	Descriptions
Communication; Generally, Communications includes information transfer and social aspects. Crewmembers share information, and **assure** reception and understanding. Suggestions of other crewmembers are considered, even if one does not agree. Ambiguities and uncertainties are announced.	**Atmosphere** ▪ Encourage open and honest communication ▪ Achieve a positive first impression ▪ Listen actively ▪ Consider suggestions ▪ Information Transfer ▪ Share information ▪ Assure reception ▪ Assure understanding ▪ Information Management ▪ Clearly state plans and intentions ▪ Announce ambiguities ▪ Announce uncertainties ▪ Communicate candidly operational problems within the crew
Leadership and Teamwork Led by the Captain, the crew achieves a safe and efficient performance in a climate that is rational and free of intimidation.	**Command ability** ▪ Take the lead of the crew as Captain ▪ Establish goals, control outcome and correct ▪ Consider condition of others ▪ Team Ability ▪ Act as a constructive member of a team ▪ Take initiative ▪ Encourage others to cooperate ▪ Support others ▪ Seek ideas and views from others ▪ Present own point of view ▪ Provide appropriate feedback ▪ Propose alternative ideas if appropriate
Social interaction conflicts have to be addressed and managed. Every crewmember takes initiative to be an active and constructive part of the team.	▪ Conflict Management ▪ Address and manage conflicts ▪ Achieve rational climate ▪ Avoid intimidation ▪ Adopt assertive behavior if appropriate and persist until attention of others is gained or corrective action taken ▪ Accept appropriate criticism ▪ Avoid competition between crewmembers

Workload Management; Crewmembers clearly prioritize operational tasks and distribute them appropriately. Available external and internal resources are used for task completion within appropriate time frame. Stress and error are inherent factors of flight; crewmembers aim to minimize their negative effects. Situation Awareness and Decision Making; Crewmembers recognize and anticipate factors affecting the flight. After these factors are evaluated, they choose the appropriate course of action. To achieve a favorable outcome, crewmembers actively monitor execution	**Task** ▪ Prioritize operational tasks ▪ Distribute tasks appropriately ▪ Complete tasks in efficient time ▪ Use external and internal resources **Time** ▪ Plan ahead ▪ Allocate time to task appropriately ▪ Identify probable periods of Stress and Error ▪ Aim to minimize negative effects of stress ▪ Aim to minimize effects of error **Preparation** ▪ Act with respect to time available ▪ Avoid distractions ▪ Anticipate factors affecting the flight ▪ Recognize factors affecting the flight **Processing** ▪ Evaluate factors affecting the flight ▪ Choose appropriate course of action ▪ Monitor execution ▪ Monitor development of the situation ▪ Apply GRADE for complex decisions: G-Gather info, R-Review priorities, A-Analyze alternatives, D-Decide, E-Evaluate outcome.
And development of the situation.	**Interaction** ▪ involve others in the process ▪ discuss discrepancies

8.10.3 Crew Resource Management (CRM)

CRM can be defined as the utilization of all available human, informational and equipment resources towards the effective performance of a safe and efficient flight. CRM is an active process by crewmembers to identify significant threats to an operation, communicate them to each other and to develop and take measures to avoid or minimize the risk. CRM skills provide a primary line of defense against threats to safety that exist in the aviation and against human errors and its consequences. The basic performance of flight crew above has been defined, so as to include all CRM skills required by ECARs, JAR-OPS and FARs.
All flight crew shall be committed to applying CRM principles and practicing it through all aspects of operations

8.10.3.1 Multi Crew Concept (MCC)

The Multi Crew Concept regulates the organization of the work and task sharing in the cockpit. Goals, Roles, Responsibilities and Tasks are clearly defined.
The objectives of this concept are as follows:

- Full availability of PF for the primary job of piloting the airplane and the availability of the PM to carry out the secondary tasks.
- Clearly defined and balanced job sharing and workload distribution.
- Regulated co-operation by strict adherence to SOPs, mutual information, crosschecking, supervision and support.

These objectives are valid for all normal and abnormal conditions.

Responsibility of Command;

The Captain shall lead the entire crew according to the above principles and builds the team. He is responsible for:

- The entire flight
- Coordinating the co-operation between crewmembers
- Setting priorities
- Delegating tasks and responsibilities
- Maintaining the general overview through appropriate monitoring

Responsibility of Action;

Irrespective of the responsibility of command, the Copilot shall carefully and properly perform his regulatory assigned and individually delegated duties.

Monitoring and Supervision;

In addition to his primary tasks, each pilot shall monitor the flight progress and the actions of other crewmembers. Any significant and unexpected deviation from the normal flight path and/or SOPs shall be challenged and resolved according to the Two-Challenge Rule.

The Two Challenge Rule;

- Challenge the deviation
- If no response or response is inadequate/inappropriate, Challenge again (more assertively)
- If no response or response is still inadequate /inappropriate to the second challenge, Take control (" I have control") and resolve the deviation.

Mutual Information;

Both pilots shall keep each other informed of the current situation concerning aircraft systems, navigation, ATC, radio telephony, weather, etc. as well as of their individual intentions related to the flight progress.

Communication;

The co-operation as a team in accordance with the MCC requires a clear, effective and unmistakable communication based on the principle of "two way communication", i.e. instructions and certain information shall be confirmed verbally. Certain call-outs as well as instructions must be confirmed verbally (two way communication). A fixed wording is used for high priority communication, e.g. extending/retracting flaps, landing gear, for power setting.

High Priority Communication;

Due to the high priority of configuration changes and engine thrust settings pilots shall utilize a standard phraseology to operate flaps, landing gear as well as setting of engine thrust for take-off, climb, cruise and 'Go-around'. Cockpit communication must be in English and precise phraseology must be used. The exchange of information and verbal communications are either duty assignments by PF: commands, orders, and requests, or, transmission of information i.e. announcements and call outs.

Commands;

Assignment of duty to change aircraft configuration, power, flaps, gear. Company requires mandatory acknowledgment by PM, and when duty is performed a report. e.g.
PF: (commands): Flaps 1. PM: (acknowledges): Flaps 1,
PM: checks conditions allow the command to be performed, PM: executes command, continuously monitoring actions, PM: reports desired configuration is achieved.
ORDER: Instruction of a lower priority concerning a system. Acknowledgment and report are required (e.g. setting of navigational aids, activation of anti-ice.)
PF: Orders HGD
PM: Acknowledges HGD on # 1
PM: Reports HGD tuned and identified
REQUEST: An instruction, neither acknowledgement nor report is necessary e.g. Landing lights on

Announcement;

The transmission of information with the purpose of initiating a specific reaction by another crewmember, the action can be directly confirmed by observation.
No acknowledgment is required, but a reaction is a must e.g. high/ low speed, high rate of descent, below G/S. If no reaction occurs, the announcement will be repeated once; if still no reaction, a take-over by the other crewmember is mandatory, "Two Challenge Rule".

Call Outs;
Transmission of information, containing the transformation of instrument indication, or Amplification, or recognition of an existing situation, acknowledgment may be required in individual cases, e.g. altitude call outs in approach.

Note 1: All ATC instructions regarding altitude, heading, and speed, should be repeated by PF, after the PM acknowledges the ATC instructions.

Note 2: cross-cockpit communication for any two pilot crews is VITAL. Any time a crewmember makes any adjustments, changes to any information or equipment on the flight deck, he will advise the other crewmember of his intentions/actions and get an acknowledgment and/or confirmation of critical actions during normal, abnormal and emergency situations. This includes but is not limited to aircraft configuration changes, altimeter and airspeed settings, altitude settings, transfer of control the aircraft, automated flight system, flight management system, radio navigation aids, weigh and balance calculations and entries, performance calculations or inputs to FMS, Flight plan deviation etc…

Note 3: All intentional deviations from SOP should be announced by PF after obtaining clearance from the Captain. (In case F/O is flying). The nature and value of deviation should be clearly communicated in order to facilitate PM monitoring.

Note 4: ATC communications requires aviation English language fluency and the use of standard phraseology as indicated in OM-C Jeppesen.

Note 5: Effective communications between cockpit crew and cabin crew requires standardization and fluency in the English language, standard calls in normal, abnormal and emergency conditions are defined in FCOM (PRO-NOR-SOP, PRO-ABN-90).

8.10.3.2 Responsibility of Command

The Captain must lead the entire crew according to principles defined in basic performance of flight crew.

8.10.3.3 Responsibility of Action

Each flight crewmember must carefully and properly perform his regularly or individually assigned duties.
Any intended or observed deviation from normal flight operation and/or standard operating procedures must be announced and acknowledged.
By confirming the receipt, the crewmember concerned becomes responsible for the execution of the assigned task. After checking the necessary parameters, he acts accordingly.
The crewmember having assigned the task has to follow up on the proper task execution as assigned or requested.

8.10.3.4 Monitoring and Supervision

In addition to his primary tasks each member of the flight crew has to monitor the flight progress and supervise the actions of other crewmembers.

8.10.3.5 Role of PF/PM

The job sharing in the cockpit requires a clearly defined assignment of tasks to PF and PM; the aim is to guarantee that the full attention of PF is concentrated on the primary task of piloting the airplane.

PF focuses his attention in particular on:

- Control of airplane
- Observance of SOPs
- Compliance with flight safety aspects
- Altitude and speed restrictions
- Airspace observation
- Preparation of airplane for the individual segments of the flight procedures
- Correct use of checklists.

PM focuses his full attention in particular on:

- Monitoring and cross checking flight progress
- Assistance and supervision of PF
- Challenging Deviations
- Airspace observation
- Monitoring airplane systems
- Operating airplane systems in accordance with PF instructions.
- R/T communication and correct use of checklists.
- Setting, identifying and checking navigational aids according to the instructions of PF Keeping the necessary flight records.

Task assignment to PF and PM shall be observed in a very strict manner. For instance, PF shall unnecessarily intervene in handling of R/T communication; neither shall the PM set navigational aids without consulting PF. Whenever the Captain, with due consideration of all relevant circumstances, decides that any phase of flight (i.e. take- off, landing) may be critical, he shall assign himself as PF. If at any portion of the flight, the Captain believes that it will be safer course of action to take over controls of the airplane he shall do so, even if the Copilot originally had been assigned as PF.

8.10.3.6 Task Sharing

The PF must focus his attention primarily on the control of the airplane. Whenever other activities or special events may prevent the PF from fulfilling this task, he shall hand over to the PM with the call-out 'You have control'. The PM shall confirm takeover with the reply 'I have control'.
The PM has to assist the PF, by e.g.

Supervising the PF Performing R/T

Copiloting "For e.g. assisting the PF by executing the pilot's requests for headings, courses, NAV frequencies, etc." During manual flight all inputs to the auto flight control units must be performed by the PM when commanded by the PF. During auto flight, all inputs to the auto flight control units must be performed by the PF.
Note: For FMS task sharing refer to OM-B.

8.10.3.6.1 Philosophy for the use of Checklists

- The use of checklists is mandatory for all phases of flight. Reciting the checklist from memory is strictly forbidden except for Non-Normal or Emergency checklist recall items.
- On ground, the CAPTAIN shall call for all checklists up to and including before takeoff and after landing checklists.
- PF will call for all other checklists in flight up to and including the landing checklist.
- After reading any checklist, the crew- member reading it shall call the checklists Name followed by the word Completed, as follows: (AFTER TAKEOFF/CLIMB CHECKLIST COMPLETED)
- If a checklist is interrupted for any reason, the checklist must be restarted from the beginning.

Checklist Priority

- In all cases ECAM Actions shall always be performed immediately, in accordance with FCOM procedures.

ECAM Actions shall be followed by NORMAL then ABNORMAL CHECKLISTS during takeoff and by ABNORMAL then NORMAL CHECK LISTS during approach.

8.10.4 Policy for Use of Automation during Flight

In general there are 5 levels of automation, irrespective of the type of airplane:

1. **Managed Automatic**
   - The airplane is operated by use of autopilot and auto thrust with inputs from the FMS as programmed or modified by the pilots (Lateral NAV / Vertical NAV).
   - The objective is to provide assistance to the pilots, by freeing the PF from routine handling tasks and thus giving him time and resources to assess the overall operational situation.
2. **Selected Automatic**
   The airplane is operated by use of autopilot and auto thrust with inputs from an auto-flight control unit as selected by the pilots, e.g. speed, heading, vertical speed.
   The objective is to allow deviations from the programmed FMS profile to meet operational requirement.
3. **Managed Manual**
   - The airplane is operated by use of manual flight control inputs with or without auto thrust. The pilot follows the flight director indications generated by the FMS as programmed or modified.
   - The objective is to provide the pilot flying with adequate attitude or flight path orders with the flight director symbols so as to facilitate accurate hand-flying of the airplane.
4. **Selected Manual**
   - The airplane is operated by use of manual flight control inputs with or without auto thrust. The pilot follows the flight director indications as selected by the pilots on an auto flight control unit.
   - The objective is to allow deviations from the programmed FMS-profile while hand-flying the airplane.
5. **Basic Manual**
   - The airplane is operated by use of manual inputs. The pilot controls altitude, heading, speed and positions by applying attitude and thrust as required.
   - The objective is to maintain the desired flight path, while automatic guidance is not available or not appropriate/adequate.

The auto flight system shall be operated in such a way that optimum benefit is achieved from its capabilities. Examples for optimum benefits are:

- Reduction of workload,
- precision of navigation,
- availability of protection modes,
- passenger comfort,
- economic flight

Flight Crew shall use the maximum automation capabilities of their auto flight system to get the abovementioned benefits, especially in heavy traffic airspaces and airports such as (CDC, FRA, LGW, LHR…)

Levels of Automated Flight I

	AP	FD	A/THR	FMS-GUIDANCE
MANAGED AUTOMATIC	ON	ON	ON	YES
SELECTED AUTOMATIC	ON	ON	ON	NO
MANAGED MANUAL	OFF	ON	ON/OFF	YES
SELECTED MANUAL	OFF	ON	ON/OFF	NO
BASIC MANUAL	OFF	OFF	ON/OFF	NO

Levels of Automated Flight II

	AUTOMATIC	MANUAL
MANAGED	AP on A/THR on FMS Guidance	AP off A/THR optional FMS Guidance by FD
SELECTED	AP on A/THR on Selected Guidance	AP off A/THR optional Selected Guidance by FD
BASIC	-----------------	AP off A/THR optional no FMS/FD Guidance

Note: For limitations of the auto flight systems refer to AFM-LIM-22.

8.10.4.1 Operating Philosophy

Refer to OM-B

8.10.4.1.1 Auto-Flight System Monitoring

The monitoring of the Auto-Flight system by:

- Cross-checking the status;
- Observing the result of any change;
- Supervising the resulting guidance and aircraft performance;
- The use of appropriate level of automation.

8.10.5 Personal Safety Measures

In order to prevent personal accidents with cars or other movable equipment on the ramp, it is mandatory to wear the conspicuous yellow warning vest available on each aircraft. It must be worn during day and night when leaving the airplane for a walk-around or visual inspection.

8.10.6 Sterile Cockpit Policy

Refer to 8.3.12. Admission to Flight Deck

8.10.7 Selection of Runway

For take-off and landing the runway which gives the best safety margin under prevailing conditions shall normally be used, paying due regard to all relevant factors such as approach and landing aids, ATS requirements, etc.
For conservative performance calculation during take-off; wind direction and velocities expressed as light and variable shall be considered as 5 knots tailwind.
When practicable, take-off and landing shall be performed into the wind, especially when reduced braking coefficients exist (e.g. wet runway).
The tail-wind component for take-off and landing shall not exceed the values specified in the OM-B; due consideration, however, shall be given to the runway condition and the braking action to be expected.
Company tail wind limit is 10kts.

Note: Attention is drawn to the fact that the required runway length increases rapidly with increasing tailwind. It is therefore important, especially for landing on marginal runways, that the threshold speed does not exceed the prescribed speed for the configuration concerned. It may be necessary to avoid a landing under marginal crosswind or tail-wind condition after consideration of local conditions such as the length or width of the runway, its condition, and surrounding obstacles**.** The steady crosswind component for take-off and landing shall not exceed the values specified in the OM-B; due consideration, however, shall be given to the runway condition and the braking action to be expected.

Note: The crosswind capability increases with higher landing weights and speeds. As gusts are normally of short and rare occurrence, gusts exceeding crosswind limitation shall be considered whenever judged operationally significant.

Whenever take-off is limited by field length or obstacles, pilots should use the minimum line up distance possible. If these factors are not limiting, pilots should refrain from sharp turns during line up in order to avoid unnecessary stress on wheels and tires.
It is prohibited to take-off/land on a runway with a braking coefficient of 0.25 and less (Poor).

8.10.8 Clearance from Runway

An airplane shall be stopped not closer to the runway than at the holding position. During low visibility operations CAT II or III holding position markings and signs shall not be crossed without clearance. Lighted stop bars shall never be crossed. In the absence of such markings or visual aids the airplane shall be held at least 70 meters clear of the active runway.

8.10.9 Positive Identification of Runways

It is of vital importance that **both pilots** are fully aware of their location on the terminal or ramp and to prevent any risk of being in the wrong position, or on the wrong runway.

8.10.10 Positive Identification of Aerodromes

At certain locations the proximity of adjacent aerodromes, the presence of multiple runways, or the proximity of highways paralleling a runway, may create confusion and result in a landing at the wrong aerodrome or on the wrong runway, especially in darkness or conditions of reduced visibility.

In order to preclude such an incident which may have serious consequences, Captains shall take all measures to ensure positive identification of aerodrome/ runways such as:

- Strict adherence to standard approach procedures using the available instrument landing aids, regardless of weather conditions, down to the final stages of the approach. No short cuts shall be attempted which would entail loss of radio navigational guidance
- When conducting radar vectored approach a cross-check using available radio aids shall be made to determine whether the runway ahead is the correct one.
- When conducting an approach subject to maintaining VMC or a visual approach the pilot shall be thoroughly familiar with the aerodrome and the surrounding terrain, and ceiling and visibility shall be such that positive identification of the aerodrome/ runway is possible without difficulty. Available navigation aids shall be used to the fullest extent.

8.10.11 Noise Abatement

At many locations the close proximity of aerodromes to densely populated areas has created considerable problems resulting from noise by airplanes landing and taking off. In many instances this has led Air and State authorities to enforce noise abatement rules. These are published in (Route Information Manual) as appropriate.

Pilots shall take all possible measures during take-off and landing to ensure that noise created be kept to a minimum and shall comply with relevant noise abatement procedures and ATC instructions. Safety to flight operations shall always take precedence over compliance with noise abatement rules and the final decision shall always rest with the Captain.

At aerodromes where the preferential use of specific runways is prescribed pilots should normally use the preferential runway for landing or take-off, provided aircraft limitations are not exceeded (see OM-B)

8.10.12 Abnormal (Non-Normal) & Emergency Procedures and Checklists (E.G. QRH) Refer to FCOM-PRO-ABN-90.

Abnormal procedures contain actions which are necessary to cope with an impending or effective failure of any airplane system or component, or which are necessary to protect the airplane and its occupants from serious harm.
These actions are presented in the QRH, which are provided in booklet form in each cockpit.
When the necessity arises to apply an abnormal procedure it is the obligation of the Captain to identify the applicable procedure and it may be appropriate to change PF designation during progress of flight. For this decision he must take into consideration the complexity of cockpit duties, the necessity to supervise actions, the capacity and proficiency of crewmembers, and the workload arising from flight progress.
An abnormal/emergency procedure must only be commenced when PF is in full control of the situation, not below 400 feet during takeoff, and therefore it is initiated by PF.
Actions designed to contain the failure i.e. ECAM actions, shall only be accomplished after flight path control is achieved and can be maintained.
Actions designed to secure or reconfigure the inoperative systems i.e. Secondary actions, shall only be accomplished after flight path control is achieved and can be maintained, Primary actions have been completed and the aircraft is above the applicable minimum flight altitude.
Abnormal operation is non-routine. Therefore all actions are announced loudly before being performed. Announcement is either made by memory (memory actions) or by reading from the procedure presentation (booklet or screen). Execution of a challenged action is confirmed by the appropriate response. This challenge/response principle assures that all crewmembers are aware of progress and status.
Each CM must be familiar with the contents of abnormal procedures in order to execute his duties in proper sequence and to act efficiently. Each action must be mastered by the designated CM. Pilot actions must be mastered by both, CM1 and CM2, irrespective of the designation in the abnormal list.

Failure Handling Sequence:

- Fly the aircraft
- Silence the warning
- Identify failure/abnormality
- Ask for and execute checklist
- Refer to OM-B for relevant fleet type.

Pilot execution of abnormal / non-normal and emergency procedures shall ensures a crosscheck and verbal confirmation by the two flight crewmembers (dual response) occurs before the actuation of any critical aircraft system controls. Such guidance shall identify critical systems, as defined by the OEM, and address, as a minimum:

- Engine thrust levers;
- Fuel master or control switches;
- Engine fire handles or switches;
- Engine fire extinguisher switches;
- IDG/CSD disconnect switch.

8.10.12.1 Commitment Altitude

- At critical airports, where obstacle clearance, during a one-engine inoperative Go-around/Missed Approach at structural landing weight, cannot be assured, a Commitment Altitude, by raising the MDA/DA, will be determined.
- A Commitment Altitude is an altitude, below which obstacle clearance criteria cannot be guaranteed, in the event of a one-engine inoperative Go-around/Missed Approach, at Structural Landing Weight.
- Commitment Altitude's, when required, are listed in the Jeppesen manual, at the beginning of each airport plate on a light green colored page.

8.10.12.2 Overweight Landing

According to the Aircraft Maintenance Manual, Overweight Landing can be categorized as follows:

a) **Overweight Landing:** An overweight landing is a landing with an aircraft weight more than the Maximum landing Weight (MLW) and :
   - a vertical acceleration (vertical G) equal to or more than 1.7 g and less than 2.6 g at aircraft Center of Gravity (CG), or
   - A vertical speed (Vs) equal to or more than 6 ft./s and less than 13 ft./s (780 ft./min).

b) **Severe Overweight Landing:** A severe overweight landing is a landing with an aircraft weight more than the Maximum landing Weight (MLW) and:
   - a vertical acceleration (vertical G) equal to or more than 2.6 g at aircraft Center of Gravity (CG), or
   - A vertical speed (Vs) equal to or more than 13 ft./s (780 ft./min).

