

Modeller's Guide to Focke-Wulf Fw 190 Variants

Radial Engine Versions

Part II

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This article is the continuation of [Modeller's Guide to Focke-Wulf Fw 190 Variants - Radial Engine Versions - Part I](#). In the first part of this article, we have covered the development history, prototypes and the A series subtypes of this fighter. This part two covers ground-attack F series subtypes and G series fighter-bomber subtypes. As these versions were generally based on fighter airframes, reference to Part I and is recommended for full understanding of this article (Ed.)

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Ground-Attack Versions

The very positive results of the introduction into service of the Fw 190A prompted the RLM to consider the possibility of using the plane for other roles than dedicated fighter. The greatest hope was placed in adaptation of the Fw 190As as a fighter-bomber. It was seen as a replacement of the aged biplane Henschel 123 and, in part, of the Junkers 87 dive bomber that were still providing useful service in modified form, especially on the Eastern front. In early 1942, the RLM widened the specifications for the Fw 190 and ordered development of attack and close support (*Schlachtflugzeug*) versions of the plane.

A special project study of the modified Fw 190 airframe, designated Ra-2 (*Rechnerische Ankündigung 2*), was prepared containing different variants of the Fw 190 for these roles. In May 1942, previously planned tests were conducted with the modified Fw 190A-0/U4 (W.Nr. 0008) plane. This airframe received underwing and fuselage store stations for ETC 50 bomb racks that provided for 50 kg bomb carriage. Results were so promising that development work continued.

From the beginning, the most serious problem was the large increase in weight. This came about not only as a result of the additional bomb load, but due to the need to introduce additional armour to protect the plane from ground fire. This armour consisted of plates protecting the fuel tanks, engine and undercarriage installations from below. To keep the weight down, previously planned armour plates in the cockpit sidewalls were abandoned. For the same reason, new strengthened undercarriage struts were not introduced, instead the pressure in shock absorbers was increased.

In connection with the mass production of the Fw 190A fighter aircraft, early development work on the attack version was restricted to A-3, A-4 and A-5 airframe modifications. These planes, already introduced in Luftwaffe service units, were fully suited to fighter-bomber tasks. However, the increased weight forced a reduction the armament suite (removal of the one pair of wing mounted MG FF cannons), that could result in only slightly poorer performance in spite of increased weight.

Fw 190 F-1 and F-2

The best modification proved to be the **Fw 190A-4/U3** variant with reduced armament (2x1 MG 17 machine guns in the fuselage and 2x1 MG 151/20 E cannons in the wings) and under-fuselage mounted ETC 501 bomb

rack for 250 or 500 kg bomb carriage or with the ER 4 adapter - four 50 kg bombs.

The RLM order was for 30 of these planes but only 18 were built, since, in the meantime, the A-4 version was replaced by the modernized Fw 190A-5 plane. This version was modified by creation of different variants adapted for fighter-bomber role. The most numerous version, the **Fw 190A-5/U3** (equipped similarly to the A-4/U3), was produced in a production run of 63 planes. Part of these planes received desert equipment (designated as **A-5/U3/tp**).

Positive opinions coming from Luftwaffe units and increasing demand for fighter-bomber planes caused the Focke-Wulf factory to start production of the attack version of the plane, designated Fw 190F, as a completely new series rather than as a fighter modification, as it was previously. The first production series Fw 190F-1 was intended to be based on the A5/U3 modification. The design office decided to include previously produced Fw 190A-4/U3 planes as the F version with the designation F-1. Planes originally built as Fw 190A-5/U3 modifications were designated as F-2.

Generally, through May 1943 271 planes were built as both Fw 190F-2 standard and F-2/tp (desert) versions.

