

# Vaporizer accessory for injection of LPG, refrigerants and other Pressurized liquids

LPG and other pressurized liquids are sometimes difficult to measure because the liquid in the bottom of the container has a different composition than the gas above the liquid in the cylinder. If the liquid is 99% propane and 1% butane for example, the gas may be 99.5% propane and only .5% butane. This is because the vapor pressure and boiling point of propane and butane are different.

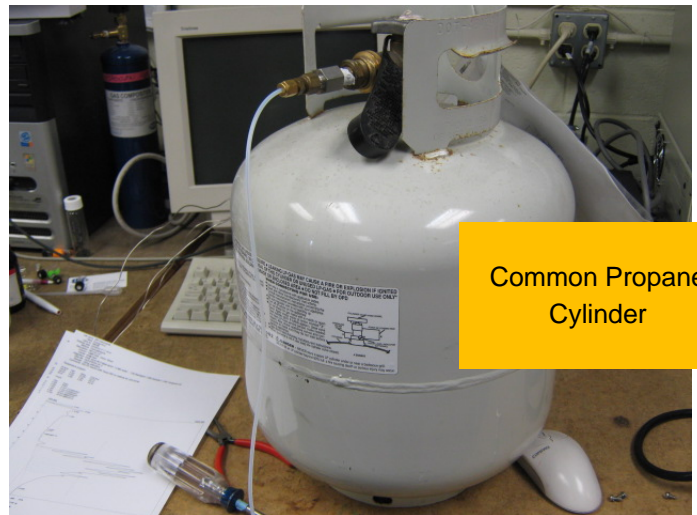
It is difficult to inject pressurized liquid into the GC. Its easier to vaporize the liquid and then inject it in a gaseous state.

To accomplish this, SRI offers the Vaporizer Accessory for the 8610C GC ( part# 8690– 9400 ). The vaporizer is mounted between the ducts of the heated valve oven which is normally installed on a SRI GC configured for gas analysis.

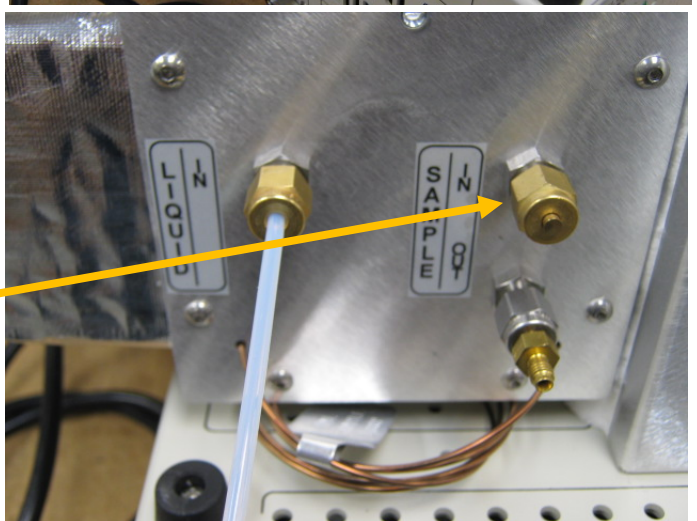
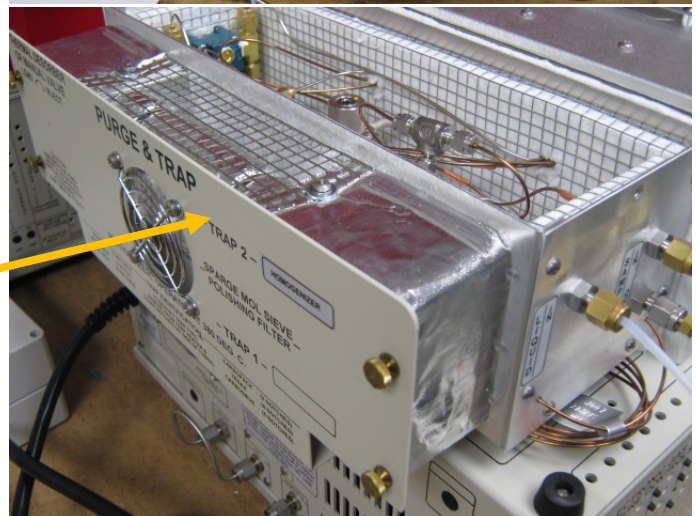
The Vaporizer has two inlets and one outlet. The liquid inlet leads to the vaporizer heater while the regular inlet is intended for samples which are already a gas.

The regular sample inlet should be capped off when the liquid inlet is being used.

