Fuel Trailer

While this may not be the cheapest way to construct a fuel trailer, it was made with off the shelf parts that anyone can obtain. A list of the parts necessary to construct this fuel trailer is included in the Bill of Materials at the end of the document.

Completed Fuel Trailer

The key to building a fairly legal fuel trailer is to find a truck bed fuel tank system approved for flammable liquids, as most tanks are only approved for combustible liquids which is diesel or jet fuel. I mention “legal” because there are several legal considerations, depending on where you live. The tank I selected is the only one I found that is legal as a truck bed fuel tank for gasoline in all 50 states. Another legal consideration is that the tank is legal in certain pickup truck beds. It may not be legal on a trailer. When I ordered the tank they asked what truck I was going to install it in and when I told them it wasn’t going in a truck bed, they

balked. I explained that it would be on a trailer for off road use in rural Oregon where law officers pretty much ignore minor infractions because they would have to dig in our arcane statutes to figure out what to cite you for if it is actually illegal in this state.

The other legal consideration is a trailer. In Oregon, small trailers don't require either tail lights or brakes. I selected a small commonly available trailer that is often used for transporting off road toys, and it came with tail lights, so your tow vehicle should be equipped with the electrical connections for tail and brake lights if you use the listed trailer.

After searching the Internet for a flammable legal fuel tank / pump system that would work on a 12 volt car battery, I settled on the Transfer Flow 109 gallon Refueling Tank system. It is the largest legal tank for a truck bed without having to have a hazardous material drivers endorsement. I believe that is a federal requirement (DOT) not any particular state limit, although it may very well be in your state. Transfer Flow has no notes on their web site that the 109 gallon tank is illegal because of any state law.

Using the dimensions of the tank, I selected the smallest trailer for the tank size. I was unable to find a trailer that was wide enough for the tank sitting across it to minimize the length, so I selected a common trailer that was just long enough to fit the tank length wise, essentially 55" or about 5 ft. The cheapest, smallest trailer I could find that was locally available was at Lowes, item # 110783, essentially a 4 ft. X 5 ft. mesh bed trailer. The mesh bed would make it easy to bolt the tank to the bed and they are commonly available for transporting off road toys. The axle is rated at 2000 lb. but the listed gross weight of the trailer is 1280 lb. just barely what the trailer, tank and 100 gal. fuel load will be.

Basic Trailer

The first thing to do is bolt on a retractable tongue jack so that the trailer will stand on its own when unhitched from the tow vehicle and you can maneuver it around.

Retractable Tongue Jack

When I ordered the Transfer Flow tank I also ordered the fuel filter kit upgrade for the pump and a fuel meter. This is what the package looked like when it arrived.

Fuel Tank Order As It Came Off The Truck

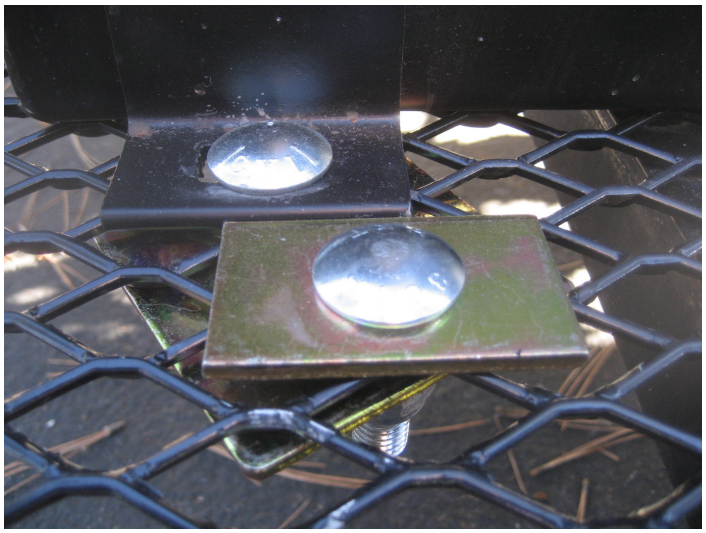
The cardboard boxes contain the filter, hose, nozzle, fuel meter and instructions. Use the materials list supplied by Transfer Flow to verify that you have received everything you ordered.

Fuel Tank Unpacked

Transfer Flow, Inc. Fuel Tank: 0800109416 109.0 gallon tank unpacked.

Unbolt the fuel tank and get some help to lift it onto the trailer and place it. I moved the tank as far forward as possible, looking through the mounting pads to line up with mesh holes in all four corners. Center it between the wheels as close as possible.

Mount the tank such that all of the pumping equipment is as far forward as possible, since the tank is almost centered fore and aft on the axle and you want the CG forward of the axle. The battery is the other heavy part of the system and it is mounted as far forward as possible.



