

COLD WEATHER OPERATIONS

AirShares Elite Owners and Staff,

It's October, 2008. While the world waits for credit markets to thaw our overnight temperatures are dropping into the freezing range. Cold weather operations for light piston aircraft present challenges to pilots that require careful planning and preparation. I encourage you to brush up on cold weather operations with the resources I've provided below.

PDFs of the following titles for your reference and reading pleasure can be downloaded by clicking on the document title:

[Cold Starts](#)
[Cirrus Design Cold Weather Tips](#)
[Cirrus Design Icing Advisory](#)
[AOPA ASF Icing Advisory](#)
[TKS System POH Supplement](#)

Below you will find guidance on before-takeoff engine management, notes on the use of TKS fluid enroute, and web links to recommended on-line resources.

Startup: Under low ambient temperatures, fuel does not readily vaporize in the cylinders and therefore ignition of a cold soaked engine can be challenging for those who do not take this fact of physics in to account. I recommend priming the engine 7-10 seconds during your initial cabin check on pre-flight, and then proceeding with your external pre-flight. By the time you get back in the cockpit several minutes later, the fuel you flooded the engine with will have had a chance to vaporize and saturate the cylinders, creating a readily ignitable mixture. Do not prime again; leave the boost pump off; and leave the throttle closed with the mixture full rich. If the engine does not ignite or cough within the first few revolutions of the propeller, it probably will not start - stop cranking and start over, giving another dose of prime and then a few minutes to let it vaporize. The mantra: "Prime then time... Prime then time..."

After Startup: Do not exceed 1000 RPM until the oil temperature reaches 75°F or greater. On the MFD engine page the oil temp is not displayed until it reaches 75°F. This may require a couple of minutes in cold weather. The majority of engine wear occurs during the initial start-up on a cold-soaked engine, so maintaining low RPMs is critical to mitigating this.

Runup: Do not exceed 1700 RPM until the oil temperature reaches 100°F or greater. Since the 2000 RPM prop governor check is no longer required, it is possible to do the

runup at 1700 RPM for the mag check, and after the oil warms a few more RPM - about 1800 - is usually enough to get the #2 alternator on line for the alternator check.

Departure: Do not depart until the cylinder head temperatures (CHTs) are 210°F or greater. This generally coincides with the oil temperature reaching 130°F, which is a Cirrus Design guideline for their pro pilots. The CHTs are still white bars at that point on the MFD, but approaching green. Warming the cylinders may take an extra minute or two before a departure. Once the oil temperature is in the green, about 1300 RPM will warm the heads fairly quickly and bring the oil temperature up to 130°F for departure.

Ambient Temp <20°F: Warm hanger or pre-heat required. Engine pre-heaters must be plugged in at least four to six hours to be effective. We strongly advise you not to use forced air systems - they can be so hot as to delaminate the cowling. Forced air over 150°F should not be used, *ever*.

TKS Fluid Use EnRoute

* The aircraft TKS system works best as an anti-ice, not de-ice system; it is far better at preventing ice from attaching to the protected areas than it is at removing accreted ice. Also, when the TKS has not been used for some time, it can take up to five minutes for fluid to be pushed through all the membranes, and flow through the micro-perforated panels. These two facts combine to make it very important that TKS be activated before the possibility of icing is even suspected, and left operating until either visible moisture or below freezing temperatures have been exited. Don't wait until ice begins to form - if you're in a cloud and temperatures are at or below zero, turn on the TKS and get out of there immediately.

* Flight into known icing is prohibited, but should you have an inadvertent icing encounter, please remember to mark the minutes you used the Ice Protection system in the appropriate box on the flight detail sheet. The transponder timer function is useful for this. This lets us know when an aircraft may require a top off prior to the next flight in addition to keeping you aware of how much time you have before it runs out.

On-line Resources

* "[A Pilot's Guide to In-Flight Icing](#)" is a free, online course primarily intended for the general aviation pilot who flies aircraft certified for flight in icing, although much of the information is applicable to all pilots. With an operational focus, this course provides tools pilots can use to deal with in-flight icing. Emphasis is on avoidance, detection and exit, as well as the effects of ice accretion on performance and handling and the particular hazard of Supercooled Large Droplet (SLD) icing. *Highly Recommended!*



- * AOPA's Air Safety Foundation has set up a "Safety Hot Spot" on aircraft icing chocked full of resources and information. <http://www.aopa.org/asf/hotspot/icing.html> -- This is definitely worth a look.
- * Recently implemented icing weather products: <http://adds.aviationweather.gov/icing/>
- * For additional information on the weeping wing system go here: <http://www.weepingwings.com/system.html>
- * More resources can be found on our Safety web-site, created exclusively for AirShares Elite pilots and instructors. Log-in with username: **owner** and password: **safety** to <http://www.safety.airshareselite.com>

Please have a safe and enjoyable holiday season!

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