**Purging propane containers**

Important safety information for folks that buy a new propane cylinder or tank, or buy a new RV of any type, MH, Fiver, or Travel Trailer, and are filling them up for the first time! This applies to Motorhomes with tanks as well as trailers with cylinders. With a new RV, filling the tanks or cylinders for the first time, or folks that have replaced older tanks or cylinders, the requirement and process of "purging" is a mystery for many. And since we have heard from folks having problems filling new tanks or cylinders for the first time, it appears that some certified propane techs are disregarding, or were never trained in correct "first time filling" purging procedures for a new tank or cylinder. For professionals, the correct procedures can be found in NPGA Safety bulletin 133-89 (a).  
  
For my fellow RVrs, in understandable terms, here is the procedure that should be followed and why. You don't need to understand the procedures themselves, but just read through them once and you will be able to tell if your new tank, cylinder, or containers in your brand new RV are being purged as they need to be, on first filling. And you'll know they at least have the right equipment, or not.  
  
New propane containers (tanks or cylinders) are sometimes shipped with shipping air that provides a balance of pressure while shipping over various altitudes, and locations. Shipping air that is in the tank may be as much as 100 PSI. To be able to fill the tank fully that pressure must be relieved first down to one atmosphere which must be replaced by purging the tank with propane vapor, not liquid, which is what the filling stations use to fill your propane containers with after the first purge with vapor. That is the purging technique that is most used and I will describe in a few minutes. The second method is purging by vacuum negative pressure down to at least 26 inches of mercury vacuum. Then LP gas vapor, not liquid, can be put into the tank to displace any air left over, and liquid filling is then done.   
  
All new propane tanks (MHs,) and cylinders (Fivers and Travel trailer from 4-40 pounds, which includes BBQ tanks etc.,) MUST BE PURGED BEFORE BEING FILLED FOR THE FIRST TIME! It is easy for you, the consumer to make sure it is done properly, if at all. It might also explain why so many folks are complaining of their local fill station being unable to fill their new OPD cylinder, or new RV tanks for the first time.  
  
NPGA Bulletin 139-89 (a) states that all new containers (ASME Tanks - [MH] & DOT Cylinders [Trailer cylinders], including Motor Fuel containers) and in some cases used containers, may contain water, air, or other contaminants, and it is essential that these be removed before filling the container and placing it into service. Water vapor present in the gas vapor may cause regulator freeze ups at the inlet.  
  
Air by definition contains moisture. The real risks that result from not purging, or improperly purging, the tank or cylinder for the first time, need to be known by the newbie, and the experienced RVr alike.

There are only three scenarios to have to purge a tank or cylinder.   
  
1. If it is new, and is being filled for the first time.   
  
2. If you erroneously opened the old style POL valve on a used empty tank while disconnected. The old POL design has no back-check valve, like the new OPD valves, which prevents air from being sucked in as well as keeping the gas in when not connected. If you open the old style POL valve any gas rushes out and air replaces it at 1 atmosphere of pressure, or more or less, depending on your altitude at the time.   
  
3. If you have had the old style POL valve replaced on your old tank, they had to remove the old valve to replace it, air got in, and it must be purged before filling.  
  
Note: It is still good practice to close the OPD valve before disconnecting and not depend on the back-check valve. Some of the back-check valves are held in place with a snap ring, and if that failed with the valve open, any gas in the cylinder would be freely discharged.  
  
