7908

CONFIDENTIAL

Classification

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

TECHNICAL REPORT

SPECIAL OBSERVER SECTION

SUBJECT: ~~Focke-Wulf 190A-3~~

SOURCE: Air Ministry and M.A.P.

I GENERAL

1. Preliminary information on the main dimensions of the F.W.190, results of performance measurements, armament, and estimated power of the B.M.W.801D engine are given in Table I attached to this note. Attention is drawn to the following points of special interest:-

II DETAILS

1. Aerodynamic

a. Wing loading. The high wing loading (42.3 lb/sq.ft.) makes the landing speed high, but the landing is facilitated by the very good lateral control.

b. Wings. The mean wing thickness chord ratio is fairly low (12%) and the section is quite conventional with the maximum thickness at 25-30% of the chord.

c Controls. Preliminary flight tests show the controls to be light, free of friction, and well harmonised. Note the high percentage balance (28.8%, based on gross area) of the ailerons and that metal covering is used forward of the aileron hinges. None of the control surfaces has trimming tabs adjustable in flight. They have fixed tabs, pre-set on the ground, about 1 ft. x 1 in. perforated with small holes. Longitudinal trim is obtained by adjusting the tail setting which has an incidence range of -3° to +5° and is electrically operated by push buttons.

d. Cockpit cover. This is extremely neat. Visibility both forward and to the rear is good for a fighter.

e. Propeller. The propeller diameter seems small for the power available but the solidity is high (0.13).

f. Performance. The top speed at supercharged height, 375 m.p.h. at 18,000 ft. is rather less than would be expected from the estimated engine power. This indicates that the power plant installation is not as effective at top speed as might be expected. The climb performance is good.

2. Engine and engine installation

a. The engine is installed as a complete power unit, connected to the airframe at the bulkhead by self-aligning joints. The engine is mounted on ten rubber pad elements and has connections for induction and hot oil priming. An oil dilution system is also fitted.

Classification Cancelled
Auth: Dir., AHB
By
Date 21/10/43

CONFIDENTIAL

Classification

DATE 5th August, 1942.

REPORT NO. 234

7 copies
Copy No. 3

Sheet No. 1 - Lt. Mc. 8/8/42



Archives of M. Williams

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

TECHNICAL REPORT

AIR TECHNICAL SECTION

SUBJECT: Focke-Wulf 190A-3 (cont'd)

b. In the F.W.190 a honeycomb type oil cooler and oil tank are mounted near the armor deflector plated nose of the nacelle which forms a fixed gill ring for the contra-flow oil cooling air from inside the nacelle.

c. Other points of interest are the engine cooling air system, single lever hydraulic engine control unit, electric and hydraulic propeller pitch change mechanism, supercharger two speed drive, and the crankshaft assembly by means of two frictional grip maneton joints and a Hirth-type centre connection.

d. Cooling is assisted by a twelve bladed fan in the nose of the nacelle, driven directly from the propeller re-duction gear frame at 1.72 times crankshaft speed (i.e. 3.15 times propeller speed).

e. The front and rear halves of the cylinder heads are cooled by separate air-streams; a fixed exit area only is provided.

f. Hydraulic fluid for the single leaver control unit is carried in the hollow engine mounting ring on the F.W.190.

g. The propeller pitch is varied electrically by manual switching and hydraulically by governor control, through a V.D.M. type epicycle gear train, mounted in the engine nose.

h. The two speed supercharger drive gear box has two plate clutches, servo operated and controlled automatically by capsules, the height at which the supercharger changes speed being dependent on throttle position, i.e. boost pressure and atmospheric pressure.

3. Armament and armor.

a. Two 7.92 mm. machine guns are fitted on top of the engine in front of the pilot's cockpit; two 20 mm. Mauser guns in the wing roots and two Oerlikon 20 mm. guns mounted one in each wing further outboard. The four former fire through the propeller disc, the smaller calibre being mechanically synchronized and the larger calibre electrically synchronized. Provision is made for carrying 2,000 7.92 calibre rounds and approximately 520 20 mm. rounds. It is considered that the fire power is better than any of our existing single engine fighters and does not compare unfavourably with the latest twin engine fighters. A standard Revi reflector gunsight is fitted. Provision is made to carry a bomb rack below the fuselage and fuel-and-air pipes indicate that a jettisonable fuel tank may be carried. Armor plating is provided immediately behind the pilot and round the front of the engine. The front windscreen is of bullet proof glass.