Tank Fasteners Supplied By Transfer Flow

Using the tie down bolts and reinforcements, bolt the tank to the trailer. By judicious spacing I was able to put two bolts and two reinforcements on each of the corner pads, solidly anchoring the tank to the trailer.

Once the tank is bolted into place, you must hook up all of the plumbing and the optional fuel filter if you ordered that item.

Optional Fuel Filter

I opted for the optional fuel filter and fuel meter. Assemble the fuel filter pad to the pump exit, spin on the filter, connect the meter, the hose and the nozzle using teflon tape.

Optional Fuel Flow Meter

This unit will deliver fuel to a flying club aircraft so the meter will provide a reasonable record of fuel usage for a particular flight and is useful to track long term fuel usage.

Note: this meter is **NOT** legal for commercial use. Such a meter and usage would have to be tagged by your state Dept. of Weights & Measures.

Nozzle Installed

Note the cool D clevis pin that locks the nozzle in place during transit.

Tank Bolted Down, Filter, Hose, Nozzle, Meter Installed

Ready for fill and leak testing. Note: It isn't clear in this picture but there are two bungee cords holding the hose down for transport.

Battery Box And Control Box

Pick any battery that is big enough to run the pump. I had a spill proof, no maintenance AGM battery from another project that was sitting around. Just purchase the right battery charger for the type of battery that you select. A sealed, maintenance free battery is probably optimum as the battery gets bounced around when the trailer is towed, and you don't want the added maintenance headache of having to monitor water level for a battery that sits around the hangar. Mount the battery as far forward as possible to keep the CG in front of the axle.

Since the pump motor uses about 18 amps, according to the documentation, a battery of at least 40 AH should probably be considered, more is better. Any car starter battery is good since this is more of a pulse application rather than a long slow drain, although deep discharge batteries would be good in this application, unless you keep the battery on a maintainer between use.

Battery Charger

The battery charger selected was a Battery Minder for an AGM type battery. The battery charger must match the type of battery selected for optimum battery charging. This charger is smarter than the average pilot. It includes self test, dead cell detection, de-sulphator and temperature compensation. It'll even call your wife and tell her you're at the hangar while you're having a beer with the boys down at the EAA chapter hangar lying to each other about your flying exploits.

Purchased through Amazon, where else?

Master Switch

The master switch and bezel is supplied by Transfer Flow. You just have to figure out how to mount it somewhere and wire it. I purchased a lockable box and attached it to the trailer frame and on a smaller aluminum chassis mounted the switch. Getting it to all fit together was a bitch, good luck. (Hint: Get a bigger lock box with some room to work. The cool thing about this system is the switch has a momentary contact that is wired to run the pump backwards, so when you are done fueling, you can run the pump backwards, open the nozzle valve and purge the fuel hose. Nifty huh?

Tool Box

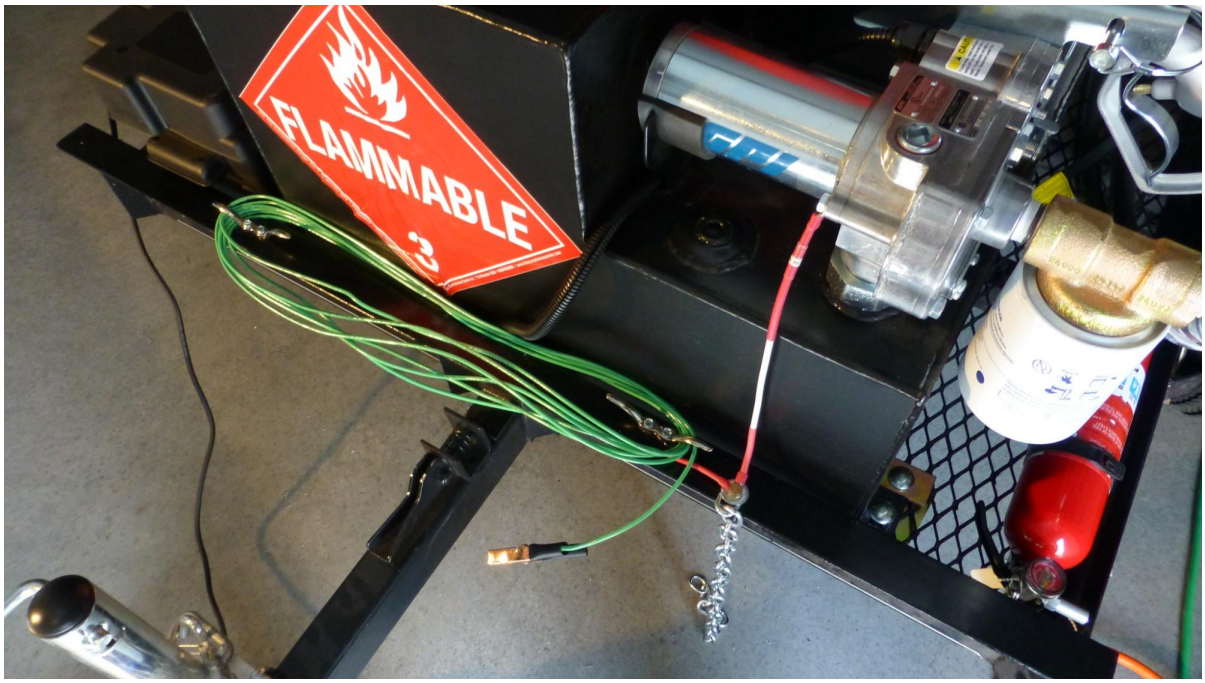
I bought a cheapo plastic tool box to store the battery charger, documentation and items to take care of the trailer, when the trailer is being towed.