When the regular inlet is used, leave the cap off the liquid inlet to prevent the expansion volume from buffering the sample.



Common Propane Cylinder



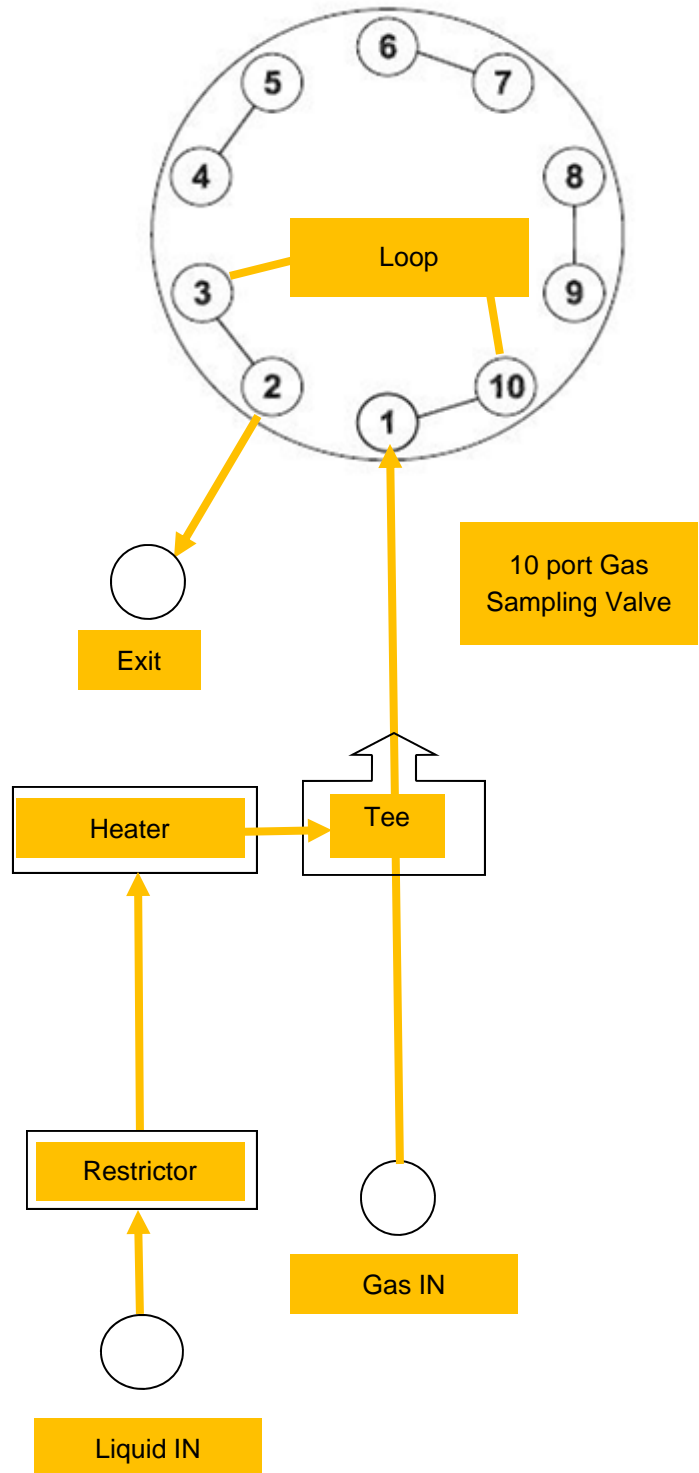
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The Vaporizer is connected to the 10port gas sampling valve ( GSV ) which is also mounted in the heated valve oven.

The pressurized liquid is connected to the Liquid IN port ( a 1/8" Swagelok fitting ). The pressure forces liquid sample to flow through a restrictor tube ( a coil of 10 feet of stainless steel tubing with an internal diameter of .005" ). The flow rate of the liquid is slow, about 30 microliters per minute ( 30ul/min ). When the liquid reaches the heater at the end of the tubing it expands to a gas. The flow rate of the gas is about 30ml/min since the liquid expands by about 1000 times when it evaporates.

The heater has a volume of about 10ml so the expanding gas has plenty of time to mix and homogenize before flowing through the loop of the GSV and then out to the exit fitting.