Summary of features

Fw 190F-1 could be distinguished by the following external features:

- A-4 airframe (see A-4 recognition features)
- Fuselage armament of MG 17
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack, with or without ER 4 adapter for four 50 kg SC 50 bombs
- Landing light in port wing leading edge (some aircraft only)

Fw 190F-2 could be distinguished by the following external features:

- A-5 airframe (see A-5 recognition features)
- Fuselage armament of MG 17
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack, with or without ER 4 adapter for four 50 kg SC 50 bombs

Fw 190F-3

The Fw 190F version development program also included other A-5 version modifications: Fw 190A-5/U10, A-5/U11, A-5/U12 and A-5/U17.

The Fw 190A-5/U12 armed with 6 20 mm MG 151/20 E cannons proved to be a development dead-end. Since the cannon were found capable of destroying only lightly armoured targets, the further development of this version in the F series was abandoned.

In contrast, the A-5/U17 became a prototype for the Fw 190F-3 that was introduced into series production in May 1943. Also, The A-5/U10 "universal" wing was adopted for the F series starting from this variant, as it was in the A-6 fighter production. The F-3 was powered, like fighter the version, by a 1272 kW (1730 hp) BMW D-2 engine.

The main production model was the **Fw 190F-3/R1** plane equipped with four (2x2) underwing mounted ETC 50 bomb racks and under-fuselage mounted ETC 501 adapted for bombs or an auxiliary 300 litres fuel tank.. Numerous planes of this version were fitted with desert equipment (**F- 3/R1/tp**).

The next plane would have been the **Fw 190F-3/R3** with two 30 mm MK 103 cannons mounted under the wings. It was not produced because of negative test results from the similarly armed Fw 190A-5/U11 (W.Nr. 151303), which proved too heavy. In addition it was realized that the MK 103 cannon munitions could not penetrate Russian T-34 tank armour. Only three Fw 190F-3/R3 with two MK 103 cannons were built.

The Fw 190F-3 planes were produced until April 1944 in the Arado factory in Warnemunde. 274 F-3 planes of all versions were produced.

In October 1943, planned production of the F-4 version was to start. The main difference between the F-3 and F-4 was a modernized, electrical bomb release installation. The two variants of supplementary armament were provided as in the previous versions: R1 (2x ETC 50 and ETC 501) and R3 (2x MK 103). Other armament was to remain the same (2x1 MG 17 and 2x1 MG 151/20 E). Production did not start.

Two other models, e.g. Fw 190F-5 and F-6 were not produced. Prototypes of these variants were planned as Fw 190 V36 (for F-5) and Fw 190 V37 and V40 (for F-6). The 1765 kW (2400 hp) BMW 801 F engine was to be used as the power plant but the factory didn't have time to start production of this engine and both modifications were cancelled. The same thing happened in the case of Fw 190F-7 plane which was based on the A-7 airframe. Since development work was concentrated on the Fw 190A-8 plane in the latter part of 1943, the F-7 series was abandoned.

Summary of features

Fw 190F-3 could be distinguished by the following external features:

- A-5 airframe (see A-5 recognition features)
- Fuselage armament of MG 17
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack, with or without ER 4 adapter for four 50 kg SC 50 bombs
- A pair of ETC 50 bomb racks under each wing (on most but not all aircraft)

Fw 190F-8

This model was produced in greatest numbers of the all of the F series planes. It was produced based on the A-8 airframe. Production started in March 1944 in the Arado factory in Warnemunde and in the April 1944 in the NDW-Wismar factory.

The Fw 190F-8 was powered by a BMW 801 D-2 engine variant adapted for C3 (96 octane) fuel. An additional injector in the left supercharger inlet for emergency short term (10-15 min) engine power increase during flight under 1000 m altitude was standard equipment.

Armament of this variant consisted of two 13 mm MG 131 machine guns mounted in the fuselage and two 20 mm MG 151/20 E cannons in the wings.

Most of the equipment was the same as in the Fw 190A-8. From April 1944, the FuG 16 ZS radio set, adapted for direct communication with units on the battlefield was introduced in place of the FuG 16 ZY . Only a few planes (compared with previous versions) had a desert equipment including an anti-dust filter.