Tool Box Open

The tool box has room for the battery charger, ethanol fuel test kit, screw driver to open master switch box, spare fuse, key to unlock tank filler cap and all of the instruction manuals and documentation that came with all of the equipment.

Fire Extinguisher

The fire extinguisher comes with a mounting bracket but you will have to supply bolts, washers and nuts to attach it. I bought the extinguisher after everything else was mounted and I would urge others to think about where to mount the extinguisher before putting the battery box and control box, etc. on. There is probably a better, more convenient place to mount it, making it more accessible during an emergency.



Static Grounding System

The static grounding system consists of a heavy wire going from the pump motor to a bolt through the frame which has a chain that drops to the ground providing a path for static electricity accumulated on the trailer to get around the rubber tires to earth. The ground wire that is connected to the aircraft being refueled is also connected at this single point.

First Fill

Oregon is an interesting state. You cannot pump gasoline into your car, an attendant has to do it. (New Jersey is the only other state in the union with a similar law.) Oregon was the only state that passed a mandatory E10 law with absolutely no exceptions, not for aircraft, not for marine use, not for antique or classic cars, not for small engines used in emergency equipment, nothing. Our legislature didn't bother to examine the other state mandatory E10 laws that were enacted before ours, all three of them. Needless to say we spent a lot of time and effort getting another law passed in the following legislative session to correct these egregious oversights.

The supreme irony is that if you tow a fuel trailer or a boat into a gas station, you must fill it, the attendant won't touch it. The other idiocy is that if you fill your own auto with fuel and there is a sheriff in the station, he can't cite you, because Oregon has never added the statutory language to specify the misdemeanor to cite you for, that the the sheriff needs to write on the ticket. Go figure.

Refueling Aircraft

First use of fuel trailer, refueling aircraft at High Desert Aviation on Prineville, OR airport. Erik Cook, owner of HDA, is my partner in a non-profit LSA flying club that we have formed. We are looking for an LSA legal Aeronca Champ which will have a mogas STC. Erik has a mogas STC for this Cherokee which he uses for primary flight instruction.

Bill of Materials

1. Trailer Lowes 388.00
   - 4 ft. x 64 in. Mesh Floor Tilt
   - Item # 110783, Model # 4X5M
2. Trailer Jack Bi Mart 40.00
3. Tank Transfer Flow, Inc.
   - Tank: 0800109416 109.0 gal AS Refuel X/B Sys 1178.72
   - Fuel Pump: 0200113958 w/Fuel filter upgrade 67.91
   - Fuel Pump Meter: 0200113959 144.35
   - Freight 159.00
4. Fire Extinguisher
   - Lowes: First Alert 1A 19.00
5. Battery Box Big R 10.00
   - 11 in. X 8 in. Plastic Battery Box
6. Battery Whatever will power the pump
7. Battery Charger Got it on Amazon 76.00
   - Battery Minder, Model 2012-AGM
8. Control Box Mouser Electronics
   - 546-EJ664 6 in. x 6 in. x 4 in. W/Panel Enclosure 56.00
   - (2) 563-NG-9513 NEMA Gland .20 in. x .39 in. 5.00
9. Tool Box
   - Some kind of tool box to put docs, battery charger,
   - tools, spare fuse, ethanol test kit, etc.
10. Static Ground Components
    - Chain
    - Wire from pump motor to central ground stud
    - Wire for grounding airplane (~25 ft.)
    - Clamp to aircraft

- **Ground stud bolt, washers and nut**
- **Fixtures to wrap ground wire**
- **Chain**

11. Miscellaneous Hardware

- **Terminals for wiring**
- **Bungee cords to hold down hose while transporting**
- **Clevis pin to lock nozzle during transport**
- **Nuts, bolts, washers to mount battery box, master switch box, tool box, fire extinguisher, etc.**