

Focke-Wulf Fw 190

Fw 190



Fw 190As of [Jagdgeschwader 54](#).

Type Fighter

Manufacturer Primarily [Focke-Wulf](#) Flugzeugbau AG, but also Ago, Arado, Fieseler, Mimetall, Norddeutsche Dornier and others

Designed by [Kurt Tank](#)

Maiden flight [1 June 1939](#)

Introduced August 1941

Retired 1945 (*Luftwaffe*)

Primary users [Luftwaffe](#)
[Hungarian Air Force](#)
[Turkish Air Force](#)
[Romanian Air Force](#)

Produced [1941-1945](#)

Number built Over 20,000

Variants [Ta 152](#)

The [Focke-Wulf Fw 190 Würger](#) ("[shrike](#)"), often called **Butcher-bird**, was a single-seat, single-engine [fighter aircraft](#) of Germany's [Luftwaffe](#), and one of the best fighters of its generation. Used extensively during the [Second World War](#), over 20,000 were manufactured, including around 6,000 fighter-bomber models. Production ran from [1941](#) to the end of hostilities, during which time the aircraft was continually updated. Its final incarnations retained qualitative parity with Allied fighter planes, although Fw 190s lagged far behind in production numbers.

The Fw 190 was well liked by its pilots, and widely regarded as superior to the front line [Supermarine Spitfire](#) Mk V on its combat debut in 1941. Compared to the [Bf 109](#), the Fw 190 was a "workhorse,"

employed in and proved suitable for a wide variety of roles, including ground attack, long-range bomber escort, night-fighter and (especially in the "D" version) high-altitude interceptor.

Early development

In autumn 1937, the [Reichsluftfahrtministerium](#) (RLM) or Reich Air Ministry asked various designers for a new fighter to fight alongside the [Messerschmitt Bf 109](#), Germany's front line fighter. Although the Bf 109 was at that point an extremely competitive fighter, the RLM was worried that future foreign designs might outclass it and wanted to have new aircraft under development just in case.^[1]

[Kurt Tank](#) responded with a number of designs, most incorporating liquid-cooled inline engines. However, it was not until a design was presented using the air-cooled, 18-cylinder [BMW 139 radial engine](#) that the RLM's interest was aroused. At the time, use of radial engines was unusual in Europe because of their large frontal area and the belief that they caused too much drag to allow for a competitive design. Tank was not convinced of this, having witnessed the success of the [Pratt & Whitney Wasp](#) radial engines used by the [US Navy](#), and designed a highly [streamlined](#) mounting for the engine.^[2] Instead of leaving the front of the engine "open" to allow cooling air to flow over the cylinders, Tank used a very small opening between the engine cowling and an oversized propeller spinner to admit air, blowing it over the engine with a fan. In theory, the use of the tight-fitting cowling also provided some thrust due to the compression of air at speed through the cowling.^[3]



Fw 190A

It was also believed that because Fw 190 used a radial engine it would not affect production of the Bf 109, furthering the RLM's interest in the Fw 190.^[4]

Prototypes

The first prototype, the **Fw 190 V1** powered by a 1,550 hp BMW 139 18 cylinder radial engine, with civil registration **D-OPZE**, was flown on [1 June 1939](#) and soon showed exceptional qualities for such a comparatively small aircraft, with excellent handling, good visibility and speed (initially around 610 km/h (380 mph)).^[5] The roll rate was 162 degrees at 410 km/h (255 mph) but the aircraft had a high stall speed of 205 km/h (127 mph). According to the pilots who flew the first prototypes, its wide landing gear made takeoff and landing easier, resulting in a more versatile and safer aircraft on the ground than the Bf 109.

Problems with a far-forward cockpit location, directly behind the engine, resulted in a cockpit that became too hot for comfort. In fact during the first flight, the temperature reached 55 C (131 F), after which Focke Wulf's chief test pilot, Hans Sander commented: "It was like sitting with both feet in the fireplace."^[6] For months, Focke Wulf and BMW traded blame. Finally, BMW convinced Tank and the RLM to drop the 139 engine in favor of the new [801 engine](#). The 801 engine was similar in diameter to the 139, although it was heavier and longer by a considerable margin. This required Tank to redesign the 190. Even with the new engine and the cooling fan, the 801 suffered from very high rear row cylinder head temperatures which, in at least one case, resulted in the detonation of the fuselage mounted MG 17 ammunition.

Engine problems plagued the 190 for much of its early development, and the entire project was threatened several times with a complete shutdown. If not for the input of *Oberleutnants* Karl Borris and Otto Behrens, both of whom had enlisted in the *Luftwaffe* as mechanics, the Fw 190 program might very well have died before reaching the front lines. Borris and Behrens could see past the limitations of the Fw 190 and the 801 and see a formidable fighter. During several RLM commissions that wished to terminate the program, both men indicated that the Fw 190's outstanding qualities outweighed its deficiencies.

These deficiencies were corrected in later V-series prototypes before the A-0 production prototypes were built. Examples of the A-0 series were delivered to front-line squadrons in late 1940, but the aircraft did not reach combat units in any numbers until August and September 1941. Engine reliability problems (overheating was the primary concern) seen in the prototypes continued to plague the Fw 190 until spring 1942 and the availability of the BMW 801 C-2 engine in the Fw 190 A-2. In fact, the problem was solved by simply rerouting part of the exhaust system, a method discovered by III./JG 26's Rolf Schroedter. To further help matters, the rerouting could be done easily in *Gruppe* workshops.

