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Jet fuel

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Jet fuel is a type of [aviation fuel](#) designed for use in [jet-engined](#) aircraft.

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Modern Fuels

The most common fuel worldwide is a [kerosene](#)-based fuel classified as *JET A-1*. JET A-1 is produced to an internationally standardized set of specifications, and has a [flash point](#) of 38Â°C and a freezing point maximum of -47Â°C.

A version of JET A-1 known as *JET A* is available only in the [United States](#). It is similar, except for its higher freezing point of -40Â°C. The only other jet fuel that is commonly used in civilian aviation is called *JET B*. JET B is a fuel in the [naphtha-kerosene](#) region that is used for its enhanced cold-weather performance. However, JET B's lighter composition makes it more dangerous to handle, and it is thus restricted only to areas where its cold-weather characteristics are

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absolutely necessary.

Both JET A and JET B can contain a number of additives:

- [Tetra-ethyl lead](#) (TEL) to increase the fuel's [flash point](#);
- [Anti-oxidants](#) to prevent gumming;
- [static electricity](#) dissipating agents;
- [Corrosion inhibitors](#);
- [Fuel System Icing Inhibitor](#) (FSII) agents; FSII is often mixed at the point-of-sale so that users with heated fuel lines do not have to pay the extra expense;
- [Biocide](#) additives.

Militaries around the world use a different classification system of JP numbers. Some are almost identical to their civilian counterparts and differ only by the amounts of a few additives; JET A-1 is similar to JP-8, JET B is similar to JP-4. Other military fuels are highly specialized products and are developed for very specific applications. JP-5 fuel is fairly common, and was introduced to reduce the risk of fire on aircraft carriers. Other fuels were specific to one type of aircraft. [JP-6](#) was developed specifically for the [XB-70 Valkyrie](#) and [JP-7](#) for the [SR-71 Blackbird](#). Both these fuels were engineered to have a high [flash point](#) to better cope with the heat and stresses of high speed supersonic flight. One aircraft-specific jet fuel still in use by the [USAF](#) is [JPTS](#), which was developed in [1956](#) for the [Lockheed U-2](#) spy plane.

Jet A

Jet A is the standard jet fuel type in the U.S. Jet A has a fairly high flash point of 100Å°F, with an autoignition temperature of over 800Å°F. Jet A can be identified in trucks and storage facilities by the fuel code 1863. Jet A trucks, storage tanks and pipes that carry Jet A will be marked with a black sticker with a white "JET A" written over it, next to another black stripe. Jet a will have a clear to straw color if it is clean and free of contamination. Water is heavier than Jet A, and will collect on the bottom of a tank. Jet A storage tanks must be sumped on a regular basis to check for water contamination. It is possible for water particles to become suspended in Jet A, which can be found by performing a "Clear and Bright" test. A hazy appearance can indicate water contamination beyond the acceptable limit of 30ppm (parts per million).

History of Jet Fuel

Fuel for a piston-engine powered aircraft (usually a high-octane gasoline known as AvGas) has a low flash point to improve its ignition characteristics. Turbine engines can operate with a wide range of fuels, and jet-aircraft engines typically use fuels with higher flash points, which are less flammable and therefore safer to transport and handle. The first jet fuels were based on kerosene or a gasoline-kerosene mix, and most jet fuels are still kerosene-based.

Military Fuels

The first U.S. specification for jet fuel (AN-F-32) was published in 1944. Known as JP-1 ("Jet Propellant 1") it was a kerosene with a -60C freezing point. The U.S. military soon sought fuels with better qualities, including absence of visible smoke and reduced production of contrails. In addition, the low freezing point requirement limited the availability of the fuel. JP-1 was superseded by various "wide-cut" fuels, mixtures of naphtha and kerosene: JP-2 (1945), JP-3 (1947), and JP-4 (1951), a kerosene-gasoline mix. These fuels had a lower flash point than JP-1, but were accepted due to their greater availability. As noted above, the JP designations were not universal; other countries developing jet aircraft issued their own specifications, but the resulting fuels were similar.

JP-5 (1952) was developed with a high flash point for use aboard aircraft carriers where the risk from fire is particularly great. JP-5 remains the primary jet fuel for most navies.

JP-6 (1956) was developed with special characteristics to meet fuel requirements for the XB-70 aircraft. When the XB-70 was cancelled, the JP-6 specification was also cancelled.

JP-7 (published in 1970, but developed earlier) was a special fuel designed to meet the stringent requirements of the aircraft that became the SR-71 Blackbird. JP-7 is notable in that it is not a distillate fuel but is created from special blending stocks.

In the 1990s the U.S. Air Force switched from JP-

4 (a wide-cut fuel) to JP-8 (kerosene-based), which, among other characteristics, has a higher flashpoint and is less carcinogenic, although it has a strong odor and an oily touch and is relatively unpleasant to handle.

Commercial Fuels

Commercial jet fuels had their origins in military fuels, but commercial use worldwide now greatly exceeds military use. As noted above Jet-A, similar to JP-8, is a pure kerosene, while Jet-B is a kerosene-gasoline mix similar to JP-4.

See also

- [Aviation fuel](#)
- [JP-7](#)

External links

- [History of Jet Fuel](#)
- [Aviation Fuels](#) (by [Chevron](#))
- [Day, Dwayne A., Aviation Fuel](#)