

BOEING 787-800

Reference Manual

for the X-Plane model by
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1. Introduction

This manual contains reference information for the Boeing 787-800 X-Plane model based on the actual Boeing Manual. Use this manual to prepare your flight in terms of fuel load, takeoff and climb performance, step climb determination, flap extension and retraction scheduling and other performance related topics.

In its current version this manual does not provide any further explanation of how to use these data. In future versions I intend to add a chapter about the usage of the data. I hope being able to provide such additions as soon as I'm more familiar with the plane.

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DO NOT USE FOR FLIGHT!

All data in this manual are meant for usage with the X-Plane model by myvirtualhanger.com. It is NOT intended to be used for anything even remotely related to real aviation.

DO NOT USE FOR FLIGHT!

2. Reference

This chapter is stripped down to the essentials. It does not contain any explanation in favor of quick and clear access to these data at any given time. The data provided in this reference are more than sufficient to prepare a realistic flight with the X-Plane model of the Boeing 787-800.

2.1 Limitations

Operational Limitations		
Max. Range (full tanks)	8200 nm	13195 km
Max. Range (full payload)	7200 nm	11585 km
Max. Speed	Mach 0.85	
Max. Cruise Speed	Mach 0.89	
Max. Payload	see weight limitations	
Seating	210 to 250 seats	
Cargo Capacity	4,822 cu ft	137 m ³
Runway Slope	+/- 2%	
Max. Operating Altitude	43,100 ft	13,135m
Max. Takeoff and Landing Altitude	8,400 ft	2,560m
Maximum Takeoff and Landing Tailwind component	15 kt	17.3 mph
Weight Limitations		
Empty Weight	242,000 lbs	109,769 kg
Max. Payload	113,000 lbs	51,255 kg
Max. Taxi Weight	503,000 lbs	228,383 kg
Max. Takeoff Weight	502,500 lbs	227,930 kg
Max. Landing Weight	380,000 lbs	172,365 kg
Max. Zero Fuel Weight	355,000 lbs	161,025 kg
Automatic Landing		
Headwind component	25 kt	28.7 mph
Tailwind component	15 kt	17.3 mph
Crosswind component	25 kt	28.7 mph

2.2 Takeoff Speeds (dry Runway)

2.2.a. V1, VR, V2 for Max. Takeoff Thrust

Weight (1000 lbs)	Flaps 5			Flaps 15			Flaps 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
540	165	170	174	160	163	168	153	156	161
500	159	162	168	153	156	162	147	149	155
460	154	157	164	148	151	158	142	144	151
420	146	149	157	141	143	151	135	136	145
380	138	140	149	132	135	144	126	128	138
340	127	131	142	122	126	136	117	120	131
300	117	121	134	113	116	129	118	111	124
260	106	111	126	102	107	121	99	101	116

2.2.b. V1, VR, V2 Adjustments

Temp		V1							VR							V2						
		Press Alt. (1000 ft)							Press Alt. (1000 ft)							Press Alt. (1000 ft)						
C	F	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10
70	158	8	8						5	6						-1	-1					
60	140	6	6	7	9				4	4	5	6				-1	-1	-2	-2			
50	122	4	4	5	7	8	9	10	2	3	4	5	6	7	8	-1	-1	-1	-2	-2	-3	-3
40	140	1	2	3	5	6	8	9	1	1	2	3	5	6	7	-1	-1	-1	-1	-2	-2	-3
30	86	0	0	2	3	5	6	8	0	0	1	2	3	5	6	0	0	-1	-1	-1	-2	-2
20	68	0	0	1	2	3	5	6	0	0	1	1	2	3	5	0	0	0	0	-1	-1	-2
-60	-76	0	0	1	2	3	4	5	0	0	1	1	2	3	4	0	0	0	0	-1	-1	-1

2.2.c. Slope and Wind V1 Adjustments

Weight (1000lbs)	Slope (%)					Winds (Kts)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
540	-4	-2	0	2	3	-3	-2	-1	0	1	1	2	2	
500	-4	-2	0	1	2	-3	-1	-1	0	0	1	1	1	
460	-3	-2	0	1	1	-2	-1	-1	0	0	1	1	1	
420	-3	-1	0	1	1	-2	-1	-1	0	0	0	1	1	
380	-2	-1	0	1	1	-2	-1	-1	0	0	0	1	1	
340	-2	-1	0	1	1	-1	-1	0	0	0	1	1	1	
300	-1	0	0	1	1	-1	0	0	0	0	1	1	1	
260	-1	0	0	1	1	0	0	0	0	1	1	1	1	

