

- Û Provides optimum pressure equalization and dependable starting
- Û Eliminates fragile external glass tubing

Lexel plasma tubes use an innovative high conductivity gas pressure equalization system that is completely isolated from the discharge bore yet entirely contained within the ceramic tube structure (patent pending). This exclusive Lexel design feature assures optimum pressure equalization through the plasma tube and **easy, reliable starting every time**.

Other laser designs require the use of external glass tubing for the gas return path -- a another source of breakage.

Contoured bore profile

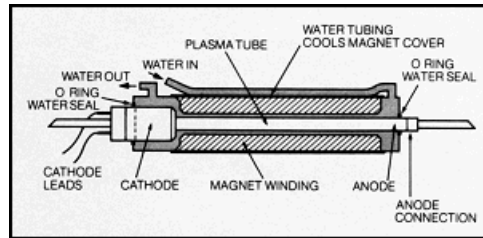
- Û Matches discharge with magnetic field for long bore life
- Û Minimizes bore enlargement and particle drop-out noise

The discharge bore profile in Lexel plasma tubes is contoured to match the discharge current density with the axial magnetic field from the surrounding electromagnet. This important design step, coupled with the high erosion resistance of BeO ceramic, eliminates the problems of particle deposits and dusting on Brewster windows and particle "drop-out noise" often reported in other designs.

Ceramic-insulated electrodes

- Û Allows complete cooling with ordinary tap water
- Û Eliminates electrolysis tube failures

In the Lexel plasma tube, the heat from both electrodes (anode and cathode) is transferred through high thermal conductivity ceramic into the surrounding cooling water. Virtually all of the heat is removed from the electrodes to the water by conduction without being allowed to transfer into the surrounding laser head. Since the cooling water does not contact any metal parts of the plasma tube, there is no possibility of electrolysis. The Lexel laser **can be cooled with ordinary city tap water**. It is never necessary to use special deionized water.



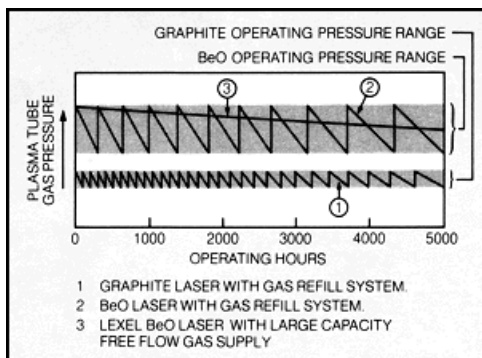
Other conductive cooled plasma tube designs have the high voltage anode in direct contact with the cooling water, a situation which requires special high resistivity water and inevitably leads to electrolysis tube failure.

Radiation-cooled designs do not fully contain the electrode and discharge heat, thus allowing substantial thermal losses to be radiated to the surrounding optical structure.

Only the Lexel plasma tube **eliminates both the electrolysis failures and thermal radiation problems of other designs**.

Large capacity free flow gas supply

- Û Provides optimum gas supply through-out tube life
- Û Eliminates gas fill valves and fill system failures



A large capacity stainless steel gas supply tank is an integral part of the Lexel plasma tube. The gas supply tank holds up to 1,600 milliliters of argon or krypton, enough for 8,000 to 10,000 hours of full-power operation. This large amount of reserve gas, combined with Lexel's BeO bore design, maintains the gas pressure in the optimum range throughout the tube life.

Lexel's Free Flow design eliminates the need for gas valves, refill buttons, and pressure monitoring required in other plasma tube designs. **A Lexel laser will never fail because of a sticking or leaking fill valve, nor will it ever run out of gas** because gas pressure monitoring was neglected.

High-temperature Brewster window seals

- Ü **Strain free non-organic quartz to quartz window seal**
- Ü **Eliminates epoxy window leaks and contamination**

Lexel Brewster's Angle windows are sealed using a fused quartz-to-quartz glass seal which is bakeable to over 1,000°C. This proprietary Lexel seal completely eliminates window leaks, water vapor diffusion, birefringent strain, and window contamination commonly observed on epoxy-bonded tubes.

The combination of the Lexel quartz window seal, 1,000°C window bake, and proprietary window material selection yields the best low-loss, distortion-free and color-center-controlled Brewster windows available **for long lifetime operation**.

