UK CIVIL AVIATION AUTHORITY
ENGINE TYPE CERTIFICATE DATA SHEET NO. 3013

Issue 7
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CIVIL TYPE APPROVAL OF GNOME H1200 Mk 660

1 CONSTRUCTOR: ROLLS-ROYCE plc
Bristol

2 The above-mentioned engine is approved for use in civil helicopters classified in the Transport Category (Passenger) subject to compliance with the appropriate installation requirements of British Civil Airworthiness Requirements. The type engine data covered by this approval are set out in the following paragraphs.

The engine build standard is defined by H1200 Mk 660 DIS No. 1 Issue 1 or subsequent approved issues.

Certification basis: BCAR Section C Issue 5 dated 1st July, 1962.
Type Certificate No. 022.

3 ENGINE PARTICULARS

3.1	Description	Turbo-shaft with free power turbine
3.2	Compressor	Type: 10 stage axial flow with variable inlet guide vanes and Stage 1, 2 and 3 stators. Pressure ratio: (sea-level ISA conditions) Nominal 8.12 : 1 at 26 300 rpm. Air flow: (sea-level ISA conditions) Nominal 12.55 lb/sec at 26 300 rpm.
3.3	Combustion Chamber	Annular
3.4	Turbine	Two stage axial flow driving compressor and a single stage power turbine.
3.5	Accessories	No provision is made for aircraft accessory drives.

3.6 Weight

Basic engine	314 lb
Installation features	60 lb
Computor, HE ignition box, power demand anticipator and suppressor box (aircraft mounted)	24 lb
Engine Dry Weight	398 lb ± 1¼%

Note: For weight details see BSE Weight Specification WS 214

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4 ENGINE PERFORMANCE

Static sea-level ratings under the following conditions:-

(a) International Standard Atmospheric conditions at sea-level.
(b) All optional air bleeds closed.
(c) Aircraft service accessory drives unloaded.
(d) Air intake Part No. WD 350-7 or approved alternative.
(e) Exhaust unit Part No. HP 562 (item 2).
(f) Power turbine entry temperature measured by 8 thermocouples located at entry to power turbine nozzle.

4.1 Maximum Contingency Power

4.1.1	Power turbine shp (Minimum)	1350
4.1.2	Maximum compressor rpm	26 750
4.1.3	Maximum power turbine rpm	19 500
4.1.4	Maximum power tubine entry temperature °C	710
4.1.5	Fuel Consumption lb/shp/hr not greater than	0.62

4.2 Intermediate Contingency Power

4.2.1	Power turbine shp (Minimum)	1250
4.2.2	Maximum compressor rpm	26 300
4.2.3	Maximum power turbine rpm	19 500
4.2.4	Maximum power turbine entry temperature °C	685
4.2.5	Fuel consumption lb/shp/hr not greater than	0.62

4.3 Maximum Take-off and Maximum Continuous Power

4.3.1	Power turbine shp (Minimum)	800
4.3.2	Maximum compressor rpm	24 300
4.3.3	Maximum power turbine rpm	19 500
4.3.4	Maximum power turbine entry temperature °C	580
4.3.5	Fuel consumption lb/shp/hr not greater than	0.70
4.3.6	Oil consumption pt/hr not greater than	0.5
4.3.7	Oil circulation rate, gal/hr integral oil tank	Not applicable
4.3.8	Oil pressure (minimum for acceptance at 115/120°C oil inlet temperature) 1bf/in^2	35

5 OPERATING LIMITATIONS

The following operating limitations are applicable only when the installed engine instrument accuracies are in accordance with Bristol Siddeley Statement DS No. 118 Issue 2 dated 23rd December, 1965.

5.1 Compressor RPM

5.1.1	Maximum contingency (2\ min limit)	26 750
5.1.2	Intermediate contingency	26 300
5.1.3	Maximum for take-off (5 min limit)	26 300
5.1.4	Maximum continuous	25 300
5.1.5	Minimum for approach	17 500
5.1.6	Ground idling	14 500 ± 1000
5.1.7	Maximum overspeed (20 sec limit)	27 500

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5.2 Power Turbine RPM

		Minimum	Maximum
5.2.1	With maximum contingency power	17 300	19 500
5.2.2	With intermediate contingency power	17 300	19 500
5.2.3	With maximum take-off power	17 300	19 500
5.2.4	With maximum continuous power	17 300	19 500
5.2.5	Maximum for auto-rotation	-	21 000
5.2.6	Maximum overspeed (20 sec limit)	-	22 000

5.3 Power Turbine Entry Temperature °C (Mean of 8 thermocouples located at entry to power turbine nozzle.)

5.3.1	Momentary maximum during starts	670
5.3.2	Maximum contingency	710
5.3.3	Intermediate contingency	685
5.3.4	Maximum for take-off	685
5.3.5	Maximum continuous	635
5.3.6	Maximum idling	520