Up until the point of commencing the takeoff, it is not permissible to plan to land at a weight which exceeds either the maximum structural or performance limited landing weight.

Prior to departure, the predicted landing weight should be calculated based on the actual takeoff weight and the anticipated trip fuel burn. The performance limited landing weight should be calculated based on the ambient conditions forecast for the expected time of arrival.

For planning purposes, plan to land at Maximum Landing Weight minus 500 kg for tankering sectors in order to allow a margin for LMC and in case of fuel savings en-route (refer to 8.1.7.2.8 Fuel Transportation (Tankering).

If during the course of the flight it becomes evident that the aircraft will arrive at the destination at a weight which exceeds either the maximum structural or performance limited landing weight, appropriate action should be taken to modify the flight profile so that the landing weight is reduced to ensure that limit weights are not exceeded. It is recommended to:

- Fly at speed faster than ECON speed
- Fly at lower then optimum flight level
- Perform an early descent, use of speed brake or holding
- Request to extended track miles from the ATC
- Take landing configuration as early as possible

Note: Commercial expediency in itself is not a justification to land overweight.

An overweight landing should only be performed if it is considered safe. If a decision is made to land overweight, the FCOM PRO-ABN-80-overweight landing checklist and procedures must be followed.

On all aircraft, if a landing is made at a weight in excess of the structural maximum landing weight,

An entry shall be made in the Aircraft Technical Log, which includes the actual landing weight, flap setting and estimated rate of descent at touchdown.
In abnormal/non-normal or emergency situations, or when the QRH calls for an immediate landing, it is permissible to land at a weight which exceeds the maximum structural landing weight.
The following situations are typical of those in which it may be considered that an overweight landing is justified:

- A malfunction that renders the aircraft un-airworthy or unable to continue the flight according to plan;
- A condition where safety could be compromised unless an expeditious landing is carried out;

or

- Serious illness of crew or passengers that requires immediate medical attention.
- The following factors should be included in the assessment as to whether to land overweight, and if so, by how much:
- Familiarity with the runway to be used.
- Weather - IMC or VMC, windshear, turbulence, OAT, crosswind, tailwind, precipitation.
- Runway - elevation, length, slope, obstructions (at both ends), width and surface conditions.
- Available approach procedures and the use of auto land.
- Aircraft condition - number of engines operating, serviceability of systems, flaps, etc.
- The possibility of tire failure.
- Pilots’ physical condition - limitations, fatigue.

8.10.12.3 Emergency Landing

Refer to QRH-ABN-25-EMER LANDING

8.10.12.4 Emergency Communications

The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC actions with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.
Refer to Jeppesen 15.2.2 for complete procedures of emergency communications.

8.10.13 Flight with One Engine Inoperative

8.10.13.1 Engine Failure on Takeoff After V1

In the event of an engine failure the flight crew shall establish a safe flight path and land at a suitable aerodrome (e.g. departure aerodrome, take-off alternate). ATC must be notified as soon as practicable and must be informed about the intentions.
The engine failure procedure as contained in OM-B should be followed. Crewmembers must be aware that GPWS warnings/alerts may be generated along the engine out flight path even if the engine failure occurred considerably after V1 and even when the published EOSID is precisely followed.
Performance and terrain permitting two alternatives may be considered:

- Departure route according to the ATC clearance.
- In favorable weather conditions: Any safe visual flight path.

8.10.13.2 Continuation of Flight with One Engine Inoperative

When an engine of an airplane fails or is shut down in flight as a precautionary measure to prevent possible damage, ATC, crewmember, passengers and the Company must be notified as soon as practicable and must be informed regarding the progress of the flight. The following action must be taken:

8.10.13.2.1 Two-Engine Airplanes

Normally a landing shall be made at the nearest suitable aerodrome, at which a safe landing can be made.

8.10.14 Depressurization Strategy

European Alps Area Depressurization Strategies

- The European Alps extend from South-Eastern France through Switzerland, Austria and northern Italy.
- They are considered to lie within a 'box' bounded by latitudes 43 ° N and 48 ° N and longitudes 005 ° E and 014 ° E.
- The 'box' is divided into three sections, each with a different procedure..

Procedures

Section 1 - Between longitudes 005 ° E and 009 ° E.

- Flight is north of latitude 46° N Initially descending to the North to FL 180.

Track as required to Zurich (LSZH), Basel-Mulhouse (LFSB) or Geneva (LSGG).

As soon as practical, descend to the higher of Grid MORA and 10,000ft.

- Flight is south of latitude 46° N Initially descending to the south to FL 180.

Track as required to, Nice (LFMN), Milan (LIMC), Lyon (LFLL) or Torino (LIMF).

As soon as practical, descend to the higher of Grid MORA and 10,000ft.

Section 2 - Between longitudes 009 ° E and 011 °E.

- Flight is north of latitude 46° N Initially descending to the north to FL 160.

Track as required to Zurich (LSZH), Stuttgart (EDDS) or Munich (EDDM).

As soon as practical, descend to the higher of Grid MORA and 10,000ft.

- Flight is South of latitude 46° N Initially descend to the south to FL 140.

Track as required to Milan (LIMC), Pisa (LIRP) or Rome (LIRF).

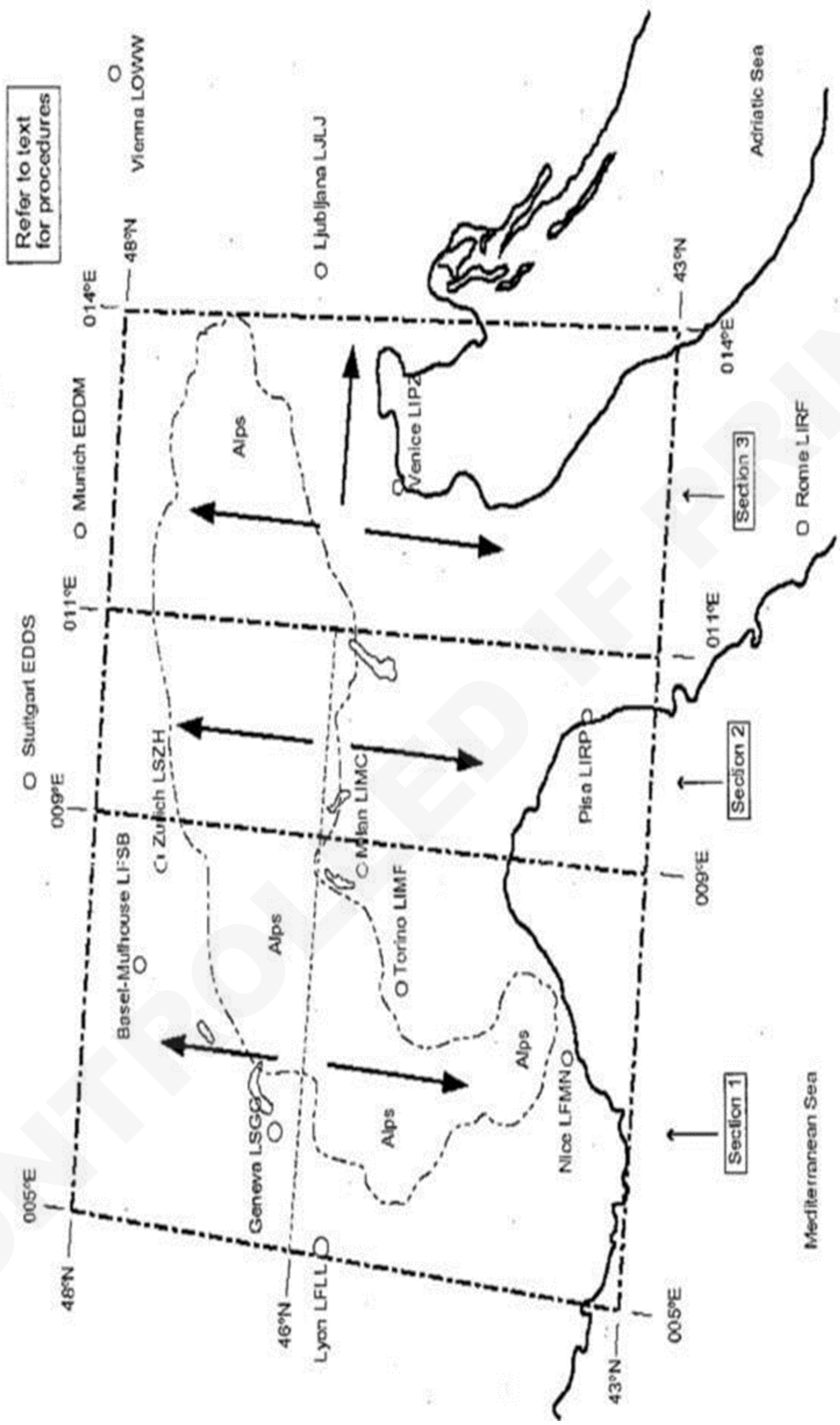
As soon as practical, descend to the higher of Grid MORA and 10,000ft.

Section 3 - Between longitudes 011 ° E and 014 ° E.

- For all latitudes,

Initially descend to the north, east or south to FL 140.

Track as required to Munich (EDDM), Vienna (LOWW), Ljubljana (LJLJ) or Venice (LIPZ)
As soon as practical, descend to the higher of Grid MORA and 10,000ft.


Refer to text for procedures
Vienna LOWW
Ljubljana LJLJ
Adriatic Sea
48°N
014°E
43°N
014°E
Munich EDDM
Alps
Venice LIPZ
Section 3
Rome LIRF
011°E
011°E
Stuttgart EDDS
009°E
Zurich LSZH
Milan LIMC
Pisa LIRP
Section 2
009°E
Basel-Mulhouse LFSB
Alps
Torino LIMF
Alps
Alps
Nice LFMN
Section 1
Mediterranean Sea
Geneva LSGG
005°E
48°N
46°N
Lyon LFLL
005°E
43°N

8.11 Standard Operating Procedures

8.11.1 Introduction

In order to compensate for the reduction of the human ability to perform and assimilate, it is essential to organize work in the cockpit for the crew individually and as a team. For this purpose, standardized rules must be established; these rules and procedures are referred to as SOP's. They are required to ensure safe piloting for the aircraft and the operation of its systems. SOP's increases safety, decrease cockpit work load, standardize the operation and reduce training requirements and costs. It is obvious that SOP's cannot cover each and every situation, no regulation or policy is substitute for the exercise of good judgment.
SOP's cannot be a substitute for awareness. Procedures or Manuals contents cannot replace the exercise of good Judgment. Under routine conditions, strict compliance with all policies, rules, regulations and procedures is required. In emergency, Instructions become guiding principles; it is the PIC authority to apply them when and as far as the situation permits.
This should not be construed to divert from the Manual's instructions, unless the situation in hand is not covered by procedures. Flight conditions may necessitate the PIC to temporary disregard instructions in favor of exercising his/her authority, if it is in his/her momentary judgment done for the sake of safety. Basically we are applying AIRBUS SOP "OM-B" for all our fleet except as mentioned for the specific type.

8.11.1.1. All Nesma Airlines operations shall be in compliance with, operating limitations and performance, as defined by the original equipment manufacturer (OEM) and established by the State of Registry for each aircraft type used in operations.

8.11.1.2. Standard callouts during all phases of flight must be done by PF and PM.

8.11.2 Aircraft Preparations

1. Flight preparation may start before the aircraft is released by Maintenance. However, a complete check is required once the aircraft is released. In order to prolong APU life and optimize bleed output, it is recommended to keep ground power connected to the aircraft to just before final preparations.

   Use of APU on ground:
   - The use of APU shall be limited on ground (for fuel, maintenance cost and emission reasons) without compromising on passenger comfort.
   - After landing, the use of APU should be delayed if taxi time permits and one engine taxi in procedures is not followed.
   - Whenever, GPU is not available, APU should not be started earlier than 60 minutes before scheduled departure time.
   - APU is recommended to be used 15 minutes before scheduled departure time.
   - APU should not be turned off before passenger disembarkation
2. The PM shall carry out the Preliminary cockpit preparation and the external checks, special attention is needed to include critical items such as:
   - Pitot/ Static ports (not damaged or obstructed)
   - Locked or disabled flight controls
   - Presence of frost, snow or ice on critical surfaces.
   - Aircraft structural integrity (damage)
   - Exterior Security inspection
3. The PF shall carry out the cockpit preparation which includes FMS set up and must be cross-checked by the PM and cockpit security inspection.

4. Cabin crew will complete the aircraft interior Emergency Equipment and Security inspections
5. Final cockpit preparation is to be performed by the Captain. When a crew change takes place, the outgoing crew shall carry out the Shutdown / Parking checklist (Normal Check List modified by Nesma Airlines, Refer to "Forms" Section). The joining crew should carry out full cockpit preparation and complete the preflight checklist.
6. The PM should cross check the fuel on board with fuel receipt figures.
7. **Transponder**
   Select SYS 1 (refer to FCOM-DSC-34)
8. **Radar System**
   Select Radar system for take-off (refer to FCOM-DSC-34).
9. The flight crew shall ensure availability, accessibility, and serviceability of the flight deck emergency systems according to cockpit preparation check list (QRH 3.01) and emergency equipment according to the aircraft LOPA, which as minimum , shall be conducted by the flight crew prior to the first flight:
   - **i)** Of the flight crew on aircraft during the duty period;
   - **ii)** On an aircraft after it has been left unattended by a flight crew for any period of time.
10. Either on conducting a passenger flight or transporting supernumeraries in the passenger cabin with cabin crew, the availability, accessibility and serviceability of the aircraft cabin emergency system and equipment shall be included in the preflight inspection. This inspection shall be conducted by the flight crew or, delegated to the cabin crew prior to the first flight of the flight crew on an aircraft during a duty period, after a new cabin crew has assumed control of the aircraft cabin and also after an aircraft has been left unattended by a flight crew or cabin crew for any period of time. Supernumeraries could assist but not interfere with qualified crewmembers in the performance their duties.

Note: The Security and the Emergency equipment inspections are conducted prior to each originating flight of the day.

8.11.3 Safety Belt and Shoulder Harnesses

8.11.3.1 Flight Crew

Flight crews must keep their safety belt fastened when at their station. In addition shoulder harnesses must be fastened

- During taxi, take-off and landing
- During climb phase, from take-off till top of climb
- During descent phase, from top of descent till landing
- During flight when deemed necessary in the interest of safety (e.g. turbulence, emergency). This also applies to a person occupying an observer seat.

8.11.3.2 Cabin Crew

Seat and shoulder harnesses must be fastened:

- During taxiing, take-off, climb, final approach and landing
- During flight, if so instructed by the flight crew. Exceptions:
- Safety checks
- Safety related announcements and demonstrations to passengers
- Cabin Reports
- Approval of the Pilot in Command.

8.11.4 Display of Lights

Navigation lights must be 'ON' when the airplane is manned for the purpose of ground maneuvering, and taxiing prior to towing or engine start during day and night conditions .
Beacon (Anti-collision lights) must be operated at any time an airplane is in operation, e.g. during flight and while taxiing. In addition, they must be operated before starting engines until the engines have been stopped.
Strobe lights must be switched on when entering a runway and during the flight operation; they are switched off when leaving a runway. In case of LVP enforce strobe lights, must be switched on during taxi
Taxi lights must be on while taxiing during day or night operations.
Landing / Turn Off lights must be used as described in the OM-B; they must be switched on when operating at altitudes below 10.000 ft and if deemed necessary when operating in areas of known inadequacy of ATS or birds activity; they may also be used for identification purposes with aerodrome control and as urgency signals. During fog, snowfall, etc. landing lights may reduce visibility and produce visual illusions; in this case they should be used appropriately. When lights are used while taxiing, care should be taken not to blind other aircraft or Marshaller.

8.11.5 Engine Start

Starting an airplane engine can produce a hazard to ground personnel and objects. Since the visibility from the cockpit is limited, an engine start on the ground shall normally be conducted with the aid of ground personnel. Communication procedures concerning engine start and the cooperation with ground personnel are outlined in section FCOM (SOP).

8.11.6 Pushback or Towing

Prior to pushback or towing, the required clearance shall be obtained in accordance with the procedures outlined in section FCOM (SOP**).**and published in Jeppesen (Route Manual). In addition, clearance shall be obtained from ground personnel as outlined in FCOM.

8.11.7 Jet Blast

Due to congested ramps and the potential damage from jet blast there is a risk of taxi incidents and damage. The Captain must therefore take great care to judge the situation around his aircraft, especially as to the distance from other aircraft and objects. Handle the thrust levers, particularly on initiating taxi, with caution taking into consideration jet blast. On most aircraft it is not possible to see the wing tip in the normal seated position during taxi, select an appropriate taxi speed, taking into consideration other traffic and the level of maneuvering required.

8.11.8 Ramp Signals and Guide Lines

In order to facilitate the safe taxiing of the airplane close cooperation between the pilot and ground personnel is required.
Note: for marshalling signals (see Jeppesen Manual). Taxi guide lines may vary from aerodrome to aerodrome and do not always and for all types of airplanes ensure adequate clearance from obstructions, especially in congested areas.
Apron guide lines and marshalling signals are intended to aid pilots when taxiing on the apron. Thus, even when guided by apron guide lines or by marshalling signals, the Captain shall exercise utmost caution as he is responsible for the safe maneuvering of the airplane. If there is any doubt about adequate clearance from obstructions, ground assistance should be requested.

8.11.8.1 Taxi

Proper attention and callout should be given by both pilots to maintain adequate object clearance during taxi; PF should concentrate on steering the airplane, while PM should concentrate on navigation and has to give advice from taxi chart, including heading information and visual cues to be expected. Surface markings must be observed. If there is any doubt about the position, the airplane shall be stopped and ATC or apron control shall be informed.
Holding position markings and signs must not be passed without clearance. Lighted stop bars must not be crossed (for exceptions refer to Jeppesen). In the absence of such markings or visual aids the airplane shall hold at least 70m clear of the active runway. Before take-off the flight crew must verify by all possible means that the airplane is lined up at the correct runway and takeoff position. When entering any parking or holding position PM calls out as soon as possible the markers, signs, indicators, etc. he has identified for the airplane type concerned. PF confirms verbally.

8.11.9 Takeoff

8.11.9.1 Take-off Data

Prior to every departure, the take-off data must be calculated, crosschecked and inserted in the FMGS;

- This calculation is performed by PF and must be crosschecked by PM.
- Speeds shall be set using the Speed bugs and inserted in the FMGS.
- Callouts during take-off shall be performed as prescribed in the FCOM.

Note: Prior to take-off the Captain must re-check weather and the runway conditions to ensure a safe take-off and departure.

8.11.9.2 Reserved

8.11.9.3 Take-off Briefing

All briefings shall reflect the appropriate actions by PF and PM. Prior to engine start a briefing shall be conducted by the PF. This should be as short as the situation permits, but must include the following:

- One engine out climb-out procedure and EOSID (if applicable)
- Use of automation
- Fuel status
- Low visibility procedures
- Noise abatement climb-out
- Confirmation of actual departure procedures to ascertain familiarity with the ATC clearance
- NOTAMS
- Special aspects of the particular take-off such as critical take-off weight, local traffic, and adverse meteorological conditions.
- Specify which runway and intersections to be used and the expected taxi routings and expected taxi routing, including points of high risk of incursion and airport hot spots. Also, addressing relevant taxi progress monitoring and/or verbal callouts after taxi way passage and taxi speed during LVP
- Review the runway conditions and any weather related factors
- Specify the Take-Off thrust setting and configuration to be used
- Review technical status and any MEL/CDL items and their effect upon handling or performance
- Rejected Take Off procedures.
  Type of SID and charts
- Prior to takeoff review and verify;
  1. ATC clearance and departure instructions shall be made by the PF, highlighting any changes from previous briefings.
  2. Take-off data shall be verified, taking into account the actual runway being used. Authorized persons occupying the flight deck jump seats shall be briefed before departure and approach, on the smoke ban, sterile cockpit procedure, emergency exits, use and location of oxygen and emergency equipment.

8.11.9.3.1 Takeoff Briefing Script

Special consideration was incorporated in the following Takeoff Briefings;

1. Initial actions and/or profile during the Takeoff phase for important abnormal procedures, such as the Engine Failure, Engine Fire and RTO.
2. Procedures and regulations requirements for the National and International regulatory during the Pre-departure and Takeoff phases, such as the reminder for the briefings on the Technical Status, SID, EOSID, Noise abatement or the need for necessary items such as the Anti- ice or Ignition.
3. The minimum required wordings in order to have quieter Cockpit but at the same time, meeting the above requirements.

Note: The titles (Phase one: Before T/O until below 400 feet and Phase two: 400' and above) are not part of the briefing, they are to simplify the briefing sequence.

8.11.9.3.2 T/O Briefing for A320

- **Aircraft technical status.**

Phase one: Before T/O until below 400 feet

- **Left/Right hand seat T/O. Standard call out,**
- Anti- ice.
- Ignition. **Is / are required**
- Noise abatement.

- **Any malfunction before V1, I/YOU will call STOP or GO**
- In case of **STOP**, I / You will take the necessary stopping action and ECAM action on my / your command.
- In case of **GO**, no action to be done below 400', Except for :
  - TOGA (If necessary)
  - Gears up
  - Canceling the Aural Warning.

Phase two: 400' and above

- At 400', we **Identify** "Failure" and we carry ECAM action, for :
- Engine Fire until second Agent discharge.
- Engine out profile: We accelerate to 1500', clean up, after "Green Dot" continues climb and ECAM action until STATUS, start APU and then "After T/O" checklist.
- SID "Briefing".
- EOSID if applicable.

8.11.9.4 Commencement of Take-Off Roll

The take-off should be commenced at the beginning of the runway. Intersection take-offs are permitted, provided due consideration is given to take-off performance limitations and local noise abatement requirements. To reduce noise and in the interest of expediting traffic, rolling take-offs are recommended whenever possible. Flight crews should refrain from sharp turns during line-up in order to avoid unnecessary stress on wheels and tires.