Operational Service

For the first few months of the Fw 190's combat career, the [Allies](#), being entirely unaware of the new fighter, attributed pilots' reports of a new 'radial-engined fighter' to [Curtiss P-36](#) Mohawks captured from the French. The new fighter outperformed the Spitfire Mk V then in service with the RAF in all aspects except turning radius. As Allied fighter losses rose and local air superiority over the [Channel front](#) passed to the *Luftwaffe*, Allied plans were tentatively made to launch a [Commando](#) raid on a *Luftwaffe* airfield to snatch a Fw 190 for evaluation. However, the British acquired an intact Fw 190 A-3 in late June 1942, when [Jagdgeschwader 2](#) pilot Oblt. [Armin Faber](#) landed on a British airfield by mistake.^[7] Taking advantage of this, the RAF was quick to study the aircraft for any novel design elements.^[8] In particular, the cooling system and installation of Fw 190's [radial engine](#) was a direct influence on [Hawker Siddeley's Tempest II](#). The British confirmed that the Fw 190 could outperform, in most aspects, the then top-of-the-line [Spitfire](#) Mk V. In terms of firepower, rate of roll and straight line speed at low altitude, the Fw 190 was considerably better, a discovery which prompted the rush development of the Spitfire Mark IX with the new two-stage supercharged Merlin 61 engine.

The Fw 190's first significant mass engagement took place on [19 August](#) 1942, during [Operation Jubilee](#), the Allied raid on [Dieppe](#). *Jagdgeschwaders* [JG 2](#) and [JG 26](#) had recently converted from the Bf 109, fielding 115 fighter aircraft during the day's fighting, including a small number of Bf 109 G models. The RAF committed over 300 fighter aircraft, consisting mostly of Spitfire V models, with just six squadrons of Spitfire Mk IX, and also some of the new [Hawker Typhoons](#). In addition several squadrons of [Hawker Hurricanes](#) and RAF [Mustangs](#) performed fighter-bomber and reconnaissance duties. During the action, the two *Jagdgeschwadern* lost 25 Fw 190s to all causes, including crashes, but, in return, they claimed 106 Allied aircraft. Fighting over occupied territory, the RAF lost 81 pilots and aircrew killed or taken prisoner, against *Luftwaffe* fighter losses of 14 pilots killed. ^[1] During the engagement, the Fw 190 was also successfully used against Allied naval vessels as an attack aircraft. ^[2]

On the Eastern Front, the Fw 190 achieved great renown with the celebrated unit, [JG54 Grünherz](#), the *Jagdgeschwader* most often associated with the Fw 190 and the first to complete the transition from the Bf 109 in March 1943. With the "butcher bird," as the Fw 190 was informally known, JG54 produced some of the highest-scoring fighter aces in history, among them [Otto Kittel](#) (267 victories) and [Walter Nowotny](#) (255 victories).

During 1943, the Fw 190 equipped specialist *Jabo Staffeln* of both JG 2 and JG 26, undertaking nuisance fighter-bomber raids on the south coast of England. Initial successes were soon replaced by mounting losses and negligible bombing results as the raids were countered by the Hawker Typhoon's capabilities at low-level. The fighter-bomber and ground attack versions were introduced in increasing numbers on the [Eastern Front](#) throughout 1943, replacing the obsolete [Junkers Ju 87](#).

As the USAAF's daylight bombing offensive grew in size through 1943, the Fw 190 became a "bomber-destroyer" with ever heavier armament and armour fitted. The type's performance above 20,000 feet dropped off considerably as a result, making the Fw 190 an increasingly vulnerable target for Allied escort fighters.

Fw 190 A



Fw 190 A-3, III./JG 2, Hans Hahn, France 1942

There were nine distinct sub-variants of the original Fw 190 A.

The **Fw 190 A-1** first rolled off the assembly lines in June 1941. The first few models were shipped to the *Erprobungsstaffel* (formerly from II./JG 26 *Schlageter*) for further testing. Following testing the Fw 190 A-1s entered service with II./JG 26 stationed outside of Paris, France. The A-1 was equipped with the BMW 801C-1 engine, rated at 1,560 hp (1,160 kW). Armament consisted of two fuselage mounted [MG 17s](#), two wing root mounted MG 17s and two outboard wing mounted [MG FF/MS](#). For the most part, the MG 17s were thought to be almost useless in what was then modern air combat and therefore gained the nickname "rattles." There were 102 Fw 190 A-1s built between June and August of 1941. The A-1 models still suffered from the overheating that prototype Fw 190s suffered from in testing. Many of these early engines reached only 30-40 hours of use (sometimes less) and had to be replaced soon after.^[9]

The first **Fw 190 A-2s** were assembled in August 1941. Equipped with the BMW 801 C-2, producing 1,600 hp (1,190 kW), the new engine finally resolved most of the overheating issues. The addition of new ventilation slots on the side of the fuselage aided cooling further. The A-2 wing weaponry was updated, with the two wing root mounted MG 17s being replaced by 20 mm [MG 151/20E](#) cannons. With the introduction of the new cannons, the Revi C12/C gun sight was upgraded to the new C12/D model. Some A-2s were also outfitted with the ETC-501 bomb rack. Another major change switched the hydraulic landing gear to electric actuation, as issues had been reported in combat units with the A-1 gear. The introduction of the A-2 marked a shift in air supremacy from the British and the Spitfire Mk V to the Germans. Due to similarities with the A-3, most build numbers of the A-2 include the A-3 model. About 910 A-2 and A-3s were built between October 1941 and August 1942.^[10]