Most of the early production series F-8 planes had the additional armour used since the F-3 airframes. For weight reduction and improvement in flight characteristics it was not used in later F-8s. These planes had

only the standard Fw 180 A-8 armour. Because the under-fuselage ETC 501 bomb rack was a standard item in A-8 planes all F-8 planes got it as well but without the stabilizers for the droppable fuel tank.

In the second half of 1944, a widened "blown" cockpit canopy was added. The purpose of this modification was to improve the pilot's side-forward visibility, important during fighter-bomber missions.

The Fw 190F-8 could be specialized using following *Umrüstbausatz* kits:

- **Fw 190F-8/U1** - long range fighter-bomber (provided as replacement for the Fw 190G-8 by then withdrawn from production). The plane had underwing pylons installed from the Bf 110 V.Mitt-Schloss (Verkleidetes Messerschmitt Schloss) for mounting two 300 litre fuel tanks and additional fuel pumps inside the wings. Some planes had ETC 503 bomb racks in place of the pylons that gave the capability of carrying two additional 250 kg bombs (in this case the fuel tank was mounted under the fuselage) on ETC 501 racks. It was possible was to mount bombs on all points (2x250 kg and 1x500 kg), this reduced range but made the Fw 190A dangerous plane carrying 1000 kg of bombs.
- **Fw 190F-8/U2** - torpedo plane with two underwing ETC 503 racks or under-fuselage mounted ETC 504 (previously ETC 501) bomb rack. The plane was equipped with a special sight system, TSA 2A (Tiefsturzangle 2A) for precise aerial torpedo BT (Bombentorpedo) aiming. Using this torpedo it was possible to attack targets from a higher altitude and from a higher angle than in the case of an ordinary aerial torpedo LT (Lufttorpedo). It was planned to use two BT 400 or one BT 700 torpedo. Other armament was reduced to two fuselage mounted MG 131 machine guns. A small number of these planes were in service with 11./KG200.
- **Fw 190F-8/U3** - torpedo plane adapted for transportation of the heavy BT 1400 torpedo on an under-fuselage mounted ETC 502 pylon designed specially for this in TWP Gotenhafen-Hexengrund (see the section "Operational use"). His plane had a lengthened tail wheel strut to eliminate the possibility of striking the ground with the torpedo. The plane was equipped with the TSA 2 sight system coupled with a FuG 101 radio altimeter. This version was powered by the more powerful 2000 hp (1470 kW) BMW 801 TS engine. The Ta 152 tail was also mounted.
- **Fw 190F-8/U4** - night fighter-bomber powered by a BMW 801 TS engine with exhaust flames dampers. Standard equipment was: PKS 12 autopilot device, FuG 101 radio altimeter, TSA 2A sight system and other devices to aid night navigation and flight. Armament consisted of aerial torpedoes and bombs that could be carried on two underwing ETC 503 bomb racks. Other armament was reduced to two MG 151/20 E cannons in wings. Probably only one plane built (W.Nr. 586596). Admittedly, NSGr 20 used numerous Fw 190F-8 with flame dumpers and underwing mounted bomb racks but it was not a F-8/U4 but rather field adapted, standard G-8 or F-8/U1 planes.
- **Fw 190F-8/U5** - simplified variant of F-8/U2 modification, without some of the external equipment.

During the process of modifying serial production Fw 190F-8 planes (generally done by cooperants and licence production factories) the decision was made to adapt nearly all *Umrüstbausatz* modifications to *Rustsatz* kit standards. In this way, some U variants were doubled in documentation as R variants. There are six known variants:

- **Fw 190F-8/R1** - fighter-bomber with four underwing mounted ETC 50 bomb racks for 50 kg bombs, later replaced by ETC 71 dispensers for 70 kg bombs (e.g. AB 70 cluster bomb). There are planes known with both dispenser types mounted in pairs of the different types (2x ETC 50 + 2x ETC 71) under the wings.
- **Fw 190F-8/R3** - attack plane with two MK 103 30 mm cannons, similar to the A-5/U11 variant. Only two planes built.
- **Fw 190F-8/R13** - plane adapted for night operations, equivalent to the F8/U4.

