

Boeing 737-400 Performance □ CFM56-3B2

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ABBREVIATED CHARTS

Use the following charts to quickly determine trip fuel and trip time.

737-400 Abbreviated Flight Planning Chart, CFM56-3B2

ISA Conditions No Wind 250/280/.74					
NM	Altitude	Avg. TAS	Air Time	Air Fuel	Cruise Seed
50	100-110	345	15	1830	300
60	130-140	364	17	2190	300
70	150-160	374	19	2310	300
80	170-180	385	21	2480	300
90	190-200	397	23	2700	300
100	210-220	409	25	2920	300
110	220-230	413	27	3190	300
120	230-240	422	28	3300	300
130	250-260	444	29	3410	.74
140	270-280	441	32	3630	
150	280-290	439	33	3740	
160	290-300	437	35	3960	
170	300-310	435	36	4070	
180	310-320	433	38	4180	
190	330-350	431	39	4400	
200		428	41	4510	
250			45	4900	
300			51	5500	
350			58	6180	
400			65	6820	
450			72	7480	
500			79	8140	
550			86	8800	
600			93	9460	
650			100	10120	
700			107	10780	
750			114	11440	
800			121	11390	
850			128	12100	
900			135	12650	
950			142	13310	
1000	330-350	428	149	13970	.74

TIME AND FUEL CORRECTION FOR WIND

Change in Time = Time x Wind Component/TAS

Change in Fuel = Fuel x Wind Component/TAS

737-400 Abbreviated In-flight Diversion Chart, CFM56-3B2

Based On: 280/.74 Climb .74/250 Descent				
Dist (NM)	Rec. Alt.	TAS (kts)	Time (Min)	Fuel (Lbs)
50	100-110	345	12	1540
60	130-140	361	15	1870
70	150-160	371	17	1980
80			19	2090
90			29	2310
100	150-160	371	22	2420
110	160-170	377	24	2530
120	170-180	382	25	2640
130	180-190	394	27	2810
140	190-200	394	29	2970
150	200-210	400	30	3080
160	210-220	406	31	3190
170	220-230	412	33	3300
180	230-240	418	34	3410
190	240-250	445	35	3520
200	250-260	445	37	3630
220	260-270	443	40	3850
240	280-290	440	43	4070
260			45	4290
280			48	4570
300			51	4790
320			54	5010
340			56	5230
360			59	5450
380			62	5670
400	280-290	440	65	5890

Note: Distance is from point of diversion to alternate.

Additional allowances that must be included to obtain the total fuel required:

- APU Operation - 2.5 lbs/min
- Taxi - 25 lbs/min
- In-Flight Flaps Down Maneuvering: 200 lbs/min
- 45 Minute Reserve, 250 kts below 10,000 ft; Long Range Cruise @ 10,000 ft and above

Pressure Altitude (Ft)	Fuel (Lbs)
30,000	3800
25,000	3900
20,000	4100
15,000	4200
10,000	4400
9,000	4000
5,000	4200

- Holding Fuel

Altitude (Ft)	Fuel Flow (Lbs/Hr)	Fuel Flow (Lbs/Min)
30,000	4700	78
25,000	4760	79
20,000	4780	80
15,000	4860	81
10,000	4980	83

