Gyrotron Technology, Inc.

Gyrotron Glass Cutting

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About the Gyrotron Beam

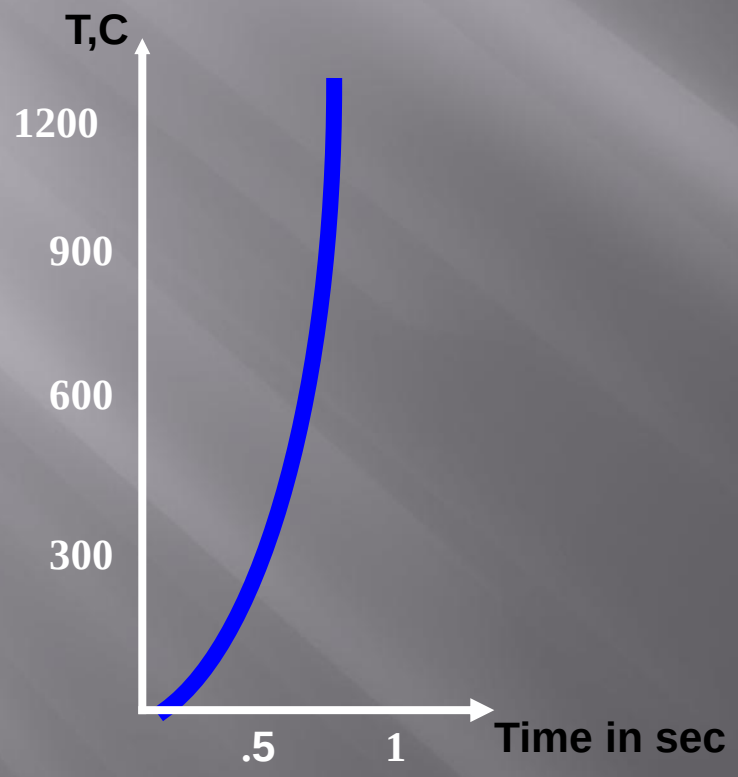
What is the Gyrotron beam?

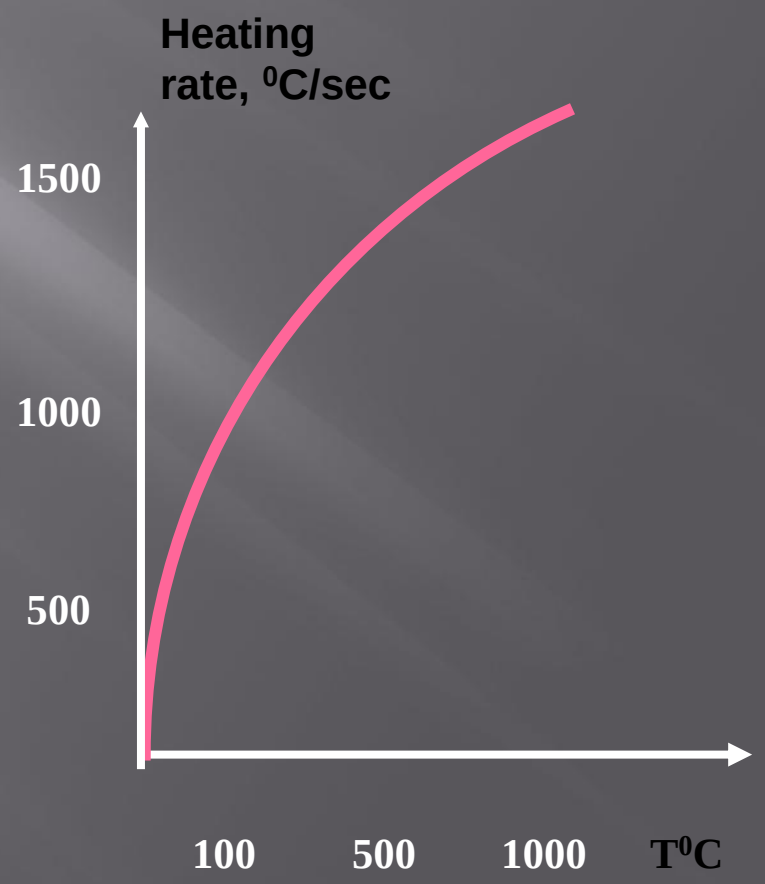
The Gyrotron Beam is a new industrial heat source. Allows heating:

