8. OPERATING PROCEDURES

8.1 Flight Preparation Instructions

(A) An Operational Flight Plan (OFP) shall be completed for each intended flight based on considerations of aircraft performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes/operating sites concerned.

(B) The flight shall not be commenced unless the designated Commander is satisfied that:

(1) the aeroplane is airworthy;

(2) the aeroplane configuration is in accordance with the configuration deviation list (CDL);

(3) the parts of the operations manual that are required for the conduct of the flight are available;

(4) the documents, additional information and forms required according to **Subchapter 8.1.12** are available on board;

(5) current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the aircraft including any diversion that may reasonably be expected;

(6) space-based facilities, ground facilities and services required for the planned flight are available and adequate;

(7) the provisions specified in the operations manual in respect of fuel, oil, oxygen, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight; and

(8) any additional operational limitation can be complied with.

(9) See **EK.10.74.005 Dispatch Manual** for Flight Plan Generation Process and methods of flight plan generation.

8.1.1 Minimum Flight Altitudes

(A) It is the responsibility of Turkish Airlines to establish and publish minimum flight altitudes. As an integral part of **EK.10.73.002 Operations Manual Part-C**, Jeppesen Airway Manual establishes and publishes the required minimum flight altitudes on behalf of Turkish Airlines. Minimum flight altitudes are inclusive of terrain and obstacle clearance requirements taking into account any restrictions which may be imposed by respective state authorities.

(B) Where the minimum flight altitudes established by Turkish Airlines and a State overflown differ, the higher values shall apply.

(C) All flights shall be planned and operated at or above the established minimum flight altitudes except for take-off and landing.

(D) Commander is responsible for terrain and obstacle clearance when using RNAV/RNP procedures as applicable.

(E) For flights conducted at or below any minimum altitudes listed in **Subchapter 8.1.1.1**, ATC instructions consisting of the phrases “DIRECT TO” or “PROCEED OWN NAVIGATION TO” are not and shall not be classified as radar vectors, therefore terrain and obstacle clearance is at the responsibility of the Commander.

(F) Turkish Airlines takes into account the following factors and considerations when establishing minimum flight altitudes:

(1) the accuracy with which the position of the aeroplane can be determined;

(2) the probable inaccuracies in the indications of the altimeters used;

(3) the characteristics of the terrain (e.g. sudden changes in the elevation) along the routes or in the areas where operations are to be conducted;

(4) the probability of encountering unfavorable meteorological conditions (e.g. severe turbulence and descending air currents); and

(5) possible inaccuracies in aeronautical charts;

(6) corrections for temperature and pressure variations from standard values and wind and terrain effects (refer to **Subchapter 8.1.1.4**);

(7) ATC requirements; and

(8) any foreseeable contingencies along the planned route.

8.1.1.1 Minimum Altitudes

(A) Minimum En-route Altitude (MEA): MEA represents the lowest published altitude between radio fixes that assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes.

(B) Minimum Grid Altitude (MGA): MGA represents the lowest safe altitude which can be flown off-track.

(C) Minimum Sector Altitude (MSA): MSA represents the safe altitude around a navigation station or aerodrome reference point and sectors and values are officially published by State authorities.

(D) Minimum Terrain Clearance Altitude (MTCA): MTCA represents an altitude providing terrain and obstacle clearance for all ATS routes, all STAR (up to IAF or equivalent end point) and for selected airports on SID segments.

(E) For more definitions, descriptions, and examples of the minimum altitudes see **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

8.1.1.2 Procedure to Establish Minimum Altitudes

(A) For normal operations, planned en-route IFR altitudes shall be at or above the published minimum IFR altitudes indicated in the **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual en-route charts which conform to ICAO Annexes. Turkish Airlines uses a computer flight planning system which prohibits flight plans to be filed if requested en-route altitudes are below established minimum flight altitudes.

(B) For non-normal operations, operational minimum terrain clearance altitudes to be used are described in **Subchapter 8.1.1.1**. These altitudes are depicted accordingly in the **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual charts and should be corrected according to **Subchapter 8.1.1.4** if needed.

(C) For special operations which are published by the IOCC, Flight Planning Performance Management (engine failure drift down, depressurization, etc.), either item (1) or (2) below is used (as applicable);

(1) Minimum terrain clearance altitude shall clear all obstacles within 5 NM of designated route centerline by:

(a) 1,000 ft if the reference point is not higher than 6,000 ft MSL; or

(b) 2,000 ft if the reference point is higher than 6,000 ft MSL.

(2) Minimum altitudes listed in **Subchapter 8.1.1.1** may be derived by the Flight Planning Performance Management for geographical regions not specified in the **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(D) IFR Flight Levels (FL): Refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(E) The terrain clearance must be checked in accordance with the procedure described in **Subchapter 8.1.1.3**.

(F) For procedure to establish the minimum altitudes for to/from a VFR classified aerodrome, refer to **Subchapter 8.3.1.3**.

8.1.1.3 Procedure to Determine Terrain and Obstacle Clearance

(A) Take-off terrain and obstacle clearance can only be assured if the Commander complies with the Regulated Take-Off Weight (RTOW) published by the Flight Planning and Performance Management or as calculated by the Commander in accordance with **Operations Manual Part-B**. Published or calculated RTOW can only be valid if the required normal/abnormal/emergency procedures outlined in **Operations Manual Part-B** are used.

(B) Take-off terrain and obstacle clearance can be assured for engine out conditions when the Commander uses the special EOSIDs published by the Flight Performance and Planning Management.

(C) Commander is responsible for terrain and obstacle clearance during climb-to or descends-from any minimum altitude listed in **Subchapter 8.1.1.2**.

(D) No turn shall be made before 400’ AGL after takeoff (except special airport operations published by the Flight Performance and Planning Management)

(E) When selecting flight levels/altitudes, pressure and/or temperature below ISA and/or wind and terrain effects shall be taken into account and an increase of safety margins may be required. For determination of corrections applied to the Minimum Altitudes refer to **Subchapter 8.1.1.4**.

8.1.1.4 Altimeter Corrections

8.1.1.4.1 Low Temperature Altitude Correction

(A) The pilot-in-command is responsible for the obstacle clearance of the aeroplane, except when an IFR flight is being vectored by radar. When radar vectors are given, the radar controller issues clearances such that the prescribed obstacle clearance will exist at all times. When an IFR flight is being vectored by radar, ATC may assign minimum radar vectoring altitudes which are below the minimum sector altitude. Minimum vectoring altitudes provide obstacle clearance at all times until the aeroplane reaches the point where the pilot will resume own navigation. The pilot-in-command should closely monitor the aircraft's position with reference to pilot-interpreted navigation aids to minimize the amount of radar navigation assistance required and to alleviate the consequences resulting from a radar failure. The pilot-in-command should also continuously monitor communications with ATC while being radar vectored, and should immediately climb the aircraft to the minimum sector altitude if ATC does not issue further instructions within a suitable interval, or if a communications failure occurs.

(B) The calculated minimum safe altitudes/heights must be adjusted when the ambient temperature on the surface is much lower than that predicted by the standard atmosphere. In such conditions, an approximate correction is 4% height increase for every 10°C below standard temperature as measured at the altimeter setting source. This is safe for all altimeter setting source altitudes for ISA temperature deviations above –15°C.

(C) A more accurate correction should be obtained from the Low Temperature Altitude Correction Table below. Values at this table are calculated for a sea level aerodrome. They are therefore conservative when applied at higher aerodromes.

(D) Low temperature altitude correction (correction value to be added to the QNH altitude value) should be applied to ensure the aeroplane remains above the minimum altitudes when the local aerodrome OAT value is reported as "0" degrees Celsius or less. The pilot-in-command should add the values derived from the table to the published procedure altitudes, including MSAs, MDAs, DAs, missed approach altitudes and all other flight related altitudes (thrust reduction, acceleration, engine-out acceleration, holding, etc.) to ensure adequate obstacle clearance.

(E) Procedures in respect to altitude corrections are as follows:

(1) Accepting an IFR assigned altitude by ATC rests with the pilot-in-command. The pilot-in-command should refuse this clearance if he finds unacceptable due to low temperature.

(2) Once an IFR altitude is accepted, any temperature correction must not be applied to compensate for cold temperature.

(3) ATC should be informed about the amount of correction applied to any published procedure altitude.

(F) Low temperature altitude correction tables:

Aerodrome OAT	Height above the aerodrome used for altimeter source (ft)						
	200	300	400	500	600	700	800
0 C	+20	+20	+30	+30	+40	+40	+50
-10 C	+20	+30	+40	+50	+60	+70	+80
-20 C	+30	+50	+60	+70	+90	+100	+120
-30 C	+40	+60	+80	+100	+120	+140	+150
-40 C	+50	+80	+100	+120	+150	+170	+190
-50 C	+60	+90	+120	+150	+180	+210	+240

Aerodrome OAT	Height above the aerodrome used for altimeter source (ft)						
	900	1000	1500	2000	3000	4000	5000
0 C	+50	+60	+90	+120	+170	+230	+280
-10 C	+90	+100	+150	+200	+290	+390	+490
-20 C	+130	+140	+210	+280	+420	+570	+710
-30 C	+170	+190	+280	+380	+570	+760	+950
-40 C	+220	+240	+360	+480	+720	+970	+1210
-50 C	+270	+300	+450	+590	+890	+1190	+1500

(G) For examples of low altitude correction, refer to Subchapter 8.1.1.4.4.

8.1.1.4.2 Low Pressure Altitude Correction

(A) When using QNH altimeter settings, low pressure altitude correction is not required.

(B) When using QNE altimeter settings and radar vectors are not available or not acceptable, minimum safe altitudes depicted **Subchapter 8.1.1.1** must be corrected for deviations in pressure when the pressure in the vicinity (published QNH value) is lower than the standard atmosphere (1013 hPa). An appropriate correction is 30 ft (10 m) per hPa below 1013 hPa or values obtained from low pressure altitude correction table below. Standard QNE values are 1013 hPa or 29.92".

(C) Low pressure altitude correction table:

QNH of nearest station	Values to be added to the published minimum safe altitudes (ft)
1013 hPa	NA
1010 hPa	+80 ft
1005 hPa	+220 ft
1000 hPa	+380 ft
995 hPa	+510 ft
990 hPa	+630 ft
985 hPa	+780 ft
980 hPa	+920 ft
975 hPa	+1080 ft

(D) For examples refer to **Subchapter 8.1.1.4.4**.

8.1.1.4.3 Wind and Terrain Effects

(A) The combination of strong winds and mountainous terrain can cause local changes in atmospheric pressure due to the Bernoulli effect. This occurs particularly when the wind direction is across mountain crests or ridges. It is up to the pilot-in-command to evaluate whether the combination of terrain, wind strength and direction are such as to make a correction for wind necessary.

(B) Corrections for wind speed should be applied in addition to the standard corrections for pressure and temperature, and ATC should be advised.

(C) Wind and terrain effect table:

Wind speed (KT)	Altimeter error (ft)
20	53
40	201
60	455
80	812

Note : The clearance of controllers do not include wind and terrain effects.

(D) For examples refer to **Subchapter 8.1.1.4.4.**

8.1.1.4.4 Application of Corrections

Example for procedure altitudes:

Conditions	Aerodrome elevation 5000 ft Aerodrome OAT -30°C Aerodrome QNH 998 hPa Wind at present altitude 20 KT Approach procedure altitude 9000 ft Height above altimeter source 4000 ft (9000-5000=4000)
Step 1: Temperature correction (from Low Altitude Correction Table)	Correction for -30°C and 4000 ft AGL = +760 ft 9000 ft + 760 ft = 9760 ft
Step 2: Pressure correction	No pressure correction when using QNH setting
Step 3: Wind and terrain effects (from Wind and terrain effect table)	Correction for 20 KT = 53 ft 9760 ft + 53 ft = 9813 ft
Step 4: Minimum Usable Altitude (must be rounded up to the next 100 ft)	9900

8.1.2 Criteria and Responsibilities for Determining the Adequacy and Selection of Aerodromes to be Used

8.1.2.1 Criteria for the Approval of an Aerodrome

(A) As a general policy, criteria for determining the usability of an aerodrome for operations shall be based on the criteria that normal operating procedures can be used.

(B) Before an aerodrome can be used as a destination or as an alternate, it shall be classified as adequate for the types of aeroplanes which are intended to be used.

(C) Aerodromes listed in **LS.74.040 Aerodrome Categorisation List** are evaluated as adequate and are authorized for use by Turkish Airlines.

(D) Aerodromes not listed in **LS.74.040 Aerodrome Categorisation List** may be authorized for operational use by Turkish Airlines if such operations are permitted by the appropriate aerodrome authorities and authorization has been obtained in accordance with the approval and authorization process.

(E) Authorized aerodromes are given categories as defined in **PR.70.617 Procedure for Aerodrome Analysis and Authorization** and these categories are published in **LS.74.040 Aerodrome Categorisation List**. Operational suitability of aerodromes as destination or alternate is checked and defined within the flight planning system. Pre-flight planning is based on operational suitability of aerodromes.

(F) When deemed necessary by the Commander for the safety of the flight, any aerodrome not listed in **LS.74.040 Aerodrome Categorisation List** may be used after its suitability (Runway length and width, PCN value, ATC services etc.) has been confirmed by the Commander using all available resources. Operational data such as weather and NOTAM may be obtained via ACARS, HF, VHF, etc.

8.1.2.2 Approval and Authorization Process

(A) Standard aerodrome approval shall be based on **PR.70.617 Procedure For Aerodrome Analysis and Authorization.**

(B) Before an aerodrome is authorized for use by Turkish Airlines, it shall be approved by Chief Flight Operations Officer (Nominated Person). The standart approval process is defined within **PR.70.617 Procedure For Aerodrome Analysis and Authorization.**

(C) Using an isolated aerodrome as destination aerodrome requires the approval of the Turkish DGCA in addition to the authorization process.

(D) For inaugural (initial) flights, applicable Fleet Manager shall ensure that the flight crew composition is based on qualification and experience. For this purpose flight crew composition shall consist of a minimum of two Commanders and:

(1) one Commander is ranked as a CI (Commander Instructor or Examiner), and

(2) remaining Commander is ranked as a CI, CN or C1.

(E) For Portable and Installed EFB attached aircraft, documentation including up-to-date approach and aerodrome charts are accessible via EFB and all information in the EFB are updated according to **PR.74.615 EFB (Electronic Flight Bag) Procedure**.

8.1.2.3 Selection of Aerodromes

(A) Only aerodromes that are adequate for the type(s) of aircraft and operation(s) concerned shall be used for Turkish Airlines flights. Turkish Airlines ensures that sufficient means are available to navigate and land at the destination aerodrome or at any destination alternate aerodrome in the case of loss of capability for the intended approach and landing operation.

(B) An aerodrome shall be considered as adequate if, at the expected time of use, the aerodrome is available and equipped with necessary ancillary services such as air traffic services (ATS), sufficient lighting, communications, weather reporting, navigation aids and emergency services.

(C) For dispatching the aeroplane it shall be assumed that:

(1) the aeroplane will land on the most favourable runway, in still air; and

(2) the aeroplane will land on the runway most likely to be assigned, considering the probable wind speed and direction, the ground handling characteristics of the aeroplane and other conditions such as landing aids and terrain.

(D) If compliance with item (C)(1) for a destination aerodrome having a single runway where a landing depends upon a specified wind component can not be ensured, the aeroplane shall be dispatched if two alternate aerodromes are designated that permit full compliance with landing requirements (i.e. landing weight, factored Landing Distance Available (LDA), approach procedure angle, runway slope, wind components, landing elevation, missed approach gradient) and item (C) above. Before commencing an approach to land at the destination aerodrome, the commander shall ensure that a landing can be made in full compliance with the above.

(E) If compliance with item (C)(2) for the destination aerodrome can not be ensured, the aeroplane shall be only dispatched if an alternate aerodrome is designated that allows full compliance with landing requirements (i.e. landing weight, Landing Distance Available (LDA), approach procedure angle, runway slope, wind components, landing elevation, missed approach gradient) and item (C) above.

8.1.2.3.1 Selection of Take-Off Alternate Aerodrome

(A) 'Take-off alternate aerodrome' means an alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and if it is not possible to use the aerodrome of departure. If it is possible to use the departure aerodrome there will be no necessity for selection of take-off alternate aerodrome. For this reason, the departure aerodrome shall not be selected as the take-off alternate aerodrome in the OFP.

(B) Where it is not possible to use the departure aerodrome due to meteorological, performance or other reasons, an adequate take-off alternate aerodrome shall be specified in the Operational Flight Plan (OFP). The take-off alternate aerodrome shall be no further from the departure aerodrome than:

(1) for two-engined aeroplanes:

(a) one hour flying time at the one engine inoperative cruising speed according to the AFM in still air standard conditions based on the actual take-off mass; or

(b) the ETOPS diversion time approved, subject to any MEL restriction, up to a maximum of two hours, at the one engine inoperative cruising speed according to the AFM in still air standard conditions based on the actual take-off mass;

(2) for three and four-engined aeroplanes, two hours flying time at the one engine inoperative cruising speed according to the AFM in still air standard conditions based on the actual take-off mass.

(C) If the AFM does not contain a one engine inoperative cruising speed, the speed to be used for calculation shall be that which is achieved with the remaining engine(s) set at maximum continuous power.

8.1.2.3.2 Selection of Destination Alternate Aerodrome(s)

(A) At least one destination alternate aerodrome shall be selected for each IFR flight unless the destination aerodrome is an isolated aerodrome or all the conditions below are complied with:

(1) the duration of the planned flight from take-off to landing or, in the event of in-flight re-planning in accordance with **Subchapter 8.1.7**, the remaining flying time to destination does not exceed six hours; and

(2) two separate runways are available and usable at the destination aerodrome; and

(a) runways which are constructed with separate landing surfaces but the runways may overlay or cross and it shall not prevent operations on the other runway if one runway is blocked,

(b) each runway shall have a separate approach procedure based on a separate navigation aid.

(3) the appropriate weather reports and/or forecasts for the destination aerodrome indicate that, for the period from one hour before until one hour after the expected time of arrival at the destination aerodrome,

(a) the ceiling will be at least 2000 ft or circling height + 500 ft, whichever is greater, and

(b) the ground visibility will be at least 5 km.

(B) Two destination alternate aerodromes shall be selected when:

(1) the appropriate weather reports and/or forecasts for the destination aerodrome indicate that during a period commencing one hour before and ending one hour after the estimated time of arrival, the weather conditions will

be below the applicable planning minima which also includes the wind component limitations stated at **Subchapter 8.1.2.8**; or

(2) no meteorological information is available.

(C) If the conditions in the destination aerodrome requires two destination alternate aerodromes to be selected:

(1) prior to dispatch, the lead dispatcher on duty shall inform IOCC of the existing conditions;

(2) IOCC, based on economical and operations factors, shall determine whether the flight is to be conducted on-time/delayed/combined with another flight or cancelled;

(3) IOCC shall inform and coordinate with the appropriate personnel, departments and line stations the decision taken; and

(4) if the decision is to conduct the flight, dispatch shall select the 2 most suitable destination alternate aerodromes which are not classified as operationally significant regarding the weather forecast (see **Subchapter 8.1.5.5**) (IOCC shall be included in the selection process) to be specified in the OFP. Dispatch shall brief the Commander with specific details as to the preplanning agreed by IOCC in reference to the suitable destination alternate aerodromes selected and the plan of action to be conducted in case of any diversion.

(D) Any required alternate aerodrome(s) shall be specified in the OFP and ATS FPL.

(E) See **Subchapter 8.1.2.3** **(D) & (E)** for additional requirements.

8.1.2.4 Operations to or From Aerodromes with Time Restrictions

8.1.2.4.1 Aerodromes with Curfew Hours

(A) Curfew hours are listed in **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual for all aerodromes.

(B) It is the responsibility of the dispatch to ensure that flight operations do not commence to/from an aerodrome during published aerodrome curfew hours. If required, IOCC shall obtain the proper authorization prior to commencing flight operations.

(C) If unforeseeable circumstances occur after the flight operations commence, it is the responsibility of IOCC to obtain permission from the respective aerodrome authority to operate to/from an aerodrome during curfew hours.

(D) Once flight operations begin, the Commander shall inform IOCC of the revised ETA to the aerodrome with curfew hours. If unable to contact IOCC, flight shall continue as planned unless advised otherwise.

(E) ATC issued clearances (departure or arrival) do not constitute permission for operations to/from an aerodrome during curfew hours. The authority to operate during curfew hours rests with the aerodrome authorities (example: DHMI).

8.1.2.4.2 Calculated Take Off Time (CTOT) Assigned by ATS

(A) For flights into areas or aerodromes with limited acceptance capacity, a departure time restriction may be assigned by the ATS. For each regulated point, area or aerodrome, the related Air Traffic Flow Management Authority allocates a time period for the aeroplane operators and ATC.

(B) The CTOT is defined as a specified time with a tolerance of minus 5 min to plus 10 min which the aeroplane shall commence take-off. The tolerance is primarily intended for use by ATC to allow for aerodrome or airspace congestion problems. Also in some states time restrictions will refer to an en-route fix rather than take-off. Therefore, the

Commander must plan and confirm for a Target Off-Block Time (TOBT must not be later than CTOT minus taxi time) consistent with the CTOT. The arrangements for departure must ensure that the flight will be ready for departure on the assigned runway inside the CTOT window.

(C) The flight crew shall immediately inform the station representatives when a CTOT is assigned or amended by the ATC. Since assigned CTOTs are frequently improved with a short notice, flights must be prepared for departure from the parking position or gate as follows:

Anticipated Departure Delay	Action
CTOT-taxi time is not more than 60 minutes:	Passenger boarding and aeroplane handling shall aim for the STD.
CTOT-taxi time is equal or more than 60 minutes:	Passenger boarding and aeroplane handling shall aim for a departure time approximately halfway between STD and CTOT- taxi time.

(D) When it becomes apparent that for unforeseeable reasons the passenger boarding or aeroplane handling cannot be accomplished at the targeted time, a revised target shall be established between the station representative and the Commander. The Commander and the station representative shall then assess the situation and determine if the assigned CTOT can still be met, if not a new CTOT should to be requested.

(E) The Commander shall be informed of the assigned or amended CTOT, via radio, datalink, station personnel or the ATC Delay Management Flight Dispatcher of IOCC.

8.1.2.5 Runway and Taxiway Limitations

(A) Runway selection shall be based solely on safety factors. Items which may influence runway selection include, but not limited to:

(1) current weather conditions;

(2) runway surface conditions and contamination;

(3) ATC requirements;

(4) aerodrome induced delays;

(5) runway width;

(6) runway length;

(7) pavement strength; and

(8) runway facilities (lighting, navigation aids, etc.).

(B) Taxiways to be used should be in accordance with the code letters which corresponds to the greates wingspan, pr the greatest outer main gear wheel span, whichever gives the more demanding code letter of the aeroplanes for which the facility is intended as given in the table below. If there is any doubt about the width or wingtip clearance of a taxiway, confirmation with ATC is recommended.

Aerodrome Reference Code Letter	
B777/B787	E
A330/A350	E
A319/A320/A321/B737	C

Note: Based on the risk assessments executed by Flight Operations Directorate, if company NOTAM allows the use of a taxiway lower than the limit prescribed above, then this taxiway may be used with care. When a taxiway width becomes narrower; oversteering must be anticipated and used.

(C) The PCN values shall be checked for the runways at the aerodrome according to **PR.70.617 Aerodrome Analysis and Authorization Procedure** and the flight shall be planned accordingly. Weight limitations will be added to Company notes on the NOTAMs if any specific permission is obtained from the Airport Authority.

(D) For detailed information, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual

8.1.2.5.1 Narrow Runway Operations

(A) Unless runway width restrictions are depicted in the applicable AFM or as published by the aeroplane manufacturer for the type of aeroplane operated, runway widths of 40.0 m and above shall be considered as nominal runway width for all types of aeroplane operated by Turkish Airlines.

(B) Narrow runway operations require special flight crew certification for runway widths of 30.0 m and above up to the value determined in accordance with item (A) above.

(C) Take-offs and landings shall not be conducted on runways with a width of less than 30.0 m.

(D) Narrow runway operations shall only be conducted if:

(1) narrow runway operations are not restricted in the applicable AFM;

(2) narrow runway operations for the specific aeroplane type have been granted or are not objected to by the Turkish DGCA;

(3) flight crew members shall be trained according to **EK.10.72.001 Operations Manual Part-D** by the Turkish Airlines Flight Training Directorate;

(4) published limitations and procedures in **EK.10.73.001 Operations Manual Part-A, Operations Manual Part-B, EK.10.73.002 Operations Manual Part-C** and the applicable AFM are adhered to; and

(5) narrow runway take-off and landings may only be conducted by the Commander (seated in the left hand seat) or co-pilot (P3-P4 seated in the right hand seat).

(E) In case of flight crew incapacitation, if the aerodrome is not classified as category "C", above classified flight crew member may continue the approach if he deems a safe, stabilized approach and landing can be made. Otherwise the flight crew member shall initiate a go-around. For details regarding category C aerodrome operation **Subchapter 5.1.3.1.2 Aerodrome Competency** procedures shall also be observed.

(F) LIFUS flights shall not be planned for these types of operations according to **PR.10.72.001 Procedure for Line Flying Under Supervision (LIFUS)**.

(G) Narrow runways shall be capable of supporting the operation of an aeroplane during all required phases of ground operations (taxi, take-off, landing, 180 degree turns if required).

(H) Braking action shall be available and classified as "GOOD" for all narrow runway operations when deemed necessary. Aeroplane shall not be dispatched for flight with braking action classified less than "GOOD" unless the runway classification can be improved to "GOOD" prior to the ETA.

(I) For night operations to/ from narrow runways, refer to **Subchapter 8.1.2.6**.

(J) The following aeroplane systems shall be fully operational for narrow runway operations:

(1) flight controls;

(2) all wheel braking units;

(3) nose wheel steering;

(4) anti-skid system; and

(5) all reversers.

(K) Crosswind Limits:

(1) Crosswind limits decrease in proportion with the narrower runway width as compared to the standard runway width.

(2) Standard runway width value of 147 ft. (45 m.) shall be used for narrow runway crosswind limitations calculation.

(3) Gust factor shall be calculated as part of the steady wind value for narrow runway crosswind limitations calculation.

(4) Narrow runway crosswind limitation calculation shall be as follows;

(a) 147 ft. minus NARROW RWY WIDTH (ft) = DIFFERENCE (ft)

45 m. minus NARROW RWY WIDTH (m) = DIFFERENCE (m)

Example: 147 ft.– 97 ft. (narrow runway width) = 50 ft.

Example: 45 m.– 30 m. (narrow runway width) = 15 m.

(b) 10% of the DIFFERENCE (ft) = Value to be reduced.

Example: 50 ft. x 10% ft.= 5 knot reduction

Example:15 m. x 3% m. = 5 knot reduction (decimal values must be rounded up)

(c) Refer to the Surface Wind Components and Limitations chart in **Subchapter 8.1.2.8** for the applicable maximum crosswind wind component; reduce this value by the value calculated in item (b) above to determine the crosswind limit for the narrow runway.

Example: Normal crosswind limit for GOOD braking 25 kt. – 5 kt. = 20 kt. Therefore the crosswind limit for a 97 ft narrow runway based on GOOD braking conditions is 20 kt.

(L) Take off alternate shall be specified on the operational flight plan.

8.1.2.5.2 Short Runway Operations

(A) Normal operations require runways with TORA and LDA of 6,500 ft (1,982 m) and greater.

(B) Short runway operations for runways with TORA and LDA below 6,500 ft (1,982 m) require flight crew certification.

(C) Before operating to/from an aerodrome, TORA (for takeoff) and LDA (for landing) of the runway(s) available shall be checked against the full runway length for possible restrictions resulting from displaced thresholds, NOTAMs, etc. Company operational restrictions may also apply as depicted in Jeppesen CCI pages and/or Company NOTAMs.

(D) For planning purposes, if any adequate runway is classified as short runway at the destination and alternate aerodromes, short runway operation requirements shall also be applied in case the runway intended to be used at the time of arrival is predicted to be the short runway because of wind, weather, NOTAMs, etc.

(E) Special requirements for short runway operations are:

(1) flight crew members shall be trained according to **EK.10.72.001 Operations Manual Part-D** by the Turkish Airlines Flight Training Directorate;

(2) aerodrome operating minima visibility shall be at or above 1,500 m (regardless of the type of approach to be conducted, higher values if minima dictate as such);

(3) runway of intended landing shall be equipped with a VASI or PAPI which provides a normal glide path (same as the glide slope limits dictated in the AFM for the applicable aeroplane type). VASI or PAPI requirement may be replaced with an operable glide slope of an Instrument Landing System (ILS);

(4) published limitations and procedures in **EK.10.73.001 Operations Manual Part-A, Operations Manual Part-B, EK.10.73.002 Operations Manual Part-C** and the applicable AFM are adhered to; and

(5) takeoff and landings may only be conducted by Commanders (seated on the left hand seat) or co-pilots (P3-P4 seated in the right hand seat);

(6) particular attention shall be given to the aerodromes with short runways in terms of performance calculations (e.g. LDA, TODA, Approach, Landing Climb Gradient and etc.). Dispatcher shall ensure that the performance requirements at the expected landing mass are met based on the weather reports and/or forecasts and field condition reports at the estimated time of landing;

(7) aeroplanes without installed EFB should not be planned for the short runway operations. In case of EFB failure or unavalibility, landing analysis charts and stopping distances for probable weight, weather and runway conditions for the planned short runway operations shall be included in the pre-flight documentation;

(8) commencing the final approach, commander shall compare again wind aloft with reported surface wind to become aware of shear potential and/or significant tailwind component;

(9) landing distance calculations with 15% safety margin shall be made in accordance with “Autobrake 3 or Max” for B737 and “Medium Autobrake” for A319/A320 to ensure 200 meters margin before the end of landing distance available;

(10) gust factor shall be calculated as part of the steady wind value for tailwind limitation and landing distance calculation.

(F) In case of flight crew incapacitation, if the aerodrome is not classified as category “C”, above classified flight crew member may continue the approach if he deems a safe, stabilized approach and landing can be made. Otherwise the flight crew member shall initiate a go-around. For details regarding category C aerodrome operation **Subchapter 5.1.3.1.2 Aerodrome Competency** procedures shall also be observed.

(G) LIFUS flights shall not be planned for these types of operations according to **PR.10.72.001 Procedure for Line Flying Under Supervision (LIFUS)**.

(H) Braking action shall be available and classified as “GOOD” for all short runway operations when reduced friction on a runway due to runway contamination or precipitation is possible to occur. Aeroplane shall not be dispatched for flight with braking action classified less than “GOOD” unless the runway classification can be improved to “GOOD” prior to ETA.

(I) The following aeroplane systems shall be fully operational for short runway operations:

(1) flight controls;

(2) all wheel braking units;

(3) auto-brake system;

(4) nose wheel steering;

(5) anti-skid system; and

(6) all reversers.

(J) Take off alternate shall be specified on the operational flight plan.

8.1.2.5.3 Short and Narrow Runway Operations

(A) Short and narrow runway operations shall fulfill the requirements depicted in **Subchapters 8.1.2.5.1** and **8.1.2.5.2**.

(B) Short and narrow runway landing and takeoffs shall only be conducted by a suitably qualified Commander seated in the left hand seat.

(C) In case of Commander incapacitation, unless the flight crew member seated on the right hand seat is not another a suitably qualified Commander, he shall initiate a go-around.

(D) LIFUS flights shall not be planned for these types of operations according to **PR.10.72.001 Procedure for Line Flying Under Supervision (LIFUS)**.

(E) Take off alternate shall be specified on the operational flight plan.

8.1.2.5.4 Runways with Arresting Gear/Hook Barrier Installed

(A) When a landing to be made to a runway with an arresting gear/hook barrier installed at the touchdown zone:

(1) Landing Distance Available (LDA) shall be reduced by the distance from the approach end of the runway (the landing threshold) to the cable. Performance calculations shall be based on the adjusted LDA,

(2) Following a normal approach to that runway, touchdown should be planned beyond the arresting gear/hook barrier. Flare should be initiated accordingly,

(3) An Autoland shall not be made.

(B) When a take-off to be made from a runway with an arresting gear/hook barrier installed at the beginning of the runway:

(1) Take-off roll shall be initiated once past the cable,

(2) Take-off Distance Available (TODA) shall be reduced by the distance from the departure end of the runway (threshold) to the cable. Performance calculations shall be based on the adjusted TODA,

(3) When specific RTOW charts are available from IOCC for this purpose, such charts shall be used.

(C) In order to make the necessary performance adjustments, the distance from the approach/departure end of the runway, or the relevant threshold to the cable shall be obtained from **EK.10.73.002 Operations Manual Part-C**/ Jeppesen Airway Manual or when not published, from the appropriate ATC unit.

(D) Arresting nets (if installed) are located in the overrun area near the runway threshold. If the net is in the raised position at the lift-off end, it should be treated as an obstruction that has to be cleared by 35 feet and an adjustment should be made to the takeoff distance available.

8.1.2.5.5 Steep Approach Procedures

(A) 3.5 degrees for CAT I operations, 3.0 degrees for CAT II/III operations and 6.1% (approx. 3.5 degrees) for NPAs are the nominal angles/ gradient of approach. An approach with a higher descent angle/gradient is considered a steep approach as per ICAO regulations, nonetheless an approach with lower than 4.5 degrees is not considered as steep per EASA regulations.

(B) Steep approach procedures trainings shall be conducted by Turkish Airlines Flight Training Directorate during conversion training of flight crew according to **EK.10.72.001 Operations Manual Part-D** with descent angles higher than 3.5 degrees but lower than 4.5 degrees. This generic training suffices for the required crew qualification to execute steep approaches with the angles lower than 4.5 degrees.

(C) Steep approach operations using glideslope angles of 4.5° or more and with screen heights of less than 60 ft, but not less than 35 ft, require prior approval by the Turkish DGCA.

(D) All steep approaches must be flown fully stabilized and in landing configuration (with highest flap setting if conditions permit) beyond the FAF.

(E) Refer to **Operations Manual Part-B** “Stable Approach Criteria” for descent rate limitations during steep approaches.

8.1.2.6 Night Operations

(A) The criteria listed below are required for night operations in addition to the requirements depicted in other related sections:

(1) For runway of intended landing:

(a) threshold lights;

(b) runway edge lights;

(c) runway end lights (may be replaced by the threshold lights at the runway extremity);

(d) VASI or PAPI system (may be replaced with an operable glide slope of an ILS or glidepath of an RNP approach with Baro VNAV (ie. LNAV/VNAV)); and

(e) a straight-in approach procedure: an approach with a published straight-in-landing minima (circle-to-land is prohibited) or,

a side step approach or,

a specifically approved visual approach as the final part and continuation of instrument approach at night.

(2) For runway of intended departure:

(a) runway edge lights;

(b) runway end lights (may be replaced by the threshold lights at the runway extremity); and

(c) a published SID, if not available, published EOSID (if the EOSID is used, ATC shall be informed).

(B) For night operations on narrow runways, the following criteria are required for the runway of intended landing in addition to the requirements described above:

(1) straight in approach procedure - see note below (circle-to-land is prohibited); and

(2) an approach lighting system (any classification).

Note: for a straight in approach, the angle formed by the final approach track and the runway centerline shall not exceed 15 degrees.

8.1.2.7 Rescue and Firefighting Service (RFFS)

(A) Planning:

1) In accordance with ICAO ANNEX 6 ATTACHMENT I, Turkish Airlines considers the following items to determine the acceptability of an aerodrome RFFS protection level when an aerodrome is exposed to a temporary reduction of its RFFS capability:

a) for departure or destination aerodromes, the difference between the aerodrome RFFS category and the aeroplane RFFS category, and the frequency of flights to that aerodrome; and

b) for alternate aerodromes, the difference between the aerodrome RFFS category and the aeroplane RFFS category, and the probability that this alternate aerodrome will be used.

2) An aerodrome RFFS category below the protection levels defined in the Minimum Acceptable Aerodrome RFFS Category table below is acceptable based on the Flight Operations Risk Assessment (AQD NO: R1608-19) by Flight Operations Risk Assessment Management.

3) If other considerations prevail, such as weather conditions, runway(s) characteristics, or length of diversion, risk mitigations and avoidance will be assessed by the IOCC based on the NOTAMs issued for the concerned airport. If there are any specific requirements after the assessment, they will be published as a Company NOTAM for the associated airport. The variations and their validity periods shall be included in the Company NOTAM published.

4) For cases where one time on demand flights are required, IOCC shall be responsible to determine the necessary requirements based on items 1 and 3 above.

5) Lowest aerodrome RFFS category for Turkish Airlines operated aeroplane is Category 4. ARFC shall not be reduced below Category 4.

6) If an individual aerodrome serves more than one purpose, the highest required category corresponding to that purpose at the time of expected use applies.

(B) In-Flight:

1) The Commander may decide to land at an aerodrome regardless of the RFFS category if, in the Commander's judgement after due consideration of all prevailing circumstances, to do so would be safer than to divert (e.g. possibility of occurrence of a more significant hazard as a result of diversion or hold).

2) The information contained about the acceptable aerodrome RFFS category at the planning stage and, the variations under item (A) 3) are applicable at the in-flight re-planning point.

(C) Acceptable Aerodrome RFFS Category:

Minimum Acceptable Aerodrome RFFS Category			
Aeroplane Type	Aeroplane RFFS Category (ARFC)	Departure and Destination Aerodrome (**Note 1**)	Take-Off, En-route, Destination Alternate Aerodromes (**Note 1 & 2**)
A330-300	9	8	7
A350-900			
B777			
B787-9			
B777F			
A330-200F	8	7	6
A330-200			
A321	7	6	5
B737-800/900ER			
B737-8-9 MAX			
A319	6	5	4
A320			
B737-700			
Non-revenue/Ferry Flight			

Note 1: One more category below these values may be acceptable in the case of a temporary downgrade of 72 hours or less (not below Category 4) as indicated in the NOTAMs and Company NOTAMs.

Note 2: At flight planning stage, RFFS Category for En-route Alternate Aerodromes may be reduced down to Category 4, if the conditions detailed in **EK.10.74.005 Dispatch Manual Section 1.9.2.8 Monitoring of the Diverts** are met. The integrity of such planning is under the responsibility of IOCC.

8.1.2.8 Surface Conditions and Wind Limitations

(A) It is the Commander's responsibility to acquire the information in reference to the direction and the velocity of surface wind prior to initiating a take-off or an approach to land. The Co-pilot shall not be the PF for takeoff and landing, if the reported crosswind component of the runway intended to be used is or expected to be more than;

(1) 15 kts (including gust factor) for P5/P6 classified Co-Pilot,

(2) 20 kts (including gust factor) for P3/P4 classified Co-Pilot.

(B) Flight operations shall not be conducted if the reported/forecasted speed of surface wind including the gust factor is above 50 kts. However, this restriction does not prevent the flight to be dispached according to **Subchapter 8.1.2.3.2** considering the destination weather as below minima.

(C) When in doubt the Commander shall ask for runway braking coefficient prior to attempting a take-off or landing.

(D) Calculated runway lengths shall be sufficient for the actual runway braking conditions.

(E) Refer to **Subchapter 8.4** for autoland wind limits.

(F) Further crosswind limitations apply for narrow runway operations as explained in **Subchapter 8.1.2.5.1**.

(G) The table below displays the maximum wind limitations as a factor of braking action or braking coefficient or runway condition code:

<table>
<tr><th rowspan="2">RWYCC (note6)</th><th rowspan="2" colspan="2">RUNWAY STATE-WIDTH REPORTED BRAKING ACTION</th><th colspan="2">BRAKING COEFFICIENT</th><th colspan="4">TAKE-OFF AND LANDING MAXIMUM WIND LIMITATIONS</th></tr>
<tr><th>Russian</th><th>ICAO</th><th>HEADWIND</th><th>CROSSWIND (Note 1)</th><th>CROSSWIND GUST (Note 1)</th><th>TAILWIND</th></tr>
<tr><td>6</td><td rowspan="2">rwy width > 45m</td><td>DRY</td><td colspan="2">-</td><td rowspan="6">50 KNOTS</td><td>30 KNOTS (Note 2)</td><td>30 KNOTS (Note 2)</td><td rowspan="2">10 KNOTS (Note 5)</td></tr>
<tr><td>5</td><td>GOOD</td><td rowspan="2">0.42 or above</td><td rowspan="2">0.40 or above</td><td rowspan="2">25 KNOTS (Note 4)</td><td rowspan="2">30 KNOTS</td></tr>
<tr><td>6</td><td rowspan="2">40m ≤ rwy width ≤ 45m</td><td>DRY</td></tr>
<tr><td>5</td><td>GOOD</td><td rowspan="2">20 KNOTS</td><td rowspan="2">28 KNOTS</td><td rowspan="3">10 KNOTS</td></tr>
<tr><td>4</td><td colspan="2">GOOD to MEDIUM</td><td>0.41 – 0.40</td><td>0.39 – 0.36</td></tr>
<tr><td>3</td><td colspan="2">MEDIUM</td><td>0.39 – 0.37</td><td>0.35 – 0.30</td><td>15 KNOTS</td><td>21 KNOTS</td></tr>
<tr><td>2</td><td colspan="2">MEDIUM to POOR (Note 3)</td><td>0.36 – 0.35</td><td>0.29 – 0.26</td><td colspan="2">10 KNOTS</td><td>5 KNOTS</td></tr>
<tr><td>1</td><td colspan="2">POOR</td><td>0.34 or less</td><td>0.25 or less</td><td colspan="4" rowspan="2">OPERATIONS NOT PERMITTED
Aeroplane shall not be dispatched unless the runway condition can be improved to “MEDIUM/POOR” or above condition prior to the Estimated Time of Arrival (ETA) at the aerodrome.</td></tr>
<tr><td>0</td><td colspan="2">NIL</td><td colspan="2">-</td></tr>
</table>

select more limiting applicable factor from shaded columns to determine resulting limitations.

Note 1: If approved by the applicable aeroplane type AFM and/or FCOM.

Note 2: At Commander’s discretion if approved by the applicable aeroplane type AFM and/or FCOM, dry runway crosswind limits (with or without gust) for B777/B787 and A330/A350 aircraft may be increased up to 35kts.

Note 3: With one of the spoiler, anti-skid or reverser systems inoperative, take-off and landing shall not be conducted on runways withRWYCC 2 or equivalent medium/poor braking coefficient conditions.

Note 4: For non-narrow runway operations, if the crosswind value is within limits for landing either for the take-off aerodrome or take off alternate aerodrome if specified, maximum crosswind take off limit may be increased to 30 kts for the take-off aerodrome.

Note 5: May be increased up to 15 kts if approved by the applicable aeroplane type AFM and/or FCOM, unless local restrictions contradicts.

Note 6: RWYCC (Runway Condition Code) is evaluated via aerodrome authority assessment, pilot reports or assessed by the flight crew in the absence of any RWYCC report using RCAM (Runway Condition Assessment Matrix) depending on the contaminant type and depth as described in table (L) below.

(H) Assessing and reporting the condition of the movement area and related facilities is necessary in order to provide the flight crew with the information needed for safe operation of the aeroplane. The runway condition report (RCR) is used for reporting assessed information.

(I) The philosophy of the RCR is that the aerodrome operator assesses the runway surface conditions whenever water, snow, slush, ice or frost are present on an operational runway. From this assessment, a runway condition code (RWYCC) and a description of the runway surface are reported which can be used by the flight crew for aeroplane performance calculations.

(J) The RWYCC reflects the runway braking capability as a function of the surface conditions. With this information, the flight crew can derive, from the performance information provided by the aeroplane manufacturer, the necessary stopping distance of an aircraft on the approach under the prevailing conditions.

(K) Where available, the pilot reports of runway braking action should be taken into consideration as part of the ongoing monitoring process, using the following principle:

(1) a pilot report of runway braking action is taken into consideration for downgrading purposes; and

(2) a pilot report of runway braking action can be used for upgrading purposes only if it is used in combination with other information qualifying for upgrading.

(L) The table below provides a correlation of runway condition code, surface condition and pilot reports:

Runway condition assessment matrix (RCAM)			
Assessment criteria		Downgrade assessment criteria	
Runway Condition Code (RWYCC) [1]	Runway surface description [2]	Aeroplane deceleration or directional control observation	Pilot report of runway braking action [3]
6	**DRY**	---	---
5	**DAMP** **WET** (water up to and including 3 mm) **SLUSH** (up to and including 3 mm) **DRY SNOW** (up to and including 3 mm) **WET SNOW** (up to and including 3 mm) **FROST**	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	GOOD
4	**COMPACTED SNOW** (OAT at or below -15 °C)	Braking deceleration OR directional control is between good and medium	GOOD TO MEDIUM
3	**SLIPPERY WET** **DRY SNOW** (more than 3 mm depth) **WET SNOW** (more than 3 mm depth) **DRY SNOW ON TOP OF COMPACTED SNOW** (any depth) **WET SNOW ON TOP OF COMPACTED SNOW** (any depth) **COMPACTED SNOW** (OAT above -15 °C)	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced	MEDIUM
2	**STANDING WATER** (more than 3 mm depth) **SLUSH** (more than 3 mm depth)	Braking deceleration OR directional control is between medium and poor	MEDIUM TO POOR
1	**ICE** [4]	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced	POOR
0	**WET ICE** [4] **WATER ON TOP OF COMPACTED SNOW** [4] **DRY SNOW OR WET SNOW ON TOP OF ICE** [4]	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain	LESS THAN POOR

(1) The RWYCC shall be reported for each third of the runway assessed.
(2) If 25 per cent or less area of a runway third is wet or covered by contaminant, a RWYCC 6 shall be reported.
(3) Two consecutive pilot reports of runway braking action of POOR shall trigger an assessment if an RWYCC of 2 or better has been reported.

(4) The aerodrome operator may assign a higher RWYCC (but no higher than code 3) for each third of the runway.

8.1.2.9 Touchdown

All landings should be aimed to the first 300 m (1,000 ft) after threshold or aiming point markings of the runway unless the specific approach procedures require contrary. A positive touchdown should normally be accomplished between 300 m (1000 ft) to 600 m (2000 ft) within the defined touchdown zone. If touchdown cannot be achieved within the first 900 m (3000ft) or one third of the LDA (whichever is less) of the landing runway; a go-around/rejected landing should be initiated with consideration given to remaining runway length, performance conditions and calculations, terrain and wind, controllability of the aircraft, etc. The TDZ lights and/or markings painted on the runway can be used to assess the touchdown zone.

8.1.3 Methods and Responsibilities for Establishing Aerodrome Operating Minima

8.1.3.1 The Concept of Minima

(A) The term “minima” refers to aerodrome weather conditions and defines the minimum visibility (horizontal / vertical) prescribed for take-off or landing at an aerodrome.

(B) Different concepts of minima:

(1) Aeroplane capability minima: Aeroplane Flight Manual (AFM) defines the lowest minima for which the aeroplane has been certified.

(2) Aerodrome operating minima: Jeppesen aerodrome charts are established in accordance with respective national authority minima for aerodromes.

(3) Turkish Airlines minima: This is the lowest minima to which Turkish Airlines is authorized to use at a specific aerodrome. This minimum cannot be lower than items (1) and (2) above.

8.1.3.2 The Method for Establishing Aerodrome Operating Minima

(A) Aerodrome operating minima shall be established for each departure, destination or alternate aerodrome planned to be used. As an integral part of **EK.10.73.002 Operations Manual Part-C**, Jeppesen Airway Manual establishes and publishes the required aerodrome operating minima on behalf of Turkish Airlines.

(B) These minima shall not be lower than those established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State. Any increment specified by the competent authority shall be added to the published minima.

(C) Following factors are taken into account when establishing aerodrome operating minima:

(1) type, performance and handling characteristics of the aircraft;

(2) composition, competence and experience of the flight crew;

(3) dimensions and characteristics of the runways/final approach and take-off areas (FATOs) that may be selected for use;

(4) adequacy and performance of the available visual and non-visual ground aids;

(5) equipment available on the aircraft for the purpose of navigation and/or control of the flight path during the take-off, the approach, the flare, the landing, rollout and the missed approach;

(6) the obstacles in the approach, missed approach and climb-out areas necessary for the execution of contingency procedures, for the determination of obstacle clearance;

(7) obstacle clearance altitude/height for the instrument approach procedures;

(8) means to determine and report meteorological conditions; and

(9) flight technique to be used during the final approach.

(D) Instrument departure and approach procedures established by the State of the aerodrome shall be used.

(E) Notwithstanding item (C), the Commander may accept an ATC clearance to deviate from a published departure or arrival route, provided obstacle clearance criteria are observed and full account is taken of the operating conditions. In any case, the final approach shall be flown visually or in accordance with the established instrument approach procedures.

(F) Notwithstanding item (C), procedures other than those referred to in (C) may be used provided they have been approved by the State in which the aerodrome is located and are specified in **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

8.1.3.3 Aeroplane Categories

(A) Aircraft categories are based on the indicated airspeed at threshold (V_{AT}) which is equal to the stalling speed (V_{SO}) multiplied by 1,3 or one-g (gravity) stall speed (V_{S1g}) multiplied by 1,23 in the landing configuration at the maximum certified landing mass. If both V_{SO} and V_{S1g} are available, the higher resulting V_{AT} shall be used.

(B) Turkish Airlines aeroplane are categorized either 'C' or 'D' according to their V_{AT} values as specified in the table below:

Aeroplane Category	V_{AT}
C	From 121 to 140 kt
D	From 141 to 165 kt

(C) The landing configuration(s) that is taken into account is specified in the **Operations Manual Part-B** and all approaches shall be flown as stabilized approaches.

(D) The categories defined in the table above are permanent values that do not change with conditions of day-to-day operations.

(E) Turkish Airlines aeroplane approach and take-off categories are:

Aeroplane Type	Category
B737-700	C
B737-800 SFP	C
B737-800/-8 MAX	D
B737-900ER/-9 MAX	D
A319	C
A320	C
A321	C / D
A330	C
A350	C
B777	D
B787	D

8.1.3.4 Flight Crew Minima

(A) Flight crew minima is the lowest minima that the flight crew is authorized to operate based on the qualification of the flight crew members.

(B) Flight crew members are limited to the minima of the flight crew member with the higher minima:

Pilot 1 Authorisation	Pilot 2 Authorisation	Minima
CAT III	CAT II	CAT II
CAT III	CAT I	CAT I
CAT II	CAT I	CAT I

(C) Flight Crew who has not flown into an airport within last 12 months as PF or PM, a 50 feet to MDA/MDH and 100 meters to minimum required visibility shall be added both at dispatch phase for planning purposes and during flight. Recency (refer to **Subchapter 5.1.3.1.3**) of either crew member (commander or co-pilot) satisfies the requirement above. This increment shall only be applied provided that both items below are valid:

(1) an Aerodrome Information Note has not been prepared by Flight Operations Risk Assessment Management for the associated airport, and

(2) non-precision approaches that uses a navigation system for course deviation but does not provide glidepath information such as localizer, VOR, NDB and LNAV approaches.

8.1.3.5 Aerodrome Operating Minima Criteria

8.1.3.5.1 Take-Off and Departure Minima

(A) Take-off minima shall be expressed as visibility or runway visual range (RVR) limits, taking into account all relevant factors for each aerodrome planned to be used and aircraft characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions, e.g. ceiling, should be specified.

(B) The Commander shall not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a weather-permissible take-off alternate aerodrome is available.

(C) When the reported meteorological visibility (VIS) is below that required for take-off and RVR is not reported, a take-off may only be commenced if the Commander can determine that the visibility along the take-off runway is equal to or better than the required minimum.

(D) When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the Commander can determine that the visibility along the take-off runway is equal to or better than the required minimum.

(E) Visual reference:

(1) The take-off minima should be selected to ensure sufficient guidance to control the aircraft in the event of both a rejected take-off in adverse circumstances and a continued take-off after failure of an engine.

(2) For night operations, ground lights should be available to illuminate the runway and any obstacles.

(F) Required RVR/Visibility:

(1) When RVR or meteorological visibility is not available, the Commander should not commence take-off unless he can determine that the actual conditions satisfy the applicable take-off minima.

(2) In the event of an engine failure at any point during take-off, the aeroplane can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins.

(3) The take-off minima specified by Turkish Airlines shall be expressed as RVR/CMV (converted meteorological visibility) values not lower than those specified in the table below:

Take-Off RVR/VIS (Without An Approval For Low Visibility Take-Off)	
FACILITIES	**RVR/ VISIBILITY (Note 1)**
DAY ONLY: NIL (Note2)	500 m
DAY: at least runway edge lights or runway centerline markings NIGHT: at least runway edge lights and runway end lights or (**Note 3**) runway centerline lights and runway end lights	400m

Note 1: the reported RVR/ Visibility value representative of the initial part of the take-off 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: Runway centerline lights and runway end lights combination may be considered as an exception to **Subchapter 8.1.2.6** in case of temporary unavailablity or downgrade of runway edge lights in non-LVO conditions.

(G) For low visibility take-off (LVTO) provisions with an RVR below 400m, refer to **Subchapter 8.4**.

(H) Before commencing take-off, the Commander shall be satisfied that:

(1) according to the information available to him, the weather at the aerodrome or operating site and the condition of the runway or final approach and take-off areas intended to be used would not prevent a safe take-off and departure; and

(2) established aerodrome operating minima will be complied with.

8.1.3.5.2 Approach and Landing Minima

(A) The decision height (DH) to be used for a non-precision approach (NPA) flown with the continuous descent final approach (CDFA) technique, approach procedure with vertical guidance (APV) or CAT I operation should not be lower than the highest of:

(1) the minimum height to which the approach aid can be used without the required visual reference;

(2) the obstacle clearance height (OCH) for the category of aircraft;

(3) the published approach procedure DH where applicable;

(4) the system minimum specified in table approach system minima below; or

(5) the minimum DH specified in the AFM or equivalent document, if stated.

(B) The minimum descent height (MDH) for an NPA operation flown without the CDFA technique should not be lower than the highest of:

(1) the OCH for the category of aircraft;

(2) the system minimum specified in approach system minima table below; or

(3) the minimum MDH specified in the AFM, if stated.

Approach System Minima	
Facility	**Lowest DH/ MDH (ft)**
ILS/MLS/GLS	200
GNSS/SBAS (LPV)	200
GNSS (LNAV)	250
GNSS/Baro-VNAV (LNAV/ VNAV)	250
LOC with or without DME	250
VOR	300
VOR/DME	250
NDB	350
NDB/DME	300

GNSS: global navigation satellite system;

LNAV: lateral navigation;

LPV: localiser performance with vertical guidance

VNAV: vertical navigation;

(C) The lowest minima in terms of RVR to be used for approach are listed in the **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(D) Before commencing an approach to land, the Commander shall be satisfied that according to the information available to him, the weather at the aerodrome and the condition of the runway or final approach and take-off areas intended to be used should not prevent a safe approach, landing or missed approach, having regard to the performance information contained in the FCOM / **Operations Manual Part-B** / CSPD.

(E) Approach and landing is not authorised when the airport operating landing visibility minimum is below 800 meters unless RVR reporting is available for the runway of intended use.

(F) The in-flight determination of the landing distance should be based on the latest available meteorological or runway state report, preferably not more than 30 minutes before the expected landing time.

(G) For approach and landing minima associated with low visibility operations refer to **Subchapter 8.4**.

8.1.3.5.3 Determination and Applicability of Visibility and RVR

(A) The criteria for establishing RVR/CMV and determination of RVR/CMV/VIS for NPA, APV and CAT I operations are specified in **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(B) For precision approach only the RVR/CMV/Visibility (also a particular ceiling if required by the state authority), for a non-precision approach and/or circling approach both the visibility/CMV and VV/ceiling shall be at or above the minima.

(C) If both RVR and visibility are reported, RVR value is controlling factor. Visibility shall be used only if RVR value is not reported.

(D) The minimum RVR for a visual approach operation is 800m.

(E) A conversion from meteorological visibility to RVR/CMV should not be used:

(1) when reported RVR is available;

(2) for calculating take-off minima; and

(3) for any RVR minima less than 800 m.

(F) If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. 'RVR more than 1 500 m', it should not be considered as a reported value.

(G) When converting meteorological visibility to RVR in circumstances other than those in item (E), the conversion factors specified in table below shall be used:

Conversion of reported meteorological visibility to RVR/CMV

Light elements in operation	RVR/CMV=reported meteorological visibility x	
	Day	Night
HI approach and runway lights	1.5	2.0
Any type of light installation other than above	1.0	1.5
No Lights	1.0	Not applicable

(H) In some countries, minima may still be given as RVR and Visibility. The applicable value must be used. If both values are given, the RVR value is controlling.

(I) For details, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

8.1.3.5.4 Circling Operations

(A) Circling Minima

(1) the MDH for circling operation should not be lower than the highest of:

(a) the published circling OCH for the aeroplane category;

(b) the minimum circling height derived from "circling-MDH and minimum visibility vs. aeroplane category table" below; or

(c) the DH/MDH of the preceding instrument approach procedure.

(2) the MDA for circling should be calculated by adding the published aerodrome elevation to the MDH, as determined by item (A)(1); and

(3) the minimum visibility for circling shall be the highest of:

(a) the circling visibility for the aeroplane category, if published;

(b) the minimum visibility derived from "circling-MDH and minimum visibility vs. aeroplane category table" below item (A)(4); or

(c) the RVR/CMV for the preceding instrument approach procedure specified in Jeppesen Airway Manual.

(4) Circling - Aeroplanes MDH and minimum visibility vs. aeroplane category:

Aeroplane Category	C	D
MDH (ft)	600	700
Minimum meteorological visibility (m)	2400	3600

(B) Conduct of flight — general:

(1) the MDH and OCH included in the procedure are referenced to aerodrome elevation;

(2) the MDA is referenced to mean sea level;

(3) for these procedures, the applicable visibility is the meteorological visibility; and

(4) The relationship between height above threshold and in-flight visibility required to obtain and sustain visual contact during the circling maneuver is given in the table above (item (4)) as a minimum, unless other higher minimums required in Jeppesen approach charts for that specific approach.

(C) Instrument approach followed by visual maneuvering (circling) without prescribed tracks

(1) when the aeroplane is on the initial instrument approach, before visual reference is stabilized, but not below MDA/H, the aeroplane should follow the corresponding instrument approach procedure until the appropriate instrument MAPt is reached.

(2) at the beginning of the level flight phase at or above the MDA/H, the instrument approach track determined by radio navigation aids, RNAV, RNP, ILS, MLS or GLS should be maintained until the pilot:

(a) estimates that, in all probability, visual contact with the runway of intended landing or the runway environment will be maintained during the entire circling procedure;

(b) estimates that the aeroplane is within the circling area before commencing circling; and

(c) is able to determine the aeroplane's position in relation to the runway of intended landing with the aid of the appropriate external references.

(3) when reaching the published instrument MAPt and the conditions stipulated in (C)(2) are unable to be established by the pilot, a missed approach should be carried out in accordance with that instrument approach procedure.

(4) after the aeroplane has left the track of the initial instrument approach, the flight phase outbound from the runway should be limited to an appropriate distance, which is required to align the aeroplane onto the final approach. Such maneuvers should be conducted to enable the aeroplane:

(a) to attain a controlled and stable descent path to the intended landing runway; and

(b) to remain within the circling area and in such way that visual contact with the runway of intended landing or runway environment is maintained at all times.

(5) flight maneuvers should be carried out at an altitude/height that is not less than the circling MDA/H.

(6) descent below MDA/H should not be initiated until the threshold of the runway to be used has been appropriately identified. The aeroplane should be in a position to continue with a normal rate of descent and land within the touchdown zone.

(D) Instrument approach followed by a visual maneuvering (circling) with prescribed track

(1) the aeroplane should remain on the initial instrument approach procedure until one of the following is reached:

(a) the prescribed divergence point to commence circling on the prescribed track; or

(b) the MAPt.

(2) the aeroplane should be established on the instrument approach track determined by the radio navigation aids, RNAV, RNP, ILS, MLS or GLS in level flight at or above the MDA/H at or by the circling maneuver divergence point.

(3) if the divergence point is reached before the required visual reference is acquired, a missed approach should be initiated not later than the MAPt and completed in accordance with the instrument approach procedure.

(4) when commencing the prescribed circling maneuver at the published divergence point, the subsequent maneuvers should be conducted to comply with the published routing and published heights/altitudes.

(5) unless otherwise specified, once the aeroplane is established on the prescribed track(s), the published visual reference does not need to be maintained unless:

(a) required by the State of the aerodrome; or

(b) the circling MAPt (if published) is reached.

(6) if the prescribed circling maneuver has a published MAPt and the required visual reference has not been obtained by that point, a missed approach should be executed in accordance with (E)(2) and (E)(3).

(7) subsequent further descent below MDA/H should only commence when the required visual reference has been obtained.

(8) unless otherwise specified in the procedure, final descent should not be commenced from MDA/H until the threshold of the intended landing runway has been identified and the aeroplane is in a position to continue with a normal rate of descent to land within the touchdown zone.

(E) Missed approach

(1) missed approach during the instrument procedure prior to circling:

(a) if the missed approach procedure is required to be flown when the aeroplane is positioned on the instrument approach track defined by radio-navigation aids RNAV, RNP, or ILS, MLS, and before commencing the circling maneuver, the published missed approach for the instrument approach should be followed; or

(b) if the instrument approach procedure is carried out with the aid of an ILS, MLS or an stabilized approach, the MAPt associated with an ILS, MLS procedure without glide path (GP-out procedure) or the stabilized approach procedure, where applicable, should be used.

(2) if a prescribed missed approach is published for the circling maneuver, this overrides the maneuvers prescribed below.

(3) if visual reference is lost while circling to land after the aeroplane has departed from the initial instrument approach track, the missed approach specified for that particular instrument approach should be followed. It is expected that the pilot will make an initial climbing turn toward the intended landing runway to a position overhead the aerodrome where the pilot will establish the aeroplane in a climb on the instrument missed approach segment.

(4) the aeroplane should not leave the visual maneuvering (circling) area, which is obstacle protected, unless:

(a) established on the appropriate missed approach procedure; or

(b) at minimum sector altitude (MSA).

(5) all turns should be made in the same direction and the aeroplane should remain within the circling protected area while climbing either:

(a) to the altitude assigned to any published circling missed approach maneuver if applicable;

(b) to the altitude assigned to the missed approach of the initial instrument approach;

(c) to the MSA; or

(d) to the minimum holding altitude (MHA) applicable to transition to a holding facility or fix, or continue to climb to an MSA; or as directed by ATS.

When the missed approach procedure is commenced on the 'downwind' leg of the circling maneuver, an 'S' turn may be undertaken to align the aeroplane on the initial instrument approach missed approach path, provided the aeroplane remains within the protected circling area.
The commander should be responsible for ensuring adequate terrain clearance during the above-stipulated maneuvers, particularly during the execution of a missed approach initiated by ATS.

(6) because the circling maneuver may be accomplished in more than one direction, different patterns will be required to establish the aeroplane on the prescribed missed approach course depending on its position at the time visual reference is lost. In particular, all turns are to be in the prescribed direction if this is restricted, e.g. to the west/east (left or right hand) to remain within the protected circling area.

(7) if a missed approach procedure is published for a particular runway onto which the aeroplane is conducting a circling approach and the aeroplane has commenced a maneuver to align with the runway, the missed approach for this direction may be accomplished. The ATS unit should be informed of the intention to fly the published missed approach procedure for that particular runway.

(8) the commander should advise ATS when any missed approach procedure has been commenced, the height/altitude the aeroplane is climbing to and the position the aeroplane is proceeding towards and/or heading the aeroplane is established on.

(9) for further information, refer to **EK.10.73.002 Operations Manual Part-C**/Jeppesen Airway Manual.

8.1.3.5.5 Side Step Maneuver and Approach Minima

(A) ATC may authorize a standard instrument approach procedure which serves either one of parallel runways that are separated by 1,200 feet or less followed by a straight−in landing on the adjacent runway.

(B) Aircraft that will execute a side−step maneuver will be cleared for a specified approach procedure and landing on the adjacent parallel runway. Example, “cleared ILS runway 07L approach, side−step to runway 07R.” Pilots are expected to commence the side−step maneuver upon reaching minimums according to below item (D) provided that the runway or runway environment is in sight. Compliance with minimum altitudes associated with stepdown fixes is expected even after the side−step maneuver is initiated.

(C) The final approach track may not be aligned with the runway. In such cases, additional visibility/RVR should be required in order to allow the pilot sufficient time to assess the position of the aircraft relative to the runway. In the case of a side-step manoeuvre, where the aircraft will manoeuvre at a relatively late stage toward a parallel runway, additional visibility/RVR should also be required.

(D) Complying with all of the above items whether the approach track is aligned with the runway or not, Company minima for side step manoeuvre according to executed instrument approach are as below:

Visibility (m) *	5000 or Circle to Land / Sidestep Minimum
MDA (ft) *	AAL+1000 or Circle to Land / Sidestep Minimum

*: Whichever is higher

(E) After being established on the final approach course of the runway which instrument approach procedure is executed, continue to descent until side step MDA according to item (D) above. If visual reference is obtained for the runway intented to land (day or night); execute side step manoeuvre and continue approach, if not, go around as published according to pre-briefed missed approach specified for that particular procedure without delay.

8.1.3.5.6 Effect on Landing Minima of Temporarily Failed or Downgraded Ground Equipment

(A) These instructions are intended for use both pre-flight and in-flight.

(B) It is not expected that the Commander would consult such instructions after passing 1000 ft above the aerodrome. If failures of ground aids are announced at such a late stage, the approach could be continued at the Commander’s discretion. If failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in ‘failed or downgraded equipment- effect on landing minima for operations without a low visibility operations (LVO) approval table’, presented below, and the approach may have to be abandoned.

(C) Conditions applicable to failed or downgraded equipment-effect on landing minima for operations without a low visibility operations (LVO) approval table:

(1) multiple failures of runway/FATO lights other than indicated should not be acceptable;

(2) deficiencies of approach and runway/FATO lights are treated separately; and

(3) failures other than ILS affect RVR only and not DH.

(D) For effects of failed or downgraded equipment on landing minima during low visibility operations(LVO), refer to **Subchapter 8.4**.

(E) Approach lighting systems:

Class of lightning facility	Length, configuration and intensity of approach lights
FALS	CAT I lighting system (HIALS ≥720 m) distance coded centreline, Barrette centreline
IALS	Simple approach lighting system (HIALS 420 – 719 m) single source, Barrette
BALS	Any other approach lighting system (HIALS, MALS or ALS 210 - 419 m)
NALS	Any other approach light system (HIALS, MALS or ALS <210 m) or no approach lights

(F) For detailed information on lighting systems and a comparison of ICAO and FAA specifications, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(G) Failed or downgraded equipment-effect on landing minima for operations without a low visibility operations (LVO) approval table:

<table>
<tr><th rowspan="2">Failed or downgraded equipment</th><th colspan="2">Effect on landing minima</th></tr>
<tr><th>CAT I</th><th>APV, NPA</th></tr>
<tr><td>ILS stand-by transmitter</td><td colspan="2">No effect</td></tr>
<tr><td rowspan="3">Outer Marker</td><td rowspan="3">Not allowed except if replaced by height check at 1000 ft.</td><td>APV- not applicable</td></tr>
<tr><td>NPA with FAF: no effect unless used as FAF</td></tr>
<tr><td>If the FAF cannot be identified (e.g. no method available for timing of descent), non-precision operations cannot be conducted</td></tr>
<tr><td>Middle Marker</td><td>No effect</td><td>No effect unless used as MAPt</td></tr>
<tr><td>RVR Assessment Systems</td><td colspan="2">No effect</td></tr>
<tr><td>Approach Lights</td><td colspan="2">Minima as for NALS</td></tr>
<tr><td>Approach Lights except the last 210 m</td><td colspan="2">Minima as for BALS</td></tr>
<tr><td>Approach lights except the last 420 m</td><td colspan="2">Minima as for IALS</td></tr>
<tr><td>Standby power for approach lights</td><td colspan="2">No effect</td></tr>
<tr><td>Edge lights, threshold lights and runway end lights</td><td colspan="2">Day: no effect; Night: not allowed</td></tr>
<tr><td>Centerline lights</td><td>No effect if F/D or autoland Otherwise RVR 750m</td><td>No effect</td></tr>
<tr><td>Centerline lights spacing increased to 30m</td><td colspan="2">No effect</td></tr>
<tr><td>Touchdown zone lights</td><td>No effect if F/D or autoland; Otherwise RVR 750m</td><td>No effect</td></tr>
<tr><td>Taxiway lighting system</td><td colspan="2">No effect</td></tr>
</table>

8.1.3.6 Commencement and Continuation of Approach

(A) The Commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/VIS.

(B) If the reported RVR/VIS is less than the applicable minimum the approach shall not be continued:

(1) below 1,000 ft above the aerodrome; or

(2) into the final approach segment in the case where the DA/H or MDA/H is more than 1,000 ft above the aerodrome.

(C) Where the RVR is not available, RVR values may be derived by converting the reported visibility.

(D) If, after passing 1 000 ft above the aerodrome, the reported RVR/VIS falls below the applicable minimum, the approach may be continued to DA/H or MDA/H. For CAT IIIB with NO DH, approach may be continued to Alert Height.

(E) The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the visual reference adequate for the type of approach operation and for the intended runway is established at the DA/H or MDA/H and is maintained. However some state requirements may differ and be more restrictive; refer to Jeppesen Country Rules and Regulations and/or applicable AIP. Refer to **Subchapter 8.1.3.7** below for visual references for NPA, APV and CAT I operations, **Subchapter 8.4.4.3** for visual references for CAT II/III operations.

(F) The touchdown zone RVR shall always be controlling. If reported and relevant, the midpoint and stop-end RVR shall also be controlling. The minimum RVR value for the midpoint is 125 m or the RVR required for the touchdown zone if less, and 75 m for the stop-end. For aeroplane equipped with a rollout guidance or control system, the minimum RVR value for the midpoint shall be 75 m.

(G) '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.

8.1.3.7 Visual References for NPA, APV and CAT I Operations

(A) At DH or MDH, VASI/PAPI (mandatory for NPA at night, not mandatory during daytime or CAT I operations and RNP approach with Baro VNAV (ie. LNAV/VNAV)) and at least one of the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) elements of the approach lighting system (This item is not adequate reference alone for NPA and shall be accompanied by at least one of the following visual references);

(2) the threshold;

(3) the threshold markings;

(4) the threshold lights;

(5) the threshold identification lights;

(6) the touchdown zone or touchdown zone markings;

(7) the touchdown zone lights;

(8) FATO/runway edge lights.

8.1.4 Operating Minima For VFR Classified Aerodrome

8.1.4.1 General

(A) Aerodromes with no serviceable radio navigation aids and/or usable instrument approach procedures are classified as VFR aerodromes.

(B) IFR flights to/from a VFR classified aerodrome are not allowed except when authorised by the Chief Flight Operations Officer (Nominated Person). For details refer to **Subchapter 8.3.1**.

8.1.4.2 Meteorological Conditions

VMC Visibility and Distance from Cloud Minima are defined in Jeppesen Airway Manual GEN Part, ICAO RULES OF THE AIR – ANNEX 2, 3.9 VMC VISIBILITY AND DISTANCE FROM CLOUDS MINIMA.

	Flight Visibility	**Distance from cloud**
At or above 10,000ft/ FL100	8km	1500m horizontally 1000ft vertically
Below 10,000ft/ FL100	5km	

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

8.1.5.1 Routes and Areas of Operation

(A) Turkish Airlines flight operations are only conducted along routes, or within areas, for which:

(1) ground facilities and services, including meteorological services, adequate for the planned operation are provided;

(2) the performance of the aircraft is adequate to comply with minimum flight altitude requirements;

(3) the equipment of the aircraft meets the minimum requirements for the planned operation; and

(4) appropriate maps and charts are available.

(B) The operations shall be conducted in accordance with any restriction on the routes or the areas of operation specified by the competent authority.

8.1.5.2 Planning Minima for Take-Off Alternate Aerodrome

(A) An aerodrome shall only be selected as a take-off alternate aerodrome when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima specified in accordance with **Subchapter 8.1.3**.

(B) The ceiling shall be taken into account when the only approach operations available are non-precision approaches (NPA) and/or circling operations. Any limitation related to one engine inoperative operations shall be taken into account.

8.1.5.3 Planning Minima for Destination Aerodrome Other Than an Isolated Destination Aerodrome

(A) An aerodrome shall only be selected as the destination aerodrome when:

(1) the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable planning minima as follows:

(a) RVR/visibility (VIS) specified in accordance with **Subchapter 8.1.3**; and

(b) for an NPA or a circling operation, the ceiling at or above MDH; or

(2) two destination alternate aerodromes are selected.

8.1.5.4 Planning Minima for a Destination Alternate, Isolated, Fuel En-Route Alternate (Fuel ERA) or En-Route Alternate (ERA) Aerodrome

(A) An aerodrome shall only be selected as an alternate aerodrome for one of these purposes when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima table, presented below.

(B) Non-precision minima (NPA) in the table below means the NPA with the next highest minima that apply in the prevailing wind and serviceability conditions. Unserviceabilities should be fully taken into account.

Planning minima for destination alternate aerodrome, isolated destination aerodrome, fuel ERA and ERA aerodrome	
Type of Approach	**Planning Minima**
CAT II and CAT III	CAT I RVR
CAT I	NPA RVR/ VIS Ceiling shall be at or above MDH
APV	NPA or CAT I minima, depending on the DH/MDH
NPA	NPA RVR/VIS + 1000 m Ceiling shall be at or above MDH + 200ft
Circling	Circling

8.1.5.5 Application of Aerodrome Weather Forecasts

(A) For planning purposes:

(1) Information in forecasts prefixed by "BECMG" or “TEMPO”, indicating below minima in accordance with planning minima defined above and below minima per item (D) for the applicable time period, shall be classified as below minima and procedures defined as for **Subchapter 8.1.2.3.2** shall be applied.

(2) Information in forecasts prefixed by “PROB 30/40 (alone)” or “PROB 30/40 TEMPO”, indicating below minima in accordance with planning minima defined above and below minima per item (D) for the applicable time period, shall not be classified as below minima but the weather shall be classified as “Operationally Significant” (refer to item (C)).

(3) For operations within the Commonwealth of Independent States (C.I.S) and Peoples Republic of China with forecasts containing the prefix “TEMPO”, refer to item (B) below.

(B) For planning purposes within the Commonwealth of Independent States (C.I.S) and Peoples Republic of China:

(1) Based on operational experience, information in forecasts prefixed by “TEMPO”, indicating below minima in accordance with planning minima defined above and below minima per item (D) for the applicable time period, shall not be classified as below minima but the weather shall be classified as “Operationally Significant” (refer to item (C) below).

(2) Commonwealth of Independent States (C.I.S) consists of: Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

(C) For operations to aerodromes which the weather forecast is classified as “Operationally Significant”:

(1) Destination and/or destination alternate aerodromes shall be allocated with extra fuel as agreed to between the dispatch and the Commander.

(2) Allocated fuel shall consist of a minimum of 60 minutes (except in case of PROB 30/40 TEMPO which may be disregarded by commander discretion with the amount of fuel as agreed with dispatch) of extra holding fuel in addition to the requirements of **Subchapter 8.1.7**.

(3) If fuel allocation is limited due to aeroplane operational mass, payload should be reduced to compensate for the required fuel. If payload reduction is not feasible,the flight shall be dispatched with two destination alternates as explained in **Subchapter 8.1.2.3.2(C)**.

(4) En-route alternate and ETOPS alternate aerodromes classified as operationally significant may be allocated with extra fuel as agreed to between the dispatch and the Commander. Allocated fuel should be based on the location of the en-route alternate aerodrome, as sufficient fuel may already be on board the aeroplane for the planned flight (**Example:** A flight from Istanbul to Beijing with en-route alternate aerodrome of Baku has sufficient fuel for the intended flight or a possible diversion to Baku, therefore allocation of additional fuel should not be considered).

(D) Refer to the following table for specific prefix application:

APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING

1. APPLICATION OF INITIAL PART OF TAF

a) **Application the time period**: From the start of the TAF validity period up to the time of applicability of the first subsequent 'FM…*' or 'BECMG', or if no 'FM' or 'BCMG' is given, up to the end of the validity period of the TAF.

b) **Application of forecast**: The prevailing weather conditions forecast in the initial part of the TAF shall be fully applied with the exception of the **mean wind** and **gusts** (**and crosswind**) which shall be applied in accordance with the policy in the column 'BECMG AT and FM' in the table below.