www.luftwaffe-performance.org

CONFIDENTIAL
Classification

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

TECHNICAL REPORT

AIR TECHNICAL SECTION

SUBJECT: _____

## Table I

## Particulars of F.W. 190 A-3. M.P.499

### Aerodynamic data

#### General

| | |
|---|---|
| Weight | 8580 lb. |
| Gross wing area S | 203 sq.ft. |
| Wing loading | 42.3 lb./sq.ft. |
| Span loading | 7.21 " " |
| C.G. | 0.28$\bar{c}$ |
| Propeller dia. | 10.9 ft. |
| Propeller solidity | 0.13 |
| Gear ratio | 0.54 |

#### Wings

| | |
|---|---|
| Area gross | 203 sq.ft. |
| Area nett | 177 " " |
| Span 2S | 34.5 ft. |
| Mean chord $\bar{c} = \frac{S}{2S}$ | 5.88 ft. $\frac{t}{c}$ mean 12% |
| Aspect ratio | 5.87 |
| Dihedral | 5° |
| Chord root | 7.50 ft. $\frac{t}{c}$ 14% |
| Chord tip | 4.05 ft. $\frac{t}{c}$ 9.5% |

#### Flaps

| | |
|---|---|
| Type | split |
| Max. angle | 60° |
| Flap area /S | 0.092 |
| Flap chord / - inner end | 0.16 |
| local chord - outer end | 0.21 |
| Flap span / (overall) 2S | 0.55 |
| Central cut away span / 2S | 0.09 |

#### Longitudinal control

| | |
|---|---|
| S' tailplane area gross | 31.6 sq.ft. |
| Total elevator area/S' | 0.38 |
| $\frac{l'}{\bar{c}}$ ($l'$ = C.G. to ¼ chord T.P.) | 2.89 |
| $\frac{S'}{S}$ | 0.156 |
| Elevator angles down | 26 |
| up | 31 |
| Type of balance shielded horn | |
| Percentage balance | 9.1% |
| Stick gearing deg./in. | 4.1 |
| Tail volume coefficient | 0.45 |

#### Directional control

| | |
|---|---|
| S" gross fin & rudder area | 24.3 sq.ft. |
| Rudder area /S " | 0.315 |
| $\frac{l''}{S}$ ($l''$ = C.G. to centroid of S") | 1.12 |
| Fin & rudder volume coeff. $\frac{S'' l''}{Ss}$ | 0.134 |
| Rudder angles | ±16° |
| Type of balance | shielded horn |
| Percentage balance | 4.6% |
| Pedal gearing deg./in. | 6 |

#### Lateral control

| | |
|---|---|
| Type | Frise |
| Aileron area (total both ailerons including balance) | 20.1 sq.ft. |
| Aileron area /S | 0.099 |
| Aileron chord /local chord | 0.30 |
| Aileron span /2S | 0.43 |
| Percentage balance | 28.8% |
| Aileron angles | ±17° |
| Stick gearing | 3.2 deg/in. |

CONFIDENTIAL
Classification

DATE 5th August, 1942. REPORT NO. 234

Archives of M. Williams

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

TECHNICAL REPORT

AIR TECHNICAL SECTION

SUBJECT: Focke-Wulf 190A-3 (cont'd)

**Performance**

Maximum level speeds - 3 minute rating.

| Height ft. | T.A.S. M.P.H. | R.P.M. | Boost lb/sq.in. | Remarks. |
|---|---|---|---|---|
| S.L. | 304 | 2450 | 4.5 x 2.036 = "H3 | |
| 4,500 | 326 | 2450 | 4.5 | Full throttle height, M. blower. |
| 8,000 | 315 | 2450 | 2.4 | M. Blower. |
| 11,000 | 325 | 2450 | 4.5 | S. Blower. |
| 18,000 | 375 | 2450 | 4.5 | Full throttle height, S. blower. |
| 25,000 | 351 | 2450 | 0.5 | S. Blower. |