- **Ultra rapidly, with heating rate thousands of degrees per second large or small objects;**
- **To any temperature up to over 3,000^{0}C with high repeatability and accuracy better than 1%;**
- **With precise and controllable temperature distribution.**

Gyrotron Glass Heating Capability

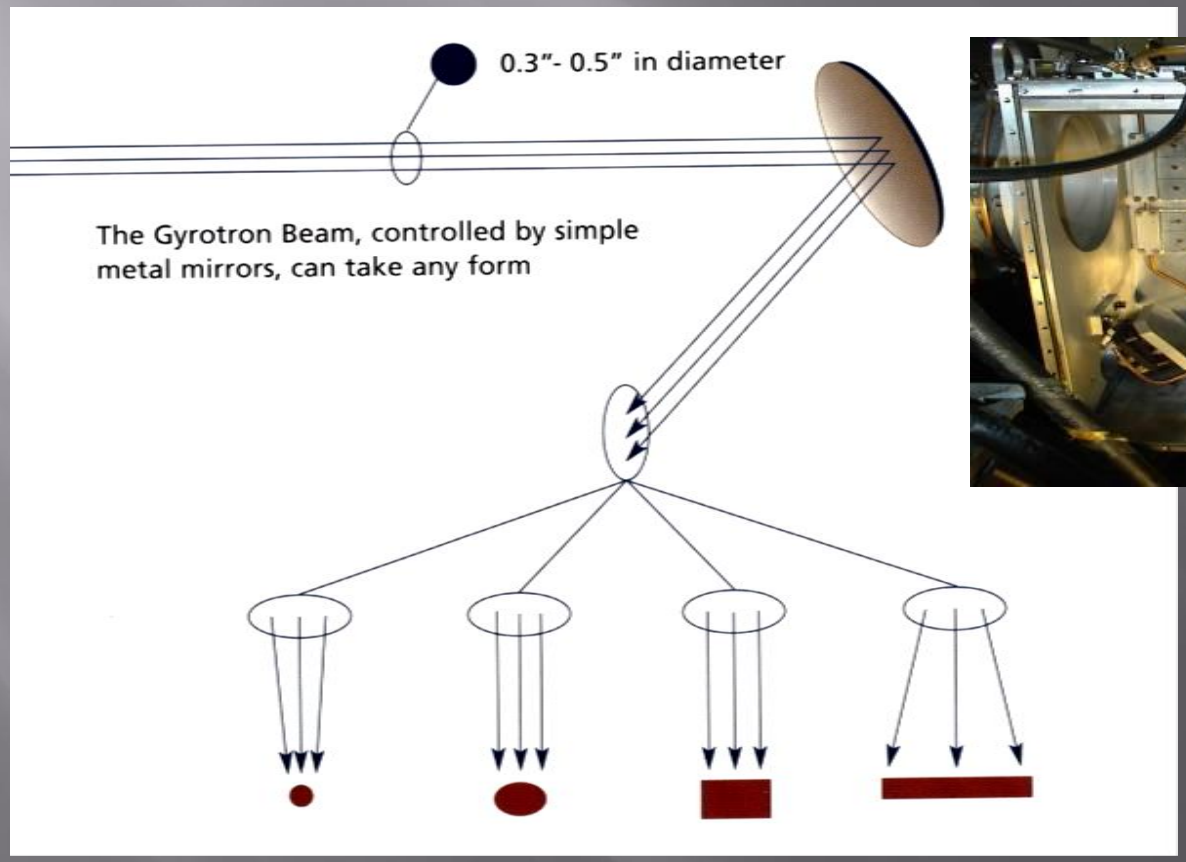
Glass can be heated with rate over 1,000C/sec (1,800F)





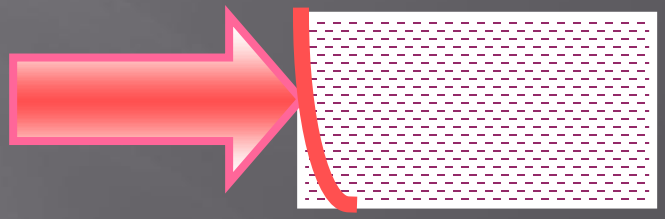
Shaping the Gyrotron Beam

The bean can be shaped into any form – circular, strip, square, etc by using simple metal mirrors

