

	<u>Subsonic</u>	<u>Supersonic</u>
Approach	- 4.0 minutes	3.5 minutes
Taxi-In, Idle	- 7.0 minutes	7.0 minutes
Idle, Taxi-Out	- 19.0 minutes	19.0 minutes
Takeoff	- 0.7 minutes	1.2 minutes
Climb-Out	- <u>2.2 minutes</u>	<u>2.0 minutes</u>
	32.9 minutes	32.7 minutes

Emissions per landing/takeoff cycle in pounds:

	<u>CO</u>	<u>THC</u>	<u>NO</u> <u>x</u>	<u>Part.</u>
Concorde	790	196	102	2.4
<u>B-707</u>	<u>202</u>	174	30	4.8
B-747	187	49	126	5.2
DC-8	303	174	30	4.8
DC-10	72	21	95	0.4

As noted, the above data are based on a 33 minute landing/takeoff cycle, 26 minutes of which is taxi/idle time. In order to present more realistic data, the FAA has reviewed the actual taxi/idle time required for aircraft at both JFK and IAD. The takeoff, climb-out and approach times have not been changed. At JFK the observed idle taxi-out time is 10 minutes and the taxi-in time is 10 minutes. At IAD the observed idle taxi-out time is five minutes and the taxi-in idle time is four minutes. Tables I and II present a comparison of the Concorde's emissions with the emissions of intercontinental subsonic aircraft at both JFK and IAD. These tables not only depict the total pollutants per landing/takeoff cycle but also break down the pollutants in relation to passenger load factor.

**POUNDS OF POLLUTANTS  
PER LANDING AND TAKE-OFF CYCLE**

AIRCRAFT	ENGINE	PASSENGER CAPACITY	EMISSION (#/CYCLE)			
			CO	HC	NO <sub>x</sub>	PART
CONCORDE	OLYMPUS 593	110	671	160	100	2.3
B-747-200B	JT-9D	375	147	38	123	4.0
DC-10-30	CF-6	250	57	16	94	0.3
B-707-320B	JT-3D	145	159	135	29	4.4
DC-8-61	JT-3D	200	159	135	29	4.4

**POUNDS OF POLLUTANTS PER PASSENGER FOR VARIOUS LOAD FACTORS**

AIRCRAFT	50%				60%				70%				80%				90%				100%			
	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART
CONCORDE	12.2	2.9	1.8	.04	10.2	2.4	1.5	.03	8.7	2.1	1.3	.03	7.6	1.8	1.1	.03	6.8	1.6	1.0	.02	6.1	1.4	.9	.02
B-747-200B	.78	.20	.66	.02	.65	.17	.55	.02	.56	.14	.47	.02	.49	.13	.41	.01	.44	.11	.36	.01	.39	.10	.33	.01
DC-10-30	.46	.13	.75	<.01	.38	.11	.63	<.01	.33	.09	.54	<.01	.29	.08	.48	<.01	.25	.07	.42	<.01	.23	.06	.38	<.01
B-707-320B	2.2	1.9	.40	.06	1.8	1.6	.33	.05	1.6	1.3	.29	.04	1.4	1.2	.25	.04	1.2	1.0	.22	.03	1.1	.93	.20	.03
DC-8-61	1.6	1.4	.29	.04	1.3	1.1	.24	.04	1.1	1.0	.21	.03	1.0	.8	.18	.03	.9	.8	.16	.02	.8	.7	.15	.02

Emissions loading for aircraft using taxi times observed at J. F. Kennedy International Airport.  
Takeoff, climbout and approach times are those proposed by EPA.

**AIRCRAFT EMISSIONS COMPARISON AT J. F. KENNEDY INTERNATIONAL AIRPORT**

Table I

**POUNDS OF POLLUTANTS  
PER LANDING AND TAKEOFF CYCLE**

EMISSION (#/CYCLE)						
AIRCRAFT	ENGINE	PASSENGER CAPACITY	CO	HC	NO <sub>x</sub>	PART
CONCORDE	OLYMPUS 593	110	455.2	94.0	99.4	2.1
B-747-200B	JT-9D	375	72.0	17.7	118.8	2.6
DC-10-30	CF-6	250	28.1	7.5	91.7	0.2
B-707-320B	JT-3D	145	78.8	62.2	27.9	4.0
DC-8-61	JT-3D	200	78.8	62.2	27.9	4.0

**POUNDS OF POLLUTANTS PER PASSENGER FOR VARIOUS LOAD FACTORS**

AIRCRAFT	50%				60%				70%				80%				90%				100%			
	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART	CO	HC	NO <sub>x</sub>	PART
CONCORDE	8.3	1.71	1.81	.04	6.9	1.42	1.51	.03	5.9	1.22	1.29	.03	5.2	1.07	1.13	.02	4.59	.95	1.00	.02	4.14	.85	.90	.02
B-747-200B	.38	.09	.63	.01	.32	.08	.53	.01	.27	.07	.45	.01	.24	.06	.40	.01	.21	.05	.35	.01	.19	.05	.32	.01
DC-10-30	.22	.06	.73	<.01	.19	.05	.61	<.01	.16	.04	.52	<.01	.14	.04	.46	<.01	.12	.03	.41	<.01	.11	.03	.37	<.01
B-707-320B	1.08	.86	.38	.06	.91	.71	.32	.05	.78	.61	.27	.04	.68	.54	.24	.03	.60	.48	.21	.03	.54	.43	.19	.03
DC-8-61	.79	.62	.28	.04	.70	.52	.23	.03	.56	.44	.20	.03	.49	.39	.17	.03	.44	.35	.16	.02	.39	.31	.14	.02

EMISSIONS LOADING FOR AIRCRAFT USING TAXI TIMES MEASURED AT DULLES INTERNATIONAL AIRPORT.  
TAKE-OFF CLIMBOUT AND APPROACH TIMES ARE THOSE PROPOSED BY EPA.

**AIRCRAFT EMISSIONS COMPARISON AT DULLES INTERNATIONAL AIRPORT**

Table II

The emissions from the Concorde have also been compared to the supersonic aircraft engine emissions standards proposed by the Environmental Protection Agency (39 Federal Register 26653, July 27, 1974). That comparison is set out in the chart below. The data for CO, THC and NO<sub>x</sub> are presented in terms of pounds of pollutants per 1,000 pound-thrust hours/cycle which are the EPA criteria.

	CO	THC	NO <sub>x</sub>
Concorde	69.3	17.2	9.0
EPA proposals*			
A)	24.7	4.7	9.0
B)	20.6	3.0	6.9

The EPA proposed smoke requirement for an aircraft engine rated at 38,500 pounds of thrust is a smoke number of 21. The Concorde's present smoke number is 28. If the EPA proposal is adopted, any Concorde engine produced after January 1, 1979 must meet the EPA smoke requirements in order to operate in the United States.

A number of commentators raised the issue of how the Concorde's engine technology could be modified to achieve these emission reductions. EPA stated in its notice of proposed rulemaking that the technology necessary to meet these standards is in an early developmental stage. EPA projects that the technology capable of reducing emissions from supersonic power plants will be essentially the same as that developed for subsonic jet engines.

\* Final EPA values are expected to be within the range shown in A) and B).