

Aichi D3A Val

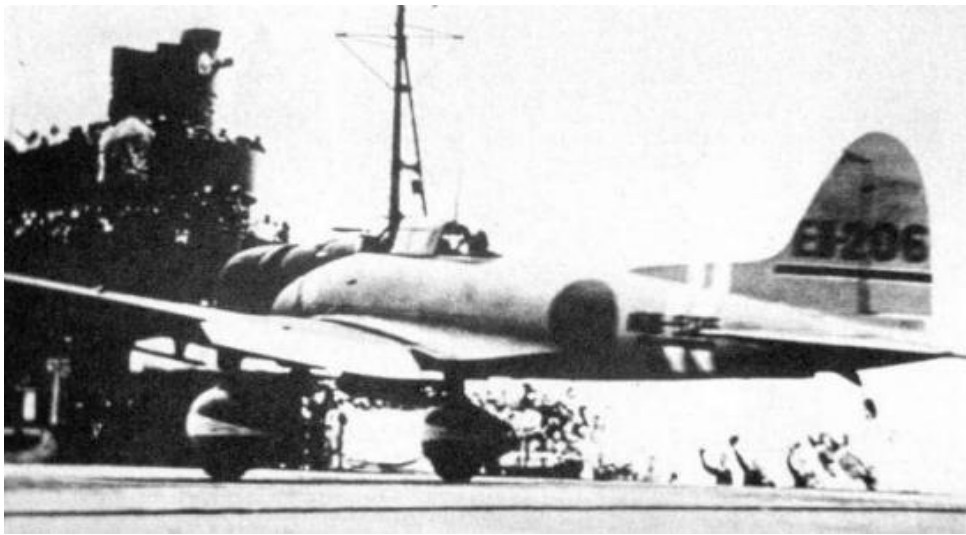


Conçu en 1936 pour la Marine Impériale Japonaise, le D3A, surnommé Val par les Alliés, est devenu un des bombardiers en piqué de la Seconde Guerre Mondiale les plus connus. Il fut un élément crucial de la stratégie japonaise durant les batailles de la Mer de Corail et de Midway. L'Aichi D3A est un bombardier en piqué biplace en tandem japonais dénommé Val par le code des alliés du Pacifique. Premier avion japonais à bombarder des objectifs américains et aussi celui qui parvint à couler la plus grande quantité de navires de combats alliés, cet appareil a participé à pratiquement toutes les opérations aéronavales japonaises de la Seconde Guerre mondiale. Au cours de l'été 1936 la Marine Impériale japonaise lança une fiche-programme (11-Shi) concernant un monoplan d'attaque en piqué embarqué destiné à remplacer les biplans Aichi D1A. Aichi, Nakajima et Mitsubishi se portèrent candidats, seuls les deux premiers se voyant commander chacun deux prototypes. Premier appareil de ce type – monoplan, à aile basse et de construction entièrement métallique – produit au Japon, il s'inspirait d'avions allemands tels que les Heinkel He 66, He 70 et He 74. Le premier prototype du D3A vola en janvier 1938, avec un moteur en étoile Nakajima Hikari 1 de 710 ch. Mais il fallut attendre la fin de 1940 pour qu'entre en service le D3A1, produit à raison de 477 exemplaires, avec des ailes légèrement plus petites et un moteur Mitsubishi Kinsei 43 de 1.000 ch. Le projet développé par Aichi Tokei Denki Seizo Co associait une voilure elliptique inspirée du Heinkel He 70 et un fuselage au dessin assez proche du Mitsubishi A6M Zéro malgré un poste de pilotage biplace en tandem. De construction entièrement métallique avec surfaces mobiles entoilées, il était calculé pour résister à une attaque en piqué, et pour simplifier la construction, un train classique fixe caréné fut retenu, la trainée engendrée ne devant pas influencer de façon importante sur les performances. Tracté par un moteur 9 cylindres en étoile Nakajima Hikari 1 de 710 chevaux au décollage entraînant une hélice tripale métallique, le prototype débuta ses essais en janvier 1938.