2. APPLICATION OF FORECAST FOLLOWING CHANGE INDICATION IN TAF AND TREND

TAF or TREND for AERODROME PLANNED AS:	**FM** (alone) and **BECMG AT**: **Deterioration and Improvement**	**BECMG** (alone) **,BECMG FM**, **BECMG TL**, **BECMG FM…*TL**, in case of:		**TEMPO** (alone), **TEMPO FM**, **TEMPO FM…TL**, **PROB30/40** (alone)			**PROB 30/40 TEMPO** **Deterioration and Improvement**
				Deterioration		**Improvement**	
		Deterioration	**Improvement**	**Transient/ Shower Conditions** in connection with short-lived weather phenomena, e.g. thunderstorms, showers	**Persistent Conditions** in connection with e.g. haze, mist, fog, dust/ sandstorm, continuous precipitations	**In any Case**	
DESTINATION at ETA± 1HR **TAKE-OFF ALTERNATE** at ETA± 1HR **DEST. ALTERNATE** at ETA± 1HR **ENROUTE ALTERNATE** at ETA± 1HR	Applicable from the **start of change**; **Mean wind**: Shall be within required limits; **Gusts**: May be disregarded.	Applicable from the time **of the start of** change; **Mean wind**: Shall be within required limits; **Gusts**: May be disregarded.	Applicable from the time **of the end of** change; **Mean wind**: Shall be within required limits; **Gusts**: May be disregarded.	Not applicable **Mean wind and gusts** exceeding required limits may be disregarded.	Applicable **Mean wind**: Shall be within required limits; **Gusts**: May be disregarded;	Shall be dis-regarded	Deterioration may be disregarded; on Commander's discretion Improvement shall be disregarded including mean wind and gusts.
ETOPS ENRT ALTN at earliest/latest ETA± 1 HR	Applicable from the **time of start** of change; **Mean wind**: Shall be within required limits; **Gusts** exceeding crosswind limits shall be fully applied	Applicable from the **time of start** of change; **Mean wind**: Shall be within required limits; **Gusts** exceeding crosswind limits shall be fully applied	Applicable from the **time of end** of change; **Mean wind**: Shall be within required limits; **Gusts** exceeding crosswind limits shall be fully applied	**Applicable if below applicable landing minima**; **Mean wind**: Shall be within required limits; **Gusts** exceeding crosswind limits shall be fully applied	**Applicable if below applicable landing minima**; **Mean wind**: Shall be within required limits; **Gusts** exceeding crosswind limits shall be fully applied		

Note: 'Required Limits' are those contended in this Manual.

*The space following 'FM' should always include a time group e.g. 'FM1030'.

8.1.5.6. Meteorological Conditions

(A) On IFR flights the Commander shall only:

(1) commence take-off; or

(2) continue beyond the point from which a revised ATS flight plan applies in the event of in-flight replanning,

when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the planning minima.

(B) On IFR flights, the Commander shall only continue towards the planned destination aerodrome when the latest information available indicates that, at the expected time of arrival, the weather conditions at the destination, or at least one destination alternate aerodrome, are at or above the applicable aerodrome operating minima.

(C) In addition, on IFR flights, the Commander shall only continue beyond:

(1) the decision point when using the reduced contingency fuel (RCF) procedure; or

(2) the pre-determined point when using the pre-determined point (PDP) procedure,

when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the applicable aerodrome operating minima. Refer to **Subchapter 8.1.7** for RCF and PDP procedures.

(D) On IFR flights to/from a VFR classified aerodrome, the Commander shall only commence take-off when the appropriate weather reports and/or forecasts indicate that the meteorological conditions along the part of the route to be flown under VMC will, at the appropriate time, be at or above the VMC limits. Refer to **Subchapter 8.1.4.2 (A)** for VMC Visibility and Distance from Cloud Minima.

8.1.6 Interpretation of Meteorological Information

8.1.6.1 General

(A) Meteorological authority designated by each State authority shall provide or arrange for the provision of meteorological services in accordance with the Standards and Recommended Practices of ICAO Annex 3.

(B) **EK.10.73.002 Operations Manual Part-C** (Jeppesen Airway Manual) highlights and provides detailed information on different weather reports/forecasts/charts, meteorological data and their interpretation.

(C) Dispatchers and flight crew members are required to develop and maintain a good working knowledge of the system used for reporting meteorological conditions and of the associated codes. Some codes use the same figures as the values being reported and some codes use lettered abbreviations which can become particularly significant when attempting to assess whether or not meteorological conditions will be at or above set/approved Turkish Airlines criteria/minima.

(D) In order to dispatch a flight in accordance with set/approved Turkish Airlines criteria/minima, Dispatch shall only use meteorological information provided or published by State or aerodrome authorities.

(E) In order to continue a flight in accordance with set/approved Turkish Airlines criteria/minima, Commander shall only use meteorological information provided by State or aerodrome authorities.

8.1.6.2 Meteorological Information to be Provided

(A) The minimum meteorological information to be provided to a flight shall consist of:

(1) significant weather charts relating to the specific flight;

(2) upper temperature/winds charts relating to the specific flight;

Note: Computer flight plans are issued with winds/temperatures aloft forecast values for each point specified in the operational flight plan (OFP). Issued winds/temperatures values are used in the calculation of the actual OFP. The provided wind/temperature values on the OFP are for Flight Levels (FL) 100, 180, 240, 300, 340, and 390. These values may be used instead of the required prognostic charts.

(3) aerodrome actual weather reports (METAR) (if available) and aerodrome weather forecasts (TAF) for take-off, take-off alternate (if applicable), en-route alternate (as applicable), destination, and destination alternate aerodromes (if applicable); and

(4) SIGMET (as applicable) information relating to the specific flight.

(B) All the forecasts issued within World Area Forecast Centers (WAFC's) are issued for fixed valid times of 0000, 0600, 1200 and 1800 UTC. The period for use of these forecasts are ±3 hours.

(1) For example: Validity time (UTC): 0600 Period of use (UTC): 0300-0900

(C) For detailed information on actual weather reports (METARs and SPECI), aerodrome forecast reports (TAFs), non-routine weather Information (SIGMETs and AIRMETs) and en-route meteorological weather charts, refer to Jeppesen Airway Manual Meteorology section.

8.1.7 Determination of the Quantities of Fuel and Oil Carried

8.1.7.1 Fuel and Oil Supply

(A) The Commander shall only commence a flight or continue in the event of in-flight re-planning when satisfied that the aeroplane carries at least the planned amount of usable fuel and oil to complete the flight safely, taking into account the expected operating conditions.

(B) Minimum oil quantity values and the rate of consumption are depicted in the FCOM or AFM for the applicable aeroplane type.

8.1.7.2 Fuel Policy

(A) Turkish Airlines fuel policy, which is explained below, has been established for the purpose of flight planning and in-flight re-planning to ensure that every Turkish Airlines operated flight carries sufficient fuel for the planned operation and reserve fuel to cover any deviations from the planned operation. The fuel policy and any change to it require prior approval by the competent authority.

(B) Fuel planning shall be based on,

(1) procedures contained in this operations manual and data provided by the aircraft manufacturer; and

(2) the operating conditions under which the flight is to be conducted including:

(a) aircraft fuel consumption data;

(b) anticipated masses;

(c) NOTAMs;

(d) expected meteorological conditions;

(e) air navigation services provider(s) procedures and restrictions;

(f) the effects of deferred maintenance items and/or configuration deviations; and

(g) any other conditions that might cause increased fuel consumption.

(C) The pre-flight calculation of usable fuel required for a flight shall include:

(1) taxi and APU fuel;

(2) trip fuel;

(3) reserve fuel consisting of:

(a) contingency fuel;

(b) alternate fuel, if a destination alternate aerodrome is required;

(c) final reserve fuel; and

(d) additional fuel, if required by the type of operation; and

(4) extra fuel if required by the Commander.

(D) In-flight re-planning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination aerodrome other than originally planned shall include:

(1) trip fuel for the remainder of the flight;

(2) reserve fuel consisting of:

(a) contingency fuel;

(b) alternate fuel, if a destination alternate aerodrome is required;

(c) final reserve fuel; and

(d) additional fuel, if required by the type of operation; and

(3) extra fuel if required by the Commander.

(E) Contingency fuel is carried to compensate for factors that may influence fuel required on a particular flight in an unpredictable way including:

(1) deviations of an individual aeroplane from the expected fuel consumption data;

(2) deviations from forecast meteorological conditions;

(3) deviations from planned routings and/or cruising levels/altitudes; and

(4) unexpected prolonged taxi times before take-off.

(F) The departure aerodrome may be selected as the destination alternate aerodrome.

(G) Final decision on the fuel to be carried rests with the Commander.

8.1.7.3 Planning Criteria

(A) Basic Procedure

(1) The usable fuel to be on board for departure shall be the sum of the following:

(a) Taxi and APU fuel, which shall not be less than the amount expected to be used prior to take-off. Local conditions at the departure aerodrome and APU consumption are taken into account when calculating taxi and APU fuel for each flight.

1. The total amount of fuel expected to be used prior to take-off including allowances for departure aerodrome conditions, operation of the ice protection systems (if required) and APU.

2. Reference taxi and APU fuel allocation figures given in the table below. Commander may increase or decrease this reference fuel allocation taking into consideration actual expected fuel use and the maximum mass values of the aeroplane.

Aeroplane Type	**Reference Allocation For Taxi** (10 minutes taxi)	**Reference Allocation For APU** (60 minutes APU)
B737-700/800/900 ER	120 kg	105 kg
B737-8/-9 MAX	106 kg	107 kg
B777	330 kg	240 kg
B787-9	220 kg	195 kg
A319	100 kg	130 kg
A320	120 kg	130 kg
A321	140 kg	130 kg
A321 NEO	103 kg	130 kg
A330	250 kg	215 kg
A350-900	250 kg	230 kg

(b) Trip fuel, which shall include:

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

2. fuel from top of climb to top of descent, including any step climb/descent;

3. fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

4. fuel for approach and landing at the destination aerodrome.

(c) Contingency fuel, except as provided for in (B) Reduced Contingency Fuel (RCF) Procedure, which shall be the higher of:

1. Either:

i 5 % of the planned trip fuel or, in the event of in-flight re-planning, 5% of the trip fuel for the remainder of the flight;

ii not less than 3 % of the planned trip fuel or, in the event of in-flight re-planning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate (ERA) aerodrome is available (see **Subchapter 8.1.7.4** for the location of the fuel ERA aerodrome for purposes of reducing contingency fuel to 3%);

2. or an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m), above the destination aerodrome in standard conditions.

(d) Alternate fuel, which shall include:

1. fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;

2. fuel for climb from missed approach altitude to cruising level/altitude, taking into account the expected departure routing;

3. fuel for cruise from top of climb to top of descent, taking into account the expected routing;

4. fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

5. fuel for executing an approach and landing at the destination alternate aerodrome;

Note 1: Where two destination alternate aerodromes are required, the fuel value shall be sufficient to proceed to the alternate aerodrome that requires the greater amount of alternate fuel.

Note 2: Required additional distance must be added to alternate route for arrival procedure if there is no arrival procedure of planned alternate route.

(e) Final reserve fuel, which shall be fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions, calculated with the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required.

A/C Type	Approximate Final Reserve Fuel in Kg
A319 / A320	1200 kg
A321	1400 kg
A321 NEO	1200 kg
A330-200	2400 kg
A330-300	2200 kg
B737-700/800/900 ER	1200 kg
B737-8/-9 MAX	1000 kg
B777-300ER / B777F	3200 kg
B787-9	2200 kg
A350-900	2600 kg

Note: Chart values are provided for information purposes only. Flight crews should check OFP and FMS for exact values. Chart values are rounded up to the nearest 100 and based on maximum landing mass.

(f) Minimum additional fuel, which shall permit:

1. the aeroplane to descend as necessary and proceed to an adequate alternate aerodrome in the event of engine failure or loss of pressurisation, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route, and

i hold there for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and

ii make an approach and landing,

except that additional fuel is only required if the minimum amount of fuel calculated in accordance with items (b) through (e) is not sufficient for such an event; and

2. holding for 15 minutes at 1,500 ft (450 m) above destination aerodrome elevation in standard conditions, when a flight is operated without a destination alternate aerodrome.

(g) Extra fuel, which is at the discretion of the Commander and the dispatcher.

(B) Reduced Contingency Fuel (RCF) Procedure: When planning to a destination aerodrome (destination 1 aerodrome) with an RCF procedure using a decision point along the route and an optional refuel destination (destination 2 aerodrome), the amount of usable fuel on board for departure shall be the greater of items (1) or (2) below:

(1) The sum of:

(a) taxi fuel;

(b) trip fuel to the destination 1 aerodrome, via the decision point;

(c) contingency fuel equal to not less than 5 % of the estimated fuel consumption from the decision point to the destination 1 aerodrome;

(d) alternate fuel or no alternate fuel if the decision point is at less than six hours from the destination 1 aerodrome and two separate runways are available and usable at the destination 1 aerodrome and the appropriate weather reports and/or forecasts for the destination 1 aerodrome indicate that, for the period from one hour before until one hour after the expected time of arrival at the destination 1 aerodrome, the ceiling will be at least 2 000 ft or circling height + 500 ft, whichever is greater, and the ground visibility will be at least 5 km.;

(e) final reserve fuel;

(f) additional fuel; and

(g) extra fuel if required by the Commander.

(2) The sum of:

(a) taxi fuel;

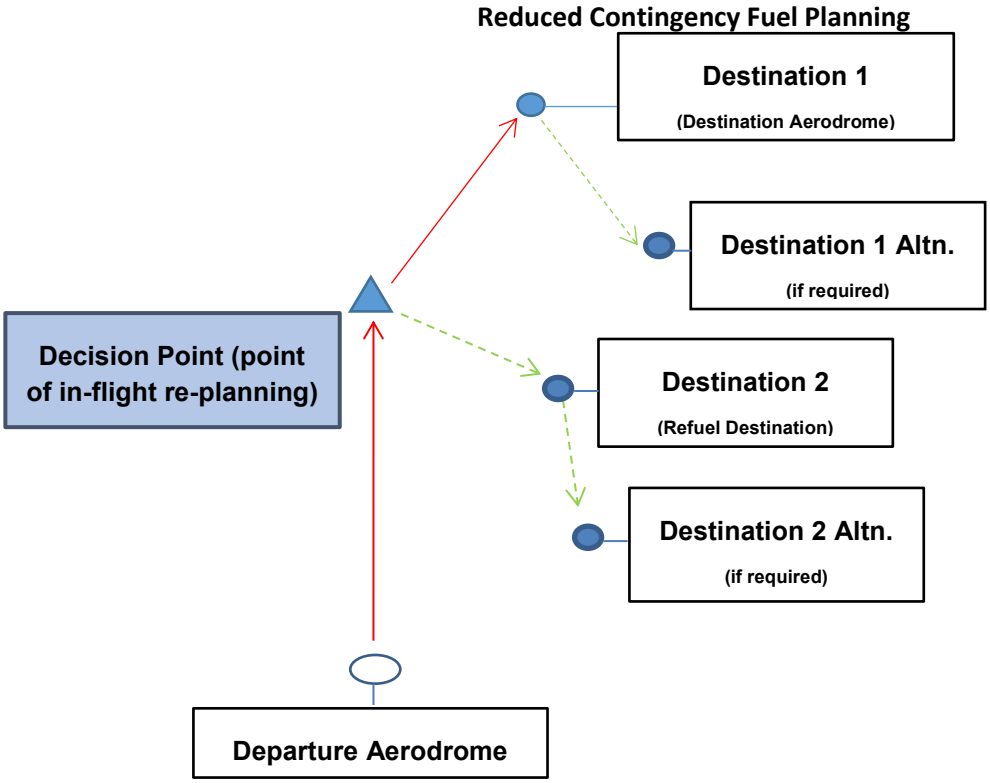
(b) trip fuel to the destination 2 aerodrome, via the decision point;

(c) contingency fuel equal to not less than the amount calculated in accordance with (A)(1)(c) above from departure aerodrome to the destination 2 aerodrome;alternate fuel, if a destination 2 alternate aerodrome is required;

(d) final reserve fuel;

(e) additional fuel; and

(f) extra fuel if required by the Commander.



(C) **Predetermined Point (PDP) Procedure:** When planning to a destination alternate aerodrome where the distance between the destination aerodrome and the destination alternate aerodrome is such that a flight can only be routed via a predetermined point to one of these aerodromes, the amount of usable fuel, on board for departure, shall be the greater of (1) or (2) below:

(1) The sum of:

(a) taxi fuel;

(b) trip fuel from the departure aerodrome to the destination aerodrome, via the predetermined point;

(c) contingency fuel calculated in accordance with (A)(1)(c) above;

(d) additional fuel if required, but not less than fuel to fly for 2 hours at normal cruise consumption above the destination aerodrome, which also shall not be less than final reserve fuel; and

(e) extra fuel if required by the Commander.

(2) The sum of:

(a) taxi fuel;trip fuel from the departure aerodrome to the destination alternate aerodrome, via the predetermined point;

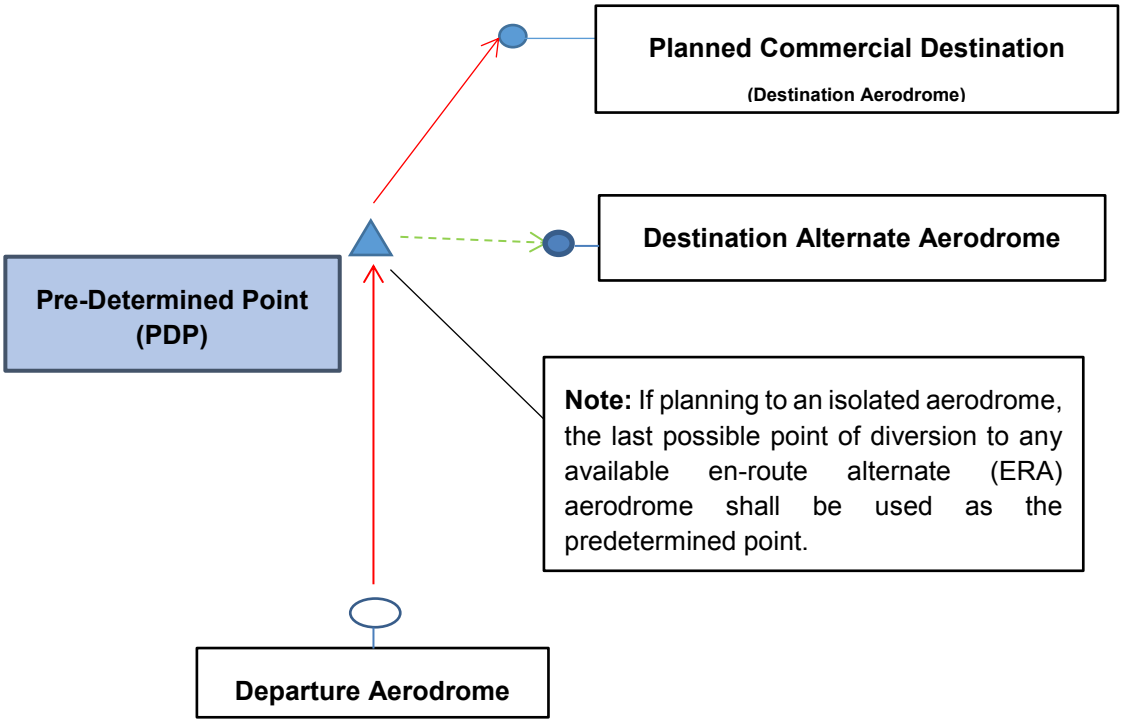
(b) contingency fuel calculated in accordance with (A)(1)(c) above;

(c) additional fuel if required, but not less than:

1. fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination alternate aerodrome elevation in standard conditions, which also shall not be less than final reserve fuel; and

(d) extra fuel if required by the Commander.

Pre-Determined Point (PDP) Planning



(D) **Isolated Aerodrome Procedure**

(1) The use of an isolated aerodrome exposes the aircraft and passengers to a greater risk than to operations where a destination alternate aerodrome is available

(2) Even though the airport is surrounded by airports within acceptable range of each individual aircraft type (such as single engine, ETOPS, 4 engines etc), it still might be classified as an Isolated based on the operational requirements that limits selection of those airports as an alternate

(3) Turkish Airlines analysis the risks of operation to isolated aerodrome before any commercial operations

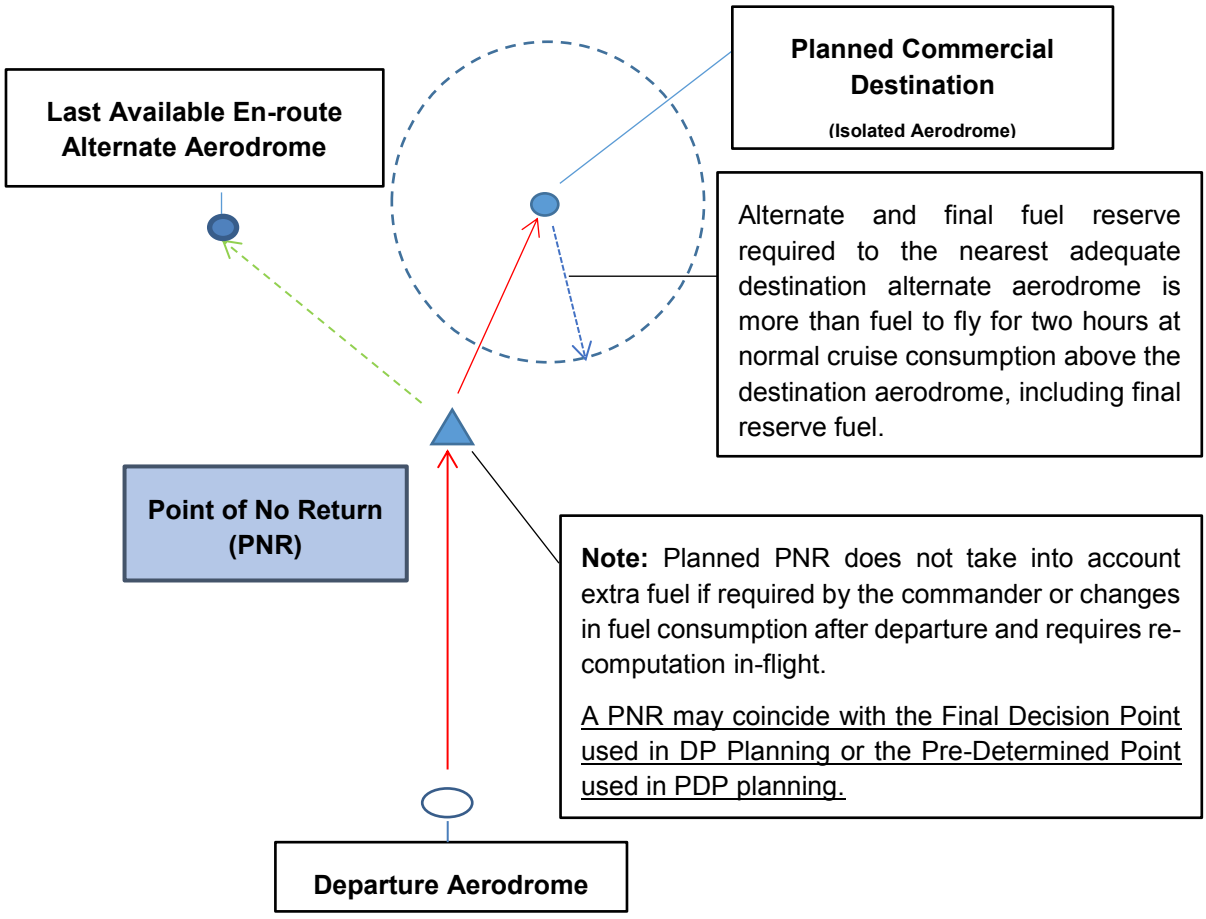
(4) An isolated aerodrome is one for which the alternate and final fuel reserve required to the nearest adequate destination alternate aerodrome is more than fuel to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel.

(5) When planning to an isolated aerodrome, the last possible point of diversion to any available en-route alternate (ERA) aerodrome shall be used as the predetermined point.

(6) For each flight into an isolated aerodrome a point of no return shall be determined; and

(7) A flight to be conducted to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic and other operational conditions indicate that a safe landing can be made at the estimated time of use.

Point of No Return (PNR)



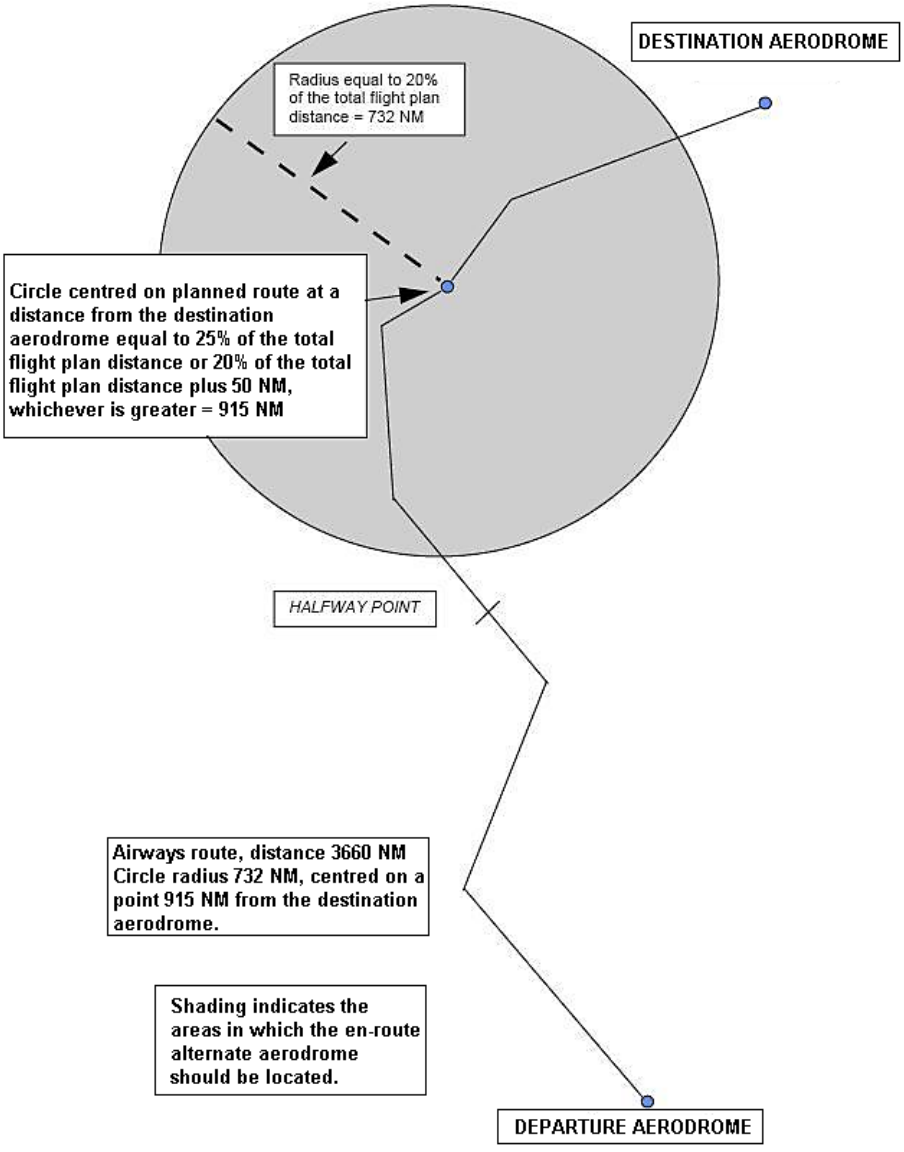
8.1.7.4 Fuel En-Route Alternate (Fuel ERA) Aerodrome

(A) The fuel ERA aerodrome should be located within a circle having a radius equal to 20 % of the total flight plan distance, the centre of which lies on the planned route at a distance from the destination aerodrome of 25 % of the total flight plan distance, or at least 20 % of the total flight plan distance plus 50 NM, whichever is greater. All distances should be calculated in still air conditions (see Figure 1).

(B) During the period commencing one hour before and ending one hour after the time of arrival at the 3% ERA aerodrome, the meteorological conditions shall be at or above Turkish Airlines' approved planning minima.

(C) The period of use of the 3% ERA aerodrome should also be specified on the OFP.

Figure 1- Location of the fuel ERA aerodrome for purposes of reducing contingency fuel to 3%



8.1.7.5 Oil Planning

(A) For flight planning and in-flight re-planning purposes, each aeroplane shall carry sufficient engine oil contents for the planned operation and for any deviations from the planned operation.

(B) Minimum values and the rate of consumption are depicted in the **FCOM** for the applicable aeroplane type.

(C) Prior to initiating a flight, the Commander shall ensure that the engine oil contents have been serviced in accordance with the aeroplane manufacturer recommendations. Prior to initiating a flight from a transit station, the Commander shall ensure that engine oil contents do not indicate any abnormal/excessive oil consumption.

8.1.7.6 Fuel and Oil Consumption Records

(A) Fuel records shall be retained in the AML and the related sections of the AML shall be filled-in by the Commander.

(B) If the fuel information column is filled-in by other personnel, the Commander shall ensure that the quantity indicated in the "Total at Departure" agrees with the total fuel on board the aeroplane, less any fuel used during the elapsed time period.

(C) Commander shall perform a calculation of fuel onboard as described below (any fuel used during the elapsed time period should also be taken into account);

(1) Aeroplane refuelled after Commander embarks:

*Quantity Prior to Refuelling + ((Uplift Lt) x (Density**)) = Actual Fuel On Board vs Fuel Display*

(2) Aeroplane refuelled before Commander embarks:

Quantity Prior to Refuelling + ((Uplift Lt) x (Density**)) = Actual Fuel On Board vs Fuel Display*

**Fuel Slip value should be used. If value not available, AML "Remaining Fuel" value should be used.*

*** If the density value of the fuel cannot be provided, it will be taken according to* **Subchapter 8.1.8.2 item (F)**.

(D) Upon arrival to parking position after the flight, before remaining fuel is recorded on AML, the amount of fuel left on the tanks and fuel used is collected and checked that the total fuel is the same as the Actual Fuel On Board calculated at the beginning of the flight.

(E) If fuel slip cannot be provided, Commander should request uplift value as liters for calculations from Ground Operations / Refuelling Personnel.

(F) Fuel amount and the accuracy should be checked according to table below.

Aeroplane Type	**Maximum Tolerance (Full Tanks)** Based on aeroplane manufacturer's calculations
B737-700/-800/-MAX	± 400 kg
B737-900ER	±480 kg
B777	±1500 kg
B787-9	±1500 kg
A319/320/321	-300 / +200 kg
A330	-2600 / +2000 kg
A350-900	+1500 kg

(G) If calculations are outside accuracy limits or any doubt exists, the Commander shall write down a defect regarding the fuel display / calculation systems and notify relevant departments.

(H) If uplift check is within limits, calculated values shall be filled in appropriate sections of AML.

(I) It is the responsibility of the appropriate maintenance personnel to record the oil quantities and consumption in the AML.

8.1.7.7 Tankering Fuel Policy

(A) The amount of tankering fuel to be carried will be shown in the tankering fuel column of the OFP.

(B) When determining the amount of tankering fuel, aeroplane operational mass limits shall be considered and calculated accordingly.

(C) In case there is a company note on the NOTAMs stating that the fuel tankering is due to high cost of fuel, the tankering fuel can be considered as holding fuel

(D) In case of limited/no fuel availability at the destination aerodrome, this information will be provided as company note on the NOTAMs and the tankering fuel shall not be considered as holding fuel, except for urgency, emergency situations or if an alternate contingency plan has been established and agreed between the Commander and the FOCC. The alternate contingency plan may include a fuel stop on an alternate aerodrome on the return flight.

8.1.7.8 Top-Up Fuel Procedure

Top-Up fuel procedure is established in order to minimize the difference between EZFW and AZFW value, and to ensure that the flight is performed with maximum payload. According to **PR.74.502 Top-Up Fueling Procedure**:

(1) Automatic flight plan shall be generated on the FWZ system three hours in advance of the scheduled time of departure (STD-3 hrs). The aeroplane will be supplied 5 tonnes less for wide-body and 2 tonnes less for narrow-body than the block fuel amount determined in the flight plan generated in accordance with the EZFW within the period of STD-3 hrs.;

(2) Block fuel completion (TOP-UP) determined in the flight plan generated in line with the updated weight values within the period of STD-1 hr shall be performed by the contracted fuel company. Final fuel determination according to the latest EZFW figure rests with the Commander;

(3) In the event that such process of fueling is carried out during passengers are on board (transit stop), embarking or disembarking, then actions shall be performed in accordance with the regulations of the concerned airport authority and the procedures defined in **Subchapter 8.2.1.3**.

8.1.8 Mass and Centre of Gravity

8.1.8.1 Definitions

For definitions of terms related to mass and centre of gravity, refer to **Operations Manual Part-B**.

8.1.8.2 Mass and Centre of Gravity Calculations

(A) During any phase of operation, the loading, mass and centre of gravity (CG) of the aeroplane shall comply with the limitations specified in the Aeroplane Flight Manual (AFM) or the **Operations Manual Part-B**, whichever is more restrictive.

(B) The mass and the CG of any Turkish Airlines aeroplane are established by actual weighing prior to initial entry into service and thereafter at intervals of four years. The accumulated effects of modifications and repairs on the mass and balance are accounted for and properly documented. For details on methods, procedures and responsibilities, see **TL.50.001 Aircraft Weighing Instruction**.

(C) The mass of all operating items and crew members included in the aircraft dry operating mass are determined by using standard masses published by OPSM. The influence of their position on the aircraft's CG is also determined.

(D) The mass of the traffic load, including any ballast, is established either by actual weighing or by using standard passenger and baggage masses.

(E) The use of standard masses for passengers, checked baggage and other items are approved by the Turkish DGCA.

(F) If the fuel density is not provided by the fuelling company or is not known, a standard density value of 0,795 kg/l should be used for fuel calculations except below some typical density values:

(1) JET A1 (Jet fuel JP 1) 0.79

(2) JET B (Jet fuel JP 4) 0.76

(3) Oil 0.88

(G) The loading of:

(1) Turkish Airlines aeroplane are performed under the supervision of qualified personnel; and

(2) traffic load is consistent with the data used for the calculation of the aeroplane mass and balance.

(H) In the Certificate Limitations section of the AFM, forward and aft center of gravity (CG) limits are specified. These limits ensure that the certification stability and control criteria are met throughout the entire flight and allow the proper trim setting for take-off. These limits shall be observed in accordance with set operational procedures in the **Operations Manual Part-B**.

(I) Additional structural limits such as the floor strength limitations, the maximum load per running meter, the maximum mass per cargo compartment and the maximum seating limit shall be accounted for.

8.1.8.3 Mass Values for Crew Members

(A) The standard mass (including hand baggage) of:

(1) flight crew/ technical crew members is 85 kg; and

(2) cabin crew members is 75 kg.

(B) Standard operating crew member masses shall be corrected to take into account any additional baggage (layover or ER baggage checked-in or carried in the cabin). Additional baggage shall be calculated at 15 kg per crew member. The position of this additional baggage must be accounted for when establishing the center of gravity of the aeroplane.

8.1.8.4 Mass Values for Passengers and Baggage

(A) The mass of passengers shall be computed using the standard mass values specified below.

(B) Turkish Airlines preferred method is Option 2.

Type of Flight	Standard Passenger Masses (per each passenger)		
	Option 1	Option 2	
	Male or Female	Male	Female
All flights except holiday charters	84 kg	88 kg	70 kg
Holiday charters	76 kg	83 kg	69 kg
Children	35 kg		
Infants	10 kg		

(1) The standard masses include hand baggage and the mass of any infant below 2 years of age carried by an adult in one passenger seat.

(2) Infants occupying separate passenger seats are considered as children for the purpose of this subchapter.

(3) Holiday charter means a charter flight that is part of a holiday travel package. On such flights the entire passenger capacity is hired by one or more charterer(s) for the carriage of passengers who are travelling, all or in part by air, on a round- or circle-trip basis for holiday purposes. The holiday charter mass values apply provided that not more than 5 % of passenger seats installed in the aircraft are used for the non-revenue carriage of certain categories of passengers. Categories of passengers such as company personnel, tour operators' staff, representatives of the press, authority officials etc. can be included within the 5% without negating the use of holiday charter mass values.

(C) The mass of checked baggage shall be computed using either the actual weighed mass of baggage or using standard mass values specified below.

(D) Turkish Airlines standard method is using the actual weighed mass of baggage.

Type of Flight	Standard Baggage Masses
Domestic	11 kg
European region	13 kg
Intercontinental	15 kg
All other	13 kg

(1) Domestic flight means a flight with origin and destination within the borders of the Republic of Turkey.

(2) Intercontinental flight means a flight with origin and destination in different continents.

(3) European region flight means a flight, other than a domestic flight, whose origin and destination are within the area defined in **Chapter 5**.

(E) On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass values, the actual mass of such passengers shall be determined by adding an adequate mass value increment.

(F) If standard mass values for checked baggage is used and a significant number of baggage is expected to exceed the standard check-in baggage mass values, the actual mass of such baggage shall be determined by weighing or by adding an adequate mass increment.

(G) Check-in, operations and cabin staff and loading personnel shall report to the Commander of the flight or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to significantly deviate from the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. hadj passengers, military personnel or sports teams).

8.1.8.5 Mass and Balance Data Documentation

(A) The mass and balance data shall be documented prior to each flight specifying the load and its distribution. Mass and balance documentation is achieved in the form of a computer generated loadsheet or a manual load and trim sheet as explained in **Operations Manual Part-B Chapter 6**.

(B) The mass and balance document shall enable the Commander to determine that the load and its distribution is such that the mass and balance limits of the aircraft are not exceeded.

(C) The mass and balance documentation shall contain the following information:

(1) aircraft registration and type;

(2) flight identification, number and date;

(3) name of the Commander;

(4) name of the person who prepared the document (this may be replaced with an electronic signature, indicated on the upper right corner of the computer generated loadsheet. This procedure is approved by the Turkish DGCA);

(5) dry operating mass and the corresponding CG of the aircraft (information shall be checked from the DOW-DOI data in Briefing Package/ACARS/Station print-out (on flight crew request via ahm.thy.com)));

(6) mass of the fuel at take-off and the mass of trip fuel;

(7) mass of consumables other than fuel, if applicable;

(8) load components including passengers, baggage, freight and ballast;

(9) take-off mass, landing mass and zero fuel mass;

(10) applicable aircraft CG positions; and

(11) the limiting mass and CG values.

(D) The information above shall be available in flight planning documents or mass and balance systems. Some of this information may be contained in other documents readily available for use.

(E) The integrity of the mass and balance data and documentation generated by a computerised mass and balance system shall be verified, at intervals not exceeding 6 months.

(F) The person supervising the loading of the aircraft shall confirm by hand signature that the load and its distribution are in accordance with the mass and balance documentation given to the Commander. The Commander shall indicate his acceptance by hand signature.

(G) The mass and balance documentation shall include advice to the Commander whether the standard method or a non-standard method has been used for determining the mass of the load components.

(H) THY pantry codes shall be used when AnadoluJet aeroplanes conduct flights on behalf of THY and AnadoluJet pantry codes shall be used when THY aeroplanes conduct flights on behalf of AnadoluJet.

(I) At applicable stations where ground handling operations allow, loadsheet information which will be sent to the cockpit through ACARS should be used instead of the computer/paper loadsheet. The received ACARS loadsheet message will be checked for validity and printed in 3 copies, will be either signed manually or digitally via appropriate ACARS AOC page by the Commander. After reaching agreement with the operations/handling agent and after the agent signs the loadsheets, one copy will be given to the agent, one copy will be put into the flight envelope and 3rd copy will be given to the cabin chief in order to provide seating configuration information. When the ACARS system is inoperative, or if the loadsheet can not be received through the ACARS due to any reason, the computer/paper loadsheet implementation shall apply.

(J) At stations where ACARS loadsheet implementation is not in effect, computer/paper loadsheet will be used. If a difference between computer/paper loadsheet and ACARS loadsheet is recognized and this difference is “within LMC limits”, a revised computer/paper loadsheet should not be requested by the Commander.

(K) If the actual ZFW stated on the mass and balance documentation is different from the estimated ZFW used for the OFP calculations and the Commander believes that this change may result in the aeroplane landing with less than the amount of fuel required to be onboard according to **Subchapter 8.1.7**, he shall contact IOCC via any available means and request fuel figures according to the actual ZFW. He may than decide to ask for a new OFP based on the actual figures and increase the block fuel accordingly, or continue with the original.

(L) The mass and balance documentation shall contain a section for Last Minute Changes.

8.1.8.6 Procedure for Last Minute Changes

(A) Any last minute change (LMC) after the completion of the mass and balance documentation shall be brought to the attention of the Commander and entered in the mass and balance documentation.

(B) Maximum allowed LMC values are:

(1) for wide body aeroplanes, 1000 kg (passenger, cargo, mail or any combination);

(2) for cargo aeroplanes, 2000 kg;

(3) for narrow body aeroplanes, 500 kg (passenger, cargo, mail or any combination).

(C) If the maximum allowed LMC number is exceed, a new mass and balance documentation shall be prepared.

(D) Details of the LMC shall be entered in the "Last Minute Changes" section of both the original and duplicated copies of the mass and balance document.

(E) In case of LMC on mass and balance documentation after door closure, changes may be relayed to the Commander via radio or the ground service interphone. Flight crew and ground staff shall amend their copies in weight and index accordingly. The load message sent to the destination must contain the corrected figures of passenger, cargo, baggage or mail load.

(F) LMC values shall be checked for mass limitations, load limitations of compartments and CG envelope by the responsible ground personnel.

(G) LMC shall not be applied to the crew composition section of the mass and balance document and when the crew composition stated on the mass and balance documentation does not match actual configuration, a new document shall be prepared.

8.1.8.7 Seating Policy

(A) Turkish Airlines prefers to use seat allocation for its passengers during the check-in process.

(B) Unless seat allocation is applied and the effects of the number of passengers per seat row, cargo in individual cargo compartments and fuel in individual tanks is accounted for accurately in the balance calculation, operational margins must be applied to the certificated center of gravity envelope.

(C) Large CG errors may occur when free seating (freedom of passengers to select any seat when entering the aeroplane) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. If extreme longitudinal seat selection occurs, Commander shall apply corrective action by instructing the cabin crew members to reposition the passengers in the cabin as required.

8.1.9 ATS Flight Plan

8.1.9.1 General

(A) An ATS IFR flight plan shall be submitted to the appropriate ATS unit for all flights.

(B) It is the responsibility of the following (the order of responsibility indicated below) to submit an ATS IFR flight plan:

(1) IOCC (for all flights – where capability exists);

(2) Ground Operations (outstations where dispatch capability is insufficient);

(3) Commander (when dispatch and ground operations are not available).

(C) When filing for a scheduled flight, the repetitive ATS IFR flight plan filing system may be used.

(1) A repetitive ATS IFR flight plan is filed for flights which are to be operated on a regular basis at the same time and day within a specific period (e.g. winter/summer schedule or a series of flights for special events).

(2) It is essential that the data upon which the Operational Flight Plan (OFP) is calculated is identical to that specified in the repetitive ATS IFR flight plan filing system and vice versa.

(D) When filing for a non-scheduled flight, the one-time (on demand) ATS IFR flight plan filing system shall be used.

(E) The Commander is responsible for ensuring that an ATS IFR flight plan is filed and activated and that he is fully aware of the details of the filed ATS IFR flight plan.

(F) Turkish Airlines flights shall not be operated to/from any aerodrome which is not serviced by an appropriate ATS unit.

(G) Full details of requirements for ATS IFR Flight Plans may be found in the Jeppesen Airway Manual under "Rules and Regulations" and “ICAO Doc 4444, Appendix 2”.

8.1.9.2 Flight Number Coding

(A) See **LS.95.012 Production Planning Directorate - List of Flight Number / Service Type / Operation Code** for Turkish Airlines flight number coding list.

(B) According to operational needs, flight number - type of operation match can be different than the table.

(C) On most Turkish Airlines Flights, Call Sign will be different from Flight Number to avoid confusion on ATS communication.

8.1.10 Operational Flight Plan

8.1.10.1 General

(A) An Operational Flight Plan (OFP) shall be prepared for each intended flight based on considerations of aircraft performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes/ operating sites concerned by the Turkish Airlines IOCC (or non-Turkish Airlines dispatch offices approved by the Chief Flight Operations Officer (Nominated Person)).

(B) A hard/soft copy (computerized or manual) of each OFP shall be kept on file at the IOCC office originating the OFP.

(C) OFP prepared by IOCC shall indicate the name of the Dispatcher preparing the OFP which stands for the signature of the dispatcher. OFP can only be generated by the duty dispatcher's own user ID for flight planning system, indicating his name. Flight Crew should check "ADD INFO/REMARKS" section of OFP for "IRROPS FLIGHT PLANNING" note and contact dispatcher for briefing if the note is present.

(D) For self-dispatch operations, if an OFP is transmitted to self-dispatch room, the flight crew will print all documents in the preflight documents folder, described in **Subchapter 2.1.5.1**. After printing of documents flight crew should check the contents according to **LS.73.020 Self Dispatch Guide**.

(E) Short Flight Plan (SFP) is the first page of the OFP.

(F) All flight crew members shall sign the Short Flight Plan (SFP) verifying that:

(1) the flight crew members and the dispatcher are in agreement (shared responsibility) with the acceptability of the OFP;

(2) they have valid license and medical certificates with them and the flight and duty times comply with the legal requirements depicted in **Chapter 7**; and

(3) the Commander has received and accepted the OFP or equivalent document.

(G) The signed SFP shall be placed in the dispatch release box.

(H) When an OFP is transmitted to an out-station for delivery to the Commander, the out-station representative shall print all documents including **LS.73.020 Self Dispatch Guide** in the preflight documents folder, described in **Subchapter 2.1.5.1** and keep the signed SFP.

(I) If a computerized OFP is not available, the OFP shall be prepared manually, based on the applicable **EK.10.73.001 Operations Manual Part-A, Operations Manual Part-B, EK.10.73.002 Operations Manual Part-C** and the Turkish Airlines OFP format.

(J) When a revised OFP is received by ACARS, Commander shall confirm it verbally or by ACARS, cross-check all relevant information in the print-out and sign ACARS OFP. Revised OFP shall be used for the rest of the flight. The Commander shall retain only the new flight plan in the post flight documents envelope after the flight. In-flight changes to OFP by IOCC shall be coordinated with the appropriate ATS unit before transmission to the applicable aeroplane.

(K) All entries on the OFP shall be permanent in nature and manually entered information or data shall not be erased or scribbled out, only a single line (cross-out) shall be used to delete.

(L) To plan an OFP as accurate as possible, the take-off mass shall be calculated using the expected zero fuel mass.

(M) Items which are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the OFP.

(N) OFP is described in **Subchapter 8.1.10.4** and **8.1.10.5**.

8.1.10.2 Contents of the OFP

(A) The OFP used and the entries made during flight shall contain the following items:

(1) aeroplane registration;

(2) aeroplane type and variant;

(3) date of flight;

(4) flight identification;

(5) names of flight crew members;

(6) duty assignment of flight crew members;

(7) place of departure;

(8) time of departure (actual off-block time, take-off time);

(9) place of arrival (planned and actual);

(10) time of arrival (actual landing and on-block time);

(11) type of operation (ETOPS, IFR, Ferry Flight, etc.);

(12) route and route segments with checkpoints/waypoints, distances, time and tracks;

(13) planned cruising speed and flying times between checkpoints/waypoints, including:

(a) estimated times (based on available wind data) overhead, and

(b) actual times (based on actual wind data) overhead;

(14) safe altitudes and minimum levels;

(15) planned altitudes and flight levels;

(16) fuel calculations (records of in-flight fuel checks);

(17) fuel on board when starting engines;

(18) where applicable, alternate(s) for take-off, en-route and destination including information required in items (13), (14), (15) and (16) above;

(19) initial ATS Flight Plan clearance and subsequent re-clearance;

(20) in-flight re-planning calculations; and

(21) relevant meteorological information.

(B) Items that are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

8.1.10.3 Use of the OFP as a Navigation Log

(A) The OFP shall be used to record the pertinent details of the flight, inclusive of:

(1) record and check the fuel and ATA at time intervals of every 30 minutes (or first available waypoint – whichever is the later of);

(2) record on the blank spaces of the OFP, all in-flight obtained en-route, destination and destination alternate aerodrome(s) actual/forecasted weather reports (an ACARS print out of the relevant data may also be used); and

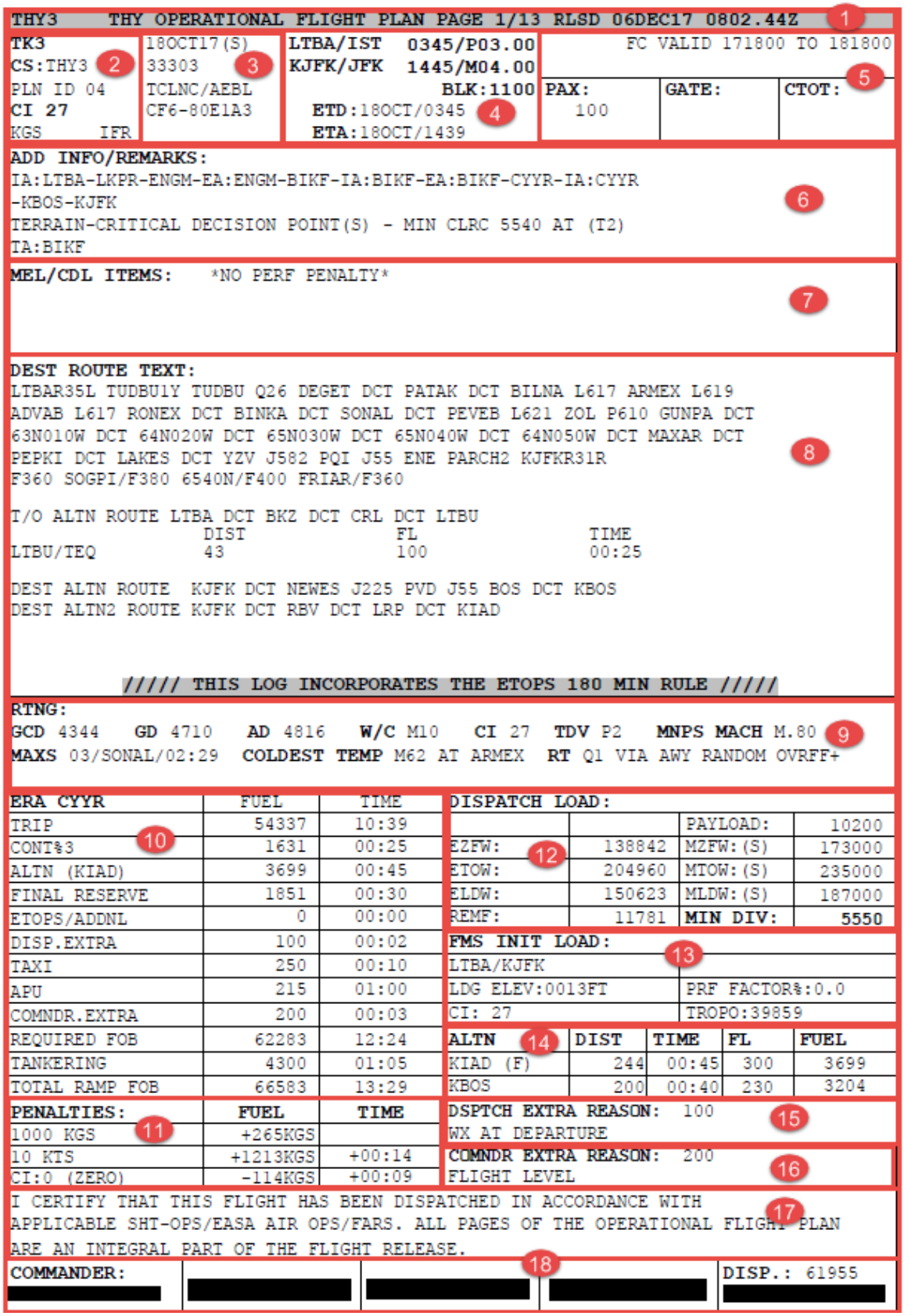
(3) record on the blank spaces of the OFP, all in-flight obtained information relating or pertinent to the flight as workload permits and without compromising essential flight duties.

(B) Commander signature and fuel consumption columns are mandatory items to be filled out under any circumstances and this requirement is under the Commander's direct responsibility.

(C) Electronic Flight Folder (EFF) – Electronic Flight Plan Package will be used as primary source over hardcopy flight plan package on EFB installed aeroplanes (except B777/B787 fleet). When flight plan package is downloaded, hardcopy flight plan package will not be processed and it will be kept as backup. After the flight, hardcopy OFP with a remark "EFF" on it will be retained in the flight envelope along with the other flight documents.

Therefore, when Electronic Flight Folder (EFF) module of the installed EFB is operational and capable of recording time and fuel checks either automatically or manually, recording of this data on the hardcopy OFP is not required. EFF module can also be used to record notes related or pertinent to the flight (i.e. transponder codes, frequencies.

8.1.10.4 Description of the OFP



THY3 THY OPERATIONAL FLIGHT PLAN PAGE 1/13 RLSD 06DEC17 0802.44Z (1)

TK3	18OCT17(S)	LTBA/IST 0345/P03.00	FC VALID 171800 TO 181800
CS:THY3 (2)	33303 (3)	KJFK/JFK 1445/M04.00	
PLN ID 04	TCLNC/AEBL	BLK:1100	PAX: / GATE: / CTOT: (5)
CI 27	CF6-80E1A3	ETD:18OCT/0345 (4)	100
KGS IFR		ETA:18OCT/1439	

ADD INFO/REMARKS: (6)
IA:LTBA-LKPR-ENGM-EA:ENGM-BIKF-IA:BIKF-EA:BIKF-CYYR-IA:CYYR
-KBOS-KJFK
TERRAIN-CRITICAL DECISION POINT(S) - MIN CLRC 5540 AT (T2)
TA:BIKF

MEL/CDL ITEMS: *NO PERF PENALTY* (7)

DEST ROUTE TEXT: (8)
LTBAR35L TUDBU1Y TUDBU Q26 DEGET DCT PATAK DCT BILNA L617 ARMEX L619
ADVAB L617 RONEX DCT BINKA DCT SONAL DCT PEVEB L621 ZOL P610 GUNPA DCT
63N010W DCT 64N020W DCT 65N030W DCT 65N040W DCT 64N050W DCT MAXAR DCT
PEPKI DCT LAKES DCT YZV J582 PQI J55 ENE PARCH2 KJFKR31R
F360 SOGPI/F380 6540N/F400 FRIAR/F360

T/O ALTN ROUTE LTBA DCT BKZ DCT CRL DCT LTBU

	DIST	FL	TIME
LTBU/TEQ	43	100	00:25

DEST ALTN ROUTE KJFK DCT NEWES J225 PVD J55 BOS DCT KBOS
DEST ALTN2 ROUTE KJFK DCT RBV DCT LRP DCT KIAD

///// THIS LOG INCORPORATES THE ETOPS 180 MIN RULE /////

RTNG: (9)
GCD 4344 GD 4710 AD 4816 W/C M10 CI 27 TDV P2 MNPS MACH M.80
MAXS 03/SONAL/02:29 COLDEST TEMP M62 AT ARMEX RT Q1 VIA AWY RANDOM OVRFF+

ERA CYYR	FUEL	TIME
TRIP	54337	10:39
CONT%3 (10)	1631	00:25
ALTN (KIAD)	3699	00:45
FINAL RESERVE	1851	00:30
ETOPS/ADDNL	0	00:00
DISP.EXTRA	100	00:02
TAXI	250	00:10
APU	215	01:00
COMNDR.EXTRA	200	00:03
REQUIRED FOB	62283	12:24
TANKERING	4300	01:05
TOTAL RAMP FOB	66583	13:29

PENALTIES: (11)	FUEL	TIME
1000 KGS	+265KGS	
10 KTS	+1213KGS	+00:14
CI:0 (ZERO)	-114KGS	+00:09

DISPATCH LOAD:

		PAYLOAD:	10200
EZFW: (12)	138842	MZFW:(S)	173000
ETOW:	204960	MTOW:(S)	235000
ELDW:	150623	MLDW:(S)	187000
REMF:	11781	MIN DIV:	5550

FMS INIT LOAD: (13)
LTBA/KJFK
LDG ELEV:0013FT — PRF FACTOR%:0.0
CI: 27 — TROPO:39859

ALTN (14)	DIST	TIME	FL	FUEL
KIAD (F)	244	00:45	300	3699
KBOS	200	00:40	230	3204

DSPTCH EXTRA REASON: 100 (15)
WX AT DEPARTURE

COMNDR EXTRA REASON: 200 (16)
FLIGHT LEVEL

I CERTIFY THAT THIS FLIGHT HAS BEEN DISPATCHED IN ACCORDANCE WITH (17)
APPLICABLE SHT-OPS/EASA AIR OPS/FARS. ALL PAGES OF THE OPERATIONAL FLIGHT PLAN
ARE AN INTEGRAL PART OF THE FLIGHT RELEASE.

COMMANDER: [redacted] (18) DISP.: 61955 [redacted]

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 2/13 RLSD 06DEC17 0802.44Z

TK3	LTBA/IST 0345/P03.00	OUT:	OFF:	BLKF:
CS:THY3	KJFK/JFK 1445/M04.00	IN:	ON:	TAXI:
PLN ID 04	BLK:1100	BLK:	FLT: 19	BRF:
CI 27	ETD:18OCT/0345			REM:
KGS IFR	ETA:18OCT/1439			

DEP INFO (ATIS): 20

CLEARANCE:

RWY/INT		V1	
SHIFT		VR	
ASMD/FLX		V2	
TRIM		MIN CLN/GRN DOT	
FLAPS			

T/O ALTN:LTBU	ETOW	ATOW	MTOW(S)	EET	CREW	PAX	TTLFOB:66583
	204960		235000	10:39	3/10		ACTFOB:

FILED - AT 1217Z/18OCT17

```
(FPL-THY3-IS
-A333/H-DFGHIRSWXYZJ4J5E1E2E3/B1LD1
-LTBA0345
-K0860F380 TUDBU1Y TUDBU Q26 UPAMA/N0460F380 Q26 DEGET DCT
 PATAK DCT BILNA L617 REGLI/K0850F380 L617 ARMEX L619 ADVAB L617
 RONEX DCT BINKA/N0460F380 DCT SONAL DCT PEVEB L621
 ZOL/N0470F400 P610 GUNPA/M081F400 DCT 63N010W DCT 64N020W DCT
 65N030W DCT 65N040W/M080F400 DCT 64N050W DCT MAXAR DCT
 PEPKI/N0470F400 DCT LAKES DCT YZV J582 PQI J55 FRIAR/N0440F360
 J55 ENE PARCH2
-KJFK1038 KBOS KIAD
-PBN/A1B1D1L1S1S2O1 NAV/RNP APCH S1 S2 RNP4 L1 RNAV10 RNP10 A1
 DOF/171018 REG/TCJOL EET/LBSR0014 LRBB0034 LHCC0107 LZBB0124
 LKAA0135 EPWW0141 EDUU0218 EKDK0229 ENOR0300 BIRD0346 CZUL0741
 CZQX0759 CZQM0918 KZBW0924 SEL/BPCG CODE/4BA9EC OPR/THY
 RALT/ENGM BIKF CYYR TALT/LTBU RMK/TCAS EQUIPPED RVR/75
-A/WR C/VANNUFFEL F.A. E/1223 J/LF P/TBN R/UVE S/DMJ)

*DIFF*

-ACFT- DFGHIRSWXYZJ4J5LOE1E2E3/B1LD1
-RTNG- K0850F360 TUDBU1Y TUDBU Q26 UPAMA/N0460F360 Q26 DEGET...
-INFO- REG/TCLNC
-INFO- SEL/AEBL
```

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RVSM ENTRY CHECK (BELOW FL280)		(ALT. DIFF. MAX 200 FT)
LEFT ALT:	STBY ALT: 22	RIGHT ALT:
RVSM FL		(ALT. DIFF. MAX 200 FT)
LEFT ALT:	STBY ALT:	RIGHT ALT:

AWY MOCA	WPT FRQ NAME/FIR LAT/LONG	FL TRO SHR	MT TT VAR	WIND SAT TDV	TAS MN G/S	DIST REMD ACCD	TIME ACCT REMT	ETA ATA REV	RQRD ACCF FOB
102FT	LTBA35L ISTANBUL/ATATURK N40586E028489			23		0 4710 0	0 0000 1039		66118 465

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 6/15 RLSD 25OCT17 0519.40Z									
AWY MOCA	WPT FRQ NAME/FIR LAT/LONG	FL TRO SHR	MT TT VAR	WIND SAT TDV	TAS MN G/S	DIST REMD ACCD	TIME ACCT REMT	ETA ATA REV	RQRD ACCF FOB
DCT 038	**FIR ZQX** 24 GANDER DOMESTIC FIR N55143W064283	400 303 00	216 193 23W	270/037 M48 P9	469 .802 459	70 1005 3705	9 0820 0219		20721 45672
DCT 036	**FIR ZUL** MONTREAL FIR N53518W065006	400 281 00	215 193 22W	280/041 M48 P9	469 .802 461	85 920 3790	11 0831 0208		19865 46528
DCT 048	YZV D114.50 SEPT-ILES N50139W066164	400 258 01	212 192 20W	286/050 M47 P10	469 .800 470	223 697 4013	28 0859 0140		17651 48742
J582 036	**FIR ZQM** MONCTON FIR N47472W067353	400 320 01	217 199 18W	290/059 M50 P7	464 .797 459	155 542 4168	20 0919 0120		16130 50263
J582 034	**FIR ZBW** BOSTON FIR N47086W067548	400 331 00	217 199 18W	288/061 M52 P5	464 .801 460	41 501 4209	6 0925 0114		15729 50664
J582 028	PQI D116.40 PRESQUE ISLE N46465W068057	400 331 00	216 199 17W	288/061 M52 P5	464 .801 460	24 477 4233	3 0928 0111		15495 50898
J55 051	S/D(400) FRIAR/-12NM N44369W069454	400 380 00	225 208 17W	292/067 M59 M2	457 .801 447	147 330 4380	20 0948 0051		14050 52343
J55 028	FRIAR N44265W069531	DSC	224 208 16W			12 318 4392	1 0949 0050		14027 52366
J55 028	ENE D117.10 KENNEBUNK N43255W070368	360 389 02	223 208 15W	312/072 M57 M1	445 .777 457	69 249 4461	9 0958 0041		13353 53040
PARCH2 024	ASPEN N42490W070547	360 393 00	217 200 17W	302/040 M59 M3	442 .775 449	39 210 4500	5 1003 0036		12969 53424
PARCH2 022	PVD PROVIDENCE N41435W071258	360 393 00	215 200 15W	302/039 M59 M3	442 .775 449	70 140 4570	10 1013 0026		12282 54111
DEST ATIS 25									
PARCH2 022	TOD TRAIT/-28NM N41381W071318	360 387 03	234 220 14W	278/025 M57 M1	447 .780 434	7 133 4577	1 1014 0025		12210 54183
PARCH2 022	TRAIT N41171W071551	DSC	234 220 14W			28 105 4605	3 1017 0022		12156 54237
PARCH2 020	PARCH N41060W072072	DSC	234 220 14W			15 90 4620	3 1020 0019		12121 54272
PARCH2 020	CCC CALVERTON N40558W072479	DSC	266 252 14W			33 57 4653	5 1025 0014		12030 54363
PARCH2 020	ROBER N40411W073020	DSC	230 217 13W			19 38 4672	3 1028 0011		11965 54428
PARCH2 020	**FIR ZNY** NEW YORK FIR N40358W073265	DSC	268 255 13W			20 18 4692	5 1033 0006		11871 54522

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 7/13 RLSD 18OCT17 1221.45Z

AWY MOCA	WPT FRQ NAME/FIR LAT/LONG	FL TRO SHR	MT TT VAR	WIND SAT TDV	TAS MN G/S	DIST REMD ACCD	TIME ACCT REMT	ETA ATA REV	RQRD ACCF FOB
PARCH2 020	MALDE N40339W073352	DSC	267 254 13W			7 11 4699	1 1034 0005		11980 54601
PARCH2 020	ZULAB N40358W073393	DSC	315 302 13W			4 7 4703	2 1036 0003		11916 54665
PARCH2 020 13FT	KJFK31R NEW YORK/J.F.KENNEDY N40384W073467	DSC	308 295 13W			7 0 4710	3 1039 0000		11779 54802

ALTERNATE ROUTE SECTION KBOS/BOS

AWY MOCA	WPT FRQ NAME/FIR LAT/LONG	FL TRO SHR	MT TT VAR	WIND SAT TDV	TAS MN G/S	DIST REMD ACCD	TIME ACCT REMT	ETA ATA REV	RQRD ACCF FOB
163FT	KJFK35L NEW YORK/J.F.KENN N40384W073467					0 200 0	0 0000 0040		5054
DCT 020	NEWES KZBWF BOSTON FIR N40513W073267	CLB	063 049 14W			30 170 30	6 0006 0034		3420
J225 022	BAWLL N41135W072537	230 381 00	062 048 14W	296/023 M25 P6	320 .521 327	33 137 63	6 0012 0028		2861
J225 022	RAALF N41179W072472	230 381 00	060 046 14W	296/023 M25 P6	320 .521 327	7 130 70	1 0013 0027		2782
J225 023	PVD D115.60 PROVIDENCE N41435W071258	DSC	081 067 14W			66 64 136	11 0024 0016		2273
J55 022	BOS D112.70 BOSTON N42214W070594	DSC	041 027 14W			43 21 179	9 0033 0007		2112
DCT 021 19FT	KBOS31R BOSTON N42218W071004	DSC	314 298 16W			21 0 200	7 0040 0000		1851

ALT ATIS

ALTERNATE ROUTE SECTION KIAD/IAD

AWY MOCA	WPT FRQ NAME/FIR LAT/LONG	FL TRO SHR	MT TT VAR	WIND SAT TDV	TAS MN G/S	DIST REMD ACCD	TIME ACCT REMT	ETA ATA REV	RQRD ACCF FOB
163FT	KJFK35L NEW YORK/J.F.KENN N40384W073467					0 244 0	0 0000 0045		5548
DCT 020	RBV D113.80 ROBBINSVILLE N40121W074297	CLB	245 231 14W			52 192 52	10 0010 0035		3305
DCT 028	LRP D117.30 LANCASTER N40072W076175	DSC	278 267 11W			83 109 135	13 0023 0022		2376
DCT 026	FIR ZDC WASHINGTON FIR N39252W076596	DSC	229 218 11W			53 56 188	8 0031 0014		2238

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 9/13 RLSD 18OCT17 1221.45Z

CRITICAL FUEL SCENARIO (IA-ETOPS-EROPS) INFORMATION

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CRITICAL FUEL SCENARIO ETOPS 60/180 TAS 426/414

GO ENGM EEP COORD. 6145.3N 00313.9W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
ENGM	0427	100	+11	P0	41930/35459	6471	1:29	0810-1050

GO BIKF ETP ENGM-BIKF ETP COORD. 6208.9N 00508.4W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
ENGM	0483	100	+10	M1	41251/30685	10566	1:21	0810-1050
BIKF	0486	100	+13	M1	41251/30715	10536	1:21	0830-1427

GO BIKF EXP COORD. 6231.3N 00707.4W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
BIKF	0427	100	+13	M1	40553/34132	6421	1:29	0830-1427

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GO BIKF EEP COORD. 6501.9N 03858.2W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
BIKF	0426	100	-21	M3	31356/24156	7200	1:39	0830-1427

GO CYYR ETP BIKF-CYYR ETP COORD. 6401.9N 04946.0W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
BIKF	0709	100	-16	M6	28288/11790	16498	2:07	0830-1427
CYYR	0722	100	-3	M12	28288/12009	16279	2:07	1153-1426

GO CYYR EXP COORD. 6025.2N 06015.3W

ALTN	GCD	FL	W/C	TMP	FOB/SRP	MINF	TME	WX WINDOW
CYYR	0427	100	+3	M11	24404/17740	6664	1:34	1153-1426

RMK MINF INCL APU / ENG + A ANTI ICE 5.0 PCT / ICE ACCR 8.0 PCT

TOTAL ETP FUEL DOES NOT EXCEED NORMAL FUEL REQUIREMENTS

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 10/13 RLSD 18OCT17 1221.45Z

CRITICAL TERRAIN SCENARIO 29

T1 074NM AFTER 6540N 30

DECOMPR 31	CONT TO 32	BIKF	MAX TERRAIN 33	7957	MIN CLRC AGL 34	8734
1ENG OUT 31	CONT TO 32	BIKF	MAX TERRAIN 33	7957	MIN CLRC AGL 34	19906

RMK ENG ANTI ICE ON / NO MEL RESTRICTIONS 35

ALTN	GCD	FL	WIND	TMP	RF/SRP	MINF	TME	WX WNDW
				36	30297			
BIKF	559	146	166/017	M18	19839	10458	01.39	1112-1401

MINF INCL APU / ENG ANTI ICE 3.0 PC / ICE ACCR 8.0 PC

MAX ELEV BTWN	T1/BIKF/T2	8796	AT	64300N044100W 37	CLRC	27259
MIN CLRC BTWN	T1/BIKF/T2	8511	AT	64030N022337W 37	ELEV	1116

T2 123NM AFTER 6540N

DECOMPR	RETURN TO	BIKF	MAX TERRAIN	8760	MIN CLRC AGL	8627
1ENG OUT	RETURN TO	BIKF	MAX TERRAIN	8760	MIN CLRC AGL	18816
DECOMPR	CONT TO	BIKF	MAX TERRAIN	8734	MIN CLRC AGL	5540
1ENG OUT	CONT TO	BIKF	MAX TERRAIN	8734	MIN CLRC AGL	15135

RMK ENG ANTI ICE ON / NO MEL RESTRICTIONS

ALTN	GCD	FL	WIND	TMP	RF/SRP	MINF	TME	WX WNDW
BIKF	602	143	206/021	M17	29789	11157	01.48	1112-1401
BIKF	767	134	206/021	M17	15934	13855	02.19	1112-1401

MINF INCL APU / ENG ANTI ICE 3.0 PC / ICE ACCR 8.0 PC

MAX ELEV BTWN	T2/BIKF/T3	8734	AT	64300N044275W	CLRC	27321
MIN CLRC BTWN	T2/BIKF/T3	5540	AT	66245N043455W	ELEV	7976

T3 178NM AFTER 6540N

DECOMPR	RETURN TO	BIKF	MAX TERRAIN	8058	MIN CLRC AGL	5540
1ENG OUT	RETURN TO	BIKF	MAX TERRAIN	8058	MIN CLRC AGL	15132

RMK ENG ANTI ICE OFF / NO MEL RESTRICTIONS

ALTN	GCD	FL	WIND	TMP	RF/SRP	MINF	TME	WX WNDW
BIKF	769	133	206/020	M16	29125	13906	02.20	1112-1401
					15219			

MINF INCL APU / ENG ANTI ICE 3.0 PC / ICE ACCR 8.0 PC

MAX ELEV BTWN	T3/ALTN	8058	AT	64328N046506W	CLRC	30308
MIN CLRC BTWN	T3/ALTN	5540	AT	66245N043455W	ELEV	7976

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AIRPORT LIST - SUITABILITY TIMES			
LTBA	DEP	0340-0420	
LTBU	T/O ALTN	0325-0525	
LTBA	IA	0400-0604	
LOWW	IA	0552-0746	
ENGM	IA	0732-0910	
ENGM	EA	0910-1050	
BIKF	EA	0930-1427	
BIKF	IA	0930-1327	
BIKF	EA	0930-1427	
CYYR	EA	1253-1426	
CYYR	IA	1326-1439	
KBOS	IA	1419-1441	
KJFK	IA	1440-1441	
BIKF	TERRAIN ALTN	1112-1401	
BIKF	TERRAIN ALTN	1112-1401	
CYYR	FA	1136-1656	
KBOS	DEST ALTN	1419-1619	
KIAD	DEST ALTN	1424-1624	
KJFK	DEST	1419-1459	

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UPPER WIND SUMMARY 39

CLIMB SPOT WIND

ALT	WIND	ALT	WIND	ALT	WIND	ALT	WIND
5000 40	80/009	18000	358/017	24000	322/028	30000	302/031
TDV	P7	TDV	P7	TDV	P9	TDV	P4
TEMP	P12	TEMP	M14	TEMP	M24	TEMP	M40

WINDS/TEMPERATURES ALOFT FORECAST

	10000	18000	24000 41	30000	34000	39000
BA010	062011P3	358017M14	322028M24	302031M40	284033M50	282028M60
RIMBO	062011P3	358017M14	322028M24	302031M40	284033M50	282028M60
TUDBU 42	092004P3	354009M14	43 26M25	314029M41	300027M51	284025M60
ETUBA	092004P3	354009M14	332026M25	314029M41	300027M51	284025M60
UPAMA	026006P3	002010M14	338023M25	322027M42	308026M51	286023M60
APROB	042006P3	002010M14	342013M25	308015M42	298014M51	268016M61
VIKBI	042006P3	002010M14	342013M25	308015M42	298014M51	268016M61
TIXIP	284007P3	338010M13	324010M25	302013M42	296013M52	258017M61
VASIS	242009P3	308007M13	312007M26	276010M42	272013M52	252021M62
DEGET	226011P3	270007M12	242003M26	230010M42	228012M52	228021M62
PATAK	218018P3	178007M12	208008M26	236013M43	232017M53	230023M63
BILNA	208017P4	198014M12	210014M27	236016M42	240023M53	240026M63
SOPAV	210013P4	244022M13	254024M27	256025M43	256033M54	250036M63
REGLI	206009P4	234019M13	238022M27	240026M43	244032M54	242037M63
EPOPA	206009P4	234019M13	238022M27	240026M43	244032M54	242037M63
SOGPI	206009P4	234019M13	238022M27	240026M43	244032M54	242037M63
DEVEG	258013P4	256028M14	254034M27	254037M44	258045M54	258039M62
NUDRO	258013P4	256028M14	254034M27	254037M44	258045M54	258039M62
ARMEX	258013P4	256028M14	254034M27	254037M44	258045M54	258039M62
XIDNA	258013P4	256028M14	254034M27	254037M44	258045M54	258039M62
ADVAB	256013P0	260035M14	258044M28	258054M44	260054M54	260035M61
GINOK	256013P0	260035M14	258044M28	258054M44	260054M54	260035M61
RONEX	256013P0	260035M14	258044M28	258054M44	260054M54	260035M61
BINKA	270036P0	264051M15	264054M29	258043M44	256039M53	254047M61
SONAL	266035P0	264051M15	262052M29	252041M44	254039M53	254048M61
PEVEB	354008M1	274026M19	264041M32	254065M47	254089M55	258069M57
ZOL	330014M3	278028M22	264041M33	260058M49	258071M57	258056M54
GUNPA	292007M4	280018M23	274021M35	266034M51	260031M57	272034M55
6310N	178009M5	226007M23	264011M35	284016M50	286019M59	250026M59
6420N	162043M6	182039M21	184037M34	192030M50	196046M60	204032M61
6530N	152048M7	150054M22	154055M35	164065M53	166055M60	178038M54
6540N	090029M11	100035M29	108050M39	118053M50	140034M50	164023M49
6450N	024004M17	108011M32	116018M43	176006M51	172008M50	204011M47
MAXAR	276012M20	278007M35	290012M45	282011M52	264015M51	248014M47
PEPKI	272010M18	292031M31	286039M43	286035M56	270025M53	252023M47
LAKES	328009M18	284026M30	276033M42	272032M58	274029M54	262028M48
YZV	292023M12	294031M30	298052M40	302067M46	300065M47	288052M46
PQI	298047M9	298064M23	300067M35	310076M45	310073M50	290062M51
FRIAR	310048M1	304068M16	306073M30	316086M46	318091M55	296068M60
ENE	296036P0	306059M16	298066M29	314071M46	318075M54	290063M60
ASPEN	292028P0	306039M15	294041M28	308040M44	318039M54	278042M62
PVD	292028P0	308038M15	292041M28	306039M44	318038M54	278041M62
TRAIT	314027P1	304025M14	294028M27	300023M44	284021M54	256041M60
PARCH	314026P1	298023M14	300025M27	292019M44	268019M54	260033M61
CCC	314026P1	298023M14	300025M27	292019M44	266018M54	258033M61
ROBER	314026P1	298023M14	300025M27	292019M44	266018M54	258033M61

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WINDS/TEMPERATURES ALOFT FORECAST

	10000	18000	24000	30000	34000	39000
MALDE	326015P3	310023M15	286014M27	260012M44	246014M53	252031M59
ZULAB	326015P3	310023M15	286014M27	260012M44	246014M53	252031M59
KJFK	326015P3	310023M15	286014M27	258012M44	246014M53	252031M59

DESCENT SPOT WIND

ALT	WIND	ALT	WIND	ALT	WIND	ALT	WIND
39000	252/031	**34000**	246/014	**30000**	258/012	**24000**	286/014
TDV	M2	TDV	M1	TDV	P0	TDV	P6
TEMP	M59	TEMP	M53	TEMP	M44	TEMP	M27

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COMPANY NOTES

LTBA
IST TEST

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KJFK
TEST

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DPP PLANNING BRIEF - DEST 2 KBGR D.P. FRIAR

SECTOR	TRIP	TIME	DIST		
LTBA-FRIAR	51916	09:49	4392	GW AT FRIAR	152721
FRIAR-KJFK	2390	00:50	318	REQ FUEL AT FRIAR	14094
FRIAR-KBGR	592	00:25	153	DEST2 ALTN	CYQB
KBGR-CYQB	4525	01:00	257		

1. **HEADER:** ATC Callsign, Static text (THY OPERATIONAL FLIGHT PLAN), page number and total number of pages, and dispatch release time stamp when dispatcher releases OFP. For example: RLSD 18OCT17 1221.45Z: If OFP is not released by dispatcher phrase RLSD .00Z is shown.
2. **TK3:** Commercial Flight number (IATA Prefix, as found on Pax tickets).

   CS: THY3: ATC callsign (Uses ICAO prefix and may differ from commercial flight. THY uses alpha-numeric callsigns like THY5HP).

   PLN ID 02: Plan ID number. A number which increases each time the flight is “Released” by the dispatcher.

   CI: Cost Index.

   KGS: Units of weight/fuel information.

