

T2100 Manual



Liability Note: The manufacturer assumes NO liability for damage however caused in the handling & usage of the nebulizers. Use at your own risk.

Burgener Research Inc. does not warrant the nebulizer beyond the purchase price.

Caution: Do Not Handle unless you are sure that the nebulizer is dry, or washed with clean water. Acids, particularly HF, often look like water and will wet the end of the nebulizer during usage.

Warning: This device operates on compressed gases. Appropriate care must be taken. If in doubt about correct operating procedures, call an experienced operator or call Burgener Research at +1 905 823 3535.

Please Note: The T2100 nebulizer requires 45 psi to have a 1 liter per minute of Argon gas flow, so the operating pressures are in the range of 30 - 40 psi, depending on the torch optimum flow rate.

Minimizing Pulsations: T2100 nebulizers will pulse if the pump can not deliver constant sample flow. Change your pump tubing often, or use a surgeless pump if possible. A Syringe Pump or Gravity feed system will also work.

DO NOT TOUCH THE TIP! The gas orifice at the tip of the nebulizer is Teflon, and is SOFT. This tip is very easily damaged and should NEVER be touched with fingers, tissues, or anything else. If the tip is accidentally touched, and the nebulizer continues to operate, then it is still functional, and its use can be safely continued.

It is recommended that the red Nebulizer safety cap is kept on the Nebulizer while not in use. This will protect the tip from accidental damage.

Dropping and Breakage: The Burgener T2100 Nebulizer body is 100% Teflon. Generally it will not break. If it is dropped such that the tip is deformed, then it will be irreparably damaged. If it continues to operate after being dropped, then it has not been affected, and its use can be safely continued.

Operating Instructions

Your new Burgener T2100 Nebulizer is unique. It should give you a long and convenient service on almost any liquid you can pump to it. The operation and care of your nebulizer is different from most other nebulizers in several important ways, including not requiring humidified Argon.

1. Solutions and Solvents

The T2100 handles all liquids as far as we are aware. Ideally, but not always possible, the standards and samples should have a similar matrix. Burgener nebulizers use surface tension of the liquid to bring the sample to the gas orifice. With lower surface tension the droplet sizes produced will generally be smaller, which will increase the amount of sample sent to the torch, and will increase the instrument's sensitivity.

2. Sample Introduction / Maximizing Stability

Burgener T2100 Nebulizers do not have any suction, so they require a pump to supply the sample solution. The pump speed and the quality of the pump tubing have a large effect on the stability of the nebulizer. Try to select a pump tubing size that allows running the pump at a high speed. Pulsations occur if the pump can not deliver constant sample flow. Change the pump tubing often: usually once a day for maximum stability and lowest %RSD. Optimum flow rate varies with each instrument, but it should be about 0.5 to 2.0 ml/min.

3. Sample Capillary Tubing and Fittings

Sample lines are attached with UpChurch® 10/32 Fingertight fittings. GENTLY TIGHTEN THE SAMPLE LINE use of too much force will over tighten the fitting and can close the capillary. We supply .043" OD X .017" ID polyethylene capillary tubing. You may use any tubing that fits an UpChurch® 10/32 Fingertight fitting. We recommend that you use .025" ID or smaller capillary tube for the sample line. This should catch any particles before they get into the nebulizer. It is much safer & easier to replace the capillary tubing than to clean the nebulizer. NOTE: larger sample capillary line ID will amplify pulsations from the pump. If you have problems with pulsations, use the BRC 203 with .017" ID sample capillary rather than the BRC 207 with a .025" ID.

4. The Gas Line

The gas line is 2mm OD X 1mm ID Teflon tubing. It is attached with UpChurch® 10/32 Fingertight fittings. A gas line filter is NOT included in the nebulizer. Any particles from the gas line will destroy the nebulizer, so please ensure that the gas line to the nebulizer is clean of any particles. If removing and replacing the gas lines, then GENTLY tighten until snug, do not force. Be careful that the fitting screws in freely and is not cross threaded.

5. Nebulizer Flow Rates / Pressure

The Burgener T2100 Nebulizer operating pressure is determined by the torch. Torches require 0.6 to 1 liter per minute. The optimum flow varies with each nebulizer. Each nebulizer should be tested by looking for the flow which gives optimum precision. This will generally be found to be a narrow range. An initial pressure can usually be found by observing the central channel of the plasma while aspirating a solution of 1,000 ppm Y. Adjust the pressure until the red tongue is just level with the upper turn of the work coil. This is easy to observe with a relatively new torch, but, once the torch becomes discolored, it may be difficult to see this tongue. In this case, the alternative is to begin at about 0.6 L/min and increase at .05 intervals until the best precision is found.