**Rates of climb**

| Height ft. | Rate of climb ft/min. | R.P.M. | Boost lb/sq.in. | Remarks |
|---|---|---|---|---|
| 0-4,000 | 2760 | 2350 | 3.5 | 30 minute rating M. blower |
| " | 3050 | 2450 | 4.5 | 3 minute rating M. blower. |
| 8,000 | 2250 | 2450 | 1.9 | Full throttle " |
| 10,000-17,500 | 2750 | 2350 | 3.5 | 30 minute rating S. " |
| " | 3280. | 2450 | 4.5 | 3 " " S. " |
| 25,000 | 1900 | 2450 | 0 | Full throttle S. " |
| 32,800 | 500 | 2450 | | 500 ft/min. ceiling |

All these results are corrected to a weight of 8,580 lb.

**Armament** (guns fixed and firing forward).

| Number | Type | Calibre | Location | Synchronisation. | Rounds/gun |
|---|---|---|---|---|---|
| 2 | M.G.17 | 7.92 mm. | top of engine | mechanical | 1000 |
| | M.G.151 | 20 mm. | wing root | electrical | 200 approx. |
| | M.G.F.F. Oerlikon | 20 mm. | wing | | 60 |

**Engine data**

General

Type B.M.W.801D (de-rated: maximum permissible boost + 4.5 lb/sq.in. at 2450 r.p.m.).

Double row radial — 14 cylinders
Supercharger — Two speed automatically controlled.



www.aircraftperformance.org
Archives of M. Williams

HEADQUARTERS
EUROPEAN THEATER OF OPERATIONS
UNITED STATES ARMY

TECHNICAL REPORT

AIR TECHNICAL SECTION

SUBJECT: Focke-Wulf 190A-3 (cont'd)

Direct petrol injection.
Ignition duel from a single magneto.
Fuel 100 octane (C3 German type No.)

Installation

Cowl dia. 4.3 ft.
Cooling air entry dia outer 32"
inner 20.5"

Cooling fan blades 12
blade chord 4"
effective " length 5"
Propeller-fan gear ratio 3.15
Oil cooler Hexagonal honeycomb ¼" across flats.
depth of tubes 5"
Area (estimated) 260 sq.in.
Exhausts Single ejector without flame damping.

Operational details

| Conditions | Time min. | Boost lb/sq.in. | R.P.M. Up to 6 KM | R.P.M. Over 6 KM | B.H.P. (approx.) |
|---|---|---|---|---|---|
| Take-off and level | 3 | +4.50 | 2450 | 2450 | 1560 1490 G.L. 17000 ft. |
| Climbing | 30 | +3.50 | 2350 | " | |
| Continuous | - | +1.50 | 2250 | " | |

