DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

A45EU
BAe/SNIAS
CONCORDE, Type 1

January 9, 1979

TYPE CERTIFICATE DATA SHEET NO. A45EU

This data sheet, which is a part of Type Certificate No. A45EU prescribes conditions and limitations under which the aircraft for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder

BRITISH AEROSPACE, Aircraft Group,
Weybridge - Bristol Division,
Bristol, (BS 99 7 AR) England.

and

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE
37, Blvd. de Montmorency
Paris 16e, France

I - CONCORDE Type 1 (Transport Category Supersonic Airplane), approved January 9, 1979

Engines

4 - Rolls-Royce/SNECMA Olympus Mk 610-14-28 engines, incorporating Type A6A16/24AL or Type A6A16/24CA control amplifiers.

Fuel

(a) Engine fuels to the following specifications are approved for unlimited use. (For fuels approved for limited use, refer to the approved Concorde Airplane Flight Manual).

ASTM D 1655-75 Grades JET A1
French specification AIR 3405 C Issue 4
British specification D.Eng.RD 2494 Issue 7 Amdt 3 and 2453 Issue 3 Amdt 3
Canadian specification 3-GP-23h

(b) The following additive must be used in engine fuels:
SHELL ASA 3 antistatic additive, in concentration not exceeding 1.0 mg/liter (0.4 lb per 50,000 US Gallons).

(c) The following additives may be used in engine fuels:
(1) Anti-icing additive to specifications MIL-1-27686 E, D.Eng.RD.2451 Issue 2, or AIR 3652 A, at a concentration not in excess of 0.15 percent by volume.

(2) Corrosion inhibitors HITEC E 515 or TOLAD 245, in concentration not exceeding, respectively, 21 mg/liter (8.9 lb. per 50,000 US Gallons and 34 mg/liter (14.3 lb. per 50,000 US Gallons).

(3) Automate Yellow 662 or 662 F fuel dye may be added at concentrations not exceeding 120 mg/liter (50 lb. per 50,000 US Gallons). This additive should be used only when necessary to check for fuel system leakage.

(4) Fluid AL 38, a combination of anti-icing additive and corrosion inhibitor HITEC E 515.AL 38, may be added at concentrations not exceeding 0.13 percent by volume providing that the basic fuel does not contain either HITEC E 515 or anti-icing additive.

Oil

The following oils are approved for the OLYMPUS engines:

BP	ENER JET	523
ESSO	ETO	25
MOBIL	RM	193 A-3
SHELL	ASTO	555

The following oils are approved for the Integrated Drive Generator:

ESSO	ETO	25
ESSO	ENCO	2380

Engine limits

Condition	Static Thrust (Lbs) SL - ISA	N1* (Low Compressor)	N2* (High Compressor)	** EGT	Time Limit
Start and relight	-	-	-	550°C	2 sec.
***Contingency	38,130	102%	106.8%	883°C	2.5 sec.
Takeoff (with reheat)	37,080	102%	105.7%	806°C	5 min.
Takeoff (without reheat)	31,350	102%	105.7%	806°C	5 min.
Reheated climb	32,800	102%	105.1%	755°C	15 min.
Maximum continuous	28,800	102%	105.3%	736°C	Unrestricted
Idle	-	-	60% (min)		Unrestricted
Maximum overspeed		108.5%	110.0%	-	20 sec.
Reverse (ground)	-	-	98.0%	-	30 sec.
Reverse (flight)	-	(as obtained at reverse idle)		-	4 min.

*100% N_1 = 6,500 rpm; 100% N_2 = 8530 rpm.

**E.G.T. limitations vary with total temperature as presented in the approved Concorde Airplane Flight manual; the values shown herein are the highest authorized.

