

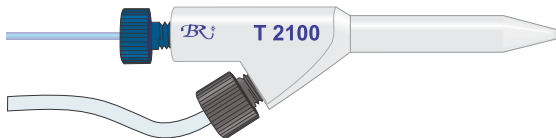


OPERATING INSTRUCTIONS

BURGENER T 2100 NEBULIZER

US Patents # 5,411,208; 6,634,572 Canadian Patents # 2,112,093; 2,384,201

EXTRA WIDE SAMPLE CAPILLARY



ENHANCED PARALLEL PATH ICP NEBULIZERS

SAMPLE FLOW FROM .5 to 3.0 ml/min

ROBUST DESIGN, INERT TEFLON CAPILLARIES

ATOMIZES ANY LIQUID, ANY SALT LEVEL

Produced in Canada by:

Burgener Research Inc.

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3 MONTH SATISFACTION WARRANTY

For 3 months after receiving it, if you are not satisfied with your Burgener Nebulizer, Burgener Research will repair, replace or refund your nebulizer, at your request.

CAUTION:

Do Not Handle unless you are sure that the nebulizer is dry or washed with clean water.

Burgener Research Inc. does not warrant the nebulizer beyond the purchase price. The Manufacturer and Agent(s) assume NO liability for damage however caused in the handling and usage of the nebulizers. Use at your own risk. If in doubt about correct operating procedures, call an experienced operator or call Burgener Research at (+1)905 823 3535.

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.

IMPORTANT

1. Handling

The gas orifice is at the very tip of the nebulizer. It is made of PFA Teflon which is VERY 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.

2. Dropping and Breakage

Burgener Nebulizer bodies are strong and generally will not break. If a nebulizer 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 it is safe to use.

T2100 Operating Instructions

Your new Burgener Nebulizer is unique. It should give you a long and convenient service on most solutions. The operation and care of your nebulizer is different from most other nebulizers in several important ways.

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 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.

3. Sample Capillary Tubing and Fittings

Sample lines are attached with IDEX Fingertight 10/32 fittings. TIGHTEN THE SAMPLE LINE GENTLY - it can close the capillary line if over tightened. We supply either 0.044" OD X .020" ID Teflon capillary tubing. We recommend that you use .020" (500 micron) ID or smaller 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.**

4. The Gas Line

The gas line is attached with IDEX style 10/32 "Fingertight" fittings. We supply 2mm OD X 1mm ID Teflon tubing. 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 for Teflon Bodies GENTLY tighten until snug, do not force. For Peek bodies, tighten the gas fittings HARD.

5. Humidified Argon

It does not matter if the Argon is humidified or not.

6. Nebulizer Pressure

Burgener Nebulizer operating pressure is determined by the torch. Torches require 0.6 to 1.2 liter per minute. The pressure varies with each nebulizer, but the flow should be almost the same for an individual torch. Each nebulizer should be tested by looking for the pressure 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 30 psi and increase at 2 to 5 psi intervals until the best precision is found.

7. 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 effects 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. Usually, rotation only has a small effect.

8. 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.

9. Unplugging the Sample Line

Burgener nebulizers use our patented Enhanced Parallel Path design. This design allows the Mira Mist to have a sample path that is constant in size throughout its length, except at the beginning and ends, where the sample line INCREASES in size. With this unique sample line design, and our nebulizer's unique 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 .015" - 0.020" OD wire from the front of the nebulizer until it sticks out the back of the nebulizer. Check that the tip of the wire is rounded and does not have sharp edges.