Production of the **Fw 190 A-3s** started in spring 1942. The A-3 model was equipped with the BMW 801D-2 engine, which increased power to 1,700 hp (1,270 kW) by raising the compression ratio and increasing the power of the compressor. Due to these changes the A-3 model required a higher octane fuel – 100 (C3) versus 87 (B4). The A-3 retained the same weaponry as the A-2. Soon after entering service on the [Eastern Front](#), the A-3 controlled the air over Russia. The A-3 also introduced the [Umrüst-Bausätze](#) – factory conversion sets. The U1 featured an ETC-501 bomb rack with the removal of the MG FFs in the outer wings. The U2 added RZ 73 mm rocket launchers inside the wing, with three launchers per wing. The U3 introduced the *Jabo* ([Jagdbomber](#)), adding an ETC-501 center

line bomb rack and one SC-50 bomb under each wing. The U3 retained the fuselage mounted MG 17s and the MG 151 wing cannons. The U4 was a reconnaissance version with two Rb 12.5 cameras in the rear fuselage with armament similar to the U3, however the ETC-501 was typically fitted with a 300 l drop tank. There were also a small number of U7 aircraft tested as high altitude fighters armed with only two MG 151 cannons, but a reduced overall weight. See the A-2 model for build numbers. ^[11]

Introduced in June 1942, the **Fw 190 A-4** was equipped with the same engine and basic armament as the A-3. It was, however, equipped with updated radio gear, and in some instances pilot-controllable engine cooling vents. The A-4's main improvement was the number of *Umrüst-Bausätze* versions. The U1 was outfitted with under wing bomb racks and the removal of all armament with the exception of the MG 151 cannons. The U3 was designed as a *Jabo*, fitted with under wing ETC-501 racks, which could be fitted with either SC-250 bombs or 300 l drop tanks. The U3 also was deployed in night missions having some slight modifications such as exhaust suppressors and landing lights being fitted. The U3 served as the basis of the Fw 190 F-1 assault fighter. The U4 was a reconnaissance fighter, with two Rb 12.4 cameras in the rear fuselage and a EK16 or Robot II gun camera. The U4 was equipped with the fuselage mounted MG 17s and MG 151 cannons. The U7 was a high-altitude fighter, easily identified by the compressor air intakes on either side of the cowling. Galland himself flew a U7 in the spring of 1943. The U8 introduced the *Jabo-Rei* (*Jagdbomber Reichweite*), adding a 300 l drop tank on the centerline and two SC 50 bombs under each wing. The MG FF/M cannons were sometimes removed which allowed the addition of two SC-250 mounted on each side of wing mounted drop tanks. The U8 served as the basis of the Fw 190 G. Some A-4s were outfitted with underwing WGr 21 rocket mortars, these were designated Fw 190 A-4/R6. A total of 976 A-4s were built between June 1942 and March 1943. ^[12]

The **Fw 190 A-5** was developed when it was found that the Fw 190 could easily carry more ordnance. The nose was lengthened by 15 cm, and the aircraft was equipped with the BMW 801D-2 engine, rated at 1,700 hp (1,270 kW). New radio gear, including [IFF](#) (via the FuG 25a) and the newly invented electronic [artificial horizon](#) found their way into the A-5. The A-5 retained the same basic armament as the A-4. The A-5 too, saw several *Umrüst-Bausätze* kits. The U2 was designed as a night *Jabo-Rei* and featured anti-reflective fittings and exhaust flame dampeners. A center line ETC-501 rack typically held a 250 kg bomb, and wing mounted racks mounted 300 l drop tanks. A EK16 gun camera, as well as landing lights, were fitted to the wing leading edge. The U2 was armed with only two MG 151 cannons. The U3 was a *Jabo* fighter fitted with ETC-501s for drop tanks and bombs; it too featured only two MG 151 for armament. The U4 was a "recon" fighter with two Rb 12.5 cameras and all armament of the base A-5 with the exception of the MG FF cannons. The U8 was another *Jabo-Rei* outfitted with SC-250 centerline mounted bombs, under wing 300 l drop tanks and only two MG 151s; the U8 later became the Fw 190 G-2. A special U12 was created to fight American and British bombers, outfitted with two 20 mm cannons, two 30 mm cannons and two 13 mm machine guns. Other A-5 versions featured wing mounted cannon and machine gun pods such as the WB 151/20 pod. There were 1,752 A-5s built from November 1942 to June 1943. ^[13]



Fw 190A starting up

The **Fw 190 A-6** was developed to fix the shortcomings found in previous A models when fighting US heavy bombers. Modifications to the type to date had caused the weight of the aircraft to creep up. To

combat this and to allow better weapons to be installed in the wings, a larger, bigger, lighter wing was designed. This new wing was introduced into production with the A-6. The normal armament was increased to two MG 17 machine guns and four MG 151/20E cannons. It is believed the MG 17s were kept because their tracer rounds served as a targeting aid for the pilots. New armor plates were added to the canopy in order to fit the new canopy fittings, as well as a new FuG 16ZE [radio navigation](#) system. The A-6 was outfitted in numerous ways with various [Rüstsätze](#) (field modification kits) sets, including a 30 mm thick transparent armor plates added to the canopy and windshield to better protect the pilots from tail gunners of the heavy bombers. More flexible than the factory upgrade kits for previous versions, these field upgrade kits allowed the A-6 to be refitted in the field as missions demanded. About 1,055 A-6s were built between May 1943 and March 1944. ^[14]

