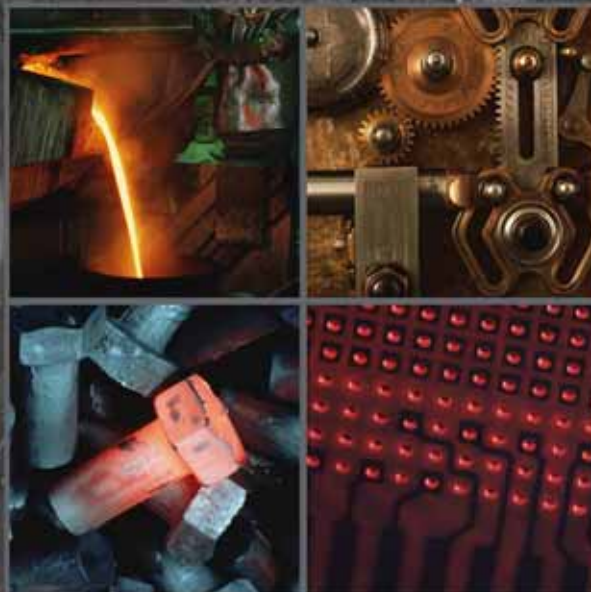


2018-2020

Metallographic Buyer's Guide



Version 5.01

Equipment and Consumables

www.metallographic.com

www.metallographic-equipment.com

www.metallography.org

www.MetallographicHardness.com

PACE[®]
TECHNOLOGIES
www.metallographic.com

3601 E. 34th St., Tucson, AZ 85713
Telephone: +1 520-882-6598 FAX: +1 520-882-6599
email: pace@metallographic.com

Thanks to our loyal customers PACE Technologies has had eight consecutive years of record growth. This growth has been both domestically and internationally as we now have 25 distributors and sell our products in over 55 countries around the world. In May 2015, we received the President's e-award for export expansion, which is the highest honor bestowed by the United States government for American companies involved with exporting. In early 2017, Don Zipperian, CEO/CTO of PACE Technologies was elected to be on the Board of Directors for the International Metallographic Society.

In 2015 we also completed construction on our new building expansion which increased our manufacturing capability by 50% and in 2016 expanded even more with the addition of another warehousing facility.

Our plan for the future is to continue to develop new consumables and equipment, as well as focus on reducing manufacturing costs in order to provide even greater value and savings to our customers. In addition, we are continuing development of automated equipment. It has been an exciting time for PACE Technologies and our plan is to stay focused on continued growth in the upcoming years.

PACE Technologies offers cost-effective, top of the line metallographic testing equipment and consumables. In addition, we now offer quality furniture for the laboratory and have added a line of Metrology instruments. With our Best Price Guarantee we will beat any competitors pricing for comparable products so you can be sure you are getting the best price in the industry.

At PACE Technologies, our goal is customer satisfaction. We offer user-friendly technical and ordering information, instant communications and transparent pricing. Our employees practice a "customer-first" philosophy every day and customer dedication has made PACE Technologies today's leader in the supply of metallographic consumables and equipment.

Our mantra is known as our 5-F program

- First to quote
- First to follow-up
- First to ship
- Full training and technical support
- Fastest service (24/7 web-based service)



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TECHNOLOGIES

www.metallographic.com



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Technology

Quality

Where "Quality Matters"



*2014 Small
Business
Exporter of
the Year
Business
Award*



**2015 Presidential e-Award
for Business Export**



2015 Manufacturer of the Year



Customer Assistance

For sales literature, order placement, prices, delivery & order status, contact us: Phone: +1-520-882-6598 FAX: +1-520-882-6599

Websites: www.metallographic.com, www.metallography.org, www.metallographic-equipment.com, www.MetallographicHardness.com

For product list, metallographic procedures, etchants & troubleshooting guidelines online, visit: <http://www.metallographic.com>

For Safety Data Sheets (SDS):

Call: +1-520-882-6598 or online: <http://www.metallographic.com/MSDS/MSDS.htm>

For equipment quotes:

Call +1-520-882-6598 or email: pace@metallographic.com



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Terms and Conditions

- Prices subject to change without notice
- Minimum order of \$50.00
- Taxes added where applicable
- Prices FOB factory
- Terms Net 30 days with established credit



Metallographic Consumables



Metallographic Equipment



Hardness Testers



Metrology Instruments

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Metallography Introduction

Metallography is the study of a material's microstructure and can be considered an integral branch for metallurgical testing or for the field of materials science. Analysis of a material's metallographic microstructure aids in determining if the material has been processed correctly and is therefore a critical step for determining **product reliability** and/or for determining why a **material failed**.

Metallurgy is primarily the study of metals, however, many of the principles used for testing metals applies to ceramics, plastics, minerals, computer chips and many other applications which may be more unique such as determining the age of the fish population in a lake by statistically analyzing the thickness of the fishes ear bone.

Industries / Materials	Applications
<ul style="list-style-type: none"> - Aerospace Engineering - Advanced Materials - Academia - Superalloys - Ceramic Matrix Composites - Metal Matrix Composites - Polymer Matrix Composites - Biomedical Devices - Medical Implants - Materials Science Education - Metallurgical Engineering - Mechanical Engineering - Electronics - Solder Joint Analysis - Integrated IC Chip Failure analysis - Printed Circuit Board or PCB quality control and failure analysis - Dielectric layer coating analysis - Automotive - Heat Treating - Metal Fabrication - Forging - Foundary Castings - Thermal Spray Coatings - Welding - Powder Metallurgy - Deep Drawing - Fastener Testing - Mining Metallurgical Testing Labs 	<ul style="list-style-type: none"> - Grain Size Analysis - Porosity - Phase Analysis - Inclusion Analysis - Graphite Nodularity - Coating Thickness - Decarburization - Welding Analysis - HAZ Sensitization - Twin Boundaries - Cracks - Dendrites - Corrosion - Carburizing Thickness - Nitriding Thickness - Intergranular Fracture - Weld Sensitization - Flow Line Stress - Microhardness Testing - Rockwell Hardness Testing - Superficial Hardness Testing - Brinell Hardness Testing

Metallographic Preparation Process

The basic steps for proper metallographic specimen preparation include:

- Documentation
- Sectioning
- Mounting
- Rough grinding
- Fine grinding
- Polishing
- Etching
- Examination

Essentially, metallographic samples or metallurgical specimens need to be sectioned or cut close to the area of interest using metallographic equipment such as an abrasive saw or a precision wafering saw, the damage produced from cutting then needs to be completely removed by grinding and polishing with metallographic polishing and grinding equipment, followed by analysis which may require etching the specimen in order to bring out the details of the structure.

Metallographic Equipment

Proper metallographic specimen preparation is the key to obtaining accurate microstructural analysis. This is accomplished by minimizing damage initially by properly sectioning the specimen with a metallographic abrasive saw for most metals and larger samples, or with the use of a metallographic precision wafering saw for smaller or more delicate specimens. After sectioning, the specimens are typically mounted in a plastic either using a castable metallographic resin such as an epoxy, acrylic or polyester or with a metallographic mounting press. Mounting makes the specimens easier to hold, as well as protects delicate edges or coatings. Metallographic grinding and polishing are required to remove the damage produced during cutting and/or to expose the area of interest. Metallographic etching is used to bring out the details of the microstructure when viewed with a metallurgical microscope.

Metallographic Abrasive Saws - most commonly use specialized abrasive blades ranging from 10-inch to 16-inch diameter. Metallographic abrasive saws are table feed or wheel feed cutters that are designed to have safety lock out switches. Metallographic abrasive saws are wet cutting saws which are designed to reduce burning of the specimen so as not to damage the metallurgical or metallographic structure of the specimen. The more versatile abrasive saws allow for the speed of the motor to be changed to better match the abrasive blade to the material being sectioned. Typically, softer blades and slower speeds produce the best cuts.



MEGA-M250
Abrasive Cutter

Metallographic Precision Wafering Saws - one of the most widely used small precision saws uses either thin diamond or CBN blades. Metallographic precision wafering saws range in speed and size, however, they all use some sort of micrometer for precise positioning of the sample to the blade.



PICO-175 High Speed Wafering Saw



TP-7001B Compression Mounting Press

Metallographic Compression Mounting Presses - after sectioning or abrasive cutting the specimen is typically encapsulated in a thermoset or thermoplastic resin so that the sample is easier to hold or to fixture in an automated polishing machine. Metallographic compression mounting presses apply both heat and temperature to form phenolics, epoxies or acrylic mounts. Castable metallographic mounting can also be accomplished with castable polyesters, acrylics or epoxy resins.



TP-7500 Hydraulic Mounting Press

Metallographic Polishers - are used to remove the damage and deformation created during cutting. Grinding and polishing is accomplished with a variety of abrasives. Metallographic polishers are either manual or automated with automation being preferred for consistency and ease of use.



NANO-1000T Polisher



NANO-2000T Polisher with FEMTO 1100 Automatic Polishing Head

Metallographic Vibratory Polishers - are used for polishing very difficult to polish materials. The metallographic vibratory polisher is an excellent machine for polishing soft materials such as aluminum, stainless steel, solder materials, refractory metals such as rhenium, niobium, and precious metals such as gold and silver. Metallographic vibratory polishers are also the most efficient sample preparation technique for preparing specimens for electron backscattered diffraction (EBSD) analysis.



Metallurgical Microscopes - are inverted reflected light metallographic microscopes. Illumination techniques include brightfield (B.F.), darkfield (D.F.), polarized light and differential interference contrast (D.I.C.)



Metallographic Microhardness Testers - are frequently used to measure the hardness and case depth for heat treated parts. Metallographic microhardness testers utilize either a Vickers or Knoop indenter to produce an indent at a specified load. The depth of the diagonal indent or the hardness is calculated by optically measuring the length of the indent diagonal with an optical filar. Automated microhardness testing instruments are particularly useful for heat treating facilities.



Metallographic Rockwell Hardness Testers - provide a measurement of the bulk hardness by applying a minor or preliminary load to set the indenter and then the major primary or full load for a specific dwell time. Indenters are either conical or ball types for metallographic Rockwell testers. Metallographic hardness is presented in the form of various hardness scales which are based on the depth of penetration of an indenter into the material at a given load. Softer Rockwell scales use larger indenters and lower loads, whereas harder materials use conical or smaller indenters and higher loads.



Metallographic Brinell Hardness Testers - provide a measurement of the bulk hardness by applying a load to a ball indenter. Metallographic Brinell hardness is determined by optically measuring the diameter of the ball impression in the specimen.

Metallographic Image Analysis - is a method for quantifying metallographic features such as: grain size, porosity, phase analysis, metallurgical inclusions, nodularity, coating thickness and other metallurgical testing features. Metallographic image analysis can also be used to measure and characterize the quality of welded joints.

Lab Furniture Introduction

PACE Technologies now offers laboratory furniture to make PACE Technologies your one-stop shop for all things Metallography and Metrology. See pages 162-167 for product details.



Storage Cabinets - Scientists that use chemical and flammable substances know the importance of clear labels and safe storage. The bright safety standard *yellow* color of our ventilated cabinet sets it apart from other typical lab furniture, making it a smart and safe way to store flammable substances. If the color alone isn't enough, the cabinet is clearly labeled "flammable" and features a lock and key for secure storage.



Flammable-cabinet



Corrosive-cabinet

In contrast, the bright safety standard *blue* colored corrosive storage cabinet sets apart chemicals in a safe and noticeable way. Also featuring unmistakable signage and a lock and key.

The Specimen Storage Cabinet features removable and interchangeable trays for customizable storage and archiving of different size specimens. Designed specifically by PACE engineers for easy specimen organization, users may store 1-inch, 1.25-inch, 1.5-inch or 2-inch samples or remove the trays all together for polishing pad storage.



SPEC-STORE
Specimen Storage
Cabinet

Lab Benches - PACE Technologies offers several different size lab benches that when purchased together can be organized into various shapes, creating a simple work station with room in the cabinets and drawers for storage. Additionally, an optional protective cover is available as an upgrade to protect the surfaces of your lab benches.



MEGA-BENCH

The MEGA Cutter Bench benefits PACE Technologies customers specifically, for it was designed to perfectly fit the MEGA M250, M300 and T300 abrasive cutters.

Fume Hood - Essential to any metallurgical etching lab is the Fume Hood. With high exhaust air flow, a built-in sink, multiple air and gas supply lines, and programmable control, users can safely limit exposure to toxic fumes and hazardous materials in the lab.



FUME-HOOD

Metrology Introduction

Metrology is the science of measurement and its application, whether practical or theoretical, whereby measurement is defined as the process of obtaining quantity values by way of experimentation that can be used to determine the dimension, quantity or capacity of a body or substance.

Metrology aims to define internationally accepted units of measurement, establish realization of units of measurement through experimentation, and establish traceability chains.

Determining a standard that is traceable from the highest international level all the way down to the end user (known as the *Traceability of Measurement*) is the important job of the metrology scientist. Making sure that every lab uses the same measurement standard with the same definitions and values across the board allows for accurate and meaningful measurements. That traceability of the measurement is ensured by calibration.

Calibration is a process of comparison that establishes the relationship between readings from the measuring instrument being used and a reference measurement standard. Calibration assures the user that all measurements taken with their device are accurate using those known standards. Without proper calibration, inaccurate measurements can result in failures of production or noncompliance with contractual requirements

There are three main categories of metrology which are scientific metrology, industrial metrology and legal metrology. Within these categories applications of metrology are diverse and include: natural gas, nanoparticles, food safety, cancer treatment, pharmaceuticals, space technology, nuclear power plants, aviation, kidney dialysis and so much more.

PACE Technologies is proud to offer a top-of-the-line series of measuring devices for a variety of applications. These measuring machines are accurate, precise and efficient. Visit pages 168-174 to see our selection of Metrology equipment.



Instant Vision Measuring Systems

Manual Vision Measuring Systems

Semi-automatic Vision Measuring Systems

Automatic Vision Measuring Systems

Digital Vertical Profile Projectors



Metallographic Consumables



Fast Cure Epoxy Resin



Dyed Polycrystalline Diamond Suspension



Compression Mounting Powder



Castable Mounting Accessories



Silicon Carbide (SiC) 8-inch, 240 grit Plain-backed Paper



Polishing Pads



ACRYLIC PLUS Acrylic Resins

Abrasive Cutting Fluids

Abrasive Cutting Fluids

Pace Product Name	Catalog Number	Pkg	Price (\$)
MAXCUT™ Abrasive Cutting Fluid (32 oz)	MAXCUT-1000-32	32oz	22.50
MAXCUT™ Abrasive Cutting Fluid (1/2 gallon)	MAXCUT-1000-64	1/2 gallon	44.00
MAXCUT™ Abrasive Cutting Fluid (1 gallon)	MAXCUT-1000-128	1 gallon	82.00
MAXCUT™ Abrasive Cutting Fluid (5 gallons)	MAXCUT-1000-5G	5 gallons	210.00
MAXCUT™ 2 Cutting Fluid with Anti-corrosion Additive (32 oz)	MAXCUT2-1000-32	32 oz	27.50
MAXCUT™ 2 Cutting Fluid with Anti-corrosion Additive (1/2 gallon)	MAXCUT2-1000-64	1/2 gallon	47.00
MAXCUT™ 2 Cutting Fluid with Anti-corrosion Additive (1 gallon)	MAXCUT2-1000-128	1 gallon	85.00
MAXCUT™ 2 Cutting Fluid with Anti-corrosion Additive (5 gallons)	MAXCUT2-1000-5G	5 gallons	250.00
MAXCUT™ OL1000 Water Soluble Emulsion Cutting Fluid (32 oz)	MAXCUT-OL1000-32	32 oz	27.50
MAXCUT™ OL1000 Water Soluble Emulsion Cutting Fluid (1/2 gallon)	MAXCUT-OL1000-64	1/2 gallon	47.00
MAXCUT™ OL1000 Water Soluble Emulsion Cutting Fluid (1 gallon)	MAXCUT-OL1000-128	1 gallon	85.00
MAXCUT™ OL1000 Water Soluble Emulsion Cutting Fluid (5 gallons)	MAXCUT-OL1000-5G	5 gallons	250.00
Propylene Glycol Based Corrosion Inhibitor Additive (32 oz)	PCC-5000-32	32 oz	22.50



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MAXCUT™ Abrasive Cutting Fluid



MAXCUT™ OL Water Soluble Emulsion Cutting Fluid

Abrasive Cutting Fluid Recommendations

Cutting Fluid	Application	Recommended Dilution	Changing Frequency
MAXCUT™ 1000 cutting fluid	As a replacement for Buehler Ltd COOLMET cutting fluid	25:1 (water)	50 cuts or weekly
MAXCUT™ 2 1000 cutting fluid with anti-corrosion additive	Recommended for reducing corrosion in cutting chamber	25:1 (water)	50 cuts or weekly
MAXCUT™ OL1000 water soluble emulsion cutting fluid	Improved heat transfer and corrosion resistance	20:1 (water)	50 cuts or weekly

TIPS: Abrasive Cutter Care

To reduce corrosion in abrasive cutters:

1. Use clean/fresh MAXCUT™ 2 or MAXCUT™ OL1000 cutting fluids; fluids should be changed weekly
2. Rinse and dry table and vises after use
3. When not in use open hood to prevent humidity build-up
4. If cutter will not be used for an extended period of time, spray table and vises with a water displacement oil such as WD-40®

Abrasive Blade Recommendations

Material	Composition	Recommended Blade
Universal thin resin / rubber blade	Alumina resin-rubber bond	MAX-A
Hard non-ferrous metals (titanium, zirconium etc)	SiC / resin-rubber bond	MAX-C
General purpose blade for steels and ferrous metals	Alumina / resin-bonded	MAX-D
Soft non-ferrous metals (aluminum, brass, zinc, etc.)	Alumina / resin-bonded	MAX-E
Industrial general purpose reinforced blade	Alumina / resin-bonded	MAX-I
Heat treated and hardened steels	Alumina / resin-bonded	MAX-VHS

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**9-inch MAXCUT™ Abrasive Blades 32mm (~1¼") Arbor**

Pace Product Name	MOS	Catalog Number	Pkg	Price (\$)
Hard Nonferrous Materials (Titanium, Zirconium, etc.)	4240	MAX-C230	10	155.00
General Purpose Blades (Steels and Ferrous Materials)	4984	MAX-D230	10	120.00
Soft Nonferrous Materials (Aluminum, Brass, Zinc, etc.)	5000	MAX-E230	10	120.00

Abrasive Blade Maximum Operating Speed (M.O.S.) (rpm)

Blade	10-inch	12-inch	14-inch	16-inch
MAX-A	3820	3185	2730	2860
MAX-C	3440	3185	3460	2390
MAX-D	4585	3820	3275	3800
MAX-E	4500	3800	3200	3800
MAX-VHS	3055	2500	2220	1925
MAX-I	4500	3800	3200	3800
DMAX	6100	5000	4350	3800

Abrasive Blade Thickness (inches)

Blade Thickness	10-inch	12-inch	14-inch	16-inch
MAX-A	0.039	0.055	0.063	0.090
MAX-C	0.059	0.078	0.078	0.100
MAX-D	0.059	0.078	0.078	0.100
MAX-E	0.059	0.078	0.078	0.100
MAX-VHS	0.075	0.078	0.098	0.100
MAX-I	0.059	0.78	0.078	0.100
DMAX	0.059	0.060	0.060	0.075



MAXCUT-A Blade



MAXCUT-C Blade



MAXCUT-D Blade



MAXCUT-VHS Blade



MAXCUT-E Blade



MAXCUT-I Blade

10-inch MAXCUT™ Abrasive Blades 32mm (~1¼") Arbor

Pace Product Name	MOS	Catalog Number	Pkg	Price (\$)
Universal Thin Blade (Resin/rubber)	4580	MAX-A250	10	199.00
Hard Nonferrous Materials (Titanium, Zirconium, etc.)	3440	MAX-C250	10	199.00
General Purpose Blade (Steels and Ferrous Metals)	4585	MAX-D250	10	166.00
Nickel, Steels (Reinforced Thin Blade)	4585	MAX-D250-RT	10	166.00
Soft Nonferrous Materials (Aluminum, Brass, Zinc, etc.)	4500	MAX-E250	10	166.00
Industrial Purpose Blade	4500	MAX-I250	10	148.00
Hardened Steels	3055	MAX-VHS250	10	199.00
Diamond Thin Blade (1.5 mm thick) -High Concentration (180 grit)	6100	DMAX-250	each	500.00



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RECOMMENDED CUTTING PROCEDURES

- Select the appropriate abrasive blade (abrasive, bond, hardness, material properties, cutter speed)
- Secure specimen. Improper clamping may result in blade and/or specimen damage.
- Check coolant level and replace when low or excessively dirty.

Note: Abrasive blades break down during cutting and thus produce a significant amount of debris.

- Allow the abrasive blade to reach its operating speed before beginning the cut.
- A steady force or light pulsing action will produce the best cuts and minimize blade wear characteristics, as well as maintain sample integrity (no burning).
- When sectioning materials with coatings, orient the specimen so that the blade is cutting into the coating and exiting out of the base material, thereby keeping the coating in compression.



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12-inch MAXCUT™ Abrasive Blades 32mm (~1¼") Arbor

Pace Product Name	MOS	Catalog Number	Pkg	Price (\$)
Universal Thin Blade (Resin/rubber)	3185	MAX-A300	10	245.00
Hard Nonferrous Materials (Titanium, Zirconium, etc.)	3185	MAX-C300	10	245.00
General Purpose Blade	3820	MAX-D300	10	199.50
Soft Nonferrous Materials (Aluminum, Brass, Zinc, etc.)	3800	MAX-E300	10	199.50
Industrial Reinforced Blade	3800	MAX-I300	10	178.00
Hardened Steels	2550	MAX-VHS300	10	245.00
Diamond Thin Blade (1.5 mm thick) - High Concentration (180 grit)	5000	DMAX305	each	680.00



14-inch MAXCUT™ Abrasive Blades 32mm (~1¼") Arbor

Pace Product Name	MOS	Catalog Number	Pkg	Price (\$)
Universal Thin Blade (Resin/rubber)	2730	MAX-A350	10	295.00
Hard Nonferrous Materials (Titanium, Zirconium, etc.)	2390	MAX-C350	10	295.00
General Purpose Blade (Steels and Ferrous Metals)	3275	MAX-D350	10	275.00
Soft Nonferrous Materials (Aluminum, Brass, Zinc, etc.)	2460	MAX-E350	10	275.00
Industrial Reinforced Blade	3200	MAX-I350	10	255.00
Hardened Steels	2220	MAX-VHS350	10	295.00
Diamond Thin Blade (1.5 mm thick) - High Concentration (180 grit)	4350	DMAX-350	each	785.00

TIPS: Abrasive Cutting

1. Properly fixture or clamp the sample/specimen
2. Select the proper abrasive blade
3. Set the correct speed for variable speed cutters
4. Use appropriate cutting fluid and direct flow to cutting area
5. Cut specimen while monitoring the amperage the motor is pulling. The correct blade should minimize the current draw on the motor
6. After completion of the cutting operation, clean and dry the cutter fixtures, table, and cutting chamber
7. When not in use clean/dry and leave the hood in the open position to prevent corrosion.



MEGA-T300 Abrasive Saw



MEGA-T400 Abrasive Saw

16-inch MAXCUT™ Abrasive Blades 32mm (~1¼") Arbor

Pace Product Name	MOS	Catalog Number	Pkg	Price (\$)
Universal Thin Blade (Resin/rubber)	2860	MAX-A400	10	385.00
Hard Nonferrous Materials (Titanium, Zirconium, etc.)	2390	MAX-C400	10	385.00
General Purpose Blade (Steels and Ferrous Metals)	3800	MAX-D400	10	368.00
Soft Nonferrous Materials (Aluminum, Brass, Zinc, etc.)	3800	MAX-E400	10	368.00
Industrial Reinforced Blade	3800	MAX-I400	10	348.00
Hardened Steels	1925	MAX-VHS400	10	385.00
Diamond Thin Blade (1.5 mm thick) - High Concentration (180 grit)	3800	MAX-400	each	950.00



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Precision Wafer Cutting



For quick online ordering scan the code.



3-inch (76 mm) Diamond Blades (1/2-in arbor, 0.006-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
3-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0030LC	each	189.00
3-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0035LC	each	189.00
3-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0035HC	each	189.00
3-inch CBN Wafering Blade (medium-grit, high conc.)	WCBN-0035	each	189.00

4-inch (102 mm) Diamond Blades (1/2-in arbor, 0.012-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
4-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0040LC	each	185.00
4-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0045LC	each	185.00
4-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0045HC	each	185.00
4-inch CBN Wafering Blade (medium-grit, high conc.)	WCBN-0045	each	185.00
4-inch CBN/Diamond Hybrid Wafering Blade (medium grit, high conc.)	WCBND-0045	each	185.00
4-inch x 0.024-inch x 0.5-inch Electroplated 120-grit Diamond Blade	WB-040EPD	each	150.00

Precision Wafer Cutting

For quick online
ordering scan the code.



5-inch (127 mm) Diamond Blades (1/2-in arbor, 0.015-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
5-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0050LC	each	225.00
5-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0055LC	each	225.00
5-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0055HC	each	225.00
5-inch CBN Wafering Blade (medium-grit, high conc.)	WCBN-0055	each	225.00
5-inch CBN/Diamond Hybrid Wafering Blade (medium grit, high conc.)	WCBND-0055	each	225.00
5-inch x 0.024-inch x 0.5-inch Electroplated 120-grit Diamond Blade	WB-050EPD	each	165.00

6-inch (153 mm) Diamond Blades (1/2-in arbor, 0.020-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
6-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0060LC	each	295.00
6-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0065LC	each	295.00
6-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0065HC	each	295.00
6-inch CBN Wafering Blade (medium-grit, high conc.)	WCBN-0065	each	295.00
6-inch CBN/Diamond Hybrid Wafering Blade (medium-grit, high conc.)	WCBND-0065	each	295.00
6-inch x 0.032-inch x 0.5-inch Electroplated 120-grit Diamond Blade	WB-060EPD	each	180.00



7-inch (175 mm) Diamond Blades (1/2-in arbor, 0.024-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
7-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0070LC	each	360.00
7-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0075LC	each	360.00
7-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0075HC	each	360.00
7-inch CBN Wafering Blade (medium-grit, high conc.)	WCBN-0075	each	360.00
7-inch CBN/Diamond Hybrid Wafering Blade (medium grit, high conc.)	WCBND-0075	each	360.00
7-inch x 0.039-inch x 0.5-inch Electroplated 120-grit Diamond Blade	WB-070EPD	each	195.00



8-inch (204 mm) Diamond Blades (1/2-in arbor, 0.024-in thick)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch Diamond Wafering Blade (fine-grit, low conc.)	WB-0080LC	each	405.00
8-inch Diamond Wafering Blade (medium-grit, low conc.)	WB-0085LC	each	405.00
8-inch Diamond Wafering Blade (medium-grit, high conc.)	WB-0085HC	each	405.00
8-inch CBN/Diamond Hybrid Wafering Blade (medium grit, high conc.)	WCBND-0080	each	405.00
8-inch x 0.039-inch x 0.5-inch Electroplated 120-grit Diamond Blade	WB-080EPD	each	210.00



High Quality Metal Pressed
Precision Wafering Blades

Wafering Cutting Accessories



DIACUT™ Anti-Corrosion
Cutting Fluid

DIACUT™ Oil-Based
Cutting Fluid

DIACUT™ Water-Based
Cutting Fluid



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Wafering Cutting Accessories

Pace Product Name	Catalog Number	Pkg	Price (\$)
DIACUT™ Dressing Stick (1/2 x 1/2 x 4-1/2-inch)	DRESS-0010	each	8.50
DIACUT™ Oil-based Cutting Fluid (16 oz)	OL-3000-16	16 oz	9.50
DIACUT™ Oil-based Cutting Fluid (32 oz)	OL-3000-32	32 oz	18.00
DIACUT™ Water-based Cutting Fluid (16 oz)	WL-3000-16	16 oz	9.50
DIACUT™ Water-based Cutting Fluid (32 oz)	WL-3000-32	32 oz	18.00
DIACUT™ 2 Water-based Anti-corrosion Cutting Fluid (16 oz)	WL2-3000-16	16 oz	9.50
DIACUT™ 2 Water-based Anti-corrosion Cutting Fluid (32 oz)	WL2-3000-32	32 oz	18.00
Propylene Glycol Based Anti-Corrosion Additive (32 oz)	PCC-5000-32	32 oz	22.50
8-inch diamond cup grinding wheel for PICO 175	CUP-G-1000	each	650.00

Precision Abrasive Blades



Precision Abrasive Blades

Pace Product Name	Catalog Number	Pkg	Price (\$)
6 x 0.0625-inch Alumina Abrasive Blade (1/2-inch arbor) - Ferrous Metals	MAX-D150	10	130.00
6 x 0.0385-inch SiC Abrasive Blade (1/2-inch arbor) - Non-Ferrous Metals	MAX-C150	10	130.00
7 x 0.0285-inch Abrasive Blade (1/2-inch arbor) - General Purpose Metals	MAX-7000S	10	135.00



7-inch General Purpose
Abrasive Blade (MAX-7000S)



6-inch Non-Ferrous Metals
Abrasive Blade (MAX-C150)



6-inch Ferrous Metals
Abrasive Blade (MAX-D150)

Precision Diamond Wafering Guidelines

Material	Characteristic	Speed (rpm)	Feed rate	Blade (Grit/conc)
Silicon substrate	Soft/Brittle	<300	<100	Fine/Low
Gallium arsenide	Soft/Brittle	<200	<100	Fine/Low
Boron composites	Hard/Brittle	500	250	Fine/Low
Ceramic fiber composites	Hard/Brittle	1000	500	Fine/Low
Glasses	Brittle	1000	500	Fine/Low
Minerals	Friable/Brittle	>1500	>600	Fine/Low
Alumina ceramic	Hard/Tough	>1500	>500	Medium/Low
Zirconia (PSZ)	Hard/Tough	>3500	>800	Medium/Low
Silicon Nitride	Hard/Tough	>3500	>800	Medium/Low
Metal Matrix Composites	Hard/Tough	>3500	>500	Medium/High
General Purpose		Variable	Variable	Medium/High

TIPS: Precision Wafering

1. Properly fixture or clamp the sample/specimen
2. Select the proper wafering blade
3. Set the blade speed and load/feed rate
4. Use appropriate cutting fluid and direct flow to cutting area
5. After completion of the cutting operation, clean and dry the cutter fixtures, table, and cutting chamber
6. When not in use leave the hood in the open position to prevent corrosion
7. For samples with coatings orient the sample so the coating is cut in compression
8. Dress the blade periodically when the cutting rate diminishes

Medium Grit Wafering Blade Cut

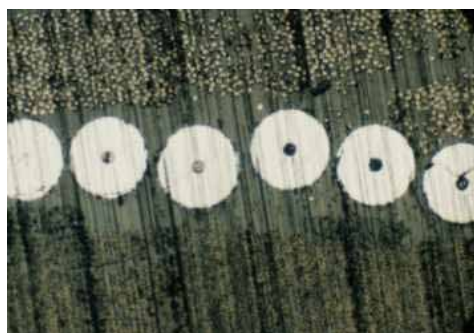


Boron-graphite composite sectioned with medium grit diamond wafering blade. Boron fibers damaged.

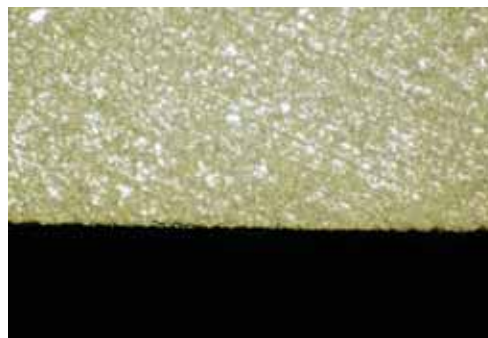


Silicon edge damage after sectioning with medium grit diamond wafering blade.

Fine Grit Wafering Blade Cut



Boron-graphite composite sectioned with fine grit diamond wafering blade. Boron fiber damage minimal.



Silicon edge intact after sectioning with fine grit diamond wafering blade.



PICO 175 Automated High Speed Precision Wafering Saw



Compression Mounting

Compression mounting is a very useful mounting technique which provides excellent specimen edge retention. Compression mounting resins are available in different colors and with various fillers to improve hardness or conductivity.

Several compression mounting characteristics include:

- Convenient means to hold the specimen
- Provides a standard format to mount multiple specimens
- Protects edges
- Provides proper specimen orientation
- Provides the ability to label and store the specimens



Hardened Steel Mold Assemblies



TP-7001B Pneumatic Pressure Mounting Press



TP-7500 Hydraulic Mounting Press

Compression mounts are quick and easy to produce, requiring several minutes to cure at the appropriate molding temperature. Most of the time required in compression mounting occurs during the heating and cooling cycles. When choosing a compression mounting machine, the most important features include its maximum force, heating temperature and how intimately the heater and water cooler are integrated with the mold assembly. For faster turnaround time, water cooling is essential.

Compression Mounting Comparisons

	PHENOLICS	ACRYLIC	EPOXY (Glass-filled)	DIALLYL PHTHALATE
Type	Thermoset	Thermoplastic	Thermoset	Thermoset
Cost	Low	Moderate	Moderate	Moderate
Ease of Use	Excellent	Moderate	Good	Good
Availability in Colors	Yes	No	No	No
Cycle Times	Excellent	Moderate	Good	Good
Edge Retention	Fair	Good	Excellent	Excellent
Clarity	None	Excellent	None	None
Hardness	Low	Medium	High	High

	PHENOLICS	ACRYLIC	EPOXY (Glass-filled)	DIALLYL PHTHALATE
Color	Black, Red, Green, Orange, White	Clear	Black	Blue, Black
Curing Temperature	Refer to specific machine guidelines and recommendations			
Shore-D Hardness	82	80	88	88
Curing Time	4-10 minutes	10-15 minutes	6-12 minutes	6-12 minutes
Shrinkage (in/in)	0.006	0.001-0.003		0.001-0.003
Chemical Resistance	Glycol, petrochemicals, solvents, acids	Alcohol, dilute acids, solvents	Solvents, acids alkalies & oxidizers	Solvents, acid and alkalies

Compression Mounting



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Phenolic Compression Mounting

Pace Product Name	Catalog Number	Pkg	Price (\$)
Phenolic Resins - Black (5 lbs)	CM-2001B-5	5 lbs	22.00
Phenolic Resins - Black (25 lbs)	CM-2001B-25	25 lbs	95.00
Phenolic Resins - Red (5 lbs)	CM-2001R-5	5 lbs	23.50
Phenolic Resins - Red (25 lbs)	CM-2001R-25	25 lbs	99.50
Phenolic Resins - Green (5 lbs)	CM-2001G-5	5 lbs	23.50
Phenolic Resins - Green (25 lbs)	CM-2001G-25	25 lbs	99.50
Phenolic Resins - Orange (5 lbs)	CM-2001O-5	5 lbs	23.50
Phenolic Resins - Orange (25 lbs)	CM-2001O-25	25 lbs	99.50
Phenolic Resins - White (5 lbs)	CM-2001W-5	5 lbs	23.50
Phenolic Resins - White (25 lbs)	CM-2001W-25	25 lbs	99.50



Compression Mounting Powders

TIPS: Phenolic Colors

1. Use different phenolic colors to code jobs, specimen types, or for different test dates. For example, changing the phenolic color each month will show which samples or jobs are getting old.
2. If the color dye in the mount bleeds out when rinsing with an alcohol, this is an indication that the mount was not cured either at a high enough temperature or for the proper length of time.



25 lb Compression Mounting Powders



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Acrylic Clear Compression Mounting

Pace Product Name	Catalog Number	Pkg	Price (\$)
TRANSACRYLIC™ Resin Powder (Transparent) (5 lbs)	CM-2101A-5	5 lbs	80.00
TRANSACRYLIC™ Resin Powder (Transparent) (25 lbs)	CM-2101A-25	25 lbs	365.00

TIP: Acrylic Mounts

A common problem with acrylic mounts, known as the “cotton ball” effect, can occur with thermoplastics acrylic resins if they are not heated long enough or held at a sufficiently high enough force to completely melt the plastic. To solve this problem, simply put the mount back into the mounting press and either increase the time, temperature and/or force of the press.



Diallyl Phthalate Compression Mounting

Pace Product Name	Catalog Number	Pkg	Price (\$)
Diallyl Phthalate Compression Resin - Blue (5 lbs)	DY-2301A-5	5 lbs	110.00
Diallyl Phthalate Compression Resin - Blue (25 lbs)	DY-2301A-25	25 lbs	455.00



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Epoxy Compression Mounting

Pace Product Name	Catalog Number	Pkg	Price (\$)
EPOCOMP™ Epoxy Compression Resin (5 lbs)	EP-2201A-5	5 lbs	105.00
EPOCOMP™ Epoxy Compression Resin (25 lbs)	EP-2201A-25	25 lbs	455.00
EPOCOMP™ Fine Epoxy Resin Powder (5 lbs)	EPF-2201-5	5 lbs	105.00
EPOCOMP™ Fine Epoxy Resin Powder (25 lbs)	EPF-2201-25	25 lbs	455.00

TIP: Glass Filled Mounts

1. Epoxies (glass-filled) and diallyl phthalates are excellent mounting compounds for protecting the specimen edges during grinding and polishing.
2. To reduce cost, it is recommended that the epoxy or diallyl phthalate be used at the specimen interface and then layered with a lower cost mounting compound such as a phenolic.



Conductive Mounting

Pace Product Name	Catalog Number	Pkg	Price (\$)
Conductive Mount (Graphite Powder Filler) - 1 lb	CONDUCTO-1P	1 lb	32.50
Conductive Mount (Graphite Powder Filler) - 5 lbs	CONDUCTO-5P	5 lbs	150.00
Conductive Mount (Graphite Powder Filler) - 25 lbs	CONDUCTO-25P	25 lbs	625.00
Conductive Mount (Copper Powder Filler) - 1 lb	CONDUCTO-CU-1	1 lb	52.00
Conductive Mount (Copper Powder Filler) - 5 lbs	CONDUCTO-CU-5	5 lbs	225.00
Conductive Mount (Copper Powder Filler) - 25 lbs	CONDUCTO-CU-25	25 lbs	995.00

TIP: Conductive Mounts

1. Conductive mounts are used to provide conductivity to the mount for use with electron microscopy.
2. Conductive mounts use either graphite powder or copper as the conductive filler.

Accessories

Pace Product Name	Catalog Number	Pkg	Price (\$)
Measuring Scoop (30 ml)	MS-1000-030	each	2.00
Mold Release (8 oz)	MR-1000-08	8 oz	15.00
Mold Release (16 oz)	MR-1000-16	16 oz	22.00
Mold Release (1 gallon)	MR-1000-128	1 gallon	99.50
Small Disposable Protective Gloves	GLOVES-S200	200/pkg	22.50
Medium Disposable Protective Gloves	GLOVES-M200	200/pkg	22.50
Large Disposable Protective Gloves	GLOVES-L200	200/pkg	22.50
Utility Heat Protective Gloves (Large)	GLOVE	pair	7.50
Scribing Tool	SCRIBE	each	22.50
Plastic Specimen Clips (100/pkg)	KLIP-0100	100/pkg	32.50
Metal Spring Specimen Clips (100/pkg)	MKLIP-0100	100/pkg	45.00
Plastic Spring Specimen Clips (100/pkg)	SKLIP-0100	100/pkg	32.00
Plastic Spring Specimen Clips (1000/pkg)	SKLIP-1000	1000/pkg	245.00



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Compression Mounting Troubleshooting

The most common problems associated with compression mounting typically relates to rushing the curing or cooling cycle.

Symptoms	Cause	Action
Large bubbles in acrylic resins	Insufficient mounting pressure	-Increase mounting force or increase temperature
Soft surfaces on mounts	Mount did not completely polymerize because of polymer incompatibility with mold release or oil on the specimen surface	-Clean specimen and mounting machine to remove incompatible contamination -Use a compatible mold release
Voids or cracks	High internal stress due to rapid cooling	-Allow mounts to cool slower and longer
Haze around specimen (acrylic mounts)	-Specimen contains moisture -Specimens contain copper or some other polymerization retarding alloy	-Use a desiccator or low temperature oven to dry specimens -Coat specimens with an appropriate lacquer before mounting
Phenolic dye leaching out with alcohol rinsing	Insufficient mounting temperature	-Increase mounting temperature or service check the heating element
Distortion or cracking of specimen	Autoclave pressure is too great for the specimen	-Reduce mounting force or use a castable mounting resin

Compression Mounting Recommended Procedure:

- Clean specimens to remove cutting and handling residue
- Remove debris from mold assembly
- Apply thin coat of mold release compound to mold assembly
- Raise mold ram to up position
- Center specimen on ram
- Lower ram assembly
- Pour predetermined amount of resin into mold
- Clean and remove any excess resin from around the mold assembly threads
- Lock mold assembly cover
- Slowly raise ram into up position
- Apply recommended heat and maintain force for specified period of time
- Cool to near room temperature
- Remove mounted specimen
- Clean mold and ram assembly

Castable Mounting

Castable resins are monomer resins which utilize a catalyst or hardener for polymerization. Polymerization results in cross-linking of the polymer to form a relatively hard mount. Castable resins also have the advantage of simultaneously mounting multiple samples at one time for increased throughput. A number of resin systems are used for metallographic mounting which includes:

- Epoxy (2-part) resins
- Acrylic (castable) resins
- Polyester (clear and large castings) resins

	EPOXY	ACRYLIC	POLYESTER
Type	Epoxy Resin and Hardener	Acrylic Resin and Hardener	Polyester Resin and Hardener
Peak Temperature	100°F-375°F (38°C-190°C)	150°F (65°C)	100°F (38°C)
Shore-D Hardness	82	80 (90+ for SUPERMOUNT)	76
Cure Time	30 minutes to 8 hours	8-15 minutes	6-8 hours
Comments	Moderate hardness, low shrinkage, transparent		Very fast cure, Transparent, clear

CASTABLE RESINS	RESIN TYPE	PROPERTIES
CASTAMOUNT™ Acrylic	3-parts powder and 2-parts liquid	Translucent, fast cure
ACRYLIC PLUS Acrylic	2-parts powder and 1-part liquid	Semi-clear, fast cure, lower cost
SUPERMOUNT Acrylic	3-parts powder and 2-parts liquid	Black, hard, low shrinkage, fast cure
Epoxy - standard	Epoxy (2-liquids) 5:2 resin:hardener (wt)	Clear to translucent, low shrinkage, 4-8 hour cure
Epoxy - ELITE	Epoxy (2-liquids) 3:1 resin:hardener (wt)	Clear to translucent, low shrinkage, 2-4 hour cure
Quick Mount Epoxy	Epoxy (2-liquids) 10:1 resin:hardener (wt)	Translucent, slightly yellow, 30 minute - 2 hour cure
ULTRATHIN™ 2 Epoxy	Epoxy (2-liquids) 10:1 resin:hardener (wt)	Clear, low viscosity for porous specimens, 2-6 hour cure
POLYCAST™ Polyester	Polyester (2-liquids)	Clear and relatively inexpensive

Acrylic Castable Resins

Castable acrylics are easy to use and are very robust. The main advantage of mounting with castable acrylics is the fast curing time. Depending upon the mixing ratio, castable acrylic mounts are typically ready to use within 8-15 minutes. Also unlike epoxy resins, the ratio of the various acrylic parts (powder to liquid) can be altered by up to 25% with no adverse effect to the final properties of the mount. This is because both the liquid and powder are acrylics containing various additives and curing agents. By varying the ratio of the liquid to powder, the curing time and viscosity can be altered.

Note: The acrylic powder contains a catalyst that reacts with the liquid hardener to initiate the curing process. Fillers are added to increase hardness and to reduce shrinkage.

Characteristics of Castable Acrylics Includes:

- Rapid mounting, producing very repeatable and consistent mounts
- Moderate shrinkage and good hardness
- Semi-transparent
- High odor

TIP: Acrylics

Acrylics can be submerged into a water bath during curing. This reduces the exotherm heat and thus reduces the shrinkage of the mount at the specimen interface. A secondary advantage is that the water absorbs the odor.



