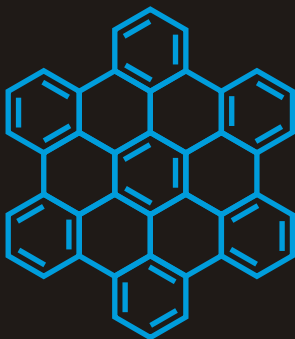
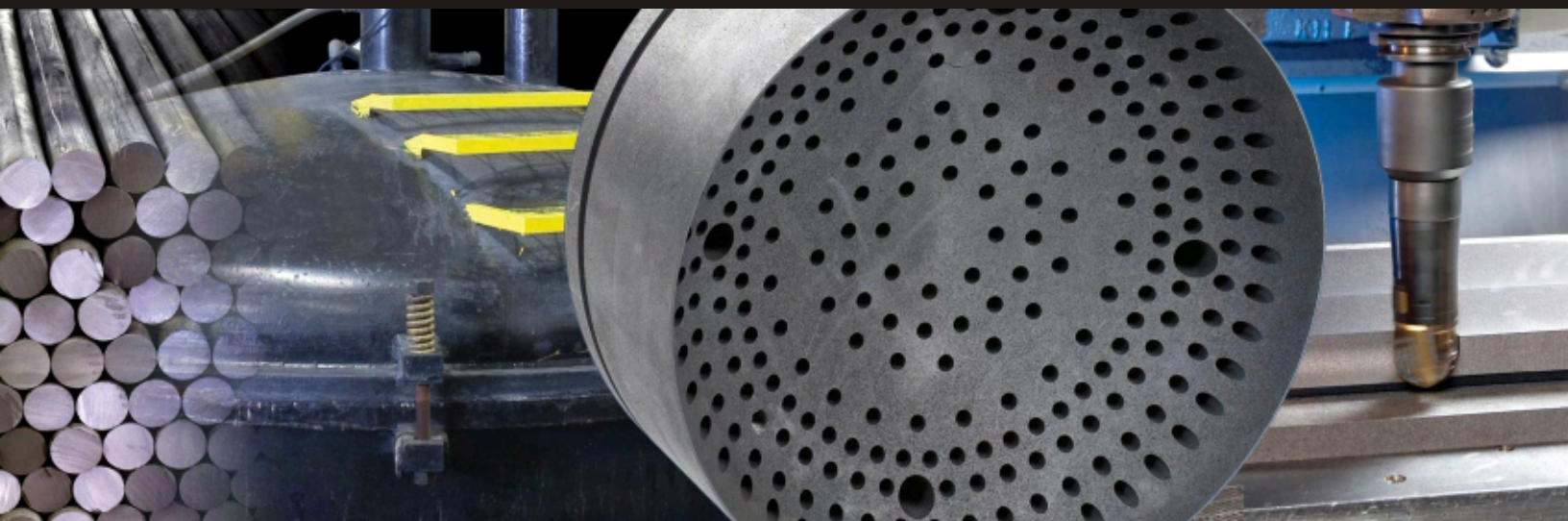


# GMI



Family of Companies

**Experts in Graphite & Carbon  
Manufacturing,  
Purification &  
Machining**



**Graphite Machining, Inc.**

**ADVANCED  
CARBON  
TECHNOLOGIES, INC.**



NAC CARBON PRODUCTS, INC.



# The GMI Family of Companies



An industry leader, the GMI Family of Companies has the unique ability to meet your carbon and graphite needs from raw materials through purification and precision machined parts. With over 30 years of experience, we are experts in the manufacturing, purification and machining of graphite, carbon and graphite composites.

We specialize in providing cost-effective solutions for a wide range of applications to meet your specific needs. What sets us apart from the competition is the combination of our people, technical expertise, and easy access to our state-of-the-art facilities. We are committed to providing quality products at competitive prices, when you need them. Your satisfaction is our goal.

## People

Any company can purchase equipment, but the experience and attitude of the people involved are what make companies excel. We have a highly qualified, dedicated team of people with extensive graphite experience here to serve you. Our employees understand how important quality and on-time delivery are.

## Technical Expertise

Our staff has more than 35 years of industrial experience in the fields of carbon technology, including polycrystalline graphites, pyrolytic graphite and carbon-carbon composites. With this knowledge and background, we are able to provide our customers with outstanding technical support and cost-saving solutions.

## State-Of-The-Art Facilities

The GMI Family of Companies' facilities feature over 250,000 sq. ft. of combined manufacturing space and are located in rural America where pride in workmanship is alive and well.



