

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E3EU-Rev 7 ROLLS ROYCE BRISTOL Viper MKS 521, 522, 526

March 23, 2007

TYPE CERTIFICATE DATA SHEET NO. E3EU

Engines of models described herein conforming with this data sheet (which is a part of Type Certificate No. E3EU), and other approved data on file with the Federal Aviation Agency, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Civil Air Regulations provided they are installed, operated and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

Type Certificate Holder	Rolls-Royce Limited, Bristol Engines Division P.O. Box 3, Filton, Bristol, England			
Model	Viper	<u>Mk. 521</u>	<u>Mk. 522</u>	<u>Mk. 526</u>
Type	Turbojet	8 stage axial compressor, annular combustion chamber incorporating a vaporising combustion system, single stage turbine.	--	--
Rating (static thrust at sea level, lb.)				
Takeoff		3100 (unlim.)	3330 (5 min.)	--
Maximum continuous (See Note 5)		3100	3100	--
Fuel Controls				
Barometric flow control		Bristol Siddeley, VU.22141	Bristol Siddeley, B.F.C.203	Bristol Siddeley V 279B3
Air-fuel ratio control		Lucas Type AFC.103	Lucas Type AFC.118	Lucas Type AFC.118
Fuel pump		Lucas MGBB 134	Lucas MGBB 137	Lucas MGBB 137
Fuel		See Note 8		
Oil		Castrol 98, Castrol 98UK, (See Note 9) Esso TJ15 (also ENCO TJ15) Esso Extra 274 (also ENCO Extra 274), Mobil Jet II Aeroshell Turbo oil 390	--	--
Principal Dimensions, ins.				
Length, (including nose bullet)		92.97	--	105.55
Height		32.15	--	--
Width		28.7	--	--
Weight (dry) lb.				
Basic Engine, D.I.S. Part A Section 1		758	773	772
Items supplied by B.S.E.L. and incorporated as installation items, D.I.S. Part B Section 1		33	--	58

Page No.	1	2	3	4
Rev No.	7	7	6	7

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LEGEND: "-" INDICATES "SAME AS PRECEDING MODEL" "-" INDICATES "DOES NOT APPLY" NOTICE: SIGNIFICANT CHANGES ARE BLACK-LINED IN THE LEFT MARGIN

	<u>Mk. 521</u>	<u>Mk. 522</u>	<u>Mk. 526</u>
Center of gravity, in.			
Forward of mounting trussion center line	2.4	2.6	2.3
Below mounting trunnion center line	0.75	--	1.0
Ignition (High Energy System)	Two igniters Smiths/Lodge Type 804	Smiths/Lodge LB.108	--
NOTES	1 through 9	--	--

"- -" indicates "same as preceding model"

"__" indicates "does not apply"

Certification basis CAR 10 and British Civil Airworthiness Requirements Section C Issue 5, dated July 1, 1962 (BCAR Section C is equivalent to U.S.CAR Part 13 effective June 15, 1956 as amended by 13-1 through 13-5).
Type Certificate (Import) No. E3EU issued September 24, 1964, for Viper Mk. 520 and 521, amended February 1, 1966 to include Mk. 522 and delete Mk. 520, amended November 15, 1966 to include Mk. 525, amended January 8, 1968, to include Mk. .526 and delete Mk. 525
Date of Application for Type Certificate: February 5, 1962.

The United Kingdom Civil Aviation Authority originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E3EU. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of UK.

Import Requirements To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with Civil Aviation Authority of United Kingdom or EASA airworthiness approval shall have a Joint Aviation Authorities (JAA) or EASA Form 1, Authorized Release Certificate. The JAA or EASA Form 1 should state that the engine conforms to the type design approved under the U.S. Type Certificate E3EU, is in a condition for safe operation and has undergone a final operational check.

NOTE 1. Maximum permissible engine operating rotor speeds are as follows:

	<u>Mk. 521</u>	<u>Mk. 522</u>	<u>Mk. 526</u>
Takeoff, r.p.m.	13,760 (100%)	-- (5 min.)	--
Maximum continuous, r.p.m.	13,760 (100%)	13,550 (98.5)	--
Momentary Overspeed, r.p.m. (20 second limit)	14,170 (100%)	--	--

NOTE 2. Maximum permissible temperatures are as follows:

Jet pipe temperatures			
Takeoff	695°C	740°C (5 min.)	--
Maximum continuous	695°C	715°C	--
Ground idling	610°C	630°C	645°C
Starting	800°C	--	--
Oil inlet	125°C	--	--

NOTE 3. Fuel and oil pressure limits:

Fuel pressure: Minimum filter inlet pressure for continuous operation is as specified on B.S.E.L. curve Ref. FSD.246 (Mk. 521), FSD.374 (Mk. 522), and FSD.1457 (Mk. 526)

Oil pressure: (At 95% R.P.M.)
Normal 7-38 P.S.I.
Minimum to Complete Flight 5 P.S.I.