6. Nebulizer Orientation - Rotate to Optimize

Some nebulizers are sensitive to orientation. The gas flows from the nebulizer at a bit of an angle, and this affects the flows in chambers, especially cyclonic chambers. Be sure to check orientation once the apparently optimum nebulizer pressure has been found to determine which gives the better results. For the orientation check, rotate the nebulizer in 45 degree increments and check for a gain in precision. For most T2100 nebulizers, rotation only has a small effect.

7. Washing Your Nebulizer - Salting

For the longest life and best performance, wash your nebulizer by simply running water as a sample for 10 minutes at the end of the day before shutting down the plasma. Any other form of washing is usually unnecessary. Teflon does not wet, so salts rarely build up. However, over long periods of time - weeks or months - Sodium Silicate salts may occur in the gas orifice. The best way to clean them out is to rinse the tip in 5% HF for 5 to 10 minutes, or to run a 5% HF solution as a sample. Use appropriate caution with HF. Sometimes, an ultrasonic bath may remove such salts.

8. Unplugging the Sample Line

The T2100 uses the patented Enhanced Parallel Path design. This design has a sample path that is constant in size throughout its length except at the tip, where the sample line increases in size. With the T2100's unique sample line design, and its solid construction, it is possible to clean out particles with a cleaning wire. Caution: You MUST use a microscope. The gas orifice is on the edge of the sample hole, and if you TOUCH the gas hole, you will destroy the nebulizer. To clean out a blockage, push a .020" OD wire from the front of the nebulizer until it sticks out the back.

Replacing the Capillary Tubing

The Burgener T2100 Nebulizer is designed to use standard chromatographic 10/32 fittings for the gas lines and for the capillary tubing fittings. This allows minimal dead space between the nebulizer and capillary tubing. It also allows the capillary tubing to be easily changed. Simply unscrew the old capillary tubing fitting from the back of the nebulizer. Remove the capillary tubing from the fitting. Place new capillary tubing into the fitting, so that the capillary tubing lines up with the end of the fitting. There should not be capillary tubing sticking out past the fitting. Then screw the fitting and tubing into the back of the nebulizer until finger tight. Test it for tightness by pumping water. If any leaks out during the test, you may need to tighten the fitting a bit more, or the capillary tubing is not squeezed enough by the fitting. If the capillary tubing needs more squeezing, then adjust it so that it extends out past the fitting a tiny bit and try again. The Fitting may require squeezing in a stronger material, such as the Peek fittings available from UpChurch.

To replace the capillary tubing into the UpChurch fitting, you may have to stretch the capillary tubing first: wrap some around your fingers or use two forceps and wrap it around the tip of the forceps and pull until the tubing is $\frac{3}{4}$ to $\frac{1}{2}$ the original OD. Then pull through the stretched part and continue pulling until some of the unstretched part extends past the tip of the fitting. Then cut off the excess at the tip of the fitting.

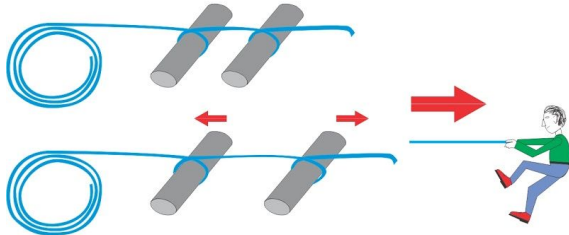
STEP 1

Pull out existing capillary tubing



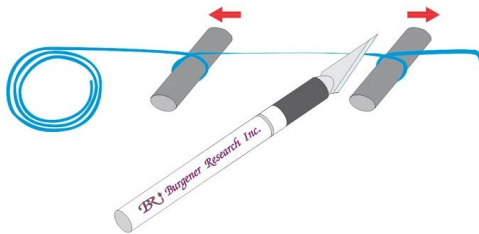
STEP 2

Stretch out new capillary tubing



STEP 3

Cut off the short end of the stretched tubing



STEP 4

Thread stretched tubing through the blue fitting and pull through until unstretched portion is visible and the tubing is snug in the blue fitting



STEP 5

Cleanly slice off the protruding capillary tubing

