

11 July, 1944

(b) Grade 150 Aviation Fuel. - At the present time there is no Grade 150 Aviation Fuel available in the U.S.A. It is the opinion of the War Department that the best way to meet the requirements of the Ninth Air Force is to import Grade 150 Aviation Fuel from the U.K. However, this would involve the purchase of 150 Grade fuel at a price which is considerably higher than the cost of Grade 100 Aviation Fuel. In addition, it would be necessary to pay a heavy import duty on the fuel. For these reasons, the War Department has decided to proceed with the importation of Grade 150 Aviation Fuel for the purpose of clarity the questions listed by Colonel Early are repeated below and will be answered in the same order.

I. Availability of Fuel. - It is felt that all the information contained in this section will be sufficient. First, regarding:

(a) For Ninth Air Force. - At the present time Grade 150 aviation fuel is blended in U.K. refineries using normal aviation fuel components plus 3% Monomethyl Aniline and 0.9 cc. Tetra-Ethyl Lead per U.S. gallon. A similar fuel is prepared in the U.S.A. by substituting Xylylamine for the Monomethyl Aniline.

The total production of Monomethyl Aniline in the U.K. amounts to 15,300 tons per annum. This entire production is required to meet the requirements of the Eighth Fighter Command (approximately 10,000 tons per month of finished Grade 150 fuel), and the RA F Fighter Command (Air Services of Great Britain). (the former requirement of approximately 12,000 tons per month of finished Grade 150 fuel is due to the fact that the British fighters are now flying longer flights and therefore require more fuel per hour.)

Therefore, in order to provide an additional quantity of Grade 150 aviation fuel it will be necessary to import the finished fuel from the U.S.A., either to the U.K. for trans-shipment or direct from the U.S.A. to the continent. There is no question about fuel being made available in the U.S.A. since there is ample Xylylamine and the 150 Grade merely replaces the 100 Grade without any corresponding loss in overall production. Calling upon CWS aircraft and supply support personnel to import fuel is not necessary if

(b) For Far shore only. - It would not be a difficult task to replace the present 150 Grade fuel now being used on the continent with the 150 Grade, but it is strongly recommended, that if such replacement is necessary, it be complete, since there would be some difficulty if it were necessary to carry two grades of aviation fuel. It might be mentioned that the greatest amount of distribution in the U.K. is with static installations, and with the many years experience in distributing fuel under conditions in the U.K. it is not too difficult a supply problem. It is thought it might be extremely difficult in a mobile air force.

* * * * * It is the opinion of the War Department

(c) For fighters only and all far shore. Medium and Heavy bombers have not been cleared for using 150 Grade fuel. The 150 Grade fuel is essentially a fighter-grade fuel and there is very little improvement in performance to be gained by using same in either medium or heavy bombers. It should be noted

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using all except 20% in oxygen mixture or usual gasoline. It would be noted that the gain is in rich mixture performance and there is no gain whatever in the lean mixture performance which in turn might give increased range. In (c) for example with only 20% O₂ cycle, engine and usual gasoline usage.

2. When Can It Be Obtained.

(a) Far shore distribution problems, if any. It is estimated that 150 Grade fuel could be made available within a period of 45/60 days. This would allow for shipments either direct to the U.S.A. from the U.S.S.R. or direct to the continent. Until such time as there is deep water available on the continent it would appear that all shipments of this fuel would have to be made through the U.S.S.R. But it would be necessary to re-ship this fuel through the U.S.S.R. since transhipments are necessary. If no compressor is available then the cost of shipping will be 150 grade fuel.

(b) Any problems in change over. As stated before, the far shore distribution problem would definitely be complicated if it were necessary to carry two grades. If one grade of fuel were carried then the change over could be made relatively quickly. Providing the continent is then entirely on bulk fuel distribution, which is likely to be the case, lastly, if the aircraft is equipped for the R.A.F. fuel system, there is probably no difficulty about changing over.

3. Technical Aspects. It is essential to realize the experience that exists in the U.S.S.R. in respect to changes in configuration and flight at 150 grade fuel. (a) What advantages. Tests to date in this theater indicate there is the appreciable increase in lead fouling of spark plugs and deleterious effect on synthetic rubber parts. However, it has been stated by the U.S.S.R. that synthetic fuel might have a tendency to affect the synthetic parts to some extent after a period of prolonged usage. Maximum fuel 150 grade fuel rating is 12,200 hours and 100% R.P. engine life 100 hours per hour of use.

The following limiting war emergency rating manifold pressures

have been established by the Eighth Air Force for the different aircraft:

W.E.P. = War Emergency Rating P.E.P. = Peak Engine Pressure
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P.E.P. = Peak Engine Pressure P.E.R. = Peak Engine Rating
(1) P-51B without Water 60° C. 65° C. 65° C.
(2) P-51B with Water 60° C. 65° C. 65° C.
(3) P-51C without Water 60° C. 65° C. 65° C.
(4) P-51C with Water 60° C. 65° C. 65° C.

P-51B

67°

72°

W.E.P. = War Emergency Rating

It is thought that the above manifold pressures may even be increased to some extent using 150 Grade fuel, and roughly speaking the increase in speed of fighter aircraft at altitudes below 20,000 ft. is approximately 25 miles per hour. The increase in the rate of climb is approximately 800 ft. per minute. In addition, manifold pressures can be used at the higher ratings without danger of reaching incipient detonation, thus giving a greater factor of safety.