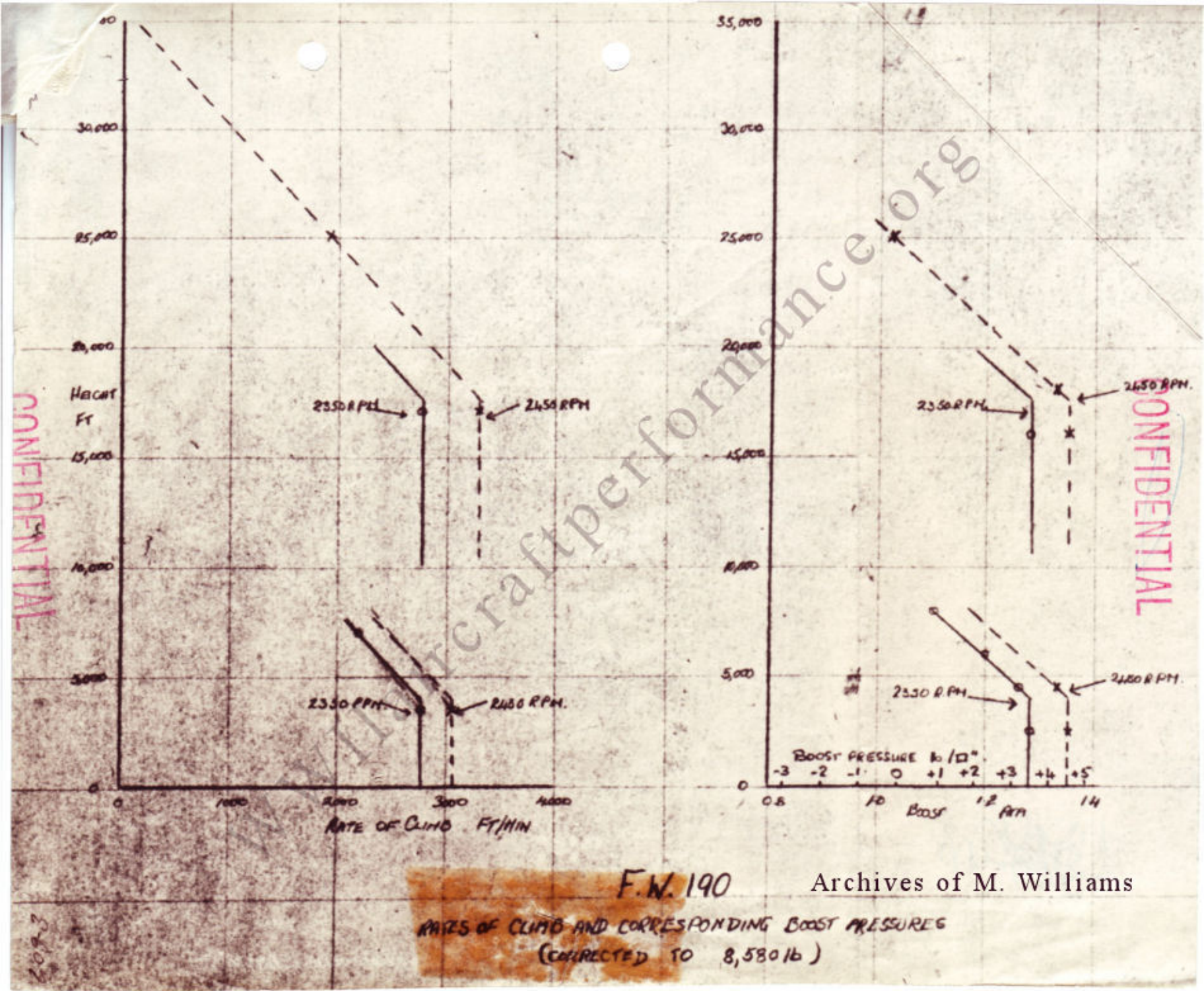
Melvin F. McNickle,
Major, A.U.S.



