

## Airbus A340 Performance

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## TAKEOFF

### Takeoff Performance

Takeoff performance is calculated for a given runway and its obstacles and for given conditions of flap setting, temperature, wind and QNH. This calculation provides a maximum permissible takeoff weight (or a maximum takeoff temperature for an actual weight). The optimization process calculates the speeds which will produce the maximum takeoff weight. On a typical runway, the performance of a four engine aircraft is generally limited by the all engine operation at takeoff.

There are two ways to calculate takeoff performance:

- Regulatory Takeoff Weight (RTOW) (not shown here) - calculated for a specific aircraft version and for a particular runway specified at the top of the chart.
- Quick Reference Tables (see below) - used to enable the crew to quickly determine the takeoff performance at an airport for which no takeoff chart has been established. They are conservative.

### Flexible Takeoff

In many cases, the aircraft will depart with a weight lower than the maximum permissible takeoff weight. When this happens, it can meet the required performance (runway, second segment, obstacle...) with a decreased thrust setting that is adapted to the weight. This is called a FLEXIBLE TAKEOFF and the thrust is called FLEXIBLE THRUST. The use of flexible thrust saves engine life.

The pilot can use flexible takeoff when the actual takeoff weight is lower than the maximum permissible takeoff weight for the actual temperature. The maximum permissible takeoff weight decreases when temperature increases, so it is possible to assume a temperature at which the actual takeoff weight would be the limiting one. This temperature is called FLEXIBLE TEMPERATURE or assumed temperature and is entered in the FADEC via the MCDU PERF TO page in order to get the adapted thrust.

There are some requirements for the use of flexible takeoff:

- Thrust must not be reduced by more than 25% of the full rated takeoff thrust.
- The flexible takeoff N1 cannot be lower than the Max Climb N1 at the same flight conditions.
- Maximum flexible temperature is limited to ISA + 40 (55°C at sea level).
- The flexible takeoff thrust cannot be lower than the Max Continuous thrust used for the final takeoff flight path computation (at ISA + 40).
- The flexible temperature cannot be lower than the flat rating temperature, TREF (ISA + 15), or the actual temperature (OAT).
- Flexible takeoff is not permitted on contaminated runways or with any inoperative item affecting the performance.

### Derated Takeoff

A derated takeoff is defined as a takeoff at a thrust setting less than the maximum takeoff thrust, where the AFM provides a set of takeoff limitations and performance data (not shown here) corresponding to a derated thrust setting which complies with all the takeoff requirements of JAR

25. The N1 values corresponding to each derated takeoff thrust setting are given in the AFM and are considered as a normal takeoff limit. The 6 derate levels are: D04, D08, D12, D20 and D24, corresponding to 4, 8, 12, 20 and 24% decrease from the maximum takeoff thrust.

Derated takeoff may be used when the takeoff weight is limited by  $V_{mcg}$ , enabling benefit to be taken from the reduction in  $VMCG$  associated with the new rating. The use of flexible thrust is not permitted when derated thrust is used. Selection of full takeoff thrust by setting the thrust levers at TOGA is not permitted when a derated takeoff is performed. The use of derated takeoff is allowed on dry, wet and contaminated runways.

The minimum control speeds  $V_{mcg}$  and  $V_{mca}$  are reduced for two reasons:

- The derated thrust is lower than the maximum takeoff thrust.
- The effect of temperature on  $V_{mcg}$  and  $V_{mca}$  is taken into account.

The effect of the derate on the maximum takeoff weight is different depending on whether  $V_{mcg}$  or  $V_{mca}$  is limiting. As  $V_{mcg}$  only concerns the accelerate stop distance, the  $V_{mcg}$  decrease by far compensates the thrust loss. The  $V_{mcg}$  limited weight is then improved by derating. But as  $V_{mca}$  mainly concerns the airborne phase of the takeoff, the effect of the thrust decrease is more important and not compensated by the effect of a lower  $V_{mca}$ . Therefore a derated takeoff would not improve TOW if  $V_{mca}$  limited.

## TAKEOFF, QUICK REFERENCE TABLES

### Use of Tables

The first table gives the corrections to be applied to the runway length for wind and runway slope. The other tables give the maximum takeoff weight, limitation codes and associated speeds as a function of temperature and corrected runway length. TREF (flat rating temperature) and TMAX are given at the top of each table. For pressure altitudes above 2000 feet, use a specific RTOW chart.

The quick reference tables are established at  $V_1$  min with air conditioning OFF and anti-ice OFF. Do not use these tables with tailwinds.

### How to Proceed

1. Enter the first table with runway length, slope and wind data. Determine the corrected runway length by applying the corrections due to slope and wind.
2. Select the configuration as a function of this corrected runway length.
3. Enter the table(s) corresponding to the configuration and airport pressure altitude. As far as airport pressure altitude is concerned, two methods may be applied: a) interpolate the takeoff performance by using the two tables enclosing the airport pressure altitude, b) for a more conservative figure, use the table corresponding to the pressure altitude immediately above the airport.
4. Enter the appropriate column of the table(s) with the corrected runway length. Two methods may be applied: a) interpolate the takeoff performance between the two columns enclosing the corrected runway length, b) for a more conservative figure, use the column corresponding to the shorter runway length.

5. Determination of maximum takeoff weight. Enter the table(s) and column(s) as explained above with the actual OAT and read maximum takeoff weight, limitation codes, V1 Vr and V2. If necessary, interpolate weight and speeds.
6. Determination of flexible temperature. The determination of flexible temperature is possible only when there is no obstacle on the flight path. Enter the table(s) and column(s) with the actual takeoff weight and read the corresponding temperature as flexible temperature.

### Limitation Codes

- 1: first segment
- 2: second segment
- 3: runway
- 5: runway
- 6: brake energy
- 7: maximum computation weight
- 8: final takeoff
- 9: Vmu

Note: Limitation code 4 (obstacles) does not appear in quick reference tables. VMC limitation appears with an asterisk (\*) in the chart.

### Corrections for Wind and Runway Slope

Runway length (m)		2000	2250	2500	2750	3000	3250	3500	3750	4000
Effect of wind	per knot of head wind add (meters)	9	10	11	11.5	12	12.5	13.5	14.5	15
Effect of runway slope	per percent uphill slope subtract (meters)	110	145	180	215	250	285	320	360	395
	per percent downhill slope add (meters)	75	90	105	120	130	145	160	175	190

### A340 Quick Reference Tables, CONF 1 + F

CONFIGURATION 1 + F = 0 FT			PRESSURE ALTITUDE		
TREF = 30°C TMAX = 55°C		DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2		
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	278.8 3/6 148/57/66	286.0 3/6 146/60/68	293.0 3/6 144/62/70	299.8 3/6 142/64/72	303.7 3/6 142/67/75
-10	274.1 3/6 146/56/65	281.1 3/6 144/58/67	288.1 3/6 142/61/69	294.4 3/6 140/63/71	301.4 3/6 139/65/73
0	269.7 3/6 144/54/64	276.6 3/6 142/57/66	283.5 3/6 140/59/68	290.3 3/6 139/61/70	295.9 3/6 138/63/71
10	265.7 3/6 143/53/63	272.6 3/6 141/56/65	279.4 3/9 139/58/67	286.2 3/6 138/60/69	291.4 3/6 137/62/70
20	262.0 3/6 143/52/62	269.0 3/6 141/55/64	275.7 3/9 139/57/66	282.4 3/6 137/59/68	288.6 3/6 136/61/69
30	258.5 3/9 142/52/61	266.2 3/6 141/54/63	272.7 3/9 139/57/65	279.2 3/9 138/59/67	285.6 3/6 137/61/68
32	255.1 3/9 141/51/60	263.0 3/6 141/54/62	269.3 3/9 139/56/64	275.7 3/6 137/58/66	282.0 3/6 136/60/67
34	251.1 3/9 139/50/58	259.4 3/6 141/53/61	265.7 3/9 139/55/63	271.9 3/6 137/57/65	278.1 3/6 136/59/66
36	247.5 3/3 139/49/57	256.4 3/6 141/52/60	262.5 3/9 140/54/62	268.5 3/9 138/56/64	274.5 3/6 137/58/65
38	244.0 3/3 138/48/56	253.5 3/6 142/51/59	259.5 3/9 140/53/61	265.3 3/9 139/55/63	271.1 3/9 137/57/64
40	240.4 3/3 137/47/55	250.0 3/9 142/50/58	256.4 3/6 141/53/60	262.0 3/9 139/55/62	267.6 3/9 138/56/63
42	236.6 3/3 135/46/54	245.9 3/9 140/49/57	252.8 3/6 141/52/59	258.3 3/9 139/54/61	263.8 3/9 138/56/62
44	232.5 3/3 134/44/53	241.7 3/3 139/48/56	249.0 3/6 141/51/58	254.4 3/9 139/53/59	258.6 3/9 138/55/61
46	228.7 3/3 134/43/51	237.7 3/3 138/47/54	245.9 3/6 142/50/57	251.1 3/6 141/52/58	253.4 2/3 140/55/61
48	225.2	234.0	242.4	246.6	248.6

	3/3 133/42/50	3/3 138/46/53	3/9 142/49/56	3/6 143/52/58	3/6 142/55/61
50	221.7 3/3 132/42/49	230.4 3/3 137/45/52	238.7 3/9 141/48/55	242.1 3/6 144/52/58	243.9 3/6 143/54/60
52	* 218.1 3/3 131/41/48	226.9 3/3 136/44/51	234.7 3/9 141/47/54	237.6 2/3 145/52/57	239.5 3/6 146/54/60
54	* 215.4 3/3 131/40/47	223.7 3/3 136/43/50	230.0 2/3 141/47/53	232.9 2/3 145/51/57	235.2 3/6 149/55/60
55	* 213.8 3/3 131/40/46	222.1 3/3 136/43/49	227.7 3/3 141/47/53	230.6 2/3 145/51/57	232.7 3/3 149/55/60

### A340 Quick Reference Tables, CONF 1 + F

CONFIGURATION 1 + F = 2000 FT		PRESSURE ALTITUDE			
TREF = 26 °C TMAX = 51 °C		DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2		
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	263.3 3/6 144/53/62	270.6 3/6 143/56/64	277.2 3/6 142/58/66	283.6 3/6 140/60/68	289.6 3/6 139/62/70
-10	259.0 3/6 143/52/61	266.1 3/6 141/54/63	272.6 3/6 140/57/65	279.0 3/6 138/59/67	285.2 3/6 137/61/69
0	254.9 3/6 141/50/60	261.8 3/6 140/53/62	268.3 3/6 138/55/64	274.7 3/6 137/57/66	280.9 3/6 135/60/67
10	251.0 3/6 140/49/59	258.0 3/6 139/52/61	264.4 3/6 137/54/63	270.8 3/6 136/56/64	277.0 3/6 134/59/66
20	247.4 3/9 139/48/57	254.7 3/6 138/51/60	261.0 3/6 136/53/62	267.3 3/6 135/56/63	273.4 3/6 134/58/65
26	245.3 3/9 138/48/57	253.0 3/6 139/51/59	259.3 3/6 137/53/61	265.4 3/6 135/55/63	271.5 3/6 134/57/65
28	242.5 3/9 137/47/56	250.7 3/6 139/50/59	256.8 3/6 137/52/60	262.8 3/6 136/55/62	268.7 3/6 135/57/64
30	239.6 3/9 137/46/55	248.5 3/6 140/50/58	254.3 3/6 138/52/60	260.2 3/9 137/54/61	266.0 3/6 136/56/63
32	236.7 3/3 136/46/54	245.9 3/6 140/49/57	251.8 3/6 139/51/59	257.5 3/6 137/53/61	263.1 3/6 136/55/62
34	233.6	242.9	249.0	254.5	260.0

	3/3 135/45/53	3/9 140/48/56	3/6 139/50/58	3/6 137/53/60	3/6 136/54/61
36	230.5 3/3 134/44/52	239.7 3/9 139/47/55	246.1 3/6 139/50/57	251.5 3/6 137/52/59	256.9 3/6 136/54/60
38	227.8 3/3 133/43/51	236.8 3/9 138/47/54	243.8 3/6 139/49/56	249.1 3/6 138/51/58	254.3 3/6 137/53/60
40	224.8 3/3 132/42/50	233.7 3/9 137/46/53	241.2 3/6 140/49/56	246.4 3/6 138/51/57	251.4 3/6 137/52/59
42	221.4 3/3 131/41/49	230.1 3/3 136/45/52	238.3 3/6 140/48/55	243.4 3/6 139/50/56	247.9 3/6 138/52/58
44	217.4 3/3 131/40/48	225.9 3/3 135/44/51	234.1 3/9 140/47/53	239.8 3/6 140/49/55	242.2 3/6 139/51/57
46	213.3 3/3 130/39/46	221.6 3/3 134/42/49	229.5 3/9 139/45/52	234.7 3/6 142/49/55	236.5 3/6 142/51/57
48	209.0 3/3 129/38/45	217.1 3/3 133/41/48	224.9 3/9 138/44/50	228.7 3/3 142/48/54	230.7 3/6 143/51/57
50	* 204.7 3/3 127/36/43	212.6 3/3 132/40/46	220.1 3/3 137/43/49	223.0 2/3 141/47/53	225.1 3/6 144/51/56
51	* 202.7 3/3 127/36/43	210.6 3/3 132/39/45	217.4 3/3 136/42/48	220.2 3/3 141/47/52	222.4 3/6 144/50/56