8.11.9.5 Callouts during Take-Off Roll

Refer to FCOM for details.

8.11.9.6 Normal Takeoff Procedure (All Engines- Including Noise Abatement)

The following procedure shall be used for takeoffs
Procedure A: Noise relief during the latter part of the procedure.

Takeoff to 1500 feet AAL	• Takeoff Thrust • Takeoff Flap • Climb at V2 +10 to 20 kt
At 1500 feet AAL	• Reduce Thrust to Climb Thrust
1500’ AAL to 3000 feet AAL	• Climb at V2 +10 to 20 kt
At 3000 feet AAL)	• Accelerate as required.

8.11.9.6.1 Normal Takeoff Procedure (All Engines Including Noise Abatement)

The following shall be used for takeoffs **Procedure B**: Noise relief during the part of the procedure close to the aerodrome.

Takeoff to 1000 feet AAL	➢ Takeoff thrust ➢ Takeoff Flap ➢ V2 + 10 to 20 Kts
At 1000 feet AAL	➢ Accelerate to flaps retraction speed (F) ➢ Retract flaps / Slats on schedule ➢ Reduce to climb power ➢ Climb on Green Dot speed
At 3000 feet AAL	➢ Accelerate smoothly to Enroute climb

8.11.9.6.2 Turns after Take-Off

Turns up to a bank angle of 15° may be executed until 1000 ft.
Turns up to a bank angle of 20° may be executed between 1000 ft and 3000 ft. Turns up to a bank angle of 25° may be executed above 3000 ft.
Minor heading changes (up to 10° bank) are not considered to be a turn.
Note:
For the above maneuvers the minimum speeds as per OM-B shall be observed.

8.11.9.6.3 Initial Communication with ATC

Initial communication with ATC should be established as required by SID, or as instructed, but not before 400ft AGL.

8.11.9.7 Go / No-go-Decision

The decision to reject a take-off rests solely with the Captain.
He shall announce his decision to reject the take-off by the command: "Stop". If CM 2 is performing the take-off, CM 1 takes over control with the command: "Stop". The reasons justifying a rejected take-off diminish with increasing speed. Once the RTO has been initiated the procedure must be executed completely. For details refer to OM-B. Because a rejected takeoff is a critical maneuver, the Captain calls out, performs the stopping actions, using the following procedures:

1. The Captain calls stop and applies full brakes while simultaneously closing the throttles. If the automatic brakes fail to operate, the Captain shall stand on the brakes until the airplane stops.
2. Apply maximum allowable reverse thrust until stop, ground spoilers will deploy automatically.
3. Apply maximum braking. The automatic brakes, (ABS), will apply maximum wheel braking unless the pilot has overridden the system.
4. Maintain directional control with rudder and brakes.
5. If anti-skid is inoperative, select reverse first then apply brakes in a manner to prevent wheels from locking? If a skid is detected, release pedal pressure, and then reapply to a lesser degree.
6. Perform appropriate checklist when aircraft stops.
7. Check brake temperature indication.

The Captain should clearly announce his/her RTO decision, whether it is to continue or reject. Captains are encouraged to be go-minded. To this end, Captains may discontinue the takeoff below 100 knots for any abnormality, such a decision should not be considered as an acceleration-STOP. Above 100 knots, rejecting a takeoff may lead to a hazardous situation.

8.11.9.7.1 Items for Reject

Refer to FCTM-AEP-MISC

8.11.9.7.2 Special Procedure For Supervision Flights

The Captain may transfer the decision to reject a take-off to the Captain under supervision. He shall give due consideration to the proficiency status of the Captain under supervision and the prevailing take-off conditions.
On supervision flights the RTO shall be executed by CM 1. If the Captain occupying the right seat takes over control during a RTO he shall call out: I have control.

8.11.9.7.3 Procedure for Training Flights

The training captain, as the Captain has the prerogative to transfer the responsibility for the decision to reject a take-off to the Captain under training for a specific takeoff or for all takeoffs during an entire duty period. He shall give due consideration to the proficiency status of the Captain under training and the prevailing take-off conditions.
On training flights the rejection of take-off shall still be executed by CM 1, since a Captain under training has already passed Captain's training and since the left seat position is laid out for the optimum handling of the airplane. If the Captain occupying the right seat takes over control during a rejection of take-off he shall call out: 'I have control'.

8.11.9.7.4 Engine Failure On Take-Off (After V1)

Refer to FCOM.

8.11.9.7.5 Engine Failure Procedure (EFP), When An Engine Fails At Or After V1 And Before The First Turning Point

1. Standard Engine Failure Procedure
   - **a)** Climb straight ahead or EOSID (extended runway centerline).
   - **b)** At 1500ft AAL (acceleration height), accelerate to minimum clean speed and follow the prescribed procedure leading to the 'designated fix' (in the procedure).
2. Non-Standard Engine Failure Procedure
   - **a)** Climb straight ahead (extended runway centerline), and:
   - **b)** At the point defined in the procedure, start turn (Left/Right) with a bank angle of 15^o (unless otherwise specified), and follow the prescribed procedure leading to the 'designated fix' (in the procedure)
   - **c)** At the acceleration altitude, accelerate to minimum clean speed

Notes:

(1) For the above maneuvers, the minimum speeds as per OM-B shall be observed.

(2) An EFP is classified as Non-Standard when:

- ➢ A turn starts before 1000ft AAL OR
- ➢ Acceleration height is greater than 1500ft AAL

(3) Non-Standard EFP will, in general, be designed only when there is a benefit of 1%, or more, of the MTOW

(4) No turn shall be initiated before the 'runway end' and the 'minimum height' before the start of turn, which shall be, at least, 400 feet.

8.11.10 Climb, Cruise and Descent

8.11.10.1 Climb

Non-Standard Engine Failure Procedure
Only published SIDs assure terrain clearance and compliance with other restrictions. The captain may, however, accept deviations from SIDs, provided:
Terrain clearance and compliance with other restrictions can be assured. If during any departure terrain clearance becomes doubtful, the flight crew shall take appropriate action and inform ATC accordingly. During any departure MEAs, MSA and MOCAs must be observed. Climb must be arranged so as to cross the point from which the higher MEA applies not below such altitude.

8.11.10.2 Conventional SID

Conventional SIDs are defined and described using conventional navigational elements (e.g. HDG, TRK, Radial, QDM, and DME) the designator on the chart is identical with the designator of the Nav Database.
Prior departure the flight crew must compare the FMS coding with the SID description. Navigational aids must be set accordingly. The term "conventional” must be added to the departure briefing. The SID in the NAV Database is programmed as closely as possible to the SID chart description.
FMS guidance may be used; however, tracking must be closely monitored by means of conventional navigational elements. Any deviations must be corrected by the PF.

8.11.10.3 RNAV Overlay SID

RNAV overlays SIDs are defined by way points with additional FMS instructions.
The SID in the NAV Database is programmed so as to match the SID chart description using special coding elements for the FMS. The designator on the chart is identical with the designator of the NAV Database. The description on the chart contains conventional navigation elements and in addition a GPS/ FMS/RNAV description with waypoints (e.g. A800' - DF051 - DF052).
Prior departure the flight crew must compare the SID designator from the chart with the selected SID from the FMS. Navigational aids should be set as appropriate. A plausibility check must be made by comparing FMS coding and NAV Display "ND" with the charted description of the RNAV SID. FMS guidance must be used. Any deviations by the FMS from the SID chart description must be corrected by the PF if considered relevant for safety reasons.

8.11.10.4 Rnav SID

RNAV SIDs are defined by way points with additional FMS instructions. The designator on the chart is identical with the designator of the NAV Database. The description on the chart contains a GPS/FMS/RNAV description with waypoints (e.g. PG274 - PG278 - NIBAR - NIPOR).
Prior departure the flight crew must compare the SID designator from the chart with the selected SID from the FMS. A plausibility check must be made by comparing FMS coding, description of the RNAV SID chart and NAV Display "ND".
The SID in the NAV Database is programmed so as to match the SID chart description using special coding elements for the FMS. FMS guidance must be used. Any deviations by the FMS from the SID chart description must be corrected by the PF if considered relevant for safety reasons.

8.11.10.5 Radar Departure

Radar departures are based on radar vectoring by ATC. In certain cases part of a SID may be based on radar vectoring as well.

8.11.10.6 No SID Departure

Where no SID is published and terrain clearance for initial climb to the first Enroute waypoint cannot be assured when proceeding direct to that waypoint, the Captain must take alternative measures to assure safe terrain clearance.
E.g. climb within the circling area or climb opposite to a published approach procedure may be considered.

8.11.11 Maximum Bank Angle

The maximum bank angle for normal operations shall not exceed 25°

8.11.12 Speed Control below 10,000ft AAL

1. A speed of 250 knots below 10,000ft AAL shall be observed for normal operations.
2. Exceptionally, at the request of ATC, a higher speed may be maintained below 10,000ft AAL, but must be reduced to 250 knots, or less, prior to descending below 5000ft AAL.
3. For higher altitude airports (i.e. Sanaa,), speed should be reduced to 250 Kts or less prior to descending below 10.000ft AAL.

8.11.13 Call-Out during Climb/Descent

PM shall call passing 1000ft before the cleared Altitude/Flight Level. This shall be acknowledged by the PF calling Checked.

- 1000ft prior to level off -One Thousand "Above/Below Alt./FL"
- Dual pilot response for ATC altitude clearance;
- "Double point" to altitude window (both pilots physically point to and confirm the new altitude set).
- Every 5000 feet descending and every 5000 feet climbing

8.11.14 Adherence to Level Assignments

As a safeguard against inadvertent reduction of vertical separation standards the cruising level(s) assigned by ATC or - in uncontrolled airspace - as selected in accordance with the applicable cruising level system shall be maintained as accurately as possible.

8.11.15 Cruise Level

A crosscheck that the assigned altitude is above the minimum safe altitude.

8.11.16 Flight below Minimum Altitudes during Climb and Cruise

Airplane proceeding in accordance with published departure routes are safe in respect of terrain and other restrictions on any level included in the departure route or otherwise assigned by ATC.
A crosscheck that the assigned altitude is above the minimum Safe En-route Altitudes published for subsequent segments of a departure route shall be observed by commencement of climb sufficiently in advance to ensure that the point from which the higher minimum safe en-route altitude applies is crossed not below such altitude.
During an off-route departure, level flight may only be accepted at or above the minimum sector altitude or minimum safe grid altitude. An airplane being radar vectored and positively identified may be flown below these altitudes if the pilot is able to monitor the airplanes position using the available radio navigational aids.

8.11.16.1 Point of Equal Time / Point of Safe Return

Where no suitable intermediate en route aerodromes are available and the fuel carried will not allow the airplane to return from the aerodrome of destination to the aerodrome of departure regarded as alternate, the following points shall be calculated in advance:

- Point of Equal Time (PET), and
- Point of Safe Return (PSR), if so required.

8.11.16.2 Strategic Lateral Offset Procedure

Under certain circumstances it is recommended to fly up to 2 miles right of track (i.e. doubtful ATC environment, avoidance of wake turbulence in RVSM airspace). The decision rests with the Captain.

8.11.16.3 Continuation of Flight

A flight may only be continued towards the aerodrome of intended landing if, according to the latest information available, the weather forecast for that aerodrome or at least one alternate aerodrome is above the applicable landing minimum.

8.11.17 Planning of Descent

Efficiency and economy in flight operations very much depend on a well-planned and conducted descent. The descent shall be performed as efficiently and smoothly as possible taking into account flight safety, local conditions, ATS procedures, and meteorological factors (turbulence, icing).
In order to obtain descent clearance in time, adequate advance notice should be given to ATC.

8.11.17.1 Descent

STARs and associated minimum altitudes assure terrain clearance and compliance with other restrictions. The Captain may, however, accept deviations from published STARs provided:

- Limitations given in this section are met
- Compliance with other restrictions can be assured.

8.11.17.2 Descent Briefing

Prior to starting any descent the flight crew must check terrain and applicable minimum altitudes related to the descent path. The PF must brief all flight crewmembers about restrictions during descent regarding the applicable minimum altitudes. If during any descent terrain clearance becomes doubtful, the flight crew must take appropriate action and inform ATC accordingly.

8.11.17.3 A. Maximum Permissible Rate of Descent

1. During descent down to 10.000 ft. above the minimum safe flight altitude, there are no limitations with regard to the rate of descent.
2. During descent below ’10.000 ft. above the minimum safe flight altitude’, the rate of descent shall, for safety reasons not exceed the following values:

Down to an Altitude of	Max. Rate of Descent
10.000 ft. above MGA / MEA	not specified
5.000 ft. above the terrain	5.000 ft. / min
4.000 ft. above the terrain	4.000 ft. / min
3.000 ft. above the terrain	3.000 ft. / min
2.000 ft. above the terrain	2.000 ft. / min
1.000 ft. above the terrain	1.500 ft. / min
Below 1.000 ft. above terrain	1.000 ft. / min

The Ground Proximity Warning System (GPWS) provides additional protection in various flight phases. Exception: Adherence to some published approach profiles may require a higher rate of descent than 1.000 ft. /min below 1.000 ft. AGL. In this case a rate of descent of up to 1.500 ft / min is acceptable provided the airplane is in a stabilized descent when passing 1.000 ft AGL.

8.11.7.3 B. Escape Maneuver When Potential Terrain Conflict Is Recognized

When potential terrain conflict with recognize PF must exercise a go-around procedure to clear off from the terrain.

8.11.17.4 Descent Below Minimum Safe En-Route Altitude/Minimum Safe Grid Altitude

Descent below the minimum safe en-route altitude/ minimum safe grid altitude to the minimum sector altitude may be made when approaching the navigation aid from which an approach-to-land will be conducted, provided the airplane's position can be accurately established as being within 25 NM from the navigation aid upon which the minimum sector altitude is based by:

- The use of a radio navigational aid or
- Positive radar control.

8.11.17.5 Descent Below Minimum Sector Altitude

When conducting radar vectored instrument approaches, clearance to descend below the minimum sector altitude may be accepted, provided the Captain is able to monitor the airplane's position using the available radio navigational aids. In certain instances the minimum sector altitude for a given sector may be higher than the minimum safe en-route altitude established for a particular route segment between fixes or for a holding area within that sector. In such cases descent below the minimum sector altitude down to the minimum safe en-route altitude is permitted, provided the flight is conducted along the respective route or within the holding area.

Definition: Minimum sector altitude is the lowest altitude which will provide a minimum clearance of 1.000 ft above all objects located in an area contained within a sector of a circle of 25NM radius centered on a radio aid to navigation.

8.11.17.6 Flight Below Minimum Safe Altitudes

In general no flight may be operated below published Mesa

For limiting portions of flight (e.g. shortcuts, radar vectoring off route etc) however a flight may be operated below published minimum altitudes when it is assured that following conditions are met:

1. **Flight below MEA/MHA/MSA down to MGA:**
   - Confirmed airplane position within applicable MGA Grid, and
   - Adjacent higher MGA must be respected when airplane position within 5 NM to grid boundary
2. **Flight below MEA/MHA/MGA down to MSA:**
   - Confirmed airplane position within applicable MSA sector
3. **Flight below MSA down to cleared FL/ALT by ATC:**
   - Confirmed airplane position within applicable MSA area, and
   - Radar vectored, and
   - terrain/obstacle clearance can be assured by use of appropriate charts
4. **Flight below MEA/MHA/MGA/MSA down to MRVA:**
   - Radar Vectoring Chart available and
   - Confirmed airplane position within applicable sector of Radar Vectoring Chart &
   - Radar vectored

8.11.17.7 Escape Maneuver When Potential Terrain Conflict Is Recognized

When potential terrain conflict is recognized during descent proceed for go around procedure and change heading to area of minimum safe altitude.

8.11.18 Approach and Landing

Every approach shall be planned and conducted in accordance with the procedures prescribed in OM-B and observing the limitations in respect of rate of descent and bank angle. This phase of flight specifically requires most accurate flying technique and highest attention of all flight crewmembers. Planning for an approach shall be done well in advance in order that pilots are well prepared for the expected approach procedures and that the Approach Chart is only required for quick references. It is, however, compulsory for each pilot to have the Approach Chart, and where applicable the TMA chart, readily available during every approach.
The speed during an approach shall be kept within reasonable limits paying due regard to ATS procedures, traffic density, weather conditions, and approach aids used, and shall be decreased to approach speed before the instrument approach procedure or, if executing a visual approach, before entering the aerodrome traffic pattern. Altimeter setting during the approach to land shall be in accordance with published procedures. Before commencing an approach the Captain must re-check the weather at the aerodrome, the runway conditions and the airplane technical status to ensure a safe approach, landing or missed approach. In IMC or at night it is recommended that. Flight crewmembers are to maximize the use of radar monitoring where available.

8.11.18.1 Approach Briefing

The approach briefing should be conducted after both pilots have reviewed all relevant factors affecting the forthcoming approach and landing (weather, NOTAMS, runway conditions, specific airport restrictions). It should be completed prior to commencement of the descent. Persons occupying the flight deck jump seats shall be reminded with the sterile cockpit procedure.
The PF shall conduct the briefing covering the following items in the given order:

- Nominate the runway and the type of approach to be used.
- Brief on any special or non-normal requirements (Technical status, anti-ice, runway occupancy limits).
- Chart number, layout, and date (cross-checked by the PM)
- STAR, STAR Transitions, Approach Transitions
- Type of approach and use of automation
- Low visibility approaches
- NOTAMS
- Transition Level, MSA (highest MSA sector, the aircraft is expected to cross, on the arrival route to the Initial Approach Fix)
- Lateral profile
- Vertical profile, including minimum height positions
- Outer Marker/Equivalent fix altitude – precision approaches
- Final Approach Fix (FAF) altitude – non-precision approaches
- AH/DH/DA/VDP/MDA and if any ‘commitment altitude’
- Minimum required and existing visibility and/or RVR
  - Threshold elevation and field elevation
- Missed approach point
- Missed Approach procedure
- Diversion fuel and fuel available
- Landing distance

- Taxi routing after landing.
- Any other important information (APU, Auto-brakes, Low-drag approach, etc.)

In case of abnormal/emergency situations; when time permits, PIC or his delegate shall call cabin crew (normally the purser) – in accordance with FCOM PRO-ABN-90 Communications – and brief him/her with the following points (NITS):

PIC's NITS Briefing

- Nature of the emergency
- Intentions
- Time available to prepare the cabin

(Synchronize watches)

- **S**pecial instructions (for example, exits that may be unusable)
  - Signal to brace
  - Signal to remain seated (if no evacuation is required. On ground emergency only)
  - Final Call (if applicable)
  - At 2000 feet, the flight crew will make the P.A: "Finish Preparation"

This is an order. Cabin crew should immediately take their seats.

The Purser/briefed cabin crewmember will acknowledge the PIC/delegate briefing by repeating back the full instructions given (NITS), and must ask for clarification on anything not understood.

8.11.18.2 Noise Abatement during Approach

In order to avoid coming in too low while on final approach, Captains shall endeavor not to descent below the prescribed glide path, even after visual reference to the ground has been established, making use of all available aids,.

I.e. ILS glide path or VASIS. When flying in an aerodrome traffic circuit pilots should likewise avoid overflying populated areas at too low altitudes and shall observe the circuit heights as may be established by the appropriate Authority.

8.11.18.3 Setting of Decision Height/Decision Altitude/Minimum Descent Altitude

Except for CAT II/III ILS approaches the barometric altimeter, set to the current QNH of the aerodrome concerned, shall be used to indicate the applicable DA/MDA.

8.11.18.4 Setting and Checking of Navigational Aids

For instrument approaches the setting and checking of navigational aids is regulated as follows:

1. The order for tuning to a particular navigational aid is given by the PF.
2. The PM tunes the appropriate receiver(s) and checks the identification of the facility.
3. In case of ILS: the execution is confirmed by PM after identification has taken place: Completed and identified.

8.11.18.5 Descent to Prescribed Altitudes during Approach

The altitudes prescribed in instrument approach procedures shall be strictly adhered to. Descent to the next lower altitude prescribed in a procedure shall only be made after passing the relevant fix and provided the airplane is following the track specified in the procedure.
Note: The foregoing does not apply when the flight is cleared to descent during radar vectoring or to conduct a visual approach.
Note: In the context of this requirement, a "visual circuit" is considered to consist of at least downwind, base and final approach legs, flown in accordance with the recommended procedure specified in the applicable aircraft type's FCOM. In all other circumstances, a stabilization limit of 1000ft AAL shall apply.

8.11.18.5.1 Stabilized Approach

An approach is stabilized when all of the following criteria are met:

1. Minimum stabilized heights to achieve stabilized approaches:

Meteorological Conditions	Heights above Airfield Elevation
IMC	1000 ft.
VMC	500 ft.

2. The aircraft is on the correct lateral and vertical flight path (based on navaids guidance or visual references).
3. Only minor changes in heading/pitch are required to maintain the correct flight path.
4. Bank Angle not greater than 7 degrees.
5. The aircraft indicated speed is not less than VAPP (computed by GS-MINI function for Airbus types).
6. The aircraft is in the correct landing configuration.
7. Sink rate is no greater than 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 feet per minute, a special briefing should be conducted.
8. Power setting is appropriate for the aircraft configuration and is not below the minimum power for an approach as defined by the aircraft operating manual.
9. All briefings and checklists have been completed.
10. For stabilized ILS approaches, it must be flown with maximum deviation of one dot of the glide-slope and ¼ dot of localizer;
11. Special approach procedures or abnormal conditions requiring deviation from the above elements of stabilized approach criteria require a specific briefing prior to commencement of the approach.

Note: When conducting circling, or visual approaches, the height at which the airplane must be fully stabilized may be lower than 1000 ft above threshold elevation, but in no case less than 500 ft.

