

Brewster Buffalo

F2A "Buffalo"



F2A-1 of US Navy squadron VF-3.

Type Single seat carrier-based fighter

Manufacturer [Brewster Aeronautical Corporation](#)

Designed by Dayton Brown and R.D. MacCart

Maiden flight [2 December 1937](#)

Introduced April [1939](#)

Retired 1948

Primary users [United States Navy](#)
[Royal Air Force](#)

Produced 1938-1941

Number built 509

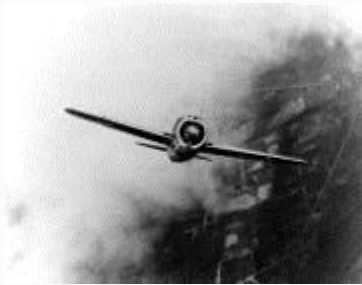
The **Brewster Buffalo**, or **Brewster F2A**, was an [American fighter plane](#) which saw limited service with both [Allied](#) and [Finnish](#) air forces during [World War II](#). The F2A was the first [monoplane fighter aircraft](#) used by the [United States Navy](#). It was derided by some American servicemen as "flying coffins"^[1] due to a reputation for poor construction and marginal performance. Despite this, with the [Ilmavoimat](#) (Finnish Air Force), the F2A proved a potent weapon versus the [Red Air Force](#).

Design and development

In the 1930s, the [Brewster Aeronautical Corporation](#) was a relatively new manufacturer which had wanted to enter the aviation market. In 1934 they secured a Navy contract for an aircraft of original Brewster design, the XSBA-1 scout bomber. The XSBA was rather innovative for its time, and was an all-metal monoplane featuring a retractable landing gear and an enclosed bomb bay.

New business for Brewster came in the form of a [1935](#) US Navy requirement for an [aircraft carrier](#)-based fighter intended to replace the [Grumman F3F](#) biplane. Two aircraft designs were considered: the Brewster **Model 139** and the [Grumman](#) XF4F-1 which was still a "classic" biplane. The Model 139 incorporated sophisticated features for the time: a monoplane configuration, wing flaps, arresting gear, retractable [landing gear](#) and an enclosed [cockpit](#).

The US Navy competition was opened up to allow another competitor, the [Seversky XNF-1](#), a navalized [P-35](#) that was eliminated early on when the prototype could not reach more than 267 mph.^[2]



Brewster XF2A-1 prototype

Brewster's **XF2A-1** prototype first flew on 2 December [1937](#) and early test results showed that it was far in advance of the Grumman entry. While the XF4F-1 would not enter production, it would later re-emerge as a monoplane, the [Grumman Wildcat](#). The Brewster fighter looked "pugnacious" with a stubby fuselage, mid-set wings and a host of advanced features. It was all-metal, with flush-riveted, stressed aluminum construction, although flying surfaces were still fabric-covered. Split flaps, a hydraulically-operated retractable main undercarriage (and partially retractable tail wheel) and a streamlined framed canopy gave the XF2A-1 a modern look. Powered by a Wright R-1820-22 Cyclone producing 850 hp gave it a top speed of 277.5 mph (later boosted to 304 mph at 16,000 ft after improvements were made to the cowling streamlining and carburetor/oil cooler intakes).^[3]

Service testing of the Brewster prototype began in January 1938 and, in June, the Navy ordered 54 of the **F2A-1** production model. The armament mix of two machine guns, a .30 caliber and .50 caliber Browning machine gun mounted in engine cowling firing through the propeller arc would later be augmented by the provision of an additional .50 caliber machine gun in each wing outboard of the landing gear.

Operational history



Cockpit of a Brewster F2A Buffalo serving as US Navy training aircraft in April 1943.

Of the first deliveries, beginning in June [1939](#), nine went to Squadron VF-3 on the [USS Saratoga \(CV-3\)](#). The balance of 44 were declared surplus and sold to [Finland](#) (where they were successfully employed until [1944](#)). Although it was becoming clear that the F2A was inferior to the latest German fighters, the [United Kingdom](#), [Belgium](#) and the [Netherlands East Indies](#) purchased several hundred of the land-based versions. In early WWII, any type of modern monoplane fighter was considered better than nothing, and the Brewster planes were available.

