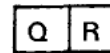




Société Nationale Industrielle
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DIRECTION APRES VENTE

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Lettre-Service

N. 628 - 77 - 84

V/Réf. :

N/Réf. :

MARIGNANE, le 20.09.1984

SUBJECT : Helicopters SA 342 - K - L - J

ENGINE CONDITION CHECK : Ageing follow-up

Sirs,

The purpose of the present Service-Letter is to give further information about the engine ageing follow-up method ; this letter does not modify the procedure described in the Flight Manual but provides additional details applicable to the various cases met in operation.

We remain, Sirs,

Yours faithfully,

A. BURY

M. AYBALE



S.N.I. aerospatiale

Lettre-Service

N° 628 - 77 - 84

ENGINE AGEING FOLLOW-UP METHOD

- I Determination of the specific T4 temperature correction when putting into service a new or overhauled engine
- II Checking the engine condition in operation
- III Determination of the specific T4 temperature correction when putting into service an engine which has already consumed part of its ageing margin
- IV Determination of the T4 temperature correction after replacing the T4 temperature indicator.



I DETERMINATION OF THE SPECIFIC T4 CORRECTION WHEN PUTTING INTO SERVICE A NEW OR OVERHAULED ENGINE

I.1 Reminder and supplement of instructions to be followed when putting an engine into service (see MDE 71.10.300 - page 1/2)

- Calibrate the thermocouple line (see MDE 77.10.602)
- Check and, if necessary, adjust the torque measuring system (see MDE 77.20.502 / 501).

I.2 T4 correction determination procedure

The procedure for determining the T4 correction specific to an engine is given in Appendix AS 21 to the 342 Flight Manual, on Sheet 10 and Figure 6 (See Figures 1 and 1A)

This procedure requires the following parameters to be recorded in flight :

torque, T4, Hp (pressure altitude), O.A.T.

The following conditions must be met :

- the above parameters must be stabilized (3 minutes pre-stabilization period)
- several successive recordings must be taken for determining the T4 correction.

If aberrant results are found, check the following :

- the altitude measuring system (MDE 34.11.301 / 601 / 602)
- the O.A.T. thermometer. (°s)

NOTE : The specific T4 correction is determined in flight with a «plain» air intake and a standard exhaust pipe.

Subtract the following values from the T4 read :

- 35° C if the exhaust pipe is equipped with a jet deflector
- 15° C if the air intake is equipped with a sand filter.
- 20° C if the engine is equipped with a muffler.

I.3 Example (Figure 1A)

Measurement in flight :

Torque	: 80 %	} determine (5)
Hp	: 2000 m	
O.A.T.	: + 20° C	
T4 read	: 445° C	

The intersection (6) of the lines drawn from (5) and from the value of the T4 read (445° C) determine the new T4 correction (- 10° C).

S H E E T 10	HELICOPTER : Gazelle							TEST	
								Flight	Ground
	TYPE	342 K	342 L	342 J					
DETERMINATION OF THE T4 TEMPERATURE CORRECTION SPECIFIC TO THE ENGINE								BAR. PRESS. or PRESS. ALT.	
<u>GENERAL</u> The procedure for checking the engine condition given in the Flight Manual necessitates prior correction of the t4 temperature specific to the engine. This check is to be carried out in flight with a «plain» air intake on all new or overhauled engines when first installed on the helicopter, and must not be modified until the next overhaul. Routine checks are to be carried out with air intake fitted with the accessory equipment normally used. The t4 correction corresponding to such equipment must then be made. If doubt exists as to the condition of the engine a check must be made with a «plain» air intake.									
								O.A.T.	
								FUEL Q'ty	
<u>PROCEDURE</u> 1) Stabilize the aircraft. 2) Apply collective pitch to the first detent or to a pitch corresponding to approximately 80 % torque. 3) Note the following parameters : Torque, t4, Zp, O.A.T. (θ s). 4) Plot torque and t4 temperature on chart given in figure 6. The point of intersection (6) of lines from points (4) and (5) gives the t4 correction specific to the engine. 5) Carry out five measurements. Eliminate the minimum and maximum measurements. Determine the arithmetical mean of the three remaining measurements which correspond to the t4 correction. 6) Mark the t4 correction at the location provided for this purpose on the VNE plate secured to the instrument panel.									
MEASUREMENTS	Torque	t4	Zp	θ s	T4 correction (curve)				
1st measurement									
2nd measurement									
3rd measurement									
4th measurement									
5th measurement									
Arithmetical mean of the three intermediate measurements T4 correction →									