Ultra-high vacuum processing

- Ü **Uses only high vacuum materials and techniques**
- Ü **Eliminates window, cathode and gas contamination**

The materials used in Lexel plasma tubes are completely compatible with high temperature ultra-high vacuum processing. There is absolutely no epoxy, rubber O-rings or any other organic material used in Lexel plasma tubes. Other ion laser manufacturers appear to compromise their plasma tube vacuum integrity by using either epoxy seals, rubber O-rings or organic fill valve seals. The use of any organic material in a plasma tube means that the tube cannot be completely out-gassed by a high temperature bake-out, and there will be some residual contamination gases to slowly evolve and contaminate the windows, cathode or discharge plasma.

One of Lexel's major contributions to ion laser reliability is the completely vacuum-compatible plasma tube. The entire tube is processed at high temperatures and at an ultra-high vacuum of better than 10^{-9} torr. The result is **the ultimate in long lifetime, contamination-free laser operation**.

Contamination-free copper pinch-off

- Ü **The ultimate seal-off method**
- Ü **Eliminates O-ring leaks and glass stress cracks**

After a plasma tube is completely processed it must be sealed off and separated from the vacuum processing station without affecting the vacuum integrity of the tube or the gas purity. We use a copper pinch-off, the most advanced, most reliable and truly contamination free method.

Other designs use either an O-ring seal or a glass "tip-off," neither of which is completely satisfactory. The O-ring seal method has tended to introduce air into the tube at the time of seal-off and can slowly leak or outgas contaminants into the tube during life. The glass tip-off requires melting of a glass exhaust tubing which sometimes results in leaks or glass stresses which can crack at a later time.

The Lexel copper pinch-off is the method used on virtually all high power vacuum tubes for over 25 years. It has proven to be **100% reliable and absolutely contamination-free**.

Continuously active flash-type barium getter

- Ü **Assures long shelf life and sure starting**
- Ü **Eliminates tube failures during storage or inactive periods**

The final requirement of any tube is the inclusion of a getter to absorb any contaminant gases such as CO, CO₂ or H₂O that may slowly evolve during its lifetime. We use a flash type getter to deposit a thin film of barium over the inner surface of the stainless steel gas supply tank. This type of getter is the same as is flashed inside of virtually all TV picture tubes. It is continuously active, absorbing any possible contaminants even when the tube is not operating.

Other laser manufacturers use a bulk-type getter material which is active only when the tube is on and hot. Such bulk-type getters are ineffective when the laser tube is cold. The results are plasma tubes that often fail to start after periods of storage or inactivity.

We have eliminated tube storage failure through its unique vacuum techniques and the use of the continuously active getter. **Lexel plasma tubes start reliably**, even after storage periods of well over a year.

CAMBRIDGE LASERS LABORATORIES, INC.

LEXEL LASER

853 Brown Road · Fremont CA 94539

510-651-0110 tel · 510-651-1690 fax

E-mail to: info@lexellaser.com

Website support: webmaster@lexellaser.com

Copyright © 2003 **CompanyLongName** n Last modified: 11/29/05

WEBSITE PAGES

[HOME PAGE](#)

LASERS

Visible gas-ion lasers

- [For science and industry: Lexel 85/95 series 85/95 detailed specifications](#)
- [For laser displays: Lexel ColorPro/BeamPro series](#)

Deep UV gas-ion laser

- [For science and industry: Lexel 95-SHG](#)

TUBES

[Ceramic replacement tube for Lexel lasers](#)

Ceramic replacement tubes for other lasers

- [Lexel Beta-I tube for Coherent brand lasers](#)
- [Lexel Beta-I tube for Spectra-Physics brand lasers](#)

SUPPORT

Service/support

- [Set up new service request](#)
- [Check progress of existing service request](#)

[Service history of your Lexel laser](#)

[Service contract options](#)

[Manuals and documentation](#)

TECH INFO

General topics

- [How gas-ion lasers work](#)
- [Laser wavelength charts](#)

Features of Lexel lasers

- [Laser head](#)
- [Plasma tube](#)
- [Optical resonator](#)
- [Power supply](#)
 - [Power supply interior](#)
- [Single-frequency operation](#)
 - [Model 503 Etalon](#)
 - [Typical frequency stability](#)

COMPANY

[Quality: Why choose Lexel](#)

[Lexel company profile](#)

[Careers](#)

ORDERING/CONTACT

[Headquarters office](#)

[International distributors](#)