An improved version **F2A-2**, of which 43 were ordered, included a more powerful engine, a better propeller, and integral flotation gear, and was followed by the **F2A-3**. Unfortunately, the

improvements added weight that adversely affected the fighter's performance and caused perennial problems with its landing gear (collapse issues), especially in shipboard service.



Lt. [John S. Thach](#) tipped this F2A-1 Buffalo of [VF-3](#) (BuNo 1393) onto its nose on [Saratoga](#) in March 1940.

US Marine Corps

The [US Marine Corps](#) flew F2As at the [Battle of Midway](#). The grim outcome was the primary source for the myth of the Brewster being one of the worst fighters flown in combat. However, the main reasons for the losses (15 of 25 planes) included the obsolescence of F2A-3, inexperience of USMC pilots, who attempted to enter into a [World War I](#)-style dogfight with experienced Japanese [Mitsubishi Zero](#) fighters, and the fact that the Buffalos were outnumbered and caught at a tactical disadvantage.

The poor performance of the USMC in the aerial battle sparked Finnish Ace [Hans Wind](#) to write his combat manual on Brewster; he analyzed the air combat, the tactical errors the Americans made and proposed tactics which the Finnish Brewster pilots were to use when encountering different types of enemy planes. They were later used with remarkable success in 1942-43. Meanwhile, the Battle of Midway marked the end of F2A-3's American combat career. The surviving airframes were transported to mainland US as advanced trainers.

Belgium

Just before the war started Belgium needed more modern planes to expand and modernize its air force and ordered 40 F2A-2s (which had a factory designation of B-339) with a different engine, the Wright R-1820-G105 with a power output of 1000 hp. The arrestor hook was removed and the plane got a slightly longer tail. Unfortunately only two aircraft reached France during the collapse of Belgium and they were later captured by the Germans. Six planes ended up in Martinique with the French Air Force where they were eventually destroyed. The rest of the order was passed to the UK, where they were considered unfit for duty in western Europe and they were supplied to the commonwealth forces in Asia and the Middle East.

British Commonwealth squadrons



Brewster Buffalo Mark Is being inspected by RAF personnel at Sembawang airfield, Singapore on 12 October 1941

The [Royal Air Force](#) (RAF), liking alliterative names and no doubt being struck by the stocky appearance, dubbed it the **Brewster Buffalo**. Because of the belief that Buffaloes were outclassed

by [Messerschmitt Bf 109s](#), they were sent to RAF, [Royal Australian Air Force](#) and [Royal New Zealand Air Force](#) squadrons in [Singapore](#), [Malaya](#) and [Burma](#), shortly before the outbreak of war with [Japan](#). Commonwealth forces seriously underestimated the capability of Japanese aircraft they would soon face, however.

[British Commonwealth](#) Buffalo squadrons suffered high attrition rates, in part from mechanical problems. Nevertheless, they claimed a 2:1 kill ratio against the Japanese.^{[\[citation needed\]](#)} Three Commonwealth pilots became aces on the Buffalo; the highest scoring of them, [Geoff Fisk](#) became the highest-scoring Commonwealth pilot in the [Pacific Theatre](#) (although some of his kills came during a period flying [P-40s](#)).

Netherlands East Indies

The [ML-KNIL](#) (Militaire Luchtvaart van het Koninklijk Nederlands-Indisch Leger: Military Aviation of the Royal Netherlands-Indies Army) had ordered 144 Brewster B-339C and 339D models, the former with used engines supplied by the Dutch and the latter with new and more powerful engines that Brewster purchased from Wright. Only 71 had arrived in the [Netherlands East Indies](#) by the time war began, and not all were in service. Some served briefly at Singapore before being withdrawn for the defense of [Java](#).

