

SECRET

**SECRET**

From: - Headquarters, Air Defence of Great Britain.  
To: - Messrs. Rolls Royce Ltd., Aero Service Dept., DERBY.  
(For the attention of Mr. W.D. Calvert).  
Messrs. Rolls Royce Ltd., Hillington, Glasgow, S.W.2.  
(For the attention of Mr. G.B. Taylor).  
Date: - 4th September, 1944. See further distribution overleaf: -  
Ref: - ADGB/S.36777/Eng.4.

Packard/Merlin V.1650-7 - Mustang III  
+ 25 lbs. sq./in. Boost Operation Using  
150 Grade Fuel.

1. Since the re-rating of the Packard/Merlin V.1650-7 to + 25 lbs. sq./in. boost operation, isolated cases of severe vibration have been experienced after 1 to 2 minutes at full combat rating, 3000 R.P.M. and + 25 lbs. sq./in. boost pressure.
2. In an endeavour to eliminate this trouble, three Mustang aircraft known to be subject to vibration at high boost pressure, were flown to No. 3501 S.U., Cranfield, for investigation by Messrs. Rolls Royce. As a result of experiments carried out, it was decided to try two aircraft with the ignition timing retarded. The aircraft were flight tested and on several runs, + 25 lbs. sq./in. boost pressure was maintained for five minutes, all trace of vibration had disappeared. The ignition timing was similarly retarded on the third aircraft, with the same successful results. The ignition timing on the three aircraft was set at:-
  - (a) Inlet -  $45^{\circ}$  B.T.D.C.
  - (b) Exhaust -  $38^{\circ}$  B.T.D.C.as opposed to the original setting of  $50^{\circ}$  B.T.D.C. for both Inlet and Exhaust.
3. Although the new ignition timing eliminated the vibration troubles on the three aircraft quoted, it was felt that further tests were necessary to ensure that the new timing was also satisfactory for 100 octane, (130 Grade) fuel, without any loss of power. Messrs. Rolls Royce agreed to carry out the necessary investigation and tests at Glasgow.
4. As a result of the investigation and tests carried out by Messrs. Rolls Royce, Glasgow, the following decisions have been agreed:-

- (i) To standardise the ignition timing of all 1650-7 engines to  $45^{\circ}$  B.T.D.C. on both inlet and exhaust.
- (ii) To standardise the carburettor enrichment valve setting to 11.6 inches of water instead of 18.8 inches.

5. Action by Messrs. Rolls Royce.

Arrangements have been made with Messrs. Rolls Royce to carry out the necessary alterations on all engines in Service, including spare replacement engines at No. 3501 S.U.

6. Action by Air Ministry, E.3.

Arrangements have been made with Air Ministry, E.3., to supply quantity 8, 1650-7 engines, to No. 3501 S.U., R.A.F. Station, Middle Wallop. The engines will be held as a replacement pool for Units operating at + 25 lbs. sq./in. boost pressure and

Cont'd over/ will be ...



will be modified by Messrs. Rolls Royce.

7. Action by Units.

In order to ensure that engines will be fully modified to the new standard, Units will place all demands for replacement engines on No. 3501 S.U., R.A.F. Station, Middle Wallop. (A.D.G.B. Signal Q.10 dated 2/Sept/44, refers).

8. Action by 3501 S.U.

For the present, the replacement pool of modified engines should be kept up to quantity 8. All Mustang III aircraft with 1650-7 engines installed, are to be modified to the new standard prior to release to Units.

*J. I. Dow*  
Air Vice Marshal, *W/Cmdr*  
Air Officer i/c Administration,  
AIR DEFENCE OF GREAT BRITAIN.

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Sub. Form 247.

ROYAL AIR FORCE.

Receipt No. .... T.219.

This receipt should be returned Non-Secret.

From:- M.A.P., R.D.E.2.  
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To:- Technical Branch,  
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Receipt is acknowledged of your:- ADGB/S.36777/Eng.4. dated  
4th September, 1944.

Date:- .....1944.

Signature .....  
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