### A340 Quick Reference Tables, CONF 2

CONFIGURATION 2 = 0 FT		PRESSURE ALTITUDE			
TREF = 30 °C TMAX = 55 °C		DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2		
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	261.9 3/9 140/47/57	273.3 3/9 143/51/60	284.0 3/6 147/55/63	291.6 3/6 145/57/65	294.8 3/6 145/61/68
-10	257.7 3/9 138/46/56	269.0 3/9 142/50/59	279.6 3/6 145/53/62	286.9 3/6 143/56/64	292.6 3/6 142/58/66
0	253.6 3/9 137/44/55	264.7 3/9 140/48/58	275.2 3/6 143/52/61	282.4 3/6 142/54/63	289.3 3/6 140/57/65
10	249.6 3/9 135/43/54	260.8 3/9 139/47/57	271.2 3/6 142/51/60	278.4 3/6 141/53/62	285.1 3/9 139/55/63
20	245.8	256.9	267.2	274.7	281.4

	3/9 134/42/52	3/9 138/46/56	3/9 141/50/59	3/6 140/52/61	3/9 138/55/62
30	242.5 3/9 132/41/51	253.6 3/9 137/46/55	263.6 3/9 140/49/58	271.8 3/6 141/52/60	278.3 3/9 139/54/62
32	* 239.3 3/9 132/41/50	250.3 3/9 136/45/54	260.2 3/9 139/48/57	268.3 3/6 140/51/59	274.8 3/6 138/53/61
34	* 235.5 3/3 130/40/49	246.7 3/9 135/44/53	256.4 3/9 139/47/56	264.7 3/6 140/50/58	271.0 3/6 138/52/60
36	* 232.2 3/3 130/39/48	243.2 3/9 135/43/52	252.9 3/9 138/46/55	261.6 3/6 141/49/57	267.7 3/9 139/51/59
38	* 228.9 3/3 129/38/47	239.8 3/9 134/42/51	249.5 3/9 138/46/54	258.4 3/9 141/49/56	264.6 3/9 139/51/58
40	* 225.6 3/3 129/37/46	236.3 3/9 133/41/50	246.0 3/9 137/45/53	254.7 3/9 140/48/55	261.3 3/6 140/50/57
42	* 222.1 3/9 139/36/45	232.6 3/3 132/40/48	242.3 3/9 137/44/51	250.8 3/9 140/47/54	256.7 3/6 140/49/56
44	* 218.3 3/9 129/35/44	* 228.6 3/3 132/39/47	238.3 3/9 136/43/50	246.6 3/9 139/46/53	251.7 3/6 141/49/56
46	* 214.8 3/3 129/34/43	* 224.9 3/3 131/38/46	234.5 3/9 135/42/49	242.7 3/9 138/45/52	246.7 3/6 142/49/55
48	* 211.5 3/3 129/33/41	* 221.5 3/3 130/37/45	230.9 3/9 135/41/48	238.4 3/9 138/44/51	241.7 2/3 142/48/54
50	* 207.5 3/3 129/32/40	* 218.1 3/3 130/36/44	227.4 3/9 135/40/47	233.9 2/3 138/43/50	237.0 2/3 142/48/54
52	* 202.9 3/9 129/31/39	* 214.9 3/3 129/36/43	224.0 3/9 134/39/46	229.4 2/3 138/43/49	232.4 2/3 141/47/53
54	* 199.1 3/3 129/31/38	* 211.9 3/3 129/35/42	220.9 3/9 134/38/45	224.9 2/3 138/43/49	227.8 2/3 142/47/52
55	* 197.3 3/3 129/31/38	* 210.4 3/3 129/35/41	219.3 3/9 134/38/44	222.7 2/3 138/43/48	225.5 2/3 142/47/52

## A340 Quick Reference Tables, CONF 2

CONFIGURATION 2 = 2000 FT			PRESSURE ALTITUDE		
TREF = 26 °C TMAX = 51 °C		DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2		
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	247.2 3/9 136/43/53	258.0 3/9 140/47/56	268.1 3/9 143/51/59	276.0 3/6 143/53/61	281.0 3/6 142/56/64
-10	243.1 3/9 134/42/52	253.9 3/9 138/46/55	263.9 3/9 141/49/58	271.6 3/6 141/52/60	278.1 3/6 139/54/62
0	239.0 3/9 133/40/50	249.9 3/9 137/44/54	259.8 3/9 140/48/57	267.4 3/6 140/51/59	273.8 3/6 138/53/61
10	235.3 3/9 131/39/49	246.2 3/9 135/43/53	256.0 3/9 139/47/56	263.5 3/6 139/49/58	269.9 3/6 137/52/60
20	231.9 3/9 130/38/48	242.7 3/9 134/42/52	252.3 3/9 137/46/55	260.2 3/6 138/49/57	266.4 3/6 136/51/59
26	230.0 3/9 129/38/48	240.8 3/9 134/42/51	250.3 3/9 137/45/54	258.4 3/6 138/48/56	264.6 3/6 136/50/58
28	* 227.4 3/3 128/37/47	238.2 3/9 133/41/50	247.6 3/9 136/45/53	256.0 3/6 139/48/56	262.1 3/6 137/50/57
30	* 224.7 3/3 128/36/46	235.4 3/9 133/41/49	244.7 3/9 136/44/52	253.5 3/6 139/47/55	259.7 3/6 138/49/57
32	* 222.0 3/3 127/36/45	232.6 3/9 133/40/49	241.9 3/9 136/43/51	250.6 3/9 139/46/54	257.0 3/6 138/49/56
34	* 219.2 3/3 126/35/44	229.5 3/9 132/39/48	238.9 3/9 135/43/50	247.5 3/9 138/46/53	254.1 3/6 138/48/55
36	* 216.3 3/3 126/34/43	226.5 3/9 131/38/47	235.9 3/9 135/42/50	244.3 3/9 138/45/52	251.1 3/6 138/47/54
38	* 213.8 3/3 126/33/42	223.8 3/3 130/37/46	233.2 3/9 134/41/49	241.5 3/9 137/44/51	248.8 3/6 139/47/53
40	* 211.1 3/9 126/33/41	221.0 3/3 129/37/45	230.4 3/9 134/40/48	238.5 3/9 137/43/50	245.8 3/6 139/46/53
42	* 208.0 3/9 126/32/40	* 217.7 3/3 129/36/44	227.0 3/9 133/40/47	235.0 3/9 136/43/49	241.1 3/9 139/46/52
44	* 204.2	* 213.8	222.8	230.8	235.5

	3/3 126/31/39	3/3 128/35/42	3/9 133/38/46	3/9 136/41/48	2/3 139/45/51
46	* 200.3 3/3 126/30/38	* 209.8 3/3 127/34/41	218.6 3/9 132/37/44	226.4 3/9 135/40/47	229.6 2/3 139/45/50
48	* 194.9 3/9 126/28/36	* 205.5 3/3 126/33/40	214.2 3/9 131/36/42	220.7 3/9 135/40/46	223.7 2/3 138/44/50
50	* 188.1 3/3 126/28/35	* 201.4 3/3 126/31/38	209.9 3/9 130/35/41	215.3 2/3 134/39/45	218.1 2/3 138/43/48
51	* 185.2 3/3 126/28/35	* 199.5 3/3 126/31/37	207.9 3/9 130/34/40	212.7 2/3 134/39/44	215.4 2/3 138/43/48

## IN FLIGHT PERFORMANCE, THRUST RATINGS

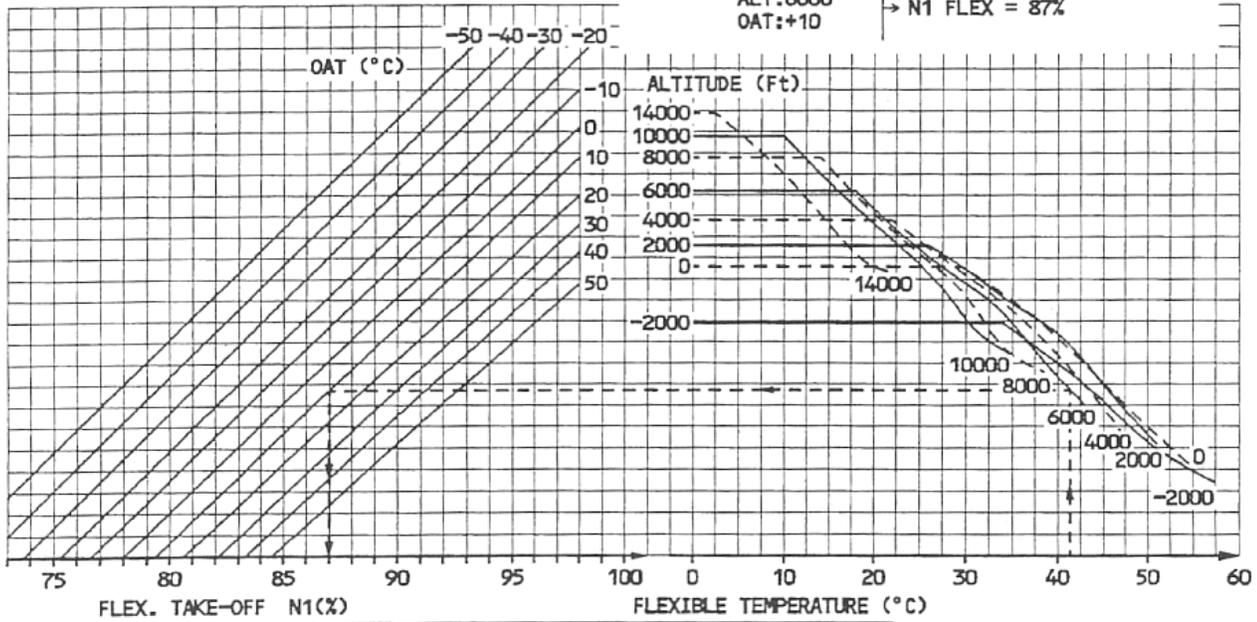
Thrust rating charts (not all are shown here) have been established for:

- Maximum Takeoff - This is the maximum thrust certified for takeoff and is normally limited to 5 minutes.
- Maximum Go-Around - The maximum permissible thrust during go-around.
- Flexible Takeoff (FLEX) - This is a derated takeoff thrust as compared to the maximum possible. The related N1 is calculated by entering the flexible temperature in the FMGS MCDU. Flexible temperature is a function of aircraft weight and environmental conditions. It guarantees that regular performance requirements are met.
- Maximum Continuous - This is the maximum thrust certified for continuous use. This rating should be used, at the pilot's discretion, only when required to ensure safe flight (i.e., engine failure).
- Maximum Climb - The maximum thrust approved for normal climb operation.
- Maximum Cruise - The maximum thrust approved for normal cruise operation. There is no thrust lever position corresponding to this thrust rating. It is not displayed to the pilot, and the N1 limit which is displayed in cruise is the max climb N1. The max cruise N1 is taken into account as a limitation in the FMGS to compute the max aircraft speed.

# A340 Flexible Takeoff N1

EXAMPLE : ALT:6000ft. OAT=+10°C. FLX T=41°C.  
 - FLX TEMP 41°C > FLAT RATING TEMP(ISA+15=18°C)

ALT:6000  
 OAT:+10 → N1 FLEX = 87%



CFM56-5C2	N1 CORRECTIONS FOR AIR BLEED	OAT ≥ ISA+15
FLEX TAKE-OFF N1 MACH = .000	AIR CONDITIONING ON	- 2.6
	ENGINE ANTI-ICE ON	- 1.3
	ENGINE AND WING ANTI-ICE ON	- 3.0

## A340 Takeoff Thrust N1

CFM56-5C2	N1 CORRECTIONS FOR AIR BLEED							OAT < ISA + 15	OAT >/= ISA + 15	
TAKEOFF N1 NO AIR BLEED MACH=.000	AIR CONDITIONING ON							-2.6	-2.6	
	ENGINE ANTI-ICE ON							0.0	-1.3	
	ENGINE ANTI-ICE AND WING ANTI-ICE ON							0.0	-3.0	
OAT (°C)	PRESSURE ALTITUDE (FT)									
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000
-54	79.9	81.2	82.4	82.9	83.3	83.9	84.4	85.0	85.8	86.6
-50	80.6	81.9	83.1	83.6	84.0	84.6	85.2	85.7	86.5	87.3
-46	81.3	82.6	83.9	84.3	84.7	85.3	85.9	86.4	87.2	88.0
-42	82.0	83.3	84.6	85.0	85.4	86.0	86.6	87.1	88.0	88.7
-38	82.6	83.9	85.2	85.7	86.1	86.7	87.3	87.8	88.6	89.4
-34	83.3	84.6	85.9	86.3	86.8	87.3	87.9	88.5	89.3	90.1
-30	83.9	85.2	86.5	87.0	87.4	88.0	88.6	89.2	90.0	90.8
-26	84.6	85.9	87.2	87.6	88.1	88.7	89.3	89.8	90.7	91.4
-22	85.2	86.6	87.8	88.3	88.7	89.3	89.9	90.5	91.3	92.1
-18	85.9	87.2	88.5	89.0	89.4	90.0	90.6	91.2	92.0	92.8
-14	86.5	87.9	89.2	89.6	90.1	90.7	91.3	91.9	92.7	93.5
-10	87.1	88.5	89.8	90.2	90.7	91.3	91.9	92.5	93.3	94.1
-6	87.7	89.1	90.4	90.9	91.3	91.9	92.5	93.1	93.9	94.7
-2	88.3	89.7	91.0	91.5	91.9	92.6	93.2	93.8	94.6	95.4
2	88.9	90.3	91.6	92.1	92.6	93.2	93.8	94.4	95.2	96.0
6	89.5	90.9	92.3	92.7	93.2	93.8	94.4	95.0	95.8	96.6
10	90.1	91.5	92.9	93.4	93.8	94.5	95.1	95.7	96.5	97.3
14	90.8	92.2	93.5	94.0	94.5	95.1	95.7	96.3	97.1	97.9
18	91.3	92.7	94.1	94.6	95.1	95.7	96.3	96.9	97.7	97.7
22	91.9	93.3	94.7	95.2	95.6	96.3	96.9	96.8	96.7	96.6
26	92.5	93.9	95.3	95.8	96.2	96.2	96.1	95.8	95.9	95.8
30	93.1	94.5	95.9	95.7	95.5	95.4	95.3	95.1	95.1	95.0
34	93.6	94.4	95.0	94.9	94.9	94.8	94.6	94.5	94.2	93.5
38	93.0	93.6	94.2	94.2	94.3	94.1	93.8	93.1	92.5	91.8
42	92.2	92.8	93.2	93.3	93.4	92.8	92.2	91.5	90.8	
46	91.2	91.7	92.0	92.1	91.9	91.3	90.6			
50	90.1	90.5	90.9	90.8	90.4					
54	89.0	89.4	89.8							

