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A.F.C.157.

AIR FIGHTING DEVELOPMENT UNIT
R.A.F. STATION, WITTERING

43B

REPORT NO.85
ON
SHORT TACTICAL TRIALS OF SPITFIRE VIII

INTRODUCTION

1. On instructions from Headquarters, Fighter Command, a Spitfire VIII, No.JF.664 (Merlin 63) was delivered to this Unit on 7.7.43 for short tactical trials. The trials took the form of a direct comparison with a Spitfire IX (Merlin 63) made available by No.332 (Norwegian) Squadron at R.A.F. Station, NORTH WEALD.

BRIEF DESCRIPTION

2. The Spitfire VIII has a strengthened airframe primarily designed to take the 61 series of Merlin; as a result it is slightly heavier than the Spitfire IX. The fuel capacity has been increased to 96 gallons in the main tank, with 27 gallons carried in two wing tanks, making a total of 123 gallons. The wing tanks were filled for the trial but the fuel could not be used as the system had not received A.I.D's approval at the time. The wings are of a greater span, having extended wing tips similar to those on the Spitfire VI. The ailerons are smaller, having about 8½ inches less span than on the standard universal Mark VC wing. The aircraft used on the trial was a tropical version but the tropical air filter was never used, so that its performance was directly comparable with the Spitfire IX. The weight of the Spitfire VIII was 7,760 lbs.

TACTICAL

General.

3. The trials took the form of comparing the two aircraft at all heights up to 40,000 feet. Two experienced pilots took part, taking turns in flying the two aircraft so as to rule out any differences in piloting. Other pilots of the Unit and two pilots from Norwegian Squadrons at North Weald have also flown the aircraft and their opinions are incorporated in this report.

Performance.

4. There was very little to choose between the performance of the two aircraft which were similarly loaded as regards armament, ammunition and radio, except that at altitude the Mark VIII gave slightly better results than the Mark IX available for the trial. This may be due to the individual engines or airframes of these two aircraft. In particular the following was noticed:-

(i)	Speeds.	(a) Up to 20,000 feet	Nothing to choose between the aircraft.
		(b) 30,000 feet.	Spitfire VIII slightly faster.
		(c) 36,000 feet.	Spitfire VIII again faster, this time by a greater margin than before.
(ii)	Climbs.	(a) Zero to 10,000 feet.	Spitfire IX very slightly ahead.

(b)	10,000 to 20,000 ft.	Both aircraft the same.
(c)	20,000 to 30,000 ft.	Spitfire VIII very slightly better.
(d)	30,000 to 40,000 ft.	Spitfire VIII very slightly better.

Manoeuvrability.

5. There was nothing to choose between either aircraft as regards turning circles at any height; whether on offensive or defensive manoeuvres neither could make any impression on the other. In rate of roll, however, the Spitfire IX was considerably better especially at low altitude. A number of full rolls through 360 degrees were timed by the same pilot flying each aircraft in turn and although quantitative tests are difficult to produce, it appeared that there was often more than 1.5 seconds superiority for the Mark IX over the Mark VIII. The Mark VIII feels fairly light on the ailerons but at high speeds it becomes very heavy, and so this new combination of extended wing and small aileron cannot be considered satisfactory.

Other Points.

6. (i) The fuel transfer cock when in operation works in the opposition direction from the main fuel cock, i.e., it is up when "OFF" and it is considered that it should be down for "OFF" and move progressively through "port" and "starboard" as it reached the up position.

(ii) A K.D.G. fuel contents gauge is fitted to this aircraft which does not appear at all accurate and is certainly no use to a fighter pilot when manoeuvring.

(iii) The enlarged horn balanced elevator fitted to this aircraft suits it far better than the Spitfire V on which previous flying with it had been done at this unit. In particular at altitude the longitudinal stability is considered an improvement.

CONCLUSIONS.

7. There is no difference in performance between the Spitfire VIII and Spitfire IX with Merlin 63 engines, except that with the extended wing tips the Spitfire VIII is performing a little bit better at high altitude.

8. The smaller span ailerons combined with extended wing tip give the Spitfire VIII an inferior rate of roll.

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