8.11.18.5.2 Excessive Flight Parameter Deviation Callouts

Parameter	Callout Criteria
Airspeed	Lower than V APP – 5 kt or Greater than V APP + 10 kt (*)
Vertical Speed	Greater than – 1000 ft./MN
Pitch Attitude	Lower than (-2.5˚) Nose Down or Greater than (10 ˚) Nose Up
Bank Angle	Greater than 7 degrees
LOC deviation	1/4 dot or Excessive (Beam) Deviation Warning
Glide Slope deviation (ILS)	1 dot or Excessive (Beam) Deviation Warning

When reaching the applicable stabilization height and below, a callout should be performed by the PM if any flight parameter exceeds the limits provided in the following table:
(*) The final approach speed V APP is considered to be equal to V REF + 5 kt (or V LS + 5 kt, as applicable).
V REF is the reference target threshold speed in the full flaps landing configuration (i.e., in the absence of airspeed corrections because of wind, windshear or non-normal configuration).
Note: The crew should ensure that the above mentioned stabilization criteria are met, if not a go around should be executed immediately.
Runway alignment must be accomplished not later than 500 ft above threshold elevation.
However, where certain types of approaches (e.g. low visibility circling, non-precision, sidestep) swing over necessitate alignment turns below 500 ft it is essential that special attention is being given to bank angle.
A swing over to another RWY may be accepted provided

- The landing RWY is clearly visible and
- It can be assured that the airplane will be aligned on centerline and fully established in slot no later than 500 ft. above threshold elevation.

Nesma Airlines upholds a No-Blame Policy concerning go-around(s). If an approach is not stabilized by the limits specified above, or become un-stabilized after passing these limits, an Immediate Go-Around Must Be Executed.
Notwithstanding the above, crews are encouraged to exercise sound judgment and airmanship, and to consider executing an earlier go-round, if it is likely that these limits may be exceeded.
A go-around must be considered a Normal Maneuver, to be carried out whenever a crewmember assesses that this option offers the safest course of action. Go-around is to be reported.

8.11.18.6 Direct Straight-In Approaches

Direct straight-in approaches are authorized and encouraged at Captain's discretion to shorten the approach procedure, if conditions are suitable and subject to ATC clearance.
In the case of a radar vector to a final approach course or fix, a timed approach from a holding fix, or an approach for which the procedure specifies "No PT", Pilots shall not make a procedure turn unless cleared to do so by ATS.

8.11.18.7 Sre Approach

Data for SRE approaches are published only in exceptional cases. ATC will provide procedure details such as minima, termination point and missed approach procedure upon request.

8.11.18.8 Par Approach

Data for PAR approaches are published only in exceptional cases. ATC will provide procedure details such as minima and missed approach procedure upon request.

8.11.18.9 Non-Precision Approaches

Non-precision approaches with a minimum 2.5 degrees slope from FAF to touchdown are required. In cases where only a step down approach is available, Flight crew shall aim at executing the approach with a stabilized constant descent profile during the final segment of non-precision approach. Where terrain is a factor, approach charts with color and shaded contour formats shall be used.
The duties of PF and PM during Non-ILS (including non-precision) approach, refer to QRH 3.08, 3.09.

8.11.18.10 Visual Approach

Definition: An approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.
The following shall be provided for the acceptance and the conduct of visual approach:

1. A visual approach requires ATC approval and is part of an IFR flight
2. The Captain must have the aerodrome in sight and identified
3. The Captain must be familiar with the aerodrome and the surrounding terrain
4. It must be flown closely to the basic principles of instrument approaches and whenever practicable according to the traffic pattern outlined in the FCOM. Where no instrument approach procedure is available the circuit altitude shall be 1500 ft. above aerodrome elevation.
5. The visual glide path angle should be 2.5 to 3 degrees depending on terrain. Optical illusions may seriously affect the flight crew's perspective in judging this visual glide path.
   Therefore the following must be observed:
   - Early stabilized approach
   - Continuous monitoring and cross checking of flight instruments
   - Full use of all available navigation and landing aids during the entire approach.
6. In case of straight-in visual approaches the published instrument approach procedure shall be adhered to as closely as possible.
7. Once the airplane is established and descending on the final approach to the runway of intended landing, 360 degrees turns and other maneuvers for descent profile adjustment are not permitted.

8.11.18.11 Circling Approach

Definition according ICAO: A circling approach is the extension of an instrument approach procedure which provides for visual circling of the aerodrome prior to landing. I.e. the visual phase of an instrument approach to position an airplane for landing on a runway which is not suitably located for a straight-in approach.
(Refer to 8.1.3.5.6. Visual maneuvering (Circling))

8.11.18.12 Side Step Approach (SSTP)

This procedure is mostly used in U.S.A.
Definition according to FAA: A visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than **1200 ft** to either side of the runway to which the instrument approach was conducted.
Landing minima are applicable as for circling approaches.

8.11.18.13 Standard Call-out Procedure during Approach

The following mandatory call-outs must be made by the flight crewmember specified in the right-hand column unless generated automatically by synthetic voice.

Call-outs during Approach

(Refer to OM-B for details)

8.11.18.14 Change-Over from Instrument Flying to Flying with Visual Reference

Excellent co-operation between PF and PM is necessary during changeover from instrument flight to flying with visual reference to the ground. When, during the progress of the final approach, visual reference is expected to be obtained, the pilot flying shall divide his attention between monitoring the flight instruments and lookout.
When the approach lights, runway lights, or runway markings are clearly in sight and the altitude of the airplane with reference to the ground can be determined, he shall indicate to the pilot monitor where to look for visual reference (i.e. "Runway 11 o'clock").
During transition to visual flight the pilot flying shall pay particular attention to retain the proper approach path by maintaining the stabilized attitude. He should **never** allow the airplane's **nose to drop** and should **not** permit the rate of **descent to increase** during the last part of the final approach and shortly before flare. Flight crews shall be aware of factors and conditions that cause visual illusions and their effects, including:

- Perception of height/depth, distances and angles: and
- Assessment of the aircraft's horizontal position and glide path.

8.11.18.15 Approaches with Visual Reference to the Ground

Approaches shall be flown closely to the basic principles of instrument approaches; they are only authorized subject to ATC approval and provided the Captain has the aerodrome in sight and is familiar with the aerodrome and the surrounding terrain. Whenever practicable the approach with visual reference to the ground shall be flown according to the traffic pattern outlined in OM-B.
In case of straight-in visual approaches the published instrument approach procedure shall be adhered to as closely as possible. Where no instrument approach procedure is available the circuit altitude shall be 1500 ft. above aerodrome elevation. The visual glide path angle should normally be in the order of 2.5° to 3.0° depending on terrain clearance requirements.

8.11.18.16 Wind Correction during Approach

To compensate for wind, gusts and shear effects corrections of the approach speed shall be made in accordance with the FCOM-LIM-12 page 5/6.

8.11.18.17 Aerodrome Lighting

At aerodromes equipped with high intensity approach and/ or runway lights due regard shall be paid to the possibility of glare from the lighting system. The pilot monitor should be alert to request dimming of lights by order of the pilot flying.

8.11.18.18 Use of VASIS, T- VASIS or PAPI

On runways equipped with VASIS, T-VASIS or PAPI the visual glide slope shall be adhered to as closely as possible. Due to glide slope tolerances, however, VASIS, TVASIS or PAPI indications shall not be used below 200 ft above aerodrome elevation.
Note: In conditions of ground fog, mist or snow T-VASIS may provide erroneous indications due to light refraction

8.11.18.19 Descent below DA/H or MDA/H

Continuation of an approach below the applicable minimum is only allowed if:

1. The airplane has arrived at a position from which a normal approach profile can be followed to the runway-in-use; the maximum rate of decent is 1000 ft/min, and
   At least one of the following visual references for the intended runway is distinctly visible and identifiable:
   Non Precision and CAT I operations:
   - Elements of the approach light system, threshold, threshold markings, threshold lights
   - Threshold identification lights, visual glide slope indicator, touchdown zone or
   - Touchdown zone markings, touchdown zone lights and runway edge lights. **Note1:** CAT I; the minimum visual segment to control the airplane consists of three centerline lights/barrettes of the ALS and either one crossbar of the ALS or the threshold lights of the landing runway.
   - Below Five Hundred feet if the runway is clearly visible by announcing LANDING. The flight crew must monitor the approach and the PM must call out:
     - Malfunction of instruments, approach and landing aids
     - Deviations from the approach path
     - Deviations from the required airplane configuration
     - Deviations from the altitudes specified for the approach procedure
     - Rates of descent in excess of defined limits
     - Deviations from target speed of plus 10 / minus 5 Kts
     - Bank angles exceeding 7° or Pitch Attitude exceeding 10° up or 2.5° down.
     - All other significant deviations.

8.11.18.20 Go-Around and Missed Approach

A Missed Approach Procedure (MAP) is the navigational description of a go-around for a specific runway. It starts at the Missed Approach Point (MAP) and not lowers than DH / DA / MDA / MDH to ensure adequate protection from obstacles. A MAPT is published for non-precision approaches.

1. A 'Go-around' is a normal procedure which should be applied without hesitation if required.
2. A decision to initiate a 'Go-around' rests with the Captain as long as the airplane is higher than 1.000 ft. AAL.
3. As soon as the airplane is lower than 1.000 ft. AAL, a 'Go-around' shall be executed as soon as any active crewmember calls out "GO-AROUND", regardless of who is PF/PM.
4. Adequate protection from obstacles is assured if the missed approach procedure is initiated not lower than the decision height/decision altitude/minimum descent altitude (DH/DA/ MDA) and not later than at the missed approach point (MAPT) where one is specified.
5. In a precision approach procedure, the MAPT is the point where the glide path intersects the decision height, or a suitable fix (e.g. middle marker, DME fix). If no suitable fix is available or if the MAPT facility is unserviceable the missed approach shall be initiated when time to MAPT has expired.
6. During a non-precision approach: in the event a 'Go-around' is initiated prior to arriving at the MAPT the pilot should, while climbing, proceed to the MAPT and then follow the missed approach procedure in order to remain within the protected airspace.
7. When executing a non-precision approach procedure at the missed approach point (MAPT). If the Missed Approach Point (MAPT) is determined by 'time', the Missed Approach Procedure shall be executed when the time has elapsed.
8. During a precision approach: in the event a 'Go-around' is initiated prior to reaching DH/AH, the aircraft shall proceed to the threshold of the runway of intended landing, before following the missed approach procedure.

8.11.18.21 Go-around and Missed Approach with one Engine Inoperative

In the event of a go-around following an engine out approach the flight crew shall establish a safe flight path. ATC must be notified as soon as practicable and be informed about the intentions.

Prior to starting an engine-out approach, the flight-crew must consider limiting factors in case of a missed approach. Limiting factors could be a specific climb gradient required for the published missed approach procedure and / or the obstacle situation.

Three alternatives may be considered:

- Published EOSID.
- Published missed approach procedure
- In favorable weather conditions: Any safe visual flight path.

8.11.19 Landing Distance

In preparation for each landing on a destination or alternate aerodrome due consideration shall be given to all relevant factors, such as wind, slope, runway surface condition/braking action, MEL, faulty equipment or system in the conditions existing at the estimated time of arrival, in regard to the required runway length.
The following minimum distances shall be available (VREF at threshold at 50 ft.):

CONDITION	REQUIRED
Dry Runway	Landing field length - dry
Wet Runway	Landing field length - wet or, if not available, landing field length dry X 1.15
Contaminated Runway	115% of the actual landing distance for contaminated runway according to published tables, or The Landing field length -wet, whichever is longer.
Abnormal Landings	Actual landing distance

If the runway is dry or damp and the Landing Distance Available (LDA) is more than 2400m, the landing distance need not be determined.
Landing performance, Refer to QRH 4.02, 4.03& 4.04.

8.11.19.1 Height over Threshold

To accomplish a safe landing, the height of the airplane over the landing threshold should be approximately 50 feet. The airplane has to cross the landing threshold in the correct configuration and attitude. The Threshold Crossing Height (TCH) may vary according to the information provided on the approach chart.
When downdrafts are expected (e.g. terrain, Windshear, turbulent air) the height over the threshold may be slightly increased considering the runway condition and length available.

8.11.19.2 Touchdown

Final approach shall be adjusted so as to achieve touchdown in the Touch-Down Zone (TDZ) area paying due regard to obstructions in the final approach area, runway length, runway conditions etc.
Notes:

- If the touchdown cannot be accomplished within the Touchdown Zone of the landing runway, a 'Go- around' shall be initiated.
- Touch down Zone (TDZ) Area is defined as Area starting from 150 m (500 feet) till 30% of Runway length with maximum 900 m (3000 feet).

8.11.19.3 Noise Abatement after Landing

After each landing full reverse thrust shall be applied. When landing at night and/or where local airport noise restriction apply, the use of full reverse thrust should be used to such extent as required in the interest of safety, paying due regard to landing weight, runway length, wind, and runway conditions. On such occasions the auto brake system shall be used while monitoring its effectiveness

8.11.20 Parking Brake

After having arrived at the ramp, parking brakes shall not be released until all engines have been shut down and until it is ascertained, that chocks are in position, by verbal communication or other visual means (refer to OM-B for details) On releasing the brakes, the Captain shall ensure the airplane is not moving.

8.11.21 Communications Language Skills

English language fluency is necessary for effective communication between flight crew and ATC controllers.

Radio Communications

All radio communications must be in English and in a precise correct and clear manner, standard ICAO radio phraseology should be used at all times. Standard callouts contribute to improved situational awareness and safety. Pilots shall make sure that all ATC instructions accepted are clearly understood. Pilots should understand that missed or misunderstood clearance could pose a safety risk to flight, if in doubt, ask the controller to repeat and clarify the instructions particularly where terrain is a consideration, all ATC clearances shall be written; listen before transmitting especially when changing to a new frequency. Keep the last used frequency in the standby window until communications are established on the new frequency. The following phraseologies are to be used:

1. Ready for departure instead of ready for takeoff.
2. Line up and wait instead of line up and hold.
3. Request to cross RW instead of request clearance to cross RW
4. The phrases 'cleared for' and 'cleared to' are only used by ATC.
5. After landing when clear of runway, report runway vacated.
6. Use Go-around instead of overshoot.
7. Use affirm instead of affirmative.
8. Call looking out, traffic in sight, or negative contact when responding to inflight traffic information by ATC.
9. When requesting something from ATC state only 'call sign' and 'request' on initial transmission e.g. London control Nesma Airlines6046 request…
10. Follow ICAO R/T phraseology as indicated in OM-C Jeppesen. In addition, flight crewmembers are required to report the cleared flight level on first contact with ATC, unless specifically requested not to do so by ATC unit.
11. To avoid call sign confusion, all ATC clearances should be repeated word by word including the use of call sign, do not use the terms Roger or Wilco by themselves to acknowledge instructions.
12. Special attention must be drawn to call sign confusion during altitude clearance acceptance and read back, especially at busy airports or areas.
13. All clearances to enter, land on, takeoff, cross and backtrack on the runway in use shall be read back.

14. When unable to use standard phrases, be brief, consistent with clarity. The following phrases and words should be used whenever applicable:

Acknowledge, Confirm, How do you read? Roger, Negative, Correction, Standby, Say again, Disregard, Cancel, Break, Go ahead.

- **In flight Broadcast**: This message is broadcast by the PM on pilot frequency 126.9, or 123.45 when over flying areas with poor or without ATC control services/coverage. The call should indicate aircraft call sign, departure and arrival airports, the airway, direction of flight, FL, position, time, next position and time.
- **Listening Watch:** All Flight crew shall maintain a radio listening watch as applicable to the theatre of operation to include monitoring guard frequency 121.5 as will to appropriate FRQ.s

8.11.22 Standard Call Out

Refer to OM-B (QRH-SOP)

8.11.22.1 Communication with Cabin Crew

Nesma Airlines policy is to standardize verbiage / terminology signals and / or Verbal commands to be used for communication.

Refer to FCOM for standard verbiage and terminology and signals.

8.11.23 Checklist

Refer to OM-B (QRH-SOP)

8.11.24 Flight Data Analysis (FDA) Program

Nesma Airlines established a continuity monitoring of the all flights by activating the Flight Data Analysis (FDA) Program.

8.11.25 Electronic Flight Bag EFB

Refer to 8.12 Electronic Flight Bag (EFB).

8.11.26 Punctuality

In order to improve accuracy in recording of chocks-off / on, takeoff and landing times, and the following procedures shall be applied:

- On flights where a pushback is required, record chocks-off time when the aircraft actually begins to move.
- On flights where a start is done at the stand (no pushback), once the second engine start has commenced, order the mechanic to disconnect. Record chocks-off time when the aircraft actually begins to move.
- Chocks-off/on shall be logged in accuracy of minutes, by any means, do not round it to the nearest 5 or 10 minutes.

Note: Once the second engine start has commenced, the flight crew may order the mechanic to disconnect even before the engine has stabilized. This will allow departure procedures to be expedited and the mechanic can always be called back if a problem arises.

- On all arrivals, record the chocks-on time when the parking brake is set, before the engines are shut down at the final stopping place, even if waiting for ground power to be connected.

On-time performance is of vital importance for Nesma Airlines operations. In order to ensure this, delays are reported in written format using the journey log. The reasons for the delay must be defined in full, the defined IATA delay codes are for reference only. The following guidelines will be used for reporting delays:

- When possible, pass the delay reason to the mechanic along with the Chocks off time. Record reason and delay time in the Journey Log and as further clarifications would help to identify a problem area, expand with additional comments on the delay reasons.
- All outstations are allotted a defined turnaround time (e.g. 00:45 minutes). In case of an inbound delay, all crew efforts should be directed at recovering the delay and departing as close to the Scheduled Departure Time as possible. If the flight departs within the scheduled turnaround time, there is no additional station delay.
- Delay shall be recorded after 5 minutes of the STD.

Flight crew should make every effort to be on the aircraft as early as possible but in no case later than 35 minutes before Scheduled Departure Time (STD).

In order to maintain the integrity of our on-time performance, boarding clearance should be given no later than 25 minutes before STD to allow boarding to be in progress by STD –20 minutes. For ground time greater than 60 minutes, commence boarding by STD –30 minutes. Under no circumstances must boarding be delayed in anticipation of delayed transfer passengers unless a decision is taken by Dispatch Control with flight crew co-ordination.

Note: Do not prolong cockpit set up procedures longer than required, e.g. during completion of FMS set-up, enter INIT-B average wind and only enter full wind data if time permits or during flight. The time gained can better be used to expedite departure or for customer service issues.

8.11.26.1 Delayed Fuel Decision

If the Final Fuel figure is made available to the Flight Dispatch when Flight crew sign the Dispatch Release, the maximum reduction in fueling delays can be achieved.
The check-in counter normally closes at the latest 45 minutes prior to departure and the gate 15 minutes prior to departure, thus Final ZFW may be obtained at least 35 minutes before STD. Flight crew should make a fuel decision immediately. In the event that the transfer counter is still open, a delay in receiving the Final ZFW may be experienced. If no Final ZFW is given by 15 minutes pre- STD, Minimum Fuel should be declared as Final without waiting further.

Note: Be aware that a delayed fuel decision means a delayed fuel browser at the aircraft which, in-turn delays the fueling of other aircraft and ultimately results in compounded delays throughout the system.

8.11.26.2 Fuel Load Procedure

The procedure of advising the fuel load for each flight from the Flight Dispatch to the Maintenance staff shall be as given below:
For Tankering flights, the Flight Dispatch staff shall keep a margin of 2000 Kgs for any unexpected additions to the EZFW and enter the OFP Min Fuel Load + Tanker Fuel – 2000 Kgs as the minimum fuel quantity to be loaded (See 8.1.7.2.8 Fuel Transportation (Tankering)).
Maintenance staff shall then relay the requested figure for pre-loading on the aircraft.

Note: When Flight Crew arrives the aircraft, Standby Figures must be communicated in proper place such as Flight deck without any distraction and with reconfirmation of the figures from the Technician. Standby and Final fuel figures must be crosschecked by both pilots to avoid any errors.

8.11.26.3 On-time Performance Management

On-time performance is a key requirement for Nesma Airlines' cost saving policy and customer satisfaction goals.
Research on the performance of major airlines suggests that there is a positive correlation between on-time performance and operating profit.
Punctuality is a key leadership challenge in Nesma Airlines and ranks high on the management agenda from strategy and planning all the way to front-line operations.
Crewmembers are the face of front line operations. The Commander, in addition to his other duties and responsibilities, is the manager of the flight and has the final responsibility to achieve the on time departure.
The "Target is ETD - 3 minutes" for all doors to be closed and for push back / engine start to be in progress. In order to achieve this, the following performance indicators (milestones) are being introduced.
The Commander is responsible to ensure that all departments / support agents coordinate with one another to achieve this objective.
Achieving OTP success requires focus. All involved should be committed every step of the way on the end result of avoiding delays.
Detailed Flight Crew reports are essential for robust delay monitoring and analysis. On a daily basis, the OTP of the fleet is reviewed by operations management in order to establish the root cause of delays with the purpose of implementing corrective actions to eliminate delays and improve OTP.

Besides ensuring that you do everything possible to maintain on-time departures, to aid in the investigative process you are required to clearly specify, on the Journey Log, the precise reasons why a delay occurred. This requires you to be aware of the time progress leading to the departure and note the actual times reached during all stages of the pre-departure sequence. Flight Crew should feedback in the Journey Log where barriers to achieving an on time departure are occurring.

Any slot times and revised slot times which are issued, must be noted on the Journey Log.

> **Note:** Whenever the Flight Crew depart and or arrive on time, this information must be included and communicated very clearly as part of the PA to the passengers.

8.11.26.4 Punctuality Key Performance Indication (KPIs)

The following table shows the KPIs required to maintain adequate on-time performance (OTP).

Elements for On Time Departure	Target Time for Departure (minutes)1
Report time / Sign-in	-90 (Flight/Cabin crews)
Crew on-board / Arrive On Chocks	-45
Cleaning / Security Checks completed Boarding Clearance given	-25
Load sheet presented to the Captain	-10
Cockpit Briefings and Checklists completed	-10
Boarding Completed Refueling Completed	-5
Paperwork Signed Cabin and Cargo Doors Closed	-4
Engine Starts (No Pushback)	-4
Push-back commences / Taxi	0
Delay Reporting	+5 minutes

[1] Negative sign indicates time before flight

8.11.26.5 Nesma Airlines' OTP Best Practices

As a business it is imperative that we strive to be the best in all areas under our control. In a competitive environment passengers have a choice, and all it takes is one bad experience to lose a loyal customer who could have expanded our reach to other customers. It costs five times more to attract new customers than to keep existing ones so we must position ourselves to be defined by everything that we do best and not by bad experiences.

