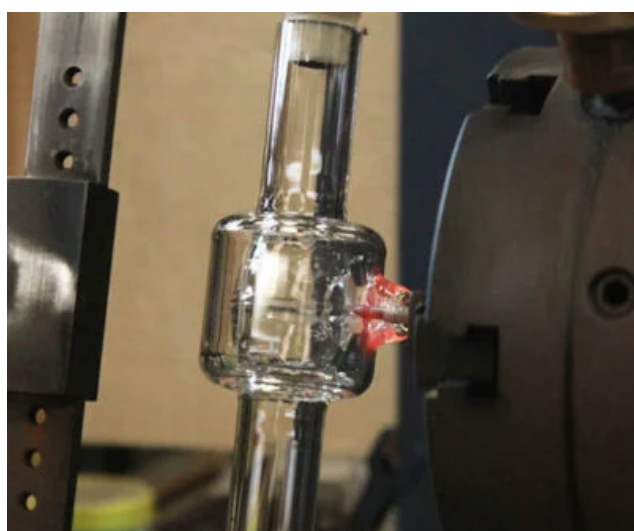


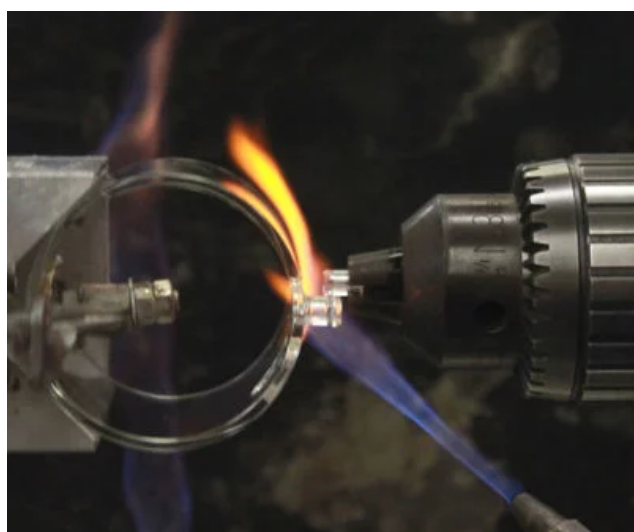
## Glass to Metal Seals

Describing glass-to-metal seals is the easy part. Producing a good one requires knowledge and experience. With decades of experience, our skilled artisans perform specialized operations such as sealing faceplates or metal rings to a variety of fabricated vacuum tubes. Working with a variety of materials, including several types of glass, kovar, and ceramics, we produce components that are used in lasers, infrared systems, semi-conductors, and photomultipliers.



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## Glassblowing

Our production staff includes glassblowers with an array of glassblowing skills. Forming, shaping, blowing, bending, molding, and sealing are included in their repertoire. These processes can be performed in several glass types. Glass to metal seals with kovar, tungsten, and platinum are also common. Our hydrogen firing process of kovar assures the quality of the seal. Seals can be hermetic or compression by design. Graded seals, with glasses of different expansion, can also be sealed together under certain criteria. Window seals are commonly made with dissimilar materials without distortion. Anodes, cathodes, and getters can be installed as required.

## Autolathe

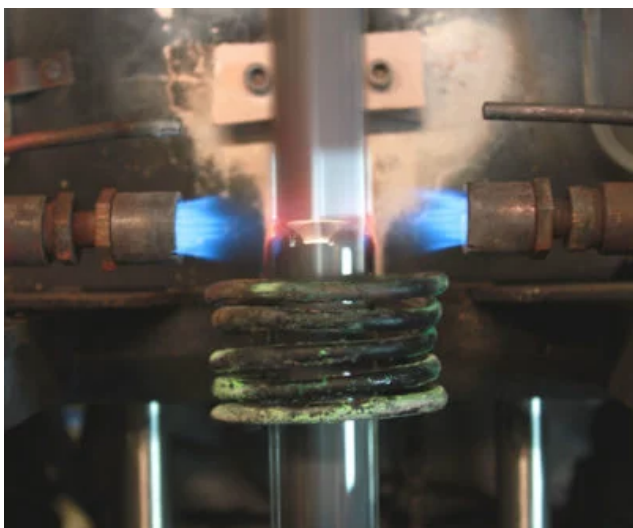
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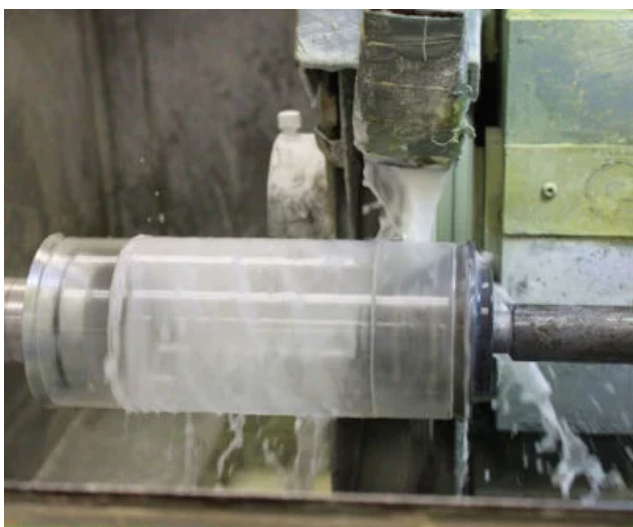
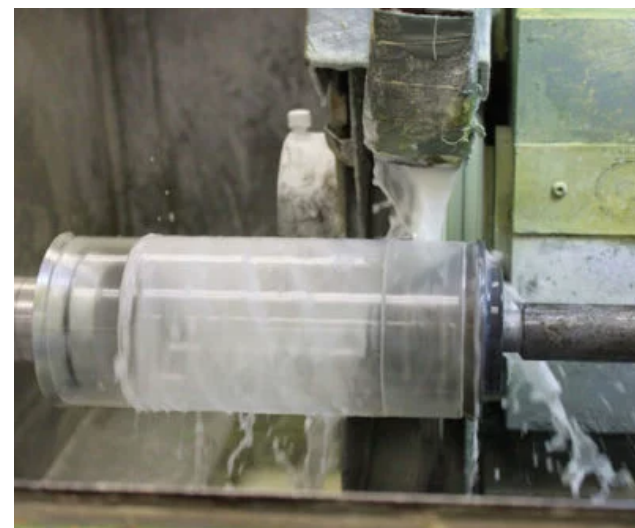