As the Dutch Buffaloes were lighter than the F2A-3 used by the US, they were able to successfully dogfight the Japanese [Nakajima "Oscar"](#) fighter, although it was still out-turned by the [Mitsubishi Zero](#). Apart from their role as fighters, they were also used as dive bombers against Japanese troopships. Though reinforced by the Commonwealth Buffaloes retreating from Malaya, the Dutch squadrons were unable to stem the superiority of Japanese forces at ground level, and they flew their last mission on [7 March](#). Altogether 17 Dutch pilots were killed, 30 Buffaloes were shot down, 15 were destroyed on the ground, and several were lost to misadventure. In return, Dutch pilots claimed 55 enemy aircraft destroyed. In a major engagement on [19 February 1942](#), eight Dutch Brewsters intercepted a formation of about 35 Japanese bombers, which had an escort of about 20 Zeroes. The Dutch pilots destroyed 11 Japanese planes and lost four Buffaloes.

Finland

In [Finland](#), the Brewsters enjoyed their greatest success. The planes did not arrive in time for the [Winter War](#), but their impact in the [Continuation War](#) (1941-44) was remarkable. The plane was never referred to as the Buffalo in Finland; it was known simply as the Brewster, or sometimes by the nickname *Taivaan helmi* ("Sky Pearl") or *Pohjoisten taivaiden helmi* ("Pearl of the Northern Skies"). The 44 Brewsters used by the FAF received the serial numbers BW-351 to BW-394. Other nicknames were *Pylly-Valtteri* ("Butt-Walter"), *Amerikanrauta* ("American hardware" or "American car") and *Lentävä kaljapullo* ("flying beer-bottle"). It appears the workmanship of the Finnish airframes was also better than those produced later; this was a common phenomenon as the aircraft factories were manned by a less-skilled work force after the start of World War II.



[Finnish Air Force](#)'s Brewster B239 formation during the [Continuation War](#)

The Brewster was regarded as being very easy to fly and many Finnish pilots commented that it was a "gentleman's plane" while the Messerschmitt Bf 109 (also used by the FAF) was "a killing machine." Brewsters were also popular within the FAF because of their long range and endurance, and their good maintenance record. This was due in part to FAF mechanics, who solved a problem plaguing the Wright Cyclone engine by inverting one of the piston rings in each cylinder, thus enhancing the engine reliability. Note that the Finnish planes dispensed with most of the US Navy gear such as a life-raft. This resulted in a considerably lighter aircraft.

In the end, the Brewster gained a reputation as one of the most successful fighting aircraft ever flown by the [Finnish Air Force](#). In service during 1941-1945, the Brewsters were credited with 496 [Soviet](#) and [German](#) aircraft destroyed, against the loss of 19 Brewsters: a victory ratio of 26:1. However, the substantiation of this claim on German and Soviet records is so far incomplete, and all claims have not been managed to be connected on actual losses (as of 2006).

During the Continuation War, [Lentolaivue 24](#) (Fighter Squadron 24) was equipped with the B-239s until May 1944, when the Brewsters were transferred to [Hävittäjälentolaivue 26](#) (Fighter Squadron 26). Most of the pilots of [Lentolaivue 24](#) were Winter War combat veterans and the squadron achieved total of 459 kills with B-239s, while losing 15 Brewsters in combat. For example, between [25 June 1941](#) and [31 December 1941](#), LeLv 24 scored 135 kills with Brewsters at a cost of two pilots and two Brewster Buffaloes.

The top-scoring Buffalo pilot was [Hans Wind](#), with 39 kills in B-239s. Wind scored 26 of his kills while flying BW-393 and Eino Luukkanen scored seven more kills with the same plane. BW-393 is credited with 41 kills in total, possibly making it the fighter aircraft with the greatest number of victories in the history of air warfare.

The top scoring Finnish ace, [Ilmari Juutilainen](#), scored 34 of his 94 and one-half kills while flying B-239s, including 28 kills with BW-364.

Although the Buffalo was clearly obsolete in 1944, barely holding its own against Soviet fighters, with most airframes worn out, LeLv 26 pilots still scored some 35 victories against the Soviets in the summer of 1944. The last aerial victory by a Brewster against the [Soviet Union](#) was scored over the [Karelian Isthmus](#) on [17 June 1944](#). After Finland agreed to a truce, it was obliged to turn against its former ally, Germany, and a Brewster pilot, Lt Erik Teromaa (11 kills), claimed a [Luftwaffe Stuka](#) on [October 3, 1944](#), during the [Lapland War](#).