   IFR: Flight Rules (taken from field 8 of ATS flight Plan – V: VFR, I: IFR).
3. **18OCT17(S):** Date of Flight scheduled, denoted by (S).

   33303: Aircraft Subtype – as named in FPM system subtype records.

   TCLNC/ AEBL: A/C registration / SELCAL ID.

   CF6-80EA13: Engine ID.
4. **LTBA/IST:** ICAO and IATA ID of departure airport.

   0345/P3.0: STD (Scheduled Time of Departure, UTC) and local time difference to UTC at departure.

   KJFK/JFK: ICAO/IATA ID of destination airport.

   1445/M4.0: STA (Scheduled Time of Arrival, UTC) and local time difference to UTC at destination.

   BLK:1100: Scheduled Block time - difference between STD and STA.

   ETD: Estimated Time of Departure (Est Block time from system) – Date and UTC time.

   ETA: Estimated Time of Arrival, UTC (Assumed landing time from flight page – Assumed take off time + flight time).
5. **UPPERWIND FORECAST RANGES:** Give an indication of oldest and newest upperwind forecasts used for calculation. Format is DDHHMM – e.g. FC 171800 TO 181800 means that upperwind forecasts with valid times from 17th 18:00Z through 18th 18:00Z are used.

   PAX: Number of passengers box (taken from THY’s internal systems automatically).

   GATE: Gate or stand number (Reserved for crew entry).

   CTOT: CTOT (Calculated Take off Time).
6. **ADD INFO REMARKS** Section is to show system generated and dispatcher’s text in the following priority order:

   IA: Intermediate Alternate (Enroute Alternate).

   EA: ETOPS Alternate.

   Dispatcher remarks and system generated remarks (i.e.TEST OFP NOT FOR OPERATIONAL USE).

TERRAIN: Information of terrain scenario.

TA: Terrain Alternate.

7. **MEL/CDL ITEMS:** System generated text based upon system applied MEL status.

   If no operational effect(s) are present, system will show text “NO PERF PENALTY”

   If operational effect(s) are present but they have “NIL EFFECT”, system will show text “NO PERF PENALTY” If operational effect(s) are present, system will show MEL number and “Effect” (type of effect, value and unit). If more than one effect is present but one of those effect has “NIL EFFECT” NIL EFFECT note will not be displayed in this box

   Note: MEL mesages are also added to briefing package automatically.

8. **DEST ROUTE TEXT:** Route Description – In ICAO ATC format with the following exceptions:

   TAS and FL (initial and changes) are not shown.

   Airport identifiers have the planned runway ID as a suffix.

   SID and STAR ID’s are shown regardless of what is set in the administrator/airport record.

   FL Profile: FL at TOC, then waypoint ID followed by next FL to be climbed to in the event of an en-route descent, position ID will show the name of the waypoint at which the FL is achieved. A T/D waypoint will be inserted in the nav-log as appropriate.

   In airspace where Metric FL’s are allocated the level will be in metres prefixed with an “S” character.

   For example: S1010 for 10100M.

   T/O ALTN ROUTE: Take-off alternate route, ICAO and IATA code, distance, flight level and flight time information of take-off alternate airport.

   DEST ALTN ROUTE: Destination Alternate route.

   THIS LOG INCORPORATES THE ETOPS 180 MIN RULE: Text to be generated if any part of the routings goes beyond Threshold distance of an EROPS (airport “string”) airport.

   Time: System used MDT (Max DiversionTime), if flight remains within threshold time then no warning is generated.

9. **RTNG:** Routing Section.

   GCD: Great Circle Distance (Units: NM).

   GD: Ground distance (Units: NM).

   AD: Air Distance (ESAD, Units: NM).

   W/C: Average Wind Component (Units knots, M:Minus for headwind, P:Plus for tailwind).

   CI: Cost Index.

   TDV: Average ISA Deviation (Units Degrees C, M:Minus, P:Plus).

   MNPS MACH: If mach speed is defined for NAT HLA region, it is shown here. If mach speed is not defined, average computed mach number is shown.

   MAXS XX/ XXXXX / XX:XX: Maximum shear, position and time where experienced.

   COLDEST TEMP: XXX AT XXXXX: Coldest OAT in degrees C at (waypoint ID where temp is experienced).

   RT: Route.

RT1: Route name. RT routes are company routes and Q routes are generated by FPM automatically. Other than RT and Q routes means route is generated ad-hoc base by flight dispatcher or sector planning group i.e ZZZ, Z1, SPG, TST etc.

VIA: Route Name and/or explanation. Some examples are as follows:

COMPANY ROUTE (generated as company route).

VIA AWY RANDOM (Generated by FPM automatically).

VIA AWY NATC (Route for North Atlantic Tracks –NATC means Track C).

OVRFF+: Generated by FPM automatically (Q1,Q2, etc. routes). Symbol "+" means overflight charges have been taken into account.

OVRFF- : Generated by FPM automatically (Q1,Q2, etc. routes). Symbol "-" means overflight charges have not been taken into account.

10. TYPE OF FUEL PLANNING: Describes dominant policy applied for determination of reserve fuel:

PLANNING TYPE/FUEL/TIME:

STANDARD: Fuel planning; no "Special Planning" (reduced contingency methods) applied, normal alternate selection applied.

ISOLATED: If isolated destination planning applied.

NO ALTN: Planning with no destination alternate.

ERA XXXX: If ERA 3% planning is applied – XXXX will read the ICAO ID of the allocated ERA airport. Note: The 3% or 5% will show when RCF/RDP planning has been applied and will indicate how the POR-AUX DEST contingency fuel was calculated.

DPP VIA DP XXXXX: If "Reduced Contingency Fuel Policy" or "isolated" decision point procedure has been applied. The XXXXX would be the POR/DP.

CONTINGENCY FUEL: CONT5% is display when 5% CONT fuel has been planned.

5MINUTES: If 5 minutes Special Planning has been applied to drive CONT fuel. ERA selection may be planned depend on the planned route distance.

CONT5MINUTES: Display when 5MINS or another upper/lower "cap" has been applied to derive the contingency fuel. ERA selection may be planned depend on the planned route distance.

CONT STAT: Display when statistical contingency fuel is applied.

TRIP FUEL: Trip fuel.

TRIP TIME: Trip time.

CONT %3: Contingency fuel (Units and rounding to be determined by A/C subtype record).

CONT %3 TIME: Time that CONT fuel would allow for based upon flight's mean fuel flow alternate fuel.

ALTN (XXXX): ICAO ID of Alternate airport which has determined the required ALTN fuel.

ALTN TIME: Trip time from destination to alternate airport.

FINAL RESERVE: Final reserve fuel quantity – Units and rounding to be determined by A/C subtype record.

FINAL RESERVE TIME: Final reserve time shown as holding time the final reserve fuel quantity would allow for at the configured altitude above the destination alternate airport.

ETOPS/ADDNL FUEL: Fuel is added by the system automatically to satisfy hard coded fuel policy conditions such as: Critical fuel scenario/ETOPS -Minimum fleet T/O fuel -Minimum fleet landing fuel -Isolated aerodrome policy. This field may also contains any "Unusable/Ballast" fuel allocated by the dispatcher or automatically added to satisfy MEL defects whose effects is FQU (Fuel Quantity Unusable).

*** :** In cases where some or all of the ETOPS/ADDNL fuel is unusable the system adds automatically prefix the fuel quantity with a **'*'** asterisk symbol. Dispatcher or auto generated MEL comments should clarify the breakdown of this fuel amount.

ETOPS/ADDNL TIME: Flight time that ETOPS/ADDNL fuel would allow for based upon flight's mean fuel flow.

DISP. EXTRA FUEL: Additional fuel added by dispatcher. This field may contain statistical holding fuel or a dispatcher modified value.

DISP. EXTRA TIME: Holding time that DISP. EXTRA fuel quantity would allow for at the configured altitude above the destination airport.

TAXI: Taxi fuel - Subtype specific Taxi fuel flow multiplied by the flight's taxi time (which can be taken from one of several different sources). Units and rounding to be determined by A/C subtype record).

TAXI TIME: Taxi time

APU FUEL: Subtype specific fuel amount taken from apu fuel flow value.

APU TIME: Apu time.

COMNDR. EXTRA FUEL: Extra fuel uplifted at captain's request.

COMNDR. EXTRA TIME: Time that CMNDR EXTRA fuel quantity would allow for at the configured altitude above the destination airport.

REQUIRED FOB FUEL: This is the sum of all of the previous fuel values including Taxi and APU.

REQUIRED TIME: Sum of all previous time values except APU and TAXI Time.

TANKERING FUEL: This value is populated by the "EXTRA" fuel function in FPM and therefore this field may contain excess fuel required for tankering and if fuel is loaded to meet a specific fuel target (perhaps due prefuelling).

TOTAL RAMP FOB FUEL: Sum of all previous fuel values, including tankering fuel– the planned block fuel.

TOTAL RAMP FOB TIME: Sum of all previous time values except APU and TAXI Time.

11. **PENALTIES:** Weight, wind and cost index penalties for quick referance.

    1000KGS: Fuel adjustment (no time should be displayed here) required for a 1000kgs change in TOW (Take Off Weight.).

    10KTS: Fuel and Time adjustments necessary for a 10kts increase in H/wind (or reduction in T/wind).

    Corrections will be based upon the following equation: TRIPF * (1 - ((AVTAS + AVWC -5) /(AVTAS + AVWC + 5)).

    CI0: Fuel/Time adjustment for flight at Cost Index 0.

12. **DISPATCH LOAD:**

    EZFW: Estimated Zero Fuel Weight used by system in calculation (RZFW).

    ETOW: Estimated Take Off Weight.

    ELDW: Estimated Landing Weight.

    PAYLOAD: System generated payload information. If "Fixed ZFW" mode the box is blank. If fixed ZFW mode is not engaged it will be payload: Pax+Freight. Maximum ZFW, TOW and LGW.

Derivation method of the maximum weights are shown using the following codes:

S: Structural limiting weight (as stored in AC subtype or AC registration records).

R: Regulated (performance limited) weight.

I: Manually inserted limiting weight (inserted by dispatcher).

REMF: System generated remaining fuel.

MIN DIV: Minimum diversion fuel.

MZFW (S): Maximum structural zero fuel weight.

MTOW (S): Maximum structural take off weight.

MLDW (S): Maximum structural landing weight.

13. **FMS INIT LOAD:**

    LTBA/KJFK: ICAO codes for departure and destination airport.

    LDG ELEV: Airport elevation of destination.

    PRF FACTOR: Cruise degradation/Performance factor. FBias value from aircraft registration record.

    CI: Repetition of cost index.

    TROPO: Tropopause height at top of climb.

14. **ALTN KIAD (F):** Alternate airport's ICAO code. (F) suffix signifies the alternate for which alternate airport's fuel has been uplifted. Calculated ground distances, times from destination airports, fuels, and cruise FLs are shown here.
15. **DSPTCH EXTRA REASON:** Dispatch extra reason and fuel value.
16. **COMNDR EXTRA REASON:** Commander extra reason.
17. **CREW DECLARATION:** Static text.
18. **COMMANDER / DISP:** Crew names and dispatcher name/company ID number is generated here. If names are too long then the last characters are not shown.
19. **CREW ENTRY BOXES:** Reserved for crew entry. (Actual OOOI (out, off, on, in) times, Block, Flight time and Block Fuel, Taxi Fuel, Break Release Fuel, Remaining)
20. **CREW ENTRY AREA:** This section of the OFP is reserved for crew entry of various data values.

    Dep Info (ATIS) : Reserved for crew entry of departure airport ATIS report.

    Clearance: Reserved for crew entry of ATC clearance.

    Take-off and Landing Bug Card: Runway, speeds, flaps info etc.

    T/O ALTN: If specified by the Dispatcher then this will be populated by the ICAO airport ID for the nominated Take-off alternate.

    ETOW: System Calculated TOW.

    ATOW: Reserved for crew entry of actual TOW.

    MTOW: Maximum TOW.

    EET: Estimated Elapsed Time. System generated flight time.

    CREW COMPLIMENT-FLIGHT DECK/CABIN CREW: Generated by system. Subject to interface data.

    PAX: Reserved for crew entry.

TTLFOB: System Calculated TOTAL RAMP FOB.

ACTFOB: Reserved for crew entry of Actual fuel uplift.

21. **ATC SECTION:** This section informs flight crew of the status and content of the ATS flight plan.. If the flight plan has not been filed to ATC at the time of OFP generation or has been filed to ATC after OFP relase, the text *TO FILE* is shown in bold. If the flight plan has been filed then the text *FILED* is shown in bold followed by the time and date. *DIFF* section highlights any differences identified between the filed ATS FPL (or Eurocontrol ACK) and the current OFP. This difference indicates which field of the ICAO flight plan contains the difference. Dispatchers make sure of validity of ATC flight plan, and it is the responsibility of flight crew to verify that the relevant information contained in the OFP is consistent with the Air Traffic Services (ATS) flight plan.
22. **RVSM Entry Check / RVSM FL:** RVSM entry checks and RVSM FL sections are reserved for crew data entry (recording not mandatory).
23. **OFP NAV LOG:** This section describes the various data fields in the OFP nav-log. Many of these data fields serve different purposes depending on the type of waypoint being described (airport, official, pseudo-waypoint etc.). When a new page begins for long Nav-logs then the nav-log column header will also be generated in the first row after the standard header.

    AWY: Airway ident for airway segment. If there is a direct then “DCT” is shown.

    SID or STAR identifier is also shown here.

    MOCA: Minimum Obstacle Clearance Altitude – in hundreds of feet (FL format).

    Defined area for terrain to show: 10 nm Left and Right fm AWY CL; 1000 up to (including) 5000; 2000 fm 5001 rounded to the next 100. When the waypoint is the FIRST waypoint on the routing then the AWY and MOCA are replaced by the Runway Threshold Elevation.

    Note: Runway threshold elevation can only be shown for departure airport (not destination airport in the alternate nav-log, which shows ARP elevation). When the waypoint is the LAST waypoint on the routing then the AWY and MOCA are supplemented by the threshold Elevation.

    WPT, FRQ, NAME/FIR, LAT/LONG: Waypoint name, if waypoint is a navigational aid its frequency, and coordinates of waypoint and FIR name.

    ARINC Waypoint name: If waypoint is either departure or destination airport, ICAO ID of that airport followed immediately by the runway ID If waypoint is an alternate airport, ICAO ID of airport. Pseudo-waypoints will be labeled as follows:

    TOC: Top Of Climb.

    TOD: Top Of Descent.

    S/C: Top of climb (enroute step climb).

    S/D: Top of descent (enroute step descent).

    S/C and S/D waypoints are followed by the FL to be climbed/descended to in brackets.

    IA1: ETP’s (Equal Time Points) between IA airports.

    EA2: ETOPS Entry or Exit points or ETP’s between EA airports.

    (***): FIR boundaries created where no official/charted waypoint exists on the FIR boundary.

    (---): Wind pick up points. There are generated at 50nm intervals whenever the distance between official waypoints exceeds 100nm and are generated to increase the accuracy of the wind information used.

    Waypoint Name / -XXNM: To show position which is not a waypoint systems takes next waypoint as reference and shows distance to that waypoint. (i.e. FRIAR/ -12NM means 12 Nm before waypoint named FRIAR).

EEP1: ETOPS entry point (first ETOPS sector).

EXP1: ETOPS exit point (first ETOPS sector).

ETP1: Equal Time Point, numbered according to number of EA ETP's.

FIR XXXX: Entering a new FIR waypoint with ICAO FIR region ID number

Full name of Airport or waypoint or new FIR, latitude and longitude of waypoint are shown. If waypoint is departure or destination airports then threshold Lat/Long is shown. If waypoint is an alternate airport then ARP Lat/Long is shown.

FL: Flight level at waypoint replaced with CLB in climb phases or DSC in descent phases.

TRO: Tropopause height at waypoint.

SHR: Shear rate at waypoint. Note: TRA and SHR are blank in climb or descent phases.

MT: Initial magnetic track from previous waypoint.

TT: Initial true track from previous waypoint.

VAR: Magnetic variation at previous waypoint (where initial track was measured). Units in degrees, where direction is less than 100 degrees, preceding zero's should be added so that value is always three characters.

WIND: Segment wind velocity.

SAT: Outside air temperature at waypoint.

TDV: ISA deviation at waypoint.

TAS: True Air Speed (UNITS= kts).

MN: Mach number (Units = Ratio TAS/LSS).

G/S: Ground Speed (UNITS = kts).

DIST: Segment distance (UNITS: NM).

REMD: Remaining ground distance.

ACCD: Accumulated distance (Accumulated in the nav-log to alternate will "reset" at the destination airport so accumulated at beginning of Alternate nav-log will read 0.).

TIME: Segment flight time.

ACCT: Accumulated flight time.

REMT: Remaining flight time (ACCT in the nav-log to alternate will "reset" at the destination airport so ACCD at beginning of Alternate nav-log will read 0.).

TDP: Terrain Decision Point. TDP1, TDP2, TDP3 etc. are shown as T1, T2, T3 etc. in terrain scenario.

ETA/ATA/REV COLUMN: Reserved for crew data entry.

RQRD: Required fuel; sum of: TOTAL FOB – APU/TAXI – TRIP FUEL.

ACCF: Accumulated Fuel; sum of: APU/TAXI + TRIP FUEL (burn).

Note: ACCF in the nav-log to Alternate will not be populated at all.

FOB: Blank for crew data entry of fuel on board.

24. **FIR NAMES:** FIRs are shown in bold font.

25. **DEST ATIS:** Located before last TOD point, a box will appear titled "DEST ATIS" – this is for crew entry. At the end of the nav-log to alternate (s) similar boxes will appear titled "ALT ATIS" also for crew entry.
26. **ALTERNATE ROUTE SECTION:** Destination alternate airports nav logs.
27. **CRITICAL FUEL SCENARIO (IA-ETOPS-EROPS) INFORMATION:** If a flight's routings takes it beyond THT (Threshold Time, normally 60 minutes for a twin engine A/C) from an adequate airport then the system performs an ETOPS analysis and covers that "ETOPS" portion of the routing with Suitable "EA" airports. It will also perform critical fuel analysis for that portion of flight according to the EA availability and display the results on this page.

    The system handles both "Balanced" and "Unbalanced" ETOPS planning. Unbalanced ETOPS is where the last Adequate (IA, 60minute) airport before the ETOPS Entry and/or the last IA airport after exiting the ETOPS segment of flight are NOT suitable for use as EA airports. In these cases ETPs may not be generated and ETOPS critical fuel is based upon diversion to the suitable EA airport from either the EEP (ETOPS Entry Point) or EXP (ETOPS Exit Point).

    ETOPS 60/180: THT (threshold time) and MDT (Maximum Diversion Time) used by system – which may be less than the real MDT if Variable MDT is used.

    TAS 426/414: TAS's from subtype record which, when combined with THT and MDT, define the radius of the IA and EA circles.

    Note: The TAS's are static for each A/C subtype and DO NOT determine the actual speeds used when the system calculates the critical fuel.

28. **CRITICAL FUEL SCENARIO:** The format of the ETOPS Critical fuel tables is always the same.

    Three different tables may be generated, labeled as follows:

    EEP: ETOPS Entry Point. This shows the critical fuel results for diversion from the EEP to the IA airport and, if "Unbalanced" ETOPS is applied (that IA is not also Suitable), results to the protecting EA airport in the second row.

    ETP: Equal Time Point. Generated between consecutive EA airports showing results of critical fuel analysis from the ETP to each EA airport.

    EXP: ETOPS Exit Point. This shows the critical fuel results for diversion from EXP to the next IA airport and in the event that of Unbalanced ETOPS (where the IA is not also suitable) results to the protecting EA.

    Go XXXX: Name and type of waypoint (waypoint name is GOXXXX – ICAO ID of airport for diversion).

    ALTN: ICAO ID's of the EA's/IA's.

    EEP or ETP OR EXP COORD: Coordinates of EEP/ETP/EXP.

    ALTN: ICAO ID of IA/EA airport.

    GCD: Great Circle Distance from ETP to appropriate EA/IA airport.

    FL: FL assumed during calculation from ETP to appropriate EA/IA airport.

    W/C: Average wind component applied from EEP/ETP/EXP to appropriate EA/IA.

    TMP: Average ISA deviation from EEP/ETP/EXP to appropriate EA/IA airport.

    FOB: Remaining Fuel at EEP/ETP/EXP assuming flight plan is flown precisely from departure to ETP.

    SRP: Surplus fuel upon landing at EA/IA airport. This is the FOB minus the MINF value and a low SRP value usually indicates ETOPS/ADDNL fuel has been uplifted.

    MINF: Minimum fuel on board required at ETP in order to conduct safe diversion to listed IA/EA and land with ETOPS critical fuel reserves (as defined in THY fuel policy).

    TME: Flight time from ETP to each appropriate EA/IA airport.

WX WINDOW: Required "good" weather window for each IA/EA airport. These windows are calculated according to earliest arrival minus one hour and latest arrival time plus one hour to diversion airport rule.

RMK: System generated remarks describing the various Anti-Ice and other penalties applied to each EA/IA scenario. Statement informing crew whether any of the ETP scenarios have necessitated critical fuel uplift.

DPP PLANNING BRIEF: If the DPP (Decision Point Planning/RCF (Reduced contingency Fuel procedure) special planning method has been applied in order to reduce the flight's contingency fuel then the following table is inserted into the OFP. This table provides the pilots with an overview of the various scenarios calculated in order to satisfy the legal requirements for reduction of the contingency fuel.

THY3 THY OPERATIONAL FLIGHT PLAN PAGE 9/15 RLSD 18OCT17 1342.24Z					
DPP PLANNING BRIEF - DEST 2 KBGR D.P. FRIAR					
SECTOR	TRIP	TIME	DIST		
LTBA-FRIAR	51916	09:49	4392	GW AT FRIAR	152721
FRIAR-KJFK	2390	00:50	318	REQ FUEL AT FRIAR	14094
FRIAR-KBGR	592	00:25	153	DEST2 ALTN	CYQB
KBGR-CYQB	4525	01:00	257		

DEST 2 (XXXX): ICAO ID for the nominated

Dest 2/Aux Dest airport D.P. (XXXXX): Decision Point/Point Of Reclearance waypoint ID

SECTOR: Trip fuel, Trip Time and sector distance for the described sector is shown in the table.

GW AT: Gross Weight at Decision Point/Point Of Reclearance is shown in the table.

REQ FUEL AT: Required Fuel at Decision Point/Point of Reclearance is shown in the table.

DEST2 ALTN (XXXX): ICAO ID of the Aux Dest ALTN airport is shown in the table.

29. **CRITICAL TERRAIN SCENARIO:** If the OFP is calculated with the terrain feature and critical terrain is found to affect the route then the system adds another set of tables titled "Critical Terrain Scenario" at the bottom of the ETOPS page. These tables provide details of the Critical Decision Point position(s) and diversion airports used to assure acceptable Terrain clearance.
30. **T1 XXX NM AFTER XXXX:** Terrain Decision Point with consecutive numbering. Relative position of DP within planned route is given by the distance from the previous waypoint
31. **EMERGENCY SCENARIOS:** Emergency Scenarios for the RETURN - and the CONTINUE alternate. The indicated scenarios depend on the aircraft subtype's Emergency Profile settings and may vary between aircraft types (e.g. 2-Engine Out scenarios for 3- and 4-Engine aircraft).
32. **EN ROUTE ALTERNATES:** En-route alternates used for calculation of this specific decision point.
33. **MAXIMUM TERRAIN HEIGHT:** Maximum terrain height within the area of coverage between the previous DP (or the departure aerodrome if this is the first DP) and this DP for the RETURN alternate.

    Maximum terrain height within the area of coverage between this DP ant the next DP for the CONTINUE alternate.

34. **MINIMUM CLEARANCE AGL:** Minimum clearance AGL on the line between the decision point and the relevant en-route alternate. Contrary to the Maximum Terrain Height, which is an absolute elevation value from the Digital Elevation Database (DEM), this is a difference value (delta-value) between an elevation and the aircraft's forecasted descent paths.

    This figure indicates the smallest vertical clearance the system forecasts during the aircraft's descent. For each of the configured emergency descent profiles the system checks the vertical clearance between the descent path and the underlying terrain and reports the smallest vertical clearance along any of the configured descent profiles.

    This figure does not necessarily correspond to the same spot as the maximum terrain elevation as the aircraft may still be at high altitudes during descent over the maximum terrain spot but may have lower vertical clearance

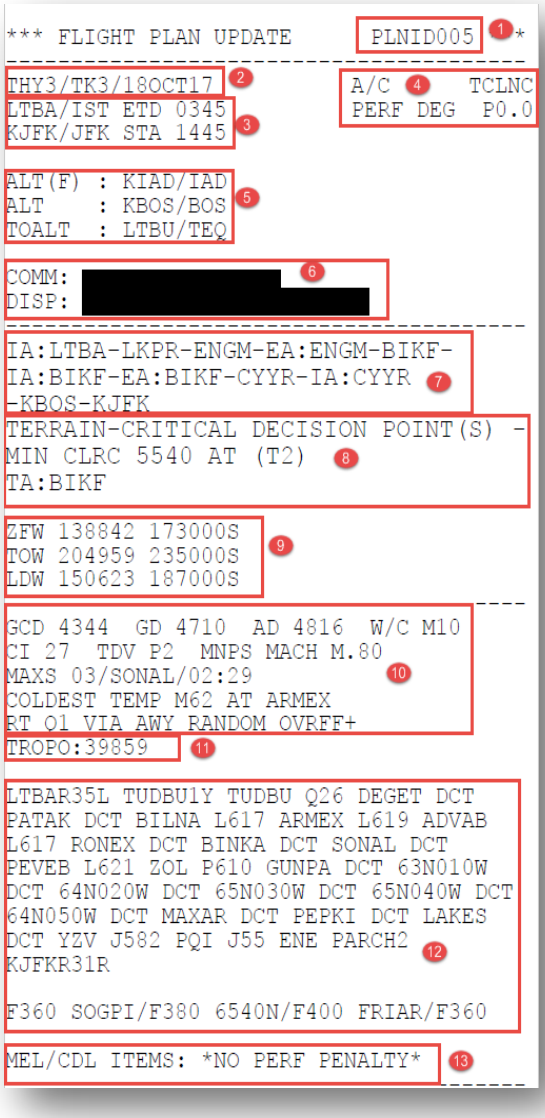
at a position further down the descent path, even though the underlying terrain is much lower than the highest terrain along the diversion path.

Minimum vertical Clearance may be larger than the final level-off altitude if the distance from the en-route alternate is shorter than the lateral length of the emergency descent profiles (e.g. if the emergency descent profile stops at FL100 and would cover a lateral mileage of 150NM, but the en-route alternate is only 100NM away, the aircraft will never be forecasted to reach FL100 during descent).

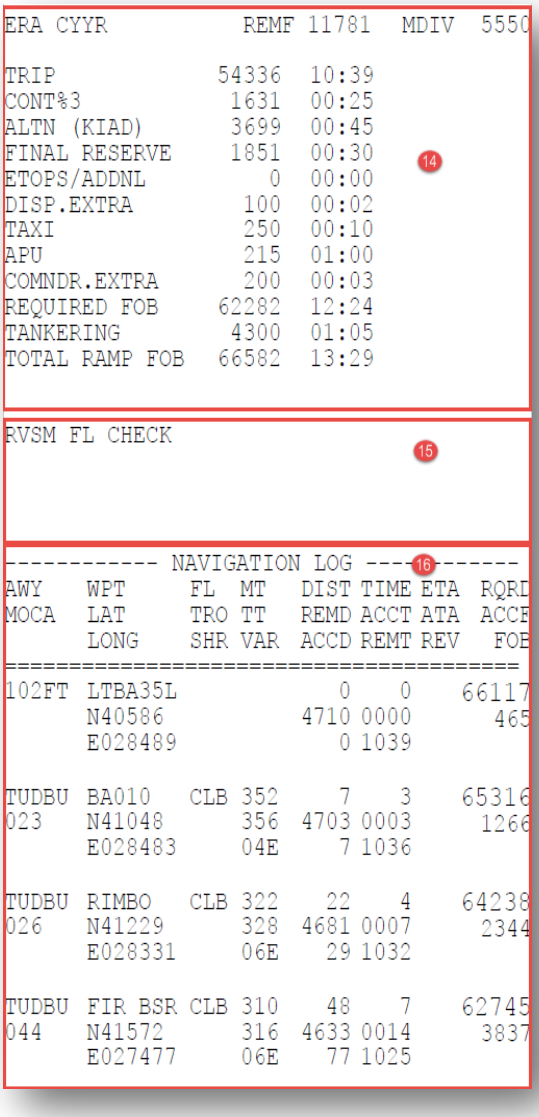
35. **BLEED CONFIGURATION AND TERRAIN CLEARANCE:** Bleed configuration and terrain clearance relevant MEL items.
36. **EN-ROUTE ALTERNATES SUMMARY:** Same as for ETOPS report.
37. **MAX ELEVATION and MINIMUM VERTICAL CLEARANCE:** Maximum elevation and minimum vertical clearance within the area defined by the relevant en-route alternate, the previous and the next decision points and the planned route between those two points. The position is given in coordinates and for both spots the terrain height and the vertical clearance is indicated.
38. **AIRPORT LIST – SUITABILITY TIMES**: Suitability times of airports used for planning.
39. **UPPER WIND SUMMARY:** Header of upper wind summary section.
40. **CLIMB SPOT WINDS:** Wind direction, speed, ISA Deviation and OAT values at four standard FL intervals above the departure airport – FL50, FL180, FL240, FL300.
41. **WINDS/ TEMPERATURES ALOFT FORECAST:** Flight Levels – standard GRIB levels: FL100, 180, 240, 300, 340 and 390.
42. **ENROUTE WAYPOINT ID'S:** RIMBO, TUDBU etc.
43. **ENROUTE WINDS:** Wind velocity and temperature.
44. **DESCENT SPOT WIND:** Wind direction, speed, ISA Deviation and OAT values at four standard FL intervals above the destination airport – FL390, FL340, FL300, FL240.
45. **COMPANY NOTES:** Company notes section for departure and destination airports. Company notes are added by Operation Planning and Support Management.

Note: Items that are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

8.1.10.5 Description of the ACARS OFP



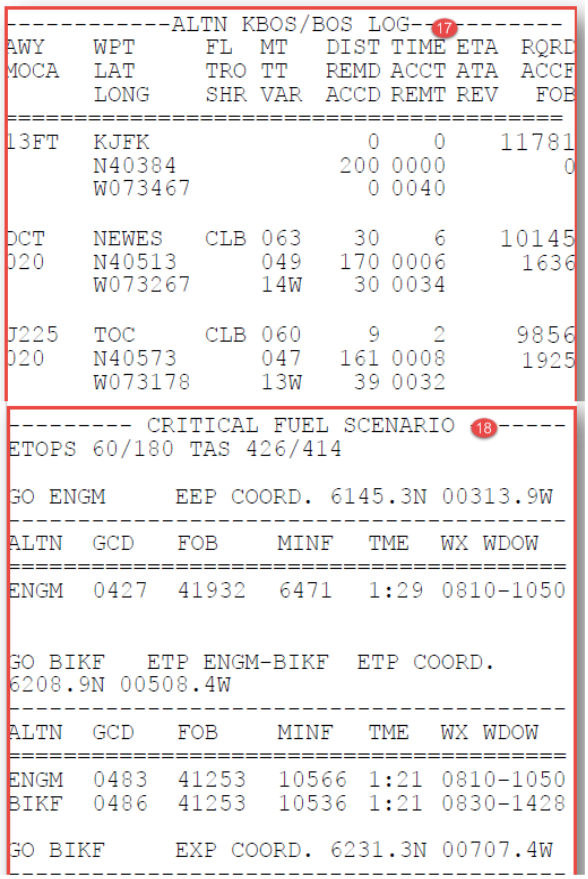
```
*** FLIGHT PLAN UPDATE        PLNID005  1 *
-------------------------------------------
THY3/TK3/18OCT17  2          A/C  4   TCLNC
LTBA/IST ETD 0345            PERF DEG  P0.0
KJFK/JFK STA 1445  3

ALT(F) : KIAD/IAD
ALT    : KBOS/BOS  5
TOALT  : LTBU/TEQ

COMM:  [redacted]  6
DISP:  [redacted]
-------------------------------------------
IA:LTBA-LKPR-ENGM-EA:ENGM-BIKF-
IA:BIKF-EA:BIKF-CYYR-IA:CYYR  7
-KBOS-KJFK
TERRAIN-CRITICAL DECISION POINT(S) -
MIN CLRC 5540 AT (T2)  8
TA:BIKF

ZFW 138842 173000S
TOW 204959 235000S  9
LDW 150623 187000S
-------------------------------------------
GCD 4344  GD 4710  AD 4816  W/C M10
CI 27  TDV P2  MNPS MACH M.80
MAXS 03/SONAL/02:29  10
COLDEST TEMP M62 AT ARMEX
RT Q1 VIA AWY RANDOM OVRFF+
TROPO:39859  11

LTBAR35L TUDBU1Y TUDBU Q26 DEGET DCT
PATAK DCT BILNA L617 ARMEX L619 ADVAB
L617 RONEX DCT BINKA DCT SONAL DCT
PEVEB L621 ZOL P610 GUNPA DCT 63N010W
DCT 64N020W DCT 65N030W DCT 65N040W DCT
64N050W DCT MAXAR DCT PEPKI DCT LAKES
DCT YZV J582 PQI J55 ENE PARCH2  12
KJFKR31R

F360 SOGPI/F380 6540N/F400 FRIAR/F360

MEL/CDL ITEMS: *NO PERF PENALTY*  13
-------
```



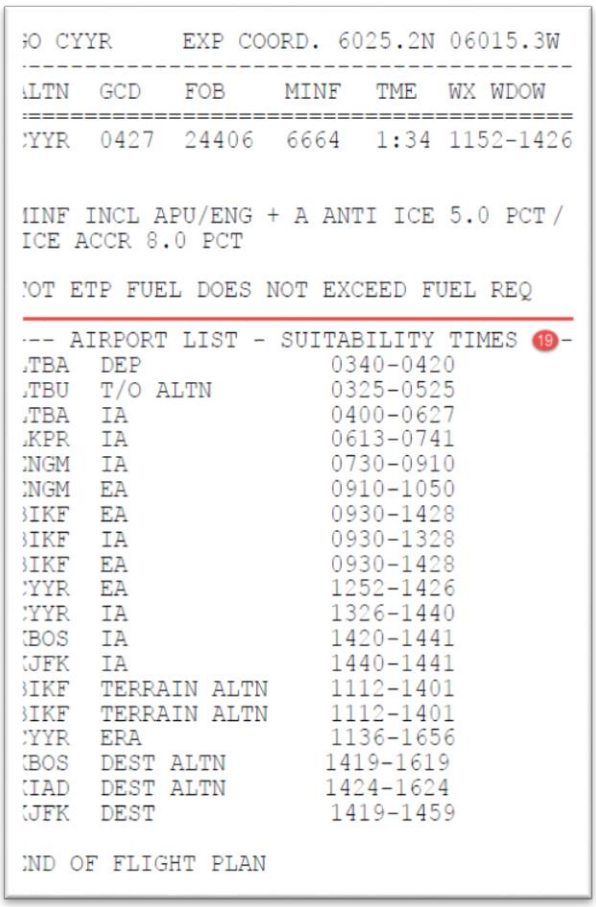
```
ERA CYYR          REMF 11781   MDIV  5550

TRIP            54336  10:39
CONT%3           1631  00:25
ALTN (KIAD)      3699  00:45
FINAL RESERVE    1851  00:30  14
ETOPS/ADDNL         0  00:00
DISP.EXTRA        100  00:02
TAXI              250  00:10
APU               215  01:00
COMNDR.EXTRA      200  00:03
REQUIRED FOB    62282  12:24
TANKERING        4300  01:05
TOTAL RAMP FOB  66582  13:29

RVSM FL CHECK  15

------------ NAVIGATION LOG ----16-------
AWY    WPT      FL  MT   DIST TIME ETA  RQRD
MOCA   LAT      TRO TT   REMD ACCT ATA  ACCF
       LONG     SHR VAR  ACCD REMT REV   FOE
=========================================
102FT  LTBA35L            0    0    66117
       N40586          4710 0000      465
       E028489            0 1039

TUDBU  BA010   CLB 352     7    3    65316
023    N41048      356  4703 0003     1266
       E028483     04E     7 1036

TUDBU  RIMBO   CLB 322    22    4    64238
026    N41229      328  4681 0007     2344
       E028331     06E    29 1032

TUDBU  FIR BSR CLB 310    48    7    62745
044    N41572      316  4633 0014     3837
       E027477     06E    77 1025
```

1. **PLNID005:** Plan ID number.
2. **THY3 / TK3 / 18OCT17:** ATC callsign / Commercial Flight No. / Date of Flight.
3. **LTBA/IST:** ICAO and IATA ID of departure airport.
   ETD 0345: Estimated Time of Departure, UTC.
   KJFK/JFK: ICAO/IATA ID of destination airport.
   STA 1445: Scheduled Time of Arrival, UTC.
4. **A/C TCLNC:** Registration of aircraft.
   PERF DEG P0.0: Cruise degradation/Performance factor.
5. **ALT (F) :** KIAD/IAD: Alternate airport's ICAO and IATA codes. (F) suffix signifies the alternate for which alternate airport's fuel has been uplifted.
   TOALT: LTBU/TEQ: Take off alternate airport's ICAO and IATA codes.
6. **COMM:** Commander's name.
   DISP: Dispatcher's name and company ID number.

7. **IA:** Intermediate Alternate (Enroute Alternate).
   EA: ETOPS Alternate.
8. **TERRAIN:** Information of terrain scenario.
   TA: Terrain Alternate.
9. **ZFW 138842:** Estimated Zero Fuel Weight. **173000S:** Maximum structural zero fuel weight.
   TOW 204959: Estimated Take Off Weight. **235000S:** Maximum structural take off weight.
   LDW 150623: Estimated Landing Weight. **187000S:** Maximum structural landing weight.
10. **Routing Section**
11. **TROPO:** Tropopause height at top of climb.
12. **DEST ROUTE TEXT:** Route Description – In ICAO ATC format with the some exceptions.
13. **MEL/CDL ITEMS:** System generated text based upon system applied MEL status.



```
-----------ALTN KBOS/BOS LOG-17--------
AWY    WPT      FL  MT   DIST TIME ETA  RQRD
MOCA   LAT      TRO TT   REMD ACCT ATA  ACCF
       LONG     SHR VAR  ACCD REMT REV   FOB
=======================================
13FT   KJFK               0    0    11781
       N40384           200 0000       0
       W073467            0 0040

DCT    NEWES    CLB 063    30    6    10145
020    N40513       049   170 0006     1636
       W073267      14W    30 0034

J225   TOC      CLB 060     9    2     9856
020    N40573       047   161 0008     1925
       W073178      13W    39 0032

--------- CRITICAL FUEL SCENARIO 18-----
ETOPS 60/180 TAS 426/414

GO ENGM     EEP COORD. 6145.3N 00313.9W
---------------------------------------
ALTN  GCD   FOB    MINF   TME   WX WDOW
=======================================
ENGM  0427  41932  6471   1:29 0810-1050


GO BIKF   ETP ENGM-BIKF  ETP COORD.
6208.9N 00508.4W
---------------------------------------
ALTN  GCD   FOB    MINF   TME   WX WDOW
=======================================
ENGM  0483  41253  10566  1:21 0810-1050
BIKF  0486  41253  10536  1:21 0830-1428

GO BIKF     EXP COORD. 6231.3N 00707.4W
---------------------------------------
```



```
GO CYYR     EXP COORD. 6025.2N 06015.3W
---------------------------------------
ALTN  GCD   FOB    MINF   TME   WX WDOW
=======================================
CYYR  0427  24406  6664   1:34 1152-1426


MINF INCL APU/ENG + A ANTI ICE 5.0 PCT /
ICE ACCR 8.0 PCT

NOT ETP FUEL DOES NOT EXCEED FUEL REQ

--- AIRPORT LIST - SUITABILITY TIMES 19-
ATBA  DEP              0340-0420
ATBU  T/O ALTN         0325-0525
ATBA  IA               0400-0627
AKPR  IA               0613-0741
ENGM  IA               0730-0910
ENGM  EA               0910-1050
BIKF  EA               0930-1428
BIKF  IA               0930-1328
BIKF  EA               0930-1428
CYYR  EA               1252-1426
CYYR  IA               1326-1440
EBOS  IA               1420-1441
KJFK  IA               1440-1441
BIKF  TERRAIN ALTN     1112-1401
BIKF  TERRAIN ALTN     1112-1401
CYYR  ERA              1136-1656
EBOS  DEST ALTN        1419-1619
KIAD  DEST ALTN        1424-1624
KJFK  DEST             1419-1459

END OF FLIGHT PLAN
```

14. **FUEL PLANNING:** Describes dominant policy applied for determination of reserve fuel
15. **RVSM Entry Check/RVSM FL:** RVSM entry checks and RVSM FL sections are reserved for crew data entry (not mandatory).
16. **OFP NAV LOG:** This section describes the various data fields in the OFP nav-log.
17. **ALTERNATE ROUTE SECTION:** Destination alternate airports nav logs.
18. **CRITICAL FUEL SCENARIO (IA-ETOPS-EROPS) INFORMATION:** If a flight's routings takes it beyond THT (Threshold Time, normally 60 min for a twin engine A/C) from an adequate airport then the system performs an ETOPS analysis and covers that "ETOPS" portion of the routing with Suitable "EA" airports. It will also perform critical fuel analysis for that portion of flight according to the EA availability and display the results on this page.
19. **AIRPORT LIST – SUITABILITY TIMES:** Suitability times of airports used for planning.

8.1.11 Turkish Airlines' Aeroplane Technical Log

8.1.11.1 General

(A) The Aircraft Maintenance Log (AML) is used for recording defects and malfunctions discovered during the operation and contain details of all maintenance carried out on the particular aeroplane. It is also used for recording operating information relevant to flight safety and contains maintenance data for the operating crew.

(B) All entries made in the the Aircraft Maintenance Log shall be clear and accurate. When it is necessary to correct an entry, the correction shall be made in a manner that clearly shows the original entry. For detailed usage of AML, see **PR.50.028 Procedure for Usage of Aircraft Maintenance Log**.

8.1.11.2 Certificate of Release to Service

(A) Daily Check:

(1) Commander is responsible for confirming the validity period of the Daily Check (conducted/signed by maintenance staff only) is valid for:

(a) 48 hours for B737-700/800/900ER/-8 MAX/-9 MAX, A350;

(b) 72 hours for B777 and B787 and

(c) 3 days (**DY**) for A319/320/321 and A330.

Note 1: See Turkish DGCA approved maintenance program for changes in the validity period. For changes in the validity period of daily check, refer to the daily check task card in accordance with Turkish DGCA approved maintenance program.

Note 2: "**DY**" means 24 calendar hours elapsed. "DY" interval may be counted from 00:00 UTC of the next day (not to include remaining day time since task completion).

(2) Daily check shall never be exceeded (even during the flight). If the aeroplane's flight pattern is such that the aeroplane's permissible daily check limit is exceeded prior to reaching a maintenance facility, the Commander shall notify Turkish Airlines Maintenance Control Centre (contact information located in the AML red binder) for clarification and rectification before flight.

(B) Transit Check: For aeroplanes in Turkish Airlines fleet, no transit check is required.

(C) EPDSC - ETOPS Predeparture Service Check (applicable for B777, B787, B737-900ER/-8 MAX/-9 MAX, A330 and A350 aeroplanes) will be performed before:

(1) every flight (ETOPS and non-ETOPS) departing from the stations in which concerned aeroplane uses as base,

(2) every ETOPS flight (in all stations) except diversions not resulted from technical reasons,

(3) every flight taking more than 8 hours except diversions not resulted from technical reasons,

(4) EPDSC is not required for other flights.

8.1.11.3 Recording of Defects

(A) Recording of defects shall be achieved as follows:

(1) in each AML section, a single defect must be written with a sequence-item no;

(2) if one AML section is not enough to explain the details, Commander may continue to the below section without giving an item no;

(3) If defect/finding detected by Commander, Commander checks PILOT box, signs SIGN section and write downs company ID number on ID NO section.

(4) in each page, maximum two defects shall be recorded. If there is not enough space for a defect on a single page, “CONTINUED ON THE NEXT PAGE” box should be marked to continue writing on the next page; and

(5) defects must be noted clearly and entirely with capital letters.

(B) Commanders are responsible for entering any known defects (in the English language - including details of the defect), affecting the airworthiness or safe operation of the aeroplane and any flight safety related cabin defects. Flight safety related cabin defects must be reported to the Commander by Cabin Chief.

(C) Once a defect written erroneously on AML is to be cancelled, “CANCELLED” statement shall be written on the defect. Reason for the cancellation shall be written readable below the defect and initials of the Commander cancelling it shall be included.

(D) For the defects detected during flight which require an AML recording, an ACARS free text description of the defect should be sent before top of descent point. Beyond top of descent point there is no need to send ACARS message. AML selection at ACARS Electronic Flight Log page must be selected as “YES” for any post-flight defect recording.

(E) If no defects are noted for the post-flight (upon completion of the Parking/Shutdown Checklist), the Commander of the inbound flight shall enter “NIL INBOUND” statement in the first section of the AML and shall not cross out any remaining empty defect sections of the AML (as necessary, these sections are to be filled out by the maintenance staff or the flight crew out-bound).

(F) Statement written by Commander as “INFO” on “DEFECT” section of page, for informing other flight crew or technical personnel, is closed by Commander or technician stating “INFO NOTED” on “CORRECTIVE ACTION TAKEN” section of page.

(G) For further details, see **PR.50.028 Procedure for Usage of Aircraft Maintenance Log**.

8.1.11.4 Recording of Other Information

(A) Commanders are responsible for entering the detailed information in the appropriate section of the AML (outbound page – page used for the flight to be conducted) when ground de-icing and/or anti-icing has been accomplished.

(B) Commanders are responsible for entering the detailed information in the appropriate section of the AML after refueling. Fuel slip regarding the uplift should be requested if it is not received and fuel information must be filled accordingly. Commander shall calculate fuel uplift according to **Subchapter 8.1.7.6 item (C)**, to determine the correct fuel quantity on board.

(C) The Commander shall make a note in the defect section of the AML when full takeoff thrust has been used. Example of the note to be entered: “INFO - Full takeoff thrust used for departure”. The purpose of the noting above is for tracking purposes only and a maintenance action is not required.

8.1.11.5 Pre-Flight Inspection

(A) The Commander shall ensure that the pre-flight inspection has been performed prior to each flight to ensure that the aeroplane is classified airworthy for the intended flight.

(B) Flight crew members shall use the fluorescent jackets or raincoats located in the flight deck for conducting the pre-flight inspection or for any other duties required on the ramp area.

(C) Pre-flight inspection tasks do not require an authorized maintenance staff involvement unless:

(1) maintenance action or check is required (including defect rectification), or

(2) servicing of the oil/hydraulic/nitrogen/oxygen servicing is required.

(D) The scope of a pre-flight inspection is determined in accordance with Turkish DGCA requirements. Pre-flight inspection shall be performed according to the applicable FCOM/**Operations Manual Part-B** procedures. **EK.10.50.001 CAME (Continuous Airworthiness Management Exposition)** ensures that pre-flight inspection is performed accordingly.

(E) Pre-flight inspections are inclusive of the following minimum tasks:

(1) walk-around type inspection of the aeroplane:

(a) shall be conducted by a flight crew member. Maintenance staff walk-around shall not be acceptable for the purposes of meeting the requirements of the Pre-flight Inspection.

(b) During exterior inspection at aerodromes in the EU (European Union), all access panel doors which can be opened without the use of ladders, wrenches etc., must be opened and checked for security purposes. This is in accordance with the “Secure Airport” procedures that are in effect in aerodromes in the EU. After the check, the flight crew shall make sure that relevant doors are closed.

(2) check of emergency equipment for condition:

(a) flight deck, including observer seat equipment and oxygen mask.

(b) cabin (conducted in accordance with **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.5.1.17. Emergency Equipment Check**.

1. Any findings shall be reported to the Commander.

(3) review of the AML for defect write-ups, MEL or CDL deferred items:

(a) if any defect write-ups are present; check for requirements, limitations, performance penalties and ensure corrective actions have been taken (item rectified or deferred per MEL, CDL, approved documentation, or approved for further flights by the Turkish DGCA or the Engineering Department (as applicable)). For the procedures to be followed at Crew Concept stations, refer to **Subchapter 8.1.11.7**.

(b) if any cabin related deferred items are present, Cabin Crew must be notified at the pre-flight crew briefing.

(c) if any MEL deferred items are present; check validity dates of the MEL items:

1. expired dates render the aeroplane non-airworthy. The Commander is responsible for accepting only airworthy aeroplanes for flight.

2. check for any Operational (O) or Maintenance (M) procedures to be conducted prior to and during the flight:

i If maintenance procedures are required prior to flight, a statement in the technical log book shall be entered by qualified maintenance staff with the appropriate signature.

ii If operational procedures related to cabin are present, Cabin Crew must be notified at the pre-flight crew briefing about the procedures.

(d) if applicable, ensure placards are installed.

(4) consumable fluids and gases uplifted prior to further flight are correct specification, free from contamination and correctly recorded;

(5) control of all doors (except main cabin door) to verify that they are closed and locked prior to main cabin door closure;

(a) to be accomplished either visually as required or by indications available in the flight deck (if any installed).

(6) control surface and landing gear locks, pitot/static covers, restraint devices and engine/aperture blanks, have been removed;

(7) control of the aircraft's external surfaces, wings and engines to be free from ice, snow, sand, dust etc.; and

(8) security of cargo and baggage loading:

(a) loadmaster/loading agent signature on the Load Sheet and the Aircraft Security Search Checklist shall be accepted as having complied with this requirement.

(F) Upon completion of the pre-flight inspection requirements, any found defect shall be recorded in the AML. Any previous corrective actions (including the ones in the flight crew compartement environment) shall also be recorded in the AML. Front, green copy and red copy must be available to record any defect/action. If green copy is removed by the technician, a new AML page sequence is filled out. Flight information (Date, Flight Number, Block Time, Flight Time, STA From, STA To, Commander Name and Surname, Type of Flight) of the new log page are not filled out. After such a defect/action is recorded, handling must be done according to **Subchapter 8.1.11.7**.

(G)If there is no finding upon completion of the Pre-flight Inspection requirements or handling any found out defect has been completed, Commander shall sign the Pre-flight Inspection section of the AML if he is convinced that the aeroplane

is airworthy for the intended flight. If the previous pages of the AML are not present on board for any reason (e.g. delivery flights), Commander shall record “INFO: PRE-FLIGHT INSPECTION PERFORMED PRIOR TO THE FIRST FLIGHT” in the defects section of the first AML page. If more than one AML pages is used for maintenance actions, it is suggested to sign all AML pages for the systematic follow up reasons.

(1) Signatures of the Co-Pilot or any maintenance staff are not acceptable.

(2) Commander shall not sign any other sections of the AML:

(a) Signing of any maintenance checks or defect write-up rectification is the responsibility of maintenance staff only (exceptionally Commander shall also sign underneath the “CORRECTIVE ACTION TAKEN” block when the procedure described in **Subchapter 8.1.11.7 (B)** is applied).

(H) Prior to closing the main cabin door, red copy of the signed AML shall be handed over to the Turkish Airlines Ground Operations Staff / Technician.

8.1.11.6 Events Requiring Maintenance Inspection

(A) During ground or flight operations, events may occur which require maintenance inspection after flight. The AMM refers to such events as "Conditional Inspections".

These include, but are not limited to:

(1) Hard landing (or suspicion of hard landing)

(2) Overweight landing

(3) Severe turbulence

(4) Overspeed - flap/slat, MMO/VMO, landing gear, landing gear tires

(5) High energy stop

(6) Lightning strike

(7) Extreme dust

(8) Tail strike

(9) Bird strike

(10) Encountering swarm of insects

(B) An event that requires maintenance inspection shall be recorded in the AML.

Note: Contact the maintenance department if any doubt exists about an event requires a maintenance inspection.

8.1.11.7 Procedure for Handling Defects

(A) At stations where technical service is provided, technicians defer the defect according to MEL / CDL and transfer it to the Deferred Items List (DIL).

(B) In Crew Concept stations, if a defect is acceptable as "go or go if" within the provisions of Minimum Equipment List (MEL) and Configuration Deviation List (CDL) and maintenance action is not required, Commander may contact with Maintenance Control Center (MCC) and defer such defect in accordance with **PR.50.028 Procedure for Usage of Aircraft Maintenance Log**. In such a situation:

(1) Commander declares defects to MCC via phone call or ACARS message. Commander agrees with MCC on deferring the defect. After agreement, MCC delivers MEL reference and "MEL Authorization Number" to the commander;

(2) Commander fills out "CORRECTIVE ACTION TAKEN" block of AML with recording "MEL Authorization Number" and writing statement: "MEL AUTHORIZATION APPLIED, DEFECT WAS DEFERRED AND TRANSFERRED TO DIL ITEM:….BY COMMANDER" by signing below of the statement.

(3) After the item is deferred, the Commander shall transfer this item to Deferred Items List (DIL) page with MEL/CDL reference. During transferring of defect to DIL page, Commander fills the boxes of DIL page explained below:

(a) D/I NO: Deferred Item sequence number

(b) STATION: Three letter IATA station code

(c) DATE: GMT date written as Day/month/year

(d) This item transferred from Log page ____ item no: ____:

Blanks above are filled out with deferred defect's AML page and item number.

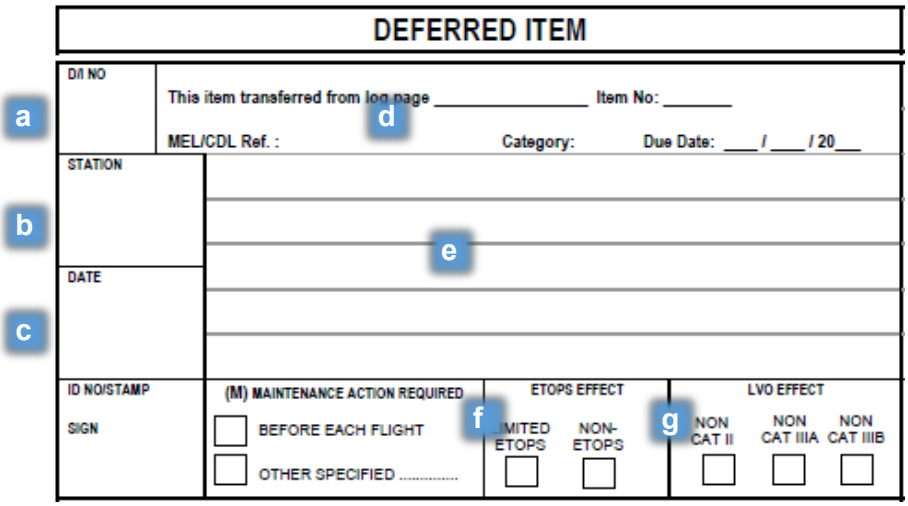
MEL/CDL Ref: ___ Category __: If the defect couldn't be rectified before flight is "GO" or "GO IF" according to MEL or CDL, then MEL or CDL reference number is recorded, if it's a MEL item then it's recorded with its category.

Due Date:__/__/20__: Due date to rectify deferred defect according to its MEL category.

(e) DEFERRED ITEM: The defect on AML deferred according to MEL/CDL, hold items and information that concern flight crew are recorded on this section.

(f) ETOPS EFFECT: DI's on AML which are deferred defects or rectifications affecting

ETOPS status and; If it is limited, LIMITED box of ETOPS status section on DIL page is marked with "X". If it downgrades aircraft's ETOPS status, NON-ETOPS box is marked with "X".



(4) once defect deferring process is applied by Commander as explained above, by signing 'Preflight Inspection' section of AML page, Commander ensures that aeroplane is airworthy for intended flight.

(C) Any malfunction rising up after engine start up, prior to takeoff or during takeoff run, which leads to an abort or delayed takeoff and is either reset by the flight crew or disappears on its own, does not need a “technical release”. The flight may be continued after the Commander confirms the affected system is recovered by resetting according to FCOM/QRH and the ATC unit is informed. In this case the maintenance department must be notified so they can fill out an “Aircraft Technical Failure Report Form” to be submitted to competent authorities. Also, appropriate entry shall be made to the AML.

8.1.11.8 Flight (Technical) Preparation

(A) By signing the pre-flight inspection of the AML, the Commander is certifying compliance with Turkish DGCA/EASA regulations requirements with respect to:

(1) the airworthiness of the aeroplane (satisfactory completion of Turkish Airlines approved Pre-Flight inspection procedure);

(2) the aeroplane configuration is in accordance with the Configuration Deviation List (CDL);

(3) the instruments and equipment required for the flight to be conducted are available and in operable condition except as provided for in the Turkish Airlines MEL;

(4) those parts of the operations manual which are required for the conduct of the flight are available;

(5) the documents, additional information and forms required to be available are on board;

(6) the aeroplane carries at least the planned amount of fuel and oil to complete the flight safely, taking into account the expected operating conditions; and

(7) the defects listed in the AML have been rectified and signed-off or deferred as necessary, and that any deferred defects or items are acceptable within the provisions of the MEL.

(B) The requirement of de-icing entry (de-icing accomplished and inspected accordingly) shall be made on the out-bound page of the AML.

8.1.11.9 Description of the Aircraft Maintenance Log (AML)

(A) Below is a description of the items found in the AML for B777 and A330 aeroplane types under THY inventory. Areas with a light brown background are to be filled by the flight crew and areas with a white background are to be filled by the technical personnel. Other types are not described since their items are covered in these descriptions.

(B) Valid AML pages can be found at Document Management (DDMS) under info.thy.com portal with the following references:

(1) **FR.50.0021 AML A319/320/321**

(2) **FR.50.0029 AML B737-700/800**

(3) **FR.50.0063 AML B737-900ER**

(4) **FR.50.0025 AML A330**

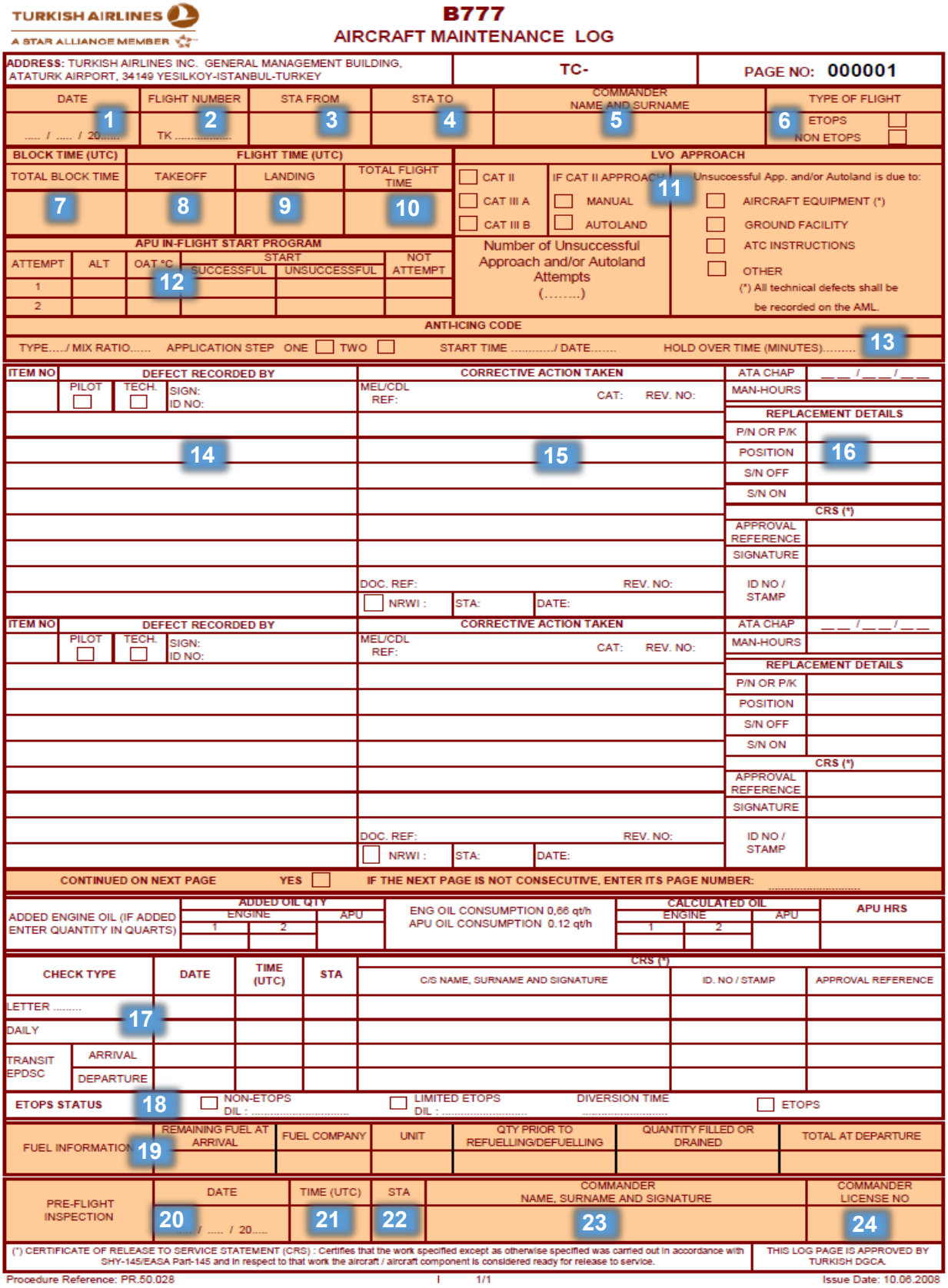
(5) **FR.50.0478 AML A350**

(6) **FR.50.0034 AML B777**

(7) **FR.50.0032 AML B737 MAX**

(8) **FR.50.0460 AML B787**

8.1.11.9.1 B777 AML



TURKISH AIRLINES
A STAR ALLIANCE MEMBER

B777
AIRCRAFT MAINTENANCE LOG

ADDRESS: TURKISH AIRLINES INC. GENERAL MANAGEMENT BUILDING, ATATURK AIRPORT, 34149 YESILKOY-ISTANBUL-TURKEY | TC- | PAGE NO: 000001

DATE (1)	FLIGHT NUMBER (2)	STA FROM (3)	STA TO (4)	COMMANDER NAME AND SURNAME (5)	TYPE OF FLIGHT (6)
..... / ..... / 20.....	TK				ETOPS ☐ NON ETOPS ☐

BLOCK TIME (UTC)	FLIGHT TIME (UTC)		
TOTAL BLOCK TIME (7)	TAKEOFF (8)	LANDING (9)	TOTAL FLIGHT TIME (10)

LVO APPROACH

☐ CAT II ☐ CAT III A ☐ CAT III B

IF CAT II APPROACH (11): ☐ MANUAL ☐ AUTOLAND

Unsuccessful App. and/or Autoland is due to:
☐ AIRCRAFT EQUIPMENT (*)
☐ GROUND FACILITY
☐ ATC INSTRUCTIONS
☐ OTHER
(*) All technical defects shall be be recorded on the AML.

Number of Unsuccessful Approach and/or Autoland Attempts (.....)

APU IN-FLIGHT START PROGRAM (12)

ATTEMPT	ALT	OAT °C	START SUCCESSFUL	START UNSUCCESSFUL	NOT ATTEMPT
1					
2					

ANTI-ICING CODE

TYPE...../ MIX RATIO..... APPLICATION STEP ONE ☐ TWO ☐ START TIME ...../ DATE..... HOLD OVER TIME (MINUTES)..... (13)

ITEM NO	DEFECT RECORDED BY	CORRECTIVE ACTION TAKEN	
(14)	PILOT ☐ TECH. ☐ SIGN: ID NO:	MEL/CDL REF: CAT: REV. NO: (15)	ATA CHAP: __ __ / __ __ / __ __
			MAN-HOURS:
			REPLACEMENT DETAILS (16)
			P/N OR P/K:
			POSITION:
			S/N OFF:
			S/N ON:
			CRS (*)
			APPROVAL REFERENCE:
			SIGNATURE:
		DOC. REF: REV. NO:	ID NO / STAMP:
		☐ NRWI : STA: DATE:	

ITEM NO	DEFECT RECORDED BY	CORRECTIVE ACTION TAKEN	
	PILOT ☐ TECH. ☐ SIGN: ID NO:	MEL/CDL REF: CAT: REV. NO:	ATA CHAP: __ __ / __ __ / __ __
			MAN-HOURS:
			REPLACEMENT DETAILS
			P/N OR P/K:
			POSITION:
			S/N OFF:
			S/N ON:
			CRS (*)
			APPROVAL REFERENCE:
			SIGNATURE:
		DOC. REF: REV. NO:	ID NO / STAMP:
		☐ NRWI : STA: DATE:	

CONTINUED ON NEXT PAGE YES ☐ IF THE NEXT PAGE IS NOT CONSECUTIVE, ENTER ITS PAGE NUMBER: .....

ADDED ENGINE OIL (IF ADDED ENTER QUANTITY IN QUARTS)	ADDED OIL QTY ENGINE 1	ADDED OIL QTY ENGINE 2	ADDED OIL QTY APU	ENG OIL CONSUMPTION 0,66 qt/h APU OIL CONSUMPTION 0.12 qt/h	CALCULATED OIL ENGINE 1	CALCULATED OIL ENGINE 2	CALCULATED OIL APU	APU HRS

CHECK TYPE		DATE	TIME (UTC)	STA	CRS (*) C/S NAME, SURNAME AND SIGNATURE	CRS (*) ID. NO / STAMP	CRS (*) APPROVAL REFERENCE
LETTER ..... (17)							
DAILY							
TRANSIT EPDSC	ARRIVAL						
	DEPARTURE						

ETOPS STATUS (18) ☐ NON-ETOPS DIL : ..... ☐ LIMITED ETOPS DIL : ..... DIVERSION TIME ..... ☐ ETOPS

FUEL INFORMATION (19)	REMAINING FUEL AT ARRIVAL	FUEL COMPANY	UNIT	QTY PRIOR TO REFUELLING/DEFUELLING	QUANTITY FILLED OR DRAINED	TOTAL AT DEPARTURE

PRE-FLIGHT INSPECTION	DATE (20)	TIME (UTC) (21)	STA (22)	COMMANDER NAME, SURNAME AND SIGNATURE (23)	COMMANDER LICENSE NO (24)
	..... / ..... / 20.....				

(*) CERTIFICATE OF RELEASE TO SERVICE STATEMENT (CRS) : Certifies that the work specified except as otherwise specified was carried out in accordance with SHY-145/EASA Part-145 and in respect to that work the aircraft / aircraft component is considered ready for release to service.

THIS LOG PAGE IS APPROVED BY TURKISH DGCA.

Procedure Reference: PR.50.028 I 1/1 Issue Date: 10.06.2008
THY KYS Form No: FR.50.0034 Rev.10 Revision Date: 30.04.2016

1- DATE: Day/month/year according to GMT time of the flight..

2- FLIGHT NUMBER: Flight number indicated in the OFP.

3- STA FROM: Three-letter IATA code of departure station..

4- STA TO: Three-letter IATA code of arrival station.

5- COMMANDER NAME AND SURNAME: Name and surname of commander.

6- Type of flight (ETOPS or NON-ETOPS).

7- BLOCK TIME: Total block time.

8, 9- Takeoff time and Landing time.

10- FLIGHT TIME: Total flight time.

11- LVO APPROACH: When Low Visibility Operations (LVO) is performed, this related box is ticked by flight crew. If multiple approaches are done because of previous unsuccessful approaches and/or autolands, number of unsuccessful attempts shall be logged and reasons shall be ticked. Any technical defects leading to an unsuccessful attempt shall be recorded as well.

12- APU IN-FLIGHT START PROGRAM: This section is filled out by flight crew during flight.

13- ANTI-ICING CODE: The code is written in the following order; TYPE: Type of fluid (Type-1, Type-2, Type-3 or Type-4), MIX. RATIO: Fluid/water mixture ratio, recorded as percentage. Anti-icing fluid rate is always said and written first, START TIME: Local time when anti-icing is applied. Written as hour: minute, DATE: Local date of application, written as Day/month/year, APPLICATION STEP: According to application type “ONE” or “TWO” box is marked with “X”, HOLDOVER TIME (MINUTES): Anti-icing protection time of application fluid calculated by Commander according to fluid type, mixture ratio and meteorological report.

14- ITEM NO: For each item, item number is written by Commander or authorized technician. Defect Recorded By: If the defect is written down by the Commander, Commander checks PILOT box, signs SIGN section and writes down company ID number on ID section.

15- CORRECTIVE ACTION TAKEN: To be entered by maintenance staff after defect rectification or deferred in accordance with the applicable MEL/CDL. May be entered by the Commander after the requirements described in **Subchapter 8.1.11.7**.

16, 17- To be entered by maintenance staff only.

18- To be entered by maintenance staff only. Shows the current ETOPS status of the aircraft.

19- FUEL INFORMATION: Fuel company name, fuel unit (kg), fuel amount prior to Refuel/Defuel, filled/drained fuel quantity, total fuel quantity just prior to departure, remaining fuel quantity at arrival is filled out.

20- DATE: Date of maintenance as Day/month/year according to GMT time.

21- TIME: GMT time of preflight inspection work done.

22- STA: Three-letter IATA code of the station where preflight inspection work is done.

23- COMMANDER NAME, SURNAME AND SIGNATURE: It is filled out with capital letters of first name initial, surname and signed by commander who does the preflight inspection work. Signature of Commander indicates that he accepts the aeroplane for the next flight leg in an airworthy condition in accordance with **Subchapter 8.1.11**.

24- COMMANDER LICENSE NO: License number of the Commander who approves the preflight inspection.

8.1.11.9.2 A330 AML

TURKISH AIRLINES
A STAR ALLIANCE MEMBER

A330
AIRCRAFT MAINTENANCE LOG

ADDRESS: TURKISH AIRLINES INC. GENERAL MANAGEMENT BUILDING, ATATURK AIRPORT, 34149 YESILKOY-ISTANBUL-TURKEY	TC-	PAGE NO: 000001

DATE	FLIGHT NUMBER	STA FROM	STA TO	COMMANDER NAME AND SURNAME	TYPE OF FLIGHT
..... / ..... / 20..... 1	TK 2	3	4	5	ETOPS ☐ NON ETOPS ☐ 6

BLOCK TIME (UTC)	FLIGHT TIME (UTC)			LVO APPROACH		
TOTAL BLOCK TIME	TAKEOFF	LANDING	TOTAL FLIGHT TIME	☐ CAT II ☐ CAT III A ☐ CAT III B	IF CAT II APPROACH, ☐ MANUAL ☐ AUTOLAND	Unsuccessful App. and/or Autoland is due to: ☐ AIRCRAFT EQUIPMENT (*) ☐ GROUND FACILITY ☐ ATC INSTRUCTIONS ☐ OTHER (*) All technical defects shall be be recorded on the AML.
7	8	9	10		11 Number of Unsuccessful Approach and/or Autoland Attempts (.....)	

ANTI-ICING CODE	
TYPE...../ MIX RATIO.... 12 APPLICATION STEP ONE ☐ TWO ☐	
START TIME ...../DATE.....	HOLD OVER TIME (MINUTES).....

FOR TRENT 700 ENGINES 13

Was there freezing fog condition at Arrival/Departure? Yes ☐ No ☐ If yes, Record taxi-in tim.... Min or Record taxi-out time ..... Min

Check the previous flight for freezing fog condition during taxi-in. Calculate and record total operating time in freezing fog condition in combination with the taxi-out time of current flight and the taxi-in time of previous flight as to use in FCOM related procedure. ..... Min

ITEM NO	DEFECT RECORDED BY			CORRECTIVE ACTION TAKEN			ATA CHAP	__ __ / __ __ / __ __
	PILOT ☐	TECH. ☐	SIGN: ID NO:	MEL/CDL REF:	CAT:	REV. NO:	MAN-HOURS	
	14			15			REPLACEMENT DETAILS	
							P/N OR P/K	16
							POSITION	
							S/N OFF	
							S/N ON	
							CRS (*)	
							APPROVAL REFERENCE	
							SIGNATURE	
				DOC. REF:		REV. NO:	ID NO / STAMP	
				☐ NRWI :	STA:	DATE:		

ITEM NO	DEFECT RECORDED BY			CORRECTIVE ACTION TAKEN			ATA CHAP	__ __ / __ __ / __ __
	PILOT ☐	TECH. ☐	SIGN: ID NO:	MEL/CDL REF:	CAT:	REV. NO:	MAN-HOURS	
							REPLACEMENT DETAILS	
							P/N OR P/K	
							POSITION	
							S/N OFF	
							S/N ON	
							CRS (*)	
							APPROVAL REFERENCE	
							SIGNATURE	
				DOC. REF:		REV. NO:	ID NO / STAMP	
				☐ NRWI :	STA:	DATE:		

CONTINUED ON NEXT PAGE YES ☐ IF THE NEXT PAGE IS NOT CONSECUTIVE, ENTER ITS PAGE NUMBER: .....

ADDED ENGINE OIL (IF ADDED ENTER QUANTITY IN QUARTS)	ADDED OIL QTY ENGINE 1	ADDED OIL QTY ENGINE 2	ADDED OIL QTY APU	ENG OIL CONSUMPTION CF6-80E1A3: 0.87 qt/h, TRENT 772B-60: 0.67qt/h, PW4000: 0.5 qt/h APU OIL CONSUMPTION 0.3 qt/h	CALCULATED OIL ENGINE 1	CALCULATED OIL ENGINE 2	CALCULATED OIL APU	APU HRS

CHECK TYPE		DATE	TIME (UTC)	STA	CRS (*) C/S NAME, SURNAME AND SIGNATURE	ID NO/STAMP	APPROVAL REFERENCE
LETTER							
DAILY							
TRANSIT EPDSC	ARRIVAL						
	DEPARTURE						

17

ETOPS STATUS 18 ☐ NON-ETOPS DIL : ..... ☐ LIMITED ETOPS DIL : ..... DIVERSION TIME ..... ☐ ETOPS

FUEL INFORMATION 19	REMAINING FUEL AT ARRIVAL	FUEL COMPANY	UNIT	QTY PRIOR TO REFUELLING/DEFUELLING	QUANTITY FILLED OR DRAINED	TOTAL AT DEPARTURE

PRE-FLIGHT INSPECTION	DATE	TIME (UTC)	STA	COMMANDER NAME, SURNAME AND SIGNATURE	COMMANDER LICENSE NO
	20 ..... / ..... / 20.....	21	22	23	24

(*) CERTIFICATE OF RELEASE TO SERVICE STATEMENT (CRS) : Certifies that the work specified except as otherwise specified was carried out in accordance with SHY-145/EASA Part-145 and in respect to that work the aircraft/aircraft component is considered ready for release to service.

THIS LOG PAGE IS APPROVED BY TURKISH DGCA

Procedure Reference: PR.50.028 1/1 Issue Date: 10.06.2008
THY KYS Form No: FR.50.0025 Rev.10 Revision Date: 30.04.2016

1- DATE: Day/month/year according to GMT time of the flight.

2- FLIGHT NUMBER: Flight number indicated in the OFP.

3- STA FROM: Three-letter IATA code of departure station.

4- STA TO: Three-letter IATA code of arrival station.

5- COMMANDER NAME AND SURNAME: Name and surname of commander.

6- Type of flight (ETOPS or NON-ETOPS).

7- BLOCK TIME: Total block time.

8, 9- Takeoff time and Landing time.

10- FLIGHT TIME: Total flight time.

11- LVO APPROACH: When Low Visibility Operations (LVO) is performed, this related box is ticked by flight crew. If multiple approaches are done because of previous unsuccessful approaches and/or autolands, number of unsuccessful attempts shall be logged and reasons shall be ticked. Any technical defects leading to an unsuccessful attempt shall be recorded as well.

12- ANTI-ICING CODE: The code is written in the following order; TYPE: Type of fluid (Type-1, Type-2, Type-3 or Type-4), MIX. RATIO: Fluid/water mixture ratio, recorded as percentage. Anti-icing fluid rate is always said and written first, START TIME: Local time when anti-icing is applied. Written as hour: minute, DATE: Local date of application, written as Day/month/year, APPLICATION STEP: According to application type “ONE” or “TWO” box is marked with “X”, HOLDOVER TIME (MINUTES): Anti-icing protection time of application fluid calculated by Commander according to fluid type, mixture ratio and meteorological report.

13- FOR TRENT 700 ENGINES: The taxi times under freezing fog conditions shall be recorded.

14- ITEM NO: For each item, item number is written by Commander or authorized technician. Defect Recorded By: If the defect is written down by the Commander, Commander checks PILOT box, signs SIGN section and writes down company ID number on ID section.

15- CORRECTIVE ACTION TAKEN: To be entered by maintenance staff after defect rectification or deferred in accordance with the applicable MEL/CDL. May be entered by the Commander after the requirements described in **Subchapter 8.1.11.7**.

16, 17- To be entered by maintenance staff only.

18- To be entered by maintenance staff only. Shows the current ETOPS status of the aircraft.

19- FUEL INFORMATION: Fuel company name, fuel unit (kg), fuel amount prior to Refuel/Defuel, filled/drained fuel quantity, total fuel quantity just prior to departure, remaining fuel quantity at arrival is filled out.

20- DATE: Date of maintenance as Day/month/year according to GMT time.

21- TIME: GMT time of preflight inspection work done.

