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An argument for the experimental, light sport header tank!

Some light sport pilots spend much of their flying time within a relatively *small area* around local airfields – well within- at most: an **hour** of flying time before landing.

These pilots **don't** need to top off their fuel tanks, as the required safe amount of gas required for an hour of flying- plus the required ½ hr. of reserve time is less than 10 total gallons (for example: at 5 gallons per hr. burn rate for a typical light sport engine).

If you have 2 wing tanks, that would be no more than 5 gallons per side of useable fuel for your local flying excursion.

But most of us know that using your fuel gauges, **you cannot judge the last 5 gallons** of useable fuel in your tanks; these gauges are widely inaccurate when judging fuel level.

The typical solution: just load up with LOTS of extra fuel on each side and be done with it! We don't want to worry about running out while flying. Extra fuel is the answer!

Here is the problem: throwing an extra 5 gallons "for safety" into each **wing adds about 60 lbs. of weight to your aircraft** – weight that is present just to make us feel secure that we won't run out – even for those local trips of less than hour around the patch.

No surprise: there is a substantial amount of useable fuel left in our wing tanks even when the gauge reads empty: but the problem is – just how much?? Your life and safety is not worth the gamble to find out.

Have you ever come close to running out of fuel because you misjudged the level in the tanks… and the resulting pucker factor will not let you ever forget? (We are ALL human, after all – mistakes can and will be made in our lifetime).

Didn't we work REAL hard while building our plane to watch for adding any extra weight – even to the point of analyzing options down to the ounces and pounds before putting them in our aircraft? And now that we are flying – we throw an **extra 60 lbs.** of dead weight (fuel) – just because we cannot accurately understand how much useable fuel we have on board?

For those of you who haven't flown your aircraft yet- maybe you are still building at this time – let any pilot that flies a light sport warn you that keeping the weight down as much as possible means your plane will perform **so** much better in the air! DO work at keeping the weight off! You will later have to experience to believe!

The header tank is a GREAT solution for this problem Note**: I spend 75% of my flying time visiting local airstrips, my flying time is well within an hour and fuel is always available.**

The header configuration is as follows: With a high wing homebuilt aircraft, both wing tanks are plumbed into a common 2 gallon header tank (header tank size is your choice…keep in mind mounting restrictions and weight)**.** The header tank then feeds the engine. This way **all fuel**

from both tanks MUST flow thru the header tank first. The header tank is always FULL until: the last useable drop from both wing tanks is consumed. This is typically long after the wing tank gauges read empty! If the header tank fuel gauge starts moving off FULL, you know you have reached the point where the wing tanks are no longer contributing to the header.

By monitoring **accurately** the level in a 2 gallon header tank, you can know and watch the approximate last half hour of fuel before the engine stops. There is no guessing when that time has come – the needle on the gauge will move like a minute hand… steady towards the last ounce of fuel. What you decide to do during that last half hour is your choice (Land!). With this setup, you now have ability to accurately monitor your fuel level like never before! (Even expensive fuel flow gauges fail to inform when there is an unexpected loss of fuel from a wing tank due to a leak, etc). Of course, you should **not plan on running your fuel levels so close that you get to this poin**t... but if you ever do - you will know exactly where you stand and how much time is left.

These are my own opinions and findings – your experience will vary. I really enjoy flying a lot more now that:

I have eliminated that nasty feeling flying when close to empty (Did I estimate my flight time and fuel reserves properly for those longer trips?) We need to always plan carefully for fuel managementand provide for the mandated reserve – the number one cause of accidents – but it is **quite a safety feature** to have awareness your last half hour of flight, minute by minute down to a “science”.

My aircraft is performing at optimum levels because I have eliminated 60 lbs. of dead weight! (Take off distances, flight speeds, maneuvering performance, etc. - everything is affected adversely by weight). The benefits from 60 lbs. of weight reduction is not as evident on much heavier, certified aircraft. I am only referring to the magnitude of benefits with light sport class aircraft!

Of all the efforts I made to eliminate excess weight from the plane while building, the installation of a header tank was the significant winner by far!

If you do decide to re-plumb your fuel system to accomodate a header tank, **be very careful and get advice** about fuel flow design issues if you are not familar with these factors. (venting, fuel flow pressure, etc are super critical issues!)

Jon Croke

Comments? Feedback@HomebuiltHELP.com

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