OTP is one area which strongly affects passenger perception of an airline and where passengers determine that an airline reliably departs on time, a sense of dependability arises which in turn results in the airline becoming the preferred choice for repeat travel.

Nesma Airlines closely monitors delays and maintains a database in order to develop statistics that show the when, why and what caused a delay. The aim is not a blame game, but to see what trends are developing and to what severity in order to determine the root causes of delays.

The following key points take into account on-line experiences in order to advise on best practices that have the potential to impact OTP positively if followed.

Table: Points to take into account for OTP management

1. Safety First.
2. Get to work on time.
3. Get to the aircraft early.
4. Do not wait around Ops for paperwork, get it delivered to the aircraft.
5. Do not stop Cabin Crew from proceeding to the aircraft before you.
6. Do not get lost during long transits.
7. Control Cleaners.
8. Tankering must not be done at the expense of an on time departure.
9. Prior to requesting new flight paperwork, confirm the requirement.
10. Do not sign the load sheet until all passengers are on board and settled.
11. Do not sign the Aircraft Technical Log (ATL) until all fueling and engineering works have been completed.
12. Use the Secondary Flight Plan pages to prepare the return flight.
13. Before arrival inform the arriving station's GHA about the requirement for wheel chairs/ high loaders / GPUs etc.
14. Clearly indicate delay reasons on the Journey Log.
15. In case of in-bound delays, reduce turn-around time to pick up the rotation schedule
16. For headcount problems, delegate the responsibility to the stations
17. Over fueling concerns

1. **Safety First:**

   Do it right and safe.

   Though OTP is an important business objective, our number one priority shall always be safety. Do not, for example, rush a sick aircraft into the air because of the concern of minimizing delay.
   Follow correct procedures and get an all clear from an authorized engineer. Should an in-flight emergency result, the cost in terms of money and time would be far worse without even taking into account the tragic impact of injury or loss of life.
2. **Get to work on time**
   Complete your pre-flight planning early and proceed to the aircraft without delay. It may be that the aircraft is at a remote bay requiring extra time to reach it.
   Anticipate the situations that you will face in your journey to work. If traffic is a known issue, plan accordingly and give yourself the necessary journey time. If passengers can account for traffic when getting to their flight, then so can crew. All the same, if you will be late, make sure that the other Pilot and Crew are informed to enable them to board and ready the aircraft. At the earliest opportunity, let dispatch know so they can prepare an alternate solution.
   If you are using the company's transportation and they happened to come late, do not wait and take the most comfortable transportation you can find and you will get reimbursed.
3. **Get to the aircraft early**
   As part of your pre-flight preparations you are allotted a 60 minutes pre-departure period from Standard Departure Time (STD). This is Company time and you should utilize it effectively and be focused on the end goal of an on-time departure.
   Make every effort to be on the aircraft a minimum of 45 minutes before departure.
   Bear in mind the On-Time Departure KPIs target times given in 8.11.26.3 Punctuality Key Performance Indication (KPIs) and aims, as much as possible, to better them. Do your best to be on-board early as there may be last minute issues arising, which necessitate an early resolution to avoid impacting OTP.
   Passenger boarding should be requested early taking into account the time it takes passengers to reach the aircraft, which if by bus, may be impacted by aircraft movements on the apron.
4. **Do not wait around OPS for paperwork, get it delivered to the aircraft**
   Tasks such as coordinating with dispatch regarding payload, additional weather reports or amended TLR do not require you to hang around operations as the documents can be delivered to the aircraft or send through PPS Crew Briefing.
   If for any reason more time is required at dispatch, ensure that one Flight Crew member proceeds to the aircraft to start boarding.

5. **Do not stop Cabin Crew from proceeding to the Aircraft before PF**
The cabin purser reports to the Commander before leaving operations as a courtesy and so that the Flight Crew can inform them if there are any variables affecting the flight, which they should know about. Unless PF are ready to proceed to the aircraft at that same moment, do not delay the Cabin Crew from proceeding to the aircraft ahead of PF.
Getting to know each other and team building can just as easily be achieved on-board during the Crew Briefing as detailed in 8.3.15. Cabin Safety Requirements. Delaying the crew in getting to the aircraft early delays them in starting their preparations for passenger boarding. Bearing in mind the above, when a bus is required to transport the Crew to the aircraft, the whole crew should attempt, to the maximum extent possible, to proceed together in order to avoid extra transport charges which are applicable for each bus used. All the same, OTP remains the primary objective to perfect, so under no circumstances shall a departure delay be acceptable due to late arriving crew. It is preferable to take an extra bus transport charge then to cause a departure delay.
6. **Do not get lost during long transits**
There is a tendency from some crews who have a long transit time between flights to disappear for personal errands such as duty free etc. Under no circumstances should this be allowed to impact OTP. If total transit time is greater than 60 minutes, commence boarding a minimum of STD -30 minutes (refer to 8.8).
7. **Control Cleaners**
If you find the cleaners slow completing their tasks, take control and expedite them. They should not be allowed to delay the aircraft.
8. **Tankering must be done at the expenses of an on time departure**
Company policy prohibits taking a delay due to tankering. Passenger perception is focused on on-time departures and any departure delay affects our on-time reputation, which we must protect. Delays are not acceptable if the reason for taking extra fuel is purely tankering.
9. **Prior to requesting new flight paperwork, confirm the requirement**
The OFP, TLR and Load sheet have built in variables that allow for considerable variations in actual conditions that minimizes the necessity for new reports.
Certain changes to flight details are acceptable using with the same OFP as detailed in 8.1.10. Operational Flight Plan.
Do not rush to generate a new load sheet for small weight change, consider LMC option first. Do not give printer problems more than 5 minutes of troubleshooting, request the backup printer or send your documents to the station/operations office for printing. Report the issue after the flight.
If you request new flight plan, do not wait the hardcopy, print it onboard.
10. **Do not sign the load sheet until all passengers are on board and settled**
Only once the "All on Board" message is delivered and all passengers are settled the Captain should then sign the Load sheet and note his staff number.
11. **Do not sign the Aircraft Technical Log (ATL) until all fueling and engineering works have been completed**
To avoid duplication of work if a technical problem arises, do not sign the technical log until all technical work is done.

12. **Use the secondary flight plan pages to prepare the return flight**
    During arrival preparations, and especially if arriving late, the secondary flight plan can be prepared for the return flight and then stored as a SECONDARY F-PLN in the DATA INDEX
    /PILOTS ROUTES page and then kept as is or instead re-used to prepare a diversion / alternate routing or for expected runway changes at landing. If re-used, recall that stored flight plans do not retain certain revisions (see FCOM DSC-22_20-60-60 'Pilots / Stored Route Functions').
13. **Before arrival inform the arriving station's GHA about the requirement for wheel chairs / high loaders, GPU etc.**
    To reduce turn-around delays, early on, before arrival, use the radio to inform the arriving station about specific handling instructions
14. **Clearly indicate delay reasons on the Journey Log**
    Detailed Flight Crew reports are essential for robust delay monitoring and analysis, and in order for operations management to apply the right corrective actions to eliminate delays. Always write down the cause of Departure and Arrival delays in the remarks column of the Journey Log or in a Voyage Report giving clear explanations.
    When an arrival delay is due to en-route circumstances such as extended holding due to ATC restrictions or other, this should be clearly explained in the Journey Log.
    If an arrival delay is due to insufficient Block time compared to Flight time, this should be highlighted and reported immediately after flight. Ensure that the extended flight time was not caused by unforeseen en-route delays, and if so, explain that separately.
15. **In case of in-bound delays, reduce turn-around time to pick up the rotation schedule**
    If an in-bound delay is experienced, and in order to pick up the rotation schedule, every effort should be made to turn-around within 40 minutes regardless of the allocated turn-around time. For those stations that have been allocated a scheduled turn-around time less than 40 minutes, the allocated time shall be respected as given. Recall that most of the competitors turn-around within 25 minutes as a standard, so 40 minutes is generous and achievable.
16. **For headcount problems, delegate the responsibility to the stations**
    In case of discrepancies in headcount between the GD, passenger manifest and the actual passengers onboard, ask the stations personnel to find the source of discrepancy and account for it in the flight documents. Do not keep recounting many times. It is the responsibility of the stations.
    Note that you can write down extra passenger names or scratch it off the paper using a pen. You do not have to re-print the passenger manifest.
17. **Over fueling concerns**
    In case of mistaken fuel loading (Over fueling) and as long as it does not affect your maximum structural weights, make defueling your last choice.

8.12 Electronic Flight Bag (EFB)

8.12.1 Abbreviations

AFM	Airplane Flight Manual
AC	Air Circular
CM1	Crewmember 1 – Left Hand Seat Pilot
CM2	Crewmember 2 – Right Hand Seat Pilot
EDFO	Executive Director Flight Operations
EFB	Electronic Flight Bag
EMI	Electro-Magnetic Interference Test
EQRH	Electronic Quick Reference Handbook
FAA	Federal Aviation Authority
FCOM	Flight Crew Operating Manual
FCTM	Flight Crew Training Manual
FO	First Officer
FODM	Flight Operations Documentation Manager
Flight Dispatcher	Flight Operation Officer
ECAA	Egyptian Civil Aviation Authority
GOM	General Operation Manual
IOE	Initial Operating Experience
JDM	Jeppesen Distribution Manager
MDM	Mobile Device Management
MEL	Minimum Equipment List
NA	Not Applicable
OCC	Operations Control Center
OLB	Operations Library Browser
OPS	Operations
PAAdmin	Performance Application Administrator
POI	Principle Operation Inspector
RD	Rapid Decompression
TOC	Top of Climb
TOD	Top of Descent
W&B	Weight and Balance
XML	extensible Mark-up Language

8.12.2 Definitions

A. Airworthiness of iPad

1) Hardware Status:
Screen, frames, buttons, connection ports are in good condition.

2) Software Status:
All applications are current and up to date per company policy, and / or comply with the EFB failure procedures.

B. Critical Phases of the flight:
Flight phases below 10,000 ft. AGL (not including cruise flights), Takeoffs, Landings, Taxi procedures and all parts of the flight operation considered as critical or require high workload by the flight crewmembers.

C. Class II:
IPad Class II EFB is portable, commercial off-the-shelf (COTS) device. Class II EFBs are not mounted to the aircraft, connected to aircraft systems for data and can be temporarily connected to an existing aircraft power supply for battery recharging.
Class II EFBs that have Type B applications for aeronautical charts, approach charts must be appropriately secured and viewable during critical phases of flight and must not interfere with flight control movement.
Note: Portable Class II EFB components are not considered to be part of aircraft type design (i.e., not in the aircraft type certificate (TC) or Supplemental Type Certificate (STC)).

D. Secured
The iPad is secured on the Holder.
The holder is secured in an existing provision with the intended function to hold charts (chart clip on each sliding window).

E. Stowed
The iPad is stowed at the proper place.
CM1 stows the iPad on the left side operation manual stowage. CM2 stows the iPad on the right-side operation manual stowage.
The iPad should be in standby or turned off mode to reserve the battery.

F. Type A:
Type A applications are those applications intended for use on the ground or during noncritical phases of flight when pilot workload is reduced. EAC 121-15, lists examples of Type A applications is in shown 8.12.5 Software Description.
Malfunction of a Type An application must be limited to a “minor failure effect” classification for all flight phases and have no adverse effect on the completion of a flight operation.

1) Type A applications for aeronautical charts are applications that require all aeronautical charts pertinent to the flight to be printed prior to departure of the flight.

2) Type A applications for Weight and Balance (W&B) are applications that present existing information found in the applicable Aircraft Flight Manual (AFM). Type a W&B applications may accomplish basic mathematics but must not use algorithms to calculate results. Type a W&B applications must retrieve and apply existing published information.

3) Type A applications for aircraft performance are applications that present existing information found in the applicable AFM or PEP/POH. Type an applications for performance may be software applications that retrieve and apply existing published information. Type A performance applications must not use algorithms to calculate results.

G. Type B:

Type B applications are applications that are intended for use during critical phases of flight or have software and/or algorithms that must be provided by an acknowledged service provider or tested for accuracy and reliability. EAC 121-15, Appendix 2 may be referred to for examples of Type B applications.

1) Type B aeronautical chart applications are applications that display aeronautical charts in electronic format. These applications must be available for use during all phases of flight. These applications do not require paper printing of aeronautical charts and the viewable electronic format allows chart manipulation.

2) Type B ECL: Not Applicable.

3) Type B W&B applications are applications with algorithms to calculate W&B results. Type B W&B applications are produced for a specific aircraft and, therefore, must be tested and proven accurate by the applicant.

4) Type B aircraft performance applications are performance applications with algorithms to calculate performance results. Type B aircraft performance applications are produced for a specific aircraft and, therefore, must be tested and proven accurate by the applicant.

5) Electronic checklists, including normal, abnormal, and emergency.

H. Viewable:

1) The iPad is powered ON,

2) The appropriate chart is displayed,

3) The iPad brightness is appropriate.

I. EFB Release:

A version of EFB that includes performance data, weight and balance data, new manuals or any other data related to EFB applications (i.e. forms, aeronautical charts, logs, checklists, performance calculations, etc.). New releases are synchronized with the onboard devices through servers or any means provided by the application's vendor.

Definitions

Fly Smart with Airbus: it is Airbus primary interface for EFB concept. It includes five basic modules and subject to further development as part of the manufacturer strategy. The five modules are takeoff, landing, Load sheet, and documentation and inflight performance.

Fly Smart In-flight Performance: the application of Fly Smart with Airbus suite that calculates the in-flight performance. It includes five sub-modules; climb, cruise, flight planning, one- engine descent, holding and atmospheric conversion tables. This application contains all the data contained in the in-flight performance tables inside the QRH.

Fly Smart Gateway: the interface for uploading EFB releases on the server.

PEP: the official Performance Engineering Program from Airbus. It contains the performance database of the aircraft and its basic operational characteristics.

PA Admin: The PA Admin tool is used to process the aircraft/airports raw data obtained from accredited sources to establish the required setup of the fly Smart interface.

PA Admin requires PEP and Aircraft balance and service files as a prerequisite along with the Gateway as an interface to publish the data.

LTS: load sheet software. The Airbus software used for load sheet generation.
FODM: Flight Operations Documentation Manager. The document production and customization tool provided by Airbus.
PPS crew Briefing: PPS is the official flight plan application. Crew Briefing holds all the Data generated by the OCC and makes them available for offline retrieval.
EQRH: Electronic QRH. The application provided by the manufacturer that provides electronic checklists including normal, abnormal and emergency procedures.

8.12.3 Control and responsibilities

1) **Chief Pilot** responsible for ensuring that all Electronic Flight Bag contents comply with approved procedures. Chief Pilot has the authority to establish and modify the Electronic Flight Bag Program. He is responsible to ensure that the Electronic Flight Bag contents comply with the approved procedures.
2) Training department is responsible for the EFB training program.
3) Flight Dispatcher are responsible to update and keep the airworthiness of the back-up iPad.
4) Fly Smart with Airbus administrator
   - Managing iPads users
   - Managing iPads users profile.
   - Importing data loads from applications administration tool.
   - Creating dedicated iPad releases
   - Having overview of iPad configuration (performance and ops library data installed)
   - Delegating Gateway administration to IT personnel
   - Creating monthly reports during evaluation period
   - Customize the performance applications as per Nesma Airlines policies.
   - Will take Documentation administration responsibility in case of no assigned personal as per his qualification.
5) Documentation Administrator is responsible for:
   - Customize (modify or add to) the content of the manuals
   - Generation of Fly Smart with Airbus compatible document files (*.OLB file)
   - Provide document files to the Fly Smart with Airbus Administrator
   - Administer and manage the safetycloud-based document management in a way that ensures the latest controlled copies of the manuals are uploaded to the cloud.
   - Generation and customization of Fly Smart EQRH package.
6) JDM administrator
   - Manage iPad user accounts for JDM
   - Manage Jeppesen charts updates
   - Manage, update, distribute and control the following company manuals through JDM administration tool:
     1. JEPPESEN Airway text Manual covering the applicable area of operations
     2. OM-A Vol 1
     3. CMEL
     4. Company Security manual
        - Ensure up-to-date devices onboard
        - Report to the Chief pilot the status of operation

7) EFB Administrator
   - The EFB Administrator works as the link between administrators (Fly Smart administrator, Documentation administrator), JDM administrator, Chief Pilot and End users.
   - He manages/delegates the Fly smart Gateway to Manage iPads users, Manage iPads users profile, import data loads from applications administration tool (FODM, PERFO administration tool), Create dedicated iPad releases, and have overview of iPad configuration (performance and ops library data installed).

8.12.4 EFB Hardware

1) IPad Air 2 and iPad Pro are selected as a COTS device to serve Nesma Airlines for EFB Class I and Class II.
2) It will be strictly used for EFB purposes, and it will include the list of the approved Apps and application mentioned in the EFB package.

A. iPad Hardware Description Template

The template below has been provided to facilitate the documentation of these components.

a) Aircraft Owner or Applicant's Name: **Nesma Airlines**
b) Aircraft Make/Model: **Airbus family**
c) Operating Rule: **ECAA121**
d) Manufacturer/Model: **Apple/ iPadAir2/iPad Pro**
e) The following major components are included with this make/model of EFB: Technical specifications for iPad are clarified in the next table.

iPad Air		iPad Pro	
Model	A1430	**Model**	A2435
Processor	A8X chip with 64-bit architecture	**Processor**	Apple M2 chip 8-core CPU with 4 performance cores and 4 efficiency cores
Display	▪ Retina display ▪ 9.7-inch (diagonal) LED-backlit Multi-Touch display with IPS technology ▪ 2048-by-1536-pixel resolution at 264 ppi ▪ Fingerprint-resistant oleo phobic coating ▪ Fully laminated display Antireflective coating	**Display**	Liquid Retina display 11-inch (diagonal) LED backlit Multi-Touch display with IPS technology 2388-by-1668-pixel resolution at 264 pixels per inch (ppi) ProMotion technology Wide color display (P3) True Tone display Fingerprint-resistant oleophobic coating Fully laminated display Antireflective coating
Hard Drive	16-32-64GB	**Hard Drive**	128-256GB
Connection	- Wi-Fi (802.11a/b/g/n/ac); dual band (2.4GHz and 5GHz); HT80 with MIMO - Bluetooth 4.2 technology UMTS/HSPA/HSPA+/DC-HSDPA (850,900,	**Connection**	Wi-Fi + Cellular models Wi-Fi 6E (802.11ax) with 2x2 MIMO; speeds up to 2.4 Gbps4 Simultaneous dual band Bluetooth 5.3

	1700/2100,1900, 2100 MHz); GSM/EDGE (850, 900, 1800, 1900 MHz)		5G (sub-6 GHz) with 4x4 MIMO Gigabit LTE with 4x4 MIMO and LAA GPS/GNSS, Cellular
Weight	444 grams	**Weight**	468 grams
Battery	Built-in rechargeable lithium-polymer battery	**Battery**	Built-in 28.65-watt-hour rechargeable lithium-polymer battery
Operating System	Apple iOS	**Operating System**	Apple iOS
Classification	Class II	**Classification**	Class I
Power Supply	▪ Up to 10 hours of surfing the web on Wi-Fi, watching video, or listening to music ▪ Up to 9 hours of surfing the web using cellular data network ▪ Charging via power adapter or USB to computer system		

B. EFB Holder

Nesma Airlines may provide portable holder to secure the iPads during critical phase of flight for using type B EFB applications. The holder is secured in an existing provision with the intended function to hold charts (chart clip on each sliding window). The used holder shall satisfy the following:

1) The holder is secured during the critical phase of the flights.
2) The holder must be viewable during the critical phases of the flights, if the Jeppesen FD PRO is in use.
3) The holder is not permanently attached to the airplane and it is part of the pilot flight kit, therefore no need for ICA, STC, or any other kind of certification.
4) The holder is found in compliance with the rules and regulations stated in the EAC 121-15

C. Printer

Wireless printer shall be provided onboard for Load sheet printing, stowed and secured in cabin and used only in ground. It shall not be stored or opened in the cockpit during any phase of flight.

D. iPads Serial Numbers:

SN	SU-NMG	SU-NML	SU-NMR
1	DMPR451MG5WR	RG7245FVMR	JQMTCD7KN9
2	K7RQQ27TKG	L2Y4JYL4RC	CX9GJX9N9T
3	XPQOH7H6NX	DMPQG6V5G5WQ	Q6TX7016TM

8.12.5 Software Description

8.12.5.1 Scope

Nesma airlines are approved for type A and type B EFB operations.
These five modules are the takeoff, landing, Load sheet, documentation and weather modules.
The following list of applications shall be used as a part of EFB Class II on board Nesma airlines aircraft:

Application	Type
Jeppesen FD PRO	B
FlySmart AIB Manager	B
FlySmart AIB Load sheet	A
FlySmart AIB Takeoff	A
FlySmart inflight performance	A & B
FlySmart AIB Landing	A
FlySmart AIB OLB	B
Adobe Products	A
PPS Crew Briefing	A & B
EQRH	B

8.12.5.2 Flysmart Server

It's the responsibility of Nesma Airlines to maintain connections to servers and archive EFB releases. In that realm, Nesma Airlines shall provide at least one server and ensure its reliability and robustness.
Database used shall be in accordance with Fly Smart with Airbus technical instructions.
Fly Smart server shall host the Fly Smart Gateway application, on which the new EFB releases are uploaded. Fly Smart Gateway allows the creation of user profiles, management of fleet and documents. It also allows the tracking of registered devices and status of updates.

8.12.5.3 Jeppesen Distribution Manager (JDM PRO)

Nesma Airlines use the JDM pro administration tool provided by Jeppesen as a part of the service, which provide a full control of the JEPPESEN FD PRO Application including both contents and users control in accordance with JDM PRO online user guide in accordance with Nesma Airlines operational and quality requirements (ref 8.1.12. Onboard Library, 8.12.6.4 Process of the Jeppesen FD Pro update and new revision and 8.12.15.4 Jeppesen FD Update Control)

8.12.6 EFB Processes

8.12.6.1 Process of PA Admin Setup

1) Adding Aircraft Data;
    a) Open PA Admin.
    b) Click on "ADD AIRCRAFT" icon.
    c) Select the company database which is already implemented in the PEP.

