Supermarine Spitfire

RAF Supermarine Spitfire XII banks in clouds.

Type	Fighter
Manufacturer	Supermarine
Designed by	R. J. Mitchell
Maiden flight	5 March 1936
Introduction	1938
Retired	1955, RAF
Primary user	Royal Air Force
Produced	1938–1948
Number built	20,351
Variants	Seafire Spiteful

The **Supermarine Spitfire** was an iconic British single-seat fighter used primarily by the RAF and many Allied countries through the Second World War and into the 1950s. [1]It is not only the most famous allied fighter aircraft of that war, but was produced in greater numbers than any other Allied design. The Spitfire was the only Allied fighter in production at the outbreak of the war that was still in production at the end of the Second World War.

Produced by the Supermarine subsidiary of Vickers-Armstrongs, the Spitfire was designed by the company's Chief Designer R. J. Mitchell, who continued to refine the design until his death from cancer in 1937; the position of chief designer then filled by his colleague, Joseph Smith [2]. Its elliptical wing had a thin cross-section, allowing a higher top speed than the Hawker Hurricane and other contemporary designs; it also resulted in a distinctive appearance, enhancing its overall streamlined features. Much loved by its pilots, the Spitfire saw service during the whole of the Second World War and subsequent years, in all theatres of war, and in many different variants.

The Spitfire will always be compared to its adversary, the Messerschmitt Bf 109; both were among the best of their day.

Design and development

The still unpainted Spitfire prototype *K5054* shortly before its first flight

Supermarine's Chief Designer, R.J. Mitchell, had won four Schneider Trophy seaplane races with his designs: (Sea Lion II in 1922, S 5 in 1927, S 6 in 1929 and S 6b in 1931), combining powerful Napier Lion and Rolls-Royce "R" engines with minute attention to streamlining. These same qualities are equally useful for a fighter design, and, in 1931, Mitchell produced such a plane in response to an Air Ministry specification (F7/30) for a new and modern monoplane fighter.

This first attempt at a fighter resulted in an open-cockpit monoplane with gull-wings and a large fixed, spatted undercarriage powered by the evaporative cooled Rolls-Royce Goshawk engine.[3] The Supermarine Type 224 did not live up to expectations; nor did any of the competing designs, which were also deemed failures.

Mitchell immediately turned his attention to an improved design as a private venture, with the backing of Supermarine's owner, Vickers-Armstrongs. The new design added undercarriage retraction, an enclosed cockpit, oxygen breathing-apparatus and the much more powerful newly developed Rolls-Royce PV-12 engine, later named the Merlin, powering all Spitfire Mk I to Mk IX variants after which the Rolls Royce Griffon engine was used.

By 1935, the Air Ministry had seen enough advances in the industry to try the monoplane design again. They eventually rejected the new Supermarine design on the grounds that it did not carry the required eight-gun armament, and did not appear to have room to do so.


Spitfire flying over the English coast (from a period photograph)

Elliptical wing design

Once again, Mitchell was able to solve the problem. It has been suggested that by looking at various Heinkel planes, he settled on the use of an elliptical planform, which had much more chord to allow for the required eight guns, while still having the low drag of the earlier, simpler wing design. Mitchell's aerodynamicist, Beverley Shenstone, however, has pointed out that Mitchell's wing was not directly copied from the Heinkel He 70, as some have claimed. In addition to the Spitfire wing being much thinner with a completely different section, the matter is one of parallel development of the same technical solution; the elliptical planform is the most efficient in terms of lift distribution along the span, having good qualities at stall as well— a fact which would not have escaped Mitchell.[4] In any event, the elliptical wing was enough to sell the Air Ministry on this new Type 300, which they funded by a new specification, F.10/35, drawn up around the Spitfire.

The elliptical wing was chosen for superior aerodynamic attributes, but it was a complex wing to construct, and the Messerschmitt Bf 109's angular and easier to construct wing offered similar performance (model per model) to the Spitfire. It has been reported that the Bf 109 took one-third the man hours to construct compared to the Spitfire.

One flaw in the thin-wing design of the Spitfire manifested itself when the plane was brought up to very high speeds. When the pilot attempted to roll the plane at these speeds, the aerodynamic forces subjected upon the ailerons were enough to twist the entire wingtip in the direction opposite of the aileron deflection (much like how an aileron trim tab will deflect the aileron itself). This so-called aileron reversal resulted in the Spitfire rolling in the opposite direction of the pilot's intention.