The **Fw 190 A-7** was based on the Fw 190 A-5/U9, and entered production in November of 1943. The A-7 was equipped with the BMW 801 D-2 engine, again producing 1,700 hp (1,270 kW). The basic armament was finally updated to include two fuselage mounted MG 131, two wing root mounted MG 151s and two outer wing mounted MG 151s. The Revi gun sight was updated to the new 16B model. The addition weight of the new weapon systems required the updating of the wheels to a reinforced rim to better deal with typical combat airfield conditions. The A-7 was typically outfitted with the centerline mounted ETC-501 rack. There were several major [Rüstsätze](#) for the A-7 many including WGr 21 rockets. 701 A-7s were produced from November 1943 to April 1944 to move assembly lines to the A8. ^[15]



Focke-Wulf Fw 190 A-8 in 1944

The **Fw 190 A-8** entered production in February 1944. The A8 model introduced the *erhöhte notleistung* emergency boost system to the fighter variant of the Fw190A (a similar system had been fitted to some earlier jabo variants of the 190A). The *erhöhte notleistung* system operated by spraying additional fuel into the fuel/air mix cooling it and allowing higher boost pressures to be run, but at the cost of much higher fuel consumption. The A-8 was equipped with a new wooden propeller easily identified by its wide paddle-shaped blades and a new canopy design similar to the “[bubble](#)” canopies in widespread use by the Allied air forces. Nearly a dozen [Rüstsätze](#) kits available for the A8, including the famous A8/R2 and A8/R8 models which were outfitted with heavy armor including 30 mm canopy and windscreen armor, 5 mm cockpit armor and upgraded outer wing cannons to the [MK 108](#) 30 mm cannon that could destroy most heavy bombers with two or three hits. Over 6,550 A-8 airframes were produced with at least eight factories turning out the fighter. ^[16]

The **Fw 190 A-9** was the last A model produced, and was first built in September 1944. The A-9 was fitted with the new BMW 801S, called the 801TS when shipped as a “power-egg”, or *Kraftei*, engine (an aircraft engine installation format embraced by the *Luftwaffe* for a number of engine types on operational aircraft, partially for easy field replacement), rated at 2,000 hp (1,490 kW); the more powerful 2,400 hp (1,790 kW) [BMW 801F](#) was not available. Cowl mounted armor was upgraded from the 6 mm on earlier models to 10 mm. The A-9 was very similar to the A-8 in most other aspects, including the armament and [Rüstsätze](#) kits. 910 A-9s were built between April 1944 and May 1945. ^[17]

In total about 13,291 Fw 190As were produced in all variants. ^[18]

Fw 190 D "Dora"



The Fw 190 D-9 was a greatly improved version featuring, despite the appearance, an in-line engine. It was considered a match for the best Allied fighters of the time.

The Fw 190 D (nicknamed the Dora-9 "*Dora-Neun*"; or Long-Nose Dora, "*Langnasen-Dora*") was introduced for one primary reason: high altitude performance. While previous versions of the Fw 190 were very effective at low and medium altitudes, they lacked performance at the higher altitudes at which the American heavy bombers (such as the [B-17 Flying Fortress](#)) and accompanying Allied escort fighters operated.

Two previous Fw 190 development platforms attempted to solve these performance issues. Both the Fw 190 B and C airframe series were developed to tackle this issue, and all attempts to do so had failed for various reasons, including and not limited to high performance superchargers and turbo systems, reliable cockpit pressurization systems, poor material availability and the war demand itself. [\[citation needed\]](#)

The Fw 190 D began development in 1942 at the same time as the B and C variants. However, starting in 1941, Kurt Tank saw a need for the move to an inline engine when the Spitfire and soon the P-51 Mustang began flying over Western Europe. Tank knew the move to an inline engine could help the Fw 190 in its altitude performance. [\[citation needed\]](#)

In October 1942, the first mock-up Fw 190 D was built with a [Jumo 213 A](#) engine installed. Tank had always preferred the DB 600 series engines, especially the DB 603, but they were in short supply due to the requirements of Bf 109 and Bf 110 production; thus Tank had to make do with what was available, which was the then-new, Jumo 213. The liquid-cooled 1,750 PS (1,726 hp, 1,287 kW) Jumo 213 A could produce 2,100 PS (2,071 hp, 1,545 kW) of emergency power with MW-50 injection. [\[citation needed\]](#)

As with the B and C variants, attempts to pressurize the cockpit failed, and resulted in the Fw 190 D undergoing some rather major redesigns, and leading to the cancellation of both the D-1 and D-2 models.

The first Dora to make it into volume production was the unpressurized **Fw 190D-9** model.

Due to the multiple attempts to create an effective next generation 190, as well as the comments of some *Luftwaffe* pilots, expectations of the Dora project were low. These impressions were not helped by the fact that Tank made it very clear that he intended the D-9 to be a stop-gap until the Ta 152 arrived. These negative opinions existed for some time until pilot feedback began arriving at FW and the *Luftwaffe* command structure. [\[19\]](#)

In order to fit the new engine in the Fw 190 fuselage while maintaining proper balance and weight distribution, both the nose and the tail of the aircraft were lengthened, adding nearly 1.52 meters to the fuselage, bringing the overall length to 10.192 meters versus the 9.10 meters of the late war A-9 series. The tail lengthening was accomplished with a simple added fuselage section, spliced in-

between the complete tail unit's front mating line and the extreme rear of the fuselage. Furthermore, the move to an inline engine required more components to be factored into the design, most significantly the need for coolant radiators (radial engines are air-cooled). To keep the design as simple and as aerodynamic as possible, Tank used an annular radiator (i.e. the radiator was shaped like a doughnut instead of the usual rectangle) installed at the front of the engine, similar to the configuration used in the Jumo powered versions of the [Junkers Ju 88](#), which gave the appearance that the D-9 was still a radial engine-powered aircraft^[20].