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CASTAMOUNT Acrylic Resins (3-parts powder: 2-parts liquid)

Pace Product Name	Catalog Number	Pkg	Price (\$)
CASTAMOUNT™ Acrylic Kit (1 lb resin & 12 oz liquid)*	AK-5000-K1	1 lb/12 oz	52.00
CASTAMOUNT™ Acrylic Kit (5 lbs resin & 64 oz liquid)*	AK-5000-K5	5 lbs/64 oz	220.00
CASTAMOUNT™ Acrylic Resin (powder) (1 lb)	AR-5000-P1	1 lb	45.00
CASTAMOUNT™ Acrylic Resin (powder) (5 lbs)	AR-5000-P5	5 lbs	195.00
CASTAMOUNT™ Acrylic Resin (powder) (25 lbs)	AR-5000-P25	25 lbs	950.00
CASTAMOUNT™ Acrylic Resin (powder) (100 lbs)	AR-5000-P100	100 lbs	3250.00
CASTAMOUNT™ Acrylic Hardener (12 oz)*	AH-5000-H12	12 oz	22.00
CASTAMOUNT™ Acrylic Hardener (32 oz)*	AH-5000-H32	32 oz	32.50
CASTAMOUNT™ Acrylic Hardener (1/2 gallon)*	AH-5000-H64	1/2 gallon	58.00
CASTAMOUNT™ Acrylic Hardener (1 gallon)*	AH-5000-H128	1 gallon	92.00
CASTAMOUNT™ Acrylic Hardener (5 gallons)*	AH-5000-H640	5 gallons	410.00

* May require dangerous goods shipping, extra charges may apply



ACRYLIC PLUS Castable Resins (2-parts powder: 1-part liquid)

Pace Product Name	Catalog Number	Pkg	Price (\$)
ACRYLIC PLUS Kit (1 lb resin & 12 oz liquid)*	ACYP-5000-K1	lb/12 oz	48.00
ACRYLIC PLUS Kit (5 lbs resin & 64 oz liquid)*	ACYP-5000-K5	5 lbs/64 oz	195.00
ACRYLIC PLUS Resin (powder) (1 lb)	ACYP-5000-P1	1 lb	42.00
ACRYLIC PLUS Resin (powder) (5 lbs)	ACYP-5000-P5	5 lbs	185.00
ACRYLIC PLUS Resin (powder) (25 lbs)	ACYP-5000-P25	25 lbs	895.00
ACRYLIC PLUS Resin (powder) (100 lbs)	ACYP-5000-P100	100 lbs	1850.00
ACRYLIC PLUS Hardener (12 oz)*	ACYH-5000-H12	12 oz	19.50
ACRYLIC PLUS Hardener (32 oz)*	ACYH-5000-H32	32 oz	29.50
ACRYLIC PLUS Hardener (1/2 gallon)*	ACYH-5000-H64	1/2 gallon	52.00
ACRYLIC PLUS Hardener (1 gallon)*	ACYH-5000-H128	1 gallon	84.00
ACRYLIC PLUS Hardener (5 gallons)*	ACYH-5000-H640	5 gallons	265.00

* May require dangerous goods shipping, extra charges may apply



ACRYLIC PLUS Acrylic Resins

SUPERMOUNT Castable Resins (3-parts powder: 2-parts liquid)

Pace Product Name	Catalog Number	Pkg	Price (\$)
SUPERMOUNT Glass Filled Acrylic Kit (1 lb powder & 12 oz liquid)*	GRAK-5000-K1	1 lb/12 oz	58.00
SUPERMOUNT Glass Filled Acrylic Kit (5 lbs resin & 64 oz liquid)*	GRAK-5000-K5	5 lbs/64 oz	240.00
SUPERMOUNT Glass Filled Acrylic Resin (powder) (1 lb)	GRAR-5000-P1	1 lb	48.00
SUPERMOUNT Glass Filled Acrylic Resin (powder) (5 lbs)	GRAR-5000-P5	5 lbs	215.00
SUPERMOUNT Glass Filled Acrylic Resin (powder) (25 lbs)	GRAR-5000-P25	25 lbs	975.00
SUPERMOUNT Glass Filled Acrylic Resin (powder) (100 lbs)	GRAR-5000-P100	100 lbs	3350.00
SUPERMOUNT Glass Filled Acrylic Hardener (12 oz)*	GRAH-5000-H12	12 oz	19.50
SUPERMOUNT Glass Filled Acrylic Hardener (32 oz)*	GRAH-5000-H32	32 oz	29.50
SUPERMOUNT Glass Filled Acrylic Hardener (1/2 gallon)*	GRAH-5000-H64	1/2 gallon	52.00
SUPERMOUNT Glass Filled Acrylic Hardener (1 gallon)*	GRAH-5000-H128	1 gallon	84.00
SUPERMOUNT Glass Filled Acrylic Hardener (5 gallons)*	GRAH-5000-H640	5 gallons	410.00

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SUPERMOUNT Acrylic Resins

Epoxy Castable Resins

The most common and best performing castable resins are epoxy based. Epoxy resins are typically two-part systems consisting of a resin and a catalyst (hardener). Mixing ratios vary depending upon the volume of the mixture or the mount size. Larger mounts require a ratio of less hardener to resin. The advantages of mounting with epoxy resins include:

- Low shrinkage
- Relatively clear
- Relatively low exotherms
- Excellent adhesion
- Excellent chemical resistance
- Good hardness
- Relatively inexpensive

Epoxy curing times are dependent upon a number of variables including:

- Volume of mounting resin (larger mounts cure faster)
- Thermal mass of specimen (larger specimens absorb heat and therefore require longer curing time)
- Specimen material properties
- Initial resin temperature (higher resin temperatures cure faster)
- Ambient temperature (higher room temperatures cure faster)
- Relative humidity and shelf life (absorption of water degrades resin and shortens shelf life)
- Mounting mold (plastic, phenolic rings, and rubber absorb heat differently)

As a general rule, curing times can vary from 30-45 minutes for fast curing epoxies and up to 24 hours for slower curing epoxies. For metallographic epoxies to grind properly, the hardness needs to be at least a Shore D80. Note that epoxy resins typically will continue to harden over a longer period of time (maximum hardness, Shore D90).

In some cases, the curing time and temperature may need to be controlled to compensate for the above variables. For example, an 8-hour resin system can be cured in 30-45 minutes by preheating the resin to approximately 120°F (50°C) prior to mixing and then curing at room temperature. This procedure initiates the catalytic reaction sooner; however, this may also increase the maximum exotherm temperature.

TIP: Castable Mounting

Preheat resin and sample to 35°C (95°F) to expedite the initial heating process and for increasing throughput.

Conversely, the resin curing cycle can be slowed or reduced by decreasing the curing temperature by forcing air over the curing mounts (fume hood or fan), placing the mounts into a water bath, or curing in a refrigerator. In these cases, care must be taken to not stop the reaction; however if this does occur or the resin is too soft after curing, heating it to 100-120°F for several hours should push the reaction to completion and the mount should be hard after cooling to room temperature.

Epoxy Resin (Standard Cure) (5:2 Resin:Hardener)

Pace Product Name	Catalog Number	Pkg	Price (\$)
Epoxy Resin (32 oz)	EP-3000-32	32 oz	36.00
Epoxy Resin (1 gallon)	EP-3000-128	1 gallon	107.00
Epoxy Resin (5 gallons)	EP-3000-5G	5 gallons	485.00
Epoxy Resin Hardener (8 oz)	EH-3000-08	8 oz	20.50
Epoxy Resin Hardener (32 oz)	EH-3000-32	32 oz	44.00
Epoxy Resin Hardener (1 gallon)	EH-3000-128	1 gallon	185.00



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Standard Cure epoxy Resin



Fast-Curing Epoxy (10:1 Resin:Hardener)

Pace Product Name	Catalog Number	Pkg	Price (\$)
Quick Mounting Fast Curing Epoxy Resin (32 oz)	ERF-3000-32	32 oz	50.00
Quick Mounting Fast Curing Epoxy Resin (1 gallon)	ERF-3000-128	1 gallon	145.00
Quick Mounting Fast Curing Epoxy Resin (5 gallons)	ERF-3000-5G	5 gallons	650.00
Quick Mounting Fast Curing Epoxy Hardener (8 oz)*	EHF-3000-08	8 oz	29.50
Quick Mounting Fast Curing Epoxy Hardener (32 oz)*	EHF-3000-32	32 oz	89.50
Quick Mounting Fast Curing Epoxy Hardener (1 gallon)*	EHF-3000-128	1 gallon	325.00



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* May require dangerous goods shipping, extra charges may apply

Fast Cure Epoxy Resin





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Low Viscosity Epoxy Resins (10:1 Resin:Hardener)

Pace Product Name	Catalog Number	Pkg	Price (\$)
ULTRATHIN™ 2 Low Viscosity Resin (32 oz)	ULTRA-3000R-32	32 oz	50.00
ULTRATHIN™ 2 Low Viscosity Resin (1 gallon)	ULTRA-3000R-128	1 gallon	145.00
ULTRATHIN™ 2 Low Viscosity Resin (5 gallons)	ULTRA-3000R-5G	5 gallons	650.00
ULTRATHIN™ 2 Low Viscosity Hardener (8 oz)*	ULTRA-3000H-08	8 oz	29.50
ULTRATHIN™ 2 Low Viscosity Hardener (32 oz)*	ULTRA-3000H-32	32 oz	89.50
ULTRATHIN™ 2 Low Viscosity Hardener (1 gallon)*	ULTRA-3000H-128	1 gallon	325.00

* May require dangerous goods shipping, extra charges may apply



Low Viscosity Epoxy System



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Non-butyl glycidyl ether (environmentally friendly) Epoxy-Elite Resins (3:1 Resin:Hardener)

Pace Product Name	Catalog Number	Pkg	Price (\$)
EPOXY-ELITE™ Resin (32 oz)	ELITE-3000R-32	32 oz	45.00
EPOXY-ELITE™ Resin (1 gallon)	ELITE-3000R-128	1 gallon	140.00
EPOXY-ELITE™ Resin (5 gallons)	ELITE-3000R-5G	5 gallons	625.00
EPOXY-ELITE™ Hardener (8 oz)	ELITE-3000H-08	8 oz	25.00
EPOXY-ELITE™ Hardener (32 oz)	ELITE-3000H-32	32 oz	75.00
EPOXY-ELITE™ Hardener (1 gallon)	ELITE-3000H-128	1 gallon	275.00

BENEFITS of EPOXY-ELITE

- Non-butyl glycidyl ether
- Non-regulated DOT/ IATA shipping
- Very clear
- Moderate to fast curing time (45 minutes to 2 hours – depending upon the mass of the mount)
- Low exotherm
- Mixing ratio 3:1 resin: hardener



EPOXY-ELITE Epoxy System

Polyester Resin (Clear Casting Resin)

Polyesters are typically used when a very clear mount is required. Polyester resins are also useful for mounting parts for display. In this case, the part appears suspended in the plastic. The procedure for molding samples to be displayed is to first determine the mixing ratio of the resin to hardener (catalyst). This ratio is variable depending upon the mass of the casting.

Polyester Catalyst Mixing Ratios

(Proportions are based on ambient and resin temperature of 70°)

Single Layer Casting (metallographic)		Multiple Layer Casting (display)	
Layer Thickness (inches)	Drops of catalyst per ounce of resin	Layer	Drops of catalyst per ounce of resin
1/8	15	1 st layer	4-5
1/4	8	2 nd layer	3-4
1/2	6	3 rd layer	2-3
3/4	5	4 th layer	1-2
1 – 1.5	4	5 th layer or more	1



Polyester Resin

For larger volumes, the amount of hardener needs to be reduced significantly. The procedure for suspending the sample in the mount is to pour an initial layer and allow it to pot or gel (do not let it fully cure). The object or specimen is then placed on the initial rubbery polyester layer and another layer of the liquid polyester is poured. Multiple layers can be poured in this fashion if required.

Characteristics of Polyester include:

- Very clear (water clear)
- High odor
- Best resin system for making large castings

Polyester resins are similar to acrylics and can be submerged into water during the curing cycle in order to reduce the exotherm temperature and shrinkage.



For quick online ordering scan the code.

POLYCAST™ Polyester Castable Resins

Pace Product Name	Catalog Number	Pkg	Price (\$)
POLYCAST™ Polyester Resin (1 gallon)	POLYCAST-128	1 gallon	85.00
POLYCAST™ Polyester Hardener (2 oz)*	POLYHARD-02	2 oz	7.50
POLYCAST™ Color Dye Set (3 colors)*	DYE-1000	3 colors	25.00

* May require dangerous goods shipping, extra charges may apply



Castable Mounting Molds

Pace Product Name	Catalog Number	Pkg	Price (\$)
1-inch Reusable Two-piece Plastic Molds	METPREP-0100	12/pkg	22.50
1.25-inch Reusable Two-piece Plastic Molds	METPREP-0125	12/pkg	26.50
1.5-inch Reusable Two-piece Plastic Molds	METPREP-0150	12/pkg	35.00
2-inch Reusable Two-piece Plastic Molds	METPREP-0200	12/pkg	48.00
1.0-inch Disposable Plastic Molds	MOUNT-0100	50/pkg	22.00
1.25-inch Disposable Plastic Molds	MOUNT-0125	50/pkg	22.50
1.50-inch Disposable Plastic Molds	MOUNT-0150	50/pkg	23.00
1.0-inch Silicon Rubber Molds	RMOUNT-0100	3/pkg	25.00
1.25-inch Silicon Rubber Molds	RMOUNT-0125	3/pkg	30.00
1.5-inch Silicon Rubber Molds	RMOUNT-0150	3/pkg	40.00
2.0-inch Silicon Rubber Molds	RMOUNT-0200	3/pkg	45.00
2.75 x 1.55 x 7/8-inch Rectangular Silicon Rubber Molds	RMOUNT-315R	each	14.50
3 x 2 x 7/8-inch Rectangular Silicon Rubber Molds	RMOUNT-302R	each	15.50
1.0-inch Silicon Rubber Molds for FEMTO-1100 Polishing Head	FMOUNT-0100	3/pkg	26.00
1.25-inch Silicon Rubber Molds for FEMTO-1100 Polishing Head	FMOUNT-0125	3/pkg	31.00
1.5-inch Silicon Rubber Molds for FEMTO-1100 Polishing Head	FMOUNT-0150	3/pkg	41.00
2.0-inch Silicon Rubber Molds FEMTO-1100 Polishing Head	FMOUNT-0200	3/pkg	46.00

Note: Contact us for special mold size requests



Castable Mounting Accessories



Castable Mounting Accessories

Pace Product Name	Catalog Number	Pkg	Price (\$)
Epoxy Casting Dispenser	ED-3000-01	each	15.00
Mold Release (8 oz)	MR-1000-08	8 oz	15.00
Mold Release (16 oz)	MR-1000-16	16 oz	22.00
1.25-inch Specimen Storage Containers	STORE-0125	25/pkg	18.00
Stirring Sticks (large)	SS-1000-100	100/pkg	10.00
Mixing Cups (3 oz graduated)	MCUPS-0100	100/pkg	13.00
Plastic Mixing Cups (9 oz)	PCUPS-050	50/pkg	6.50
Vacuum Impregnator Pouring Cups	POUR-CUP	50/pkg	38.50
Plastic Specimen Clips (100/pkg)	KLIP-0100	100/pkg	32.50
Metal Spring Specimen Clips (100/pkg)	MKLIP-0100	100/pkg	58.00
Plastic Spring Specimen Clips (100/pkg)	SKLIP-0100	100/pkg	32.00
Plastic Spring Specimen Clips (1000/pkg)	SKLIP-1000	1000/pkg	245.00
Mounting Film (heat or solvent activated) (12 x12-inch)	TAPE-012	each	9.50

Castable Mounting Accessories

Pace Product Name	Catalog Number	Pkg	Price (\$)
Small Protective Gloves	GLOVES-S200	200/box	22.50
Medium Protective Gloves	GLOVES-M200	200/box	22.50
Large Protective Gloves	GLOVES-L200	200/box	22.50



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ordering scan the code.

Petrographic Mounting

Petrographic Mounting Accessories

Pace Product Name	Catalog Number	Pkg	Price (\$)
Microscope Slides 1-inch x 3-inch (50/box)	MIC-S	50/box	15.00
Plain Glass Slide 27mm x 46mm (72/box)	PETRO-S	72/box	26.00
Microscope Cover Slip 24mm x 40mm (Approx 75-100 slips)	C-SLIP	75/box	13.50



Petrographic Low Viscosity Resins

Pace Product Name	Catalog Number	Pkg	Price (\$)
ULTRATHIN™ 2 Low Viscosity Resin (32 oz)	ULTRA-3000R-32	32 oz	50.00
ULTRATHIN™ 2 Low Viscosity Resin (1 gallon)	ULTRA-3000R-128	1 gallon	145.00
ULTRATHIN™ 2 Low Viscosity Resin (5 gallons)	ULTRA-3000R-5G	5 gallons	650.00
ULTRATHIN™ 2 Low Viscosity Hardener (8 oz)*	ULTRA-3000H-08	8 oz	29.50
ULTRATHIN™ 2 Low Viscosity Hardener (32 oz)*	ULTRA-3000H-32	32 oz	89.50
ULTRATHIN™ 2 Low Viscosity Hardener (1 gallon)*	ULTRA-3000H-128	1 gallon	325.00

* May require dangerous goods shipping, extra charges may apply



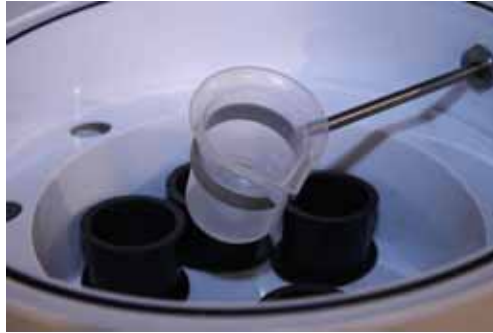
Petrographic Mounting Accessories

Vacuum/Pressure Mounting

Vacuum impregnation is a very useful technique used to fill in pores or voids prior to specimen preparation. It is highly useful for thermal spray coatings and other porous samples.

The most effective technique is to pour the resin under vacuum and/or apply pressure during the curing cycle. (Advantages - better infiltration of pores and cracks, more transparent mounts, and fewer air bubbles).

Vacuum Mounting Unit



For porous or cracked specimens, the resin can aid in supporting these features. Filling these voids can be difficult depending upon their size, with the smaller voids being much more difficult to impregnate than larger voids. This arises mainly because of the compressibility and volume of air within the void. By applying a vacuum to the specimen and pouring while under vacuum the total pressure of this air can be reduced significantly. Subsequent curing at increased pressures will force (or push) the resin into the voids. Note that the vacuum time on both the resin and specimen should be kept to a minimum in order to minimize degassing of the resin.

$$PV = nRT \text{ (gas law)}$$

P - Pressure

V - Volume

T - Temperature

$$V(\text{bubble size}) = nRT/P$$

Thus in order to decrease the air bubble size, impregnate at low pressures and cure at higher pressures.

Recommended Procedure:

1. Place mold and sample into impregnation chamber
2. Mix castable mounting resin
3. Place cover on chamber and pull vacuum
4. Pour resin into mount
5. Slowly increase the pressure
6. Allow the mount to cure at room pressure or apply an external pressure.

TIPS: Vacuum Mounting

- Do not pull vacuum for more than 60 seconds. Extended vacuum causes the dissolved gases in the liquid resin to degas and bubble (similar to opening up a carbonated beverage bottle).
- To reduce the curing time, preheat resin, hardener and specimen to 35°C (95°F). Note: This will also increase maximum exotherm.
- Slight preheating of the epoxy will also reduce the viscosity of the resin and allow it to flow better.

Castable Mounting Troubleshooting

In general, acrylics are the easiest and most robust castable mounting materials to use. Epoxies are very useful; however, complete mixing and achieving the proper resin-to-hardener ratio is very important. Polyesters, especially for larger casting, may require some trial and error testing prior to mounting one-of-a-kind samples.

Castable Mounting Troubleshooting

Symptoms	Cause	Action
Lack of or partial curing of resin	Improper or insufficient mixing	-Remount taking care to sufficiently mix resin and hardener -Check expiration date on hardener (typically 1-year life)
Soft or gummy resins (grinding produces a matted finish)	Insufficient curing of resin – primarily due to a low exotherm	-Heat mount in an oven at 90-100°F (30-40°C) for 1-2 hours and let cool -Resin should harden upon cooling
Bubbling, cracking or yellowing of resin	Exotherm too high	-Mount at room temperatures below 85°F (30°C) -Decrease volume or volume percentage of hardener
Curing time takes too long	Improper resin mixture, old hardener, or mounting temperature too cold	-Replace old hardener - Mount at room temperature 85°F (30°C) -Preheat resin and cure at room temperature
Bubbles in resin	Improper mixing resin or degassing of the specimen	-Mix with a slow folding motion -Pour resin under vacuum and/or cure at higher pressures -Clean specimen prior to mounting

Abrasive Grinding

In most cases, the specimen surface and subsurface are damaged after cutting and sectioning. The depth or degree of damage is very dependent on how the material was cut. The purpose of abrasive grinding is to remove this damage and to restore the microstructural integrity of the specimen for accurate analysis. It is also important to realize that it is possible to create more damage in grinding than in sectioning. In other words, it is better to properly cut the sample as close as possible to the area of interest using the correct abrasive or wafering blades as opposed to grinding with very coarse abrasives. For metallographic specimen preparation, silicon carbide, zirconia, alumina and diamond are the most commonly used abrasives.

Proper abrasive grinding is dependent to various degrees upon the following parameters:

- Abrasive type
- Abrasive bond
- Grinding speeds
- Grinding loads
- Lubrication

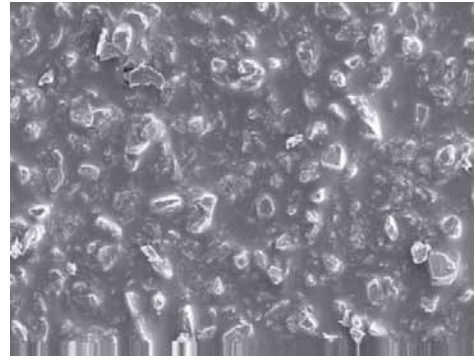
ABRASIVES USED FOR METALLOGRAPHIC GRINDING

The following description offers a more detailed explanation of these abrasive grinding variables. Perhaps the most significant variable is the abrasive and how it interacts with the specimen. The properties of the more commonly used abrasives for metallographic cutting, grinding and polishing are shown in the following table.

Abrasive	Hardness (Knoop-HK)	Hardness (Mohs)	Crystal structure	Grinding/ Polishing Form
Silica	820	6-7	Hexagonal-triagonal	Suspension
Alumina	2150	8-9	Hexagonal-rhombohedral (alpha or gamma phases)	Grinding belts, grinding papers, lapping films, suspensions, slurries, powders
Silicon carbide	2480	9.1-9.5	Hexagonal-rhombohedral	Grinding belts, grinding papers, lapping films, polyester backed foils, powders
Boron carbide	2750	9-10	Rhombohedral	Powders
Zircon	1500	7.5-8	Tetragonal	Grinding belts, grinding papers, (typically for coarse abrasive cutting)
Diamond	8000	10	Cubic – hexagonal	Lapping films, suspensions, pastes

Silicon Carbide

Silicon carbide (SiC) is a manufactured abrasive produced by a high temperature reaction between silica and carbon. It has a hexagonal-rhombohedral crystal structure and has a hardness of approximately 2500 HK. It is an ideal abrasive for cutting and grinding because of its high hardness and sharp edges. It is also somewhat brittle, and therefore it cleaves easily to produce sharp new edges (self-sharpening). SiC is an excellent abrasive for maximizing cutting rates while minimizing surface and subsurface damage. For metallographic preparation, SiC abrasives are used in abrasive blades and in coated abrasive grinding papers ranging from very coarse (60 grit) to very fine (1200 grit) abrasive sizes.



Coated SiC Abrasive Paper

Bonded or coated abrasive papers of SiC are designed so that the abrasive will have a large number of cutting points (negative abrasive rake angle). This is achieved by aligning the abrasive particles approximately normal to the backing. **Note:** Coated abrasives are not quite coplanar, thus SiC papers produce excellent cut rates (stock removal) with minimal damage. The above image shows a coated SiC abrasive grinding paper.

Grinding with SiC grinding papers is the most common and repeatable process for obtaining consistent stock removal for rough grinding of metals. SiC abrasives are sized or classified by grit size, where the smaller grit number represents coarser abrasive sizes.

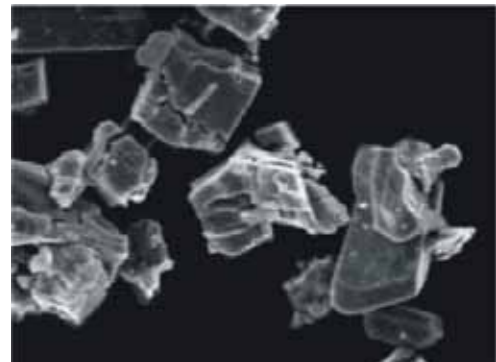
Also note that the European grading system is slightly different than the U.S. grading system. Simply put, both systems are related to the number of openings in a metal mesh screen. The primary difference is when the size of the openings approaches the size of the metal wire. For the European grading system, the size of the wire is not taken into account, whereas, the ANSI or U.S. grit size compensate for the wire size. Thus for the finer grit sizes, the European numbers can be significantly larger. Proper classification or identification of the European grading system should include the letter "P" in front of the grit number.

Grinding characteristics of silicon carbide abrasives

Grinding with SiC abrasives produces very repeatable and consistent results. In general, grinding papers are typically used once and thrown away, thus they do not change with time as is the case for abrasive grinding surfaces such as diamond impregnated grinding disks.

Alumina

Alumina is a naturally occurring mineral (Bauxite) (see image of calcined alumina abrasive). It exists in either the softer gamma (Mohs 8) or harder alpha (Mohs 9) phase. Alumina abrasives are used primarily as final polishing abrasives because of their high hardness and durability. Unlike SiC abrasives, alumina is readily classified or sized to submicron or colloidal particles (< 1 micron).

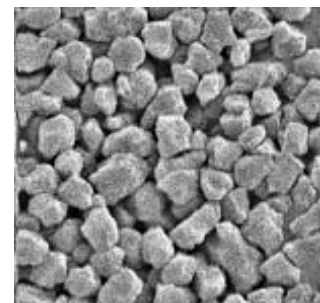


Calcined Alumina Abrasive

Note that larger coated or bonded grit size papers of alumina are also commercially available. However, they are not ideal for most metallographic applications because they easily dull, which results in lower cut rates and more specimen damage.

Diamond

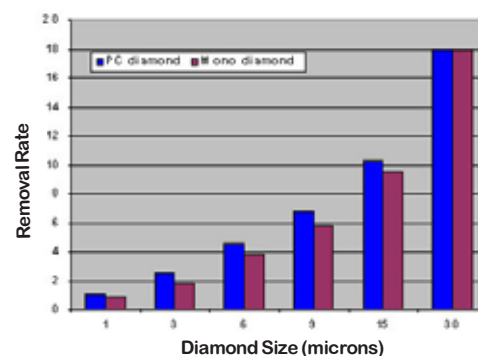
Diamond is the hardest material known to man (Mohs 10, 8000 HV). It has a cubic crystal structure, and is available either as a natural or an artificial product. Although diamond would be ideal for coarse grinding, its price makes it a very cost-prohibitive coarse grinding material for anything except hard ceramics. The image to the right is of a “blocky” monocrystalline diamond.



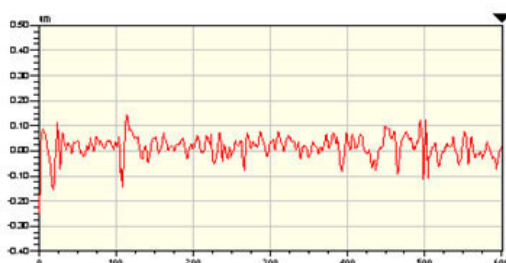
Blocky Monocrystalline Diamond

For metallographic applications, both monocrystalline and polycrystalline diamond can be used, however polycrystalline diamond has a number of advantages over monocrystalline diamond, especially for the finer micron sizes. These advantages include:

- Higher cutting rates
- Very uniform surface finish
- More uniform particle size distribution
- Higher removal rates (self-sharpening abrasives)
- Harder/tougher particles
- Blocky shaped
- Hexagonal microcrystallites (equally hard in all directions)
- Extremely rough surface (more cutting points)
- Surface area 300% greater than monocrystalline diamond
- No abrasion-resistant directionality (abrasion independent of particle orientation)



The chart to the right shows polycrystalline diamond has a higher cut rate as compared to monocrystalline diamond for sizes up to 15 micron. For coarser diamond the cut rates do not differ significantly between polycrystalline and monocrystalline diamond.

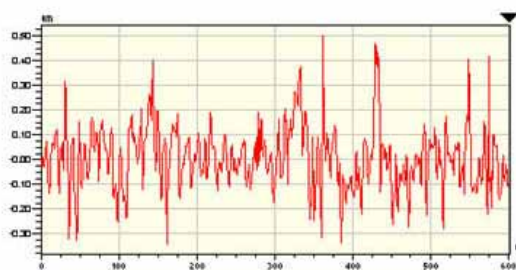


Rq	0.04 um
Ra	0.03 um
Rt	0.39 um
Rp	0.14 um
Rv	-0.25 um

Angle	440.28 urad
Curve	-1.69 m
Terms	None
Avg Ht	0.02 um
Area	9.28 um2

Surface roughness of a low carbon steel polished with 3 um polycrystalline diamond

In addition to higher cut rates, polycrystalline diamond also produces a finer surface finish. In the figure to the right, the surface roughness, Ra, for rough polishing a low carbon steel with a 3 micron diamond was 0.03 micron for polycrystalline diamond and 0.09 micron for monocrystalline diamond. As demonstrated by the Rq value (0.012 micron for monocrystalline diamond, 0.04 micron polycrystalline diamond), the average depth of the scratches is also much deeper for monocrystalline diamond as compared to the PC diamond.

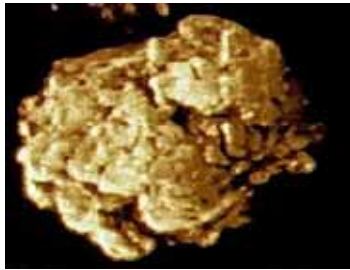


Rq	0.12 um
Ra	0.09 um
Rt	0.84 um
Rp	0.50 um
Rv	-0.34 um

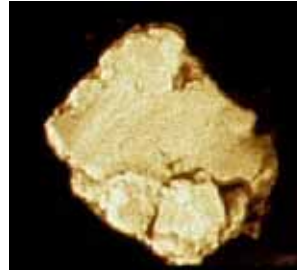
Angle	-94.78 urad
Curve	-0.98 m
Terms	None
Avg Ht	0.01 um
Area	4.26 um2

Surface roughness of a low carbon steel polished with 3 um monocrystalline diamond

Higher magnification characterization of polycrystalline and monocrystalline diamond shows that polycrystalline diamond has a rougher surface with a larger number of smaller cutting points (see images below). Polycrystalline diamond also has higher friability due to its ability to cleave along these microcrystalline planes. In general, higher-friability diamonds produce better surface finishes.



Polycrystalline Diamond
(High Friability)



Monocrystalline Diamond
(Low Friability)

SiC Grinding Papers

The most common method for grinding metals is with SiC grinding papers. The advantage of using SiC paper include:

- Easy to use
- Repeatable
- Relatively lower cost to other options
- Available with and without a pressure sensitive (PSA) adhesive backing

TIP: Grinding

For individual or single specimen preparation machines it is highly recommended to start the grinding sequence with a finer grit paper such as 360 grit paper. It is not necessary to do a lot of heavy planar grinding for individually loaded specimens because they should already be fairly plane after mounting.

TIP: Heavy Grinding

If heavy grinding is required, it is recommended that a metallographic belt grinder be used with a squaring fixture.



Squaring fixture for PENTA 7500 Belt Grinder



PENTA 7500 Belt Grinder

8-inch SiC Papers with Adhesive Backing



For quick online ordering scan the code.



8-inch SiC Abrasive Paper Adhesive-Backed (Combination Package)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch Combination PSA-backed SiC paper (240, 360, 600, 800, 1200 grit) (25/pkg)	SIC-P08C	5 each	55.00

8-inch SiC Abrasive Paper Adhesive-Backed (25/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 60-grit SiC (PSA-backed) Paper	SIC-060P8-25	25/pkg	50.00
8-inch 80-grit SiC (PSA-backed) Paper	SIC-080P8-25	25/pkg	50.00
8-inch 120-grit SiC (PSA-backed) Paper	SIC-120P8-25	25/pkg	40.00
8-inch 180-grit SiC (PSA-backed) Paper	SIC-180P8-25	25/pkg	40.00
8-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P8-25	25/pkg	32.00
8-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P8-25	25/pkg	32.00
8-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P8-25	25/pkg	32.00
8-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P8-25	25/pkg	32.00
8-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P8-25	25/pkg	32.00
8-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P8-25	25/pkg	50.00
8-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P8-25	25/pkg	50.00
8-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P8-25	25/pkg	50.00

8-inch SiC Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 60-grit SiC (PSA-backed) Paper	SIC-060P8-100	100/pkg	135.00
8-inch 80-grit SiC (PSA-backed) Paper	SIC-080P8-100	100/pkg	135.00
8-inch 120-grit SiC (PSA-backed) Paper	SIC-120P8-100	100/pkg	110.00
8-inch 180-grit SiC (PSA-backed) Paper	SIC-180P8-100	100/pkg	110.00
8-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P8-100	100/pkg	107.00
8-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P8-100	100/pkg	107.00
8-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P8-100	100/pkg	107.00
8-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P8-100	100/pkg	107.00
8-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P8-100	100/pkg	107.00
8-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P8-100	100/pkg	135.00
8-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P8-100	100/pkg	135.00
8-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P8-100	100/pkg	135.00

GRIT NUMBER

Median Diameter, (microns)	250	180	150	106	75	58.5
Standard grit	60	80	100	120	180	240
European (P-grade)	60	80	100	120	180	P220

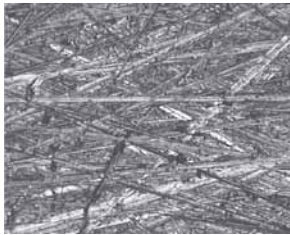
Abrasive Grinding

SiC Abrasive Surface Finish (Roughness) for a Rc30 Steel (Original Mag 50X)

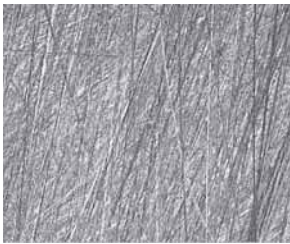
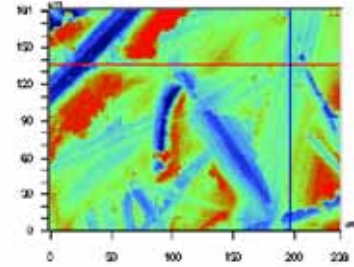
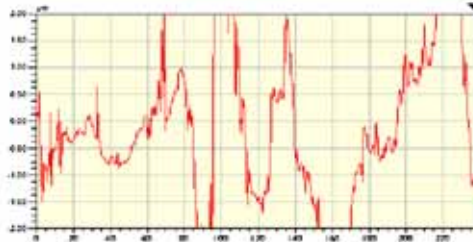
OPTICAL MICROGRAPH

2D LINE PROFILE

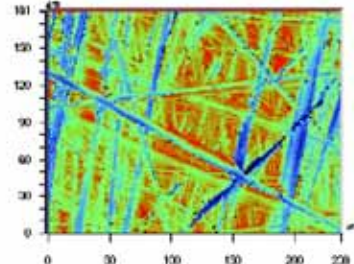
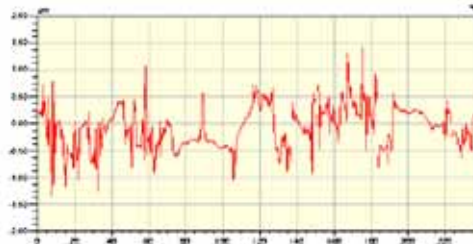
3-D OPTICAL
CONTOUR



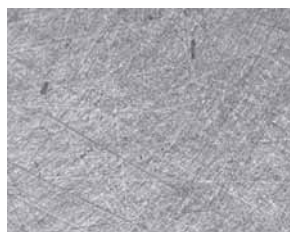
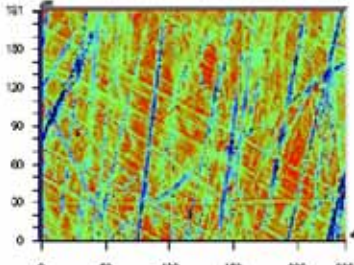
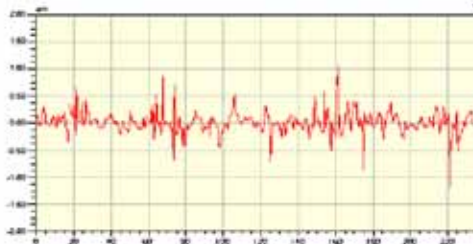
60 grit



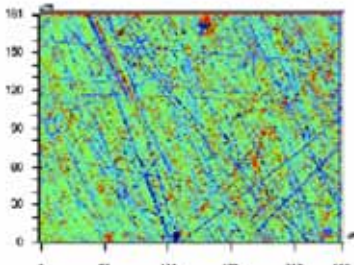
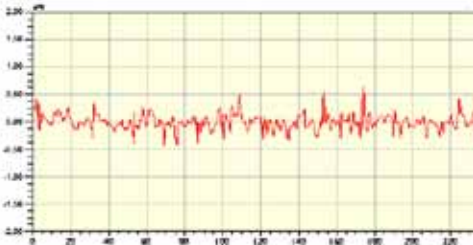
240 grit (P220)



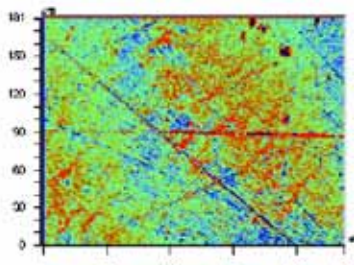
400 grit (P800)



600 grit (P1200)



1200 grit (P4000)



GRIT NUMBER

46.2	40.5	35	30.2	25.75	21.8	15.3	6.5	2.5
280	320		360		400	600	800	1200
P320	P360	P400	P500	P600	P800	P1200	P2400	P4000

10-inch SiC Papers with Adhesive Backing



For quick online ordering scan the code.

10-inch SiC Abrasive Paper Adhesive-Backed (combination package)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch Combination PSA-backed SiC Paper (240, 360, 600, 800, 1200 grit) (25/pkg)	SIC-P10C	5 each	75.00

10-inch SiC Abrasive Paper Adhesive-Backed (25/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 60-grit SiC (PSA-backed) Paper	SIC-060P10-25	25/pkg	55.00
10-inch 80-grit SiC (PSA-backed) Paper	SIC-080P10-25	25/pkg	55.00
10-inch 120-grit SiC (PSA-backed) Paper	SIC-120P10-25	25/pkg	42.00
10-inch 180-grit SiC (PSA-backed) Paper	SIC-180P10-25	25/pkg	42.00
10-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P10-25	25/pkg	40.00
10-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P10-25	25/pkg	40.00
10-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P10-25	25/pkg	40.00
10-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P10-25	25/pkg	40.00
10-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P10-25	25/pg	40.00
10-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P10-25	25/pkg	55.00
10-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P10-25	25/pkg	55.00
10-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P10-25	25/pkg	55.00



10-inch SiC Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 60-grit SiC (PSA-backed) Paper	SIC-060P10-100	100/pkg	155.00
10-inch 80-grit SiC (PSA-backed) Paper	SIC-080P10-100	100/pkg	155.00
10-inch 120-grit SiC (PSA-backed) Paper	SIC-120P10-100	100/pkg	126.00
10-inch 180-grit SiC (PSA-backed) Paper	SIC-180P10-100	100/pkg	126.00
10-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P10-100	100/pkg	121.00
10-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P10-100	100/pkg	121.00
10-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P10-100	100/pkg	121.00
10-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P10-100	100/pkg	121.00
10-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P10-100	100/pkg	121.00
10-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P10-100	100/pkg	155.00
10-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P10-100	100/pkg	155.00
10-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P10-100	100/pkg	155.00

12-inch SiC Papers with Adhesive Backing

12-inch SiC Abrasive Paper Adhesive-Backed (Combination Package)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch Combination PSA-backed SiC Paper (240, 360, 600, 800, 1200 grit) (25/pkg)	SIC-P12C	5 each	95.00

12-inch SiC Abrasive Paper Adhesive-Backed (25/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch 60-grit SiC (PSA-backed) Paper	SIC-060P12-25	25/pkg	95.00
12-inch 80-grit SiC (PSA-backed) Paper	SIC-080P12-25	25/pkg	95.00
12-inch 120-grit SiC (PSA-backed) Paper	SIC-120P12-25	25/pkg	78.00
12-inch 180-grit SiC (PSA-backed) Paper	SIC-180P12-25	25/pkg	78.00
12-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P12-25	25/pkg	76.00
12-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P12-25	25/pkg	76.00
12-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P12-25	25/pkg	76.00
12-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P12-25	25/pkg	76.00
12-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P12-25	25/pkg	76.00
12-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P12-25	25/pkg	95.00
12-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P12-25	25/pkg	95.00
12-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P12-25	25/pkg	95.00

12-inch SiC Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch 60-grit SiC (PSA-backed) Paper	SIC-060P12-100	100/pkg	250.00
12-inch 80-grit SiC (PSA-backed) Paper	SIC-080P12-100	100/pkg	250.00
12-inch 120-grit SiC (PSA-backed) Paper	SIC-120P12-100	100/pkg	215.00
12-inch 180-grit SiC (PSA-backed) Paper	SIC-180P12-100	100/pkg	215.00
12-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P12-100	100/pkg	208.00
12-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P12-100	100/pkg	208.00
12-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P12-100	100/pkg	208.00
12-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P12-100	100/pkg	208.00
12-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P12-100	100/pkg	208.00
12-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P12-100	100/pkg	250.00
12-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P12-100	100/pkg	250.00
12-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P12-100	100/pkg	250.00



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14-inch SiC Papers with Adhesive Backing



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14-inch SiC Abrasive Paper Adhesive-Backed (Combination Package)

Pace Product Name	Catalog Number	Pkg	Price (\$)
14-inch Combination PSA-backed SiC Paper (240, 360, 600, 800, 1200 grit) (25/pkg)	SIC-P14C	5 each	115.00

14-inch SiC Abrasive Paper Adhesive-Backed (25/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
14-inch 60-grit SiC (PSA-backed) Paper	SIC-060P14-25	25/pkg	105.00
14-inch 80-grit SiC (PSA-backed) Paper	SIC-080P14-25	25/pkg	105.00
14-inch 120-grit SiC (PSA-backed) Paper	SIC-120P14-25	25/pkg	88.00
14-inch 180-grit SiC (PSA-backed) Paper	SIC-180P14-25	25/pkg	88.00
14-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P14-25	25/pkg	85.00
14-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P14-25	25/pkg	85.00
14-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P14-25	25/pkg	85.00
14-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P14-25	25/pkg	85.00
14-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P14-25	25/pkg	85.00
14-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P14-25	25/pkg	135.00
14-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P14-25	25/pkg	135.00
14-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P14-25	25/pkg	135.00

14-inch SiC Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
14-inch 60-grit SiC (PSA-backed) Paper	SIC-060P14-100	100/pkg	285.00
14-inch 80-grit SiC (PSA-backed) Paper	SIC-080P14-100	100/pkg	285.00
14-inch 120-grit SiC (PSA-backed) Paper	SIC-120P14-100	100/pkg	245.00
14-inch 180-grit SiC (PSA-backed) Paper	SIC-180P14-100	100/pkg	245.00
14-inch 240-grit (P220) SiC (PSA-backed) Paper	SIC-240P14-100	100/pkg	240.00
14-inch 320-grit (P360) SiC (PSA-backed) Paper	SIC-320P14-100	100/pkg	240.00
14-inch 360-grit (P500) SiC (PSA-backed) Paper	SIC-360P14-100	100/pkg	240.00
14-inch 400-grit (P800) SiC (PSA-backed) Paper	SIC-400P14-100	100/pkg	240.00
14-inch 600-grit (P1200) SiC (PSA-backed) Paper	SIC-600P14-100	100/pkg	240.00
14-inch 800-grit (P2400) SiC (PSA-backed) Paper	SIC-800P14-100	100/pkg	475.00
14-inch 1000-grit (P3000) SiC (PSA-backed) Paper	SIC-1000P14-100	100/pkg	475.00
14-inch 1200-grit (P4000) SiC (PSA-backed) Paper	SIC-1200P14-100	100/pkg	475.00



8-inch SiC Papers with Plain-Backing

8-inch SiC Abrasive Paper Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 60-grit SiC (Plain-backed) Paper	SIC-2108-060	100/pkg	109.00
8-inch 80-grit SiC (Plain-backed) Paper	SIC-2108-080	100/pkg	109.00
8-inch 120-grit SiC (Plain-backed) Paper	SIC-2108-120	100/pkg	65.00
8-inch 180-grit SiC (Plain-backed) Paper	SIC-2108-180	100/pkg	65.00
8-inch 240-grit (P220) SiC (Plain-backed) Paper	SIC-2108-240	100/pkg	61.00
8-inch 320-grit (P360) SiC (Plain-backed) Paper	SIC-2108-320	100/pkg	61.00
8-inch 360-grit (P500) SiC (Plain-backed) Paper	SIC-2108-360	100/pkg	61.00
8-inch 400-grit (P800) SiC (Plain-backed) Paper	SIC-2108-400	100/pkg	61.00
8-inch 600-grit (P1200) SiC (Plain-backed) Paper	SIC-2108-600	100/pkg	61.00
8-inch 800-grit (P2400) SiC (Plain-backed) Paper	SIC-2108-800	100/pkg	109.00
8-inch 1000-grit (P3000) SiC (Plain-backed) Paper	SIC-2108-1000	100/pkg	109.00
8-inch 1200-grit (P4000) SiC (Plain-backed) Paper	SIC-2108-1200	100/pkg	109.00



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10-inch SiC Papers with Plain-Backing

10-inch SiC Abrasive Paper Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 60-grit SiC (Plain-backed) Paper	SIC-2110-060	100/pkg	130.00
10-inch 80-grit SiC (Plain-backed) Paper	SIC-2110-080	100/pkg	130.00
10-inch 120-grit SiC (Plain-backed) Paper	SIC-2110-120	100/pkg	116.00
10-inch 180-grit SiC (Plain-backed) Paper	SIC-2110-180	100/pkg	116.00
10-inch 240-grit (P220) SiC (Plain-backed) Paper	SIC-2110-240	100/pkg	103.00
10-inch 320-grit (P360) SiC (Plain-backed) Paper	SIC-2110-320	100/pkg	103.00
10-inch 360-grit (P500) SiC (Plain-backed) Paper	SIC-2110-360	100/pkg	103.00
10-inch 400-grit (P800) SiC (Plain-backed) Paper	SIC-2110-400	100/pkg	103.00
10-inch 600-grit (P1200) SiC (Plain-backed) Paper	SIC-2110-600	100/pkg	103.00
10-inch 800-grit (P2400) SiC (Plain-backed) Paper	SIC-2110-800	100/pkg	130.00
10-inch 1000-grit (P3000) SiC (Plain-backed) Paper	SIC-2110-1000	100/pkg	130.00
10-inch 1200-grit (P4000) SiC (Plain-backed) Paper	SIC-2110-1200	100/pkg	130.00



12-inch SiC Papers with Plain-Backing



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12-inch SiC Abrasive Paper Plain-Backed (100/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
12-inch	60-grit SiC (Plain-backed) Paper	SIC-2112-060	100/pkg	155.00
12-inch	80-grit SiC (Plain-backed) Paper	SIC-2112-080	100/pkg	155.00
12-inch	120-grit SiC (Plain-backed) Paper	SIC-2112-120	100/pkg	155.00
12-inch	180-grit SiC (Plain-backed) Paper	SIC-2112-180	100/pkg	120.00
12-inch	240-grit (P220) SiC (Plain-backed) Paper	SIC-2112-240	100/pkg	115.00
12-inch	320-grit (P360) SiC (Plain-backed) Paper	SIC-2112-320	100/pkg	115.00
12-inch	360-grit (P500) SiC (Plain-backed) Paper	SIC-2112-360	100/pkg	115.00
12-inch	400-grit (P800) SiC (Plain-backed) Paper	SIC-2112-400	100/pkg	115.00
12-inch	600-grit (P1200) SiC (Plain-backed) Paper	SIC-2112-600	100/pkg	115.00
12-inch	800-grit (P2400) SiC (Plain-backed) Paper	SIC-2112-800	100/pkg	155.00
12-inch	1000-grit (P3000) SiC (Plain-backed) Paper	SIC-2112-1000	100/pkg	155.00
12-inch	1200-grit (P4000) SiC (Plain-backed) Paper	SIC-2112-1200	100/pkg	155.00

14-inch SiC Papers with Plain-Backing



14-inch SiC Abrasive Paper Plain-Backed (100/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
14-inch	60-grit SiC (Plain-backed) Paper	SIC-2114-060	100/pkg	195.00
14-inch	80-grit SiC (Plain-backed) Paper	SIC-2114-080	100/pkg	195.00
14-inch	120-grit SiC (Plain-backed) Paper	SIC-2114-120	100/pkg	195.00
14-inch	180-grit SiC (Plain-backed) Paper	SIC-2114-180	100/pkg	185.00
14-inch	240-grit (P220) SiC (Plain-backed) Paper	SIC-2114-240	100/pkg	155.00
14-inch	320-grit (P360) SiC (Plain-backed) Paper	SIC-2114-320	100/pkg	155.00
14-inch	360-grit (P500) SiC (Plain-backed) Paper	SIC-2114-360	100/pkg	155.00
14-inch	400-grit (P800) SiC (Plain-backed) Paper	SIC-2114-400	100/pkg	155.00
14-inch	600-grit (P1200) SiC (Plain-backed) Paper	SIC-2114-600	100/pkg	155.00
14-inch	800-grit (P2400) SiC (Plain-backed) Paper	SIC-2114-800	100/pkg	395.00
14-inch	1000-grit (P3000) SiC (Plain-backed) Paper	SIC-2114-1000	100/pkg	395.00
14-inch	1200-grit (P4000) SiC (Plain-backed) Paper	SIC-2114-1200	100/pkg	395.00

Double-sided Adhesive

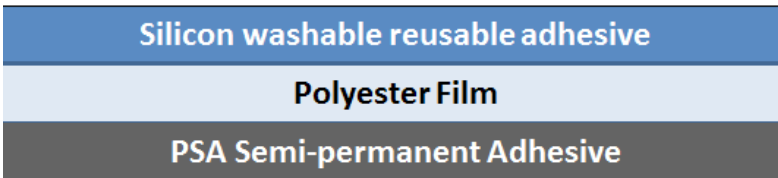


Double-sided Adhesive for Non-Adhesive Backed Papers

Pace	Product Name	Catalog Number	Pkg	Price (\$)
8-inch	Double-sided Adhesive	DSA-08	10/pkg	26.00
10-inch	Double-sided Adhesive	DSA-10	10/pkg	43.00
12-inch	Double-sided Adhesive	DSA-12	10/pkg	55.00
14-inch	Double-sided Adhesive	DSA-14	10/pkg	65.00

Grinding Foils (alternative to PSA backed adhesives)

As an alternative to PSA (pressure sensitive adhesive) backed silicon carbide papers, PACE Technologies offers non-PSA-backed abrasive grinding foils. Grinding foils utilize a polyester film backing which attaches to a reusable/washable silicon adhesive receiver disk. The grinding foils are a great lower cost alternative to PSA-backed grinding papers.



