

Fuel Guidance – Flash Point

By Tom Gahs

CG policy on flash point has been updated in the Naval Engineering Manual (NEM), Rev D.1. This article discusses the rationale for the policy change.

FLASH POINT DEFINITION. Flash point is a measure of a fuel's flammability. The flash point affects a fuel's ease of ignition, flame spread rate once ignited, and extinguishment difficulty. As ambient air temperature in a space approaches a fuel's flash point, the presence of flammable vapors increases dramatically. Marine fuel, by definition, must have a minimum flash point of no less than 60°C (140°F).

LOW FLASH POINT FUEL. Prudent shipboard safety practice is to take on fuels with a flash point of no lower than 60°C (140°F). However, due to market conditions in some parts of the country, only non-marine diesel fuel may be available. For example, DESC bunker fuel product DF2 has a minimum allowable flash point value of 52°C (125°F). This product is currently only available at Cape Girardeau & St. Louis, MO and Baltimore, MD. Emergency Substitute Fuels may also have flash points less than 60°C (140°F). Risk is obviously highest for cutters that must routinely load low flash point fuel, but even a single low flash point fueling warrants special precautions.

COLD WEATHER BLENDING. In the winter months, it is common commercial practice in Alaska to cut commercial diesel fuels with kerosene, or #1 diesel fuel, to improve cold weather handling properties. Such cold weather blending is authorized by DESC bunker fuel contracts only in Alaska and only from 15 October to 15 April. The practice also lowers the winter blend's minimum allowable flash point to 52°C (125°F). Risk is minimal for local Alaskan cutters who burn the "winter blend" fuel in local Alaskan waters. This is due to generally colder ambient air and water conditions during the Alaskan winter months. However, cutters that are deployed to Alaskan waters, take on low flash point fuel, and then transit to warm or tropical waters with that low flash point fuel are at increased fire risk. Coast Guard bulk fuel storage facilities at Kodiak Island may have low flash point fuel even during summer months. This is more of a concern because air and water temperatures may not support safe Summer operating temperatures. Locally stationed cutters who may routinely fuel from Kodiak Island are especially at risk because they would not have any high flash point fuel onboard to increase an overall blend's flash point. Operating time with low flash point fuel is also at 100%. Steps are being taken to modify the Kodiak Island bulk fuel contract so that it complies with DESC bunker fuel "winter blend" contract practices.

RECOMMENDATIONS. SOLAS guidance states that when low flash point fuel is unloaded, storage and engineering space temperatures should be kept at least 10°C cooler than the flash point of the fuel. This translates to a maximum safe engineering space air temperature of 42°C (108°F). Prevention of fuel leaks and proper insulating/shielding of fittings/hot surfaces remains the best defense against the hazards of using fuels in general. When forced to load low flash point fuel (less than 60°C, 140°F), the following precautions shall be taken:

Applicable to all unloaded low flash point fuel:

- Cutters should be aware of the flash point of all fuels unloaded. Cutter LOGREQs should require flash point information be provided as part of LOGREQ reply.
- Take on only the minimum amount of low flash point fuel required for mission and stability reasons.
- Advise engineering watchstanders of the reduced flash point fuel and the required precautions.
- Maintain vigilance to locate and correct any/all fuel leaks and fuel spray, especially around operating machinery.
- Increase efforts to keep bilges dry and free from fuel leaks.
- Do not perform full power trials.
- Review ECCM and main space fire doctrine (or Fire Bill) procedures with all engineering and bridge watchstanders.
- Ensure "smoking lamp" is out throughout the ship (underway or in port) when transferring or unloading the low flash point fuel.
- If there is a designated "Smoking Lounge," ensure it is well clear (10 ft radius) of any fuel tank vent(s).

For cutters operating in Alaskan AOR during winter months:

- Keep low flash point fuel segregated and minimize mixing with fuel from tanks with high flash point fuel. Keep track of what tanks contain low flash point fuel and use low flash point fuel first to minimize the overall extended risk to the cutter.
- Adjust engine room ventilation and/or propulsion plant configuration to maintain compartment air temperatures below 42°C (108°F).
- When departing the D17 AOR, burn as much low flash point fuel as soon as is possible. As engineering space air temperatures approach the maximum safe operating value (42°C/108°F), discontinue burning low flash point fuel. Upon next bunkering, blend remaining low flash point fuel with high flash point fuel. The resulting flash point can be estimated by assuming a straight line interpolation. For example, a 50/50 mix of 130°F flash point fuel with a 150°F flash point fuel will result in a 140°F flash point mixture.

For general guidance outside of the Alaskan AOR:

- If possible, adjust engine room ventilation and/or propulsion plant configuration to maintain compartment air temperatures below 42°C (108°F).
- If engine room air temperature can be maintained below 42°C (108°F), keep low flash point fuel segregated and minimize mixing with fuel from tanks with high flash point fuel. Keep track of what tanks contain low flash point fuel and use low flash point fuel first to minimize the overall extended risk to the cutter.
- If engine room air temperature can not be maintained below 42°C (108°F), blend low flash point fuel with high flash point fuel. Burn blended fuel as soon as possible to minimize overall risk to the cutter. See guidance above for estimating blend's flash point.

Cutters participating in the In-Line Sampling Program will be provided with the actual measured flash point for each fuel load. In many cases, the actual flash point will not be as low as the minimum allowed by the purchase requirements. Note that the minimum Flash Point on MIL-SPEC F-76 and JP-5 products will never be below 60°C/140°F. If you should have shipboard fuel quality questions, contact Tom Gahs at ELC-026, voice 410-762-6291, email TGahs@elcbalt.uscg.mil. Valuable fuel quality information is also posted at the CG's fuel quality web site is at <http://www.uscg.mil/hq/elcbalt/fueltest/fueltest.htm> Please check it out.