A novel feature in the final Spitfire design was its wing washout. The trailing edge of the wing twists slightly upward along its length, from −1/2 degree at its root to +2 degrees at its tip. This causes the wing roots to stall before the tips, reducing the potentially dangerous rolling moment in the stall known as a tip stall, that may result in a spin. When the root stalls, the turbulent separated slipstream, departing from the wing top side, shakes the elevator and thus the aircraft's control column in a characteristic "judder", warning the pilot that he is about to reach the limit of the aircraft's performance, while full control is retained at the wingtips and ailerons. This allowed even average pilots to hold the Spitfire in a steep turn right at the point of stall, hoping that the pursuing enemy would have to fall out of his own steep turn first or would have to follow in a more gradual turn, eventually appearing in the Spitfire's gunsight.

Name

The Air Ministry submitted a number of names to Vickers-Armstrongs for the new aircraft, tentatively known as the Type 300, including the improbable *Shrew*. The name *Spitfire* was suggested by Sir Robert MacLean, director of Vickers-Armstrongs at the time, who called his daughter Ann, "a little spitfire." The word dates from Elizabethan times and refers to a particularly fiery, ferocious type of person, usually a woman. The name had previously been used unofficially for Mitchell's earlier F.7/30 Type 224 design. Mitchell is reported to have said that it was "just the sort of bloody silly name they would choose",[5] possibly an oblique reference to an earlier, much less successful aircraft of his design that had been given the same name.

Production

The prototype **(K5054)** first flew on 5 March 1936, from Eastleigh Aerodrome (later Southampton Airport) just four months after the maiden flight of the contemporary Hawker Hurricane. Testing continued until 26 May 1936, when Captain J. "Mutt" Summers, (Chief Test Pilot for Vickers (Aviation) Ltd.) flew K5054 to RAF Martlesham Heath and handed the aircraft over to Squadron Leader Anderson of the Aeroplane & Armament Experimental Establishment (A&AEE).

The Air Ministry placed an order for 310 of the aircraft on 3 June 1936, before any formal report had been issued by the A&AEE, interim reports being issued on a piecemeal basis. The British public first saw the Spitfire at the RAF Hendon air-display on Saturday 27 June 1936.

To build the Spitfires in the numbers anticipated, a whole new 'Shadow Factory' was built at Castle Bromwich, near Birmingham, as a "shadow" to Supermarine's original Southampton factory. Although the project was ultimately led by Lord Nuffield who was an expert in mass construction in the motor-vehicle industry, the Spitfire's stressed-skin construction required skills and techniques outside the experience of the local labour force, and experienced staff from Supermarines and Vickers-Armstrongs engineers were needed. The site was set up quickly from July 1938 - machinery being installed two months after work started on the site.

More than 20,300 examples of all variants were built, including two-seat trainers, with some Spitfires remaining in service well into the 1950s. Although its great wartime foe, the Messerschmitt Bf 109, in its many variants, exceeded the Spitfire's production statistics, the Spitfire was the only British fighter aircraft to be in continual production before, during, and after the Second World War.

Variants

Duxford, 2001. The "Grace Spitfire," a preserved trainer version, ex-No. 485 Squadron RNZAF.

As its designer, R.J. Mitchell will forever be known for his most famous creation. However the development of the Spitfire did not cease with his premature death in 1937. Mitchell only lived long enough to see the prototype Spitfire fly. Subsequently a team led by his Chief Draughtsman, Joe Smith, would develop more powerful and capable variants to keep the Spitfire current as a front line

aircraft. As one historian noted: 'If Mitchell was born to design the Spitfire, Joe Smith was born to defend and develop it.'

There were 24 marks of Spitfire and many sub-variants. These covered the Spitfire in development from the Merlin to Griffon engines, the high speed photo-reconnaissance variants and the different wing configurations. The Spitfire Mk V was the most common type, with 6,479 built, followed by the 5,665 Mk IX airframes produced. Different wings, featuring a variety of weapons, were fitted to most marks; the A wing used eight .303 machine guns, the B with four .303 machine guns and two 20 mm Hispano cannon, and the C or Universal Wing which could mount either four 20 mm cannon or two 20 mm and four .303 machine guns. As the war progressed, the C wing became more common.[6]The final armament variation was the E wing which housed two 20 mm cannon and two .5 inch Browning heavy machine guns.