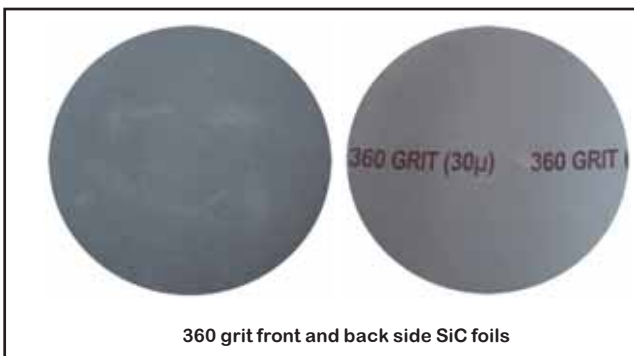
Silicon Receiver Disk with PSA backing



120 grit front and back side SiC foils



240 grit front and back side SiC foils



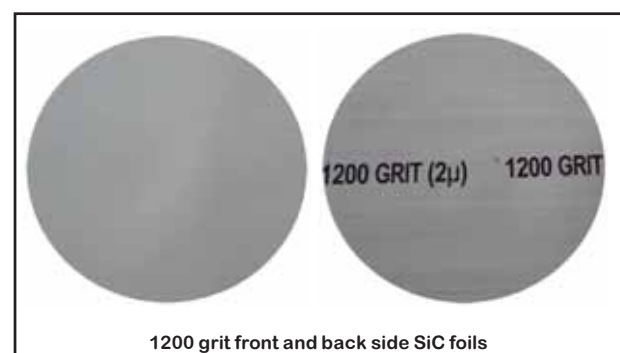
360 grit front and back side SiC foils



600 grit front and back side SiC foils



800 grit front and back side SiC foils



1200 grit front and back side SiC foils

Receivers for SiC Polyester Foils (Silicon Adhesive)

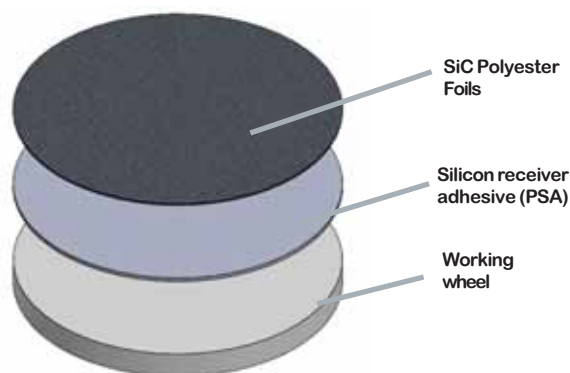


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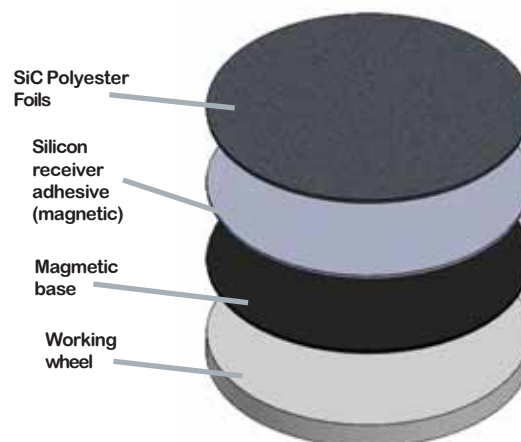
Receivers for SiC Foils (2/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch Receivers for SiC Foils (PSA-backed)	REC-5008	2/pkg	75.00
10-inch Receivers for SiC Foils (PSA-backed)	REC-5010	2/pkg	95.00
12-inch Receivers for SiC Foils (PSA-backed)	REC-5012	2/pkg	120.00
8-inch Receivers for SiC Foils (Magnetic-backed)	MREC-5008	2/pkg	85.00
10-inch Receivers for SiC Foils (Magnetic-backed)	MREC-5010	2/pkg	115.00
12-inch Receivers for SiC Foils (Magnetic-backed)	MREC-5012	2/pkg	140.00

Receiver Disk System



Magnetic Receiver System



8-inch SiC Polyester Foils



8-inch SiC Foils (50/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 120-grit (105 micron) SiC Foils	SIC-5108-120	50/pkg	44.00
8-inch 240-grit (63 micron) SiC Foils	SIC-5108-240	50/pkg	42.00
8-inch 360-grit (30 micron) SiC Foils	SIC-5108-360	50/pkg	42.00
8-inch 600-grit (15 micron) SiC Foils	SIC-5108-600	50/pkg	42.00
8-inch 800-grit (6.5 micron) SiC Foils	SIC-5108-800	50/pkg	48.00
8-inch 1200-grit (2.5 micron) SiC Foils	SIC-5108-1200	50/pkg	48.00

10-inch SiC Polyester Foils



10-inch SiC Foils (50/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 120-grit (105 micron) SiC Foils	SIC-5110-120	50/pkg	60.00
10-inch 240-grit (63 micron) SiC Foils	SIC-5110-240	50/pkg	52.00
10-inch 360-grit (30 micron) SiC Foils	SIC-5110-360	50/pkg	52.00
10-inch 600-grit (15 micron) SiC Foils	SIC-5110-600	50/pkg	52.00
10-inch 800-grit (6.5 micron) SiC Foils	SIC-5110-800	50/pkg	70.00
10-inch 1200-grit (2.5 micron) SiC Foils	SIC-5110-1200	50/pkg	70.00

12-inch SiC Polyester Foils

12-inch SiC Foils (50/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch 120-grit (105 micron) SiC Foils	SIC-5112-120	50/pkg	78.00
12-inch 240-grit (63 micron) SiC Foils	SIC-5112-240	50/pkg	72.00
12-inch 360-grit (30 micron) SiC Foils	SIC-5112-360	50/pkg	72.00
12-inch 600-grit (15 micron) SiC Foils	SIC-5112-600	50/pkg	72.00
12-inch 800-grit (6.5 micron) SiC Foils	SIC-5112-800	50/pkg	82.00
12-inch 1200-grit (2.5 micron) SiC Foils	SIC-5112-1200	50/pkg	82.00



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Manual Specimen Preparation

Basic manual specimen preparation for many materials can be accomplished using a manual hand grinder such as the PENTA 5000 grinder. The technique is to manually grind the specimen in one direction, rotate the specimen by 90 degrees and grind on the next finer grit size until all the grinding marks from the previous step are removed. The PENTA 5000 hand grinder accommodates five grinding grit papers so that both 800 (P2400) and 1200 (P4000) grit papers can be used to produce a nearly polished specimen surface. In fact, for some sample preparation a 1200 (P4000) grit finish is sufficient for analysis (e.g. weld analysis).

Note: PACE Technologies is the only metallographic supplier to offer a 5-station hand grinder that utilizes both 800 (P2400) and 1200 (P4000) grit grinding papers.

Premium SiC Rolls

Abrasive Rolls (Fits Competitive Hand Grinders)

Pace Product Name	Catalog Number	Pkg	Price (\$)
120-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-120R-60	each	65.00
240-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-240R-60	each	40.00
320-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-320R-60	each	40.00
360-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-360R-60	each	40.00
400-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-400R-60	each	40.00
600-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-600R-60	each	40.00
800-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-800R-60	each	65.00
1200-grit SiC (3-7/16-in width, 60-ft length, 1-in core)	SIC-1200R-60	each	65.00



SiC Rolls



PENTA-5000 5-station hand grinder

Specimen Planar Grinding

In general, it is better to cut as close to the area to be investigated than to grind with very coarse abrasives such as 60, 80 and 120 grit grinding papers, however, if a specimen requires coarse abrasive grinding it is **HIGHLY** recommended that a belt grinder with a planar grinding/squaring fixture be used. The squaring fixture is important so that mounted specimens remain square and flat.

Note: It is nearly impossible to maintain a square sample by hand on a belt grinder. Square specimen mounts are very important for subsequent specimen preparation on automated single specimen preparation machines. PACE Technologies is the only metallographic equipment manufacturer that offers a planar grinding fixture for its PENTA 7500 belt grinder.

Typical abrasive belts include: silicon carbide, alumina and zirconia.

Abrasive Belt	Benefit
Alumina	Hard and durable abrasive, not as sharp SiC, however, lasts longer than SiC
Silicon carbide	Very hard and friable. Fast initial cutting, however, breaks down very fast so it is a "short lived" abrasive
Zirconia	Very durable and hard abrasive. It is a long lasting abrasive and is an excellent choice for belts grinders. The only drawback is that it requires higher grinding forces when compared to SiC and alumina abrasives

TIP: Planar Grinding

For thermal spray coatings, the recommended procedure is to grind with coarser abrasives such as zirconia on the PENTA 7500 belt grinder while using the squaring attachment prior to fine grinding and polishing



Abrasive Grinding Belts

Silicon Carbide Belts

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Abrasive Belts

Pace Product Name	Catalog Number	Pkg	Price (\$)
60-grit SiC Belt (4-inch x 36-inch)	SIC-B60	10/pkg	98.00
80-grit SiC Belt (4-inch x 36-inch)	SIC-B80	10/pkg	95.00
120-grit SiC Belt (4-inch x 36-inch)	SIC-B120	10/pkg	95.00
180-grit SiC Belt (4-inch x 36-inch)	SIC-B180	10/pkg	95.00
240-grit SiC Belt (4-inch x 36-inch)	SIC-B240	10/pkg	95.00

Premium Alumina Belts



Abrasive Belts

Pace Product Name	Catalog Number	Pkg	Price (\$)
80-grit Alumina Belt (4-inch x 36-inch)	ALO-B080	5/pkg	35.00
120-grit Alumina Belt (4-inch x 36-inch)	ALO-B120	5/pkg	35.00

Zirconia Belts



Zirconia Belts

Pace Product Name	Catalog Number	Pkg	Price (\$)
60 grit Zirconia Abrasive Belt (4-inch x 36-inch)	ZrO2-B060	5/pkg	58.00
120 grit Zirconia Abrasive Belt (4-inch x 36-inch)	ZrO2-B120	5/pkg	58.00



Silicon Carbide Powders

The main application for grinding with silicon carbide particles is for flat lapping on hard metal plates such as cast iron. For metallographic specimen preparation silicon carbide powders are used for grinding petrographic thin section specimens.



Silicon Carbide (SiC) Abrasive Powder

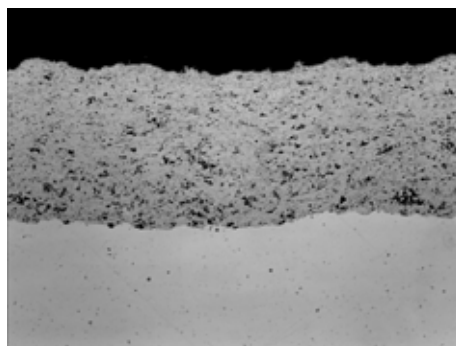
SiC Powders



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Abrasive Powders

Pace Product Name	Catalog Number	Pkg	Price (\$)
120-grit (P120-grit) SiC Powder (1 lb)	SIC-120-P1	1 lb	18.50
120-grit (P120-grit) SiC Powder (5 lbs)	SIC-120-P5	5 lbs	80.00
240-grit (P280-grit) SiC Powder (1 lb)	SIC-240-P1	1 lb	17.50
240-grit (P280-grit) SiC Powder (5 lbs)	SIC-240-P5	5 lbs	76.00
320-grit (P400-grit) SiC Powder (1 lb)	SIC-320-P1	1 lb	17.50
320-grit (P400-grit) SiC Powder (5 lbs)	SIC-320-P5	5 lbs	76.00
400-grit (P800-grit) SiC Powder (1 lb)	SIC-400-P1	1 lb	17.50
400-grit (P800-grit) SiC Powder (5 lbs)	SIC-400-P5	5 lbs	76.00
600-grit (P1200-grit) SiC Powder (1 lb)	SIC-600-P1	1 lb	17.50
600-grit (P1200-grit) SiC Powder (5 lbs)	SIC-600-P5	5 lbs	76.00
800-grit (P2400-grit) SiC Powder (1 lb)	SIC-800-P1	1 lb	20.50
800-grit (P2400-grit) SiC Powder (5 lbs)	SIC-800-P5	5 lbs	90.00
1000-grit (P3000-grit) SiC Powder (1 lb)	SIC-1000-P1	1 lb	25.00
1000-grit (P3000-grit) SiC Powder (5 lbs)	SIC-1000-P5	5 lbs	105.00
1200-grit (P4000-grit) SiC powder (1 lb)	SIC-1200-P1	1 lb	25.00
1200-grit (P4000-grit) SiC powder (5 lbs)	SIC-1200-P5	5 lbs	105.00



WC-Co Thermal Spray Test Coupon, (200X DIC)

Eliminating Embedded Abrasives

Alumina abrasives are typically used for grinding specimens that have a tendency to embed the more friable silicon carbide abrasives. Materials susceptible to embedding abrasive particles include low recrystallizing temperature metals such as tin, zinc and lead; electronic components containing solder joints; soft copper and aluminum metals; as well as refractory metals such as rhenium, niobium and tungsten. Alumina abrasives are the better choice because they are durable and do not fracture as easily as silicon carbide abrasives.



8-inch Alumina Papers with Adhesive Backing

8-inch ALO Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch P120-grit Alumina (PSA-backed) Paper	ALO-120P8-100	100/pkg	107.00
8-inch P220-grit Alumina (PSA-backed) Paper	ALO-220P8-100	100/pkg	107.00
8-inch P500-grit Alumina (PSA-backed) Paper	ALO-500P8-100	100/pkg	107.00
8-inch P1200-grit Alumina (PSA-backed) Paper	ALO-1200P8-100	100/pkg	107.00



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10-inch Alumina Papers with Adhesive Backing

10-inch ALO Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch P120-grit Alumina (PSA-backed) Paper	ALO-120P10-100	100/pkg	121.00
10-inch P220-grit Alumina (PSA-backed) Paper	ALO-220P10-100	100/pkg	121.00
10-inch P500-grit Alumina (PSA-backed) Paper	ALO-500P10-100	100/pkg	121.00
10-inch P1200-grit Alumina (PSA-backed) Paper	ALO-1200P10-100	100/pkg	121.00



12-inch Alumina Papers with Adhesive Backing

12-inch ALO Abrasive Paper Adhesive-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch P120-grit Alumina (PSA-backed) Paper	ALO-120P12-100	100/pkg	208.00
12-inch P220-grit Alumina (PSA-backed) Paper	ALO-220P12-100	100/pkg	208.00
12-inch P500-grit Alumina (PSA-backed) Paper	ALO-500P12-100	100/pkg	208.00
12-inch P1200-grit Alumina (PSA-backed) Paper	ALO-1200P12-100	100/pkg	208.00



8-inch Alumina Papers with Plain-Backing



For quick online
ordering scan the code.

8-inch ALO Abrasive Paper Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch P120-grit Alumina (Plain-backed) Paper	ALO-2108-P120	100/pkg	61.00
8-inch P220-grit Alumina (Plain-backed) Paper	ALO-2108-P220	100/pkg	61.00
8-inch P500-grit Alumina (Plain-backed) Paper	ALO-2108-P500	100/pkg	61.00
8-inch P1200-grit Alumina (Plain-backed) Paper	ALO-2108-P1200	100/pkg	61.00

10-inch Alumina Papers with Plain-Backing



10-inch ALO Abrasive Paper Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch P120-grit Alumina (Plain-backed) Paper	ALO-2110-P120	100/pkg	103.00
10-inch P220-grit Alumina (Plain-backed) Paper	ALO-2110-P220	100/pkg	103.00
10-inch P500-grit Alumina (Plain-backed) Paper	ALO-2110-P500	100/pkg	103.00
10-inch P1200-grit Alumina (Plain-backed) Paper	ALO-2110-P1200	100/pkg	103.00

12-inch Alumina Papers with Plain-Backing



12-inch ALO Abrasive Paper Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch P120-grit Alumina (Plain-backed) Paper	ALO-2112-P120	100/pkg	115.00
12-inch P220-grit Alumina (Plain-backed) Paper	ALO-2112-P220	100/pkg	115.00
12-inch P500-grit Alumina (Plain-backed) Paper	ALO-2112-P500	100/pkg	115.00
12-inch P1200-grit Alumina (Plain-backed) Paper	ALO-2112-P1200	100/pkg	115.00

Zirconia Abrasive Disks

For longer life, coarse grinding zirconia abrasive disks are especially useful. Zirconia abrasives are much more durable than either alumina or silicon carbide abrasives, however, to be effective higher applied grinding forces are required.



Zirconia Abrasive Paper PSA-Backed (25/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 120-grit Zirconia (PSA-backed) Paper	ZR-120P08-25	25/pkg	99.00
8-inch 220-grit Zirconia (PSA-backed) Paper	ZR-220P08-25	25/pkg	99.00
10-inch 120-grit Zirconia (PSA-backed) Paper	ZR-120P10-25	25/pkg	150.00
10-inch 220-grit Zirconia (PSA-backed) Paper	ZR-220P10-25	25/pkg	150.00
12-inch 120-grit Zirconia (PSA-backed) Paper	ZR-120P12-25	25/pkg	180.00
12-inch 220-grit Zirconia (PSA-backed) Paper	ZR-220P12-25	25/pkg	180.00

Diamond Grinding Disks (PSA)

Diamond grinding is most often used when grinding very hard / brittle materials such as engineered ceramics, however, diamond grinding disks are also used to planar grind a wide range of other metals and minerals. The primary advantage of diamond grinding disks is that the abrasive is hard and does not wear down too quickly. The main disadvantage is that coarse diamond grinding can produce a lot of surface and subsurface damage.

Note: For some materials excessive damage from coarse diamond grinding disks should be avoided as it may not be possible to remove it with fine grinding or fine polishing.

8-inch Diamond Grinding Disk with Adhesive Backing

Diamond Grinding Disks - 8-inch

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 250 micron Diamond Grinding Disk	DIA-DISK-8250	each	175.00
8-inch 125 micron Diamond Grinding Disk	DIA-DISK-8125	each	175.00
8-inch 75 micron Diamond Grinding Disk	DIA-DISK-8075	each	175.00
8-inch 45 micron Diamond Grinding Disk	DIA-DISK-8045	each	155.00
8-inch 30 micron Diamond Grinding Disk	DIA-DISK-8030	each	155.00
8-inch 15 micron Diamond Grinding Disk	DIA-DISK-8015	each	155.00
8-inch 9 micron Diamond Grinding Disk	DIA-DISK-8009	each	155.00



For quick online ordering scan the code.

10-inch Diamond Grinding Disk with Adhesive Backing

Diamond Grinding Disks- 10-inch

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 250 micron Diamond Grinding Disk	DIA-DISK-10250	each	275.00
10-inch 125 micron Diamond Grinding Disk	DIA-DISK-10125	each	275.00
10-inch 75 micron Diamond Grinding Disk	DIA-DISK-10075	each	275.00
10-inch 45 micron Diamond Grinding Disk	DIA-DISK-10045	each	235.00
10-inch 30 micron Diamond Grinding Disk	DIA-DISK-10030	each	235.00
10-inch 15 micron Diamond Grinding Disk	DIA-DISK-10015	each	235.00
10-inch 9 micron Diamond Grinding Disk	DIA-DISK-10009	each	235.00



12-inch Diamond Grinding Disk with Adhesive Backing

Diamond Grinding Disks - 12-inch

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch 250 micron Diamond Grinding Disk	DIA-DISK-12250	each	355.00
12-inch 125 micron Diamond Grinding Disk	DIA-DISK-12125	each	355.00
12-inch 75 micron Diamond Grinding Disk	DIA-DISK-12075	each	355.00
12-inch 45 micron Diamond Grinding Disk	DIA-DISK-12045	each	325.00
12-inch 30 micron Diamond Grinding Disk	DIA-DISK-120301	each	325.00
12-inch 15 micron Diamond Grinding Disk	DIA-DISK-12015	each	325.00
12-inch 9 micron Diamond Grinding Disk	DIA-DISK-12009	each	325.00

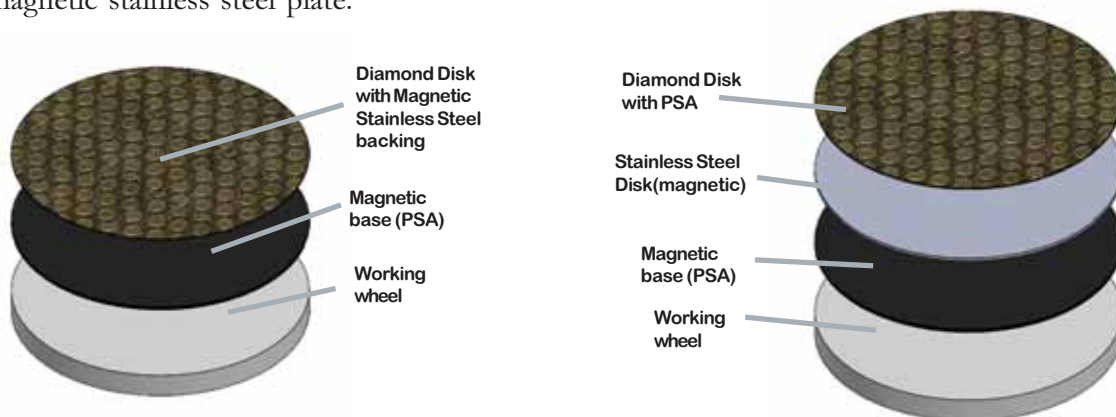


Diamond Disk

Macro	Diamond Size	Micro
	9 micron Diamond Disk	
	15 micron Diamond Disk	
	30 micron Diamond Disk	
	45 micron Diamond Disk	
	75 micron Diamond Disk	
	125 micron Diamond Disk	

Diamond MD Grinding Disks

As an alternative to PSA (pressure sensitive adhesive) backed diamond grinding disks, PACE Technologies offers magnetic backed (MD) abrasive diamond grinding disks. The magnetic diamond disks can be purchased pre-assembled on a magnetic stainless steel plate or the stainless steel plate can be purchased separately and the user can assemble the adhesive backed diamond grinding disks onto a magnetic stainless steel plate.



8-inch Diamond Grinding Disk with Magnetic Backing

8-inch Diamond Grinding Disks (Stainless Steel Magnetic Backing)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch 250 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-250M	each	185.00
8-inch 125 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-125M	each	185.00
8-inch 75 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-75M	each	185.00
8-inch 45 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-45M	each	165.00
8-inch 30 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-30M	each	165.00
8-inch 15 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-15M	each	165.00
8-inch 9 micron Diamond Grinding Disk with Magnetic Backing	PDGD8-09M	each	165.00



For quick online ordering scan the code.

10-inch Diamond Grinding Disk with Magnetic Backing

10-inch Diamond Grinding Disks (Stainless Steel Magnetic Backing)

Pace Product Name	Catalog Number	Pkg	Price (\$)
10-inch 250 micron Diamond Grinding Disk With Magnetic Backing	PDGD10-250M	each	285.00
10-inch 125 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-125M	each	285.00
10-inch 75 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-75M	each	285.00
10-inch 45 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-45M	each	245.00
10-inch 30 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-30M	each	245.00
10-inch 15 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-15M	each	245.00
10-inch 9 micron Diamond Grinding Disk with Magnetic Backing	PDGD10-09M	each	245.00



12-inch Diamond Grinding Disk with Magnetic Backing

12-inch Diamond Grinding Disks (Stainless Steel Magnetic Backing)

Pace Product Name	Catalog Number	Pkg	Price (\$)
12-inch 250 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-250M	each	365.00
12-inch 125 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-125M	each	365.00
12-inch 75 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-75M	each	365.00
12-inch 45 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-45M	each	325.00
12-inch 30 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-30M	each	325.00
12-inch 15 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-15M	each	325.00
12-inch 9 micron Diamond Grinding Disk with Magnetic Backing	PDGD12-09M	each	325.00



Diamond MD Composite Disks

As an alternative to traditional grinding with silicon carbide or alumina grinding papers, composites disks utilizing an embedded and applied diamond suspension have been used. The main benefit in using composite disks is that the number of steps can be reduced from five or six SiC steps (240, 360, 600, 800 and 1200 grit) down to two steps using a 6, 9 or 15 micron diamond on a SIRIUS composite disk, followed by fine grinding with either a 3 or 6 micron diamond on an ORION composite disk. Note that the ORION and SIRIUS composites disks are pre-charged with 3 and 6 micron diamond, respectively.

Another benefit of the composite disks is that they use diamond abrasives so they can be a better alternative for harder materials such as engineered ceramics and ceramic composites. The primary drawback is the increased cost per specimen, as they require diamond abrasives. In addition, the disks will wear out of flat and thus result in increasing grinding times over the life of the disk. The composite disks are manufactured with a magnetic backing for easy changing and storage.



ORION Composite Disks
for 3-6 micron diamond

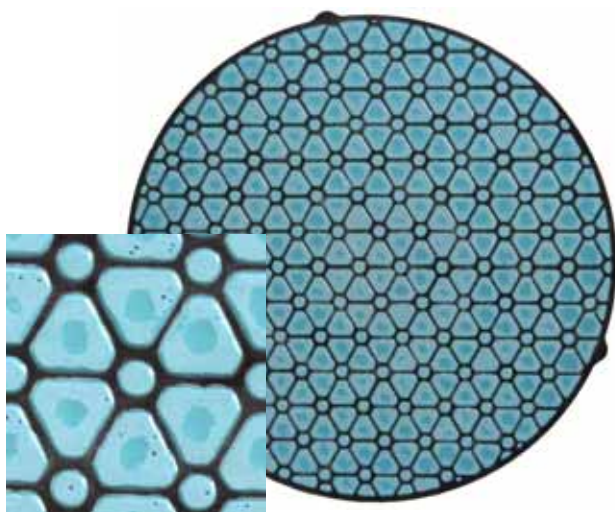
SIRIUS Composite Disks for
6-15 micron diamond



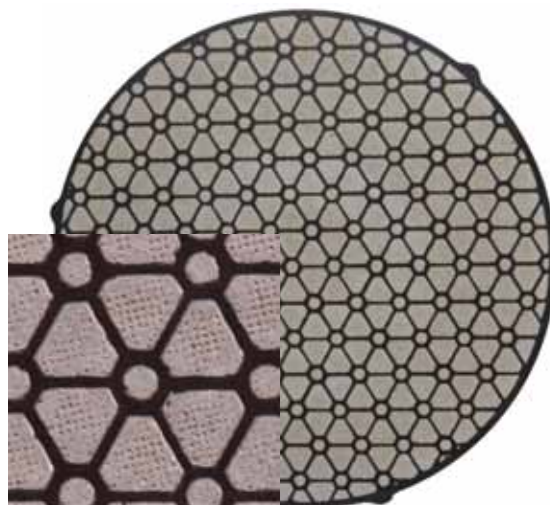
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ordering scan the code.

Diamond Composite Disks (Stainless Steel Magnetic Backing)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	8-inch MD ORION Composite Disk for 3-6 micron Diamond Suspensions	ORION-MD08	each	98.00
	10-inch MD ORION Composite Disk for 3-6 micron Diamond Suspensions	ORION-MD10	each	105.00
	12-inch MD ORION Composite Disk for 3-6 micron Diamond Suspensions	ORION-MD12	each	115.00
	8-inch MD SIRIUS Composite Disk for 6-15 micron Diamond Suspensions	SIRIUS-MD08	each	98.00
	10-inch MD SIRIUS Composite Disk for 6-15 micron Diamond Suspensions	SIRIUS-MD10	each	105.00
	12-inch MD SIRIUS Composite Disk for 6-15 micron Diamond Suspensions	SIRIUS-MD12	each	115.00



ORION Composite Disk



SIRIUS Composite Disk

Lapping Films (Superior Flatness)

The primary advantage to using abrasives coated onto lapping films is improved flatness across the specimen surface. This is especially true for specimens that have a large difference in the hardness of the specimen constituents. The abrasive is coated onto a polyester film versus a paper backing. The result is a harder base surface. Typically abrasive lapping films include: silicon carbide, alumina and diamond. Diamond lapping films are quite common for use in grinding and polishing electronic components, including silicon dies. Alumina is very useful for softer materials, including solder joints and plated specimens. Silicon carbide is very useful for metal coated specimens.

8-inch SiC Lapping Films with Plain-Backing

8-inch Silicon Carbide Lapping Films Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (Plain-backed) Lapping Film	SIC-8001PB-3	100/pkg	85.00
3 micron SiC (Plain-backed) Lapping Film	SIC-8003PB-3	100/pkg	85.00
5 micron SiC (Plain-backed) Lapping Film	SIC-8005PB-3	100/pkg	85.00
9 micron SiC (Plain-backed) Lapping Film	SIC-8009PB-3	100/pkg	85.00
12 micron SiC (Plain-backed) Lapping Film	SIC-8012PB-3	100/pkg	85.00
16 micron SiC (Plain-backed) Lapping Film	SIC-8016PB-3	100/pkg	85.00
30 micron SiC (Plain-backed) Lapping Film	SIC-8030PB-3	100/pkg	85.00



For quick online ordering scan the code.

10-inch SiC Lapping Films with Plain-Backing

10-inch Silicon Carbide Lapping Films Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (Plain-backed) Lapping Film	SIC-1001PB-3	100/pkg	105.00
3 micron SiC (Plain-backed) Lapping Film	SIC-1003PB-3	100/pkg	105.00
5 micron SiC (Plain-backed) Lapping Film	SIC-1005PB-3	100/pkg	105.00
9 micron SiC (Plain-backed) Lapping Film	SIC-1009PB-3	100/pkg	105.00
12 micron SiC (Plain-backed) Lapping Film	SIC-1012PB-3	100/pkg	105.00
16 micron SiC (Plain-backed) Lapping Film	SIC-1016PB-3	100/pkg	105.00
30 micron SiC (Plain-backed) Lapping Film	SIC-1030PB-3	100/pkg	105.00



12-inch SiC Lapping Films with Plain-Backing

12-inch Silicon Carbide Lapping Films Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (Plain-backed) Lapping Film	SIC-1201PB-3	100/pkg	185.00
3 micron SiC (Plain-backed) Lapping Film	SIC-1203PB-3	100/pkg	185.00
5 micron SiC (Plain-backed) Lapping Film	SIC-1205PB-3	100/pkg	185.00
9 micron SiC (Plain-backed) Lapping Film	SIC-1209PB-3	100/pkg	185.00
12 micron SiC (Plain-backed) Lapping Film	SIC-1212PB-3	100/pkg	185.00
16 micron SiC (Plain-backed) Lapping Film	SIC-1216PB-3	100/pkg	185.00
30 micron SiC (Plain-backed) Lapping Film	SIC-1230PB-3	100/pkg	185.00



8-inch SiC Lapping Films with Adhesive Backing



For quick online
ordering scan the code.

8-inch Silicon Carbide Lapping Films Adhesive Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (PSA-backed) Lapping Film	SIC-8001PSA-3	100/pkg	115.00
3 micron SiC (PSA-backed) Lapping Film	SIC-8003PSA-3	100/pkg	115.00
5 micron SiC (PSA-backed) Lapping Film	SIC-8005PSA-3	100/pkg	115.00
9 micron SiC (PSA-backed) Lapping Film	SIC-8009PSA-3	100/pkg	115.00
12 micron SiC (PSA-backed) Lapping Film	SIC-8012PSA-3	100/pkg	115.00
16 micron SiC (PSA-backed) Lapping Film	SIC-8016PSA-3	100/pkg	115.00
30 micron SiC (PSA-backed) Lapping Film	SIC-8030PSA-3	100/pkg	115.00

10-inch SiC Lapping Films with Adhesive Backing



10-inch Silicon Carbide Lapping Films Adhesive Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (PSA-backed) Lapping Film	SIC-1001PSA-3	100/pkg	195.00
3 micron SiC (PSA-backed) Lapping Film	SIC-1003PSA-3	100/pkg	195.00
5 micron SiC (PSA-backed) Lapping Film	SIC-1005PSA-3	100/pkg	195.00
9 micron SiC (PSA-backed) Lapping Film	SIC-1009PSA-3	100/pkg	195.00
12 micron SiC (PSA-backed) Lapping Film	SIC-1012PSA-3	100/pkg	195.00
16 micron SiC (PSA-backed) Lapping Film	SIC-1016PSA-3	100/pkg	195.00
30 micron SiC (PSA-backed) Lapping Film	SIC-1030PSA-3	100/pkg	195.00

12-inch SiC Lapping Films with Adhesive Backing



12-inch Silicon Carbide Lapping Films Adhesive Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron SiC (PSA-backed) Lapping Film	SIC-1201PSA-3	100/pkg	250.00
3 micron SiC (PSA-backed) Lapping Film	SIC-1203PSA-3	100/pkg	250.00
5 micron SiC (PSA-backed) Lapping Film	SIC-1205PSA-3	100/pkg	250.00
9 micron SiC (PSA-backed) Lapping Film	SIC-1209PSA-3	100/pkg	250.00
12 micron SiC (PSA-backed) Lapping Film	SIC-1212PSA-3	100/pkg	250.00
16 micron SiC (PSA-backed) Lapping Film	SIC-1216PSA-3	100/pkg	250.00
30 micron SiC (PSA-backed) Lapping Film	SIC-1230PSA-3	100/pkg	250.00

8-inch Alumina Lapping Films with Plain-Backing

8-inch Alumina Lapping Films Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Alumina (Plain-backed) Lapping Film	ALO-8105PB-3	100/pkg	95.00
0.30 micron Alumina (Plain-backed) Lapping Film	ALO-8103PB-3	100/pkg	95.00
1 micron Alumina (Plain-backed) Lapping Film	ALO-8001PB-3	100/pkg	87.00
3 micron Alumina (Plain-backed) Lapping Film	ALO-8003PB-3	100/pkg	87.00
5 micron Alumina (Plain-backed) Lapping Film	ALO-8005PB-3	100/pkg	87.00
9 micron Alumina (Plain-backed) Lapping Film	ALO-8009PB-3	100/pkg	87.00
12 micron Alumina (Plain-backed) Lapping Film	ALO-8012PB-3	100/pkg	87.00
15 micron Alumina (Plain-backed) Lapping Film	ALO-8015PB-3	100/pkg	87.00
30 micron Alumina (Plain-backed) Lapping Film	ALO-8030PB-3	100/pkg	87.00



For quick online ordering scan the code.

10-inch Alumina Lapping Films with Plain-Backing

10-inch Alumina Lapping Films Plain-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Alumina (Plain-backed) Lapping Film	ALO-10105PB-3	100/pkg	160.00
0.30 micron Alumina (Plain-backed) Lapping Film	ALO-10103PB-3	100/pkg	160.00
1 micron Alumina (Plain-backed) Lapping Film	ALO-1001PB-3	100/pkg	145.00
3 micron Alumina (Plain-backed) Lapping Film	ALO-1003PB-3	100/pkg	135.00
5 micron Alumina (Plain-backed) Lapping Film	ALO-1005PB-3	100/pkg	135.00
9 micron Alumina (Plain-backed) Lapping Film	ALO-1009PB-3	100/pkg	135.00
12 micron Alumina (Plain-backed) Lapping Film	ALO-1012PB-3	100/pkg	135.00
15 micron Alumina (Plain-backed) Lapping Film	ALO-1015PB-3	100/pkg	135.00
30 micron Alumina (Plain-backed) Lapping Film	ALO-1030PB-3	100/pkg	135.00



12-inch Alumina Lapping Films with Plain-Backing

12-inch Alumina Lapping Films Plain-Backed (100/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Alumina (Plain-backed) Lapping Film	ALO-12105PB-3	100/pkg	185.00
0.30 micron Alumina (Plain-backed) Lapping Film	ALO-12103PB-3	100/pkg	185.00
1 micron Alumina (Plain-backed) Lapping Film	ALO-1201PB-3	100/pkg	175.00
3 micron Alumina (Plain-backed) Lapping Film	ALO-1203PB-3	100/pkg	160.00
5 micron Alumina (Plain-backed) Lapping Film	ALO-1205PB-3	100/pkg	160.00
9 micron Alumina (Plain-backed) Lapping Film	ALO-1209PB-3	100/pkg	160.00
12 micron Alumina (Plain-backed) Lapping Film	ALO-1212PB-3	100/pkg	160.00
15 micron Alumina (Plain-backed) Lapping Film	ALO-1215PB-3	100/pkg	160.00
30 micron Alumina (Plain-backed) Lapping Film	ALO-1230PB-3	100/pkg	160.00



Alumina Lapping Film Guide



8-inch Alumina Lapping Films with Adhesive Backing



For quick online ordering scan the code.