2.3 Takeoff Speeds (wet Runway)

2.3.a. V1, VR, V2 for Max. Takeoff Thrust

Weight (1000 lbs)	Flaps 5			Flaps 15			Flaps 20		
	V1	VR	V2	V1	VR	V2	V1	VR	V2
540	160	170	174	154	163	168	147	156	161
500	152	162	168	146	156	162	139	149	155
460	145	157	164	140	151	158	133	144	151
420	137	149	157	131	143	151	124	136	145
380	127	140	149	121	135	144	115	128	138
340	117	131	142	111	126	136	106	120	131
300	106	121	134	101	116	129	96	111	124
260	95	111	126	91	107	121	87	101	116

2.3.b. V1, VR, V2 Adjustments

Temp		V1							VR							V2						
		Press Alt. (1000 ft)							Press Alt. (1000 ft)							Press Alt. (1000 ft)						
C	F	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10	-2	0	2	4	6	8	10
70	158	12	13						5	6						-1	-1					
60	140	9	9	11	13				4	4	5	6				-1	-1	-2	-2			
50	122	5	5	7	9	12	13	15	2	3	4	5	6	7	8	-1	-1	-1	-2	-2	-3	-3
40	140	2	2	4	6	9	11	13	1	1	2	3	5	6	7	-1	-1	-1	-1	-2	-2	-3
30	86	0	0	2	4	6	8	11	0	0	1	2	3	5	6	0	0	0	-1	-1	-2	-2
20	68	0	0	1	2	4	6	8	0	0	1	1	2	3	5	0	0	0	0	-1	-1	-2
-60	-76	0	0	1	2	3	4	6	0	0	1	1	2	3	4	0	0	0	0	-1	-1	-1

2.3.c. Slope and Wind V1 Adjustments

Weight (1000lbs)	Slope (%)					Winds (Kts)								
	-2	-1	0	1	2	-15	-10	-5	0	10	20	30	40	
540	-6	-3	0	2	5	-4	-3	-1	0	0	1	2	2	
500	-5	-2	0	2	5	-4	-2	-1	0	1	1	2	3	
460	-5	-2	0	2	4	-4	-2	-1	0	1	2	2	3	
420	-4	-2	0	2	4	-4	-2	-1	0	1	2	3	3	
380	-3	-1	0	3	4	-3	-2	-1	0	1	2	3	4	
340	-3	-1	0	3	4	-3	-2	0	0	1	2	3	4	
300	-3	-1	0	3	4	-3	-2	0	0	1	2	3	4	
260	-2	-1	0	3	4	-2	-1	0	0	1	2	3	4	

2.4 Approach Speeds – Vref

Weight (1000 lbs)	Flaps		
	30	25	20
500	161	164	160
480	158	162	164
460	156	160	161
440	153	156	157
420	149	152	154
400	145	149	150
380	142	145	146
360	138	141	142
340	134	137	138
320	130	133	134
300	126	129	130
280	122	124	125
260	120	120	121
240	120	120	121

2.5 Flap Maneuver Speeds

The following tables contain flap maneuver speeds for various flap settings. The flap maneuver speed is the recommended operating speed during takeoff or landing operations. These speeds guarantee full maneuver capability or at least 40 degree of bank (25 degree bank and 15 degree overshoot) to stick shaker within a few thousand feet of the airport altitude. While the flaps may be extended up to 20.000 feet, less maneuver margin to stick shaker exists for a fixed speed as altitude increases.