Supermarine developed a two-seat variant to be used for training and was known as the T Mk VIII, but no orders were received for this aircraft and only one example was ever constructed (identified as N32/*G-AIDN* by Supermarine). However, in the absence of an official two-seater variant, a number of airframes were crudely converted in the field. These included an RAF Mk VB in North Africa, where a second seat was fitted instead of the upper fuel tank in front of the cockpit, although it was not a dual control aircraft and is thought to have been used as the squadron "run-about." The only unofficial two seat conversions that were fitted with dual controls were a small number of Russian lend/lease Mk IX aircraft. These were referred to as Mk IX UTI and differed from the Supermarine proposals by using an in-line "greenhouse" style double canopy rather than the raised "bubble" type of the T Mk VIII.

In the postwar era, the idea was revived by Supermarine and a number of two-seat Spitfires were built by converting old Mk IX airframes with a second "raised" cockpit featuring a bubble canopy. These were then sold to the Indian Air Force and Irish Air Corps. Today, only a handful of the trainers are known to exist, including both the T Mk VIII and a T Mk IX based in the USA and the "Grace Spitfire" - ML407, a T Mk IX that is privately owned and operates out of Duxford, UK. The second cockpit of this aircraft has been lowered and is now behind the front cockpit.

Naval variants

A naval version of the Supermarine Spitfire, called the **Seafire,** was specially adapted for operation from aircraft carriers. Although never conceived for the rough-and tumble of carrier-deck operations, the Spitfire was considered to be the best candidate available at the time and went on to serve with distinction. Modifications included an arrester hook, folding wings and other specialised equipment. Some features of the basic design were, whilst unproblematic for land operation, problematic for carrier-deck operations. One was poor visibility over the nose. Like the Spitfire, the Seafire had a relatively narrow undercarriage track, which meant that it was not ideally suited to deck operations. The addition of heavy carrier equipment also added to the weight of the machine and reduced low-speed stability, critical for such operations, and normally a forte of the Spitfire. Early marks of Seafire had relatively few modifications, however late marks of Seafire were heavily-adapted and highly potent machines. The Seafire II was able to outperform the A6M5 (Zero) at low altitudes when the two types were tested against each other during wartime mock combats. Contemporary Allied carrier fighters such as the F6F Hellcat and F4U Corsair, however, were considerably more robust and practical for carrier operations. A performance advantage was regained when late-war Seafire marks equipped with the Griffon engines supplanted their Merlin-engined predecessors.

The name Seafire was arrived at by collapsing the longer name **Sea** Spit**fire.**

Griffon-engined variants


The first Griffon-powered Spitfire, *DP845*.

The first Griffon-engined Mk XII flew on August 1942, but only five had reached service status by the end of the year. This mark could nudge 400 mph in level flight and climb to an altitude of 30,000 feet (10,000 m) in under eight minutes. Although the Spitfire continued to improve in speed and armament, range and fuel capacity were major issues: it remained *short-legged* throughout its life except in the dedicated photo-reconnaissance role, when its guns were replaced by extra fuel tanks.

Newer Griffon-engined Spitfires were being introduced as home-defence interceptors, where limited range was not an impediment. These faster Spitfires were used to defend against incursions by high-speed "tip-and-run" German fighter-bombers and V-1 flying bombs over Great Britain.

As American fighters took over the long-range escorting of USAAF daylight bombing raids, the Griffon-engined Spitfires progressively took up the tactical air superiority role as interceptors, while the Merlin-engined variants (mainly the Mk IX and the Packard-engined XVI) were adapted to the fighter-bomber role.

Although the Griffon-engined marks lost some of the favourable handling characteristics of their Merlin-powered predecessors, they maintained their combat manoeuvring advantage over nearly all contemporary German (and American) designs in Europe throughout their production.

Griffon-engined Spitfires and Seafires continued to be flown by many squadrons of the Royal Auxiliary Air Force and Royal Naval Volunteer Reserve until re-equipped in 1951–52. The last flight of a Spitfire in RAF service took place on 9 June 1957 by a PR19, PS 583 from RAF Woodvale as part of the Temperature and Humidity Flight. This is the last known flight of a piston engined fighter in the RAF.

Operational history

Early RAF service


Flight of RAF Spitfires.