Made with Pride in the  
United States of America





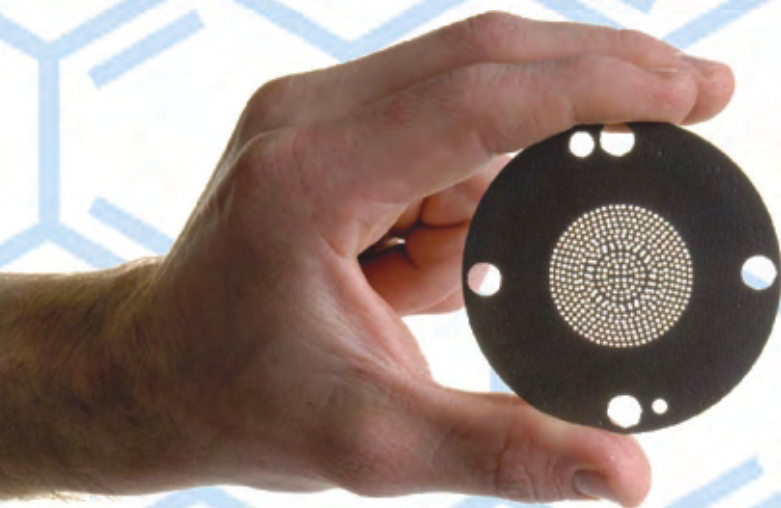
## Graphite & Carbon Machining at the Highest Level



Graphite Machining, Inc. (GMI) is one of the major graphite machining companies in North America. We offer high quality, precision machining of Graphite, Carbon and Graphite Composites. GMI has extensive experience in a wide variety of applications. We can handle your requirements from drawings to finished parts to custom packaging and shipping. Plus, we use our expertise to help reduce costs along the way.

In addition, GMI offers material treatment services that can significantly extend life of the product including:

Oxidation retardation treatment (mono-aluminum phosphate)  
Halogen purification through our sister company Advanced Carbon Technologies, Inc.



**Graphite, Carbon & Graphite Composites**

**Diversified Graphite Inventory**

**Automated State-of-the-Art CNC Machining & Turning Centers**

**Prototypes, Short & Long Production Runs**

### Machining a Wide Range of Sizes



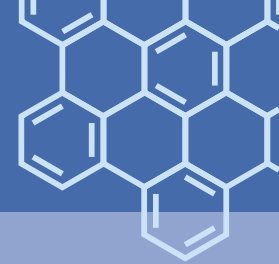
*Large diameter susceptors for induction furnaces are produced from solid graphite. (above)*

*Heating elements measure just a few inches long. (left)*

GMI is capable of machining and fabricating graphite and carbon-graphite parts of practically any size from 1/16" in diameter to 24" x 48" x 120", which is the largest graphite manufactured today.

*GMI can machine to extremely close tolerances. The center of this wafer thin graphite part has hundreds of holes that are only .015" in diameter. (left)*

# in Graphite & Carbon



## Fabrication of Larger Parts

At GMI, large vent tubes, chimneys, susceptors and retorts are being fabricated from smaller parts. This unique staved design eliminates the need for large diameter feeder stock which often has long lead times.



*Precision machined wedges can be assembled to create vent tubes up to 110" in diameter by 72" long.*

## State-of-the-Art Equipment & Facilities



*Automated CNC Turning Centers are capable of machining parts up to 28" in diameter.*

GMI's machining facilities – located in Topton, PA, Robesonia, PA and Metamora, MI – are among the world's finest. We have more than 125,000 square feet of combined manufacturing space, designed for efficient handling of your order from receipt of material to final packaging and shipping. Our substantial investment in equipment features over 150 pieces of automated machining equipment including:

- Lathes that handle up to 70" diameters
- Saws that cut up to 96" thick by 132" long
- CNC machining centers with travels up to 50" x 100"
- CNC turning centers up to 28" diameter by 120" long

## The GMI Advantage

### Diversified Graphite Inventory

To insure ready availability for our customers, we maintain a substantial inventory of graphite produced by various graphite companies from around the world. We also have the advantage of having a graphite producer – NAC Carbon – as part of our family of companies.

### Independence

Unlike some major graphite producers, we will supply graphite from a wide range of manufacturers from around the world. We have the independence to recommend the best and most economical graphite grade for your application. We will never attempt to "push" our grades of graphite.

### Competitive Pricing

Our large annual graphite usage allows us to purchase graphite at very favorable prices and pass the savings on to our customers.

### Flexibility & Fast Delivery

All of us at GMI understand how important on-time delivery is. Also, rush jobs are not a problem. If your equipment is down, or you need graphite parts quickly in order to meet your demanding schedules, call us. We will do everything possible to deliver what you need when you need it.