Flap Position	All Weights
Flaps Up	Vref 30 + 80
Flaps 1	Vref 30 + 60
Flaps 5	Vref 30 + 40
Flaps 15	Vref 30 + 20
Flaps 20	Vref 30 + 20
Flaps 25	Vref 25
Flaps 30	Vref 30

2.5.a. Sea level pressure altitude

Weight (1000 lbs)	Manouver Speeds (KIAS)						
	Flap Position						
	Up	1	5	15	20	25	30
500	241	226	201	181	181	164	161
480	239	223	199	179	179	162	158
460	236	220	196	176	176	160	156
440	233	215	193	173	173	156	153
420	229	211	189	169	169	152	149
400	226	206	186	166	166	149	145
380	222	201	182	162	162	145	142
360	218	196	178	158	158	141	138
340	214	191	174	154	154	137	134
320	210	187	170	150	150	133	130
300	206	183	166	146	146	129	126
280	202	179	162	142	142	124	122
260	197	174	157	139	139	120	120
240	193	170	153	135	132	120	120

2.5.b. 10000 ft pressure altitude

Weight (1000 lbs)	Manouver Speeds (KIAS)						
	Flap Position						
	Up	1	5	15	20	25	30
500	243	227	202	182	182	164	161
480	240	224	200	180	180	162	158
460	237	220	197	177	177	160	156
440	234	216	194	174	174	156	153
420	3230	211	190	170	170	152	149
400	226	206	186	166	166	149	145
380	223	201	183	163	163	145	142
360	219	196	179	159	159	141	138
340	215	192	175	155	155	137	134
320	211	188	171	151	151	133	130
300	206	183	166	146	146	129	126
280	202	179	162	142	142	124	122
260	198	175	158	139	139	120	120
240	193	170	153	136	136	120	120

2.5.c. 20000 ft pressure altitude

Weight (1000 lbs)	Manouver Speeds (KIAS)						
	Flap Position						
	Up	1	5	15	20	25	30
500	250	233	204	184	184	164	161
480	246	229	201	181	181	162	158
460	242	226	199	179	179	160	156
440	236	220	195	175	175	156	153
420	232	214	192	172	172	152	149
400	228	208	188	168	168	149	145
380	224	203	184	164	164	145	142
360	220	197	180	160	160	141	138
340	216	193	176	156	156	137	134
320	212	189	172	152	152	133	130
300	207	184	167	147	147	129	126
280	203	180	163	143	143	124	122
260	198	175	158	139	139	120	120
240	193	170	153	136	136	120	120

2.6 Thrust (TPR) settings

2.6.a. Takeoff Thrust

OAT (C)	Airport Pressure Altitude (ft)												
	-2000	-1000	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10k
70	49.4	50.3	51.0	50.3	49.6	48.8	48.1	47.3	46.1	45.5	44.4	43.1	41.7
60	56.4	57.6	58.7	58.1	57.5	56.9	56.4	55.8	54.7	54.3	53.4	52.1	50.8
55	60.1	61.6	62.5	62.0	61.5	60.9	60.5	60.0	58.9	58.7	57.8	56.6	55.4
50	64.0	65.4	66.7	66.2	65.6	65.0	64.6	64.2	63.2	63.1	62.3	61.2	60.0
45	67.4	69.2	70.9	70.4	69.9	69.3	68.9	68.5	67.5	67.5	66.7	65.7	64.5
40	70.6	72.7	74.5	74.3	74.1	73.7	73.4	73.0	72.0	72.0	71.2	70.2	69.1
35	74.0	76.2	78.3	78.1	77.8	77.6	77.6	77.6	76.6	76.7	75.9	74.9	73.7
30	74.9	78.5	82.1	81.8	81.6	81.3	81.4	81.5	80.7	81.2	80.7	79.7	78.6
25	75.1	78.7	82.3	83.4	84.4	84.9	85.0	85.1	84.7	85.1	84.9	84.2	83.6
20	75.3	78.9	82.6	83.6	84.7	85.7	87.2	88.6	88.3	88.7	88.5	88.0	87.5
15	75.5	79.1	82.6	83.9	84.9	86.0	87.4	88.9	89.7	91.3	91.8	91.3	90.8
10	75.7	79.4	83.0	84.1	85.1	86.2	87.7	89.1	90.0	91.6	92.6	93.3	94.0
5	75.9	79.6	83.2	84.3	85.4	86.4	87.9	89.3	90.2	91.8	92.8	93.5	94.3
0	76.1	79.8	83.5	84.5	85.6	86.7	88.1	89.6	90.4	92.1	93.1	93.8	94.5
-10	76.5	80.2	83.9	85.0	86.0	87.1	88.6	90.1	90.9	92.6	93.6	94.3	95.0
-20	76.9	80.6	84.3	85.4	86.5	87.6	89.1	90.5	91.4	93.1	94.1	94.8	95.5
-30	77.3	81.0	84.8	85.9	87.0	88.1	89.5	91.0	91.9	93.6	94.6	95.3	96.0
-40	77.7	81.5	85.2	86.3	87.4	88.5	90.0	91.5	92.4	94.1	95.1	95.8	96.5
-50	78.1	81.9	85.7	86.8	87.9	89.0	90.5	92.0	92.9	94.5	95.6	96.3	97.1