The first Spitfire to enter service with the RAF arrived at 19 Squadron, Duxford, on 4 August 1938, and over the next few weeks aircraft were delivered at the rate of one a week to both 19 and 66

Squadrons (also based at Duxford). The next to be equipped with Spitfires was 41 Squadron at Catterick, followed by a succession of squadrons stationed at Hornchurch in Essex. The public's first sight of the Spitfire in RAF colours was on Empire Air Day, 20 May 1939 during a display at Duxford in which the pilot "belly-landed" his aircraft having forgotten to lower his undercarriage and was consequently fined £5 by the Air Ministry. By the outbreak of the Second World War, there were around 400 Spitfires in service with the RAF, and a further 2,000 on order.[7]

In an incident known as the Battle of Barking Creek on 6 September 1939, Spitfires were first blooded on a pair of unfortunate Hawker Hurricanes from no. 56 RAF Squadron. The Hurricanes were shot down by Spitfires of no. 74 RAF Squadron in a friendly fire incident over the Medway, leading to the death of P/O Montague Leslie Hulton-Harrop, the first British pilot fatality of the Second World War.

Battle of Britain

R.J. Mitchell and his Spitfire are often credited with winning the Battle of Britain. This is a view often propagated within popular culture, such as in the film *The First of the Few*. However, the maintenance of civilian morale under air attack is vital, and no doubt the Spitfire and its legend contributed to this.

The Spitfire was one of the finest fighters of the war; aviators, aviation historians and laymen alike often claim it to be the most aesthetically appealing. It is, however, frequently compared to the Hawker Hurricane, which was used in greater numbers during the critical stages of 1940. Although early Spitfires and Hurricanes carried identical armament (eight .303 inch / 7.696 mm machine guns), the placement of the Hurricane's guns was better, yielding a closer pattern of fire. A slower top speed, and poorer performance at altitude,however, made the Hurricane more vulnerable against the German fighter escorts. Wherever possible, the RAF tactic during the Battle of Britain was to use the Hurricane squadrons to attack the bombers, holding the Spitfires back to counter the German escort fighters. In total numbers, the Hurricane shot down more Luftwaffe aircraft, both fighters and bombers, than the Spitfire, mainly due to the higher proportion of Hurricanes in the air. Seven of every ten German planes destroyed during the Battle of Britain were shot down by Hurricane pilots. Losses were also higher among the more numerous Hurricanes.

The Mark I and Mark II models saw service during the Battle and beyond, into 1941. Both of these used eight .303 Browning machine guns. It was relatively common during the Battle of Britain for the German planes to return safely to base with surprisingly high numbers of .303 bullet holes as the Luftwaffe machines were receiving progressively more armour in critical areas. The use of a smaller number of heavier, larger calibre guns would have been far more effective, and this was rectified in later versions of the Spitfire. The Mark V entered service in early 1941, and was the first to feature an effective and reliable cannon armament (the Mark IBs of 19 Squadron were tried out with two 20 mm Hispano-Suiza cannon fitted in 1940, although frequent stoppages meant the types were replaced by conventionally armed aircraft in September 1940). The "B" configuration of two 20 mm cannon and four .303 machine guns was standard during the mid-war years.

Another contemporary, the Luftwaffe's Messerschmitt Bf 109, was similar in physical dimensions, attributes and performance to the Spitfire. Some inherent advantages helped the Spitfires win many dogfights, most notably manoeuvrability: the Spitfire had higher rates of turn than the Messerschmitt. Good cockpit visibility was probably a factor as well, as the early Bf 109s had a narrow enclosure with heavily-framed, panelled cockpit windows. In fairness, these did offer less optical distortion that 'blown' Plexiglass. At this time, the Merlin engine's lack of direct fuel injection meant that both Spitfires and Hurricanes, unlike the Bf 109E, were unable simply to nose down into a deep dive. This meant the Luftwaffe fighters could simply "bunt" into a high-power dive to escape attack, leaving the Spitfire spluttering behind as its fuel was forced by negative "g" out of the carburettor. RAF fighter

pilots soon learned to "half-roll" their aircraft before diving to pursue their opponents. The use of uninjected carburettors was calculated to give a higher specific power output, due to the lower temperature, and hence the greater density, of the fuel/air mixture fed into the motor, compared to injected systems. In March 1941, a metal diaphragm with a hole in it was fitted across the float chambers. It partly cured the problem of fuel starvation in a dive, and became known as "Miss Shilling's orifice" as it was invented by a female engineer, Beatrice "Tilly" Shilling. Further improvements were introduced throughout the Merlin series, with injection introduced in 1943. Production of the Griffon-engined Spitfire Mk XII had begun the year before.