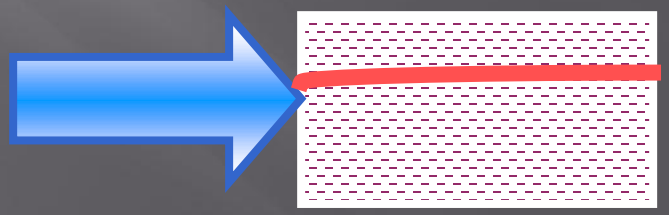


The Gyrotron Difference in Glass Heating

Glass absorbs infrared or hot air from its surface, creating temperature difference between inner and outer surfaces



The gyrotron beam penetrates inside and heats glass uniformly across the thickness



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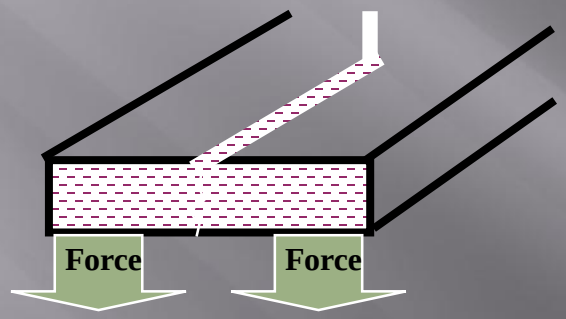
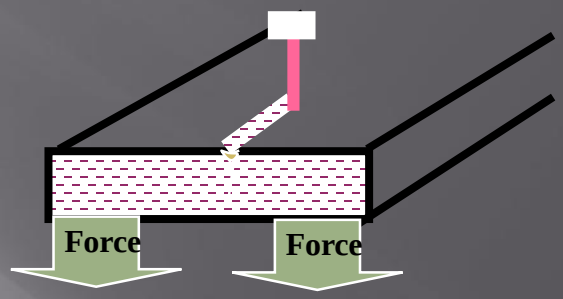
GYROTRON GLASS CUTTING TECHNOLOGY

Traditional Glass Cutting Approaches

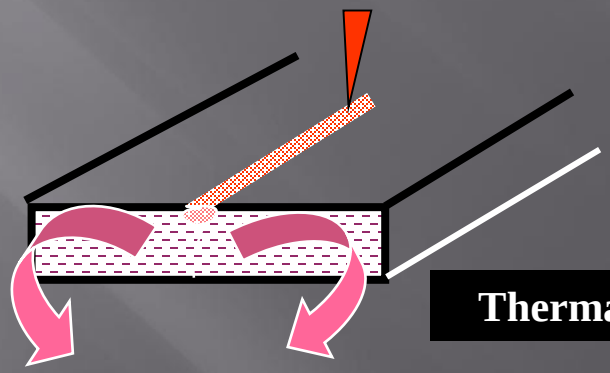
In all existing cutting methods glass surface is weakened and then glass breaks



Mechanical scribing



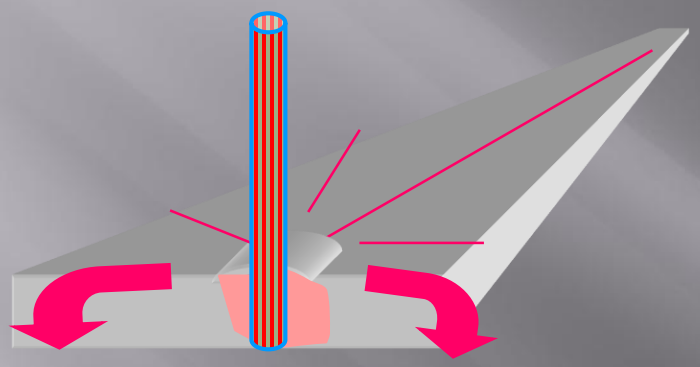
Evaporation (laser)



