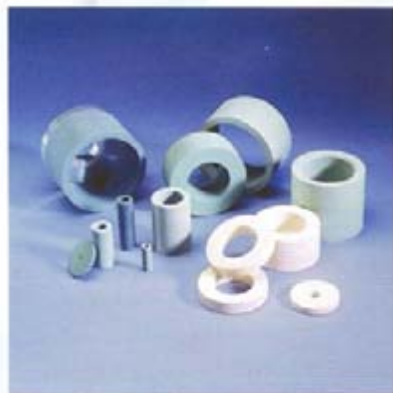
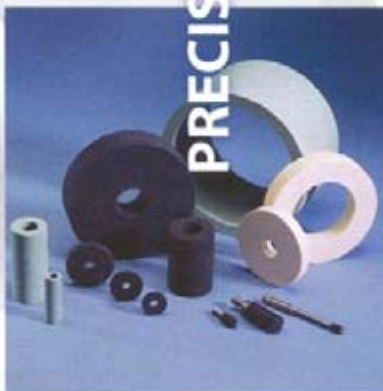
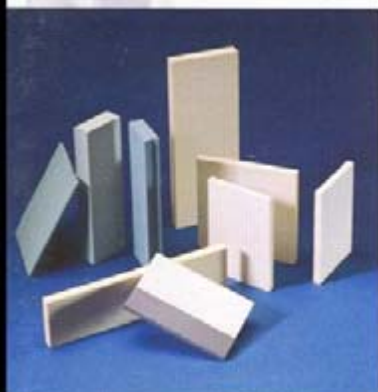


PRECISION ABRASIVE TOOLS



**DARMANN**  
ABRASIVE PRODUCTS



## The Darmann Story

Darmann Abrasive Products, Inc. designs, manufactures and markets fine grit, bonded abrasive products for superfinishing and precision grinding applications. Our value proposition is to provide customers with superior engineered products and responsive customer support. This customer focused approach has enabled us to become the superfinishing market leader.

The company was founded in 1983 to address the needs of bearing and automotive customers in the emerging superfinishing market. At the time it was apparent that large, mainstream abrasive suppliers were not focused on the specific needs of superfinishing customers. Darmann developed proprietary process technology capable of producing consistent, tightly graded products manufactured to precise geometries. Superior products combined with the shortest delivery times enabled Darmann to become the superfinishing market leader. Today we have the deepest case history in the industry.

At the request of customers, the company utilized the same core technology to manufacture conventional abrasive wheels. Our technology was well suited to customer applications that required fine grit wheels and customized features. Recently, significant investments have been made to our wheel manufacturing department in order to meet the growing demand for Darmann products. We supply wheels for a variety of applications including orthopedic implants, fuel injection and hydraulic components.

In the early 1990s Darmann began to develop targeted CBN and diamond solutions for precision grinding applications. We have focused on specialized wheels for small bore grinding, fuel injection and ceramic applications. The company has accumulated considerable experience making wheels as small as a pencil head and applications that require sub-micron particle sizes. A major area of emphasis for Darmann is the development of our superabrasive technology. Today CBN and diamond are our fastest growing businesses.

We are committed to building on the traditions that have made Darmann an important provider of superfinishing and superabrasive products. The company is making significant investments in new equipment, facility improvements, new technology and people. In addition, we are implementing lean manufacturing techniques throughout our company to better meet the evolving needs of our customers.



# The Darmann Advantage

There are some compelling reasons to consider Darmann. The unique combination of products engineered for superfinishing and precision grinding applications combined with superior customer and technical service differentiate Darmann. This is what we refer to as the Darmann Advantage.

**1. Darmann is the market leader.** No one sells more superfinishing stones than Darmann. No one provides a broader range of conventional abrasive types, range of hardness, engineered structures, bond options, part geometries, packaging and printing options than Darmann. We have designed, manufactured and sold more than 10,000 different parts.

**2. Consistent fine grit, bonded abrasive products.** We have developed proprietary technology that addresses the exacting requirements of fine grit, vitrified bonded products. There are a number of factors that go into the production of a consistent fine grit abrasive product including the use of raw materials that are sized within narrow acceptance ranges, good process controls and, most importantly, the ability to measure process parameters with sufficient granularity. We believe that the key to producing a consistent product is to control both grade and structure. Our precise grading system ensures that Darmann products exhibit consistent hardness. Controlling the product structure can assist in obtaining the optimum surface finish, stock removal, and tool life.

**3. Superior customer service and technical support.** Darmann has maintained a long standing commitment to superior customer service. We believe that our customers require more than just consistent, high quality products. Manufacturers' require that their suppliers demonstrate a company-wide focus on customer service including short lead times, free test samples, inventory management programs and specialized packaging and shipping.

We offer superior technical support by knowledgeable professionals. Our application engineers will work with customers to survey existing practices, list concerns and document current control parameters. Once the current process is benchmarked and opportunities identified, our engineers are able to recommend improvements that can result in significant productivity and cost improvements. Recommendations may include changes to the process, abrasive, grit size, structure, hardness or bond type.

