Composite fuel strake leaks:

Q: My Varieze is airworthy but needs some engine work & fuel strake repair.

A. Strake fuel leaks are work - I've been seeing comments on the Velocity and Cozy website this past week on how to do it.  The key being that where the leak manifests is not necessarily adjacent to where the leak in the tank is.

If you have built the tank or have a tank on your purchased plane and don’t know where the leak is, it is most often in 4 places,

1. At the openings in the tank, including the flox around the drain and fuel and vent lines. More on fuel caps and drains in option 5, below.
2. At a connection of parts, particularly the forward joint of strake skins, the strake skin to fuselage, spar or wing side, and particularly the upper skin to all edges.
3. The TASK strakes had holes in the foam and really needed good coverage of wet epoxy, some guys even added Urethane liners – I did (thinking I’d use auto fuel) and had a option 2 leak anyway. (Auto Fuel isn’t Auto fuel any more – it all seems to have alcohol that attacks other stuff.)
4. The fuel drain has an o ring that can deteriorate and it is hard to put a pipe fixture into glass without spreading and cracking the surrounding glass, we found a little corner of Bondo was much more firmly attached. (A special condition of option 1.
5. The fuel cap can leak too – and you’d best fix it because water can get in the fuel that way too. (I’ve found no water in my fuel in 30 years, these tanks do not weep water as much as metal tanks. Getting the cap sealed fixed a problem I did have once. I actually added a washer to attach a chain and destroyed the central seal of the cap. I later drilled a hole right through the bolt well below the central cap seal for the future fuel caps.

It is best to rig up a system to test an overnight vacuum on the tank. Test your rig on a tank that isn’t leaking so you can find all the places to block – vent lines blocked carefully, fuel selector off, tube carefully potted in the fuel fill opening.

Some leaks stop and start according to how high the fuel level is...that's a hint that can be explored with nose up and nose down, and theoretically tilting the plane left and right may give you more information...One guy proposed identifying the interior skin leak by triangulation, but it might help you eliminate large areas, if not isolating the leak.

You need to guess where the interior seal is not holding, cut a hole big enough for a hand and light and add 1/2" in all directions - in a round or square cork shape - if you want to be very forward thinking, you actually cut the top skin in a circle, cut the foam clearing the inside skin in a smaller circle/square (about 1/4" smaller in every dimension, sand the bottom skin, vacuum carefully and wipe all crumbling foam away, then use a razor knife to cut through the inside skin - to reduce the chance of leaving anything that will choke your fuel filters.  Then you either use wet epoxy in a fairly large area toward the leak or add 4 oz model glass in the same area - it tends to have such small weave that pin-holes don't occur.

There is a stop-gap approach, trying to block the leak by putting a very small vacuum on the tank (after closing the vents and fuel selector) (so as not to collapse the tank) then apply epoxy over the outside evidence of the leak and see if that makes the tank hold a vacuum overnight - with a good airspeed indicator plumbed in.  Don't go too high on the altimeter - say 5,000'.  Unfortunately, if the epoxy doesn't reach the tank inner wall, the foam will just transport the fuel somewhere else - even though it is closed cell foam.