FIGURE I

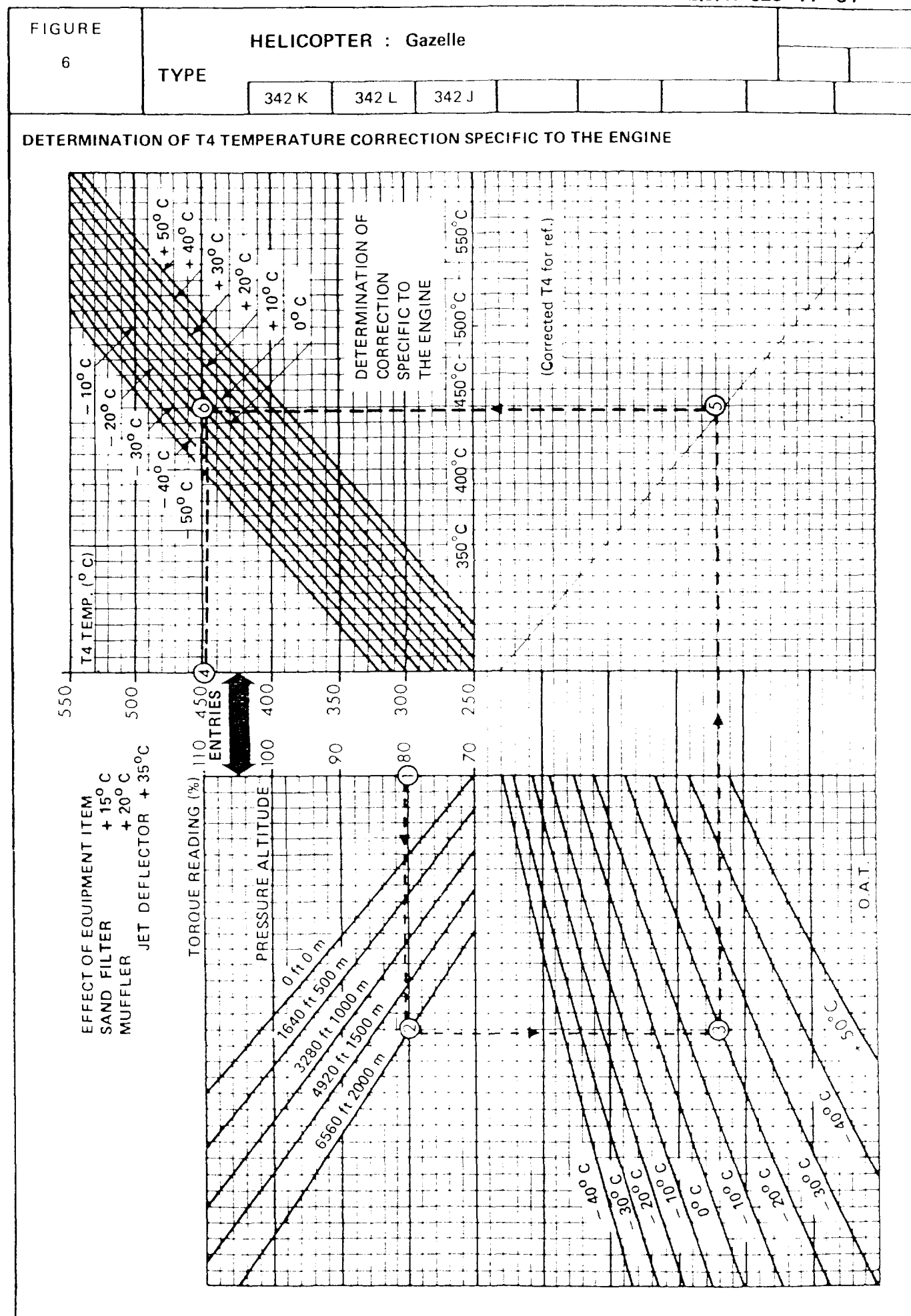


FIGURE 1A



II CHECKING THE ENGINE CONDITION IN OPERATION

II.1 Checking procedure

The engine check is to be carried out according to the instructions of the 342 K - L - J Flight Manual, Section 2, pages 16 and 17 (See Figures II and IIA).

On completion of the checking operations, if the engine condition is considered as incorrect, check the following before changing the engine :

- Torquemeter line (MDE 77.20.502 / 501)
- T4 line (MDE 77.10.602)
- Altimeter line (MDE 34.11.301 / 601 / 602)
- O.A.T. thermometer.

In case of doubt about the adjustment of the engine rating or if the latter has been formerly re-adjusted, check and, if necessary adjust the governed engine rating, using a frequency-meter and complying with the instructions of the Engine Maintenance Manual - Chapter 73.20.1.

II.2 Checking intervals

No special flight is required for this check which may be carried out during any mission, every 25 hours at least, and at shorter intervals if the aircraft is operated in sand-laden or contaminated atmosphere requiring frequent rinsing and washing of the engine.

The engine condition check shall be recorded on such a table and diagram as those shown in Figure IIB/C. These documents shall be attached to the engine log book.

The ageing margin of a new engine is 40° C ; this margin is shown in Figure III ; it is represented by the line between the «condition presumed incorrect» and the «condition presumed correct» areas.

NOTE : *The engine condition check is performed with a «plain» air intake and standard exhaust pipe.*

Subtract the following values from the T4 read :