Les premiers essais se révélèrent décevants : sous-motorisé, l'Aichi AM17 (désignation constructeur) était instable en évolutions larges, se mettait facilement en vrille en virage serré, les freins de piqué vibraient de façon dangereuse à 370 km/h alors que la Marine demandait de porter la vitesse d'attaque à 440 km/h. Malgré de son train fixe obsolète, comme son équivalent allemand [Ju 87 Stuka](#), le Val était stable et facile à manier dans des piqués abrupts, laissant ainsi le pilote se concentrer sur sa cible. L'adoption d'une dérive dorsale améliora considérablement la maniabilité de cette machine, dont l'armement composé de deux mitrailleuses de 7.7 mm tirant vers l'avant et d'une arme de même calibre montée dans l'habitacle arrière, était nettement insuffisant. Malgré sa lenteur mais grâce à une manœuvrabilité exceptionnelle, il était capable d'engager des chasseurs ennemis. Le Val devint vulnérable à partir de 1943, car la qualité des équipages déclinait radicalement, les vétérans de 1941 tués au combat étant remplacés par des jeunes pilotes peu entraînés. Si l'Aichi D3A1 fut peu utilisé en Chine ou en Indochine en 1940, 126 Val constituèrent la première vague japonaise partie surprendre les installations militaires américaines de Pearl Harbor le 7 décembre 1941. Le D3A1 participa ensuite à toutes les opérations aéronavales japonaises durant les 10 premiers mois de guerre. Entre autres, en avril 1942, durant le raid de la Marine Impériale dans l'Océan Indien, ils envoient par le fond les croiseurs HMS Cornwall et HMS Dorsetshire le 5 avril. 4 jours plus tard le porte-avions HMS Hermes, dépourvu d'avions, fut localisé au large de Ceylan et coulé à son tour avec son escorte : le destroyer HMAS Vampire, la corvette Hollyhock et deux pétroliers ravitailleurs. Le D3A2 était une version plus aérodynamique et plus puissante grâce à son Kinsei 54 en étoile de 1 300 ch. La production s'étendra de 1942 à 1944, avec 815 D3A2 construits. Il sera en première ligne notamment lors des combats dans les Salomons. Avec l'arrivée des Judy, le Val quittera les ponts de porte-avions lourds pour rejoindre les bases terrestres ou le pont des porte-avions légers. Quelques avions furent construits après qu'il soit retiré du front pour l'entraînement. La plupart de ceux qui existaient encore en 1945 furent surchargés de bombes et utilisés pour les opérations kamikazes. A l'automne 1942 le D3A2 entra en service, les modèles antérieurs étant envoyés dans les écoles, mais après la Bataille de Midway le manque de pilotes expérimentés combiné aux performances insuffisantes de cet appareil commença à poser de sérieux problèmes. L'arrivée en première ligne du Yokosuka D4Y Suisei entraîna, en 1943, la relégation du Val aux unités basées à terre ou opérant depuis les porte-avions de petite taille.

Aichi D3A Val :

- Moteur Mitsubhisi Kinsei 44
- 1070 Ch
- 385 Km/h
- 3 Mitrailleuses 7.7 mm 370 kg de bombes
- 3650 Kg en charge
- 10300 m de plafond pratique
- 1350 Km en distance franchissable
- 2 Equipiers



Source : <http://les-avions-de-legende.e-monsite.com/pages/les-bombardiers/les-bombardiers-japonais/aichi-d3a-val.html>

The **Aichi D3A Type 99 Carrier Bomber** ([Allied reporting name "Val"](#))^[a] is a [World War II carrier-borne dive bomber](#). It was the primary dive bomber of the [Imperial Japanese Navy](#) (IJN) and was involved in almost all IJN actions, including the [attack on Pearl Harbor](#). The Aichi D3A was the first Japanese aircraft to bomb American targets in the war, commencing with [Pearl Harbor](#) and U.S. bases in the [Philippines](#), such as [Clark Air Force Base](#). They sank more [Allied](#) warships than any other [Axis](#) aircraft.^{[2][3][4]}