[edit] European offensive 1941–43

The introduction of the Focke-Wulf Fw 190 in late 1941 along the Channel front proved a shock to RAF Fighter Command, the new German fighter proving superior to the then-current Mark VB in all aspects except turning radius. Losses inflicted on Fighter Command's Spitfires were heavy, as air superiority switched to the Luftwaffe through most of 1942, until the Merlin 61-engined Mark IX version started to see service in sufficient numbers. In an attempt to achieve some degree of parity with the Fw 190, some squadrons still operating the Mark V received specially modified versions that had four feet of wing-tip removed (to improve their rate of roll) and reduced supercharger blades on the Merlin for optimum performance at lower altitudes. These aircraft were designated LF Mark V officially, but were also known by their pilots as "Clipped, Clapped and Cropped Spits," also referring to the fact that many of these Spitfires, thus modified, had seen better days.

As the American strategic bombing campaign gathered momentum in mid-1943, the need for fighter escort meant much of Fighter Command's Spitfire force was utilized in this role while the US fighter groups worked up to operational status. The inadequate range of the Spitfire, however, meant the RAF support operations were limited to northwestern France and the Channel. As the battle intensified over occupied Europe, USAAF fighters like the P-47, P-38 and P-51 bore the brunt of bomber protection. Spitfire IX squadrons had to bide their time until the invasion of Europe before fully engaging the Luftwaffe's *Jagdwaffe*.

Mediterranean service

The first Spitfires to see overseas service were Mark Vs flown from the deck of the aircraft carrier HMS *Eagle* to Malta in March 1942. In the months that followed, some 275 Spitfires were delivered to the beleaguered island. To counter the prevalent dusty conditions, the Spitfires were fitted with a large Vokes air filter under the nose, which lowered the performance of the aircraft through induced drag. The Spitfire V and, later, much-improved, longer-ranged Mark VIIIs also soon became available in the North African Theatre and, henceforth, featured heavily with the RAF, South African Air Force and USAAF during the campaigns in Sicily and Italy.

Asia and the Pacific

Spitfire versus Zero: Clive "Bardie" Wawn

Spitfire Mk XIV versus Hap "Zero": Clive "Killer" Caldwell

The Royal Australian Air Force, the Royal Indian Air Force and the RAF also used Spitfires against Japanese forces in the Pacific theatre. The first Spitfires in the Far East were two photo-reconnaissance (PR IV) aircraft in October 1942. Japanese air raids on Northern Australia prompted the formation in late 1942 of No. 1 Wing RAAF (No. 54 Squadron RAF, 452 and 457 squadrons RAAF), flying the Spitfire Vb. The wing arrived at Darwin in February 1943, and saw constant action until September. In the Burma-India Theatre, the first Spitfire Vs were not received until September 1943. The Spitfire VIII were received by the RAAF in April 1944. Spitfire pilots in Asia and the Pacific were surprised to find that they could not follow many Japanese fighters, such as the Mitsubishi Zero, through a turn. Ironically, they were forced to adopt tactics similar to those used by German pilots when facing Spitfires; utilizing their higher speed, especially in a dive, to make swooping attacks, and pursuing Japanese planes which had reached the limits of their range.

D-day and beyond

After the Normandy landings, Spitfire squadrons were moved across the Channel, operating from tactical airfields close to enemy lines. As the Allied air forces achieved air supremacy, Spitfire pilots had fewer opportunities to combat German aircraft, concentrating their efforts on roaming over German territory, attacking ground targets of opportunity and providing tactical ground support to the army units. The Merlin's glycol cooling system proved particularly vulnerable to small arms fire, with one hit in the wrong place being enough to eventually seize the engine.

The newer, faster marks of Spitfire were retained in Britain to counter the V-1 flying bomb offensive in mid-1944, although these aircraft were deployed across the Channel before the war in Europe ended.

Postwar service

Following the Second World War, the Spitfire remained in use with many air forces around the world.

Europe

Soon after the end of the Second World War, the Swedish Air Force equipped a photo reconnaissance wing, F 11 in Nyköping (just south of Stockholm), with 50 Mk XIXs, designated S 31. Several S 31 photographic missions in the late 1940s entailed flagrant violations of Soviet and, at least once, Finnish airspace in order to document activities at the air and naval installations in the Baltic and Kola regions. At that time, no Soviet fighter was able to reach the operational altitude of the S 31. No Swedish planes were lost during those clandestine operations. However, by the early 1950s, Soviet air defenses had become so effective that such practices had to cease. The S 31s were replaced by jet-powered SAAB S 29Cs in the mid-1950s.

Spitfires played a major role in the Greek Civil War, flown by the RAF and SAAF during October–December 1944, and by the Hellenic Air Force from 1946 to the end of the war in August 1949.

