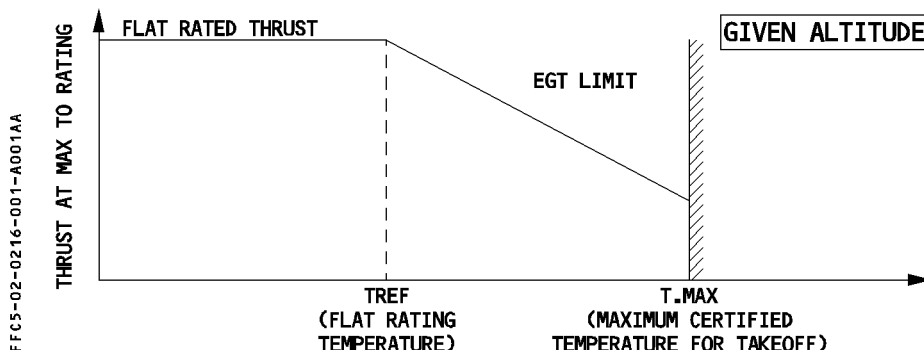


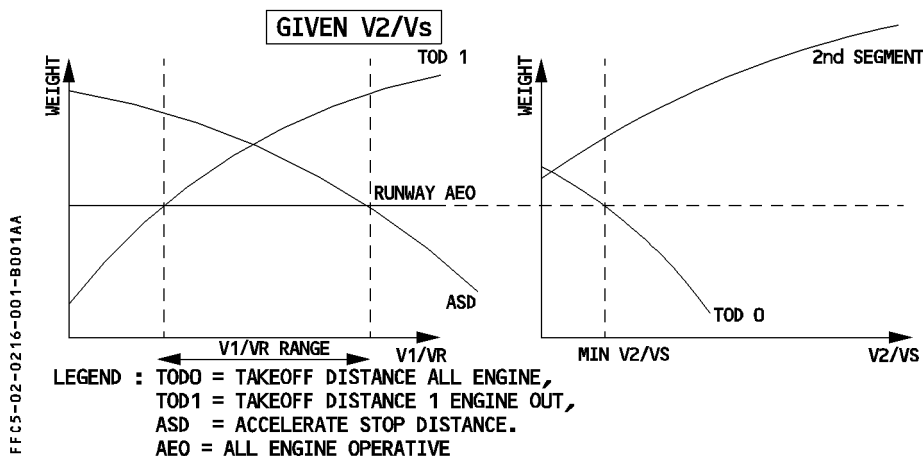
TAKEOFF PERFORMANCE

Takeoff optimization is calculated for a given runway and its obstacles and for given conditions of flap setting, temperature, wind and QNH. The calculation produces a maximum permissible takeoff weight (or a maximum takeoff temperature for an actual weight).

The takeoff thrust produced by the engines varies as follows :



The optimization process calculates the speeds which will produce the maximum takeoff weight. To do so, it takes into account the different takeoff limitations such as TOD, ASD, TOR, second segment..., as shown on the graphs below.



On a typical runway, the performance of a four engine aircraft is generally limited by the all engine operation at takeoff. The optimum $V2/VS$ is close to the minimum value and there is usually a usable range of $V1/VR$ (and consequently a usable range of $V1$).

TAKEOFF CHART DESCRIPTION

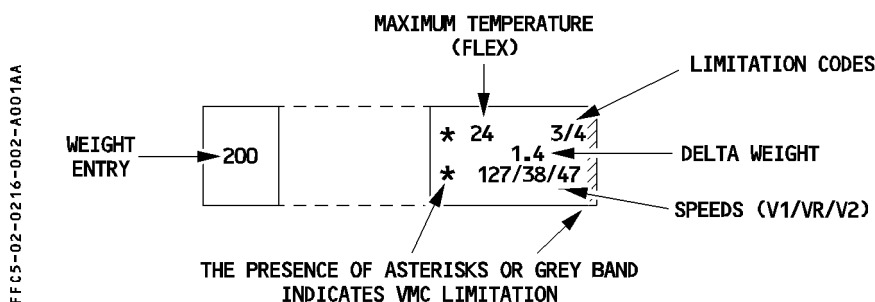
The takeoff chart (RTOW : Regulatory TakeOff Weight) is calculated for a specific aircraft version and for a particular runway specified at the top of the chart. The top of the chart also gives some information about the runway and lists the calculation assumptions.

