# 14 ADVERSE WEATHER

## 14.1 HIGH DENSITY ALTITUDE OPERATION

### 14.1.1 General Information

At aerodromes with high density altitude, aircraft energy levels during approach can mimic those seen during a rushed approach at sea level under International Standard Atmosphere (ISA) conditions. This similarity is often compounded by a higher True Airspeed (TAS) in hot and high conditions, which can obscure the perception of approach speed. To estimate density altitude, the following rule of thumb applies:

1. Density Altitude = Aerodrome Altitude + 1,000 feet for every 8 degrees Celsius above ISA.
2. For example, at Nairobi with an elevation of 5,500 feet and an OAT of 32 degrees Celsius (ISA+28), the density altitude would be approximately 9,000 feet.
3. The following briefing details the procedures required before dispatching to high altitude/elevation aerodromes (>5000 ft. AMSL) such as but not limited to, Addis Ababa (ADD), Bogota (BOG), Johannesburg (JNB), Nairobi (NBO), Mexico City (MEX).
4. The procedure checks the dispatch and enroute limiting landing weights to determine the limiting landing weight allowable on arrival. That limiting allowable weight and the trip fuel will need to be considered when determining maximum allowable take-off weight.
5. The take-off weight should be limited to no more than the maximum allowable landing weight plus trip fuel.
6. This procedure should be completed by the flight crew prior to making any final fuel/payload decisions during the pre-departure phase using the OPT.

### 14.1.2 Pre-departure

Before finalizing payload or making a final fuel decision prior to departure to a high elevation aerodrome:

1. Conservatively calculate the OPT landing performance for both wet and dry runways. On occasion, you will find calculations based on wet performance will allow you to uplift more weight.
2. Both the “Landing Dispatch” and “Landing Enroute” calculations need to be checked. One will normally be limiting for go-around climb gradient and the other may be limiting due to brake cooling. Please also keep in mind the relevant missed approach climb gradient, and the 0.6%

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allowance for a turn if required. (Refer to QRH Operational Information chapter). Please verify the limiting landing weight values using the forecast ambient conditions for the ETA. Please be aware that any requests for fuel tankering will affect the planned landing weight.

### 14.1.3 Calculation of Landing Limited Weight

Use the OPT Performance "Landing Dispatch" – for the destination aerodrome.

1. Decide on Runway, approach, and DH to be used, based on the weather forecast at ETA.
   a. Enter required climb gradient from that missed approach into OPT.
   b. Apply MEL/CDL/NOTAMs if required, select the other defaults as appropriate, e.g. "A/C Auto", A/I, Landing.
   c. Calculate the results.
   d. Under the title "Dispatch Landing Data for RWY xxx" read the value for "Max Landing Wt", this is the maximum landing weight.
2. Next, click the "Show Enroute" tab and calculate performance for expected landing weight and autobrake selection to maximize the runway available by using lowest autobrake setting that does not generate a "Predicted enroute field length exceeds landing distance available" message, or a FOLD value in an amber color.
3. Verify that the "WARNING: FUSE PLUG MELT ZONE" message is not shown.
4. If the above message is shown, reduce weight in the OPT until it is not shown.
5. Take the most restrictive Calculated Maximum Landing Weight from steps 1 and 2 above, then add the trip fuel to destination. This becomes the maximum take-off weight restricted by landing performance.
6. MLW (destination) + Trip Fuel = Max TOGW (Landing Weight Restricted).
7. Compare the OPT RTOW derived for departure aerodrome, and the Weight from step 3 above. The most restrictive of the two is the limiting take-off weight.
8. Max Allowable Take-off Gross Weight (MATOGW) = Lesser of departure aerodrome RTOW and the weight calculated in step 3 above.
9. Please communicate and coordinate any required weight reductions with the dispatcher working the flight.
10. Both the FCOM and QRH provide some guidance if the go around climb performance cannot be met after calculating the performance at time of landing. See FCOM or QRH "Performance Inflight – Text – Normal Configuration Landing Distance – Calculation of Landing Performance at Time of Landing – Go-Around Performance" (after the "FCOM" paragraph) for the relevant aircraft type.

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## 14.2 COLD WEATHER OPERATIONS

For operations in temperatures below 0 degrees centigrade refer to the applicable FCOM Supplementary Procedures Section.

### 14.2.1 Cold Soaked Fuel and Upper Wing Ice

In order to prevent the formation of ice on the upper wing surface, with subsequent potential delays, de-icing costs and impact on anti-icing holdover times, dispatchers have been instructed to apply the following restriction to fuel tankering.

If the destination OAT is likely to be less than 20°C at time of arrival, the aircraft shall not be planned to land with more than the following fuel quantity:

| Type | Fuel Quantity |
|---|---|
| Boeing 787-9 | |
| | |

*Table 22 Maximum Planned Fuel Quantity when destination OAT is less than 20°C*

The figure is a planning restriction only and does not apply to aircraft once airborne.

The restriction does not apply if:

1. Fuel is being carried for operational reasons, such as destination alternate requirements, or lack of fuel availability at destination.
2. The flight is planned with a short flight time (up to 2 hours) or low altitude cruise where fuel is unlikely to become cold soaked.
3. If the scheduled ground time of the aircraft at the destination exceeds 12 hours.

### 14.2.2 Altitude Corrections

Extremely low temperatures create significant altimeter errors and the potential for reduced terrain clearance. When the temperature is colder than ISA, The aircraft's true altitude will be lower than the indicated altitude.

When operating in conditions below 0°C flight crew must apply cold weather altitude corrections as stated in the table below.

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| Aerodrome Temperature | Corrections Required |
|---|---|
| 0° to -15°C | Ad 10% to the DA/MDA, all approach altitudes, and the MSA Note |
| Below -15°C | Refer to the aircraft FCOM for the applicable adjustment. |

*Table 23 - Altitude Correction*

**Note:** If the procedure altitude is above the correct MSA, temperature corrections to approach altitudes (i.e., IAF, IF, FAF) are not required.

Flight crew shall note, altitude corrections are not required under the following conditions:

1. While under ATC radar vectors.
2. When maintaining an ATC assigned flight level (FL).
3. When the reported aerodrome temperature is above 0°C.

When the aerodrome temperature is at or above the minimum published temperature for the procedure being flown.

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