22- STA: Three-letter IATA code of the station where preflight inspection work is done.

23- COMMANDER NAME, SURNAME AND SIGNATURE: It is filled out with capital letters of first name initial, surname and signed by commander who does the preflight inspection work. Signature of the Commander indicates that he accepts the aeroplane for the next flight leg in an airworthy condition in accordance with **Subchapter 8.1.11**.

24- COMMANDER LICENSE NO: License number of the Commander who approves the preflight inspection.

8.1.12 List of Documents, Personal Items, on Board Library and Flight Documents Folder

(A) The items listed within this subchapter shall be carried on board the aeroplane and shall, within a reasonable time of being requested to do so by a person authorized by an authority, be presented by the Commander of the aeroplane to that person.

(B) The management and control of the on board library shall be made according to **PR.70.001 On-Board Library Management and Control Procedure**.

(C) The following documents, manuals and information shall be carried on each flight, as originals or copies unless otherwise specified:

(1) the aircraft flight manual (AFM), or equivalent document(s);

(a) Configuration Deviation List (CDL);

(2) the original certificate of registration (permanent – no expiration date);

(3) the original certificate of airworthiness (CofA) (permanent – no expiration date);

(4) the noise certificate, including an English translation, where one has been provided by the authority responsible for issuing the noise certificate (permanent – no expiration date);

(5) a certified true copy of the air operator certificate (AOC) (permanent – no expiration date);

(6) the Operations Specifications (OPS SPEC), relevant to the aircraft type, issued with the AOC;

(7) the original aircraft radio license, if applicable (requires renewal);

(8) the third party liability insurance certificate(s) (requires renewal);

(9) Official flight log (should be available on board the aeroplane for all flights, but may be replaced with ACARS data or a report written on a blank paper and signed by the Commander). Refer to **Subchapter 8.1.12.3** for reference.

(10) the aircraft maintenance log (AML);

(11) details of the filed ATS flight plan(refer to OFP), if applicable;

(12) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted (Significant Weather and Winds Aloft charts etc.). Portable and Installed EFBs are used for Navigational charts and Documentation if applicable. (see note 1);

(13) procedures and visual signals information for use by intercepting and intercepted aircraft (see note 1);

(14) information concerning search and rescue services for the area of the intended flight, which shall be easily accessible in the flight crew compartment (see note 1);

(15) the current parts of the operations manual that are relevant to the duties of the crew members, which shall be easily accessible to the crew members;

(a) **EK.10.73.001 Operations Manual Part-A**;

(b) **Operations Manual Part-B** including the FCOM/QRH;

(c) **EK.10.73.002 Operations Manual Part-C** and Jeppesen Airway Manuals;

(d) Supplementary Performance Data and Runway Take-Off Analysis Manual;

(16) the MEL;

(17) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(18) appropriate meteorological information;

(19) cargo and/or passenger manifests, if applicable;

(20) mass and balance documentation;

(21) the operational flight plan, if applicable;

(22) notification of special categories of passenger (SCPs) and special loads (see note 2), if applicable;

(23) any other documentation that may be pertinent to the flight or is required by the States concerned with the flight including;

(a) a copy of Airworthiness Review Certificate (requires renewal),

(b) a copy of Certificate of Residual Disinsection (requires renewal),

(c) Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (DOC 9481-AN/928).

(d) Type and Non-Type Related Checklist and Guides (see **PR.70.001 On-Board Library Management and Control Procedure** Table-1)

(e) **FR.73.0001 Aircraft Security Search Checklist;**

(f) General Declaration, if applicable;

(g) Bomb Search Form (10 copies **FR.71.8009 A330 Bomb Search Form**, 10 Copies **FR.71.8010 A350 Bomb Search Form** 10 copies **FR.71.8005 B777-300ER Bomb Search Form**, 5 copies **FR.71.8006 A319/320/321 Bomb Search Form**, 5 copies **FR.71.8007 B737 Bomb Search Form** 10 copies **FR.71.8008 B787 Bomb Search From**)

(h) Air Mail Documents, if applicable;

(i) Occurrence Report forms described in **Subchapter 11.2.2** (see note 3).

(j) **FR.32.0463 Work Accident Information Form**

(k) **FR.73.0008 Low Visibility Operations Assessment Form**

Note 1: Information can be found in **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

Note 2: As applicable for the intended flight, minimum two copies and extra copy of Special Loads Notification or NOTOC for every additional leg.

Note 3: If a form that is missing needs to be filled, the Commander shall consult **Chapter 11** for the contents of the appropriate form and fill out a blank sheet of paper with the required information. If during flight such forms are used, the Commander shall inform the arrival station for replenishment.

(D) A mobile phone with a SIM card should be available on board.

(E) Notwithstanding (C), in case of loss or theft of documents specified in (C)(2) to (C)(8), the operation may continue until the flight reaches its destination or a place where replacement documents can be provided.

(F) When a certificate is not placed on board due to renewal, a copy of the certificate may be carried on board. For more information, see **PR.50.004 Procedure for Certificates to be Carried On Board and Operation Authorizations**.

8.1.12.1 Crew Documents

(A) The following personal crew member documents shall be carried by each crew member designated for operations on a specific flight:

(1) Domestic Flights;

(a) A valid crew member license or certificate (as applicable) with appropriate rating(s).

(b) A valid flight crew member medical certificate (with limitations – as applicable).

(c) For co-pilots in possession of a CPL, a valid Instrument Rating.

(d) For flight crew members approved for CAT II/III operations and PBN operations, a valid Certificate of Low Visibility Operations (**FR.72.2097 Operational Qualifications Certificate**).

(e) A certificate issued by the Flight Training Directorate showing the relevant crew is certified for operations requiring separate approval (short/narrow runway, low visibility etc.).

(f) An up-to-date Pilots Logbook (see **PR.73.012 Procedure for Recording of Flight Hours of Flight Crew Members** for recording instructions).

(g) Turkish Airlines identification card containing his photo.

(2) International Flights (in addition to the requirements listed in item (1) above);

(a) A valid passport with appropriate visas (as applicable).

(b) Certificates of vaccination and Crew Member Certificate (as applicable).

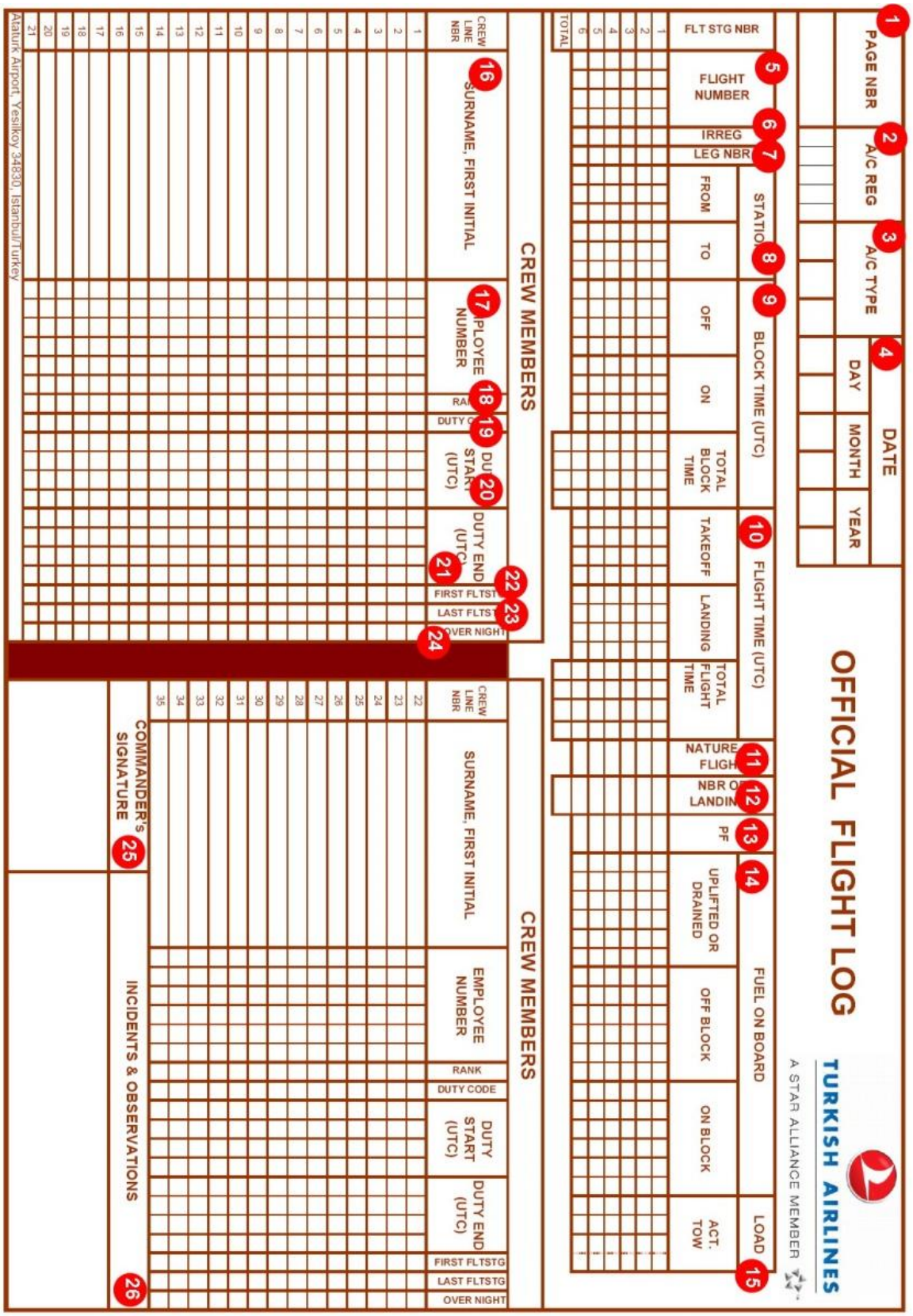
8.1.12.2 Crew Personal Items

(A) The following items shall be carried and kept readily available by the crew members (as required):

(1) Flash light (not required to be carried if installed on the aeroplane);

(2) Spare spectacles for flight crew requiring corrective lenses (contact lenses may be used as corrective lenses but are not allowed as spare corrective lenses).

8.1.12.3 Description of the Official Flight Log



Filling Instructions

1. Page Number
2. Registration of the aircraft
3. Type of Aircraft (350; 330; 320 for A321-A320-A319; 737 for B737 -800, -900ER, -8 MAX, -9 MAX, 777 and 787)
4. Date on which the flight is initiated (UTC)
5. Flight number indicated on the OFP
6. Irregularity codes (This box will be left blank for normal operations): T: If the flight occurs the following day X: If the aircraft returns to the station of departure due to technical reasons D: If aircraft diverts
7. Number of legs that have been flown with the same flight number
8. Departure and arrival aerodrome (IATA code)
9. Block time (UTC)
    a) Off-block
    b) On-block
    c) Block Time
10. Airborne time (UTC)
    d) Take off time (UTC)
    e) Touch down/landing time (UTC)
    f) Flight Time
11. One of the following abbreviations will be used for the nature of the flight: P: PASSENGER C: CARGO T: TRAINING F: FERRY FLIGHT X: TEST FLIGHT L: POSITIONING FLIGHT (non-revenue flight which is performed to relocate the A/C) (L)
12. Number of landings for the flight (for training flights only)
13. Pilot Flying (PF) for that flight leg (refer to crew line number)
14. Fuel on board (in Kg)
    g) Fuel uplifted or drained is the total quantity of fuel added to or removed from the aircraft
    h) Off block fuel shall be recorded after the required fuel for dispatch has been attained
    i) Fuel remaining after engine shutdown shall be recorded as on block fuel
15. Actual take-off weight
16. Name(s) of crew member(s)
17. Employee Number
18. Rank; C: Designated Commander K: Commander P: Pilot S: Steward(ess) D: Dispatch T: Technician W: Weight and balance office
19. Duty Codes; 1: Operating crew 2: Pay deadhead 3: Non-pay deadhead

20. Duty start (UTC); refer to **Chapter 7**.
21. Duty end (UTC); refer to **Chapter 7**.
22. Flight stage the crew member embarked the aircraft.
23. Flight stage the crew member disembarked the aircraft.
24. The box shall be crossed if the crew member(s) stay(s) overnight at a stop over station.
25. Commander's signature.
26. Events that have been encountered during the flight (e.g. unexpected delays, extended taxi time, etc.)

8.2 Ground Handling Instructions

8.2.1 Fuelling Procedures

8.2.1.1 General

(A) Every Turkish Airlines operated flight carries sufficient fuel for the planned operation and reserve fuel to cover any deviations from the planned operation as per Turkish Airlines fuel policy. Information and procedures in this section have been referenced from the following documents for defining fuelling and defuelling processes with operational safety measures to ensure clean, good quality and "on specification" fuel delivery to Turkish Airlines aircrafts and assure safe operations for Turkish Airlines fleet:

(1) Turkish DGCA Requirements;

(2) EASA Requirements;

(3) ICAO Requirements;

(4) IATA Requirements; and

(5) Turkish Airlines **EK.10.67.001 Ground Opertations Manual (GOM)**.

(B) Types and priority of fuels to be used on Turkish Airlines aeroplanes:

(1) Standard fuel: Jet A-1;

(2) 1st substitute fuel: Jet A;

(3) 2nd substitute fuel: JP 8; and

(4) 3rd substitute fuels: TS-1, RT, JP-5.

Note: For more detailed information, see **EK.10.74.002 Fuel Manual**.

8.2.1.2 Safety Precautions During Refuelling And Defuelling

(A) The main causes of fire caused by jet fuel are due to sparks, static electricity and hot points. Jet fuel generally does not catch fire easily, but the risk of fire is increased during the fuel is sprayed (link, disconnecting pipe) and in the presence of fuel vapour especially when low flash point fuels are used. A list of the approved fuel types and additives are given in the applicable Aeroplane Maintenance Manual (AMM) servicing chapter.

(B) Precautions listed within this chapter shall be used as a general guideline when refueling/ defueling. Additional safety precautions may be utilized to preclude the possibility of an incident/ accident during refueling/ defueling if deemed necessary by the Commander to ensure safety. Detailed safety precautions for refueling/ defueling procedures are provided in the applicable Aeroplane Maintenance Manual (AMM) servicing chapter and in the applicable Flight Crew Operating Manuals (FCOMs), **EK.10.67.001 Ground Operations Manual (Turkish Airlines GOM) 3.2. Safety During Refueling/De-fueling** and **EK.10.74.002 Fuel Manual 2. Aircraft Fueling/Defueling Procedures**.

(C) Precautions to be used during refueling/ defueling are as follows:

(1) Refueling/ defueling procedures shall be conducted/ supervised by qualified personnel only.

(2) Parking brake shall be set (brake pressure in the normal range), and/ or the aeroplane wheel chocks positioned in accordance with normal operating procedures.

(3) Authorized refueling/ defueling areas or zones approved by the applicable local airport authority shall be utilized.

(4) Fuelling vehicle(s) and the aeroplane shall be bonded (by cable) prior to connecting any fuelling hoses to the aeroplane. At the end of the refueling/defueling, bonding cable shall be removed last. The bonding connection shall be made only to designated points on clean and unpainted metal surfaces.

(5) Tank fuellers and hydrant dispensers shall have a clear exit path at all times.

(6) Fuelling vehicles shall be positioned such that they do not obstruct access to the aeroplane for rescue or fighting vehicles or obstruct the evacuation routes, including chute deployment areas.

(7) Electrical equipment and vehicles with hot parts shall not be positioned close to the fuel vent points. Aeroplane vent pipe safety zone radius should be minimum 3 meters. All personnel involved in the fuelling of an aeroplane shall be familiar with how to summon the Airport Fire Service.

(8) The fuelling truck shall be positioned as to allow the fuel hose to be connected to the aeroplane in a most direct manner while avoiding wheel brakes and Auxiliary Power Unit (APU) inlets/outlets. Hoses shall be run out on selected routes, which shall prevent them from being run over by ground servicing vehicles. Hoses shall be connected to the fuelling point without exerting any sideways pressure, which could damage the aeroplane adapters. Once connected, hoses should hang freely and vertically from the fuelling point.

(9) Aeroplane engines shall be shutdown (except for utilization of refueling with one engine running- refer to **Subchapter 8.2.1.2.**) and the engine ignition system selected "OFF".

(10) Aeroplane weather radar shall be selected “OFF” and a test of the system shall not be conducted.

(11) Aeroplane HF radio(s) shall not be used to transmit and a test of the system shall not be conducted.

(12) Aeroplane fuel dump system (if applicable) shall not be activated.

(13) Aeroplane fuel pumps shall not be switched “ON” or “OFF”.

(14) Aeroplane strobe light shall not be switched “ON” or “OFF”.

(15) Ground Power Unit (GPU) and/or APU may be operating, but shall not be switched “ON” or “OFF”. However, a normal APU shutdown must be completed if a fuel spill has occurred during the refuel/ defuel procedure.

(16) In case of thunderstorms in the vicinity of the aerodrome, immediately cease fuelling operations, ensure the fuelling truck is disconnected from the aeroplane and is positioned at a safe distance from the aeroplane.

(17) Ground equipment positioned below the aeroplane, which may cause damage to the aeroplane as the aeroplane settles down due to increase in weight during refueling, shall be repositioned.

(18) Defueling/ refueling shall be stopped if any fire or overheat warning is known or displayed on the flight deck.

(19) In the event of a fuel spill, fuelling shall be stopped and the station representative or the flight crew members shall be informed immediately, who shall then inform the appropriate authorities. APU bleed load shall be unloaded immediately. The APU shall not be started until the spillage is removed and there is no risk from fuel or vapors.

(20) Engine(s) shall not be started or operated during refueling/defueling except for refueling/defueling operations with one engine running.

(21) Oxygen bottles shall not be filled during refueling/defueling operation.

(22) If the APU exhaust discharges to the rear of the aeroplane, fuelling vehicles shall be positioned to avoid any risk of coming in the path of the exhaust stream.

(23) In the event of an APU fire, the APU shall be shut down and the APU fire extinguishing system shall be activated. The flight crew and the Airport Fire Services shall be alerted, and the flight crew will decide on the type of disembarkation (normal or emergency evacuation).

(24) GPU(s) should not be positioned within 6 meters of fuelling equipment and vent points.

(25) Photographic flash equipment shall not be used within 6m of fuelling equipment and vent points.

(D) Additional precautions to be applied within the refueling/defueling area or zone:

(1) Smoking and use of naked lights is prohibited.

(2) Only authorised persons and vehicles are permitted.

(3) Metal wheels or metal studded tires shall not be used.

8.2.1.3 Refuelling and Defuelling with One Engine Running

(A) Refueling/ defueling with one engine running shall only be conducted when the GPU is not available and the APU is unserviceable.

(B) Procedures for refueling/ defueling with one engine running are defined in the applicable FCOMs for each type of aeroplane.

(C) The following items shall constitute the minimum requirements to conduct refueling/ defueling with one engine running:

(1) airport authorization shall be obtained prior to conducting such an operation;

(2) aerodrome Rescue and Fire Fighting Services shall be present alongside the aeroplane from the commencement of the refueling/ defueling procedure until the procedure is completed;

(3) the flight crew members shall be in the flight deck at all times for the operation and shall monitor all the systems and engine(s);

(4) a qualified technician shall be present at the fuelling station;

(5) the refueling/ defueling system shall be fully operational; and

(6) only the flight crew members shall be onboard the aeroplane during such a procedure.

8.2.1.4 Refuelling and Defuelling When Passengers Embarking, Onboard or Disembarking

(A) Refueling/ defueling when passengers embarking, onboard or disembarking shall only commence (*) if authorized by the Commander and the following additional precautions must be taken:

(1) A flight crew member shall remain in the flight deck during refueling and defueling when passengers are embarking, onboard or disembarking.

(2) Minimum number of cabin crew described in **EK.10.71.001 Cabin Crew Manual (CCM) 4.2. Number and Composition of Cabin Crew** shall be onboard.

(3) When refueling or defueling with passengers onboard, ground servicing activities and work inside the aeroplane, such as catering and cleaning, shall be conducted in such a manner that they do not create a hazard and allow emergency evacuation to take place through those aisles and exits intended for emergency evacuation.

(4) Except for the main entry door(s) used for the embarkation/disembarkation, all other doors shall be kept closed provided that the slides are disarmed, or, if open, portable stairway(s) should be positioned at all open door(s).

(5) Evacuation of passengers in the event of an emergency shall be made via at least two of the main passenger doors (or the main passenger door plus one emergency exit).

(6) To ensure the area outside designated emergency evacuation exits is unobstructed, the passenger embarkation or disembarkation shall be carried out in a controlled manner (in accordance with **EK.10.67.001 Ground Operations Manual (GOM)**) at the gate and loading bridge/ portable stairway (single aisle and non-crowding) under the supervision of ground personnel.

(7) A two-way communication shall be established and maintained via the aeroplane intercommunication system between the ground crew supervising the refueling or defueling and the flight crew on board.

(8) The public address (PA) system shall be serviceable.

(9) Electrical power must be available on the aircraft.

(10) Crew, staff and the passengers shall be informed that refueling or defueling will be commencing.

(11) Passengers are not allowed to use the toilets.

(12) An aeroplane shall not be fuelled via the over wing method (unpressurized), while the passengers are embarking, onboard or disembarking.

(13) An aeroplane shall not be refueled/defueled with Avgas or wide-cut type fuel or a mixture of these types of fuel, when passengers are embarking, onboard or disembarking.

(14) For Boeing aeroplanes, defueling with passengers embarking, on board or disembarking is prohibited.

(15) Crew change during refueling/defueling with passengers on board is not allowed.

(*) Refuelling/Defuelling considered to be commenced when the fuel hose is connected to the aeroplane and completed when the fuel hose is disconnected.

(B) Responsibilities

(1) Commander responsibilities;

(a) Before starting refueling/defueling Commander shall brief Cabin Chief and ground operations representative about;

- He determines which cabin exits are designated for rapid deplaning or emergency evacuation, emphasizes that routes to such exits are unobstructed and ramp area beneath kept clear by the ground crew supervising the refueling or defueling,
- Informs expected duration of refueling/defueling.

(b) If required by local regulations, the Commander shall inform the applicable authorities that the refueling or defueling process will be taking place with passengers are embarking, onboard or disembarking.

(2) Flight crew responsibilities remaining in the flight deck;

(a) Establish and maintain two-way communication via the aeroplane intercommunication system with the ground crew supervising the refueling or defueling.

(b) Set the signs as follows;

- ''Fasten Seat Belt'' signs - OFF
- ''No Smoking/Do Not Use Cellular Phone'' signs - ON (if applicable)
- Emergency Lighting – ARM

(c) Inform the cabin crew of the beginning and completion of refueling/defueling when passengers are embarking, onboard or disembarking.

(d) Be ready to initiate;

- If necessary, a rapid deplaning if there is spillage or leak of fuel,
- If necessary, an emergency evacuation if there is a fire/ fire warning

(3) Cabin Crew responsibilities;

(a) Be informed about the Commander's briefing content including designated exits to be used (Cabin chief will inform the cabin crew).

(b) One cabin crew member for each pair of doors/floor level exit or for two pairs of overwing emergency exits will be assigned/stationed. For the cabin crew members who will be responsible for the designated exits, see**EK.10.71.001 Cabin Crew Manual (CCM)**.

Note: The cabin crew member/members who haven't been assigned/stationed at the designated doors will take their evacuation stations at the command of flight crew "Attention Cabin Crew at stations". Their prepared evacuation stations are defined in Cabin Crew Checklists. Cabin crew shall await at their stations since evacuation may be initiated following the command. They shall act in accordance with the directives, and shall guide the passengers by using evacuation commands, when necessary.Set the interior lighting to the brightest position to enable emergency exits to be identified easily.

(c) Make the necessary announcements via PA before, during and upon completion of the procedure, instructing passengers to unfasten their seat belts, refrain from smoking, using the toilets and electronic devices (see **EK.10.71.002 Cabin Crew Announcement Manual**). During embarkation announcements shall be repeated regularly to ensure that all passengers have been informed about fueling/defueling.

(d) Ensure that passengers are not using the toilets and they are awake.

(e) Ensure that electrical equipments such as hot cup are not switched to "on" or "off" positions.Ensure that cabin curtains will be tied up and kept secured.

(f) Supervise passengers and ensure that cabin exits, routes to exits and aisles are unobstructed. Cabin crew may regulate passenger embarkation as necessary if passenger flow is blocked inside the cabin. Cleaning shall not be conducted with vacuum cleaners obstructing the aisles and the exits. Passenger meal/ beverage servicing shall not be conducted with galley carts blocking any aisles or doors.

(g) Be ready to call the flight crew via interphone system if fuel vapour presence is detected inside the aeroplane, or any other hazard arises inside/outside of the aeroplane (fire, spill etc.) during refueling or defueling. In these cases fueling/defueling must be stopped immediately.

(h) Be prepared for an immediate emergency evacuation or rapid deplaning if ordered by the Commander or the flight crew member in the flight deck

(4) Ramp Agent/ Ground Operations Representative responsibilities;

(a) Ensures that fire trucks are be positioned alongside the aeroplane, unless otherwise is dictated by local aerodrome policies. In such case, the fire trucks shall be positioned within an acceptable distance from the aeroplane determined by the aerodrome fire department.

(b) Ensures that passenger boarding / disembarkation is carried out in a non-crowding manner in compliance with **EK.10.67.001 Ground Operations Manual (GOM)**. Gate and ramp passenger activity should be followed and regulated accordingly.

(c) Ensures that the ramp area beneath the exits intended for emergency evacuation and slide deployment are kept clear of any obstructions.

(d) Ensures the position of the fuel bowser/ installation relative to the aeroplane is in such place that it will not impede the rapid exit of passengers in case of immediate emergency evacuation.

(e) Establish and maintain two-way communication via the aeroplane intercommunication system.

(f) Inform the flight crew of the beginning and ending of refueling.

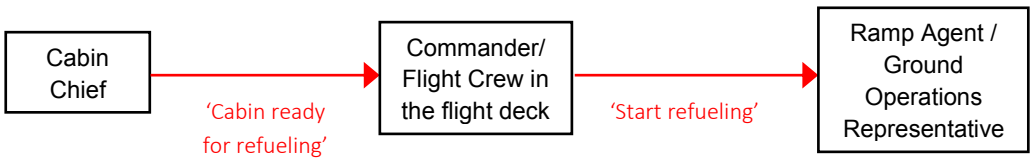
(g) Notify flight crew, if a fuel spillage, smoke or fire occurs.

(h) Stop refueling upon flight crew request.

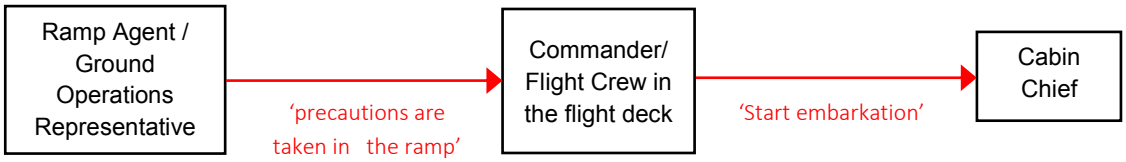
(C) Chain of communication;

Note: Below are some communication flows not being limited to all situations but to give some examples. Phrases in these examples should not being considered as standards and they are for information only.

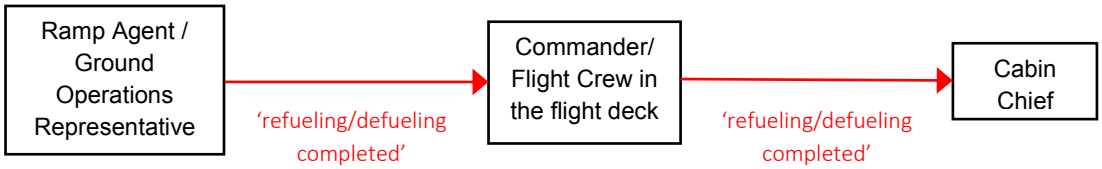
(1) Before refueling/defueling starts when passengers embarking/onboard/disembarking;



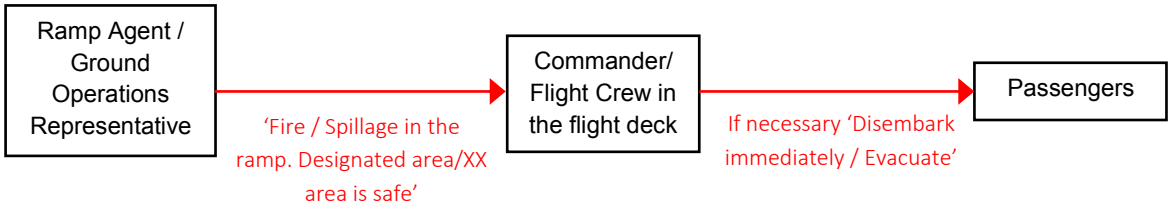
(2) Before passengers embarking when refueling/defueling is continuing;



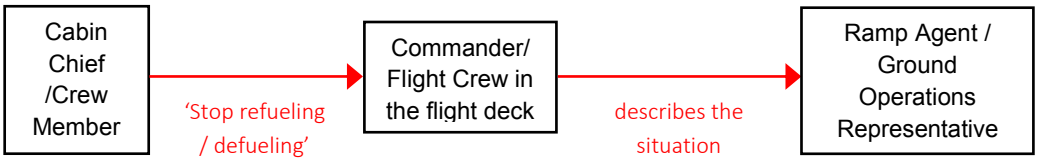
(3) When refueling/defueling completed;



(4) In case of fire warning / fuel spillage at ramp area;



(5) In case of the presence of fuel vapour inside the aeroplane, or any other hazard inside/outside of the aeroplane (fire, spill etc.)



8.2.1.5 Precautions to be Taken to Avoid Mixing Fuels

(A) 'Wide-cut fuel' is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it has the properties of higher volatility, lower flash point and lower freezing point.

(B) Usage of mixed fuel is only permissible as specified within the limitations section of the applicable aeroplane AFMs.

(C) Various types of jet engine fuels are permissible for usage, refer to applicable FCOMs:

(1) Kerosene type fuels: JET A, JET A1, and JP 8.

(2) Wide-cut type fuels: JET B and JP4 (low flash point which are not widely used).

(D) A major concern when mixing fuels is the fuel air mixture that develops in the space above the fuel inside the tank. When wide-cut fuel and kerosene type fuels are being mixed, the fuel vapour mixture with air is in the explosive or ignitable envelope throughout the range of ground temperature.

(E) Greater precautions shall be observed when refueling an aeroplane with wide-cut fuel types where the fuel tanks already contain kerosene type fuels.

8.2.1.5.1 Precautions With Wide-Cut Fuels

(A) Wide-cut fuel usage shall be subject to approval of Senior Vice President, Flight Operations (Chief Pilot).

(B) Boeing does not permit the use of wide-cut fuels on the B737 aeroplanes.

(C) Turkish Airlines aeroplanes shall not be fuelled with wide-cut fuel or any mixture thereof, while the passengers are onboard, embarking, or disembarking.

(D) When refueling with wide-cut fuels, the aeroplane's electrical system or supply shall be selected "OFF" prior to commencing refueling and remain "OFF" until refueling has been completed and the hoses have been disconnected.

(E) When wide-cut fuel is used, it shall be recorded in the aeroplane technical log. The next two uplifts (non-wide-cut fuel) of fuel shall also be treated as being wide-cut fuel.

(F) Over wing refueling is not permitted when wide-cut fuels are involved.

(G) When refueling with wide-cut fuels, fuel filling rates shall be reduced by 50% of the normal filling rate.

8.2.1.5.2 Mixed Fuel Freezing Point Determination

(A) The freezing point of any fuel mixture will vary.

(B) Fuel freezing points of fuel mixtures are particularly more of a concern when operating transatlantic, transpacific, and Siberian routes and when very low OAT are expected.

(C) The limiting freezing point value of the mixture should be considered, if the mixture ratio of the highest freezing point fuel is more than 10%. Apply the following example:

(1) When the mixture contains less than 10% of JET A and more than 90% JET A1, the fuel shall be considered as JET A1 (typically -47°C) .

(2) When the mixture contains more than 10% of JET A and less than 90% JET A1, the fuel shall be considered as JET A (typically -40°C).

(3) When in doubt; use the most conservative freezing point of the fuel on board as the freezing point of the fuel mixture ((typically for JET A -40°C).

(D) To achieve the best dilution, apply the following example:

(1) All of the JET A (making up the lesser of the fuel to be mixed) should be transferred in to the inner wing tanks prior to refueling. This procedure will enable a maximum dilution but does not guarantee that the mixture will be consistent.

(2) During normal operational procedures, the JET A fuel in the inboard tanks will be consumed first by the engines. Thus, the concentration of the remaining JET A fuel on board, later in flight when low fuel temperatures are encountered, will be less than at takeoff. Low concentrations of JET A in JET A1 will have a freezing point similar to JET A1 and can be treated as JET A1 with respect to the cold fuel alert.

8.2.1.6 Refuelling/Defuelling Responsibilities

(A) Upon being advised of the actual or estimated ZFW, the Commander shall determine the fuel type and final fuel figure in accordance with procedures laid out within this manual. The required final fuel figure, in kilograms, shall be entered in the “Fuelling Order” form (provided by ground operations or the fuelling company).

(B) The Commander is responsible for ensuring that the required fuel is on board the aeroplane and distributed appropriately prior to push-back or taxiing.

(C) In order to ensure fuel quantity system accuracy, after fuelling procedures have been completed, the Commander shall perform an uplift check using the fuel record figures in the Aircraft Maintenance Log (AML). The uplift check consists of comparing the sum of the arrival fuel plus the uplift fuel with the total of the gauge readings after fuelling.

(D) In all international and domestic stations, Commander should check and sign the FMM (Fuel Order & Monitoring Message) form which is filled out by the ground staff as per the Instruction **TL.41.001 Instruction on Filling the FMM (Fuel Order & Monitoring Message) Form and Entering up the Computer System**. Name/Surname and ID Number of the Commander must be specified on the form. However if Turkish Airlines contracted ground operations/maintenance personnel exists assuring correct fueling process is completed according to local agreements without raising any doubt to the Commander that correct fuel uplift is accomplished, there may be no need for Commander signature.

(E) If a technician is not available after completion of fuelling procedures, the Commander shall record quantity of uplifted fuel and total amount of fuel in kilograms in the AML according to the FFM form or according to uplift calculation if FFM form is not present.

(F) If the total amount of fuel uplifted exceeds the amount of fuel requested by the Commander, the Commander shall be notified immediately. To avoid any unnecessary delays (defueling) caused by the excess fuel, the Commander shall re-evaluate the performance parameters to ensure that the flight is not subject to any performance restrictions. If performance restrictions are applicable, the Commander shall notify the appropriate personnel for the defueling process.

(G) In all cases, Turkish Airlines flights shall not depart with fuel less than required (contingency fuel and extra fuel provided in the official flight plan may be consumed on the ground if provided by dispatch as precaution or with no specific reason; final decision rests with the Commander) by the official flight plan.

(H) The following procedures shall be applied during the fuelling process and the responsibilities for the person(s) conducting the refueling are defined as applicable:

(I) A fuel sample check should be conducted using an approved chemical water detector unless other means of inspection is utilized at the specific station.

(J) Fuelling panel of the fuelling truck shall be set to zero prior to refueling and the value uplifted shall be noted.

(K) Distribution of the fuel to be uplifted into the tanks shall be in accordance with the limitations and the operating bulletins as dictated in the aeroplanes FCOMs.

(L) Fuel nozzles shall be properly connected to the fuelling hydrant and the aeroplane.

(M) Fuel flow pressure shall be monitored during the refueling process (max 50 psi).

(N) Fuel hose and connections integrity shall be observed throughout the fuelling process.

(O) At the completion of the re/defueling process, all connections shall be removed from the aeroplane, fuelling caps re-installed (if available).

(P) To confirm the type of fuel used on Turkish Airlines' aeroplane, the grade of the fuel used should be marked on the fuel receipt and fuelling vehicle.

(Q) It is Turkish Airlines policy, that if any deviation from the contracted fuel specification is uplifted at a particular station, it shall be brought to the attention of the Financial Directorate/Fuel Management.

8.2.2 Aeroplane, Passengers and Cargo Handling Procedures Related to Safety

8.2.2.1 Embarking and Disembarking Passengers

(A) The Commander of the aeroplane is responsible for the safety of all crew members, passengers and cargo (inclusive of baggage and mail) on board an aeroplane, as soon as he embarks the aeroplane until he disembarks the aeroplane at the end of the flight. At all other times, as applicable, passenger safety is the responsibility of the ground operations personnel. For detailed information, see **EK.10.67.001 Ground Operations Manual (GOM) 1. Passenger Handling**.

(B) Passenger embarkation/ disembarkation shall be carried out in a controlled manner.

(C) Smoking shall not be permitted on any part of the ramp area in the vicinity of the aeroplane to be boarded.

(D) Passenger embarkation shall not commence until approval has been issued by the Commander. At IST, SAW, ESB, ADB, AYT, ADA, DLM, BJV, the operations coordinator of the contracted ground handling agent starts the boarding of passengers by informing the Commander in case there is no irregularity (For passenger embarkation details at IST, SAW, ESB, ADB, AYT, ADA, DLM, BJV, see **PR.10.60.004 Procedure for Automatic Start of Passenger Boarding Process at Stations)**.

(E) Passenger embarkation or cargo loading shall not commence until **FR.73.0001 Aircraft Security Search Checklist** has been successfully completed.

(F) Passenger disembarkation shall only commence after receiving the initial approval from the Commander and the final approval from the appropriate ground personnel.

(G) Crew members shall remain on board (at their stations) until all of the passengers have disembarked the aeroplane. Exceptions to this case are as follows;

(1) Flight crew may disembark the aeroplane when the minimum required cabin crew (including a Cabin Chief) are delegated to remain on board for the disembarkation of passengers in need of assistance (wheelchair/ stretcher/ ambulance). During passenger disembarkation in the absence of flight crew members, ground handling agent shall be on board and responsible to alert the aerodrome services in the event of ground emergency or urgent need.

(2) At transit stops (passengers remaining on board) where crew change is required. Crew members may leave their stations to hand-over their duties to incoming crew. During crew change, at least one flight crew member shall be in the flight deck and minimum number of required cabin crew shall be available on board. Passengers shall not be left unattended anytime.

8.2.2.1.1 Embarking and Disembarking Passengers with One Engine Running

(A) Passenger embarkation/ disembarkation may be conducted with one engine running with the approval of the Commander and provided one of the procedures listed in item (1) or item (2) below are carried out:

(1) Utilizing a bridge (direct connection to terminal building):

(a) ground personnel shall be positioned at the bridge access to the ramp to prevent passengers from inadvertently accessing the ramp area; and

(b) ground personnel should be positioned within the bridge area to expedite the procedure.

(2) Utilizing stairs via the ramp area:

(a) embarkation/ disembarkation shall only be conducted from doors which are on the opposite side of the running engine; and

(b) ground personnel shall be positioned at the ground level of the stairs, mid-point (between stairs and the transport bus or terminal), and the end-point (entry to transport bus or terminal) to prevent passengers from inadvertently approaching the operating engine.

(B) See the **EK.10.67.001 Ground Operations Manual (GOM) 3.1.5.1. Boarding/Deboarding Passengers and Loading/Unloading While Engines are Running** and **Subchapter 8.2.1** for safe guards on the ramp area.

8.2.2.1.2 Transit Stop Passenger Embarking/Disembarking

(A) Disembarking passengers shall take all personal carry-on items along with them while leaving the aeroplane. Transit Passengers shall remain on board.

(B) After completion of ground handling procedures, cabin crew members shall perform a security check of the aeroplane in accordance with the appropriate security checklist.

(C) If the security check conducted reveals no findings, passenger embarkation may recommence.

(D) If the security check conducted reveals a finding:

(1) unidentified item(s) in the cabin shall not be displaced;

(2) appropriate security department shall be notified;

(3) security procedures of the local authority shall be applicable. If local authority requires Commander's guidance for course of action, the Commander shall use appropriate decision-making to handle the situation as each situation will dictate various approaches for resolve; and

(4) upon completion of all applicable security procedures, no further actions are required and passenger embarkation may recommence.

(E) For a passenger refusing to travel at transit stop refer to **Subchapter 8.2.2.1.6.**

8.2.2.1.3 Procedures for Reduced Number of Cabin Crew During Ground Operations (Passengers Onboard (transit stop) or Embarking)

(A) When utilizing this procedure, refuelling/defuelling with passengers onboard (transit stop)/ embarking shall not be conducted.

(B) Electrical power is available on the aircraft;

(C) A Commander (cannot be delegated to a first officer - may be a Commander on duty as deadhead crew who is type rated/ qualified but not assigned for the specific flight) shall be onboard the aeroplane at all times prior to commencing with the procedure outlined within this chapter.

(D) Cabin chief (cannot be delegated to a cabin crew member - may be a cabin chief who is type qualified but not assigned for the specific flight) shall be on board prior to commencing with the procedures outlined within this chapter.

(E) Cabin crew stations and associated duties are specified in the **EK.10.71.001 Cabin Crew Manual (CCM) 4.4.** according to the available cabin crew number.

(F) Cabin crew shall be aware of the position of servicing and loading vehicles at and near the exits.

(G) Additionally, in the case of passengers' embarkation:

(1) Cabin chief shall have performed the pre-boarding safety briefing to the cabin crew including;

(a) Responsibility areas regarding security and safety checks;
(b) Emergency evacuation procedures;

(2) Pre-boarding cabin checks shall have been completed.

(H) Crew scheduling department is responsible for ensuring that the required number of crew members for the scheduled flight shall be ready for duty onboard the aeroplane at least 15 minutes prior to the scheduled (original or rescheduled) departure time unless the flight will be conducted with reduced number of cabin crew according to **Subchapter 4.1.2.2.2**:

(1) The scheduled departure time (original or rescheduled) shall be published to the passengers by the Integrated Operations Coordination Center (IOCC), and the crew scheduling department shall plan accordingly.

(2) The crew scheduling department shall inform the IOCC if the crew members will not be onboard the aeroplane 15 minutes prior to departure and a new scheduled departure time shall be published to the passengers.

(3) If the Commander feels as though the required crew members will not be onboard the aeroplane 15 minutes prior to departure, he shall not approve /initiate the boarding process.

(I) Utilization of such a procedure may impact the time required to prepare the aeroplane for departure as the crew member numbers have been reduced. Ground personnel shall await the final approval of the Commander prior to commencing embarkation of the passengers as this required time may vary from case to case. The Commander shall not estimate the boarding time, but will advise ground operations at the completion of required procedures.

(J) For minimum cabin crew needed during ground operations (passengers onboard (transit stop) or embarking or disembarking) refer to table **4.1.2.2.1 (C)**.

8.2.2.1.4 Procedures for Reduced Number of Cabin Crew During Flight Operations in Unforeseen Circumstances

(A) Minimum cabin crew numbers required in unforeseen circumstances (such as incapacitation or unavailability of cabin crew in transit station) are specified in table **4.1.2.2.2 (D)**.

(B) Basically at least one cabin crew member is required for every 50, or fraction of 50, passengers present on the same deck of the aeroplane.

(C) For A319, A320 and B737 aeroplane types;

(1) Passenger numbers shall be reduced according to the cabin crew number available as described in table **4.1.2.2.2 (D)**.

(2) Passenger distribution is not limited and there is no need to block certain seats/sections.

(D) For A321, A330/350, B777 and B787 aeroplane types;

(1) Passenger numbers: One passenger door/exit should be considered as inoperative and maximum allowed number of passengers and crew in type related MEL should be used.

(2) Commander should consult to MEL to determine possible door/exit to be chosen.

Note: Door/exit to be chosen as inoperative shall be selected by mutual agreement of Commander and station representative, considering operational (e.g. maximizing passenger number, boarding) and safety related (e.g. CG limits) factors.

(3) For passenger distribution, seats/sections shall be blocked as stated in MEL according to the selected door.

(4) Selected door shall be left unattended.

(E) A verbal briefing by cabin crew, or a briefing using automatic audio/visual presentation, or a briefing by reference to a briefing card, is immediately complemented by a verbal/public announcement to inform passengers that a particular door/exit is unattended and shouldn't be preferred in case of evacuation unless a cabin crew directs them to that particular door/exit.

(F) Conspicuous signs and placards are placed in appropriate locations indicating which seats/sections are not to be occupied by passengers.

(G) All crew members are briefed, if any, on the location of the unattended door/exit, passenger distribution and modified cabin safety procedures,

(H) For the passenger exit is to be left unattended, procedures depicted in the **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.11.1. Slide Positions of the Doors** shall be applied. Unattended passenger exit slide shall be armed from push-back until engine shutdown at the destination aerodrome.

(I) Catering and comfort related duties of cabin crew may be reduced / cancelled regarding the workload. Necessary announcements shall be done to inform passengers about the situation.

8.2.2.1.5 Passenger Count

(A) For security reasons, the number of passengers who have passed through the boarding gate shall be the same as the number of passengers on board, prior to closing the aeroplane doors for departure.

(B) A passenger count shall be performed:

(1) when the aeroplane is parked at a remote stand.

(2) when the aeroplane is parked at a gate or a bridge, if directed in Line Information Forms (**FR.71.0216 Line Information Form**) published and kept up-to-date by the Cabin Crew Directorate for each station, in accordance with security evaluations and current station conditions.

(3) regardless of the information contained in the Line Information Form, if the Commander, cabin chief or ground staff are in strong doubt that there is a discrepancy between the number of passengers on board and the number stated on the load and trim sheet.

(4) if a Line Information Form for a specific international station is not available.

(C) In case of passenger count discrepancies, one of the following procedures listed below shall be carried out as necessary:

(1) Passenger checked in but missing at the gate:

(a) any checked baggage of the missing person shall be off-loaded; and

(b) no further action is necessary.

(2) Passenger count discrepancy (between the boarding gate and aeroplane):

(a) Ground personnel shall conduct a recount of the boarding cards to confirm the number of passengers checked through the gate.

(b) Cabin chief shall conduct a recount (maximum three times) of all passengers on board the aeroplane.

(c) If discrepancy has been resolved, no further action is necessary; otherwise a physical check of all passenger boarding passes shall be conducted by the ground personnel on board the aeroplane to identify the missing or unaccounted passenger(s).

(d) If the physical boarding pass check has positively identified the passenger as being on board, no further action is necessary.

(e) If the physical boarding pass check has positively identified the passenger as being missing:

1. any checked baggage belonging to the missing passenger shall be off-loaded (this shall also include any last minute checked in baggage at the gate or at the aeroplane);

2. if the missing passenger is believed to have entered the sterile cabin area and thereafter classified as missing, area occupied by the missing passenger shall be isolated (isolated area shall consist of two forward and two aftward rows, including the opposite aisle), all passengers seated in the isolated area shall be disembarked for proper security re-screening, remaining passengers on board shall be instructed to place all personal carry-on items on their laps;

3. the passengers shall be ready to visually identify the items as cabin crew members conduct the aeroplane security check; and

4. cabin crew members shall perform a security check of the aeroplane (a detailed search of the isolated area):

i. if the security check conducted reveals no findings, passenger embarkation shall recommence;

ii. if the security check conducted reveals a finding, unidentified item(s) in the cabin shall not be displaced and the appropriate security department shall be notified.

(f) The security procedures of the local authority shall be applicable (if local authority requires Commander's guidance for course of action, the Commander shall use appropriate decision-making to handle the situation as each situation will dictate various approaches for resolve).

(g) Upon completion of all applicable security procedures no further actions are required and passenger embarkation may recommence.

(h) If the number of passengers on board is more than the number of passengers that should be on board, a physical check of all passengers boarding passes shall be conducted by the ground personnel to identify the passenger(s) who should not be on board. If the aforementioned passenger(s) are positively identified, the Commander shall utilize the procedure stated **Subchapter 8.2.2.1.6 (B).**

8.2.2.1.6 Passenger Refusing to Travel After Embarking the Aeroplane

(A) Any passenger refusing to travel after embarking the aeroplane shall be informed by the cabin chief (if aeroplane doors are closed) or the ground personnel (if the aeroplane doors are open) about when he makes such a decision security procedures and local security procedures may vary.

(1) The Commander does not have the authority to insist on any specific form of actions to be taken, he shall accept and respect the local authority's procedures or decisions.

(2) If the passenger decides to continue to travel after being advised of consequences, no further action is necessary.

(B) If the passenger still refuses to travel after embarking the aeroplane (or is on board unintentionally), the Commander shall utilize the following security procedure;

(1) Such passenger shall disembark the aeroplane with all personal belongings.

(2) Any checked baggage belonging to this passenger shall be off-loaded (this shall also include any last minute checked in baggage at the gate or at the aeroplane).

(3) The remaining passengers in the cabin are asked via PA whether they got anything (luggage, case, pack or bag etc.) from someone else in order to transport on board.

(4) Passengers who have remained on board shall be instructed to place all personal carry-on items on their laps, if this is impracticable then the passenger shall be ready to visually identify the items as cabin crew members conduct the aeroplane security check.

(5) Cabin crew members shall perform a detailed security search of the aeroplane including seat pockets, under the seat, seat backs, lavatories and any other areas of the cabin easily accessible to the disembarking passenger.

(6) If the security check conducted reveals no findings, passenger embarkation may recommence.

(7) If the security check conducted reveals a finding, unidentified item(s) in the cabin shall not be displaced, the passengers shall be disembarked and the appropriate security department shall be notified. The security procedures of the local authority shall be applicable (if local authority requires Commander's guidance for course of action, the Commander shall use appropriate decision-making to handle the situation as each situation will dictate various approaches for resolve). Upon completion of all applicable security procedures no further actions are required and passenger embarkation may recommence.

(C) If a passenger refuses to travel after a transit stop, the following precautions shall also be carried out:

(1) The respective passenger's baggage in the cargo compartment shall be offloaded while he disembarks the aeroplane with all personal belongings.

(2) The remaining passengers in the cabin are asked via PA whether they got anything (luggage, case, pack or bag etc.) from someone else in order to transport on board.

(3) While passengers place their personal belongings on their laps, cabin crew conducts a cabin security search. If a suspect item is found, all passengers are disembarked and appropriate authorities and/or Turkish Airlines Security Directorate is informed.

(4) Upon completion of all applicable security procedures, the ground and flight operation may be resumed unless any suspicious irregularities are noticed.

8.2.2.1.7 Passenger Manifest

(A) For international departures, computerized copy of the passenger manifest (list) shall be provided to the cabin chief.

(B) In the event of technical difficulties for which a computerized copy of the passenger manifests cannot be provided:

(1) hand written passenger manifest shall be provided, or

(2) a copy of passenger manifest shall be provided, or

(3) if a passenger manifest cannot be provided, a written and signed statement from the station representative shall be acceptable and the statement shall include the reasoning for not providing the manifest, the name of the station representative, signature and telephone numbers to be contacted in case of problems with customs/ immigrations at destination or diverted airports and a statement indicating that the passenger manifest will be sent electronically to the destination airport or any airport which the airplane may divert to.

(C) For detailed procedures for handling of passenger manifest (list), see **EK.10.67.001 Ground Operations Manual (GOM) & EK.10.71.001 Cabin Crew Manual (CCM)**.

8.2.2.1.8 Rapid Deplaning

(A) RD (rapid deplaning) of passengers and crew is required for any situation not covered by the emergency evacuation where a significant hazard exists but there is time to conduct a controlled disembarkation.

(B) RD can be initiated at any time that an aircraft is on-stand with an air bridge connected or boarding steps in place and passengers aboard. The decision to initiate RD is likely to be taken in response to an occurrence involving some aspect of pre or post flight ground handling activity.

(C) There are great number of activities that must take place to ready a passenger aircraft for each flight. These include:

(1) maintenance inspection and release

(2) flight crew external inspection and cabin crew inspection and preparation

(3) flight crew cockpit preparation and briefing

(4) cleaning

(5) refueling

(6) catering

(7) baggage and freight loading/offloading

(8) passenger embarkation/disembarkation

(D) Every effort is made to ensure that all ground support activities are carried out efficiently and safely. However, occurrence of accidents, machinery malfunctions, and situations sometimes arise which pose a potential risk to the passengers in the process of boarding. These risks might include, but are not limited to:

(1) fuel spills,

(2) smoke or fumes, from a variety of potential sources, entering the aircraft cabin,

(3) a fire in proximity to the aircraft caused by malfunctioning ground support equipment,

(4) an accident, either directly involving the aircraft in question, one on an adjacent stand or ground support vehicles in proximity to the aircraft,

(E) Although such cases are rare, when they do occur the most prudent course of action is often the RD of passengers from the affected aircraft. Incidents have shown that passengers may not appreciate the important difference between RD and emergency evacuation so it is important that instructions to the passengers are absolutely clear and unambiguous.

For detailed application, refer to **Operations Manual Part-B**.

8.2.2.2 Carriage of Special Categories of Passengers (SCP)

(A) Persons requiring special conditions, assistance and/or devices when carried on a flight shall be considered as SCPs including at least:

(1) persons with reduced mobility (PRMs) who, without prejudice to EU Regulation (EC) No 1107/2006, are understood to be any person whose mobility is reduced due to any physical disability, sensory or locomotory, permanent or temporary, intellectual disability or impairment, any other cause of disability, or age;

(2) infants and unaccompanied minors; and

(3) deportees, inadmissible passengers or prisoners in custody.

(B) Any Passenger who is not capable of conducting the required procedures in the event of an emergency or are not capable of caring for himself and requires special assistance during flight should have an appropriate/qualified/able-bodied travel companion (declared prior to check-in procedures are completed) capable of providing the above requirements or sign **FR.67.0425 Release and Waiver of Liability Form**. For detailed procedures see to **PR.67.021 Procedure for Applications Related to Disabled Passengers or Passengers with Reduced Mobility**.

(C) It is not the responsibility of Turkish Airlines or its employees to provide for such services. Able-bodied travel companion shall be capable of physically assisting or moving such person in normal and emergency situations.

(D) Able-Bodied Travel Companion (Passenger delegated by an INCAD or MEDA passenger):

(1) Capable of assisting the specific passenger during flight with personal needs without the assistance of a cabin crew member.

(2) Capable of physically dragging/lifting the passenger (without the assistance of a cabin crew member) and deliver him to the nearest exit during an emergency or evacuation.

(E) SCPs shall not be allocated, nor occupy, seats that permit direct access to emergency exits or where their presence could:

(1) impede crew members in their duties;

(2) obstruct access to emergency equipment; or

(3) impede the emergency evacuation of the aircraft.

(F) The Commander shall be notified in advance when SCPs are to be carried on board.

(G) In case of transit passenger from a connected flight; a passenger who had been accepted to the previous flight according to the related procedures will not necessarily be asked for any other documents or proof for acceptance for the next flight (For detailed information on General Instruction for Acceptance of Disabled and Sick Passengers, see "**TL.10.67.004 General Instruction on Admittance of Persons with Reduced Mobility and Sick Passengers**").

(H) See **Turkish Airlines GEK.10.67.001 Turkish Airlines Ground Operations Manual (GOM) 1.4. Special Categories of Passengers** and **EK.10.71.001 Cabin Crew Manual (CCM) 8.1.2.** / **8.1.3.** / **8.1.4.** for detailed procedures on SCPs.

8.2.2.2.1 Persons with Reduced Mobility (PRMs), Sick Passengers and Pregnant Passengers

(A) All passengers mentioned within this section, during any abnormal circumstances or emergencies (evacuation, etc.), shall be provided the same assistance as normal passengers.

(B) The responsibility for the admittance of sick passengers, pregnant passengers and PRMs has been granted to ground handling firms.

(C) It is the responsibility of station managers to make the final decision for carriage of such passengers.

(D) For detailed handling procedures concerning sick passengers, pregnant passengers and PRMs, see **EK.10.67.001 Ground Operations Manual 1.4. Special Categories of Passengers** .

8.2.2.2.2 Infants and Children

(A) Infant: A person who is less than the age of 2 years.

(B) Infants who are to travel in the arms of a travel companion shall be secured with a supplementary loop belt (which attaches to the main safety belt provided for each seat).

(C) Total infants onboard the aeroplane shall not exceed the number of infant life vests onboard, if the aeroplane is to fly over water for approach and landing or is to fly over the water for more than 50 NM for any duration of flight.

(D) Minor: A person who is 2 years of age and older but less than 12 years of age.

(E) Accompanied Minor: A person who is 2 years of age and older but less than 7 years of age and is accompanied by an able-bodied travel companion.

(F) Minor Group Travel: Passengers who are 7 years of age and older but less than 12 years of age traveling in groups (normally occurs during school travels) with an appointed guardian delegated by the parents to accompany the group.

(G) Unaccompanied Minor: A passengers who is 7 years of age and older but less than 12 years of age and not accompanied by an able-bodied travel companion.

(H) See **EK.10.67.001 Ground Operations Manual (GOM) 1.4.2. Infant and Minor Passengers** for details.

8.2.2.2.3 Inadmissible Passengers, Deportees or Persons in Custody

(A) The Commander or ground personnel shall deny the boarding of any inadmissible passenger if they verbally (statements which may refer to or to be considered as relating to the safety of any crew member(s), passenger(s), or aeroplane, etc.) or physically resists boarding the aeroplane.

(B) The persons subject to judicial or administrative proceedings normally are not admitted to the Company flights as handcuffed, leg-shackled and gagged (except for very special conditions). Even in such special necessity to carry the said persons in this condition, the consent of the Commander shall be obtained.

(C) See **EK.10.67.001 Ground Operations Manual (GOM) 1.4.10 Inadmissible Passenger (INAD) and Deportees (DEPORTEE)** and **1.4.12. Carriage of Persons Subject to Judicial or Administrative Proceedings and of Their Armed Guards** for details.

8.2.2.3 Allocation of Seats

See **EK.10.67.001 Ground Operations Manual (GOM) 1.1.1.2 Checks to be Done Before Check-in Transactions.**

8.2.2.4 Permissible Size and Weight of Carry-On Baggage

See **EK.10.67.001 Ground Operations Manual (GOM) 5.2.1.3. Baggage Weights**.

8.2.2.5 Loading and Securing of Items in the Aeroplane

(A) It is the responsibility of the Turkish Airlines Ground Operations Directorate or the applicable Ground Handling Agency to follow the instructions/ procedures/ limitations/ rules/ regulations concerning loading, unloading and securing items in the aeroplane for each specific aeroplane type.

(B) During loading, qualified personnel shall ensure that all items to be loaded in the cargo holds/sections shall be correctly positioned, secured and easily accessed if required.

(C) The location of cargo in the passenger compartment shall be such that, in the event of an emergency, it will not hinder egress nor impair the crew's view and impede access to emergency equipment.

(D) All baggage and cargo on board that might cause injury or damage, or obstruct aisles and exits if displaced, shall be stowed so as to prevent movement.

(E) Checks shall be made by the cabin crew before take-off, before landing and whenever the fasten seat belts signs are illuminated or it is otherwise so ordered to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

(F) The Commander shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all equipment and baggage are properly secured.

(G) The Commander shall ensure that all documents and crew bags are correctly stowed or secured by using all available means in the flight deck. If there are not enough locations designed to secure documents or crew bags in the flight deck, unsecured items must be sent to cabin.

(H) It is the responsibility of the cabin crew members to take passenger related safety and security precautions, ensuring that :

(1) all hand baggage or items and servicing trolleys are securely stowed; and

(2) all exits and escape paths are unobstructed before takeoff and landing.

(I) See **EK.10.67.001 Ground Operations Manual (GOM)** and refer to **Operations Manual Part-B** provide detailed information for loading and unloading and **EK.10.71.001 Cabin Crew Manual (CCM)** provides detailed information on securing items in the aeroplane.

8.2.2.6 Positioning of Ground Equipment

(A) Switching "ON" the anti-collision beacon light is a universal signal in the aviation industry that the engines are about to be started, or engines are running, or the aircraft is being towed, or that the aircraft is moving under its own power and that all ground personnel shall remain clear of such an aircraft.

(B) Switching "OFF" the anti-collision beacon light is an indication that it is safe to approach the aircraft.

(C) Ground personnel shall not approach an aeroplane until the anti-collision beacon lights has been switched off, except for the qualified ground personnel to insert nose wheel chocks or connect ground power and aircraft equipment shall not be in the area marked with the red lines.

(D) Once the aeroplane is parked, ground support vehicles shall be stationed clear of its extremities and if possible parallel to the fuselage or main plane centerline so that in the event of brake failure they will not collide with the aeroplane itself. Ground equipment should also be positioned so that inadvertent movement will not endanger the aeroplane structure. In all cases, free access to the aeroplane main exit shall be preserved.

(E) Procedures for positioning of ground equipment (the support points, heights, required distances and system requirement values vary depending on the aeroplane type&variant and are described in details) are presented in the applicable 'Servicing' section of the Aircraft Maintenance Manuals and the **EK.10.67.001 Ground Operations Manual (GOM) 4.1.3 Ground Support Equipment for Arrival of Aircraft**.

8.2.2.7 Operation of Aeroplane Doors

(A) Instructions and limitations (wind speed) for operating of aeroplane doors are as stated in the FCOMs of the respective aeroplane type.

(B) The cabin or compartment doors shall not be opened before the anti-collision beacon has been switched "OFF" upon arrival at the gate/parking position.

(C) Cabin doors shall not be opened without the permission of the Commander.

(D) Cabin chief shall inform or confirm with the Commander that the related slides are disarmed, thereafter with the Commander approval may open (upon receiving the final approval from the ground personnel) the applicable cabin doors.

(E) The aeroplane doors shall be opened or closed by the operating cabin crew members or by a qualified technician or by flight crew members when an operating cabin crew member or a qualified technician is not available.

(F) Prior to commencing push-back, slides shall be armed by the cabin crew or qualified personnel. All slides shall remain armed during taxi, take-off, landing and when safe and practicable to do so.

(G) When the aeroplane comes to rest at the destination, slides shall be disarmed by qualified personnel.

(H) When operating cabin crew members or flight crew members or a qualified technician is not onboard, the aeroplane doors may be opened or closed by ground personnel, who is trained and certified for the operation of applicable aeroplane doors.

(I) Procedures for arming and disarming emergency slides are as stated in the FCOM of the respective aeroplane type and **EK.10.71.001 Cabin Crew Manual (CCM)**.

8.2.2.8 Safety on the Ramp- Fire Prevention, Blast and Suction Areas

(A) Ground personnel shall be trained on all aspects of ramp safety with particular reference to fire prevention, blast and suction areas of the aeroplane and they shall be instructed to be constantly on the alert to remove loose objects and/or debris.

(B) Fire prevention on the ramp, blast and suction areas including recommended safe distances are described with details in the **EK.10.67.001 Ground Operations Manual (GOM) 3.1.2. General Apron Safety**.

(C) Flight crew members, for their own safety, shall use the fluorescent jackets or raincoats located in the flight deck for conducting the pre-flight inspection or for any other duties required on the ramp area.

8.2.2.9 Start Up, Ramp Departure and Arrival Procedures

(A) When operating on the ramp area, local procedures for start-up and taxi shall be followed.

(B) Except for operations when dictated, engine start shall not be initiated until all passengers or freight have been loaded, the aeroplane doors and hatches have been closed, and all ground equipment, except for a ground power unit when used, have been removed from the vicinity of the aeroplane.

(C) The assistance of marshallers shall be used when maneuvering in relatively confined or crowded areas of the apron.

(D) Flight deck to ground intercom (when serviceable) should be used until clearance for hand signals has been given prior to departure.

(E) In case of unavailability/unserviceability of headset or severe thunderstorm and CB clouds around the airport, upon agreement with the Commander, the communication may be established by means of sign language to be within view of the Commander. In this case, illuminated torch lights/wands must be used to increase the visibility of the hand signals when the following situations exist;

(1) Insufficient apron lighting,

(2) Poor visibility,

(3) Night conditions and,

(4) When required by local airport authorities or regulations.

(F) All start-up, ramp departure and arrival procedures shall be applied in accordance with the procedures as stated in the FCOMs of the respective aeroplane type.

(G) Ground marshallers and pilots shall use only the hand signals defined in ICAO Rules of The Air - Annex 2 or as provided in the Jeppesen Airway Manual and **EK.10.67.001 Ground Operations Manual (GOM)**.

8.2.2.10 Servicing of Aeroplanes

(A) It is essential that ground clearance is received by the flight crew members prior to initiating any action or operating any system which might be hazardous to personnel or equipment on the ground.

(B) Prior to boarding an aeroplane, the flight crew shall make a mental note of work in progress around the aeroplane, and liaise with the maintenance personnel to find out if any servicing or rectification of systems is in progress or due to take place prior to departure.

(C) For the detailed procedures requiring maintenance servicing (oil, hydraulic etc.), see Aircraft Maintenance Manual (AMM) Servicing Chapter for the applicable aeroplane type.

(D) For ground handling services (water supply, toilet servicing, supply of power-GPU, catering etc.), see **EK.10.67.001 Ground Operations Manual (GOM) 4. Aircraft Departure And Arrival Processes**.

8.2.2.11 Documents and Forms for Aeroplane Handling

(A) The documents and forms for aeroplane, passenger and cargo handling related to safety shall be available on board the aeroplane are as follows:

(1) Mass and Balance Document,

(2) Notification Form for special categories of passengers,

(3) Special Loads Notification (Other than Dangerous Goods),

(4) Dangerous Goods Notification,

(5) Dangerous Goods Transport Document,

(6) General Declaration Form,

(7) Passenger Manifest,

(8) Cargo Manifest,

(9) Air Mail Documents.

8.2.2.12 Special Loads

8.2.2.12.1 Wet Cargo

See **EK.10.67.001 Ground Operations Manual (GOM) 5.11.17 Wet Cargo (WET)**.

8.2.2.12.2 Live Animals (AVI)

(A) The responsibility for the admittance of live animals has been granted to ground handling firms according to **EK.10.67.001 Ground Operations Manual (GOM) 5.11.27 Live Animals(AVI)** and **PR.60.005 Procedure for Carriage of Live Animals**. For procedures regarding in-flight handling of Live Animals carried in passenger compartment See **EK.10.71.001 Cabin Crew Manual (CCM)**.

(B) It is the responsibility of station managers to make the final decision for carriage of live animals.

(C) For detailed information, see latch tool calculated by Ground Operations Personnel and **EK.10.67.001 Ground Operations Manual (GOM) 5.4.27. Live Animals (AVI)**.

8.2.2.12.3 Perishable Cargo (PER)

(A) Perishable cargo may perish if exposed to undue changes in temperature or humidity. They shall only be accepted for carriage when it is reasonably ascertain that they will reach destination in good condition. Turkish Airlines Ground Operations Directorate or the applicable Ground Handling Agencies shall obtain the specific information about the perishable cargo such as the maximum acceptable duration of transportation from the shipper.

(B) The Commander shall be informed with Special Loads Notification about the perishable cargo and specific handling instructions.

(C) There is no limitation on transporting perishable (PER) cargo, regarding to operation of cooling/heating systems. This is because such cargo poses no direct threat to flight safety and the outer packets are durable to all kinds of outside air conditions for approximately 72 hours.

(D) The Commander may refuse carriage of PER cargo if he is not certain that they will reach destination in good condition. In this case if the authorised personnel grants approval for carriage of the PER cargo and takes note of this on the Special Load Notification stating that he takes on responsibility, the packages should be accepted.

(E) However, special cargo loads (PER, PEP, PES, PEM, PIL) those containing cooling/heating requirements with “whenever (if) possible” wording on the NOTOC form may be accepted for carriage without the need for granting of the authorised personnel explained in (D). The acceptance of this cargo does not create any additional responsibility on the Commander assuring that above conditions are met.

8.2.2.12.4 Human Remains (HUM)

See **EK.10.67.001 Ground Operations Manual (GOM) 5.11.10. Human Remains (HUM)**.

8.2.2.12.5 Valuable Cargo (VAL)

See **EK.10.67.001 Ground Operations Manual (GOM) 5.11.16. Valuable Cargo (VAL)**.

8.2.2.12.6 Living Human Organs or Blood Plasma (LHO)

(A) Usually cooled with dry ice or cryogenic liquids and thus to be handled accordingly.

(B) LHO should be carried in the cabin under the care of the crew, close to the main exit door, where it can be off loaded quickly. If LHO cannot be carried in the cabin due to its size or weight, it may be loaded in a cargo compartment, provided it is adequately secured and loaded in a position where it can be off loaded quickly.

(C) LHO shall be loaded separately from live animals.

(D) When LHO is to be loaded in cargo compartement, Commander shall be informed by NOTOC.

(E) The pilots may ask for precedence over the rest of the traffic for takeoff and landing and for direct routes when carrying LHO.

(F) For detailed information on the carriage of LHO, see **EK.10.67.001 Ground Operations Manual (GOM) 5.11.11. Live Human Organ/Blood (LHO)** and **EK.10.71.001 Cabin Crew Manual (CCM)**.

8.2.2.12.7 Transfer of Aircraft on Ground (AOG) Parts

(A) AOG parts are materials, which are required to dispatch an aircraft on ground due to a defect or failure.

(B) Aircraft materials that are used at stations to rectify defects such as hydraulic fluids, oil, wheels etc., are not considered as AOG parts.

(C) AOG parts may contain explosives (flares or other pyrotechnics), chemical oxygen generators, unserviceable tire assemblies, cylinders of compressed gas (oxygen, carbon dioxide, nitrogen or fire extinguishers), paint, adhesives, aerosols, lifesaving appliances, fuel equipment etc. Therefore, AOG parts which are classified as dangerous goods must be processed and loaded according to **IATA Dangerous Goods Regulations, SECTION 2 - Limitations, 2.2 Hidden Dangerous Goods** by the cargo department.

(D) AOG parts are only carried in aircraft cargo compartments, not in the flight deck or cabin.

(E) After loading an AOG part, the staff responsible for the loading of the aircraft shall record the loaded AOG part on the Weight and Balance Sheet, so that the Commander of the flight is informed.

8.2.2.13 Classification of Load Compartments

(A) Carriage of goods at the cargo compartment shall be in compliance with the procedures stated within **EK.10.67.001 Ground Operations Manual (GOM) 5. Load Control**.

(B) Classes of cargo compartments:

(1) Class A: Class A cargo or baggage compartment is one in which:

(a) the presence of a fire would be easily discovered by a crew member while at his station; and

(b) each part of the compartment is easily accessible in flight.

(2) Class B: Class B cargo or baggage compartment is one in which:

(a) there is sufficient access in flight to enable a crew member to effectively reach any part of the compartment with the contents of a hand fire extinguisher;

(b) when the access provisions are being used, no hazardous quantity of smoke, flames or extinguishing agent will enter any compartment occupied by the crew or passengers; and

(c) there is a separate approved smoke detector or fire detector system to give warning to the flight deck.

(3) Class C: 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 to the flight deck;

(b) there is an approved built-in fire-extinguishing system controllable from the flight deck;

(c) there are means to exclude hazardous quantities of smoke, flames, or extinguishing agent, from any compartment occupied by the crew or passengers and,

(d) there are means 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: Class D cargo or baggage compartment is one in which:

(a) a fire occurring will be completely confined without endangering the safety of the aeroplane or the occupants;

(b) there are means 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 aeroplane; and

(e) the compartment volume does not exceed 1000 cubic ft. For compartments of 500 cubic ft. or less, airflow of 1500 cubic ft. per hour is acceptable.

(5) Class E: Class E cargo compartment is one on aeroplanes used only for the carriage of cargo and in which:

(a) there is a separate approved smoke or fire detector system to give warning to the flight deck;

(b) there are means to shut off the ventilating airflow to, or within, the compartment, and the controls for these means are accessible to the flight crew in the crew compartment;

(c) there are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight crew compartment; and

(d) the required crew emergency exits are accessible under any cargo loading condition.

8.2.2.14 Multiple Occupancy of Aeroplane Seats

Multiple occupancy of any aeroplane seating, whether it is classified for passengers or crew members, is strictly prohibited. No seat shall be occupied by more than one passenger, except for infants held in the arms of an able-bodied travel companion.

8.2.2.15 Ground Servicing with One Engine Running

(A) There may be circumstances which may require ground servicing with one engine running.

(1) For fuelling procedures with one engine running refer to **Subchapter 8.2.1.2.**

(2) For passenger embarkation/disembarkation with one engine running refer to **Subchapter 8.2.2.1.1.**

(3) Ground personnel shall have been briefed on all aspects of ramp safety with particular reference to engine blast and suction areas.

(B) Upon completion of passenger disembarkation, a left wing engine shall be kept running and ground servicing such as loading/unloading the aeroplane, catering etc. shall be applied from the right hand side of the aeroplane.

8.2.3 Procedures for the Refusal of Embarkation

(A) The Commander has the statutory authority to refuse entry to the aeroplane of anyone whose presence in flight could represent a hazard to the safety of the aeroplane or its occupants. Such persons could include those appear to be intoxicated, or who demonstrate by manner or physical indications that they are under the influence of drugs to the extent that the safety of the aeroplane or its occupants is likely to be endangered, or of suffering from any form of mental or physical illness which could put the remaining passengers at risk (this does not apply to medical patients under proper care).

(B) In order to assist the Commander in the proper exercise of this authority, all Turkish Airlines personnel engaged in passenger handling and loading, including other crew members, handling agents and check-in personnel, should alert the Commander if at any time they consider that the condition of particular passengers could jeopardize the safety of a proposed flight.

(C) If difficulty is encountered in dealing with such passengers, particularly those who may require physical restraint, the assistance of the aerodrome, or local police should be requested.

(D) The Commander is responsible for the safety of all crew members, passenger and cargo, as soon as he embarks on board, until he disembarks the aeroplane at the end of the flight. The Commander:

(1) has the authority to give commands as deemed necessary for the purpose of securing the safety of the aeroplane, persons and property carried therein. All persons on-board the aeroplane shall obey such commands of the Commander.

(2) has the authority to disembark any person, or any part of the cargo, which in his opinion, may represent a potential hazard to the safety of the aeroplane or its occupants.

(3) shall not permit a person to be carried on-board who appears to be under the influence of alcohol or drugs to the extent that the safety of the aeroplane or its occupants is likely to be endangered.

(4) has the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage poses any risk to the safety of the aeroplane or its occupants.

(5) has the right to refuse transportation of the passengers whose age, mental or physical condition requires special assistance, which cannot be provided by the cabin crew members, unless being accompanied by a qualified travel companion.

(E) Refer to **Chapter 10** for the definition, procedures and the guidelines stated for the unruly passengers.

8.2.4 De-icing and Anti-icing On Ground

8.2.4.1 General

(A) A commander shall not commence take-off unless the external surfaces are clear of any deposit which might adversely affect the performance and/or controllability of the aeroplane except as permitted in the Airplane Flight Manual. For this reason a contamination check of the aeroplane surfaces shall be performed prior to departure.

(B) For details regarding ground handling instructions during de-ice/anti-ice, see **EK.10.67.002 De-icing/Anti-icing Manual** and fluid application tables are prepared using FAA Holdover Time Guidelines in accordance with SAE Fluid Application Tables included in **LS.67.046 Guidelines for De-Icing Anti-Icing on Ground**.

8.2.4.2 Definitions

(A) **Anti-icing:** Precautionary procedure which provides protection against the formation of frost or ice and accumulation of snow or slush on treated surfaces of the aeroplane for a limited period of time (holdover time).

(B) **Check:** An examination of an item against a relevant standard by a trained and qualified person.

(C) For other definitions, see **EK.10.67.002 De-icing/Anti-icing Manual.**

8.2.4.3 Checks Prior to De-icing/Anti-icing

(A) Any contamination found on wings, tail and control surfaces shall be removed by a de-icing treatment. Frost or any other contamination is not acceptable on the lower side of the horizontal stabilizer and elevator, unless specified otherwise in the AFM or other aircraft manufacturer's documentation. Coating of frost might be present on wing surfaces in areas cold soaked by fuel or hoarfrost if allowed in accordance with the aircraft manufacturer's published documentation (AFM, FCOM etc.).

(B) If anti-icing is also required, this treatment may be performed as a one-step or two-step de-icing/anti-icing of the relevant surfaces.

(C) Ice ridges around radome area shall be specifically checked during the walkaround check. If applicable, removing them with hot air is the best option. Make sure that clean aircraft requirement is provided.

(D) For details regarding checks prior to application, see **EK.10.67.002 De-icing/Anti-icing Manual.**

8.2.4.4 De-icing/Anti-icing Procedures

(A) Under no circumstances shall an aeroplane that has previously been anti-iced receive a further coating of anti-icing fluid directly on top of the contaminated film. When it is necessary to apply another coating of anti-icing fluid, the aeroplane surfaces must be de-iced first before the final coating of anti-icing fluid is applied.

(B) For de-icing/anti-icing applications, see **EK.10.67.002 De-icing/Anti-icing Manual**.

8.2.4.4.1 De-icing

It is the responsibility of the de-icing operator to ensure that all frozen deposits (with the possible exception of frost which may be allowed) are removed from the specified surfaces during the de-icing process.

8.2.4.4.2 Anti-icing

See **EK.10.67.002 De-icing/Anti-icing Manual**.

8.2.4.4.3 De-icing/Anti-icing Fluids

(A) Wherever in this document fluid Types I, II, III, or IV are indicated, this always refer to the latest version of the applicable ISO and SAE fluid types. (For example: Type I fluid refers to ISO Type I per ISO 11075 as well as SAE Type I per AMS 1424. Type II fluid refers to ISO Type II per ISO 11078 as well as SAE Type II per AMS 1428, etc.).

(B) The following fluids may be used for de-icing:

(1) heated water; (applied only first step of the two-step de-icing/anti-icing application)

(2) mixture of water and Type I fluid;

(3) Type I fluid;

(4) Type II, Type III, or Type IV fluid;

(5) mixture of water and Type II, Type III, or Type IV fluid.