NOTE 4: Maximum permissible air bleed extraction

Range of R.P.M. at which air bleed may be used 40% - 100%
Maximum air delivery for aircraft services and engine de-icing (% of no bleed mass (low) 7-1/2%

NOTE 5: The ratings are based on static test stand operation under the following conditions:

International Standard Atmospheric Conditions at sea level.
All optional air bleeds closed.
Aircraft Service Accessory drives unloaded.
Test bed venturi intake to B.S.E.L. Drg. BL.51795/RM.56950.
Exhaust Cone with integral propelling nozzle together with trimmers as defined in D.I.S. (Mk. 521 and Mk. 522) Exhaust Cone with 10° horizontally angled propelling nozzle together with trimmers as defined in D.I.S. (Mk. 526).
Jet Pipe Temperature measured by 5 thermocouples as defined in D.I.S.
Thrust measured with engine angled on test bed to BSEL Drawing No. RM81236.

NOTE 6: This engine meets FAA requirements for operating in icing conditions, for adequate disc integrity and rotor blade containment and does not require airframe mounted armoring.

NOTE 7: The following accessory drive provisions are incorporated:

Mark 521 and 522

Drive	Rotation*	Speed Ratio to Turbine Shaft	Torque (in. lb.)		Overhang (in. lb.)
			Continuous	Static	
Starter Generator	C	.573	230+	1560	276
A.C. Generator	C	.727	32	580	77
Hydraulic pump	AC	.232	177	790	23
Alternator (tachometer)	C	.305	15	400	9

Mark 526

Starter	C	.572	230+	1560	276
AC Generator	C	.528	425	2700	284
Generator (Tachometer)	C	.305	(Drive Shear 35/45)3		
Hydr. Pump (Mk.526 only)	AC	.572	46	69	6

*Clockwise or anti-clockwise looking on the drive face of the accessory.

+The maximum torque when the machine is operating as a starter is 820 in. lb.

NOTE 8: The following fuels are eligible for these engines.

Aviation Kerosine Specifications (All Marks)
British D. Eng. RD. 2482 or 2494
Canadian 3-GP-23e Kerosine Type
American A.S.T.M. D1655/64T Jet A or A-1
Aviation Wide-cut Specifications (All Marks)
British D. Eng. R.D. 2486
Canadian 3-GP-22e Wide-Cut type
American A.S.T.M. D1655/64T Jet B

Aviation Gasoline Specifications: (All Marks except 526)

British D. Eng. R.D. 2485

Canadian 3-GP-25d

American Mil-G-5572C, all Grades

Max. lead content: 5.5 mls TEL/IMP Gal.

Minimum Pressure at engine inlet: See BSEL Report PFG/EJM 46319

Maximum Fuel Temperature °C 30

Maximum accumulated usage of gasoline per engine in any one engine overhaul period: 9,600 U.S. Gals.

NOTE 9: Approval is given for the use of Castrol 98 oil manufactured by either Castrol Ltd. of the U.K. or by Royal Lubricants Inc. of the U.S.A.

NOTE 10. Viper models have following characteristics and applications:

- | | |
|----------|--|
| Mark 520 | Basic model for Hawker-Siddeley DH-125. Approved September 24, 1964; withdrawn February 1, 1966 owing to non-applicability for U.S. type certificated aircraft. |
| Mark 521 | Variant for DH-125 Series 1A, T.C. No. A3EU, Equal takeoff and Maximum Continuous thrust ratings. Approved September 24, 1964. |
| Mark 522 | Variant for DH-125 Series 1A/522, T.C. No. A3EU. Increased Takeoff (5 min.) rating, incorporates thrust limiter for low temperature operation. Approved February 1, 1966. |
| Mark 525 | Variant for Piaggio PD-808, T.C. No. A12EU. Equal takeoff and maximum continuous thrust ratings. Approved November 15, 1966, withdrawn January 8, 1968, owing to non-applicability for U.S. registered aircraft. |
| Mark 526 | Variant for Piaggio PD-808/526, T.C. No. A12EU. Similar to Mk. 522 except thrust limiter system deleted. Approved January 8, 1968. |

NOTE 11. SERVICE INFORMATION:

Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or, for approvals made before September 28, 2003 by CAA (UK). Any such documents including those approved under a delegated authority, are accepted by the FAA and are considered FAA approved.

- Service bulletins,
- Structural repair manuals,
- Vendor manuals,
- Aircraft flight manuals, and
- Overhaul and maintenance manuals.
- Technical Variances

These approvals pertain to the type design only.

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