- 35° C if the exhaust pipe is equipped with a jet deflector
- 15° C if the air intake is equipped with a sand filter.
- 20° C if the engine is equipped with a muffler.

II.3 Example (Figure IIA)

Measurement in flight :

Torque	: 80 %	}	determine (3)
Hp	: 2000 m		
O.A.T.	: + 20° C		
T4 read	: 450° C	}	determine (5)
New T4 correction	: - 10° C		

The intersection (6) of the lines drawn from (3) and (5) determines the ageing of the engine (5° C). (remaining margin : 35° C).

II.4 Plot the recorded engine ageing values on chart of Figure IIC and check data continuity. Any point off the ageing line will raise doubts as to the exactness of the recorded parameters or show a sudden deterioration of the engines if the recorded values are confirmed.

		HELICOPTER : Gazelle							
TYPE		342 K	342 L	342 J					

CHECKING THE ENGINE

This check is to be carried out in flight :

- 1) Set the aircraft in stabilized level flight, with the heating system off.
- 2) Bring collective pitch to the first flexible detent, or, a pitch corresponding to a torque of about 80 %.
- 3) Note the following parameters : torque, t_4 , pressure altitude, O.A.T..
- 4) Enter torque and t_4 values in the curve shown on the following page. Intersection of the lines drawn from the temperature correction specific to the engine and the O.A.T. correction should be found in the area of correct operation.

EXAMPLE :

Torque read ① = 80 %
 t_4 read ④ = 450°C
 Pressure altitude ② = 2000 m
 O.A.T. ③ = 20°C
 Correction specific to the engine ⑤ = -10°C

NOTE : The correction specific to the engine is given at the bottom of the never exceed speed name plate on the instrument panel.

