

Summary of Use of 150 Grade Fuel.

1. A considerable amount of experience has been gained with 150 Grade Fuel. It has been proved that the fuel is satisfactory under Service conditions and gives rise to no real problems in either handling or operation. The only difference between 150 Grade Fuel and 100 Grade Fuel is that the former fuel tends to foul sparking plugs, due to its higher lead content. In practice it has been found that this plug fouling can be overcome by opening up engines to maximum cruising R.P.M. and boost for 30 seconds every 15 minutes.

2. The following is a brief summary of the experience gained on each type of engine:-

(i) Spitfire IX L.F./Merlin 66.

A total of 9,268 hours has been flown with 150 Grade Fuel and a maximum boost pressure of + 25 lbs. sq./in. Of this total over 6,000 hours flying was done by Nos. 1 and 165 Squadrons and during this time they were employed in various operational roles. Pilots report very favourably on the fuel and are impressed by the added performance given by the higher boost.

A series of backfires were experienced in the early stages, but these have been very largely overcome and Messrs. Rolls Royce are of the opinion that a slight retarding of the ignition would eliminate the backfires.

(ii) Spitfire XIV/Griffon 65.

A total of over 2,000 hours has been flown at a maximum of + 21 lbs. sq./in. boost. Of this total 610 Squadron flew 1,119 hours. There have been no failures of any kind which could be associated with the use of the higher boost pressure.

Rolls Royce will be producing Griffon 65 engines very soon, which will include certain improvements which it is anticipated will allow the engine to be run at + 25 lbs. boost pressure. We can expect these engines to be available in about three months time in quantity.

(iii) Mustang III/Packard Merlin 1650-7.

A total of over 7,000 hours has been flown at a maximum boost pressure of + 25 lbs. sq./in. In the initial stages many backfires were experienced and at one period it became necessary to restrict the maximum boost pressure to + 22 lbs. sq./in. These backfires were practically eliminated by increasing the mixture strength. Trials have also been done with the ignition retarded slightly and it appears that this action would entirely eliminate all cases of backfire.

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(iv) Tempest V/Sabre IIA.

A total of 2,500 hours has been flown at a maximum boost pressure of + 11 lbs. sq./in. No difficulties have been experienced with the Sabre IIA engine.

Messrs. Napier's and A.D.G.S. have both flown aircraft at + 11 lbs. sq./in. boost pressure with 150 Grade Fuel. The trials have been very satisfactory, and it appears that the engine could be used at the higher boost pressure with 150 Grade Fuel.

It is understood that M.A.P. only cleared the engine for + 11 lbs. boost operation while Tempest aircraft were employed against the flying bomb and that it is their intention to reduce the maximum allowable boost pressure to + 9 lbs. sq./in. now that the menace is over.

(v) Mosquito XIII/Merlin 25.

A total of 3,552 hours has been flown with 150 Grade Fuel. Severe backfires were experienced in the higher gear and it became necessary to restrict the use of boost pressures in excess of + 18 lbs. sq./in. to 'M' gear. In 'M' gear it was only possible to obtain a maximum of + 25 lbs. sq./in. boost, the engines ran very satisfactorily at this boost pressure.

Trials were done at A.F.D.U. with the aid of R.A.E. and Messrs. Rolls Royce in an endeavour to eliminate backfires experienced in 'S.S.' gear. It was found that the fitting of a AV1/40/217 carburettor allowed a richer mixture to be supplied and our experience to date indicates that the use of this carburettor would allow of + 25 lbs. boost pressure in 'S.S.' gear.

In addition non-operational aircraft were also operated on 150 Grade Fuel. These aircraft were not subjected to higher boost pressures as the trials were only undertaken to establish if the aircraft could operate on the fuel without experiencing excessive plug fouling, or other difficulties.

In these trials over 2,000 hours were flown on Mitchell and Boston aircraft (Cyclone R.2600 series), 800 hours were flown with Typhoon aircraft, 950 hours were flown with Mosquito XII aircraft and 1,790 hours were flown with Spitfire V aircraft.

These trials established that the aircraft could be flown successfully with 150 Grade Fuel. Trials with the Allison/Mustang 1 proved to be unsuccessful and it is considered that the Allison engine is the only one in normal Service use in this Command which cannot be operated on 150 Grade Fuel.

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