As it was used in the anti-fighter role, armament in the "D" was generally lighter compared to that of the earlier aircraft - usually the outer wing cannon were dropped so that the armament consisted of two 13 mm MG 131 machine guns and two 20 mm MG 151/20E wing root cannon. What little it lost in roll rate, it gained in turn rate, climb, dive and horizontal speed. The Dora still featured the same wing as the A-8, however, and was capable of carrying outer wing cannons as well, as demonstrated by the D-11 variant, with a three-stage supercharger and four wing cannon (two MG 151s and two MK 108s).^[21]

As stated before, pilots worried that the new Fw 190 would be a clumsy mix-and-match patchwork of designs and equipment. However, when they first flew the Dora-9, they were impressed. Sporting excellent handling and performance characteristics, it became very clear that the Dora-9 was nearly the perfect response to the *Luftwaffe's* need for a high-altitude, high-speed interceptor. When flown by capable pilots, the Fw 190 D proved to be a match for P-51s and Mk XIV Spitfires. In most World War II pilot circles the Dora-9 and the similar [Ta 152](#) were considered the pinnacle of German prop-driven aircraft.^[citation needed]

Some Fw 190 Ds served as fighter cover for [Me 262](#) airfields as the jet fighters were very vulnerable on takeoff and landing. These special units were known as *Platzsicherungstaffe*, and had the entire aircraft underside painted in red and white or sometimes black and white stripes. This unique color scheme served to help anti-aircraft artillery protecting the airfields identify friendly aircraft. The best known of these covering squadrons guarded the airfield of [JV 44](#), operational late in the war, from about March 1945 to May 1945.^[citation needed]

Attack versions

While nearly all variants of the Fw 190 could carry bombs and other air-to-ground ordnance, there were two dedicated attack versions of the Fw 190. The *Luftwaffe* was looking for aircraft to replace the Hs 123 biplane, which were seriously outmatched in 1942, as well as the slow and heavy Ju 87. Two versions of the Fw 190 rose to the occasion to supply what the *Luftwaffe* and RLM were looking for.^[citation needed]

[\[edit\]](#) Fw 190 F

The Fw 190 F was started as a Fw 190 A-0/U4. Early testing started in May 1942. This A-0 was outfitted with centerline and wing mounted ETC-50 bomb racks. The early testing was quite good, and Focke-Wulf began engineering the attack version of the Fw 190. New armor was added to the bottom of the fuselage protecting the fuel tanks and pilot, the engine cowling, and the landing gear mechanisms and outer wing mounted armament. Finally the *Umrüst-Bausatze* kit 3 was fitted to the plane by means of a ETC-501 or ER4 centerline mounted bomb rack and up to a SC250 bomb under each wing. This aircraft was designated the Fw 190 F-1. The first 30 Fw 190 F-1s were converted Fw 190 A-4/U3s; however, Focke-Wulf quickly began assembling the planes on the line as Fw 190 F-1s as their own model. The Fw 190 F-2s were converted Fw 190 A-5/U3s, which again were soon assembled as Fw 190 F-2s, not refitted A-5s. There were about 270 Fw 190 F-2s built.^[citation needed]

The **Fw 190 F-3** was based on the Fw 190 A-5/U17, which was outfitted with a centerline-mounted ETC-501 bomb rack, and two double ETC-50 bomb racks under each wing. 432 Fw 190 F-3s were built.

Due to issues creating an effective strafing Fw 190 F able to take out the Russian T-34 tank, the F-4 through F-7 models were abandoned, and all attempts focused on conversion of the Fw 190 A-8.

The **Fw 190 F-8** differed from the A-8 model with a slightly modified injector on the compressor which allowed for increased performance at lower altitudes for several minutes. The F-8 was also outfitted with the improved FuG 16ZS radio unit which provided much better communication with ground combat units. Armament on the Fw 190 F-8 was two [MG 151/20](#) 20 mm cannon in the wing roots and two [MG 131](#) machine guns above the engine. At least 3,400 F-8 were built, probably several hundreds more in December 1944 and from February to May 1945. ^{[citation needed](#)}

Dozens of F-8s served as various test beds for anti-tank armament, including the WGr.28 280 mm ground-to-ground missile, 88 mm *Panzerschreck* 2 rockets, *Panzerblitz* 1 and [R4M](#) rockets.

There were also several *Umrüst-Bausätze* kits developed for the F-8, which included: The U1 long range *Jabo*, outfitted with underwing V.Mtt-Schloß shackles to hold two 300-liter fuel tanks. ETC-503 bomb racks were also fitted, allowing the Fw 190 F-8/U1 to carry one SC250 bomb under each wing and two SC250 bombs on the centerline.

The U2 torpedo bomber, outfitted with an ETC-503 bomb rack under each wing and a centerline-mounted ETC-504. The U2 was also equipped with the TSA 2A weapons sighting system that improved the U2's ability to attack seaborne targets.

The U3 heavy torpedo bomber was outfitted with an ETC-502, which allowed it to carry one BT-1400 heavy torpedo. Due to the size of the torpedo, the U3's tail gear needed to be lengthened. The U3 also was fitted with the 2000-hp BMW 801S engine, and the tail from the Ta-152.