## Vacuum Forming

Also included on our production staff is the vacuum forming department. Forming glass over a mandrel in a vacuum defines our method. Using our proprietary process, inside diameters can be formed to very tight tolerances within  $\pm .0001''$ . Tapers, flats, multiple diameters etc. can be included with the mandrel for an array of inside diameter profiles. Depending on the diameter, straightness can also be controlled here. When the inside diameter is small ( $< .060''$ ), the bore can be inside diameter straightened. This can be achieved by inserting a wire under tension through the bore, then applying heat to the tube. Tubes can also be straightened from the outside diameter on a set of rollers while applying heat.

## Grinding/Cutting

The grinding department performs an array of functions. Precision cutting with diamond blades, cutting angles, drilling, beveling, countersinking, concentric grinding, centerless grinding, plunge grinding, outside diameter polishing, grinding flat, lapping flat, and polishing flat are some of our capabilities. Tubes of 120 mm diameter can be cut. Being able to grind and cut in a variety of ways allows us to control inner and outer diameters to precise specifications and make end fittings concentric. We can also grind hard to fabricate features such as bevels, tapers, and o-ring grooves.



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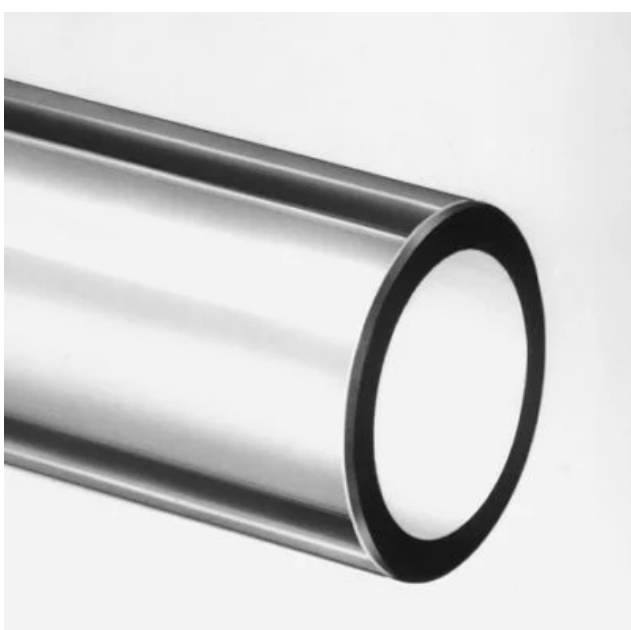


## Decoration

Our decoration department can apply your company logo, serial number, etc. in the color of your choice with a decal. Decals permanently bond to the surface. Glass can also be acid etched and filled with ceramic paint. Serial numbers are important for traceability and lot control and markings can be added to show flow direction. Logos help with branding for your company.

## Glass Redrawing

Production can also redraw glass. This process involves introducing a precise preform (tube) in an oven and drawing it out at a smaller scale. Tubes can be accurately drawn up to 3 mm outside diameter from the preform in borosilicate glasses. Glass pulled through the oven is very straight and maintains concentricity.



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## Ultrasonic Washing

Cleanliness is essential to a functioning laser. Ultrasonic washing, several acid baths, soap baths, and deionized rinses are at our disposal. Glass can also be dried in a controlled dryer. The ultrasonic washing process uses ultrasound waves to clean hard to reach areas that other methods cannot clean.

## Guaranteed Quality Assurance

Andrews Glass has been ISO Certified since 1998, assuring the highest quality standards. Our Quality Assurance Department confirms compliance with your required specifications by utilizing trained inspectors. All products have a final inspection sheet with each characteristic documented from the drawing. The sheet dictates what gage is used for the verification of that characteristic while maintaining a recorded history. That history determines the level of statistical inspection for the future. Capabilities include helium leak detection, gauging, bore inspection, 50x comparator, laser micrometer, polariscope, and several hand tools. Custom gages are designed where appropriate. Inspection

records are kept for a minimum of three years.

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Accreditations



ISO 9001-2015  
CERTIFIED



Online Shop

10-Position Midi-Dist  
Cyanide Distillation Super  
Value System

PRV Complete Set w/  
Coupling

HNU Style 10.0/10.6eV PID  
Lamp

47mm Fritted Base w/ #8  
Stopper

Get In Touch

Toll Free: 800.845.0026  
Tel: 856.692.4435  
Fax: 856.692.5357

mail@andrews-glass.com





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Vineland, NJ 08360

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