

Anti-icing additive must be used in accordance with the SGAC-approved SNIAS SA 330F (TURMO IVA) or SA 330G (TURMO IVC) Rotorcraft Flight Manuals (ref. Type Certificate No. H4EU.)

The following fuel additives are approved for use:

- Phillips PFA 55 MB, MIL-I-27686 (as revised), or French Air 3652 (as revised) anti-icing additive in quantity up to 0.15 percent in volume (with or without glycerin).
- Shell ASA-3 antistatic additive in quantity up to 0.0001 percent in volume.

Oils	ENGINE OIL	SPECIFICATION (Latest Amendment)				REMARKS
		FRENCH	NATO	U.S.A.	U.K.	
Synthetic	AIR 3513	0.148	MIL-L-7808		3 cst (98,9°F)	
	AIR 3514	0.150				
		0.156	MIL-L-23699		5 cst (98,9°F)	
		0.149		D.ENG.RD 2487	7.5 cst (98,9°C)	
	AIR 3517	0.159				
MINERAL	AIR 3515	0.134 and 0.135	AERO-SHELL <u>Turbine oil 3</u> ESSO Aviation <u>Utility oil F</u> CALTEX JET Engine Oil Medium heavy	D.ENG.RD 2490		

CAUTION: The mixing of mineral and synthetic oils is not recommended.
The system should be flushed when changing from one type to the other.

PRINCIPAL DIMENSIONS

Length: 85.98 in.
Width: 25.08 in.
Height 28.31 in.

WEIGHT

Dry completely equipped, including exhaust pipe : 499.4 lb.
Tolerance on weight = 0 to +11 lb.

CENTER OF GRAVITY

Forward of rear engine mount plane: 35.3 in.
In the horizontal plane of the engine centerline
and output drive shaft, from centerline on drive shaft side: 3.15 in.
Reward of front engine mounting bolt in plane of the
fixation struts: 19.66 in.

IGNITION

High tension, low energy, comprising:
- Double ignition coil : Air-Equipment Type 81268/21
- Two torch igniters : Turbomeca 0.237.30.755.0
- Two high tension cables : Turbomeca 0.043.07.709.0 and 710.0
- Ignition fuel micropump : Turbomeca 0.044.63.504.0

STARTING

Electric Starter: SEB Type 1028

CERTIFICATION BASIS

FAR 21.29 and FAR 33, effective February 1, 1965 and Amendments 33-1, 33-2, and 33-3.
Date of Application for Type Certificate: March 10, 1970 (TURMO IVA)
Type Certificate No. E10EU issued June 23, 1971.
Date of Application for amended Type Certificate: December 14, 1972 (TURMO IVC)
Type Certificate amended May 15, 1974, to include TURMO IVC.

The aviation authority for France, the Direction Generale de L'Aviation Civile (DGAC), originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E10EU. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of France.

IMPORT REQUIREMENTS: To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with the DGAC 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 E10EU, is in a condition for safe operation and has undergone a final operational check.

Additional guidance is contained in FAA Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers and Related Products, Imported into the United States.

This engine is eligible only in S.N.I.A.S. SA330F model helicopter when fitted with TURMO IVA, and SA330G model helicopter when fitted with TURMO IVC, reference Type Certificate H4EU; and must be maintained in accordance with SA330F Maintenance Manuals, chapters 71, 72, 73, 75, 76, 77, 78, and 80.

NOTE 1. Maximum permissible rotor speeds, r.p.m.*

		<u>IVA</u>	<u>IVC</u>
- Gas generator turbine			
2 1/2 min. power rating	33,950	33,800	
30 min. power rating		33,300	33,350
Takeoff (5 min.)		33,300	33,450
Maximum continuous		32,800	32,500
Transient (30 sec. max.)		34,100	34,100

*Refer to Turbomeca Operation Manual for required action if limits are exceeded. Also refer to this Manual for other r.p.m. limits versus OAT and engine bleed configuration.

- Free Turbine (expressed as output shaft r.p.m.)	
Nominal speed	22,840
Maximum speed	23,750

NOTE 2. Maximum permissible temperatures.

A. Gas generator turbine exhaust (T4), °C*
(measured with two thermocouples on gas generator turbine exhaust diffuser).

	<u>IVA</u>	<u>IVC</u>
2 1/2 min. power rating	790	790 **
30 min. power rating	780	770
Takeoff (5 min.)	780	780
Maximum continuous	750	710
Starting (30 sec. max.)	750	750
Transient, for operation	820 (30 sec. max.)	830 (12 sec. max.)
Maximum residual before starting	150	150

* Refer to Turbomeca Operation Manual for required action if limits are exceeded.

**Maximum limit for Turmo IVC with bleed air on for anti-icing = 820°C (refer to Turbomeca Operation Manual for engine disposition).

B. Oil temperature limits (measured in oil tank), °C

- Maximum operating	100
- Minimum for starting	-35 with AIR 3513, 3514; -26 with AIR 3517, MIL-L-23699, D.ENG.RD 2487;
	-20 with AIR 3515 (D.ENG.RD.2490)
- Minimum for power higher than idle	0

- C. Fuel temperature limits, °C
 - Minimum for starting -30 with TR0 and TR4 (JP4); -20 with TR5 (JP5)
 - Maximum for operating +50

NOTE 3. Fuel and Oil Pressure Limits, psig.

- Fuel: At engine inlet for starting 4.3 to 11.6
 At engine inlet for operation -5.8 to 17.4
- Oil: (At engine oil pump outlet)
 At ground idle, minimum 10.0
 Normal operating range 51.0 ± 3.0
 Maximum pressure 65.0
 Minimum at 32,000 r.p.m. 29.0

NOTE 4. Accessory Drive Provisions

The following driven accessories are provided on the engine and are included in engine weight.

Accessory	Part No.	Direction of of Rotation (facing pad)	Reduction Ratio (referenced to turbine speed)	Max. Torque		Overhang in. lb.
				Continuous in. lb.	Static in. lb.	
- On gas generator turbine.						
Starter	SEB Type 1028	CW (Clockwise)	1:1.24188		150	49
Tachometer Transmitter	JAEGER Type 545 359	CCW (Counter clockwise)	1:7.94482	1	5	18
- On free turbine (output turbine)						
Tachometer Transmitter drive	(Not fitted)	CCW	1:3.81419	2	9	27

NOTE 5. Engine ratings are based on calibrated test stand performance under the following conditions:

- Static sea level ISA conditions, (59°F, 29.92 in.Hg.)
- No air bleed
- No power off-takes by the accessories.

The ratings are minimum acceptable final test performance of series and overhauled engines, measured with:

- Calibrated test bed air intake, according to Turbomeca dwg. No. 6202 66 701 0.
- Flight exhaust pipe, Turbomeca Part No. 0.249.76.000.0 (which is part of engine delivery).
- Air intake anti-icing protection shield installed, but not supplied with hot air.

NOTE 6. Maximum permissible air bleed (from centrifugal compressor plenum).

(Orifice limited at engine outlet with 0.598 in. orifice).

- For aircraft services (including inlet duct anti-icing when required) 0.397 pounds per second.
- See Turbomeca Operation Manual for limitations on bleed flow vs engine power and r.p.m.

NOTE 7. Air intake anti-icing limits:

- If OAT is between +5°C and -20°C, Gas Generator r.p.m. must be equal to or higher than 26,000
- If OAT is between -20°C and -30°C, Gas Generator r.p.m. must be equal to or higher than 26,500
- Also engine oil temperature must be equal or higher than 30°C.

The engine meets FAR 33 requirements for operation in icing conditions when above limitations are observed.