**4. Innovative research and development.** We maintain an active research and development effort targeted at the evolving needs of our customers. A major area of focus is in the development of new and improved superabrasive technology including the creation of new bond systems. Representative projects include new products to grind such challenging materials as ceramics, finishing of miniature bearings and improved mounted wheels for fuel injection parts.





## Superabrasive Solutions

Darmann manufactures small CBN and diamond products for precision grinding and superfinishing applications. These are our fastest growing businesses and an area of emphasis for the company. We have made significant investment in this business to upgrade our technology, increase capacity and widen our product offerings.

### Superabrasive Markets

We have focused on custom wheels and stones for applications in the following industries:

- Aerospace & Defense
- Bearing Components
- Automotive Components
- Fuel Injection Components
- Industrial Parts

### Superabrasive Capabilities

We have developed the capabilities to design and manufacture a wide variety of superabrasive products tailored to the needs of our customers:

- Mounted wheels in a variety of shapes
- Miniature wheels with ODs as small as .080" (2mm) and thickness as small as .040" (1mm)
- Specialized features and geometries
- Experience with difficult materials such as ceramic and M50
- Products that utilize sub-micron diamond or CBN particles
- Experience with a variety of grinding modes
- Application of superabrasive technology to superfinishing operations
- Proprietary bond systems

### Representative Products

The following is a representative sampling of custom products we have developed in conjunction with our customers:

- Grinding and finishing
- Diamond superfinishing stones for industrial ceramic applications
- Mounted fuel injection wheels
- Cylinder honing of a two cycle engine application
- Superfinishing of high performance automotive parts
- Sub-micron stones for defense application
- A layered wheel for a pressure sensor application



# Metal Bonded Superabrasive Honing Stones

Darmann now makes metal bonded superabrasive honing stones for a wide variety of honing machines and applications. Whether you are honing diesel engine cylinder liners, down-hole pumps, transmission parts or precision tubular components we can design a custom stone.

## Metal Bonded Markets

- Precision Tubular Honing
- Diesel Cylinder Liners
- Auto Transmission Components
- Hydraulic Components
- Long Tube Honing

## Metal Bonded Capabilities

We offer a full range of superabrasive grit types and sizes, with metal bonds to optimize the abrasive performance.

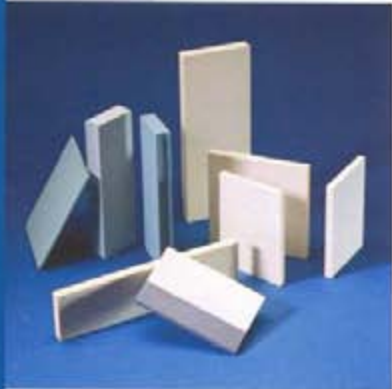
- Full range of diamond and CBN grit types and sizes
- Variety of metal bonds
- Stones suited for a variety of materials
- Experience with smoothing, rounding, sizing and surface finishing
- Precision stone dimensions
- Hone mounting in a wide variety of configurations

## Representative Products

The following is a sampling of custom products that illustrate our technology.

- Rough and finish honing products for automotive applications
- Surface honing for transmission parts
- "Plateau Honing" for engine cylinder liners
- Long tube honing applications
- Hydraulic & engine cylinder roughing and finishing





## The Superfinishing Experts™

Darmann provides the largest selection of superfinishing products in the industry. We have amassed substantial experience with superfinishing applications. This enables our technical staff to recommend superfinishing solutions that target customer specific needs. We can generally recommend a solution that will increase stone life and reduce operating costs. Once a customer dials in a Darmann product he will receive the same consistent product each time, every time.

We have developed wheel manufacturing technology that enables us to make a variety of wheel types from spindle mounted wheels for fuel injection applications to feature rich wheels for the medical industry. Our wheel manufacturing department has been greatly expanded to increase capacity and integrate new process technology into our operations.

### Darmann Conventional Products

- Deep case history
- Fast turnaround of prototypes
- Aluminum oxide, silicon carbide and ceramic abrasives
- Vitrified and resin products
- Mounted wheels on spindles, mandrels and shanks
- Wheels up to 4" (100mm) OD
- Broadest selection of bond and abrasive types
- Prompt on site application support
- Specialized geometries manufactured to tight tolerances
- Unmatched consistency and performance
- Wax and sulfur treatments
- Variety of packaging and printing options
- Inventory management programs

# Representative Applications

Darmann has developed over 10,000 products for over 250 customers worldwide that represent a wide variety of applications. The following is a representative sample of products:

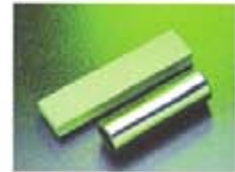
## Automotive Chassis Products

- Shock absorber rods
- Strut rods
- Steering racks
- Power steering pump components
- Transmission components
- Wheel hub flange
- Flanged wheel bearing units