Note: De-icing fluid is normally applied heated in order to ensure maximum efficiency.

(C) The following fluids may be used for anti-icing:

(1) mixture of water and Type I fluid;

(2) Type I fluid;

(3) Type II fluid, Type III fluid, or Type IV fluid;

(4) mixture of water and Type II fluid, Type III fluid, or Type IV fluid.

Note: De-icing fluids must be heated to ensure a temperature of 60 °C (140 °F) minimum at the nozzle.

(D) Type I fluids (unthickened type):

(1) As for effective anti-icing an even layer and thickness of fluid is required over the prescribed aeroplane surfaces.

(2) Type I fluids provide only limited holdover effectiveness. For longer anti-icing protection, undiluted, unheated Type II or Type IV fluids shall be used.

(3) After the de-icing process with Type I,

(a) If precipitation is not encountered, refer to **LS.67.046 Guidelines for De-icing and Anti-icing on Ground Table 3 Active Frost holdover times** (Type I fluid provides a holdover time of 0:35 min when no precipitation is present).

(b) If precipitation is encountered, then refer to **LS.67.046 Guidelines for De-icing and Anti-icing on Ground Table 4 Holdover Times for SAE Type I Fluid on Critical Aircraft Surfaces Composed Predominantly of Aluminium or Table 5 Holdover Times for SAE Type I Fluid on Critical Aircraft Surfaces Composed Predominantly of Composites**, depending on the structure type of the aeroplane.

(E) Type II, Type III and Type IV fluids (thickened type):

(1) Fluids based on alcohol are prohibited because they can cause window crazing.

(2) The higher viscosity of Type II fluids and Type IV fluids have the advantage of alonger holdover time but may cause problems to aeroplane types with a low liftoff speed due to the viscous properties of the treatment.

(3) The low lift-off speed might not be sufficient to allow the fluid to "runback" and disappear from the aerofoil. As a consequence the centre of pressure will change, resulting in a delayed rotation and liftoff. It is therefore imperative to check the instructions in the **Operations Manual Part-B** and the crew memorandums for winter operation.

(4) When thickened fluids are used, spraying near the flight deck windows must be avoided, as fluid can cause a severe loss of visibility. Any thickened fluid remaining on the nose areas where it could blow back onto the windscreens should be removed prior to departure, using a diluted Type I fluid, squeegees, or equivalent. If flight deck windows are contaminated with thickened fluids, use water or an approved windshield cleaner (use of a low windscreen washing fluid is recommended when OAT is at or below 0 °C (32 °F)).

* CAUTION: Prior to cleaning of the flight deck windows, ensure that the window heating system is switched off.

(F) These fluids may not be used below -25°C (-13°F) in active frost conditions.

8.2.4.5 Limits and Precautions

8.2.4.5.1 Fluid Related Limits

When performing two-step de-icing/anti-icing, the freezing point of the fluid used for the first step shall be at OAT or below.

8.2.4.5.2 Temperature Limits for Type I Fluids

(A) The freezing point of the Type I fluid mixture used for either one-step de-icing/anti-icing or as a second step in the two-step operation shall be at least 10 °C (18 °F) below the OAT. In no case shall this temperature be lower than the LOUT.

(B) For temperature limitations for Type I fluids, refer to **LS.67.046 Guidelines for De-icing and Anti-icing on the Ground,** Table 3 Temperature Limitations for Anti-icing Fluids for SAE Type I Fluids.

8.2.4.5.3 Temperature Limits for Type II/III/IV Fluids

(A) Type II, III, and IV fluids used as de-icing/anti-icing agents may have a lower temperature application limit of -23 °C (-9 °F). The application limit may be lower, provided a 7 °C (13 °F) buffer is maintained between the freezing point of the neat fluid and OAT.

(B) In no case shall this temperature be lower than the LOUT.

(C) These fluids may not be used below -25°C (-13°F) in active frost conditions.

(D) For temperature limitations for Type II, III and IV fluids, refer to **LS.67.046 Guidelines for De-icing and Anti-icing on the Ground** Table 3 Temperature Limitations for Anti-icing Fluids for SAE Type II, III and IV Fluids.

8.2.4.5.4 Application Limits

(A) Under no circumstances shall an aeroplane that has been anti-iced receive a further coating of anti-icing fluid directly on top of the contaminated film.

(B) If an additional treatment is required before flight, a complete de-icing/anti-icing application shall be performed. Ensure that any fluid remaining from previous treatment is flushed off.

(C) Anti-icing only is not permitted.

8.2.4.5.5 Precautions

(A) One-step de-icing/anti-icing:

(1) One-step de-icing/anti-icing is performed with a heated fluid.

(2) The fluid used to de-ice the aeroplane remains on the aeroplane surfaces to provide limited anti-ice capability.

(3) The correct fluid concentration shall be chosen with regard to desired holdover time and is dictated by OAT and weather conditions.

(4) The application of Type II, III, or IV fluid, especially when used in a one step process, may cause fluid to collect in aerodynamically quiet areas, cavities and gaps which can dry out and leave dried residues. Dried residues may rehydrate and freeze following a period of high humidity and/or rain conditions. This may impede flight control systems. These dried residues may require removal. Whenever suitable, de-ice and anti-ice with only Type I.

(B) Two-step de-icing/anti-icing:

(1) The correct fluid(s) shall be chosen with regard to ambient temperature. After de-icing, a separate overspray of anti-icing fluid shall be applied to protect the relevant surfaces thus providing maximum possible anti-ice capability. The second step is performed with anti-icing fluid.

(2) The correct fluid concentration shall be chosen with regard to desired holdover time and is dictated by OAT and weather conditions as stated in **LS.67.046 Guidelines for De-icing and Anti-icing on the Ground**.

(3) The second step shall be performed before first step fluid freezes, if necessary area by area.

(4) It is the responsibility of the de-icing operator to ensure that all frozen deposits have been removed from the treated surfaces, before applying the second step fluid.

(5) Where re-freezing occurs following the initial treatment, both first and second step must be repeated.

(C) A de-icing/anti-icing treatment should be continuous and as short as possible. If a treatment is interrupted (for example if a truck runs out of fluid):

(1) The commander shall be immediately informed stating:

(a) reason for interruption;

(b) actions to be taken (in consultation with the Commander);

(c) expected time of delay.

(2) Before continuing the treatment, the de-icing operator shall:

(a) inform the commander;

(b) establish in consultation with the commander, further treatment to be carried out, including any surfaces requiring re-treatment (in relation to holdover time).

8.2.4.5.6 Precautions Regarding Type I Fluids

See **EK.10.67.002 De-icing/Anti-icing Manual**.

8.2.4.5.7 Clear Ice Precautions

(A) Clear ice can form on aeroplane surfaces, below a layer of snow or slush. It is therefore important that surfaces are closely examined following each de-icing operation, in order to ensure that all deposits have been removed.

(B) Significant deposits of clear ice can form, in the vicinity of the fuel tanks, on wing upper surfaces as well as under-wing. Aeroplanes are most vulnerable to this type of build-up when:

(1) wing temperatures remain well below 0 °C (32 °F) during the turnaround/transit;

(2) ambient temperatures between -2 °C and +15 °C (28 °F and 59 °F) are experienced;

(3) ambient humidity is high and/or precipitation occurs while the aeroplane is on the ground.

(C) This type of ice formation is extremely difficult to detect. However, frost or ice on the lower surface of either wing can indicate the presence of clear ice on the upper wing surfaces.

(D) Therefore when the above conditions prevail, or when there is any doubt whether clear ice has formed, a close examination shall be made immediately prior to departure, in order to ensure that all frozen deposits have in fact been removed.

(E) Low wing temperatures associated with this type of build-up normally occur when large quantities of cold fuel remain in wing tanks during the turnaround/transit and any subsequent re-fuelling does not cause a sufficient increase in wing temperature.

8.2.4.6 Checks After De-icing/Anti-icing

(A) Following the de-icing/anti-icing procedures and prior to takeoff, the critical aeroplane surfaces shall be clean of all frost, ice, slush, and snow accumulations.

(B) A check to ensure compliance with the ‘clean aircraft concept’ is made immediately following the application of the de-icing and/or anti-icing fluids and shall be carried out by qualified personnel.

(C) **Post Treatment Check:** An aeroplane shall not be dispatched after a de-icing/anti-icing operation until the aeroplane has received the following visual check by a trained and qualified person. This check shall cover wings, horizontal stabilizer, vertical stabilizer and fuselage, plus all other parts of the aeroplane on which a de-icing/anti-icing treatment was performed.

(1) The check shall be performed from points offering sufficient visibility of all prescribed surfaces (e.g. from the de-icer itself or other equipment suitable for gaining access). Any contamination found, shall be removed by further de-icing/anti-icing treatment and the check repeated.

(2) Before take-off, the commander must ensure that he has received confirmation that this post de-icing/ anti-icing check has been accomplished.

(3) Where the de-icing provider is carrying out the de-icing/anti-icing process and also the post de-icing/ anti-icing check, it may either be performed as a separate check or incorporated into the de-icing operation as defined below:

(a) as the de-icing/ anti-icing operation progresses the de-icing operator will closely monitor the surface receiving treatment, in order to ensure that all forms of frost, ice, slush or snow (except as may be allowed in the AFM and/or AMM) are removed;

(b) once the operation has been completed, the de-icing operator will carry out a close visual check of the surface where treatment commenced, in order to ensure it has remained free of contamination (this procedure is not required under 'frost only' conditions);

(c) where the request for de-icing/anti-icing did not specify all of the following surfaces, i.e. wing, horizontal stabilizer, vertical stabilizer and fuselage, the surfaces omitted from the request shall also receive a close visual check at this time, in order to confirm that they have also remained free of contamination; and

(d) any evidence of contamination that is outside the defined limits shall be reported to the commander immediately.

(D) **Pre-Takeoff Check:** The commander shall continually monitor the weather conditions after the performed de-icing/anti-icing treatment. Prior to takeoff he shall assess whether the applied holdover time is still appropriate and/or if untreated surfaces may have become contaminated.

(1) This check is normally performed from inside the flight deck.

(2) This check shall be accomplished as close to the time of takeoff as possible.

(3) When deemed necessary by the commander, the check may be conducted from within the aeroplane by visually checking the wings or other surfaces by the commander himself or a flight crew member designated by the commander.

(a) Where, before commencing takeoff, a crew member of an aircraft observes that there is frost, ice or snow adhering to the wings of the aircraft, the crew member shall immediately report that observation to the commander, and the commander or a flight crew member designated by the commander shall inspect the wings of the aircraft before takeoff. In such a case, the commander shall ensure that leaving and entering the flight deck for the purpose of the pre-take-off check is in compliance with the flight deck door principles stipulated in **Chapter 10** and **Subchapter 8.3**.

(4) Before an aircraft is de-iced or anti-iced or visually inspected from within the aircraft, the commander of the aircraft shall ensure that the crew members and passengers are informed of the decision to do so.

(5) The commander of the flight shall make the proper arrangements for the pre-takeoff check. The commander:

(a) shall monitor the weather conditions after the de-icing and/ or anti-icing treatment and be sure that the treatment is still within the holdover time;

(b) shall stop the aircraft and set the parking brake at a position from which takeoff can be accomplished within a reasonable amount of time after the completion of the pre-takeoff check; and

(c) shall request a pre-takeoff contamination check from qualified ground personnel as described below, if:

1. the predetermined portions of the aircraft cannot be assured to be free of contamination; and
2. low visibility or insufficient lighting prevents such checks.

(E) **Pre-Takeoff Contamination Check:**

(1) This is a check of the critical surfaces for contamination.

(2) This check shall be performed when the condition of the critical surfaces of the aeroplane cannot be effectively assessed by a pre-takeoff check or when the applied holdover time has been exceeded.

(3) Under severe weather conditions, especially at night, the commander may request an external check to ensure that the critical surfaces of the aeroplane are free of any contamination. If the applied holdover time has been exceeded or if there is any doubt regarding the effectiveness of anti-icing, an external contamination check may be required. This check is normally accomplished from outside the aeroplane just before commencing takeoff roll by qualified ground personnel.

(4) The commander shall continually monitor the weather and aeroplane condition to ensure compliance with 'clean aircraft concept'. If this requirement cannot be satisfied by either an internal or external check then the commander shall request another complete treatment.

8.2.4.7 Communication Procedures

(A) During off-gate de-icing/anti-icing, a two-way communication between flight crew and de-icing/anti-icing operator/supervisor must be established prior to the de-icing/anti-icing treatment. The operator/supervisor shall have a basic knowledge of english language at operational level for a proper communication. This communication shall be done either by intercom or by VHF radio. In case VHF is used, the registration of the aircraft instead of flight number shall be used during all communications. For de-icing/anti-icing operations with engines running, both verbal and visual communications shall be established to control aeroplane movement.

(B) Before de-icing/anti-icing, the Commander shall confirm the treatment required (areas to be de-iced, anti-icing requirements, special de-icing procedures etc.).

(C) Before fluid application starts, the commander shall be requested to configure the aircraft for de-icing/anti-icing (surfaces, controls and systems, as per aircraft type requirements). The de-icing crew shall wait for confirmation that this has been completed before commencing the treatment.

(D) During treatment all necessary information to the flight deck shall be given such as beginning of treatment, treatment of sections requiring de-activation of aircraft systems, anti-icing code, etc.

(E) When a treatment is interrupted for a significant period of time (e.g. truck runs out of fluid) the flight crew shall be informed stating the reason, the action to be taken and the estimated time delay. When continuing the treatment, the previously treated surfaces must be fully de-iced and anti-iced again, when the holdover time of the treatment from before the interruption is not sufficient.

(F) The de-icing/anti-icing operator together with the airport authorities must publish all necessary information about how to operate on the off-gate site by NOTAM or in the **EK.10.73.002 Operations Manual Part-C**. This information has to include at least the location of, and standard taxi routing to the de-icing/anti-icing area, means to coordinate the de-icing/anti-icing operation, and means to communicate before and during the de-icing/anti-icing operation and information about taxi and stopping guidance.

8.2.4.7.1 Transmission of the Anti-icing Code to the Commander

(A) An aeroplane shall not be dispatched for departure after a de-icing/anti-icing operation until the Commander has been notified of the type of de-icing/anti-icing operation performed (Anti-icing Code).

(B) The Anti-icing Code shall be provided by a qualified person at the completion of the treatment, indicating that the checked surfaces are free of ice, frost, snow, and slush, and in addition includes the necessary information to allow the Commander to estimate the holdover time to be expected under the prevailing weather conditions.

(C) The following information shall be recorded and be communicated to the Commander by referring to the last step of the procedure and in the sequence provided below:

(1) the fluid Type; i.e. Type I, II, III, IV

(2) manufacturer/brand name (if applicable)

(3) the concentration of fluid within the fluid/water mixture, expressed as a percentage by volume;

Note: Not required for Type I fluid.

(4) the local time (hours: minutes), either

(a) for a one-step de-icing/anti-icing: at the start of the treatment or

(b) for a two-step de-icing/anti-icing: at the start of the second step (anti-icing);

(5) the date (written: day, month, year);

Note: Required for record keeping, optional for Commander notification.

(6) the complete name of the anti-icing fluid (so called “brand name”).

Note: for type III fluids only, optional for Type II and IV fluids.

(7) the statement "Post de-icing/anti-icing check completed”

Note: For specific aeroplane types, additional requirements exist e.g. special clear ice checks, such as tactile checks on wings. Additional confirmation for these checks is required.

(D) EXAMPLE:

A de-icing/anti-icing procedure whose last step is the use of a mixture of 75% of a Type II fluid and 25% water, commencing at 13:35 local time on 20 February 2011, is reported and recorded as follows:

TYPE II/manufacturer brand name (if applicable) /75/13:35/(20 Feb 2011)/

"Post de-icing/anti-icing check completed".

8.2.4.7.2 Standard Communication Terminology During Off-Gate De-icing/Anti-icing Procedures

(A) The following standard communication terminology is recommended:

De-icing: "Set parking-brakes, confirm aircraft is ready for treatment, Inform on any special requests."

After aircraft is configured for treatment:

Flight Deck: "Brakes are set, you may begin treatment and observe.....(any special re-quests like: ice under wing/flaps, clear-ice on top of wing, snow on fuselage, ice on landing-gear, anti-ice with type IV fluid, etc.)".

De-icing: "We begin treatment now and observe.... (Special request given, like "ice under wing", etc.). I will call you back when ready".

Only after equipment is cleared from aircraft and all checks are made:

De-icing: "De-icing/anti-icing completed, de-icing/anti-icing code is :.....(plus any additional info needed). I am disconnecting, stand by for all clear signal (to confirm that all areas around the aircraft are clear) at right/left and/or contact ground/tower for taxi clearance."

Flight Deck: "De-icing/anti-icing completed, de-icing/anti-icing code is.....".

8.2.4.7.3 All Clear Signal

(A) The flight crew shall receive a confirmation from the ground crew that all de-icing/anti-icing operations are complete and that all personnel and equipment are clear before reconfiguring or moving the aeroplane.

(B) All clear signal means that de-icing procedures are completed and the area around the aeroplane is safe for the movement of the aeroplane. The right hand thumb is pointed upward only by supervisor to give information to the Commander.

8.2.4.8 Holdover Time

(A) See **EK.10.67.002 De-icing/Anti-icing Manual** for general principles about Holdover Time.

(B) Manufacturer specific Lowest Operational Use Temperature (LOUT) guidelines, limitations, application methods and procedures shall be followed at all times. The agency/operator providing de-icing/ anti icing services shall be responsible for the appropriate application of such fluids. Holdover time guidelines can also be obtained for individual fluid products and these "brand name specific" holdover times may differ from the tables published here.

(C) For holdover time tables, refer to **LS.67.046 Guidelines for De-icing and Anti-icing on the Ground**.

(D) As stated item (B) above, certain de-icing and anti-icing fluids has brand specific holdover times (i.e. FAA holdover times). When de-icing and/or anti-icing application is made using such specific brand types of fluids, holdover times obtained from local authorities (agencies/operators of fluid application) should be used instead of the holdover times stated in **LS.67.046 Guidelines for De-icing and Anti-icing on the Ground.**

8.2.4.9 Responsibility

(A) The responsibility to determine the need for de-icing/anti-icing before dispatch rests with the trained and qualified ground crew or flight crew who performs the Contamination Check at the gate. This information must be given in writing or verbally to the Commander of the aeroplane, who is after that responsible to proceed in order to get proper treatment.

(B) It is the responsibility of the handling company to use the correct fluid concentrations. The handling company shall observe the relevant freezing point and aerodynamic limitations and application methods. The handling company is responsible for the correct and complete accomplishment of the de-icing/anti-icing of the aeroplane.

(C) It is the responsibility of the de-icing operator to ensure that:

(1) all frozen deposits are removed from the specified surfaces during the de-icing process;

(2) the treatment is performed symmetrically and that on completion all frozen deposits have been removed;

(3) the surfaces mentioned in **Subchapter 8.2.4.1** are free of frost, ice, slush and snow, prior to the start of the anti-icing treatment;

(4) on completion of the treatment the surfaces mentioned in **Subchapter 8.2.4.1** are fully covered with an adequate layer of anti-icing fluid; and

(5) all frozen deposits have been removed from the treated surfaces, before applying the second step fluid.

(D) The Commander is responsible for accepting the performed procedure of effective de-icing/anti-icing to conform to **Operations Manual Part-B** and/or AFM and legal requirements.

(E) The Commander's request for such treatment and the fluid mixtures used will always take precedence over locally recommended procedures.

(F) In case of precipitation the Commander shall assess whether or not the applied holdover time is still appropriate. After receiving the anti-icing code, he is responsible for ensuring that the relevant control surfaces remain free of frost, ice, slush and snow until takeoff.

(G) Under normal circumstances the qualified ground handling agent is responsible for correct and comprehensive de-icing of the aeroplane and for the visual check upon completion, paying particular attention to the upper surfaces of wings and stabilizers.

(H) An aeroplane shall not be dispatched for departure after a de-icing/anti-icing operation until the Commander has been notified of the type of de-icing/anti-icing operation performed (Anti-icing Code). The Commander shall not commence taxi before receiving all clear signal (completion of de-icing procedures and aircraft cleared for taxi) .

(I) Protection period is measured from the time of treatment start. After satisfactory de-icing/anti-icing, it is for the Commander to decide whether the holdover time is adequate for taxiing and takeoff.

(J) Whenever de-icing has taken place the Commander (or the person designated by the Commander) must make an appropriate entry in the technical log showing the local time of start, the de-icing fluid type and the concentration.

(K) Commander of the aeroplane shall be involved in the decision making process of whether or not to deice their aeroplane. Commander bases his decision on the initial inspection and recommendation of qualified ground crew. Where contamination is adhering to one or more critical surface, Commander shall have the aeroplane de-iced. Should Commander elect to verify whether or not contamination is adhering, a tactile check, under the supervision of Commander or delegate, shall be completed by a qualified ground crew member. This procedure should be sufficient to resolve any dispute regarding the adherence of contamination on the aeroplane. It is Commander's overriding responsibility to ensure that, at the commencement of take-off, no ice, slush, snow or frost is adhering to any critical surface of the aeroplane. Inspection by ground personnel does not relieve Commander of the responsibility for the pre-flight inspection. Commander maintains final authority in all required deicing/anti-icing situations.

(L) Notwithstanding that authority, the following methods are applied:

(1) Where contamination is adhering to one or more critical surfaces, Commander shall have the aeroplane de-iced;
(2) Commander's decision to order deicing and/or anti-icing cannot be overruled or reduced to a lower level of protection; and
(3) Where a tactile inspection by the deicing representative does not resolve a disagreement regarding the adherence of contamination, Commander should take the most conservative course of action.

8.2.4.10 Ramp and Taxi Precautions

(A) When off-gate de-icing/anti-icing area is entered by taxiing, a sufficient taxi and stopping guidance must be arranged, or marshaller assistance must be given. In case radio contact must be established before entering the de-icing/anti-icing area, the signs with clearly marked operation frequency must be visible from the cockpit before entering this area.

(B) Icy conditions on the ramp/gate area mean that the push-back vehicle may not be able to develop sufficient traction to push the aeroplane with engines running. In this case, after completing checks down to engine start, have the aeroplane pushed back, to a position from which it can taxi forward, before starting engines. Be aware that idle thrust may be sufficient to move the aeroplane forward even though the parking brake is set.

(C) Be alert to the possibility of engine inlet ice build-up during taxi and ground holding operations. Ice can form in engine inlets at temperatures above 10 °C with high humidity present during extensive ground holds with the engines at idle. If visible moisture is present with a temperature below that specified in the FCOM/AFM, engine anti-ice systems must be selected ON after each engine is started.

Note: Ensure that probe/pitot and sensor heating systems are ON before taxiing.

(D) Taxi with great care since rutted areas may cause steering problems. Neither aircraft nor ground vehicles are capable of stopping quickly. When guide lamp installations are available, make use of them to align the aircraft in the gate area. Snow may cover the normal taxi markings. Be alert to the possibility of foreign object damage due to high snow in ramp areas or along narrow taxiways. Test braking and steering capabilities frequently. Maintain a greater distance than normal from other traffic to avoid jet-blast which could adversely affect anti-ice treatment and/or blow contaminants onto the aeroplane.

(E) Engine thrust may need to be higher than normal to overcome the drag caused by slush or snow. Changes should be made slowly and carefully to avoid blowing equipment and/or contaminants into other aircraft.

(F) Flaps should be kept UP when taxiing through slush or standing water, with pre-takeoff checks delayed until they are able to be lowered and anti-skid selected ON.

(G) The de-icing supervisor is responsible for confirming that the aeroplane is completely free of ice or snow prior to releasing it.

(H) It is the responsibility of the Commander to receive an ‘all clear’ signal from the ground personnel that shows all areas around the aircraft are clear and the aircraft is released.

(I) The flightcrew shall verify that the taxi and takeoff checklists are duly completed. When lining up for takeoff and prior to releasing the brakes accelerate the engines to verify proper operation.

8.2.4.11 Take-Off

(A) Takeoff is prohibited if any of the following conditions exist:

(1) snow, ice or frost deposits are adhering to the wings, control surfaces, engines or propellers and any other stabilizing surfaces of the aeroplane including horizontal and vertical stabilizers;

(2) heavy fall of wet snow with ambient temperature around freezing point;

(3) moderate or heavy freezing rain;

(4) the runway braking action is reported as "poor" (braking coefficient less than 0.25).

(B) Observe appropriate performance limitations for takeoff. Acceleration will be adversely affected by slush or standing water on the runway, which cause significantly greater drag. Be alert for conditions which could affect stopping and directional control should it become necessary to abort.

(C) Line up carefully and ensure that the nose wheel is straight, as skidding of an offset nose wheel upsets directional control. Apply thrust slowly to prevent asymmetry which would also affect directional control.

(D) During takeoff roll maintain positive forward pressure on the nose wheel and use rudder for directional control as soon as it becomes effective.

8.2.4.11.1 Rotation Technique

(A) During takeoff in poor weather conditions or in a contaminated runway situation, takeoff roll and rotation shall be equal to a normal takeoff situation, holding light forward pressure and using rudder and aileron to maintain directional control. Target pitch attitude shall be attained using normal rotation rate of 2-3 degrees/sec. This will ensure that any abnormal pitch-up tendency due to possible residual contamination over the airfoil is detected early and the angle of attack does not become higher than normal.

(B) If pitch-up or lateral instability is experienced after lift-off, use elevator, rudder and aileron to maintain the desired attitude. Apply maximum available thrust and use smooth continuous control inputs to avoid over-controlling.

(C) Do not allow further increase in pitch attitude until full lateral control has been regained. Set wing and stabilizer anti-ice systems ON as soon as practicable after lift-off.

8.2.4.11.2 Rejected/Aborted Take-off

(A) Directional control problems may be aggravated during an aborted takeoff due to excessive anti-skid cycling and/or individual wheels skidding. The rudder must be used as the primary steering aid and, to regain directional control, be prepared to release wheel brakes, cancel reverse thrust and reselect forward idle. Brakes should be re-applied when directional control is regained.

(B) Do not "pump" the wheel brakes when the anti-skid system is ON.

8.2.4.11.3 Residues

(A) Dried fluid residues occur when surfaces have been treated but the aircraft has not subsequently been flown and not been subject to precipitation. The fluid may than have dried on the surfaces.

(B) Repetitive application of thickened de-icing/anti-icing fluids may lead to subsequent formation or build up of a dried residue in aerodynamically quiet areas, such as cavities and gaps. This residue may re-hydrate if exposed to high humidity conditions, precipitation, washing, etc., and increase to many times its original size/volume. This residue will freeze if exposed to conditions at or below 0°C. This may cause moving parts such as elevators, ailerons, and flap actuating mechanisms to stiffen or jam in flight.

(C) Re-hydrated residues may also form on exterior surfaces, which can reduce lift, increase drag and stall speed.

(D) Re-hydrated residues may also collect inside control surface structures and cause clogging of drain holes or imbalance to flight controls.

(E) Residues may also collect in hidden areas: around flight control hinges, pulleys, grommets, on cables and in gaps.

(F) In order to detect dried residues, it may help to spray a water mist onto the affected surfaces. This causes the dried residues to rehydrate and swell into a kind of gel.

(G) If de-icing has been applied, the de-icing/ anti-icing section of the AML shall be filled out by the Commander. No entry to the AML under defect field such as “de-icing / anti-icing performed and the aircraft needs cleaning” is required unless there are residues or dirt encountered on the aeroplane during the walk-around checks.

APPENDIX 1 Canadian Runway Friction Index (CRFI) Tables for Flights to Canada

(A) The tables provided within this appendix shall be used for Canada flights under adverse runway conditions. AFM calculations for the respective type shall also be considered. The limiting calculation shall be the governing one for the operational use.

(B) For any flight, scheduled or diverted to Canada, the Commander of the flight shall consider that there is a different standardized method of determining what the effect of braking is for a given certain type of runway contamination, which is called Canadian Runway Friction Index (CRFI).

Description of CRFI and Method of Measurement

(A) The decelerometer is an instrument mounted in a test vehicle that measures the decelerating forces acting on the vehicle when the brakes are applied. The instrument is graduated in increments from 0 to 1, the highest number being equivalent to the theoretical maximum decelerating capability of the vehicle on a dry surface. These numbers are referred to as the CRFI. It is evident that small numbers represent low braking coefficients of friction while numbers on the order of 0.8 and above indicate the braking coefficients to be expected on bare and dry runways.

(B) The brakes are applied on the test vehicle at 300m (1000ft) intervals along the RWY within a distance of 10m (30ft) from each side of the RWY centerline at that distance from the centerline where the majority of ACFT operations take place at each given site. The readings taken are averaged and reported as the CRFI number.

Aircraft Movement Surface Condition Reports (AMSCR)

(A) AMSCRs are issued to alert pilots of natural surface contaminants—such as snow, ice or slush—that could affect ACFT braking performance. The Runway Surface Condition (RSC) section of the report provides information about RWY condition in plain language, while the CRFI section describes braking action quantitatively using the numerical format.

(B) Because of mechanical and operational limitations, the RWY friction readings produced by decelerometer devices may be inaccurate under certain surface conditions. As a result, RWY friction readings will not be taken and a CRFI will not be provided to ATS or to pilots when any of the following conditions are present:

(1) the RWY surface is wet and no other type of contamination is present;

(2) there is a layer of slush on the RWY surface and no other type of contamination is present;

(3) there is wet snow on the RWY surface; or

(4) there is dry snow on the RWY surface exceeding 2.5cm (1 IN) in depth.

(C) An RSC report must be provided when:

(1) there is frost, snow, slush or ice on a RWY;

(2) there are snow banks, drifts or windrows on or adjacent to a RWY;

(3) sand, aggregate material, anti-icing or de-icing chemicals are applied to a RWY;

(4) the cleared RWY width falls below published width;

(5) the RWY lights are obscured or partially obscured by contaminants;

(6) there is a significant change in RWY surface conditions including a return to bare and dry conditions; or

(7) as per required minimum inspection frequency.

(D) The following changes relating to RWY conditions are considered significant:

(1) a change of 0.05 or more in the coefficient of friction;

(2) changes in depth of deposit greater than 20mm (0.79 IN) for dry snow, 10mm (0.4 IN) for wet snow, 3mm (0.13 IN) for slush;

(3) a change in the cleared width of a RWY of 10 percent or more;

(4) any change in the type of deposit or extent of coverage, including a return to bare and dry conditions;

(5) any change in the height of snow banks or their distance from the centerline on one or both sides of the RWY;

(6) any change in the visibility of RWY lighting because the lights are obscured by contaminants; and

(7) any other conditions that are, in the opinion of the aerodrome authority, considered to be significant.

(E) When available, a CRFI reading will be issued along with the RSC in order to provide an overall descriptive picture of the RWY condition and to quantify braking action.

(F) The CRFI is to be reported whenever:

(1) there is ice or frost on the RWY;

(2) there is wet ice on the RWY;

(3) there is slush over the ice on the RWY;

(4) sand, aggregate material, anti-icing or de-icing chemicals are applied to the RWY;

(5) there is a chemical solution on the ice on the RWY;

(6) there is compacted snow on the RWY; or

(7) there is dry snow not exceeding a depth of 2.5cm (1IN) on the RWY.

(G) When a deposit is present but the depth is not measurable, the word “TRACE” shall be used. Otherwise, the depth is expressed in inches or feet or both. When the depth is above 2 IN, whole values are used. When the depth is less than 2 IN, the decimal system is used. The accepted decimal values are 0.13, 0.25, 0.5, 0.75 and 1.5; however, caution has to be exercised as these values could be confused with CRFI measurements.

(H) When clearing is not underway or expected to begin within the next 30 MIN, a notation such as “Clearing expected to start at (time in UTC)” will be added to the RSC report. When the meteorological conditions cause RWY surface conditions to change frequently, the NOTAM will include the agency and telephone number to contact for the current RWY conditions.

(I) The full range of RSC/CRFI information will be available as a voice advisory from the control tower at controlled aerodromes and from the FSS at uncontrolled aerodromes.

(J) Each new NOTAM (AMSCR report) issued supersedes the previous report for that aerodrome. A NOTAM is valid for 24 hr, based on the most recent observation of either the RSC or CRFI, after which time it is removed from the database

by way of cancellation. A NOTAM may also be cancelled if the reporting requirements are no longer met or the NOTAM was issued in error.

Note: The absence of a NOTAM in no way indicates that RWY conditions are acceptable for operations.

Example of RSC and CRFI reports
CYFB RSC **17/35 100** PCT DRY SN ON ICE 0.5 INS **1201100630**
CYFB CRFI 17/35 -22C .34 **1201100630**

Decoding of CRFI Portion

(A) location indicator (CYFB)

(B) title (CRFI)

(C) RWY number (17/35)

(D) temperature in degrees Celsius (-22C)

(E) RWY average CRFI reading (.34)

(F) ten figure time group (UTC) in year-month-day-hour-minute (YYMMDDHHMM) format (**1201100630**)

(G) A NOTAM is issued based on reporting requirements rather than on dissemination criteria. Therefore, conditions such as “100 percent bare and dry”, “bare and damp”, or “bare and wet” will be disseminated if reported.

(H) Information on taxiways and aprons, although not mandatory, can be disseminated in a NOTAM if deemed to have an impact on safe operations.

CRFI Application to Aircraft Performance

(A) The information contained in Tables 1 and 2 below has been compiled and is considered to be the best data available at this time, because it is based upon extensive field test performance data of ACFT braking on winter-contaminated surfaces. It should provide a useful guide to pilots when estimating ACFT performance under adverse RWY conditions. The onus for the production of information, guidance or advice on the operation of ACFT on a wet and/or contaminated RWY rests with the ACFT manufacturer. The information published in Tables 1 and 2 below does not change, create any additional, authorize changes in, or permit deviations from regulatory requirements. These tables are intended to be used at the pilot's discretion.

(B) Because of the many variables associated with computing accelerate-stop distances and balanced field lengths, it has not been possible to reduce the available data to the point where CRFI corrections can be provided, which would be applicable to all types of operations. Consequently, only corrections for landing distances and crosswinds are included pending further study of the take-off problem.

(C) It should be noted that in all cases the tables are based on corrections to ACFT Flight Manual (AFM) dry RWY data and that the certification criteria does not allow consideration of the extra decelerating forces provided by reverse thrust or propeller reversing. On dry RWYs, thrust reversers provide only a small portion of the total decelerating forces when compared to wheel braking. However, as wheel braking becomes less effective, the portion of the stopping distance attributable to thrust reversing becomes greater. For this reason, if reversing is employed when a low CRFI is reported, a

comparison of the actual stopping distance with that shown in Table 1 will make the estimates appear overly conservative. Nevertheless, there are circumstances, such as crosswind conditions, engine out situations or reverser malfunctions, that may preclude their use.

(D) Landing distances recommended in Table 1 are intended to be used for aeroplanes with no discing and/or reverse thrust capability and are based on statistical variation measured during actual flight tests.

(E) Notwithstanding the above comments on the use of discing and/or reverse thrust, Table 2 may be used for aeroplanes with discing and/or reverse thrust capability and is based on the landing distances recommended in Table 1 with additional calculations that give credit for discing and/or reverse thrust. In calculating the distances in Table 2, the air distance from the screen height of 50ft to touchdown and the delay distance from touchdown to the application of full braking remain unchanged from Table 1. The effects of discing and/or reverse thrust were used only to reduce the stopping distance from the application of full braking to a complete stop.

(F) The recommended landing distances stated in Table 2 take into account the reduction in landing distances obtained with the use of discing and/or reverse thrust capability for a turboprop powered aeroplane and with the use of reverse thrust for a turbojet-powered aeroplane. Representative low values of discing and/or reverse thrust effect have been assumed and, therefore, the data may be conservative for properly executed landings by some aeroplanes with highly effective discing and/or thrust reversing systems.

(G) The crosswind limits for CRFI shown in Table 3 contain a slightly different display range of RWY friction index values from those listed in Tables 1 and 2. However, the CRFI values used for Table 3 are exactly the same as those used for Tables 1 and 2 and are appropriate for the index value increments indicated.

Table 1 - CRFI Recommended Landing Distances (No Discing/Reverse Thrust)

LDG DIST (m) Bare and Dry Unfactored	Reported Canadian Runway Friction Index (CRFI)												Landing Field Length (m) Bare and Dry	
	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.27	0.25	0.22	0.20	0.18		
	Recommended Landing Distance in Meters (No Discing/Reverse Thrust)												Factor	
													60%	70%
549	951	976	1006	1040	1079	1128	1189	1232	1265	1320	1363	1409	915	784
610	1061	1092	1125	1168	1214	1272	1345	1393	1433	1497	1546	1601	1016	871
671	1134	1168	1208	1253	1305	1372	1448	1506	1549	1619	1674	1738	1118	958
732	1250	1290	1332	1384	1445	1518	1604	1668	1713	1793	1854	1921	1220	1046
793	1357	1400	1448	1506	1573	1653	1750	1817	1869	1954	2021	2094	1321	1133
854	1451	1497	1552	1613	1686	1771	1875	1948	2003	2098	2168	2244	1423	1220
915	1546	1598	1656	1723	1802	1896	2009	2091	2152	2253	2329	2415	1525	1307
976	1662	1717	1781	1857	1942	2049	2174	2262	2329	2442	2527	2622	1626	1394
1037	1750	1811	1881	1960	2055	2168	2302	2399	2469	2591	2683	2783	1728	1481
1098	1845	1909	1982	2067	2171	2290	2436	2539	2616	2744	2841	2951	1829	1568
1159	1933	2003	2082	2174	2280	2408	2564	2674	2756	2893	3000	3116	1931	1655
1220	1997	2067	2149	2247	2357	2491	2652	2768	2853	2997	3103	3225	2033	1742
Example: A330 landing at CYVR, APT ELEV 14ft, RWY 08R, ZERO WIND, CRFI 0.30, Landing weight 160T														
Landing Distance for Bare and Dry (Unfactored)								1005m (AFM)						
Recommended Landing Distance								2237m						

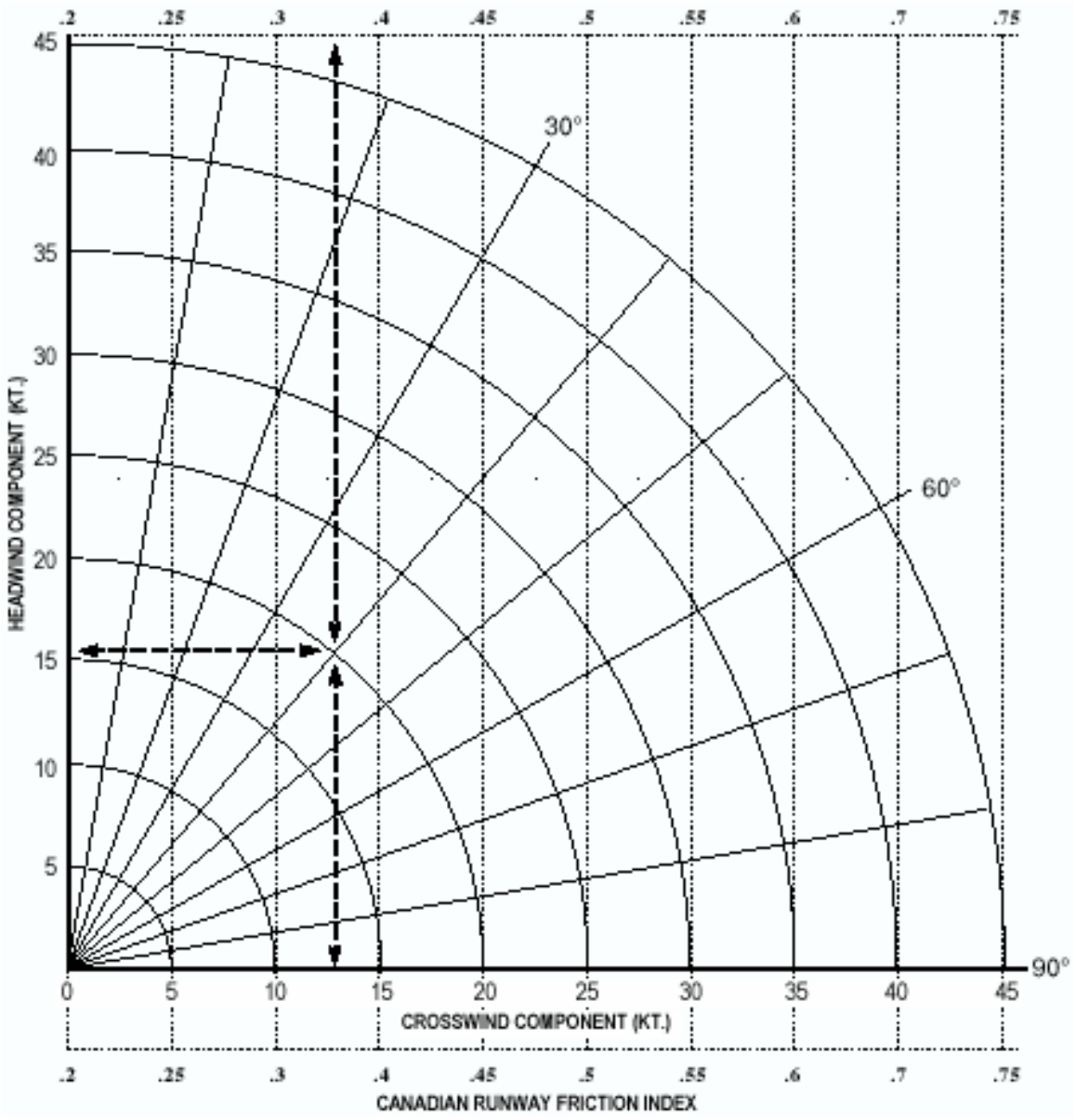
1. The recommended landing distances in Table 1 are based on a 95% level of confidence. A 95% level of confidence means that in more than 19 landings out of 20, the stated distance in Table 1 will be conservative for properly executed landings with all systems serviceable on RWY surfaces with the reported CRFI.
2. Table 1 will also be conservative for turbojet and turboprop-powered ACFT with reverse thrust, and additionally, in the case of turboprop-powered ACFT, with the effect obtained from discing.
3. The recommended landing distances in CRFI Table 1 are based on standard pilot techniques for the minimum distance landings from 50ft, including a stabilized approach at Vref using a glide slope of 3° to 50ft or lower, a firm touchdown, minimum delay to nose lowering, minimum delay time to deployment of ground lift dump devices and application of brakes, and sustained maximum anti-skid braking until stopped.
4. Landing field length is the landing distance divided by 0.6 (turbojets) or 0.7 (turboprops). If the AFM expresses landing performance in terms of landing distance, enter the table from the left-hand column. However, if the AFM expresses landing performance in terms of landing field length, enter the table from one of the right-hand columns, after first verifying which factor has been used in the AFM.

Table 2 - CRFI Recommended Landing Distances (Discing/Reverse Thrust)

LDG DIST (m) Bare and Dry Unfactored	Reported Canadian Runway Friction Index (CRFI)												Landing Field Length (m) Bare and Dry	
	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.27	0.25	0.22	0.20	0.18		
	Recommended Landing Distance in Meters (Discing/Reverse Thrust)												Factor	
													60%	70%
366	610	622	634	647	662	677	695	714	726	744	759	775	610	523
427	714	729	744	762	787	811	839	860	875	900	918	939	712	610
488	814	833	854	878	906	936	973	1000	1025	1055	1079	1107	813	697
549	918	939	964	991	1022	1061	1107	1137	1162	1198	1229	1259	915	784
610	1019	1043	1073	1104	1140	1183	1235	1272	1299	1342	1375	1412	1016	871
671	1089	1116	1147	1183	1226	1272	1329	1369	1400	1448	1485	1524	1118	958
732	1189	1220	1253	1290	1336	1387	1448	1488	1518	1570	1607	1649	1220	1046
793	1281	1311	1348	1390	1436	1491	1555	1598	1631	1683	1723	1765	1321	1133
854	1360	1393	1433	1476	1524	1582	1649	1695	1729	1784	1823	1869	1423	1220
915	1445	1482	1524	1573	1628	1692	1765	1814	1851	1912	1957	2006	1524	1307
976	1549	1592	1637	1692	1750	1820	1902	1957	2000	2064	2116	2168	1626	1394
1037	1631	1677	1726	1784	1848	1924	2009	2070	2113	2186	2238	2296	1728	1481
1098	1713	1762	1817	1878	1948	2027	2122	2186	2232	2308	2363	2424	1829	1568
1159	1796	1848	1905	1970	2043	2128	2229	2299	2347	2430	2488	2555	1931	1655
1220	1851	1905	1963	2030	2107	2198	2299	2372	2424	2506	2570	2637	2033	1742

1. The recommended landing distances in Table 2 are based on a 95% level of confidence. A 95% level of confidence means that in more than 19 landings out of 20, the stated distance in Table 2 will be conservative for properly executed landings with all systems serviceable on RWY surfaces with the reported CRFI.
2. The recommended landing distances in Table 2 take into account the reduction in landing distances obtained with the use of discing and/or reverse thrust capability for a turboprop-powered ACFT and with the use of reverse thrust for a turbo-jet powered ACFT. Table 2 is based on Table 1 recommended landing distances with additional calculations that give credit for discing and/or reverse thrust. Representative low values of discing and/or reverse thrust effect have been assumed, hence the data will be conservative for properly executed landing by some ACFT with highly effective discing and/or thrust reversing systems.
3. The recommended landing distances in CRFI Table 2 are based on standard pilot techniques for the minimum distance landings from 50ft, including a stabilized approach at V_{ref} using a glide slope of 3° to 50ft or lower, a firm touchdown, minimum delay to nose lowering, minimum delay time to deployment of ground lift dump devices and application of brakes and discing and/or reverse thrust, and sustained maximum anti-skid braking until stopped. In Table 2, the air distance from the screen height of 50ft to touchdown and the delay distance from touchdown to the application of full braking remain unchanged from Table 1. The effects of discing and/or reverse thrust were used only to reduce the stopping distance from the application of full braking to a complete stop.
4. Landing field length is the landing distance divided by **0.6 (turbojets)** or **0.7 (turboprops)**. If the AFM expresses landing performance in terms of landing distance, enter the table from the left-hand column. However, if the AFM expresses landing performance in terms of landing field length, enter the table from one of the right-hand columns, after first verifying which factor has been used in the AFM.

Table 3 - Crosswind Limits for CRFI



Example:

CYOW CRFI RWY 07/25 -4C .30 **1201191200** - Tower wind 110° / 20KT

The wind is 40° off the RWY heading and produces a headwind component of 15KT and a crosswind component of 13KT.

The recommended minimum CRFI for a 13KT crosswind component is .35. A take-off or landing with a CRFI of .3 could result in uncontrollable drifting and yawing

8.3 Flight Procedures

8.3.1 IFR/VFR Policy

8.3.1.1 General

(A) It is not allowed to simulate IMC, abnormal or emergency situations by artificial means (e.g. pulling of circuit breakers) except on non-revenue training flights or test flights.

(B) Turkish Airlines does not operate to uncontrolled airports.

(C) For uncontrolled airspace regulations, refer to route specific part of Jeppesen Airway Manual.

8.3.1.2 Application of IFR

(A) All Turkish Airlines revenue flights shall be conducted under Instrument Flight Rules (IFR). For exceptions refer to **Subchapter 8.3.1.3.**

(B) Cancellation of IFR flight is not permitted.

(C) Clearances to maintain "own separation in VMC" or a Visual Approach in order to avoid undue fuel penalties or delays may be accepted or requested by the Commander for limited portions of climb, descent or approach under the following conditions:

(1) relevant traffic can be clearly identified and kept in sight;

(2) it is assured that sufficient separation will exist at all times;

(3) during the daytime;

(4) VMC can be maintained; and

(5) the flight is able to establish its exact position and maintain proper terrain clearance.

(D) When radar control is not available, instrument approaches under IMC or at night shall be flown as full published procedure.

(E) Visual approaches as the final part and continuation of an instrument approach are not authorized at night unless;

(1) a special training has been conducted by flight crew for the specific approach at the simulator and,

(2) approved by the CFOO (Nominated Person, Flight Operations) based on risk assessment carried out for these approaches/aerodromes (Refer to Jeppesen CCI pages).

8.3.1.3 Application of VFR

(A) Turkish Airlines does not conduct commercial VFR flights but only commercial IFR flights to/from a VFR classified aerodrome.

(B) All flights to/from VFR classified aerodromes shall be conducted under Instrument Flight Rules restrictions and in VMC for aerodrome control zone.

(C) In reference to item (A) above, to operate to/from a VFR classified aerodrome, the following shall be complied with:

(1) Execute all approaches and climb-outs visually in Visual Meteorological Conditions as specified in **Subchapter 8.1.4.2**,

(2) Refer to **Subchapter 8.3.1.4** for operations at or below MSA.

(D) Requirements to operate to/from a VFR classified aerodrome are:

(1) Aerodromes control zone (upper limit) shall penetrate a controlled airspace.

(2) Operations shall be conducted during daylight only.

(3) Aerodrome shall have an operational control tower (staffed accordingly).

(E) Terrain and obstacle clearance to/from a VFR classified aerodrome is at the responsibility of the Commander.

(F) If the aerodrome has published procedures which have not yet been approved or not authorized for Turkish Airlines' operations, they may be used as a reference document if the above mentioned circumstances are maintained.

(G) Such operations will be authorized by the Chief Flight Operations Officer (Nominated Person) before the first flight is conducted and this authorization will be valid for all successive operations to that destination.

8.3.1.4 Operations Below Minimum Safe/Sector Altitude (MSA)

(A) For operations below the Minimum Safe/Sector Altitude (MSA), the Commander is responsible for terrain and obstacles clearance at all times.

(B) During IMC:

(1) Descend phase:

(a) Commander may accept radar vectors if ATC issued clearances are at or above the published MVA until established on any waypoint (at the specified altitude) of a published STAR or until reaching the published nav-aid or approach fix serving the aerodrome and descend in accordance with the published IAP.

(b) If ATC radar vectors are not available, or MVA is not published, or radar vectors are not acceptable, the Commander shall execute the STAR procedure as published and descend in accordance with the published IAP. If a STAR procedure is not available, the flight shall be conducted in accordance with the Official Flight Plan (OFP) until reaching the published nav-aid or approach fix serving the aerodrome (at or above the highest applicable published minimum altitude) and descend in accordance with the published IAP.

(2) Climb phase:

(a) Commander may accept radar vectors if ATC issued clearances are at or above published MVA until established on any waypoint (at the specified altitude) of a published SID or any waypoint specified in the current OFP.

(b) If ATC radar vectors are not available, or MVA is not published, or radar vectors are not acceptable, the Commander shall execute the SID procedure as published, climb accordingly, and thereafter continue in accordance with the OFP. If a SID procedure is not available, published engine-out procedures may be used to assure terrain and obstacle clearance until reaching the published nav-aid or fix serving the aerodrome. If nav-aid or fix serving the aerodrome is reached before the highest applicable published minimum altitude, the pilot-in-command shall continue to climb in published holding pattern and thereafter continue in accordance with the OFP. Commander shall inform ATC when published engine out procedures are to be used as this information is not available to ATC.

(C) During VMC:

(1) Descend phase:

(a) Commander may accept radar vectors if ATC issued clearances are at or above published MVA. Radar vectors below the MVA shall not be accepted if terrain and obstacle clearance cannot be assured by the Commander.

(b) If ATC radar vectors are not available, or MVA is not published, or radar vectoring is not acceptable, the Commander shall be capable of:

1. maintaining VMC until touchdown; or
2. maintaining VMC until established on any waypoint (at the specified altitude) of a published STAR and descend in accordance with the published IAP; or
3. maintaining VMC until reaching any published nav-aid or approach fix serving the approach and descent in accordance with the published IAP.

(2) Climb phase:

(a) Commander may accept radar vectors if ATC issued clearances are at or above published MVA. Radar vectors below the MVA shall not be accepted if terrain and obstacle clearance cannot be assured by the Commander.

(b) If ATC radar vectors are not available, or MVA is not published, or radar vectors are not acceptable, the Commander shall be capable of:

1. maintaining VMC until established on any waypoint (at the specified altitude) of a published SID, execute the SID procedure and thereafter continue in accordance with the OFP; or
2. maintaining VMC until established on the published engine-out procedure and thereafter continue to the published nav-aid or fix serving the aerodrome and climb in accordance with the published holding pattern until reaching the highest applicable published minimum altitude and thereafter continue in accordance with the OFP; Commander shall inform ATC when published engine out procedures are to be used as this information is not available to ATC; or
3. maintaining VMC until within radar coverage (radar vectors acceptable).

8.3.1.5 Noise Abatement Procedures

(A) Turkish Airlines uses two takeoff procedures, one satisfying the needs of NADP 1 (to meet the close-in noise abatement objective) and one that satisfies the needs of NADP 2 (designed to meet the distant noise abatement objective) which are described in the **Operations Manual Part-B**.

(B) Nothing in these procedures shall prevent the pilot-in-command from exercising authority for the safe operation of the aeroplane.

(C) National requirements shall take precedence if different from Turkish Airlines procedures.

8.3.2 Navigation Procedures

8.3.2.1 Company Policies

(A) An aeroplane shall not be operated unless the navigation equipment required or otherwise installed is approved and installed in accordance with the applicable requirements including operational and airworthiness requirements and the minimum standards applicable. During all phases of flight full use of all available navigation and landing aids must be made.

(B) A failure of a single unit required for operation 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.

(C) The function of all equipment necessary for each flight shall be checked prior to departure. Once in flight, equipment which are not directly required for navigation along the selected route should be tuned to ground stations within range of which indications will enable the accuracy of the primary aids to be verified, or from which the bearing and distance indications will enable ground-speed checks or ETA adjustments to be made. The routine use of all fitted equipment will ensure that errors in performance or faulty operation may be detected, and rectification arranged at an early stage.

(D) Reliance should not be placed on information derived from ground beacons until the appropriate coded signal has been identified and, in the case of two-pilot flight crew, confirmed by both pilots. One flight crew should read aloud the coordinates, tracks or distances while the other flight crew operates the keyboard and reads back the figures he has programmed as a cross-check of their accuracy. In flight, other available navigation equipment should be selected and used to confirm the accuracy of the primary aid, and to be readily available for use if the primary equipment gives indications of inaccuracy or malfunction. Above all, flight crew members must remain alert to the possibility of errors in programming or performance, and be prepared to revert to the use of raw data provided by such standard VOR, NDB and DME equipment as are available.

(E) Navigation logs should be comprehensively completed en route, except when climbing and descending, and ETAs should be kept amended to take account of significant changes. Note should be made of any diversion from the planned route, whether initiated by the Commander or requested by air traffic control, with a brief description of the circumstances, the time the alteration was made, and any fuel replanning calculations which were necessary. If difficulties are encountered in following a particular route, the more information which is recorded to assist a post-flight investigation, the greater will be the chances of overcoming the problems on future flights over the same route. It must be noted that when operating off the route indicated on the navigation log the listed safety altitudes may not be valid and caution must be exercised especially during climb out and at top of descent.

(F) Phases of flight requiring compulsory use of the systems are specified in **Subchapter 8.3.18** (e.g. autopilot, flight director, etc.).

8.3.2.1.1 Procedures for System Degradation

(A) Degradation of on-board equipment must be taken into consideration for any in-flight planning/replanning with regard to destination and alternate weather, and for fuel planning for en-route conditions.

(B) Any downgrading of ground facilities must be assessed with regard to possible increased landing minima at destination and/or alternate airports.

8.3.2.1.2 Navigation

(A) The most important principle governing the performance of all navigation tasks is redundancy, as navigational errors carry a significant risk potential.

(B) Whether navigating on manually-tuned navigation aids, on the navigation system or on radar vectors, cross-checks of the primary aids are essential. The sole use of the airborne navigation systems carried on the aeroplane is not adequate for all phases of flight and should be supplemented by specific independent checks using those equipment not directly required for navigation.

(C) Flight plans activated in the navigation system shall be checked by both pilots against the flight plan by comparing the routing (airways) and total distance to be flown. For flights utilizing ETOPS and/or MNPS (HLA) airspace, FMS shall be checked by both pilots by comparing the waypoints, tracks and distances of such special procedure airspace segments against the flight plan. A FMS is also suitable and authorized for preflight planning (when an Operational Flight Plan is not available).

(D) For in-flight replanning, all available means (e.g. Route Facility Charts) shall be used to cross-check the corresponding data.

(E) For adhoc in-flight replanning, flight crews must not only check if the fuel requirements of **Subchapter 8.1.7** will be met, but also if the available navigational aids for the replanned route and/or the replanned destination as well as the airborne equipment will be sufficient and satisfactory for a safe conclusion of the flight.

8.3.2.1.3 Navigation Procedures

(A) Notwithstanding the overall responsibility of the Commander for precise navigation and proper use and handling of navigation systems, the Pilot Flying (PF) is responsible for the selection of the navigation aids and of the required navigation system configuration.

(B) It is the responsibility of all flight crew members to monitor navigation performance, verify present position and, if applicable, maintain a particular RNP, in accordance with the respective AFM’s.

(C) The PF, whenever flying manually, will direct the PM to set specific navaids. In such cases, the PM is responsible to set, identify and check the navaids specified by the PF and to establish the required navigation system configuration.

(D) When flying on autopilot, the PF sets and identifies the navaids and checks the navigation system configuration. Any changes made by PM shall be made at request of, and be checked by the PF.

(E) The flight crews shall inform each other of any doubts about the reliability of a navigation aid or of a system.

(F) For flights or portions of a flight conducted at altitudes where safe terrain clearance is not contingent upon navigation accuracy, the on-board navigation system redundancy may be considered acceptable as long as the aeroplane's computed positions are checked at regular intervals against displayed navigation aids, where these aids are available. In areas where such aids are not available (e.g. sea, desert), traffic separation provided by ATC accounts for the reduced navigation accuracy.

(G) Safe terrain clearance is dependent on navigation accuracy for take-off and climb. If the departure procedures are stored in the navigation database, the on-board navigation system must be in the update mode and the system-computed positions checked continuously against displayed navigation aids. If these conditions cannot be met, take-off and climb must be performed according to conventional radio-navigation.

(H) If the arrival procedures for descent and approach are stored in the navigation database the on-board navigation system must be in the update mode and the system-computed positions must be checked continuously against displayed navigation aids. The use is restricted down to MOCA/MORA/MSA and intermediate approach altitude, unless the system is certified for use in the approach according to the AOM.

(I) If these conditions are not met, the whole descent and/or approach procedure must be performed by using conventional radio-navigation.

(J) ILS facilities of all categories are known to produce false beams outside their coverage sectors due to radiation aberrations. Such beams are subject to being captured without a warning flag. In order to ensure proper localizer beam capture, the ILS mode shall not be armed until the vicinity of the beam has been ascertained and checked by independent navigation aids and the capture shall be monitored by the same means.

(K) During IMC conditions, a DME distance/altitude check at glide slope/glide path intercept or at the OM position or its equivalent by comparison to the Instrument Approach Chart shall be performed whenever possible to avoid false glide slope/glide path captures and unstabilized approaches.

(L) FMS vertical navigation features may not substitute for altitude preselect procedures and practices.

8.3.2.1.4 Navigation Aids

(A) Navigation aids should be selected for coverage and geometry with adequate cross-checks. Distance information for cross-checks shall be used only if a DME is co-located with a VOR which coincides with a waypoint.

(B) If not otherwise specified for certain procedures, required navigation aids must be positively identified at the time of selection. VOR or ILS associated DMEs require separate identification.

(C) Whenever elements of information relative to position are contradictory, the reliability of any relevant navigation aid(s) should be verified by additional independent means.

(D) Navigation and approach aids must not be used:

(1) Whenever positive identification is not possible.

(2) Whenever reports or other information (e.g. NOTAMS) indicate that system is unserviceable, unreliable, ground checked only, or on test.

8.3.2.1.5 FMS Navigation

(A) Standard en-route navigation shall be performed by FMS navigation where appropriate tracking is either pre-programmed in the navigation database or manually set up by using waypoints/airways contained in the pre-programmed database.

(B) Unusable navaids must be deselected to prevent false updating of FMS.

(C) For use of FMS in all other flight phases refer to **Operations Manual Part-B**.

8.3.2.1.6 Continuous Descent Final Approach (CDFA)

(A) In the interest of safety, Turkish Airlines uses stabilized CDFA technique and profiles when flying non-precision approach procedures whenever required conditions are met.

(B) Notwithstanding (A), another approach flight technique may be used for a particular approach/runway combination if approved by Turkish DGCA. In such cases, the applicable minimum runway visual range (RVR):

(1) shall be increased by 400 m; or

(2) for aerodromes where there is a public interest to maintain current operations and the CDFA technique cannot be applied, shall be established and regularly reviewed by Turkish DGCA taking into account Turkish Airlines' experience, training programme and flight crew qualification.

(C) CDFA procedures are detailed in the **Operations Manual Part-B**.

8.3.2.1.7 Strategic Lateral Offset Procedures (SLOP)

(A) Certain airspaces make use of SLOP (Strategic Lateral Offset Procedures) and specific guidelines exist in these cases. Flight crews should familiarize themselves with these procedures; in brief there are only three positions that an aeroplane may fly; on centerline, 1 NM or 2 NM right of centerline. Aeroplane without automatic offset programming capability must fly the centerline. For details refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(B) In other areas where SLOP are not in use and where Commander considers a higher than normal potential for traffic conflict exists such as:

(1) African routes, where In-flight Broadcast Procedures (IFBP) are in use,

(2) While climbing or descending on airways, where it is known that bidirectional traffic exists, a one nautical miles (1.0 nm) right offset may be flown. This offset navigation procedure is subject to the following restrictions:

(a) the aeroplane is not operating below MSA;

(b) the aeroplane is not following SIDs, STARs or radar vectors;

(c) the aeroplane is not operating in designated European B-RNAV airspace or routes, or in any area where RNP5 or better is required;

(d) navigation accuracy is assured; and

(e) subject to prior ATC approval.

8.3.2.2 Operations in Specified Navigation/Communication/Surveillance Performance Areas

8.3.2.2.1 High Level Airspace (HLA) Navigation

(A) Turkish Airlines is approved to operate in High Level Airspace (HLA) (former Minimum Navigation Performance Specification Airspace (MNPSA)) which requires special training, equipment, procedures and regulatory approval. Detailed information can be found in the Regional Supplementary Procedures, ICAO Doc 7030, as well as in national AIPs. Operations in MNPS airspace such as North Atlantic High Level Airspace (NAT HLA) and Polar regions shall be in accordance with regional supplementary procedures. For NAT requirements see North Atlantic Operations And Airspace Manual (NAT Doc 007).

(B) For descriptions, requirements and procedures refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(C) For ETOPS requirements and procedures in MNPS airspace/High Level Airspace (HLA) refer to **Subchapter 8.5.**

8.3.2.2.2 Performance Based Navigation (PBN)

8.3.2.2.2.1 Definitions

(A) Area navigation (RNAV): A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

(B) Performance-Based Navigation (PBN): Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

(C) Receiver Autonomous Integrity Monitoring (RAIM): A technique whereby a GNSS receiver/processor determines the integrity of the GNSS navigation signals using only GNSS signals.

(D) RAIM Prediction: Prediction of RAIM availability by using a software tool to assess the expected capability of meeting the navigation performance. The software is used during dispatch phase and made available to the flight crew in NOTAM section.

(E) Required Navigation Performance (RNP): A navigation specification for PBN operations which includes a requirement for on-board navigation performance monitoring and alerting.

(F) RNP APCH: A PBN specification used for instrument approach operations.

(G) RNP APCH operation down to LNAV minima: A 2D instrument approach operation for which the lateral guidance is based on GNSS positioning.

(H) RNP APCH operation down to LNAV/VNAV minima: A 3D instrument approach operation for which the lateral guidance is based on GNSS positioning and the vertical guidance is provided either by the Baro VNAV function.

(I) RNP AR APCH: A navigation specification used for instrument approach operations requiring a specific approval.

(J) Two-dimensional (2D) instrument approach operation: An instrument approach operation using lateral navigation guidance only.

(K) Three-dimensional (3D) instrument approach operation: An instrument approach operation using both lateral and vertical navigation guidance.

8.3.2.2.2.2 General

(A) An overview of PBN specifications is as follows. The table shows flight phases and the required navigation performance for each specification. For both, RNP X and RNAV X designations, the 'X' (where stated) refers to the lateral navigation accuracy (total system error) in NM, which is expected to be achieved at least 95 % of the flight time by the population of aircraft operating within the airspace, route or procedure. For RNP APCH, lateral navigation accuracy depends on the segment. Only RNP AR APCH requires specific approval. Eligibility of the fleets for the PBN specifications other than RNP AR APCH shall be covered in type specific Operational Manuals. RNP AR APCH eligibility shall continue to be depicted in the AOC.

Navigation Specification	Flight Phase							
	Enroute		Arrival	Approach				Departure
	Oceanic	Continental		Initial	Intermediate	Final	Missed	
RNAV 10	10							
RNAV 5		5	5					
RNAV 2		2	2					2
RNAV 1		1	1	1	1		1	1
RNP 4	4							
RNP 2	2	2						
RNP 1			1	1	1		1	1
RNP APCH (LNAV)				1	1	0.3	1	
RNP APCH (LNAV/VNAV)				1	1	0.3	1	
RNP AR APCH				1-0.1	1-0.1	0.3-0.1	1-0.1	

(B) For all PBN operations;

(1) Normal, abnormal and contingency procedures shall be accomplished in accordance with relevant FCOM/AFM, FCTM and QRHs. For explanatory purposes, Flight Operations Standards Management may consolidate procedures as guides (Refer to **Subchapter 8.1.12** for references) or handbooks. These guides and handbooks shall not supersede MEL limitations and FCOM/AFM, FCTM and QRH procedures, however may be more restrictive.

(2) Electronic navigation database management shall be accomplished in accordance with **PR.74.605 Procedure for FMS Navigation Database**.

(3) Relevant entries in the Minimum Equipment List (MEL) shall be made by IOCC. Continued airworthiness of the area navigation system shall be ensured.

(4) Flight crew qualification and proficiency constraints shall be specified in accordance with **EK.10.72.001 Operations Manual Part-D** to ensure that the training program for relevant personnel is consistent with the intended operation.

(C) PBN may be required on notified routes, for notified procedures and in notified airspace.

(D) For purposes of consistency with the PBN concept, this chapter is using the designation 'RNAV 10' because this specification does not include on-board performance monitoring and alerting. However, many routes still use the designation 'RNP 10' instead of 'RNAV 10'. 'RNP 10' was used as designation before the publication of the fourth edition of ICAO Doc 9613 in 2013. The terms 'RNP 10' and 'RNAV 10' shall be considered equivalent.

(E) All Turkish Airlines airplanes are GNSS equipped. All oceanic/remote phases of flight requiring RNAV 10 or RNP 4 shall be flown with GNSS update.

(F) In the context of the terminology, B-RNAV and P-RNAV requirements are termed as RNAV 5 and RNAV 1, respectively. Functional and operational requirements of B-RNAV/RNAV 5 and P-RNAV/RNAV 1 are identical.

(G) The Joint Aviation Authorities (JAA) published airworthiness and operational approval for precision area navigation (P-RNAV) on 1 November 2000 through TGL-10. The Federal Aviation Administration (FAA) published AC 90-100 U.S. terminal and en-route area navigation (RNAV) operations on 7 January 2005, and updated on 1 March 2007 through AC 90-100A. While similar in functional requirements, differences exist between these two documents. ICAO PBN specification harmonized European and United States RNAV criteria into a single ICAO RNAV 1 and 2 specification. The aeroplane requirements for RNAV 1 and 2 are identical, while some operating procedures are different.

(H) The flight crew shall ensure that RNAV 1, RNAV 2, RNP 1, RNP 2, and RNP APCH routes or procedures to be used for the intended flight, including for any alternate aerodromes, are selectable from the navigation database and are not prohibited by NOTAM. The flight crew shall take account of any NOTAMs or briefing material that could adversely affect the aircraft system operation along its flight plan including any alternate aerodromes.

(I) When PBN relies on GNSS systems for which RAIM is required for integrity, its availability shall be verified during the preflight planning (RAIM Prediction) through NOTAMs. In the event of a predicted continuous loss of fault detection of more than five minutes, the flight planning shall be revised to reflect the lack of full PBN capability for that period.

(J) Detailed information about PBN operations can be found in ICAO Doc 9613 PBN Manual, related EASA Regulations (especially Part-CAT and Part-SPA), ICAO NAT Supplementary Procedures (Doc 7030), **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual and **EK.10.72.001 Operations Manual Part-D 2.1.15. Performance Based Navigation (PBN)**.

(K) The flight crew shall comply with any instructions, procedures or limitations defined in the applicable FCOM/AFM, FCTM, QRH, MEL etc. as necessary to comply with the requirements in this chapter.

8.3.2.2.2.3 Selection of Destination Alternates for PBN Operations

An aerodrome shall only be selected as a destination alternate aerodrome if an instrument approach procedure that does not rely on GNSS is available either at that aerodrome or at the destination aerodrome. The limitation applies only to destination alternate aerodromes for flights when a destination alternate aerodrome is required. A take-off or enroute alternate aerodrome with instrument approach procedures relying on GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures relying solely on GNSS may be used without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met. Refer to **Subchapter 8.1.2.3.2** for other conditions . The term 'available' means that the procedure can be used in the planning stage and complies with planning minima requirements.

8.3.2.2.2.4 Monitoring and Verification

(A) Preflight and general considerations

(1) At navigation system initialization, the flight crew shall confirm that the navigation database is current and verify that the aircraft position has been entered correctly. Database cycles have one day in common. If within the UTC date and time at common day, flight crew shall select and activate the new database cycle prior first flight of the day.

(2) The active flight plan, if applicable, shall be checked by comparing the charts or other applicable documents with navigation equipment and displays. This includes confirmation of the departing runway and the waypoint sequence, reasonableness of track angles and distances (For SIDs/STARs differences of 3 degrees or less may result from the equipment manufacturer's application of magnetic variation and are operationally acceptable), any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. Where relevant, the RF leg arc radii shall be confirmed.

Note: As a minimum, the departure checks could be a simple inspection of a suitable map display that achieves the objectives above.

(3) The flight crew shall check that the navigation aids critical to the operation of the intended PBN procedure are available.

(4) The flight crew shall confirm the navigation aids that shall be excluded from the operation, if any.

(5) An arrival, approach or departure procedure shall not be used if the validity of the procedure in the navigation database has expired. Navigation databases shall be current for the duration of the flight. If the AIRAC cycle will change during flight, apply the following procedures to ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight:

(a) electronic data must be verified against paper products. Flight crew must compare aeronautical charts (new and old) to verify navigation fixes,

(b) if an amended chart is published for the procedure, the database must not be used to conduct the operation,

(c) an alternative planning shall be requested in coordination with dispatch, excluding affected procedures and navigation facilities and/or waypoints.

(6) The flight crew shall verify that the navigation systems required for the intended operation are operational.

(B) Departure

(1) Prior to commencing a take-off on a PBN procedure, the flight crew shall check that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll.

(2) Where GNSS is used, the signal shall be acquired before the take-off roll commences.

(3) Unless automatic updating of the actual departure point is provided, the flight crew shall ensure initialization on the runway or FATO by means of a manual runway threshold or intersection update, as applicable. This is to preclude any inappropriate or inadvertent position shift after take-off.

(C) Arrival and approach

(1) The flight crew shall verify that the navigation system is operating correctly and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted.

(2) Any published altitude and speed constraints shall be observed.

(3) The flight crew shall check approach procedures (including alternate aerodromes if needed) as extracted by the system, to confirm the correct loading and the reasonableness of the procedure content.

(4) Prior to commencing the approach (before the IAF), the flight crew shall verify the correctness of the loaded procedure by comparison with the appropriate approach charts. This check shall include:

(a) the waypoint sequence;

(b) reasonableness of the tracks and distances of the approach legs and the accuracy of the inbound course; and

Note: For SIDs/STARs, differences of 3 degrees or less may result from the equipment manufacturer's application of magnetic variation and are operationally acceptable. Refer to applicable AFM/FCOM for approach reasonableness limitations.

(c) the vertical path angle, if applicable.

Note: As a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives described above.

(D) Altimetry settings for RNP APCH Operations

(1) Barometric settings

(a) The flight crew shall set and confirm the correct altimeter setting and check that the two altimeters provide altitude values that do not differ more than 100 ft at the most at or before the final approach fix (FAF).

(b) The flight crew shall fly the procedure with:

1. a current local altimeter setting source available — a remote or regional altimeter setting source shall not be used; and

2. the QNH, set on the aircraft's altimeters.

(2) Temperature compensation

(a) For RNP APCH operations to LNAV/VNAV minima:

1. the flight crew shall not commence the approach when the aerodrome temperature is outside the promulgated aerodrome temperature limits for the procedure unless the area navigation system is equipped with approved temperature compensation for the final approach;

2. when the temperature is within promulgated limits, the flight crew shall not make compensation to the altitude at the FAF and DA/H;

3. since only the final approach segment is protected by the promulgated aerodrome temperature limits, the flight crew shall consider the effect of temperature on terrain and obstacle clearance in other phases of flight.

(b) For RNP APCH operations to LNAV minima, the flight crew shall consider the effect of temperature on terrain and obstacle clearance in all phases of flight, on any step-down fix.

(E) Sensor and lateral navigation accuracy selection

(1) The flight crew shall verify, prior to approach, that the GNSS sensor is used for position computation.

(2) Flight crew of aircraft with RNP input selection capability shall confirm that the indicated RNP value is appropriate for the PBN operation.

8.3.2.2.2.5 Management of the Navigation Database

(A) For RNAV 1, RNAV 2, RNP 1, RNP 2, and RNP APCH, the flight crew shall neither insert nor modify waypoints by manual entry into a procedure (departure, arrival or approach) that has been retrieved from the database. User-defined data may be entered and used for waypoint altitude/speed constraints on a procedure where said constraints are not included in the navigation database coding.

(B) For RNP 4 operations, the flight crew shall not modify waypoints that have been retrieved from the database. User-defined data may be entered and used.

(C) The lateral and vertical definition of the flight path between the FAF and the missed approach point (MAPt) retrieved from the database shall not be revised by the flight crew.

8.3.2.2.2.6 Displays and Automation

(A) For RNAV 1, RNP 1, and RNP APCH operations, the flight crew shall use a lateral deviation indicator, and where available, flight director and/or autopilot in lateral navigation mode.

(B) The appropriate displays shall be selected so that the following information can be monitored:

(1) the computed desired path;

(2) aircraft position relative to the lateral path (cross-track deviation) for FTE monitoring;

(3) aircraft position relative to the vertical path (for a 3D operation).

(C) The flight crew shall maintain procedure centerlines unless authorized to deviate by air traffic control.

(D) Cross-track error/deviation (the difference between the area-navigation-system-computed path and the aircraft-computed position) shall normally be limited to ± 1⁄2 time the RNAV/RNP value associated with the procedure. Brief deviations from this standard (e.g. overshoots or undershoots during and immediately after turns) up to a maximum of 1 time the RNAV/RNP value shall be allowable.

(E) For a 3D approach, the flight crew shall use a vertical deviation indicator and, where required by AFM limitations, a flight director or autopilot in vertical navigation mode.

(F) Deviations below the vertical path shall not exceed 75 ft at any time, or half-scale deflection where angular deviation is indicated, and not more than 75 ft above the vertical profile, or half-scale deflection where angular deviation is indicated, at or below 1000 ft above aerodrome level. The flight crew shall execute a missed approach if the vertical deviation exceeds this criterion.

(G) Manually selecting aeroplane bank limiting functions may reduce the aeroplane's ability to maintain its desired track and are not recommended. Flight crew should recognize that manually selectable aircraft bank-limiting functions might reduce their ability to satisfy ATC path expectations, especially when executing large angle turns. This should not be construed as a requirement to deviate from aeroplane flight manual procedures; flight crew should be encouraged to limit the selection of such functions within accepted procedures.

8.3.2.2.2.7 Vectoring and Positioning

(A) ATC tactical interventions in the terminal area may include radar headings, 'direct to' clearances which bypass the initial legs of an approach procedure, interceptions of an initial or intermediate segments of an approach procedure or the insertion of additional waypoints loaded from the database.

(B) In complying with ATC instructions, the flight crew shall be aware of the implications for the navigation system.

(C) 'Direct to' clearances may be accepted to the IF provided that it is clear to the flight crew that the aircraft will be established on the final approach track at least 2 NM before the FAF.

(D) 'Direct to' clearance to the FAF shall not be acceptable. Modifying the procedure to intercept the final approach track prior to the FAF shall be acceptable for radar-vectored arrivals or otherwise only with ATC approval.

(E) The final approach trajectory shall be intercepted no later than the FAF in order for the aircraft to be correctly established on the final approach track before starting the descent (to ensure terrain and obstacle clearance).

(F) 'Direct to' clearances to a fix that immediately precede an RF leg shall not be permitted.

(G) For parallel offset operations enroute in RNP 4 and A-RNP, transitions to and from the offset track shall maintain an intercept angle of no more than 45° unless specified otherwise by ATC.

(H) If ATC issues a heading assignment taking the aeroplane off a route, the flight crew should not modify the flight plan in the RNAV system until a clearance is received to rejoin the route or the controller confirms a new route clearance. When the aeroplane is not on the published route, the specified accuracy requirement does not apply.