Design and development

In mid-1936, the Japanese Navy issued the 11-Shi specification for a [monoplane](#) carrier-based dive bomber to replace the existing [D1A biplane](#) then in service.^[1] [Aichi](#), [Nakajima](#), and [Mitsubishi](#) all submitted designs, with the former two subsequently being asked for two prototypes each. The Aichi design started with low-mounted elliptical wings inspired by the [Heinkel He 70 Blitz](#). It flew slowly enough that the drag from the [landing gear](#) was not a serious issue, so the fixed gear was used for simplicity.^[5] The aircraft was to be powered by the 529 kW (709 hp) [Nakajima Hikari](#) 1 nine-cylinder [radial engine](#). The first [prototype](#) was completed in December 1937, and flight trials began a month later, after which it was designated as D3A1. Initial tests were disappointing. The aircraft was underpowered and suffered from directional instability in wide turns, and in tighter turns it tended to [snap roll](#). The [dive brakes](#) vibrated heavily when extended at their design speed of 200 [knots](#) (370 km/h), and the Navy was already asking for a faster diving speed of 240 knots (440 km/h)^{[6][7]} The second aircraft was extensively modified before delivery to try to address the problems. Power was increased by replacing the Hikari with the 626 kW (839 hp) [Mitsubishi Kinsei](#) 3 in a redesigned [cowling](#), and the [vertical tail](#) was enlarged to help with the directional instability. The wings were slightly larger in span and the outer sections of the [leading edges](#) had [wash-out](#) to combat the snap rolls, and strengthened dive brakes were fitted. These changes cured all of the problems except the directional instability, and it was enough for the D3A1 to win over the [Nakajima D3N1](#).^{[8][7]} In December 1939, the Navy ordered the aircraft as the **Navy Type 99 Carrier Bomber Model 11** (*kanjō bakugekiki*, usually abbreviated to 艦爆 *kanbaku*).^[9] The production models featured slightly smaller wings and increased power in the form of the 746 kW (1,000 hp) Kinsei 43 or 798 kW (1,070 hp) Kinsei 44. The directional instability problem was finally cured with the fitting of a long dorsal [fin](#)-strake which started midway down the rear fuselage, and the aircraft actually became highly maneuverable.^{[10][7]} In June 1942, an improved version of D3A1, powered by a 969 kW (1,299 hp) Kinsei 54, was tested and designated as D3A2 or the **Model 12**. The extra power reduced range, so the design was further modified with additional [fuel tanks](#) to bring the total tankage to 900 L (240 US gal), giving it the range needed to fight effectively over the [Solomon Islands](#). Known to the Navy as the **Model 22**, it began to replace the Model 11 in front-line units in the autumn of 1942, and most Model 11s were then sent to training units. While some late production models of D3A1 were fitted with a [propeller spinner](#), it became a standard with D3A2.^[7]

Equipment

The [pilot](#) position was equipped with a Type 95 [telescopic gunsight](#) in the earlier models and a Type 99 in the later models, which were used for aiming the bomb during the dive. The [observer/navigator](#) position was equipped with a Type 97 Mk1 [drift sight](#), which was a long vertical tube located in the front-left of the observer's seat. In addition, the observer position was equipped with a [drift meter](#) that was mounted on the floor in the front-right of the observer's seat. The observer also operated a Type 96 Mk2 [radio](#) set that was mounted in front of the observer's seat and behind the pilot's seat. On top of the radio set was a Type 3 [reflector compass](#) for precise navigation.^[11] Armament was two fixed forward-firing 7.7 mm (0.303 in) [Type 97 machine guns](#), and one flexible 7.7 mm (.303 in) [Type 92 machine gun](#) at the rear end of [cockpit](#), which was operated by the observer. Normal bomb load was a single 250 kg bomb (e.g., [Type 99 No 25 semi-AP](#) or Type 98 No 25 land bomb) carried under the fuselage, swung out under the propeller on release by a trapeze. Two additional 60 kg bombs (e.g., Type 99 No 6 semi-AP or Type 2 No 6 land bomb) could be carried on wing racks located under each wing outboard of the dive brakes.^{[7][12]} Initially, D3A dive bombers were painted in silver. During the summer of 1941, the paint finish changed to light olive grey. The color changed again in early 1942 to dark green.^[7]