8-inch Alumina Lapping Films, Adhesive Backed (100/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	0.05 micron Alumina (PSA-backed) Lapping Film	ALO-8105PSA-3	100/pkg	140.00
	0.30 micron Alumina (PSA-backed) Lapping Film	ALO-8103PSA-3	100/pkg	140.00
	1 micron Alumina (PSA-backed) Lapping Film	ALO-8001PSA-3	100/pkg	125.00
	3 micron Alumina (PSA-backed) Lapping Film	ALO-8003PSA-3	100/pkg	125.00
	5 micron Alumina (PSA-backed) Lapping Film	ALO-8005PSA-3	100/pkg	125.00
	9 micron Alumina (PSA-backed) Lapping Film	ALO-8009PSA-3	100/pkg	125.00
	12 micron Alumina (PSA-backed) Lapping Film	ALO-8012PSA-3	100/pkg	125.00
	15 micron Alumina (PSA-backed) Lapping Film	ALO-8015PSA-3	100/pkg	125.00
	30 micron Alumina (PSA-backed) Lapping Film	ALO-8030PSA-3	100/pkg	125.00

10-inch Alumina Lapping Films with Adhesive Backing



10-inch Alumina Lapping Films, Adhesive Backed (100/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	0.05 micron Alumina (PSA-backed) Lapping Film	ALO-10105PSA-3	100/pkg	250.00
	0.30 micron Alumina (PSA-backed) Lapping Film	ALO-10103PSA-3	100/pkg	250.00
	1 micron Alumina (PSA-backed) Lapping Film	ALO-1001PSA-3	100/pkg	235.00
	3 micron Alumina (PSA-backed) Lapping Film	ALO-1003PSA-3	100/pkg	220.00
	5 micron Alumina (PSA-backed) Lapping Film	ALO-1005PSA-3	100/pkg	220.00
	9 micron Alumina (PSA-backed) Lapping Film	ALO-1009PSA-3	100/pkg	220.00
	12 micron Alumina (PSA-backed) Lapping Film	ALO-1012PSA-3	100/pkg	220.00
	15 micron Alumina (PSA-backed) Lapping Film	ALO-1015PSA-3	100/pkg	220.00
	30 micron Alumina (PSA-backed) Lapping Film	ALO-1030PSA-3	100/pkg	220.00

12-inch Alumina Lapping Films with Adhesive Backing



12-inch Alumina Lapping Films, Adhesive Backed (100/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	0.05 micron Alumina (PSA-backed) Lapping Film	ALO-12105PSA-3	100/pkg	275.00
	0.30 micron Alumina (PSA-backed) Lapping Film	ALO-12103PSA-3	100/pkg	275.00
	1 micron Alumina (PSA-backed) Lapping Film	ALO-1201PSA-3	100/pkg	265.00
	3 micron Alumina (PSA-backed) Lapping Film	ALO-1203PSA-3	100/pkg	245.00
	5 micron Alumina (PSA-backed) Lapping Film	ALO-1205PSA-3	100/pkg	245.00
	9 micron Alumina (PSA-backed) Lapping Film	ALO-1209PSA-3	100/pkg	245.00
	12 micron Alumina (PSA-backed) Lapping Film	ALO-1212PSA-3	100/pkg	245.00
	15 micron Alumina (PSA-backed) lapping Film	ALO-1215PSA-3	100/pkg	245.00
	30 micron Alumina (PSA-backed) lapping Film	ALO-1230PSA-3	100/pkg	245.00

8-inch Diamond Lapping Films (Type A) with Plain-Backing

8-inch Diamond Type A Lapping Films Plain-Backed (5/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron Type A Diamond (Plain-backed) Lapping Film	DA-01P8	5/pkg	92.50
0.25 micron Type A Diamond (Plain-backed) Lapping Film	DA-025P8	5/pkg	92.50
0.50 micron Type A Diamond (Plain-backed) Lapping Film	DA-05P8	5/pkg	92.50
1 micron Type A Diamond (Plain-backed) Lapping Film	DA-1P8	5/pkg	92.50
3 micron Type A Diamond (Plain-backed) Lapping Film	DA-3P8	5/pkg	92.50
6 micron Type A Diamond (Plain-backed) Lapping Film	DA-6P8	5/pkg	92.50
9 micron Type A Diamond (Plain-backed) Lapping Film	DA-9P8	5/pkg	92.50
15 micron Type A Diamond (Plain-backed) Lapping Film	DA-15P8	5/pkg	92.50
30 micron Type A Diamond (Plain-backed) Lapping Film	DA-30P8	5/pkg	150.00
45 micron Type A Diamond (Plain-backed) Lapping Film	DA-45P8	5/pkg	150.00



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10-inch Diamond Lapping Films (Type A) with Plain-Backing

10-inch Diamond Type A Lapping Films Plain-Backed (5/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron Type A Diamond (Plain-backed) Lapping Film	DA-01P10	5/pkg	145.00
0.25 micron Type A Diamond (Plain-backed) Lapping Film	DA-025P10	5/pkg	145.00
0.50 micron Type A Diamond (Plain-backed) Lapping Film	DA-05P10	5/pkg	145.00
1 micron Type A Diamond (Plain-backed) Lapping Film	DA-1P10	5/pkg	145.00
3 micron Type A Diamond (Plain-backed) Lapping Film	DA-3P10	5/pkg	145.00
6 micron Type A Diamond (Plain-backed) Lapping Film	DA-6P10	5/pkg	145.00
9 micron Type A Diamond (Plain-backed) Lapping Film	DA-9P10	5/pkg	145.00
15 micron Type A Diamond (Plain-backed) Lapping Film	DA-15P10	5/pkg	145.00
30 micron Type A Diamond (Plain-backed) Lapping Film	DA-30P10	5/pkg	175.00
45 micron Type A Diamond (Plain-backed) Lapping Film	DA-45P10	5/pkg	175.00



12-inch Diamond Lapping Films (Type A) with Plain-Backing

12-inch Diamond Type A Lapping Films Plain-Backed (3/pkg)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron Type A Diamond (Plain-backed) Lapping Film	DA-01P12	3/pkg	160.00
0.25 micron Type A Diamond (Plain-backed) Lapping Film	DA-025P12	3/pkg	160.00
0.50 micron Type A Diamond (Plain-backed) Lapping Film	DA-05P12	3/pkg	160.00
1 micron Type A Diamond (Plain-backed) Lapping Film	DA-1P12	3/pkg	160.00
3 micron Type A Diamond (Plain-backed) Lapping Film	DA-3P12	3/pkg	160.00
6 micron Type A Diamond (Plain-backed) Lapping Film	DA-6P12	3/pkg	160.00
9 micron Type A Diamond (Plain-backed) Lapping Film	DA-9P12	3/pkg	160.00
15 micron Type A Diamond (Plain-backed) Lapping Film	DA-15P12	3/pkg	160.00
30 micron Type A Diamond (Plain-backed) Lapping Film	DA-30P12	3/pkg	185.00
45 micron Type A Diamond (Plain-backed) Lapping Film	DA-45P12	3/pkg	185.00



Diamond Lapping Film Color Guide



8-inch Diamond Lapping Films (Type A) with PSA-Backing



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8-inch Diamond Type A Lapping Films, Adhesive Backed (5/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-01P8	5/pkg	107.00
0.25 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-025P8	5/pkg	107.00
0.50 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-05P8	5/pkg	107.00
1 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-1P8	5/pkg	107.00
3 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-3P8	5/pkg	107.00
6 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-6P8	5/pkg	107.00
9 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-9P8	5/pkg	107.00
15 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-15P8	5/pkg	107.00
30 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-30P8	5/pkg	160.00
45 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-45P8	5/pkg	160.00

10-inch Diamond Lapping Films (Type A) with PSA-Backing



10-inch Diamond Type A Lapping Films, Adhesive Backed (5/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-01P10	5/pkg	165.00
0.25 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-025P10	5/pkg	165.00
0.50 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-05P10	5/pkg	165.00
1 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-1P10	5/pkg	165.00
3 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-3P10	5/pkg	165.00
6 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-6P10	5/pkg	165.00
9 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-9P10	5/pkg	165.00
15 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-15P10	5/pkg	165.00
30 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-30P10	5/pkg	180.00
45 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-45P10	5/pkg	180.00

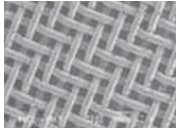





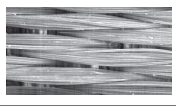

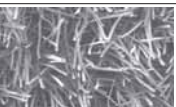

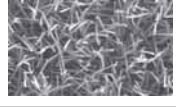


12-inch Diamond Lapping Films (Type A) with PSA-Backing



12-inch Diamond Type A Lapping Films, Adhesive Backed (3/pkg)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-01P12	3/pkg	175.00
0.25 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-025P12	3/pkg	175.00
0.50 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-05P12	3/pkg	175.00
1 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-1P12	3/pkg	175.00
3 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-3P12	3/pkg	175.00
6 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-6P12	3/pkg	175.00
9 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-9P12	3/pkg	175.00
15 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-15P12	3/pkg	175.00
30 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-30P12	3/pkg	202.00
45 micron	Type A Diamond (PSA-backed) Lapping Film	DAA-45P12	3/pkg	202.00

Polishing Pad Selection Guideline

SEM Photograph	Polishing Pad	Abrasive Application
	CERMESH™ Metal Mesh Pad - is a wire mesh surface useful for coarse and intermediate lapping/polishing. The texture of this wire allows for the abrasive to become semi-fixed; thus offering the advantage of increased stock removal, while minimizing damage.	45, 30 and 15 micron diamond
	POLYPAD™ Polishing Pad - is a very tightly woven and rugged polishing pad for intermediate polishing. Provides good removal and flatness.	15, 9 and 6 micron diamond
	TEXPAN™ Polishing Pad - is commonly used as an intermediate polishing pad for metals and ceramics. It is low napped for superior edge retention.	9, 6 micron diamond and 3, 1 micron diamond with colloidal silica
	BLACK CHEM™ 2 Polishing Pad - is a porometric polymer pad which has a consistency similar to a porous rubber type of pad. BLACK CHEM™ 2 pad has a low nap and is widely used for chemical mechanical polishing (CMP).	Colloidal silica or diamond and colloidal silica combination
	DACRON® 2 Polishing Pad - is a low napped polishing pad for polishing primarily with 1-9 micron diamond abrasives. It is also a very effective pad for coarser alumina abrasives.	9, 6 micron diamond and 3, 1 micron diamond with colloidal silica
	NYPAD™ Polishing Pad - is a low napped silk polishing pad for intermediate polishing primarily with mid-sized intermediate diamond abrasives.	9, 6 micron diamond and 3, 1 micron diamond with colloidal silica
	GOLD PAD Polishing Pad - is a low napped polishing pad for intermediate polishing primarily with 1-3 micron diamond abrasives.	3 and 1 micron diamond and alumina
	ATLANTIS Polishing Pad - is a low napped intermediate polishing pad for most metals. It is a stacked pad for better contouring to the specimen surface with minimal relief.	3 and 1 micron diamond and alumina
	MICROPAD™ and MICROPAD™2 Polishing Pad - are the most common high napped final polishing pad for metals and polymers. The high nap provides a very soft and gentle polishing action.	1, 0.5 and 0.25 micron diamond and alumina
	TRICOTE™ Polishing Pad - is a tight high napped final polishing pad for most metals. It has a tighter nap than the MICROPAD™ polishing pads.	1, 0.5 and 0.25 micron diamond and alumina
	NAPPAD™ Polishing Pad - is another high napped final polishing pad useful for most metals and polymers. It is especially useful for very soft materials such as aluminum and copper.	Alumina and colloidal silica
	MOLTEC™ 2 Polishing Pad - is a natural (wool) pad used for final polishing.	Alumina and colloidal silica
	FELT PAD - is a thick felt pad for polishing glass and large surface area parts (sapphire windows, etc).	Alumina and colloidal silica

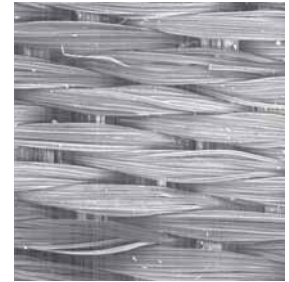
DACRON® is a registered trademark for Dupont

Metallographic Polishing

Metallographic polishing can be broken into two polishing categories: rough polishing and final polishing. Proper polishing requires the correct combination of polishing pad and abrasive run at the correct machine conditions (speed, direction and force).

ROUGH POLISHING:

The most critical metallographic preparation step is rough polishing. For this step, the remaining surface and subsurface damage following cutting and grinding needs to be removed. Following this stage, the true microstructure of the material should be restored (inclusions, brittle phases, voids, porosity, etc.) with the exception of a few surface imperfections, which can be subsequently removed at the final polishing stage.



Woven pad texture

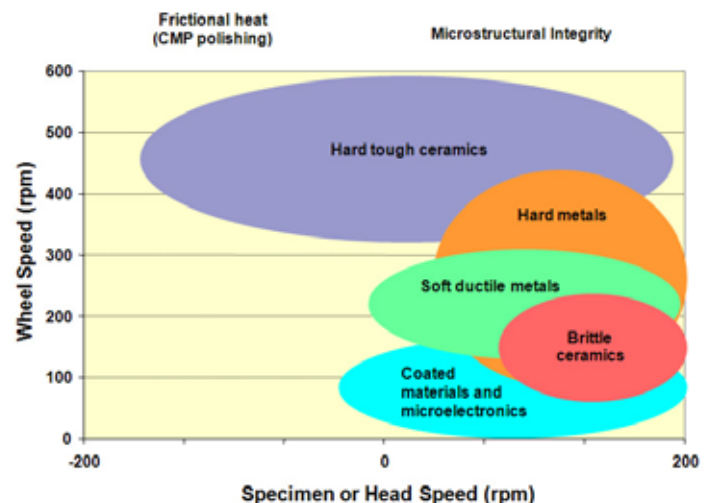
Rough polishing is most commonly accomplished with woven, low napped (napless) polishing pads paired with abrasive slurries such as diamond or alumina. The primary objective for rough polishing with woven polishing pads is to maintain the flatness across the specimen surface, especially if the specimen has both hard and soft phases, coatings, or other critical features.

Note: For cases where flatness is absolutely critical, polyester backed lapping films may provide better flatness.

For rough polishing operations that use alumina or diamond slurries, the correct choice for the polishing pad surface is critical. As already indicated, low napped polishing pads are recommended for rough polishing. Low napped polishing pads include woven, urethane coated fibers and porous urethane pads. Although, to a certain extent, determining the correct polishing pad is based on empirical trial and error experimentation, a number of properties which affect the polishing pad characteristics include:

1. Resin fibers (hardness, density, size, count, chemistry)
2. Type of weave
3. Compressibility of the pad
4. Porosity or polishing pad surface area
5. Wettability of the abrasive suspension with the pad

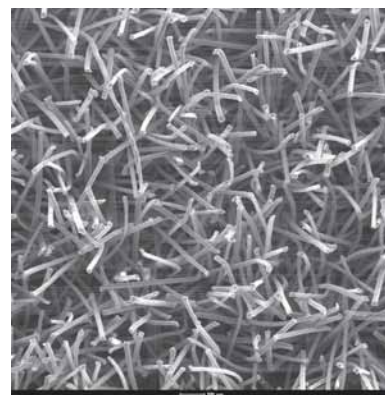
For automated disk-on-disk polishing, the relative velocity speed of rough polishing is dependent upon the type of material being prepared (see diagram.) For metals and materials highly susceptible to damage (brittle ceramics and microelectronic materials), the relative velocity differences should be small. Thus, running the specimen holder in the same direction and at approximately the same head and base speed (e.g. 150 rpm base speed / 150 rpm head speed) will create the least amount of damage to the specimen. However, keep in mind that removal rates will also be relatively low under these conditions.



FINAL POLISHING:

If the sample has been properly prepared up to this point, the true microstructure of the specimen should be intact. This includes retention of the inclusions, brittle phases/structures, sharp edges with no rounding, distinct porosity edges (no rounding), no smeared metal and no embedded abrasive particles.

Note: The only purposes for final polishing should be to clean up the surface and to prepare the surface for etching if it is required. If the true microstructure has not been resolved by this point in the preparation process, it is highly probable that the resulting surface after final polishing will still contain microstructural artifacts.

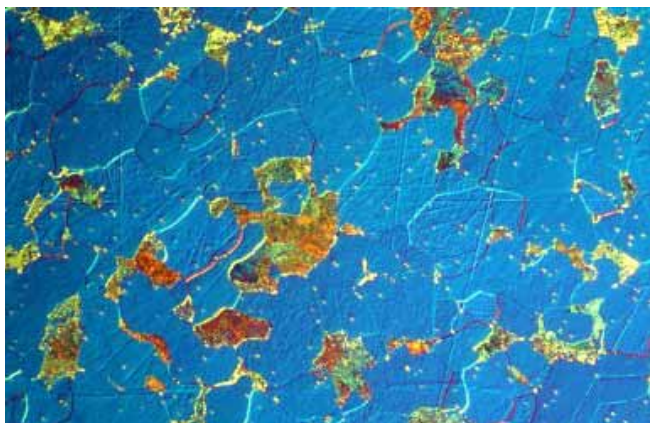


Napped or flocked polishing pad

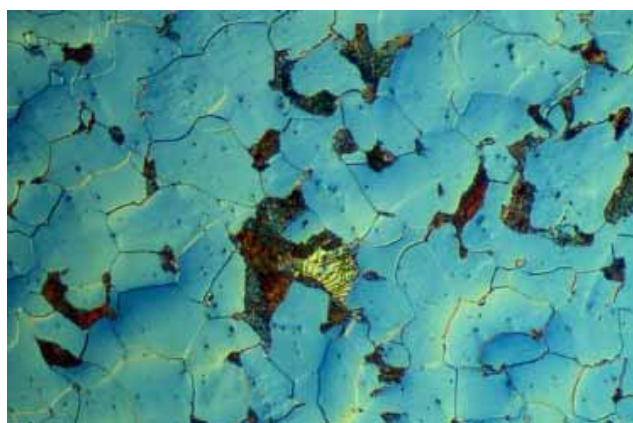
Final polishing is most commonly accomplished with napped or flocked polishing pads using an abrasive slurry such as alumina. However, with the proper backing, woven pads can also be used successfully.

VIBRATORY POLISHING:

A unique mechanical polishing technique which still uses the standard polishing abrasives is known as vibratory polishing. Vibratory polishing uses a spring and motor to create the vibration. Essentially, the sample is vibrating up and down; however, by angling the spring mechanism, the specimen will also rotate around the polishing bowl. Vibratory polishing is a very low deformation polishing technique; however, polishing is usually very slow and it is not uncommon to polish samples for hours to days with this technique. The microstructures below show the effect of polishing a low carbon steel with standard polishing techniques compared to vibratory polishing. As can be seen under DIC illumination, vibratory polishing is an effective polishing technique for removing surface deformation. Vibratory polishing has also been shown to be the best specimen preparation EBSD analysis.



1018 Steel, standard polishing, etchant 2% Nital, mag. 400X DIC



1018 Steel, Vibratory polishing, etchant 2% Nital, mag. 400X DIC

Polishing Pads with Adhesive Backing

CERMESH™ PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch CERMESH™ Metal Mesh Cloth (PSA-backed)	CMESH-2008	5/pkg	80.00
9-inch CERMESH™ Metal Mesh Cloth (PSA-backed)	CMESH-2009	5/pkg	125.00
10-inch CERMESH™ Metal Mesh Cloth (PSA-backed)	CMESH-2010	5/pkg	142.00
12-inch CERMESH™ Metal Mesh Cloth (PSA-backed)	CMESH-2012	5/pkg	175.00
14-inch CERMESH™ Metal Mesh Cloth (PSA-backed)	CMESH-2014	5/pkg	245.00

POLYPAD™ PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch POLYPAD™ Polishing Pad (PSA-backed)	PP-6008	10/pkg	55.00
9-inch POLYPAD™ Polishing Pad (PSA-backed)	PP-6009	10/pkg	69.00
10-inch POLYPAD™ Polishing Pad (PSA-backed)	PP-6010	10/pkg	76.00
12-inch POLYPAD™ Polishing Pad (PSA-backed)	PP-6012	10/pkg	90.00
14-inch POLYPAD™ Polishing Pad (PSA-backed)	PP-6014	10/pkg	125.00

TEXPAN™ PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch TEXPAN™ Polishing Pad (PSA-backed)	TP-5008	10/pkg	42.00
9-inch TEXPAN™ Polishing Pad (PSA-backed)	TP-5009	10/pkg	62.00
10-inch TEXPAN™ Polishing Pad (PSA-backed)	TP-5010	10/pkg	70.00
12-inch TEXPAN™ Polishing Pad (PSA-backed)	TP-5012	10/pkg	86.00
14-inch TEXPAN™ Polishing Pad (PSA-backed)	TP-5014	10/pkg	120.00

BLACK CHEM™ 2 PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch BLACK CHEM™ 2 Polishing Pad (PSA-backed)	BC2-8008	10/pkg	110.00
9-inch BLACK CHEM™ 2 Polishing Pad (PSA-backed)	BC2-8009	10/pkg	128.00
10-inch BLACK CHEM™ 2 Polishing Pad (PSA-backed)	BC2-8010	10/pkg	135.00
12-inch BLACK CHEM™ 2 Polishing Pad (PSA-backed)	BC2-8012	10/pkg	175.00
14-inch BLACK CHEM™ 2 Polishing Pad (PSA-backed)	BC2-8014	10/pkg	245.00

DACRON® II PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch DACRON® II Polishing Pad (PSA-backed)	DC2-3008	5/pkg	68.00
9-inch DACRON® II Polishing Pad (PSA-backed)	DC2-3009	5/pkg	85.00
10-inch DACRON® II Polishing Pad (PSA-backed)	DC2-3010	5/pkg	95.00
12-inch DACRON® II Polishing Pad (PSA-backed)	DC2-3012	5/pkg	135.00
14-inch DACRON® II Polishing Pad (PSA-backed)	DC2-3014	5/pkg	195.00

8-inch



9-inch



10-inch



12-inch



14-inch



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Code is based on pad diameter.

Polishing Pads with Adhesive Backing

NYPAD™ PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch NYPAD™ Polishing Pad (PSA-backed)	NY-3008	10/pkg	48.00
9-inch NYPAD™ Polishing Pad (PSA-backed)	NY-3009	10/pkg	59.00
10-inch NYPAD™ Polishing Pad (PSA-backed)	NY-3010	10/pkg	65.00
12-inch NYPAD™ Polishing Pad (PSA-backed)	NY-3012	10/pkg	85.00
14-inch NYPAD™ Polishing Pad (PSA-backed)	NY-3014	10/pkg	120.00

GOLD PAD PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch GOLD PAD Polishing Pad (PSA-backed)	GP-4008	10/pkg	48.00
9-inch GOLD PAD Polishing Pad (PSA-backed)	GP-4009	10/pkg	59.00
10-inch GOLD PAD Polishing Pad (PSA-backed)	GP-4010	10/pkg	65.00
12-inch GOLD PAD Polishing Pad (PSA-backed)	GP-4012	10/pkg	85.00
14-inch GOLD PAD Polishing Pad (PSA-backed)	GP-4014	10/pkg	120.00

ATLANTIS PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch ATLANTIS Polishing Pad (PSA-backed)	ATL-3008	5/pkg	40.00
9-inch ATLANTIS Polishing Pad (PSA-backed)	ATL-3009	5/pkg	48.00
10-inch ATLANTIS Polishing Pad (PSA-backed)	ATL-3010	5/pkg	52.00
12-inch ATLANTIS Polishing Pad (PSA-backed)	ATL-3012	5/pkg	67.00
14-inch ATLANTIS Polishing Pad (PSA-backed)	ATL-3014	5/pkg	94.00

MICROPAD™ PSA-Backed

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MICROPAD™ Polishing Pad (PSA-backed)	MP-9008	10/pkg	40.00
9-inch MICROPAD™ Polishing Pad (PSA-backed)	MP-9009	10/pkg	48.00
10-inch MICROPAD™ Polishing Pad (PSA-backed)	MP-9010	10/pkg	55.00
12-inch MICROPAD™ Polishing Pad (PSA-backed)	MP-9012	10/pkg	72.00
14-inch MICROPAD™ Polishing Pad (PSA-backed)	MP-9014	10/pkg	98.00

MICROPAD™ 2 PSA-Backed (with stiffer backing)

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MICROPAD™ 2 Polishing Pad (PSA-backed)	MP2-9008	10/pkg	45.00
9-inch MICROPAD™ 2 Polishing Pad (PSA-backed)	MP2-9009	10/pkg	58.00
10-inch MICROPAD™ 2 Polishing Pad (PSA-backed)	MP2-9010	10/pkg	68.00
12-inch MICROPAD™ 2 Polishing Pad (PSA-backed)	MP2-9012	10/pkg	85.00
14-inch MICROPAD™ 2 Polishing Pad (PSA-backed)	MP2-9014	10/pkg	105.00



8-inch



9-inch



10-inch



12-inch



14-inch



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Code is based on pad diameter.

TRICOTE™ PSA-Backed

Pace	Product Name	Catalog Number	Pkg	Price (\$)
8-inch	TRICOTE™ Polishing Pad (PSA-backed)	TRI-4008	10/pkg	45.00
9-inch	TRICOTE™ Polishing Pad (PSA-backed)	TRI-4009	10/pkg	54.00
10-inch	TRICOTE™ Polishing Pad (PSA-backed)	TRI-4010	10/pkg	65.00
12-inch	TRICOTE™ Polishing Pad (PSA-backed)	TRI-4012	10/pkg	85.00
14-inch	TRICOTE™ Polishing Pad (PSA-backed)	TRI-4014	10/pkg	120.00

NAPPAD™ PSA-Backed

Pace	Product Name	Catalog Number	Pkg	Price (\$)
8-inch	NAPPAD™ Polishing Pad (PSA-backed)	NP-7008	10/pkg	40.00
9-inch	NAPPAD™ Polishing Pad (PSA-backed)	NP-7009	10/pkg	48.00
10-inch	NAPPAD™ Polishing Pad (PSA-backed)	NP-7010	10/pkg	65.00
12-inch	NAPPAD™ Polishing Pad (PSA-backed)	NP-7012	10/pkg	80.00
14-inch	NAPPAD™ Polishing Pad (PSA-backed)	NP-7014	10/pkg	120.00

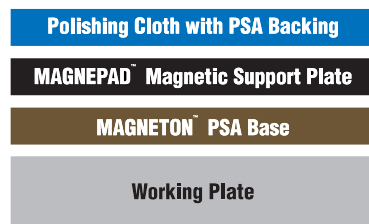
MOLTEC™ 2 PAD PSA-Backed

Pace	Product Name	Catalog Number	Pkg	Price (\$)
8-inch	MOLTEC™ 2 PAD Polishing Pad (PSA-backed)	MT2-7008	5/pkg	50.00
9-inch	MOLTEC™ 2 Polishing Pad (PSA-backed)	MT2-7009	5/pkg	58.00
10-inch	MOLTEC™ 2 Polishing Pad (PSA-backed)	MT2-7010	5/pkg	65.00
12-inch	MOLTEC™ 2 Polishing Pad (PSA-backed)	MT2-7012	5/pkg	80.00
14-inch	MOLTEC™ 2 Polishing Pad (PSA-backed)	MT2-7014	5/pkg	112.00

FELT PAD PSA-Backed

Pace	Product Name	Catalog Number	Pkg	Price (\$)
8-inch	FELT PAD Polishing Pad (PSA-backed)	FP-8125-08	5/pkg	50.00
9-inch	FELT PAD Polishing Pad (PSA-backed)	FP-8125-09	5/pkg	58.00
10-inch	FELT PAD Polishing Pad (PSA-backed)	FP-8125-10	5/pkg	65.00
12-inch	FELT PAD Polishing Pad (PSA-backed)	FP-8125-12	5/pkg	80.00
14-inch	FELT PAD Polishing Pad (PSA-backed)	FP-8125-14	5/pkg	112.00

Polishing Pads with Magnetic Backing



- A) Working Plate
B) MAGNETON™ PSA Base
C) MAGNEPAD™ Magnetic Plate
D) Polishing Pad (PSA)

Magnetic Polishing System using standard PSA backed polishing pads

Magnetic system utilizing PSA backed polishing pads

Magnetic system utilizing flexible magnetic backed polishing pads



- A) Working Plate
B) MAGNETON™ PSA Base
C) Polishing Pad (with magnetic backing)

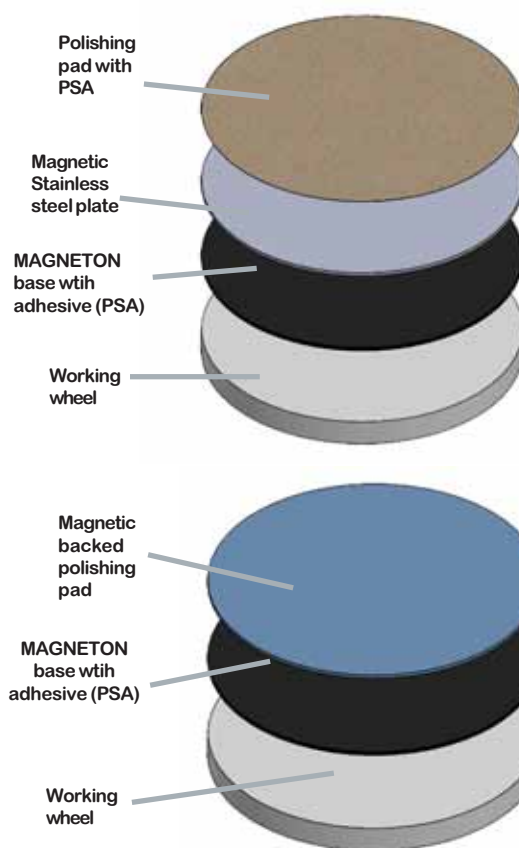
Magnetic Polishing System with magnetic backing on polishing cloth

Magnetic Polishing Pad System

The magnetic polishing pad system was designed to be a more economical solution for changing out polishing pads in-between polishing steps. Unlike SiC abrasive papers which need to be replaced after each set of samples, polishing pads can be used for numerous specimen preparation sequences. Thus the primary advantages for using magnetic backed polishing pads includes:

- Quick removal and changing
- Easy to store
- More economical use of charged polishing pads

The magnetic polishing system can be used in a number of ways. The most basic is to apply a PSA (adhesive backed) polishing pad to a magnetic stainless steel plate or a Teflon® coated stainless steel plate. Although using adhesive backed polishing pads is the most economical method, it can be a bit cumbersome to have to change out the polishing pads. Thus, the magnetic backed polishing pads are also available pre-assembled onto either a magnetic stainless steel plate or onto a ferrous rubber material. The ferrous rubber material is not magnetic itself; however, the magnetic particles embedded into the rubber allow it to be magnetically attached to a magnetic base.



Magnetic PSA Backed Base Plate

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MAGNETON™ Base Plate (PSA-backed)	MAG-B08	each	33.00
10-inch MAGNETON™ Base Plate (PSA-backed)	MAG-B10	each	36.00
12-inch MAGNETON™ Base Plate (PSA-backed)	MAG-B12	each	41.00
14-inch MAGNETON™ Base Plate (PSA-backed)	MAG-B14	each	58.00

Magnetic Teflon® Coated Stainless Steel Pad Base

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MAGNEPAD™ Teflon® Coated Base Plate	MAG-P08	each	42.00
10-inch MAGNEPAD™ Teflon® Coated Base Plate	MAG-P10	each	48.00
12-inch MAGNEPAD™ Teflon® Coated Base Plate	MAG-P12	each	60.00
14-inch MAGNEPAD™ Teflon® Coated Base Plate	MAG-P14	each	84.00
8-inch MAGNEPAD™ Stainless Steel Base Plate	SSMAG-P08	each	35.00
10-inch MAGNEPAD™ Stainless Steel Base Plate	SSMAG-P10	each	44.00
12-inch MAGNEPAD™ Stainless Steel Base Plate	SSMAG-P12	each	52.00
14-inch MAGNEPAD™ Stainless Steel Base Plate	SSMAG-P14	each	72.00

8-inch



10-inch



12-inch



14-inch



For quick online ordering scan the code. Code is based on pad diameter.

Polishing Pads with Magnetic Rubber

CERMESH™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch CERMESH™ Metal Mesh Magnetic Rubber Pad	CMESH-2008-MAG	5/pkg	90.00
10-inch CERMESH™ Metal Mesh Magnetic Rubber Pad	CMESH-2010-MAG	5/pkg	158.00
12-inch CERMESH™ Metal Mesh Magnetic Rubber Pad	CMESH-2012-MAG	5/pkg	195.00
14-inch CERMESH™ Metal Mesh Magnetic Rubber Pad	CMESH-2014-MAG	5/pkg	275.00

POLYPAD™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch POLYPAD™ Magnetic Rubber Pad	PP-6008-MAG	5/pkg	50.00
10-inch POLYPAD™ Magnetic Rubber Pad	PP-6010-MAG	5/pkg	70.00
12-inch POLYPAD™ Magnetic Rubber Pad	PP-6012-MAG	5/pkg	88.00
14-inch POLYPAD™ Magnetic Rubber Pad	PP-6014-MAG	5/pkg	125.00

TEXPAN™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch TEXPAN™ Magnetic Rubber Pad	TP-5008-MAG	5/pkg	40.00
10-inch TEXPAN™ Magnetic Rubber Pad	TP-5010-MAG	5/pkg	65.00
12-inch TEXPAN™ Magnetic Rubber Pad	TP-5012-MAG	5/pkg	80.00
14-inch TEXPAN™ Magnetic Rubber Pad	TP-5014-MAG	5/pkg	112.00

BLACK CHEM™ 2 Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch BLACK CHEM™ 2 Magnetic Rubber Pad	BC2-8008-MAG	5/pkg	105.00
10-inch BLACK CHEM™ 2 Magnetic Rubber Pad	BC2-8010-MAG	5/pkg	130.00
12-inch BLACK CHEM™ 2 Magnetic Rubber Pad	BC2-8012-MAG	5/pkg	170.00
14-inch BLACK CHEM™ 2 Magnetic Rubber Pad	BC2-8014-MAG	5/pkg	240.00

DACRON® II Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch DACRON® II Magnetic Rubber Pad	DC2-3008-MAG	5/pkg	99.50
10-inch DACRON® II Magnetic Rubber Pad	DC2-3010-MAG	5/pkg	115.00
12-inch DACRON® II Magnetic Rubber Pad	DC2-3012-MAG	5/pkg	155.00
14-inch DACRON® II Magnetic Rubber Pad	DC2-3014-MAG	5/pkg	225.00

NYPAD™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch NYPAD™ Magnetic Rubber Pad	NY-3008-MAG	5/pkg	48.00
10-inch NYPAD™ Magnetic Rubber Pad	NY-3010-MAG	5/pkg	65.00
12-inch NYPAD™ Magnetic Rubber Pad	NY-3012-MAG	5/pkg	85.00
14-inch NYPAD™ Magnetic Rubber Pad	NY-3014-MAG	5/pkg	120.00



8-inch

10-inch

12-inch

14-inch

For quick online ordering scan the code. Code is based on pad diameter.



Polishing Pads with Magnetic Rubber

GOLD PAD Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch GOLD PAD Magnetic Rubber Pad	GP-4008-MAG	5/pkg	45.00
10-inch GOLD PAD Magnetic Rubber Pad	GP-4010-MAG	5/pkg	60.00
12-inch GOLD PAD Magnetic Rubber Pad	GP-4012-MAG	5/pkg	80.00
14-inch GOLD PAD Magnetic Rubber Pad	GP-4014-MAG	5/pkg	112.00

ATLANTIS Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch ATLANTIS Magnetic Rubber Pad	ATL-3008-MAG	5/pkg	50.00
10-inch ATLANTIS Magnetic Rubber Pad	ATL-3010-MAG	5/pkg	72.00
12-inch ATLANTIS Magnetic Rubber Pad	ATL-3012-MAG	5/pkg	90.00
14-inch ATLANTIS Magnetic Rubber Pad	ATL-3014-MAG	5/pkg	125.00

MICROPAD™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MICROPAD™ Magnetic Rubber Pad	MP-9008-MAG	5/pkg	45.00
10-inch MICROPAD™ Magnetic Rubber Pad	MP-9010-MAG	5/pkg	60.00
12-inch MICROPAD™ Magnetic Rubber Pad	MP-9012-MAG	5/pkg	80.00
14-inch MICROPAD™ Magnetic Rubber Pad	MP-9014-MAG	5/pkg	112.00

TRICOTE™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch TRICOTE™ Magnetic Rubber Pad	TRI-4008-MAG	5/pkg	58.00
10-inch TRICOTE™ Magnetic Rubber Pad	TRI-4010-MAG	5/pkg	88.00
12-inch TRICOTE™ Magnetic Rubber Pad	TRI-4012-MAG	5/pkg	108.00
14-inch TRICOTE™ Magnetic Rubber Pad	TRI-4014-MAG	5/pkg	150.00

NAPPAD™ Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch NAPPAD™ Magnetic Rubber Polishing Pad	NP-7008-MAG	5/pkg	45.00
10-inch NAPPAD™ Magnetic Rubber Polishing Pad	NP-7010-MAG	5/pkg	60.00
12-inch NAPPAD™ Magnetic Rubber Polishing Pad	NP-7012-MAG	5/pkg	80.00
14-inch NAPPAD™ Magnetic Rubber Polishing Pad	NP-7014-MAG	5/pkg	112.00

MOLTEC™ 2 Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MOLTEC™ 2 Magnetic Rubber Polishing Pad	MT2-7008-MAG	5/pkg	58.00
10-inch MOLTEC™ 2 Magnetic Rubber Polishing Pad	MT2-7010-MAG	5/pkg	88.00
12-inch MOLTEC™ 2 Magnetic Rubber Polishing Pad	MT2-7012-MAG	5/pkg	108.00
14-inch MOLTEC™ 2 Magnetic Rubber Polishing Pad	MT2-7014-MAG	5/pkg	150.00

FELT PAD Magnetic Rubber Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch FELT PAD Magnetic Rubber Polishing Pad	FP-8125-08-MAG	5/pkg	58.00
10-inch FELT PAD Magnetic Rubber Polishing Pad	FP-8125-10-MAG	5/pkg	88.00
12-inch FELT PAD Magnetic Rubber Polishing Pad	FP-8125-12-MAG	5/pkg	108.00
14-inch FELT PAD Magnetic Rubber Polishing Pad	FP-8125-14-MAG	5/pkg	150.00



Polishing Pads with Magnetic Metal Backing

CERMESH™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch CERMESH™ Stainless Magnetic Polishing Pad	CMESH-2008-SSMAG	5/pkg	95.00
10-inch CERMESH™ Stainless Magnetic Polishing Pad	CMESH-2010-SSMAG	5/pkg	165.00
12-inch CERMESH™ Stainless Magnetic Polishing Pad	CMESH-2012-SSMAG	5/pkg	205.00
14-inch CERMESH™ Stainless Magnetic Polishing Pad	CMESH-2014-SSMAG	5/pkg	288.00

POLYPAD™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch POLYPAD™ Stainless Magnetic Polishing Pad	PP-6008-SSMAG	5/pkg	70.00
10-inch POLYPAD™ Stainless Magnetic Polishing Pad	PP-6010-SSMAG	5/pkg	95.00
12-inch POLYPAD™ Stainless Magnetic Polishing Pad	PP-6012-SSMAG	5/pkg	120.00
14-inch POLYPAD™ Stainless Magnetic Polishing Pad	PP-6014-SSMAG	5/pkg	168.00

TEXPAN™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch TEXPAN™ Stainless Magnetic Polishing Pad	TP-5008-SSMAG	5/pkg	62.00
10-inch TEXPAN™ Stainless Magnetic Polishing Pad	TP-5010-SSMAG	5/pkg	85.00
12-inch TEXPAN™ Stainless Magnetic Polishing Pad	TP-5012-SSMAG	5/pkg	105.00
14-inch TEXPAN™ Stainless Magnetic Polishing Pad	TP-5014-SSMAG	5/pkg	150.00

BLACK CHEM™ 2 Magnetic Stainless Steel Polishing Pad

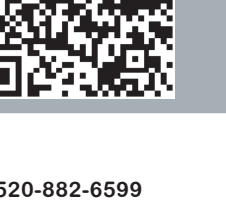
Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch BLACK CHEM™ 2 Stainless Magnetic Polishing Pad	BC2-8008-SSMAG	5/pkg	115.00
10-inch BLACK CHEM™ 2 Stainless Magnetic Polishing Pad	BC2-8010-SSMAG	5/pkg	135.00
12-inch BLACK CHEM™ 2 Stainless Magnetic Polishing Pad	BC2-8012-SSMAG	5/pkg	190.00
14-inch BLACK CHEM™ 2 Stainless Magnetic Polishing Pad	BC2-8014-SSMAG	5/pkg	260.00

DACRON® II Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch DACRON® II Stainless Magnetic Polishing Pad	DC2-3008-SSMAG	5/pkg	115.00
10-inch DACRON® II Stainless Magnetic Polishing Pad	DC2-3010-SSMAG	5/pkg	135.00
12-inch DACRON® II Stainless Magnetic Polishing Pad	DC2-3012-SSMAG	5/pkg	160.00
14-inch DACRON® II Stainless Magnetic Polishing Pad	DC2-3014-SSMAG	5/pkg	215.00

NYPAD™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch NYPAD™ Stainless Magnetic Polishing Pad	NY-3008-SSMAG	5/pkg	65.00
10-inch NYPAD™ Stainless Magnetic Polishing Pad	NY-3010-SSMAG	5/pkg	99.00
12-inch NYPAD™ Stainless Magnetic Polishing Pad	NY-3012-SSMAG	5/pkg	110.00
14-inch NYPAD™ Stainless Magnetic Polishing Pad	NY-3014-SSMAG	5/pkg	155.00



8-inch



10-inch



12-inch



14-inch



For quick online ordering scan the code. Code is based on pad diameter.

Polishing Pads with Magnetic Metal Backing

GOLD PAD Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch GOLD PAD Stainless Magnetic Polishing Pad	GP-4008-SSMAG	5/pkg	60.00
10-inch GOLD PAD Stainless Magnetic Polishing Pad	GP-4010-SSMAG	5/pkg	75.00
12-inch GOLD PAD Stainless Magnetic Polishing Pad	GP-4012-SSMAG	5/pkg	90.00
14-inch GOLD PAD Stainless Magnetic Polishing Pad	GP-4014-SSMAG	5/pkg	125.00

ATLANTIS Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch ATLANTIS Stainless Magnetic Polishing Pad	ATL-3008-SSMAG	5/pkg	58.00
10-inch ATLANTIS Stainless Magnetic Polishing Pad	ATL-3010-SSMAG	5/pkg	80.00
12-inch ATLANTIS Stainless Magnetic Polishing Pad	ATL-3012-SSMAG	5/pkg	99.00
14-inch ATLANTIS Stainless Magnetic Polishing Pad	ATL-3014-SSMAG	5/pkg	138.00

MICROPAD™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MICROPAD™ Stainless Magnetic Polishing Pad	MP-9008-SSMAG	5/pkg	60.00
10-inch MICROPAD™ Stainless Magnetic Polishing Pad	MP-9010-SSMAG	5/pkg	75.00
12-inch MICROPAD™ Stainless Magnetic Polishing Pad	MP-9012-SSMAG	5/pkg	90.00
14-inch MICROPAD™ Stainless Magnetic Polishing Pad	MP-9014-SSMAG	5/pkg	125.00

TRICOTE™ Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch TRICOTE™ Stainless Magnetic Polishing Pad	TRI-4008-SSMAG	5/pkg	65.00
10-inch TRICOTE™ Stainless Magnetic Polishing Pad	TRI-4010-SSMAG	5/pkg	95.00
12-inch TRICOTE™ Stainless Magnetic Polishing Pad	TRI-4012-SSMAG	5/pkg	115.00
14-inch TRICOTE™ Stainless Magnetic Polishing Pad	TRI-4014-SSMAG	5/pkg	160.00

NAPPAD™ Magnetic Stainless Steel Polishing Pad

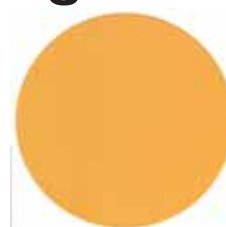
Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch NAPPAD™ Stainless Magnetic Polishing Pad	NP-7008-SSMAG	5/pkg	60.00
10-inch NAPPAD™ Stainless Magnetic Polishing Pad	NP-7010-SSMAG	5/pkg	75.00
12-inch NAPPAD™ Stainless Magnetic Polishing Pad	NP-7012-SSMAG	5/pkg	90.00
14-inch NAPPAD™ Stainless Magnetic Polishing Pad	NP-7014-SSMAG	5/pkg	125.00

MOLTEC™ 2 Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch MOLTEC™ 2 Stainless Magnetic Polishing Pad	MT2-7008-SSMAG	5/pkg	65.00
10-inch MOLTEC™ 2 Stainless Magnetic Polishing Pad	MT2-7010-SSMAG	5/pkg	95.00
12-inch MOLTEC™ 2 Stainless Magnetic Polishing Pad	MT2-7012-SSMAG	5/pkg	115.00
14-inch MOLTEC™ 2 Stainless Magnetic Polishing Pad	MT2-7014-SSMAG	5/pkg	160.00

FELT PAD Magnetic Stainless Steel Polishing Pad

Pace Product Name	Catalog Number	Pkg	Price (\$)
8-inch FELT PAD Stainless Magnetic Polishing Pad	FP-8125-08-SSMAG	5/pkg	65.00
10-inch FELT PAD Stainless Magnetic Polishing Pad	FP-8125-10-SSMAG	5/pkg	95.00
12-inch FELT PAD Stainless Magnetic Polishing Pad	FP-8125-12-SSMAG	5/pkg	115.00
14-inch FELT PAD Stainless Magnetic Polishing Pad	FP-8125-14-SSMAG	5/pkg	160.00



Metallographic Diamond

The majority of specimens will use at least one, if not multiple, diamond polishing steps. For metallographic specimen preparation either a man-made synthetic polycrystalline diamond or a monocrystalline diamond is used and the diamond is either mixed into a suspending solution or in a paste form. For metallography, diamond is coded by the following color scheme:

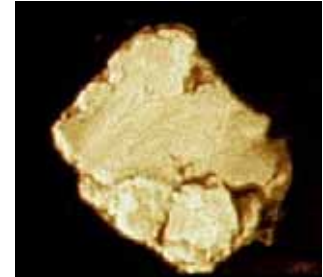


Diamond is the hardest material known to man (Mohs 10, 8000 HV). It has a cubic crystal structure, and is available either as a natural or an artificial product. For metallographic applications, both monocrystalline and polycrystalline diamond can be used, however polycrystalline diamond has a number of advantages over monocrystalline diamond, especially for the finer micron sizes.

These advantages include:

- Higher cutting rates
- Uniform surface finish
- More uniform particle size distribution
- Higher removal rates (self-sharpening abrasives)
- Harder/tougher particles
- Blocky shaped
- Hexagonal microcrystallites (equally hard in all directions)
- Extremely rough surface (more cutting points)
- Surface area 300% greater than monocrystalline diamond
- No abrasion-resistant directionality (abrasion independent of particle orientation)

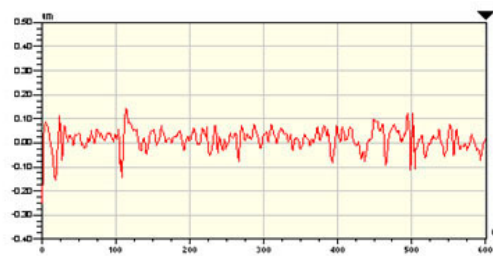
Polycrystalline diamond has a higher cut rate as compared to monocrystalline diamond. In addition to higher cut rates, polycrystalline diamond also produces a finer surface finish. The surface roughness, Ra, for rough polishing a low carbon steel with a 3 micron diamond was 0.03 micron for polycrystalline diamond and 0.09 micron for monocrystalline diamond. As demonstrated by the Rq value (0.012 micron for monocrystalline diamond, 0.04 micron polycrystalline diamond), the average depth of the scratches is also much deeper for monocrystalline diamond as compared to the PC diamond.