The U4, created as a night fighter, was equipped with flame dampers on the exhaust and various electrical systems such as the FuG 101 radio altimeter, the PKS 12 automatic pilot, and the TSA 2A sighting system. Weapons fitted ranged from torpedoes to bombs; however, the U4 was outfitted only with two MG 151/20 cannon as fixed armament.

The **Fw 190 F-9** was based on the Fw 190 A-9 but with the new Ta-152 tail unit, a new bulged canopy as fitted to late-build A-9s, and four ETC-50 or ETC-70 bomb racks under the wings. 147 F-9 were built in January 1945, probably several hundreds more in December 1944 and from February-May 1945. ^{[citation needed](#)}

Fw 190 G

The Fw 190 G was built as a long range attack aircraft (*Jabo-Rei*, or *Jagdbomber mit vergrößerter Reichweite*). Following the success of the Fw 190 F as a *Schlachtflugzeug* (close support aircraft), both the *Luftwaffe* and Focke-Wulf began investigating ways of extending the range of the Fw 190 F. From these needs and tests, the Fw 190 G was born.

There were four distinct versions of the Fw 190 G: The **Fw 190 G-1**: The first Fw 190Gs were based off of the Fw 190 A-4/U8 *jabo-rei*'s. Initial testing found that if all but two wing root mounted MG 151 cannons (with reduced ammo load) were removed, the Fw 190 G-1 as it was now called, could carry a 250 kg or 500 kg bomb on the center line and, via an ETC 250 rack, up to a 250 kg bomb under

each wing. Typically the G-1s flew with underwing fuel tanks, fitted via the VTr-Ju 87 rack. The FuG 25a IFF (identification friend/foe) was fitted on occasion as well as one of the various radio direction finders available at the time. With the removal of the fuselage mounted MG 17s, an additional oil tank was added to support the BMW 801 D-2 engine's longer run times. [\[citation needed\]](#)

The **Fw 190 G-2**: The G-2 was based on the Fw 190A-5/U8 aircraft. The G-2s were similarly equipped to the G-1s, however due to wartime conditions, the underwing drop tank racks were replaced with the much simpler *V.Mtt-Schloß* fittings, to allow for a number of underwing configurations. Some G-2s were also fitted with the additional oil tank in place of the MG 17s, however not all were outfitted with the oil tank. Some G-2s were fitted with exhaust dampers and landing lights in the left wing leading edge for night operations. [\[citation needed\]](#)

The **Fw 190 G-3**: The G-3 was based on Fw 190 A-6. Like the earlier G models, all but the two wing root mounted MG 151 cannons were removed. The new V.Fw. Trg bombracks however, allowed the G-3 to simultaneously carry fuel tanks and bomb loads. Because of the range added by two additional fuel tanks, the G-3's duration increased to two hours, 30 minutes. Due to this extra flight duration, a PKS 11 autopilot was fitted. Some G-3s built in late 1943 were also fitted with the a modified 801 D-2 engine which allowed for increased low-altitude performance for short periods of time. The G-3 had two primary *Rüstsätze* kits. The R1 replaced the V.Fw. Trg racks with WB 151/20 cannon pods. This gave the G-3/R1 a total of 6 20 mm cannons. When fitted with the R1 kit, the G model's addition armor was typically not used, and the PKS11 removed. The G-3/R1 was used in both ground strafing and anti-bomber roles. The R5 was similar to the R1, but the V.Fw. Trg racks were removed, and two ETC 50 racks per wing were added. As with the R1, the additional armor from the base G model were removed, as was the additional oil tank. In some instances, the fuselage mounted MG 17s were refitted. [\[citation needed\]](#)

The **Fw 190 G-8**: The G-8 was based on the FW 190A-8. The G-8 used the same "bubble" canopy of the F-8, and was fitted with underwing ETC 503 racks that could carry either bombs or drop tanks. Two primary *Rüstsätze* kits were also seen on the F-8. The R4, which was a planned refit for the GM1 engine boost system, but never made it into production, and the R5 which replaced the ETC 503's with two ETC 50 or 71 racks. Due to the similarities with the F-8, the G-8 was only in production for a short amount of time. [\[citation needed\]](#)

Some Gs were field modified to carry 1000 kg, 1600 kg and 1800 kg bombs. When this was done the landing gear was slightly improved by enhancing the oleo struts and using reinforced tires.

Approximately 800 FW 190Gs were built in all variants. Due to war conditions, the manufacturing environment and the use of special workshops during the later years of the war, the accurate number of G models built is next to impossible to determine. Several commonly quoted numbers are well inflated for propaganda purposes (even within the *Luftwaffe* itself) as well as, by this time, use of "composite" aircraft, that is, wings from a fuselage damaged plane, and the fuselage from a wing damaged plane were often reassembled and listed as a Fw190G with a new serial number. The Fw190G-1 currently at the National Air and Space Museum is one of these "composite" planes, built from the fuselage of a Fw190A-7. [\[citation needed\]](#)

Trainer versions



Fw 190F-8/U1 (rebuilt as an S-8), Wk Nr 584219, "Black 30" on display at [RAF Hendon](#). This particular machine was attached to *Jagdfliieger schule* 103.