NORMAL SHADED AREAS = OAT < ISA + 15

GRAY SHADED AREAS = OAT >/= ISA + 15

## A340 Maximum Climb Thrust N1

CFM56-5C2	N1 CORRECTIONS FOR AIR BLEED											OAT < ISA + 15	OAT >/= ISA + 15
MAXIMUM CLIMB N1 AIR CONDITIONING ON 250/300/.82	AIR CONDITIONING ON											1.4	1.4
	ENGINE ANTI-ICE ON											0.0	-1.6
	ENGINE ANTI-ICE AND WING ANTI-ICE ON											0.0	-2.5
TAT (°C)	PRESSURE ALTITUDE (FT)												
	-	3000	7000	11000	15000	19000	23000	27000	31000	35000	39000		
-54	74.6	77.7	79.5	80.5	82.1	84.3	85.4	86.5	87.5	89.7	89.9		
-50	75.2	78.4	80.2	81.2	82.8	85.0	86.1	87.2	88.2	90.4	90.7		
-46	75.9	79.0	80.9	81.9	83.5	85.7	86.8	87.9	88.9	91.1	91.4		
-42	76.5	79.7	81.5	82.5	84.2	86.4	87.5	88.6	89.6	91.9	92.1		
-38	77.1	80.3	82.2	83.2	84.9	87.1	88.2	89.3	90.3	92.5	92.8		
-34	77.7	81.0	82.8	83.8	85.5	87.8	88.9	90.0	91.0	93.2	93.5		
-30	78.3	81.6	83.5	84.5	86.2	88.4	89.5	90.6	91.7	93.9	94.1		
-26	78.9	82.2	84.1	85.1	86.8	89.1	90.2	91.3	92.3	94.6	94.8		
-22	79.6	82.8	84.7	85.8	87.5	89.8	90.9	92.0	93.0	95.2	95.5		
-18	80.2	83.5	85.4	86.4	88.1	90.5	91.6	92.7	93.7	95.9	96.2		
-14	80.8	84.1	86.0	87.1	88.8	91.1	92.2	93.3	94.4	96.6	96.0		
-10	81.4	84.7	86.6	87.7	89.4	91.8	92.9	94.0	95.0	95.9	95.1		
-6	81.9	85.3	87.2	88.3	90.0	92.4	93.5	94.6	95.6	95.0	94.2		
-2	82.5	85.9	87.8	88.9	90.7	93.0	94.1	95.3	95.0	94.2	93.4		
2	83.1	86.5	88.5	89.5	91.3	93.6	94.8	94.7	94.2	93.4	92.6		
6	83.7	87.1	89.1	90.1	91.9	94.3	94.5	93.9	93.4	92.7	91.8		
10	84.2	87.7	89.7	90.7	92.5	94.5	93.7	93.1	92.7	92.0	91.2		
14	84.8	88.3	90.3	91.3	93.1	93.8	92.9	92.4	92.0	91.4	90.7		
18	85.4	88.8	90.8	91.9	92.7	93.1	92.3	91.7	91.3	90.8	90.1		
22	85.9	89.4	91.3	92.0	92.2	92.6	91.7	91.1	90.7				
26	86.5	90.0	90.8	91.5	91.7	92.1							
30	87.0	90.1	90.3	91.0	91.2	91.6	91.2	90.6	90.2				
34	87.6	89.6	89.8	90.6	90.8	91.3	90.8	90.1					
38	87.9	89.1	89.3	90.2	90.4	90.9	90.4						
42	87.4	88.7	88.8	89.8	90.0								
46	86.9	88.2	88.4	89.5	89.6								
50	86.2	87.7	88.0	89.1									
54	85.5	87.2											

NORMAL SHADED AREAS = OAT < ISA + 15

GRAY SHADED AREAS = OAT >/= ISA + 15

## IN FLIGHT PERFORMANCE, CLIMB

### General

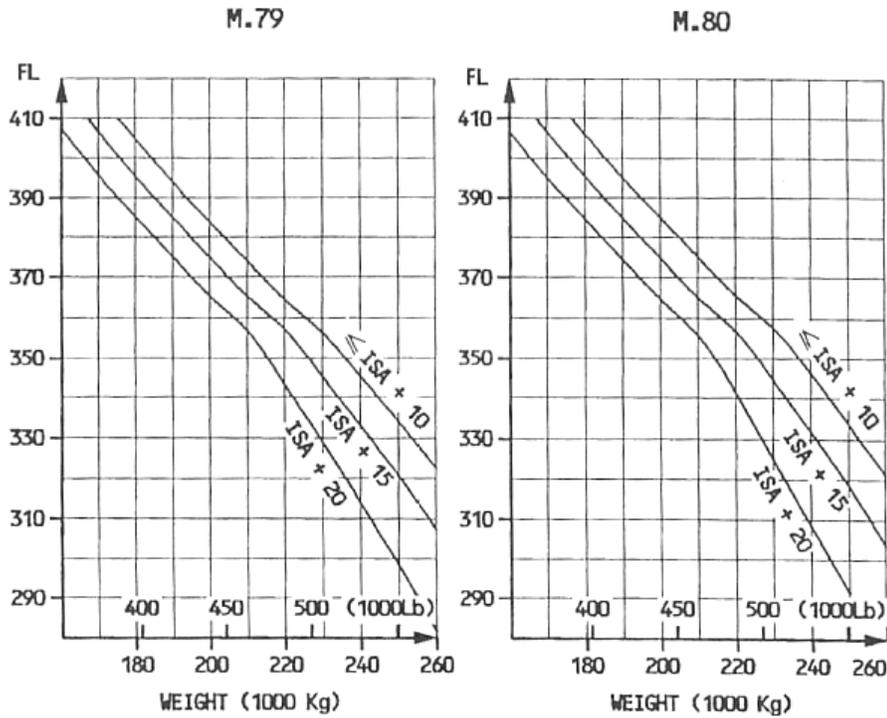
Climb tables are established at MAX CLIMB THRUST with air conditioning in normal mode, and anti-icing off. The climb speed profile is:

- 250 kt from 1500 ft up to FL100
- Acceleration from 250 kt to 290 kt
- Climb at 290 kt then M.79 up to selected altitude

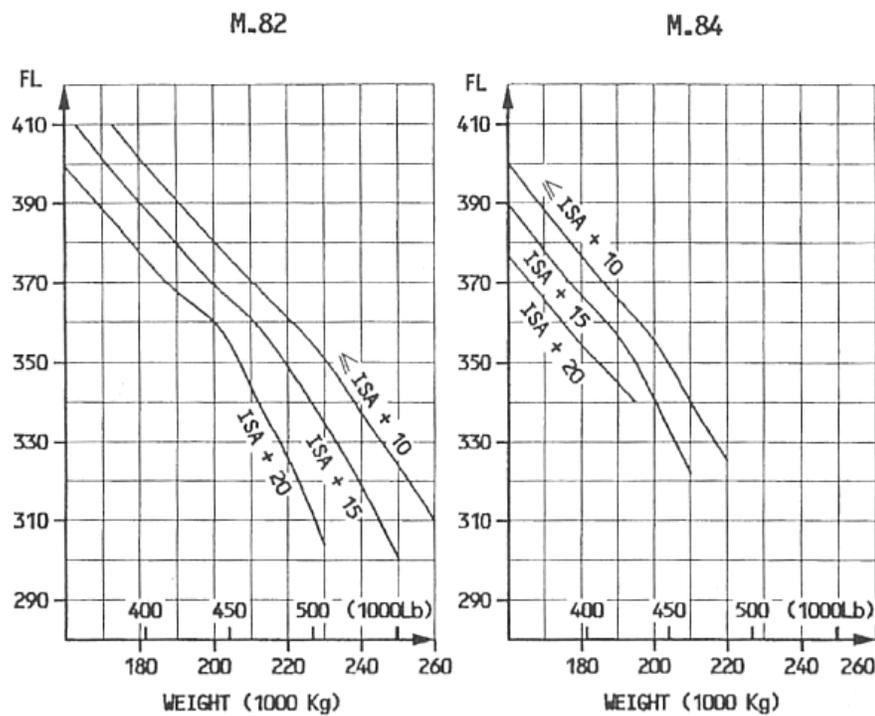
## Climb Ceiling

The following graphs show for M.79, M.80, M.82 and M.84 the flight levels that can be reached with a minimum rate of climb of 300 fpm.

### A340 M.79 and M.80 Climb Ceiling



### A340 M.82 and M.84 Climb Ceiling



### A340 Climb Table, ISA Temp

CLIMB 250 KT / 290 KT / M.79														
MAX. CLIMB THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 30.0%				VALUES ARE FROM BRAKE RELEASE POINT							
							TIME = MIN. DIST. = NM		FUEL = KG TAS = KT					
FL	WEIGHT AT BRAKE RELEASE (1000 KG)													
	130		140		150		160		170		180		190	
	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS
<b>410</b>	16 103	3031 378	18 114	3319 380	20 127	3634 382	22 141	3986 384	25 159	4392 387	28 188	4890 391	34 223	5628 398
<b>390</b>	15 91	2873 370	16 101	3135 372	18 111	3415 374	19 122	3720 375	21 135	4056 377	24 149	4433 380	26 167	4872 383
<b>370</b>	17 82	2729 362	15 90	2971 364	16 98	3227 365	18 108	3502 367	19 118	3799 369	21 129	4124 370	23 142	4485 372
<b>350</b>	13 74	2601 355	14 81	2827 357	15 89	3065 358	16 97	3319 359	17 105	3591 360	19 115	3884 362	21 125	4205 364
<b>330</b>	12 68	2479 347	13 74	2692 349	14 80	2916 350	15 87	3152 351	16 95	3404 352	17 103	3674 354	19 112	3967 355
<b>310</b>	11 61	2346 338	12 66	2545 339	13 72	2753 340	14 78	2973 341	15 84	3206 342	16 91	3455 344	17 99	3722 345
<b>290</b>	10 53	2187 326	11 58	2370 237	11 63	2562 328	12 68	2763 329	13 73	2975 230	14 79	3200 331	15 85	3441 332
<b>270</b>	9 46	2038 314	10 50	2207 316	10 55	2383 317	11 59	2568 318	12 64	2762 319	13 69	2967 319	14 74	3186 320
<b>250</b>	8 41	1897 303	9 44	2053 305	9 48	2215 306	10 52	2385 307	11 56	2563 307	12 60	2750 308	12 64	2949 309
<b>220</b>	7 33	1696 287	7 36	1833 288	8 39	1976 289	9 42	2126 290	9 45	2283 291	10 49	2447 292	11 52	2621 292
<b>200</b>	6 29	1569 276	7 31	1694 277	7 34	1825 278	8 37	1962 279	8 39	2106 280	9 42	2257 281	10 45	2416 281
<b>180</b>	6 25	1445 265	6 27	1559 266	7 29	1679 267	7 32	1804 268	8 34	1935 269	8 37	2073 270	9 39	2219 271
<b>160</b>	5 22	1323 254	6 23	1427 255	6 25	1535 256	6 27	1649 257	7 29	1769 258	7 32	1894 259	8 34	2027 259
<b>140</b>	5 18	1202 241	5 20	1295 242	5 21	1393 244	6 23	1495 245	6 25	1603 245	7 27	1717 246	7 29	1836 247
<b>120</b>	4 15	1083 228	4 17	1165 229	5 18	1252 230	5 19	1343 231	5 21	1140 232	6 22	1541 233	6 24	1649 234
<b>100</b>	3 11	900 204	4 12	966 206	4 13	1037 207	4 14	1112 208	4 15	1191 209	5 16	1274 210	5 17	1363 211
<b>50</b>	2 6	616 167	2 6	657 168	2 7	702 169	3 7	750 170	3 8	801 171	3 9	856 172	3 9	914 173
<b>15</b>	1 3	415 119	1 3	439 119	2 3	466 119	2 3	495 120	2 4	528 121	2 4	562 122	2 4	600 123
PACK FLOW LO		PACK FLOW HI				ENGINE ANTI-ICE ON				TOTAL ANTI-ICE ON				