Middle East

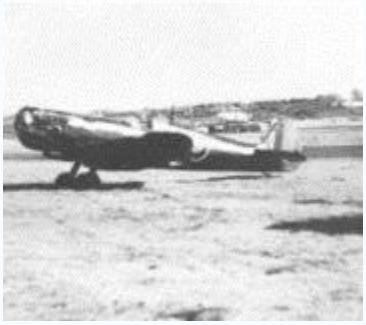
Spitfires last saw combat during the 1948 Arab-Israeli War, when, in a strange twist, Israeli Air Force Spitfires flown by former RAF pilots such as Ezer Weizman engaged Egyptian Spitfires and Royal Air Force Spitfires.

Private

One notable variant was the privately owned *LV-NMZ* (Argentine registration). This was a PRXI, *PL-972*, purchased by James Elwyn Storey and his brother Jack to do aerial photography for the Argentine government. Both served in the RAF during the Second World War. James flew his Spitfire from Bournemouth (UK) to Gibraltar, on to Dakar in Senegal, from Dakar to Natal in Brazil, then Rio de Janeiro, Porto Alegre and finally Buenos Aires. He used external wing tanks and a belly ferry tank. He established two records, one for the heaviest fuel load ever carried by a Spitfire and one for the longest flight for a Spitfire, the Dakar to Natal leg – approximately 1,870 miles.

Some air forces retained Spitfires in service well into the 1960s.

Speed and altitude records



The Spitfire Mk XI flown by Sqn. Ldr. Martindale, seen here after its flight on 27 April 1944 during which it was damaged achieving a true airspeed of 606 mph (975 km/h).

Beginning in late 1943, high-speed diving trials were undertaken at Farnborough to investigate handling characteristics of aircraft near the sound barrier (i.e. the onset of compressibility effects). Because it had the highest limiting Mach number of any aircraft at that time, a Spitfire XI was chosen to take part in these trials. Due to the high altitudes necessary for these dives, a fully feathering Rotol propeller was fitted to prevent overspeeding. It was during these trials that EN409, flown by Squadron Leader J. R. Tobin, reached 606 mph (975 km/h)(Mach 0.891) in a 45-degree dive. In April 1944 the same aircraft suffered engine failure in another dive when being flown by Squadron Leader A. F. Martindale, and the propeller and reduction gear broke off. Martindale successfully glided the 20 miles (30 km) back to the airfield and landed safely.

That any operational aircraft off the production line, cannons sprouting from its wings and warts and all, could readily be controlled at this speed when the early jet aircraft such as Meteors, Vampires, P-80s, etc could not, was certainly extraordinary — *Jeffrey Quill*[8]

On 5 February 1952, a Spitfire Mk 19 of No. 81 Squadron RAF based in Hong Kong achieved probably the highest altitude ever achieved by a Spitfire. The pilot, Flight Lieutenant Ted Powles, was on a routine flight to survey outside air temperature and report on other meteorological conditions at various altitudes in preparation for a proposed new air service through the area. He climbed to 50,000 feet (15 240 m) indicated altitude, with a true altitude of 51,550 feet (15 712 m), which was the highest height ever recorded for a Spitfire. The cabin pressure fell below a safe level, and in trying to reduce altitude, he entered an uncontrollable dive which shook the aircraft violently. He eventually regained control somewhere below 3,000 feet (900 m). He landed safely with no discernible damage to his aircraft. Evaluation of the recorded flight data suggested that, in the dive, he achieved a speed of 690 mph (1110 km/h) or Mach 0.94, which would have been the highest speed ever reached by a propeller-driven aircraft. Today, it is generally believed that this speed figure is the result of inherent instrument errors and has to be considered unrealistic.

However, the critical Mach number of the Spitfire's elliptic wing was higher than the subsequently used wing with laminar-flow-section, straight-tapering planform wing of the follow-on Spiteful/Seafang/Attacker aircraft, bringing comment on the wisdom of replacing the old but better wing with the new one.

Survivors

Preserved Spitfire at Duxford. Notice the late-war "bubble" cockpit

There are approximately 44 Spitfires and a few Seafires airworthy, although many air museums have static examples. For example, Chicago's Museum of Science and Industry has paired a static Spitfire with a static Ju 87 R-2/Trop. Stuka dive bomber. The RAF maintains some for flying display and ceremonial purposes in the Battle of Britain Memorial Flight at RAF Coningsby in Lincolnshire.

The Temora Aviation Museum in Temora, New South Wales, Australia, has two airworthy Spitfires: a Mk VIII and a Mk XVI, which are flown regularly during the museum's flying weekends.[9]

In the Polish Aviation Museum a Supermarine Spitfire LF Mk XVIE is on display.