There were many other modifications to the B-239 that were made locally in Finland during its career. Some of these were the installation of pilot seat armor and replacing the single 0.30 in (7.62 mm) machine gun with a 0.50 in (12.7 mm) machine gun. By 1943, all except one Finnish B-239 had four 0.50" machine guns. The wing guns had 400 rounds and fuselage guns 200 rounds each. The 0.30 in (7.62 mm) had 600 rounds. In spring 1941, before reflector sights — the Finnish [Väisälä](#) T.h.m.40 sights, which were based on the Revi 3c — were installed, metric instruments were installed.

During the war, Finnish designers devised a new aircraft, the [Humu](#) based on the Brewster Buffalo, but domestically produced from cheaper materials such as plywood. Only a single prototype was built, as the plane was clearly obsolete in 1943 and deliveries of Messerschmitt Bf 109s filled the needs of fighter squadrons.

The last flight made by the Buffalo in Finnish service was on [14 September 1948](#). Besides the Humu prototype, the hood and fin (with 41 kills) of BW-393 survive in a museum. The BW-372 is displayed today in NAS Pensacola's aviation museum, restored in Finnish colours.

Variants



 Brewster Buffalo F2A-2

- **XF2A-1**: Prototype
- **F2A-1**: 11, US Navy
- **B-239**: 44, Finland
- **F2A-2**: 43, US Navy and Marines
- **B-339**: 40, Belgium (only 2-7 delivered, rest to UK [Fleet Air Arm](#))
- **B-339C**: 24, Netherlands East Indies
- **B-339D**: 48, Netherlands East Indies
- **B-339E**: 170, United Kingdom (RAF, RAAF, RNZAF)
- **F2A-3**: 108, US Navy and Marines
- **B-439**: 20, Netherlands East Indies (went to RAAF, then USAAF)

Specifications (F2A-1)

General characteristics

- **Crew**: One, pilot
- **Length**: 26 ft (7.9 m)
- **Wingspan**: 35 ft (10.7 m)
- **Height**: 11 ft 11 in (3.6 m)
- **Empty weight**: 3,785 lb (1,717 kg)
- **Max takeoff weight**: 5,040 lb (2,286 kg)
- **Powerplant**: 1x [Wright R-1820-34 Cyclone 9](#) , 950 hp (708 kW)

Performance

- **Maximum speed**: 311 mph at 18,000 ft (500 km/h at 5,500 m)
- **Range**: 1,000 miles (1,600 km)
- **Service ceiling**: 33,000 ft (10,100 m)

Armament

- 1 x 0.30 cal (7.62 mm) machine gun and 1 x 0.50 cal (12.7 mm) machine gun in the fuselage
- 2 x 0.50 cal (12.7 mm) machine guns in the wings (optional)
- In Finnish service: 4 x 0.50 in (12.7 mm) machine guns

[\[edit\]](#) Operators



US Navy Ordnance man loads guns of a F2A fighter, 1943.

+ Finland

- [Finnish Air Force](#)
 - Lentolaivue 24 / Hävittäjälentolaivue 24 (1941-1944)
 - Hävittäjälentolaivue 26 (1944-1945)

• Japan

- Captured Buffaloes were repaired and test flown, both in Japanese markings, and - starring in recreated combat footage - in incorrect RAF markings.

• Netherlands

- [Militaire Luchtvaart KNIL](#)
 - [Vliegtuiggroep IV, 3e Afdeling](#) (3-VIG IV: 3rd Squadron, IV Group)
 - [Vliegtuiggroep V, 1e Afdeling](#) (1-VIG V)
 - [Vliegtuiggroep V, 2e Afdeling](#) (2-VIG V, helped defend Singapore)
 - [Vliegtuiggroep V, 3e Afdeling](#) (3-VIG V)

• United Kingdom

- [Royal Air Force](#)
 - [No. 60 Squadron RAF](#)
 - [No. 67 Squadron RAF](#) (ex-60 Sqn., most pilots were RNZAF)
 - [No. 71 Squadron RAF](#)
 - [No. 146 Squadron RAF](#) (ex-67 Sqn.)
 - [No. 243 Squadron RAF](#) (most pilots were RNZAF)
- Royal Navy [Fleet Air Arm](#)
 - [No. 711 Squadron FAA](#)
 - [No. 759 Squadron FAA](#)
 - [No. 760 Squadron FAA](#)
 - [No. 804 Squadron FAA](#)
 - [No. 805 Squadron FAA](#)