***Eligible only with unlimited-type fuels.

Oil Temperature:	
- Maximum for start of takeoff	: 125°C
- Maximum takeoff & transient (5 min.)	: 195°C
- Maximum for continuous operation	: 190°C
- Minimum for motoring cycle	: -40°C
- Minimum for starting	: -35°C
- Minimum for advance above idle	: -20°C

Oil Pressure:	Pre-Mod 8562	Post-Mod 8562
- Minimum for continued operation	13 psi	5 psi
- Minimum for takeoff	18 psi	10 psi

Fuel Temperature:	Kerosene Type	Wide-Cut Type
- Minimum for starting	-40°C	-40°C
- Minimum for advance above idle	20°C	-40°C
- Maximum for continuous operation	150°C	50°C
- Maximum transient (2 min.)	170°C	50°C

Fuel Pressure:		
- Minimum at engine inlet	12.5 psia	20 psia
- Maximum fuel filter differential	7 psi	7 psi

Airspeed limits (IAS)	Vmo/Mmo	(Maximum operating limit	:	(As presented in the speed and Mach number) approved Concorde AFM)
	Va	(Manoeuvring)	:	(As presented in the approved Concorde AFM)
	Vla	(Lowest authorized)	:	(As presented in the approved Concorde AFM)
	Vlo	(Landing gear operation)	:	270 kts (M 0.7)
	Vle	(Landing gear extended)	:	270 kts (M 0.7)
	V	(Nose/visor) Visor down or operating	:	325 kts (M 0.8)
		Nose 5° or operating between UP and 5°:		325 kts (M 0.8)
		Nose DOWN or operating between 5° and DOWN	:	270 kts @ altitudes below 20,000 ft.
	V	(Landing lights) Max. speed for extension, retraction or extended position.	:	270 kts
	Vmc	(Minimum control speed with the critical engine inoperative)		
		On the ground Vmcg	:	116 kts
		In flight (takeoff) Vmc	:	132 kts
		In flight (approach) Vmcl	:	150 kts
	V	(Tire limit speed)	:	(As presented in the approved Concorde AFM)
	V	(Max. for windscreen wiper operation)	:	325 kts.
	V	(Max. for fuel jettison)	:	M = 0.93
	Miscellaneous Limitations:			
	- Maximum total temperature, Tmo		:	127°C
	- Maximum positive incidence		:	16.5°
	- Maximum negative pitch attitude		:	-5.5° above M = 1.0
	- Nose position for takeoff		:	-5°

C.G. range (Landing gear extended)

	FORWARD			AFT		
Weight	Landing	En route	Takeoff	Landing	En route	Takeoff
Above 96,000 kg (211,640 lb)	52.5%	See Approved Airplane Flight Manual.	All weights 52.5%	All weights 52.5%	See Approved Airplane Flight Manual	All tanks full except tank 11 54%
96,000 kg (211,640 lb) to 88,000 kg (194,010 lb)	Linear variation between 52.5% and 52%					
Below 88,000 kg (194,010 lb)	52%					Other conditions 53.5%

Landing gear retraction moment is -1470 m.kg (-10,635 ft.lb).
(Gear retraction moves C.G. forward approximately 0.03% C_O.)

Datum — The datum for center-of-gravity computations is a vertical reference plane located 8.333 feet (2.540 m) forward of Fuselage Station XA.0. A reference rigging point "C" is provided on the airframe 83.172 feet (25.351 m) aft of the datum at 13.66% C_O.

M.A.C. — The "reference root chord" (C_O) is 90.748 feet (27.660 m) in length; its leading edge is located 70.771 feet (21.570 m) aft of the datum.

Leveling means — Clinometer on the cabin rails.

Maximum weights (See NOTE 4)

- Taxi weight	186,880 kg	412,000 lb
- Takeoff weight	185,070 kg	408,000 lb
- Landing weight	111,130 kg	245,000 lb
- Zero fuel weight	92,080 kg	203,000 lb

Minimum crew — For all flights: Pilot, copilot and third crew member capable of performing the duties of a flight engineer (systems operator).

Maximum passengers — 128 - based on compliance with FAA emergency evacuation demonstration requirements (FAR 25.803(c)) - See approved interior arrangement drawing for maximum passenger capacity approved for each airplane as delivered.

Maximum baggage

	Total	Running Load Limit	Floor Strength Limit
Under floor hold Forward of door	995 kg (2,194 lb)	320 kg/m (210 lb/ft)	488 kg/m^2 (100 lb/ft^2)
Aft of door	585 kg (1,290 lb)		
Rear hold Lashed freight or Unlashed freight	2,767 kg (6,100 lb) 2,268 kg (5,000 lb)	670 kg/m (450 lb/ft)	488 kg/m^2 (100 lb/ft^2)

Fuel capacity

Fuel tank capacity (lb) - (At density of 6.68 lb/US Gallon).