As the *Luftwaffe* phased out older planes such as the Ju 87, many pilots required flight training to make the transition from these much slower aircraft to the Fw 190. Thus was born the *Schulflugzeug*,^[22] or training aircraft, version of the Fw 190. Several old Fw 190 A-5s, and later in 1944, several A-8s were converted by replacing the back section of the standard canopy with a side opening canopy similar to that in use on the Bf 109. There were an estimated 58 Fw 190 S-5 and S-8 models converted. These aircraft had some handling issues, and were very few in number.^[citation needed]

Late war

After the "D," later variants of the 190 were named "Ta" (after Kurt Tank): this was a singularly rare honorific as aircraft were known and "titled" under the manufacturer's name, Tank was the first engineer to be so honored. The aircraft developed into something much different than earlier Fw 190 models. The most promising design was the [Ta 152H](#); the "H" model used the liquid-cooled [Jumo 213E](#) engine and possessed a much greater wing area for better high-altitude performance - to attack the expected B-29s. It was capable of speeds in excess of 700 km/h and had a service ceiling of around 15,000 m. Armed with a single 30 mm cannon and two MG 151/20E guns, it was highly promising, but manufacturing problems, materials shortages and the disruption towards the end of the war resulted in very few Ta 152s of all types being built (no more than 150 in total). Effort was also diverted into further prototype work, the lower-altitude Ta 152C with a DB 603 engine and five cannon [this possessed the noticeably shorter wing].^[citation needed]

Fw 190As were also used to launch and control the unmanned [Mistel](#) guided bombs during the last days of the Western Front in the Second World War. Most of the *Mistels* used in combat were launched from Fw 190 motherships.

Non-German Fw 190 operation

- [United Kingdom](#): British forces captured three Fw 190As in different circumstances, including the infamous Faber misjudgment.^[23]
- [Hungary](#): Received 72 Fw 190 F-8s for training and defensive purposes.
- [France](#): Postwar, the SNCA aircraft company constructed 64 examples of the Fw 190 A-5/A-6 under the designation, **NC 900**, used operationally for a short period and withdrawn due to problems with the BMW-801 engines.
- [Japan](#): Japanese Army received two Fw 190 A-5/A-8s for testing.
- [Romania](#): Received a number of Fw 190 A-8s used for defensive purposes in metropolitan areas.
- [Soviet Union](#): Soviet forces captured examples of the Fw 190A and D series.
- [Spain](#): Eastern front and Reich Defense sent some examples of Fw 190 A-8s for use in Division Azul Air Sqdn.

- [Turkey](#): Beginning in mid-1942, Turkey received 72 examples of the **Fw 190 A-3a** (export model of A-3, a stood for *ausländisch* - foreign) from Germany to modernize their air force. These aircraft were basically Fw 190 A-3s, with BMW 801 D-2 engines and FuG VIIa radios and an armament fit of four MG 17s, with the option of installing two MG FF/M cannon in the outer wing positions. The export order was completed between October 1942 and March 1943. The Fw 190 remained in service with the [Turkish Air Force](#) until 1948-1949.
- [United States](#): American forces captured several Fw 190s as bases were abandoned by the *Luftwaffe*; several were flown as unit "hacks". The US Navy even had an example of the A-5 (serial number 150 051) at the Patuxent Naval Air Test Center for some time, with it painted in the standard mid-war three-color maritime scheme they used in World War II.



Captured FW 190 at US base in Europe

[\[edit\]](#) Fw 190 and Ki-61

During the war, Germany sent one Fw 190 A-8 to Japan for technical evaluation. The analysis of the FW-190 assisted in the development of the radial-engined [Kawasaki Ki-100](#) from the inline-engined [Ki-61](#) Hien "Tony," specifically, the successful mating of a wide engine to a narrow airframe. The Ki-61 itself was influenced by German engineering in that it was powered by a Japanese version of the early [Bf 109's Daimler-Benz DB 601](#) engine [\[3\]](#).^{[\[citation needed\]](#)}

Survivors



Focke-Wulf Fw 190 D-13/R11, "Yellow 10," Serial No: 836017 from the Champlin Fighter Museum, Phoenix, Arizona, c. 1995.

At least 28 Fw 190s exist in museums, collections and in storage worldwide, with 15 displayed in the United States. Two of these survivors are Fw 190 Ds located in the United States, including one at the [Museum of Flight](#) in Seattle (formerly of the [Champlin Fighter Museum](#)) and a second example at the [National Museum of the United States Air Force](#) at Wright-Patterson AFB, OH. (on loan from the [National Air and Space Museum](#) (NASM) of the [Smithsonian](#) since 1975). The NASM also stores a rare Ta 152 H-0/R-11 at the Paul E. Garber Preservation, Restoration and Storage Facility in Suitland, Maryland. Other surviving Fw 190s include four in the United Kingdom ([Imperial War Museum](#), [RAF Museum](#) with a rare two-seat S-8), three in Germany ([Sinsheim Auto & Technik Museum](#)) and two in Norway; individual examples exist in France, Serbia ([Museum of Aviation in Belgrade](#)) Macedonia (FYR), Russia, South Africa and Brazil.

Airframe salvage and recovery



The Fw 190 A-3, photographed just after being salvaged.

