

M. 280.

30th May, 1962.

Mr. D. M. Carroll,
Chef de la Mission Australienne,
S.N.E.C.M.A.,
70 Boulevard Kellermann,
Paris 13,
FRANCE.

Dear Sir,

Subject: Surge Test on Atar 9C Engines.

Following the return of Messrs. Foster and Taggart, brief discussions have been held on the requirements for testing the surge characteristics of the Atar 9C engines. We understand that all production Atar 9C engines are currently subjected to a surge test, whereby the engine is operated under conditions of reduced air mass flow at a constant speed setting. The multi-violet tuyere assembly is independently controlled and the propelling nozzle area is slowly reduced until the engine surges. The value of compressor delivery pressure P_2 obtained at the fixed $N \sqrt{T_1}$ value is the criterion of the acceptability of the engine.

The equipment necessary for carrying out this test includes:

- (i) Special distributor assembly, i.e., a high pressure nozzle guide vane assembly of approximately 940 cm² throat area.
- (ii) Special slave jet pipe, incorporating an Atar 101-G tuyere assembly.
- (iii) Apparatus for closing the tuyere. (In this check, the nozzle area adjustment is independent of the main fuel control unit).
- (iv) Measuring apparatus for determining the cross-sectional area of the tuyere.
- (v) Special pressure and temperature pickups for compressor delivery measurement.

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If this surge test is mandatory for our engines, it will be necessary to obtain the special test equipment, and as a first step, it would be appreciated if you would obtain an official statement from SNECMA, whether or not the surge test will be included in the engine production test schedule. We believe that every engine is now tested at one value of $N/\sqrt{T_1}$ and that periodically, one engine is selected for test at four different values of $N/\sqrt{T_1}$.

We do not possess complete information on the details of the equipment required for this test, the only part numbers available here, being:

Prandtl "Buse"	Part No. 845-732
Prandtl P_2	" " 845-001-878
T_2 Multiple 6 Window Thermocouple	" " 845-809.

However, we understand that Mr. Coleman was to obtain further data on the remaining items.

If this surge test is a production requirement for C.A.C., would you please advise us as soon as convenient, and also provide some indication of the total cost of the equipment.

We would also request you to obtain an official quotation for the supply of one set of the equipment from SNECMA. It is anticipated that the equipment would be required at C.A.C. by February 1963.

With the further reference to engine surging contained in SNECMA Note Interieure KL/6472 and KL/6473, forwarded with your letter P.529 there would appear to be some necessity for carrying out the compressor surge tests. In this matter, it would be of interest to know under what flight conditions, compressor surge has been experienced. Would you please obtain any information that may be available on the operating limitations, as the Department of Air are interested in this aspect.

Yours faithfully,

H. H. KNIGHT,
Manager.

Per:

C. Bellward
for 927
C. BELLWARD

GHF/SL