- **Fw 190F-8/R14** - torpedo plane adapted to carry aerial torpedoes LT F 5b and LT 1B on the ETC 502 bomb rack. It was a development of Fw 190 A-5/U14 plane. It was equipped with the lengthened tail wheel strut and enlarged Ta 152 tail. Powered by the more powerful BMW 801 TS engine.
- **Fw 190F-8/R15** - equivalent to F-8/U3.
- **Fw 190F-8/R16** - equivalent to F-8/U2.

Summary of features

Fw 190F-8 could be distinguished by the following external features:

- A-8 airframe (see A-8 recognition features)
- "Blown" canopy and pilot head armour braced with solid armoured pylon (all but the first production batches)
- Fuselage armament of MG 131
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack, with or without ER 4 adapter for four 50 kg SC 50 bombs
- Wing armament racks, either a pair of ETC 50 bomb racks, pair of smaller ETC 71 dispensers, ETC 501 bomb rack, (on most but not all aircraft)

Fw 190F-8 Special Armament Options

In the beginning of 1944, due to the difficult situation on the Eastern Front, the Luftwaffe was in desperate need of an attack plane with armament capable of destroying armoured vehicles including Soviet heavy tanks. In this situation, it became vital to arm Fw 190F planes with offensive armament other than bombs. This was not an easy task, because the Luftwaffe had not developed weapon systems adaptable for mounting in light fighter planes. The only way to solve this problem was by trial and error until the proper armament could be found.

First tested on the Fw 190F was the 280 mm mortar **W.Gr. 28/32** with high explosive warhead. This missile was judged as unusable because of its unstable and highly curved flight path that made it impossible to aim them into the targets. Next tested was the **Panzerschreck 1** missile launcher combined into two three barrelled units mounted under wings on ETC 50 or ETC 70 bomb racks. Each missile had a hollow-charge warhead. They were soon replaced by the more modern **Panzerschreck 2** (PD 8.8) launchers combined in units consisting of two launchers with 88 mm missiles with hollow-charge warheads that could be fired individually or in salvos. Equipped in this manner, a Fw 190F-8 (W.Nr. 580383) was tested by Major Eggers at Udetfeld Air Base. The results obtained were satisfactory but there were also some disadvantages like the missile's short (137 m) range and limited accuracy. Despite this, in October 1944 a small number of Panzerschreck 2 equipped planes were delivered to service units on the Eastern Front.

In December 1944, the highly efficient missile **Panzerblitz 1 (Pb 1)** system was developed consisting of six and, more often, eight R4M air-to-air missiles. They were adapted for tank destroying by mounting an 80 mm M8 type warhead for an armour penetration of up to 90 mm. Using the Pb 1 unit it was possible to destroy tanks at a 200 m distance with rockets being fired in salvo or in pairs. The only limitation was a maximum speed of 490 km/hr, not to be exceeded during missile firing. Up to February 1945 the Luftwaffe received 115 **Fw 190F-8/Pb 1** planes.

The successor to the Pb 1 unit was the **Panzerblitz 2 (Pb 2)** unit. The main difference between them was the replacement of the M8 warhead by a hollow-charge warhead able to penetrate up to 180 mm armour. Also developed was the new missile system **Panzerblitz 3 (Pb 3)** with a 210 mm hollow-charge warhead,

but it was not operational by the end of the war. The same situation applied with the **AG 140 (Abschussgerat 140)** missile system consisting of units with two 210 mm missile launchers different from Pb 3. The AG 140 system was tested on the following three Fw 190F-8 planes designated as prototypes: V78 (W.Nr. 551103), V79 (W.Nr. 583303) and V80 (W.Nr. 586600).