Tank No.	Usable Weight	Total Weight	Arm (% MAC)
1	9,348	9,361	39.80
2	10,176	10,207	76.10
3	10,176	10,207	76.10
4	9,348	9,361	39.80
5	16,032	16,072	49.40
5A	4,956	4,963	74.80
6	25,803	25,889	66.70
7	16,490	16,525	64.70
7A	4,956	4,963	74.80
8	28,590	28,645	46.70
9	24,710	24,747	16.90
10	26,597	26,618	30.50
11	23,192	23,218	113.90
Systems	827	1,021	69.43
TOTAL	211,200	211,797	56.23

Oil capacity

Each engine:
- 26 US quarts total
- 11 US quarts usable
- 6.5 US quarts minimum for starting

Maximum operating altitude

60,000 ft.

Control surface movements

(As specified in SNIAS Document No. 459.000/75).

Serial Numbers eligible

S/N 1 through S/N 16.

A French "Certificat de Navigabilite pour Exportation", or a British "Certificate of Airworthiness for Export", endorsed as noted under "Import Requirements", must be submitted for each individual aircraft for which application for US certification is made.

The type design approved under this Type Certificate is defined in Concorde Document No. 408.106/78, Issue 2, including Revision 1 and later revisions. Additional modifications generated by Air France or by British Airways, and approved by DGAC or CAA, as appropriate, are defined in the following:

(1) Air France Document No. AF-01-TSS, "Index of Air France - originated modifications approved in compliance with FAA and DGAC regulations".

(2) Civil Aviation Authority letter 9/30/CON 10FH, dated December 15, 1978.

Import requirements

An FAA Standard Airworthiness Certificate may be issued on the basis of a French "Certificat de Navigabilite pour Exportation" signed by a representative of the Direction Generale de l'Aviation Civile (DGAC), of France, or a British "Certificate of Airworthiness for Export" signed by a representative of the Civil Aviation Authority (CAA) of the United Kingdom, containing the following or equivalent statement: "The airplane covered by this certificate has been examined, tested and found to conform to the type design approved under Type Certificate No. A45EU and to be in condition for safe operation".

Certification basis

FAR 21.29(a)(1)(ii) based upon:

The Anglo/French Supersonic Transport TSS Standards, as defined in Contents List No. 29, dated March 26, 1976.

Portions of FAR 25 effective February 1, 1965, including Amendment Nos. 25-1 through 25-17, plus Amendment No. 25-18 with respect to new FAR 25.1001(i), and Amendment Nos. 25-22 and 25-24 with respect to new FAR 25.1303(b)(4), as determined to be applicable through code comparison of FAR 25 and TSS Standards.

Portions of US Special Conditions for Concorde, No. 25-43-EU-12, dated June 21, 1972, including Amendment Nos. 1 through 5, determined to be applicable through code comparison of those Special Conditions and TSS Standards.

FAR Part 36, dated December 1, 1969, including Amendment Nos. 1 through 10.

Equivalent safety shown in lieu of direct compliance with respect to those requirements listed in Attachment "F" of FAA Concorde Validation Program No. A45EU.

The aircraft is approved with respect to optional certification requirements relating to ditching, ditching equipment and ice protection, corresponding to FAR 25.801, 25.1415 and 25.1419, respectively.

Date of Application : July 15, 1965.
Type Certificate No. A45EU, issued January 9, 1979.

Equipment

The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for airworthiness certification. Concorde Equipment List SB/8/00/0020 identifies all required equipment and all optional equipment approved by the Direction Generale de l'Aviation Civile (DGAC) of France and by the Civil Aviation Authority (CAA) of the United Kingdom.

In addition, the following apply:

(1) CAA/DGAC-Approved Airplane Flight Manual, Document No. CSD/FM/FAA No. 1, approved December 5, 1978, is applicable for all serial numbers.