Ref: PPM, PERF APPLI- ADMIN

2) Adding Airport Data;
    a) Download required airport(s) from contracted company provider.
    b) Filter the airports from unneeded obstacles if any.
    c) Check for unusual type of information such as an obstacle inside the clearway and so on.
    d) Import the downloaded airports in the airport manager.
    e) OCC manager is responsible for airport data provision as per OCDM 3.9.2

Ref: PPM, PERF APPLI- ADMIN

3) Import Weight & Balance Files and Data;
    a) Preparation of aircraft W&B data for manual calculations or for EFB W&B module is carried out in accordance with the procedures mentioned in OMA Ch. 8.1.8.
    b) This includes aircraft operational data, weighing report and establishment of DOW/DOI.
    c) All operational configuration, service type, crew configuration and other operationally- related weight issues should be carried out with the perspective reference.

Ref: PPM, PERF APPLI- ADMIN

4) PACKAGING DATA OR CREATING THE "LOAD";
    a) Package the data to create the load files.
    b) Zip the three load files.
    c) Send those three files to EFB Administrator to publish them to end users

8.12.6.2 Process of the Documentation

8.12.6.2.1 Airbus OLB Documents Distribution

1) The Documentation administrator gets the new manual.
2) The Documentation administrator imports new manual into FODM. Only the documentation administrator has the privilege to modify documents before delivering the EFB package if directed by the operations director.
3) Documentation administrator converts the files using FODM from XML format to OLB format.
4) The Documentation administrator notifies the EFB Administrator of the new update.
5) The Documentation Administrator publishes the new data the Gateway server.
6) The EFB Administrator notifies the Test Team (Technical Office Team).
7) The Test Team will report to the EFB Administrator of the result if any anomaly exists
8) If result is unsatisfactory, the EFB Administrators sends it back to Documentation Administrator.
9) If result is satisfactory, the EFB Administrator will publish the new data on the Main Server.
10) The EFB Administrator notifies Chief Pilot of the update.

11) Chief Pilot notifies End users of the new update or delegates the technical office team to notify end users
12) End users synchronize iPad with the FlySmart with Airbus Gateway.
13) The EFB Administrator will review End users update status (through the Gateway software) and forward any discrepancy to the Chief Pilot.

Note: outdated documents on the server shall not be used or reproduced. Documentation administrator ensures the currency of the documents on the server.

8.12.6.2.2 Cloud-Based Documents Distribution

1) After receiving the updated documents, documentation administrator uploads the new documents to the cloud.
2) The documentation administrator ensures that the newly uploaded documents are fully synchronized.
3) EFB administrator notifies Chief Pilot of the update
4) Chief Pilot notifies End users of the new update or delegates the technical office team to notify end users.
5) End users synchronize iPad with the cloud. Normally, automatic synchronization is turned on.

8.12.6.2.3 EQRH Package Update

1) The Documentation administrator gets the new manual.
2) The Documentation administrator imports new manual into FODM.
3) The Documentation administrator notifies the EFB Administrator of the new update.
4) The Documentation administrator creates the package using EQRH packager tool provided by the vendor of the application.
5) The Documentation administrator notifies Chief Pilot and EFB administrator through the update procedures mentioned in 15.1 Update Notification.
6) Chief Pilot notifies End users of the new update.
7) End users synchronize iPad with the Fly smart with Airbus Gateway.
8) The EFB Administrator will review End users update status (through the Gateway software) and forward any discrepancy to the Chief Pilot.

8.12.6.3 Process of the Performance and Load Sheet Update

1) The Performance Administrator generates and sends the data to the EFB Administrator.
2) The EFB Administrator validates/ Ensures traceability.
3) The EFB Administrator publishes new data on back-up server.
4) The EFB Administrator notifies the Test Team.
5) The Test team will report back to the EFB Administrator of the result.
6) If the result is unsatisfactory, the EFB Administrator sends it back to Documentation Administrator.
7) If result is satisfactory, the EFB Administrator will publish the new data on the Main Server.
8) The EFB Administrator advises Chief Pilot of the update.
9) Chief Pilot notifies end users of the update or delegates anyone from the EFB team to notify end users.
10) End users synchronize iPad with the Fly smart with Airbus Gateway.
11) The EFB Administrator will review end users update status (through the gateway software) and forward any discrepancy to the Chief pilot.

8.12.6.4 Process of the Jeppesen FD Pro Update and New Revision

1) Jeppesen sends the update directly to the application.
2) The terminal charts are updated as per provider.
3) The En-route charts will be updated as per provider.
4) Terrain and cultural data only updated with the application updates.
5) The JEPPESEN text Manuals (General, Europe, Eastern Europe, Africa and middle east/south Asia) are updated as per provider.
6) The EFB Administrator will verify the users are in configuration through the JDM software and forward any discrepancies to the Chief pilot.

8.12.6.5 Process of Updating FODM/Gateway/PEP Software

1) Airbus notifies Nesma Airlines
2) EFB Administrator will check the compatibility of the new (FODM/Gateway/PEP) update with other software:
   - Documentation Administrator: FODM Version
   - PAA Admin: PEP Version
   - IT: Servers Version
3) If the compatibility result is unsatisfactory, the EFB Administrator will evaluate the result and send it to the proper stakeholder.
4) If the compatibility result is satisfactory, the EFB Administrator notifies the
5) User to continue with the update.
6) The EFB Administrator will review End users update status through Gateway software and forward any discrepancy to the Chief pilot.

8.12.6.6 Process for updating PPS Crew Briefing data

1) Flight dispatchers create new flight plan data using the approved PPS software
2) Data is automatically synchronized on the application
3) User download the required files to be available offline
4) At least two iPads should be synchronized to have the required files available offline.

8.12.6.7 Process of changing hardware/software

1) In case that any change of hardware/software is required due various reasons, such as out of stock or stop the production line. The EFB Administrator will communicate with concerned personnel.
2) If the hardware/software requires any special approval documentation, the documentation must be received prior to change/replace/purchase
3) The new hardware/software.
4) The approval documentation must be forwarded to operations director, and then to ECAA for approval.

8.12.7 EFB Operations Procedures

8.12.7.1 General:

- **a)** Task sharing and cross-checking data is mandatory to reduce the risk of erroneous inputs.
- **b)** Whenever it says (Both), CM1 and CM2 shall do it on his own iPad.
- **c)** Whenever it says (CM1 or CM2), conscientious crosschecking item by item of inserted data and results between the PIC and the SIC is required (both have same revision and version of applications). If any doubts exist regarding results both crewmembers shall do it.
- **d)** In case of any discrepancy between EFB revisions, only the last approved revision shall be used.
- **e)** Each aircraft shall be equipped with an approved iPad holder in the flight kit.
- **f)** Each pilot is responsible to ensure the airworthiness of the iPad. For the first flight of the day, verify the iPad battery status – Minimum of 70%.
- **g)** EQRH is part of Fly Smart installation and takes the same version number as the rest of Fly Smart applications.

8.12.7.2 Flight Preparation

IPad……………………………………………………………………………………..ON
AIB Manager……………………………………CHECK FLYSMART VERSION (Both)

<u>*To update data used by Fly smart with Airbus Applications for iPad, or when EFB version is out of date</u>

Server, Username, Password...Enter (Both)

Update All .... Select (Both)

*Once update is completed, the new EFB version appears on top

Jepp FD PRO…………………………………………………………………Display (Both)
PPS CrewBriefing……………………………………………………………Synchronized

*update data used by Jeppesen FD PRO application for iPad, or when new update is released:
Updates…………………………………………………………………….Select (Both)

8.12.7.3 Preliminary Cockpit Preparation:

a) EFB preparation
IPads……………………………………………………………………ON (Both)
IPad Holder………………………………………………………………SECURED (Both)
Jepp FD PRO……………………………………………………………...PREPARE (Both)

- Setup the flight details (Departure, Arrival, Alternates)
- Insert the En-route details
- Select the proper terminal charts (REF, Co, STAR, APP, TAXI, SID)

Fly smart AIB (My Flight page) ……………………………………………PREPARE (Both)

- Select the Aircraft Type
- Select the proper Aircraft Registration
- Clear previous flight setups
- Insert the Flight Number (e.g. NMA xxx)
- Select the Departure airport (FROM)
- Select the Arrival airport (TO)

PPS Crew Briefing……………………………………………DOWNLOAD DOCUMENTS

- Update list of flights
- Select flight
- Download required documents
- Make sure the downloaded sign is shown

b) MEL / CDL Items Check OLB DISPLAY (Both)
MEL/CDL Items…………………………………CHECK DISPATCH CONDITIONS (Both)

- check dispatch conditions

MEL/CDL Items……………………………………………………………SELECT (Both)

- Selected MEL/CDL items are sent to the performance app

c) EQRH
CHECKLISTS…………………………………………………………RESET AND READY

8.12.7.4 Before Pushback or Start:

a) Load sheet Calculations (Load sheet not received from agent)

Actual Figures……………………………………………………………………...OBTAIN

Load sheet data………………………………………………………..PREPARE (CM1 or CM2)

- verify aircraft configuration
- Detailed Entry Mode
- Crew
- Catering
- Insert passenger loading instructions
- Insert Cargo loading instructions
- Insert Fuel On Board (FOB), Trip Fuel, and Taxi fuel details
- verify MEL item is properly selected

Final Loading…………………………………COMPUTE (CM1 or CM2) & CROSSCHECK

- Crosscheck inputs and results
- Last minute change computation should be recomputed and crosschecked in accordance with company rules.

Load sheet…………………………………………Export, Sign and Generate (CM1 or CM2)

- The Load sheet must be approved by the PIC
- PIC may insert information notes
- The Load sheet must be signed by the crew who checked it.

Load sheet Display……………………………………………………SEND (CM1or CM2)

***First option:**

- Select Print
- Fetch the Load sheet
- Send to the appropriate station Email to print

***Second option:**

- Select Print
- Select the printer
- Select the number of copies

b) Performance Calculations

Note:

1. Consider to do Load sheet Calculation when MANUAL Load sheet received from agent (to check it)

2. In case of failure of both options revert to manual load sheet and file a report to EFBreporting@nesmaairlines.com

Airfield Data……………………………………………………………………OBTAIN (Both)

- both pilots listen to ATIS

T.O. Data…………………………………PREPARE & CHECK/REVISE (CM1 or CM2)

- Check and select the departure airport
- Select Runway in use, and modify the runway if required.
- Insert Airfield data (Wind, OAT, QNH, RWY COND)
- Check or insert TOW
- Check or insert T.O. thrust
- PIC select the Thrust setting
- Select Flap configuration for take off
- Air condition (ON or OFF)

- Select Anti Ice (ON or OFF)
- Verify proper MEL/CDL item is properly selected
- Set up All Engine Climb Gradient Parameters (Thrust reduction altitude, level-off altitude, gradient)

T.O. Performance……………………………COMPUTE (CM1 or CM2) & CROSSCHECK

- Last minute change: Takeoff computation should be recomputed and crosschecked in accordance with company rules.

Note 1: if takeoff weight limited by performance is less than the maximum structural takeoff weight, load sheet calculation shall be redone to update limiting weights.

Note 2: Takeoff performance calculates All Engine Climb Gradient (SID gradient). If the aircraft is not capable of achieving the required gradient, inform the ATC.

c) iPad

Airplane Mode…………………………………………………………….ON (Both)

- The transmitting capability of the iPad should be switched off.

d) Jepp FD PRO – Navigation chart

Terminal charts……………………………………………………….As required (Both)
Brightness……………………………………………………………..As required (Both)

- Night Theme is recommended during night operations.

e) PPS Crew Briefing

Flight Data………………………………………………………………Downloaded (Both)

f) EQRH

Normal Checklist…………………………………………………………BEFORE START

8.12.7.5 Taxi

Terminal charts…………………………………………………..…As required (Both)
IPads…………………………………………………………On, Secured, & Viewable (Both)

- Any changes to the calculations must be computed and crosschecked.
- The CM2 computes and updates FMGS
- The CM1 crosschecks.

8.12.7.6 Before Takeoff

Terminal charts……………………………………………………….As required (Both)
IPads…………………………………………………….On, Secured, & Viewable (Both)

- Use appropriate brightness setting
- Use of power outlet in this phase is prohibited
- EQRH BEFORE TAKEOFF

8.12.7.7 Flight

Jepp FD PRO……………………………………………………………As required (Both)

- Jepp FD PRO En-route charts may be used IPads……………As required (Both)
- iPad may remain secured on the holder
- IPad should be charged during cruise in the documentation Stowage.
- iPad should be on Standby to reserve the battery

EQRH……………………………………………………………AFTER TAKEOFF/CLIMB
In-flight Performance……………………………………………………WHEN REQUIRED

8.12.7.8 Approach and Landing

Airfield Data……………………………………………………………OBTAIN (Both)

- Both pilots listen to ATIS.

Landing Data…………………………………PREPARE & CHECK/REVISE (CM1 or CM2)

- Check or select proper arrival airport
- Insert runway in use, and modify it if required.
- Insert airfield data (Wind, OAT, QNH, RWY COND)
- Check or insert proper landing weight
- Check or select proper landing CG
- Select Landing configuration
- Select Air Condition (ON or OFF)
- Select Anti-Ice (ON or OFF)
- Select and insert APPR Type
- Select proper GA Gradient
- Insert Pilot
- Select Landing Technique
- Brake Mode
- Verify or select proper MEL/CDL/ECAM status.

Landing Performance…………………………COMPUTE (CM1 or CM2) & CROSSCHECK
EQRH…………………………………………………………………………APPROACH

- Compute if landing conditions have changed (i.e. runway or weather conditions or in-flight failures affecting performance)
- No preliminary landing performance was established before departure, for example, in case of diversion.

IPads………………………………………………………On, Secured, & Viewable (Both)

- IPad should be on, secured, and viewable during final approach.
- Use of the power outlet during landing is prohibited.

8.12.7.9 Taxi In

Terminal charts……………………………………………………………As required (Both)
EQRH……………………………………………………………………..AFTER LANDING
IPads……………………………………………………………On, Secured, & Viewable (Both)

- Use appropriate brightness setting
- Use of power outlet is prohibited

8.12.7.10 Parking

IPad Airplane Mode……………………………………………………………OFF (Both)
EQRH………………………………………………………………….……PARKING
My Flight……………………………………………………….……Display (Both)
Clear button……………………………………………………………Select (Both)

8.12.7.11 Securing the Aircraft:

EQRH…………………………………………………………SECURING THE AIRCRAFT
IPad…………………………………………………………………Remove (Both)

8.12.8 EFB Failure Procedures

General:

1) EFB Failure Procedures provide operational mitigation means related to EFB failures prior to dispatch. It also describes the subsequent failure with operational impact in flight and their associated impact on operations.
2) At least three iPads will be located at airport OCC to be used only as a backup.
3) A complete set consists of three iPads, at least two of them should be operative prior to takeoff, and otherwise it is a no-go item as per CMEL MI46-11-01.
4) Failure includes malfunctioning of the device and out-of-date dataset with no accessibility to update.
5) A Pilot Report (EFB) must be written and submitted when a failure condition is encountered – refer to EFB Reporting Procedures.

8.12.8.1 IPads:

1) A Minimum of two iPads must be operative before takeoff as per CMEL MI46-11-01.
2) A failure of **one or two** iPads when flying from Nesma Airlines base.

Consequence	Operational Procedure
Back up iPads are available at OCC office – updated and charged	The crew must check the backup iPad airworthiness The crew must sign the custody of the backup iPad and write the reason The crew must return the backup iPad to OCC The Flight Dispatcher must check the backup iPad airworthiness The Flight Dispatcher must sign the return of the backup iPad The Flight Dispatcher must send the form to Chief pilot Refer to failure procedures of the EQRH Application:

3) On Ground (outside Nesma Airlines base or after closing doors when flying from Nesma Airlines base) or In Flight: Failure of iPad on one (CM1 or CM2) side:

Consequence	Operational Procedure
Applications remain available on the other side	Status on operative iPad checked OK Battery life is sufficient for the remaining flight Use of backup iPad in lieu of the failed one

4) On Ground (outside Nesma Airlines base or after closing doors when flying from Nesma Airlines base): Failure of both iPads (CM1 & CM2 side):

Consequence	Operational Procedure
Electronic flight bag is not complied with Loss of iPads on both sides	Refer to CMEL MI 46-11-01

Documentation:

1) A Minimum of two Documentation sources should be available as per CMEL 46-11-01.
2) **On Ground or In Flight: Failure of Documentation on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of Documentation on one side	Documentation is available on the other side and backup iPad is ready. Replace broken iPad with the backup iPad

3) **On Ground or In Flight: Failure of Documentation on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of Documentation on both sides	Refer to CMEL MI 46-11-01 Use Backup iPad

8.12.8.2 Takeoff Application:

1) **On Ground or In Flight (if needed): Failure of T.O. PERF on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of T.O. PERF on one side	T.O. PERF is available on the other side Use Backup iPad

2) **On Ground or In Flight (if needed): Failure of T.O. PERF on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of T.O. PERF on two sides	Refer to CMEL MI 46-11-01 Use Backup iPad

8.12.8.3 In FLT LDG Application:

1) **On Ground or In Flight: Failure of IN-FLT LDG on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of IN-FLT PERF on one side	In-Flight PERF is available on the other side Use of Backup iPad

2) **On Ground or In Flight: Failure of IN-FLT LDG on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of IN-FLT PERF on both sides	Refer to QRH

8.12.8.4 Load Sheet Application:

1) **On Ground: Failure of Load sheet on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of IN-FLT PERF on one side	In-Flight PERF is available on the other side Use of Backup iPad

2) **On Ground or In Flight: Failure of IN-FLT LDG on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of IN-FLT PERF on both sides	Refer to QRH

8.12.8.5 Load Sheet Application:

1) **On Ground: Failure of Load sheet on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of Load sheet on one side	Load sheet is available on the other side Use Backup iPad

2) **On Ground: Failure of Load sheet on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of Load sheet on both sides	Refer to CMEL MI 46-11-01 Use of Backup iPad Revert to Manual load sheet if outside Nesma Airlines Base

8.12.8.6 Jepp FD PRO Application:

1) **On Ground or In Flight: Failure of Jepp FD PRO on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of Jepp FD PRO on one side	The Jepp FD PRO is available on the other side Use Backup iPad

2) **On Ground or In Flight: Failure of Jepp FD PRO on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of Jepp FD PRO on both sides	Refer to CMEL MI 46-11-01 Use Backup iPad on CM1 side

8.12.8.7 PPS Crew Briefing

1) **On Ground or In Flight: Failure of PPS Crew Briefing on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of PPS Crew Briefing on one side	Use Backup iPad and make sure PPS crew briefing documents are available on two devices Use Backup iPad

2) **On Ground or In Flight: Failure of PPS Crew Briefing on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of PPS Crew Briefing on both sides	Revert to paper documents

8.12.8.8 EQRH Application

1) **On Ground: Failure of EQRH on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of EQRH on one side	EQRH is available on the other side Use Backup iPad Request paper copy of QRH as a backup.

2) **On Ground: Failure of EQRH on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of EQRH on both sides	Refer to CMEL MI 46-11-01 Use of Backup iPad Revert to paper copy of QRH if available

8.12.8.9 In-Flight Performance Application

1) **On Ground: Failure of in-flight performance on one (CM1 or CM2) side:**

Consequence	Operational Procedure
Loss of in-flight performance on one side	The app shall be available on the other side Backup iPad should be functional

2) **On Ground: Failure of EQRH on both (CM1 & CM2) sides:**

Consequence	Operational Procedure
Loss of in-flight performance on both sides	Refer to CMEL MI 46-11-01 Use of Backup iPad Revert to paper copy of QRH if available

8.12.8.10 Gateway

Gateway including all releases uploaded on the server shall be backed up on daily basis as per IT manual to avoid any unrecoverable failure.

8.12.9 EFB Maintenance Program

A. EFB Maintenance Program

1) All anomaly reports will be recorded and maintained by Operations Technical Office.
2) All actions taken will be recorded and maintained by Operations Technical Office.

B. Scheduled maintenance:

1) The EFB administrator has the authority to conduct/delegate the scheduled maintenance actions.
2) The scheduled maintenance program must be accomplished once every 12 Calendar Months.
3) Check will be conducted according to the below checklist.

EFB Maintenance Form		
IPad ID:	**A/C:**	**Date:**
Item	**☐S**	**☐US**
iPad Hardware		
Check Hardware status	☐	☐
Screen condition and touch screen response	☐	☐
Buttons and clicks	☐	☐
Others (Comments).		
iPad Software		
iPad updates	☐	☐
Non EFB apps (specify).		
EFB applications		
Check manuals and documents.	☐	☐
Any items recommended by Authority.	☐	☐
Any items recommended by manufacture or software providers.	☐	☐
Battery		
The battery should be fully drained.	☐	☐
IPad battery will require a 6- hour capacity check.	☐	☐
The battery (or device) will require replacement every 2 to 3 years, subject to the battery 6- hour capacity check.	☐	☐
If the device cannot sustain power through 6 hours of normal use, the battery (or iPad) will be replaced.	☐	☐
Check completed by:	**Date:**	**Signature:**

C. Un-scheduled maintenance:

1) Operations Technical Office Publishes a bulletin to conduct any unscheduled maintenance.