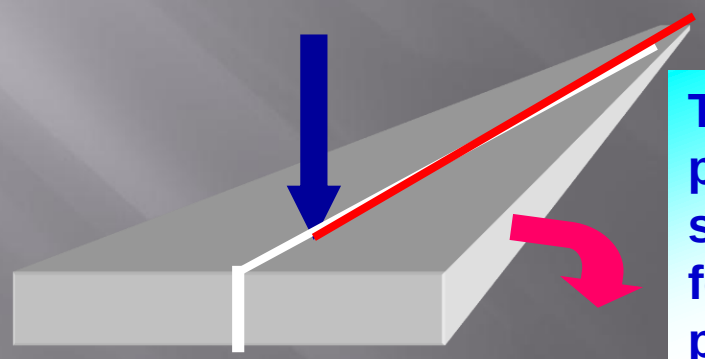
Thermal shock (flame)

Gyrotron Glass Cutting Concept

The gyrotron heating results in an actual cut, not a break

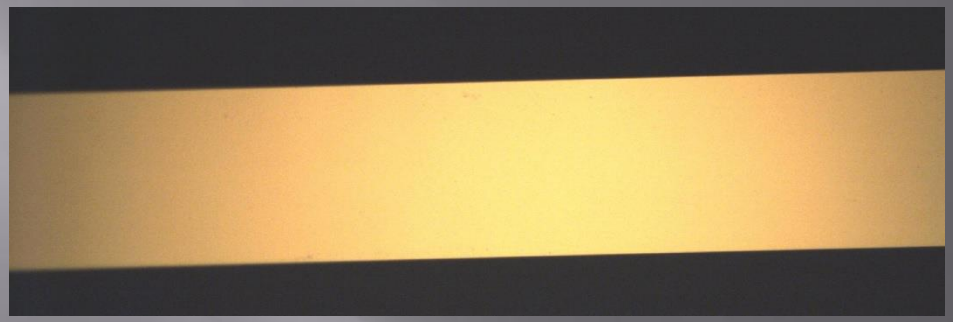


When the beam meets with glass, the area under the beam is heated across the glass thickness. As a result, glass expands in all directions creating stress lines.



The further beam motion along the propagation path on the glass sheet creates prevailing direction for the stress along the propagation path.

Gyrotron Glass Cutting: Benefits



Superior quality edge without chips or other defects

Residual stress and dust free

Cut a wide range of glass thicknesses:

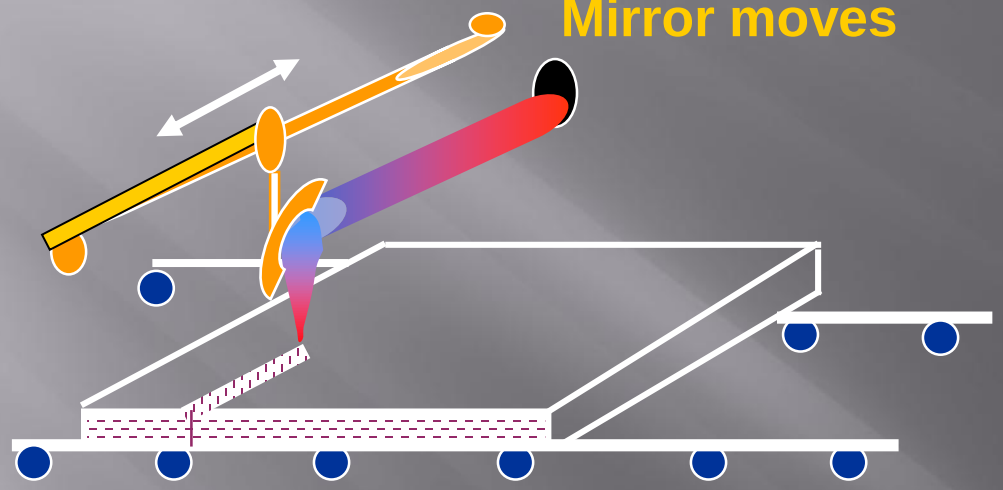
up to 20 mm and even more

No need for cleaning, grinding, seaming, and polishing – lower operation costs

High speed, accuracy, and yield

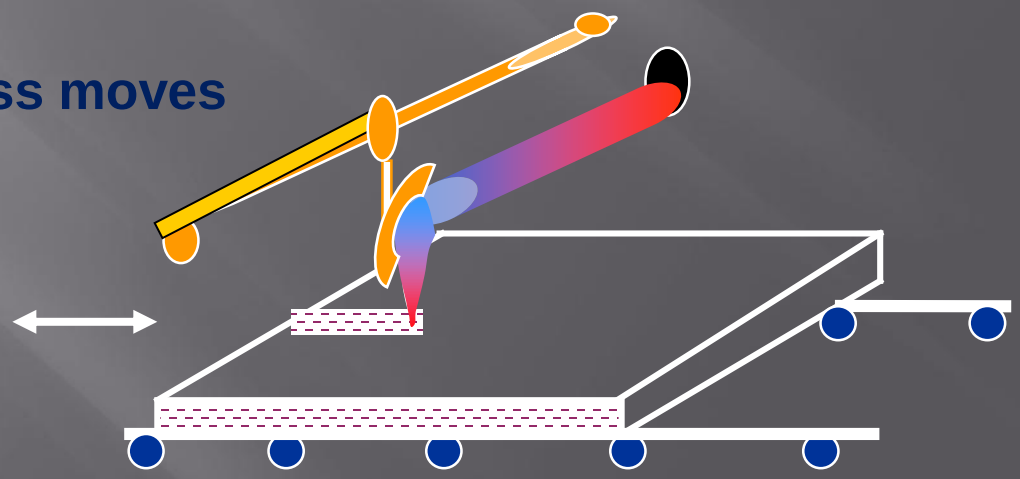
Gyrotron Glass Cutting: Approaches

Mirror moves



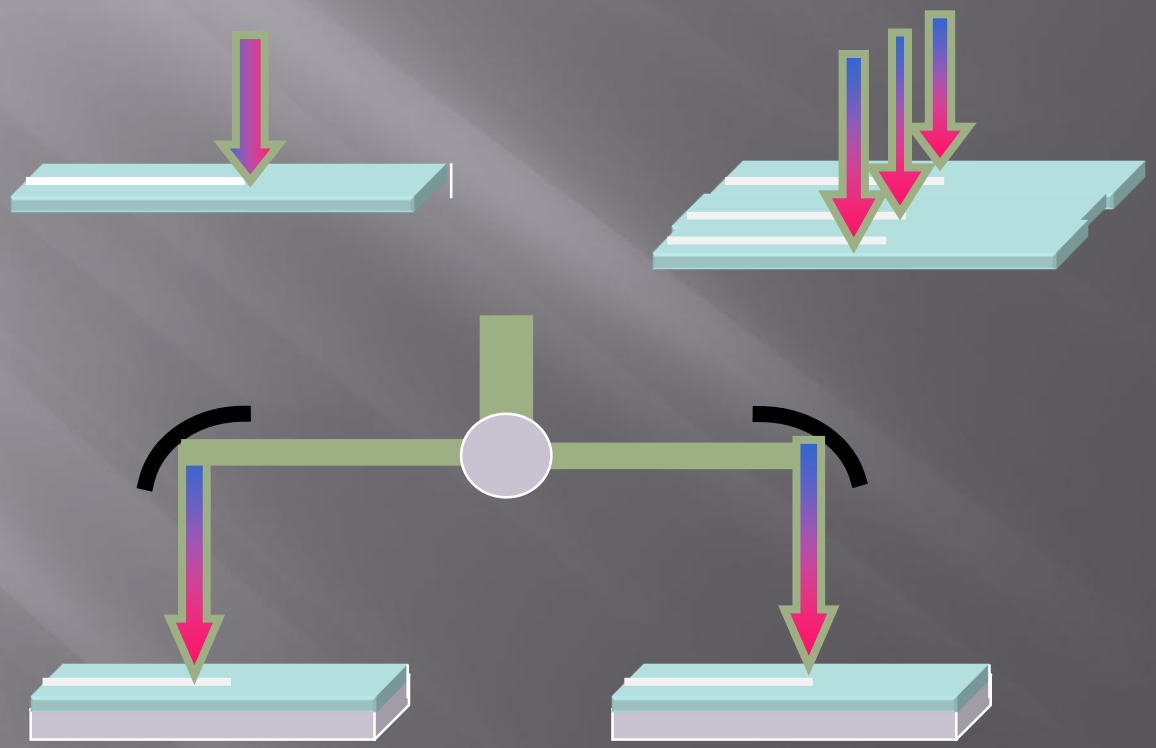
Mirror and glass can be moved simultaneously for a complex cut

Glass moves



Gyrotron Glass Cutting: Options

One gyrotron installation can serve several lines at once.