Blocky monocrystalline diamond



Polycrystalline diamond

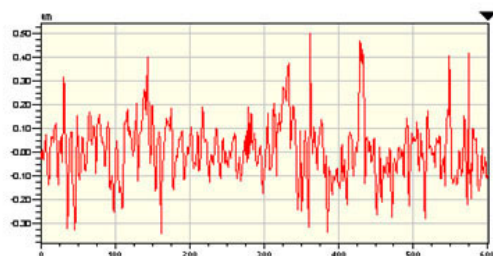


Surface roughness of a low carbon steel polished with 3 micron polycrystalline diamond

Rq	0.04 um
Ra	0.03 um
Rt	0.39 um
Rp	0.14 um
Rv	-0.25 um

Angle	440.28 urad
Curve	-1.69 m
Terms	None
Avg Ht	0.02 um
Area	9.28 um2

nd



Surface roughness of a low carbon steel polished with 3 micron monocrystalline diamond

Rq	0.12 um
Ra	0.09 um
Rt	0.84 um
Rp	0.50 um
Rv	-0.34 um

Angle	-94.78 urad
Curve	-0.98 m
Terms	None
Avg Ht	0.01 um
Area	4.26 um2

nd

Polycrystalline Diamond Suspensions (High Viscosity)

PC High Viscosity Colloidal Diamond Suspension for Manual Dispensers

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-0105-250	250 ml	48.00
0.05 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-0105-500	500 ml	86.00
0.05 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0105-1GL	1 gallon	450.00
0.10 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-0110-250	250 ml	48.00
0.10 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-0110-500	500 ml	86.00
0.10 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0110-1GL	1 gallon	450.00
0.25 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-0125-250	250 ml	48.00
0.25 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-0125-500	500 ml	86.00
0.25 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0125-1GL	1 gallon	450.00
0.50 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-0150-250	250 ml	48.00
0.50 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-0150-500	500 ml	86.00
0.50 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0150-1GL	1 gallon	450.00
1 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1001-250	250 ml	48.00
1 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1001-500	500 ml	86.00
1 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1001-1GL	1 gallon	450.00



250 ml



500 ml



1 Gallon



For quick online ordering scan the code. Code is based on suspension amount.

Polycrystalline Diamond Suspensions (High Viscosity)

PC High Viscosity Diamond Suspension for Manual Dispensers

Pace Product Name	Catalog Number	Pkg	Price (\$)
3 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1003-250	250 ml	55.00
3 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1003-500	500 ml	99.00
3 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1003-1GL	1 gallon	465.00
6 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1006-250	250 ml	62.00
6 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1006-500	500 ml	108.00
6 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1006-1GL	1 gallon	470.00
9 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1009-250	250 ml	62.00
9 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1009-500	500 ml	108.00
9 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1009-1GL	1 gallon	470.00
15 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1015-250	250 ml	62.00
15 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1015-500	500 ml	108.00
15 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1015-1GL	1 gallon	470.00
30 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1030-250	250 ml	74.00
30 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1030-500	500 ml	122.00
30 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1030-1GL	1 gallon	485.00
45 micron DIAMAT™ PC High Viscosity Diamond Suspension (250 ml)	PC-1045-250	250 ml	74.00
45 micron DIAMAT™ PC High Viscosity Diamond Suspension (500 ml)	PC-1045-500	500 ml	122.00
45 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1045-1GL	1 gallon	485.00



High Viscosity Polycrystalline Diamond Suspensions

For quick online
ordering scan the
code. Code is
based on
suspension amount.

250 ml



500 ml



1 Gallon



Polycrystalline Diamond Suspensions (Low Viscosity)

PC Low Viscosity Colloidal Diamond Suspension for Automated Dispensers

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-0105-250	250 ml	48.00
0.05 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-0105-500	500 ml	86.00
0.05 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0105-1GL	1 gallon	450.00
0.10 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-0110-250	250 ml	48.00
0.10 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-0110-500	500 ml	86.00
0.10 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0110-1GL	1 gallon	450.00
0.25 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-0125-250	250 ml	48.00
0.25 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-0125-500	500 ml	86.00
0.25 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0125-1GL	1 gallon	450.00
0.50 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-0150-250	250 ml	48.00
0.50 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-0150-500	500 ml	86.00
0.50 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0150-1GL	1 gallon	450.00
1 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1001-250	250 ml	48.00
1 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1001-500	500 ml	86.00
1 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1001-1GL	1 gallon	450.00



Low Viscosity Colloidal Polycrystalline Diamond Suspensions

250 ml

500 ml

1 Gallon

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based on
suspension amount.



Polycrystalline Diamond Suspensions (Low Viscosity)

PC Low Viscosity Diamond Suspension for Automated Dispensers

Pace Product Name	Catalog Number	Pkg	Price (\$)
3 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1003-250	250 ml	55.00
3 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1003-500	500 ml	99.00
3 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1003-1GL	1 gallon	465.00
6 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1006-250	250 ml	62.00
6 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1006-500	500 ml	108.00
6 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1006-1GL	1 gallon	470.00
9 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1009-250	250 ml	62.00
9 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1009-500	500 ml	108.00
9 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1009-1GL	1 gallon	470.00
15 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1015-250	250 ml	62.00
15 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1015-500	500 ml	108.00
15 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1015-1GL	1 gallon	470.00
30 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1030-250	250 ml	74.00
30 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1030-500	500 ml	122.00
30 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1030-1GL	1 gallon	485.00
45 micron DIAMAT™ PC Low Viscosity Diamond Suspension (250 ml)	GPC-1045-250	250 ml	74.00
45 micron DIAMAT™ PC Low Viscosity Diamond Suspension (500 ml)	GPC-1045-500	500 ml	122.00
45 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1045-1GL	1 gallon	485.00



Low Viscosity Polycrystalline Diamond Suspensions

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based on
suspension amount.

250 ml



500 ml



1 Gallon



Polycrystalline Diamond Suspensions (1-gallon Refills)

PC Diamond Suspension – Refill (1-gallon) - High Viscosity

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0105-1GL	1 gallon	450.00
0.10 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0110-1GL	1 gallon	450.00
0.25 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0125-1GL	1 gallon	450.00
0.50 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-0150-1GL	1 gallon	450.00
1 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1001-1GL	1 gallon	450.00
3 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1003-1GL	1 gallon	465.00
6 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1006-1GL	1 gallon	470.00
9 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1009-1GL	1 gallon	470.00
15 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1015-1GL	1 gallon	470.00
30 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1030-1GL	1 gallon	485.00
45 micron DIAMAT™ PC High Viscosity Diamond Suspension (1 gallon)	PC-1045-1GL	1 gallon	485.00



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1-gallon PC Diamond Suspension Refills

PC Diamond Suspension – Refill (1-gallon) - Low Viscosity

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0105-1GL	1 gallon	450.00
0.10 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0110-1GL	1 gallon	450.00
0.25 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0125-1GL	1 gallon	450.00
0.50 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-0150-1GL	1 gallon	450.00
1 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1001-1GL	1 gallon	450.00
3 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1003-1GL	1 gallon	465.00
6 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1006-1GL	1 gallon	470.00
9 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1009-1GL	1 gallon	470.00
15 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1015-1GL	1 gallon	470.00
30 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1030-1GL	1 gallon	485.00
45 micron DIAMAT™ PC Low Viscosity Diamond Suspension (1 gallon)	GPC-1045-1GL	1 gallon	485.00



Polycrystalline Diamond Suspensions (Dyed)

PC Diamond Suspension – Dyed High Viscosity Diamond

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron (blue) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1001-1L	1-liter	132.00
1 micron (blue) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1001-1GLB	1-gallon	485.00
3 micron (green) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1003-1L	1-liter	184.00
3 micron (green) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1003-1GLG	1-gallon	465.00
6 micron (yellow) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1006-1L	1-liter	189.00
6 micron (yellow) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1006-1GLY	1-gallon	470.00
9 micron (red) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1009-1L	1-liter	189.00
9 micron (red) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1009-1GLR	1-gallon	470.00
15 micron (brown) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1015-1L	1-liter	189.00
15 micron (brown) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1015-1GLBR	1-gallon	470.00
30 micron (orange) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1030-1L	1-liter	215.00
30 micron (orange) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1030-1GLO	1-gallon	485.00
45 micron (purple) DIAMAT™ PC High Viscosity Diamond Suspension (1-liter)	PC-1045-1L	1-liter	215.00
45 micron (purple) DIAMAT™ PC High Viscosity Diamond Suspension (1-gallon)	PC-1045-1GLP	1-gallon	485.00



Dyed Polycrystalline Diamond Suspensions

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suspension amount.



1 Liter



1 Gallon

Monocrystalline Diamond Suspensions (High Viscosity)

MA High Viscosity Diamond Suspensions

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron (blue) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1001-250	250 ml	28.00
1 micron (blue) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1001-500	500 ml	55.00
1 micron (blue) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1001-1GL	1 gallon	295.00
3 micron (green) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1003-250	250 ml	32.00
3 micron (green) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1003-500	500 ml	64.00
3 micron (green) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1003-1GL	1 gallon	295.00
6 micron (yellow) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1006-250	250 ml	36.00
6 micron (yellow) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1006-500	500 ml	68.00
6 micron (yellow) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1006-1GL	1 gallon	295.00
9 micron (red) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1009-250	250 ml	36.00
9 micron (red) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1009-500	500 ml	68.00
9 micron (red) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1009-1GL	1 gallon	295.00
15 micron (brown) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1015-250	250 ml	36.00
15 micron (brown) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1015-500	500 ml	68.00
15 micron (brown) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1015-1GL	1 gallon	295.00
30 micron (orange) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1030-250	250 ml	42.00
30 micron (orange) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1030-500	500 ml	75.00
30 micron (orange) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1030-1GL	1 gallon	315.00
45 micron (purple) DIAMAT™ MA High Viscosity Diamond Suspension (250 ml)	MA-1045-250	250 ml	42.00
45 micron (purple) DIAMAT™ MA High Viscosity Diamond Suspension (500 ml)	MA-1045-500	500 ml	75.00
45 micron (purple) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1045-1GL	1 gallon	315.00



High Viscosity Monocrystalline Diamond

250 ml



500 ml



1 Gallon



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based on
suspension amount.

Monocrystalline Diamond Suspensions (Low Viscosity)

MA Low Viscosity Diamond Suspensions

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron (blue) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1001-250	250 ml	28.00
1 micron (blue) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1001-500	500 ml	55.00
1 micron (blue) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1001-1GL	1 gallon	295.00
3 micron (green) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1003-250	250 ml	32.00
3 micron (green) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1003-500	500 ml	64.00
3 micron (green) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1003-1GL	1 gallon	295.00
6 micron (yellow) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1006-250	250 ml	36.00
6 micron (yellow) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1006-500	500 ml	68.00
6 micron (yellow) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1006-1GL	1 gallon	295.00
9 micron (red) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1009-250	250 ml	36.00
9 micron (red) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1009-500	500 ml	68.00
9 micron (red) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1009-1GL	1 gallon	295.00
15 micron (brown) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1015-250	250 ml	36.00
15 micron (brown) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1015-500	500 ml	68.00
15 micron (brown) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1015-1GL	1 gallon	295.00
30 micron (orange) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1030-250	250 ml	42.00
30 micron (orange) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1030-500	500 ml	75.00
30 micron (orange) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1030-1GL	1 gallon	315.00
45 micron (purple) DIAMAT™ MA Low Viscosity Diamond Suspension (250 ml)	GMA-1045-250	250 ml	42.00
45 micron (purple) DIAMAT™ MA Low Viscosity Diamond Suspension (500 ml)	GMA-1045-500	500 ml	75.00
45 micron (purple) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1045-1GL	1 gallon	315.00



Low Viscosity Monocrystalline Diamond

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suspension amount.



250 ml



500 ml



1 Gallon

Monocrystalline Diamond Suspensions (1-gallon Refills)

MA Diamond Suspension – Refill (1-gallon) - High Viscosity

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron (blue) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1001-1GL	1 gallon	295.00
3 micron (green) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1003-1GL	1 gallon	295.00
6 micron (yellow) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1006-1GL	1 gallon	295.00
9 micron (red) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1009-1GL	1 gallon	295.00
15 micron (brown) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1015-1GL	1 gallon	295.00
30 micron (orange) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1030-1GL	1 gallon	315.00
45 micron (purple) DIAMAT™ MA High Viscosity Diamond Suspension (1 gallon)	MA-1045-1GL	1 gallon	315.00



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1-gallon Monocrystalline High Viscosity Diamond Refills

MA Diamond Suspension – Refill (1-gallon) - Low Viscosity

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron (blue) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1001-1GL	1 gallon	295.00
3 micron (green) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1003-1GL	1 gallon	295.00
6 micron (yellow) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1006-1GL	1 gallon	295.00
9 micron (red) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1009-1GL	1 gallon	295.00
15 micron (brown) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1015-1GL	1 gallon	295.00
30 micron (orange) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1030-1GL	1 gallon	315.00
45 micron (purple) DIAMAT™ MA Low Viscosity Diamond Suspension (1 gallon)	GMA-1045-1GL	1 gallon	315.00



1-gallon Monocrystalline Low Viscosity Diamond Refills

Diamond Polishing Pastes

Diamond pastes have been, and continue to be, commonly used for hand or manual polishing steps because they are easy to apply and the diamond is better charged or fixed onto the polishing pad as compared to diamond suspensions. They are less commonly used on automated polishing machines because diamond suspensions are easier to apply and they also have a built-in lubricant. The use of diamond pastes requires the application of an additional diamond extender or lubricant, which is typically either a glycol or alcohol based solution.

Polycrystalline Diamond Paste



Polycrystalline Diamond Paste

PC Diamond Paste

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.10 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-0210-05	5 grams	36.00
0.10 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-0210-20	20 grams	86.00
0.25 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-0225-05	5 grams	36.00
0.25 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-0225-20	20 grams	86.00
0.50 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-0250-05	5 grams	36.00
0.50 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-0250-20	20 grams	86.00
1 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2001-05	5 grams	37.00
1 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2001-20	20 grams	108.00
3 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2003-05	5 grams	55.00
3 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2003-20	20 grams	176.00
6 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2006-05	5 grams	55.00
6 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2006-20	20 grams	176.00
9 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2009-05	5 grams	55.00
9 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2009-20	20 grams	176.00
15 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2015-05	5 grams	62.00
15 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2015-20	20 grams	188.00
30 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2030-05	5 grams	62.00
30 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2030-20	20 grams	188.00
45 micron DIAMAT™ PC Diamond Paste (5 grams)	PC-2045-05	5 grams	65.00
45 micron DIAMAT™ PC Diamond Paste (20 grams)	PC-2045-20	20 grams	195.00

5 grams



20 grams



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Advantages

- Better pre-charging of polishing pads
- Easy to use for manual polishing
- Reduces embedded diamond in specimen
- Less frequent charging

Disadvantages

- Not practical for automated polishing machines
- Requires an additional lubricant or extender
- Increased potential to capture and hold contamination from grinding swarf

Monocrystalline Diamond Paste

MA Diamond Paste

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.25 micron (white) DIAMAT™ MA Diamond Paste (5 grams)	MA-0225-05	5 grams	15.00
0.25 micron (white) DIAMAT™ MA Diamond Paste (20 grams)	MA-0225-20	20 grams	45.00
0.50 micron (white) DIAMAT™ MA Diamond Paste (5 grams)	MA-0250-05	5 grams	15.00
0.50 micron (white) DIAMAT™ MA Diamond Paste (20 grams)	MA-0250-20	20 grams	45.00
1 micron (blue) DIAMAT™ MA Diamond Paste (5 grams)	MA-2001-05	5 grams	15.00
1 micron (blue) DIAMAT™ MA Diamond Paste (20 grams)	MA-2001-20	20 grams	45.00
3 micron (green) DIAMAT™ MA Diamond Paste (5 grams)	MA-2003-05	5 grams	18.00
3 micron (green) DIAMAT™ MA Diamond Paste (20 grams)	MA-2003-20	20 grams	55.00
6 micron (yellow) DIAMAT™ MA Diamond Paste (5 grams)	MA-2006-05	5 grams	18.00
6 micron (yellow) DIAMAT™ MA Diamond Paste (20 grams)	MA-2006-20	20 grams	55.00
9 micron (red) DIAMAT™ MA Diamond Paste (5 grams)	MA-2009-05	5 grams	18.00
9 micron (red) DIAMAT™ MA Diamond Paste (20 grams)	MA-2009-20	20 grams	55.00
15 micron (brown) DIAMAT™ MA Diamond Paste (5 grams)	MA-2015-05	5 grams	20.00
15 micron (brown) DIAMAT™ MA Diamond Paste (20 grams)	MA-2015-20	20 grams	60.00
30 micron (orange) DIAMAT™ MA Diamond Paste (5 grams)	MA-2030-05	5 grams	20.00
30 micron (orange) DIAMAT™ MA Diamond Paste (20 grams)	MA-2030-20	20 grams	60.00
45 micron (purple) DIAMAT™ MA Diamond Paste (5 grams)	MA-2045-05	5 grams	20.00
45 micron (purple) DIAMAT™ MA Diamond Paste (20 grams)	MA-2045-20	20 grams	60.00



Monocrystalline Diamond Paste

5 grams



20 grams



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based on
paste amount.

Diamond Extenders / Lubricants

Diamond lubricants or extenders are required for diamond pastes; however, they are also useful for thinning diamond suspensions. By alternating between the diamond suspension and the extender the diamond can better drop out of suspension and embed into the polishing surface. Extenders / lubricants are typically glycol or alcohol based products.



Diamond Extenders / Lubricants



For quick online
ordering scan the code.

Diamond Extender / Lubricants

Pace Product Name	Catalog Number	Pkg	Price (\$)
DIALUBE™ Diamond Extender (16 oz)	DL-3000-16	16 oz	10.00
DIALUBE™ Diamond Extender (32 oz)	DL-3000-32	32 oz	19.00
DIALUBE™ Diamond Extender (1/2 gallon)	DL-3000-64	1/2 gallon	36.00
DIALUBE™ Diamond Extender (1 gallon)	DL-3000-128	1 gallon	63.00
DIALUBE™ Blue Alcohol Based Lube (32 oz)*	AOD-3000-32	32 oz	15.00
DIALUBE™ Blue Alcohol Based Lube (1 gallon)*	AOD-3000-128	1 gallon	50.00
DIALUBE™ Blue Alcohol Based Lube (5 gallons)*	AOD-3000-640	5 gallons	240.00
DIALUBE™ Purple Alcohol Based Lube (32 oz)*	ADL-3000-32	32 oz	16.00
DIALUBE™ Purple Alcohol Based Lube (1 gallon)*	ADL-3000-128	1 gallon	52.00
DIALUBE™ Purple Alcohol Based Lube (5 gallons)*	ADL-3000-640	5 gallons	250.00
POLYLUBE™ Nonaqueous Diamond Extender (32 oz)	PDL-3000-32	32 oz	16.00
POLYLUBE™ Nonaqueous Diamond Extender (1 gallon)	PDL-3000-128	1 gallon	52.00
POLYLUBE™ Red (Anti-corrosion lube) (32 oz)	PDL-3000R-32	32 oz	16.00
POLYLUBE™ Red (Anti-corrosion lube) (1 gallon)	PDL-3000R-128	1 gallon	52.00

* May require dangerous goods shipping, extra charges may apply

Final Polishing

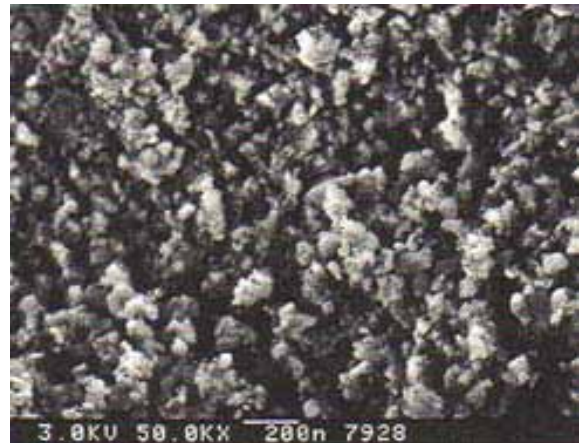
Final polishing has been accomplished with alumina, diamond, colloidal silica, ceria (cerium oxide) and rouge (iron oxide). However, the most commonly used abrasive for final polishing metals is alumina. Alumina abrasives can be classified as either calcined, levigated, or polycrystalline based on their manufacturing process, crystal structure (hardness) and their sizing process.

Alumina Property	Polycrystalline	Calcined	Levigated
Crystal structure	Polycrystalline alpha alumina	Monocrystalline alpha alumina	Monocrystalline gamma or alpha alumina
Shape	Rough spherical particles	Hexagonal platelets	Hexagonal platelets
Particle size	0.05-0.25 microns	0.5-15 microns	<1 micron
Specific gravity	3.95 gm/cc	3.95 gm/cc	3.95 gm/cc
Hardness	Knoop 2000 (Mohs 9)	Knoop 2000 (Mohs 9)	Mohs 8-9
Applications	Available in a slurry at either a pH 4 or pH 10, primarily for metal polishing	Available in powders, slurries or suspensions, rough polishing	More commonly known as Linde A (0.30 micron), Linde B (0.05 micron), Linde C (1 micron)

Polycrystalline Alumina

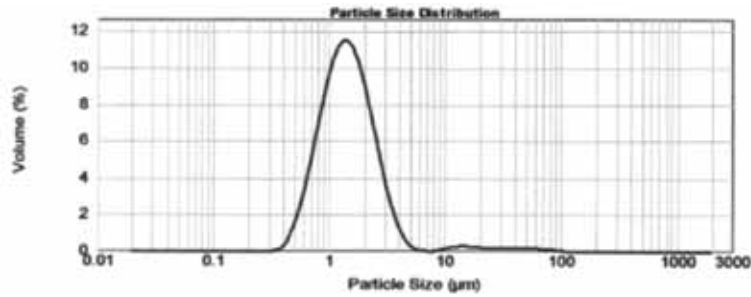
Polycrystalline, or nanometer, alumina is a colloidal alumina manufactured by a proprietary process. Polycrystalline abrasives are also milled at either a low or a higher pH in order to avoid agglomeration. The abrasive solution is maintained in solution to avoid aggregation. This processing offers two significant improvements over conventional calcined alumina processes:

- Tighter, more controlled particle size distributions
- Harder alpha alumina crystal

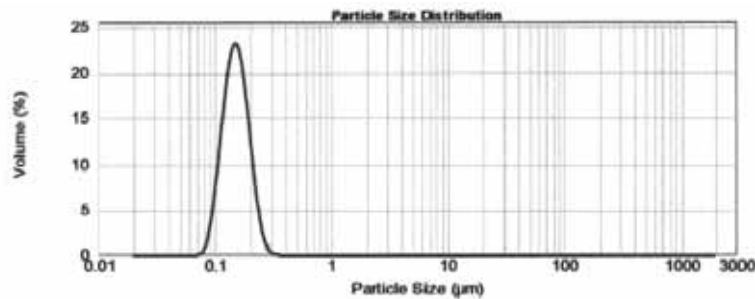


0.05 micron polycrystalline alumina (magnification 50,000X)

A tighter, more controlled particle size distribution is the result of less particle aggregation. For example, standard calcined 0.05 micron gamma alumina products form aggregate sizes as large as 5 microns. In some cases, these aggregates can be broken down during polishing with harder specimens; however, they are a problem when polishing softer metals (such as aluminum, tin, lead, copper and soft steels) with calcined alumina abrasives.



Particle size distribution for 0.05 micron deagglomerated alumina



Particle size distribution for 0.05 micron polycrystalline alumina

Nanometer polycrystalline alumina is specifically milled to produce a much smaller aggregate particle size distribution (<0.5 micron) (see PSD charts above). Polycrystalline alumina is also a harder alpha alumina particle, therefore making it a more efficient cutting abrasive. Thus, polycrystalline alumina is a much more controlled polishing abrasive compared to calcined gamma alumina abrasives.

In general, the more modern polycrystalline alumina abrasives outperform traditional calcined and levigated alumina abrasives for final polishing because they produce a much more consistent and better surface finish.

Advantages and Features of Polycrystalline Alumina

- Improved surface finishes over gamma alumina
- Less random scratching
- Higher cutting rates than gamma alumina
- More uniform surface finish
- Tighter particle size distributions than gamma alumina
- Low viscosity for easy dispensing
- Semi-permanent suspensions

Application of Polycrystalline Alumina Polishing

The most efficient polishing techniques are to initially wet the polishing cloth with the polycrystalline alumina slurry and then to slowly drip or spray the suspension onto the polishing cloth. The most common polishing cloths for alumina polishing are **MICROPAD™ (MICROPAD™ 2) pad**, **ATLANTIS pad**, **TRICOTE™ pad** and **NAPPAD™ pad**.

Final Polishing - Alumina Slurries

Alumina Polycrystalline Slurries

Pace Product Name	Catalog Number	Pkg	Price (\$)
Nanometer 0.05 micron Alumina Slurry - pH 10 (16 oz)	NA-1005-16	16 oz	27.00
Nanometer 0.05 micron Alumina Slurry - pH 10 (32 oz)	NA-1005-32	32 oz	48.00
Nanometer 0.05 micron Alumina Slurry - pH 10 (1/2 gallon)	NA-1005-64	1/2 gallon	84.00
Nanometer 0.05 micron Alumina Slurry - pH 10 (1 gallon)	NA-1005-128	1 gallon	158.00
Nanometer 0.05 micron Alumina Slurry - pH 4 (16 oz)	NA-1020-16	16 oz	32.00
Nanometer 0.05 micron Alumina Slurry - pH 4 (32 oz)	NA-1020-32	32 oz	58.00
Nanometer 0.05 micron Alumina Slurry - pH 4 (1/2 gallon)	NA-1020-64	1/2 gallon	90.00
Nanometer 0.05 micron Alumina Slurry - pH 4 (1 gallon)	NA-1020-128	1 gallon	166.00



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Alumina Slurries - Low Viscosity

Alumina Slurries (Low Viscosity)

Pace Product Name	Catalog Number	Pkg	Price (\$)
NANO 0.05 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1005-06	6 oz	18.00
NANO 0.05 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1005-16	16 oz	42.00
NANO 0.05 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1005-32	32 oz	75.00
NANO 0.05 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1005-128	1 gallon	162.00
NANO 0.3 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1003-06	6 oz	18.00
NANO 0.3 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1003-16	16 oz	42.00
NANO 0.3 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1003-32	32 oz	75.00
NANO 0.3 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1003-128	1 gallon	162.00
NANO 0.5 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1105-06	6 oz	18.00
NANO 0.5 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1105-16	16 oz	42.00
NANO 0.5 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1105-32	32 oz	75.00
NANO 0.5 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1105-128	1 gallon	162.00



Polycrystalline NANOMETER Alumina Slurries

Alumina Slurries - Low Viscosity



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Alumina Slurries (Low Viscosity)

Pace Product Name	Catalog Number	Pkg	Price (\$)
NANO 1 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1010-06	6 oz	18.00
NANO 1 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1010-16	16 oz	42.00
NANO 1 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1010-32	32 oz	75.00
NANO 1 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1010-128	1 gallon	162.00
NANO 3 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1030-06	6 oz	18.00
NANO 3 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1030-16	16 oz	42.00
NANO 3 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1030-32	32 oz	75.00
NANO 3 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1030-128	1 gallon	162.00
NANO 5 micron Alumina Low Viscosity Slurry (6 oz)	NANO-1050-06	6 oz	18.00
NANO 5 micron Alumina Low Viscosity Slurry (16 oz)	NANO-1050-16	16 oz	42.00
NANO 5 micron Alumina Low Viscosity Slurry (32 oz)	NANO-1050-32	32 oz	75.00
NANO 5 micron Alumina Low Viscosity Slurry (1 gallon)	NANO-1050-128	1 gallon	162.00



Low Viscosity NANO Alumina Slurries

Alumina Slurries - High Viscosity

Alumina Slurries (High Viscosity)

Pace Product Name	Catalog Number	Pkg	Price (\$)
NANO2 0.05 micron Thick Alumina Suspension (6 oz)	NANO2-1005-06	6 oz	20.00
NANO2 0.05 micron Thick Alumina Suspension (16 oz)	NANO2-1005-16	16 oz	45.00
NANO2 0.05 micron Thick Alumina Suspension (32 oz)	NANO2-1005-32	32 oz	80.00
NANO2 0.05 micron Thick Alumina Suspension (1 gallon)	NANO2-1005-128	1 gallon	175.00
NANO2 0.3 micron Thick Alumina Suspension (6 oz)	NANO2-1003-06	6 oz	20.00
NANO2 0.3 micron Thick Alumina Suspension (16 oz)	NANO2-1003-16	16 oz	45.00
NANO2 0.3 micron Thick Alumina Suspension (32 oz)	NANO2-1003-32	32 oz	80.00
NANO2 0.3 micron Thick Alumina Suspension (1 gallon)	NANO2-1003-128	1 gallon	175.00
NANO2 0.5 micron Thick Alumina Suspension (6 oz)	NANO2-1105-06	6 oz	20.00
NANO2 0.5 micron Thick Alumina Suspension (16 oz)	NANO2-1105-16	16 oz	45.00
NANO2 0.5 micron Thick Alumina Suspension (32 oz)	NANO2-1105-32	32 oz	80.00
NANO2 0.5 micron Thick Alumina Suspension (1 gallon)	NANO2-1105-128	1 gallon	175.00
NANO2 1 micron Thick Alumina Suspension (6 oz)	NANO2-1010-06	6 oz	20.00
NANO2 1 micron Thick Alumina Suspension (16 oz)	NANO2-1010-16	16 oz	45.00
NANO2 1 micron Thick Alumina Suspension (32 oz)	NANO2-1010-32	32 oz	80.00
NANO2 1 micron Thick Alumina Suspension (1 gallon)	NANO2-1010-128	1 gallon	175.00
NANO2 3 micron Thick Alumina Suspension (6 oz)	NANO2-1030-06	6 oz	20.00
NANO2 3 micron Thick Alumina Suspension (16 oz)	NANO2-1030-16	16 oz	45.00
NANO2 3 micron Thick Alumina Suspension (32 oz)	NANO2-1030-32	32 oz	80.00
NANO2 3 micron Thick Alumina Suspension (1 gallon)	NANO2-1030-128	1 gallon	175.00
NANO2 5 micron Thick Alumina Suspension (6 oz)	NANO2-1050-06	6 oz	20.00
NANO2 5 micron Thick Alumina Suspension (16 oz)	NANO2-1050-16	16 oz	45.00
NANO2 5 micron Thick Alumina Suspension (32 oz)	NANO2-1050-32	32 oz	80.00
NANO2 5 micron Thick Alumina Suspension (1 gallon)	NANO2-1050-128	1 gallon	175.00



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High Viscosity NANO2 Alumina Slurries

Electronics Grade Deagglomerated Alumina Suspensions



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Alumina Suspensions (For Electronics and Soft Materials High Viscosity)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Electronics Grade Deagglomerated Alumina (6 oz)	NANO2-1005-06E	6 oz	25.00
0.05 micron Electronics Grade Deagglomerated Alumina (16 oz)	NANO2-1005-16E	16 oz	65.00
0.05 micron Electronics Grade Deagglomerated Alumina (32 oz)	NANO2-1005-32E	32 oz	125.00
0.05 micron Electronics Grade Deagglomerated Alumina (1 gallon)	NANO2-1005-128E	1 gallon	475.00
0.3 micron Electronics Grade Deagglomerated Alumina (6 oz)	NANO2-1003-06E	6 oz	25.00
0.3 micron Electronics Grade Deagglomerated Alumina (16 oz)	NANO2-1003-16E	16 oz	65.00
0.3 micron Electronics Grade Deagglomerated Alumina (32 oz)	NANO2-1003-32E	32 oz	125.00
0.3 micron Electronics Grade Deagglomerated Alumina (1 gallon)	NANO2-1003-128E	1 gallon	475.00
1 micron Electronics Grade Deagglomerated Alumina (6 oz)	NANO2-1010-06E	6 oz	25.00
1 micron Electronics Grade Deagglomerated Alumina (16 oz)	NANO2-1010-16E	16 oz	65.00
1 micron Electronics Grade Deagglomerated Alumina (32 oz)	NANO2-1010-32E	32 oz	125.00
1 micron Electronics Grade Deagglomerated Alumina (1 gallon)	NANO2-1010-128E	1 gallon	475.00



Deagglomerated NANO2 Alumina Suspensions

Deagglomerated Alumina Powders

Fine Alumina Powders (For Electronic and Soft Materials)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Electronics Grade Deagglomerated Alumina Powder (1 lb)	ALR-1005-01E	1 lb	105.00
0.05 micron Electronics Grade Deagglomerated Alumina Powder (5 lbs)	ALR-1005-05E	5 lbs	475.00
0.3 micron Electronics Grade Deagglomerated Alumina Powder (1 lb)	ALR-0103-01E	1 lb	105.00
0.3 micron Electronics Grade Deagglomerated Alumina Powder (5 lbs)	ALR-0103-05E	5 lbs	475.00
1 micron Electronics Grade Deagglomerated Alumina Powder (1 lb)	ALR-0110-01E	1 lb	105.00
1 micron Electronics Grade Deagglomerated Alumina Powder (5 lbs)	ALR-0110-05E	5 lbs	475.00



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Deagglomerated alumina powders for
electronic and soft materials polishing

Deagglomerated Alumina Powders (colloidal <1 micron)

Pace Product Name	Catalog Number	Pkg	Price (\$)
0.05 micron Deagglomerated Alumina Powder (1 lb)	ALR-1005-01	1 lb	85.00
0.05 micron Deagglomerated Alumina Powder (5 lbs)	ALR-1005-05	5 lbs	395.00
0.3 micron Deagglomerated Alumina Powder (1 lb)	ALD-0103B-01	1 lb	75.00
0.3 micron Deagglomerated Alumina Powder (5 lbs)	ALD-0103B-05	5 lbs	325.00
0.3 micron Alumina Powder (1 lb) (High Density)	ALR-0103-01	1 lb	48.00
0.3 micron Alumina Powder (5 lbs) (High Density)	ALR-0103-05	5 lbs	220.00
0.5 micron Alumina Powder (1 lb)	ALR-0105-01	1 lb	48.00
0.5 micron Alumina Powder (5 lbs)	ALR-0105-05	5 lbs	220.00



Colloidal alumina powders
(<1 micron)

Alumina Polishing Powders



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Alumina Powders

Pace Product Name	Catalog Number	Pkg	Price (\$)
1 micron Alumina Powder (1 lb)	ALR-0110-01	1 lb	48.00
1 micron Alumina Powder (5 lbs)	ALR-0110-05	5 lbs	220.00
3 micron Alumina Powder (1 lb)	ALR-0130-01	1 lb	22.00
3 micron Alumina Powder (5 lbs)	ALR-0130-05	5 lbs	74.00
5 micron Alumina Powder (1 lb)	ALR-0150-01	1 lb	22.00
5 micron Alumina Powder (5 lbs)	ALR-0150-05	5 lbs	74.00



Alumina powders



Coarse Alumina Powders

Pace Product Name	Catalog Number	Pkg	Price (\$)
9 micron Alumina Powder (5 lbs)	ALR-0190-05	5 lbs	45.00
12 micron Alumina Powder (5 lbs)	ALR-1200-05	5 lbs	45.00
15 micron Alumina Powder (5 lbs)	ALR-1500-05	5 lbs	45.00
20 micron Alumina Powder (5 lbs)	ALR-2000-05	5 lbs	45.00
30 micron Alumina Powder (5 lbs)	ALR-3000-05	5 lbs	45.00
40 micron Alumina Powder (5 lbs)	ALR-4000-05	5 lbs	45.00
240 grit Alumina Powder (5 lbs)	ALR-0240-05	5 lbs	45.00
400 grit Alumina Powder (5 lbs)	ALR-0400-05	5 lbs	45.00
600 grit Alumina Powder (5 lbs)	ALR-0600-05	5 lbs	45.00



Coarse alumina powders

Colloidal Silica Polishing Abrasives

Colloidal silica abrasives for metallographic polishing typically range in particle size from 20 nm up to 70 nm (0.02-0.07 micron). The concentration of particles typically ranges from 25-50% solids. Even at these high concentrations, colloidal silica can be maintained in a nearly perfect suspension. The electrochemical stability of colloidal silica makes it an excellent chemical mechanical polishing abrasive for polishing ceramics. The main drawback to polishing with colloidal silica is that it will crystallize as it dehydrates. This is particularly troublesome around the lid of an open bottle. One way to reduce this crystallization is to add an ingredient to the colloidal silica suspension in order to reduce the evaporation rate of the water. A comparison of the two main types of colloidal silica, SIAMAT™ and SIAMAT™ 2 Colloidal Silica, are listed in the following table.

Properties	SIAMAT™ Colloidal Silica	SIAMAT™ 2 Colloidal Silica
Particle size	50-70 nm	20-40 nm
pH	9.5-10.0	9.5-10.0
Concentration	50% solids	40% solids
Specific gravity (@ 77°F/25°C)	1.39	1.25
Viscosity	15 cP	20 cP
Applications	Precision surface finishing for ceramics and glass. Ideal as a Chemical Mechanical Polishing (CMP) abrasive when used by itself or with diamond polishing abrasives	Precision surface finishing for metals and microelectronic materials
Polishing Pad recommendation	TEXPAN™ – As a polishing extender for intermediate polishing of ceramics and glass with diamond	MICROPAD™ – Metals and Composites
	BLACK CHEM™ 2 – Final polishing of glass and ceramics	BLACK CHEM™ 2 – Final polishing of microelectronics

Application of Colloidal Silica Polishing

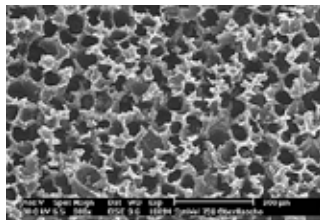
Colloidal silica polishing can be used by itself as a polishing abrasive, or in combination with other harder abrasives. Colloidal silica is a unique abrasive, as it can be either a chemical or an abrasive. For polishing hard, and often times brittle, materials such as glass and ceramics, the primary polishing mechanism is chemical. For metals, composites and microelectronic components, colloidal silica functions more as a traditional abrasive and mechanically polishes the surface.

For chemical polishing with colloidal silica, the porous **BLACK CHEM™ 2 Polishing Pad** works well because it allows the polishing process to generate more heat and thus enhances the chemical polishing rate. **GOLD PAD** and **TEXPAN™** polishing pads are also useful for polishing glass, ceramics and composites utilizing a combination of colloidal silica and diamond.

Final Polishing - Colloidal Silica



BLACK CHEM™ 2
Polishing Pad



BLACK CHEM™ 2 SEM image of
fiber structure

Colloidal silica suspensions also have very good dispersion, thus the particles are usually very uniform and work well for polishing metals. However, for polishing metals, care must be taken so that the colloidal silica does not dry out because this can result in the colloidal silica crystallizing and producing much larger abrasive particles.

The other key to successful polishing with colloidal silica is to clean the specimen surface immediately after the polishing step. The most basic cleaning process should take place, which includes running clean distilled water on the polishing pad for the last 15-30 seconds of the polishing step.

If cleaning is not accomplished before the colloidal silica crystallizes on the specimen surface, then either the polishing process should be repeated or the sample should be cleaned with a caustic cleaning solution. A commonly used cleaning solution for most materials is a mixture of ammonia (NH_4OH) with hydrogen peroxide.

Note: This solution will react, or etch, copper and copper alloys.



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Colloidal Silica - Blue

Pace Product Name	Catalog Number	Pkg	Price (\$)
SIAMAT™ Blue Colloidal Silica - 0.06 micron (16 oz)	SI-100B-16	16 oz	20.00
SIAMAT™ Blue Colloidal Silica - 0.06 micron (32 oz)	SI-100B-32	32 oz	38.00
SIAMAT™ Blue Colloidal Silica - 0.06 micron (1/2 gallon)	SI-100B-64	1/2 gallon	61.00
SIAMAT™ Blue Colloidal Silica - 0.06 micron (1 gallon)	SI-100B-128	1 gallon	108.00
SIAMAT™ Blue Colloidal Silica - 0.06 micron (5 gallons)	SI-100B-640	5 gallons	495.00



Colloidal Silica-Blue

Final Polishing - Colloidal Silica

Colloidal Silica

Pace Product Name	Catalog Number	Pkg	Price (\$)
SIAMAT™ Colloidal Silica - 0.06 micron (16 oz)	SI-100A-16	16 oz	20.00
SIAMAT™ Colloidal Silica - 0.06 micron (32 oz)	SI-100A-32	32 oz	35.00
SIAMAT™ Colloidal Silica - 0.06 micron (1/2 gallon)	SI-100A-64	1/2 gallon	61.00
SIAMAT™ Colloidal Silica - 0.06 micron (1 gallon)	SI-100A-128	1 gallon	108.00
SIAMAT™ Colloidal Silica - 0.06 micron (5 gallons)	SI-100A-640	5 gallons	495.00



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Colloidal Silica

Final Polishing - Colloidal Silica

Low-Crystallizing Colloidal Silica

Pace Product Name	Catalog Number	Pkg	Price (\$)
SIAMAT™ 2 Colloidal Silica - 0.02 micron (16 oz)	SI2-100A-16	16 oz	25.00
SIAMAT™ 2 Colloidal Silica - 0.02 micron (32 oz)	SI2-100A-32	32 oz	38.00
SIAMAT™ 2 Colloidal Silica - 0.02 micron (1/2 gallon)	SI2-100A-64	1/2 gallon	65.00
SIAMAT™ 2 Colloidal Silica - 0.02 micron (1 gallon)	SI2-100A-128	1 gallon	115.00
SIAMAT™ 2 Colloidal Silica - 0.02 micron (5 gallons)	SI2-100A-640	5 gallons	525.00



Low-Crystallizing Colloidal Silica

CMP Polishing Slurries

CMP (chemical-mechanical polishing) slurries are a combination of colloidal silica and polycrystalline alumina. The colloidal silica provides a chemical polishing action, whereas, the polycrystalline alumina provides a mechanical polishing action. CMP slurries, especially when used in conjunction with vibratory polishing produce flatter surface features and faster polishing rates.



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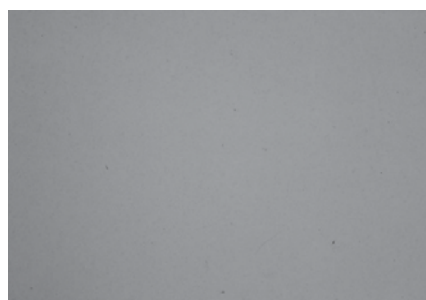
CMP Slurries - Alumina (Polycrystalline/Silica)

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	Chemical Mechanical Alumina-Silica Polishing Slurry (16 oz)	CMP-1005-16	16 oz	25.00
	Chemical Mechanical Alumina-Silica Polishing Slurry (32 oz)	CMP-1005-32	32 oz	45.00
	Chemical Mechanical Alumina-Silica Polishing Slurry (1/2 gallon)	CMP-1005-64	1/2 gallon	78.00
	Chemical Mechanical Alumina-Silica Polishing Slurry (1 gallon)	CMP-1005-128	1 gallon	122.00

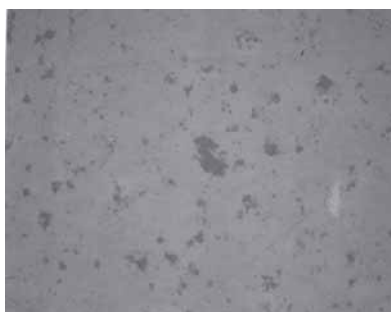


CMP2 Slurries - High Viscosity

Pace	Product Name	Catalog Number	Pkg	Price (\$)
	Chemical Mechanical Slurry - High Viscosity (16 oz)	CMP2-1005-16	16 oz	22.00
	Chemical Mechanical Slurry - High Viscosity (32 oz)	CMP2-1005-32	32 oz	40.00
	Chemical Mechanical Slurry - High Viscosity (1/2 gallon)	CMP2-1005-64	1/2 gallon	72.00
	Chemical Mechanical Slurry - High Viscosity (1 gallon)	CMP2-1005-128	1 gallon	115.00



Silicon Nitride CMP polished with colloidal silica



Silicon Nitride polishing with diamond

Cleaning

Ultrasonic Degreaser/Cleaner/Corrosion Inhibitor

Pace Product Name	Catalog Number	Pkg	Price (\$)
ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (32 oz)	UC2-1000-32	32 oz	14.00
ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (1/2 gallon)	UC2-1000-64	1/2 gallon	25.00
ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (1 gallon)	UC2-1000-128	1 gallon	48.00
IPA based Cleaning/Corrosion Inhibitor Additive (10-100X conc.) (32 oz)*	PCC-7500-032	32 oz	15.00



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Miscellaneous Supplies

Pace Product Name	Catalog Number	Pkg	Price (\$)
Compressed Non-flammable Gas (10 oz)*	AIR-1000	each	8.50
Polyurethane Clear Protective Coating (11 oz)*	URE-1000	each	18.50

* Requires Dangerous Goods shipping, extra charges may apply

Metallographic Handbook

PACE Technologies metallographic handbook provides the most comprehensive metallographic manual for the metallographer, metallurgist and materials scientist. The Metallographic Manual includes:

- Metallographic application data and examples
- Metallographic training
- Vast range of specimen preparation recommendations (broken down into 11 specimen preparation classes)
- Commonly used specimen specific etchants
- Detailed Image Analysis description as related to ASTM standards
- Electropolishing
- Hardness and microhardness testing

Note: Navigation chart for specific preparation methods, taken from Training and Etchant CD

Technical Support

Pace Product Name	Catalog Number	Pkg	Price (\$)
Metallographic Handbook	MET-MANUAL	each	25.00
Etchant Database and Training CD	CD-ETCH	each	25.00

Metallographic handbook and reference guide



Etchants



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Pre-mixed Etchants

Pace Product Name	Catalog Number	Pkg	Price (\$)
Adlers Etchant* (300 series Austenitic Stainless Steels)	ADLERS	250 ml	85.00
ASTM No. 30* (Copper Etchant)	ASTM No. 30	250 ml	85.00
Carpenters* (300 Series Stainless Steels)	CARPENTERS	250 ml	85.00
Copper No. 1* (Copper & Brass -nitric acid and DI water)	COPPER No. 1	250 ml	85.00
Copper No. 2* (Copper & Brass -HCl and Ferric Chloride)	COPPER No. 2	250 ml	85.00
Fry's Reagent* (Precipitation hardened stainless steel)	FRY'S	250 ml	85.00
Kallings No. 2 Reagent* (Martensitic 400 stainless steels)	KALLINGS	250 ml	85.00
Kellers Reagent* (Most common etch for aluminum alloys)	KELLERS	250 ml	85.00
Klemms Reagent* (Stain etch for brass)	KLEMMS	250 ml	85.00
Krolls Reagent* (Most common etch for titanium alloys)	KROLLS	250 ml	85.00
Lepito's Etchant* (Iron-nickel-chromium alloys)	LEPITO'S	250 ml	85.00
Marbles Reagent* (Nickel, nickel-iron alloys)	MARBLES	250 ml	85.00
Murakami's Reagent* (Chromium alloys)	MURAKAMI'S	250 ml	85.00
Nital Etchant* (Most common for non-heat treated or welded steel)	2% NITAL	250 ml	85.00
	3% NITAL	250 ml	85.00
	5% NITAL	250 ml	85.00
	8% NITAL	250 ml	85.00
Picral Etchant* (Heat treated steels)	PICRAL	250 ml	85.00
Titanium Attack Polish*	TI-AP-16	500 ml	85.00
Vilella's Reagent* (Most common for carburized steels)	VILELLA'S	250 ml	85.00
Waterless Kalling's* (Iron and nickel base alloys)	WATERLESS KALLING'S	250 ml	85.00

* Requires Hazmat Shipping (ground) or Dangerous Goods shipping (air), extra charges may apply.