2.6.b. Max. Climb Thrust

TAT (C)	Pressure altitude (1000 ft) / Speed (KIAS or Mach)									
	0	5	10	15	20	25	30	35	40	43
	310							0.85		
60	48.9	49.0	51.2	55.6	58.0	61.8	66.2	73.7	71.4	70.2
50	55.6	55.0	54.2	55.6	58.0	61.8	66.2	73.7	71.4	70.2
40	62.0	62.8	61.6	61.0	59.2	61.8	66.2	73.7	71.4	70.2
30	63.7	70.0	69.4	69.9	67.9	67.1	67.3	73.7	71.4	0.0
20	64.0	70.3	75.7	77.2	77.2	76.2	76.2	76.2	71.9	70.7
15	64.2	70.5	75.9	81.1	81.3	80.9	80.8	80.4	76.3	75.2
10	64.4	70.7	76.1	82.3	85.8	85.3	85.5	84.7	80.7	79.6
5	64.5	70.9	76.3	82.5	87.2	89.6	89.8	89.1	85.3	84.1
0	64.7	71.0	76.5	82.7	87.4	91.8	93.9	93.5	89.8	88.6
-5	64.9	71.2	76.6	82.9	87.6	92.0	96.3	97.6	94.3	93.2
-10	65.0	71.4	76.8	83.1	87.8	92.2	96.5	101.9	98.8	97.9
-15	65.2	71.6	77.0	83.3	88.0	92.5	96.7	103.2	102.1	101.2
-20	65.3	71.8	77.2	83.5	88.3	92.7	96.9	103.4	102.3	101.5
-25	65.5	71.9	77.4	83.7	88.5	92.9	97.2	103.6	102.5	101.7
-30	65.7	72.1	77.6	84.0	88.7	93.1	97.4	103.9	102.8	101.9
-35	65.8	72.3	77.8	84.2	88.9	93.4	97.6	104.1	103.0	102.2
-40	66.0	72.5	78.0	84.4	89.1	93.6	97.9	104.4	103.3	102.4

2.7 Long Range Cruise Enroute Fuel and Time – High Altitudes

2.7.a. Ground to Air Miles Conversation

Air Distance (nm)					Ground Distance (nm)	Air Distance (nm)				
Headwind component (kt)						Tailwind component (kt)				
100	80	60	40	20		20	40	60	80	100
518	490	464	440	419	400	384	368	354	342	330
1036	979	927	881	839	800	768	739	712	687	663
1556	1470	1392	1321	1258	1200	1153	1109	1069	1031	996
2078	1962	1857	1763	1678	1600	1538	1480	1425	1375	1329
2601	2456	2323	2204	2098	2000	1922	1850	1782	1719	1661
3126	2950	2790	2647	2518	2400	2307	2219	2138	2062	1993
3652	3446	3257	3089	2939	2800	2691	2589	2493	2405	2324
4180	3942	3725	3532	3359	3200	3075	2957	2848	2747	2654
4709	4439	4194	3976	3780	3600	3458	3326	3203	3088	2983
5239	4938	4663	4420	4201	4000	3842	3694	3556	3429	3312
5771	5437	5134	4864	4622	4400	4225	4062	3910	3769	3640
6305	5938	5605	5309	5043	4800	4608	4429	4262	4109	3967
6840	6440	6077	5754	5465	5200	4991	4796	4615	4448	4295
7376	6943	6549	6200	5887	5600	5374	5164	4968	4787	4621
7915	7448	7023	6646	6309	6000	5757	5530	5320	5125	4947
8455	7953	7497	7093	6731	6400	6140	4897	5671	5463	5272
8998	8461	7972	7541	7154	6800	6522	6263	6022	5800	5597
9544	8970	8449	7989	7577	7200	6904	6628	6373	6137	5921
10093	9482	8927	8438	8000	7600	7286	6994	6723	6473	6244
10644	9996	9407	8888	8424	8000	7668	7359	7073	6808	6567