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Gyrotron Cutting Installation Set

Gyrotron Installation Layout

H/V Power Supply

Waveguide
Mirrors

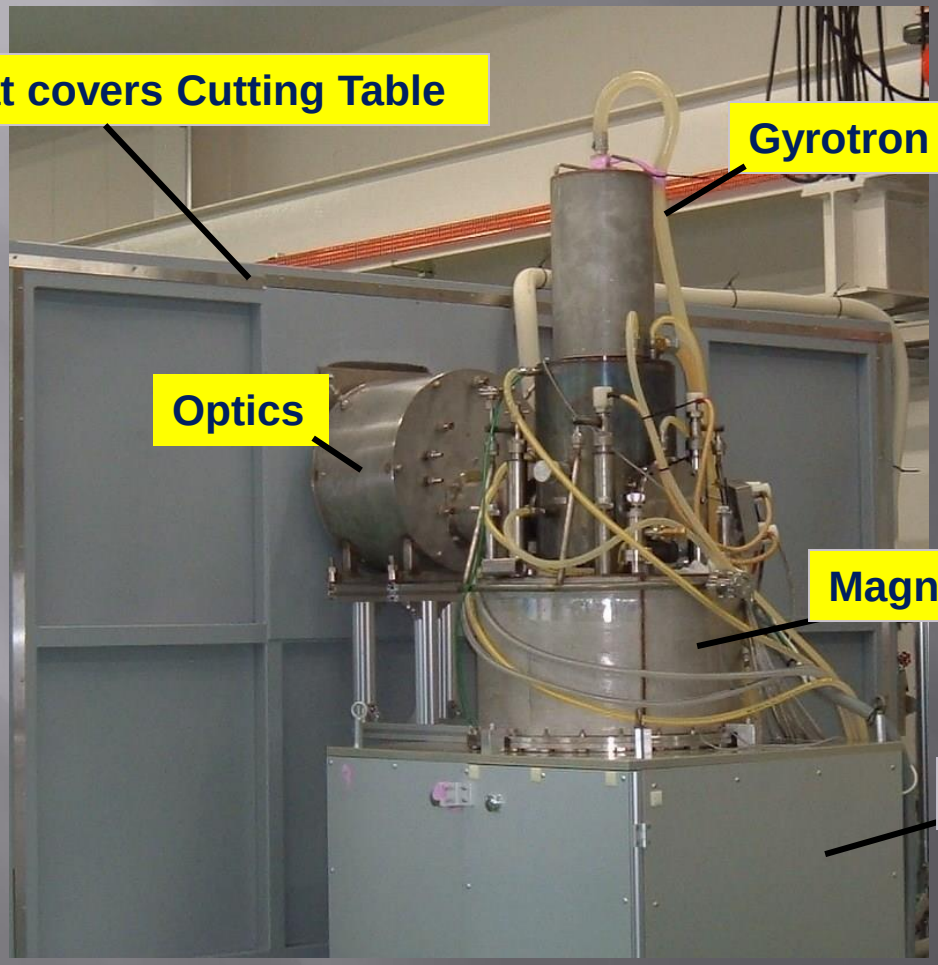
Cutting Table

Power Supplies:
- anode - magnet
- pump - filament

Gyrotron

Length – 2m (6'),
Weight – 50kg (110Lb)
Product life - over 10 years

Example of the Gyrotron Cutting Installation Set



Main Installation Parts

Power Supply

Auxiliary Equipment

Water Collector

Control

GTI Service

Gyrotron Technology Specialists will provide:

- development of optimal installation layout
- gyrotron related equipment specification
- specification requirements for cutter design
- manufacturing of gyrotron related equipment
- manufacturing glass cutting equipment (on customer demand)
- participation in factory inspection and final check at OEM plants
- supervision of hardware fabrication
- assembly and launch of the gyrotron part of the installation
- education and training
- manuals and documentation