



HOT

Hot refuelling is refuelling with the engine(s) running. It is permitted with Jet A-1 fuel, but prohibited with Avgas, because it is so much more dangerous with Avgas due to its low flashpoint. In fact, people have set themselves alight through refuelling with Avgas.

“Hot refuelling with Avgas is fraught with danger and is extremely unsafe,” says Simon Spencer-Bower, an 18,000-hour pilot and owner of Wanaka Helicopters.

“It’s good to see that the rules now forbid this, which means that individuals who used to undertake this dangerous practice in the past, are not legally allowed to anymore.”

The argument for hot refuelling is to reduce engine cycles on turbine engines and save maintenance costs. So it’s about saving money, and sometimes time, but there are inherently more risks.

The main increased dangers of hot refuelling are:

- » moving rotors or propellers;
- » noise and rotor/prop blast can create confusion – people can do silly things in a perceived ‘rush’; and
- » increased chance of static electricity build-up.

Recommendations to mitigate these risks are:

- » Only consider hot refuelling when allowed by the rules (ie, never with Avgas), and also when permitted in the Flight Manual (not all manufacturers allow hot refuelling).

- » You should be familiar with the minimum requirements for refuelling in rule 91.15.
- » Part 135 operators must have documented procedures in their expositions (rule 135.73).
- » A fire extinguisher should be immediately available. Locate it several metres from the refuelling point.
- » Only those essential to the refuelling operations should be near the aircraft.
- » The fuel nozzle should always be attended while refuelling.
- » No cigarettes or cellphones near the refuelling operation.
- » Within the vicinity of the refuelling operation, no radio transmissions should be made, or electrical switches operated.
- » Only refuel to about 95 percent to avoid overflows.
- » Always be aware of the potential for static electricity build-up and check that bonding to earth is in place.
- » For aeroplanes – engine at ground idle; for helicopters – collective at flat pitch.

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Refuelling

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- » For aeroplanes, it should be possible to stop the engine and move the aircraft in the event of a fuel spillage.
- » For helicopters, it is recommended that the pilot remains at the controls, to facilitate flying the helicopter clear, should there be a fuel spill.
- » Do not refuel on elevated helipads when upward draughts of air may be present, as this can displace some fuel.

Static Hazards

There is increased risk of a static build-up on an aircraft with the engine(s) running. But remember that static can also build up on your clothing, or other items close to the refuelling operation, such as plastic funnels. Just one spark from a static build-up can ignite fuel vapour.

Andy Brown, of Coast to Coast Helicopters, points out that, “People need to realise that static electricity can be present when refuelling. We had this very clearly demonstrated to us recently at dusk, when we watched a colleague refuelling. He was wearing 100 percent nylon shorts, and although he was using an anti-static, anti-drip nozzle, we could still see static sparks from 25 metres away.

“We have a bigger than standard extinguisher on site. A 2.5 kg extinguisher always needs to be handy, but we now take an additional 4.5 kg extinguisher on every spray-support unit. It is important to remember that the fire extinguisher should be placed about four metres or so away from any refuelling activity, so that in case of a fire, the extinguisher is still easily accessible.”

Some common static hazards:

Fuel Flow Rate: The need for fast refuelling of aircraft results in higher fuel transmission speeds, which means greater risk of static electricity build-up and also more fuel splashing.

Splashing of Fuel: If splashing or spraying occurs during the refuelling process (most likely during top-loading of a tank) a charged mist or foam can be produced.

Hot and Dry: Hot and dry conditions pose the greatest atmospheric risk of fuel flammability.

Dangers of Synthetic Clothing: Polar fleece, polyester, nylon and other synthetic materials are static hazards. Avoid wearing such clothing, but if you are, never remove it near a refuelling operation.

Chamois Leather: Studies have found that the use of a chamois as a filter can be a static hazard. Synthetic chamois are even more of a hazard.

Bonding

Static electricity will take the quickest path to earth (or ground). If this means leaping the air in the form of a spark, there is a great risk of igniting fuel vapour. This is mitigated by providing an electrical connection between earth, the fuel pump, and the aircraft – often referred to as bonding.

All bonding connections between ground equipment and the aircraft should be completed before tank filler caps are removed, and should be maintained until the filler caps have been replaced.

It is also advisable to keep the nozzle in contact with the side of the tank filler neck.

If you are refuelling from cans or drums, you must take some measures to reduce the risk of an electro-static discharge. Remember, the risk of a static electricity build-up is greater when hot refuelling.

The *Fuel Management* Good Aviation Practice booklet has information on fuelling procedures and precautions. Email: info@caa.govt.nz for a free copy. ■