The correction is determined on plain air-intake when an optional installation is fitted onto the air-intake, correct t_4 by the value relevant to the installation. This value is given in the appropriate supplement. If in doubt, check on plain air intake.

Operation of the engine is satisfactory (intersection at point ⑥)

In case of doubt over the operation of the engine, carry out two or three checks at different altitudes.

When operation of the engine is confirmed as being faulty, refer to the Maintenance Manual for the steps to be taken.

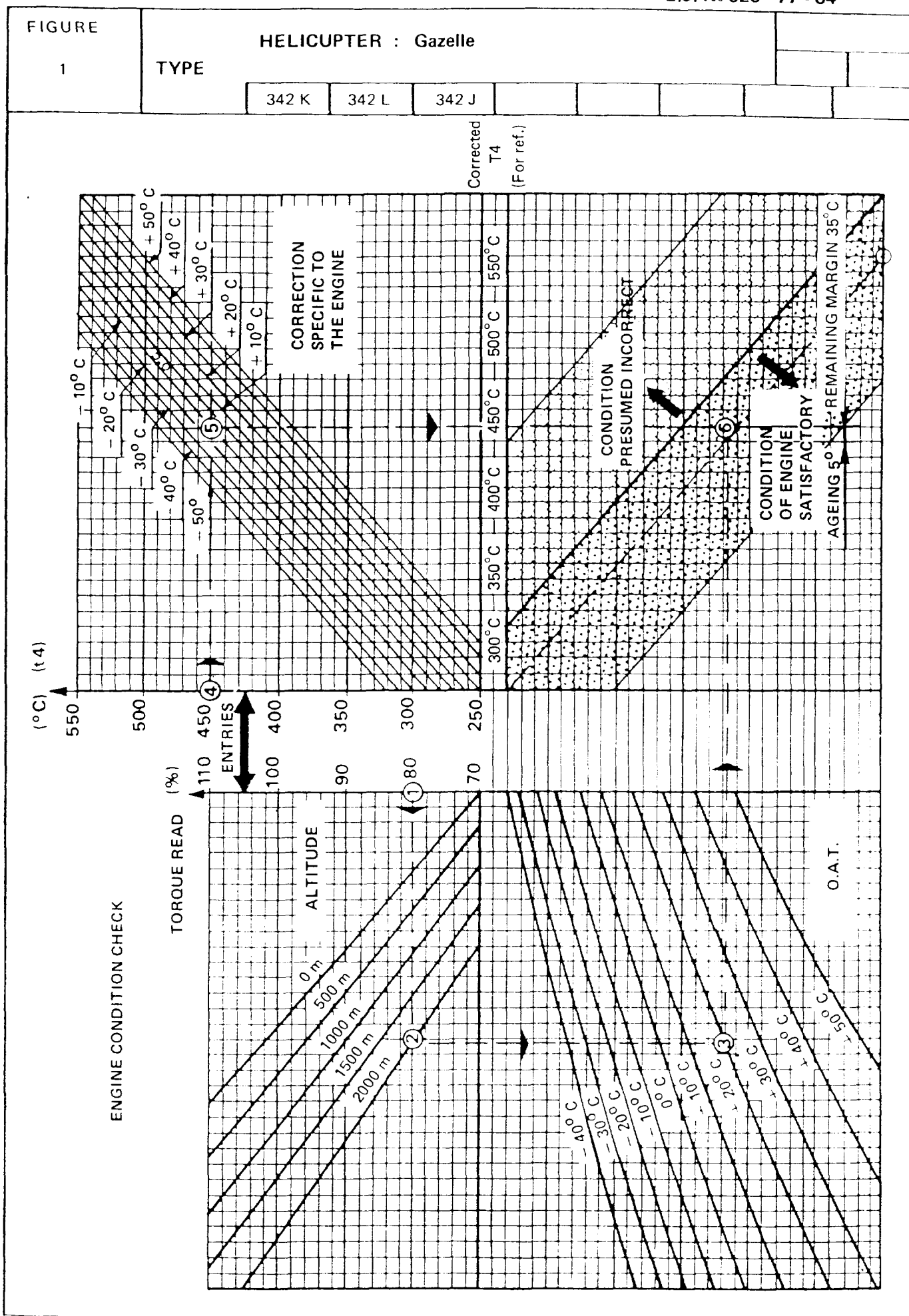


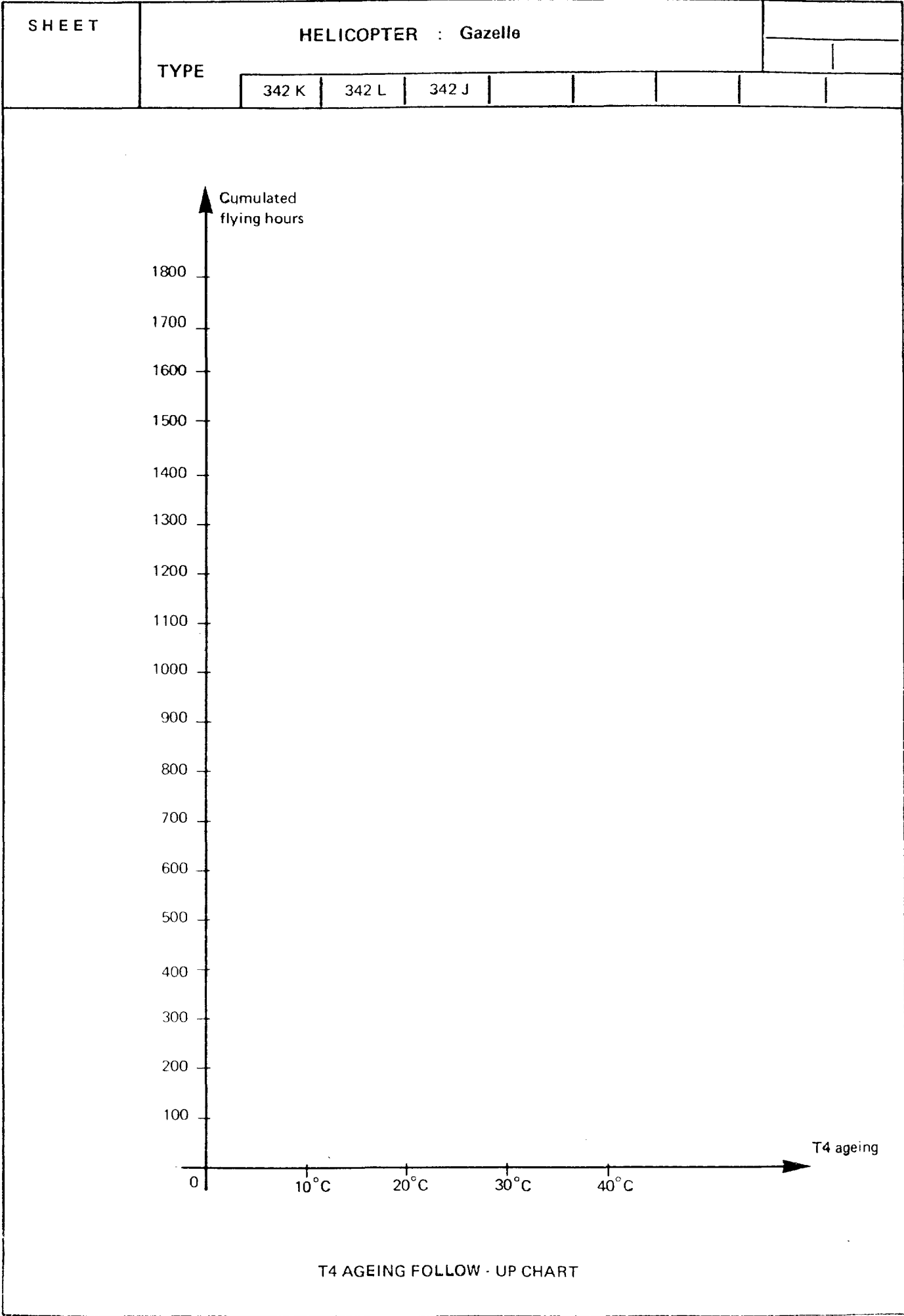
FIGURE IIA

ASTAZOU XIV ENGINE S/N

TURBOMECA

DETERMINATION OF THE T4 CORRECTION SPECIFIC TO THE ENGINE WITH «PLAIN» AIR INTAKE (PROCEDURE OF THE 342 FLIGHT MANUAL, AS 21)							SA 342 No. Δ T4	Date : Date :		
ENGINE CONDITION CHECK – AGEING (T4) FOLLOW-UP – MAXIMUM AGEING = 40°										
Date	Flight hours cumulated on the engine	Equipment item Air intake (sand filter)	Exhaust pipe (jet deflector)	Operation Rinsing or washing	Torque	T4	Pressure altitude	O.A.T.	Ageing (T4 value)	Remarks :