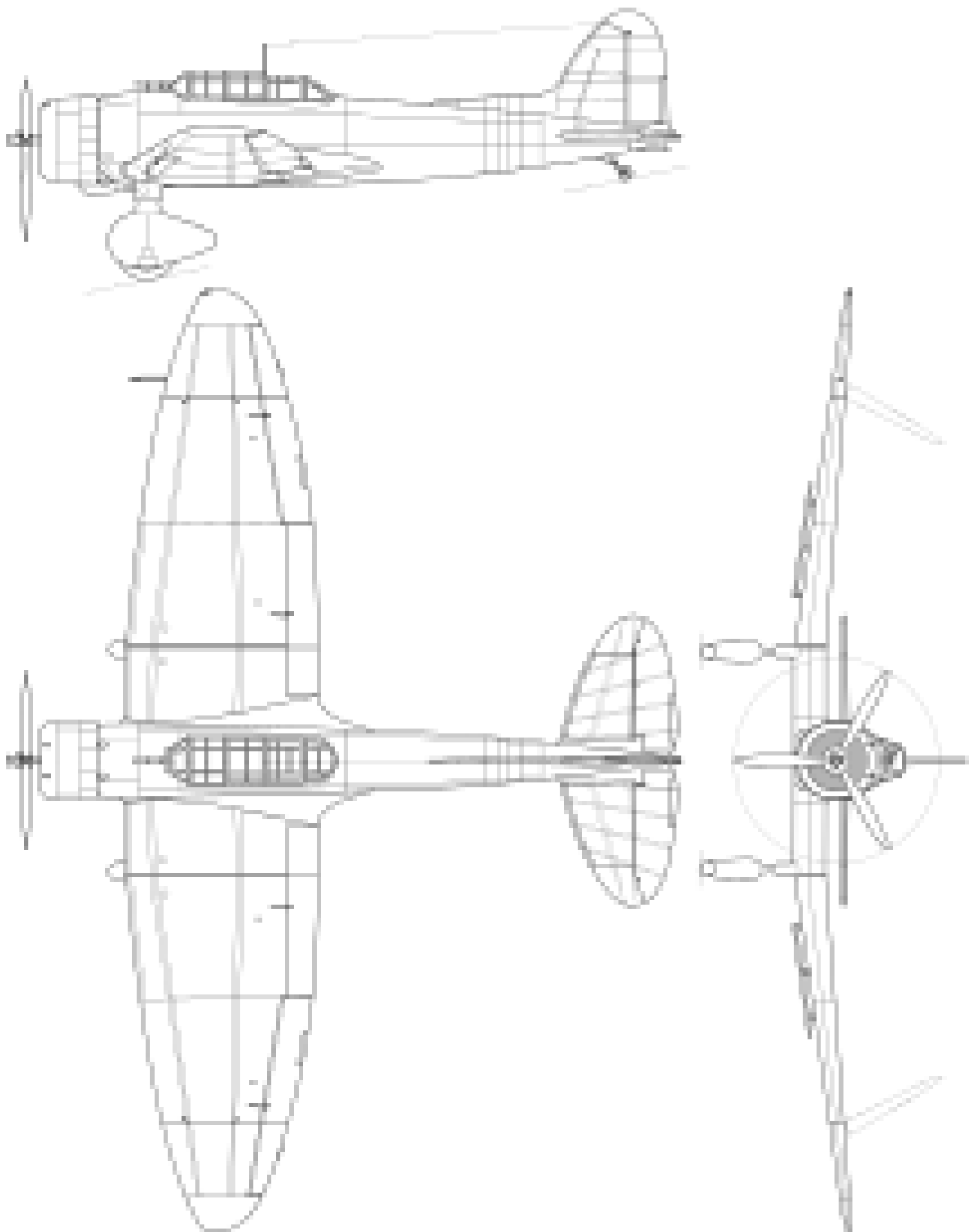
Operational history

An individual D3A dive bomber was commanded by the senior ranking crew member aboard, which could be the observer rather than the pilot.^[7] This was in contrast to [US Navy](#), where the pilot was almost always the commander of a dive bomber. For example, [Petty Officer First Class Kiyoto Furuta](#) was serving as a pilot to [Lieutenant](#) Takehiko Chihaya during the [Attack on Pearl Harbor](#),^[7] and later on to [Lieutenant Keiichi Arima](#) during the two carrier battles of the [Solomon Islands campaign](#),^[13] both of whom were observers. The D3A1 first saw combat operation in November 1939, one month prior to its official acceptance as the Navy Type 99 dive bomber. Nakajima sent several examples to the 14th Air group operating at [Haikou](#) on [Hainan](#) island in [South China](#). These D3A1s were commanded by [Lieutenant Sadamu Takahashi](#) and supported the [Imperial Japanese Army](#) in the [capture of Nanning](#), which was intended to cut the supplies coming from [French Indochina](#). After the capture of [Nanning](#), they continued to be operated in the area in 1940. In May 1940, [12th Air Group](#) became the second front-line unit to be equipped with the new D3A1 dive bombers. They first participated in the [capture of Yichang](#) and conducted anti-shipping operations on [Yangtze](#) river, west of [Yichang](#), in order to cut the Chinese supplies coming from [Chongqing](#). In September, D3A1 from the 12th Air Group started to fly [missions against Chongqing](#), which was the Chinese capital at the time. After the [invasion of Indochina](#) in autumn 1940, 14th Air Group operated at [Hanoi](#) and flew missions against [Kunming](#) and [Burma Road](#).^[7] The D3A1 commenced carrier qualification trials aboard the [aircraft carriers Akagi](#) and [Kaga](#) during 1940, while a small number of aircraft made their combat debut from land bases over [China](#).^[10] Starting with the attack on Pearl Harbor, the D3A1 took part in all major Japanese carrier operations in the first 10 months of the war. They achieved their first major success against the [Royal Navy](#) during their [Indian Ocean raid](#) in April 1942. D3A1 dive bombers scored over 80% hits^[14] with their bombs during attacks on two [heavy cruisers](#) and an aircraft carrier during the operation. Before