## Automotive Engine Components

- Lifter roller pins
- Fuel injection components
- Piston pins
- Camshaft lobes
- Crankshaft journals



## Diesel Engine

- Fuel injection components
- Camshaft lobes and journals
- Cam follower rollers



## Hydraulic

- Cylinder rods
- Pump gear journal
- Pump gear face
- Spherical end pump pistons



## Bearings

- Ball bearing raceways
- Tapered roller cups and cones
- Tapered rollers
- Cylindrical rollers and races
- Spherical rollers and races
- Needle rollers
- Miniature bearing
- Ceramic bearings
- Specialty bearings



## Medical

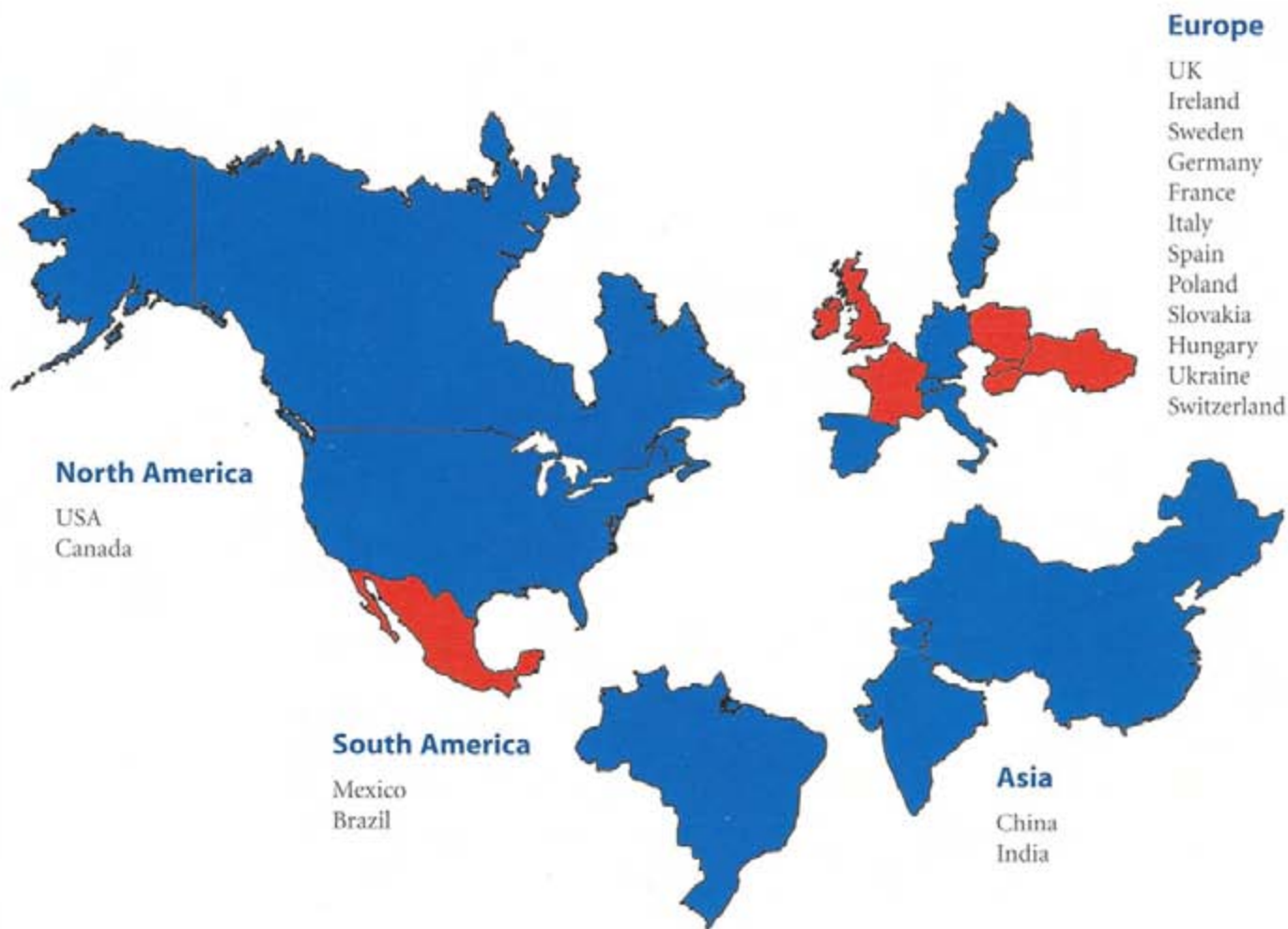
- Hip implant: femoral heads
- Hip implant: femoral sockets
- Elbow implant spheres



## Additional Markets

- Semiconductor dressing boards
- Dressing sticks
- Jointer stones
- Finger print pads
- Sharpening stones and wheels
- Aerospace & defense
- Industrial Products





- Distribution only
- Distribution & Representation

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*The Superfinishing Experts™*

100 Sterling Street  
Clinton, MA 01510  
Phone: 978-365-4544  
Fax: 800-736-3839

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