Apart from the previously described missile systems on the Fw 190F-8 plane, other weapon systems for ground attack were tested, like the doubled **SG 113 A Forstersonde** missile launchers mounted obliquely inside the wings directed downward. Firing performed automatically using Forstersonde magnetic field detection principle, when the plane flew low over a tank. In October 1944, at the research facility FGZ (Forschungsanstalt Graf Zeppelin) this device was mounted on the prototype Fw 190 V75 (W.Nr. 582071) and W.Nr. 586586 planes. In December 1944, the system was also mounted on the Fw 190 (W.Nr. 933452). This system was found to have low accuracy, so development was abandoned shortly.

In June 1944, the development team commanded by Col. Haupt (Versuchsgruppe Oberst Haupt) prepared a special **Gero II** type flamethrower in three versions: A, B and C. The device was for attacking ground targets. In February 1945, preparatory work began, by the application of additional fuselage bottom cowlings, on a Fw 190F-8 to mount the flame-thrower. There is still no evidence that this project was realized.

Authorities decided that flight tests with the wire guided air-to-air **Ruhrstahl X-4 (Ru 322)** missile, probably with modified ground attack warheads, would be carried out on F-8 planes. For the test two prototypes were used: Fw 190 V69 (W.Nr. 582072), V70 (W.Nr. 580029) and three serial production F-8 planes: W.Nr. 583431, 583438 and 584221. During these flights the more modern **Ruhrstahl X-7 (Ru-374) Rotkappchen** and **Henschel 298** missiles were tested as well. Tests were also carried out with the unpowered **BV 246 (LT 950) Hagelkorn** flying bomb, probably by Fw 190V20.

An F-8 plane was selected to transport the special bomb **SB 800 RS** known also as Prismen Rollbombe "Kurt" 1 and 2 for attacking dams of water reservoirs. This bomb was tested in Deba air base in Pommern, but we have no evidence that an Fw 190F plane was used for these tests.

Fw 190 F-9

In October 1944, the new Fw 190F-9 modification emerged from the production lines. It had its roots in the A-9 plane, and was powered by the more powerful BMW 801 TS engine with the broad-chord wooden VDM propeller of 3500 mm diameter. As in the A-9 model, the new powerplant was equipped with 14-blade fan and 30 mm longer cowling.

The F-9 planes used only the "blown" cockpit canopy. Some planes also got the enlarged wooden vertical tail from the Ta 152 plane. The armament was the same as the previous version (2x1 MG 131 and 2x1 MG 151/20 E).

For this plane, the same R modification kits (except R3) were provided, but in the event only the standard or R1 version were produced. A few planes had Panzerblitz missile launchers.

At the turn of 1944/45, due to the critical shortage in strategic materials for the aviation industry and the expanded fighter plane production program it was necessary to develop substitute parts for the Fw 190 made of wood. These were generally tails, flaps and ailerons, but there is no information which were used and on how many planes.

Proposed next for serial production was the Fw 190F-10 variant based on Fw 190A-10. It would have been powered by the BMW 801 F (TF) engine. Use of the Ta 152 tail was planned as standard. New in this variant were the enlarged main wheels of 740x210 mm size. Because of delays in the BMW 801 F engine production, no aircraft of this variant (nor the A-10) was produced by the war's end.

The next modification after F-10 would have been the Fw 190F-15 powered by the BMW 801 TS engine. This variant was developed from the Fw 190 V66 (W.Nr. 584002) prototype. In some sources there is information that V66 was not a direct F-15 prototype. Another project was Fw 190F-16. Its prototype, V67 (W.Nr. 930516) was a modified F-8 plane. The only difference was the FuG 16 ZE/ZS radio set was replaced by the FuG 15 radio. The last variant, not even realized as a prototype, could have been the Fw 190F-17 destined for marine attack, equipped with a modernized TSA 2A gunsight system.