the Indian Ocean raid, the established doctrine regarding attacks against ships was to arm all D3A1 dive bombers with semi-AP bombs. On 5 April 1942, an IJN carrier force attacked [Colombo](#) on [Ceylon](#) with half of its complement, while the other half was kept in reserve for strikes against ships. Since a second strike against Colombo was deemed necessary, the dive bombers of the reserve force were rearmed from semi-AP bombs to land bombs. When British heavy cruisers were spotted soon afterwards, the reserve force was sent with a portion of D3A1 dive bombers armed with land bombs. In the subsequent attack, land bombs unintentionally proved very effective in suppressing the [anti-aircraft fire](#) from the ships. As a result, the doctrine was modified in order to intentionally equip the first few D3A1 dive bombers with land bombs. This new method was already implemented for the attack that sank [HMS Hermes](#) just four days later, and continued to be used from then on.^[7] During 1942, dive bombing attacks by carrier-based D3A1 and D3A2 bombers significantly contributed to sinking of three US fleet carriers: [Lexington](#) at the [Battle of the Coral Sea](#), [Yorktown](#) at the [Battle of Midway](#) and [Hornet](#) at the [Battle of the Santa Cruz Islands](#). In addition, they damaged the carrier [Enterprise](#) both at the [Battle of the Eastern Solomons](#) and at the [Battle of the Santa Cruz Islands](#).^{[15][13]} Besides carrier-based units, D3A dive bombers also operated from land bases during the Solomon Islands campaign, where they participated in the [Guadalcanal Campaign](#), [Operation I-Go](#), [Operation SE](#) and Operation RO, and during the [New Guinea campaign](#), where they participated in the [Battle of Milne Bay](#) and [Battle of Buna–Gona](#). The main land-based unit to operate D3A dive bombers during these campaigns and battles was the [2nd/582nd Air Group](#).^{[13][16][17]} During the course of the war, D3A dive bombers often combined their attacks upon enemy warships with the IJN [Nakajima B5N](#) Kate torpedo bomber; consequently enemy vessels were often sunk by a combination strike of bombs and torpedoes. However, there were occasions when just the D3A's would make the attacks, or at least score the sinking hits. Discounting the Pearl Harbor strike, which also used the B5N for level bombing and torpedo attacks.