- 1% FROM FUEL BURN	OR(AND) CARGO COOL ON + 1% TO FUEL BURN				+ 1.5% TO FUEL BURN				+ 3% TO FUEL BURN					
<b>CLIMB 250 KT / 290 KT / M.79</b>														
MAX. CLIMB THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 30.0%				VALUES ARE FROM BRAKE RELEASE POINT						
								TIME = MIN. DIST. = NM		FUEL = KG TAS = KT				
<b>WEIGHT AT BRAKE RELEASE (1000 KG)</b>														
<b>FL</b>	200		210		220		230		240		250		260	
	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS	TIME DIST.	FUEL TAS
<b>410</b>														
<b>390</b>	30 191	5413 387	35 231	6204 393										
<b>370</b>	25 157	4893 375	28 175	5364 378	31 198	5934 381	36 233	6713 387						
<b>350</b>	22 137	4559 365	25 150	4953 367	27 166	5396 370	30 185	5911 373	33 209	6535 377	38 244	7367 382		
<b>330</b>	20 122	4286 356	22 133	4635 358	24 145	5020 360	26 159	5450 362	29 176	5937 364	32 196	6505 368	36 221	7195 372
<b>310</b>	19 107	4011 346	20 116	4324 347	22 126	4664 349	24 138	5037 350	26 150	5450 352	28 165	5911 354	31 182	6434 356
<b>290</b>	17 92	3699 333	18 100	3978 334	19 108	4276 335	21 116	4599 336	22 126	4952 338	24 137	5337 339	26 149	5761 341
<b>270</b>	15 80	3419 321	16 86	3669 322	17 92	3936 323	18 100	4222 324	20 107	4532 325	21 116	4867 326	23 125	5232 327
<b>250</b>	13 69	3161 310	14 74	3387 310	15 80	3628 311	17 86	3884 312	18 92	4161 313	19 99	4457 314	20 107	4778 314
<b>220</b>	11 56	2806 293	12 60	3002 294	13 64	3209 294	14 69	3430 295	15 74	3667 296	16 79	3919 296	17 85	4190 297
<b>200</b>	10 49	2585 282	11 52	2763 283	12 56	2952 283	13 60	3153 284	14 64	3368 285	14 69	3596 285	15 73	3841 286
<b>180</b>	9 42	2373 271	10 45	2536 272	11 48	2708 272	11 52	2890 273	12 55	3085 274	13 59	3293 274	14 63	3515 275
<b>160</b>	8 36	2167 260	9 39	2315 261	10 42	2471 261	10 44	2636 262	11 48	2813 262	12 51	3001 263	12 54	3202 264
<b>140</b>	7 31	1963 248	8 33	2096 248	8 35	2237 249	9 38	2386 250	10 40	2546 250	10 43	2715 251	11 46	2895 252
<b>120</b>	7 26	1762 234	7 28	1882 235	7 29	2008 236	8 32	2141 237	9 34	2285 237	9 36	2436 238	10 23	2598 239
<b>100</b>	5 19	1456 212	6 20	1555 213	6 22	1660 213	6 23	1770 214	7 25	1889 215	7 26	2014 216	8 28	2148 217
<b>50</b>	3 10	976 174	4 11	1041 176	4 11	1110 177	4 12	1183 178	4 13	1260 179	5 14	1342 181	5 15	1428 182
<b>15</b>	2 4	640 125	2 5	682 127	2 5	727 128	3 6	775 130	3 6	825 132	3 7	878 134	3 7	934 136

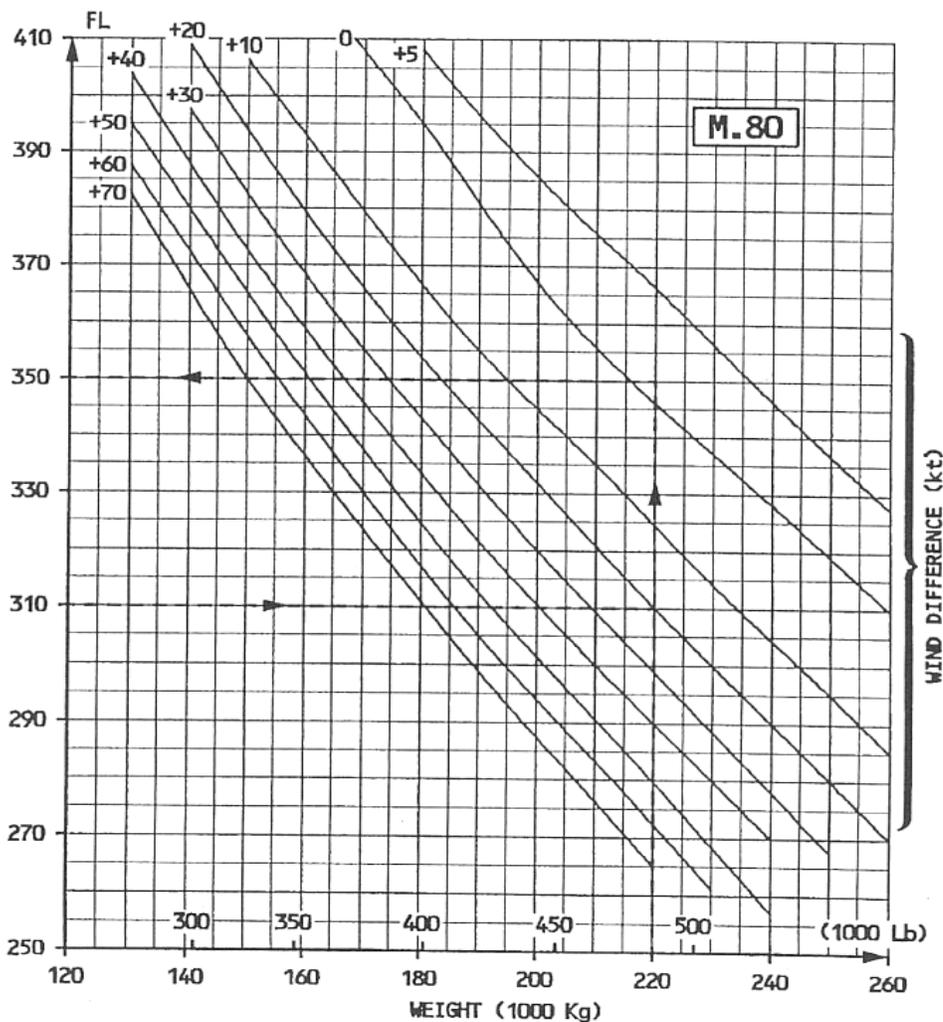
PACK FLOW LO - 1% FROM FUEL BURN	PACK FLOW HI OR(AND) CARGO COOL ON + 1% TO FUEL BURN	ENGINE ANTI-ICE ON + 1.5% TO FUEL BURN	TOTAL ANTI-ICE ON + 3% TO FUEL BURN
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## IN FLIGHT PERFORMANCE, CRUISE

### A340 Optimum Weight For 4000 Ft Step Climb

STEP CLIMB FROM/TO	WEIGHT (1000 KG)											
	ISA				ISA + 10				ISA + 20			
	LRC	M.80	M.82	M.84	LRC	M.80	M.82	M.84	LRC	M.80	M.82	M.84
310/350	236	239	241	211	233	238	241	211	222	224	216	188
330/370	216	219	221	194	214	217	219	194	203	206	199	174
350/390	197	198	200	176	194	197	198	176	182	185	179	156
370/410	180	181	182	159	177	179	181	159	164	167	162	140

### A340 Wind Altitude Trade For Constant Specific Range, M.80

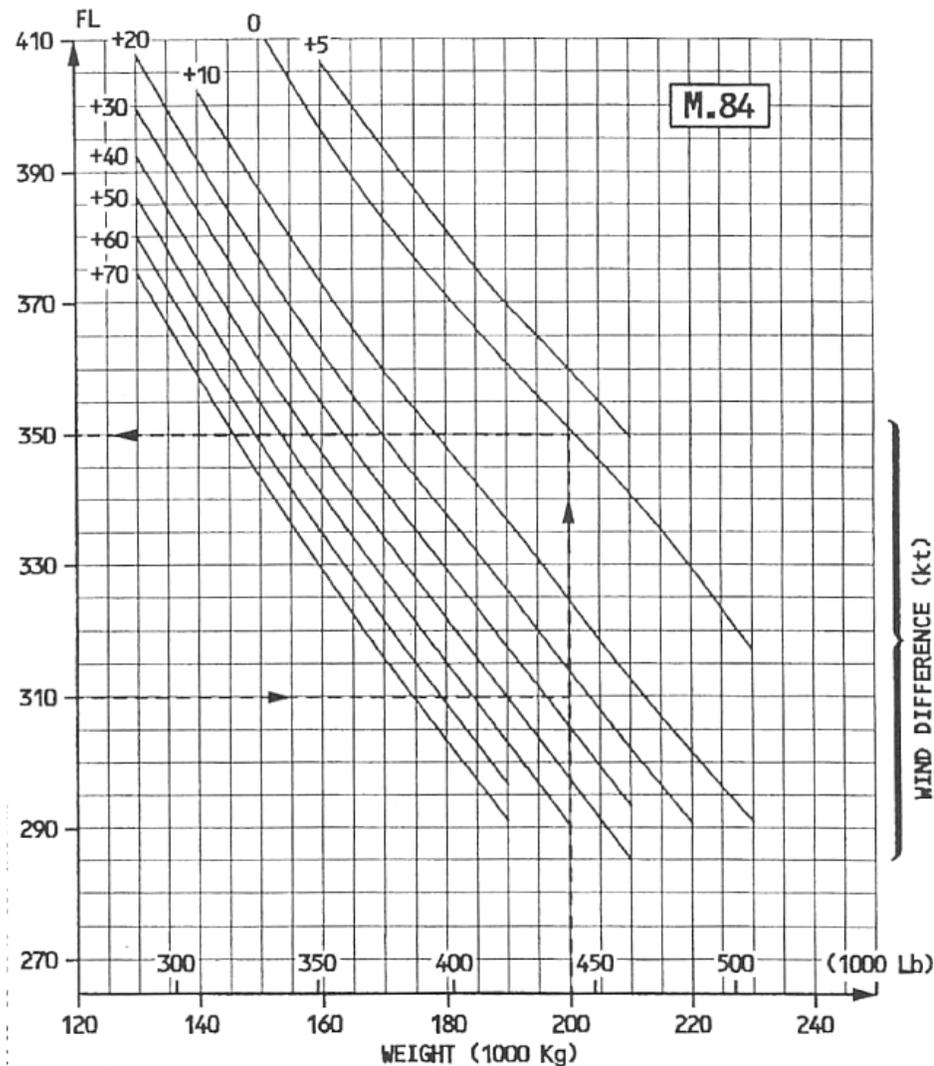


**GIVEN** : Weight : 220 000 kg (485 000 lb)  
 Wind at FL 350 : 10 kt head

**RESULTS** : Minimum wind difference to descend to FL 310 : (20 - 1) = 19 kt

**CONCLUSION** : Descent to FL 310 may be considered provided the tailwind at this altitude is more than (19 - 10) = 9 kt.

## A340 Wind Altitude Trade For Constant Specific Range, M.84



GIVEN : Weight : 200 000 kg (441 000 lb)  
Wind at FL 350 : 10 kt head

RESULTS : Minimum wind difference to descend to FL 310 :  $(25 - 0) = 25$  kt

CONCLUSION : Descent to FL 310 may be considered provided the tailwind at this altitude is more than  $(25 - 10) = 15$  kt.

### Optimum Altitude on Short Stage Length

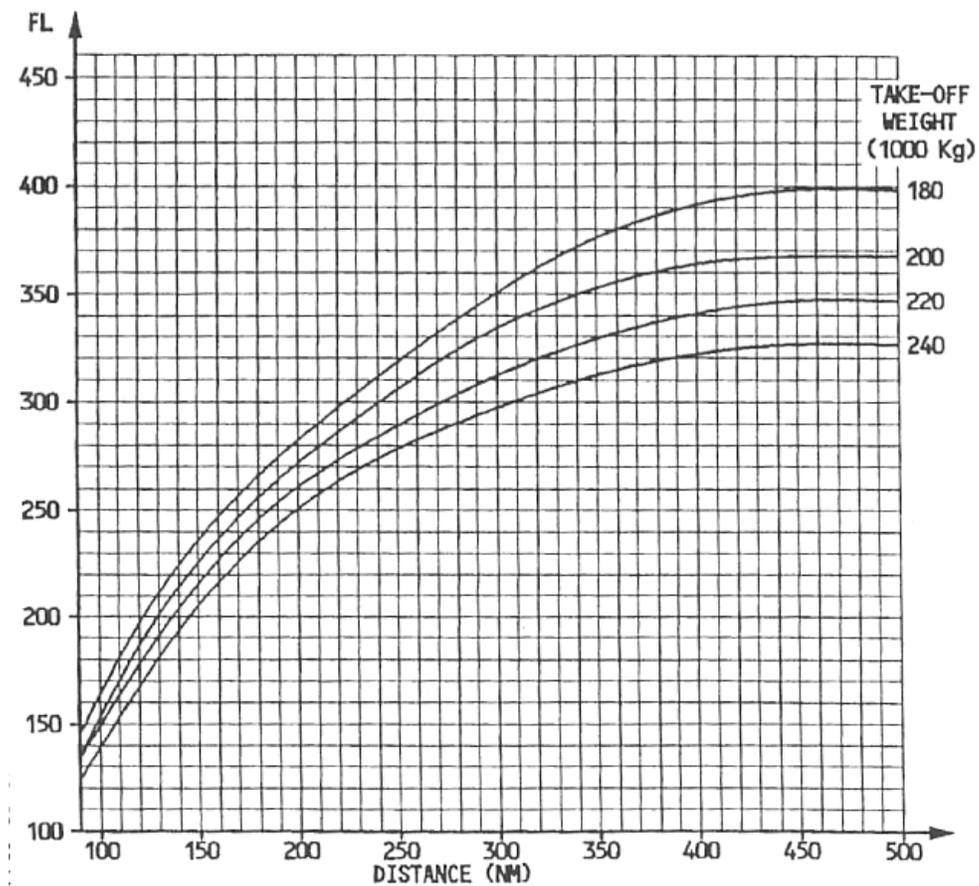
The following graph determines the optimum altitude for short stage lengths, with the cruise flight level being limited by the distance required to perform the climb and descent. It includes the following profiles:

