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CLASSIFICATION CANCELLED  
OR CHANGED TO *Unclassified*  
*5-9-46*

ARMY AIR FORCES  
MATERIEL ~~GROUP~~ COMMAND

MEMORANDUM REPORT ON  
P-38J Airplane, AAF No. 43-13563

RSP/mac/47

SUBJECT: Flight Tests

Classification changed to  
UNCLASSIFIED  
by authority of CGA/AMC  
*TE 20 may 1948*

Date 2 November 1943

SECTION Flight

SERIAL No. Eng-47-1656-A (Appendix #1)

Expenditure Order No. 430-1145  
Purchase Order No.

*James H. Williams*  
*Capt USAS*

A. Purpose

1. To report comparison of critical altitudes of P-38J-10 airplane, AAF No. 43-67570, as received from the manufacturer and after sealing the induction systems.

B. Factual Data

1. In level flight at 60" Hg. manifold pressure, 3000 engine r.p.m. the critical altitudes corrected to 26,400 turbo r.p.m. were 19,000 feet for the left engine and 20,500 for the right. Severe detonation was also encountered at this power. Locked representatives stated that in level flight at 59.5" Hg. manifold pressure, 3000 engine r.p.m. and 26,400 turbo r.p.m. the critical of this airplane is 27,500 feet. The difference in the observed critical altitude and that claimed by the manufacturer was believed due to the severe leaks in both induction systems.

2. The leaks in the induction system were due primarily to the tubing being out of round at the joints resulting in an improper fit. An attempt was made to hammer the tubes into round. In the process some of the metal became cracked and it was necessary to weld the cracks. The welding caused the metal to pucker at the ends of the tube. Further working of the metal would cause additional damage to the tubes so the pieces were assembled. The low spots, caused by the puckering, were filled with solder and the entire joint dressed down with a file. It was not possible to apply solder to the carburetor and turbo joints so they were not sealed by this method. All joints on the right induction system were wrapped with rubber tape while those on the left were not. The joints were fastened together with the original rubber seals and metal clamps. With the induction systems sealed in this manner the airplane had observed critical altitudes corrected to 26,400 turbo r.p.m. at 60"hg. manifold pressure and 3000 engine r.p.m. of 25,200 feet for the left engine and 25,300 feet for the right. No detonation was experienced during this test.

3. These tests were run as a service check on the induction system and tachometers and manifold pressure gages were not calibrated. No free air temperatures were obtained. The turbo warning light was calibrated and as the r.p.m. was increased the light came on at 23,900 r.p.m. Critical

*L.H.*

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altitudes given are corrected to the altitude at which a reading of 60" Hg. manifold pressure would be obtained at 26,400 turbo r.p.m. on the day the test was made. The results are not corrected to standard day temperatures, however, the accuracy of these critical altitudes is within  $\pm 1000$  ft. and the difference between any two critical altitudes on the same engine is within  $\pm 300$  ft.

C. Conclusions

1. The critical altitude of this P-38J was increased from 20,000 ft. to 25,300 ft. by improving the fit of the joints in the induction system manifolds between the turbo and the carburetor.

D. Recommendations

1. That immediate action be taken to improve the fit and tightness of the connections in the induction system of production airplanes, either through better production methods or redesign of the induction system.
2. Further, that all P-38J airplanes now in service be checked for critical altitude and that the necessary work required to make the joints tight be accomplished wherever necessary.

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*1 Evaluation As. 202. (2)*