Surviving aircraft

A D3A2 is currently under restoration at the [Planes of Fame](#) Museum in [Chino, California](#).^{[25][26]} There are two unrestored D3As on display at the [National Museum of the Pacific War](#) in Fredericksburg, Texas.^{[27][28]} In 2022, the [Pearl Harbor Aviation Museum](#) began acquiring the remains of a D3A from Papua New Guinea for eventual exhibit.

Specifications (D3A2 Model 22)



Aichi D3A 3-view drawing

General characteristics

- **Crew:** 2
- **Length:** 10.195 m (33 ft 5 in)
- **Wingspan:** 14.365 m (47 ft 2 in)
- **Height:** 3.847 m (12 ft 7 in)
- **Wing area:** 34.9 m² (376 sq ft)
- **Empty weight:** 2,570 kg (5,666 lb)

D3A1: 2,408 kg (5,309 lb)

- **Gross weight:** 3,800 kg (8,378 lb)

D3A1: 3,650 kg (8,050 lb)

- **Powerplant:** 1 × [Mitsubishi Kinsei 54](#) 14-cylinder air-cooled radial piston engine, 970 kW (1,300 hp) for take-off

1,200 hp (890 kW) at 3,000 m (9,800 ft)

1,100 hp (820 kW) at 6,200 m (20,300 ft)

Other engines

710 hp (530 kW) [Nakajima Hikari I](#) - 1st prototype

840 hp (630 kW) [Mitsubishi Kinsei 3](#) - 2nd prototype

1,000 hp (750 kW) [Mitsubishi Kinsei 43](#) - D3A1 Model 11 (early production)

1,070 hp (800 kW) [Mitsubishi Kinsei 44](#) - D3A1 Model 11 (late production)

- **Propellers:** 3-bladed metal constant-speed propeller

Performance

- **Maximum speed:** 430 km/h (270 mph, 230 kn) at 6,200 m (20,300 ft)

D3A1: 387 km/h (240 mph; 209 kn) at 3,000 m (9,800 ft)

- **Cruise speed:** 296 km/h (184 mph, 160 kn) at 3,000 m (9,800 ft)
- **Range:** 1,352 km (840 mi, 730 nmi)

D3A1: 1,472 km (915 mi)

- **Service ceiling:** 10,500 m (34,400 ft)

D3A1: 9,300 m (30,500 ft)

- **Time to altitude:** 3,000 m (9,800 ft) in 5 minutes 48 seconds

D3A1: 3,000 m (9,800 ft) in 6 minutes 27 seconds

- **Wing loading:** 108.9 kg/m² (22.3 lb/sq ft)

D3A1: 104.6 kg/m² (21.4 lb/sq ft)

- **[Power/mass:](#)** 3.9 kg/kW (6.4 lb/hp)

D3A1: 4.9 kg/kW (8 lb/hp)

Armament

- **Guns:** 2x forward-firing 7.7 mm (0.303 in) [Type 97 aircraft machine guns](#) in the forward fuselage upper decking + 1x 7.7 mm (0.303 in) [Type 92 machine gun](#) on a flexible mount in the rear cockpit
- **Bombs:** 1x 250 kg (550 lb) under the fuselage and 2x 60 kg (130 lb) bombs under the wings

Source : https://en.wikipedia.org/wiki/Aichi_D3A