

## ***Specialty Fuels & Logistics***

### ***Basics of “J” Fuels***

#### ***A quick overview of the most common Jet Fuels...***

**Jet-A** is a narrow cut kerosene product. This is the standard commercial and general aviation grade available in the United States. It usually contains no additives but may have an anti-icing agent included (Prist is the most commonly used).

**Jet-A1** is identical to Jet-A with the exception of freeze-point. Used outside the US and is the fuel of choice for long haul flights where the fuel temperature may fall to near the freeze point. Jet-A1 often contains a static dissipator additive.

**Jet-B** is a wide cut kerosene with lighter gasoline type naphtha components. Used widely in Canada, contains a static dissipator and has a very low flash point.

**JP-4** is a military designation for a fuel like Jet-B but contains a full military additive package including corrosion inhibitor, anti-icing and static dissipator. This was the primary fuel of the United States Air Force for decades but has been phased out in favor of JP-8.

**JP-5** is another military fuel that is similar to JP8 but has a higher flash point. The flash point of JP5 is 140 F min. and was designed for use by the US Navy on board aircraft carriers and is also being used in the US Coast Guard. It contains anti-ice and corrosion inhibitors.

**JP-8** is like Jet-A1 with a full military additive package. The USAF converted to this product in about 1996..

#### ***A brief description of “JP”(jet propellant) Fuels in order....***

**JP-1** was an early jet fuel specified in 1944 by the United States government (AN-F-32). It was a pure kerosene fuel with high flash point (relative to aviation gasoline) and a freezing point of -76 °F. The low freezing point requirement limited availability of the fuel and it was soon superseded by other "wide cut" jet fuels which were kerosene-naphtha or kerosene-gasoline blends.

**JP-2 and JP-3** are obsolete types developed during World War II. JP-2 was intended to be easier to produce than JP-1 since it had a higher freezing point, but was never widely used. JP-3 was even more volatile than JP-2 and intended to improve production, but its volatility led to high evaporation loss in service

**JP-4** (also NATO designation F-40) is typically composed of about 50-60% gasoline and 40-50% kerosene, is highly volatile, and contains hydrocarbons in the C4-C16 range. JP-4 was the primary fuel of the USAF for decades; however, it has been phased out in favor of JP-8 in or around 1996. By specification, it contains a full additive package including a corrosion inhibitor, anti-icing, and anti-static compounds. An optional additive is a metal deactivator. Compare to **Jet B**.

**JP-5** (also NATO designation F-44) is a low-volatility (C10-C19 range) jet fuel with a relatively high flash point (for shipboard safety reasons) and is designed for use in aircraft aboard Navy aircraft carriers. Anti-icing, anti-oxidant and anti-corrosion additives are required in the formulation of JP-5. An optional additive is a metal deactivator.

**JP-6** was used only in tests during the XP-70 Valkyrie program. JP-6 was similar to JP-5 but with a lower freezing point and improved thermal oxidative stability. When the XB-70 program was cancelled, the JP-6 specification, MIL-J-25656, was also cancelled

**JP-7** Not a distillate fuel, but blended from stocks...used for the SR-71 Blackbird and has a high flash point to better cope with the heat and stresses of high speed supersonic flight.

**JP-8** (also NATO designation F-34) was developed to be less volatile and explosive than JP-4. (Commercial Jet A-1 fuel is equivalent to JP-8). In 1996, the USAF completed conversion from JP-4 to JP-8 fuel. It also contains a full additive package including a corrosion inhibitor, anti-icing, and anti-static compounds. Optional additives are an anti-oxidant and a metal deactivator.

**JP-8+100** is an improved JP-8 fuel with additional "fuel injector cleaner"-type additives. This new fuel has been demonstrated to significantly reduce engine and fuel system operation and maintenance costs for a variety of aircraft. The new additive also increases the thermal stability of the fuel. (When thermal stability is compromised, fuel breaks down into gums, varnishes, carbon deposits, and coke.)

**JP-9** is a Missile fuel which is a higher energy per unit volume.

**JP-10** is a gas turbine fuel for missiles, specifically air-launched cruise missiles and contains a mixture of (in decreasing order) endo-tetrahydrodicyclopentadiene, exo-tetrahydrodicyclopentadiene, and adamantane. It is produced by catalytic hydrogenation of dicyclopentadiene. It superseded JP-9 fuel, achieving a lower low-temperature service limit of -65 °F.

**JTPS** is used in the Lockheed U-2 and developed in 1956 and is a highly stable kerosene fuel.

### ***One more fuel...***

**F-24** is a new NATO code and was issued for Jet A with military additives. Simply put, F-24 is Jet A plus the military additives S-1745 (FSII), S-1747 (CI/LI), and SDA. It has a slightly different freezing point of -40 degrees F, compared to -54 degrees F for JP-8.

### ***Availability and pricing from SFL...***

**Jet A:** Readily available and by far the most economical. Available in bulk and drums.

**JP-5:** It currently is available in bulk and drums, yet is very expensive and has a 4-6 week lead time. Currently working on more economical choices and may have available early in 2015.

**JP-8:** Is readily available in bulk and drums. Drums can generally be shipped within 24 hours of notification.