										Maintenance operation, engine moved to another helicopter, new T4 correction etc ...

FIGURE IIB





III DETERMINATION OF THE SPECIFIC T4 CORRECTION WHEN PUTTING INTO SERVICE AN ENGINE WHICH HAS ALREADY CONSUMED PART OF ITS AGEING MARGIN

It is necessary to know the ageing state when an engine is moved from one helicopter to another or when an engine is re-installed after an «inspection not affecting T.B.O.».

III.1 The part of the ageing margin consumed on the first helicopter (or before the «inspection not affecting T.B.O.») is known : see Figure III.

- Determine the T4 correction specific to this engine installed on the second helicopter, proceeding as for a new engine (see Chapter I1 and I2) but moving the point of intersection (5) by the ageing value * consumed on the first helicopter.

The point of intersection of the lines drawn from point (5A) and from the value of the T4 read determines the new T4 correction.

Mark this correction at the location provided for this purpose on the VNE plate secured to the instrument panel.

Enter the correction value in the appropriate block of the ageing follow-up table.

Example : Putting into service of an engine which has consumed 25° C of ageing on the first helicopter (see Figure III).

1) Record parameters in flight on the second helicopter

Torque : 80 %
T4 : 415° C
Zp : 2000 m
O.A.T. : 0° C

2) Plot torque, altitude and O.A.T. on the chart

3) Move point (5) by the value of ageing previously consumed (+ 25° C) ; this point is now called (5A) .

4) The point of intersection of the lines drawn from (5A) and from the value of the T4 read determines the new T4 correction (– 10° C)

This value is to be marked on the aircraft VNE plate and on the engine ageing follow-up table.

III.2 The ageing consumed on the first helicopter is unknown

In this case, when the engine is returned to TURBOMECA factory, the operator must request the engine to be tested on the bench after completion of the «inspection not affecting T.B.O.» : TURBOMECA will then draw up a special record of the engine characteristics to determine the value of the ageing consumed and will mark this value on the appropriate sheet of the engine log book.

To put this engine into service, the operator will proceed as explained in III.1.