- [No. 813 Squadron FAA](#)
- [No. 885 Squadron FAA](#)

[Australia](#)

- [Royal Australian Air Force](#)
 - [No. 21 Squadron RAAF](#)
 - [No. 24 Squadron RAAF](#)
 - [No. 25 Squadron RAAF](#) (ex-Dutch)
 - [No. 43 Squadron RAAF](#)
 - [No. 85 Squadron RAAF](#) (ex-25 Sqn.)
 - [No. 453 Squadron RAAF](#)
 - [No. 452 Squadron RAAF](#)
 - [No. 1 PRU RAAF](#) (ex-Dutch, Photo Reconnaissance Unit)

[New Zealand](#)

- [Royal New Zealand Air Force](#)
 - [No. 14 Squadron RNZAF](#)
 - [No. 488 Squadron RNZAF](#)

[United States](#)

- [United States Army Air Force](#)
 - [5th Air Force](#), Australia (ex-Dutch)
- [United States Marine Corps](#)
 - [VMF-221](#), used in [Battle of Midway](#)
 - [VS-201](#), used in [Battle of Midway](#)
- [United States Navy](#)
 - [VF-2](#)
 - [VF-3](#)
 - Trainers at [Pensacola](#)

Survivors

Surviving Brewster aircraft are extremely rare, as their construction quality was generally poor, and most were quickly dispatched to foreign military service. It was long thought that no intact Buffalo remained, but during the summer 1998, a Finnish B-239 (serial no. *BW-372*) was discovered in a Russian lake, [Big Kolejärvi](#), about 50 kilometers from the town of [Segezha](#), [Russia](#). This aircraft was identified as one of 44 model 239s sold to Finland during the Winter War.

On [25 June 1942](#), *BW-372* piloted by Lieutenant [Lauri Pekuri](#) was in a formation of eight Brewsters that encountered a mixed squadron of Soviet [Hurricanes](#) and [MiG-3s](#). In the clash, seven Soviet aircraft were damaged. Lieutenant Pekuri shot down two Hurricane fighters (he had to his credit 18 kills, including seven Hurricanes) but his fighter was hit by heavy cannon fire from a MiG-3 and he was forced to ditch the burning Brewster in Big Kolejärvi lake. Lieutenant Pekuri survived the crash with minor injuries and managed to walk 20 km to the Finnish lines.

The aircraft was recovered from the lake in 1998, and after extensive negotiations with Russian officials, it was finally transported to the United States. The Brewster fighter finally reached the Naval Aviation Museum in Pensacola, Florida on [18 August 2004](#). After discovering the historic nature of the

aircraft, original plans to restore and display it as an F2A from the Battle of Midway were quickly dispensed with. The museum plans to reassemble the Brewster and display it exactly as it came from the lake in Russia. Damage caused by enemy fire and subsequent crash landing will not be disturbed. As near as possible, it will be fully authentic and original and instantly recognizable as a Finnish Air Force B-239 at a point in time when it made its last flight in hostile skies and settled to the bottom of the lake.

Lauri Pekuri later became the first Finnish pilot to break the [sound barrier](#). He retired from the military in 1968 as a colonel, and continued working in the aviation industry. Col. Pekuri died on [3 August 1999](#), one year after his Brewster fighter was recovered. Before his death, Pekuri was notified of the recovery of *BW-372*, shown photographs of the recovered aircraft, and interviewed about its history.

- [Navy photos of Brewster F2A in flight](#)
- [Navy photos of Brewster F2A on the ground](#)
- [J. Baugher's Brewster F2A article](#)
- ["Annals of the Brewster Buffalo" by Daniel Ford](#)
- ["The Sorry Saga of the Brewster Buffalo" by Daniel Ford](#)
- [BW372](#)
- [http://www.virtualpilots.fi/feature/photoreports/bw-372_photos/BW372 photos](http://www.virtualpilots.fi/feature/photoreports/bw-372_photos/BW372_photos) photos]