Note: Etchants are not sold or shipped outside of the United States.

Hardness Test Blocks

Rockwell Test Blocks - Regular

Hardness Scale	Penetrator	Load	Ranges	Material	Catalog Number	Price (\$)
A Scale	C Diamond	60 Kg	A60-A84	Steel	RA10	82.00
A Scale	C Diamond	60 Kg	A20-A59	Brass	RA20	2.00
A Scale	A Diamond (Carbide)	60 Kg	A88 & up	Carbide	RA30	340.00
B Scale	1/16-inch Ball	100 Kg	B10-B92	Steel	RB10	82.00
B Scale	1/16-inch Ball	100 Kg	B90-B130	Steel	RB20	82.00
C Scale	C Diamond	150 Kg	All	Steel	RC10	82.00
D Scale	C Diamond	100 Kg	All	Steel	RD10	82.00
E Scale	1/8-inch Ball	100 Kg	All	Brass	RE10	82.00
F Scale	1/16-inch Ball	60 Kg	All	Brass	RF10	82.00
G Scale	1/16-inch Ball	150 Kg	G82-91	Brass	RG10	82.00
H Scale	1/8-inch Ball	60 Kg	All	Brass	RH10	82.00
K Scale	1/8-inch Ball	150 Kg	All	Brass	RK10	82.00
L Scale	1/4-inch Ball	60 Kg	All	Brass	RL10	82.00
M Scale	1/4-inch Ball	100 Kg	All	Brass	RP10	82.00
R Scale	1/2-inch Ball	60 Kg	All	Brass	RR10	82.00
S Scale	1/2-inch Ball	100 Kg	All	Brass	RS10	82.00
V Scale	1/2-inch Ball	150 Kg	All	Brass	RV10	82.00



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Rockwell Superficial Test Blocks

Hardness Scale	Penetrator	Load	Ranges	Material	Catalog Number	Price (\$)
15N Scale	N Diamond	15 Kg	All	Steel	S15N10	82.00
30N Scale	N Diamond	30 Kg	All	Steel	S30N10	82.00
45N Scale	N Diamond	45 Kg	All	Steel	S45N10	82.00
15T Scale	1/16-inch Ball	15 Kg	All	Brass	S15T10	82.00
30T Scale	1/16-inch Ball	30 Kg	All	Brass	S30T10	82.00
45T Scale	1/16-inch Ball	45 Kg	All	Brass	S45T10	82.00
15W Scale	1/8-inch Ball	15 Kg	All	Brass	S15W10	82.00
30W Scale	1/8-inch Ball	30 Kg	All	Brass	S30W10	82.00
45W Scale	1/8-inch Ball	45 Kg	All	Brass	S45W10	82.00
15X Scale	1/4-inch Ball	15 Kg	All	Brass	S15X10	82.00
30X Scale	1/4-inch Ball	30 Kg	All	Brass	S30X10	82.00
45X Scale	1/4-inch Ball	45 Kg	All	Brass	S45X10	82.00
15Y Scale	1/2-inch Ball	15 Kg	All	Brass	S15Y10	82.00
30Y Scale	1/2-inch Ball	30 Kg	All	Brass	S30Y10	82.00
45Y Scale	1/2-inch Ball	45 Kg	All	Brass	S45Y10	82.00



Hardness Test Blocks - Accessories

Anvils

Part Number	Description	Price (\$)
A1010	Pedestal Spot (1/4-inch) Anvil	160.00
A1020	1-1/2-inch Flat Anvil	160.00
A1030	2-1/2-inch Flat Anvil	205.00
A1040	Shallow "V" Anvil	205.00
A1050	Standard "V" Anvil	205.00
A1060	4-inch "V" Anvil	455.00



Hardness Test Blocks - Accessories



For quick online
ordering scan the code.

Ball Penetrators

Part Number	Description	Price (\$)
P20101	1/16-inch Rockwell Ball Penetrator Unit Indentron Certified	215.00
P20102	1/16-inch Rockwell Ball Penetrator Unit Versitron Certified	210.00
P2015030	1/16-inch Rockwell Carbide Ball Certified	11.00
P20201	1/8-inch Rockwell Ball Penetrator Unit Indentron Certified	245.00
P20202	1/8-inch Rockwell Ball Penetrator Unit Indentron Certified	27.50
P20250	1/8-inch Rockwell Carbide Ball Certified	280.00
P20301	1/4-inch Rockwell Ball Penetrator Unit Indentron Certified	280.00
P20350	1/4-inch Rockwell Carbide Ball Certified	38.00
P20401	1/2-inch Rockwell Ball Penetrator Unit Indentron Certified	305.00
P20450	1/2-inch Rockwell Carbide Ball Certified	50.00



Brinell Test Blocks and Accessories

Part Number	Description	Hardness Range	Price (\$)
B3000	3000 kg Load 10 mm Ball	All Hardness Ranges	140.00
B2000	2000 kg Load 10 mm Ball	All Hardness Ranges	140.00
B1500	1500 kg Load 10 mm Ball	All Hardness Ranges	140.00
B1000	1000 kg Load 10 mm Ball	All Hardness Ranges	140.00
B0500	500 kg Load 10 mm Ball	All Hardness Ranges	140.00
B0250	250 kg Load 10 mm Ball	All Hardness Ranges	140.00
B0187	187.5 kg Load 10 mm Ball	All Hardness Ranges	140.00
P3032	2.5 mm Carbide Balls (each)		22.00
P3031	5 mm Carbide Balls (each)		38.00
P3020	10 mm Carbide Balls (each)		50.00
P3132	2.5 mm Indenter with Carbide Ball		350.00
P3131	5 mm Indenter with Carbide Ball		390.00
P3134	10 mm Indenter with Carbide Ball		400.00



Microhardness Test Blocks and Accessories

Part Number	Description	Hardness Range	Price (\$)
MV010	Vickers (1 gram to 1000 grams)	All Ranges	455.00
MV020	Heavy Load Vickers (1 kg to 50 kg)	All Ranges	455.00
MK010	Knoop (1 gram to 1000 grams)	All Ranges	455.00

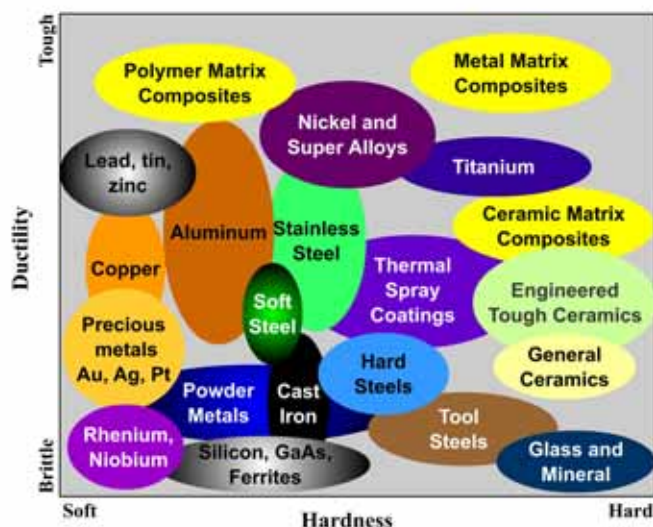
Note: When ordering please specify Knoop or Vickers, Load and the Hardness Number you require.

Part Number	Description	Price (\$)
P1110	Vickers Diamond Penetrator	795.00
P1120	Knoop Diamond Penetrator	795.00

Procedures

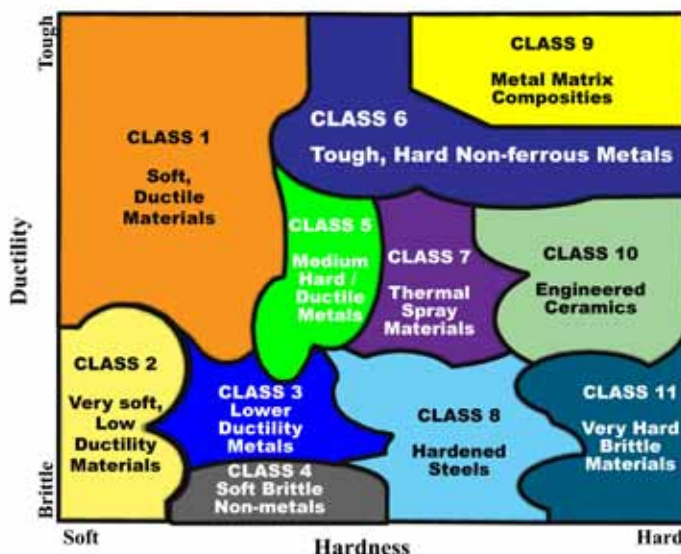
Preparation Class Procedures are available in either the “Metallographic Handbook” or in poster format. Email us at PACE@metallographic.com to request one for your lab or classroom today.

Metallographic specimen preparation techniques can vary significantly depending on the hardness or ductility of the material. The figure below shows a relative guideline chart based on the hardness and ductility for most materials analyzed by metallographic techniques. Metallographic specimen preparation procedures are fundamentally derived from this chart.



Relative hardness and ductility materials chart.

The figure below breaks the guidelines chart down into specific material classes and the following table provides an overview for the various material classes.



Guidelines chart for material classes.

Metallographic Preparation Breakdown by Material Classes

Class	Materials	Overview
1	Soft, ductile materials (aluminum, copper, lead, tin, zinc, PMC's)	-Relatively easy to prepare most materials in this class with the use of Alumina abrasives and 1-2 polishing steps.
2	Very soft, low ductility materials (rhenium, niobium, gold, silver)	- Can be difficult to prepare because these materials are very soft and abrasives can become embedded
3	Low ductility metals (powder metals and cast irons)	- Initial grinding with SiC abrasive is recommended, however rough polishing must minimize pull-out
4	Soft, brittle nonmetals (silicon, GaAs, electronic devices, ferrites)	-Subsurface damage must be minimized in cutting, grinding, and polishing of these materials. This requires the proper selection and application of the abrasive.
5	Medium hard, ductile metals (soft steels, stainless steels)	-Relatively easy to prepare most materials in this class with the use of SiC abrasives and 1-2 polishing steps
6	Tough, hard, non-ferrous metals (super alloys, titanium)	-Relatively easy to prepare most materials in this class with the use of SiC abrasives and 1-2 polishing steps
7	Thermal spray materials	-Can pose significant preparation challenges depending upon the properties of the coating
8	Hardened steels (high carbon and tool steels)	-Relatively easy to prepare most materials in this class with the use of SiC abrasives and 1-2 polishing steps
9	Metal Matrix Composites	-Very dependent upon both the matrix and filler material properties. See specific preparation procedures
10	Engineered Ceramics (zirconia, silicon nitride)	-Successful preparation is typically accomplished with colloidal silica by CMP polishing
11	Very hard, brittle materials (glass, minerals)	-Minimize initial damage and CMP polish with colloidal silica abrasives.

Preparation Recommendations

CLASS 1 - DUCTILE MATERIALS

Examples of ductile materials include aluminum, copper, brass, lead, tin, solder, zinc, polymers, and polymer matrix composites (PMC's).

Description:

Class 1 materials are relatively soft materials which have a wide range of industrial applications.

Preparation Challenge:

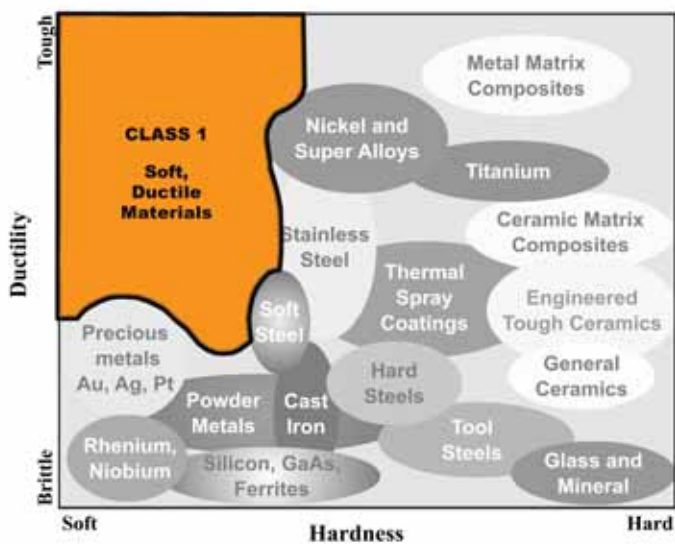
The difficulty in preparing these materials arises from the fact that these materials are very soft and often times have oxide inclusions (aluminum and copper) in the microstructure. Proper specimen preparation minimizes abrasive embedding and retains the oxides, thus eliminating scratching and smearing. If the specimen is not prepared properly, the microstructure will not be accurately represented.

SECTIONING

MAXCUT™ abrasive blade (MAX-C or MAX-E series)

MOUNTING

Compression mounting with Phenolic, Epoxy or Diallyl Phthalate compression mounting resins

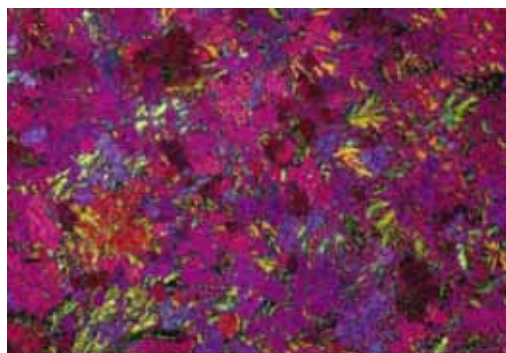


Class 1 - Ductile Materials

Preparation Guidelines for Class 1 Materials

Preparation Step	Basic recommendation
Rough Grinding	P220 grit ALO paper* P500 grit ALO paper P1200 grit ALO paper
Rough Polishing	1 or 2 diamond polishing steps on a woven polishing pad
Final Polishing	Polycrystalline alumina on a woven polishing pad

* Step may not be required for individual specimen preparation procedures



Zinc-Aluminum (200X B.F.), CrO3-Na2SO4 etchant



70-30 brass with twin boundaries, 200X BF

CLASS 2 - VERY SOFT, LOW DUCTILITY MATERIALS

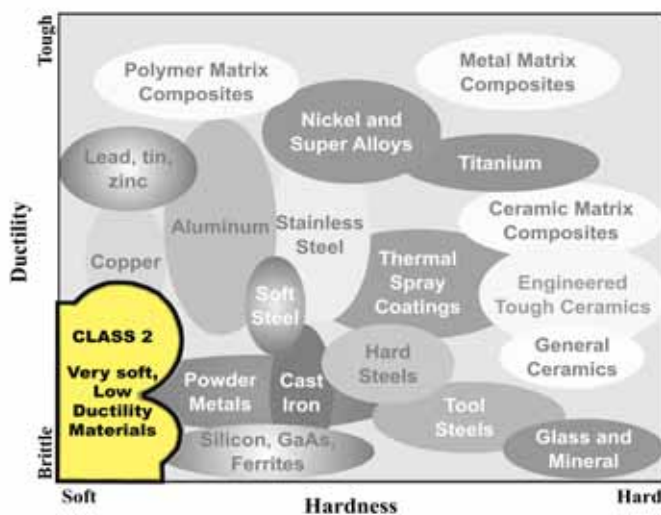
Examples include refractory metals (tungsten, rhenium, niobium, molybdenum), rare earths, precious metals (gold, silver, platinum).

Description:

Refractory metals such as rhenium, niobium and tungsten have very high melting temperatures; however, they are typically very soft and require the same specimen preparation considerations as other very soft metals.

Preparation Challenge:

For very soft materials, any loose or fractured abrasive particles can easily become embedded. This makes specimen preparation very difficult because it gums up diamond grinding disks or the specimen can become embedded with fractured SiC particles when ground with SiC papers. The key to preparation of these materials is to use tougher alumina abrasives and to chemically etch the specimen in between each grinding step. The purpose of etching is to remove the embedded particles so as not to carry them over to the next grinding step as contamination.



Class 2 - Very soft, low ductility materials

SECTIONING

MAXCUT™ abrasive blade (MAX-C or MAX-E series)

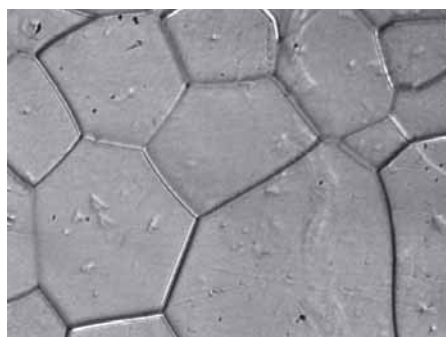
MOUNTING

Compression mounting with Phenolic, Epoxy or Diallyl Phthalate compression mounting resins

Preparation Guidelines for Class 2 Materials

Preparation Step	Basic recommendation
Rough Grinding	P220 grit ALO paper* P500 grit ALO paper P1200 grit ALO paper
Rough Polishing	1 micron diamond on a woven polishing pad
Final Polishing	Etch polish with polycrystalline alumina

* Step may not be required for individual specimen preparation procedures



Rhenium alloy, 1000X (B.F.),
Etchant 30 ml lactic acid, 30 ml HNO₃, 1 ml HF



Ne-Al-TiO alloy

CLASS 3 - LOWER DUCTILITY METALS

Examples of lower ductility metals include powder metals and cast iron.

Description:

Powder metallurgy is an example of a Class 3 low ductility material that is a very useful manufacturing process for parts designed with hard-to-machine geometries. The process includes pressing a metal powder into its shape and then sintering it just below the melting temperature of the alloy.

Preparation Challenge:

The metallographic specimen preparation of powder metallurgy samples is affected by the specimen's composition, packing and sintering conditions. Microstructural features of interest include: porosity, grain size, inclusions and orientation of voids. Proper metallurgical preparation takes into account that the microstructure may be porous and perhaps somewhat brittle due to inadequate sintering conditions.

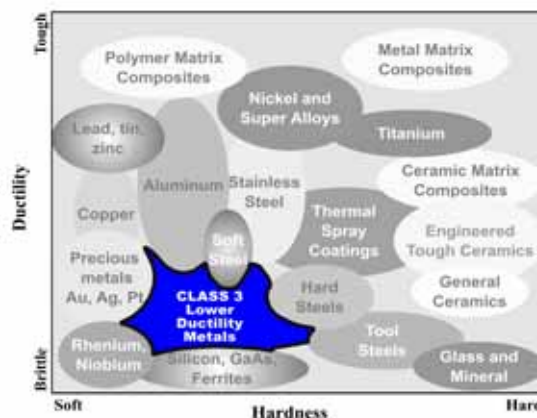
Vacuum impregnation is often used to support voids and porosity before initial grinding. In addition, metal smeared into pores can be removed by an intermediate etch in between polishing steps.

SECTIONING

MAXCUT™ abrasive blade (MAX-C or MAX-D series)

MOUNTING

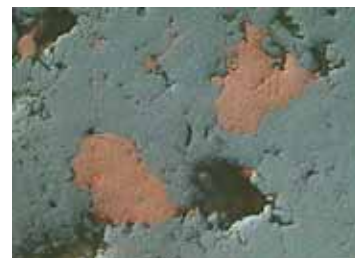
Castable epoxy or acrylics with vacuum impregnation



Class 3 - Low ductility materials

Preparation Guidelines for Class 3 - with Brittle Components

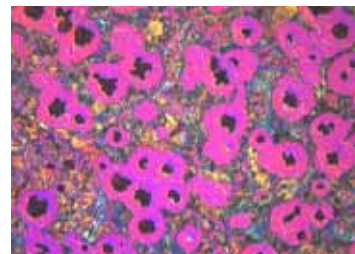
Preparation Step	Basic recommendation
Rough Grinding	Diamond on a metal mesh polishing cloth
Rough Polishing	Diamond on woven polishing pads
Final Polishing	Polycrystalline alumina on a napped polishing pad



Cu-Fe cold pressed, 500x

Preparation Guidelines for Class 3 - Powder Metals

Preparation Step	Basic recommendation
Rough Grinding	320*, 400, 600, 800, 1200 grit SiC paper
Rough Polishing	1 or 2 diamond polishing steps with a woven polishing pad
Final Polishing	Polycrystalline alumina on a woven polishing pad



Nodular Cast Iron (100X DIC), Nital etchant

* Step may not be required for individual specimen preparation procedures

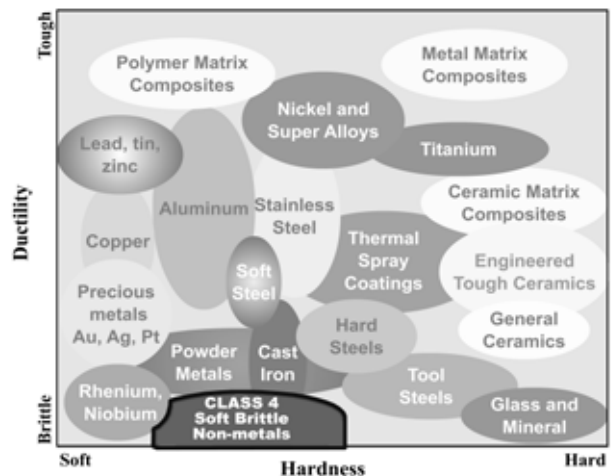
CLASS 4 - SOFT, BRITTLE NONMETALS (Electronics)

Examples include silicon, GaAs, ferrites, PZT's, MEMS devices.

Description: Ceramic capacitors are an example of a Class 4 softer more brittle types of material. These materials are typically very small, inexpensive devices used in cell phones, MP3 players, computers and other electronic products. MLC devices are constructed of alternating layers of metal and ceramic, with the ceramic material acting as the dielectric.

Preparation Challenge:

Microstructural analysis of a BaTiO₃ ceramic capacitor includes looking for missing metal layers, as well as examining for gaps and voids in the ceramic substrate. Microstructural preparation of multi-layer BaTiO₃ ceramic capacitors requires minimizing polishing relief and damage to the coating or ceramic substrate. This is accomplished by filling the existing voids with a castable resin under vacuum and then curing at a higher pressure. Initial grinding is required to open up the capacitor. The goal is to minimize microstructural damage at this step. Rough and final polishing are recommended on low napped woven polishing pads using diamond and colloidal silica, respectively.



Class 4 - Soft, brittle nonmetals and electronics

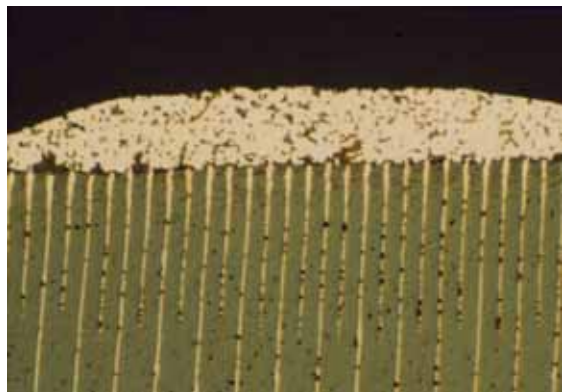
MOUNTING

Castable acrylic resins (CASTAMOUNT, ACRYLIC PLUS)

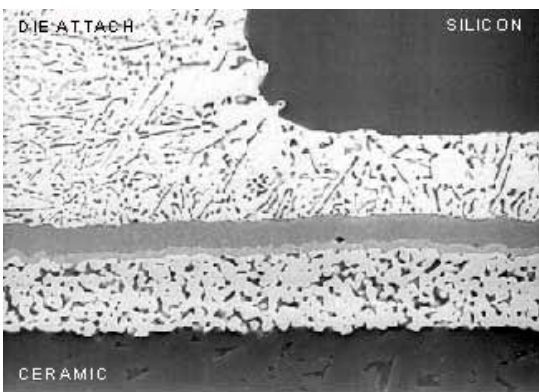
Preparation Guidelines for Class 4 Materials

Preparation Step	Soft Substrates	Basic Recommendation
Rough Grinding	320*, 400, 600, 800, 1200 grit SiC paper	45, 30, 15, 9 micron Lapping films
Rough Polishing	Diamond on a woven polishing pad	1-3 steps of diamond with woven polishing pads
Final Polishing	Polycrystalline alumina on a woven polishing pad	Colloidal silica on woven or porous urethane polishing pads

* Step may not be required for individual specimen preparation procedures



BaTiO₃ multilayer capacitor, 100X, as polished.



Electronic die

CLASS 5 - MEDIUM HARD, DUCTILE METALS

Examples include stainless steel, soft and medium hard steels.

Description:

Class 5 steels are ferrous alloys of iron containing relatively low concentrations of carbon (<2%). Steels also have a wide range of properties due to their ability to be heat treated and annealed. Depending upon the carbon concentration and other alloying elements, the microstructure of steel can be modified by heating, quenching and stress relief (annealing). Common microstructures include pearlite and ferrite for slow cooled low carbon steels and martensite for fast cooled high carbon steels. Pearlite and ferrite are relatively soft and ductile, whereas martensite is hard and brittle.

Preparation Challenge:

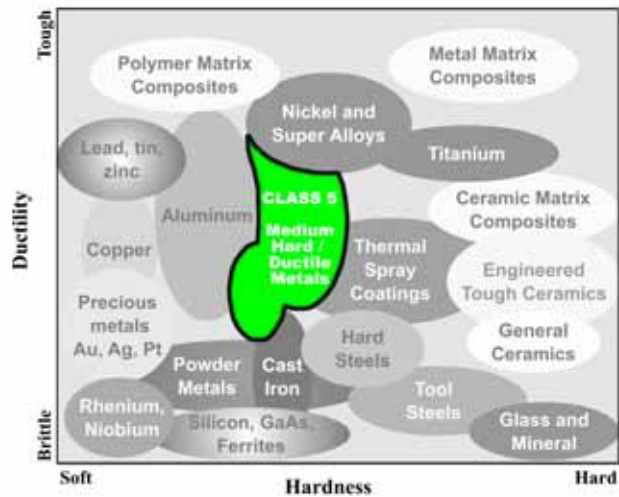
Metallographic specimen preparation is relatively straight forward.

SECTIONING

MAXCUT™ abrasive blade (MAX-D or MAX-A series)

MOUNTING

Phenolic, epoxy or diallyl phthalate compression mounting resins



Class 5 - Medium hard, ductile metals

Preparation Guidelines for Class 5 Materials

Preparation Step	Basic Recommendation
Rough Grinding	320*, 400, 600, 800, 1200 grit SiC paper
Rough Polishing	1 micron diamond on a woven polishing pad
Final Polishing	Polycrystalline alumina on a woven polishing pad

*Step may not be required for individual specimen preparation procedures



1095 Steel, Furnace Cooled (400X), 2% Nital etchant - Pearlite structure



Perfect Weld

CLASS 6 - TOUGH, HARD NON-FERROUS METALS

Examples include titanium, Inconel, Ni-Cr alloys, superalloys, nickel and cobalt alloys.

Description:

Class 6 materials such as titanium alloys are very useful because they have a good strength-to-weight ratio. This makes them ideal for use in areas ranging from aerospace to sports equipment.

Preparation Challenge:

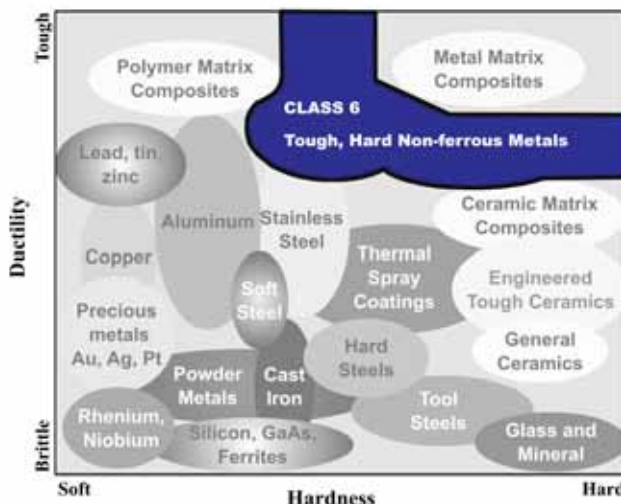
Metallographic preparation of titanium and titanium alloys is fairly straight forward by conventional metallographic techniques.

SECTIONING

MAXCUT™ abrasive blade (MAX-C or MAX-VHS series)

MOUNTING

Phenolic, epoxy or diallyl phthalate compression mounting resins



Class 6 - Tough, hard nonferrous metals

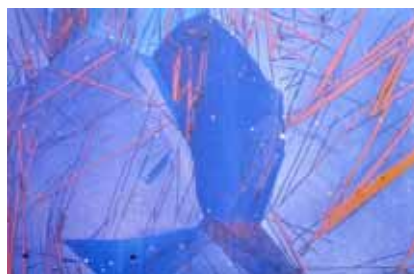
Preparation Guidelines for Class 6 Materials

Preparation Step	Basic Recommendation
Rough Grinding	240*, 320, 400, 600 grit SiC paper
Rough Polishing	2-3 diamond polishing steps on woven polishing pads
Final Polishing	Polycrystalline alumina on a napped polishing pad

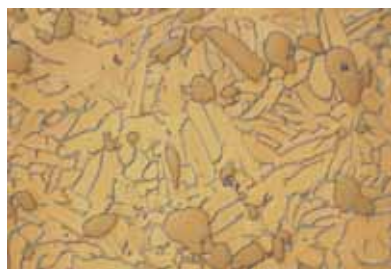
* Step may not be required for individual specimen preparation procedures



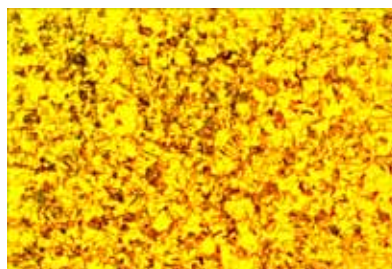
Nimonic 90 Superalloy (400X, DIC)



Fe-Ni-C0-Al alloy



Ti-6Al-4V matrix with carbide reinforcement



Hastelloy, etched: Adlers, 200X (DIC)

CLASS 7 - THERMAL SPRAY MATERIALS

Examples include powder spray coatings, ceramic coatings, intermetallic coatings.

Thermal Spray Coatings:

Thermal spraying techniques are coating processes in which melted (or heated) materials are sprayed onto a surface. Thermal spraying can provide various coating thicknesses (20 microns to several mm) over a large area. Coating materials available for thermal spraying include metals, alloys, ceramics, plastics and composites. They are fed in powder or wire form, heated to a molten or semi-molten state and accelerated towards the substrates in the form of micron-size particles. Combustion or electrical arc discharge is usually used as the source of energy for thermal spraying. The coating quality is usually assessed by measuring its porosity, oxide content, macro and microhardness, bond strength and surface roughness.

Preparation Challenge:

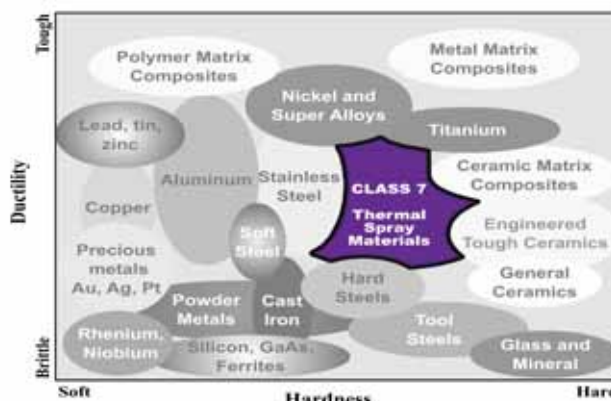
Metallographic preparation of thermal spray coatings can be tricky; however, minimizing damage and understanding the chemical and mechanical properties of the coating and substrate will greatly improve successful specimen preparation. Note for WC-Co coatings, the cobalt is reactive with water so final polishing with 0.25 micron diamond replaces traditional alumina water based suspensions/slurries.

SECTIONING

Precision wafering with either diamond or CBN blades, although with care alumina abrasive blades can be used.

MOUNTING

Castable or compression mounting resins

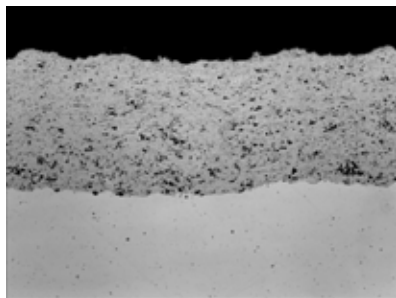


Class 7 - Thermal spray materials

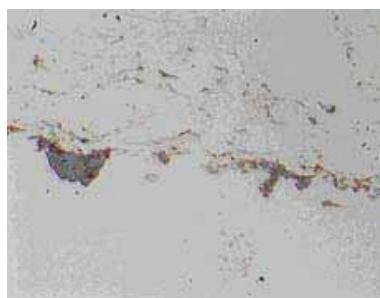
Preparation Guidelines for Class 7 Materials

Preparation Step	Basic Recommendation
Rough Grinding	Diamond on CERMESH™ metal mesh cloth
Rough Polishing	Composite diamond disks
Final Polishing	Polycrystalline alumina on a napped polishing pad

* Step may not be required for individual specimen preparation procedures



Thermal spray WC-Co coating on Steel



Thermal spray zirconia coating

CLASS 8 - HARDENED STEELS

Examples include case hardened steels, tool steels, and through-hardened steels.

Description:

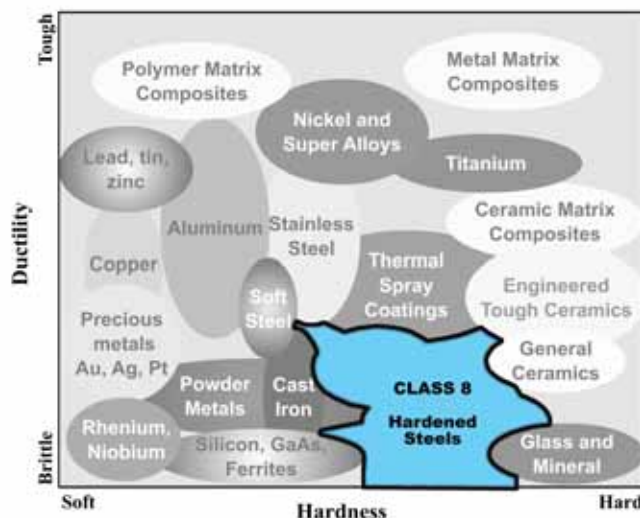
Iron and steels play an important role in the world of structural and mechanical metals. Steel, in particular, is very useful because its hardness, wearability and toughness can be altered significantly by heat treating and annealing processes. Tool steels have high hardness ($R_c > 60$) and generally are used with alloying metals such as vanadium, molybdenum and manganese.

SECTIONING

MAXCUT™ abrasive blade (MAX-VHS series)

MOUNTING

Epoxy or Diallyl Phthalate compression mounting resins

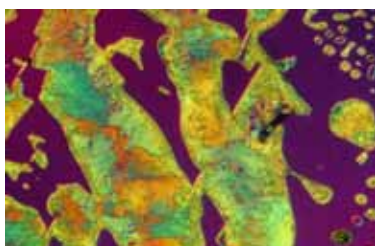


Class 8 - Hardened steels

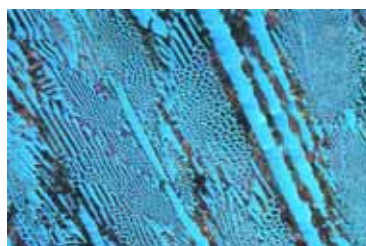
Preparation Guidelines for Class 8 Materials

Preparation Step	Basic Recommendation
Rough Grinding	120* micron diamond disk
Rough Polishing	Composite diamond disks
Final Polishing	Polycrystalline alumina on a napped polishing pad

* Step may not be required for individual specimen preparation procedures



White Iron - hypoeutectic (1000X, DIC),
Picral etchant



White Iron - hypereutectic (200X, DIC),
Picral etchant



Nitrided Steel with white layer



1095 Steel, Water Quenched (1000X), 2%
Nital etchant - Martensite structure

CLASS 9 - METAL MATRIX COMPOSITES

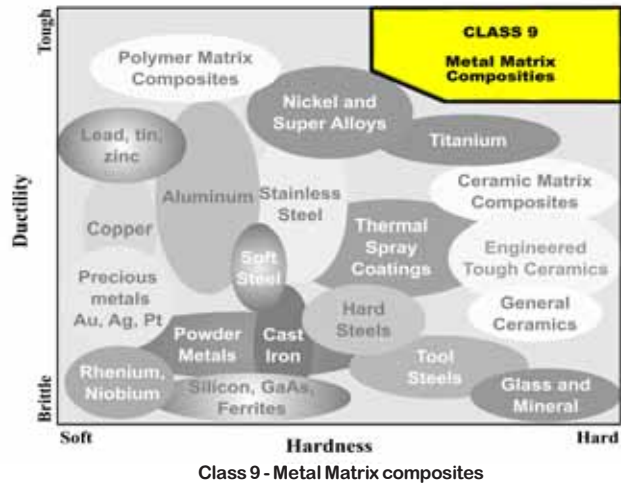
Examples include ceramic fibers in a metal matrix and/or ceramic particles in a metal matrix.

Description:

Metal matrix composite applications have been found in high performance sporting goods and high performance military applications. They are primarily used to combine the hardness and energy absorbing characteristics of the ceramic with the bonding and ductility characteristics of the metal.

Preparation Challenge:

Hard particles in a metal matrix can be difficult to microstructurally prepare because of particle pull-out, as well as excessive polishing relief between the hard particles and the softer matrix.



SECTIONING

MAXCUT™ abrasive blade (MAX-C or DMAX diamond cut-off blades)

MOUNTING

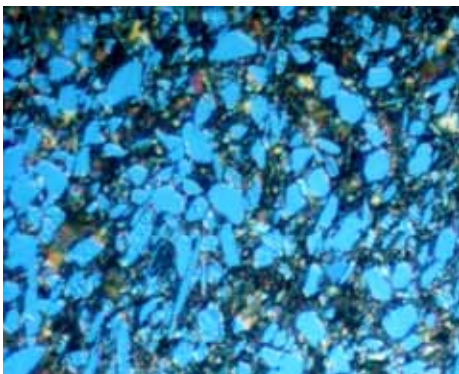
Castable mounting with epoxies and acrylics

ETCHING

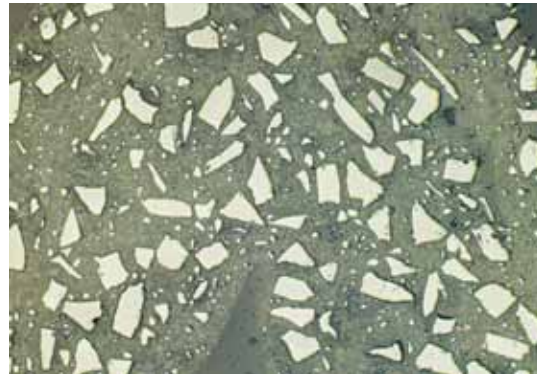
Use the recommended etchant for the metal matrix component.

Preparation Guidelines for Class 9 Materials

Preparation Step	Basic Recommendation
Rough Grinding	Diamond on CERMESH™ metal mesh cloth
Rough Polishing	Diamond and colloidal silica on woven polishing pads
Final Polishing	Colloidal silica on low-napped urethane polishing pads



ZrB₂ particles in a Titanium Matrix, 1000X (DIC), Etchant Kroll's.



SiC particles in an Aluminum Matrix, 400X (DIC), as polished.

CLASS 10 - ENGINEERED CERAMICS

Examples include silicon nitride, zirconia, SiSiC, silicon carbide, boron carbide, alumina, mullite, and ceramic matrix composites (CMC's).

Description:

Engineered ceramics have found increasing applications for high temperature, corrosion resistance, low wearability and a number of other applications. An example of a Class 10 specimen preparation technique is for aluminium oxynitride (ALON) which is a ceramic composed of aluminum, oxygen and nitrogen. It is a transparent ceramic that is harder than glass.

Preparation Challenge:

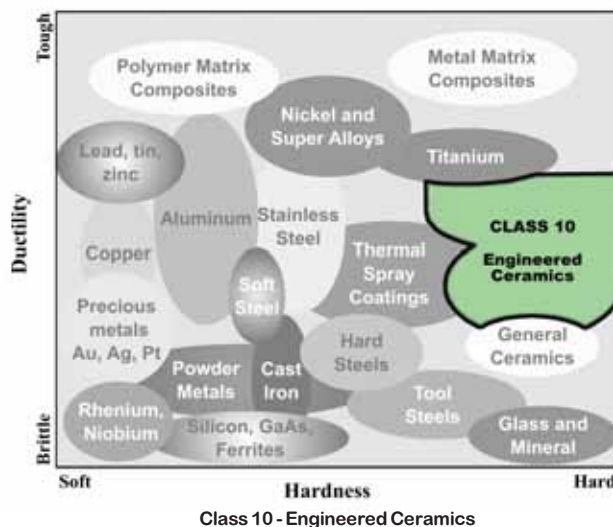
ALON is very hard therefore specimen preparation procedures generally require a CMP (chemical mechanical polishing) component to remove induced microstructural damage. When examining the surface, it is recommended that a sputter coating be used to increase surface reflectivity.

SECTIONING

Diamond wafering blades - medium grit/low concentration

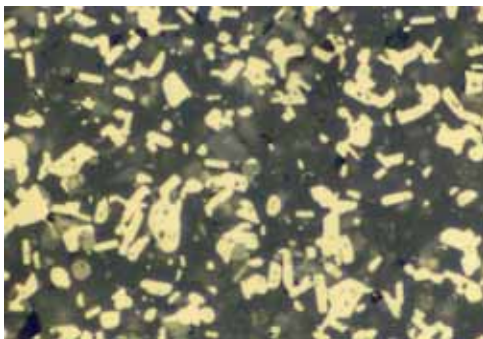
MOUNTING

Castable mounting with epoxies or acrylic resins



Preparation Guidelines for Class 10 Materials

Preparation Step	Basic Recommendation
Rough Grinding	Diamond on CERMESH™ metal mesh cloth
Rough Polishing	Diamond and colloidal silica on woven polishing pads
Final Polishing	Colloidal silica on low-napped urethane polishing pads



ALON ceramic, 1000X (BF), as polished

CLASS 11 - VERY HARD BRITTLE MATERIALS, CERMETS (Tungsten Carbide)

Examples include cermets such as tungsten carbide, glass and minerals.

Description:

CERMET's are wear resistant, tough materials.

Preparation Challenge:

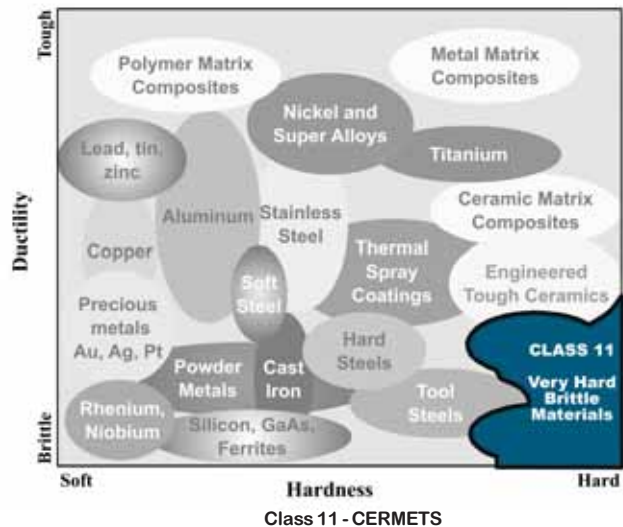
The key to proper specimen preparation of CERMET materials such as tungsten carbide is to grind with a semi-fixed abrasive (polycrystalline diamond on a metal mesh cloth), followed by combining diamond abrasives with a CMP (chemical mechanical polishing) abrasive such as SIAMAT™ colloidal silica.