- Takeoff
- Climb - 250/290/.79
- Long Range Cruise (during at least 5 minutes)
- Descent - .80/300/250
- Approach and landing

The graph is established for:

- ISA
- CG = 37%
- Normal air conditioning
- Anti-icing OFF

### A340 Optimum Altitude On Short Stage



### A340 Cruise Table, M.80

CRUISE - M.80							
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37%			
WEIGHT (1000KG)	FL290 IAS = 311 TAS = 473	FL310 IAS = 297 TAS = 469	FL330 IAS = 284 TAS = 465	FL350 IAS = 272 TAS = 461	FL370 IAS = 260 TAS = 459	FL390 IAS = 248 TAS = 459	FL410 IAS = 237 TAS = 459
	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG
<b>130</b>	81.2 1554	80.9 1435	80.7 1328	80.5 1228	80.8 1145	81.6 1079	82.7 1029
<b>140</b>	81.4 1570	81.2 1453	81.0 1346	80.9 1250	81.4 1171	82.4 1114	83.7 1070
<b>150</b>	81.7 1588	81.5 1472	81.4 1368	81.4 1276	82.0 1204	83.2 1155	84.9 1118
<b>160</b>	81.9 1608	81.8 1494	81.8 1394	82.0 1306	82.7 1243	84.3 1200	86.2 1173
<b>170</b>	82.2 1629	82.2 1519	82.3 1422	82.6 1343	83.6 1287	85.4 1252	88.0 1242
<b>180</b>	82.6 1653	82.7 1547	82.9 1457	83.4 1386	84.6 1336	86.7 1313	90.2 86.2
<b>190</b>	83.0 1681	83.2 1578	83.5 1498	84.2 1433	85.7 1391	88.5 1389	
<b>200</b>	83.4 1711	83.7 1616	84.2 1543	85.2 1484	86.9 1455	90.7 1483	
<b>210</b>	83.9 1745	84.3 1660	85.0 1592	86.2 1542	88.7 1534		
<b>220</b>	84.4 1785	85.0 1707	85.9 1646	87.4 1608	90.7 1630		
<b>230</b>	85.0 1831	85.7 1759	86.9 1705	89.0 1690			
<b>240</b>	85.6 1880	86.6 1814	87.9 1773	90.7 1784			
<b>250</b>	86.3 1933	87.5 1875	89.4 1858				
<b>260</b>	87.1 59.5	88.4 1943	91.0 1952				
PACK FLOW LO - 0.5% FROM FUEL BURN		PACK FLOW HI AND/OR CARGO COOL ON + 1.0% TO FUEL BURN		ENGINE ANTI-ICE ON + 2.0% TO FUEL BURN		TOTAL ANTI-ICE ON + 4.0% TO FUEL BURN	

### A340 Cruise Table, M.84

CRUISE - M.84							
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37%			
WEIGHT (1000KG)	FL290 IAS = 328 TAS = 497	FL310 IAS = 314 TAS = 493	FL330 IAS = 300 TAS = 489	FL350 IAS = 287 TAS = 484	FL370 IAS = 274 TAS = 482	FL390 IAS = 262 TAS = 482	FL410 IAS = 250 TAS = 482
	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG	N1 KG/H/ENG
<b>130</b>	85.0 1879	84.5 1716	84.1 1569	83.7 1438	83.8 1326	84.6 1243	85.7 1180
<b>140</b>	85.1 1884	84.6 1724	84.3 1581	84.0 1452	84.3 1351	85.4 1281	87.0 1237
<b>150</b>	85.2 1892	84.8 1735	84.5 1596	84.4 1475	85.0 1387	86.4 1332	88.9 1311
<b>160</b>	85.3 1903	85.0 1750	84.8 1616	85.0 1509	85.8 1432	87.9 1399	
<b>170</b>	85.5 1917	85.3 1769	85.3 1647	85.7 1551	87.0 1494	90.0 1492	
<b>180</b>	85.7 1935	85.7 1795	86.0 1687	86.7 1606	88.6 1570		
<b>190</b>	86.1 1958	86.2 1832	86.7 1735	87.8 1674	90.8 1676		
<b>200</b>	86.5 1989	86.8 1877	87.6 1796	89.4 1759			
<b>210</b>	87.0 2031	87.6 1931	88.8 1874	91.6 1872			
<b>220</b>	87.6 2080	88.5 2000	90.4 1963				
<b>230</b>	88.4 2139	89.6 2082					
<b>240</b>							
<b>250</b>							
<b>260</b>							
PACK FLOW LO - 0.5% FROM FUEL BURN		PACK FLOW HI AND/OR CARGO COOL ON + 1.0% TO FUEL BURN		ENGINE ANTI-ICE ON + 2.0% TO FUEL BURN		TOTAL ANTI-ICE ON + 4.0% TO FUEL BURN	

# IN FLIGHT PERFORMANCE, DESCENT

## A340 Descent Chart, M.80/300/250

DESCENT - M.80/300KT/250KT									
IDLE THRUST NORMAL AIR COND. ANTI-ICING OFF			ISA CG = 30%		MAXIMUM CABIN RATE OF DESCENT IS 350 FPM				
WEIGHT (1000KG)	150				200				IAS (KT)
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	
<b>410</b>	19.6	415	121	IDLE					237
<b>390</b>	18.8	403	115	IDLE	22.0	472	135	IDLE	248
<b>370</b>	18.0	391	108	IDLE	21.1	459	128	IDLE	260
<b>350</b>	17.2	380	103	IDLE	20.3	447	122	IDLE	272
<b>330</b>	16.6	370	98	IDLE	19.6	436	116	IDLE	284
<b>310</b>	16.0	360	93	IDLE	18.9	425	111	IDLE	297
<b>290</b>	15.2	348	87	IDLE	18.0	410	104	IDLE	300
<b>270</b>	14.4	335	81	IDLE	17.0	394	96	IDLE	300
<b>250</b>	13.5	321	75	IDLE	15.9	378	89	IDLE	300
<b>240</b>	13.1	315	72	IDLE	15.4	370	85	IDLE	300
<b>220</b>	12.2	301	66	IDLE	14.4	353	78	IDLE	300
<b>200</b>	11.4	287	60	IDLE	13.3	336	70	IDLE	300
<b>180</b>	10.5	270	54	IDLE	12.2	316	63	IDLE	300
<b>160</b>	9.6	250	48	IDLE	11.1	292	56	IDLE	300
<b>140</b>	8.6	224	42	IDLE	9.9	258	49	IDLE	300
<b>120</b>	7.6	196	36	IDLE	8.7	224	42	IDLE	300
<b>100</b>	6.7	169	31	IDLE	7.6	191	35	IDLE	300
<b>50</b>	2.3	53	10	IDLE	2.6	60	11	IDLE	250
<b>15</b>	.0	0	0	IDLE	.0	0	0	IDLE	250
CORRECTIONS	ENGINE ANTI- ICE ON	TOTAL ANTI-ICE ON		PACK FLOW LO	PACK FLOW HI AND/OR CARGO COOL ON	CHANGE FROM ISA PER 1° ABOVE ISA			
TIME	+ 2.0%	+ 8.0%		-	-	-			
FUEL	+ 15.0%	+ 50.0%		- 2.0%	+ 3.0%	+ 0.25%			
DISTANCE	+ 2.0%	+ 7.0%		-	-	+ 0.3%			

## IN FLIGHT PERFORMANCE, GO AROUND

### General

In the go around configuration corresponding to the all engine procedure, the minimum steady gradient one engine inop required by regulations is 2.7%, at a speed not exceeding 1.4 Vs. This requirement is also called approach climb performance by regulations. The following tables allow the go around limiting weight which satisfies the required gradient.

### A340 Approach Climb Limiting Weight, CONF 2

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT THREE ENGINES AT GO AROUND THRUST								Gradient: 2.7% Normal Air Conditioning Anti Icing OFF V = 1.23 Vs				<b>CONF 2</b>	
PRESSURE ALTITUDE (FT)													
OAT (°C)	-2000	0	200	400	600	800	1000	1500	2000	5000	10000	14600	
</=10	286.5	283.2	282.2	280.8	279.6	278.3	277.1	273.9	270.8	251.9	220.1	175.2	
20	285.5	282.4	281.2	280.0	278.7	277.5	276.3	273.2	270.1	251.3	202.8	158.2	
22	285.3	282.2	281.0	279.8	278.6	277.4	276.1	273.1	270.0	247.4	199.5	155.0	
24	285.1	282.1	280.9	279.6	278.4	277.2	276.0	272.9	269.8	243.2	196.2	152.5	
26	284.9	281.9	280.7	279.5	278.3	277.1	275.9	272.8	269.7	239.1	191.6		
28	284.8	281.8	280.6	279.4	278.2	277.0	275.7	270.5	265.4	234.9	185.1		
30	284.6	281.6	279.4	277.2	275.1	273.0	270.9	265.9	261.1	230.7	178.5		
32	284.5	276.3	274.2	272.1	270.1	268.1	266.1	261.3	256.7	226.8	172.1		
34	284.2	270.8	268.9	266.9	265.0	263.1	261.3	256.7	251.7	222.8	165.7		
36	278.7	265.6	263.7	261.9	260.1	258.3	256.4	251.6	247.3	217.6			
38	273.4	260.4	258.7	256.9	254.6	252.9	251.2	246.9	243.0	211.0			
40	268.0	254.8	252.9	251.0	249.3	247.6	245.9	242.1	238.6	204.4			
42	262.7	248.4	246.7	245.1	243.5	242.0	240.5	237.1	232.8	197.7			
44	257.4	241.9	240.4	238.9	237.5	236.0	234.5	230.3	225.8	191.4			
46	250.7	235.6	234.2	232.8	231.2	229.6	228.0	223.6	219.0				
48	244.4	230.2	228.7	227.1	225.5	223.8	222.1	217.5	212.6				
50	238.4	224.9	223.3	221.6	219.9	218.1	216.3	211.4	206.3				
52	232.7	219.7	218.0	216.2	214.4	212.4	210.5	205.4					
54	227.1	214.5	212.7	210.8									
55	224.4	212.0											
AIR COND. OFF: ADD 5600 KG			ENGINE ANTI ICE ON: SUBTRACT 400 KG UP TO 7500 FT; 10000 KG ABOVE 7500 FT				TOTAL ANTI ICE ON: SUBTRACT 1400 KG UP TO 7500 FT; 14000 KG ABOVE 7500 FT			SPEED INCREASE PER 0.01 Vs ADD 300 KG			

### A340 Approach Climb Limiting Weight, CONF 3

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT THREE ENGINES AT GO AROUND THRUST							Gradient: 2.7% Normal Air Conditioning Anti Icing OFF V = 1.23 Vs					<b>CONF 3</b>
PRESSURE ALTITUDE (FT)												
OAT (°C)	-2000	0	200	400	600	800	1000	1500	2000	5000	10000	14600
</=10	280.5	277.3	276.1	274.8	273.6	272.5	271.2	268.1	265.0	246.0	214.8	171.2
20	279.5	276.4	275.2	274.0	272.8	271.6	270.4	267.4	264.3	245.5	198.1	155.0
22	279.4	276.3	275.1	273.9	272.7	271.5	270.3	267.3	264.2	241.6	194.9	152.6
24	279.2	276.1	274.9	273.7	272.5	271.3	270.1	267.1	264.1	237.4	191.7	150.1
26	279.0	276.0	274.8	273.6	272.4	271.2	270.0	267.0	264.0	233.4	187.3	
28	278.9	275.8	274.7	273.5	272.3	271.1	269.9	264.8	259.8	229.3	180.9	
30	278.7	275.7	273.5	271.4	269.3	267.2	265.2	260.3	254.6	225.4	174.6	
32	278.6	270.5	268.4	266.4	264.4	262.4	260.5	255.2	250.4	221.6	168.3	
34	278.3	265.2	263.3	261.3	259.5	257.6	255.2	250.5	246.0	217.8	162.0	
36	273.0	260.1	258.3	256.2	253.9	252.1	250.3	245.9	241.6	212.7		
38	267.7	254.3	252.5	250.7	248.9	247.2	245.5	241.3	237.4	206.2		
40	262.5	249.1	247.2	245.4	243.6	242.0	240.3	236.6	233.1	199.8		
42	257.3	242.8	241.1	239.5	238.0	236.4	235.0	231.7	227.5	193.3		
44	251.2	236.3	234.8	233.4	232.0	230.6	229.1	225.1	220.8	187.1		
46	245.0	230.2	228.8	227.4	225.9	224.4	222.9	218.7	214.1			
48	238.8	225.0	223.5	222.0	220.4	218.8	217.1	212.6	207.9			
50	232.9	219.9	218.3	216.7	215.0	213.2	211.4	206.7	201.7			
52	227.3	214.8	213.1	211.4	209.5	207.7	205.8	200.8				
54	222.0	209.8	207.9	206.1								
55	219.4	207.2										
AIR COND. OFF: ADD 4900 KG	ENGINE ANTI ICE ON: SUBTRACT 400 KG UP TO 7500 FT; 10000 KG ABOVE 7500 FT					TOTAL ANTI ICE ON: SUBTRACT 1400 KG UP TO 7500 FT; 14000 KG ABOVE 7500 FT			SPEED INCREASE PER 0.01 Vs ADD 200 KG			

## IN FLIGHT PERFORMANCE, GROUND TO AIR MILES CONVERSION

### General

The ground to air miles conversion tables are used to calculate the distance for a given ground distance due to the influence of the wind.