Summary of features

Fw 190F-9 could be distinguished by the following external features:

- A-9 airframe (see A-9 recognition features)
- Paddle-blade wooden propeller
- "Blown" canopy
- Armoured headrest with cushion, braced with solid armoured pylon
- Fuselage armament of MG 131
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack, with or without ER 4 adapter for four 50 kg SC 50 bombs
- A pair of ETC 50 bomb racks or Panzerblitz rocket launch rails under each wing

Fighter-Bomber Versions

Almost concurrently with the start of production of Fw 190F close support attack version (*Schlachtflugzeug*), its derivative emerged from the production lines - an extended range fighter-bomber, Jabo-Rei (*Jagdbomber mit vergrößerter Reichweite*), designated Fw 190G. This version was an attempt to cope with the service units' need for a fighter with the capability of carrying ground attack weapons to distances considerably greater than the 500-600 km range of a Fw 190F.

Fw 190G-1

During the development of this new version, elements of the **Fw 190A-4/U8** long range fighter-bomber were used, in which range extension was obtained by use of two droppable underwing fuel tanks of 300 litres capacity each. These tanks were carried on VTr-Ju87 pylons produced by the Weserflug company, with duralumin profiled fairings.

However, the increase in fuel weight to 880 kg could considerably reduce aircraft performance and extend takeoff length to the point of reducing the operational ability of the plane from smaller airfields. Therefore it was necessary to keep down the overall weight by simultaneous reduction of armour or armament. The designers applied the second solution, removed the fuselage mounted MG 17 7.9 mm machine guns and resisted applying a second pair of cannons in the wings. Thus the new Fw 190G-1 had armament reduced to only two MG 151/20 E 20 mm cannons mounted in the wing roots with a reduced 150 rounds per cannon ammunition.

For offensive armament the under-fuselage ETC 501 bomb rack could carry 250 and 500 kg bombs or four small 50 kg bombs after the ER 4 adapter applied.

The radio equipment suite deleted the FuG 25a IFF device and often the radio altimeter was not mounted.

Because of the extended engine operational time it was suggested that an additional oil tank be mounted under the cowling, near the windshield, in the place of the previously used MG 17 machine guns.

About 50 Fw 190A-4/U8 planes were produced that were included in the G series and got the official designation Fw 190G-1. During production, the shields of the underwing munitions locks were slightly enlarged and stiffened.

Summary of features

Fw 190G-1 could be distinguished by the following external features:

- A-4 airframe (see A-4 recognition features)
- No fuselage armament
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack
- Underwing VTr-Ju 87 fuel tank racks with broad aerodynamic fairings
- Ju 87-style underwing fuel tanks

Fw 190G-2

The new Fw 190G-2 model was developed from the A-5 series fuselage and its fighter-bomber U8 modification kit (**Fw 190 A-5/U8**). It had the same modifications as used in the A-4/U8 plane.

Additional fuel (468 kg) was placed in underwing fuel tanks but (except for a few early specimens) carried under the wings on simpler V.Mtt-Schloss locks, with two side struts - stabilizers. Duralumin profiled fairings were not used in this plane, because despite its good aerodynamics during the flight to the target, when tanks were mounted, after tank ejection the fairing's influence was highly disruptive - aerodynamical drag was increased, fuel consumption increased and maximum speed was reduced by 40 km/hr. Locks without fairings were beneficial in both flight phases and after tank ejection small locks reduced the speed by only 15 km/hr.

As in the Fw 190G-1, some planes got an additional oil tank.

There were also some planes adapted for night operations designated **Fw 190G-2/N**. The main difference was application of flame dampers to protect the pilot from blinding and to reduce the possibility of early detection of the plane by enemy anti-aircraft defence. A smaller change worth a word is the application of landing lights to the left wing leading edge (in all planes).