The Hellenic Air Force Museum own and displays a Supermarine Spitfire Mk IXc [10].

Kennet Aviation, a British company specializing in ex-military aircraft has a Seafire XVII and a number of Seafire projects at its home airfield at North Weald Airfield.[11]

The *Black Spitfire* is a black-painted Spitfire which belonged to Israeli pilot and former president Ezer Weizmann. It is on exhibit in the Israeli Air Force Museum in Hatserim and is used for ceremonial flying displays.

Kermit Weeks flies a restored Mk XVI from his Fantasy of Flight museum in Florida.[12]

The "Asas de Um Sonho" Museum, located in São Carlos, Brazil, owns the only airworthy Spitfire in South America, a Mk IXc donated to the museum by Rolls Royce and painted in the colors and markings of RAF ace Johnnie Johnson.

One of the newest Spitfires to fly in Canadian skies is Michael Potter's Supermarine Mk XVI Spitfire SL721/N721WK/C-GVZB, refinished in the markings of No. 421 Squadron RCAF and is now registered in Gatineau, Quebec as part of the Vintage Wings of Canada Collection.

Spitfire in film and television

- *Malta Story* (1953) starring Alec Guinness, Jack Hawkins, Anthony Steel and Muriel Pavlow, is a black and white war film based on the heroic defence of Malta in 1942, the island itself, its people, and the RAF aviators who fought to defend it. The unique footage used in the film is equivalent to true historic archive material. Additionally many scenes were shot next to the real types of aircraft still existing in Malta at that time. The Spitfires shown in action are, however, mainly of the Mark IX, XIV and XVI types that flew from Malta after 1943-44. In 1942 the RAF was mainly using the Mark V type only that appears rarely in the film. In the footage one can see however the aircraft that attacked Malta, such as the Italian SM79 and the German Bf109F.
- *Battle of Britain* (1969) starring Sir Laurence Olivier, Michael Caine, Christopher Plummer, Ralph Richardson, Michael Redgrave, Susannah York and many others. Set in 1940, this film features several sequences involving a total of 12 flying Spitfires, as well as a number of other flying examples of Second World War-era British and German aircraft. The film's production company was "Spitfire Productions, Steven S.A."
- *Piece of Cake (television)* (1987) starring Tom Burlinson. When it aired on the ITV network in 1987, this was the most watched miniseries in history. Based on the novel by Derek Robinson, the six-part miniseries covered the prewar era from early 1939 to "Battle of Britain Day," 15 September 1940. The series had time to develop its large cast, and depicted the air combat over the skies of France and Britain during the early stages of the Second World War, though using five flying examples of late model Spitfires in place of the novel's early model Hawker Hurricanes. There were shots of several Spitfires taking off and landing together from grass airstrips.
- The movie *Dark Blue World* (2001), starring Ondřej Vetchý was about a Free Czech pilot flying a Spitfire during the Second World War. Besides original footage, it also used out-takes from the earlier *Battle of Britain* film.

- *Spitfire Ace* (2004) was a four-part mini series from RDF Media that depicted four young pilots undergoing the same training that Battle of Britain pilots would have received. One pilot was eventually selected to proceed to training in the "Grace Spitfire."
- *The First of the Few* (also known as *Spitfire* in the US and Canada) (1942) was a British film produced and directed by Leslie Howard, with Howard in the starring role of R.J. Mitchell. It tells the story of Mitchell's life and how he developed the design for the famous British fighter plane. David Niven plays his friend and test pilot Geoffrey Crisp, who narrates the biography in flashback. Leslie Howard bore little resemblance to R. J. Mitchell, however, as Mitchell was a large and athletic man. Howard portrayed Mitchell as upper-class and mild-mannered. Mitchell - "the Guv'nor" - was in fact working-class and had an explosive temper; apprentices were told to watch the colour of his neck and to run if it turned red.
- Several episodes of the ITV series *Foyle's War* focus on young RAF pilots who fly Spitfires. A real Spitfire Mark V was used in the filming.
- American pilots in the movie Pearl Harbor are shown flying Spitfires during part of the film, but with a disregard to historical accuracy that matches the rest of the movie. Ben Affleck's character gets shot down in one of these (a Mark IX, which would appear three years or so later) over the English Channel.

Operators

The Spitfire Mk VIII "Grey Nurse" which saw action with No. 457 Squadron RAAF in the South West Pacific Area is one of two Spitfires still flying in Australia, both owned by Temora Aviation Museum.