*Machined parts are packaged and ready for shipment.*



## Industries Served

### Aluminum Industry

- Canisters
- Disperser Heads
- Diffusion Heads
- Fluxing Tubes
- Filter Box Tubes
- Flow Control Cones
- Lubricating Rings
- Molds
- Porous Graphite Diffusion Heads
- Rotors, Impellers and Shafts
- Runout Plates
- Steady Eddy Rods



Rotors, impellers and shafts for aluminum gas injection systems.

### Electronic Industry

- Boats
- Crystal Growing
  - Heaters
  - Crucibles
  - Shields
  - Seed Holders
  - Cups
  - Covers
  - Electrodes
- Crystal Slicing Beams
- Susceptors



Canisters



Large boats up to 84" x 36" x 15".

### Foundry Industry

- Heating Rods, Holders and Contacts
- Plunging Bells
- Skimmer Paddles
- Skimmer Spoons



Components for fixturing and processing of carbide tooling.

# in Graphite & Carbon

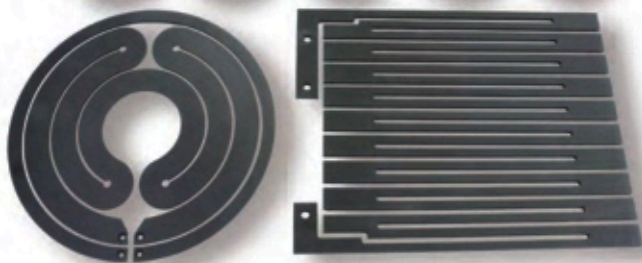


Molds

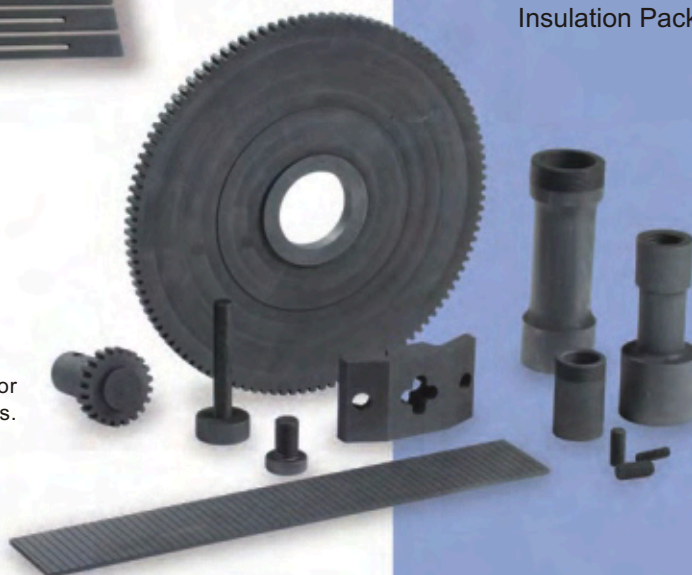
Electrodes for quartz industry.



Resistance heating elements machined to size or a resistance specification.



Fasteners, fixturing and furniture for high temperature vacuum furnaces.



## Industries Served

### Metallurgical Industry

- Casting Dies
- Crucibles
- Electrode Re-machining
- Furnace Components
- Heating Rod Holders
- Hot Pressing Dies
- Injectors
- Molds
- Resistance Heaters
- Plunging Bells
- Pusher Blocks
- Sintering Boats
- Skimmers

### Quartz Industry

- Ball Swivels
- Boule Dome Liners
- Electrodes
- Molds
- Rod Washers
- Tooling
- Vacuum Furnace Parts

### Vacuum Furnace Industry

- Bolts and Connectors
- Feed Throughs
- Furnace Linings
- Hearth Rails
- Heating Elements
- Insulation Packs



## Purification Solutions for Industry

**High Temperature Vacuum  
Induction Purification**

**Thermal Purification**

**Halogen Purification**

**Low Temperature Purification**



*Vacuum furnace with a hot zone of 51" diameter x 80" depth.*

Advanced Carbon Technologies, Inc. (ACT) performs coating, impregnation and purification of a wide range of materials including graphite, graphite composites, ceramics and refractory materials. Using specially designed high temperature induction furnaces that can be operated under vacuum or near atmospheric pressure using an inert gas or halogen gas mixture these materials can be purified to exacting specifications. Depending upon process conditions and customer requirements, purity levels of processed materials range from several hundred to less than five (5) parts per million.