Summary of features

Fw 190G-2 could be distinguished by the following external features:

- A-5 airframe (see A-5 recognition features)
- No fuselage armament
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack
- Underwing V.Mtt-Schloss fuel tank racks with supporting struts rather than solid fairings
- Bf 110-style underwing fuel tanks

- Landing light in port wing leading edge (some aircraft only)

Fw 190G-3

During the summer of 1943 production of modified Fw 190G-3 planes started. In this series the "universal" wing from the Fw 190 A-6 was applied as standard and underwing shackles for fuel tanks were replaced by similar ETC 501 V.Fw Trg (*Verkleideter Focke-Wulf Trager*) bomb racks. This solution gives this version the ability to carry both fuel tanks and 250 kg bombs, this considerably increased offensive plane capabilities.

In addition to this change, the Fw 190G-3 plane was equipped with the autopilot device PKS 11 (also the more modern version, PKS 12) to reduce pilot workload during long-range flights (maximum flight time for Fw 190G was about 2.5 hours).

Beginning in October 1943 Fw 190G-3 and later version planes were powered by the BMW 801 D-2 engine adapted for C3 (96 octane) fuel and fitted with an additional injector in the left supercharger inlet. That made it possible to briefly (10-15 min.) increase engine power during flights at low altitudes (under 1000 m).

The G-3 had also a desert version, **Fw 190G-3/tp**, with anti-dust filters and other equipment useful during operations over desert or steppe regions.

Some planes were modified by mounting these R kits:

- **Fw 190G-3/R1** - heavily armed attack fighter with two WB 151/20 pylons in place of underwing V.Fw Trg. racks. This variant had armament of 2x1 MG 151/20 E with 250 rounds per cannon and 2x2 MG 151/20 E with 125 rounds per cannon. This modernization was ordered in September 1943 to be made by LZA workshops at Sagan-Kupper Air Base. These planes did not have the autopilot device or additional armour. Planes would have been used for bomber formation attack and ground attack.
- **Fw 190G-3/R5** - close support attack aircraft modified similar to the F-3/R1 standard. In place of V.Fw Trg. racks, ETC 50 bomb racks (2x2 50 kg bombs) were mounted. In this modification, no additional armour and oil tank were applied. Some planes were again equipped with fuselage mounted MG 17 machine guns. Most of the planes had the autopilot device.

Summary of features

Fw 190G-3 could be distinguished by the following external features:

- A-6 airframe (see A-6 recognition features)
- No fuselage armament
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack
- Underwing ETC 501 racks with narrow fairings for fuel tanks or bombs

Fw 190G-8

Next, and the last production series of the G version, was the Fw 190G-8 plane (G-4 to G-7 variant designated small modifications that were not realized).

The basis for this version was the A-8 airframe. It included all modifications applied to this version and the enlarged cockpit canopy from the Fw 190F-8. Despite the fact that the plane did not have fuselage mounted machine guns, the G-8 got new, enlarged upper covers forward of the cockpit, just like the F-8 which had the MG 131 guns installed. For transportation of additional fuel tanks and bombs the new ETC 503 bomb racks were used.

Some G-8 planes also got flame dampers (version **Fw 190G-8/N** adapted for night operation).

To widen Fw 190G-8 operational use, the following *Rustsatz* kits were provided:

- **Fw 190G-8/R4** - an unrealized project of a plane equipped with a GM 1 installation for nitrogen monoxide (N₂O) injection for increased power rising (larger amount of oxygen available for combustion) at high altitudes.
- **Fw 190G-8/R5** - had four underwing ETC 50 (or ETC 70) bomb racks in place of two ETC 503.

In an emergency, single Fw 190G planes were adapted for the transportation of high weight bombs under the fuselage (1000, 1600 and 1800 kg). In this modification, the shock absorber leg was strengthened and wheels with strengthened tires were used. Also used were special bomb racks (Schlos 1000 or 2000) in place of the ETC 501 bomb rack. The Fw 190G planes with these higher bomb loads needed as long as 1200-1300 m of runway for takeoff.