The chart is given for 2 different configurations and 5 wind values per configuration. This allows the crew to select the configuration that gives either :

- the highest permissible takeoff weight, or, for a given weight,
- the highest flexible temperature.

If different configurations give equivalent performance, the crew should select the configuration associated with the lowest takeoff speeds.

The left column of the chart contains weight entry. For each weight entry (and for a given configuration and wind), the chart provides the following information :



Note : The takeoff weight is the sum of the weight entry and the delta weight.

The available limitation codes are :

- First segment : 1
- Second segment : 2
- Runway length : 3
- Obstacles : 4
- Tire speed : 5
- Brake energy : 6
- Maximum computation weight : 7
- Final takeoff : 8
- VMU : 9

CORRECTIONS DUE TO DIFFERENT TAKEOFF CONDITIONS

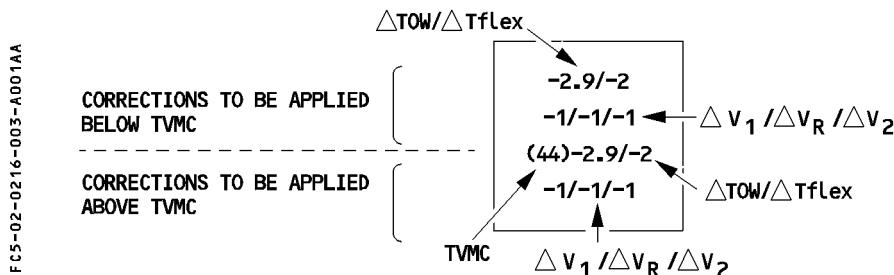
Each takeoff chart is computed for a given set of conditions (air conditioning, QNH, anti ice...) specified at the top of the chart. If the actual takeoff conditions are different the crew must apply corrections. Two types of corrections are available :

- Conservative corrections on 2.02.24 p 1 (to be used when not provided on the chart).
- Corrections (less restrictive) listed on the chart, to be applied as explained below.

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DESCRIPTION OF THE CORRECTIONS ON TAKEOFF CHART

The corrections are presented on 4 lines :



TVMC is a temperature value given per column. This is a fictitious value that indicates the temperature above which the speeds are close to a VMC limitation or are VMC limited.

Note : The lower two lines may be shaded on certain chart formats.

MINIMUM SPEEDS

Minimum $V_1/VR/V_2$ due to VMC are provided on the bottom right side of the takeoff chart.

They are only applicable in case of speed corrections.

These speeds are conservative. They may be slightly higher than $V_1/VR/V_2$ displayed in the takeoff chart.

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ADDITIONAL INFORMATION

ONE ENGINE OUT CLIMB PROCEDURE

The performance given in the chart is consistent with the flight path specified for the aircraft with one engine out and takes into account significant obstacles.

When the procedure to be followed is not the standard instrument departure, the chart describes a specific procedure (EOSID).

When the specified procedure requires a turn, except if otherwise stated on the RTOW chart, the turn should be performed with a maximum bank of 15° until the aircraft reaches 1500 feet or green dot.

The acceleration height (or altitude) ensures that the net flight path clears the highest obstacle by at least 35 feet when the aircraft is accelerating in level flight to green dot speed after an engine failure, in the most adverse conditions.

TAKEOFF ON A WET RUNWAY

Takeoff charts computed for wet runway with a 15 feet screen height and/or use of reverse thrust may produce, in some conditions, a maximum takeoff weight (or flexible temperature) higher than that obtained for a dry runway. It is thus mandatory to compare both charts (dry and wet) and retain the lower of the two weights (or flexible temperature) and the associated speeds determined for a wet runway.

Note : *The crew need not compare the charts if the top of the WET runway chart specifies "DRY CHECK". (The comparison has already been inserted in the WET runway calculation).*

To be issued later

To be issued later

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