Polish Spitfire Mk V from the 303 Kościuszko Squadron flown by S/Ldr Zumbach


American Spitfire MK V of the 334th Fighter Squadron, 4th Fighter Group.

- Australia
- Belgium
- Burma
- Canada
- Template:Taiwan
- Czechoslovakia
- Denmark
- Egypt
- France

- Germany
- Greece
- Hong Kong
- India
- Ireland
- Israel
- Italy
- Netherlands
- New Zealand
- Norway
- Poland [13]
- Portugal
- Rhodesia
- South Africa
- Soviet Union
- Sweden
- Syria
- Thailand
- Turkey
- United Kingdom
- United States
- Yugoslavia

This list is incomplete; you can help by expanding it.

Trivia

- 5071 Spitfire, a Great Western Railway Castle Class locomotive named after the aircraft in 1940. [1]
- When German pilots saw what they thought was the Spitfire, irrespective of the actual aircaft type, they would call each other through the wireless phones and say "Achtung! Schpitfeur" which later led to what was called, the "Spitfire complex." Over Malta, unable to launch a defensive force, a Canadian pilot equipped with a ground-based radio set, gave out dummy orders in German resulting in two Bf 109s shooting each other down in a panic over a Spitfire supposedly being in the air. [14]

Specifications (Spitfire Mk Vb)

Data from The Great Book of Fighters[15] *and* Jane's Fighting Aircraft of World War II[16]

General characteristics

- **Crew:** one pilot
- **Length:** 29 ft 11 in (9.12 m)
- **Wingspan:** 36 ft 10 in (11.23 m)
- **Height:** 11 ft 5 in (3.86 m)
- **Wing area:** 242.1 ft² (22.48 m²)
- **Empty weight:** 5,090 lb (2,309 kg)
- **Loaded weight:** 6,622 lb (3,000 kg)
- **Max takeoff weight:** 6,770 lb (3,071 kg)

- **Powerplant:** 1× Rolls-Royce Merlin 45 supercharged V12 engine, 1,470 hp at 9,250 ft (1,096 kW at 2,820 m)

Performance

- **Maximum speed:** 330 knots (378 mph, 605 km/h)
- **Combat radius:** 410 nmi (470 mi, 760 km)
- **Ferry range:** 991 nmi (1,140 mi, 1,840 km)
- **Service ceiling:** 35,000 ft (11,300 m)
- **Rate of climb:** 2,665 ft/min (13.5 m/s)
- **Wing loading:** 24.56 lb/ft² (119.91 kg/m²)
- **Power/mass:** 0.22 hp/lb (360 W/kg)

Armament

- **Guns:**
  - 2× 20 mm (0.787 in) Hispano Mk II cannon, 60 (later 120) shells per gun
  - 4× 0.303 caliber (7.7 mm) Browning machine guns, 350 rounds per gun
- **Bombs:**
  - 2× 250 lb (110 kg) bombs

External links

Duxford, 2001. High-speed flypast.

- The Spitfire Society
- The Spitfire Society: Spitfire Marks
- http://www.supermarine-spitfire.co.uk/spitfire.html
- Combat History of the Supermarine Spitfire - The Defence of Malta (1942)
- Warbird Alley: Spitfire page - Information about Spitfires still flying today
- K5054 - Supermarine Type 300 prototype Spitfire & production aircraft history
- The Supermarine Spitfire in Indian Air Force Service
- The Spitfire : Seventy Years On - Includes images of the factory
- Y2K Spitfire Restoration Project
- Spitfire drawings online
- A rare colour photo of a Spitfire Supermarine Mk VB in flight during the Second World War
- Birmingham - the workshop of the war

Related development

- Supermarine S.6B
- Supermarine Seafire
- Supermarine Spiteful
- Supermarine Seafang

Comparable aircraft

- Bell P-39
- Curtiss P-40
- Dewoitine D.520
- Focke Wulf Fw 190
- Hawker Hurricane
- Hawker Tempest
- Heinkel He 112
- Kawasaki Ki-61 Hien
- Macchi MC.202 Folgore
- Macchi C.205 Veltro
- Martin-Baker M.B.5
- Messerschmitt Bf 109
- Mikoyan-Gurevich MiG-3
- North American P-51 Mustang
- Yakovlev Yak-9

Designation sequence

Walrus - Spitfire - Sea Otter - Spiteful - Attacker - Seagull - Swift - Scimitar

Related lists

- Supermarine Spitfire variants

See also

- British military history of World War II
- Rolls-Royce Merlin and Griffon
- Supermarine
- Allied Technological Cooperation During WW2