8.3.2.2.2.8 Alerting and Abort

(A) Unless the flight crew has sufficient visual reference to continue the approach to a safe landing, an RNP APCH operation shall be discontinued if:

(1) navigation system failure is annunciated (e.g. warning flag);

(2) lateral or vertical deviations exceed the tolerances;

(3) loss of the on-board monitoring and alerting system.

(B) Discontinuing the approach may not be necessary for a multi-sensor navigation system that includes demonstrated RNP capability without GNSS in accordance with the AFM.

(C) Where vertical guidance is lost while the aircraft is still above 1 000 ft AGL, the flight crew may decide to continue the approach to LNAV minima, when supported by the navigation system.

8.3.2.2.2.9 Contingency Procedures

(A) The flight crew shall make the necessary preparation to revert to a conventional arrival procedure where appropriate. The following conditions shall be considered:

(1) failure of the navigation system components including navigation sensors, and a failure effecting flight technical error (e.g. failures of the flight director or autopilot);

(2) multiple system failures affecting aircraft performance;

(3) coasting on inertial sensors beyond a specified time limit; and

(4) RAIM (or equivalent) alert or loss of integrity function.

(B) In the event of loss of PBN capability, the flight crew shall:

(1) invoke contingency procedures (Specific airspace contingency procedures shall be respected as well (e.g. NAT Region)).

(2) navigate using an alternative means of navigation (use of inertial system or conventional navigation)

(3) notify ATC of any problem with PBN capability. The communications to ATC must be in accordance with the authorized procedures (refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual and ICAO Doc 4444 or ICAO Doc 7030, as appropriate).

(a) With respect to the degradation/failure in-flight of an PBN system, while the aeroplane is operating on an ATS route requiring the use of specific PBN capability:

1. aeroplane should be routed via VOR/DME-defined ATS routes; or

2. if no such routes are available, aeroplane should be routed via conventional NAVAIDs, i.e. VOR/DME; or

Note: ACFT routed in accordance with a) or b) may, where practicable, require continuous radar monitoring by the ATC unit concerned.

(b) With respect to the degradation/failure in-flight of an PBN system, while the aeroplane is operating on an arrival or departure procedure requiring the use of specific PBN capability:

1. the aeroplane should be provided with radar vectors until the aeroplane is capable of resuming its own navigation,

2. the aeroplane should be routed by conventional NAVAIDs, i.e. VOR/DME, or

3. flight crew shall climb at least MSA unless being radar vectored by ATC.

(4) If it is not possible to land at planned aerodrome due to PBN capability, proceed to a suitable airport considering the remaining navigation and approach capability of aeroplane.

(C) Contingency procedures during departure and approach must be briefed by the PF and will be executed for the respective phase of flight.

(D) In the event of communication failure, the flight crew shall continue with the operation in accordance with published lost communication procedures.

(E) Where DME updating for the RNP system is not authorized by the State, in case of GNSS signal loss or if GNSS positioning data is unreliable, contingency procedure shall be as follows:

(1) Flight crew must take precautions to inhibit DME updating or a missed approach must be executed if reverting to DME updating.

(F) RNAV 1 Descent and Arrival Specific:

(1) Where the contingency procedure requires reversion to a conventional arrival route, necessary preparations must be completed before commencing the RNAV route (According to P-RNAV regulations, such contingency is required for below MOCA or outside radar coverage. RNAV 1 is intended for application within radar coverage (MOCA is not a significant constraint if the radar service is available and the aircraft is above MSA)).

8.3.2.2.2.10 RNP Approach (RNP APCH)

(A) Pre-flight Planning:

(1) If the missed approach procedures are based on conventional means (VOR, NDB), the appropriate airborne equipment required to fly this procedure must be installed in the aeroplane and must be operational. The associated ground based navaids must also be operational.

(2) If the missed approach procedure is based on RNAV (no conventional or dead reckoning missed approach available), the appropriate airborne equipment required to fly this procedure must be available and serviceable on board the aeroplane.

(B) During The Procedure:

(1) The final approach trajectory must be intercepted no later than the FAF in order for the aeroplane to be correctly established on the final approach course before starting the descent (to ensure terrain and obstacle clearance).

(2) The crew should also check the consistency between the VNAV guidance and the primary altimeters indications commensurate with flight crew workload (e.g. after the aeroplane is established on the vertical path).

(3) During the descent, crew should check that the vertical speed is consistent with the VNAV angle to be flown.

(4) The appropriate displays must be selected so that the following information can be monitored:

(a) The RNAV computed desired path (DTK), and

(b) Aeroplane position relative to the lateral path (CrossTrack Deviation) for FTE monitoring

(c) Aeroplane position relative to the vertical path (RNP APCH operation to LNAV/VNAV mimima)

(5) The crew should respect all published altitude and speed constraints.

(6) The missed approach must be flown in accordance with the published procedure. Use of the RNAV system during the missed approach is acceptable provided:

(a) The RNAV system is operational (e.g. no loss of function, no RAIM alert, no failure indication, etc.).

(b) The whole procedure (including the missed approach) is loaded from the navigation data base.

(7) All flight crews are expected to maintain procedure centerlines, as depicted by on board lateral deviation indicators and/or flight guidance during all the approach procedure unless authorized to deviate by ATC or under emergency conditions.

(8) For normal operations, crosstrack error/deviation (the difference between the RNAV system computed path and the aeroplane position relative to the path) should be limited to ± ½ the navigation accuracy associated with the procedure (i.e., 0.5 nm for the Initial and Intermediate segments, 0.15 nm for the Final Approach segment, and 0.5 nm for the Missed Approach segment).

(9) Brief deviations from this standard (e.g. overshoots or undershoots) during and immediately after turns, up to a maximum of 1 times the navigation accuracy (i.e., 1.0 nm for the Initial and Intermediate segments), are allowable.

(10) In addition, during RNP APCH operation to LNAV/VNAV minima, flight crews must use a vertical deviation indicator, flight director and/or autopilot in vertical navigation mode.

(11) Deviations above and below the vertical path must not exceed ±75 feet. Flight crews must execute a Missed Approach if the vertical deviation exceeds the criteria above.

(12) In the event of failure of one RNAV system during a procedure where two systems are necessary, the crew should abort the procedure if the failure occurs before FAF but could continue the approach if the failure occurs after FAF.

(13) Use of GNSS altitude information by the crew is prohibited.

8.3.2.2.2.11 RNP AR Operations

(A) RNP AR operations require;

(1) The aircraft is authorized and,

(2) Crew is qualified and,

(3) Procedure is validated for the approach being flown.

Note: See **TL.74.500 Instruction on PBN Special Approvals** for the procedures regarding the approval of RNP AR operations.

(B) Unlike non-RNP AR operations, aircraft eligibility shall be depicted in the AOC. Crew qualification for the RNP AR operations requires special training. Crew qualification shall be accomplished in accordance with **EK.10.72.001 Operations Manual Part-D**.

(C) An operational GPWS shall be available for all RNP AR APCH operations. The GPWS shall use altitude values that are compensated for local pressure and temperature effects (e.g. corrected barometric and GNSS altitude), and include significant terrain and obstacle data.

(D) Relevant MEL limitations and FCOM/AFM, FCTM and QRH procedures shall be followed for RNP AR APCH operations. For explanatory purposes, Standardization Department may consolidate procedures in guides (such as **LS.73.014 A330 RNP AR APPROACH GUIDE**) or handbooks. However, these guides and handbooks shall not supersede MEL limitations and FCOM/AFM, FCTM and QRH procedures.

(E) For RNP AR APCH operations, the flight crew shall check that the autopilot/flight director is installed and operational.

(F) The RNP availability at the time and location of a desired RNP operation shall be predicted and reported in the NOTAMS section, by the dispatcher (RAIM Prediction).

(G) The flight crew shall check NOTAMs section to determine if selective exclusion of NAVAIDs (e.g. DMEs, VORs, localizers) is required in case the necessity for radio updating occurs during the flight. Radio updating may be used for enroute and arrival phases of the flight, in case GNSS updating is not available. However, RNP AR approach phase (starting with IAF) must be flown with GNSS updating. Executing RNP AR APCH without GNSS update is prohibited.

(H) Flight Considerations:

(1) The flight crew shall not fly a published RNP AR APCH procedure unless it is retrievable by the procedure name from the aircraft navigation database and conforms to the charted procedure. The lateral path shall not be modified; except for accepting a clearance to go direct to a fix in the approach procedure that is before the FAF and that does not immediately precede an RF leg. If the IAF has an “at or above” altitude restriction, it may be changed to an “at” altitude restriction using the same altitude. Speed modifications are allowed if the maximum published speed is not exceeded. No other lateral or vertical modifications after the IAF may be made. RNP AR APCHs shall be flown within the allowed temperature window as depicted on the charted procedure. Application of cold temperature corrections is prohibited for RNP AR APCHs.

(2) The flight crew shall check the mandatory list of equipment for conducting RNP AR APCH operations by means of FCOM. In-flight equipment failures that would prohibit RNP AR APCH operations shall be handled in accordance with FCOM procedures.

(3) The flight crew shall check that the navigation system uses the appropriate RNP values throughout the approach. If the navigation system does not extract and set the navigation accuracy from the on-board navigation database for each segment of the procedure, then the flight crew shall ensure that the smallest navigation accuracy required to complete the approach or the missed approach is selected before initiating the approach (e.g. before the IAF). Different IAFs may have different navigation accuracy, which are annotated on the approach chart.

(4) The flight crew shall ensure that no loss of RNP annunciation is received prior to commencing the RNP AR APCH. During the approach, if at any time a loss of RNP annunciation is received, the flight crew shall abandon the RNP AR APCH unless the pilot has in sight the visual references required to continue the approach.

(5) Initiation of all RNP AR APCH procedures is based on GNSS updating. Conducting RNP AR APCH procedures without GNSS updating (i.e. with radio updating) is prohibited.

(6) The flight crew shall confirm that the correct procedure has been selected. This process includes confirmation of the waypoint sequence, reasonableness of track angles and distances, and any other parameters that can be altered by the flight crew, such as altitude or speed constraints.

(7) The flight crew shall use a lateral deviation indicator, flight director and autopilot in lateral navigation mode on RNP AR APCH operations. The flight crew is expected to maintain procedure centerlines, as depicted by on-board lateral deviation during the entire RNP AR APCH operations unless authorized to deviate by ATC or demanded under emergency conditions. For normal operations, cross-track error/deviation (the difference between the area-navigation-system-computed path and the aircraft position relative to the path) shall be limited to the navigation accuracy (RNP) associated with the procedure segment.

(8) Vertical deviation shall be monitored above and below the glide-path; the vertical deviation shall be within ±75 ft of the glide-path during the final approach segment.

(9) The Flight crew shall execute a missed approach if:

(a) the lateral deviation exceeds one time the RNP value; or

(b) the deviation below the vertical path exceeds 75 ft, at any time; or

(c) the deviation above the vertical path exceeds 75 ft, at or below 1 000 ft above aerodrome level;

unless the pilot has in sight the visual references required to continue the approach.

(10) Graphical display of lateral and vertical deviation (e.g. Navigation Performance Scale) is mandatory for RNP AR operations.

(11) The flight crew shall ensure the lateral and vertical guidance provided by the navigation system is consistent.

(12) Procedures with RF legs:

(a) When initiating a missed approach during or shortly after the RF leg, the flight crew shall be aware of the importance of maintaining the published path as closely as possible. TO/GA to LNAV function is mandatory for RNP AR operations.

(b) The flight crew shall not exceed the maximum airspeed values shown in Table below throughout the RF leg. For example, a Category C A320 shall slow to 160 KIAS at the FAF or may fly as fast as 185 KIAS if using Category D minima. A missed approach prior to DA/H may require compliance with speed limitation for that segment.

Indicated airspeed (Knots)			
Segment	Indicated airspeed by aircraft category		
	CAT-B	CAT-C	CAT-D
Initial & intermediate (IAF to FAF)	180	240	250
Final (FAF to DA)	130	160	185
Missed approach (DA/H to MAHP)	150	240	265
Airspeed restriction*	as specified		

*Airspeed restrictions may be used to reduce turn radius regardless of aircraft category.

(13) Cold temperature corrections shall not be applied to RNP AR APCH. The approach shall not be attempted outside procedure temperature limits.

(14) Due to the performance-based obstruction clearance inherent in RNP instrument procedures, the flight crew shall verify that the most current aerodrome altimeter is set prior to the FAF. The flight crew assertively request a current altimeter setting if the reported setting may not be recent, particularly at times when pressure is reported or expected to be rapidly decreasing. Execution of an RNP operation necessitates the current altimeter setting for the aerodrome of intended landing. Remote altimeter settings are prohibited.

(15) The flight crew shall complete an altimetry cross-check ensuring both pilots' altimeters agree within 100 ft prior to the FAF but no earlier than when the altimeters are set for the aerodrome of intended landing. If the altimetry cross-check fails, then the approach shall not be continued. Altimetry cross-check shall be done manually, since the automatic altimeter comparison function of the airplane may not be adequate for PBN requirements.

(16) Missed approach operation necessitates RNP 1.0 or less. Regaining LNAV guidance and the autopilot operation after initiating a go-around is essential. When initiating an early missed approach, the flight crew shall follow the rest of the approach track and missed approach track unless a different clearance has been issued by ATC. The flight crew shall also be aware that RF legs are designed based on the maximum true airspeed at normal altitudes, and initiating an early missed approach will reduce the maneuverability margin and potentially even make holding the turn impractical at missed approach speeds.

(17) Contingency procedures:

(a) Prior to the approach, the flight crew shall assess the impact of GNSS equipment failure on the anticipated RNP AR APCH operation per the relevant FCOM procedure. If the equipment is not adequate for the RNP AR APCH, discontinue planning and switch to conventional procedures or divert.

(b) Ability to revert conventional procedures during go-around, in case of loss of capability to sustain required navigation performance must be briefed before the approach. This briefing includes but not limited to the assessment of failure of the navigation system components, including those affecting lateral and vertical deviation performance (e.g. failures of a GNSS sensor, the flight director or autopilot) or loss of navigation signal-in-space (loss or degradation of external signal).

8.3.2.2.2.12 Occurrence Reporting

(A) Significant errors (i.e. those that would affect the flight path of the aeroplane) shall be reported by the flight crew. Navigation database supplier and the competent authority will be informed and affected procedures/routes will be prohibited by a company instruction or NOTAM.

(B) Reportable Events for PBN Operations:

(1) Significant navigation errors attributed to incorrect data or a database coding error;

(2) Unexpected deviations in lateral/vertical flight path not caused by flight crew input or erroneous operation of equipment;

(3) Significant misleading information without a failure warning;

(4) Total loss or multiple navigation equipment failure; and

(5) Loss of integrity, e.g. RAIM function, whereas integrity was predicted to be available during preflight planning,

shall be considered a reportable event. Refer to **Chapter 11** for details.

8.3.2.2.2.13 RNP Monitoring Program

(A) For every RNP AR APCH, the flight crew shall report the outcome of the approach either by using ACARS or by filling out **FR.73.0014 RNP AR Monitoring Form** where ACARS is not available. In case of manual fill out, the form shall be handed to the station representatives. The Station Manager shall e-mail the form to PBNREPORTS@THY.COM. ACARS forms are also sent to PBNREPORTS@THY.COM automatically.

(B) If the approach is unsatisfactory due to navigation data errors (either in FMS or published procedure), the PIC shall inform the IOCC Duty Manager immediately by all available means (ACARS, Telephone or via Station Manager). IOCC Duty Manager shall suspend the procedure.

(C) Unsatisfactory approach reports shall be shared with Flight Safety Manager, Risk Assessment Manager, the Fleet Manager and Flight Plan and Performance Manager by Flight Operations Capacity and Efficiency Manager. The reason for the unsatisfactory approach shall be investigated and corrected.

(D) During the 90-day interim approval period of a new RNP AR APCH procedure, the information covered in **TL.74.500 Instruction on PBN Special Approvals** shall be submitted to DGCA, every 30 days.

8.3.2.2.3 Polar Navigation

Not applicable for Turkish Airlines operations.

8.3.2.2.4 Pacific Regions

Not applicable for Turkish Airlines operations.

8.3.2.2.5 RVSM – Reduced Vertical Separation Minima

8.3.2.2.5.1 General

(A) The standard vertical separation in the upper airspace is 2000 ft. In some designated airspaces a vertical separation of 1000 ft. is utilized. For those designated areas/routes the reduced vertical separation (FL 290 - FL 410 inclusive) will require the aeroplane to meet the minimum aircraft system performance specifications (MASPS) that means the aeroplane and the operator need an approval for RVSM operations. In case the operator/aeroplane is not approved for RVSM accordingly or the required additional equipment is unserviceable, it is not permitted to use ATS-routes which are designated as RVSM-routes.

(B) For areas of applicability and operation of aircraft not approved for RVSM, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual under respective RSIs and CRARs.

Note: Detailed procedures and information are provided in the FCOM and **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

8.3.2.2.5.2 Flight Planning

(A) During flight planning the flight crew should pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to:

(1) Verifying that the airframe is approved for RVSM operations (This information can be found on the AOC of the respective aircraft),

(2) Reported and forecast weather on the route of flight,

(3) Minimum equipment requirements pertaining to height-keeping systems and other related systems depicted in FCOMs.

(4) any airframe or operating restriction related to RVSM operations.

8.3.2.2.5.3 Pre-Flight Procedures at the Aeroplane for Each Flight

(A) Review technical logs and forms to determine the condition of equipment required for flight in the RVSM airspace and ensure compliance with MMEL.

(B) During the external inspection of the aeroplane, particular attention should be paid to the condition of static sources and the condition of the fuselage skin near each static source and any other component that affects altimetry system accuracy. This check may be performed by a qualified and authorised person other than the pilot (eg. a ground engineer, technician).

(C) Before take-off, all altimeters should be set to the QNH of the airfield and should display a known altitude, within the limits depicted in the FCOM. The two primary altimeters should be within limits specified by the FCOM.

Note: The maximum value for these checks cited in the operating manuals should not exceed 75 ft. before take-off, equipment required for flight in RVSM airspace should be operative, and any indications of malfunction should be resolved.

8.3.2.2.5.4 In-Flight Procedures

(A) Before entering RVSM airspace, primary and standby altimeters shall be crosschecked.

(B) At intervals of approximately 1 hour, cross-checks between the primary altimeters shall be made. A minimum of two will need to agree within ±60 m (±200 ft).

(C) The usual scan of flight deck instruments should suffice for altimeter cross-checking on most flights.

(D) If the pilot is notified by ATC of a deviation from an assigned altitude (AAD) exceeding ±90 m (±300 ft) then the pilot shall take action to return to cleared flight level as quickly as possible.

(E) For in-flight procedures including procedures prior to RVSM entry, equipment required, contingency procedures, refer to the applicable FCOM and **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

(F) For RVSM phraseologies, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual .

8.3.2.2.5.5 Contingency Procedures After Entering RVSM Airspace

(A) The pilot should notify ATC of contingencies (equipment failures, weather) that affect the ability to maintain the cleared flight level and coordinate a plan of action appropriate to the airspace concerned. The pilot should obtain to the guidance on contingency procedures is contained in the relevant publications dealing with the airspace.

(B) Examples of equipment failures that should be notified to ATC are:

(1) failure of all automatic altitude-control systems aboard the aircraft;

(2) loss of redundancy of altimetry systems;

(3) loss of thrust on an engine necessitating descent; or

(4) any other equipment failure affecting the ability to maintain cleared flight level.

(C) The pilot should notify ATC when encountering greater than moderate turbulence.

(D) If unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared flight level, the pilot should follow any established contingency procedures for the region of operation and obtain ATC clearance as soon as possible.

8.3.2.2.5.6 Post Flight Procedures

(A) When height-keeping errors specified below are encountered or received (from ATC), it shall be recorded to AML for immediate action to be taken to rectify the conditions that caused the errors and provide follow-up report via SRS, to be provided if requested by the authority:

(1) a total vertical error (TVE) of ± 90 m (± 300 ft) (note 1);
(2) an altimetry system error (ASE) of ± 75 m (± 245 ft) (note 1); and
(3) an assigned altitude deviation (AAD) of ± 90 m (± 300 ft).

Note 1: The values could only be measured by a ground based height monitoring unit (HMU), provided by regional monitoring agencies, such as European Regional Monitoring Agency (EUR RMA) established by EUROCONTROL; or alternatively, by an external dedicated airborne GPS monitoring unit (GMU).

(B) In making technical log entries against malfunctions in height-keeping systems, the pilot should provide sufficient details to enable maintenance to effectively troubleshoot and repair the system. The pilot should detail the actual defect and the crew action taken to try to isolate and rectify fault. The following information should be noted when appropriate:

(1) primary and standby altimeter readings,

(2) altitude selector setting,

(3) subscale setting on altimeter,

(4) autopilot used to control the airplane and any differences when the alternate system was selected,

(5) differences in altimeter readings, if alternate static ports selected,

(6) use of Air Data Computer selector for fault diagnosis procedure,

(7) the transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was manually selected.

8.3.2.2.6 Performance Based Communication and Surveillance (PBCS)

8.3.2.2.6.1 General

(A) The PBCS concept is aligned with that of performance-based navigation (PBN). While the PBN concept applies required navigation performance (RNP) and area navigation (RNAV) specifications to the navigation element, the PBCS concept applies required communication performance (RCP) and required surveillance performance (RSP) specifications to communication and surveillance elements, respectively. Each RCP/RSP specification includes allocated criteria among the components of the communication and surveillance systems involved. PBCS concept includes post-implementation monitoring programmes on a local and regional basis, with global exchange of information.

(B) The demonstration of compliance with the RCP and RSP specifications is specific to each individual airframe or the combination of the aircraft type and configuration. The demonstrated compliance with specific RCP/RSP specifications are documented in type specific AFMs, FCOMs and TC/STCs along with any operating or equipment limitations in MEL/MMELs.

(C) A PBCS operational authorization shall be obtained from an assessment of the required elements in the operations manual (OM) in accordance with ICAO Annex 6 Part I. However, this requirement does not preclude a State to issue a specific approval and document it in the Operations Specification (Ops Spec), associated with the air operator certificate (AOC).

(D) Refer to Turkish Airlines **AOC/Operations Specifications** for actual PBCS RCP/RSP approval status.

8.3.2.2.6.2 Requirements

(A) RCP Specification:

(1) A designator (e.g. RCP 240, RCP 400) identifies RCP specification. The value (240/400) refers to the maximum time in seconds for the ATC to initiate a clearance and receive the response from the flight crew.

(2) The RCP specification affects CPDLC and SATCOM voice communications on the aircraft and has communication performance requirements which are allocated to system components and response times, including; transaction time (in seconds), continuity, availability and integrity.

(B) RSP Specification:

(1) A designator (e.g. RSP 180, RSP 400) identifies RSP specification. The value (180/400) refers to the maximum time in seconds to deliver the surveillance data (e.g. aircraft position) to the ATC.

(2) The RSP specification affects ADS-C and SATCOM voice communications on the aircraft and has surveillance performance requirements which are allocated to system components, including; surveillance data delivery time (in seconds), continuity, availability and integrity.

(3)

Airplane Performance Capability for PBCS Operations	Required Onboard Configuration	
	Application Type	DATALINK Communication Type
RCP 240	CPDLC	VHF or SATCOM
RCP 400	CPDLC	HF
RSP 180	ADS-C	VHF or SATCOM
RSP 400	ADS-C	HF

8.3.2.2.6.3 Application

(A) Operation:

(1) PBCS operations may be applied to specific airspaces (e.g. NAT, APAC and Singapore), routes (e.g. specific airways in China) or regions for operation optimization purposes such as reduced separations. See state AIPs and NAT publications for up to date information.

(2) When planning to operate in airspace where RCP/RSP specifications are prescribed for certain services such as reduced separation; it is expected to ensure that the planned use of associated communication and surveillance capabilities for the flight are in accordance with regulations, policies and procedures in control areas for the flight as published in the AIP or other State publications. Flight Crew and Dispatcher shall be in mutual confirmation along with airplane technical capability to ensure that the planned operation is within the requirements.

(3) The Dispatcher shall ensure that the proper information below is included in the filed ICAO flight plan, indicating RCP/RSP capabilities of the airplane according the PBCS operational authorization in Turkish Airlines **AOC/Operations Specifications**:

(a) Item 10a - CPDLC descriptors (J1-J7); RCP capability* “P1” (RCP 400), “P2” (RCP 240) or “P3” (SATVOICE RCP400); and
(b) Item 10b - ADS-C descriptors (D1 or G1); and
(c) Item 18 - “SUR/RSP180” or “SUR/RSP400” to show RSP capability*
*Refer to Turkish Airlines AOC/Operations Specifications for actual PBCS RCP/RSP approval status.

(4) This information shall be checked by the flight crew in self briefing phase and preflight phase considering AOC and technical status of the airplane that could affect the RCP/RSP capabilities. Any discrepancies shall be reported to the dispatcher before the commencement of the flight.

(5) If any degradation (technical or operational) occurs before entering an airspace, specific route or region in which the particular flight had been cleared previously for RCP/RSP requirements; the flight crew shall notify IOCC and the ATC for further action.

(6) In PBCS airspace with RCP/RSP requirements; if any associated system/sub-system on ATC datalink operational capability or of the required RCP/RSP level are lost, the flight crew shall notify ATC that RCP and/or RSP capability are lost. Furthermore, IOCC shall be informed if a revised clearance issued by the ATC.

(7) Refer to type specific **FCOMs** and/or **Operations Manual Part-B** for in-flight procedures.

(B) Post Operation:

(1) In PBCS concept, Operators are required to establish a process to participate in local or regional PBCS monitoring programmes in order to participate for the actions to be taken with respect to problem reporting and resolution of deficiencies. Accordingly, Turkish Airlines is a member and stakeholder of FANS 1/A Central Reporting Agency (PBCS Global Charter).

(2) If any discrepancy or degradation occurs affecting the RCP/RSP integrity; before, during or after PBCS operation, flight crew should provide an e-report through “9.0 Datalink (PBCS)” tab in the AQD system.

(a) The report shall include:

- Departure and destination aerodrome,
- Aircraft registration, fleet type and flight number,
- Active ATC and next ATC,
- Aircraft position,
- Description and attachments (if available).

8.3.3 Altimeter Setting Procedures

(A) All Turkish Airlines Aircraft operate with reference to the Standard Altimeter Setting (1013.2hPa/29.92in.Hg) of flight level (FL/ QNE) or of altitude (QNH), whichever applies.

(B) These procedures provide adequate vertical separation from other aeroplanes and, in conjunction with correct navigation procedures, ensure adequate terrain clearance during all phases of flight.

(C) Three altimeter settings are shown below. The indicated vertical distance above the selected reference datum assumes International Standard Atmosphere conditions and errors become significant at extremely low temperatures.

ALTIMETER SETTING	REFERENCE DATUM	ALTIMETER INDICATION
QNE (Standard)	1013,2 hPa 29.92 inHg	Flight level
QNH	Local mean sea level pressure	Altitude
QFE (note 1)	Aerodrome (or threshold) elevation	Height above reference elevation

Note 1: The use of QFE on the main altimeters is prohibited for Turkish Airlines Operations.

(D) For definitions of Transition Altitude, Transition Height, Transition Level, Transition Layer and Flight Levels, refer to EK.10.73.002 Operations Manual Part-C / Jeppesen AirwayManual under General Part.

8.3.3.1 Altimeter Subscale Setting Procedures

The subscale (pressure scale) of the Captain's, Co-Pilot's and the standby altimeter shall be set in accordance with the following table: (**note 1**)

FLIGHT PHASE	ALL ALTIMETERS
Take-off and **Climb** to an ALTITUDE	QNH
Climb to a FL AND Approaching Transition Altitude	STD
Cruise Above the Transition Level OR Descent to a FL	STD
Descent to an ALTITUDE **(note 2)** OR Cleared for Approach **(note 3)**	QNH

Note 1: When any altimeter subscale setting is changed, all altimeters shall be set and crosschecked accordingly.
Note 2: Set the local QNH as soon as a clearance is given below the Transition Level, down to an altitude (QNH), unless further flight level crossing/vacating reports are required. If requested to stop descent above the Transition Level, the altimeters shall be set to STD as soon as practicable.
Note 3: The prevailing QNH shall be verified with ATC regardless of whether it is transmitted by ATIS.

8.3.3.2 Altimeter Serviceability Checks

(A) Pre-flight:

(1) Before leaving the ramp the pressure scales of all altimeters shall be set to the actual QNH of the aerodrome.

(2) The altimeter indications shall be checked against the elevation of the aerodrome.

(3) When the altimeter does not indicate the reference elevation or height exactly, but is within the tolerance specified in FCOM or AFM, no adjustment of this indication shall be made at any stage of the flight. Furthermore, any error that is within tolerance noted during preflight check on the ground shall be ignored by the pilot during flight.

(B) In-flight:

(1) After each setting of altimeters, the readings on the altimeters shall be compared as prescribed in the FCOM. This shall include the standby and metric (if installed) altimeters when these are used (e.g. in CIS, China, Mongolia etc.).

(C) If an altimeter indication is not within the specified tolerance follow procedures as outlined in **Operations Manual Part-B** and FCOM.

8.3.3.3 Operations in Areas with Metric Altitude/FL

(A) The use of meters to feet conversion tables are explained in the **EK.10.73.002 Operations Manual Part-C**/ Jeppesen AirwayManual under General Part.

(B) The following instructions apply in a metric altimetry region:

(1) Below Transition Level:

(a) Set all altimeter subscales to QNH (The prevailing QNH shall be verified with ATC regardless of whether it is transmitted by ATIS.)

(b) For metric operations, use METER-HEIGHT / FEET-ALTITUDE IN QNH conversion table on the Jeppesen approach chart.

(c) DH/DA/MDA are depicted in feet on the Jeppesen approach charts.

(2) Above Transition Altitude:

(a) Set all altimeters to standard.

(b) Use METER/ FEET FLIGHT LEVEL conversion table to select proper FL.

8.3.4 Altitude Alerting System Procedures

(A) 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 (see FCOM) when the aeroplane is approaching or is deviating from a preselected altitude/flight level. Type related procedures (refer to **Operations Manual Part-B**) specify which flight crew member will set the cleared altitude/flight level. This will be notified to the other pilot who will cross-check that the setting is appropriate and then verbally acknowledge the change.

(B) During climb, the altitude alerting system shall be set to the altitude/flight level, the flight is cleared to (or an intermediate altitude/flight level as procedures dictate) or the cruising level.

(C) During cruise, the altitude alerting system shall be set to the assigned cruising level.

(D) When descending, the altitude alerting system shall be set to the respective altitude/flight level the aeroplane is cleared to descent (or an intermediate altitude/flight level as procedures dictate).

(E) Callouts in "**8.3.6.1 Callouts**" section contributes to altitude awareness and shall always be complied.

Note: The altitude alerting system does not in any way relieve the flight crew members from the responsibility of ensuring that the aeroplane levels off or will be levelled off at the correct altitude or flight level. To mitigate potential risks the flight crew shall always maintain altitude awareness and both pilots will cross-check the assigned altitude is above the minimum safe altitude. It is of upmost importance for all flight crew members to maintain altitude awareness by complying monitoring procedures depicted in **Operations Manual Part-B**. Flight crew shall confirm with each other and the respective ATC unit when any confusion occurs including call sign confusions during altitude clearance acceptance, read back and shall report the cleared flight level on first contact with the relevant ATC unit, unless procedures dictate otherwise. In case of disagreement, doubt or misunderstanding of altitude clearances by any pilot crew member, confirmation shall be requested from ATC and after confirming the clearance, both pilots should physically point to and confirm the new altitude set.

8.3.5 Ground Proximity Warning System (GPWS)/Terrain Avoidance Warning System (TAWS) Procedures

(A) The Ground Proximity Warning System (GPWS) / Terrain Avoidance Warning System (TAWS) must be "ON" and used from take-off until landing, except as provided in the minimum equipment list (MEL).

(B) Navigation shall not be predicated on the use of the terrain display.

(C) The terrain display should be used by PM during all departures and arrivals including approaches. In non-terrain environment, PF and PM may display the weather radar on both sides.

(D) PM shall monitor the terrain display whenever terrain and/or obstacles exist near the intended flight path.

(E) When undue proximity to the ground is detected by a flight crew member or by a ground proximity warning system, the pilot flying (PF) shall take corrective action immediately to establish safe flight conditions.

(F) In response to a GPWS/TAWS caution, flight crew shall initiate action required to correct the condition which has caused the GPWS/TAWS to issue the caution and to be prepared to respond to a warning, if this should follow.

(G) In response to a GPWS/TAWS warning, flight crew shall, without delay;

(1) Initiate a climb (Go-around or Terrain Escape Maneuver as required) in the manner specified by relevant aeroplane FCOM/QRH.

(2) Maintain the climb until visual verification can be made that the aircraft will clear the terrain or obstacle ahead or until above the appropriate sector safe altitude (if certain about the location of the aircraft with respect to terrain) even if the GPWS/TAWS warning stops. If, subsequently, the aircraft climbs up through the sector safe altitude, but the visibility does not allow the flight crew to confirm that the terrain hazard has ended, checks should be made to verify the location of the aircraft and to confirm that the altimeter subscale settings are correct.

(H) The response to a GPWS/TAWS warning may be limited to that which is appropriate for a caution, only if;

(1) The aeroplane is being operated by day in clear visual conditions, and

(2) It is immediately clear to the Commander that the aeroplane is in no danger in respect of its configuration, proximity to terrain or current flight path.

(3) It is emphasized that even if a warning is anticipated or suspected to be false or nuisance, immediate and aggressive action as per item (G) above is required by the flight crew unless it is beyond doubt that the items under (H) (1) and (2) above can be complied with.

(I) When, following recovery from a GPWS/TAWS alert or caution, a transmission of information shall be made to the appropriate ATC unit;

(1) When the workload permits, that the flight crew shall notify the air traffic controller of the new position and altitude/flight level, and what the Commander intends to do next.

(J) To prevent an excessive terrain closure rate, consider a maximum vertical speed and reduce this maximum limit with decreasing altitude not exceeding:

(1) -5,000 fpm above 5,000 ft.,

(2) -4,000 fpm between 4,000 ft and 5,000 ft,

(3) -3,000 fpm between 4,000 ft and 3,000 ft,

(4) -2,000 fpm between 3,000 ft and 2,000 ft,

(5) -1,500 fpm between 2,000 ft and 1,000 ft,

(6) less than -1,000 fpm below 1,000 ft.

(K) For further details, refer to FCOM **/** Operations Manual Part-B.

(L) Refer to **Chapter 11** for GPWS/TAWS alert (Caution or warning) flight crew reporting requirements.

(M) See **EK.10.72.001 Operations Manual Part-D 2.1.21. Terrain Awareness Warning System (TAWS) Training** for GPWS/TAWS training requirements.

8.3.5.1 Runway Awareness and Advisory System (RAAS)

(A) When installed, Runway Awareness and Advisory System (RAAS) must be used during ground operations, take-off, approach to landing and go-around, except as provided in the minimum equipment list (MEL).

(B) It is the Commander's responsibility to ensure that correct taxi route is followed and the correct runway is used for take-off and landing in response to an aural callout or a visual alert provided by RAAS.

(C) Flight crew must be aware that RAAS callouts and alerts are not intended for navigation purposes and does not include knowledge of NOTAM or ATIS.

(D) RAAS annunciations do not ensure that a runway can, or cannot, be safely used for takeoff or landing.

(E) Refer to FCOM for further details.

8.3.5.2 Avoiding Controlled Flight Into Terrain (CFIT)

(A) Controlled Flight into Terrain (CFIT) occurs when an airworthy aeroplane under the complete control of the flight crew is inadvertently flown into terrain, water, or an obstacle.

(B) During the final approach segment, attention by PF and PM shall be given to required altitude constraint or altitude/distance checks prior to reaching the MDA(H) or DA(H).

(C) To enhance the flight crew's terrain awareness, an appropriate callout shall be made by flight crew when the radio altimeter activates at 2,500 ft height AGL.

(D) The radio altimeter reading shall then be included in the instrument scan for the remainder of the approach.

(E) Radio altimeter readings below the minimum obstacle clearance (MOC) values should alert the flight crew (e.g., 1,000 ft, 500 ft, etc.).

(F) Flight crew shall be ready to respond/maneuver, as appropriate, to any unanticipated radio altimeter callout or to successive radio altimeter callouts that are not consistent with the aeroplane rate of descent and/or position.

8.3.6 Policy and Procedures for the Use of ACAS / TCAS

(A) ACAS / TCAS shall be used during flight, except as provided in the minimum equipment list (MEL). It shall be used in TA/RA mode, unless inhibition of RA indication mode (using TA indication only) is called for by an abnormal procedure or due to performance limiting conditions.

(B) The flight crew has to maintain a constant lookout and avoid other traffic during all phases of flight. Airborne Collision Avoidance System (ACAS) / Traffic Collision Avoidance System (TCAS) display and ATC radar service is helpful in detecting other traffic.

(C) 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 for monitoring other traffic. Particularly critical areas are the vicinity of aerodromes, high intensity terminal areas and flight below 10.000 ft.

(D) In general the rate of climb/descend should not exceed 1000 ft/min within the last 1000 ft before reaching the assigned level, in order to reduce the risk of TCAS Resolution Advisories (RAs). Special country rules and regulations shall be respected.

(E) Nevertheless rate of climb/descend instructions given by ATC for the purpose of maintaining separation of traffic shall be strictly complied with.

(F) It is the direct responsibility of the Commander to avoid collision.

8.3.6.1 Callouts

Callouts that shall be made by the PM

(1) “2,000 TO GO” or “2,000 FEET TO LEVEL OFF” when within 2,000 ft of the assigned/cleared altitude/FL.

(2) “1,000 TO GO” or “1,000 FEET TO LEVEL OFF” when within 1,000 ft of the assigned/cleared altitude/FL.

8.3.6.2 Use of Vertical Speed

(A) Consider using Vertical Speed (V/S) mode if altitude change will be less than 2,000 ft.

(B) 2,000 ft before reaching cleared/procedural altitude/FL:

(1) Vertical speed should not exceed 1,500 fpm*.

(C) 1,000 ft before reaching cleared/procedural altitude/FL:

(1) Vertical speed should not exceed 1,000 fpm*.

** These rates are strongly recommended unless otherwise required by specific ATC request, airspace requirements, SID/STAR restrictions, WX avoidance etc.*

8.3.6.3 Traffic Advisory (TA)

(A) TAs are intended to alert the flight crew to the possibility of a Resolution Advisory (RA), to enhance situational awareness, and to assist in visual acquisition of conflicting traffic.

(B) Respond to Traffic Advisories (TAs) by attempting to establish visual contact with the intruder aircraft and other aircraft that may be in the vicinity.

(C) Flight crew should not maneuver an aeroplane in response to a TA.

(D) Following a TA, flight crew shall prepare for appropriate action if an RA occurs.

(E) Display must be closely monitored for intruders without altitude reporting capability as TCAS will not be able to provide RA's.

8.3.6.4 Resolution Advisory (RA)

(A) When a RA indication is produced by ACAS / TCAS:

(1) The pilot flying (PF) shall immediately conform to the indications of the RA indication, even if this conflicts with an air traffic control (ATC) instruction, unless doing so would jeopardise the safety of the aeroplane;

(2) The flight crew, as soon as permitted by workload, shall notify the appropriate ATC unit of any RA which requires a deviation from the current ATC instruction or clearance;

(3) When the conflict is resolved, the aeroplane shall:

(a) Be promptly returned to the terms of the acknowledged ATC instruction or clearance and ATC notified of the maneuver; or

(b) Comply with any amended ATC clearance or instruction issued.

8.3.6.5 Reporting

(A) Whenever, as a result of an ACAS/TCAS RA warning, an aeroplane has been maneuvered such that it has departed from its ATC clearance, the appropriate ATC unit shall be informed as soon as practicable.

(B) The following phraseology shall be used to notify ATC:

(1) After a flight crew starts to deviate from any ATC clearance or instruction in order to comply with a TCAS RA:

(a) Pilot: "TURKISH 123 TCAS RA" (TEE-CAS-AR-AY)

(2) In the event that a flight crew receives an ATC clearance or instruction which is contradictory to the TCAS RA, controllers should expect the flight crew to follow the RA and ATC shall be informed directly by responding:

(a) Pilot: "TURKISH 123 UNABLE, TCAS RA"

(3) The ATC response in both cases should be "ROGER". This relieves the controller of the responsibility to provide separation and he should stop issuing further instructions until the pilot reports the conflict has been cleared.

(4) After a flight crew response to a TCAS RA is completed, and a return to the ATC clearance or instruction is initiated, or has already been resumed:

(a) Pilot: "TURKISH 123 CLEAR OF CONFLICT, (assigned clearance) RESUMED" or,

(b) Pilot: "TURKISH 123 CLEAR OF CONFLICT, RETURNING TO (assigned clearance)"

(C) Whenever an aeroplane has to be maneuvered in compliance with a RA, both pilots shall fill out an Air Safety Report (refer to **Chapter 11**).

8.3.7 Policy and Procedures for In-Flight Fuel Management

8.3.7.1 In-Flight Fuel Checks

(A) The Commander shall ensure that fuel checks are carried out in-flight at intervals not exceeding 30 minutes. On a flight of less than one hour an intermediate check is to be made at a convenient time when the flight deck workload permits. At each check the usable remaining fuel shall be recorded on the operational flight plan (OFP) and evaluated to:

(1) compare actual consumption with planned consumption;

(2) check that the usable fuel remaining is sufficient to complete the flight in accordance with in-flight fuel management requirements; and

(3) determine the expected usable fuel remaining on arrival at the destination aerodrome.

(B) The relevant fuel data shall be recorded.

(C) In case Electronic Flight Folder (EFF) module of the installed EFB is operational and capable of recording fuel checks either automatically or manually, recording of this data on the OFP is not required. For EFB installed aircraft, the fuel check is automatically recorded by EFB software over each waypoint. However, if fuel check is not recorded due to system malfunction, Commander shall ensure that manual entry of fuel quantity check on the to EFB Route Leg is completed within a period of not exceeding 30 minutes.

8.3.7.2 In-Flight Fuel Management

(A) The Commander shall ensure that the flight will be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:

(1) the required alternate fuel plus final reserve fuel; or

(2) the final reserve fuel if no alternate aerodrome is required.

(B) If an in-flight fuel check shows that the expected usable fuel remaining on arrival at the destination aerodrome is less than:

(1) the required alternate fuel plus final reserve fuel: the Commander shall take into account the traffic and the operational conditions prevailing at the destination aerodrome, and at any other adequate aerodrome in deciding whether to proceed to the destination aerodrome (refer to **Subchapter 8.3.7.4** for Commitment to Stay) or to divert so as to perform a safe landing with not less than final reserve fuel; or

(2) the final reserve fuel if no alternate aerodrome is required: the Commander shall take appropriate action and proceed to an adequate aerodrome so as to perform a safe landing with not less than final reserve fuel.

(C) The Commander 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 or the fuel required to operate to an isolated aerodrome.

(D) The Commander shall advise ATC of a minimum fuel state by declaring **"MINIMUM FUEL"** when, having committed to land at a specific aerodrome (commitment to stay), 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 1: 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.

Note 2: Guidance on declaring minimum fuel is contained in the Fuel Planning Manual (ICAO Doc 9976). 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.

(E) The Commander 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.

(F) The fuel situation must be continually monitored by the flight crew. Changes in the operational status of the destination aerodrome and of the alternate aerodromes and deviations from the original flight plan (e.g. re-routing by ATC) must be taken into account.

(G) When in-flight replanning is performed the operational flight plan must be amended accordingly.

8.3.7.3 Additional Conditions for Specific Procedures

(A) On a flight using Reduced Contingency Fuel (RCF) Procedure, to proceed to the destination aerodrome (destination 1 aerodrome), the Commander shall ensure that the usable fuel remaining at the decision point is at least the total of:

(1) trip fuel from the decision point to the destination aerodrome;

(2) contingency fuel equal to 5 % of trip fuel from the decision point to the destination aerodrome;

(3) destination aerodrome alternate fuel, if a destination alternate aerodrome is required; and

(4) final reserve fuel.

(B) On a flight using Predetermined Point (PDP) Procedure, to proceed to the destination aerodrome, the Commander shall ensure that the usable fuel remaining at the PDP is at least the total of:

(1) trip fuel from the PDP to the destination aerodrome;

(2) contingency fuel from the PDP to the destination aerodrome; and

(3) additional fuel.

(C) On a flight using Isolated Aerodrome Procedure, the last possible point of diversion to any available en-route alternate (ERA) aerodrome shall be used as the PDP and the fuel remaining at this point shall be evaluated as decribed above in item (B). Before reaching this point, the Commander shall assess the fuel usable 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 aerodrome before deciding whether to proceed to the isolated aerodrome or to divert to an en-route aerodrome.

(D) If the usable fuel remaining is expected to be less than the required amount explained above for specific procedures, the Commander shall take appropriate action as described in **Subchapter 8.3.7.2 item (B)**.

8.3.7.4 Commitment to Stay

(A) If an in-flight fuel check indicates that the expected usable fuel remaining on arrival at destination will be less than the required fuel as described in **Subchapter 8.3.7.2**, the Commander shall decide whether to continue to the planned destination with a "commitment to stay" decision or to divert to an alternate or adequate aerodrome. In either case, the remaining fuel after landing shall never be less than the final reserve fuel.

(B) For "commitment to stay", the following requirements must be fulfilled:

(1) an EAT (Expected Approach Time) must be received from ATC so that the Commander may calculate that the remaining fuel after landing will be more than the final reserve fuel;

(2) two separate (not intersecting) and suitable runways are available;

(3) the weather conditions at EAT will be at or above the applicable minima for the intended approach for both suitable runways;

(4) any limitation related to one engine inoperative operations are taken into account.

(C) If the Commander decides, in exceptional cases for safety reasons, to continue the flight to the destination aerodrome without respecting the provisions given above, a report has to be filed and sent to the Flight Operations Directorate who will forward it to the Turkish DGCA.

If a commitment to stay decision is exercised and when pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel, **"MINIMUM FUEL"** shall be declared to the ATC (see **Subchapter 8.3.7.2 (D)**) and IOCC shall be notified via ACARS or, if ACARS is unavailable, via radio as soon as practicable.

8.3.8 Adverse and Potentially Hazardous Atmospheric Conditions

8.3.8.1 General

(A) Special attention must be given to potentially hazardous atmospheric conditions.

(B) Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions including:

(1) Thunderstorms,

(2) Icing conditions,

(3) Turbulence,

(4) Windshear,

(5) Jetstream,

(6) Volcanic ash clouds,

(7) Heavy precipitation,

(8) Sand storms,

(9) Mountain waves,

(10) Significant Temperature inversions.

8.3.8.2 Weather Avoidance

(A) Take-off/Landing shall be avoided during heavy thunderstorm activity near/over the departure/arrival aerodrome.

(B) The local activity of thunderstorms can often be of relatively short in nature, 20-30 minutes. Therefore, if a take-off or landing is planned during times of thunderstorm activity, consideration of the development of the storm shall determine whether a delay might cause the worst effects to be avoided.

(C) The use of Weather Radar is crucial to identify and avoid potential hazardous weather.

(1) PF should monitor the weather radar display.
(2) PM should monitor the terrain display.
(3) In a non-terrain environment, PF and PM may display the weather radar on both sides.

(D) Weather Radar echoes shall be avoided according to the following table:

Flight Altitude 1000s of ft.		**Echo Characteristics**		
	Shape	**Intensity**	**Gradient of Intensity**	**Rate of Change**
0 - 20	Avoid by 10 miles echoes with hooks fingers, scalloped edges or other protrusions	Avoid by 5 miles echoes with sharp edges or strong intensities	Avoid by 5 miles echoes with strong gradients of intensity	Avoid by 10 miles echoes showing rapid change of shape, height or intensity
20 – 25	Avoid all echoes by 10 miles			
25 – 30	Avoid all echoes by 15 miles			
Above 30	Avoid all echoes by 20 miles			

(E) When there are thunderstorms present, radar vectors shall be requested to provide a safe distance from the potential hazardous weather.

(F) If storm clouds have to be overflown, always maintain at least 5000 ft. vertical separation from cloud tops. It is difficult to estimate this separation but ATC or MET information on the altitude of the tops may be available for guidance.

(G) To the extent possible, controllers will issue pertinent information on weather areas and assist flight crew in avoiding such areas when requested. Flight crew should respond to a weather advisory by acknowledging it and, if considered necessary, requesting an alternative course of action as follows:

(1) Request to deviate off course by stating the number of miles and the direction of the requested deviation. In this case, when the requested deviation is approved, the pilot is expected to provide his own navigation, maintain the altitude assigned by ATC and to remain within the specified mileage of his original course.

(2) If possible, plan deviations on the upwind side of storm cells to avoid turbulent down-flow air. Never deviate under a storm cell or the associated anvil.

(3) Request a new route to avoid the affected area.

(4) Request a change of altitude.

(5) Request radar vectors around the affected areas.

(6) The controller must be informed as soon as possible when clear of weather and returning to flight plan route.

(H) For safety reasons, a flight crew operating under IFR shall normally not deviate for meteorological conditions from an assigned course or altitude or flight level without a proper ATC clearance. When weather conditions encountered are so severe that an immediate deviation is necessary and time will not permit approval by ATC, the Commander's emergency authority may be exercised.

(I) For more information on Weather Assistance by ATC, please refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual.

8.3.8.2.1 Thunderstorm Avoidance Policy during Approach and Missed Approach Phase:

(A) To avoid effect of possible downburst, approach shall be delayed/discontinued if, from the last 5 nm of final approach course until the end of the runway, a thunderstorm activity (red echo on wx radar) is located within 5 nm around the runway intended for landing or If the thunderstorm activity is evaluated as a potential hazard for the missed approach phase. However assuring avoidance form hazardous weather according to below given circumstances exist, Commander may request this alternative procedure for landing with prior coordination of ATC:

(B) An alternative instrument approach procedure to another runway with a different approach and/or go-around flight path,

(C) An alternative instrument approach procedure to the same runway with a different go-around flight path.

8.3.8.3 Thunderstorms

(A) Flight in areas near thunderstorms should be avoided wherever possible. When there is no possible alternative routing, the recommended weather avoidance techniques should be executed.

(B) The potential hazards include but not limited to lightning strikes, up and downdrafts, gusts, hail.

(C) The vertical extension of thunderstorms is up to 25000 ft during winter time and up to the troposphere during summer, the horizontal range is 10 to 20 km. Sudden heavy precipitation with poor visibility below the clouds, possibly hail showers, heavy icing formation, and severe turbulence might be observed around thunderstorms.

(D) When flying in an area where thunderstorm(s) exists and is unavoidable, the following preparations should be made;

(1) monitor weather radar;

(2) if possible, advise cabin crew in advance about the adverse weather ahead and switch on the seat belt signs;

(3) fasten shoulder harnesses;

(4) switch on flight deck lighting to high intensity to avoid dazzling by lightning in thunderstorm; and

(5) aeroplane should be flown in accordance with turbulence penetration procedures laid out on applicable FCOM.

(E) For more information on Thunderstorms, please refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.3.1 Lightning

(A) Lightning is not a direct danger for the crew and passengers as the electrical load will stay outside the aeroplane (Faraday Cage) but lightning strikes may disturb or damage the navigation system.

(B) The majority of lightning strikes occur at levels where the temperate is between +5C and -10C i.e. within 5000ft on either side of the freezing level.

(C) Pilots are strongly advised to request an altitude change when in IMC, in the vicinity of thunderstorms near the freezing level to avoid a possible lightning strike.

(D) If a lightning strike is encountered, it shall be recorded in the AML.

(E) For more information on Lightning refer to **Operations Manual Part-B** and **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.4 Icing Conditions

(A) Ice formation on the ground and its effects are explained in **Subchapter 8.2.4.** Pilots must be aware that flight in icing conditions involves additional hazards. In particular, they must understand the peculiarities of in-flight icing conditions and its effect on aircraft performance and handling as well as the use and limitations of aircraft deice and anti-ice equipment.

(B) Icing conditions exist when OAT (on the ground) or TAT (in-flight) is 10C or below (except when SAT is below -40C) and any of the following conditions exists:

(1) visible moisture (clouds, fog/mist with visibility of 1600m (one mile) or less, rain, snow, sleet, ice crystals) is present, or

(2) ice, snow, slush or standing water Is present on the ramps, taxiways or runways.

(C) Deice and/or anti-ice equipment must be turned on prior to entering areas with the risk of icing. Prolonged flight in known severe icing conditions must be avoided. If such conditions are nevertheless encountered, alter the flight path/altitude as quickly as possible. Strictly observe any minimum speeds associated with icing conditions. Remember that stalling speeds with contaminated wings are higher than normal and that therefore a stall may be encountered without warning.

(D) If icing exceeds the intensity of icing for which the aircraft is certified or if an aircraft not certified for flight in known icing conditions encounters icing, the commander shall exit the icing conditions without delay, by a change of level and/or route, if necessary by declaring an emergency to ATC.

(E) Refer to **Operations Manual Part-B**, applicable FCOM and FCTM for the procedures and operation of the anti-icing systems.

(F) In flight icing types:

Category	Description	Icing Onset	Where Found
Clear	Clear & smooth	Rapid	Cumuliform clouds
Rime	Milky & rough	Gradual	Stratus clouds
Mixed	Combination	Varies	Varies

(G) In Flight Icing Accumulation Rates:

Category	
Trace	Ice becomes perceptible, but is of no consequence and does not affect the performance of the aeroplane. It should be reported by pilots for meteorological purposes.
Light	The rate of accumulation may create a problem if extended flight in this condition occurs. It can be safely handled by the aeroplanes anti/de-icing equipment. No restriction to operations provided the systems are used.
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous. The aeroplanes anti/de-icing equipment will safely handle it. However, for practical purposes, it should be a signal to the pilot to alter his flight path so as to avoid further exposure.
Severe	Adverse icing condition in which the rate of accumulation is such that the anti/de-icing equipment fails to reduce or control the hazard. Pilots must change the flight path immediately to establish more favourable conditions or land as soon as possible.

8.3.8.4.1 Exposure to Severe Icing

(A) When severe icing is encountered, every effort shall be made to clear the area as soon as possible by a change of level and/or route, if necessary by declaring an emergency to ATC.

(B) Severe icing is often associated with supercooled large droplets (i.e. freezing drizzle or rain). Flight in these conditions is not covered by icing certification rules. Droplets covered by icing certification envelopes are so small that they are usually below the threshold of detectability.

Note: Consult the AFM/FCOMs for specific information regarding handling techniques if inadvertently encountering severe icing conditions.

(C) The most effective means of identifying severe icing conditions are cues that can be seen, felt or heard. This includes visual inspection of aeroplane surfaces, e.g. wings or windscreen. At temperatures near freezing it may be possible to detect large droplets splashing or splattering upon impact with the windscreen.

8.3.8.5 Turbulence

(A) Turbulence is defined as a disturbed, irregular flow of air with embedded irregular whirls or eddies and waves. An aeroplane in turbulent flow is subjected to irregular and random motions while, more or less, maintainin its intended flight path.

(B) When encountering turbulence, pilots are urgently requested to report such conditions to ATC as soon as practicable. The PIREPs should state:

(a) Aircraft location;

(b) Time of occurrence in UTC;

(c) Turbulence intensity;

(d) Whether the turbulence occurred in or near clouds;

(e) Aircraft altitude or flight level;

(f) Type of aircraft;

(g) Duration of turbulence.

(C) If severe turbulence is encountered, it shall be recorded in the AML.

(D) Please refer to **Subchapter 8.3.8.3 (D)** for general guidelines for operation in turbulence.

(E) For more information on turbulence (i.e. turbulence grade classification, types of turbulence) please refer to **EK.10.73.001 Operations Manual Part-C** / Jeppesen AirwayManual under General part, Meteorology.

8.3.8.6 Windshear

(A) Windshear is any rapid change in wind direction and/or speed along the flight path of an aeroplane.

(B) Windshear, with or without turbulence, alters the lift force acting on an aircraft, resulting in a significant sinking or rising motion. Windshear avoidance is the best precaution.

(C) If windshear is expected or reported, take-off and landing should be delayed.

(D) In case of unexpected severe windshear is encountered during take-off or on approach, special precautionary techniques can be applied by the flight crew to reduce the effect of windshear.

(E) Maximum take-off thrust should be used for take-off. It shortens the take-off roll and provides the best climb performance which leads to increasing altitude available for recovery if required.

(F) The longest suitable runway should be used taking into consideration crosswind and tailwind limitations, and obstacles in take-off or landing path.

(G) If windshear is predicted or encountered, procedures in the appropriate **Operations Manual Part-B**, FCOM and FCTM's shall be followed.

(H) Pilots are urged to promptly volunteer reports to controllers of wind shear conditions they encounter.

(I) Advanced warning of such conditions will assist other flight crew in avoiding or coping with a windshear on approach or departure.

(J) The recommended method for windshear reporting is to state the loss or gain of airspeed and the altitudes at which it was encountered.

(K) For more information on windshear, refer to **Operations Manual Part-B** and **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.7 Jetstream

(A) Jetstream is a high speed, meandering wind current, generally moving from a westerly direction at speeds of 80kt or more (up to 300kt) concentrated within a narrow band embedded in the troposphere.

(B) The extent in length is up to several thousand miles, the width can be several miles.

(C) In mid-latitudes there is a common area for clear air turbulence (CAT) around the jet stream. Taking a cross section of a jet stream looking downwind, the turbulent region would be to the left of the jet core in Northern Hemisphere and to the right in Southern Hemisphere.

(D) To avoid or to leave the areas of CAT the following procedures should be applied:

(1) When flying parallel with the Jetstream, changing altitude up to 1000 ft.

(2) When flying perpendicular to the Jetstream, changing altitude by 1000 ft. - from the warm to the cold side downwards, from the cold to the warm side upwards.

(3) If the temperature is changing in the CAT area the flight should be continued on course; probably the CAT area will be crossed in a short time.

(4) If the temperature remains constant the course should be altered in order to leave the CAT area.

8.3.8.8 Volcanic Ash Clouds

(A) Flying through an ash cloud shall be avoided by all means because of extreme hazard for the engines and the aeroplane.

(B) Volcanic ash may extend for several hundred miles, and eruptions may send ash plumes up to 40.000 ft. Do not rely on weather radar to detect ash clouds or volcanic dust as they cannot be detected by the weather radar.

(C) If the aeroplane enters an ash cloud, the flight crew can expect:

(1) smoke, dust or acrid odours similar to electric sparks in the flight deck,

(2) heavy static discharges around the windshield(St. Elmo's fire),

(3) engine surge or overheat,

(4) engine flame-out,

(5) unreliable airspeed indication,

(6) pressurization and electrical systems may be affected,

(D) When encountering ash cloud the following procedures are recommended:

(1) fly on the upwind side,

(2) declare an emergency,

(3) do not climb in order to overfly the ash cloud,

(4) try to escape the ash cloud by descending and flying a 180 degrees turn (if terrain clearance permits),

(5) Plan to land at the nearest suitable airport.

(6) If the visibility through the windshield is impaired a runway with autoland capability should be considered.

(E) For additional procedures, refer to the FCOM and the applicable QRH.

(F) Flight crews are requested to make special air-reports when volcanic eruption is observed or volcanic ash cloud is observed or encountered (Refer to **Chapter 11**).

(G) Information about volcanic activities and volcanic eruptions is also published by NOTAMS and SIGMETS.

(H) For more information on Volcanic Ash, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.9 Heavy Precipitation

(A) Heavy precipitation may occur as rain showers, snow showers and hail. The greatest hazards to flight are reduced visibility and risk of icing in combination with low temperature.

(B) On the ground, contaminated runways may influence the performance, crosswind limitations and give a risk of aquaplaning. The special procedures on the FCOM/FCTM of the respective aeroplane shall be followed.

(C) Partial loss of orientation may occur after changeover from instruments to visual flying during the approach, especially in snow showers and blowing snow.

(D) In falling or blowing snow, landing lights should be used with caution as the reflected light may actually reduce the effective visibility and even cause false impression of drift during flare and roll-out.

(E) For procedures and precautions, refer to the applicable FCOM and **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.10 Sand Storms

(A) As severe damage can be caused by the abrasive and congestive characteristics of sand and dust, it is important to avoid sand storms whenever possible.

(B) Sand may damage an aeroplane's engines, windscreen and leading edges or penetrate bearings and hinge points, and accumulations may occur on shock struts and actuator sliding parts.

(C) Sanded aprons, runways and certain landing sites can inflict ingestion damage on turbine engines, and every caution should be executed to prevent such and other damage typically caused by sand or dust.

(D) For more information on Sandstorms, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual and FCOMs.

8.3.8.11 Mountain Waves

(A) Mountain waves and downslope windshear are caused by a significant airflow crossing a mountain range together with special atmospheric conditions. The strong vertical and horizontal wind shears, so called rotor turbulences, represent a danger at low heights as well as the strong downslope wind at the lee side of the mountains.

(B) Frequently, a second rotor will form up to 100 NM from the lee side of the mountain, producing original wave action. Flight crews should be aware of the potential hazard at airports within the flow regime of the wave.

(C) When approaching a mountain range from the upwind side, there will usually be a smooth updraft. Therefore, it is not quite as dangerous an area as the lee of the range. From the leeward side, it is always a good idea to add an extra thousand feet or so of altitude because downdrafts can exceed the climb capability of the aircraft. Never expect an updraft when approaching a mountain chain from the leeward. Flight crew should always be prepared to cope with a downdraft and turbulence.

(D) For more information on Mountain Waves, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

8.3.8.12 Significant Temperature Inversions

(A) An increase of temperature with height – a reversal of the normal decrease with height in the troposphere.

(B) In inversions windshear may be encountered.

(C) Temperature inversions usually affect aeroplane performance adversely.

(D) A significant temperature inversion after takeoff, during climb out causes a sudden speed loss and decreased aeroplane performance due to higher temperature.

(E) If there is a temperature inversion in the upper levels, the maximum cruising altitude capability of the aeroplane may be significantly reduced.

(F) Strong inversions in pre-cold-front situations may be associated with strong low altitude jet winds immediately above the ground. The main negative performance factor is caused by the decrease in engine power resulting from the temperature rise. In case of known or forecast temperature inversion corrections to the performance limits must be applied as per the FCOM/FCTM.

(G) Flight crew must be aware of sea breeze windshear especially on flights to islands in summer time where the runways are often close to the shore. Airfields near the coast will be more affected than those inland.

8.3.9 Wake Turbulence

(A) Wake turbulences are generated by pressure exchanges between the lower and upper surfaces of the wing. Those exchanges cause counter rotating vortices at the outer wingtips (the heavier an aeroplane, the larger the vortices). Extreme caution is required in terminal areas, where aeroplanes are flown at low speeds with flaps extended, generating strong wake turbulences.

(B) The vortices descend at a rate of 400-500 fpm down to 900 ft below the altitude of the generating aeroplane and settle at that altitude. If generated near the ground they descend to around 100 ft to 200 ft above ground and spread out at a speed of approximately 5 kt in still air. Vortex strength diminishes with time and distance behind the aeroplane. In calm wind conditions, the remaining vortices from a landing aeroplane may persist without noticeable weakening or dissipation for up to 5 minutes.

(C) A slight crosswind may keep the windward vortex on the runway for more than 2 minutes. The intensity of the vortices increases with the mass of the generating aeroplane, the wing loading and the configuration.

(D) The three basic effects of wake turbulence on a following aeroplane are the imposed roll, loss of height or rate of climb, and possible structural stress. The greatest danger is the imposed roll on the penetrating aeroplane to a degree exceeding its counter-control capability. Should the vortex encounter occur in the final approach area, its impact is heightened because the following aeroplane is in a critical state with regard to speed, thrust, altitude and reaction time.

(E) In order to avoid possible wake turbulence, the wake turbulence separation minimas on **Subchapter 8.3.9.1** should be followed.

(F) To mitigate the effects of wake turbulence of preceding aircraft the SLOP has been designed to include offsets. For more information refer to **Subchapter 8.3.2.1.7** (SLOP Procedures) and **EK.10.73.002 Operations Manual Part-C** / Jeppesen AirwayManual.

(G) In turbulence or windshear conditions which is caused by wake turbulence, the procedures/maneuvers as outlined in related FCOMs/ FCTMs/ QRHs should be followed.

8.3.9.1 Policy

(A) To create safe separation margins between aeroplanes landing/departing the same runways, national authorities and ICAO have established minimum separation criteria taking into account the relation between aeroplane weight and the strength of wake turbulences being generated.

(B) Wake turbulence separation minima are divided into four categories according to the maximum certificated takeoff mass:

Wake Turbulence Categories (WTC)		Definition
J	SUPER	A380-800
H	HEAVY	ACFT types of 136000KG (300000LBS) or more
M	MEDIUM	ACFT types less than 136000kg (300000LBS) and more than 7000KG (15500LBS)
L	LIGHT	ACFT types of 7000KG (15500LBS) or less

(C) Some MEDIUM types - such as the B757, creating vortices as strong as heavy aeroplanes - should be considered as HEAVY aeroplanes regarding wake turbulence generation.

(D) Non-radar separation for take-off, following minimums should be applied:

Leading aeroplane	Following aeroplane	Seperation
J	H	2 minutes
	M	3 minutes (4 minutes, see **Note**)
H	H	N/A
	M	2 minutes (3 minutes, see **Note**)
M	H	N/A
	M	N/A

N/A: Not applicable- no separation is necessary.

Note: When taking off from an intermediate part of the same runway or an intermediate part of a parallel runway separated by less than 760 m (2 500 ft).

(E) Radar separation for departure and approach phases of flight, ATC usually uses the following criteria:

Leading aeroplane	Following aeroplane	Seperation
J	H	6 NM
	M	7 NM
H	H	4 NM
	M	5 NM
M	H	3 NM
	M	3 NM (See **Note**)

Note: ATC may reduce the separation to 2 NM or 2.5 NM under specific conditions on certain aerodromes for approach.

(F) Apart from the above standards for vortex separation, the controller or Commander may arrange for a larger separation in calm conditions or for other terrestrial factors which might enforce/retain the vortex energy for a longer time. On the other hand separation may be reduced in strong crosswind conditions when operating into/from single runway environments.

(G) At some airports, Time Base Seperation (TBS) is used as primary method of aeroplane separation during strong headwinds (such as EGLL). When in stronger headwind conditions, a moderate reduction in separation distances from lead and follower aeroplane may be observed in comparison to distance based wake turbulence minima.

(H) Eurocontrol has developed a re-categorisation of ICAO wake turbulence longitudinal separation minima on approach and departure, called RECAT-EU. This method of seperation to be used during approach and landings at European Airports where it is publihed by Air Traffic Control Autorities. Below are the details of RECAT-EU categorization;

'Super Heavy'	'Upper Heavy'	'Lower Heavy'	'Upper Medium'	'Lower Medium'	'Light'
'CAT-A'	'CAT-B'	'CAT-C'	'CAT-D'	'CAT-E'	'CAT-F'
A388	A332	A306	A318	AT43	FA10
A124	A333	A30B	A319	AT45	FA20
(…)	A343	A310	A320	AT72	D328
	A345	B703	A321	B712	E120
	A346	B752	AN12	B732	BE40
	A359	B753	B736	B733	BE45
	B744	B762	B737	B734	H25B
	B748	B763	B738	B735	JS32
	B772	B764	B739	CL60	JS41
	B773	B783	C130	CRJ1	LJ35
	B77L	C135	IL18	CRJ2	LJ60
	B77W	DC10	MD81	CRJ7	SF34
	B788	DC85	MD82	CRJ9	P180
	B789	IL76	MD83	DH8D	C650
	IL96	MD11	MD87	E135	C525
	(…)	TU22	MD88	E145	C180
		TU95	MD90	E170	C152
		(…)	T204	E175	(…)
			TU16	E190	
			(…)	E195	
				F70	
				F100	
				GLF4	
				RJ85	
				RJ1H	
				(…)	

Table: Example list of aeroplane types assigned to RECAT-EU categories (Category names and letters are indicative)

(I) **RECAT-EU scheme** (J) (K) (L) Leader / Follower		*"Super Heavy"*	*"Upper Heavy"*	*"Lower Heavy"*	*"Upper Medium"*	*"Lower Medium"*	*"Light"*
		"A"	"B"	"C"	"D"	"E"	"F"
"Super Heavy"	"A"	**3 NM**	**4 NM**	**5 NM**	**5 NM**	**6 NM**	**8 NM**
"Upper Heavy"	"B"		**3 NM**	**4 NM**	**4 NM**	**5 NM**	**7 NM**
"Lower Heavy"	"C"		**(*)**	**3 NM**	**3 NM**	**4 NM**	**6 NM**
"Upper Medium"	"D"						**5 NM**
"Lower Medium"	"E"						**4 NM**
"Light"	"F"						**3 NM**

Table: RECAT-EU WT distance-based separation minima on approach and departure

(*) means minimum radar separation (MRS), set at 2.5 NM, is applicable as per current ICAO doc 4444 provisions.

RECAT-EU scheme Leader / Follower		*"Super Heavy"*	*"Upper Heavy"*	*"Lower Heavy"*	*"Upper Medium"*	*"Lower Medium"*	*"Light"*
		"A"	"B"	"C"	"D"	"E"	"F"
"Super Heavy"	"A"		**100s**	**120s**	**140s**	**160s**	**180s**
"Upper Heavy"	"B"				**100s**	**120s**	**140s**
"Lower Heavy"	"C"				**80s**	**100s**	**120s**
"Upper Medium"	"D"						**120s**
"Lower Medium"	"E"						**100s**
"Light"	"F"						**80s**

Table : RECAT-EU WT time-based separation minima on departure

8.3.10 Crew Members at Their Stations

8.3.10.1 Flight Crew Members

(A) During take-off and landing each flight crew member required to be on duty in the flight crew compartment shall be at the assigned station.

(B) During all other phases of flight each flight crew member required to be on duty in the flight crew compartment shall remain at the assigned station, unless 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 remains at the controls of the aeroplane at all times.

(C) When a flight crew member is to leave the flight crew compartment for operational or physiological needs and there is to be only one flight crew member remaining in the flight crew compartment, following shall be complied with:

(1) Remaining flight crew shall put on his headset and the speaker/volume button shall remain on,

(2) Seating position shall be such to allow and continuously maintain unobstructed and easy access to flight controls,

(3) Alertness and situational awareness shall be continuously maintained to ensure appropriate execution of PF/PM duties and radio communications,

(4) In case of an abnormal situation or as needed by the remaining pilot in the flight crew compartment, the flight crew shall be recalled into flight crew compartment by use of the seat belt sign (on and off) repeatedly or by a request from cabin crew via interphone to notify the pilot who is out of flight crew compartment to return to the flight crew compartment.

(5) A cabin crew shall be present in the cockpit entry area until the pilot returns to the flight crew compartment to provide quick response to a call made by flight crew in the flight crew compartment.

(D) If the video system observing the forward galley area is inoperative, refer to **Subchapter 10.1.5.4**.

(E) On revenue flights, flight crew members shall not vacate a pilot's seat below 20.000 feet AAL for the purpose of transferring duties to another flight crew member except during base training flights.

8.3.10.1.1 Use of Headset and Speakers

(A) Each flight crew member required to be on flight deck duty shall wear the headset with boom microphone and use it as the primary device to listen to the voice communications with air traffic services:

(1) On the ground, when receiving the ATC departure clearance via voice communication or before engine start whichever is earlier,

(2) In flight below FL200,

(3) On the ground, after landing until parking position,

(4) Whenever deemed necessary by the Commander.

(B) Boom microphone shall be in a position which permits its use for two-way radio communications.

(C) During cruise, flight deck speakers can be used.

(D) Speaker volume should be kept at the minimum usable level adequate to avoid interference with normal flight deck conversation, but still ensure reception of relevant communications.

(E) When using the handset for Passenger Announcement or using the headset for reception (i.e. receiving ATIS information) the volume of the speaker should be reduced so that it does not interfere with the Passenger Announcement/microphone transmission but at a level that could still be heard by the pilot when the headset is off.

8.3.10.2 Cabin Crew Members

(A) During critical phases of flight, and taxiing each cabin crew member shall be seated at the assigned station with their seat belts/safety harnesses fastened and shall not perform any activities other than those required for the safe operation of the aeroplane.

(B) Cabin crew stations shall be assigned:

(1) Close to a floor level door/exit,

(2) Provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible, and

(3) Evenly distributed throughout the cabin, in the above order of priority.

(C) Item (B) shall not be taken as implying that, in the event of there being more cabin crew stations than required cabin crew, the number of cabin crew members shall be increased.

8.3.10.3 Controlled Rest on the Flight Deck

(A) During all phases of flight each flight crew member required to be on duty in the flight crew compartment shall remain alert. If a lack of alertness is encountered, appropriate counter measures shall be used. If unexpected fatigue is experienced, a controlled rest procedure, organized by the Commander, can be used if workload permits.

(B) Controlled rest taken in this way shall not be considered to be part of a rest period for purposes of calculating flight time limitations nor used to justify any extension of the duty period.

(C) When applying controlled rest procedures, the Commander shall ensure that:

(1) The other flight crew member(s) is/are adequately briefed to carry out the duties of the resting flight crew member,

(2) One flight crew member is fully able to exercise control of the aeroplane at all times and,

(3) Any system intervention that would normally require a cross-check according to multi-crew principles is avoided until the resting flight crew member resumes his duties.

(D) Controlled rest procedures shall satisfy all of the following criteria:

(1) Only one flight crew member at a time shall take rest at his station; the restraint device shall be used and the seat positioned to minimize unintentional interfereunce with the controls.

(2) The rest period shall be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes) to limit deep sleep and associated long recovery time (sleep inertia).

(3) After this 45-minute period, there shall be a recovery period of 20 minutes to overcome sleep inertia during which control of the aeroplane shall not be entrusted to the flight crew member. At the end of this recovery period an appropriate briefing shall be given.

(4) In the case of two-crew operations, to ensure that the non-resting flight crew member remains alert, Commander shall inform the Cabin Chief of the intention of the flight crew member to take controlled rest and the end of that rest. Every 20 minutes, contact shall be established between the non-resting flight crew member and the cabin crew, either via interphone or by a visit to the flight deck, and the cabin crew shall check that the resting flight crew member is awake at the end of the period.

(5) There shall be a minimum of 20 minutes between two subsequent controlled rest periods in order to overcome the effects of sleep inertia and allow adequate briefing.

(6) If necessary, a flight crew member may take more than one rest period, if time permits, on longer sectors, subject to the restrictions above.

(7) Controlled rest periods shall terminate at least 30 minutes before the top of descent.

8.3.10.4 Sterile Flight Crew Compartment

(A) Sterile flight crew compartment procedures are established in order that flight crew activities are restricted to essential operational activities without being disturbed by non-safety related matters.

(B) During the flight when sterile flight crew compartment procedures are applied, cabin crew and other crew communications to flight crew or entry into the flight crew compartment shall be restricted to safety or security matters.

(C) The Commander shall ensure that sterile flight crew compartment procedures are applied:

(1) During push back, engine start and taxiing;

(2) During critical phases of flight;

(3) Below 10,000 feet above the aerodrome of departure after take-off and the aerodrome of destination before landing, except for cruise flight; and

(4) During any other phases of flight as determined by the Commander.

(D) Flight crew activities that shall not be performed are:

(1) Non-critical paperwork,

(2) Company calls concerning parking information, flight connections, etc.,

(3) Non-essential communication with other flights,

(4) Reading documentation unrelated to the proper conduct of the flight,

(5) Non-essential activities such as filling of forms and documents, collecting and stowing charts,

(6) Other activities, unless flight conditions dictates to do so, such as;

(a) Conducting briefings,

(b) Mass and balance corrections and performance calculations,

(c) Head-down work (Programming CDU/MCDU, chart review, etc.),

(d) Obtaining ATIS,

(e) Passenger announcements.

(E) Reading newspaper and magazines, riddling, etc. are prohibited during the entire flight.

8.3.10.4.1 Communication to the Flight Crew

(A) Cabin crew and other crew shall use their own discretion to determine whether the situation is related to safety or security matters and whether to call the flight crew. In such cases, information shall be timely and accurate. Situations requiring information to the flight crew include but not limited to:

(1) Any outbreak of fire inside the cabin or in an engine;

(2) A burning smell in the cabin or presence of smoke inside or outside;

(3) Fuel or fluid leakage;

(4) Exit door unable to be armed or disarmed;

(5) Localized extreme cabin temperature changes;

(6) Evidence of airframe icing;

(7) Cabin/galley equipment or furniture malfunction/breakage posing a hazard to the occupants;

(8) Suspicious object;

(9) Disruptive passenger;

(10) Security threat;

(11) Abnormal vibration or noise;

(12) Medical emergency;

(13) General drop-down of the oxygen masks in the cabin; and

(14) Any other condition deemed relevant by a cabin crew or technical crew member.

8.3.10.4.2 Intra-Flight Deck Communication

(A) Prior to the flight, during the preparation phase, the Commander should recall the objectives and importance of the sterile flight deck.

(B) The sterile flight crew compartment procedures should be implemented with good common sense in order not to break the communication line between flight crew members or between cabin crew members and flight crew members.

(C) The following lines-of-defence address the three families of flight deck disruptions and, thus, prevent or minimize the interference of competing or pre-empting tasks:

(1) Communications:

(a) Keep intra-flight deck communications brief, clear and concise; and,

(b) If a flight crew member has to listen to a frequency other than ATC, he shall transfer ATC communications and flight controls to the other flight crew member. This flight crew member shall take over flight controls and/or communications afterwards.