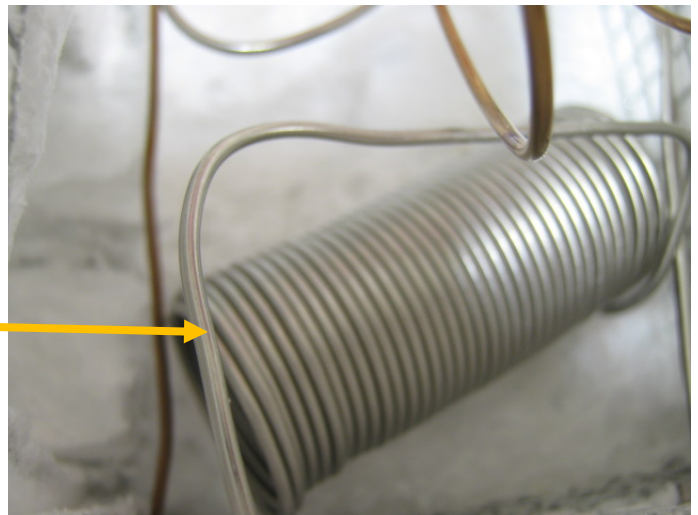
If the sample is already a gas, or you do not want the gas to contact the hot surfaces of the heater, then connect to the Gas IN port instead. This port flows directly to the loop. Whichever of the two inlets is chosen, the other must be capped off with a Swagelok fitting.



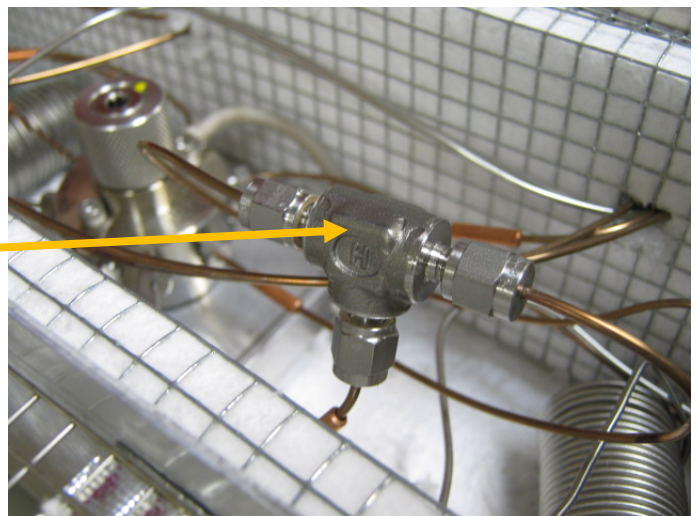


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The restrictor tubing is a coil of 10' ( 3 meters ) of stainless steel tubing with an internal diameter of .005" ( .1mm ), and is located in the heated valve oven.

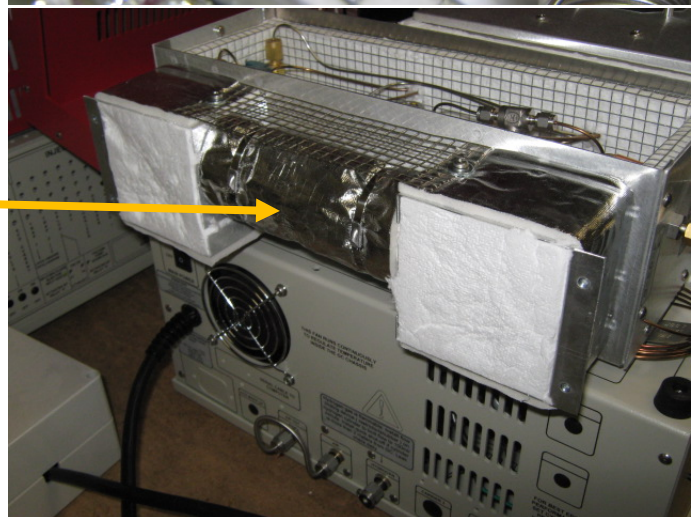


The tee is 1/16" stainless steel Swagelok .



The heater is a 6" x 1/4" stainless steel tube in an aluminum heater block which is insulated and mounted between the ducts of the valve oven. The temperature is user adjustable from the GC front panel.

150°C is a typical temperature to which the heater may be set.



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When sampling a liquid such as the LPG cylinder shown in the photo, turn the cylinder upside down and allow several minutes for the liquid to flow to the Liquid IN port and out the exit to insure that the heater and the loop are completely flushed out with new sample. Depending on the length and volume of the tubing used to connect the cylinder to the GC, it may be prudent to vent the tubing momentarily at the Liquid IN fitting ( loosen the nut to allow a leak ) in order to ensure fresh liquid is available.

The restrictor is appropriate for the 100-200 psi pressure found in common propane tanks. Other types of liquid samples may exist at higher or lower pressures, so the flow rate will change.

Remember that the Gas IN port must be capped off when the sample is connected to the Liquid IN.