Our purification furnace processes can be carried out over a wide range of temperatures (up to 3000°C); pressures (less than 1.0 torr to 760 torr); and furnace atmospheres including inert gases, reducing gases, and halogen gases or gas mixtures. For products that will not take high temperatures we offer low temperature purification (as low as 1200°C) in a vacuum atmosphere.

### **State-of-the-Art Equipment & Facilities**



*Vacuum furnace with a hot zone of 40" diameter x 80" depth.*

ACT's purification facility – located in Topton, PA – is among the world's finest. We have more than 25,000 square feet of combined manufacturing space, designed for efficient handling of your order from receipt of material to final packaging and shipping.

With eleven furnaces ranging from 10" diameter x 20" depth to 51" diameter x 80" depth, ACT can handle high temperature materials and projects of all sizes.

### **Research & Development**



*Vacuum furnace with a hot zone of 28" diameter x 50" depth*

ACT also has small furnaces available for exploratory work or to determine optimum process conditions (temperature, pressure, gases, cycle times) prior to full-scale production. When studying the feasibility of exploratory projects, avoid premature capital investments by using our testing furnaces as a low-cost alternative.



# in Graphite & Carbon



## Materials Processed

ACT provides high temperature vacuum induction purification of a wide range of materials including:

- Advanced Composites
- Carbon Composites and Fibers
- Ceramics
- Felt Insulation Board
- Graphite
- Graphite Powders
- Refractories
- Rigid Board Insulation
- Other High Purity Requirements

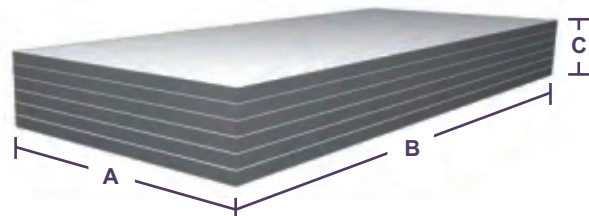
## Ultra-Pure Pyrolytic Graphite



ACT manufactures ultra-pure (<5ppm) Pyrolytic graphite using a high temperature Chemical Vapor Deposition (CVD) process. The resulting material offers the following properties:

- High Purity
- High Density
- High Strength

- High Hardness
- Virtually Zero Porosity



The pyrolytic graphite material is grown onto a substrate giving it a layered composition which has different properties in different planes. In the C plane (across its layers) it has low thermal conductivity, acting as an insulator. In the A-B plane (with the layers) it has very high thermal conductivity, acting as an excellent conductor.

ACT can provide Pyrolytic graphite as a raw material in plates, free standing shapes or as an impermeable coating on graphite or other substrates. It can also be machined to your specifications through our sister company Graphite Machining, Inc.

## The Advanced Carbon Advantage

### Ready Availability

ACT helps independent shops be more competitive by catering to their purification needs and production schedules.

### Flexibility & Fast Turnaround

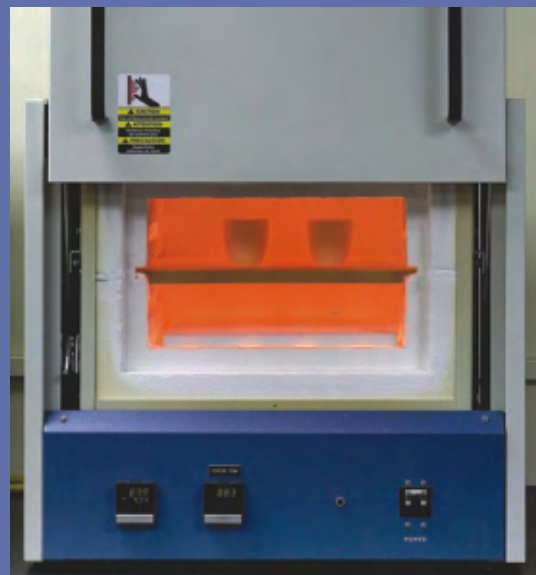
With eleven furnaces in operation, we can handle high temperature materials and projects of all sizes... and partial runs are never a problem.

### Cost Control

Using our facilities lets you avoid the cost of purchasing, installing, and operating expensive furnaces at your facility.

### Environmental Compliance

As environmental costs continue to escalate, we can provide complete purification services so you can escape the expense and red tape associated with clean-up, waste disposal, emission standards, etc.



*In-house testing for total ash.*



NAC CARBON PRODUCTS, INC.