(c) When a flight crew member leaves the flight deck, the other flight crew member shall put on his headset and make sure that COM 1 volume level is tuned up and speakers are ON.

(d) Flight crew member remaining in the flight deck shall give a short briefing about the phase of the flight when the other flight crew member returns to the flight deck.

(e) Any misinterpreted or unclear information/instruction by the ATC shall first be confirmed by the other flight crew member.

(f) If uncertainty remains, flight crew member in charge of ATC communications shall verify the information/instruction with the ATC.

(g) During ATC communications, unnecessary repeats, compliments, and/or personal messages shall be avoided.

(2) Head-down activity (FMS programming or chart review):

(a) Define task sharing for FMS programming or reprogramming depending on the level of automation being used,

(b) Plan long head-down tasks in low workload periods; and,

(c) Transfer the controls.

(3) Responding to a non-normal condition or to an unanticipated situation:

- Keep the A/P engaged to decrease workload, unless otherwise required;
- Adhere to PF, PM task sharing for non-normal conditions (i.e., PM should maintain situational awareness, monitor and backup the PF);
- Give particular attention to normal checklists, because handling a non-normal condition may disrupt the normal flow of actions.

8.3.11 Use of Restraint Devices for Crew and Passengers

8.3.11.1 Crew Members and Occupants of the Flight Deck

(A) During take-off and landing, and whenever deemed necessary by the Commander in the interest of safety (e.g. turbulence, non-normal situations), each crew member shall be properly secured by all safety belts and restraint systems (e.g. harnesses) provided.

(B) During other phases of the flight, each flight crew member in the flight crew compartment shall keep the assigned station safety belt fastened as long as he is seated at his station.

(C) Flight crew members shall fasten their shoulder harnesses before engine start and it can be unfastened earliest passing 10.000 feet AAL during the climb. During the descent, it shall be fastened latest passing 10.000 feet AAL and shall be kept fastened until all engines are shut down.

(D)Should there be a need of augmented crew member occupying 3rd or 4th pilot seat, he may un-buckle shoulder harness for a limited time below 10.000 ft. if it obstructs him to complete tasks required for the safety of operation.

(E) Cabin crew members shall keep their safety belts and restraint systems fastened at their stations before take-off until earliest passing 5.000 feet AAL during the climb. Commander will release cabin crew members by cycling the fasten belts signs to OFF then back to ON. During descent, they shall return to their stations and fasten their safety belts and restraint systems around 5.000 feet AAL after the announcement “CABIN CREW BE SEATED FOR LANDING”” made by the flight crew. It shall be kept fastened until the fasten belts signs switched OFF after landing.

(F) Cabin crew members shall not be seated on the seats assigned to flight crew members while present on the flight deck in order not to interfere with flight controls (except in abnormal or emergency conditions as requested by the flight crew members). Cabin crew members may be seated on the observer’s seat(s) when present on the flight deck, if unoccupied or when deemed necessary by the flight crew members.

8.3.11.2 Passengers

(A) On the ground, fasten seat belts signs shall be switched ON at the earliest when last passenger is on board before push back or taxi out from the parking position. Fasten seat belts signs shall be switched OFF when “Refueling and Defueling when Passengers Embarking, Onboard or Disembarking” procedures as per **Subchapter 8.2.1.3** are being applied.

(B) Before take-off and landing, during taxiing and whenever deemed necessary in the interest of safety (e.g. turbulence, non-normal situations), the Commander shall be satisfied that each passenger on board occupies a seat or berth with his safety belt or restraint system properly secured.

(C) A safety belt or a restraint system is to be worn by all passengers including occupants of vacant cabin crew seats during all phases of flight when the seat belt signs are ON.

(D) It shall be recommended to passengers (e.g. via passenger address system) to keep their safety belts or restraining systems secured during the entire flight when occupying their seats.

(E) The Commander shall be satisfied that multiple occupancy of aeroplane seats does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

8.3.11.3 Securing of Restraint Devices

See **EK.10.71.001 Cabin Crew Manual (CCM)**.

8.3.12 Admission to Flight Crew Compartment

(A) In flight, no person other than a flight crew member assigned to a flight, is admitted to, or carried in, the flight crew compartment unless that person is:

(1) An operating flight crew membercabin crew member, loadmaster or aircraft maintenance engineer (technician) who deemed necessary for operational reasons or other company personnel to be approved by Chief Flight Operations Officer for the specific flight;

(2) A representative of the Turkish DGCA or inspecting authority (for inspection) or Company representatives, if required to be there for the performance of his/ her official duties;

(3) Flight Crew members on duty for safety, training or checking purposes;

(4) An operational or technical person who has specialized duties in the cockpit (observing aircraft sytems etc.) or needs to attend the flight for familiarization or air traffic controllers;

(5) A Turkish Airlines or government personnel who needs to fly to keep his license valid according to the Turkish DGCA regulations;

(6) Member of the Board of Directors, Accountable Manager (CEO and Member of the Board), Compliance Monitoring Manager (SVP Quality Assurance), Safety Manager (SVP Corporate Safety), Nominated Person for Flight Operations, Nominated Person for Ground Operations, Nominated Person for Continuing Airworthiness, Nominated Person for Crew Training, SVP Integrated Operations Control, SVP Crew Planning, SVP Cabin Crew, Nominated Person for Security, Chief Pilot (SVP Flight Operations), Flight Operations Vice Presidents, Fleet Managers and Fleet Training Managers;

(7) Flight Crews with uniform for positioning flights;

(8) At the discretion of the Commander, Company flight crew with additional duty as manager or above status may be admitted during cruise phase for a short visit.

(B) The Commander shall ensure that:

(1) Admission to the flight crew compartment does not cause distraction and/or interference with the operation of the flight; and

(2) All persons carried in the flight crew compartment are made familiar with the relevant safety procedures.

(C) The Commander shall make the final decision regarding the admission of persons to the flight crew compartment regarding usability/serviceability of observer seat, oxygen mask etc., a MEL item creating excessive workload for the flight crew and type of flight to be executed such as LIFUS, Line Check, Cockpit En-route Inspection which does not allow other additional person admitted for entrance.

(D) The Commander shall request credentials or identification of such persons before granting such admission.

(E) The above-mentioned persons shall only be carried on the flight deck provided that a seat with safety belt/safety harness is available and that the requirements concerning supplemental oxygen are met. The Commander shall ensure that such a person is instructed to keep the safety belt/safety harness fastened at all times, not to touch any controls, switches, instruments, circuit breakers, and that such a person is briefed in the use of all flight deck relevant emergency equipment and all relevant procedures.

8.3.13 Use of Vacant Crew Seats

(A) Vacant cabin crew seats, which are not certificated for occupation (for applicable aeroplane types) during take-off, landing or other phases of flight shall not be occupied during the associated phases of flight.

(B) Vacant cabin crew seats shall meet the relevant emergency requirements for passenger seats (oxygen, seat belt/ harness, instruction card, accessibility to all verbal or other instructions given to passengers by cabin or flight crew at all times, visibility of exit signs).

(C) Any person who would otherwise be denied seating shall not occupy vacant cabin crew seats.

(D) The crewmember who is responsible for safety in the cabin, shall brief the person who has been granted permission to occupy a vacant crew seat on all safety relevant aspects associated with that seat and if the seat is located in the vicinity of an emergency exit, that person shall also be briefed on how to operate and open the door in case of an emergency (stressing that the door shall be opened only after the appropriate command has been given).

(E) Turkish DGCA auditors may occupy vacant cabin crew seats during an in-flight audit according to SHT KABİN YOL BOYU provided that all above safety concerns are complied with.

(F) For procedures and restrictions on the issuance of vacant cabin crew seats for other persons, see **PR.02.70.003 Procedure for Use of Vacant Crew Seats In Flight.**

8.3.14 Incapacitation of Crew Members

(A) Incapacitation of a crew member: any condition which affects the health of a crew member during the performance of duties, associated with the duty/position assigned to him, which renders him incapable of performing the assigned duties. The definition includes either total or partial incapacitation, which does not allow the fulfillment of duties in the "normal" way.

(B) Incapacities have occurred more frequently than other emergencies, which are the subject of extensive training (such as engine failure, cabin fire etc.). There are many forms of incapacitation ranging from obvious sudden death to a lingering and difficult to detect partial loss of functions.

8.3.14.1 Types of Incapacitation

(A) Obvious incapacitation; means total functional failure and loss of capabilities. This generally will be easily detectable and will be a prolonged condition. Some examples of obvious incapacitation are: heart disorders, severe brain disorders, severe internal bleeding, total collapse due to an acute infection, thrombosis, epilepsy etc.

(B) Subtle incapacitation; this may be considered a more significant operational hazard, because it is difficult to detect and the effects can range from partial loss of functions to complete unconsciousness. Some examples of subtle incapacitation are: minor brain seizures, hypoglycemia (low blood sugar), other medical disorders or preoccupation with personal problems, body pains such as toothache, headache, gastroenteritis, the delayed effects of alcohol, drugs or medication, common disorders such as a cold, etc.

8.3.14.2 Recognition Of Incapacity

(A) The key to early recognition of pilot incapacitation is the regular use of crew resource management concepts during flight crew compartment operation. Proper crew coordination involves checks and crosschecks using verbal communications. Routine adherence to standard operating procedures and standard profiles can aid in detecting a problem.

(B) Flight Crew Recognition: If - for instance - the PM reports significant deviation from the intended flight path, it is essential, that the PF not only corrects this problem but also confirms this verbally. If a crew member doesn't respond to any question, call-out or checklist item in the normal way or does not adhere the standard operating procedures without notifying the other crew member, there is reason to believe that might be the beginning of a subtle incapacitation.

(C) Cabin Crew Recognition: The cabin crew member does not respond to verbal communications or significantly deviates from carrying out the tasks delegated to him.

(D) Other common symptoms of the beginning of an incapacitation are:

(1) incoherent speech,

(2) strange behavior,

(3) irregular breathing,

(4) pale fixed facial expression,

(5) jerky motions that are either delayed or too rapid.

(E) If any of these are present, incapacitation must be suspected and action taken to check the state of the crew member.

(F) If a crew member feels unfit or unwell, he shall inform the other crew member(s) immediately.

8.3.14.3 Procedures to be Followed in the Event of Incapacitation of a Flight Crew Member In-Flight

(A) In case of incapacitation of any flight crew member during the flight, the basic principles defined under **Subchapter 8.3.14.5.2** and **Subchapter 8.3.19.1** shall be implemented.

(B) Remaining Flight Crew shall:

(1) Take Over Control

- announce "I have control";
- engage all available automation;
- declare emergency;

(2) Take Care Of The Incapacitated Crew Member

(a) request assistance from the cabin crew via the PA, announcing '' PURSER/CABIN CHIEF TO THE COCKPIT". Otherwise request assistance from loadmaster / technician / other crew member (if available);

(b) incapacitated crew member's seat should be moved fully back to prevent obstruction of flight controls, switches, levers, etc. If possible, have the incapacitated flight crew member removed from his seat. Assistance of at least 2 persons is needed to take him out of the cockpit.

(c) provide first aid if required;

(d) arrange a landing as soon as possible after considering all pertinent factors;

(e) arrange medical assistance after landing, giving as many details about the condition of the affected crew member as possible;

(f) In any case, a crew member shall stay in the cockpit to assist remaining flight crew.

(3) LAND ASAP

(a) prepare the flight deck and cabin for landing but avoid a rushed approach;

(b) for landing do not change seats - fly the aeroplane from your normal position;

(c) organize work after landing; this will include:

1. depending on the situation, a change of seats for taxiing in, but only after the aeroplane has come to a complete stop and will be done by a type qualified Commander; and taxiing by co-pilot is not allowed.

2. arrangements for the parking of the aeroplane;

3. having the incapacitated crew member offloaded to the ambulance as quickly as possible.

(C) For the succession of command in case of a Commander incapacitation, refer to **Subchapter 4.3**.

8.3.14.4 Procedures to be Followed in the Event of Incapacitation of a Cabin Crew Member In-Flight

(A) In case of incapacitation of any cabin crew member during the flight, the basic principles defined under **Subchapter 8.3.14.5.2** and **Subchapter 8.3.19.1** shall be implemented.

(B) If the remaining number of cabin crew composition is below the minimum required in **Subchapter 4.1.2.1**, the procedures described in **Subchapter 4.1.2.2** shall be used prior to commencing flight operations from transit bases where cabin crew allocation cannot be made.

(C) In case of incapacitation of a cabin crew during the flight, the Commander shall be informed immediately.

(D) Incapacitated crew member should be positioned in a suitable place where first aid can be provided.

(E) In case of incapacitation of the cabin chief, cabin chief duties must be transferred according to the following guidelines with Commander's decision:

(1) Relevant cabin crew member shall be valid type qualified;

(2) Relevant cabin crew member should be chosen from on-duty or deadhead crew in the following order of priority (final decision rests with the Commander):

(a) Most appropriately qualified cabin chief in operating or deadhead crew;

(b) Most appropriately qualified cabin crew member in operating or deadhead crew.

(F) Cabin chief / Assigned cabin chief reorganizes crew members' duties in coordination with the Commander. Reorganization shall include safety related duties of incapacitated crew member. Catering and comfort related duties may be reduced / cancelled regarding the workload.

(G)If the remaining number of cabin crew composition is below the minimum required in **Subchapter 4.1.2.1**, Pre-selected Passengers (PSP) shall be selected and assigned duties at unattended door/exit for evacuation. See **EK.10.71.001 Cabin Crew Manual (CCM) 8.3.5.5. Selection and Duties of Pre-Selected Passengers (PSP) and Briefing to Them** for selection of PSP and procedures. Reseating of the passengers may also be arranged regarding the number of cabin crew and PSP attended doors/emergency exits. A final decision of the Commander is required considering the weight and balance of the aeroplane for reseating.

8.3.14.5 Measures to be Taken in case of Sickness or Incapacitation of a Crew Member

8.3.14.5.1 Before Flight Duty

(A) The Commander has an overall responsibility for ensuring that all of the crew is fit for duty, even if a report of sickness is not received.

(B) When a crew member does not feel well, he shall declare his unfit condition to relevant person/authority.

(C) Any sick/ ill crew member, who is not able to perform assigned flight duty shall inform the Turkish Airlines Personnel Directorate/Health Services Management about his condition. A medical report shall be submitted as needed. For details about submission of medical reports see **PR.10.32.089 Procedure For Implementation of The Processes Regarding Submission of Sick Leave Reports and Performance of Return-To-Work Examinations.**

(D) Crew members should be aware that a sudden deterioration in health might be an indication of the onset of a dangerous or infectious complaint.

(E) Carriage of a sick crew member is not authorized without permission from an AME. Carriage of a sick crew member may threaten the company's position in several ways including:

(1) International health regulations;

(2) liability to the crew member concerned;

(3) invalidation of the insurance of the aircraft.

(F) The Commander shall ensure that the crew member having medical problems on flight duty is examined by an AME as soon as practical.

(G) A report must be submitted by the Commander to the applicable Fleet Manager and the crew member as soon as practical after returning to the main base.

(H) Where any doubt exists, the Commander must ensure that a doctor inspects the individual concerned and that the report from that doctor is forwarded to the Fleet Manager, either on the day of the flight or as soon as practical.

8.3.14.5.2 In-Flight

(A) The Commander shall be informed as soon as possible about any crew member that becomes sick or incapacitated while on flight duty. Depending on the urgency of the situation, it is the Commander's responsibility to plan to land at either the destination or the most suitable airport.

(B) Incapacitation of any crew member shall be reported to IOCC and the required reports shall filled out by the Commander or the pilot assuming command as soon as possible.

(C) If the Commander becomes sick or incapacitated while on flight duty; the pilot assuming the commands shall inform the appropriate company authorities about the situation as soon as possible and a landing is planned to the destination airport or the most suitable airport.

(D) If the diversion or landing airport is in the Republic of Turkey, the Turkish Airlines responsible personnel at the airport landed makes the necessary arrangements for the crew member sick or incapacitated to be transferred to a suitable hospital. The correspondence and documents related to crew member's situation are to be completed by the Turkish Airlines responsible personnel at the airport landed and sent to Turkish Airlines medical department by means of Flight Operations Directorate.

(E) In case the diversion or landing airport is not in the Republic of Turkey and the sick or incapacitated crew member is hospitalized, the station manager or local Consulate will prepare the proper documentation to be sent to Turkish Airlines Health Services Management by means of Flight Operations Directorate.

(F) The station manager is responsible for making the proper arrangements to replace the sick crew member, if required.

8.3.15 Cabin Safety Requirements

(A) Legal provisions require all crew members not to perform any activities during critical phases of the flight other than those required for the safe operation of the aeroplane.

(B) This means that all cabin crew members shall, in critical phases of flight, concentrate on their designated task of securing the cabin and shall, if necessary, firmly and politely refuse service requests by the passengers.

(C) On the other hand, cabin crew members shall in these flight phases refrain from distracting the flight crew members from concentration on their duties (unless safety requires such distraction), and shall assist the flight crew by providing, in due time, the " CABIN READY" or the "CABIN NOT READY" report.

8.3.15.1 Cabin Preparation and Securing

8.3.15.1.1 Preparation for Flight

8.3.15.1.1.1 Cabin Crew Briefing

(A) Refer to **Operations Manual Part-B** for briefing items.

(B) Whenever a tour of duty for the whole crew begins at home base (duty after crew rest) the Commander or the Cabin Chief will check that each cabin crew member is proficient in and familiar with the relevant emergency items and procedures.

(C) The Commander, or by delegation of the Commander, the Cabin Chief shall conclude the cabin briefing by allocating, to each individual cabin crew member, the tasks he is to perform on board and the station he is to occupy prior to/during/after take-off and landing (emergency station).

8.3.15.1.1.2 Prior to Boarding of Passengers

See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.5. Instuctions on Flight Preparation** for cabin pre-flight checks.

8.3.15.1.1.3 Prior to Taxiing

(A) The commander should inform the cabin chief where the expected taxi out time for departure is considered short.

(B) All means of assistance for emergency evacuation that deploy automatically shall be armed, all exits and escape paths unobstructed, all passengers seated and overhead bins closed prior to first movement of aircraft. In addition, it shall be ascertained that all passenger and crew baggage are (see **Subchapter 8.2.2.5**) stowed where it cannot impede evacuation or cause injury by falling or other movement. The permission requested by the cabin chief from the Commander for the closure of entry doors (If there is an expected delay for the seating of passengers or arranging of overhead bins this information must be relayed to the Commander) also means that the implementation of these items will be completed before the first movement of the aircraft. If there is still any nonseated passenger, open overhead bin before the first movement of the aircraft, required actions shall be taken by cabin crew concerning passenger seating and baggage and/or when necessary the “Push-Back Warning Announcement” in **EK.10.71.002 Cabin Crew Announcement Manual** is made by cabin chief and the Commander is informed of the situation through the interphone. All passengers must be seated with their safety belt/harness properly secured (see **Subchapter 8.3.11.2**), during taxiing.

(C) Cabin crew members are not to enter or call the flight deck except in the event of an emergency or for a safety related problem.

(D) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.1.2.** / **8.1.3.** / **8.1.4.** for seating requirements about Special Categories of Passengers (SCPs).

(E) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** for the procedures regarding the use and securing of Portable Electronic Devices (PEDs) in the cabin including Cabin Chief’s PED.

(F) See **EK.10.71.001 Cabin Crew Manual (CCM)** for the cabin preparations prior to taxiing.

8.3.15.1.1.4 Prior to Take-Off

(A) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.13. "Cabin Ready Report" before Takeoff/Landing** for the cabin preparations prior to take-off.

(B) Before take-off, after receipt of "CABIN READY" information in due time before ETD the PM shall make an announcement as "CABIN CREW BE SEATED FOR TAKE-OFF " in order to alert the cabin crew members to be ready for take-off.

(C) Upon the announcement, if any of the above conditions are not met or, if the cabin chief decides that the cabin is not ready for take off, he shall immediately inform the commander via interphone "CABIN NOT READY". Then the commander shall not commence take off until receiving "CABIN READY" information.

(D) The Commander has the authority to permit the use of PEDs without restriction during prolonged departure delays, provided that sufficient time is available to check the passenger cabin before the flight proceeds. See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** for the procedures regarding the use and securing of PEDs in the cabin including Cabin Chief's PED.

8.3.15.1.2 In-Flight Requirements

(A) After take-off, when meteorological conditions and other factors that might affect flight safety are acceptable, the standard use of seat belt signs on all fleets shall be as explained below:

(1) During climb; seat belt signs will be switched off then on when passing 5.000 feet AAL at the earliest, in order to release the cabin crew members for their duties.

Note: Due to sterile cockpit procedure; first call between flight deck and cabin crew should be initiated from flight deck via interphone. If the flight crew does not call the cabin crew within 20 minutes after selecting seat belt signs on-off, the cabin crew shall call the flight crew.

(2) Seat belt signs shall remain on until 20.000 feet MSL, then it shall be positioned to off, when flight conditions permit.

(B) The Commander has the authority to restrict the use of PEDs on any phase of the flight for flight safety reasons. If he requires the PEDs to be switched off and stowed, he shall notify the Cabin Chief and make sure a passenger announcement is made.

(C) Flight crew or technical crew members shall be aware that switching off the appropriate switch (i.e.: IFE/PASS SEAT, COMMERCIAL) at the flight deck, as described in relevant aeroplane FCOM, will switch-off the in-seat power supplies used for PEDs when required.

(D) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** for the procedures regarding the use of PEDs and handling of possible thermal runaways of batteries used in PEDs.

(E) During flight, if turbulence is encountered and the "FASTEN SEAT BELT" signs have been switched on, a passenger turbulence announcement shall be made. Once the cabin check is completed, Cabin Chief shall advise the flight crew all passengers are seated with their seat belts fastened. When necessary, the flight crew will instruct cabin crew members to be seated and fasten their seat belts by cycling the "FASTEN SEAT BELT" signs twice. Unless the degree of suddenly encountered turbulence renders it too dangerous, cabin crew members shall, in case of turbulence, ensure that baggage and other load is re-stowed and secured so as not to cause injury by falling or other movement.

(F) During turbulence, in the absence of any instructions by the Commander, the Cabin Chief may discontinue non-safety related duties and advise the flight crew of the need to switch on the "FASTEN SEAT BELT" signs.

(G) All breakdowns or malfunctions of electrical equipment in the cabin shall be immediately reported to the flight crew. Cabin crew members should be aware of the fact that resetting of circuit breakers - without knowing the reason of the failure - increases the fire risk. Commander approval is required to re-engage any tripped circuit breaker.

(H) All occurrences which may affect the safety of the operation and the well-being of the passengers shall be immediately reported to the flight crew, e.g., illness on board, unusual noise, odour and other observations.

(I) See **EK.10.71.001 Cabin Crew Manual (CCM)** for in-flight procedures in the cabin.

8.3.15.1.3 Preparation for Landing

(A) Before commencing the descent, a passenger announcement can be made by the flight crew in order to inform the passengers about the remaining time to land. This information is also useful for cabin crew preparation for landing (conclude passenger services and prepare the cabin for landing).

(B) " FASTEN SEAT BELT" signs shall be switched on, latest passing about 15.000 feet AAL for the narrow body aircrafts and about 20.000 feet AAL for the wide body aircrafts. The commander should then inform the cabin chief the estimated landing time if any necessity occurs (expected shortcut etc.). The cabin crew members shall, ensure that galleys and lavatories are safe, secure and locked, ascertain that all passengers are safely seated and that all baggage/load has been properly re-stowed.

(C) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** for the procedures regarding the use and securing of PEDs in the cabin including Cabin Chief's PED.

(1) When the aeroplane is equipped with a crew rest compartment, it is considered being part of the passenger compartment. Therefore procedures regarding usage of PEDs stated in **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** applies for crew rest compartments.

(D) Use of PEDs including use in flight mode is prohibited during low visibility approach (CAT II and CAT III) operations.

(E) Landing announcement for cabin crew shall be made when passing about 5.000 feet AAL by the PM as "CABIN CREW BE SEATEDFOR LANDING " in order to alert the cabin crew.

(F) Cabin crew members shall at the latest, on receipt of instruction from the flight deck, occupy their designated stations, fasten their seat belts/harnesses.

(G) The Cabin Chief, having received the appropriate cabin report from each cabin crew member shall report "CABIN READY" to the flight crew by interphone or by using the 'cabin ready' push button if available.

(H) If the cabin chief decides that the cabin is not ready for landing, he shall immediately inform the commander via interphone "CABIN NOT READY".

8.3.15.1.4 After Landing

(A) After the aeroplane has landed, cabin crew shall ensure that the passengers remain seated with their seat belts fastened until the final parking position has been reached, all engines have been shut down, and "FASTEN SEAT BELTS" signs are switched off.

(B) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.8.2. Use of Portable Electronic Devices** for the procedures regarding the use of PEDs in the cabin including Cabin Chief's PED.

(C) After "FASTEN SEAT BELTS" signs are switched off, each cabin crew member shall ensure that the automatically deploying means for emergency evacuation, at the door(s)/emergency exit(s) that he has been designated responsible for, are disarmed as prescribed in the type specific instructions of the AOM.

8.3.15.1.5 Use of Flight Crew Members' Portable Electronic Devices (PEDs) in Flight Deck

(A) Usage of PEDs in the flight deck poses risks of detaining flight crew members from performing their defined tasks and responsibilities, and may negatively affect the use of electronic systems in the flight deck. PEDs that will be used to assist flight crew members performing their duties are allowed to be used in the flight deck under following provisions:

(1) During preflight cockpit preparations, at certain times requiring utmost safety precautions, PEDs shall not be used. These times are, but not limited to, data entry into Flight Management Computer, refueling, etc.

(2) PEDs shall be switched to "Flight Mode" or "Flight Safety Mode", disconnected from electrical power supply units, stowed and shall not be used below 20.000 feet in-flight including taxi phase.

(a) Pilots occupying observer seat(s) may use their PEDs during critical phases of flight provided that they are switched to "Flight Mode" or "Flight Safety Mode".

(3) During low visibility operations (Both take-off and approach), all PEDs in the flight deck shall be disconnected from electrical power supply units, switched off, stowed and shall not be used.

(4) At all other times, flight crew members' PEDs may be used under following conditions:

(a) When using, PEDs shall be securely fastened in order not to pose a loose item threat or any other hazard;

(b) Transmitting capabilities like cellular data connection, wireless local area network (WLAN), wireless fidelity (Wi-Fi) or bluetooth shall be disabled by switching to "Flight Mode" or "Flight Safety Mode" (not permitting intentional radio frequency transmission); and

(c) When they are used, they shall never be left (even intermittently) on the central instrument panel or pedestal panel (aft electronic panel) and on an area which may interfere with flight controls.

8.3.15.1.6 Safety Precautions on Use of Flight Crew Member's PEDs

(A) There are two types of lithium batteries, lithium metal and lithium ion (rechargeable). Laptop computers, tablets and other battery-operated devices are often powered by one or more battery packs that contain multiple lithium ion batteries or cells.

(B) Flight crew members can carry lithium battery powered devices and their spare lithium batteries during the flight as long as the Watt hours (Wh) of its battery do not exceed 100 for lithium ion batteries, or the lithium content does not exceed 2 grams for lithium metal batteries.

(C) Current generation PEDs use lithium ion (i.e. lithium polymer) batteries and following data can be used for judgment about the Wh rating of a PED's battery. Ipad Pro (12.9 inch): 38.5 Wh, Ipad Air 2: 27.3 Wh, MacBook Air (13 inch): 54 Wh, MacBook Pro (15 inch): 99.5 Wh. Battery information can be found at technical specifications of PED.

(D) In terms of calculating the Wh of the battery, when one PED has several batteries powering it together, the addition of Wh of all the batteries powering the device must be considered.

(E) Flight crew members must be aware that lithium ion cells are flammable and capable of overheating and self-ignition. Overheating can be caused by a short circuit, overcharge, rapid discharge, extreme temperatures, mishandling or an internal defect. Overheating can cause a thermal runaway and can cause adjacent cells to overheat. This can cause a lithium battery fire to flare repeatedly as each cell overheats.

(1) Fighting a fire that contains either lithium metal or lithium ion battery cells requires:

(a) extinguishing the fire,

(b) moving the device out of the flight deck, if possible, and

(c) cooling the remaining cells to prevent or stop a thermal runaway.

(2) It is important to take action as soon as a malfunctioning device is identified, preferably before the device catches fire. If there is no risk of injury, the first course of action should be to turn off, unplug, or remove power from the device.

(3) If a PED is dropped at the flight deck, seats shall not be moved to locate it. If the seat hits the PED, it could damage the battery and cause a fire.

(4) Halon, Halon replacement or a water fire extinguisher must be used to extinguish the fire and prevent the spread of the fire to other flammable materials. Water can react with the small amount of metallic lithium in a lithium metal battery but it is still the most effective agent for cooling the remaining cells, stopping thermal runaway, and preventing additional flare-ups. Dry powder must not be used to extinguish the fire as this may increase the likelihood that additional battery cells will reach thermal runaway.

(5) Ice must not be used to cool a device with burning lithium batteries and the device must not be covered with a blanket or towel. Ice and other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.

(6) Commander must determine the safest course of action; moving the device out of the flight deck or leaving the device on the flight deck. Unless properly protected from the fire, an attempt to pick up or move a smoking or burning device must not be made. If a device can't be picked up, the crash axe can be used to push or pull the device from the flight deck.

(7) Immediately after the fire is extinguished and the device is moved from the flight deck, if possible, a crew member should douse the device with water, a water-based extinguishing agent, or other non-alcoholic liquid to cool the battery and prevent additional battery cells from reaching thermal runaway. The use of a metal container such as a galley cart or toilet bowl for this purpose can be considered.

(8) The device should be monitored for the rest of the flight.

(9) Spare lithium batteries shall be individually protected, to prevent short circuits when not in use.

8.3.15.2 Passenger Seating

Refer to **Subchapter 8.2.2.3**.

8.3.15.3 Passenger Embarkation and Disembarkation

Refer to **Subchapter 8.2.2.1**.

8.3.15.4 Refuelling/Defuelling with Passengers Embarking, on Board or Disembarking

Refer to **Subchapter 8.2.1.4.**

8.3.15.5 Carriage of Special Categories of Passengers (SCPS)

Refer to **Subchapter 8.2.2.2**.

8.3.15.6 Smoking on Board

(A) Smoking (including electronic cigarettes) is prohibited onboard all Turkish Airlines aeroplanes (all sections) on the ground or in-flight.

(B) Regardless of aerodrome authorities policies on smoking in designated areas inside of the terminal buildings, as far as Turkish Airlines is concerned and during all ground operations, smoking is strictly prohibited on the:

(1) Ramp area (in the vicinity of the Turkish Airlines aeroplanes);

(2) Loading bridge (connected to the Turkish Airlines aeroplanes).

(C) Commander does not have the authority to approve smoking on the aeroplane due to:

(1) Requirements of authorities involved (possibility of heavy fines against Commander and/or Turkish Airlines by local authorities – fines imposed on Turkish Airlines shall be reimbursed from the Commander);or

(2) Risk the health of any non-smoker (if any crew member issues an official report, or a passenger complains on such an occurrence, the Commander shall be held responsible for such decision making process); or

(3) Risk of inducing damage (damage to aeroplane interior or potentially initiating a controllable or uncontrollable cabin or cockpit fire – damages incurred from such an occurrence shall be reimbursed from the Commander if such occurrence was due to Commander approval) to Turkish Airlines aeroplanes which may not be covered under the current insurance policy

(D) Violation of this regulation will be regarded as infringement of flight safety.

8.3.15.7 Handling of Suspected Infectious Diseases

Refer to **Subchapter 8.3.19.1**

8.3.16 Passenger Briefing Procedures

(A) Passengers shall be:

(1) given verbal briefings and demonstrations (or audiovisual presentations) relating to safety about the application of procedures applicable in the event of an emergency; and

(2) 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.

8.3.16.1 Contents of Passenger Briefings

(A) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.2.10. Safety Briefings** for contents of passenger briefings.

(B) Emergency during flight:

(1) Passengers shall be instructed as appropriate to the circumstances (refer to **Operations Manual Part-B**).

8.3.16.2 Passenger Announcements by the Flight Crew

(A) Certain studies have proved that announcements of flight crew have a more significant role on building passenger confidence compared to cabin crew announcements. This is especially important during non-normal situations. While the purpose of passenger announcements is mainly to offer a briefing about how the flight is carried out, they may also serve to provide more specific information during non-normal circumstances such as diversion, etc.

(B) As a matter of courtesy, the flight crew should make announcements to passengers after embarkation and before descent, unless deemed by the Commander to have a negative effect on flight safety. Normally if flight time/conditions and workload permits, a before descent announcement should be made and must be completed before top of descent at the latest. It shall be kept in mind that a timely before descent announcement is an important triggering factor for the start of passenger and cabin readiness for landing (especially for wide body ER flights).

(C) In addition to the above, any other announcements that may increase passenger satisfaction (during cruise , during unexpected weather, turbulence etc.) may be made.

(D) For passenger announcements by the Commander, including the ones that address matters related to safety, turbulence, abnormal and emergency situations, the Commander may refer to **LS.73.002 Announcements Guide**, placed on the flight deck.

(E) The Commander, shall perform the announcements first in Turkish and then in English. However, he may allow the co-pilot to make the announcements depending on the experience level of the co-pilot.

(F) The Commander shall make the passenger announcements when the co-pilot is performing a line flight under supervision (LIFUS). If the Commander is not a native Turkish speaker, the co-pilot will make the passenger announcement in Turkish, and the Commander will in English.

(G) The sequencing for passenger announcements: the announcement in Turkish shall be made first, followed by the announcement in English.

(H) If the flight crew consists of a non-native Turkish speaker: the native Turkish speaker shall make both announcements when he is PF; when the native Turkish speaker is PM, he shall make the Turkish announcement folllowed by English version which may be completed by either PF or PM.

(I) In case of cabin announcements do not give enough impression to the passengers, flight crew should make the passenger announcement to assist the cabin crew.

8.3.16.2.1 Announcement Method

(A) Basically a clean sounding PA system is necessary to deliver a comprehensible passenger announcement. Therefore, it is necessary to test the PA system during pre-flight checks.

(B) Before a passenger announcement, the flight crew member to make the announcement shall hand over his duties to the other flight crew member, put on his headset and keep speaker volume at the minimum usable level adequate to avoid interference with passenger announcement but still ensure reception of relevant communications.

(C) Flight deck chatter and background noise shall be kept at a minimum during announcement.

(D) The following are recommended methods for passenger announcements:

(1) Think about what to say beforehand.

(2) Instead of sounding authoritarian or prohibitive, make announcements in a conversational way.

(3) Choose words carefully and pay attention to keep a steady and understandable pace through announcement.

(4) Avoid jokes to prevent misunderstandings, which may be caused by certain cultural differences.

(5) Present information in the most general way without going into too much detail. Passengers may misinterpret technical details.

(6) Pay close attention to the time of the day and avoid making announcements during times when passengers may be asleep.

(7) Coordinate the timing of the announcement with the cabin crew. Avoid making announcements during in-flight movies or when a cabin crew announcement is in progress.

(8) Make sure that PA handset push to talk switch is pressed throughout the whole announcement otherwise in-flight movie or air-show presentation will try to resume playing. In some cases, this may cause malfunctions in the entertainment system.

(9) Exclude information, which might be inaccurate.

(10) Consider making more than one announcement when flight time is expected to exceed three hours.

(11) While on the ground, if there is a delay that is expected to be 10-15 minutes or more, the Commander should address passengers accordingly and to be repeated if necessary for furher/longer delays.

(12) Passenger announcements shall not be made when the aeroplane is taxiing on the ground. A brief announcement may be performed, when deemed necessary, provided that the aeroplane is not moving and the parking brake is set.

(13) It is recommended to coordinate the timing of announcements with the cabin chief whenever it is anticipated that most of the passengers are asleep except safety, security or specific regional requirements.

8.3.16.2.2 Welcome Announcement

(A) A “Welcome Announcement” to the passengers shall be made by a flight crew member when the boarding is completed and if the workload permits, stating:

(1) names of the flight crew members;

(2) current situation (on time/expected start-up time, reason for the delay, etc.);

(3) planned flight time to destination;

(4) en-route weather conditions (expected turbulence, significant weather, etc.);

(5) other details may be added as necessary to inform passengers.

(B) If workload does not permit, welcome announcement may be done in cruise phase of the flight,

(C) Commander may make the welcome announcement during taxi phase provided that aeroplane is stationary.

8.3.17 Cosmic or Solar Radiation Detection Equipment

(A) Cosmic or solar radiation detection equipment is only required if an aeroplane is operated above 49.000 ft (15.000 m).

(B) For procedures and responsibilities on monitoring cosmic radiation levels, refer to **Subchapter 6.1.20**.

8.3.18 Policy on the Use of Autopilot and Other Auto Flight Systems

8.3.18.1 Use of Automation

(A) During flight, autopilot (A/P), flight director (F/D) and auto-thrust/auto-throttle (A/THR) should be used to the maximum extent practical.

(B) This will relieve the workload of the flight crew and give them more time to monitor instruments, ATC communications, and weather conditions and pay more attention to other aircraft.

(C) When operating in good weather and at low traffic aerodromes, the flight crew can fly the departure or arrival manually to maintain manual flying skills.

(D) Optimum use of automation requires the integrated and coordinated use of the following systems:

(1) A/P;

(2) F/D;

(3) A/THR;

(4) Flight management (FMS).

(E) The optimum use of automation enables the flight crew to stay ahead of the aircraft and be prepared for possible contingencies.

(F) A/P engagement should only be attempted when the F/D commands (if the F/D is on) are essentially satisfied and the aircraft flight path is under control.

(G) A/THR use is recommended during all phases of flight, if applicable.

(H) During line operations, the A/P and A/THR should be engaged, especially in marginal weather conditions or when operating in an unfamiliar aerodrome.

(I) During approach F/D, A/P and A/THR should be used to the maximum extent practical.

(J) CAT II landings may be done manually but auto-land is recommended.

(K) Detailed policies about automation for the appropriate type of aeroplane are found in FCOM.

Note: When the use of A/P and/or A/THR becomes unproductive and/or if doubt exists regarding the aircraft flight path or speed control they should be disconnected.

8.3.18.2 Appropriate Levels of Automation

(A) The PF always retains the authority and capability to select the most appropriate level of automation and guidance for the task, including:

(1) Adopting a more direct level of automation by reverting from FMS guidance to Non-FMS guidance such as using the A/P, F/D, A/THR and MCP/FCU for mode selection and target entry;

(2) selecting a more appropriate lateral or vertical mode; or,

(3) reverting to manual flight with or without F/D guidance and with or without A/THR for direct control of the aircraft.

(B) If doubt exists regarding the aircraft flight path or speed control, no attempt at reprogramming the automated systems should be made. A lower level of automation or manual flight with reference to navaids raw data should be used until time and conditions permit reprogramming the A/P, F/D or FMS.

(C) Except in non-normal aircraft behavior, A/P and A/THR must not be overridden manually.

8.3.18.3 Autopilot and Flight Director Mode Selections

(A) If both autopilots are inoperative, flight duty may be accepted only if the flight time does not exceed 1 hour (flight times longer than 1 hour are subject to SVP, Flight Operations (Chief Pilot)'s approval).

(B) The use and operation of the auto flight system must be monitored and supervised by the PF and PM at all times by:

(1) confirming, checking and announcing the status of autopilot, auto throttle/ autothrust and flight director modes on the FMA (arming, engagement, etc)

(2) the PFD (FMA, speed scale and altitude scale) - guidance modes, speed and altitude targets;

(3) the ND - lateral guidance (heading, track or FMS flight plan); and

(4) supervising the resulting autopilot, flight director guidance and auto throttle/ autothrust operation on the PFD and ND (pitch attitude and bank angle, speed and speed trend, altitude, vertical speed, heading or track).

(C) Autopilot and flight directors are recommended for use in turbulence.

(D) When performing manual flight, the flight director commands should be followed; otherwise, the flight director bars should be cleared from the display.

(E) No turn shall be made before 400 ft. AGL after take-off (except special aerodrome operations published on charts).

8.3.19 Other Operating Procedures

8.3.19.1 In-Flight Handling of Sick or Injured Passengers

(A) Evaluate the medical condition and, if passenger appears to be seriously ill or to have a life threatening condition, accomplish the following:

(1) Seek the assistance of a physician (medical doctor) among the passengers.

(2) Apply first aid if required.

(3) Plan to land as soon as practical at a suitable aerodrome. Unless there is an authorized physician onboard stating and confirming the death, the Commander shall consider that the person is still alive.

(4) Contact IOCC and request further assistance if an unscheduled landing is planned upon the recommendation from the volunteer physician or health professional or at the Commander's discretion.

(5) Call for an ambulance and/or paramedical assistance as appropriate to meet the aeroplane. Describe the patient's condition, gender, age and other relevant information as detailed as you can in your transmission.

(B) If there is a possibility of a contagious disease, refer to **Chapter 6**.

8.3.19.2 Removal of Sick Passenger(s)

(A) When it is necessary to remove a passenger who is sick, disabled, insensible or otherwise unable to take care for himself, the Commander or the cabin chief shall take all steps, including medical attention and hospitalization if necessary, to provide temporary care and safety until the passenger is able to care for himself; or custody of the passenger can be given to other qualified persons, agencies or institutions.

(B) Prompt steps shall be taken by the cabin chief to contact the family or relatives of the incapacitated passenger advising them of his condition and requesting instruction.

(C) Turkish Airlines shall assume all expenses for temporary care and will later request reimbursement from the passenger or his family.

8.3.19.3 Death on Board

(A) Only an authorized physician can confirm the death. If there is no physician onboard to make the confirmation, the person shall be treated as sick or injured in accordance with **Subchapter 8.3.19.1**.

(B) In the event of a death onboard, the Commander shall fill out the **FR.73.0068 Birth Onboard/Death Onboard Report**, which is provided in the Commander's folder as soon as possible (Refer to **Chapter 11**).

(C) The decision to divert or make an unscheduled landing rests with the Commander.

(D) The Turkish Airlines station representatives at the aerodrome of intended landing shall be informed as practical, who shall inform the local police, aerodrome authority and medical services. IOCC shall also be contacted (via ACARS, HF etc.) if possible.

8.3.19.4 Birth on Board

(A) In case of a birth onboard, the main concern is the health of the newborn and mother and the legal status of the newborn. To ensure accurate reporting, the Commander shall fill out the **FR.73.0068 Birth Onboard/Death Onboard Report** which is provided in the Commander's folder, as soon as possible (Refer to **Chapter 11**).

(B) The Commander shall seek medical advice from a doctor if one is onboard. If there is the slightest doubt about the health of the baby and/or mother, a diversion or an unscheduled landing should be considered.

(C) The Turkish Airlines station representatives at the aerodrome of intended landing shall be informed as practical, who will inform the local police, aerodrome authority and doctor for medical assistance. IOCC shall also be contacted (via ACARS, HF etc.) if possible.

8.3.19.5 Medical Kits Onboard And Procedures

8.3.19.5.1 First Aid Kit

(A) The cabin chief is responsible for opening the first aid kit.

(B) Turkish Airlines HUB Control Center is responsible for checking the kit to ensure it is installed and properly sealed.

(C) If the kit is used or the seal is broken, check the MEL.

(D) First aid kit is located in the cabin under the control of the cabin chief.

8.3.19.5.2 Emergency Medical Kit

(A) See **EK.10.71.001 Cabin Crew Manual (CCM) 8.3.1.4.1. Dr. Kit (Emergency Medical Kit)** for procedures regarding Emergency Medical Kit.

(B) Turkish Airlines HUB Control Center is responsible for checking the medical kit to ensure it is installed and properly sealed.

(C) If the emergency medical kit is used or the seal is broken, check the MEL.

8.3.19.5.3 Medical Kit Contents

(A) Medical Kit is white with "MEDICAL KIT" stenciled in blue. Contents are according to **LS.32.025 Doctor Kit Contents List**.

(B) The resuscitation mask and rubber gloves may be used by any crewmember assisting an emergency.

8.3.19.5.4 Universal Precaution Kit (Body Fluid Spill Kit)

(A) The universal precaution kit is intended to be used for contagious diseases.

(B) The place of the kits will be shown in "Emergency Equipment Plan".

(C) If it is used, that shall be noted to "AML".

(D) If it is used or the seal is broken, check the MEL.

(E) Contents are according to **LS.32.028 Fluid Spill Kit**.

8.3.19.6 Communicating Safety Concerns to Commander/Emergency Talk

(A) If commander actions result in a flight crew member being concerned about the safety of the aeroplane, the flight crew member shall clearly express the concern using the trigger word “UNCOMFORTABLE”.

(B) A flight crew who deems a commander’s actions to be extremely unsafe, and can foresee the potential for an incident or accident, must be able to influence the outcome. Emergency talk is the formal procedure used to achieve this.

(C) Good communication techniques of enquiry, advocacy and assertion will resolve the situation in most cases. However, in situations where this is not the case, the last line of defense phrase; “Captain, you must listen” can be used.

(D) If the phrase is used - unless in the commander’s view it is absolutely imperative to continue - the course of action must be discontinued and the situation re-assessed by the flight crew.

Note: If the emergency talk process has been used a confidential FSR (Flight Safety Report) must be filed with Corporate Safety Directorate.

8.3.19.7 Runway Incursion

(A) A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aeroplane, vehicle or person on the protected area of a surface designated for the landing and take-off of aeroplanes.

(B) Runway incursions can occur for a number of reasons but in every case, can be avoided.

(C) Analysis of runway incursion events has shown that a small number of fundamental contributory factors, most of which involve human error, are common to all incidents. Poor communication techniques, a failure to follow procedures correctly, poor knowledge of the aerodrome layout and loss of situational awareness all play a part. Air traffic control, flight crews and vehicle drivers all make errors, either singly or in combination, which can lead to a runway incursion.

(D) Runway incursions can occur at aerodromes of all sizes with similar consequences for those involved. Runway incursions happen in all types of weather, in daylight and at night. In short, a runway incursion can happen on any runway at any time.

(E) All involved parties shall take measures to prevent any runway incursion occurrences. It is mandatory for flight crew members to:

(1) Make the required briefings for all phases of flight;

(2) Use standard phraseology to reduce any errors and challenge any poor communication;

(3) Pay attention to similar callsigns and use their full callsign, and never hesitate to request confirmation for any message if in doubt;

(4) Show utmost importance to and comply with aerodrome signs, markings and lightings;

(5) Consider the taxi phase as a critical phase of flight;

(6) Maintain situational awareness by all means (aerodrome layout, taxi progress monitoring, using proper communication techniques, listening out on the appropriate frequency in use, complying with sterile flight deck principles, watching out for and monitoring the other traffic, etc.)

8.3.19.8 Cargo Transportation in the Cabin Compartment of Passenger Aeroplane

(A) Cargo transportation in the cabin compartment of Turkish Airlines' passenger aeroplane is performed according to **Turkish DGCA Circular UOD-2020/2G Carriage of Cargo in Passenger Compartment**.

(B) Further details may be found in **EK.10.71.001 Cabin Crew Manual 11. Cargo Operation with Passenger Aircraft**.

(C) The implementation of cargo transportation in the cabin compartment of passenger aeroplane, the flight crew and the cabin crew shall pay special attention to the items given below:

(1) In the passenger cabin, cargo classified as general, medical and which do not have the risk of leakage and odor (resistant to 19 Degrees of Celsius) may be carried.
(2) Devices with Li-Ion batteries (computers, tablets, mobile phones, etc.), dangerous goods, animals and wet/scented materials shall not be carried.
(3) Commander shall be informed with a NOTOC or cargo manifest or other relevant documents regarding the contents of all cargo carried in the aeroplane.
(4) Pre-flight briefing including inoperative equipment and abnormal situations with additional information required, shall be conducted by the commander to all crew members.
(5) The air conditioning system should be configured to set cabin temperature to 18 to 20°C and if equipped, pack flow should be set to maximum number of passengers or to Max Flow (HI).
(6) In the event that cabin crew members detect that the cargo is being loaded in a way that obstructs emergency exits or prevents access to the emergency equipment, they shall inform the loading personnel/flight crew member/s.
(7) In-flight Entertainment Systems, Circuit breakers of the seats and galleys that are not-in-use, other heat producing systems) at the section that the cargo is carried, shall be set to "OFF" and entry into AML shall be completed. Flight Crew shall review AML for such entry and inform Cabin Crew.
(8) Galley in the non-loading section is used for the crew. If loading is made to all sections, a galley is excluded from the scope above for crew use.
(9) In case of fire/smoke, standard fire/smoke procedures are applied.
(10) Dangerous goods and liquid cargo are not transported in the cabin of passenger aeroplane. However, if there is a leakage from a cargo as a result of an unreported or incorrectly reported cargo, the procedures specified in **Subchapter 9.1.4.** shall be followed.
(11) Whole cabin and all lavatories are monitored throughout the flight. Entire cabin whether cargo is loaded or not, shall be monitored after takeoff, before landing and whenever deemed necessary by the commander to ensure proper securing of the cargo. Cabin crew members are at their stations, shall still continue to monitor cabin and do not gather at the galleys.
(12) Flight crew members must be familiar with associated procedures in the QRH to minimize risk of smoke/ fumes entering the flight deck in case of fire or smoke in the cabin.

(D) The general rules for cargo loading to the cabin compartment of passenger aeroplane is as follows:

(1) Cargo shall be loaded on economy class seats (except emergency exits), floor under the seat (except emergency exits) or in the overhead compartment in economy class without exceeding maximum structural loading limits.

(2) In order to carry cargo on the floor under the seat, the structure under the seat shall be designed to prevent cargo from moving and the cargo must be fully placed under the seat. The equipment used to restraint the cargo shall not prevent visual inspection during flight.
(3) Cargo cannot be loaded to toilets, galleys, aisles, emergency exit areas, business class section, crew rests; sections that do not restrict the forward, sideways or upward movement of cargoes or do not have a placard indicating maximum load carrying capacity.
(4) Cargo that are not suitable in terms of shape shall not be loaded into the passenger cabin. Sharp edges must be rounded before loading.
(5) Cargo placement shall be done in a way that does not hinder access to emergency equipment.
(6) After loading on the basis of fixing cargo on seats, safety nets or similar material can be used to secure seats in blocks. This shall be done by extending nets or any other material under seats and locking all ends.
(7) At the end of the loading and fixing process for each seat, it should be ensured that the height of the loaded cargo does not exceed the backrest height of the seat and does not prevent the warning/information signs to be seen.
(8) If cargo is loaded in the main deck of passenger aeroplane, **FR.61.086 Passenger Aircraft Main Deck Loading Checklist From** shall be filled out by the loading personnel and the cabin chief.
(9) Details about loading of cargo in the cabin compartment of passenger aircraft may be found in **TL.61.035 Instruction to Cargo Loading onto Main Deck of B777, A330 and Boeing 787 Passenger Aircrafts** and **EK.10.71.001 Cabin Crew Manual 8.1.9. Cargo Operation with Passenger Aircraft.**

8.3.19.9 Operational Procedures for Flights to be Performed during COVID-19 Period

(A) Flight operations during and after the COVID-19 outbreak will be conducted in accordance with **TL.10.70.001 General Instruction for Flight Operation COVID-19 Period Applications**.

(B) Within the scope of COVID-19 precautions determined according to the Turkish DGCA rules and regulations, the instruction includes measures to be taken by the flight crew and the cabin crew:

(1) before, during and after flights,

(2) for flights to high-risk countries/regions,

(3) during layovers and special transport duties, and

(4) operational, safety and security procedures to be applied during flight operations.

8.3.20 Turkish Airlines EFB System Implementation

8.3.20.1 General

(A) EFB administrator(admin) is the person appointed by Turkish Airlines, held responsible for the administration of the EFB system within the Company. The EFB administrator is the primary link between Turkish Airlines and the EFB system and software suppliers.

The EFB Admin is responsible;

- For all the applications installed, and for providing support to the EFB users on these applications;
- To check potential security issues associated with the application installed.
- For hardware and software configuration management and for ensuring, in particular, that no unauthorized software is installed.
- For ensuring that only a valid version of the application software and current data packages are installed on the EFB system
- For ensuring the integrity of the data packages used by applications installed.
- To check all feedbacks via EFBFEEDBACK@THY.COM. If correction is needed he/she is responsible to solve problems and reports to EFB software vendor.
- EFB Admin shall ensure that all data in EFB are verified and appropriate for in flight usage.
- To provide and maintain the security of EFB system, EFB content, accessibility.

(B) The primary use of the EFB system is to provide Jeppesen charting system that forms part of the Turkish Airlines Paperless cockpit concept. Each EFB device hosts software applications for the operational use of the pilot. These software applications are limited to EFB Type A and Type B software.

- Type A Software are used by Turkish Airlines:
  - Company and Aircraft certificates (Noise Certificates, AOC & Operation Specifications, Insurance Certificates, Certification of Airworthiness & Airworthiness Review Certificate, Aircraft Radio Licence)
  - Emergency Response Guidance For Dangerous Goods
  - **LS.74.040 Aerodrome Categories List**
- Type B Software are used by Turkish Airlines:
  - Jeppesen Electronical Aeronautical Charts (take off, en route, approach and landing, missed approach, go-around, pre-composed or dynamic interactive electronic aeronautical charts, e-checklists*)
  - AFM, FCOM, Operation Manuals (Part-A,B,C), MEL, CDL
  - EFF (Electronic Flight Folder) (OFP, Notams, Weather Info)
  - Aircraft Performance Calculation (Take Off and Landing Performance)
  - Mass and Balance Calculation*

*if applicable

(C) Turkish Airlines EFB Systems consist of two different EFB implementations:

- Portable EFB System(UTAS G700 and Panasonic ToughPad EFB System): The Portable EFB system provides the Flight Crew with display and user-interface devices with which to access the functional capabilities of the entire system. The Turkish Airlines EFB system consists of two G700 EFB devices manufactured by UTAS or Panasonic ToughPad devices manufactured by Panasonic. These devices are mounted on a mounting device attached to the sidewall of the cockpit. Detailed information regarding to Portable EFB System can be found in **EK.10.74.004 EFB Policy And Procedures Manual For G700 and Panasonic Toughpad EFB Systems**.

- Installed EFB System (B777/B787 onboard EFB System): Installed EFB System is An EFB host platform installed in the aircraft and considered as an aircraft part, covered, thus, by the aircraft airworthiness approval. B777/B787 aircraft have onboard installed EFBs on both left and right hand side of cockpit. Detailed information regarding to Installed EFB System can be found in **PR.74.615 Procedure for EFB (Electronic Flight Bag) System.**

(D) Panasonic ToughPad with StrongPilot Software may be used on B777/B787 and A350 aircraft with proper mountings.

8.3.20.2 Safety Risk Evaluation (SRE)

(A) Turkish Airlines is introducing the use of the G700 and Panasonic ToughPad EFBs on its B737, A320 and A330 fleets gradually which will result in new procedures among flight crew compared to what they have been accustomed to. Since the change is a significant one and its introduction into service requires it, an SRE is conducted.

(B) Data is utilized from external sources and the operational experience from the the B777 fleet (installed EFB) as a guide for estimating probability and severity. The procedures for the use and mitigations involving the G700 and Panasonic ToughPad EFBs are;

(1) **TL.74.404 Portable EFB User Guide**

(2) **PR.74.615 Procedure for EFB (Electronic Flight Bag) System**

(3) **PR.74.616 EFB Failure Reference Procedure**

(4) **EK.10.74.004 EFB Policy And Procedures Manual For G700 and Panasonic Toughpad Efb Systems**

(C) According to Flight Operations Directorate Risk Assessment Management EFB report determine EFB Risk Level as C (acceptable) and it requires to Long-term improvement and to be monitored and tracked.

8.3.20.3 Compliance Monitoring

The EFB Admin shall interface with the Turkish Airlines Compliance Monitoring (according to ORO.GEN.200), and ensure that appropriate action is taken when required by these systems. Refer to **PR.74.615 Procedure for EFB (Electronic Flight Bag) System** for details regarding compliance monitoring.

8.4 All Weather Operations

8.4.1 Definitions

(A) Alert Height: a specified radio height, based on the characteristics of the aeroplane and its fail-operational landing system. In operational use, if a failure occurred above the alert height in one of the required redundant operational systems in the aeroplane (including, where appropriate, ground roll guidance and the reversionary mode in a hybrid system), the approach would be discontinued and a go around executed unless reversion to a higher decision height is possible. If a failure in one of the required redundant operational systems occurred below the alert height, it would be ignored and the approach continued.

(B) All Weather Operations: any takeoff or landing operations in conditions where visual reference is limited by weather conditions.

(C) Fail-Passive Flight Control System: a flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the aircraft after a failure.

(D) Fail-Operational Flight Control System: a flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing can be completed automatically by the remaining part of the automatic system, which becomes a fail-passive system.

8.4.2 Aerodrome Related Requirements

(A) An aerodrome may not be used for low visibility operations (LVO) below a visibility of 800 m unless:

(1) the aerodrome has been approved for such operations by the State of the aerodrome; and

(2) low visibility procedures have been established.

(B) Low Visibility Procedures (LVP) are established at an aerodrome for the purpose of ensuring safe operations during lower than standard category I, other than standard category II, category II and category III approaches and low visibility take-offs.

8.4.3 Flight Crew Minima

(A) Prior to conducting an LVO the Commander shall be satisfied that flight crew members are properly qualified. This qualification is certified by the ‘Certificate of Low Visibility Operation’.

(B) The flight crew consists of at least 2 pilots and both pilots are certified for LVO.

(C) Flight crew members are limited to the minima of the flight crew member with the higher minima:

Pilot 1 Authorisation	Pilot 2 Authorisation	Minima
CAT III	CAT II	CAT II
CAT III	CAT I	CAT I
CAT II	CAT I	CAT I

8.4.4 Low Visibility Operations and Procedures

(A) Procedures and instructions to be used for low visibility operations (LVO) are prescribed in the relevant FCOMs, FCTMs.

(B) The flight crew must check aeroplane specific Turkish DGCA approved AOC prior to commencing low visibility operations for low visibility approvals and limitations.

(C) Prior to commencing an LVO, the Commander shall be satisfied that:

(1) the status of the visual and non-visual facilities is sufficient;

(2) appropriate LVPs are in force according to information received from air traffic services (ATS);

(3) flight crew members are properly qualified.

(D) For an LVO:

(1) the aircraft equipment and systems required must be available;

(2) the aerodrome equipment and installation required must be available and serviceable;

(3) the aerodrome has to be operating under low visibility procedures;

(4) the flight crew must be qualified; and

(5) the specific wind limitations and the maximum altitude limit shall be considered.

(E) To ensure continuous monitoring of low visibility operations, **FR.73.0008 Low Visibility Operations Assessment Form** shall be filled whenever an actual or simulated approach and landing is attempted regardless of whether the approach is abandoned, unsatisfactory, or concluded successfully. See **PR.73.014 Procedure For Low Visibility Assessment** for usage and management of the **FR.73.0008 Low Visibility Operations Assessment Form**, which is provided in the Commander's folder in the flight crew compartment.

(F) When practicing simulated CAT II/III procedures in weather conditions of CAT I or better, LVP protection is not available. Crew should **inform ATC** that they will be conducting a simulated CAT II/III approach. Crew should be vigilant to the possibility of beam deflection by preceding traffic, other aircraft on ground and vehicles on the ground.

(G) For USA specific operational requirements refer to FAA Operations Specifications document. For Canada specific operational requirements see Transport Canada Operations Specifications document.

8.4.4.1 Taxi

(A) Flight crew members need a working knowledge of aerodrome surface lighting, markings, and signs for low visibility taxi operations.

(B) Understanding the functions and procedures to be used with stop bar lights, ILS critical area markings, holding points, and low visibility taxi routes is essential to conducting safe operations.

(C) Follow-me guidance or ATC assistance (Mode S) may be requested if insufficient visibility conditions exist.

(D) When the aeroplane is moving, there will be no checklist application or no administrative work in the flight deck; both flight crew members should be dealing with the taxi procedures.

(E) Expect icing conditions during LVO in cold weather conditions.

(F) Do not taxi beyond the red stop bars of CAT II or III holding points without clearance.

(G) If any checklist or administrative work is required, the aircraft shall be stopped and the ATC should be notified.

8.4.4.2 Take-Off

(A) Refer to Operations Specifications for aeroplane specific, approved take-off minima that may be used for a Low Visibility Take-Off (LVTO).

(B) For a low visibility take-off (LVTO):

(1) the low visibility procedures shall be in force; and

(2) flight crew members shall be properly qualified.

(C) For LVTO in aerodromes which are not authorized for CAT II/CAT III operations:

(1) LVP shall be established and in force; or

(2) if LVP is not established, the Commander must satisfy himself, with Air Traffic Services or Aerodrome Operator, that:

(a) only one aircraft at a time is allowed on the maneuvering area; and

(b) vehicle traffic on the maneuvering area is controlled and is restricted to the absolute minimum.

(D) During LVTO:

(1) Suitably qualified Commander on the left hand seat is always PF;

(2) expect icing conditions in cold weather conditions;

(3) reduced take-off thrust is not recommended (derated take-off thrust may be used according to **Operations Manual Part-B**/FCOM); and

(4) use TCAS system before entering the runway to check the approach area is clear.

(E) When LVP are not in force, the lowest RVR authorized for take-off is 400 m or higher (as published in the **EK.10.73.002 Operations Manual Part-C**/Jeppesen Airway Manual).

(F) An LVTO with an RVR below 400 m, the criteria is specified in the table below:

FACILITIES	RVR (Note 1&2)
Day: runway edge lights and runway center line markings Night: runway edge lights and runway end lights	300m
Runway edge lights and runway center line lights	200m
Runway edge lights and runway center line lights	TDZ, MID, rollout 150m **(Note 3)**
High intensity runway center line lights spaced 15 m or less and high intensity edge lights spaced 60 m or less are in operation	TDZ, MID, rollout 125m **(Note 3)**
Runway protection and facilities equivalent to CAT III landing operations are available and the aircraft is equipped either with an approved lateral guidance system or an approved HUD / HUDLS for take-off.	TDZ, MID, rollout 75m

Note 1: The reported RVR value representative of the initial part of the take-off run can be replaced by pilot assessment.

Note 2: Multi-engined aeroplanes that in the event of an engine failure at any point during take-off can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins.

Note 3: The required RVR value to be achieved for all relevant RVRs.

TDZ: touchdown zone, equivalent to the initial part of the take-off run.

MID: midpoint.

(G) An LVTO with an RVR below 150 m but not less than 125 m may be commenced if:

(1) high intensity runway center line lights spaced 15 m or less apart and high intensity edge lights spaced 60 m or less apart that are in operation;

(2) a 90 m visual segment that is available from the flight crew compartment at the start of the take-off run; and

(3) the required RVR value is achieved for all of the relevant RVR reporting points.

8.4.4.3 Low Visibility Approach and Landing

(A) Auto-land is:

(1) mandatory (*) for all CAT III approaches; and

(2) recommended for CAT II approaches.

(*) In the event of an autopilot failure at or below DH it is not forbidden to continue the approach and complete the landing when the commander determines that this is the safest course of action provided that it is allowed by the related AFM/FCOM.

(B) Before a low visibility approach, always check:

(1) qualification of both pilots for the intended operation;

(2) aerodrome requirements for LVO (aerodrome approval for LVO, LVP established,)

(3) AOC for low visibility minima of the aeroplane;

(4) FCOM limitations;

(5) MEL limitations;

(6) autoland limitations;

(7) landing performance;

(8) NOTAMs; and

(9) local requirements.

(C) A review of the available approach and runway lighting systems during the approach briefing is mandatory.

(D) The failures that may affect the aircraft's CAT II or CAT III capability of the aeroplane are listed in the FCOM/QRH and/or type specific Low Visibility Procedures Guide.

(E) For all low visibility approaches, a review of the aerodrome diagram, expected runway exit, runway remaining lighting and expected taxi route during the approach briefing is recommended.

(F) It is highly recommended that low visibility approaches are flown as stabilized approach.

(G) Use of landing lights at night in low visibility can be detrimental to the acquisition of visual references. Reflected lights from water droplets or snow may actually reduce visibility. Landing lights may therefore not normally be used in low visibility weather conditions.

(H) The appropriate fields of the AML shall be filled out by the Commander if a low visibility approach and/ or landing is performed.

(I) The flight crews must realize the importance of eye position during low visibility approaches and landing by adjusting seating position.

(J) Decision Height (DH) and all height call-outs below 200ft above the aerodrome threshold elevation are determined by a radio altimeter. Radio altimeters values must be checked to be in agreement during final approach, when passing outer marker or equivalent position.

Note: For detailed procedures, refer to the respective **Operations Manual Part-B**/AFM.

8.4.4.3.1 Category II (CAT II) Operation

(A) CAT II operation is a precision instrument approach and landing using ILS or MLS with:

(1) a decision height (DH) below 200ft but not lower than 100ft; and

(2) an RVR not less than 300m (refer to FAA OpSpecs – Foreign Operations Specifications for USA and Jeppesen Airway Manual content for country/airport specific restrictions).

(B) The DH for CAT II operation shall not be lower than the highest of:

(1) the minimum DH specified in the AFM, if stated;

(2) the minimum height to which the precision approach aid can be used without the specified visual reference;

(3) the applicable OCH for the category of aeroplane;

(4) the DH to which the flight crew is qualified to operate; or

(5) 100 ft. RVR vs. DH according to the table below:

DH (ft)	Auto-coupled to below DH *	
	RVR (Aeroplane category C)	RVR (Aeroplane category D)
100-120 ft	300 m	300**/350 m
121-140 ft	400 m	400 m
141 ft and above	450 m	450 m

(*) "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).

(**) 300 m may be used for a category D aircraft conducting an autoland.

(C) For the lowest DH and RVR minima to be used, refer to **EK.10.73.002 Operations Manual Part-C** / Jeppesen Airway Manual).

(D) The following visual references shall be available:

(1) standard runway day markings and approach and the following runway lights: runway edge lights, threshold lights and runway end lights;

(2) for operations in RVR below 450 m, additionally touch-down zone and/or runway center line lights;

(3) for operations with an RVR of 400 m or less, additionally center line lights.

(E) At DH, the visual references specified below shall be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights being the centerline of the approach lights, or touchdown zone lights, or runway centerline lights, or runway edge lights, or a combination of these;

(2) this visual reference shall include a lateral element of the ground pattern, such as an approachlight crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS to touchdown.

8.4.4.3.2 Category III (CAT III) Operation

(A) Category lllA (CAT IIIA) Operation is a precision instrument approach and landing using ILS or MLS with:

(1) a DH lower than 100ft and

(2) RVR not less than 200m.

(B) Category lllB (CAT IIIB) Operation is a precision instrument approach and landing using ILS or MLS with:

(1) a DH lower than 100ft or no DH and

(2) RVR less than 200m but not less than 75m.

(C) Where the DH and RVR do not fall within the same category, the RVR should determine in which category the operation is to be considered.

(D) For operations in which a DH is used, the DH shall not be lower than:

(1) the minimum DH specified in the AFM, if stated;

(2) the minimum height to which the precision approach aid can be used without the specified visual reference; or

(3) the DH to which the flight crew is qualified to operate.

(E) Operations with no DH shall only be conducted if:

(1) the operation with no DH is specified in the AFM;

(2) the approach aid and the aerodrome facilities can support operations with no DH; and

(3) the flight crew is qualified to operate with no DH.

(F) The lowest RVR to be used is defined in table below:

	DH (ft)	Rollout control/ guidance system	RVR (m)
CAT IIIA	Less than 100	Not required	200
CAT IIIB	Less than 100	Fail-passive	150 *
CAT IIIB	Less than 50	Fail-passive	125
CAT IIIB	Less than 50 or no DH	Fail-operational	75

* For aeroplanes certified in accordance with CS-AWO 321(b)(3) or equivalent. **Refer to Operations Specifications for aeroplane specific approval.**

(G) An approach below the published minima shall not be continued unless visual reference containing one of the following elements is attained and can be maintained for a CAT IIIA approach or a CAT IIIB approach with a fail-passive system:

(1) at least 3 consecutive lights from:

(a) the centerline of the approach lights; or

(b) touch down zone lights; or

(c) runway center line lights; or

(d) runway edge lights;

(2) or a combination of the above.

(H) An approach below the published CAT III minima with a fail-operational system shall not be continued unless a visual reference containing one of the following elements is attained and can be maintained:

(1) CAT III fail-operational operations - with a DH

(a) the pilot should be able to see at least one center line light.

(2) CAT III fail operational operations - with no DH

(b) the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aircraft equipment.

(c) a CAT III runway may be assumed to support operations with no DH unless specifically restricted as published in the AIP or NOTAM.

(I) Refer to the **Operations Specifications** for aeroplane specific Turkish DGCA approved CAT III landing minima.

8.4.4.4 Missed Approach

(A) The flight crews must be mentally ready for go-around at any stage of the approach.

(B) Especially the PM who is head-down throughout the approach and landing, should be go-around minded.

(C) The missed approach shall be performed according to FCOM / Operations Manual Part-B, AFM and normal procedures task sharing.

8.4.5 Task Sharing

(A) LVTO and CAT II or III landing shall be carried out by a suitably qualified Commander on the left hand seat.

(B) Pilot flying (PF) shall monitor the flight, airplane instruments, status and look out for visual references.

(C) Pilot monitoring (PM) shall monitor the status of the aeroplane (configuration, attitude, speed, trajectory, etc.), and the flight and aeroplane instruments (standard calls and excessive deviation callouts, etc.).

(D) Precision approaches shall be performed according to FCOM / Operations Manual Part-B, AFM and normal procedures task sharing.

(E) The PF supervises the approach and takes appropriate decisions in case of a failure. Since the approach is flown with A/P, F/D, A/THR, the PF must be continuously ready to take-over if;

(1) any A/P hard over is experienced;

(2) a major failure occurs; or

(3) any doubt arises.

(F) The PM is head-down throughout the approach and landing. The PM monitors:

(1) the FMA and calls mode change as required;

(2) the auto callouts;

(3) the aircraft trajectory or attitude; or

(4) any failure.

8.4.6 Minimum Equipment

(A) The pilot-in-command/Commander shall be satisfied that the status of the aircraft and of the relevant airborne systems is appropriate for the specific operation to be conducted.

(B) The FCOMs and/or MEL prescribe the minimum equipment that must be serviceable at the commencement of an LVTO or a CAT II or III approach.

8.4.7 Criteria for a Successful Cat II, Cat III Approach and Automatic Landing

(A) An approach may be considered to be successful if:

(1) from 500 ft to start of flare:

(i) speed is maintained (airspeed should be recorded and shown to remain within ±5 kt of the intended value, disregarding rapid fluctuations due to turbulence – ref: AMC-AWO 231.)

(ii) no relevant system failure occurs;

and

(2) from 300 ft to DH:

(i) no excess deviation occurs; and

(ii) no centralised warning gives a missed approach procedure command (if installed).

(B) An autoland may be considered to be successful if:

(1) no relevant system failure occurs;

(2) no flare failure occurs;

(3) no de-crab failure occurs (if installed);

(4) longitudinal touchdown is beyond a point on the runway 60 m after the threshold and before the end of the touchdown zone light (900 m from the threshold);

(5) lateral touchdown with the outboard landing gear is not outside the touchdown zone light edge;

(6) sink rate is not excessive;

(7) bank angle does not exceed a bank angle limit; and

(8) no rollout failure or deviation (if installed) occurs.

(C) CAT II/ III autoland wind limits:

AIRCRAFT	HEADWIND	CROSSWIND		TAILWIND
		OTHERS	USA & CANADA	
Boeing B777/B787	25 KNOTS	25 KNOTS	15 KNOTS	15 KNOTS
Airbus A350 – A330	30 KNOTS	20 KNOTS		10 KNOTS
Airbus A319 – A320 – A321	25 KNOTS	15 KNOTS		
Boeing B737		20 KNOTS		

* AFM/FCOM wind limitations of the related type applies if more restrictive.

(D) Braking action for autoland must be “GOOD” or above. More limiting values must be used if presented in the applicable AFM.

8.4.8 Effect on Landing Minima of Temporarily Failed or Downgraded Equipment

(A) These instructions are intended for use both pre-flight and in-flight. It is however not expected that the Commander would consult such instructions after passing 1 000 ft above the aerodrome. If failures of ground aids are announced at such a late stage, the approach could be continued at the Commander’s discretion. If failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in the table below and the approach may have to be abandoned.

(B) The following conditions should be applicable to the tables below:

(1) multiple failures of runway/FATO lights other than indicated in the table below are not acceptable;

(2) deficiencies of approach and runway/FATO lights are treated separately;

(3) for CAT II and CAT III operations, a combination of deficiencies in runway/FATO lights and RVR assessment equipment are not permitted; and

failures other than ILS and MLS affect RVR only and not DH.

Failed or downgraded equipment	Effect on landing minima			
	CAT IIIB (no DH)	Cat IIIB (with DH)	CAT IIIA	CAT II
ILS/MLS stand-by transmitter	Not allowed	RVR 200 m	No effect	
Outer marker	No effect if replaced by height check at 1 000 ft			
Middle marker	No effect			
RVR assessment systems	At least one RVR value to be available on the aerodrome	On runways equipped with two or more RVR assessment units, one may be inoperative		
Approach lights	No effect	Not allowed for operations with DH >50 ft		Not allowed
Approach lights except the last 210m	No effect			Not allowed
Approach lights except the last 420m	No effect			
Standby power for approach lights	No effect			
Edge lights, threshold lights and runway end lights	No effect		Day: no effect	Day: no effect
			Night: RVR 550m	Night: not allowed
Centre line lights	Day: RVR 200 m	Not allowed	Day: RVR 300 m	Day: RVR 350 m
	Night: Not allowed		Night: RVR 400 m	Night: RVR 550 m (400 m with autoland)
Centre line lights spacing increased to 30 m	RVR 150 m		No effect	
Touchdown zone lights	No effect	Day: RVR 200 m	Day: RVR 300 m	
		Night: RVR 300m	Night: RVR 550 m (350 m with autoland)	
Taxiway light system	No effect			

8.4.9 Training and Qualifications

The initial and recurrent training program and qualification requirements, for all aspects of low visibility takeoff and Category II and III operations, are prescribed in the **EK.10.72.001 Operations Manual Part-D 2.1.3. Low Visibility Operation Rules and Regulations**.

8.4.10 Commencement and Continuation of Approach

Refer to **Subchapter 8.1.3.6**.

8.4.11 Flight Crew Incapacitation During LVO

(A) Refer to **Subchapter 4.3** and **Subchapter 8.3.14** for details.

(B) If incapacity is recognized during take-off roll before V1, other pilot must execute rejected take-off maneuver.

(C) In LVO conditions, the consideration should be given to whether it would be safer for the remaining crew member(s) to continue the approach and landing or to execute a missed approach and divert.

(D) If the decision is to continue the approach, after declaring an emergency due to fligt crew incapacitation when LVP are in force, an autoland shall be completed by the remaining crew.

(E) If the decision is to execute a missed approach, the diversion aerodrome should have weather conditions at or above CAT I minima.

(F) Autoland in case of incapacitation in LVO shall be trained in simulator during recurrent/coversion trainings.

8.5 Extended Range Operations for Two-Engine Aeroplanes (ETOPS)

8.5.1 Definitions

ETOPS

Commercial flights conducted with 2-engine aeroplanes approved by the authority (ETOPS Approval) to operate beyond the threshold distance determined in accordance with Turkish DGCA/EASA regulations from an adequate aerodrome.

ETOPS Entry Point

A point on the route, where the aeroplane leaves the threshold distance of an en-route alternate aerodrome into an ETOPS segment.

ETOPS Segment

The portion of a flight between an ETOPS entry point and the ETOPS exit point.

ETOPS Exit Point

A point on the route, where an aeroplane enters the threshold distance of an en-route alternate aerodrome after an ETOPS Segment.

Adequate Aerodrome for ETOPS

An aerodrome shall be classified as an adequate aerodrome for ETOPS (having regard to the performance requirements applicable at the expected landing weight anticipated at the time of landing) if the following criteria are met:

(A) The aerodrome will be available and equipped with the necessary ancillary services, such as, ATS, sufficient lighting, communications, weather reporting, navaids and emergency services.

(B) At least one let down aid (ground radar will qualify) will be available for an instrument approach.

A list of the adequate aerodromes is provided by the Integrated Operations Control Directorate/Flight Planning and Performance Management in the Supplementary Performance Data and Runway Takeoff Analysis Manual.

Suitable Aerodrome for ETOPS

A suitable aerodrome for ETOPS (flight planning and dispatch purposes), is an adequate aerodrome with available weather reports indicating that the weather conditions are at or above the operating minima for a period of one hour before the expected time of landing and ending one hour after the expected time of landing and the runway condition reports indicate that a safe landing can be accomplished at the time of intended operation taking into account the applicable performance requirements and runway characteristics.

ETOPS En-route Alternate Aerodrome

An aerodrome to be available in the event of an engine and/or system failure, which requires a diversion from the originally planned route within the approved ETOPS diversion time/distance (calculated under standard conditions in still air). The en-route alternates shall be listed on the OFP.

Planning Minima for ETOPS En-Route Aerodromes

For ETOPS flights, applicable suitable en-route aerodromes shall be selected and specified in the OFP and ATS flight plan. The appropriate weather reports or forecasts, or any combination thereof shall 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 planning minima depicted in Table below (as applicable). When dispatching under the provisions of the MEL, those MEL limitations affecting instrument approach minima should be considered in determining ETOPS alternate minima.