On [1 November](#) 2006, a Fw 190 A-3 was salvaged from the depths off the island of Sotra, near [Bergen, Norway](#). Its pilot had made an emergency landing in December 1943 and had scrambled to safety and was rescued soon after, but his aircraft had sunk to the bottom of the sea. After its retrieval from its 60 m deep watery grave, the Fw 190, "Yellow 16," from IV/JG 5, appears to be in remarkably good condition, only missing its canopy and the fabric-covered wing and tail surfaces.^[24]

Modern Fw 190

Starting in 1997, a small German company, FLUG WERK GmbH ^[4], began work on a new Fw 190A-8. These Fw 190A-8s are new builds from the ground up, using many original dies, plans and other information from the war. Werk numbers continued from where the German war machine left off with the new Fw 190A-8 labeled FW 190A-8/N (N for *Nachbau* (English: "reproduction, replica or clone"). Some of these new Fw 190s are known to be fitted with the original tail wheel units from the Second World War; a small cache of tail gear having been discovered. In November 2005, the first flights were completed. Ironically, since the BMW 801 engines are no longer available, a Chinese licenced Russian engine, the ASh-82FN 14-cylinder twin-row radial engine, which powered some of the Fw 190's opposition: the [La-5](#) and [La-7](#), powers the new Fw 190A-8/N.

Work has also been recently started on a Fw 190D-9, and, again in a bit of irony, will be powered by a modified [Allison V-1710](#) V-12, the powerplant of the [P-39 Airacobra](#), another foe of the Fw 190 often flown by Russian forces in the Second World War.

The Fw 190A-8/N participated in the Finnish war movie [Tali-Ihantala 1944](#), painted in the same markings as *Oberst* [Erich Rudorffer](#)'s aircraft in 1944.^[25] The movie is scheduled for screening in fall 2007.

The White 1 Foundation has a pair of vintage Junkers Jumo 213 engines in its collection, complete with original annular radiators, and apparently plans an Fw 190 D-9 aircraft project of its own based on one of the engines.

Specifications (Fw 190A-8)

Data from ^[citation needed]

General characteristics

- **Crew:** One

- **Length:** 9.00 m (29 ft 0 in)
- **Wingspan:** 10.51 m (34 ft 5 in)
- **Height:** 3.95 m (12 ft 12 in)
- **Wing area:** 18,30 m² (196.99 ft²)
- **Empty weight:** 3,200 kg (7,060 lb)
- **Loaded weight:** 4,417 kg (9,735 lb)
- **Max takeoff weight:** 4,900 kg (10,800 lb)
- **Powerplant:** 1× [BMW 801D-2 radial engine](#), 1,272 kW (1,730 hp); 1,471 kW (2,000 hp) with boost

Performance

- **Maximum speed:** 656 km/h at 4,800 m, 685 km/h with boost, up to 750 km/h in a dive (408 mph at 15,750 ft, 428 mph with boost, 466 mph in a dive)
- **Range:** 800 km (500 miles)
- **Service ceiling:** 11,410 m (37,430 ft)
- **Rate of climb:** 13 m/s (2560 feet/min)
- **Wing loading:** 241 kg/m² (57 lb/ft²)
- **Power/mass:** 0.29 - 0.33 kW/kg (0.18 - 0.21 hp/lb)

Armament

- 2× 13 mm [MG 131](#) machine guns with 475 rounds/gun
- 4× 20 mm [MG151/20E](#) cannons with 250 rounds/gun in the wing root and 140 rounds/gun outboard.

[\[edit\]](#) Specifications (Fw 190D-9)

General characteristics

- **Crew:** 1
- **Length:** 10.20 m (33 ft 5 1/2 in)
- **Wingspan:** 10.50 m (34 ft 5 in)
- **Height:** 3.35 m (11 ft 0 in)
- **Wing area:** 18.30 m² (196.99 ft²)
- **Empty weight:** 3,490 kg (7,694 lb)
- **Loaded weight:** 4,350 kg (9,590 lb)
- **Max takeoff weight:** 4,840 kg (10,670 lb)
- **Powerplant:** 1× [Junkers Jumo 213A-1](#) 12-cylinder inverted-Vee piston engine, 1,287 kW, 1,544 kW with boost (1,750 hp / 2,100 hp)

Performance

- **Maximum speed:** 685 km/h at 6,600 m, 710 km/h at 11,300 m (426 mph at 21,655 ft / 440 mph at 37,000 ft)
- **Range:** 835 km (519 mi)
- **Service ceiling:** 12,000 m (39,370 ft)
- **Rate of climb:** 17 m/s (3,300 feet/min)
- **Wing loading:** 238 kg/m² (48.7 lb/ft²)
- **Power/mass:** 0.30 - 0.35 kw/kg (0.18 - 0.21 hp/lb)

Armament

- 2× 13 mm [MG 131](#) machine guns
- 2× 20 mm [MG 151](#) cannons
- 1× 500 kg (1,102 lb) SC500 bomb

External links

- [The rebuilding of a complete series of original-like FW-190s in Germany](#)
- [White 1 Foundation-restoring a radial engined Fw 190F to flying condition in Florida, USA](#)
- [Warbird Alley Fw190 page](#)
- [Die Geschichte der Focke-Wulf 190 \(German, but lots of data\)](#)
- [- Neil Page's web site - translated German pilot accounts and exclusive material on the leading Fw 190 Reich's defence Geschwader JG 300](#)
- [List of preserved Fw190s around the world](#)

Related development

- [Focke-Wulf Ta 152](#)

Comparable aircraft

- [Kawasaki Ki-100](#)
- [Lavochkin La-5](#)
- [Lavochkin La-7](#)
- [Nakajima Ki-84](#)
- [North American P-51 Mustang](#)
- [Polikarpov I-185](#)
- [Republic P-47 Thunderbolt](#)
- [Supermarine Spitfire](#)
- [Vought F4U Corsair](#)

Designation sequence

[Fw 187](#) - [Ju 188](#) - [Fw 189](#) - Fw 190 - [Fw 191](#) - [Ao 192](#) - [FS 193](#)

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