Aside from having difficulty in filling one that is not purged properly, the safety of your RV and family are at stake! If not purged properly, in addition to the moisture from the air causing regulator freeze up, a propane container with moisture in it can rust from the inside out, and have problems filling. Air in the tank can cause your propane to have much less heat per gallon, or BTUs. Worst, it can eliminate the odor that tells you if you have a leak! That's right, if the container is full of air, the odorant that gives the smell of garlic, (Ethyl or Methyl Mercaptan) that is added to the propane, will oxidize, and little or no smell may be detectable! Propane itself is odorless. This is called odorant fade. If the new container, tank or cylinder is not purged properly, you might not be able to smell a propane leak! Or if it has 100 PSI of shipping air in it, and you try to fill it without purging, it may not fill with much liquid propane, due to the air pressure. If it does fill with liquid propane over shipping air, without purging, that mixes and further compresses the air. That could cause the mixed air and propane to exceed the pressure relief valve trip pressure, and have a sudden release of propane, that at least will get your attention, and at worst, with an ignition source, could ignite. Air does not compress as easily as propane. In addition to that, your appliances will not operate as efficiently, if at all, with a 50/50 air to propane mixture. (Might explain some of the propane appliance malfunctions as well.)  
  
By code all new containers have a sticker on them that states that it is a new container and must be purged. Do not remove that sticker, so the propane fill station knows it must be purged. How can you tell if it is being purged? Read on.   
  
Here's the basic procedure.   
With either purge method, the technician should have a "shop" cylinder or tank, that is connected to your container to purge with a hose set that seals the system and has a valve set that does not allow air to re-enter the container. The technician draws vapor from the "shop" container with either method, not liquid propane from the fill station's main tank liquid propane fill tank.   
  
So for all you folks that were wondering how you could tell if they were purging the container, the first clue is the extra supply tank, and the gauges and/or valves needed. Purging should take from 10-20 min depending on method used, and the experience of the technician. If the technician attempts to hook the container to the normal fill hose, and says they are going to purge it that way, have them stop and ask the manager. Some places charge extra for purging, some don't, and others don't even try to purge them.   
  
LP Gas purge method:  
They have to use a purge kit, and a portable propane source, or one that is in the shop but delivers propane vapor not liquid. They should NOT fill it during purging from the regular liquid propane fill station. A purge kit typically has another container, usually a portable cylinder, and a connecting line with a regulator in line, and a purge valve that goes two ways, with a bleed port also built into the purge valve. The bleed port is designed so that it does not allow air to be drawn back into the container being purged.   
  
After connecting the two tanks they turn the inline purge valve lever to the purge position and open the cylinder/tank valve on the container to be purged and use the bleed port on the Purge kit to bleed any shipping air out to 1 atmosphere.  
  
Then they open the supply container's valve and turn the purge valve lever to the charge position allowing propane vapor to flow from the supply tank to the tank being purged. They wait for the flow to stop, about a minute for a 20-pound cylinder.  
  
They then turn the purge valve lever back to purge and allow the propane to bleed out of the tank being purged. This takes about 20 seconds for a 20-pound tank.  
  
After the first cycle, the mixture of air to propane vapor is half-and-half. Repeat 4 more times at least and mathematically, the ratio should be at about 6.25% air or less, which is adequate. 4 cycles is usually enough.  
  
Vacuum Method:  
For the vacuum method they still need a purge kit, but also approved vacuum pump or LP gas compressor, and a gauge or manometer to indicate vacuum inches of mercury. They also need a container to supply propane vapor, not liquid, to the tank being purged, and a way to deliver that without allowing air to re-enter. The technician then applies vacuum until it is about 26 inches of mercury (2 PSI absolute pressure) and then fills the purged container with propane vapor until it reaches 1 atmosphere of pressure. It is then ready to fill with liquid propane, after disconnecting the vacuum purge kit. This method has the advantage that no propane is released to the atmosphere, and will eventually replace the gas purge method. (NPGA Bulletin 133-89 (a), see also NFPA-58 for more information on purging)   
  
If you have a new RV, or a new container (motorhome tank or trailer cylinder,) and you don't see a real purge occurring on the first fill of your propane containers, your safety may be affected at worst (odorant fade,) or the container may not fill, rust, cause regulator freeze up, or lower BTU energy, at best.  
  
I would like to again thank the kind folks at Marshall Gas Controls for spending so much of their valuable time with me to provide the information and references used in this article. And for finally getting this RVr to understand what purging our propane containers really means. My last two new cylinders were never purged! They are now!

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