2.7.b. Reference Fuel and Time required at Check Point

Air Dist. (nm)	Pressure Altitude (1000 ft)									
	31		33		35		37		39	
	Fuel 1000 lb	Time h:mm	Fuel 1000 lb	Time h:mm	Fuel 1000 lb	Time h:mm	Fuel 1000 lb	Time h:mm	Fuel 1000 lb	Time h:mm
400	8.2	0:56	8.0	0:55	7.7	0:54	7.5	0:51	7.3	0:53
800	16.8	1:53	16.3	1:50	15.8	1:47	15.4	1:42	15.0	1:42
1200	25.4	2:49	24.7	2:45	24.0	2:40	23.3	2:34	22.7	2:31
1600	34.0	3:45	33.0	3:40	32.1	3:34	31.2	3:25	30.5	3:20
2000	42.6	4:41	41.4	4:34	40.2	4:27	39.1	4:16	38.2	4:09
2400	50.9	5:39	49.4	5:30	48.0	5:22	46.7	5:09	45.6	4:59
2800	59.2	6:36	57.5	6:27	55.9	6:16	54.4	6:01	53.1	5:49
3200	67.4	7:34	65.4	7:23	63.6	7:11	61.9	6:55	60.4	6:39
3600	75.4	8:33	73.2	8:20	71.2	8:07	69.2	7:49	67.6	7:31
4000	83.4	9:32	81.0	9:18	78.7	9:03	76.6	8:43	74.8	8:22
4400	91.1	10:32	88.5	10:16	86.0	10:00	83.7	9:38	81.7	9:15
4800	98.9	11:32	96.0	11:15	93.3	10:57	90.8	10:33	88.7	10:09
5200	106.5	12:32	103.4	12:14	100.5	11:54	97.8	11:29	95.5	11:02
5600	114.0	13:34	110.6	13:14	107.6	12:53	104.7	12:25	102.2	11:56
6000	121.5	14:35	117.9	14:13	114.6	13:51	111.6	13:21	108.9	12:51
6400	128.7	15:38	124.9	15:15	121.4	14:50	118.2	14:19	115.4	13:46
6800	135.9	16:41	131.9	16:16	128.2	15:50	124.8	15:17	121.8	14:42
7200	143.0	17:46	138.8	17:17	134.9	16:50	131.4	16:15	128.2	15:38
7600	150.0	18:51	145.6	18:20	141.4	17:51	137.7	17:14	134.5	16:34
8000	157.0	19:56	152.3	19:23	148.0	18:52	144.1	18:13	140.7	17:31

2.7.c. Fuel Required Adjustment (1000lbs)

Reference Fuel required	Weight at Checkpoint (lbs)							
	220	260	300	340	380	420	460	500
10	-1.9	-1.4	-1.0	-0.5	0.0	0.7	1.7	4.3
20	-4.4	-3.3	-2.2	-1.1	0.0	1.5	3.3	6.9
30	-6.9	-5.1	-3.4	-1.7	0.0	2.2	4.8	9.4
40	-9.4	-7.0	-4.7	-2.4	0.0	2.9	6.3	11.9
50	-11.9	-8.8	-5.9	-3.0	0.0	3.7	7.9	14.4
60	-14.4	-10.6	-7.1	-3.6	0.0	4.4	9.3	16.7
70	-16.8	-12.5	-8.3	-4.2	0.0	5.1	10.8	19.0
80	-19.3	-14.4	-9.5	-4.8	0.0	5.8	12.2	21.2
90	-21.8	-16.2	-10.8	-5.4	0.0	6.5	13.6	23.4
100	-24.2	-18.1	-12.0	-6.0	0.0	7.2	15.0	25.4
110	-26.7	-19.9	-13.2	-6.7	0.0	7.8	16.4	27.4
120	-29.1	-21.8	-14.5	-7.3	0.0	8.5	17.7	29.4
130	-31.6	-23.7	-15.7	-7.9	0.0	9.2	19.0	31.3
140	-34.0	-25.6	-17.0	-8.5	0.0	9.8	20.3	33.1
150	-36.4	-27.4	-18.2	-9.1	0.0	10.5	21.6	34.8
160	-38.9	-29.3	-19.5	-9.7	0.0	11.1	22.8	36.5