Approach facility	Alternate airfield ceiling	Weather minima Visibility /RVR
Precision approach procedure	Authorized DH/DA plus an Increment of 200 ft	Authorized visibility plus an increment of 800 meters
Non-precision approach or circling approach	Authorized MDH/MDA plus an Increment of 400 ft	Authorized visibility plus an increment of 1500 meters

* The above criteria for precision approaches are only to be applied to Category 1 approaches.

RFFS Table for ETOPS Operations (Turkish Airlines Aeroplanes)

Aeroplane Type	ETOPS Alternate Aerodrome Required level of Protection
A330 – 200/ – 300/ – 200F – A350	4
B737 – 900ER/– 8 MAX/ – 9 MAX	
B777 – B777F – B787	

8.5.2 General

(A) The content of **Subchapter 8.5** meets the regulatory content requirements of Turkish DGCA/EASA regulations for the ETOPS Operations Manual.

(B) According to Turkish DGCA Regulations, the 60-minute threshold distances (calculated under standard conditions in still air) for two-engine aeroplane types, currently operated by the Turkish Airlines are as follows:

Aircraft	60-minute Threshold Distances
A319 - 132	394 nm
A320 - 232	423 nm
A321 - 211	375 nm
A321 - 231	377 nm
A321 - 271 (NEO)	376 nm
A330 - 203	425 nm
A330 - 223/F	429 nm
A330 - 243F	429 nm
A330 - 302	425 nm
A330 - 303	425 nm
A330 - 343	429 nm
A350-900	422 nm
B737 - 700	416 nm
B737 - 700W	420 nm
B737 - 800	425 nm
B737 - 800W	428 nm
B737 - 900ERW	422 nm
B737 - 8 MAX	419 nm
B737- 9 MAX	420 nm
B777 - 300ER	435 nm
B777 - 200F	435 nm
B787 - 9	436 nm

* For actual diversions, procedures and performance depicted in FCOM shall be used.

8.5.2.1 ETOPS Approval

(A) Turkish DGCA ETOPS approval is the means available for the operation of two-engined aeroplanes over a route that contains a point further than 60 minutes flying time, at the approved one engine cruise speed specified on the related OFP, from an adequate aerodrome.

(B) Operations shall not be conducted beyond the 60-minute threshold distances for two-engined aeroplane types unless approved for ETOPS by the Turkish DGCA.

(C) ETOPS may be conducted if:

(1) Turkish Airlines is ETOPS approved (indicated in the AOC) by the Turkish DGCA; and

(2) Aeroplane type is ETOPS capable and declared as such in the following documents;

(a) Aircraft Flight Manual (AFM).

(b) AFM indicates the maximum allowable ETOPS limit in minutes.

(c) Configuration Maintenance and Procedures Standards (CMP). Current edition is available at the Turkish Airlines Technical Directorate. ETOPS Maintenance Procedures Manual. Current edition is available at the Turkish Airlines Technical Directorate.Turkish Airlines Minimum Equipment List (MEL).

(d) Primary system redundancy levels appropriate to ETOPS are reflected in the Turkish DGCA approved Turkish Airlines MEL, which is derived from the Master Minimum Equipment List (MMEL).

(D) ETOPS approved aeroplane types, current status, maximum diversion times/distances (calculated under standard conditions in still air) and speed schedules for diversion are:

	Current ETOPS Status	Engine Type	Max DGCA Approved Diversion Time	AOC Approved Max Diversion Time/ Distance		Speed Schedule
				120 min	180 min	
A330-203	Approved	CF6-80E1A3	180 min	842 nm	1255 nm	330 kts IAS
A330-223/F	Approved	PW4168A/PW4170	180 min	855 nm	1280 nm	330 kts IAS
A330-302	Approved	CF6-80E1A4	180 min	835 nm	1252 nm	330 kts IAS
A330-303	Approved	CF6-80E1A3	180 min	835 nm	1252 nm	330 kts IAS
A330-343	Approved	RR TRENT 772B	180 min	843 nm	1262 nm	330 kts IAS
A330-243F	Approved	RR TRENT 772B	180 min	847 nm	1265 nm	330 kts IAS
A350-900	Approved	RR TRENT XWB-84	180 min	827 nm	1236 nm	330 kts IAS
B777-300ER	Approved	GE 90-115B	180 min	865 nm	1291 nm	M.84/ 320 kts
B777-200F	Approved	GE 90-110B	180 min	865 nm	1301 nm	M.84/ 320 kts
B737-900ERW	Approved	CFM56-7B27	120 min	821 nm	N/A	M.79/ 310 kts
B737-8 MAX	Approved	CFM LEAP-1B27	120 min	814 nm	N/A	M.79/330 kts IAS
B737-9 MAX	*	CFM LEAP-1B28	120 min	819 nm	N/A	M.79/330 kts IAS
B787-9	Approved	GENX-1B74-75	180 min	851 nm	1286 nm	M.85/320 kts IAS

* Refer to current Operations Specifications for the actual approval status.

8.5.2.2 Area of Operation

ETOPS areas of operation defined by Turkish Airlines and approved by the Turkish DGCA are:

Africa	Asia	Australia	Caribbean	Indian Ocean
Middle East	North America	North Atlantic	Pacific	South Atlantic

8.5.2.3 Routes of Operation

Turkish Airlines' ETOPS routes of operation approved by Turkish DGCA:

B737-900/-8 MAX				
LTFM-BIKF-LTFM	LTFM-DBBB-LTFM	LTFM-DFFD-LTFM	LTFM-DGAA-LTFM	LTFM-DIAP-LTFM
LTFM-DNAA-LTFM	LTFM-DNKN-LTFM	LTFM-DNMM-LTFM	LTFM-DNPO-LTFM	LTFM-DRRN-LTFM
LTFM-FCPP-LTFM	LTFM-FKKD-LTFM	LTFM-FKYS-LTFM	LTFM-FNLU-LTFM	LTFM-FOOL-LTFM
LTFM-FTTJ-LTFM	LTFM-FZAA-LTFM	LTFM-GABS-LTFM	LTFM-GBYD-LTFM	LTFM-GFLL-LTFM
LTFM-GOBD-LTFM	LTFM-GQNO-LTFM	LTFM-GUCY-LTFM	LTFM-HKJK-LTFM	LTFM-HKMO-LTFM
LTFM-HRYR-LTFM	LTFM-HTDA-LTFM	LTFM-HTKJ-LTFM	LTFM-HTZA-LTFM	LTFM-HUEN-LTFM
LTFM-UNNT-LTFM	LTFM-VGHS-LTFM	LTBA-BIKF-LTBA	LTBA-DBBB-LTBA	LTBA-DFFD-LTBA
LTBA-DGAA-LTBA	LTBA-DIAP-LTBA	LTBA-DNAA-LTBA	LTBA-DNKN-LTBA	LTBA-DNMM-LTBA
LTBA-DNPO-LTBA	LTBA-DRRN-LTBA	LTBA-FCPP-LTBA	LTBA-FKKD-LTBA	LTBA-FKYS-LTBA
LTBA-FNLU-LTBA	LTBA-FOOL-LTBA	LTBA-FTTJ-LTBA	LTBA-FZAA-LTBA	LTBA-GABS-LTBA
LTBA-GBYD-LTBA	LTBA-GFLL-LTBA	LTBA-GOBD-LTBA	LTBA-GQNO-LTBA	LTBA-GUCY-LTBA
LTBA-HKJK-LTBA	LTBA-HKMO-LTBA	LTBA-HRYR-LTBA	LTBA-HTDA-LTBA	LTBA-HTKJ-LTBA
LTBA-HTZA-LTBA	LTBA-HUEN-LTBA	LTBA-UNNT-LTBA	LTBA-VGHS-LTBA	UCFM-ZMCK-UCFM
VDPP-VOHS-VDPP	HCMM-HDAM-HCMM	FMMI-FAOR-FMMI	FMMI-FIMP-FMMI	UAAA-ZSPD-UAAA
LTFM-FGSL-LTFM	LTFM-OBBI-LTFM	LTCG-OBBI-LTCG	LTFM-OTBD-LTFM	LTFM-OMDB-LTFM
LTFJ-OMDB-LTFJ	LTFM-OMAA-LTFM	LTFM-OMSJ-LTFM	LTFM-OOMS-LTFM	LTFM-OEDF-LTFM
LTFM-OERK-LTFM	DGAA-LTAC	DRRN-LTAC	HTDA-LTAC	LTFM-FCBB-LTFM
LTFM-HCMM-LTFM	LTFM-UAAA-LTFM	LTFM OAKB-LTFM	LTFM-UCFM-LTFM	LTFM-UTTT-LTFM
LTFM-HSSK-LTFM	LTFM-OPKC-LTFM	LTFM-UTDD-LTFM	LTFM-OPST-LTFM	LTFM-OAMS-LTFM
DTTA-FOOL	LTFM-ZMCK-LTFM			

A330/B777/B787-9				
LTFM-BIKF-LTFM	LTFM-CYUL-LTFM	LTFM-CYYZ-LTFM	LTFM-DBBB-LTFM	LTFM-DFFD-LTFM
LTFM-DGAA-LTFM	LTFM-DIAP-LTFM	LTFM-DNAA-LTFM	LTFM-DNKN-LTFM	LTFM-DNMM-LTFM
LTFM-DNPO-LTFM	LTFM-DRRN-LTFM	LTFM-FALE-LTFM	LTFM-FAOR-LTFM	LTFM-FCPP-LTFM
LTFM-FIMP-LTFM	LTFM-FKKD-LTFM	LFTM-FKYS-LTFM	LTFM-FLKK-LTFM	LTFM-FMCH-LTFM
LTFM-FMMI-LTFM	LTFM-FNLU-LTFM	LTFM-FOOL-LTFM	LTFM-FQMA-LTFM	LTFM-*FSIA-LTFM
LTFM-FTTJ-LTFM	LTFM-FZAA-LTFM	LTFM-GABS-LTFM	LTFM-GBYD-LTFM	LTFM-GFLL-LTFM
LTFM-GOBD-LTFM	LTFM-GQNO-LTFM	LTFM-GUCY-LTFM	LTFM-HKJK-LTFM	LTFM-HKMO-LTFM
LTFM-HRYR-LTFM	LTFM-HTDA-LTFM	LTFM-HTKJ-LTFM	LTFM-HTZA-LTFM	LTFM-HUEN-LTFM
LTFM-KATL-LTFM	LTFM-KBOS-LTFM	LTFM-KDCA-LTFM	LTFM-KIAD-LTFM	LTFM-KIAH-LTFM
LTFM-KJFK-LTFM	LTFM-KLAX-LTFM	LTFM-KMIA-LTFM	LTFM-KORD-LTFM	LTFM-KSEA-LTFM
LTFM-KSFO-LTFM	LTFM-MMMX-LTFM	LTFM-MMUN-LTFM	LTFM-MPTO-LTFM	LTFM-MUHA-LTFM
LTFM-RCTP-LTFM	LTFM-RJAA-LTFM	LTFM-RJBB-LTFM	LTFM-RKSI-LTFM	LTFM-RPLL-LTFM
LTFM-SAEZ-LTFM	LTFM-SBGR-LTFM	LTFM-SKBO-LTFM	LTFM-SVMI-LTFM	LTFM-TNCC-LTFM
LTFM-UNNT-LTFM	LTFM-VABB-LTFM	LTFM-VDPP-LTFM	LTFM-VCBI-LTFM	LTFM-VGHS-LTFM
LTFM-VHHH-LTFM	LTFM-VIDP-LTFM	LTFM-VNKT-LTFM	LTFM-VOBL-LTFM	LTFM-VOHS-LTFM
LTFM-VRMM-LTFM	LTFM-VTBS-LTFM	LTFM-VTSP-LTFM	LTFM-VVNB-LTFM	LTFM-VVTS-LTFM
LTFM-WADD-LTFM	LFTM-WIII-LTFM	LTFM-WMKK-LTFM	LTFM-WSSS-LTFM	LTFM-ZBAA-LTFM
LTFM-ZGGG-LTFM	LTFM-ZMCK-LTFM	LTFM-ZSPD-LTFM	LTAI-VABB-LTAI	LTAI-VOBL-LTAI
EINN-KATL-EINN	FAOR-FMMI-FAOR	FIMP-FMMI-FIMP	OBBI-VDPP-OBBI	MMMX-MNUN-MMMX
MUHA-SVMI-MUHA	LEMD-MMMX-LEMD	OEDF-VDPP-OEDF	UAAA-ZSPD-UAAA	UAAA-ZBAA-UAAA
UAAA-VHHH-UAAA	UCFM-ZMCK-UCFM	VDPP-VOHS-VDPP	VDPP-VIDP-VDPP	LTBA-BIKF-LTBA
LTBA-CYUL-LTBA	LTBA-CYYZ-LTBA	LTBA-DBBB-LTBA	LTBA-DFFD-LTBA	LTBA-DGAA-LTBA
LTBA-DIAP-LTBA	LTBA-DNAA-LTBA	LTBA-DNKN-LTBA	LTBA-DNMM-LTBA	LTBA-DNPO-LTBA
LTBA-DRRN-LTBA	LTBA-FALE-LTBA	LTBA-FAOR-LTBA	LTBA-FCPP-LTBA	LTBA-FIMP-LTBA
LTBA-FKKD-LTBA	LTBA-FKYS-LTBA	LTBA-FLKK-LTBA	LTBA-FMCH-LTBA	LTBA-FMMI-LTBA
LTBA-FNLU-LTBA	LTBA-FOOL-LTBA	LTBA-FQMA-LTBA	LTBA-*FSIA-LTBA	LTBA-FTTJ-LTBA
LTBA-FZAA-LTBA	LTBA-GABS-LTBA	LTBA-GBYD-LTBA	LTBA-GFLL-LTBA	LTBA-GOBD-LTBA
LTBA-GQNO-LTBA	LTBA-GUCY-LTBA	LTBA-HKJK-LTBA	LTBA-HKMO-LTBA	LTBA-HRYR-LTBA
LTBA-HTDA-LTBA	LTBA-HTKJ-LTBA	LTBA-HTZA-LTBA	LTBA-HUEN-LTBA	LTBA-KATL-LTBA
LTBA-KBOS-LTBA	LTBA-KDCA-LTBA	LTBA-KIAD-LTBA	LTBA-KIAH-LTBA	LTBA-KJFK-LTBA
LTBA-KLAX-LTBA	LTBA-KMIA-LTBA	LTBA-KORD-LTBA	LTBA-KSEA-LTBA	LTBA-KSFO-LTBA
LTBA-MMMX-LTBA	LTBA-MMUN-LTBA	LTBA-MPTO-LTBA	LTBA-MUHA-LTBA	LTBA-RCTP-LTBA
LTBA-RJAA-LTBA	LTBA-RJBB-LTBA	LTBA-RKSI-LTBA	LTBA-RPLL-LTBA	LTBA-SAEZ-LTBA
LTBA-SBGR-LTBA	LTBA-SKBO-LTBA	LTBA-TNCC-LTBA	LTBA-UNNT-LTBA	LTBA-VABB-LTBA
LTBA-VCBI-LTBA	LTBA-VHHH-LTBA	LTBA-SVMI-LTBA	LTBA-VIDP-LTBA	LTBA-VNKT-LTBA

LTBA-VOBL-LTBA	LTBA-VOHS-LTBA	LTBA-VOMM-LTBA	LTBA-VRMM-LTBA	LTBA-VTBS-LTBA
LTBA-VGHS-LTBA	LTBA-VTSP-LTBA	LTBA-VVNB-LTBA	LTBA-VVTS-LTBA	LTBA-WADD-LTBA
LTBA-WIII-LTBA	LTBA-WMKK-LTBA	LTBA-WSSS-LTBA	LTBA-ZBAA-LTBA	LTBA-ZGGG-LTBA
LTBA-ZMCK-LTBA	LTBA-ZSPD-LTBA	LTFM-VECC-LTFM(1)	LTFM-ZLXY-LTFM	LTFM-FGSL-LTFM
LTFM-KEWR-LTFM	LTFM-RJTT-LTFM	LTFM-OBBI-LTFM	LTCG-OBBI-LTCG	LTFM-OTBD-LTFM
LTFM-OMDB-LTFM	LTFJ-OMDB-LTFJ	LTFM-OMAA-LTFM	LTFM-OMSJ-LTFM	LTFM-OOMS-LTFM
LTFM-OEDF-LTFM	LTFM-OERK-LTFM	UCFM-RJAA-UCFM(4)	UCFM-ZBAA-UCFM(4)	UCFM-WMKK-UCFM(4)
UCFM-RCTP-UCFM(4)	KMIA-UKBB(4)	KMIA-LROP(4)	KMIA-LIRF(4)	UCFM-VTBS-UCFM(4)
VGHS-LTAC(1)	UCFM-LTAC(4)	UCFM-ZGGG-UCFM(4)	UCFM-ZSPD-UCFM(4)	VTBS-LTAC(4)
UTTT-LTAC(1)	WMKK-LTAC(4)	GOBD-LTAC(1)	VABB-LTAC(1)	LTFM-MDPC(4)
TVSA-LHBP(1)	TVSA-LTFM(1)	DFFD-LTBJ(1)	DIAP-EBLG(1)	SBGR-LTAC(4)
KJFK-LTAC(4)	KORD-LTAC(4)	SKBO-SPJC(4)	SPJC-EDDF(4)	KIAH-LTAC(4)
HTDA-LTAC(1)	KMIA-LTAC(4)	ZBAA-LTAC(1)	WADD-LTAC(4)	UCFM-VDPP(4)
VDPP-UCFM(4)	LTFM-VDPP(4)	VDPP-LTFM(4)	FSIA-HUEN(1)	FSIA-VCBI(1)
OTHH-VDPP(4)	OKBK-VDPP(4)	GOBD-SAEZ(4)	SAEZ-GOBD(4)	OBBI-VCBI(1)
OKBK-VCBI(1)	FAOR-HKJK(1)(4)	FAOR-HUEN(1)(4)	GOBD-SBGR(4)	SBGR-GOBD(4)
LTFM-GLRB(1)	GLRB-LTFM(1)	OKPC-VDPP(4)	ZSPD-LTAF(1)	FYWH-LTBA(1)
LTFM-HCMM-LTFM(1)(4)	LTFM-CYVR-LTFM	VYYY-LTFM(1)(4)	LTFM-OPIS-LTFM(1)(4)	LTFM-OPLA-LTFM(1)(4)
LTFM-OPKC-LTFM(1)(4)	OLBA-VDPP(1)(4)	OJAI-VVTS(1)(4)	MDPC-LTFM(1)	OPIS-LTAC(1)
OPKC-VDPP(4)	OKBK-VTBS(1)(4)	OKBK-VCBI(1)(4)	KJFK-EIDW(1)(4)	LTFM-UAAA-LTFM
SBGR-SAEZ-SBGR	LTFM OAKB-LTFM	LTFM-UCFM-LTFM	LTFM-UTTT-LTFM	LTFM-HSSK-LTFM
LTFM-OPKC-LTFM	LTFM-UTDD-LTFM	VCBI-OPLA(1)(4)	OMDB-VCBI(1)(4)	OKBK-VDPP(1)(4)
LTFM-OPST-LTFM	LTFM-OAMS-LTFM	LTFM-FACT-LTFM	LTBA-FACT-LTBA	OMDB-OAKB(1)(4)
TJSJ-LTFM(1)(4)	HKJK-EGSS	FMMI-HKJK(1)(4)	LTFM-MLDR-LTFM	LTFM-VOMM-LTFM(1)(4)
OOMS-VTBS(1)(4)	FYWH-LTFM(1)(4)	LTFM-KLCK(1)(4)	FMMI-FLKK(1)(4)	HKJK-EBHK(1)(4)
FZAA-HKJK(1)(4)	FVRG-LTFM(1)(4)	VMMC-LTFM(1)(4)	GOBD-LSZH(1)(4)	LTFM-KDFW-LTFM
FAOR-FIMP				

(1) Applicable for only A330 aircrafts.

(4) Applicable for only B777 aircrafts.

A350-900				
LTFM-CYUL-LTFM	LTFM-EGLL-LTFM	LTFM-KIAD-LTFM	LTFM-KLAX-LTFM	LTFM-OMDB-LTFM
LTFM-RKSI-LTFM	LTFM-VTBS-LTFM	LTFM-CYVR-LTFM	LTFM-RPLL-LTFM	LTFM-SBGR-LTFM
LTFM-VYYY-LTFM	LTFM-CYYZ-LTFM	LTFM-KMIA-LTFM	LTFM-KATL-LTFM	LTFM-KIAH-LTFM
LTFM-KORD-LTFM	LTFM-KJFK-LTFM	LTFM-RJAA-LTFM	LTFM-RJBB-LTFM	LTFM-RJTT-LTFM
LTFM-ZBAA-LTFM	LTFM-ZSPD-LTFM	LTFM-ZGGG-LTFM	LTFM-VHHH-LTFM	LTFM-RCTP-LTFM
LTFM-WSSS-LTFM	LTFM-WMKK-LTFM	LTFM-FACT-LTFM	LTFM-FAOR-LTFM	SBGR-SAEZ-SBGR
LTFM-UAAA-LTFM	LTFM-OAKB-LTFM	LTFM-UCFM-LTFM	LTFM-UTTT-LTFM	LTFM-HSSK-LTFM
LTFM-OPKC-LTFM	LTFM-UTDD-LTFM	LTFM-OPST-LTFM	LTFM-OAMS-LTFM	HKJK-EGSS
LTFM-WIII-LTFM	LTFM-ZLXY-LTFM	LTFM-KEWR-LTFM	LTFM-KSFO-LTFM	LTFM-WADD-LTFM
LTFM-KBOS-LTFM	LTFM-FIMP-LTFM	LTFM-FMMI-LTFM	LTFM-VVNB-LTFM	LTFM-VVTS-LTFM
LTFM-MDLR-LTFM	LTFM-ZMCK-LTFM	UCFM-ZMCK-LTFM	LTFM-DNMM-LTFM	LTFM-FALE-LTFM
LTFM-FCPP-LTFM	LTFM-FMCH-LTFM	LTFM-DIAP-LTFM	LTFM-GOBD-LTFM	LTFM-MMMX-LTFM
LTFM-MMUN-LTFM	LTFM-MPTO-LTFM	LTFM-MUHA-LTFM	LTFM-KDFW-LTFM	

A330F/B777F				
LTFM-BIKF-LTFM	LTFM-CYUL-LTFM	LTFM-CYYZ-LTFM	LTFM-DBBB-LTFM	LTFM-DFFD-LTFM
LTFM-DGAA-LTFM	LTFM-DIAP-LTFM	LTFM-DNAA-LTFM	LTFM-DNKN-LTFM	LTFM-DNMM-LTFM
LTFM-DNPO-LTFM	LTFM-DRRN-LTFM	LTFM-FALE-LTFM	LTFM-FAOR-LTFM	LTFM-FCPP-LTFM
LTFM-FIMP-LTFM	LTFM-FKKD-LTFM	LFTM-FKYS-LTFM	LTFM-FLKK-LTFM	LTFM-FMCH-LTFM
LTFM-FMMI-LTFM	LTFM-FNLU-LTFM	LTFM-FOOL-LTFM	LTFM-FQMA-LTFM	LTFM-*FSIA-LTFM
LTFM-FTTJ-LTFM	LTFM-FZAA-LTFM	LTFM-GABS-LTFM	LTFM-GBYD-LTFM	LTFM-GFLL-LTFM
LTFM-GOBD-LTFM	LTFM-GQNO-LTFM	LTFM-GUCY-LTFM	LTFM-HKJK-LTFM	LTFM-HKMO-LTFM
LTFM-HRYR-LTFM	LTFM-HTDA-LTFM	LTFM-HTKJ-LTFM	LTFM-HTZA-LTFM	LTFM-HUEN-LTFM
LTFM-KATL-LTFM	LTFM-KBOS-LTFM	LTFM-KDCA-LTFM	LTFM-KIAD-LTFM	LTFM-KIAH-LTFM
LTFM-KJFK-LTFM	LTFM-KLAX-LTFM	LTFM-KMIA-LTFM	LTFM-KORD-LTFM	LTFM-KSEA-LTFM
LTFM-KSFO-LTFM	LTFM-MMMX-LTFM	LTFM-MMUN-LTFM	LTFM-MPTO-LTFM	LTFM-MUHA-LTFM
LTFM-RCTP-LTFM	LTFM-RJAA-LTFM	LTFM-RJBB-LTFM	LTFM-RKSI-LTFM	LTFM-RPLL-LTFM
LTFM-SAEZ-LTFM	LTFM-SBGR-LTFM	LTFM-SKBO-LTFM	LTFM-SVMI-LTFM	LTFM-TNCC-LTFM
LTFM-UNNT-LTFM	LTFM-VABB-LTFM	LTFM-VDPP-LTFM	LTFM-VCBI-LTFM	LTFM-VGHS-LTFM
LTFM-VHHH-LTFM	LTFM-VIDP-LTFM	LTFM-VNKT-LTFM	LTFM-VOBL-LTFM	LTFM-VOHS-LTFM
LTFM-VRMM-LTFM	LTFM-VTBS-LTFM	LTFM-VTSP-LTFM	LTFM-VVNB-LTFM	LTFM-VVTS-LTFM
LTFM-WADD-LTFM	LFTM-WIII-LTFM	LTFM-WMKK-LTFM	LTFM-WSSS-LTFM	LTFM-ZBAA-LTFM
LTFM-ZGGG-LTFM	LTFM-ZMCK-LTFM	LTFM-ZSPD-LTFM	LTAI-VABB-LTAI	LTAI-VOBL-LTAI
EINN-KATL-EINN	FAOR-FMMI-FAOR	FIMP-FMMI-FIMP	OBBI-VDPP-OBBI	MMMMX-MNUN-MMMX
MUHA-SVMI-MUHA	LEMD-MMMX-LEMD	OEDF-VDPP-OEDF	UAAA-ZSPD-UAAA	UAAA-ZBAA-UAAA

UAAA-VHHH-UAAA	UCFM-ZMCK-UCFM	VDPP-VOHS-VDPP	VDPP-VIDP-VDPP	LTBA-BIKF-LTBA
LTBA-CYUL-LTBA	LTBA-CYYZ-LTBA	LTBA-DBBB-LTBA	LTBA-DFFD-LTBA	LTBA-DGAA-LTBA
LTBA-DIAP-LTBA	LTBA-DNAA-LTBA	LTBA-DNKN-LTBA	LTBA-DNMM-LTBA	LTBA-DNPO-LTBA
LTBA-DRRN-LTBA	LTBA-FALE-LTBA	LTBA-FAOR-LTBA	LTBA-FCPP-LTBA	LTBA-FIMP-LTBA
LTBA-FKKD-LTBA	LTBA-FKYS-LTBA	LTBA-FLKK-LTBA	LTBA-FMCH-LTBA	LTBA-FMMI-LTBA
LTBA-FNLU-LTBA	LTBA-FOOL-LTBA	LTBA-FQMA-LTBA	LTBA-*FSIA-LTBA	LTBA-FTTJ-LTBA
LTBA-FZAA-LTBA	LTBA-GABS-LTBA	LTBA-GBYD-LTBA	LTBA-GFLL-LTBA	LTBA-GOBD-LTBA
LTBA-GQNO-LTBA	LTBA-GUCY-LTBA	LTBA-HKJK-LTBA	LTBA-HKMO-LTBA	LTBA-HRYR-LTBA
LTBA-HTDA-LTBA	LTBA-HTKJ-LTBA	LTBA-HTZA-LTBA	LTBA-HUEN-LTBA	LTBA-KATL-LTBA
LTBA-KBOS-LTBA	LTBA-KDCA-LTBA	LTBA-KIAD-LTBA	LTBA-KIAH-LTBA	LTBA-KJFK-LTBA
LTBA-KLAX-LTBA	LTBA-KMIA-LTBA	LTBA-KORD-LTBA	LTBA-KSEA-LTBA	LTBA-KSFO-LTBA
LTBA-MMMX-LTBA	LTBA-MMUN-LTBA	LTBA-MPTO-LTBA	LTBA-MUHA-LTBA	LTBA-RCTP-LTBA
LTBA-RJAA-LTBA	LTBA-RJBB-LTBA	LTBA-RKSI-LTBA	LTBA-RPLL-LTBA	LTBA-SAEZ-LTBA
LTBA-SBGR-LTBA	LTBA-SKBO-LTBA	LTBA-TNCC-LTBA	LTBA-UNNT-LTBA	LTBA-VABB-LTBA
LTBA-VCBI-LTBA	LTBA-VHHH-LTBA	LTBA-SVMI-LTBA	LTBA-VIDP-LTBA	LTBA-VNKT-LTBA
LTBA-VOBL-LTBA	LTBA-VOHS-LTBA	LTBA-VOMM-LTBA	LTBA-VRMM-LTBA	LTBA-VTBS-LTBA
LTBA-VGHS-LTBA	LTBA-VTSP-LTBA	LTBA-VVNB-LTBA	LTBA-VVTS-LTBA	LTBA-WADD-LTBA
LTBA-WIII-LTBA	LTBA-WMKK-LTBA	LTBA-WSSS-LTBA	LTBA-ZBAA-LTBA	LTBA-ZGGG-LTBA
LTBA-ZMCK-LTBA	LTBA-ZSPD-LTBA	LTBA-VDPP-LTBA	KATL-SEQM	LTBA-GOBD
VVNB-VIDP	DGAA-EHBK	DNMM-HKJK	DNMM-HUEN	EINN-KJFK
EINN-KORD	FAOR-HKJK	FZAA-HKJK	GOBD-LTBA	GOBD-SBGR
GOBD-SBKP	HKJK-EHBK	HKJK-LTBJ	HUEN-EHBK	KMIA-EHBK
KMIA-SKBO	KORD-MMMX	LEMD-KMIA	MMMX-KIAH	MMMX-SKBO
OBBI-HKJK	OBBI-VGHS	OEDF-HKJK	OEDF-VDPP	OERK-HKJK
OERK-HUEN	OERK-VVNB	OKBK-HKJK	OKBK-VGHS	OOMS-HKJK
OOMS-VVNB	OPKC-VCBI	OTHH-HKJK	SBGR-GOBD	SBKP-GOBD
SEQM-KMIA	TNCC-EHBK	UAAA-RCTP	UAAA-ZGGG	UCFM-VHHH
UCFM-ZGGG	UCFM-ZSPD	UTAA-VGHS	UTSA-VVTS	VDPP-OBBI
VDPP-OEDF	VHHH-UCFM	VOHS-VDPP	ZBAA-UAAA	ZGGG-UCFM
ZSPD-UCFM	OTHH-VDPP	OMDW-VVNB	DNKN-GOBD	OKBK-VVNB
KORD-SKBO	OEDF-VOBL	OMDW-VOMM	OOMS-VABB	OTHH-VOBL
HSSK-HKJK	KMIA-SCEL	LTBA-SCEL-LTBA(2)	LTBA-VAAH-LTBA	OBBI-VAAH
OTHH-VAAH	SCEL-GOBD	FAUP-LTAC	UAAA-ZGSZ	UTSA-ZGSZ
ZGSZ-UAAA	KMIA-SBGR(2)	KJFK-SEQM(2)	SBGR-SEQM(2)	DGAA-HKJK(2)
DNKN-HKJK	FZAA-HKJK(3)	EHBK-KORD(2)	GOBD-HKJK	OMDW-HKJK
KORD-SEQM(2)	CYYZ-SEQM(2)	LTBA-OBBI-LTBA	LTBA-OTBD-LTBA	LTBA-OMDW-LTBA
LTBA-OOMS-LTBA	LTBA-OEDF-LTBA	LTBA-OERK-LTBA	UCFM-RKSI-UCFM	KJFK-EHBK

UTSA-VHHH	OTHH-VOMM	UCFM-RCTP-UCFM	RCTP-UAAA	SKBO-KMIA
FAOR-HUEN	FMMI-HUEN	DNMM-HCMM	FAOR-LTAC	OMDW-VDPP-OMDW(3)
LTBA-CYEG(2)	CYEG-KORD(2)	SKBO-MMMX(2)	DGAA-EGSS(3)	FYWH-LTBA(2)
LTFM-HCMM-LTFM	OOMS-VTBS	VCBI-OPLA	OTHH-VTBS	VYYY-LTFM
LTFM-OPKC-LTFM	LTFM-OPLA-LTFM	OLBA-VDPP	OJAI-VVTS	OTHH-VOHS
ZGGG-UAAA	KJFK-SKBO	VVTS-VIDP	VDPP-VOHS	OMDW-VCBI
LTBA-UAAA-LTBA	LTFM-UAAA-LTFM	LTFM OAKB-LTFM	LTBA-OAKB-LTBA	LTBA-UTSA-LTBA
LTFM-UCFM-LTFM	LTBA-UCFM-LTBA	LTFM-UTTT-LTFM	LTBA-UTTT-LTBA	LTFM-HSSK-LTFM
LTBA-HSSK-LTBA	LTFM-OPKC-LTFM	LTBA-OPKC-LTBA	LTFM-UTDD-LTFM	LTBA-UTDD-LTBA
LTBA-OPLA-LTBA	OTHH-VABB	OTHH-VVNB	OTHH-VOHS	KJFK-KIAH
OJAI-HKJK	OMDB-OAKB	DNMM-GOBD	KIAH-SEQM	DAAG-HKJK
GMMN-HKJK	OMDB-VCBI	OKBK-VDPP	LTFM-OPST-LTFM	LTFM-OAMS-LTFM
EHBK-KJFK	EINN-KIAH	KMIA-SEQM	LTFM-FACT-LTFM	LTBA-FACT-LTBA
LTBA-OAMS-LTBA	VABB-WMKK	TJSJ-LTFM	HKJK-EGSS	OMDW-VABB
UTTT-RCTP	LTFM-KLCK	FMMI-FLKK	EINN-KMIA	EINN-CYYZ
FVRG-LTFM	VMCC-LTFM	GOBD-LSZH	KMIA-EHAM	OKBK-VOHS
OKBK-VAAH	DGAA-DTTA	OPKC-WIII(3)	LTFM-KDFW-LTFM	FAOR-FIMP

(2) Applicable for only B777F aeroplanes.
(3) Applicable for only A330F aeroplanes.

Note 1: ETOPS Flights on other routes may be planned according to operational needs provided that Turkish DGCA is informed in advance and approval is granted by Turkish DGCA.

Note 2: In the event of an emergency or a force major during the planned ETOPS flight, which may cause a diversion to an alternate aerodrome, a new operational flight plan shall be prepared by IOCC for the new departure/destination aerodrome.

***** FSIA is considered as an isolated aerodrome and operation is conducted based on the approval of Turkish DGCA.

8.5.2.4 Dispatch of an Aeroplane for ETOPS

(A) Before each ETOPS flight, in addition to the normal preparation of any flight, the dispatcher shall:

(1) Ensure that suitable ETOPS en-route alternate aerodromes are available, within either the approved diversion time (calculated under standard conditions in still air) or a diversion timebased on the MEL generated serviceability status of the aeroplane, whichever is shorter.

(2) Determine the position of each equiltime point.

(3) Determine the position of the critical point and its associated fuel requirement.

(B) Refer to item **Subchapter 8.5.1** for ETOPS dispatch weather minima.

8.5.2.4.1 Aerodrome Period of Validity/Suitability

(A) To declare an en-route adequate aerodrome as suitable aerodrome to support an ETOPS flight, the ceiling and visibility forecast must be checked to meet the ETOPS dispatch weather minima during a required period of validity, also referred to as the period of suitability.

(B) The required period of validity/suitability starts one hour before the earliest estimated time of arrival at the considered en-route alternate aerodrome and ends one hour after the latest estimated time of arrival at this aerodrome.

(1) The earliest estimated time of arrival is computed considering a 2-engine diversion from the first Equi-Time Point (ETP) along the outbound route associated with the considered en-route alternate, at the normally planned cruise altitude and speed (assuming a diversion for any reason other than an engine or pressurization failure)

(a) Beginning of the period of suitability:

(Takeoff time) + (flight time to equi-time point before alternate) + (diversion time at normal cruise speed and altitude) - (one hour)

(2) The latest estimated time of arrival is computed considering a 2-engine diversion from the second ETP associated with the considered en-route alternate, at FL100 or at the MORA and at the LRC speed (assuming a pressurization failure only).

(a) End of the period of suitability:

(Takeoff time) + (Flight time to equi-time point after alternate) + (diversion time at long range speed FL100 two engines) + (one hour)

(C) For delays in excess of one hour, a new period of validity/suitability time shall be defined.

8.5.2.4.2 Communication and Navigation Facilities for ETOPS

(A) An aeroplane shall not be dispatched for an ETOPS flight unless:

(1) Communications facilities are available to provide, under all expected conditions of propagation at the one-engine-inoperative cruise altitudes, reliable two way voice communications between the aeroplane and the appropriate ATC unit over the planned route of flight and the routes to any suitable alternate to be used in the event of diversion.

(2) Non-visual ground navigation aids (ILS-VOR-DME-ADF) are available and located so as to provide, taking into account the navigation equipment installed in the aeroplane, the navigation accuracy required over the route and altitude of flight, and the routes to any alternate and altitudes to be used in the event of diversion for whatever reason.

(3) Approved visual and non-visual aids are available at the specified alternates for the authorised types of approaches and operating minima.

8.5.2.4.3 ETOPS Flight Documentation

(A) ETOPS approved dispatcher shall provide the flight crew with the following documents prior to the departure of any ETOPS flight:

(1) Computerized flight plan, including ETOPS specifications for the route (ENT (ETOPS Entry Point), EXT (ETOPS Exit Point), ETP (Equi-time Point), CP (along with the coordinates) etc.) and fuel plans.

(2) Aerodrome charts for all adequate alternates of the route. All charts adequate alternates of the route shall be in Portable and Installed EFB data base and they must be current.

(3) Weather folder (forecasts, reports and as applicable; SPECI, SIGMET, NOTAM, and SNOWTAM) for the route and for all suitable alternates, or if possible for all adequate alternate aerodromes.

(4) NOTAMs for all applicable adequate alternate aerodromes for the route to be flown.

(5) Any other documents provided for a normal flight;

(a) NAT message (if necessary).

(b) Wind aloft informations as a graphic or text (700, 500, 300, 250 and 200 hPa).

(c) Significant Weather Chart(s).

(B) In addition to the documents required in item (A) above, dispatcher may provide the following documents or forms when deemed necessary:

(1) Oceanic Clearance Memory forms

(2) AIREP reporting form

(3) Aerodrome weather summary form

(4) Re-routing log

(5) Re-clearance form

(6) MNPS Magnetic Tracks computation form

(7) Post-flight IRS monitoring form

(8) Plotting charts, with the area of ETOPS operation limits corresponding to the suitable alternates. Digital plotting charts are also accepted.

8.5.2.4.4 ETOPS Dispatch from Out-Stations

An ETOPS qualified dispatcher stationed in Istanbul shall prepare all required documents accordingly and such documentation shall be delivered to the flight crew by the local station representative in a manner suitable to Turkish Airlines.

8.5.2.5 Fuel Requirements for ETOPS

An aeroplane shall not be dispatched on an ETOPS flight unless it carries sufficient fuel and oil to meet the requirements of **Subchapter 8.1.7**, and any additional fuel that may be determined in accordance with dispatch calculated ETOPS Critical Fuel Reserves.

8.5.2.5.1 Critical Fuel Scenario for ETOPS

(A) ETOPS Critical Fuel Scenario is the scenario which requires the highest diversion fuel. An engine failure only shall not be considered as fuel critical because of the diversion being conducted at higher flight levels. The following shall be considered as possible failure scenarios occurring at the Critical Point (CP):

(1) Rapid decompression only.

(2) Engine failure + rapid decompression.

(B) Based on one-engine-out diversion speed either one of the last two scenarios (1-engine and 2-engine diversion at FL 100 or MEA/MORA) may happen to be the critical fuel scenario. The critical fuel scenario is assessed by computing the required diversion fuel in accordance with the diversion profiles defined in **Operations Manual Part-B** and in accordance with Turkish Airlines ETOPS fuel policy.

8.5.2.5.2 Dispatch Fuel Requirements

(A) ETOPS fuel planning is composed of two parts:

(1) The first part corresponds to a standard fuel scenario from the departure aerodrome to the Critical Point (CP).

(2) The second part corresponds to the critical fuel scenario from the Critical Point (CP) to the diversion aerodrome.

(B) Diversion fuel from each ETP to the diversion aerodrome shall be calculated in line with the ETOPS Critical Fuel Scenario and shall include the ETOPS critical fuel reserves. The most critical ETP point in terms of this diversion fuel requirement is the Critical Point (CP). ETOPS fuel planning must be compared to the normal standard applicable fuel requirement (i.e. from the departure to the destination and destination alternate). If it is determined by this comparison, that the ETOPS fuel planning exceeds the requirement for normal operation, additional fuel is to be carried to safely complete the Critical Fuel Scenario.

(C) Fuel calculations may be manually performed by the dispatcher or the flight crew.

8.5.2.5.3 ETOPS Critical Fuel Reserves

(A) For the computation of the ETOPS critical fuel reserves and of the complete ETOPS critical fuel planning, the diversion fuel shall include the following fuel provisions:

(1) Fuel burn-off from the Critical Point (CP) to the end of descent (e.g. 1500 ft) above the en-route alternate aerodrome in accordance with the Critical Fuel Scenario (one or two engines operative at the associated speed and at cruising flight level FL100 or higher if supplemental oxygen on board allows it).

(2) 5% of the above fuel burn-off, as contingency fuel.

(3) 5% fuel mileage penalty or a demonstrated performance factor.

(4) 15 minutes holding at 1500 ft over en-route alternate aerodrome at green dot speed/minimum clean speed.

(5) First approach with a go-around and a second approach.

(6) Effect of any CDL and/or MEL item.

(7) APU fuel consumption;

(a) For the A330: 130 kg/h

(b) For the A350 165 kg/h

(c) For the B777: 240 kg/h

(d) For the B737-900ERW: 85 kg/h

(e) For the B737-8 MAX: 85 kg/h

(f) For the B737-9 MAX: 80 kg/h

(g) For the B787-9: 210 kg/h

(B) If icing conditions are forecasted:

(a) Effect of Engine Anti-ice and Wing Anti-ice systems, the effect of airframe icing during 10% of the time during which icing is forecast (including ice accumulation on unprotected surfaces, and the fuel used by engine and wing anti-ice during this period).

(b) Fuel for engine anti-ice, and if appropriate wing anti-ice for the entire time during which icing is forecast.

Note: Unless a reliable icing forecast is available, icing may be presumed to occur when the total air temperature (TAT) at the approved one-engine-inoperative cruise speed is less than +10°C, or if the outside air temperature is between 0°C and -20°C with a relative humidity (RH) of 55% or greater.

(C) The fuel provisions associated with the effects of anti-ice systems and the ice accretion are adjusted in function of the exposure time in the forecasted icing areas:

(1) The fuel provision for ice accretion on the unheated surfaces is (in percentage) a function of the ice accretion exposure time forecast in hours;

(a) For the A330: 3% per hour

(b) For the A350 2% per hour

(c) For the B777: 3% per hour

(d) B737-900ERW: 13% of diversion fuel burned (not a function of ice accretion exposure time forecast in hours).

(e) B737-8 MAX :10% per hour

(f) B737-9 MAX: 9% per hour

(g) B787-9: 3% per hour

8.5.2.5.4 Operational Flight Plan (OFP) Analysis

(A) Fuel required comparison is automatically performed by the Turkish Airlines Computerized Operational Flight Plan (OFP) system through a Fuel-On-Board (FOB) analysis process comparing at each ETP:

(1) The fuel expected to be on-board, considering a standard fuel planning.

(2) The fuel required to divert, considering the two possible failure scenarios defined above and the diversion to either one of the two associated en-route alternate aerodromes.

(B) In the above FOB analysis, the fuel expected to be on board when over flying an ETP considers the standard contingency fuel to be intact (or partly burned as a function of the flight part already covered).

(C) Additional ETOPS fuel reserves are added to the standard fuel requirements when deemed necessary. This is indicated in the "ADDITIONAL" section of the Computerized Operational Flight Plan (OFP).

(D) The ETOPS Computerized Operational Flight Plan (OFP) format is described in **Subchapter 8.1.10**.

8.5.2.5.5 Fuel Monitoring

During an ETOPS flight, the fuel monitoring procedure is the same as for a non-ETOPS flight. Fuel requirement for diversion to an en-route alternate, mandatory during the dispatch of an ETOPS flight, is not required during the flight phase.

8.5.2.6 ETOPS Flight Crew Procedures and Responsibilities

8.5.2.6.1 Commander Responsibilities

(A) Ensuring that the weather forecast and reports for the proposed operating area and flight duration indicate that the flight may be conducted in accordance with Turkish Airlines operating minima.

(B) Ensuring that sufficient fuel is carried, to meet the requirements of the ETOPS sector, considering destination and en-route alternate fuel requirements.

(C) Confirming that all necessary en-route charts and approach charts for destination and en-route alternates are carried on board the aeroplane. All these charts shall be in Portable and Installed EFB database.

(D) When routing on the NAT HLA (formerly NAT MNPSA) track system, ensure that the requested flight planned routing/track, coincides with the allocated track, as issued by ATC.

(E) Ensuring that all other requirements laid down in **Subchapter 1.4** and **1.5** are fulfilled.

(F) Ensuring that any re-routing requested, by ATC or the Commander, does not involve deviation from the authorised area of operations.

(G) Ensuring that ETOPS maintenance release is correctly carried out.

8.5.2.6.2 Flight Deck Preparation

(A) Flight deck preparation shall be performed in accordance with **Operations Manual Part-B** and pre-flight checklist.

(B) Specific system checks/tests to be performed prior to each ETOPS flight shall be carried out.

(C) FMS set-up shall be performed for long-range navigation in accordance with FCOM.

(D) EEP (ETOPS Entry Point), ETP (the CP) and the EXP (ETOPS Exit Point) shall not be stringed to the FMS FPLN but shall be entered as DEFINED WAYPOINTS.

(E) Applicable en-route wind entries (FL300, 340 and 390) shall be entered in the relevant FMS WIND pages.

(F) Prior to an ETOPS flight, a complete IRS alignment / realignment shall be performed.

8.5.2.6.3 After Engine Start

After engine start, the aeroplane systems shall be reviewed for any (not previously known) failure condition(s), which may require the reassessment of the aeroplane dispatch in accordance with Turkish Airlines ETOPS MEL requirements.

8.5.2.6.4 In-Flight Procedures

(A) Relevant ETOPS crew procedures are provided in the applicable chapters of the **EK.10.73.001 Operations Manual Part-A,** Operations Manual Part-B, and EK.10.73.002 Operations Manual Part-C.

(B) During the course of the flight, the Commander shall continue to remain informed of any significant changes in conditions at designated en-route alternate aerodromes. Prior to proceeding beyond the ENT (ETOPS Entry Point), the forecast weather for the window of suitability, aeroplane status, runway surface conditions, landing distances and aerodrome services and facilities at designated en-route alternates shall be evaluated. Additionally, any updated NOTAM or SNOWTAM relevant to the availability of the declared enroute alternate aerodromes shall be obtained. If the Commander cannot obtain weather/NOTAM information during the flight, dispatcher on duty shall provide the required information to the Commander via HF, ACARS, or SATCOM.

(C) Weather minima at the estimated time of arrival at respective en route alternate aerodrome shall be checked to ensure it is at or above Turkish Airlines or crew en-route minima. Should the forecast minima at one or more of the declared enroute alternate aerodrome(s) be lower than Turkish Airlines or crew en-route minima or should one or more of the declared en-route alternate aerodrome(s) become not available for whatever cause, the area of operation shall be reassessed (based on the remaining available suitable en-route alternate aerodromes).

(D) Aircraft systems status shall be checked periodically with reference to the ECAM MEMO, EICAS STATUS and SYS pages.

(E) Fuel remaining in flight shall be monitored to ensure that it is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with final reserve fuel remaining.

(F) Continuous update of the fuel on board shall be recorded in conjunction with the noted position reports. Standard Turkish Airlines fuel monitoring procedures shall be used.

(G) Plotting charts which are used for navigation/plotting purposes of an ETOPS flight shall have the appropriate scale and be marked with the relevant maximum diversion distance arcs (calculated under standard conditions still air as applicable for the diversion times of 60/120/180 minutes).

(H) Flight Plan positions/position reports shall be recorded and plotted on the plotting chart; to be inclusive of:

(1) Time over position.

(2) Fuel remaining.

(3) Estimate for next flight plan position.

8.5.2.6.5 Aeroplane Defects

The flight crew must report in the aeroplane Technical Log any defects noted. Defects which are significant to ETOPS flights shall be relayed to the Maintenance Control Centre in Istanbul via HF, ACARS or SATCOM. Defect entries significant to ETOPS shall be fully investigated and rectified prior to the next ETOPS flight.

8.5.2.6.6 Diversion Decision Making

(A) A re-routing or diversion shall be considered in the following cases:

(1) Loss of MNPS capability before entering the MNPS/NAT HLA area (as applicable).

(2) Weather minima at one or more of the declared en route alternate aerodromes falling below Turkish Airlines, crew enroute minima or one or more declared enroute alternate aerodrome becoming unsuitable for any reason, before reaching the ENT (ETOPS Entry Point).

(3) Failure case requiring a diversion to the nearest en-route alternate aerodrome (cases leading to a LAND ASAP message on the ECAM/EICAS and/or in the FCOM and QRH).

(4) Failure cases resulting in an increase in fuel consumption, exceeding the available fuel reserves.

(B) In case of a diversion, procedures outlined in **EK.10.73.001 Operations Manual Part-A, Operations Manual Part-B** and **EK.10.73.002 Operations Manual Part-C** shall be adhered to:

(1) Depending on the cause of the diversion, the diversion strategy (in terms of speed and altitude) may be adapted by the flight crew as a function of the assessment of the overall situation.

(2) In case of a diversion within an MNPS/OTS area, the relevant diversion procedures, as defined in **EK.10.73.001 Operations Manual Part-A** and **EK.10.73.002 Operations Manual Part-C** are applicable.

8.5.2.7 ETOPS Training

8.5.2.7.1 Flight Crew Training

(A) Flight crew shall demonstrate their ability to cope with pre-departure and enroute changes to planned route, en-route monitoring and diversion procedures and shall demonstrate familiarity with the routes flown, in particular the requirements for and selection of en-route alternates.

(1) Flight crew members can only be qualified to fly ETOPS if they have obtained the required approval from an ETOPS check airmen during an ETOPS LIFUS or LOFT session.

(a) When LOFT is utilized, the simulator session shall be conducted by an ETOPS check airmen. If a type qualified ETOPS check airmen is not available, a non-type approved ETOPS check airmen shall be assigned as an observer during the LOFT session and shall co-sign the applicable paperwork accordingly.

(2) ETOPS check airmen are responsible for maintaining set ETOPS flight standards, practices, procedures and for the conduct and supervision of LOFT, LIFUS and recurrent training programs.

(3) An official list of the ETOPS approved check airmen is available at the applicable Fleet Managers' offices.

(B) An official list of the ETOPS approved Captains and First Officers is available at the applicable Fleet Managers' offices.

(C) See **EK.10.72.001 Operations Manual Part-D 2.1.16. Extended Range Operations/Extended Twin Engine Operations System (ETOPS) Training** for details on ETOPS Flight Crew Training.

8.5.2.7.2 Dispatcher Training

(A) Personnel responsible for the dispatch of ETOPS flights shall be suitably instructed and have demonstrated their abilities in their particular duties and are aware of their responsibilities to the operation as a whole.

(B) Dispatch of an ETOPS aeroplane on an ETOPS flight is to be carried out by authorized dispatchers only.

(C) An official list of the ETOPS approved dispatchers is available at the office of the Manager of Dispatch.

(D) Dispatcher ETOPS training is included in Dispatcher Recurrent Programme as specified in **EK.10.72.001 Operations Manaul Part-D 2.5.1. Dispatch Training Course**.

8.6 Use of the Minimum Equipment and Configuration Deviation List(s)

8.6.1 Turkish Airlines MEL & CDL System and Procedures

8.6.1.1 Minimum Equipment List (MEL)

(A) Certain aeroplane equipment may become unserviceable without adversely affecting the aeroplanes capabilities or required level of safety. Such unserviceable items are listed in the Turkish Airlines Minimum Equipment List (MEL). The MEL entitles the Commander with the authority to operate the aeroplane with specified unserviceable items.

(B) Turkish Airlines MEL which is approved by the Turkish DGCA;

(1) is based on, but is not less restrictive than the Master MEL (MMEL),

(2) specifies a timeframe (hours, days or number of flights) within which repairs shall be accomplished;

(a) Repairs should be accomplished at the earliest opportunity but in any case within the timeframe specified in the MEL for the particular equipment.

(b) MEL is not intended to provide for continued operation of the aeroplane for an indefinite period with inoperative items.

(c) One–time extensions for MEL is applicable only to rectification intervals of category B, C or D (for applicaple fleet according to MEL) and for the same duration as specified in the MEL.

(C) Whenever an aeroplane is dispatched with inoperative item(s), entries shall be made or verified in the AML/DIL as applicable by maintenance or by the Commander as stated in **Subchapter 8.1.11.7** in accordance with the requirements set in the MEL.

(D) Commander authority in reference to the MEL:

(1) Commander retains the final discretion to accept and operate the aeroplane in accordance with the MEL.

(2) Regardless of the conditions listed in the MEL, the Commander is not obliged to operate with a particular defect or defects which he thinks could adversely affect the safety of a proposed flight.

(3) The decision of the Commander of the flight to have inoperative items corrected prior to flight has precedence over the provision contained in the MEL.

(4) Commander may request requirements above the minimum listed in the MEL whenever, in his judgement, such added equipment is essential to the safety of a particular flight under the special conditions prevailing at the time.

(5) Commander shall always take into account operational constraints imposed on him as a consequence of having to operate with inoperative equipment. Individual items of the MEL might be safe but multiple MEL items, when combined, may compound to an unsafe operational condition.

(6) Commander shall never accept conditions which are less than as listed in the MEL.

(E) Maintenance, ferry, and test flights may be dispatched with less than the equipment specified in the MEL, provided all equipment expected to be utilized in that flight is operable. The recommendation in favour or against such a flight shall be obtained from the Turkish Airlines Technical Directorate, Flight Operations Directorate and the Turkish DGCA.

(F) MEL contains the minimum equipment which must be serviceable at the commencement of a restrictive flight (LVO, ETOPS, RVSM, MNPS, etc.).

(G) Equipment not listed in the MEL must be operative for all flights. On the other hand, equipment obviously not required for a safe operation of the aeroplane - such as ashtrays, passenger convenience items, passenger reading lights, and similar items are not listed- may be unserviceable.

(H) MEL shall be modified as necessary to conform with the equipment standards and operating procedures of Turkish Airlines in order to meet regulatory requirements.

(I) Turkish Airlines MEL shall be available on board each aeroplane library.

(J) MEL system shall not deviate from the Aeroplane Flight Manual (AFM) limitations or emergency procedures or from any applicable Airworthiness Directives.

(K) According to EASA Regulations, MEL requirements are applicable until the aeroplane commences the flight (the point at which the aeroplane first moves under its own power to taxi). For ETOPS flights, commencement of flight is defined as the point at which takeoff thrust is set. The decision to continue a flight following a failure or unserviceability after commencement of a flight must be subject of pilot judgement and good airmanship. The Commander may continue to make reference to use of the MEL as appropriate.

(L) As per Turkish Airlines' operations policy, if any non-normal situation occurs on the ground; during engine start and before takeoff, the associated non–normal checklist is done if an EICAS/ECAM alert message is shown or a non-normal situation is identified. After completion of the checklist, the applicable DDG/MEL must be consulted to determine whether MEL dispatch relief is available.

(M) Cabin crew chief shall enter all cabin related items in the cabin maintenance log (e-CML/ p–CML) . All safety related items shall be brought to the attention of the Commander. Maintenance staff shall review the cabin maintenance log and transfer any MEL related items to the AML, if necessary. The Commander is also able to transfer cabin related MEL items as stated in **Subchapter 8.1.11**.

If defects detected in cabin are categorized as MEL/CDL affecting defects according to e-CML/CDRM, these defects are notified to commander by cabin chief. The Commander records these defects on AML.

(N) When the same defect occurs on the same aeroplane at least 3 times within 10 calendar days, this type of defect is referred as a `Repetitive` or `Recurring` defect. The details of such defect shall be recorded to the DIL page of the AML only for information along with the details of the corrective actions taken. This entry should not be viewed as an open defect.

(O) Specific MEL meanings:

(1) Flight Day: A 24 hour period (from midnight to midnight) utilizing the Universal Time Coordinated (UTC).

(2) Not Applicable: System or equipment not installed on the aeroplane.

(3) Dash: Symbol in column 2 indicates a variable number (quantity) of the item installed.

(4) Deleted: After a sequence number indicates the item was previously listed but is now required to be operative if installed in the aeroplane.

(5) ER: Refers to extended range operations of a two engine airplane which has a type design approval for ER operations and complies with the applicable Turkish DGCA Regulations.

(6) Icing Conditions: Means an atmospheric environment that may cause ice to form on the aeroplane or in the engine(s).

(7) (M): Symbol indicates a requirement for a specific maintenance procedure, which must be accomplished prior to operation with the listed item inoperative.

(8) (O): Symbol indicates a requirement for a specific operation procedure which must be accomplished in planning for and/or operating with the listed item inoperative.

(P) MEL repair intervals:

(1) A repair time is established by the following letter designators:

(a) CATEGORY A:

1. Items in this category shall be repaired within the time interval specified in the remarks column.

(b) CATEGORY B:

1. Items in this category shall be repaired within three (3) consecutive calendar days (72 hours), excluding the day the malfunction was recorded in the Aeroplane Maintenance Log Book.

(i) For example, if it were recorded at 10 a.m. on January 16th, the three day interval would begin at midnight the 16th and end at midnight (UTC) the 19th.

(c) CATEGORY C:

1. Items in this category shall be repaired within ten (10) consecutive calendar days (240 hours), excluding the day the malfunction was recorded in the aeroplane maintenance record/ logbook.

(i) For example, if it were recorded at 10 a.m. on January 16th, the 10 day interval would begin at midnight the 16th and end at midnight (UTC) January 26th.

(d) CATEGORY D:

1. Items in this category shall be repaired within one hundred and twenty (120) consecutive calendar days (2880 hours), excluding the day the malfunction was recorded in the aeroplane maintenance log and/or record.

(Q) MEL document is accessible via in Portable and Installed EFB Aircraft and MEL Document is updated according to **PR.74.615 EFB (Electronic Flight Bag) Procedure**.

8.6.1.2 Configuration Deviation List (CDL)

(A) CDL lists the aeroplane panels and doors that may be missing for a particular operation and pictorially indicates areas of damage to the aeroplane skin/structure that is considered acceptable for flight.

(B) An aeroplane may be operated with secondary airframe and engine part deficiencies if so allowed in the approved CDL. CDL items very often do not have a time limit or a limit on the number of landings. However the CDL will specify changes to the approved AFM procedures or its performance.

(C) All missing/deficient parts carrying performance penalties are cumulative unless specified penalties for certain combinations of missing parts are imposed. Accumulated weight penalties, if any, must be considered and subtracted from the allowed mass for takeoff, climb en-route or landing. Operation with a CDL item may incur an operational limit, cognisance of which may also be needed at the planning stage of a flight as well as during flight.

(D) When first making use of the CDL for a specific item, the appropriate item shall be described and entered in the AML and the deferred items list. For any subsequent flight(s) this particular item will be carried on in the deferred item list until this part is replaced or repaired.

(E) For portable and installed EFB attached aeroplanes, CDL documents are accessible via EFB and are updated according to **PR.74.615 EFB (Electronic Flight Bag) Procedure**.

8.7 Non-Revenue Flights – Procedures and Limitations

8.7.1 Definitions

Non-Revenue Flights:

Non-Revenue flights are flights not involving transport of passengers, cargo or mail for compensation or hire. On some non-revenue flights, it is possible to carry non-revenue passengers within the exemption of **PR.73.016 Cabin Safety Procedure for Flights without Cabin Crew**.

Training Flights:

Flights with the purpose of qualifying / re-qualifying pilots on a specific type of aeroplane, including in-flight proficiency checks.

Delivery Flights:

Flights for positioning an aeroplane before/after a purchase, sale, maintenance or lease agreement from the manufacturer, seller's or lessor's facility to the airline or vice versa.

Check Flights:

Check Flights is to ensure that the aircraft's flight characteristics and its functioning in flight do not differ significantly from the normal characteristics for the type and to check the flight performance against the appropriate sections of the flight manual.

These flights are performed for the Technical Directorate to ascertain the airworthiness of an aeroplane or its systems, or collection of data for troubleshooting.

Demonstration Flights:

Flights, which may be for sales/advertising purposes or to demonstrate flight characteristics to a potential buyer, or flights with journalists and customers to introduce a new type of aeroplane.

Positioning Flights:

Flights with the purpose to bring an aeroplane to an aerodrome from which it will start/regain scheduled operations or for positioning of an aeroplane with technical malfunctions, damage, etc. outside the tolerances of the MEL to an appropriate approved/accepted maintenance location where repairs or maintenance can be performed properly.

Operational Positioning Flights:

Flight with the purpose of bringing an aeroplane to an aerodrome from which it will start/regain scheduled operation.

Ferry Flights:

Flight for positioning an aeroplane, which does not meet certain airworthiness requirements as outlined in the regulations but with a "Permit to Fly" issued by authority and is safe to perform a flight to a location where repairs or other maintenance can be carried out.

8.7.2 Types of Flight

8.7.2.1 Training Flights

Training flights consists of Aeroplane Training (Base Training) which is a requirement for flight crews being trained for a type rating for trainees not utilizing the ZFTT. See, **EK.10.72.001 Operations Manual Part-D** and **EK.10.72.014 Turkish Airlines Turkish ATO Training Manual**. These flights does not necessesarily needs to comply with all operational restrictions mostly applicable for commercial operations; such as designation of commander, night operation criteria provided that aforementioned manuals explicitly explain specific Aeroplane Training procedures and requirements consistent with Turkish DGCA and EASA regulations to be signed by related Nominated Persons and Accountable Manager and approved by Turkish DGCA.

8.7.2.2 Check Flights

(A) A Check Flight must be performed after special maintenance and/or repair work on an aeroplane and on special request of the Authority.

(B) Check flights shall be performed according to programs issued by the responsible technical department in agreement with the Flight Operations Directorate. See **PR.50.018 Check Flight Procedure**.

(C) If the aircraft does not meet the required airworthiness requirements, the only provision for allowing an aircraft to fly in these circumstances is to have an issued “Permit to Fly” from the relevant authorities. An application for “Permit to Fly” shall also be made to relevant authorities for check flights that require to be performed according to the procedures not specified in AFM’s, Turkish Airlines Operational Manuals. See **PR.50.053 The Procedure of Management of Permits of Check and Ferry Flight**.

(D) Check flights shall be performed as a non-revenue flight and shall not be operated with any persons on board that are not essential for the safe operation/checking of the aircraft. Relevant Fleet Management shall decide and assign the flight crew according to experience and technical proficiency with respect to the complexity of the flight to be performed. During application to “permit to fly”, relevant authority may also demand additional qualifications or training requirements concerning the flight crew who will perform the check flight due to the nature of the intended check flight. See **PR.50.053 The Procedure of Management of Permits of Check and Ferry Flight**.

(E) If it is required by the kind of check flight, in addition to the minimum crew, engineers, mechanics or inspectors may be on board who were directly involved in the preceding work/inspection of the aeroplane. They must be recorded in the flight log as additional crew members. Regarding the safety of the people carried on board the procedures specified in **PR.73.016 Procedure for Cabin Safety of The Flights Without Cabin Crew 6.2 Non Revenue Flights with Passengers or Augmented/Deadhead Crew** shall be carried out. See **PR.73.016 Procedure for Cabin Safety of The Flights Without Cabin Crew**, **PR.50.053 The Procedure of Management of Permits of Check and Ferry Flight**.

(F) The responsible engineer shall give the flight crew a briefing on

(1) the reason for the test flight,

(2) the test program and

(3) How the preceding work may influence the airworthiness of the aeroplane.

8.7.2.3 Delivery Flights

(A) Delivery flights are flights where - after a purchase or lease agreement - an aeroplane is flown from the manufacturer's, seller's or lessor's facility to the airline or vice versa.

(B) Non-revenue passengers may be carried with delivery flights if this is not excluded on the certificate of airworthiness and certificate of registration. Full insurance coverage must be assured.

(C) 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.

(D) For those flights with minimum crew and the permitted persons - other than flight crew and passengers - the Chief Flight Operations Officer (Nominated Person) may specify acceptable deviations from the procedures required under Turkish DGCA/EASA regulations and the Company operations manual(s), but never below the national and international regulations for non-commercial operations (ICAO Annex 2, Annex 6. II etc.). Full insurance coverage must be assured. Refer to **Subchapter 4.1.2.4** and see **PR.73.016 Cabin Safety Procedure for Flights without Cabin Crew** for Cabin Crew Members for Delivery flights.

(E) Delivery flights may be combined with training flights provided the minimum crew as per the Aeroplane Flight Manual is on board.

(F) On delivery flights, where all requirements as per Turkish DGCA/EASA regulations and the company operations manual(s) are met (including insurance coverage for commercial operations), passengers, even commercial passengers, may be carried if the aeroplane's registration is removed from the AOC only after arrival at the final (delivery) destination.

8.7.2.4 Demonstration Flights

(A) All flights with passengers aboard require full and normal crew composition.

(B) Flights without passengers may be combined with training flights and either require normal crew composition (without cabin crew) or at least a type qualified instructor plus a flight crew member with the basic pilot licenses required for that category of aeroplanes (on aeroplanes requiring an SPO, a qualified SPO is required).

(C) A demonstration flight should be considered as a normal flight with regard to alternate airfield, the company weather minima (ceiling and visibility) specified for the respective type of aeroplane, approach type and aerodrome, and diversion fuel aspects.

(D) Other than for the normal flight operation VFR flights are also permitted in excess of a distance of 25 NM from the airport provided the required VFR-minima apply. Chief Flight Operations Officer (Nominated Person) may specify additional minima-increments for these flights on an individual basis.

8.7.2.5 Positioning Flights

8.7.2.5.1 Operational Positioning Flights

(A) Non-revenue passengers may be transported with "Positioning Flights". For "Positioning Flights" with non-revenue passengers aboard see **PR.73.016 Cabin Safety Procedure for Flights without Cabin Crew**.

(B) Crew members of the company may be transported on the way to or from flight duty (Dead Head Crews).

8.7.2.5.2 Ferry Flights

Positioning of an aeroplane with technical malfunctions, damage, etc. outside the tolerances of the MEL for maintenance may be conducted with minimum crew and reduced airworthiness as permitted by AFM or its supplements. See **PR.01.70.014 Ferry Flight Procedure**.

8.8 Oxygen Requirements

8.8.1 Definitions

Supplemental Oxygen - Pressurized Aeroplane: a supply of oxygen to the required number of occupants for the required flight time at the appropriate altitude(s), following a cabin depressurization.

Supplemental Oxygen - Non Pressurized Aeroplane: a supply of oxygen to be provided in an unpressurised aeroplane to the occupants whenever altitudes above 10.000 ft are used.

First Aid Oxygen: the additional oxygen provided for the use of passengers, who do not satisfactorily recover following subjection to excessive cabin altitudes, during which they had been provided with supplemental oxygen.

Crew Protective Breathing Equipment (PBE): an equipment to protect the eyes, nose and mouth of each flight crew member while on flight deck duty and for each cabin crew member. The PBE shall allow the crew members to continue to perform their duties even under smoke or toxic air conditions in the cabin or on the flight deck; the portable PBE equipment must allow active fire fighting

8.8.2 Conditions under which Oxygen Must Be Provided and Used

(A) Adequate breathing oxygen must be provided,

(1) to all crew members and passengers in case of depressurization (supplemental oxygen) if the aeroplane is operated above 10.000 ft

(2) to a certain percentage of passengers following a depressurization (first aid oxygen), if the aeroplane is operated above 25.000 ft

(3) to all crew members for protection against smoke, fumes and other harmful gases

8.8.2.1 Supplemental Oxygen

(A) A supply of supplemental oxygen, capable of being stored and dispensed, is required on a pressurized aeroplane operating above 10.000 ft for the use of flight crew, cabin crew and passengers in the event of cabin depressurization.

(B) The Commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of an aeroplane in flight use supplemental oxygen continuously whenever the cabin altitude exceeds 10.000 ft for a period of more than 30 minutes and whenever the cabin altitude exceeds 13.000 ft.

(C) The flight crew members use supplemental oxygen continuously whenever the cabin altitude exceeds 10.000 ft.

8.8.2.2 First Aid Oxygen

(A) Pressurized aeroplanes operated at pressure altitudes above 25.000 ft, in the case of operations for which a cabin crew member is required, shall be equipped with a supply of undiluted oxygen for passengers who, for physiological reasons, might require oxygen following a cabin depressurization. First-aid oxygen is intended for those passengers who still need to breath oxygen when the amount of supplemental oxygen required has been exhausted.

(B) First aid oxygen must be provided to a certain percentage of passengers following a depressurization if the aeroplane is operated above 25.000 ft.

8.8.3 Oxygen Requirements Specifications

8.8.3.1 Supplemental Oxygen - Pressurized Aeroplane

(A) Pressurized aeroplanes operated at pressure altitudes above 10.000 ft shall be equipped with supplemental oxygen equipment that is capable of storing and dispensing the oxygen supplies in accordance with Table 1.

(B) The amount of supplemental oxygen required shall be determined on the basis of cabin pressure altitude, flight duration and the assumption that a cabin pressurization failure will occur at the altitude or point of flight that is most critical from the standpoint of oxygen need, and that, after the failure, the aeroplane will descend in accordance with emergency procedures specified in the Aeroplane Flight Manual or the Aeroplane Operating Manual to a safe altitude for the route to be flown that will allow continued safe flight and landing.

(C) Following a cabin pressurization failure, the cabin pressure altitude shall be considered the same as the aeroplane altitude, unless it is shown that no probable failure of the cabin or pressurization system will result in a cabin pressure altitude equal to the flight altitude. Under these circumstances, the maximum cabin pressure altitude established for the type certification of the aeroplane shall be used as a basis for determination of oxygen supply.

(D) When operating above 25.000 ft, aeroplane shall be equipped with a device to provide a warning indication to the flight crew of any loss of pressurization.

(E) Flight Crew:

(1) Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen as specified in Table 1. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply. Flight deck seat occupants, not supplied by the flight crew source, are considered to be passengers for the purpose of oxygen supply.

(2) Flight crew members, not covered by the sub-paragraph above, are for the purpose of oxygen supply, to be considered as:

(a) cabin crew members if they are on call or are definitely going to have flight deck duty before completing the flight,

(b) passengers if they are not on call and will not be on flight deck duty during the remainder of the flight.

(3) Oxygen masks shall be located so as to be within the immediate reach of flight crew members whilst at their assigned duty stations.

(4) Oxygen masks for use by flight crew members in pressurized aeroplanes operating above 25.000ft shall be a quick donning type of mask.

(F) Cabin Crew and Passengers:

(1) Cabin crew members and passengers shall be supplied with supplemental oxygen in accordance with Table 1. Cabin crew members carried above the minimum number of cabin crew members required shall be considered as passengers for the purpose of oxygen supply.

(2) When operating above 25.000ft there shall be provided sufficient spare outlets and masks and/or sufficient portable oxygen units with masks for use by all required cabin crew members. The spare outlets and/or units are

to be distributed evenly throughout the cabin to ensure immediate availability of oxygen to each required cabin crew member regardless of his or her location at the time of cabin pressurization failure.

(3) When operating above 25.000ft there shall be provided an oxygen dispensing unit connected to oxygen supply terminals immediately available to each occupant, wherever seated. The total number of dispensing units and outlets shall exceed the number of seats by at least 10 %. The extra units are to be evenly distributed throughout the cabin.

(4) The oxygen supply requirements, as specified in Table 1, for aeroplanes not certificated to fly at altitudes above 25.000 ft may be reduced to the entire flight time between 10.000 ft and 13.000 ft cabin pressure altitude for all required cabin crew members and for at least 10 % of the passengers if, at all points along the route to be flown, the aeroplane is able to descend safely within 4 minutes to a cabin pressure altitude of 13.000 ft.

(5) In the case of pressurized aeroplanes first issued with an individual certificate of airworthiness after 8 November 1998 and operated at pressure altitudes above 25.000 ft or, if operating below, and unable to descent safely within 4 minutes to 13.000 ft, the aeroplane shall be provided with automatically deployable oxygen equipment immediately available to each occupant. The total number of dispensing units shall exceed the number of seats by at least 10%. The extra units are to be evenly distributed throughout the cabin.

Table 1- Minimum Requirements for Supplemental Oxygen for Pressurized Aeroplanes During and Following Emergency Descent

SUPPLY FOR:	DURATION AND CABIN PRESSURE ALTITUDE
All occupants of the flight deck seats on flight deck duty	• Entire flight time at pressure altitudes above 10.000 ft. • The remainder of the flying time when the cabin pressure altitude exceeds 10 000 ft but does not exceed 13 000 ft, after the initial 30 minutes at these altitudes, but in no case less than: 1. 30 minutes' supply for aeroplanes certified to fly at altitudes not exceeding 25 000 ft; and **(Note 1)** 2. 2 hours' supply for aeroplanes certified to fly at altitudes of more than 25 000 ft. **(Note 2)**
All required cabin crew members (Note 1)	• Entire flight time when cabin pressure altitude exceeds 13.000 ft but not less than 30 minutes. • The remainder of 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 4)	Entire flight time when the cabin pressure altitude exceeds 15.000 ft but in no case less then 10 minutes (**Note 3**).
30 % of passengers (Note 4)	Entire flight time when the cabin pressure altitude exceeds 14.000 ft but does not exceed 15.000 ft
10 % of passengers (Note 4)	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

Note 1: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10.000 ft in 10 minutes and followed by 20 minutes at 10.000 ft.

Note 2: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10.000 ft in 10 minutes and followed by 110 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 aeroplane's maximum certificated operating altitude to 15.000 ft in 10 minutes.

Note 4: For the purpose of this table "passengers" means passengers actually carried and includes infants.

8.8.3.2 Supplemental Oxygen- Non Pressurized Aeroplane

(A) A supply of oxygen to be provided in unpressurised aeroplane to the occupants whenever flight altitudes above 10.000 ft are used. Aeroplanes without a pressurized cabin or aeroplanes with inoperative pressurization systems shall not operate at altitudes above 10.000ft unless supplemental oxygen and oxygen equipment with dispensing units are provided. The amount of supplemental oxygen for sustenance required for a particular operation shall be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures established for each operation in the Aeroplane Operations Manual and with the routes to be flown, and with the emergency procedures specified in the Aeroplane Operation Manual.

(B) Flight Crew: Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Table 2. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply.

(C) Cabin Crew and Passengers Cabin crew members and passengers shall be supplied with oxygen in accordance with table 2. Cabin crew members carried above the minimum number of cabin crew members required shall be considered as passengers for the purpose of oxygen supply.

Table 2- Requirements for Supplemental Oxygen for non-pressurized Aeroplane

SUPPLY FOR:	DURATION AND PRESSURE ALTITUDE
All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10.000 ft
All required cabin crew members	Entire flight time at pressure altitudes above 13.000 ft and for any period exceeding 30 minutes at pressure altitudes above 10.000 ft but not exceeding 13.000 ft.
100 % of passengers	Entire flight time at pressure altitudes above 13.000 ft.
10 % of passengers	Entire flight time after 30 minutes at pressure altitudes greater than 10.000 ft but not exceeding 13.000 ft

Note: For the purpose of this table "passengers" means passengers actually carried and includes infants under the age of 2.

8.8.3.3 First Aid Oxygen

(A) The amount of first-aid oxygen, Turkish Airlines takes into account the fact that, following a cabin depressurization, supplemental oxygen as calculated in accordance with Table 1 of SUPPLEMENTAL OXYGEN - PRESSURIZED AEROPLANE and Table 2 of SUPPLEMENTAL OXYGEN – NON PRESSURIZED AEROPLANE should be sufficient to cope with potential effects of hypoxia for:

(1) All passengers when the cabin altitude is above 15.000 ft;

(2) At least 30 % of the passengers, for any period when, in the event of loss of pressurization and taking into account the circumstances of the flight, the pressure altitude in the passenger compartment will be between 14.000 ft and 15.000 ft; and

(3) At least 10 % of the passengers for any period in excess of 30 minutes when the pressure altitude in the passenger compartment will be between 10.000 ft and 14.000 ft.

(B) For the above reasons, the amount of first-aid oxygen should be calculated for the part of the flight after cabin depressurization during which the cabin altitude is between 8.000 ft and 15.000 ft, when supplemental oxygen may no longer be available.

(C) Moreover, following cabin depressurization an emergency descent should be carried out to the lowest altitude compatible with the safety of the flight. In addition, in these circumstances, the aeroplane should land at the first available aerodrome at the earliest opportunity.

(D) The conditions above may reduce the period of time during which the first-aid oxygen may be required and consequently may limit the amount of first-aid oxygen to be carried on board.

(E) There are 2 portable type dispensing units on board every company aeroplane intending to operate above 25.000 ft.

(F) The amount of first aid oxygen required for a particular operation shall be determined on the basis of cabin pressure altitudes and flight duration, consistent with the operating procedures established for each operation and route.

(G) The oxygen equipment provided shall be capable of generating a mass flow to each user of at least four liters per minute, STPD. Means may be provided to decrease the flow to not less than two liters per minute, STPD, at any altitude.