Archives of M. Williams



www.aircraftperformance.org




CONFIDENTIAL

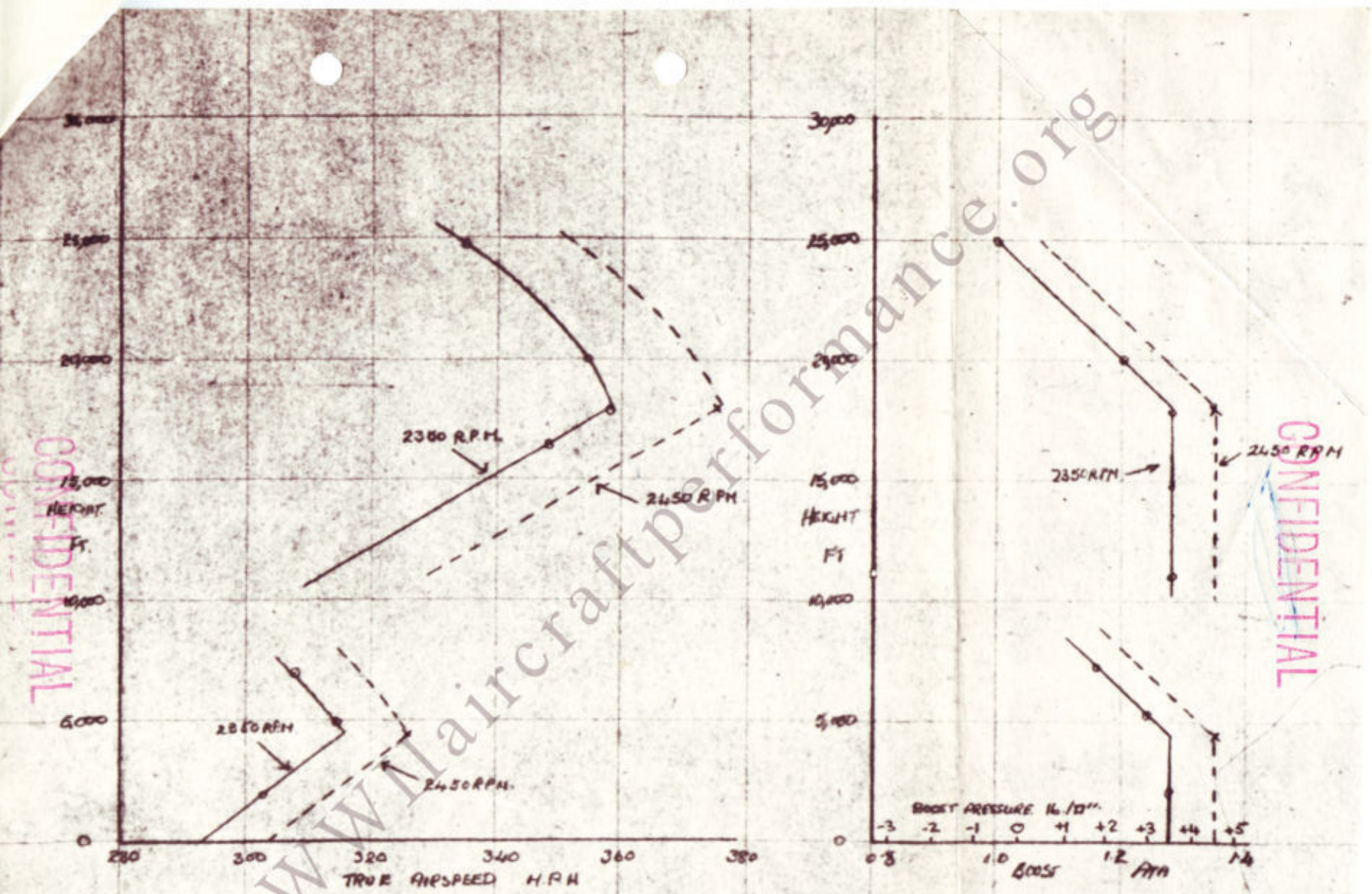
CONFIDENTIAL

F.W. 190

RATES OF CLIMB AND CORRESPONDING BOOST PRESSURES
(CORRECTED TO 8,580 lb)