TAKEOFF CHARTS

737-400 Maximum Takeoff %N1, CFM56-3B2

MAXIMUM TAKEOFF %N1 PMC ON										
AIRPORT OAT	PRESSURE ALTITUDE FT									
°C	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000
54	93.3	94.1	93.6							
52	93.6	94.2	94.2	93.7						
50	93.8	94.3	94.3	94.3	93.9					
48	84.0	94.5	94.4	94.4	94.4	94.1				
46	94.1	94.7	94.6	94.5	94.5	94.6	94.4			
44	94.3	94.8	94.8	94.7	94.7	94.7	94.8	94.6		
42	94.5	95.0	95.0	94.9	94.9	94.8	94.9	95.0	94.8	
40	94.5	95.2	95.2	95.1	95.0	95.1	95.1	95.2	95.1	94.9
38	94.8	95.3	95.4	95.3	95.2	95.3	95.3	95.4	95.3	95.2
36	95.1	95.5	95.5	95.5	95.4	95.6	95.6	95.6	95.5	95.4
34	95.3	95.7	95.7	95.7	95.6	95.8	95.8	95.8	95.7	95.6
32	95.5	95.9	95.9	95.8	95.8	96.0	96.0	95.9	95.9	95.8
30	95.2	96.1	96.1	96.0	96.0	96.3	96.2	96.1	96.0	96.0
28	94.9	95.8	96.3	96.2	96.2	96.5	96.4	96.3	96.2	96.1
26	94.6	95.5	96.0	96.4	96.4	96.6	96.5	96.5	96.4	96.3
24	94.2	95.2	95.6	96.1	96.5	96.8	96.7	96.7	96.6	96.5
22	93.9	94.8	95.3	95.7	96.2	96.9	96.9	96.9	96.8	96.6
20	93.6	94.2	95.0	95.4	95.9	96.6	97.1	97.1	97.0	96.9
18	93.3	94.2	94.7	95.1	95.6	96.3	96.8	97.3	97.2	97.1
16	93.0	93.9	94.3	94.8	95.2	96.0	96.4	96.9	97.4	97.3
14	92.6	93.5	94.0	94.4	94.9	95.6	96.1	96.6	97.0	97.5
12	92.3	93.2	93.7	94.1	94.6	95.3	95.8	96.3	96.7	97.2
10	92.0	92.9	93.4	93.8	94.2	95.0	95.4	95.9	96.4	96.8
8	91.7	92.6	93.0	93.4	93.9	94.6	95.1	95.6	96.0	96.5
6	91.3	92.2	92.7	93.1	93.6	94.3	94.7	95.3	95.7	96.2
4	91.0	91.9	92.4	92.8	93.2	93.9	94.4	94.9	95.3	95.8
2	90.7	91.6	92.0	92.4	92.9	93.6	94.1	94.6	95.0	95.5
0	90.4	91.2	91.7	92.1	92.6	93.3	93.7	94.2	94.7	95.1
-2	90.0	90.9	91.4	91.8	92.2	92.9	93.4	93.9	94.3	94.8

-4	89.7	90.6	91.0	91.4	91.9	92.6	93.0	93.5	94.0	94.4
-6	89.4	90.2	90.7	91.1	91.5	92.2	92.7	93.2	93.6	94.1
-8	89.0	89.9	90.3	90.7	91.2	91.9	92.3	92.8	93.3	93.7
-10	88.7	89.6	90.0	90.4	90.8	91.5	92.0	92.5	92.9	93.4
-12	88.3	89.2	89.7	90.0	90.5	91.2	91.6	92.1	92.5	93.0
-14	88.0	88.9	89.3	89.7	90.2	90.8	91.3	91.8	92.2	92.6
-16	87.7	88.5	89.0	89.4	89.8	90.5	90.9	91.4	91.8	92.3
-18	87.3	88.2	88.6	89.0	89.5	90.1	90.6	91.1	91.5	91.9
-20	87.0	87.8	88.3	88.7	89.1	89.8	90.2	90.7	91.1	91.6
-22	86.6	87.5	87.9	88.3	88.7	89.4	89.9	90.3	90.8	91.2
-24	86.3	87.1	87.6	88.0	88.4	89.1	89.5	90.0	90.4	90.8
-26	85.9	86.8	87.2	87.6	88.0	88.7	89.1	89.6	90.0	90.5
-28	85.6	86.4	86.9	87.2	87.7	88.4	88.8	89.3	89.7	90.1
-30	85.2	86.0	86.5	86.9	87.3	88.0	88.4	88.9	89.3	89.7