* Value determined during the latest ageing check, i.e. less than 25 hours before removal of the engine from the previous helicopter)

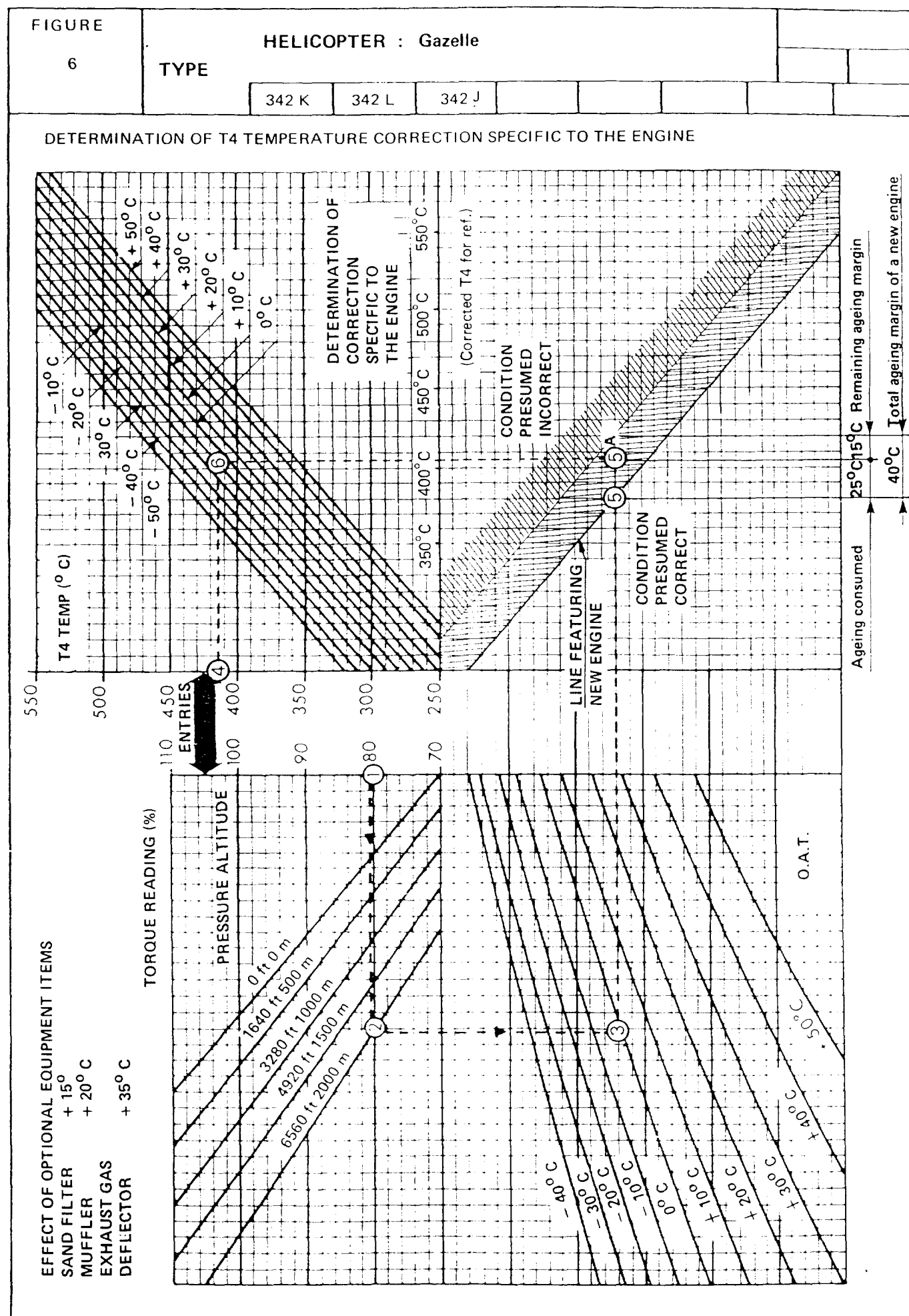


FIGURE III



IV DETERMINATION OF THE T4 CORRECTION AFTER REPLACING THE T4 INDICATOR

- Replacing the T4 indicator can result in data altering the T4 temperature correction of an aircraft.
- Determining the new T4 correction on this aircraft requires to know the engine ageing condition.
- It shall be necessary to proceed in the same way as in Chapter III «Determination of the specific T4 correction when putting into service an engine which has already consumed part of its ageing margin”.