### A340 Ground to Air Miles Conversion Table, M.80

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND				HEAD WIND		
	+150	+100	+50	0	-50	-100	-150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	26	30
30	23	25	27	30	34	38	44
40	30	33	36	40	45	51	59
50	38	41	45	50	56	64	74
100	75	82	90	100	112	128	148
200	151	164	180	200	224	255	296
300	226	247	271	300	336	383	445
400	302	329	361	400	449	511	593
500	377	411	451	500	561	638	741
1000	794	852	920	1000	1095	1210	1352
1500	1190	1278	1380	1500	1642	1815	2028
2000	1587	1704	1840	2000	2190	2420	2704
2500	1984	2130	2300	2500	2737	3025	3379
3000	2381	2556	2761	3000	3285	3630	4055
3500	2777	2983	3221	3500	3832	4235	4731
4000	3174	3409	3681	4000	4380	4840	5407
4500	3571	3835	4141	4500	4927	5445	6083
5000	3968	4261	4601	5000	5475	6049	6759
5500	4364	4687	5061	5500	6022	6654	7435
6000	4761	5113	5521	6000	6570	7259	8111
6500	5158	5539	5981	6500	7117	7864	8786
7000	5555	5965	6441	7000	7665	8469	9462
7500	5951	6391	6901	7500	8212	9074	10138
8000	6348	6817	7361	8000	8760	9679	10814
8500	6745	7243	7822	8500	9307	10284	11490
9000	7142	7669	8282	9000	9855	10889	12166
9500	7538	8096	8742	9500	10402	11494	12842
10000	7935	8522	9202	10000	10950	12099	13518

## A340 Ground to Air Miles Conversion Table, M.84

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			0	HEAD WIND		
	+150	+100	+50		-50	-100	-150
10	8	8	9	10	11	13	14
20	15	17	18	20	22	25	29
30	23	25	27	30	33	38	43
40	31	33	36	40	45	50	58
50	38	41	45	50	56	63	72
100	76	83	91	100	112	126	145
200	153	166	181	200	223	252	290
300	229	249	272	300	335	378	435
400	305	332	363	400	446	504	580
500	382	414	453	500	558	630	724
1000	763	829	906	1000	1115	1260	1449
1500	1145	1243	1360	1500	1673	1890	2173
2000	1527	1658	1813	2000	2230	2521	2898
2500	1909	2072	2266	2500	2788	3151	3622
3000	2290	2486	2719	3000	3345	3781	4347
3500	2672	2901	3172	3500	3903	4411	5071
4000	3054	3315	3626	4000	4461	5041	5795
4500	3436	3730	4079	4500	5018	5671	6520
5000	3817	4144	4532	5000	5576	6301	7244
5500	4199	4559	4985	5500	6133	6932	7969
6000	4581	4973	5438	6000	6691	7562	8693
6500	4963	5387	5892	6500	7249	8192	9417
7000	5344	5802	6345	7000	7806	8822	10142
7500	5726	6216	6798	7500	8364	9452	10866
8000	6108	6631	7251	8000	8921	10082	11591
8500	6490	7045	7704	8500	9479	10712	12315
9000	6871	7459	8158	9000	10036	11343	13040
9500	7253	7874	8611	9500	10594	11973	13764
10000	7635	8288	9064	10000	11152	12603	14488

## LANDING PERFORMANCE

### Actual Landing Distance

The landing distance is the distance measured between a point 50 feet above the runway threshold and the point where the complete stop of the aircraft is achieved. It assumes that:

- the approach speed is  $V_L$  (1.23  $V_S$  of the configuration) for manual landing or  $V_L + 5$  kt for CAT II/III automatic landings

- the pilot applies maximum braking and the antiskid system is operating
- the ground spoilers are operating

It does not consider the use of reverse thrust.

### Required Landing Distance

Manual Landing - Regulation defines the required landing distance as the actual landing distance divided by 0.6, assuming the surface is dry. If the surface is wet, the required landing distance must be at least 115% of that for a dry surface.

CAT II/III Automatic Landing - Regulation defines the required landing distance for CAT II/III automatic landing as the actual landing distance in automatic landing multiplied by 1.15. This distance must be retained for automatic landing whenever it is above the required landing distance in manual mode.

### A340 Actual Landing Distances, Configuration Full

ACTUAL LANDING DISTANCE (METERS)										
WEIGHT (1000) KG		130	150	170	190	210	230	250	270	290
R U N W A Y C O V E R E D I T I O N	DRY	980	990	1050	1160	1280	1450	1650	1850	2060
	WET	1190	1230	1320	1510	1700	1880	2050	2230	2440
	6.3 MM WATER	1550	1620	1760	2010	2260	2510	2710	2930	3150
	12.7 MM WATER	1450	1520	1650	1870	2090	2310	2490	2680	2890
	6.3 MM SLUSH	1490	1560	1670	1900	2150	2370	2580	2770	2980
	12.7 MM SLUSH	1420	1480	1590	1800	2010	2220	2390	2570	2770
	COMPACTED SNOW	1440	1480	1580	1750	1930	2090	2210	2330	2450
	ICE	2800	2960	3180	3530	3890	4200	4460	4700	4970

	CORRECTION ON ACTUAL LANDING DISTANCE							
	dry runway	wet runway	runway covered with					
			6.3 mm water	12.7 mm water	6.3 mm slush	12.7 mm slush	compacted snow	ice
per 1000 ft above SL	+4%	+5%	+4%	+4%	+6%	6%	4%	+5%
per 10 kt headwind	-5%	-5%	-6%	-6%	-6%	-6%	-5%	-6%
per 10 kt tailwind	+19%	+24%	+28%	+25%	+27%	+25%	+21%	+31%
4 reversers operative	-3%	-7%	-11%	-10%	-11%	-10%	-10%	-28%

### A340 Required Landing Distances, Manual Landing

REQUIRED LANDING DISTANCE (METERS)							
WEIGHT (1000KG)	130	140	150	160	170	180	190
CONF 3	1640	1640	1660	1710	1800	1900	1990
CONF FULL	1630	1630	1650	1670	1740	1830	1930

Corrections on landing distances:  
 Wind: per 10 kt tailwind add 24%; per 10 kt headwind subtract 5%  
 Airport elevation: per 1000 ft above sea level, add 5%

### A340 Required Landing Distances, Automatic Landing

Read the required landing distances for automatic landing in the above table and apply the associated corrections if necessary.

### FLIGHT PLANNING

#### Minimum Recommended Fuel Requirements

The total fuel quantity required to fly a given sector is the sum of the following quantities:

**Taxi Fuel** - Quantity required for startup and taxi. Fuel calculation is based on a consumption of 25 kg/min. Average quantity (12 minutes) is 300 kg.

**Trip Fuel** - Fuel required from departure to destination includes the following quantities:

- Takeoff and climb at selected speed.
- Cruise at selected speed.
- Descent from cruising level to 1500 ft AFE.
- Approach and landing. Fuel calculation is based on a consumption of 55 kg/min. Average quantity (6 minute IFR) is 330 kg.

**Reserve Fuel** - This quantity includes:

- En Route reserve fuel (contingency fuel) - According to national regulations and company policy (usually a percentage of trip fuel).
- Alternate fuel - Fuel required to fly from destination to alternate airport. In includes go-around (600 kg), climb to cruising level, cruise at long range speed, descent and approach procedure (220 kg for 4 minute VFR).
- Holding fuel - A conservative quantity corresponding to 30 minutes holding at 1500 feet above alternate airport elevation at green dot speed in the clean configuration is 2800 kg.

**APU Fuel** - During ground operations, the APU consumes about 200 kg/h packs on and APU generator on or 140 kg/h APU generator only.

In flight, APU fuel consumption is about 130 kg/h at FL200 packs on and APU generator on; 65 kg/h at FL300 APU generator only; and 55 kg/h at FL410 APU generator only.

## Quick Determination of F-PLN

The following flight planning tables allow the planner to determine trip fuel consumption and trip time required to cover a given air distance.

Notes:

1. In the tables, the asterisk (\*) means that a step climb of 4000 feet must be flown to reach the corresponding FL.
2. To obtain a flight plan at optimum cruise level, the highest flight level desired within the flight has to be selected in the table.
3. For each degree Celsius above ISA temperature apply fuel correction  $0.015 \text{ (kg/}^\circ\text{C/NM)} \times \text{ISA difference (}^\circ\text{C)} \times \text{air distance (NM)}$ .

The following tables are based upon a reference landing weight of 150,000 kg. The fuel consumption must be corrected when the actual landing weight is different from the reference landing weight. If it is lower (or greater) than the reference landing weight, subtract (or add) the value given in the correction part of the table per 1000 kg below (or above) the reference landing weight.

### Example Problem

The following is an example of a complete flight plan based on the assumptions:

- Zero fuel weight (OWE + PAYLOAD): 165,000 kg = landing weight at alternate airport.
- Cruise at M.80 at FL390
- Ground distance from departure to destination: 2600 NM
- Average wind during flight: 50 kt headwind
- ISA conditions
- En route reserve: 5%
- Ground distance from destination to alternate: 200 NM, no wind at FL200

To calculate the flight plan, a reverse calculation is needed, i.e. start with the landing weight at alternate.

1. Alternate fuel and time (see Alternate Planning Tables)  
Alternate time = 40 min  
Alternate fuel:  $4128 + 9 \times (165-150) = 4263 \text{ kg}$
2. Holding fuel and time  
A 30 min hold is assumed at 1500 feet. Holding fuel = 2800 kg
3. At destination, the landing weight =  $165,000 + 4263 + 2800 = 172,063 \text{ kg}$
4. Evaluation of the air distance between departure and destination.  
The Ground Distance/Air Distance conversion tables show that the corresponding air distance is: 2847 nm.
5. Trip fuel and time  
Enter air distance and flight level 390, interpolate to find the corresponding values of fuel

consumption and time, for the reference landing weight and without deviation from ISA.

Fuel = 33,187 kg

Time = 6 h 26 min

Correction for landing weight

Change in fuel consumption =  $167 \times (172.063 - 150) = 3,685$  kg

Trip reserves (5%) =  $0.05 \times (33,187 + 3,685) = 1,844$  kg

6. Taxi fuel = 300 kg

7. Total fuel on board (Block Fuel)

$33,187 + 3,685 + 1,844 + 2,800 + 4,263 + 300 = 46,079$  kg

### A340 Quick Determination of F-PLN, M.80 Cruise

<b>FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING</b> <b>CLIMB : 250KT/290KT/M.79 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT</b> <b>IMC PROCEDURE : 330 KG ( 6MIN)</b>									
REF. LANDING WEIGHT = 150000 KG			ISA			FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING			CG = 37.0 %			TIME (H.MIN)			
ANTI-ICING OFF			FLIGHT LEVEL				CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
AIR DIST. (NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	4061 0.39	4051 0.39	4054 0.39				14	15	
300	5343 0.52	5259 0.52	5195 0.52	5152 0.52	5133 0.52	5133 0.52	16	18	21
400	6628 1.05	6469 1.05	6338 1.05	6241 1.05	6181 1.05	6151 1.05	18	21	26
500	7915 1.18	7682 1.18	7485 1.18	7333 1.19	7232 1.19	7173 1.19	20	24	30
600	9205 1.30	8897 1.31	8634 1.31	8429 1.32	8287 1.32	8200 1.32	22	27	34
700	10497 1.43	10115 1.44	9786 1.44	9528 1.45	9345 1.45	9232 1.45	24	30	39
800	11792 1.56	11336 1.57	10941 1.57	10631 1.58	10408 1.58	10268 1.58	26	34	44
900	13089 2.09	12559 2.10	12100 2.10	11738 2.11	11474 2.11	11310 2.11	28	37	49
1000	14389 2.22	13785 2.23	13261 2.23	12849 2.24	12546 2.24	12359 2.24	31	40	54
1100	15691 2.34	15014 2.35	14426 2.37	13963 2.37	13521 2.37	13412 2.37	33	43	59
1200	16996 2.47	16245 2.48	15594 2.50	15082 2.50	14700 2.50	14470 2.50	35	47	64
1300	18303 3.00	17479 3.01	16764 3.03	16204 3.03	15783 3.03	15533 3.03	37	50	69
1400	19614 3.13	18716 3.14	17938 3.16	17329 3.16	16871 3.16	16602 3.16	40	54	75
1500	20926 3.26	19955 3.27	19114 3.29	18459 3.30	17962 3.30	17675 3.30	42	57	80
1600	22242 3.39	21198 3.40	20295 3.42	19593 3.43	19058 3.43	18755 3.43	45	61	86
1700	23559 3.51	22443 3.53	21478 3.55	20731 3.56	20158 3.56	19853 3.56	47	65	92
1800	24880 4.04	23690 4.06	22664 4.08	21872 4.09	21263 4.09	20947 4.09	50	68	98
1900	26204 4.17	24942 4.19	23854 4.21	23018 4.22	22372 4.22	22047 4.22	52	72	104
2000	27532 4.30	26197 4.32	25049 4.34	24167 4.35	23485 4.35	23153 4.35	55	76	111
2100	28862 4.43	27455 4.45	26249 4.47	25321 4.48	24602 4.48	24265 4.48	58	80	117
2200	30194 4.55	28717 4.58	27453 5.00	26480 5.01	25727 5.01	25387 5.01	60	84	123
2300	31529 5.08	29981 5.11	28660 5.13	27643 5.14	26883 5.14	26520 5.14	63	89	130
2400	32867 5.21	31248 5.24	29871 5.26	28810 5.27	28024 5.28	27661 5.28	66	93	137
2500	34208 5.34	32518 5.36	31086 5.39	29981 5.41	29169 5.41	28809 5.41	68	98	144
2600	35552 5.47	33791 5.49	32304 5.52	31156 5.54	30320 5.54	29965 5.54	71	103	150
2700	36899 6.00	35068 6.02	33526 6.05	32371 6.07	31477 6.07	31128 6.07	74	107	157
PACK FLOW LO Δ FUEL = -0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = +1.0 %			ENGINE ANTI-ICE ON Δ FUEL = +2.0 %		TOTAL ANTI-ICE ON Δ FUEL = +4.0 %		