# Experts

## Graphite & Carbon Manufacturing Specialists

**Extruded & Granular Graphite & Carbon**

**Rods & Blocks – Standard & Custom Sizes**

**Large Inventory – Fast Delivery**

**Toll Carbon Baking & Graphitization**



When your company needs quality graphite and carbon, put your trust in NAC Carbon Products, Inc. (NAC). With nearly 60 years of experience, we are experts in the manufacturing of graphite and carbon products. Our products include graphite and carbon rods and blocks; plus purified, granular, molded, baked and extruded graphite and carbon. In addition, we offer graphitization and toll carbon baking services. Our goal is to provide quality graphite and carbon at competitive prices, shipped when you need it.

### Standard Graphite & Carbon Rods & Blocks

NAC maintains a substantial inventory of standard graphite and carbon rods and blocks. Unlike other manufacturers, we produce our standard sizes in 1/4" diameter increments. In addition, we offer custom cut sizes and can manufacture graphite and carbon to your specifications.

NAC Carbon Products' grades are equivalent to many discontinued Carbide/Graphite Group (CG) products as well as other manufacturers' grades.



#### NAC-200 CARBON RODS

Extruded and Baked Carbon Rods – Fine Grain  
Grain Size - .008  
Diameters - 1/8" to 5 1/2"  
Lengths - 12"/24"/48"

#### NAC-500 GRAPHITE RODS

Extruded Graphite Rods – Fine Grain, High Density  
Grain Size - .008  
Diameters - 1/8" to 6"  
Lengths - 12"/24"/48"

#### NAC-673 GRAPHITE RODS

Extruded Graphite Rods – Medium Grain, High Density  
Grain Size - .030  
Diameters - 2" to 6"  
Lengths - 48"

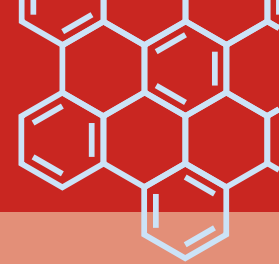


#### NAC-673 GRAPHITE BLOCKS

Molded Graphite Blocks – Medium Grain, High Density  
Grain Size - .030  
Widths – up to 16"  
Heights – up to 32"  
Lengths – up to 100"



# in Graphite & Carbon



## Granular Carbon & Graphite

A wide range of carbon, coke, and graphite granular products are manufactured by NAC. The range is from typical coarse particles to special fines with various classifications according to customer requirements. Packaging is bags, drums, or bulk. The variety of applications for these products is a result of differences in grade, particle and chemistry.

## Toll Carbon Baking, Extruding & Graphitization



*Extruding capabilities.*

NAC Carbon provides a broad range of toll services to the graphite industry. We can extrude, bake or graphitize your raw material. We feature rail car access to our manufacturing facility for shipping and receiving large quantities of raw material.

## State-of-the-Art Equipment & Facilities



*NAC's facilities feature over 100,000 square feet of manufacturing space.*

NAC's production facilities – located in Punxsutawney, PA – feature more than 100,000 square feet of manufacturing space, designed for efficient handling of your order from receipt to final packaging and shipping. Our facility is equipped with a complete range of extrusion, baking and graphitization equipment.

## The NAC Advantage

### Large Inventory & Ready Availability

To insure ready availability for our customers, we maintain a substantial inventory of graphite and carbon in a wide range of standard sizes. Same day turnaround is available for most products.

### Custom Sizes & Formulations

We offer graphite and carbon in custom cut sizes to meet your needs. In addition, we can manufacture graphite and carbon to your exact specifications and formulations. At NAC, we are always working to develop new grades to meet the needs of our customers' applications.

### Competitive Pricing

Cost-effective production methods and large volume runs allow us to provide our products at very favorable prices.

### Flexibility & Fast Delivery

All of us at NAC understand how important quality and on-time delivery are. Also, rush jobs are not a problem. If you need material today, call us. We will do everything possible to deliver what you need, and get you operating with minimum downtime.

### Private Labeling

We can also private label products for you.



*Graphite rods ready for shipment.*

# The GMI Family of Companies



## **Graphite Machining, Inc.**

### **Headquarters**

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[www.graphitemachininginc.com](http://www.graphitemachininginc.com)

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Fax: 610-682-3838  
E-mail: [info@advancedcarbon.com](mailto:info@advancedcarbon.com)  
[www.advancedcarbon.com](http://www.advancedcarbon.com)

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Fax: 814-938-4890  
E-mail: [info@naccarbon.com](mailto:info@naccarbon.com)  
[www.naccarbon.com](http://www.naccarbon.com)

## **Graphite Machining, Inc.**

### **Metamora, MI Facility**

4141 S. Oak Street  
Metamora, MI 48455  
Phone: 810-678-2227  
Fax: 810-678-2305

## **Graphite Machining, Inc.**

### **Robeson, PA Facility**

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Phone: 610-628-0080  
Fax: 610-682-0014