8.12.10 Reporting Procedures

a) **The pilot must submit the pilot Report (EFB) <u>within 24 hours</u> from Sign Off.**

b) **EFB Reporting System - Pilot:**

1. The pilot can submit the pilot Report (EFB) by the following:
   a) <u>Electronically:</u> The pilot should submit email to the EFBreporting@nesmaairlines.com.
   b) <u>Manually:</u> If the report is too long or the pilot cannot submit the report electronically, the pilot can submit the report by handwriting in the flight folder or by hand to the Chief pilot.

c) **When to write, and submit a pilot Report (EFB):**

1) Whenever a failure condition is encountered – refer to EFB Failure Procedures.
2) In case of inability to comply with the revision procedures – refer to EFB Revisions Procedures.
3) In case of problems associated with the iPad hardware, such as damages or screen brightness, etc.
4) In case of problems associated with the iPad software, such as viruses or crashes, etc.
5) In case of any safety hazards associated with EFB program.
6) Whenever a hardcopy is used instead of the applications provided.
7) Any missing Data. Such as, airport missing in the Jepp FD-PRO application or a runway is not in database of the Fly smart, etc.
8) Whenever a Back-up iPad is used instead of the assigned iPad.
9) Whenever a trouble shoot is accomplished by the end user – refer to the EFB Training Program iPad.
10) Any recommendations the end users believe that it will improve the EFB program and Nesma Airlines operations.

b) **Operations Technical Office Duties:**

1) Operations Technical Office will evaluate the problem and communicate the anomaly with the appropriate departments:
   a. Software issues with the software providers,
   b. Airplane manuals issues with the publication department,
   c. Company manuals issues as needed,
   d. Jepp FD-PRO with Jeppesen,
   e. Takeoff charts (runway analysis)
   f. Hardware issues with IT,
   g. Safety Hazards with Safety department,
   h. Others as appropriate.
2) Operations Technical Office will fill out the corrective action regarding EFB reported issues.

If required: Operations Technical Office will publish a bulletin to End users to avoid similar problems in the future.

8.12.11 EFB Training Procedures

- **a) EFB Training Program - Users:**
  - **1) Initial New Hire Pilots**
    - **a. Airbus Presentations (Self Study)**
      - **i. My Flight**
        - **1.** Performance Module Management
          - **a.** Select aircraft
          - **b.** Select Weight variant
          - **c.** Enter a Flight Number
          - **d.** Select Airports – Departure and destination
          - **e.** Start Performance application
        - **2.** Link the Performance Modules
          - **a.** Integration among EFB Modules i.e. Load sheet, Takeoff, Landing and OLB Modules
        - **3.** Update EFB data
          - **a.** Airbus Manager
          - **b.** Account Setting
            - **i.** SERVER
            - **ii.** USERNAME
            - **iii.** PASSWORD
          - **c.** Update
            - **i.** Performance Takeoff User Module
              - **1)** Introduction
              - **2)** User interface – Input data
              - **3)** User Interface – Output data
              - **4)** Exercises
            - **ii. Performance Landing User Module**
              - **1.** Introduction
              - **2.** User interface – Dispatch (if applicable)
              - **3.** User Interface – In-Flight (if applicable. Note: at least one landing interface should be available)
              - **4.** Practice
            - **iii. Load sheet User Module**
              - **1.** Introduction
              - **2.** Flight Configuration
              - **3.** Entry Modes
                - **a.** Detailed Mode
                - **b.** Detailed - DOW/DOI Mode
                - **c.** Reduced Mode
              - **4.** Passengers, Cargo and Fuel Distribution
              - **5.** Changing Fuel Density

b) Nesma Airlines Classroom – Hand on experience **03:00 hrs.**

i. iPad **00:10 mins**

1) How to operate the iPad.

ii. AIB Manager **00:05 mins**

1) Verify the correct version of EFB.
2) If not, update EFB.

iii. Takeoff User Module **00:25 mins**

1) Select My Flight and enter:
   a. Aircraft Type
   b. Aircraft Registration
   c. Flight Number
   d. From and To Airports
2) Select Takeoff Module and verify correct Tail Number
   a. Select Departure Runway, if there is a NOTAM, modify the runway length and, if required, one obstacle can be entered through "Modify Runway option".
   b. Enter Wind:
      i. Absolute or
      ii. Relative
   c. Enter OAT
   d. Enter QNH
   e. Enter Runway Condition
   f. Enter Actual Takeoff Weight (this normally comes from Load sheet module)
   g. Enter T.O. CG in %MAC (this also normally comes from
   h. Load sheet module)
   i. Select T.O. Configuration (CONF 1+F is Standard choice)
   j. Air Cond "ON" is standard Selection but can be changed
   k. Select A-ICE ON or OFF
   l. MEL/CDL can be selected. However, OLB is the correct module to select desired MEL
   m. COMPUTE
   n. On "RESULT" page select Thrust:
      i. TOGA
      ii. Maximum FLEX or
      iii. Conservative FLEX, a few degrees lower than the MAX FLEX
      iv. Then three pages of output values are displayed.
      v. First page gives V1range/Vr/V2, limitations, ENG OUT ACC, Green DOT, Reversers for computation, MTOW (Performance Limit) and Accelerate Stop Distances for Minimum and Maximum V1.
      vi. Second Page displays FMC CDU Takeoff Page
      vii. Third Page Displays Maximum and Minimum Altitudes.

iv. Landing User Module **00:20 mins**

1. Select Landing Module – In-Flight Landing is the default sub module
2. Verify correct aircraft Tail number
3. Enter Landing Runway in use
4. Modify the Runway length, if desired
5. Enter Wind
6. Enter OAT
7. Enter QNH
8. Enter Runway Condition as per Runway Condition Assessment Matrix (RCAM)
9. Enter Landing Weight (this normally is forwarded from the load
10. sheet Module)
11. Enter Landing CG(this normally is forwarded from the load sheet Module)
12. Select Landing Configuration (CONF FULL is standard DEFAULT
13. value)
14. Select AIR COND ON or OFF (AIR COND ON is standard DEFAULT value)
15. Select A-ICE ON or OFF as applicable
16. Verify APPR TYPE is NORMAL
17. Standard GA Gradient is 2.1%. If required it may be increased.
18. Add Pilot if desired
19. Select LDG TECH:
    - **a.** MAN- A/THR OFF
    - **b.** MAN- A/THR ON
    - **c.** Auto land (not to be used)
20. Select BRK MODE. Auto Brake LOW is standard.
21. Select the option for Reverser. Yes or No.
22. If the MEL was selected in OLB, it will automatically be carried to Landing Module. Otherwise, select the MEL/CDL manually
23. Select In Flight Failure(s) in ECAM Icon.
24. Select COMPUTE to run In Flight computations.
25. The result variables are displayed on 2 pages.
    - **a.** Page 1 gives:
        - **i.** MLW (PERF Limit)
        - **ii.** VAPP
        - **iii.** Landing Distance (LD)
        - **iv.** Factored LD (FLD) and
        - **v.** Margin with FLD
    - **b.** Page 2 gives:
        - **i.** LIMITATION Code
        - **ii.** Go Around Gradient
        - **iii.** VAPP Calculation and
        - **iv.** In Operative Systems in case of In Flight Failure (s)

v. Load sheet User Module 00:25 mins

1. Select Load sheet module
2. Verify correct aircraft tail number
3. Select Entry Mode
   a. Detailed (Standard)
   b. Reduced (Not Applicable for Nesma Airlines)
   c. Detailed (DOW/CG input)
4. Select Crew Compliment from the given catalogue. Standard value is 2 pilot s and 4 cabin Crew
5. Verify Catering
6. Select Passengers and distribute them in cabin Zones OA, OB and OC
7. Select Cargo/Baggage and distribute it in cargo compartments CP1,
8. CP3, CP4 and CP5
9. Verify Fuel Onboard
10. Enter trip fuel
11. Verify Taxi Fuel. Default value is 500 kg but it can be changed
12. Verify Fuel Density. Default value is 0.785 kg/l but it can be changed. Note: Fuel density has no effect on computations rather than changing the fuel vector for balance calculations. A change in fuel density will affect the total fuel weight that can be carried in the fuel tanks.
13. Touch COMPUTE to start the calculations.
    a. If all the parameter are within Takeoff Weight/CG envelope, results will be displayed as follows:
       i. On page 1 of the results:
          1. A message of under load/overload will be displayed on top of the Weight/CG Envelope.
          2. Below the Weight/CG Envelope are displayed:
             a. DOW/DOCG, Payload, ZFW/ZFWCG,T.O. Fuel, TOW/TOCG, Trip Fuel ,LW/LCG and THS
             b. Above Under load message on the right hand side of heading Results an ICON appears for Export. The option EXPORT is used to generate, sign and print or email the Load sheet to Flight Operation Performance Engineering to save the load sheet for future reference.
       ii. On page 2 of the results:
          1. Tank-wise fuel distribution diagram is shown.
          2. Below fuel diagram is given the breakdown of passengers and cargo with distribution in cabin zones and cargo compartments respectively.

vi. Fly smart OLB Application 00:10 mins

1. Select OLB
2. Verify correct Tail Number of the aircraft
3. The following list of manuals will be displayed:
    - **a.** Flight Crew Operating Manual (FCOM)
    - **b.** Minimum Equipment list (MEL)
    - **c.** Quick Reference Handbook (QRH)
    - **d.** Aircraft Flight Manual (AFM)
    - **e.** Cabin Crew Operating Manual (CCOM)
    - **f.** Flight Crew Training Manual (FCTM)
    - **g.** Weight and Balance Manual (WBM)
    - **h.** Any other documents in PDF format that should be part of the onboard library.
4. Select and browse the appropriate manual
5. Procedure for inserting an MEL:
    - **a)** Select the arrow against the MEL
    - **b)** Select MEL Entries
    - **c)** Select the ATA chapter to which the MEL is related to e.g. chapter 27 – Flight Controls
    - **d)** Select the MEL Entry E.g. F/CTL GND SPLR FAULT
    - **e)** Select the applicable Condition of Dispatch e.g. Item 27-92- 02 Ground Spoiler Control System
    - **f)** MEL Items will be displayed which will inform whether the
    - **g)** Item is GO or NOGO along with applicable Maintenance or/ and Operation procedure.
    - **h)** Tick the Square Box on the left side of 27-92-02 Ground Spoiler Control System
        - **i)** The selected MEL will be incorporated in Takeoff and Landing modules automatically.

vii. Jepp FD Pro Application 00:30 mins

1. Introduction
2. Operations
3. How to use:
    - **a.** Terminal Charts
    - **b.** En-route charts

viii. EFB Operation/EFB Failure Procedures **00:20 mins**

1. EFB Applications
2. Revision/Upgrade Procedures
3. EFB Operation Procedures
4. EFB Failure Procedures
5. EFB Reporting Procedures
6. EFB Checklist

2) Transition Training

It follows the same Training Curriculum as Initial New Hire.

3) Upgrade Training

- **a.** Revision – Takeoff, Landing, load sheet and OLB Modules **as required** EFB Operation/EFB Failure Procedures
- **b.** (as per GOM Vol. 1 Chapter 11) **20 mins**
    - **i.** EFB Applications
    - **ii.** Revision/Upgrade Procedures
    - **iii.** EFB Operation Procedures
    - **iv.** EFB Failure Procedures
    - **v.** EFB Reporting Procedures
    - **vi.** EFB Checklist

4) Recurrent Training

It follows the same Training Curriculum as Upgrade Training.

- **a.** EFB Training Program – EFB Administrator/ Administrators
    - **1.** iPad Configuration
    - **2.** Fly smart
        - **a)** Performance: The administrator will be trained as per Airbus Performance Administration Course
        - **b)** Documentation: the administrator will be trained as per Airbus Gateway Course
    - **3.** Jeppesen charts
        - **a.** How to administrate the JDM software
        - **b.** How to administrate the Jepp FD-PRO application
    - **4.** Adobe Acrobat
        - **a.** How to use and administrate electronic forms
        - **b.** How to send electronic forms

8.12.11.1 EFB Training Program - iPad

A. iPad General:

1. IPad shall be used for EFB only.
2. Prior to pushback or engine start until the end of flight: the iPad must be on Airplane Mode.

B. Hardware: Solar Mitigation:

1. The iPad operates properly within a specified temperature range. The device features **an automatic shut-down in the event the device temperature is outside the range**. In the event of a shutdown, allow the iPad to change temperature until it is back in the required range. The iPad is a low power-consumptive device, and its operation does not generate heat that would result in a shutdown. The primary cause of shutdown is an effect called "solar gain," or heat generated within the device as a result of solar energy absorbed through the display. Anecdotal evidence suggests that glare shield design with inherent UV protection may protect against this effect.
2. When the sunlight is in direct contact with the iPad, the crew should attempt to prevent a shut-down by using the window shades such that the sun is not aimed directly to the iPad. Or during non-critical phases of the flights, consider stowing iPads.
3. If an EFB user experiences an unexpected automatic shutdown, the user must report it immediately as per the EFB Reporting Procedure. Provide details such as phase of flight, lighting conditions, and environmental temperature.

C. iPad Battery:

1. The iPad will have a 12 month ops check and a 2-3-year battery life limit consistent with the procedures established with other the Class II tablet device EFBs in use.
2. iPad battery must be at least 50% or more prior to the first flight of the day
3. Ensure the following are turned off to enhance the battery life:
   a. The cellular 3G/4G/ Bluetooth/ Wi-Fi connectivity
   b. Fly smart apps when not in use
   c. Location services should be reduced to minimum
   d. Other apps or functions that can drain battery's life. (I.e. Internet browsing, reading, photos, videos, etc.)
4. The device brightness may be adjusted as needed; however, a lower setting (if appropriate) can reserve the battery's energy.
5. The use of a portable back-up battery will allow the device to be charged in flight or provide supplemental power if needed (without ships power). If a portable battery is to be used force charging, it must also be tracked and on a suitable life-limit schedule. This portable battery shall not be charged while in flight, only on ground.
6. If desired, the use of ship power via a standard 110V AC cockpit outlet is authorized provided that Apple authorized accessories are used. If ships charging is not used, then either a charged spare external battery or a third approved source of chart data must be available for any Type B application.
7. IPad has an internal rechargeable battery. The battery icon in the upper right corner of the status bar shows the battery level or charging status.
8. The best way to charge the iPad battery is
   a. To connect iPad to a power outlet using the 10W USB power adapter.

- **b.** Connecting iPad to the USB connector of a Mac or PC that is turned off might discharge iPad.
- **c.** If Mac or PC does not provide enough power to charge iPad, a not charging message will appear in the status bar.
- **d.** If iPad is very low on power it might need to be charged for up to 10 minutes before you can use it. The screen might go black for up to 2 minutes.

9. Charging Battery and use of a portable back-up battery with cable during flight:
- **a.** Charging iPad and use of a portable back-up battery with cable during Takeoff and Landing is prohibited.
- **b.** Avoid charging the iPad and use of a portable back-up battery with cable during critical phases of the flight (other than Takeoff and Landing); except when urgently needed.
- **c.** The device must be unplugged when the battery reach 100%.

10. Ensure the iPad charger is original and in good condition.
11. Monitor the device while it is charging from an aircraft power source.
12. The crew should not charge the device when it is hot to the touch or in an extreme hot environment.
13. Certain carrying cases trap the device's heat and may need to be removed while charging.

D. Device Troubleshooting

1) If iPad won't turn on, or the display stops responding:
- **a.** Turn the iPad off and turn it on again. Press and hold the Sleep/Wake button on top of iPad for a few seconds, until a red slider appears. Then slide the slider. Then press and hold the Sleep/Wake button until the Apple logo appears.
- **b.** Reset iPad. Press and hold the Sleep/Wake button and the Home button at the same time for at least ten seconds, until the Apple logo appears.

2) The user must submit a report – refer to <u>EFB reporting procedures</u>.

E. Software Policy:

1) All iPad users are responsible to ensure that any other installed apps or customized settings do not affect the intended function of Nesma Airlines authorized applications.
2) The end user must not delete any of the EFB application without a proper notification from the Chief pilot.
3) Download games, songs, movies, and videos that are not related to the EFB usage is prohibited.
4) ‘Jail braking’, or any modification of the hardware, software or installed apps is prohibited.
5) Violating company rules and regulations – refer to OMA VOL1.
6) If an EFB user discovers an anomaly that affects the operation of the device hardware or software, the user must report it immediately following the EFB reporting procedures.
7) The user is only authorized to install approved company Email only.

F. iPad Settings:

1) Before engine start or pushback until the end of flight, the iPad must be on airplane mode.
- Go to Setting
- Airplane Mode - ON

8.12.11.2 EFB Training Program – Fly Smart

A. General:

1) The performance applications include: Takeoff, Landing, and Load sheet apps.
2) The operation documentation application (OLB).
3) Manager application.
4) Refer to the Fly smart presentations and latest user guide documents.
5) Color Definitions:
- Blue = user's input
- White = default values (defined by the Administrator)
- Yellow = system data (modifiable)
- internal (structural weights, passenger distribution)
- from other performance modules
- Red = out of limits computed data

B. Data Storage and Retrieval:

1) The data is stored at Fly smart Gateway.
2) The Gateway is installed at two servers, one works as a primary and the second one works as a back-up.
3) The Fly smart Gateway application store the username activities.

C. Airbus AIB Manager

1) User Guide – EFB version:

1) The EFB version represents the version of the data release installed on your iPad applicable to all your Fly smart with Airbus applications.
2) The EFB version when displayed in GREEN, it means that all your applications are up- to-date regards to the available data release.
3) If the EFB version is set to UKNOWN, it means that all your applications are not up- to-date regards to the available data release.

2) User Guide – Applications status:

1) D : Application is up-to-date regards to current EFB version
2) ! (RED): The Application is not up-to-date regards to current EFB version
3) ! (BLACK): No data available for the application in the current EFB version

3) How to update the Airbus Fly smart contents:

1) Open the AIB Manager
2) Verify the EFB Version
3) Insert the Server: shall be provided by official means
4) Username: as given by the EFB administrator
5) Password: as given by the EFB administrator
6) Tab "Update All" button
7) Ensure that all application has a green D symbol
8) Verify the EFB version

4) **How to troubleshoot:**
   1) Delete the application,
   2) Download the application again.

      A. My Flight

      1) Verify the EFB revision with the latest revision.
      2) Verify the appropriate Aircraft Family
      3) Choose the Aircraft registration (ex. SU-NMA)
      4) Flight: Clear button to clear previous set ups
      5) Flight Number: (ex. NMAXXX)
      6) FROM: the name of the departure airport
      7) TO: the name of the arrival airport
      8) All the inputs that the user has entered on one MY Flight Page are retrieved by other applications.

      B. EFB VERSION

      1) Each crew at the start of their duty must compare the EFB version with the valid version that is provided by the operation department.
      2) The latest update is provided by a bulletin or an email from the chief pilot.
      3) Documents with ECAA approval are to have ECAA approval letter.

      C. Airbus AIB OLB

      1) Brightness Selection
      2) Autorotation lock
         a. Portrait and landscape display
      3) List of Manuals:
         a. FCOM
         b. MEL
         c. FCTM etc.
      4) Search
      5) Bookmarks
      6) What-if
      7) Notes
      8) ECAM

D. T.O Performance Calculation:

1. Import Data:

1) Flight information
   - **a.** Airplane Identification
   - **b.** RWY- Runway
   - **c.** Wind
   - **d.** OAT – Outside air temperature
   - **e.** QNH
   - **f.** RWY Cond - Runway Condition
   - **g.** TOW – takeoff weight
   - **h.** T.O CG – takeoff CG
   - **i.** CONF
   - **j.** Air Condition
   - **k.** Anti-ice
2) MEL/CDL
3) CLEAR / COMPUTE
4) Tab on the runway to modify its data.

2. Export Data:

1) Tab COMPUTE: it takes approximately 60 seconds
2) Avoid the use of STOP
3) Choose the appropriate thrust settings
4) Check all three pages available for data
5) Write down important information in the flight release
6) Operators Picture Display – used in case of EOSID

E. **Landing Performance Calculation:**

1) **Import Data:**

Inflight	Dispatch
Airport name RWY; Runway in use Wind direction OAT – outside air temperature QNH RWY COND - Runway Condition LW - Landing Weight LDG CG – Landing Center of Gravity LDG CONF - Landing Configuration AIR COND - Air Conditioning A-ICE - Anti Ice APPR TYPE - approach Type GA Gradient – Go Around Pilot - Velocity Pilot LDG Tech BRK MODE: Brake Mode MEL/ CDL/ ECAM Clear/ Compute	Airport name RWY; Runway in use Wind direction OAT – outside air temperature QNH RWY COND - Runway Condition LW - Landing Weight LDG CG – Landing Center of Gravity LDG CONF - Landing Configuration AIR COND - Air Conditioning A-ICE - Anti Ice APPR TYPE - approach Type GA Gradient – Go Around Pilot - Velocity Pilot LDG Tech BRK MODE: Brake Mode MEL/ CDL Clear/ Compute

2) **Export Data:**

1) Tab COMPUTE: it takes approximately 60 seconds
2) Avoid using the STOP button
3) Check the two pages for data
4) Use MODIFY button: to modify import data

F. **FLYSMART AIB Load sheet**

1) **Input Data:**

DETAILED	REDUCED
CONFIG ENTRY MODE CREW FDC – flight deck crew FA – flight attendant F – forward R - reward CATERING LIMITING Weights PAX - passengers CARGO FOB – fuel onboard TRIP FUEL TAXI FUEL DENSITY MEL CLEAR/COMPUTE	CONFIG ENTRY MODE LIMITING Weights DOW/DOCG ZFW – zero fuel weight ZFWCG – zero fuel weight center of gravity FOB – fuel onboard TRIP FUEL TAXI FUEL DENSITY MEL CLEAR/COMPUTE

DON'T USE REDUCED MODE

2) **Export Data:**

1. Tab export
2. Checked by: the name of the SIC or the PIC
3. Approved by: the name the PIC
4. FROM: the name of the departure airport
5. TO: the name of the arrival airport
6. PAX PER CLASS: number of passengers
7. CAPT INFO NOTES
8. LTS MODE
9. EDITION NUMBER

G. **EQRH**

Refer to EFB Training Program – EQRH

H. **In-flight Performance**

1) Setup parameters as required in every respective tab 1- Average wind
2) Temperature
3) Anti-ice
4) Air-conditioning
5) Initial Weight at cruise
6) Average CG position in MAC%
7) Ground distance (nautical miles)
8) Cruise Altitude
9) Speed Type (Cost Index, LRC, Fixed Speed)
10) Non Standard configuration items

8.12.11.3 EFB Training Program –Jepp FD PRO

A. Introduction:

1) Jepp FD Pro is an application that works with the iPad to act as a Class II EFB, Type B software application.
2) One click update automatically replaces outdated content with new versions via the internet. Notifications are displayed when content has expired and new content needs to be uploaded.