Archives of M. Williams

www.aircraftperformance.org



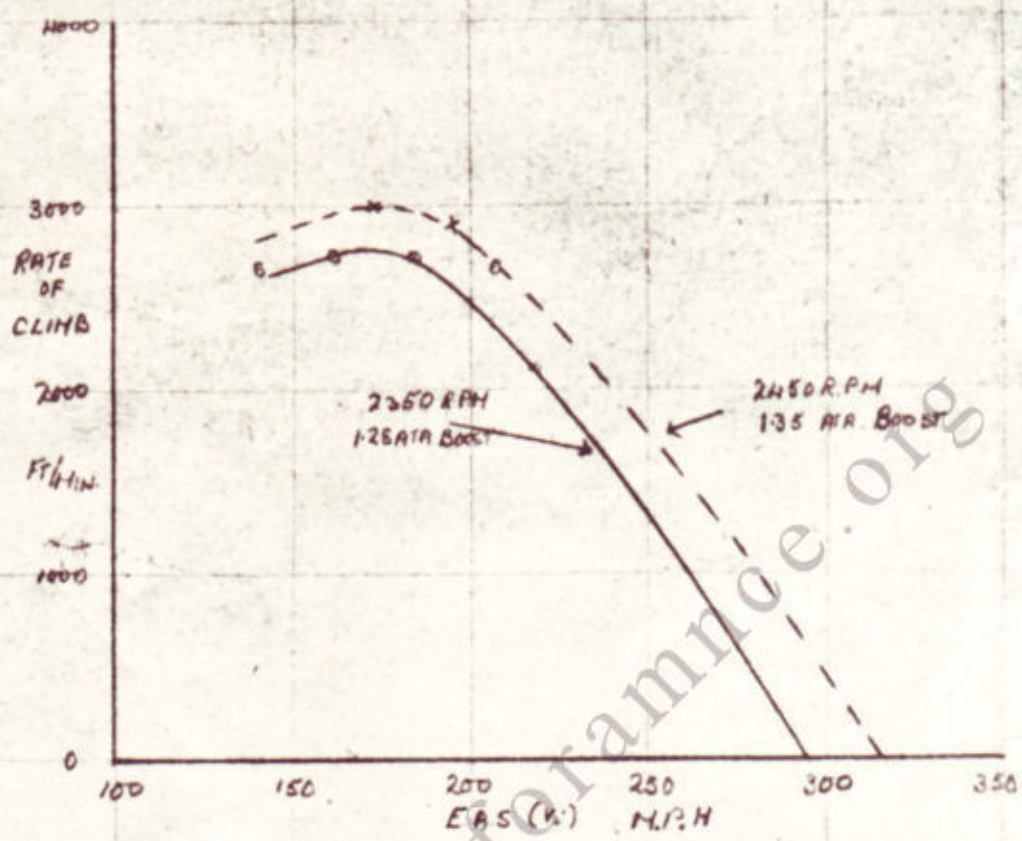

CONFIDENTIAL
CONFIDENTIAL
www.aircraftperformance.org

F.W.190

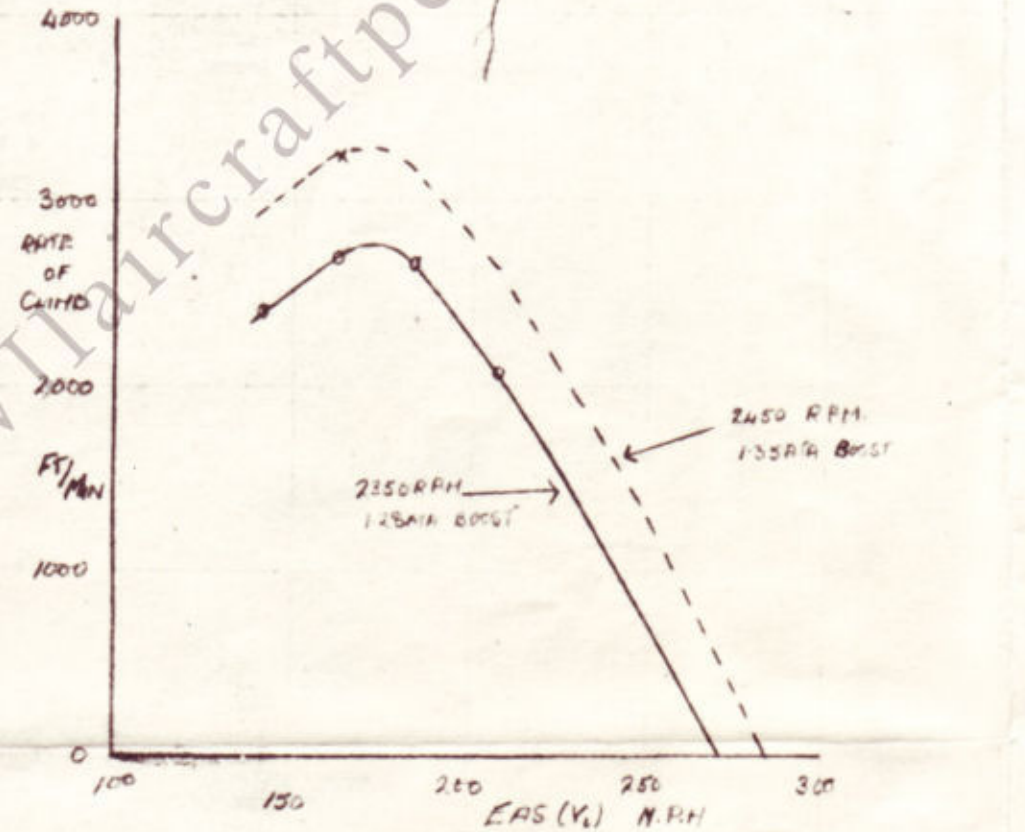
LEVEL SPEEDS AND CORRESPONDING BOOST PRESSURES

Archives of M. Williams

CONFIDENTIAL




PARTIAL CLIMBS AT 3,500 FT




PARTIAL CLIMBS AT 17,000 FT

Archives of M. Williams

FW.190

PARTIAL CLIMBS ( CORRECTED TO 8,580 lb )

CONFIDENTIAL

www.aircraftperformance.org