A340 Quick Determination of F-PLN, M.80 Cruise, con't

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/290KT/M.79 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT									
IMC PROCEDURE : 330 KG ( 6MIN)									
REF. LANDING WEIGHT = 150000 KG			ISA			FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING			CG = 37.0 %			TIME (H.MIN)			
ANTI-ICING OFF									
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
<b>2800</b>	38249 6.12	36347 6.15	34752 6.18	33559 6.20	32639 6.20	32299 6.20	78	112	164
<b>2900</b>	39601 6.25	37630 6.28	35982 6.31	34753 6.33	33806 6.33	33477 6.33	81	117	171
<b>3000</b>	40958 6.38	38916 6.41	37216 6.44	35952 6.46	34981 6.46	34667 6.46	84	122	178
<b>3100</b>	42319 6.51	40205 6.54	38496 6.57	37155 6.59	36162 6.59	35864 6.59	89	125	185
<b>3200</b>	43682 7.04	41501 7.07	39745 7.10	38364 7.12	37348 7.12	37070 7.12	92	130	192
<b>3300</b>	45049 7.16	42801 7.20	41003 7.23	39577 7.25	38540 7.25	38300 7.26*	96	135	200
<b>3400</b>	46418 7.29	44103 7.33	42266 7.37	40795 7.39	39738 7.39	39515 7.39*	101	141	208
<b>3500</b>	47790 7.42	45457 7.46	43535 7.50	42019 7.52	40946 7.52	40738 7.52*	105	146	215
<b>3600</b>	49166 7.55	46771 7.59	44809 8.03	43249 8.05	42165 8.05	41966 8.05*	109	150	223
<b>3700</b>	50545 8.08	48089 8.12	46087 8.16	44483 8.18	43391 8.18	43202 8.18*	113	155	231
<b>3800</b>	51978 8.21	49411 8.25	47370 8.29	45723 8.31	44623 8.31	44443 8.31*	118	161	239
<b>3900</b>	53367 8.33	50738 8.38	48659 8.42	46967 8.44	45862 8.44	45690 8.44*	121	166	248
<b>4000</b>	54762 8.46	52068 8.50	49953 8.55	48217 8.57	47108 8.57	46943 8.57*	125	171	256
<b>4100</b>	56165 8.59	53401 9.03	51253 9.08	49474 9.10	48361 9.10	48203 9.10*	130	177	264
<b>4200</b>	57572 9.12	54742 9.16	52557 9.21	50736 9.23	49625 9.23	49471 9.24*	133	183	272
<b>4300</b>	58983 9.25	56101 9.29	53867 9.34	52003 9.37	50896 9.37	50745 9.37*	137	188	280
<b>4400</b>	60398 9.38	57467 9.42	55183 9.47	53276 9.50	52174 9.50	52026 9.50*	142	195	286
<b>4500</b>	61817 9.50	58837 9.55	56505 10.00	54555 10.03	53459 10.03	53314 10.03*	147	201	294
<b>4600</b>	63239 10.03	60213 10.08	57834 10.13	55841 10.16	54752 10.16	54610 10.16*	152	207	302
<b>4700</b>	64667 10.16	61594 10.21	59168 10.26	57136 10.29	56096 10.29	55912 10.29*	157	213	310
<b>4800</b>	66098 10.29	62980 10.34	60508 10.39	58438 10.42	57437 10.42*	57224 10.42*	162	220	319
<b>4900</b>	67533 10.42	64373 10.47	61853 10.52	59747 10.55	58770 10.55*	58543 10.55*	168	228	328
<b>5000</b>	68973 10.54	65771 11.00	63204 11.05	61061 11.08	60109 11.08*	59869 11.08*	174	235	337
<b>5100</b>	70420 11.07	67174 11.13	64562 11.18	62381 11.21	61453 11.21*	61202 11.22*	179	242	346
<b>5200</b>	71879 11.20	68583 11.26	65927 11.31	63709 11.35	62810 11.35*	62543 11.35*	185	248	355
<b>5300</b>	73342 11.33	69997 11.39	67297 11.44	65045 11.48	64170 11.47*	63893 11.48*	191	256	362
PACK FLOW LO Δ FUEL = -0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = +1.0 %			ENGINE ANTI-ICE ON Δ FUEL = +2.0 %		TOTAL ANTI-ICE ON Δ FUEL = +4.0 %		

A340 Quick Determination of F-PLN, M.80 Cruise, con't

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/290KT/M.79 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT									
IMC PROCEDURE : 330 KG ( 6MIN)									
REF. LANDING WEIGHT = 150000 KG			ISA			FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING			CG = 37.0 %			TIME (H.MIN)			
ANTI-ICING OFF			CORRECTION ON FUEL CONSUMPTION (KG/1000KG)						
AIR DIST. (NM)	FLIGHT LEVEL						FL310	FL350	FL390
	310	330	350	370	390	410	FL330	FL370	FL410
<b>5400</b>	74811 11.46	71422 11.52	68673 11.58	66387 12.01	65538 12.00*	65252 12.01*	198	264	371
<b>5500</b>	76284 11.59	72853 12.05	70056 12.11	67736 12.14	66913 12.14*	66620 12.14*	204	271	380
<b>5600</b>	77761 12.11	74291 12.17	71443 12.24	69141 12.27	68295 12.27*	67995 12.27*	210	279	389
<b>5700</b>	79245 12.24	75735 12.30	72835 12.37	70508 12.40	69684 12.40*	69384 12.40*	217	287	398
<b>5800</b>	80733 12.37	77184 12.43	74233 12.50	71903 12.53	71081 12.53*	70784 12.53*	223	296	407
<b>5900</b>	82227 12.50	78640 12.56	75637 13.03	73314 13.06	72488 13.06*	72230 13.07*	229	304	415
<b>6000</b>	83725 13.03	80103 13.09	77047 13.16	74733 13.20	73901 13.19*	73657 13.20*	235	312	424
<b>6100</b>	85228 13.16	81573 13.22	78463 13.29	76161 13.33	75323 13.32*	75095 13.33*	243	320	433
<b>6200</b>	86750 13.29	83049 13.35	79949 13.42	77598 13.46	76751 13.45*	76542 13.46*	249	328	442
<b>6300</b>	88280 13.41	84531 13.48	81385 13.55	79069 13.59*	78187 13.58*	77999 13.59*	255	337	451
<b>6400</b>	89816 13.54	86020 14.01	82827 14.08	80538 14.12*	79636 14.11*	79475 14.12*	261	346	461
<b>6500</b>	91359 14.07	87524 14.14	84276 14.21	82014 14.25*	81095 14.24*	80946 14.25*	268	355	470
<b>6600</b>	92908 14.20	89035 14.27	85732 14.34	83497 14.38*	82562 14.37*	82424 14.38*	274	364	480
<b>6700</b>	94464 14.33	90636 14.40	87200 14.47	84987 14.51*	84038 14.50*	83909 14.51*	283	373	488
<b>6800</b>	96027 14.46	92168 14.53	88675 15.00	86486 15.04*	85523 15.03*	85402 15.04*	290	380	498
<b>6900</b>	97596 14.58	93708 15.06	90157 15.13	87994 15.17*	87040 15.16*	86903 15.17*	297	391	507
<b>7000</b>	99171 15.11	95258 15.19	91646 15.27	89509 15.30*	88550 15.29*	88413 15.30*	303	401	517
<b>7100</b>	100751 15.24	96815 15.32	93143 15.40	91032 15.43*	90069 15.43*	89931 15.43*	311	411	527
<b>7200</b>	102427 15.37	98380 15.45	94651 15.53	92563 15.55*	91599 15.56*	91456 15.56*	318	421	536
<b>7300</b>	104038 15.50	99953 15.58	96168 16.06	94103 16.08*	93138 16.09*	92990 16.09*	323	431	546
<b>7400</b>	105657 16.03	101533 16.11	97692 16.19	95652 16.21*	94691 16.22*	94533 16.22*	331	441	555
<b>7500</b>	107282 16.16	103103 16.24	99224 16.32	97210 16.34*	96259 16.35*	96087 16.35*	338	450	565
<b>7600</b>	108915 16.28	104679 16.37	100764 16.45	98776 16.47*	97838 16.48*	97647 16.47*	337	460	575
<b>7700</b>	110558 16.41	106262 16.50	102319 16.58	100350 17.00*	99427 17.01*	99217 17.00*	345	470	585
<b>7800</b>		107853 17.02	103970 17.11*	101934 17.13*	101028 17.14*	100795 17.13*	369	481	595
<b>7900</b>		109454 17.15	105593 17.24*	103529 17.26*	102660 17.27*	102384 17.26*	375	491	605
PACK FLOW LO Δ FUEL = -0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = +1.0 %			ENGINE ANTI-ICE ON Δ FUEL = +2.0 %		TOTAL ANTI-ICE ON Δ FUEL = +4.0 %		

### A340 Quick Determination of F-PLN, M.84 Cruise

<b>FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING</b> <b>CLIMB : 250KT/290KT/M.79 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT</b> <b>IMC PROCEDURE : 330 KG ( 6MIN)</b>									
REF. LANDING WEIGHT = 15000 KG			ISA			FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING			CG = 37.0 %			TIME (H.MIN)			
ANTI-ICING OFF							CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
AIR DIST. (NM)	FLIGHT LEVEL						FL310	FL350	FL390
	310	330	350	370	390	410	FL330	FL370	FL410
<b>200</b>	4118 0.39	4092 0.39	4082 0.39				12	14	
<b>300</b>	5556 0.51	5432 0.51	5335 0.51	5270 0.52	5239 0.52	5237 0.52	14	17	21
<b>400</b>	6996 1.03	6773 1.04	6591 1.04	6457 1.04	6386 1.04	6386 1.04	15	20	28
<b>500</b>	8437 1.16	8117 1.16	7849 1.16	7647 1.17	7539 1.17	7546 1.17	17	23	35
<b>600</b>	9881 1.28	9463 1.28	9109 1.29	8841 1.29	8697 1.29	8715 1.29	18	26	42
<b>700</b>	11327 1.40	10812 1.41	10374 1.41	10040 1.42	9862 1.42	9896 1.42	20	29	49
<b>800</b>	12775 1.52	12163 1.53	11642 1.54	11244 1.54	11035 1.54	11090 1.54	22	33	58
<b>900</b>	14225 2.04	13517 2.05	12914 2.06	12453 2.07	12216 2.07	12298 2.07	24	36	66
<b>1000</b>	15678 2.17	14872 2.18	14188 2.19	13666 2.19	13404 2.19	13518 2.19	25	40	76
<b>1100</b>	17132 2.29	16230 2.30	15466 2.31	14883 2.32	14598 2.32	14760 2.32*	27	43	86
<b>1200</b>	18589 2.41	17591 2.42	16747 2.43	16105 2.44	15800 2.44	15983 2.44*	29	47	94
<b>1300</b>	20048 2.53	18954 2.55	18031 2.56	17331 2.57	17009 2.57	17212 2.57*	31	51	102
<b>1400</b>	21509 3.05	20319 3.07	19319 3.08	18562 3.09	18224 3.09	18447 3.09*	33	55	111
<b>1500</b>	22972 3.18	21687 3.19	20611 3.21	19798 3.22	19449 3.22	19688 3.22*	35	59	120
<b>1600</b>	24438 3.30	23057 3.31	21905 3.33	21038 3.34	20681 3.34	20936 3.34*	38	64	129
<b>1700</b>	25907 3.42	24431 3.44	23203 3.46	22283 3.47	21920 3.47	22189 3.47*	40	69	135
<b>1800</b>	27379 3.54	25810 3.56	24505 3.58	23533 3.59	23195 3.59	23449 3.59*	42	73	142
<b>1900</b>	28853 4.07	27193 4.08	25813 4.10	24789 4.12	24456 4.12	24715 4.12*	45	79	150
<b>2000</b>	30330 4.19	28578 4.21	27126 4.23	26058 4.24	25743 4.24	25987 4.24*	47	84	157
<b>2100</b>	31809 4.31	29967 4.33	28442 4.35	27334 4.36	27044 4.37	27266 4.37*	49	90	164
<b>2200</b>	33290 4.43	31359 4.45	29763 4.48	28616 4.49	28357 4.49	28553 4.49*	52	95	171
<b>2300</b>	34774 4.55	32753 4.58	31087 5.00	29903 5.01	29682 5.02	29848 5.02*	55	101	178
<b>2400</b>	36260 5.08	34151 5.10	32415 5.13	31238 5.14	31019 5.14	31153 5.14*	57	108	186
<b>2500</b>	37749 5.20	35552 5.22	33746 5.25	32545 5.26	32373 5.27*	32466 5.27*	60	114	193
<b>2600</b>	39241 5.32	36956 5.35	35083 5.37	33859 5.39	33717 5.39*	33787 5.39*	63	120	201
<b>2700</b>	40737 5.44	38363 5.47	36424 5.50	35181 5.51	35069 5.52*	35118 5.52*	66	128	209