Production of G-8 version continued from September 1943 to February 1944. In the late series G-8 planes (from February 1944), the autopilot device was not used. Also, late-production Fw 190G-8 aircraft had the fuselage MG 131 guns installed, effectively eliminating the difference between this variant and the F-8. Thus, "pure" Fw 190G8 became identical with Fw 190F-8/U1, and G-8/R5 identical with F-8/R1.

As a consequence, G-8 production was abandoned in February 1944 in favour of modified F-8 series planes. About 800 Fw 190G planes of all versions were produced.

Summary of features

Fw 190G-8 could be distinguished by the following external features:

- A-8 airframe (see A-8 recognition features)
- "Blown" canopy
- Armoured headrest with cushion, braced with solid armoured pylon
- No fuselage armament, but retained bulged gun cover of the fighter version
- Wing armament of MG 151 in inboard positions, with protruding barrels and wing root blisters.
- No outer wing armament
- Centerline ETC 501 bomb rack
- Underwing ETC 503 racks in streamlined pylons

Mistel Sets

As was the case previously with the Bf 109, the Fw 190 (generally in A-8/F8/G-8 versions) was used as a guiding plane for units with a crewless Ju 88 bomber called Mistel and for training (with a piloted Ju 88) - Mistel S. For this bomber, sets were developed with different types of hollow-charge warheads mounted in the front of the Ju 88 fuselage in place of the cockpit. There were several variants of Mistel and Mistel S sets. The main difference was the variant of Ju 88 plane and guiding plane used.

The research and development Centre working on these constructions was situated in Nordhausen and the Leipzig-Mockau repair factory and ATG in Merseburg were involved in the process of preparation of the Ju 88 bombers.

The Fw 190 was used in Mistel 2, 3A, 3B, 3C, Mistel S2A, S3A, S3B, S3C sets. The Fw 190 adapted for the Mistel set had armament removed and under the forward cowling was mounted an additional oil tank (most of the G8 planes had this tank mounted previously).

On the wing spar and on the aft fuselage, joints for connecting struts with electrical and control connections were mounted. The TSA 1 device was provided for guiding the lower aircraft.

Because of the large number of modifications adopted for Mistel sets, planes received the additional designation M (e.g. **Fw 190A-8/M**).

Also developed, but unrealized, was a Mistel set project with Fw 190 and Ta 154 planes.

Epilogue

Finally, a comment on quoted production numbers of each variant. For many variants of the Focke-Wulf fighter, finding the true number of planes produced is impossible for the following reasons: first - full documentation is not in existence from all Focke-Wulf airframe factories and companies manufacturing the plane under licence, second - we don't know how many airframes (particularly F series) were assembled in special small workshops (e.g. Menibum), whose main aim was building of torpedo and other variants for special purposes.

The other complicating factor, sometimes making detailed compilation impossible is that many planes were assembled in field workshops where airframes and engines from planes withdrawn from service units were recycled. In this process, fully operational planes were made from parts of heavily damaged fighters withdrawn from service. For example, from a plane with a heavily damaged airframe, wings were taken and mounted to another plane with damaged wings. Often such 'composite' airframes had tail and engine taken from other Fw 190A, F or G. These composite planes, sometimes a completely new 'version', received new individual serial numbers and were sent to a field unit after a test flight .

Example of this practice is seen in a Fw 190F-8/R-1 plane stored in the National Air and Space Museum (NASM) in Washington, USA. When, after storage in the Silver Hill facility, the process of restoration started, the old identification plate on the fuselage with serial number (*Werksnummer*) W.Nr. 640069 was found. This is evidence that the airframe was taken from an A-7 plane. After rebuilding during the war, this particular plane was modified to Fw 190F-8 standard, got a new serial number (W.Nr. 931884) and was again sent to a service unit.

All things considered, the number of Fw 190 fighters produced with radial engines can be estimated to 17,000 planes minimum. Some authors quote higher numbers, but because each source is different, these numbers are not credible.

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