SECTIONING

Diamond wafering blades - medium grit/low concentration

MOUNTING

Castable mounting with epoxies or acrylic resins



Preparation Guidelines for Class 11 Materials

Preparation Step	Basic Recommendation
Rough Grinding	Diamond on CERMESH™ metal mesh cloth
Rough Polishing	Diamond on woven polishing pads
Final Polishing	Colloidal silica on porous urethane polishing pad



Tungsten-Carbide, etched with HNO3 (2000X - DIC)

Metallographic Equipment



PICO-155P Precision Saw



MEGA-T400
Abrasive Cutter



MEGA-M250 Abrasive Cutter



NANO-1000T with
FEMTO-1100
Polishing Head



PICO-200 Diamond Saw



GIGA-0900 Vibratory Polisher



LSSA-011 Vacuum Mounting Chamber



TERAPRESS TP-7700
Hydraulic Mounting Press

Abrasive Cutters

10-inch Manual Abrasive Cutters

MEGA-M250 and Variable Speed MEGA-M250V Abrasive Saws

The MEGA-M250 and variable speed MEGA-M250V manual wheel feed abrasive saw have been designed for cutting and sectioning materials ranging from soft aluminum metals to hardened tool steels up to a 3-inch (75 mm) solid stock sample using a 250 mm (~10-inch) blade.

Features:

- Durable cast aluminum alloy and stainless steel construction
- Corrosion-free, twin t-slot, stainless steel table
- Powerful direct drive, 3hp (2.2 KW), 3-phase motor
- Inductive brake for faster stopping of the blade
- Side port window for longer samples
- Cutting capacity up to 3-inches (75mm) solid stock sample using 10-inch (250 mm) blade
- High-leverage cutting handle for additional control and safety

Additional for MEGA-M250V:

- Variable speed motor with three preset speeds (2500, 3000, 3500 rpm) allowing for maximizing cutting blade performance while minimizing damage to the specimen

Applications: Ideal for the metallographic laboratory, as well as for small industrial or production applications. Ferrous metals, non-ferrous metals, foundry castings, powder metallurgy, heat treated parts, specialty alloys, and wrought metals can all be cut using the MEGA-M250 or MEGA-M250V abrasive saws.



For quick online
information scan code.



Description	MEGA-M250	MEGA-M250V
Cutting Capacity (max diameter)	3-inch (75mm)	3-inch (75mm)
Cut-off Blade Size	9-inch (230 mm) 10-inch (250 mm)	9-inch (230 mm) 10-inch (250 mm)
Arbor Size	1.25 -inch (32 mm)	1.25 -inch (32 mm)
Speed (rpm)	2895 rpm at 208-380V/50 Hz 3475 rpm at 208-380V/60 Hz 2895 rpm at 440-480V/50 Hz 3475 rpm at 440-480V/60 Hz	Preset Speeds: 2500, 3000, 3500 rpm Variable: 1500-3500 rpm
Table Dimensions	8.25 x 8.9-inches (210 x 230 mm)	
Motor Power	3 hp (2.2 KW)	
Electrical Specification	208Y, 380V, 480V (3-phase)	208Y, 480V (3-phase)
Dimensions (W x D x H) Hood Closed	28 x 29 x 24-inch (710 x 740 x 610 mm)	
Hood Open	28 x 35 x 31-inch (710 x 890 x 790 mm)	
Weight	252 lbs (115 kg)	
Recirculation System (included)	16 gallons (60 liters)	
Part No.	MEGA-M250	MEGA-M250V
MEGA-M250 Support Bench (optional)	MEGA-BENCH	

MEGA-M250 and MEGA-M250V Clamping Fixtures

Description	Part Number
Quick release clamping vise (right hand)	QCR-1000
Quick release clamping vise (left hand)	QCL-1000
3.5-in (90mm) Vertical clamping vise with shoe	MG-01
45 mm (1.8-inch) height adapter for MIG-01 vertical clamping vises	MG-H
Adjustable mechanical stop for cutting repetitive samples	MG-0150

12-inch Table Feed Abrasive Cutters



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MEGA-T300 and MEGA-T300V Abrasive Saws

The MEGA-T300 and variable speed MEGA-T300V are manual wheel feed and/or table feed abrasive cut-off machines for sectioning materials ranging from soft aluminum metals to hardened tool steels. It has a cutting capacity of 4-inch (100 mm) solid stock sample using a 300 mm (~12-inch) blade.

Features:

- Durable cast aluminum alloy and stainless steel construction
- Powerful 5.5 hp (4 KW) belt drive motor
- Wheel or table feed cutting
- Corrosion-free, T-slot, stainless steel table
- Removable side port for sectioning larger samples
- Inductive brake for faster stopping of the blade
- Optional 16 gallon (60 liter) recirculating cooling tank
- Fabricated protective hood with shatter resistant plastic window

Additional for MEGA-T300V:

- Variable speed motor with three preset speeds (2500, 3000, 3500 rpm) allowing for maximizing cutting blade performance while minimizing damage to the specimen

Applications: Ideal for the metallographic laboratory, as well as for small industrial or production applications. Ferrous metals, non-ferrous metals, foundry castings, powder metallurgy, heat-treated parts, specialty alloys, and wrought metals can all be cut by the MEGA-T300 or MEGA-T300V abrasive saws.

Description	MEGA-T300	MEGA-T300V
Cutting Capacity (Max Diameter)	4-inch (100 mm)	4-inch (100 mm)
Cut-off Blade Size	12 inch (300 mm)	12-inch (300 mm)
Arbor Size	1.25-inch (32 mm)	1.25-inch (32 mm)
Speed (rpm)	2910 rpm at 208-380V/50 Hz 3492 rpm at 208-380V/60 Hz 2910 rpm at 440-480 V/50 Hz 3492 rpm at 440-480V/60 Hz	Preset Speeds: 2500, 3000, 3500 rpm Variable Speeds: 1500-3500 rpm
	1400 rpm at 440-480V/60 Hz (optional)	
Table Dimensions	10.4 x 8.25-inch (265 x 210 mm)	
Motor Power	5.5 hp (4 KW)	
Electrical Specifications	208Y, 380V 480V (3-phase)	208Y, 480V (3-phase)
Dimensions (W x D x H) Hood Closed	36 x 34 x 26-inch (914 x 864 x 660 mm)	
Hood Open	36 x 34 x 32-inch (914 x 864 x 813 mm)	
Weight	350 lbs (160 kg)	
Recirculation System (included)	16 gallons (60 liters)	
Part No.	MEGA-T300	MEGA-T300V
Support Bench (optional)	MEGA-BENCH	



MEGA-T300 and MEGA-T300V Clamping Fixtures

Description	Part Number
Quick release clamping vise (right hand)	QCR-1100
Quick release clamping vise (left hand)	QCL-1100
3.5-inch (90mm) Vertical clamping vise with shoe	MG-01
45 mm (1.8-inch) height adapter for MIG-01 vertical clamping vises	MG-H
Adjustable mechanical stop for cutting repetitive samples	MG-0150

12-inch Manual Feed Abrasive Cutters

MEGA-M300 Abrasive Saw

The MEGA-M300 manual wheel feed abrasive saw (Part No. MEGA-M300) has been designed to be an inexpensive, basic abrasive cutter for sectioning materials ranging from soft aluminum metals to hardened tool steels up to a 4-inch (100 mm) solid stock sample using a 300 mm (~12-inch) blade.



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Features:

- Durable cast aluminum alloy and stainless steel construction
- Corrosion-free, twin t-slot, stainless steel table
- Powerful direct drive, 3 hp (2.2 KW), 3-phase motor
- Inductive brake for faster stopping of the blade
- Side port window for longer samples
- Cutting capacity up to 4-inches (100 mm) solid stock sample using 12-inch (300 mm) blade
- High-leverage cutting handle for additional control and safety

Applications: Ideal for the metallographic laboratory, as well as for small industrial or production applications. Ferrous metals, non-ferrous metals, foundry castings, powder metallurgy, heat treated parts, specialty alloys, and wrought metals can all be cut using the MEGA-M300 saw.

Description	Specification
Cutting Capacity (Max Diameter)	4-inch (100 mm)
Cut-off Blade Size	10-inch (250 mm) 12-inch (300 mm)
Arbor Size	1.25-inch (32 mm)
Speed (rpm)	2895 rpm at 208-380V/50 Hz 3475 rpm at 208-380V/60 Hz 2895 rpm at 440-480V/50 Hz 3475 rpm at 440-480V/60 Hz
Table Dimensions	8.25 x 8.9-inch (210 x 230 mm)
Motor Power	3 hp (2.2 KW)
Power	7.6 / 4.4 amps
Electrical Specification	208Y, 380V, 480V (3-phase)
Dimensions (W x D x H)	
Hood Closed	28 x 29 x 27-inch (710 x 740 x 686 mm)
Hood Open	28 x 37 x 31-inch (710 x 940 x 790 mm)
Weight	260 lbs (120 kg)
Recirculation System (included)	16 gallons (60 liters)
Part No.	MEGA-M300
Support Bench (optional)	MEGA-BENCH

MEGA-M300 Clamping Fixtures

Description	Part Number
Quick release clamping vise (right hand)	QCR-1000
Quick release clamping vise (left hand)	QCL-1000
3.5-in (90mm) Vertical clamping vise with shoe	MG-01
45 mm (1.8-inch) height adapter for MIG-01 vertical clamping vises	MG-H
Adjustable mechanical stop for cutting repetitive samples	MG-0150

16-inch Table Feed Abrasive Cutters



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MEGA-T400 and MEGA-T400V Abrasive Saws

The MEGA-T400 is an easy-to-use manual table and wheel feed stand alone abrasive saw (Part No. MEGA-T400) that has been designed for cutting and sectioning larger metallographic materials ranging from soft aluminum metals to hardened tool steel samples up to 6-inch (150 mm) solid stock sample using a 400 mm (~16-inch) blade.

Features

- Wheel feed or table feed controlled cutting
- Inductive brake for faster stopping of the blade
- Powerful belt drive 7.5 hp (5.5 KW) motor
- Bottom chamber constructed of a rugged alloy base casting
- Fabricated powder coated protective hood with impact resistant plastic window
- 16 gallon (60 liter) recirculating cooling unit with connection hoses
- Integrated base cabinet ready for operation
- Twin T-slotted stainless steel clamping table
- Ammeter display with red warning light for motor overload
- Removable side port panels for sectioning larger samples

Additional for MEGA-T400V:

- Variable speed motor with three preset speeds (1500, 2500, 3500 rpm) allowing for maximizing cutting blade performance while minimizing damage to the specimen

Applications: Ideal for the metallographic laboratory, as well as for small industrial or production application. Ferrous metals, hardened metals, non-ferrous metals, foundry castings, powder metallurgy, heat treated parts, specialty alloys, and wrought metals can all be cut by the MEGA-T400 or MEGA-T400V abrasive saws.

Description	MEGA-T400	MEGA-T400V
Cutting Capacity (Max Diameter)	6-inch (150 mm)	6-inch (150 mm)
Cut-off Blade Size	16-inch (400 mm)	16-inch (400 mm)
Arbor Size	1.25-inch (32 mm)	1.25-inch (32 mm)
Speed (rpm)	1450 rpm at 208-380V/50 Hz 1740 rpm at 208-380V/60 Hz 1450 rpm at 440-480V/50 Hz 1740 rpm at 440-480V/60 Hz	Preset Speeds: 1500, 2500, 3500 rpm Variable Speeds: 1500-3500 rpm
Table Dimensions (W x D)	14.6 x 14.2-inch (370 x 360 mm)	
Motor Power	7.5 hp (5.5 KW)	
Electrical Specifications	208Y, 380V, 480V (3-phase)	208Y, 480V (3-phase)
Dimensions (W x D x H) Hood Closed	50 x 39 x 64 -inch (1270 x 990 x 1626 mm)	
Hood Open	50 x 39 x 83-inch (1270 x 990 x 2110 mm)	
Weight	700 lb (300 kg)	
Recirculation System (included)	16 gallons (60 liters)	
Part No.	MEGA-T400	MEGA-T400V

MEGA-T400 and MEGA-T400V Clamping Fixtures

Description	Part Number
Quick release clamping vise (right hand)	LCR-1000
Quick release clamping vise (left hand)	LCL-1000
3-inch (75 mm) Vertical clamping vise with shoe	MG15-01
45 mm (1.8-inch) height adapter for MIG-15-01 vertical clamping vises	MG-H

Precision Medium Speed Wafering Saw

PICO 155 and PICO 155P Precision Saw

The PICO 155 is a versatile precision wafering saw used for sectioning delicate specimens ranging from fish bones to microelectronic components. The PICO 155P utilizes an internal coolant pump for better coolant flow. Both are ideal saws for the metallographic laboratory for it can be used as a standard precision saw or as a table top saw for cutting larger samples such as printed circuit boards. This easy-to-use precision cutter has straightforward controls: simply align the sample and start the cut. The variable speed motor can be easily adjusted by turning the knob on the front panel. Following completion of the cut, the motor will stop and activate an audible buzzer.



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Features:

- Variable speeds from 50-1500 rpm with digital feedback for constant speed control
- Digital micrometer for precision sectioning
- Counterbalanced specimen loading
- Sliding weight gravity feed loading up to 1000 grams
- Powerful 125 W motor with feedback loop
- Optional cutting table attachment for manual cutting of large flat specimens (including PC Boards)



Applications: Electronics, IC circuits, PC boards, bones, minerals, ceramics and metals.

Description	PICO 155	PICO 155P
Cutting Capacity (Max Diameter)	2-inch (50 mm)	2-inch (50 mm)
Cut-off Blade Size	Min. 3-5 inch (75-125 mm) with bowl Max. 6-7-inch (150-175 mm) recommended	Min. 3-inch (75 mm) Max. 7-inch (175 mm)
Arbor Size	0.5-inch (12.7 mm)	0.5-inch (12.7 mm)
Variable Speed (rpm)	50-300 rpm (3-inch blades) 50-1500 rpm (6-7-inch blades)	50-1500 rpm continuously adjustable
Cutting Force (grams)	0-1500grams	0-1500grams
Coolant	Gravity Drag	Pump
Micrometer Feed Distance	0 to 1-inch (0-25 mm)	0 to 1-inch (0-25 mm)
Micrometer Accuracy	2 microns	2 microns
Motor Power	125W	
Electrical Specifications	110V/220V 50/60 Hz	
Coolant Tank (built-in)	1/2 gallon (1.9 liters)	
Dimensions (W x D x H) Hood Closed*	19 x 23 x 14.5-inch (480 x 580 x 368 mm)	
Hood Open*	19 x 29 x 19-inch (480 x 740 x 370 mm)	
Weight	66 lbs (30 kg)	
Part No.	PICO 155	PICO-155P
*Note: Assembling the counter weight rod adds 4.75-inches (120 mm) in depth		

PICO-155 and PICO-155P Fixtures

Description	Part Number
Universal specimen vise (single saddle) <i>(included)</i>	P150-702
Sample holder with double parallel vise for long specimens (double saddle) <i>(included)</i>	P150-703
Specimen vise for irregular shaped specimens <i>(included)</i>	P150-706
Sample holder for round and mounted specimens (1.25-inch/32 mm) <i>(included)</i>	P150-707
Sample holder for round and mounted specimens (1.5-inch/40 mm) <i>(included)</i>	P150-706
Specimen vise for adhering specimens <i>(included)</i>	P150-709
Specimen teardrop holder for 0.6-1.6-in (18-40 mm) diameter <i>(included)</i>	P150-710
Fastener vise for longitudinal sectioning of fasteners, tubes etc. <i>(included)</i>	P150-711
Large single saddle vise with support lip <i>(included)</i>	P150-702b
Dressing Attachment <i>(included)</i>	P150-701
Swivel arm unit for angular cutting <i>(optional)</i>	P150-713
Cutting table attachment for manual cutting of extra flat specimens and PCB's <i>(optional)</i>	P150-601

Precision High Speed Wafering Saw



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PICO 175 High Speed Precision Saw

The PICO-175 is a variable high speed (50-5000 rpm) precision wafering saw (Part No. PICO-175) for sectioning materials with 0.1 mm micrometer accuracy. With easily programmable settings for feed rate (0.01-3 mm/sec), cutting force (5-20 N) and X and Y sample positioning, the PICO-175 offers a highly customizable machine that is capable of sectioning a wide variety of materials.



Features:

- Microprocessor controlled
- Touchpad control panel for parameter settings
- Automated feed with adjustable feed rate
- Motorized x-direction with 2 micron (0.0001 inch) accuracy
- X-axis range of 2.066 inches to 3.208 inches in y-direction
- Cutting capacity of 3-inches (75 mm)
- Variable wheel speeds from 50-5000 rpm
- Previous settings retained in memory
- Automated end of cut positioning and rotatable specimen holder
- Ability to cut multiple parallel sections
- Pulse or continuous cutting options

Applications: Metals, ceramics, polymers, composites, aerospace, electronics, biomaterials, geological thin sections, extremely hard engineered materials such as boron carbide, zirconia, silicon nitride and partially stabilized zirconia



Description	Specification
Cutting Capacity (Max Diameter)	3-inches (75 mm)
Cut-off Blade Size	Min 3-inch (75 mm) Max 8-inch (200 mm)
Arbor Size	0.5-inch (12.7 mm)
Variable Speed (rpm)	50-5000 rpm continuously adjustable
Max Load	5-20 N (1-4.5 lbf)
Micrometer Feed Distance	0 to 4-inch (0-100 mm)
Micrometer Accuracy	0.1 mm
Motor Power	1.0 hp (750 W)
Electrical Specifications	110V or 220V 50/60 Hz
Dimensions (W x D x H)	
Hood Closed:	25 x 22.4 x 17.8-inch (635 x 570 x 450 mm)
Hood Open:	25 x 23 x 29-inch (635 x 585 x 740 mm)
Travel Distances	X-direction: 0-2.6 inches (0-66 mm) Y-direction: 0-3.4 (0-86mm)
Feed Rate	0.0024-7.1 inches/minute (0.01-3 mm/second)
Recirculating Tank (built-in)	0.75 gallons (2.85 liters)
Weight	160 lbs (35 kg)
Part No.	PICO-175

PICO 175 High Speed Precision Saw Fixtures

Description	Part Number
Universal single saddle specimen vise (included with PICO-175)	P150-702
Sample holder with double parallel vise for long specimens (included with PICO-175)	P150-703
Sample holder for round and mounted specimens (1.25-inch/32 mm) (Included with PICO-175)	P150-707
Sample holder for round and mounted specimens (1.5-inch/40 mm) (Included with PICO-175)	P150-708
Specimen vise for irregular shaped specimens (included with PICO-175)	P150-706
Specimen vise for adhering specimens (Included with PICO-175)	P150-709
Specimen tear drop holder for 0.6-1.6-in (18-40 mm) diameter (Included with PICO-175)	P150-710
Fastener vise for longitudinal sectioning of fasteners, tubes etc. (Included with PICO-175)	P150-711
Fine mesh pump filter for PICO 175	40UMF-D28-L100M

High Speed Table Saw

PICO-200 High Speed Table Saw

The PICO-200 is a high speed (50-3000 rpm) manual variable speed table saw (Part No. PICO-200).

Features:

- High torque/high power
- 500-3000 rpm variable speed range
- Optional angle cutting holder
- Hard anodized working table
- Dry or wet cutting
- t-slot clamping vises for mounting versatility

Applications: Various metal materials, circuit boards, semiconductors. Ideal for industrial and educational institution applications.



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Description	Specification
Cutting Capacity (Max Diameter)	1.5-inches (38 mm)
Cut-off Blade Size	8-inch (200 mm)
Arbor Size	0.5-inch (12.7 mm)
Variable Speed (rpm)	50-3000 rpm continuously adjustable
Feed Distance	4.3-inches (110 mm)
Motor power	1.0 hp (750 W)
Electrical Specifications	110V/220V 50/60 Hz
Dimensions (W x D x H)	18 x 20 x 13.8-inch (460 x 500 x 350 mm)
Table Dimensions	16 x 18-inch (400 x 450 mm)
Recirculating Tank (Built-in)	(0.8 gallons) 3 Liters
Weight	93 lbs (42 kg)
Part No.	PICO-200

PICO 200 Saw Fixtures and Accessories

Description	Part Number
Vertical clamping vise with shoe	P200-V
Height adapter for P200-V vertical clamping vises	P200-H
Cutting guide	P200-GUIDE
Vacuum cleaning attachment	P200-VAC



Vertical clamping vise
with height adapter



Cutting guide

Mounting Press



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TERAPRESS TP-7001B Mounting Press

The TERAPRESS TP-7001B automated air pressure mounting press (Part No. TP-7001B) has a solid, easy-to-use, robust design. With a 360° heating element intimately connected to the mold, heating is very efficient. In addition to being efficient, the TERAPRESS TP-7001B offers users more control for both the heating and cooling cycle as compared to most competitive compression mounting presses. By using air pressure to maintain a constant force on the specimen, the requirement to continually monitor and increase the force as the resin begins to melt is eliminated.



Features:

- Interchangeable 1-2 inch (25-50 mm) mold assemblies
- Ability to produce two mounts simultaneously with use of a spacer
- Easy pneumatic force control
- Programmable microprocessor control
- Multiple cooling modes (temperature, specified time, or manually)
- Rapid ram movement for faster throughput
- Accelerated water cooling jacket
- Maximum programmable temperature of 300° C

Applications: Phenolics, hard glass filled epoxies, Diallyl Phthalates, and conductive thermosets

Description	Specification
Automation	Automated
Mount Size	1 to 2-inch (25-50 mm)
Force	Pneumatic
Incoming pressure range	Maximum 95 psi
Heater Specification	800 Watts
Thermostat Range	575°F (300°C)
Cooling System	Water
Electrical Specifications	110V or 220V 50/60 Hz
Dimensions (W x D x H)	13.25 x 16.5 x 19.5-inch (340 x 420 x 495 mm)
Weight	80 lbs (35 kg)
Part No.	TP-7001B
Recirculating Tank (16 gallons / 60 liters) with pump (optional)	TP-TANK

Mold Assemblies For Mounting Presses

Option	Flat Ram Part Number	Chamfered Ram Part No.
1-inch diameter mounting assembly for TP-7001B mounting press	TP-7000-0100	TP-7000-0100C
1-inch spacer for double mounts for TP-7001B mounting press	TPS-0100	TPS-0100C
1.25-inch diameter mounting assembly for TP-7001B mounting press	TP-7000-0125	TP-7000-0125C
1.25-inch spacer for double mounts for TP-7001B mounting press	TPS-0125	TPS-0125C
1.5-inch diameter mounting assembly for TP-7001B mounting press	TP-7000-0150	TP-7000-0150C
1.5-inch spacer for double mounts for TP-7001B mounting press	TPS-0150	TPS-0150C
2-inch diameter mounting assembly for TP-7001B mounting press	TP-7000-0200	TP-7000-0200C
2-inch spacer for double mounts for TP-7001B mounting press	TPS-0200	TPS-0200C
25 mm diameter mounting assembly for TP-7001B mounting press	TP-7000-25	TP-7000-25C
25 mm spacer for double mounts for TP-7001B mounting press	TPS-25	TPS-25C
30 mm diameter mounting assembly for TP-7001B mounting press	TP-7000-30	TP-7000-30C
30 mm spacer for double mounts for TP-7001B mounting press	TPS-30	TPS-30C
40 mm diameter mounting assembly for TP-7001B mounting press	TP-7000-40	TP-7000-40C
40 mm spacer for double mounts for TP-7001B mounting press	TPS-40	TPS-40C
50 mm diameter mounting assembly for TP-7001B mounting press	TP-7000-50	TP-7000-50C
50 mm spacer for double mounts for TP-7001B mounting press	TPS-50	TPS-50C

Pace Technologies • 3601 34th St. • Tucson, AZ 85713 • Phone: +1 520-882-6598 • Fax: +1 520-882-6599
E-mail: PACE@metallographic.com • Website: www.metallographic.com

Mounting Press

TERAPRESS TP-7200 and TP-7500 Electro-hydraulic Mounting Press

The TERAPRESS TP-7200 and TP-7500 programmable electro-hydraulic automated mounting press' are single mold compression mounting machines. With electro-hydraulic force and heating up to 200°C, molding is very efficient.

Features:

- Easy electro-hydraulic force control
- 1.25-inch to 2-inch interchangeable molds for TERAPRESS TP-7500
- 1-inch to 2-inch fixed molds for TERAPRESS TP-7200
- Rapid ram movement for faster throughput
- Multiple cooling modes (temperature, time, or manually)
- Fast or slow cooling rates
- Automatic and programmable



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Description	TP-7200	TP-7500
Automation	Automated	Automated
Mount Size	1 to 2-inch (25-50 mm)	1.25 to 2-inch (32-50 mm)
Mold Cylinders	Single non-changeable	Interchangeable Single
Force	Electro-hydraulic	Electro-hydraulic
Heater Specification	1000 Watts (110V 15 amp) 2000 Watts (110V 20 amp) 2000 Watts (220V 10 amp)	1000 Watts (110V 15 amp) 2000 Watts (110V 20 amp) 2000 Watts (220V 10 amp)
Thermostat Range	<392°F (200°C)	<392°F (200°C)
Cooling System	Water	Water
Dimensions (W x D x H)	14 x 19 x 20-inch (350 x 483 x 508 mm)	16 x 19 x 20-inch (410 x 483 x 508 mm)
Electrical Specifications	110V or 220V 50/60 Hz	110V or 220V 50/60 Hz
Weight	64 lbs (29 kg)	101 lbs (46 kg)
Part No.	TP-7200	TP-7500
Recirculating Tank (16 gallons/ 60 liters) with Pump (optional accessory)		TP-TANK

Mold Assemblies For Electro-Hydraulic Mounting Presses

Option	Part Number
1-inch diameter heater/mounting assembly for TP-7200	TP72-0100
1.25-inch diameter heater/mounting assembly for TP-7200	TP72-0125
1.5-inch diameter heater/mounting assembly for TP-7200	TP72-0150
2-inch diameter heater/mounting assembly for TP-7200	TP72-0200
30, 40 and 50 mm mold assemblies are available by special order	
1.25-inch diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-0125
1.25-inch spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS-0125
1.5-inch diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-0150
1.5-inch spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS-0150
2-inch diameter mounting rams for TP-7500/ TP-7700 mounting press	TP75-0200
2-inch spacer for double mounts for TP-7500/TP 7700 mounting press	TPS-0200
30 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-30mm
30 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-30
40 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-40mm
40 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-40
50 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-50mm
50 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-50

Mounting Press



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TERAPRESS TP-7700 Electro-hydraulic Mounting Press

The TERAPRESS TP-7700 is a programmable, dual cylinder, electro-hydraulic automated mounting press (Part No. TP-7700) with a solid, easy to use, robust design. With electro-hydraulic force and heating up to 200°C, molding is very efficient.



Features:

- Easy electro-hydraulic force control
- Dual hydraulic cylinders
- 1.25-inch to 2-inch interchangeable molds
- Multiple cooling modes (temperature, specified time, or manually)
- Fast or slow cooling rates
- Rapid ram movement for faster throughput
- Automatic and programmable
- High resolution display

Description	Specifications
Automation	Automated
Mount Size	1.25 to 2-inch (32-50 mm)
Mold Cylinders	Double
Force	Electro-hydraulic
Heater Specification	1400 Watts (110V 15 amp) 1400 Watts (22V 7.5 amp)
Thermostat Range	392°F (200°C)
Cooling System	Water
Dimensions (W x D x H)	21 x 23 x 20-inch (540x 580 x 500 mm)
Electrical Specifications	110V or 220V 50/60 Hz
Weight	170 lbs (76 kg)
Part No.	TP-7700
Recirculating tank (16 gallons/ 60 liters) with pump (optional accessory)	TP-TANK

Mold Assemblies For Electro-Hydraulic Mounting Presses

Option	Part Number
1.25-inch diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-0125
1.25-inch spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-0125
1.5-inch diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-0150
1.5-inch spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-0150
2-inch diameter mounting rams for TP-7500/ TP-7700 mounting press	TP75-0200
2-inch spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-0200
30 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-30mm
30 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-30
40 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-40mm
40 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-40
50 mm diameter mounting assembly for TP-7500/ TP-7700 mounting press	TP75-50mm
50 mm spacer for double mounts for TP-7500/ TP-7700 mounting press	TPS75-50

Castable Vacuum Mounting

Vacuum Mounting

Vacuum mounting of castable mounting resins significantly improves penetration of voids and provides better edge retention. The LSSA-011 vacuum impregnation unit (Part No. LSSA-011) allows for pouring the resin under maximum vacuum and for mounting multiple specimens.

The vacuum mounting chamber is designed to fill voids in specimens by first pulling a vacuum, then pouring the resin, followed by slowly increasing the pressure in order to force or push the castable resin (epoxy, acrylic, or polyester) into the voids, porosity, cracks, or other crevices in the specimen.

110V or 220V vacuum pumps can be purchased separately. (Part No. VAC -110 and Part No. VAC-220, respectively.)



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Description	Specification
Bell jar	Tilting, retractable pouring arm
Mount Size	1 to 2-inch (25-50 mm)
Vacuum	Vacuum pump
Dimensions (W x D x H)	12 x 12 x 12-inch (300x 300 x 300 mm)
Weight	2.2 lbs (1 kg)
Part No.	LSSA-011

Description	110V Vacuum Pump	220V Vacuum Pump
Flow Rate	2.5 CFM	7.2 m3/h
Ultimate Vacuum	10 Pa	0.2 Pa
Power	120 W -0.17 hp	370 W - 0.5 hp
Inlet Port	1/4" SAE and 1/2" ACME ports	7/16-inch - 20
Dimensions (W x D x H)	11 x 4.75 x 9-inch (279 x 120 x 229 mm)	13 x 5.5 x 10-inch (337 x 138 x 254 mm)
Weight	16.5 lbs (7.5 kg)	22 lbs (10 kg)
Part No.	VAC-110	VAC-220

Vacuum Mounting

Option	Part Number
Vacuum mounting chamber	LSSA-011
100 ml plastic pouring cups (50/pkg)	POUR-CUP
110V Vacuum pump (optional)	VAC-110
220V Vacuum pump (optional)	VAC-220



5-Station PENTA-5000 Hand Grinder



For quick online information scan code.

PENTA-5000 5-Station Hand Grinder

The PENTA-5000 5-station hand grinder (Part. No. PENTA-5000) offers a small lab the ability to prepare samples for macro viewing within minutes. The PENTA-5000 is a stationary grinder using 3-7/16 x 60-ft rolls set up for 240, 360, 600, 800 and 1200 grit abrasive.

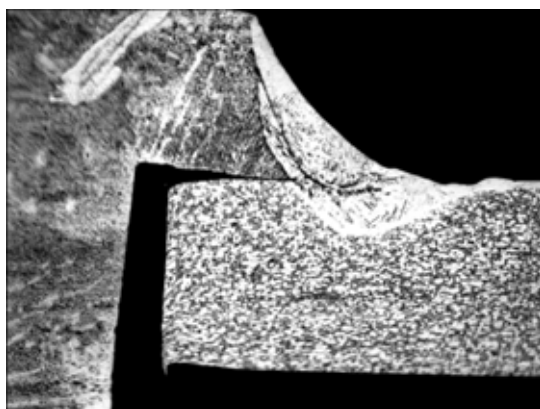


Features:

- 5 stations for coarse to fine grinding providing for a nearly polished specimen surface using a 1200 (P4000) grit SiC paper
- Eliminates need for additional polishing for many specimens
- Easy to advance system for providing fresh abrasive for consistent and rapid grinding
- Adjustable water flow valve for wet grinding
- Abrasive support plates with hard anodized coating for increased wear resistance and corrosion protection
- Wet or dry grinding
- Easy to change abrasive rolls

Applications: Heat-treated samples, weld analysis, macro-analysis

Description	Specification
PENTA 5000 Hand Grinder with 5 grinding stations	240, 360, 600, 800 and 1200 grit
Roll Sizes	3-7/16-inch width x 60 feet length with 1 -inch core
Maximum Diameter Sample	2.5-inch (65 mm)
Construction	-Aluminum casting and stainless steel -Hard coat anodized rollers and paper support plates
Dimensions (W x D x H)	22.25 x 21 x 8 -inch (565 x 535 x 203 mm)
Weight	55 lbs (25 kg)
Part No.	PENTA-5000



Titanium / Stainless steel weld, 200X, Krolls / ASTM 157 etchants



Carbon steel, 200X, 2% Nital etchant

Belt Grinder

PENTA-7500 Belt Grinder

The PENTA-7500 belt grinder (Part No. PENTA-7500) offers the ability to rapidly planarize a specimen or to grind it to the desired area of interest. The unique benefit the PENTA-7500 offers for planarizing specimen mounts, is especially useful for maintaining a square mount and minimizing the preparation time for automated polishing machines.

Features:

- High 3/4-hp dual-voltage motor which allows users to connect the unit to either 110V or 220V for more torque
- Rinse sink allowing for easy cleaning of the sample after grinding and an adjustable flow valve for wet grinding.
- Easy to change belt and tracking control
- Emergency stop button



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Description	Specification
Single Belt	4 x 36-inch (102 x 914 mm)
Belt Speed	43 ft/second (13 m/s)
Electrical Specification	110V / 220V at 50/60 Hz
Motor Power	550 W (0.75 hp)
Construction	Aluminum casting / fabricated metal
Dimensions (W x D x H)	20 x 24.75 x 14.75 -inch (510 x 630 x 375 mm)
Weight	120 lbs (53 kg)
Part No.	PENTA-7500

PENTA-7500 Belt Grinder Holders

Description	Part Number
1-inch holder	P75-100H
1.25-inch holder	P75-125H
1.5-inch holder	P75-150H
25 mm holder	P75-25H
30 mm holder	P75-30H
40 mm holder	P75-40H

* Customized holder available upon request

8 and 10-inch Polishing Machines



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NANO 8 and 10-inch Grinding and Polishing Machines

NANO 1000T is a single wheel grinder/polisher bench top polisher (Part No. NANO-1000T) for metallographic specimen preparation.

Features:

- 8 and/or 10-inch single wheel
- Variable speed (50-1000 rpm)
- 1 hp motor
- Preset fast speed buttons (100, 200, 300 rpm)
- Auto mode (programmable speed, direction and time)
- Durable GRP (glass reinforced plastic) construction
- Water inlet and outlet for wheel lubrication with splash guard and cover
- Built-in transformer so it can be operated at either 110V or 220V (factory set)



NANO 2000T is a double wheel grinder/polisher bench top polisher (Part No. NANO-2000T) for metallographic specimen preparation.

Features:

- 8 and/or 10-inch double wheel
- Variable speed (50-1000 rpm)
- Speed and time LED display
- Preset fast speed buttons (100, 200, 300 rpm)
- Auto mode (programmable speed, direction and time)
- Durable GRP (glass reinforced plastic) construction
- Water inlet and outlet for wheel lubrication with splash guard and cover
- Built-in transformer for operation at either 110V or 220V

Description	Specification
NANO 1000T	Single wheel
NANO 2000T	Double wheel
Speed (rpm)	50-1000 rpm
Motor	1 hp (750W)
Dimensions (W x D x H)	
NANO 1000T	16 x 29 x 14-inch (406 x 737 x 356mm)
NANO 1000T with FEMTO 1100/1500	17 x 29 x 27-inch (432 x 737 x 686 mm)
NANO 2000T	28 x 28 x 13-inch (711 x 711 x 330 mm)
NANO 2000T with FEMTO 1100/1500	28 x 28 x 27 - inch (711 x 711 x 686 mm)
Weight	
NANO 1000T	102 lbs (46 kg)
NANO 2000T	155 lbs (70 kg)
Part No.	NANO 1000T NANO 2000T

Note: Working wheels (hard anodized) and plain backed paper rings are sold separately. Optional FEMTO 1100 individual force or FEMTO 1500 dual central/individual force polishing heads can be ordered with the system or installed later.

NANO 8 & 10-inch Polisher Accessories

Specimen Holder	Part Number
8-inch diameter hard coat anodized aluminum working wheel	PW-800A
10-inch diameter hard coat anodized aluminum working wheel	PW-1000A
8 & 10-inch splash guard	PTM-125-001
8 & 10-inch cover	PTM-125-007
8-inch plain-backed grinding paper ring	PTM-125-005
10-inch plain-backed grinding paper ring	PTM-125-006

12 and 14-inch Polishing Machine

NANO 12 and 14-inch Grinding and Polishing Machine

NANO 1200T is a single wheel grinder bench top polisher (Part No. NANO-1200T) for metallographic specimen preparation. The polisher uses 12 and/or 14-inch wheels.

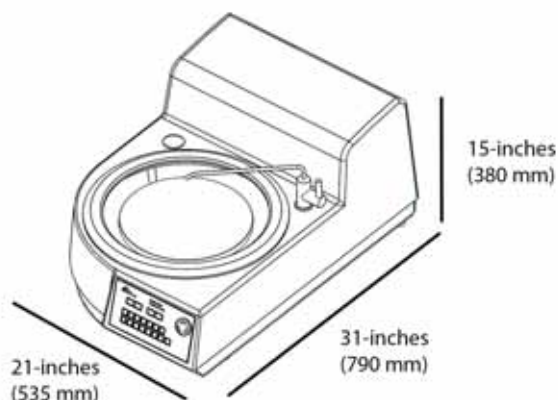
Features:

- Variable speed (50-1000 rpm)
- 1.5 hp motor
- Preset rapid speed selection (100, 200, 300 rpm)
- Auto mode (programmable speed, direction and time)
- Durable GRP (glass reinforced plastic) construction
- Water inlet and outlet for wheel lubrication with splash guard and cover
- CCW and CW direction control
- Service access easily accessible at the back of the machine
- Easily accessible built-in transformer so it can be operated at either 110V or 220V (factory set)

Note: Working wheels (hard anodized) and plain backed paper rings are sold separately. Optional FEMTO 2200 individual force or FEMTO 2500 dual central/individual force polishing heads can be ordered with the system or installed later.



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Description	Specification
NANO 1200T	Single wheel
Speed (rpm)	50-1000 rpm
Motor	1.5 hp (1100W)
Electrical Requirements	110/220 Volts (single-phase)
Working Wheel	12-inch (300 mm) or 14-inch (350 mm) diameter
Frequency	50/60 Hz
Dimensions (W x D x H)	21x31x15-inch (535x790x380 mm)
NANO 1200T with FEMTO 2200/2500	22 x 34 x 25-inch (565 x 864 x 625 mm)
Weight	110 lbs (50 kg)
Part No.	NANO 1200T

NANO 12 & 14-inch Polisher Accessories

Specimen Holder	Part Number
12-inch diameter hard coat anodized aluminum working wheel	PW-1200A
14-inch diameter hard coat anodized aluminum working wheel	PW-1400A
12/14-inch splash guard	PTM-125-207
12/14-inch cover	PTM-125-212
12-inch plain-backed grinding paper ring	PTM-125-213

Automatic Polishing Heads (Individual Force)



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FEMTO 1100 Polishing Head (8&10-inch Polishers)

The FEMTO 1100 is an individual specimen automatic polishing head for use with the NANO-1000T or NANO-2000T 8&10-inch wheel polishing machines. The FEMTO 2200 is an individual specimen automatic polishing head for use with the NANO 1200T 12&14-inch wheel polisher. The FEMTO 1100 is a variable speed (0-200 rpm), pneumatically adjustable individual piston polishing heads for polishing 1 to 6 specimens independent of each other.



FEMTO 2200 Polishing Head (12&14-inch Polishers)

The FEMTO 2200 is an individual specimen automatic polishing head for use with the NANO-1200T polishing machine. The FEMTO 2200 is a variable speed (0-200 rpm), pneumatically adjustable individual piston polishing head for polishing 1 to 6 specimens independent of each other.

Features of the FEMTO 1100 / 2200:

- Built-in peristaltic pump for lubricant or diamond abrasive dispensing
- 0-200 rpm variable speed head for flatter specimen preparation
- Automated or manual mode
- Repeatable results
- Easy-to-use controls
- Quick-locking swing mounted design

Description	FEMTO 1100 (8&10-inch)	FEMTO 2200 (12&14-inch)
Application of Force	Independent pistons (1-6 samples)	Independent pistons (1-6 samples)
Sample Holder	Fixed	Fixed
Polishing machine base	NANO 1000T / NANO 2000T (8 & 10-inch working wheels)	NANO 1200T (12 & 14-inch working wheels)
Head Speed (rpm)	0-200 rpm variable	0-200 rpm variable
Force	1.1 - 13.5 lbs (5- 60 N)	1.1 - 13.5 lbs (5- 60 N)
Dimensions (W x D x H) (without NANO base polisher)	10 x 18 x 22-inch (254 x 457 x 560 mm)	10 x 18 x 22-inch (254 x 457 x 560 mm)
Electrical Specifications	110/220V 50/60 Hz	110/220V 50/60 Hz
Weight	60 lbs (28 kg)	60 lbs (28 kg)

FEMTO 1100 and FEMTO 2200 Individual FIXED Specimen Holders

Specimen Holder (Fixed)	FEMTO 1100 (8 & 10-inch)	FEMTO 2200 (12&14-inch)
Individual specimen holder mounting fixture (for 1, 1.25, 1.5-inch, 25, 30 and 40 mm plastic rings)	SH-1100	SH-2100
1-inch diameter rings (6/set)	SR-0100	SR-0100
1.25-inch diameter rings (6/set)	SR-0125	SR-0125
1.5-inch diameter rings (6/set)	SR-0150	SR-0150
25 mm diameter rings (6/set)	SR-25mm	SR-25mm
30 mm diameter rings (6/set)	SR-30mm	SR-30mm
40 mm diameter rings (6/set)	SR-40mm	SR-40mm
Individual specimen holder mounting fixture (for use with 2-inch and 50 mm plastic rings)	SH-1200	SH-2200
2-inch diameter rings (3/set)	SR-0200	SR-0200
50 mm diameter rings (3/set)	SR-50mm	SR-50mm
Individual specimen holder mounting fixture (for use with glass slide holders)	SH-GHOLDER-1100	SH-GHOLDER-2200
Glass slide holder for 27 x 47 mm and 1 x 3-inch slides (each)	SR-G	SR-G

Automatic Polishing Heads (Dual Individual / Central Force)

FEMTO 1500 (8&10-inch Polishers) and FEMTO 2500 (12&14-inch Polishers) Polishing Heads

The FEMTO 1500 is a dual individual and central automatic polishing head for use with the NANO-1000T or NANO-2000T 8&10-inch wheel polishing machines. The FEMTO 2500 is a dual individual / central force polishing head for the NANO 1200T 12&14-inch wheel polisher. Both the FEMTO 1500 and FEMTO 2500 are variable speed (0-200 rpm), pneumatically adjustable polishing heads for polishing 1 to 6 specimens independent of each other, or 3-6 specimens using a fixed central force polishing holder for superior flatness.



Individual Force



Central Force



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Description	FEMTO 1500 (8 & 10-inch)	FEMTO 2500 (12 & 14-inch)
Application of Force	Independent pistons (1-6 samples) Central force attachment	Independent pistons (1-6 samples) Central force attachment
Sample Holder	Quick Release Chuck	Quick Release Chuck
Polishing machine base	NANO 1000T / NANO 2000T (8 & 10-inch working wheels)	NANO 1200T (12 & 14-inch working wheels)
Head Speed (rpm)	0-200 rpm variable	0-200 rpm variable
Force	1.1 - 13.5 lbs (5- 60 N)	1.1 - 13.5 lbs (5- 60 N)
Dimensions (W x D x H) (without NANO base polisher)	10 x 18 x 22-inch (254 x 457 x 560 mm)	10 x 18 x 22-inch (254 x 457 x 560 mm)
Electrical Specifications	110/220V 50/60 Hz	110/220V 50/60 Hz
Weight	60 lbs (28 kg)	60 lbs (28 kg)

FEMTO 1500 and FEMTO 2500 Quick Release INDIVIDUAL Specimen Holders

Specimen Holder (Quick Release Chuck)	FEMTO 1500 (8 & 10-inch)	FEMTO 2500 (12 & 14-inch)
Individual specimen holder mounting fixture (for use with 1, 1.25, 1.5-inch, 25, 30 and 40 mm plastic rings)	SH-1150	SH-2150
1-inch diameter rings (6/set)	SR-0100	SR-0100
1.25-inch diameter rings (6/set)	SR-0125	SR-0125
1.5-inch diameter rings (6/set)	SR-0150	SR-0150
25 mm diameter rings (6/set)	SR-25mm	SR-25mm
30 mm diameter rings (6/set)	SR-30mm	SR-30mm
40 mm diameter rings (6/set)	SR-40mm	SR-40mm
Individual specimen holder mounting fixture (for use with 2-inch and 50 mm plastic rings)	SH-1250	SH-2250
2-inch diameter rings (3/set)	SR-0200	SR-0200
50 mm diameter rings (3/set)	SR-50mm	SR-50mm
Individual specimen holder mounting fixture (for use with glass slide holders)	SH-GHOLDER-1500	SH-GHOLDER-2500
Glass slide holder for 27 x 47 mm and 1 x 3-inch slides (each)	SR-G	SR-G

FEMTO 1500 and FEMTO 2500 Quick Release CENTRAL Force Specimen Holders

Specimen Holder (Quick Release Chuck)	FEMTO 1500 (8 & 10-inch)	FEMTO 2500 (12 & 14-inch)
1-inch / 25 mm central specimen holder	QRC-SH100A-1500	QRC-SH100A-2500
1.25-inch / 30 mm central specimen holder	QRC-SH125A-1500	QRC-SH125A-2500
1.5-inch / 40 mm central specimen holder	QRC-SH150A-1500	QRC-SH150A-2500
2-inch / 50 mm central specimen holder	QRC-SH200A-1500	QRC-SH200A-2500
Central Force loading plate	CF-LP-1500	CF-LP-2500

Automatic Central / Individual Force Polishing

FEMTO 1500 and FEMTO 2500 Central Force Attachment

Note: With independent pistons, initial grinding can be done with finer abrasives, thus reducing the number of grinding steps. For flatter specimen preparation a central force polishing system (FEMTO 1500 or FEMTO 2500) are recommended.