PACK FLOW LO

Δ FUEL = -0.5 %

PACK FLOW HI OR/  
AND CARGO COOL ON

Δ FUEL = +1.0 %

ENGINE  
ANTI-ICE ON

Δ FUEL = +2.0 %

TOTAL  
ANTI-ICE ON

Δ FUEL = +4.0 %

A340 Quick Determination of F-PLN, M.84 Cruise, con't

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/290KT/M.79 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT									
IMC PROCEDURE : 330 KG ( 6MIN)									
REF. LANDING WEIGHT = 150000 KG			ISA			FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING			CG = 37.0 %			TIME (H.MIN)			
ANTI-ICING OFF			CORRECTION ON FUEL CONSUMPTION (KG/1000KG)						
AIR DIST. (NM)	FLIGHT LEVEL						FL310	FL350	FL390
	310	330	350	370	390	410	FL330	FL370	FL410
<b>2800</b>	42236 5.57	39773 5.59	37768 6.02	35509 6.04	36428 6.04*	36456 6.04*	69	136	217
<b>2900</b>	43738 6.09	41193 6.12	39153 6.15	37845 6.16	37792 6.16*	37803 6.17*	73	143	225
<b>3000</b>	45243 6.21	42618 6.24	40518 6.27	39188 6.29	39164 6.29*	39166 6.29*	77	152	233
<b>3100</b>	46751 6.33	44047 6.36	41890 6.40	40547 6.41	40542 6.41*	40530 6.42*	80	160	242
<b>3200</b>	48261 6.45	45479 6.49	43269 6.52	41920 6.54	41928 6.54*	41905 6.54*	84	169	250
<b>3300</b>	49774 6.58	46915 7.01	44653 7.05	43303 7.06	43323 7.06*	43289 7.07*	87	177	258
<b>3400</b>	51290 7.10	48398 7.13	46042 7.17	44695 7.19	44727 7.19*	44682 7.19*	92	185	266
<b>3500</b>	52809 7.22	49847 7.26	47436 7.29	46096 7.31	46139 7.31*	46111 7.32*	96	194	275
<b>3600</b>	54330 7.34	51300 7.38	48837 7.42	47507 7.44	47559 7.43*	47555 7.44*	100	203	285
<b>3700</b>	55857 7.47	52757 7.50	50243 7.54	48927 7.57	48988 7.56*	49013 7.57*	105	211	295
<b>3800</b>	57438 7.59	54218 8.03	51656 8.07	50400 8.09*	50426 8.08*	50504 8.09*	108	220	307
<b>3900</b>	58982 8.11	55688 8.15	53074 8.19	51874 8.21*	51872 8.21*	51978 8.22*	113	230	318
<b>4000</b>	60530 8.23	57166 8.27	54497 8.32	53354 8.34*	53328 8.33*	53459 8.34*	117	239	329
<b>4100</b>	62081 8.36	58649 8.40	55945 8.44	54842 8.46*	54791 8.46*	54948 8.46*	122	249	340
<b>4200</b>	63636 8.48	60137 8.52	57411 8.56	56338 8.58*	56264 8.58*	56445 8.59*	126	260	352
<b>4300</b>	65195 9.00	61629 9.04	58887 9.09	57844 9.11*	57748 9.11*	57951 9.11*	131	272	363
<b>4400</b>	66758 9.12	63127 9.17	60371 9.21	59357 9.23*	59250 9.23*	59464 9.23*	136	283	374
<b>4500</b>	68325 9.24	64630 9.29	61863 9.34	60878 9.35*	60770 9.35*	60986 9.36*	142	294	383
<b>4600</b>	69895 9.37	66138 9.41	63363 9.46	62407 9.48*	62302 9.48*	62517 9.48*	148	306	393
<b>4700</b>	71484 9.49	67652 9.54	64874 9.59	63945 10.00*	63847 10.00*	64056 10.00*	154	315	402
<b>4800</b>	73080 10.01	69170 10.06	66394 10.11	65493 10.12*	65405 10.13*	65604 10.13*	160	325	408
<b>4900</b>	74680 10.13	70699 10.18	67922 10.24	67048 10.25*	66977 10.25*	67161 10.25*	167	336	417
<b>5000</b>	76284 10.26	72248 10.31	69540 10.36*	68613 10.37*	68561 10.38*	68727 10.37*	174	346	427
<b>5100</b>	77893 10.38	73804 10.43	71151 10.48*	70187 10.49*	70222 10.50*	70303 10.50*	180	357	436
<b>5200</b>	79508 10.50	75366 10.55	72773 11.01*	71777 11.02*	71838 11.02*	71895 11.02*	190	368	446
<b>5300</b>	81128 11.02	76935 11.08	74402 11.13*	73379 11.14*	73463 11.15*	73498 11.14*	199	381	456
<b>PACK FLOW LO</b>	<b>PACK FLOW HI OR/ AND CARGO COOL ON</b>			<b>ENGINE ANTI-ICE ON</b>			<b>TOTAL ANTI-ICE ON</b>		
Δ FUEL = -0.5 %	Δ FUEL = +1.0 %			Δ FUEL = +2.0 %			Δ FUEL = +4.0 %		



A340 Alternate Planning

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT GO-AROUND : 600 KG - CLIMB : 250KT/290KT/M.79 - CRUISE : LONG RANGE DESCENT : M.80/300KT/250KT - VMC PROCEDURE : 220 KG ( 4MIN)									
REF. LDG WT AT ALTERNATE = 150000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 30.0 %			FUEL CONSUMED (KG)			
						TIME (H.MIN)			
AIR	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
DIST.							FL100	FL140	FL180
(NM)	100	120	140	160	180	200	FL120	FL160	FL200
<b>50</b>	1791 0.15						3		
<b>100</b>	2673 0.25	2654 0.24	2645 0.24	2641 0.23	2645 0.23	2656 0.23	5	5	5
<b>150</b>	3558 0.35	3507 0.34	3469 0.33	3434 0.32	3408 0.32	3391 0.31	8	7	7
<b>200</b>	4445 0.45	4363 0.43	4294 0.42	4229 0.41	4174 0.40	4128 0.40	10	10	9
<b>250</b>	5335 0.55	5221 0.53	5122 0.51	5026 0.50	4941 0.49	4866 0.48	13	12	11
<b>300</b>	6226 1.04	6081 1.02	5952 1.00	5824 0.59	5709 0.57	5606 0.56	16	14	13
<b>350</b>	7120 1.14	6944 1.12	6783 1.09	6624 1.07	6479 1.06	6347 1.05	18	16	16
<b>400</b>	8017 1.24	7808 1.21	7616 1.18	7426 1.16	7251 1.15	7090 1.13	21	19	18
<b>450</b>	8915 1.34	8675 1.30	8451 1.27	8230 1.25	8024 1.23	7834 1.22	23	21	20
<b>500</b>	9816 1.43	9545 1.40	9288 1.36	9035 1.34	8798 1.32	8579 1.30	26	23	22
<b>550</b>	10719 1.53	10416 1.49	10127 1.45	9841 1.42	9574 1.40	9326 1.38	28	25	24
<b>600</b>	11624 2.02	11290 1.58	10968 1.54	10650 1.51	10352 1.49	10075 1.47	31	27	26
<b>650</b>	12532 2.12	12166 2.07	11810 2.03	11460 2.00	11131 1.57	10825 1.55	34	30	28
<b>700</b>	13442 2.22	13045 2.16	12655 2.12	12272 2.08	11911 2.06	11577 2.03	36	32	30
<b>750</b>	14354 2.31	13926 2.25	13501 2.20	13086 2.17	12694 2.14	12330 2.12	39	34	32
<b>800</b>	15269 2.40	14809 2.34	14350 2.29	13901 2.26	13477 2.23	13085 2.20	41	36	34
<b>850</b>	16186 2.50	15695 2.43	15200 2.38	14719 2.34	14263 2.31	13841 2.28	44	38	36
<b>900</b>	17105 2.59	16582 2.52	16052 2.47	15537 2.43	15049 2.40	14598 2.37	46	41	38
<b>950</b>	18027 3.09	17473 3.01	16907 2.55	16358 2.52	15838 2.48	15358 2.45	49	43	40
<b>1000</b>	18952 3.18	18366 3.10	17763 3.04	17181 3.00	16628 2.57	16118 2.53	51	45	43
<b>1050</b>	19878 3.27	19261 3.18	18621 3.13	18005 3.09	17419 3.05	16881 3.01	54	47	45
<b>1100</b>	20806 3.36	20154 3.27	19481 3.21	18831 3.17	18213 3.14	17645 3.10	56	49	47
<b>1150</b>	21737 3.45	21048 3.36	20341 3.30	19659 3.26	19007 3.22	18410 3.18	59	51	49
<b>1200</b>	22670 3.54	21944 3.45	21202 3.39	20487 3.34	19804 3.30	19177 3.26	61	53	51
PACK FLOW LO Δ FUEL = -0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = +1.0 %			ENGINE ANTI-ICE ON Δ FUEL = +3.5 %		TOTAL ANTI-ICE ON Δ FUEL = +5.0 %		

A340 Alternate Planning, con't

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT								
GO-AROUND : 600 KG - CLIMB : 250KT/290KT/M.79 - CRUISE : LONG RANGE								
DESCENT : M.80/300KT/250KT - VMC PROCEDURE : 220 KG (4MIN)								
REF. LDG WT AT ALTERNATE = 150000 KG				ISA		FUEL CONSUMED (KG)		
NORMAL AIR CONDITIONING				CG = 30.0 %		TIME (H.MIN)		
ANTI-ICING OFF						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
AIR DIST (NM)	FLIGHT LEVEL					FL230	FL310	FL390
	230	270	310	350	390	FL270	FL350	
<b>150</b>	3381 0.31	3398 0.30				8		0
<b>200</b>	4077 0.39	4050 0.37	4050 0.36	4073 0.36		10	11	0
<b>250</b>	4774 0.47	4703 0.44	4652 0.43	4630 0.43	4631 0.43	12	13	15
<b>300</b>	5473 0.55	5358 0.52	5255 0.50	5188 0.49	5154 0.49	14	14	17
<b>350</b>	6174 1.04	6014 0.59	5859 0.57	5747 0.56	5678 0.56	17	16	19
<b>400</b>	6876 1.12	6671 1.06	6464 1.04	6307 1.03	6203 1.02	19	18	21
<b>450</b>	7579 1.20	7330 1.13	7070 1.11	6869 1.10	6729 1.09	21	20	23
<b>500</b>	8284 1.28	7990 1.20	7676 1.18	7431 1.16	7257 1.15	23	21	26
<b>550</b>	8991 1.36	8652 1.27	8284 1.24	7994 1.23	7785 1.22	25	23	28
<b>600</b>	9699 1.45	9315 1.34	8893 1.31	8558 1.30	8315 1.28	27	25	30
<b>650</b>	10409 1.53	9980 1.41	9502 1.38	9124 1.36	8845 1.35	29	27	32
<b>700</b>	11121 2.01	10646 1.49	10113 1.45	9690 1.43	9377 1.41	32	29	34
<b>750</b>	11834 2.09	11313 1.56	10725 1.52	10258 1.49	9910 1.48	34	30	37
<b>800</b>	12549 2.17	11982 2.03	11338 1.59	10827 1.56	10445 1.54	36	32	39
<b>850</b>	13266 2.25	12652 2.10	11951 2.05	11397 2.03	10980 2.01	38	34	41
<b>900</b>	13984 2.33	13324 2.16	12566 2.12	11968 2.09	11517 2.07	40	36	44
<b>950</b>	14704 2.41	13997 2.23	13182 2.19	12540 2.16	12055 2.13	42	38	46
<b>1000</b>	15425 2.49	14672 2.30	13798 2.26	13113 2.23	12594 2.20	45	40	48
<b>1050</b>	16148 2.57	15348 2.37	14416 2.33	13687 2.29	13135 2.26	47	42	51
<b>1100</b>	16873 3.05	16025 2.44	15034 2.39	14262 2.36	13676 2.33	49	44	53
<b>1150</b>	17599 3.13	16704 2.51	15654 2.46	14838 2.43	14219 2.39	51	45	55
<b>1200</b>	18327 3.21	17385 2.58	16274 2.53	15416 2.49	14763 2.46	53	47	58
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI-ICE ON		TOTAL ANTI-ICE ON		
Δ FUEL = -0.5		Δ FUEL = +1.0 %		Δ FUEL = +3.0 %		Δ FUEL = +5.0 %		