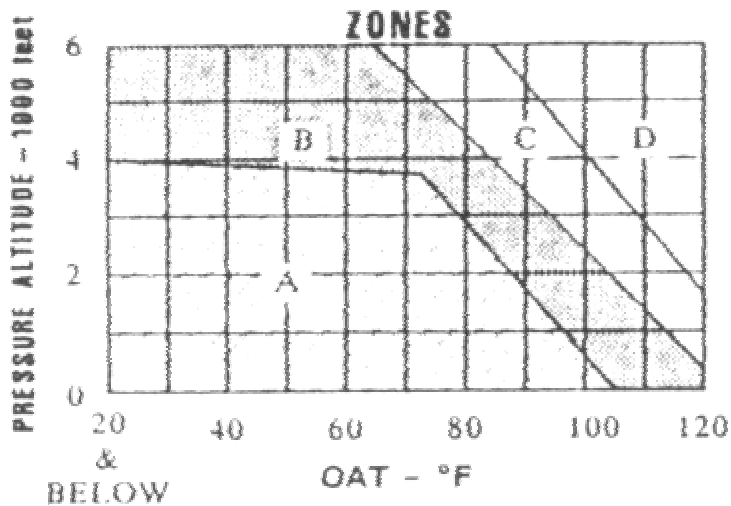
VALID FOR PMC ON, A/C AUTO, ENGINE ANTI-ICE ON OR OFF.
 FOR A/C OFF ADD 1.0% N1.
 DO NOT OPERATE ENGINE ANTI-ICE "ON" AT AIRPORT OAT ABOVE 10°C.

737-400 Flaps 5 Takeoff V-Speeds, CFM56-3B2

GROSS WT 1000 LB	V1	VR	V2
150	156	160	166
140	159	153	160
130	143	146	154
120	136	139	148
110	129	131	142
100	122	124	136
90	114	116	130
86	111	113	128

737-400 V-Speed Adjustments

- Adjust V1/Vr as shown in Zone Table below.



FLAPS 5 V1/VR ADJUSTMENTS		
ZONE	V1	VR
A	0	0
B	+2	+1
C	+3	+2
D	+4	+3

- Subtract 1 knot from V1 for each 1.0% downhill runway slope.
- Add 1 knot to V1 for each 1.0% uphill runway slope.
- Subtract 1 knot from Vr for each 5 kts of tailwind.
- Observe the following Vmcg speeds.

Pressure Altitude - 1000 feet							
°F	0	1000	2000	3000	4000	5000	6000
120	107	105	103	101			
100	112	110	108	105	103	101	99
80	116	114	113	110	109	106	104
60	116	114	113	112	111	109	108
-60	118	116	115	113	112	110	109

- Increase Vmcg 2 kts for engine A/C bleeds off.
- If V1 exceeds Vr, make VR equal to V1 and increase V2 the same amount Vr is increased.

CLIMB CHARTS

737-400 Max Climb %N1 250/280/.74M, CFM56-3B2

MAX CLIMB %N1 250/280/.74M Engine Bleeds for A/C AUTO									
TAT °C	PRESSURE ALTITUDE								
	S.L.	5000	10000	15000	20000	25000	30000	35000	37000
50	90.9	91.1	92.3						
45	91.5	91.7	92.8						
40	92.0	92.2	93.3	93.6	93.8				
35	92.1	92.7	93.8	94.1	94.3				
30	92.2	93.2	94.2	94.6	94.7	94.9			
25	91.4	93.0	94.3	94.9	95.1	95.3			
20	90.6	92.8	94.4	95.3	95.5	95.7	95.8		
15	89.9	92.0	93.6	95.1	95.9	96.1	96.2		
10	89.1	91.2	92.8	94.9	96.3	96.5	96.5	96.5	96.5
5	88.3	90.4	92.0	94.1	95.7	96.9	97.1	97.1	97.1
0	87.5	89.6	91.2	93.2	95.1	97.2	97.6	97.6	97.6
-5	86.7	88.8	90.4	92.3	94.2	96.3	97.9	98.1	98.1
-10	85.9	87.9	89.5	91.4	93.3	95.4	98.2	98.5	98.5
-15	86.1	87.1	88.7	90.6	92.4	94.5	97.3	98.9	98.9
-20	84.2	86.3	87.8	89.7	91.5	93.6	96.3	99.2	99.2
-25	83.4	85.4	86.9	88.8	90.6	92.7	95.4	98.4	98.7
-30	82.6	84.5	86.0	87.9	89.7	91.7	94.4	97.6	98.1
-35	81.7	83.7	85.1	87.0	88.8	90.8	93.5	98.5	97.1
-40	80.8	82.8	84.2	86.1	87.9	89.8	92.5	95.5	96.1
-50	79.1	81.0	82.4	84.2	85.9	87.9	90.5	93.4	94.0