B. Data Storage and Retrieval:

1) The contents are stored at Jeppesen servers.
2) The data is retrieved through Jepp FD Pro application.
3) The JDM stores the user activities and configuration status.

C. Jepp FD Pro Features

1) Full Scree view maximizes use of the entire iPad screen area
2) Two fingers swipe left or right takes you to the selected plate
3) Overview provides thumbnails and key information for quick selection of plates
4) Zoom in and out
5) Screen can be dimmed for use of device in low light environments
6) Choose the airports you are planning to use.
7) Easy use.
8) Annotate plates by simply drawing your finger tip
9) Text customized for Nesma Airlines
10) En-route charts
11) Display intended flight plan on the En-route charts

D. Training

1) Presentations
2) Videos

E. Configuring the Jepp FD Pro:

1) Ensure the IOS iPad comply with the Jepp FD PRO requirement.
2) Jepp FD PRO is downloaded properly on the iPad.
3) An email is received from the administrator with a link. On the iPad, tab on the link or copy and paste on the Internet browser. The link will automatically open the Jepp FD PRO application.
4) Click on Update to update all required items.
5) According to EAC 121-15 the display of an own-ship symbol limited to the airport surface as a Type B software application and limited to functions having a failure condition classification considered to be a minor hazard or less, and only for use at speeds of less than 80 knots. Type B software applications using own-ship may be considered only an aid to situational awareness (i.e. not appropriate for: surface navigation, guidance, maneuvering, control functions, etc.). Crewmember training, to use display of own-ship position on the airport surface, should include visual check procedures to require the pilot to do visual checks of outside airport signage and markings against the depicted airport map to verify the own-ship symbol is shown at that same location. Training should also include proper error reporting procedures for crewmembers when visual checks reveal display discrepancies.

Due to not approved GPS receiver and without Visual Check Procedures flight crewmembers shall follow Jepp FD-PRO company settings (Settings -> Jepp FD-PRO):

- ENROUTE VIEW: Enable Moving Maps: **OFF**
- ENROUTE VIEW: Display Township on En-route: **OFF**
- TERMINAL CHART VIEW: Display Township on Airport Diagram: **OFF**
- Weather setting (Settings -> Jepp FD-PRO):
- WEATHER: Display En-route Wx: ON
- WEATHER: Display METAR/TAF: ON

F. Updating the Jepp FD PRO:

1) Terminal charts are updated every two weeks.
2) The En-route charts are updated every 28 days.
3) The application itself has a notification sign on the app icon itself.

8.12.11.4 EFB Training Program – Holder

A. Secured and Viewable:

1) EAC 121-15 requires EFB Class II, iPad, with the aeronautical charts (Jeppesen FD PRO) must be secured and viewable during critical phases of the flights.
2) The EFB Class II, iPad, may be unsecured during non-critical phases of the flights.
3) The holder is secured on the side window left side (captain), and right side (FO).
4) The holder does not affect the pilot line of sights during normal and abnormal operations.
5) The holder does not interfere with the view ability of any primary or secondary flight control, displays, or indications.
6) The holder allows the iPad to be viewed in landscape orientation.
7) The holder is located within an acceptable distance from an average sized person and within 90 degrees of view when facing forward. It is the similar location of the current location of the approved paper charts in the Airbus 3xx fleets.

B. Pilot's Flight kit

1) EAC 121-15 states that EFB Class II is part of the pilot flight kits and it is usually handled or carried on/off the airplane.
2) Each aircraft is equipped with a complete EFB flight set, stowed and secured onboard and all pilots shall have access to its contents.
3) As a contingency plan, there will be iPads and holders at the OCC for back up purposes.
4) For any abnormalities, please refer the EFB reporting procedures.
5) Personal iPads are allowed to be used in case needed provided it is iPad air 2 and has the latest EFB version and will be used under the responsibility of the PIC.

C. Emergency operation requirements.

1) The holder does not obstruct or impede any emergency egress, including the cockpit door and the cockpit window.
2) The holder does not interfere with the window normal operation and its handle. The window will still be normally opened and closed during normal and emergency operations.
3) The holder does not interfere or affect the escape rope operation during emergency evacuation from the cockpit window.
4) The holder does not interfere with the window shade operation.
5) The holder does not interfere with the flight crew duties and tasks assigned during normal and emergency operations.
6) The holder does not affect the movement of any primary or secondary flight controls during normal and emergency operations.
7) The holder does not block or impede any emergency lights.
8) The holder does not block or impede any emergency signals.
9) The holder does not block or impede any emergency equipment.

D. Flight controls movement and display.

1) The holder does not affect the movement of any primary or secondary flight controls during normal and emergency operations.
2) The securing location ensures that the holder does not conflict with any visual or physical access to the flight controls.

E. Holder operational procedure.

1) Each crewmember must ensure that the holder and the iPad are secured prior to engine start or pushback and prior to the top of descent (TOD).
2) The holder and the iPad must be secured and viewable during critical phases of the flight.
3) In case of a failure of any component of the Holder, refer to the EFB MEL Procedures.

F. How to install and secure the holder

1) The holder is secured to the side window left of the captain and right of the first officer.
2) The crewmember should insert the upper side of the holder in the sunshade slot.
3) Hold the right side (captain) or the left side (FO) with the chart clip located on the side sliding window.
4) The crewmembers should ensure the holder is properly secured to the side window.
5) Place the iPad on top of the holder.

8.12.11.5 EFB Training Program – PPS Crew Briefing

A. General

PPS Crew Briefing is part of EFB Type a & B as per EAC 121-15. It acts as an interface for flight plan data retrieval on mobile devices. Crew Briefing system solutions are based on a modular and fully scalable software structure as well as a modular update data service structure all in relation to each user's operational requirements. It makes the trip-tailored briefing packages automatically and instantly available to the pilots on the iPad device.

B. Data Retrieval

Prior to each flight pilots shall ensure that flight data are downloaded and available offline. Once flight data are available offline, they are accessible anytime even in the airplane mode or after the shutdown of the application.

C. Training

Orientation of PPS crew Briefing is available at the briefing room for rehearsal and refreshment. The training program shall ensure that each pilot can refresh the flight list and download the required documents.

1. Open PPS crew Briefing
2. Update list of flights

Download the required documents and make sure the downloaded sign is shown

8.12.11.6 EFB Training Program – EQRH

A. Introduction

EQRH training material and syllabus is exclusively provided by the vendor of the EQRH application. In case of Nesma Airlines, the EQRH training materials are provided by AIRBUS through an e-learning application. For information about e-learning approval, procedures and control refer to the Operations Manual Part D chapter 6.

B. Objectives

The objectives of the EQRH e-learning are:

- To know and understand the interface of the EQRH application
- To know the main features that allow the efficient use of the EQRH application.
- To master checklists/procedures executions and rapidly access emergency procedures
- To know how to detect erroneous data
- To get acquainted with behavior in case of emergency (i.e. smoke)

C. Training

Training on how to use the EQRH application especially in emergency cases and abnormal procedures shall be carried out through Nesma Airlines approved e-learning application. The training material is provided by AIRBUS. Nesma Airlines is committed to updating the material if AIRBUS modified the content.

8.12.12 EMI and Rapid Decompression Tests

Nesma Airlines hold the responsibility for presenting proofs on the qualification of its selected EFB hardware against ECAR regulation regarding rapid decompression and Electro Magnetic Interference (EMI) tests as stated in EAC121-15.

The test should include EMI test, batteries, power source and rapid decompression for civil activities.

The test should abide by the following standards and other standards dictated by the manufacturer for the safety of operations:

EMI test: EASA Acceptable Means of Compliance (AMC) no. 20-25

Batteries: for batteries that contain lithium, the following international standards shall be followed:

- United Nations (UN) transportation regulations UN ST/SG/AC.10/11/Rev.5-2009
- International Electro technical Commission (IEC). International Standard IEC 62133
  Rapid Decompression: should follow the Radio Technical Commission for Aeronautics (RTCA) guidelines DO-160 for the Environmental Conditions and Test Procedures for Airborne Equipment. Rapid Decompression testing should be carried out up to the maximum operating altitude of the aircraft in which the EFB is to be used and it should be operative for or at least 10 minutes after the start of the decompression

Nesma Airlines have already acquired a compliance certificate for the hardware used for EFB following international standards and this compliance certificate shall be furnished upon request.

8.12.13 EFB Evaluation Procedure

This letter is to be signed by the Flight Operation Officer and the pilot (Captain or First Officer) to transfer the custody of the iPad from OCC department to the concerned crew. The pilot must state the reason behind the use of the back-up iPad.

Backup iPads are only used for conditions, which the crew may not be able to operate the flight with the current iPad. The crew must report the condition in accordance with the EFB REPORTING PROCEDURE.

The iPad must be returned to the Flight Operation Office at the airport, and signed by the flight operation officer.

Flight Crew I certify that I received the iPad fully functional and operational. And I will be responsible for the iPad until I return it to the Flight Operation Office.	
Reason: (Mandatory Field)	
Name:	
Date:	Signature:
Flight Dispatcher or Dispatcher I certify that I received the iPad fully functional and operational	
Name:	
Date:	Signature:
Comments:	

8.12.14 Onboard Printing

A wireless printer will be available onboard Nesma Airlines aircraft for printing legal documents that require a hardcopy with signature. The printer shall be stowed in safe place outside the cockpit and its use shall be limited to on-ground printing. Using of wireless printer in the cockpit during all phases of flight is absolutely prohibited.

The printer shall be consistent with commercial iPad devices and shall be easily connected through wireless means.

In case a wireless printer is provided onboard, simple technical documents on how to use shall be furnished and user orientation shall be carried out.

In normal operations, it is not mandatory to print onboard, rather the load sheet could be sent by email to the station to print and bring back the hardcopy.

8.12.15 EFB Update

8.12.15.1 Update Notification

Once a new EFB release is uploaded and available for download, an official email shall be sent to all concerned personnel to cope with and update their records. Other means for notification could be used along with the email notification.
Nesma Airlines use a mailing list to dedicated to EFB update alerts: EFBUpdates@nesmaairlines.com
The email shall be sent from EFB administrator or any delegate and shall include at least the following information:

- **I.** Release Name
- **II.** Release Notes
- **III.** Server(s) IP addresses
- **IV.** Login credentials
- **V.** Identification of documents (title and revision date)
- **VI.** Effective date, if applicable.

Release notes could include reason of the update, latest revision of documents, etc. Other information that may be deemed useful and related to the new release could also be included.
The update shall be retained for download on the server to all users until another release is uploaded.

8.12.15.2 Update Procedures

EFB administrator shall assign qualified personnel to update EFB version, and in normal cases, he may delegate the update process to the flight crew.
End users are assigned user name and password to update their FlySmart with Airbus applications. User privilege includes the download of the weight and balance data, performance data and documents. Users cannot access or download outdated EFB releases or modify the content.
As stated in EFB Bag Content, the EFB bag includes simple instructions on how to update EFB version.
Update process is as follows:

- Insert server IP address as provided in the update notifications
- Insert login credentials as provided in the update notifications
- Connect to the internet
- Once all data are set, the “Update All” button is activated
- Click Update All and wait while the EFB release is downloaded
- Once download is complete an install prompt shows up
- Click install
- After installation is completed check EFB version against the new release name and that all applications have green ticks indicating correct installation.

8.12.15.3 FlySmart with Airbus Update Control

As per the CMEL MI 46-11-01, each aircraft shall be equipped with three iPads exclusively used for EFB operations. Each iPad shall be given a unique name that allows following up with FlySmart updates.
Once an EFB update is announced, the update record is clarified on FlySmart Gateway allowing the EFB administrator to identify the update status on each aircraft. EFB administrator has the duty of ensuring the database currency on each Aircraft before its effective date.
FlySmart Gateway gives the following indications on the status tab:

Status	Explanation
Installed	Update is complete and all packages are installed
Upload in Progress	The packages are still being downloaded on the device
Update Failed	Update process failed, EFB version unknown
Transferred	Packages downloaded but still not installed

For Cloud-Based Document Management, the update shall be done in accordance with the procedures established in 8.12.6.2.2 Cloud-Based Documents Distribution and notification shall be sent as in 8.12.15.1 Update Notification. Pilot-in-command in the first flight after the effective date of the update shall receive 13.1.16 Cloud-based Documents Update Form to check the update is done correctly and received onboard the aircraft. Records of the updates shall be kept in the operations department.

8.12.15.4 Jeppesen FD Update Control

As per the contract between Nesma Airlines and Jeppesen Company, JDM administrator is provided with an administrator tool called Jeppesen Distribution Manager Pro that allows him to track the update status of each device. Each device onboard is set up using a unique ID that is easily monitored through the administrator portal.
An update notification appears on the device indicating that the Jeppesen version is not up-to-date until the update is made.
Once an update is available, the administrator can use his tool to make sure every device onboard is updated and rectify any problems associated with the update.

8.12.16 Initial Retention of Papers

As per ECAA regulations, Nesma Airlines should retain the complete paper documents onboard all its aircraft during the test period. The complete set of paper documents includes all mandatory papers that are listed in 8.1.12. Onboard Library.
All paper documents shall be packed in sealed bags onboard during the test period and a list of documents in every bag shall be seen clearly from outside. List of documents should include:

- Name of document
- Issue/Revision date
- No. of copies
- Signature of the accountable personnel

In case bag seal is broken and pilots are reverted to paper documents and/or manual Load sheet or RTOW charts a report shall be sent to EFBReporting@nesmaairlines.com in accordance with EFB Reporting Procedures.

8.12.17 EFB Bag Content

Items	Quantity
Changing the cartridge leaflet (Optional)	1
Printer Network Configuration leaflet (if applicable)	1
EFB Update Procedure leaflet (Optional)	1
iPad Air 2/ iPad Pro	3)NMx1-NMx2-NMx3(
iPad Sim Card	3
iPad Cable Charger	2
Charger Adaptor	2
Printer	1 (Cannon Pixma i110)
Charger Printer	1
Cartridge (Optional)	1
iPad Portable Holder	2

8.13 Aircraft Tracking

8.13.1 Global Aeronautical Distress and Safety System (GADSS)

According to the ICAO Concept of Operations, the Global Aeronautical Distress and Safety System (GADSS) will address all phases of flight under all circumstances including distress. This GADSS will maintain an up-to-date record of the aircraft progress and, in case of a crash, forced landing or ditching, the location of survivors, the aircraft and recoverable flight data.
GASS concept has three main functions: 1- Aircraft Tracking

2- Autonomous Distress Tracking
3- Post Flight Localization and Recovery

The ICAO GADSS concept of operations (ICAO ConOps) was designed to address three specific issues, namely, the late notification of SAR services when aircraft are in distress (as defined in ICAO Annex 11), missing or inaccurate end of flight aircraft position information and lengthy and costly retrieval of flight data for accident investigation.

8.13.2 Definitions

Aircraft Tracking: A process, established by the operator, that maintains and updates, at standardized intervals, a ground-based record of the four dimensional position of individual aircraft in flight. (ICAO Annex 6). The 4D position is mandated report every 15 minutes that includes longitude, latitude, altitude and time.
Alerting service: A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required. (ICAO Annex 11)
Autonomous Distress Tracking (ADT): The capability using transmission of information from which a position of an aircraft in distress can be determined at least once every minute and which is resilient to failures of the aircraft's electrical power, navigation and communication systems. (ICAO Annex 6)
Cospas-Sarsat System: A satellite-based system designed to detect and locate activated distress beacons transmitting in the frequency band of 406.0-406.1 MHz and to distribute these alerts to
RCCs. (ICAO/IMO IAMSAR Manual)
Emergency locator transmitter (distress tracking): Emergency locator transmitter for ICAO specified in-flight distress tracking (Cospas-Sarsat Glossary C/S G.004 - Issue 2) **Emergency phase:** A generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase. (ICAO Annex 11 & 12)

- Uncertainty phase. A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.
- Alert phase. A situation wherein apprehension exists as to the safety of an aircraft and its occupants.
- Distress phase. A situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

False alert: An alert received from any source, including communications equipment intended for alerting, when no distress situation actually exists, and a notification of the alert should not have resulted.

GADSS Information Management: The infrastructure and services used for the exchange and timely dissemination of information in support of the GADSS
Iridium satellite Communications: A communication over low-orbit satellites that ensures voice and data are transmitted and received through a band of 1-2 GHz frequencies. Iridium satellite constellation consists of 66 satellites as for 2018.
Mission Control Centre (MCC): A component of the Cospas-Sarsat ground segment that follows a prescribed set of data processing and distribution rules to process distress alert data from 406 MHz beacons, exchange it with other MCCs, and send it to RCCs
Rescue Coordination Centre (RCC): A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region. (ICAO Annex 11 & 12)
NOTE: The term RCC is used hereafter to apply generically to an aeronautical, maritime or joint (aeronautical and maritime) rescue coordination center (ARCC, MRCC, JRCC respectively).
SATCOM: satellite communication.
Search and Rescue Region (SRR): An area of defined dimensions, associated with a rescue coordination center, within which search and rescue services are provided. (ICAO Annex 12)

8.13.3 Aircraft Tracking

The GDASS Aircraft Tracking function is planned to provide an automated four-dimensional position (latitude, longitude, altitude and time) at a reporting interval of 15 minutes or less. If air traffic services obtain an aircraft position at 15-minute intervals or less, it will not be necessary for the operator to track the aircraft. However, should the aircraft be operating within an area where ATS obtains the aircraft position at intervals greater than 15 minutes, the operator will be required to ensure that the aircraft is tracked.
In general terms the Aircraft Tracking function:

- Does not introduce any change to current ATC Alerting procedures
- Establishes operator responsibilities for tracking based on areas of operation
- Is not technology-specific
- Establishes communication protocols between operator and ATC

According to ECAR 121.9 4D aircraft tracking is mandatory on Egyptian civil aircraft.

8.13.4 Autonomous Distress Tracking

The Autonomous Distress Tracking (ADT) function will be used to identify the location of an aircraft in distress with the aim of establishing the location of an accident site within a six NM radius. An aircraft is considered to be in a distress condition when it is in a state that, if the aircraft event is left uncorrected, may result in an accident. Triggering criteria might include items such as unusual attitudes, altitudes or speeds, potential collision with terrain, total loss of thrust on all engines, Mode A squawk codes, and others as defined by the operator.
The ADT function will use on-board systems to broadcast either aircraft position (latitude and longitude), or a distinctive distress signal from which the aircraft position and time can be derived. Once the ADT has been triggered by a distress condition event, the aircraft position information will be transmitted at least once every minute.

8.13.5 Post Flight Localization and Recovery

In the event of an accident, the immediate priority is the rescue of any survivors. The ADT function will greatly reduce the potential search area and even more accurate aircraft position information will be provided through the Post Flight Localization function by means of Emergency Locator Transmitter (ELT) and/or homing signals to guide SAR services on site.
To facilitate the ability to locate the wreckage and recover the flight recorder data after an accident, the post flight localization and recovery function specifies a number of requirements for ELTs, Underwater Locator Beacon (ULB) and flight recorders which are being incorporated into the provisions of ICAO Annex 6.

8.13.6 Nesma Airlines Statement of Compliance

Nesma Airlines has established Aircraft tracking capability for duration of all flights. A 4D/15 tracking is ensured through the 8.14 Automatic Flight Information Reporting System (AFIRS) installed on Nesma fleet and as indicated in 8.14.6 AFIRS UpTime Software.

8.14 Reserved

This Page Intentionally Left Blank

This Page Intentionally Left Blank

This Page Intentionally Left Blank

This Page Intentionally Left Blank

This Page Intentionally Left Blank

This Page Intentionally Left Blank

8.15 Runway Excursions

8.15.1 Definition

When an aircraft on the runway surface departs the end or the side of the runway surface, runway excursions can occur on take-off or landing and they consist of two types of events:

1. **Veer-off:** a runway excursion in which an aircraft departs the side of a runway;
2. **Overrun:** a runway excursion in which an aircraft departs the end of a runway.

8.15.2 General

1. Nesma Airlines monitor aircraft parameters related to potential runway excursions in their Flight Data Analysis (FDA) program. Whenever standardised FDA markers are provided through trend analysis, the industry best practices, should be used with priority to ensure the effectiveness of risk mitigation and safety assurance associated with runway excursion barriers and to allow comparability on industry level;
2. Nesma Airlines should incorporate appropriate technical solutions to reduce runway excursion risks, where available (including Runway Overrun Awareness and Alerting System (ROAAS), and runway veer off awareness and alerting systems, when and if available);
3. Flight Deck Crew shall not accept ATC procedures and clearances which have the potential to decrease safety margins to an unacceptable level for the flight crew thereby increasing the risk of runway excursions. This includes such procedures and clearances which increase the likelihood of having an unsafe approach path management with consequences for safe landing, e.g. which bear the risk of being un-stabilized at the landing gate or high-energy approaches. Flight Deck Crew should report such risks within their reporting process;
4. Training includes realistic, scenarios into the training programs requiring threat and error management for runway excursion prevention during both take-off and landing. This should include evidence of recurrent simulator training programs which are representative in terms of environmental conditions, including crosswind, landing on contaminated/slippery runways and poor visibility adapted with simulator representativeness. Representativeness of simulators should be assessed and their limitations communicated (in order to avoid negative training).

8.15.3 Recommendations to Prevent Runway Excursion Risk are:

1. A mishandled rejected take-off (RTO) increases the risk of take-off runway excursion – Flight Deck Crew shall strictly adhere to the procedures of Rejected Take-off ***Ref. OM-B and Ref.*** ***8.11.9 Takeoff***;
2. Take-off performance calculation errors increase the risk of a take-off runway excursion –Flight Deck Crew shall strictly adhere to the procedures of ***8.10.3.6 Task Sharing*** ***&*** ***8.11.9 Takeoff***;
3. In flight landing distance calculation errors and runway conditions changes increase the risk of a landing runway excursion – Flight Deck Crew shall strictly adhere to the procedures of ***8.11.18.1 Approach Briefing***.

This Page Intentionally Left Blank

Dangerous Goods and Weapons

Chapter 9