5.4 Output Shaft Torque, lbf ft (per engine; as mentioned at Coupling Gearbox output shaft)

5.4.1	Maximum contingency (2½ min limit)	2 700
5.4.2	Intermediate contingency	2 500
5.4.3	Maximum overtorque (20 sec limit)	2 900

5.5 Fuel

5.5.1 Fuels shall conform to the specification as listed, or to subsequent revisions thereof.

(a) Aviation Kerosene

British D Eng RD 2453 or 2494
Canadian 3-GP-23f Kerosene type
American ASTM D 1655/65T Jet A or A-1

(b) Aviation Wide-cut

British D Eng RD 2454 or 2486
Canadian 3-GP-22f wide-cut type
American ASTM D 1655/65T Jet B

NOTE: The only optional additives that may be used in approved fuels are:-

Function	Specification (latest issue) or Brand	Concentration range maximum % by volume
Anti-icing	Phillips PFS 55 MB	0.15
Anti-icing	D Eng RD 2451	0.15
Anti-icing	MIL-I-27686C per 35,000 Imp gal	0.15
Corrosion inhibitor	Hitec E515	up to 5 lb max

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Corrosion inhibitor	Dupont DCI-4A	up to 8 lb max
Corrosion inhibitor	Apollo PRI-19	up to 8 lb max
Corrosion inhibitor	Tolad 245	up to 12 lb max
Corrosion inhibitor	up to 12 lb max	
Anti-static	Shell ASA-3	up to 0.35 lb max

5.5.2 Pressure (1bf/in^2 gauge)minimum at engine inlet: Refer to BSE report No. 100 Issue 3.

5.5.3 Temperature °C
Maximum at engine inlet 50

5.5.4 Minimum drainage period (from closing HP cock after a false start) (minutes) 2

5.6 Oil 5.6.1

Approved Types:

Aeroshell Turbine Oil 750
Castrol 98 Gas Turbine Oil
Castrol 98 UK Gas Turbine Oil
Esso Aviation Turbo Oil 35 and Exxon equivalents
Esso Turbo Oil 35 and Exxon equivalents
Esso Turbo Oil TJ 15 and Exxon equivalents
Esso Extra Turbo Oil 274 and Exxon equivalents
Esso Turbo Oil 2389 and Exxon equivalents
(if Mod. GNE 2156 is embodied)

(Oils reclaimed from the above approved types to RR (AED) endorsed procedures and Rolls-Royce specifications WPS/171 and WPS/293.)

5.6.2 Inlet temperature °C (measured in oil tank)

5.6.2.1 Minimum for starting -30
5.6.2.2 Minimum for opening up -30
5.6.2.3 Maximum with Esso Extra Turbo Oil 274 or Aeroshell Turbine Oil 750 120
Maximum with other approved oils 115

5.6.3 Pressure 1bf/in^2

5.6.3.1 Engine (measured at oil pump relief valve)
Normal 35-60
Minimum to complete flight (at 110°C oil temperature) 30
Minimum for auto-rotation and ground idling 15

5.6.4 Oil tank capacity (pt)

5.6.4.1 Maximum 16
5.6.4.2 Usable 4

5.7 Compressor Air Bleeds

5.7.1 Range of rpm at which bleed may be used: Unrestricted subject to limiting power turbine entry temperature not being exceeded.

5.7.2 Maximum air delivery for aircraft services: 6.3% of no-bleed mass flow.

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6 SPECIAL FEATURES

The Gnome H1200 Mk 660 engines are produced for installation in the Westland Wessex 60 helicopter. They are coupled together in the helicopter by a Rolls-Royce coupling gearbox type 100.

7 ACCESSORIES

The following engine accessories are included in the engine approval:

Integrated Fuel system	Lucas	IFS.110
Throttle actuator	H.S. Dynamics	PQ.2185
Computer	H.S. Dynamics	PQ.2150
Thermister Assembly	H.S. Dynamics	4PP.79882A
IGV Actuator	H.S. Dynamics	PH.2023
Centrifugal Fuel Filter	Lucas	DNF.107
Overspeed Trip Governor	Smiths	0103/KSM.1
Starter	Rotax	C.13504
H.E. Ignition Box	AEI	C.44TS/1
Igniter Plug	Smiths (Lodge)	1084/1
Fuel cooled oil cooler	Serck	90270
Anti-icing valve	Dunlop	ACM.24612
Tacho. Generator (Dual)	H.S. Dynamics	PB.16206A
Shut-off cock actuator	Rotax	C.5062
Anticipator	H.S. Dynamics	PQ.2184
Suppressor	H.S. Dynamics	PQ.2169
Oil pressure transmitter	Sangamo Weston	S.122-1-114
Oil pressure warning switch	Dunlop	ACM.21564
Oil temperature transmitter	Sangam	1447 PG/CP/1/3

8 MANUALS

Operating Instructions	Contained in Maintenance Manual.
Maintenance	Gnome Mk 660 and Gearbox type 100.
Overhaul	Gnome Wessex Overhaul Manual.
Performance Brouchure	TC 609
Parts Catalogue	Mk 660 and Gearbox type 100.

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