CRUISE CHARTS

737-400 Optimum Altitude, CFM56-3B2

WEIGHT 1000 LB	OPTIMUM ALTITUDE FEET
150	29500
145	30200
140	31000
135	31800
130	32600
125	33500
120	34400
115	35300
110	36200
105	37000
100	37000

737-400 Mach .74 Cruise Chart, CFM56-3B2

ALL ENGINES A/C AUTO																	
PRESS ALT 1000 FEET	IAS STD TAT TAS	GROSS WEIGHT 1000 LB															
		150	145	140	135	130	125	120	115	110	105	100	95	90	85	80	
37	238 -33 424						90.8 -11 2743	88.9 -4 2583	87.4 2459	86.2 2356	85.1 2267	84.1 2183	83.2 2106	82.3 2036	81.5 1972	80.8 1915	
36	244 -33 425				92.4 -19 3016	90.2 -9 2825	88.5 -1 2674	87.2 2553	86.0 2452	85.0 2364	84.1 2279	83.2 2201	82.4 2131	81.6 2044	80.9 2006	80.3 1956	
35	250 -30 426			92.1 -15 3101	90.1 -6 2921	88.6 1 2778	87.3 2662	86.2 2562	85.2 2472	84.4 2388	83.5 2310	82.8 2239	82.0 2173	81.3 2114	80.7 2063	80.1 2011	
34	255 -28 428	91.7 -11 3186	89.9 -4 3018	88.6 3 2883	87.4 2772	86.4 2672	85.8 2584	84.6 2489	83.8 2421	83.1 2349	82.4 2283	81.7 2222	81.1 2168	80.5 2117	80.0 2072		
33	261 -26 430	91.3 -8 3273	89.8 -2 3117	88.6 5 2989	87.5 2861	86.3 2784	85.7 2695	84.9 2611	84.1 2533	83.4 2462	82.7 2395	82.1 2333	81.5 2277	80.9 2226	80.4 2179	79.9 2137	
32	267 -24 432	89.7 1 3219	88.5 6 3097	87.6 2993	86.7 2899	85.8 2809	85.1 2726	84.4 2648	83.7 2577	83.0 2509	82.4 2447	81.8 2391	81.3 2338	80.8 2290	80.3 2247	79.9 2207	
31	273 -22 434	88.5 8 3209	87.6 3108	86.8 3015	86.0 2926	85.3 2843	84.6 2766	83.9 2694	83.3 2626	82.7 2564	82.2 2507	81.6 2454	81.1 2405	80.7 2361	80.3 2320	79.9 2202	
30	279 -19 436	87.6 3225	86.9 3132	86.1 3044	85.4 2962	84.8 2886	84.2 2814	83.6 2748	83.0 2683	82.5 2626	82.0 2573	81.5 2523	81.0 2476	80.6 2436	80.2 2397	79.9 2363	
29	285 -17 438	86.9 3252	86.3 3165	85.6 3084	85.0 3008	84.4 2936	83.8 2869	83.3 2806	82.8 2749	82.3 2695	81.8 2644	81.4 2598	81.0 2556	80.6 2516	80.3 2481	80.0 2449	
ISA AVERAGE %N1 REQUIRED MAX TAT FOR THRUST RATING ISA FUEL FLOW LB/HR/ENG																	

MAX TAT NOT SHOWN FOR HOTTER THAN ISA + 30°C CONDITIONS.
 INCREASE/DECREASE TARGET %N1 BY 1% PER 5°C ABOVE/BELOW STD TAT
 INCREASE/DECREASE FUEL FLOW 1% PER 5°C ABOVE/BELOW STD TAT
 INCREASE/DECREASE TAS BY 1 KT PER 1°C ABOVE/BELOW STD TAT

737-400 300 KIAS Cruise Chart, CFM56-3B2

NOT AVAILABLE

LANDING CHARTS

737-400 Landing Speeds

NOT AVAILABLE