2.7.d. Long Range Cruise Wind-Altitude Trade

Pressure Altitude (1000 ft)	Cruise Weight (1000 lbs)							
	500	460	320	380	340	300	260	220
43			69	17	0	0	31	60
31		65	19	1	4	4	48	75
39	56	17	1	3	17	17	64	87
37	13	1	2	15	34	34	78	96
35	0	3	14	31	52	52	89	101
33	4	15	30	49	67	67	97	104
31	16	31	47	64	80	80	102	105
29	32	47	63	78	90	90	105	
27	48	63	76	88	98	98	105	
25	63	76	87	96	102	102		

2.8 Long Range Cruise Control

Weight (1000 lbs)		Pressure Altitude (1000 ft)									
		25	27	29	31	33	35	37	39	41	43
500	TPR	55.7	58.8	62.4	66.0	69.5	73.9	80.8			
	MACH	0.75	0.78	0.81	0.85	0.86	0.85	0.84			
	KIAS	316	314	314	318	306	291	275			
	FF/ENG	6552	6527	6577	6663	6464	6275	6271			
460	TPR	52.9	55.7	58.9	62.6	66.1	69.8	74.8	82.8		
	MACH	0.73	0.75	0.78	0.81	0.85	0.85	0.85	0.84		
	KIAS	306	304	301	303	305	293	277	262		
	FF/ENG	6052	6020	5997	6053	6101	5917	5788	5869		
420	TPR	50.0	52.7	55.6	58.8	62.6	66.1	70.2	75.8	86.1	
	MACH	0.71	0.73	0.75	0.78	0.81	0.85	0.85	0.85	0.84	
	KIAS	296	293	291	389	290	292	279	265	250	
	FF/ENG	5566	5521	5491	5467	5520	5556	5423	5346	5579	
380	TPR	47.1	49.6	52.3	55.2	58.4	62.2	66.1	70.7	77.3	
	MACH	0.69	0.71	0.73	0.75	0.78	0.81	0.85	0.85	0.85	
	KIAS	286	282	280	277	275	276	279	267	253	
	FF/ENG	5108	5038	4995	4965	4940	4979	5051	4977	4978	
340	TPR	44.2	46.4	48.9	51.5	54.5	57.7	61.5	65.9	71.1	77.9
	MACH	0.66	0.68	0.7	0.72	0.75	0.77	0.8	0.85	0.85	0.85
	KIAS	274	272	269	266	263	261	261	265	255	242
	FF/ENG	4648	4587	4516	4473	4443	4418	4450	4573	4570	4582
300	TPR	40.9	43.1	45.4	47.8	50.4	53.3	56.7	60.7	65.2	70.8
	MACH	0.62	0.65	0.67	0.69	0.71	0.74	0.76	0.79	0.84	0.85
	KIAS	258	259	257	254	251	249	247	245	248	244
	FF/ENG	4127	4117	4066	4003	3955	3925	3927	3955	4066	4149
260	TPR	37.2	39.4	41.6	44.0	46.3	48.9	51.9	55.5	59.3	63.7
	MACH	0.58	0.61	0.63	0.66	0.68	0.7	0.73	0.75	0.78	0.81
	KIAS	239	240	241	241	239	236	233	231	229	230
	FF/ENG	3601	3584	3577	3552	3502	3446	3433	3452	3469	3535
220	TPR	33.4	35.3	37.3	39.6	41.9	44.3	47.0	50.1	53.6	57.3
	MACH	0.54	0.56	0.58	0.61	0.64	0.66	0.69	0.71	0.73	0.76
	KIAS	220	221	221	221	222	222	219	217	214	213
	FF/ENG	3102	3068	3049	3034	3029	3000	2970	2964	2976	2994

2.9 Top of Descend

Pressure Altitude(1000 ft)	25	27	29	31	33	35	37	39	41	43
Distance (nm)	90	97	104	111	117	123	128	135	141	148
Time (Minutes)	19	20	21	22	23	23	24	25	26	27

The above table is based on a Mach 0.85 / 310 kt / 250 kt descend speed profile.