(2) Rain repellant installation is required in accordance with Concorde Dwg E81/-5221.

(3) Main and nose-wheel tires are required in accordance with Concorde Specification No. 459579/77.

Service information

A. General

All Concorde Service Bulletins are approved by the French DGAC and the United Kingdom CAA and carry a statement to that effect. This statement may be interpreted as "FAA-approved". All Service Bulletins that are declared Mandatory by the CAA or are the subject of a French "Consigne de Navigabilite" carry a statement to that effect. Other available service documents for the Concorde include:

(1) Structural Repair Manual
(2) Illustrated Parts Catalog
(3) Wiring Diagram Manual
(4) Maintenance Manual

B. Special Maintenance Requirements

All Concorde aircraft must be maintained in accordance with a program which includes the maintenance tasks presented in the current issues of the following:

(1) Concorde Document SST/B83/7013 "Special Maintenance Tasks Required for FAA Certification"

(2) Concorde Service Bulletin No. 27.040 "SERVO-CONTROL INSPECTION FOR DETECTION OF CRACKS ON VARIOUS CRITICAL COMPONENTS"

(3) Concorde Service Bulletin No. 27.041 "INSPECTION FOR HYDRAULIC FLUID TRANSFER DUE TO CRACKS AT SERVO-CONTROLS

and

(4) Concorde Service Bulletin No. 53.045 "INSPECTION OF UPPER FUSELAGE (ROOF) BETWEEN FR 41 AND FR 72"

Service information

C. Special Modification Requirements

The special maintenance requirements of Subsection B above result from certification safety analyses and are necessary for compliance with the airworthiness objectives of the Concorde certification basis. Any modification to a system or component that is the subject of such maintenance requirements must be evaluated with respect to reliability in a manner consistent with the Concorde's certification safety analyses, and the airplane's maintenance program must be amended as necessary to ensure the declared level of reliability in service for the modified system or component.

NOTES

NOTE 1. (a) Current weight and balance report, including list of equipment included in certificated empty weight, and loading instructions, must be in each aircraft at the time of original certification and at all times thereafter except in the case of operators having an approved weight control system. SNIAS/BAC Report "Weight and Balance Manual" contains loading information for each airplane and interior arrangement configuration as delivered. This report contains, or refers to, information relative to location of all passengers and crew member seats, location and capacity of all cargo and baggage compartments, buffets, storage spaces and coat rooms, location and capacity of lounges and lavatories.

(b) The airplane must be loaded so that the C.G. is within the specified limits at all times, considering fuel loading, usage and management, gear retraction, and movement of crew and passengers from their assigned positions.

(c) The weights of unusable fuel, systems oil and hydraulic fluid must be included in the airplane operating weight empty, and are as listed below.

(i) The unusable fuel is the difference between the total fuel and the usable fuel. It corresponds to that amount of fuel in the tanks and in the system determined to be unavailable to the engine in accordance with FAR 25.959.

- system unusable fuel : 88 kg (194 lb); arm 61.17% C_o.

- tanks unusable fuel : 183 kg (403 lb); arm 59.23% C_o.

(In the level attitude, 660 kg (1455 lb) of fuel at 65.19% C_o are undrainable).

(ii) The system oil is the total amount of oil in the engine and constant speed drive units, lines and tanks:

- engine oil : 100 kg (220 lb); arm 76.43% C_o.

- constant speed drive oil : 36 kg (79 lb); arm 78.92% C_o.

(iii) The hydraulic fluid is the total amount of fluid in the reservoirs, lines and equipment:

- hydraulic fluid : 316 kg (697 lb); arm 64.69% C_o.

NOTE 2. Placards
Required placards are illustrated in Concorde Doc. No. B10/DWR/2490, and must be installed in the designated locations.

NOTE 3. Life Limitations
Concorde airplane components and equipment which are life limited are the subjects of Concorde Service Bulletins in the 900-series, identified under the appropriate ATA chapter affected. Such components and equipment must be replaced prior to expiration of the service life limit specific therein.

NOTE 4. Noise-limited Takeoff Weight
For compliance with US environmental regulations, takeoff operations from US airports are limited to gross weights not greater than 181,440 kg (400,000 lb.)

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