Central Force: The individual pistons apply the polishing force to the landing pads and pushes down the holder through the spring loaded central male coupler. For central polishing a minimum of three samples locked into the holder is required; however, flatness is then fixed over all the mounted specimens

Individual Force: Individual specimen force can be applied using the Quick Release Chuck system by screwing down the outside of the coupler so as to lock the specimen mounting plate into a rigid plane. This set-up allows for the individual holder to be removed and cleaned. This holder also eliminates the need to replane the samples if they are removed from the holder.



Central specimen holder



Central specimen male coupler adapter



Individual specimen male coupler adapter



Quick Release Chuck



Individual specimen holder

Single Force and Central Force Polishing Machines

Single Force vs. Central Force Polishing Machines

Metallographic semi-automated polishing machines are available with individual/ single specimen loading or with a fixed central holder. The main advantage for using a central force holder is that the overall specimen flatness is better. The primary advantages for individual specimen holders are fewer required grinding/ polishing steps and the ability to repolish samples without the need to re-planarize the specimens.

Advantages

Central Force	Individual Force
Flatter specimens	Reduced number of preparation steps and lower cost
Specimens can be polished in contra head/base directions	Samples can be re-polished without having to planarize specimens in the holder

Disadvantages

Central Force	Individual Force
Minimum of 3-samples are required	Can result in loss of flatness across the specimen if heavy duty grinding is required
Typically requires 2-3 more coarser grinding steps to planarize samples	It is recommended that the grinding and polishing steps only be done at matching head and base speeds in the same direction
Additional grinding steps increase consumables cost and total preparation time	
Coarser grinding can result in more surface and subsurface damage to the specimen	
Need to planarize specimens again if they are removed from holder	

Comparing a Common Preparation Procedure for Individual vs. Central Force

Step	Individual	Central
Planar grinding	n/a	120, 240 grit SiC
Rough grinding	360, 600 grit SiC	360, 600 grit SiC
Fine grinding	800, 1200 grit SiC	800, 1200 grit SiC
Intermediate polishing	1 micron polycrystalline diamond on a woven pad	1 micron polycrystalline diamond on a woven pad
Final polishing	0.05 micron NANOMETER alumina on a napped pad	0.05 micron NANOMETER alumina on a napped pad

Vibratory Polishers

GIGA-0900 /1200 Vibratory Polisher

Vibratory polishers are available in either a 9-inch (GIGA-0900) or 12-inch (GIGA-1200) models. The GIGA vibratory polishers are designed to prepare even the most difficult to polish materials with a very gentle polishing action. Polishing is accomplished by setting the default frequency so that the sample begins to vibrate and then changing the voltage in order to adjust the rotational speed.

Features:

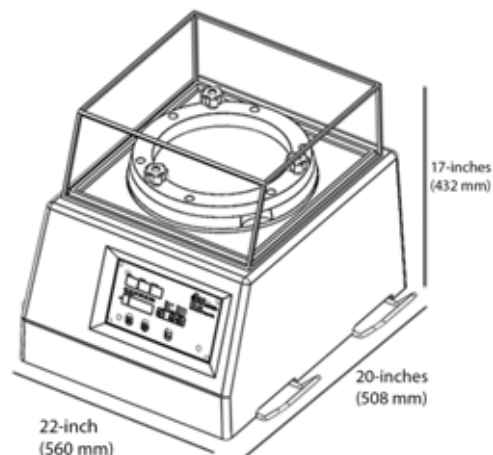
- Interchangeable polishing bowl and a variety of specimen holders and weight (quoted separately)
- FRP hood
- Heavy duty aluminum casting base
- Acrylic cover
- Durable plastic bowl
- Ability to adjust both vibration frequency and voltage
- Built-in transformer so it can be operated at either 110V or 220V



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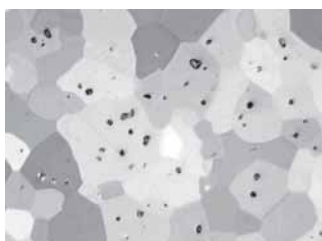
Applications: Semiconductors, glass, ceramics, minerals, composites, soft metals, plastics, refractory metals, general metals. Best method for preparing samples for EBSD (electron beam backscattered diffraction) analysis

Description	GIGA-0900	GIGA-1200
Polishing Bowl Size	9-inch	12-inch
Drive Mechanism	Horizontal frequency control, speed variable voltage control	
Controls	Simple electronic push button control	
Construction	Aluminum casting, FRP (reinforced plastic) cover and acrylic hood	
Electrical Specifications	110V or 220V 50/60 Hz	
Frequency	1-240 Hz	
Variable Voltage (speed controller)	1-200 volts	
Dimensions (W x D x H)	22 x 20 x 17-inch (560 x 508 x 432 mm)	25 x 24 x 18-inch (635 x 610 x 457 mm)
Weight	180 lbs (82 kg)	284 lbs (135 kg)
Part No.	GIGA-0900	GIGA-1200

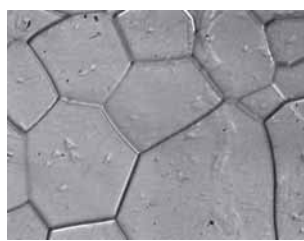


GIGA Vibratory Polisher Accessories

Specimen Holder	Part Number
1-inch diameter 304 stainless steel specimen holders (3/set)	VIB-0100
1.25-inch diameter 304 stainless steel specimen holders (3/set)	VIB-0125
1.5-inch diameter 304 stainless steel specimen holders (3/set)	VIB-0150
2-inch diameter 304 stainless steel specimen holders (3/set)	VIB-0200
1-inch 304 stainless steel holder weights (3/set)	VIB-WT-0100
1.25-inch 304 stainless steel holder weights (3/set)	VIB-WT-0125
1.5-inch 304 stainless steel holder weights (3/set)	VIB-WT-0150
2-inch 304 stainless steel holder weights (3/set)	VIB-WT-0200
Glass slide holder for 27x 47 mm and 1 x 3-inch slides (each)	SR-G
Mounting Plate for 1-inch & 1.25-inch holders	PLATE-0900-1
Mounting Plate for 1.5-inch & 2-inch holders	PLATE-0900-2



Rhenium alloy with embedded abrasive



Rhenium alloy vibratory polished

Ultrasonic Cleaner



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Ultrasonic Cleaner

The UCLEAN-012 ultrasonic cleaner is a large capacity metallographic ultrasonic cleaner (Part No. UCLEAN-012). Benefits include a timer (1-99 minutes) and heater (28-80° C), 110/220V.



Description	Specification
Ultrasonic Frequency	40 KHz
Ultrasonic Power	250 Watts
Timer	1-99 minutes
Heater	200 Watts
Temperature Range	28-80° C (adjustable)
Tank Size Dimensions (W x D x H)	12 x 6 x 9-inches (300 x 150 x 240 mm)
Overall Dimensions (W x D x H)	16 x 12 x 11-inches (400 x 300 x 280 mm)
Part No.	UCLEAN-012

Hardness Testing and Microscopy



ALPHA-MHT-1000Z
Microhardness Tester



Digital Microhardness Testers

Automated Microhardness Tester

ALPHA-MHT-AUTO automated
Microhardness Tester

Manual, Digital and Automated

- Rockwell
- Superficial Rockwell
- Dual Rockwell / Superficial Testers
- Brinell Testers



OMEGA-DIGI-RT
Digital Semi-automated
Microhardness Tester



OMEGA-HB-3000
Digital Semi-automated
Brinell Hardness Tester



IM-5000 Metallurgical
Microscope



VM-100 Digital
Stereo Microscope

Inverted Metallurgical Microscopes

Stereo Microscopes

Microhardness Testers

ALPHA-MHT-1000Z Vickers / Knoop Hardness Tester

ALPHA-MHT-1000Z is an auto-turret Micro Vickers hardness testing instrument for Vickers and Knoop indenters. Benefits include variable testing forces (10, 25, 50, 100, 200, 300, 500, 1000 gram load), 10X and 40X objectives, automatic loading, dwell and unloading along with an auto-turret head to prevent damage to the indenter. The ALPHA -MHT-1000Z can save and export data to either a printer or a PC via a RS232 interface cable.



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ALPHA-MHT-2000Z Vickers / Knoop Hardness Tester

ALPHA-MHT-2000Z is an auto turret precision Micro Vickers hardness testing instrument for Vickers and Knoop indenters. Features include variable testing forces (10, 25, 50, 100, 200, 300, 500, 1000 and 2000 gram load), 10X and 40X objectives, a large LCD screen for displaying measuring methods, testing force, indentation length, hardness value, dwell time and the number of measurements. The ALPHA- MHT-2000Z can save and export data to either a printer or a PC via a RS232 interface cable.

Description	ALPHA-MHT-1000Z	ALPHA-MHT-2000Z
Indenter types	Vickers or Knoop	Vickers or Knoop
Testing Force (gf)	10, 25, 50, 100, 200, 300, 400, 500, 1000	10, 25, 50, 100, 200, 300, 400, 500, 1000, 2000
Objective Magnification	10X and 40X	10X and 40X
Indenter Positioning	Auto turret	Auto turret
Display	Digital LED	Digital LCD
Indenter Measurement	Digital	Digital
Auto Hardness Conversion	HRA, HRG, HRK, HRB, HRC, HV, HK, HBW, etc	HRA, HRG, HRK, HRB, HRC, HV, HK, HBW, etc
Testing Range	1 HV ~ 3000 HV	1 HV ~ 3000 HV
X-Y Anvil Size	4 x 4-inch (100 x 100 mm)	4 x 4-inch (100 x 100 mm)
X-Y Anvil Travel	5 x 1-inch (125 x 25 mm)	5 x 1-inch (125 x 25 mm)
Dwell Time	5-60 seconds	5-60 seconds
Illumination	Halogen	Halogen
Dimensions (W x D x H)	17 x 19 x 17-inch (425 x 490 x 425mm)	17 x 19 x 17-inch (425 x 490 x 425mm)
Electrical Specifications	110V / 220V 50/60 Hz	110V / 220V 50/60 Hz
Weight	88 lbs (40 kg)	88 lbs (40 kg)
Part No.	ALPHA-MHT-1000Z	ALPHA-MHT-2000Z

Microhardness Tester Accessories

Description	Part Number
Vickers indenter	823-401
Knoop indenter	823-411
10X eyepiece	823-341
10X Objective	823-311
40X Objective	823-331
X-Y anvil	823-701
Dust cover	823-902
Sample leveler (optional)	823-741
Digital camera (optional)	MD50-T
Camera adapter (optional)	823-361
Microhardness indentation measurement software (optional)	MICROHARDNESS PRO

Microhardness Auto Tester



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information scan code.

ALPHA-MHT-AUTO Vickers / Knoop Hardness Tester

ALPHA-MHT-AUTO is a fully automated Micro Vickers hardness testing instrument for Vickers and Knoop indenters (Part No. ALPHA MHT-AUTO). Features include variable testing forces (10, 25, 50, 100, 200, 300, 500, and 1000 gram load), 10X, 20X and 40X objectives, touch screen control, CCD image acquisition system, motorized X-Y table, automatic focusing and automatic measurement. The hardness-depth data output is in Microsoft Word or Excel.



Description	Specification
Indenter types	Vickers or Knoop
Objective Magnification	10X and 40X
Loading Method	Automatic (Loading,Dwell/Unloading)
Testing Force (gf)	10, 25, 50, 100, 200, 300, 500, 1000
Indenter Measurement	Digital
Auto Hardness Conversion	HV, HK, HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRK, HR15N, HR30N, HR45N, HR15T, HR30T, HR45T, HS, HBW
Testing Range	1 HV ~ 3000 HV
Table Size	4.3 x 4.3-inch (110 x 110 mm)
Motorized X-Y Test Table Resolution	0.0001-inch (0.002 mm)
Maximum Height of Specimen	7.3-inch (185 mm)
Dwell Time	5-60 seconds
Illumination	Halogen
Dimensions (W x D x H)	13.2 x 22 x 26.6-inch (335 x 560 x 675 mm)
Electrical Specifications	110V / 220V 50/60 Hz
Weight	115 lbs (52 kg)
Part No.	ALPHA-MHT-AUTO

Microhardness Tester Accessories

Description	Part Number
Vickers indenter	823-401
Knoop indenter	823-411
10X eyepiece	823-341
10X Objective	823-311
20X Objective	823-321
40X Objective	823-331
Sample leveler (optional)	823-741

Rockwell / Superficial Manual Hardness Testers

Manual Rockwell (OMEGA-RT) and Manual Superficial Rockwell Hardness Tester (OMEGA-ST)

The OMEGA-RT is a manual Rockwell Tester and the manual OMEGA-ST Superficial Rockwell Testing machine are basic low cost metallographic specimen hardness machines.

Features:

- OMEGA-RT Load selection of 60, 100 and 150 Kgf (Rockwell)
- OMEGA-ST Load selection of 15, 30 and 45 Kgf (Superficial Rockwell)
- Manual instruments



For quick online information scan code.

Description	OMEGA-RT	OMEGA-ST
Tester	Rockwell	Superficial Rockwell
Rockwell Scales	HRA, HRB, HRC	HR15N, HR30N, HR45N, HR15T, HR30T, HR45T
Loading Control	Manual	Manual
Preliminary Testing Force (gf)	10 Kgr (98.07N)	3 Kgf (29.4N)
Test Force	60, 100, 150 Kgf	15, 30, 45 Kgf
Instrument Throat Height	6.5-inch (165 mm)	6.5-inch (165 mm)
Dimensions (W x D x H)	7.2 x 21.5 x 29.7-inch (182 x 546 x 755mm)	7.2 x 21.5 x 29.7-inch (182 x 546 x 755 mm)
Weight	200 lbs (90 kg)	200 lbs (90 kg)
Accuracy	Conforms to ASTM E-18	Conforms to ASTM E-18
Part No.	OMEGA-RT	OMEGA-ST

Rockwell Hardness Tester Accessories

Description	Part Number
1/16-inch steel ball indenter	811-412
1/8-inch steel ball indenter	811-431
1/4-inch steel ball indenter	811-451
1/2-inch steel ball indenter	811-471
Diamond cone indenter	811-402
Cone diamond indenter	811-401
55 mm anvil	811-511
55 mm V-shaped anvil	811-521
100 mm flat anvil	811-531
150 mm flat anvil	811-541
Small flat anvil	811-501

Rockwell and Superficial Digital Rockwell Hardness Testers



For quick online information scan code.

Rockwell and/or Superficial Rockwell Hardness Testers (OMEGA-DIGI)

OMEGA DIGI-RT are OMEGA-DIGI-ST are a semi-automated digital Rockwell and Superficial Rockwell hardness testers, respectively. The OMEGA-DIGI-RST is a semi-automated digital Dual Rockwell / Superficial Rockwell hardness tester. The OMEGA-DIGI hardness testers are designed to evaluate metallographic specimen Rockwell and/or Superficial Rockwell hardness.



Features:

- Color touch screen that displays loading force, indenter type, dwell time, and conversion scale
- Motorized control of loading, dwell, and unloading
- Built-in microprocessor that automatically computes maximum, minimum, mean and standard deviation values
- Resolution 0.1 HR
- Automatic conversion to 14 different hardness scales (HRA, HRB, HRC, HRD, HRF, HV, HK, HBW, HR15N, HR30N, HR45N, HR15T, HR30T, HT45T)
- Store up to 2000 single testing results and 1000 group results for review and analysis
- LCD displays hardness
- Loading time and dwell time (1-60 seconds)

Description	OMEGA-DIGI-RT	OMEGA-DIGI-ST	OMEGA-DIGI-RST
Mode	Rockwell	Superficial	SuperficialRockwell
Rockwell Scales	HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRH, HRK, HRL, HRM, HRR, HRP, HRS, HRV	HR15N, HR30N, HR45N HR15T, HR30T, HR45T	HR15N, HR30N, HR45N HR15T, HR30T, HR45T and HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRH, HRK, HRL, HRM, HRR, HRP, HRS, HRV
Preliminary Testing Force (gf)	10 Kgr (98.07N) Permitted Error:±1.0%	3 Kgf (29.4N)	3 Kgf (29.4N) 10 Kgr (98.07N)
Test Force	60, 100, 150 Kgf	15, 30, 45 Kgf	15, 30, 45, 60, 100, 150 Kgf
Resolution	0.1 HR		
Dwell Time	Adjustable 1-60 seconds		
Display	5.2-inch touch screen Resolution: 640 x 480		
Loading Control	Auto loading/ dwell/ unloading		
Hardness Conversion	HRC, HV, HBS, HBW, HK, HRA, HRD, HR15N, HR30N, HR45N, HS, HRF, HR15T, HR30T, HR45T, HRB		
Conversion Standard	ASTM, DIN		
Correction Range	-3.0HR to +3.0 HR, Step 0.1HR		
Data Memory	2000 single measuring result, curve analysis, results reviewing and analysis		
Max Height of Specimen	6.9 inches (175 mm)		
Instrument Throat Height	6.5 inches (165 mm)		
Power Supply	110V/60 Hz; 220V/50 Hz		
Dimensions (W x D x H)	7 x 21.5 x 30 inches (182 x 546 x 755 mm)		
Gross/Net weight	265 lbs (120 Kg)/ 198 lbs (90 Kg)		
Execution Standard	GB/T230.2, JJS Z2245, EN-ISO 6508, ASTM E-18		

Rockwell / Superficial Digital Hardness Testers



Digital Dual Rockwell / Superficial Rockwell Hardness Tester (OMEGA-SRT-15/150)

The OMEGA-SRT-15/150 is an automated digital Rockwell / Superficial Rockwell Testing machine designed for evaluating metallographic specimen hardness.



For quick online information scan code.



Digital Rockwell Hardness Tester (OMEGA-RT-60/150)

The OMEGA-RT-60/150 is a semi-automated digital Rockwell hardness tester

Description	OMEGA-RT-60/150	OMEGA-SRT-15/150
Tester	Rockwell	Rockwell/ Superficial Rockwell
Rockwell Scales	HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRH, HRK, HRL, HRM, HRR, HRP, HRS, HRV	HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRH, HRK, HRL, HRM, HRR, HRP, HRS, HRV, HR15N, HR30N, HR45N, HR15T, HR30T, HR45T
Preliminary Testing Force (gf)	10 Kgr (98.07N)	3 Kgf (29.4) 10 Kgr (98.07N)
Rockwell Testing	60, 100, 150 Kgf	60, 100, 150 Kgf
Superficial Rockwell Testing	n.s	15, 30, 45 Kgf
Hardness Resolution	0.1 HR	0.1 HR
Dwell Time	Adjustable 1-60 seconds	Adjustable 1-60 seconds
Auto Hardness Conversion	HRC, HRB, HRA, HV, HK, HBW, HT15N, HR30N, HR15T, HR30T, HR45T	HRC, HRB, HRA, HV, HK, HBW
Electrical Requirements	110V/60 Hz; 220V/50 Hz	110V/60 Hz; 220V/50 Hz
Instrument Throat Height	6.3-inch (160 mm)	6.3-inch (160 mm)
Dimensions (W x D x H)	8.5 x 20 x 28 inch (216 x 508 x 711mm)	8.5 x 20 x 30-inch (216 x 508 x 762 mm)
Weight	200 lbs (90 kg)	200 lbs (90 kg)
Accuracy	Conforms to ASTM E-18	Conforms to ASTM E-18
Part No.	OMEGA-RT-60/150	OMEGA-SRT-15/150

Rockwell Hardness Tester Accessories

Description	Part Number
Mini-printer	811-831
1/16-inch steel ball indenter	811-412
1/8-inch steel ball indenter	811-431
1/4-inch steel ball indenter	811-451
1/2-inch steel ball indenter	811-471
Diamond cone indenter	811-402
Fuses	811-811
Cone diamond indenter	811-401
55 mm anvil	811-511
55 mm V-shaped anvil	811-521
100 mm flat anvil	811-531
150 mm flat anvil	811-541
Small flat anvil	811-501

Rockwell and/or Superficial Rockwell Automated Hardness Testers



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information scan code.

Rockwell Fully Automated Hardness Tester (OMEGA-AUTO)

The OMEGA-AUTO-RT is an automated digital Rockwell hardness tester (Part No. OMEGA-AUTO-RT). The OMEGA-AUTO-ST is an automated digital Superficial Rockwell hardness tester (Part No. OMEGA-AUTO-ST) and the OMEGA-AUTO-RST is an automated Dual Rockwell and Superficial Rockwell hardness tester (Part No. OMEGA-AUTO-RST). The OMEGA-AUTO hardness testers are designed to accurately evaluate metallographic Rockwell and/or Superficial Rockwell specimen hardness.

Features:

- One touch operation
- Auto load change
- Auto lifting
- Auto loading
- Auto measuring
- Auto conversion
- Data transmission
- Color touch screen
- Ability to set upper and lower limits
- Stores up to 2000 single test results, 1000 group test results
- Optional data analysis software and Bluetooth receiver to input and analyze data
- Supports FexQMS data analysis and control software



Description	Specification		
Model	OMEGA-AUTO-RT	OMEGA-AUTO-ST	OMEGA-AUTO-RST
Preliminary Testing Force (gf)	10 Kgr (98.1N)	3 Kgf (29.4N)	3 Kgf, 10 Kgf
Test Force	60, 100, 150 Kg	15, 30, 45, Kg	15, 30, 45, 60, 100, 150 Kgf
Rockwell Scales	HRA, HRB, HRC, HRD, HRE, HRF, HRG, HRH, HRK, HRL, HRM, HRP, HRR, HRS, HRV		
Superficial Rockwell Scales	15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 15N, 30N, 45N		
Resolution	0.1 HR		
Dwell Time	Adjustable 1-60 seconds		
Display	5.2-inch Color touch screen Resolution: 640 x 480		
Loading Control	Auto loading/dwell/unloading		
Conversion Scale	HRC, HRB, HRA, HV, HK, HBW, etc		
Conversion Standard	ASTM, DIN		
Correction Range	-3.0HR ~ +3.0 HR, Step value 0.1 HR		
Data Processing	Stores up to 2000 single test results and 1000 group test results		
Max Height of Specimen	11 inches (280 mm)		
Instrument Throat Height	6.7 inches (170 mm)		
Electrical Requirements	110V/60 Hz; 220V/50 Hz		
Dimensions (W x D x H)	9 x 24 x 34.8 inches (225 x 615 x 885 mm)		
Gross/ Net weight	308 lbs / 275.6 lbs (140/ 125 kg)		
Execution Standard	GB/T230.2, JJS Z2245, EN-ISO 6508, ASTM E-18		
Part No.	OMEGA-AUTO-RT	OMEGA-AUTO-ST	OMEGA-AUTO-RST

Brinell Manual Hardness Tester

Manual Brinell Hardness Tester (OMEGA-HB)

The OMEGA -HB Brinell tester is a basic economical manual Brinell tester (Part No. OMEGA-HB) designed to evaluate metallographic specimen hardness. Recommended optional external BrinScan camera and measurement software.

Features:

- Testing range of ~8 to 650 HBW
- Test forces (kg) 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000
- Robust and durable design
- Economical manual system

Applications: Wide application range including testing Brinell hardness of ferrous, non-ferrous metal and bearing alloy materials, precision measurement of flat surfaces and measurement of curved surface



For quick online information scan code.

Brinell Measuring System (BrinScan)



BrinScan Measuring System (Camera and Computer)

Features:

- Portable, high definition USB camera
- Ergonomical design
- Easy and fast measurement
- Real-time statistics (Max, Min, Average, Std. Deviation, CP, CK, etc)
- Exportable to MS Word

Description	Specification
Test Force (Kgf)	187.5, 250, 500, 750, 1000, 3000 Kgf
Measuring Range	(8-650) HBW
Max Height of Specimen	9-inches (230 mm)
Instrument Throat Height	4.7-inches (120 mm)
Electrical Requirements	110V/60 Hz; 220V/50 Hz
Dimension (W x D x H)	10.6 x 27.6 x 33.1-inches (268 x 700 x 842 mm)
Gross Weight	420 lbs (210 Kg)
Execution Standard	GB/T 231.2, ISO 6506, ASTM E10-12
Part No.	OMEGA-HB

Brinell Hardness Tester Accessories

Description	Part Number
2.5 mm carbide ball	P3025
5 mm carbide ball	P3050
10 mm carbide ball	P3100
2.5 mm indenter with carbide ball	P4025
5 mm indenter with carbide ball	P4050
10 mm indenter with carbide ball	P4100
V-groove anvil table	BRN-511
65 mm small flat anvil table	BRN-501
200 mm large flat anvil table	BRN-541
Brinell Optical Measuring System for 10 mm Brinell Indenters	BrinScan QB100
Brinell Optical Measuring System for 2.5 and 5 mm Brinell Indenters	BrinScan QB250

Brinell Digital Hardness Testers



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information scan code.

Digital Brinell Hardness Tester (OMEGA-HB-3000)

OMEGA-HB-3000 Digital Brinell tester is a ball indenter designed to evaluate metallographic specimen hardness. (Part No. OMEGA-HB-3000)

Features:

- Testing range of ~8 to 650 HBW
- Measurement is incorporated into unit with results displayed on a LCD screen
- Test forces (kg) 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000
- Semi-automatic
- Built-in eyepiece filler
- Robust and durable design



Description	Specification
Test Forces (kg)	62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000
Testing Range	~8 to 650 HBW
Max Height of Specimen	8.8-inch (225 mm)
Max width of specimen	5.3-inch (135 mm)
Electrical Requirements	110V/60 Hz; 220V/50 Hz
Dimensions (W x H x D)	9.3 x 21.5 x 31.1-inch (235 x 545 x 790 mm)
Weight	290 lbs (130 kg)
Part No.	OMEGA-HB-3000

Brinell Hardness Tester Accessories

Description	Part Number
Mini-printer	811-831
2.5 mm carbide ball	P3025
5 mm carbide ball	P3050
10 mm carbide ball	P3100
2.5 mm indenter with carbide ball	P4025
5 mm indenter with carbide ball	P4050
10 mm indenter with carbide ball	P4100
V-groove anvil table	BRN-511
65 mm small flat anvil table	BRN-501
200 mm large flat anvil table	BRN-541



Brinell Tester Tables



OMEGA-HB-3000 Brinell Tester
Control Panel

Brinell Automated Hardness Tester

Fully Automated Digital Brinell Hardness Tester (OMEGA-AUTO-HB)

The OMEGA AUTO-HB Digital Brinell tester is a fully automated Brinell tester (Part No. OMEGA-AUTO-HB) designed to evaluate metallographic specimen hardness.

Features:

- Testing range of ~8 to 650 HBW
- Measurement is incorporated into unit with results displayed on a LCD screen
- One key operation
- Displays data statistics, hardness conversion, and limitation setting
- Loading by high accuracy force sensor
- Compensation of force loss during loading with micro-central processing unit
- Test forces (kg) 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000
- Robust and durable design
- Fully automated

Applications: Wide application range including testing Brinell hardness of ferrous, non-ferrous metal and bearing alloy materials, precision measurement of flat surfaces and measurement of curved surface



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information scan code.



Description	Specification
Test Force (Kgf)	62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000 Kgf
Measuring Range	(8~650) HBW
Hardness Resolution	0.1HBW
Measurement	Automatic
Objective	1X and 2X
Software	Win 10 OS, MS Office Brinell Measurement Software BrinScan V3.0
Max Height of Specimen	10 inches (260 mm)
Instrument Throat Height	6 inches (150 mm)
Electrical Requirements	110V/60 Hz; 220V/50 Hz
Dimension (W x D x H)	12 x 24.5 x 39 inches (313 x 622 x 992 mm)
Gross/Net Weight	440 / 375 lbs (200 / 170 kg)
Execution Standard	GB/T 231.2, JIG150, EN-ISO 6506, ASTM E10-12, JIS Z2243
Part No.	OMEGA-AUTO-HB

Brinell Hardness Tester Accessories

Description	Part Number
2.5 mm carbide ball	P3025
5 mm carbide ball	P3050
10 mm carbide ball	P3100
2.5 mm indenter with carbide ball	P4025
5 mm indenter with carbide ball	P4050
10 mm indenter with carbide ball	P4100
V-groove anvil table	BRN-511
65 mm small flat anvil table	BRN-501
200 mm large flat anvil table	BRN-541

Macro Vickers Hardness Tester



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information scan code.

OMEGA-5000-VZ Marco Vicker Tester with Auto Turret

OMEGA-5000-VZ is semi-automated Macro Vickers hardness testing instrument with auto shifting between indenter and objective lens (Part No. OMEGA-5000-VZ).

Features include variable testing forces (1, 2, 2.5, 3, 5, 10, 20, 30 and 50 kilogram load), 10X and 20X objectives, touch screen control, CCD image acquisition system, motorized X-Y table, automatic focusing and automatic measurement. The hardness-depth data output is in Microsoft Word or Excel.



Description

Specification

Indenter types	Vickers or Knoop
Objective Magnification	10X and 20X
Loading Method	Automatic (Loading,Dwell/Unloading)
Testing Force (gf)	1, 2, 2.5, 3, 5, 10, 20, 30, 50
Indenter / Measurement	Auto Turret
Testing Range	1 HV ~ 3000 HV
Table Size	4.3 x 4.3-inch (110 x 110 mm)
Maximum Height of Specimen	6.7-inch (170 mm)
Dwell Time	5-60 seconds
Illumination	Halogen
Dimensions (W x D x H)	11.0 x 20.9 x 24.8-inch (280 x 530 x 630 mm)
Electrical Specifications	110V / 220V 50/60 Hz
Data Output	Built-in Printer
Weight	103 lbs (47 kg)
Part No.	OMEGA-5000-VZ

Micohardness Tester Accessories

Description	Part Number
Vickers indenter	823-401
10X eyepiece	823-341
10X Objective	823-311
20X Objective	823-321
Sample leveler (optional)	823-741
Digital camera (optional)	MD50-T
Camera adapter (optional)	823-361
Microhardness indentation measurement software (optional)	MICROHARDNESS PRO

Metallurgical Microscopes

Inverted Metallurgical Microscope Brightfield (IM-3000)

The IM-3000 inverted metallurgical microscope is a basic bright-field microscope (Part No. IM-3000). The IM-3000 inverted microscope is an excellent choice for a basic multipurpose economical metallurgical microscope.

Features:

- Binocular eyepiece tubes
- Digital camera port
- Objectives include 4X, 10X, 20X and 40X with wide field 10X eyepieces



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information scan code.



Description	Specification	Part Number
Eyepiece	Wide field WF10X (Field No. 20mm)	431-513
Objectives	Infinite Plan Achromatic 4X/0.1	431-623
	Infinite Plan Achromatic 10X/0.25	431-633
	Infinite Plan Achromatic 20X/0.4	431-643
	Infinite Plan Achromatic 40X/0.6	431-653
Nosepiece	Quintuple	431-603
Focus System	Coaxial coarse/fine focus	
Mechanical Stage	X-Y Mechanical Stage	431-403
Illumination	6V/30W Halogen Lamp	431-803
Color Filters	Yellow color filter	431-303
	Blue color filter	431-313
	Green color filter	431-323
	Ground glass	431-333
Electrical Requirements	110V/60 Hz; 220V/50 Hz	
Dimensions (W x D x H)	12 x 25 x 22-inches (304 x 635 x 559 mm)	
Part No.	IM-3000	

IM-3000 Inverted Metallurgical Microscope Accessories

Description	Specification	Part Number
Eyepiece	Wide field WF10X (field no. 20mm)	431-513
Objectives	Infinite Plan Achromatic 50X/0.75	431-633
	Infinite Plan Achromatic 100X/0.9	431-683
Digital Camera Adapter	0.5X C-mount Adapter	431-725
Digital Camera	5 MP	MD-50T
Light Blubs	6V/30W Halogen Lamp	431-803

Metallurgical Inverted Microscope (BF, DF, Polarized Light & DIC)



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information scan code.

Inverted Metallurgical Microscope (IM-5000)

The IM-5000 inverted metallurgical microscope (Part No. IM-5000) features bright-field, dark field, polarized light and differential interference contrast (DIC) illumination, binocular eyepiece tubes and two digital camera ports. The IM-5000 inverted microscope is an excellent choice for a multipurpose economical metallurgical microscope.

Features:

- Objectives include 5X, 10X, 20X, 50X and 100X with wide field 10X eyepieces
- Brightfield, darkfield, and polarized light illumination
- Differential interference contrast
- Multiple camera ports

Applications: Metals, semiconductors, glass, ceramics, minerals, composites, soft metals, plastics, refractory metals, general metals.



Description		Part Number
Eyepiece	Wide field WF10X (Field No. 22mm)	431-515
Objectives	PL L5X/0.12 BD (working distance 10 mm)	431-615
	PL L10X/0.25 BD (working distance 10 mm)	431-625
	PL L20/0.40 BD (working distance 5 mm)	431-635
	PL L50X/0.70 BD (working distance 1.3 mm)	431-655
	PL L100X/0.90 BD (working distance 0.7 mm)	431-695
Eyepiece Tube	Trinocular, 45 degree inclination ratio Observation: 80%, photo 20%	431-505
Focus System	Coaxial coarse/ fine focus (2 micron)	
	Travel (stage to focal plane) up 1 mm, down 7 mm	431-705
Nosepiece	Quintuple	431-605
Mechanical Stage	Travel range: 1.6x1.6-inches (40 x 40 mm)	
	Size: 8.9 x 7-inch (226x178 mm)	431-415
Illumination	12V/50W Halogen Lamp	431-835
Color Filters	Grey color filter	431-305
	Blue color filter	431-315
	Green color filter	431-325
	Ground glass	431-335
Dimensions (WxDxH)		9 x27.5 x18-inches (227 x 698 x 457 mm)
Part No.		IM-5000

IM-5000 Inverted Metallurgical Microscope Accessories

Description	Specification	Part Number
Eyepiece	Wide field WF 15X (field no. 16 mm)	431-525
	Wide field WF 20X (field no. 12 mm)	431-535
Digital Camera Adapter	0.5X C-mount Adapter	431-725
Digital Camera	5 MP	MD-50T
Light Blubs	12V/50W halogen light bulb	431-000

Stereo Microscope



Stereo Metallurgical Microscope (ZMS0745T)

The ZMS0745T trinocular stereo microscope (Part No. ZMS0745T) has an optical design for enhancing reproduction and true color imaging of the specimen.

The ZMS0745T stereo microscope has a magnification range of 7X to approximately 45X and is ideal for low magnification documentation of the metallographic specimens prior to polishing and grinding. It is also useful for measuring cracks, weld penetration depth and other topographical features.



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Description	Specification
Total Magnification	7X ~ 45X
Zoom Objective Magnification	0.7X ~ 4.5X
Working Distance	4.6-inch (118 mm)
Eyepieces	SWH10X
Trinocular Eyetubes	Inclined 45 degrees from main body (360 degree rotation)
Diopter Adjustment	+/- 6 degrees
Interpupillary Adjustment	2 ~ 3-inch (52 ~ 76 mm)
Focus Range	3-inch (76 mm)
Stage Size	5-inch (125 mm)
Part No.	ZMS0745T

ZMS0745T Stereo Metallurgical Microscope Accessories

Description	Part Number
Eyepiece	SWH10X/23mm eyepiece
	SWH15X/17mm eyepiece
	SWH20X/14mm eyepiece
Magnifier	0.37X magnifying objective
	0.5X magnifying objective
	0.7X magnifying objective
	1.5X magnifying objective
	2X magnifying objective
Digital Camera Adapter	Adapter 0.5X (C1.0)
	Adapter 1X (C1.0)
Digital Camera	5 MP
Light Sources	4-Division LED light source (ML-144D)
	Fiber optic light source with bifurcated fiber cables (150 W)
Stage	Mechanical stage with X-Y micrometers



Digital Stereo Microscope



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Digital Stereo Microscope (VM-100)

The VM-100 digital stereo microscope (Part No. VM-100) has 0.7X ~ 4.5X electronic magnification with a zoom ratio of 6.5:1. With a built-in SD memory card, high resolution photo and video recordings are easy to obtain (22-inch monitor included).



The VM-100 digital stereo microscope is ideal for low magnification documentation of metallographic specimens prior to polishing and grinding. It is also very useful for measuring cracks, weld penetration depth and other topographical features.

Features:

- High definition 0.7-4.5 X parallel continuous zoom lens
- Fast and easy to switch objective magnification
- Precision coarse and fine lifting system
- Adjustable LED bottom and surface illumination
- Control illumination independently
- Built-in full HD sensor and VGA integrated camera
- Camera can directly connect with the monitor
- Use SD card to take picture or record
- Simple external interface: 12V power supply input, USB/ VGA video output and slot for SD card

Description	Specification
Optical Objective	0.7 X ~ 4.5X Horizontal zoom lens Zoom ratio: 6.5:1
Camera Parameter	2 million pixel (1920 x 1080) Image size: 1/2.86-inch Frames per second: 30 fps
Camera Function	White balance, brightness control, digital noise reduction Photograph and video recording VGS/USB Out put, SD card storage OSD: Comprehensive digital UI design, Wireless USB 2.0 mouse operation Cross line Picture frozen, 10 X digital magnification
Illumination	Bottom: Adjustable LED Illumination Surface: Adjustable LED Illumination
Microscope Stand	Z-axis Travel: 6-inch (150 mm) Coarse/fine lifting system
Electrical Parameters	90~240 V; 50~60 Hz
Dimensions (W x D x H)	11.4 x 11 x 15.7 inches (290 x 280 x 400 mm)
Gross/ Net Weight	15/10 lbs (7.0/4.7 kg)
Part No.	VM-100

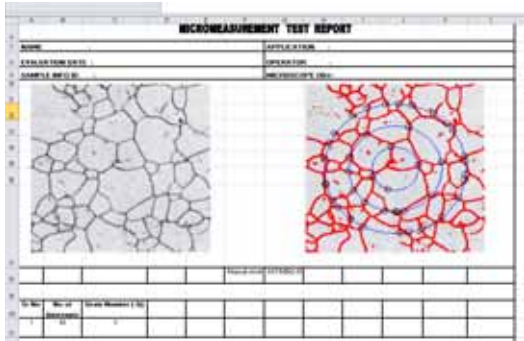
Metallographic Image Analysis

MATERIALS PLUS Software

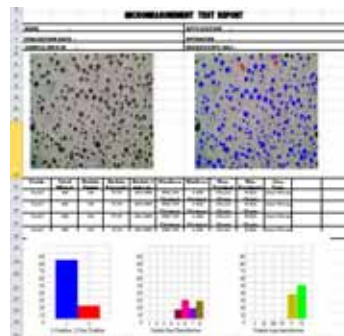
Materials Plus software is an image analysis package for measuring grain size, phases percentage, inclusions in steels, nodularity, porosity, decarburization and coating thickness based on ASTM standards.



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Grain size automatic circle measurement



Graphite nodules (ASTM A247)

Description

Measurement Tools

Specification

Calibration, Length, Angle, Perimeter, Width, Radius, Area, Color, Counting

Grain Size Analysis
(Manual and Interception Methods)

ASTM E112

Phase Analysis
(Area %)

ASTM E566, ASTM 1245

Inclusion Rating in Steels (A, B, C and D - Thin & Thick)
(Min, Max, Length, width, Apex ratio, Type, serverity level)

ASTM E454/ E1245

Nodularity (Count, maximum diameter, minimum diameter, area, percentage)

ASTM A247

Porosity (Field name, number of count, area %, diameter average, area average)

ASTM A276

Measurement of Pearlite Banding with average, maximum, minimum bandwidth and length

Decarburization (Maximum, minimum and average of decarb level)

ASTM E1077

Coating Thickness (Min. Length, max. length, average length, min. height, diameter, area)

ASTM B487

Particle Measurement (Sr. no., length, width, area and apex ratio)

Density (% black and white)

Filters (Solarize, emboss, bright, sharpness, smooth, diffuse and contract)

Invert

Annotation

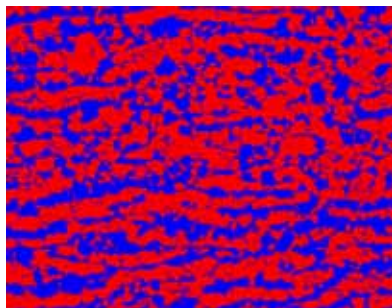
Background Removal (very useful for phase analysis)

Amalgamation (merging two images together)

Report (MS-Word, MS-Excel)

Hardness Testing (area of indent)

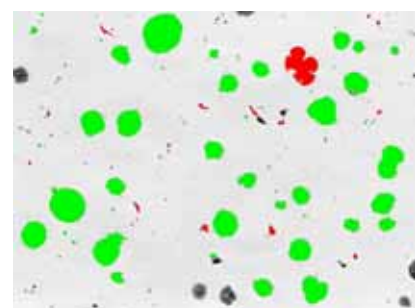
Gallery (saving images and reports)



Volume fraction ASTM E562



Decarburization Depth (ASTM E1077)



Graphite nodules (ASTM A247)

Welding Penetration Software



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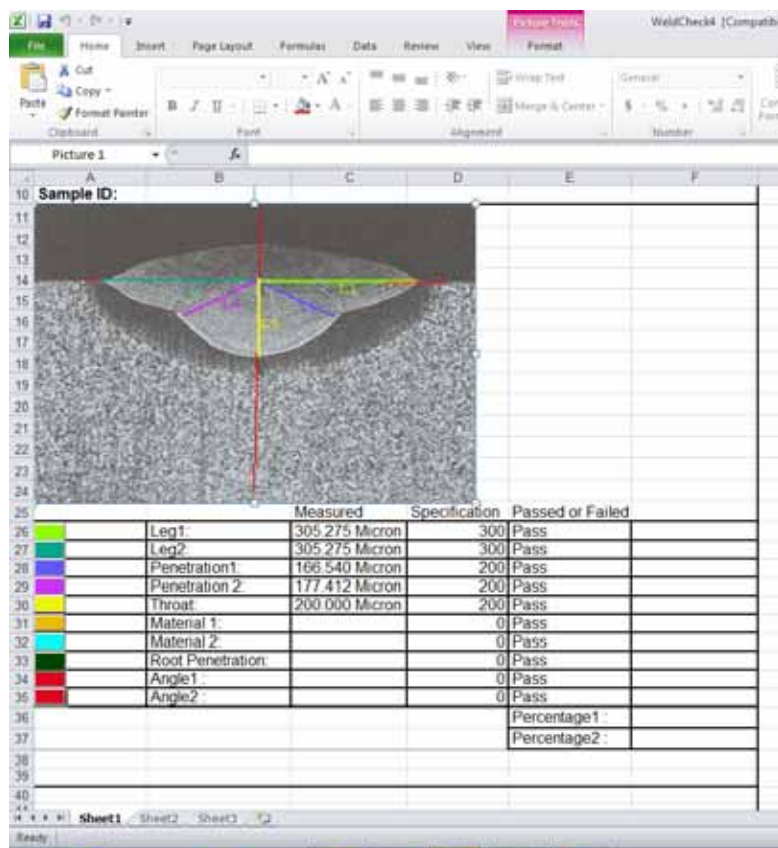
WELD CHECK Software

Weld Check software is a powerful, easy-to-use tool that enhances the ability to quickly and efficiently measure critical welding features such as fillet welds, throat, leg lengths and penetration depth.

Fillet weld example: A fillet weld of approximately triangular cross section joining two surfaces at approximately right angles to each other can be measured for the following important measurements:

- Distance from the foot of the fillet to the center of the face (or throat)
- Distance from the root of the joint to the junction between the exposed surface of the weld and the base metal (leg)
- Angles and the root penetration
- Depth of HAZ (heat affected zone)
- Area of HAZ
- Joint penetration
- Phase counting, etc.

Weld Check is a Microsoft Windows based product so reports are easily generated in MS Excel.



The **Weld Check** software can handle both gray monochrome (8 bit) and color (24 bit) images. Multiple images of any size can be opened and displayed on the screen for analysis or comparison. The software supports the most common formats such as BMP, JPEG, TIFF, PNG, GIF and PSD. Live images can also be observed and captured on the same platform. Since the system is in a Windows environment, graphs and charts displayed on the monitor can be quickly transferred into other Windows based programs such as, MS Word, MS Excel or any other commercial Windows based software for the purpose of producing reports and presentations.

Microhardness Testing Software

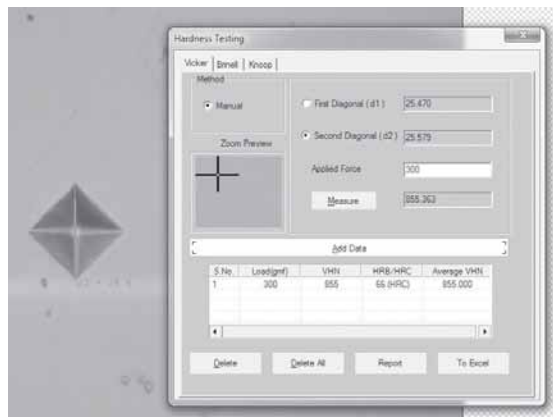
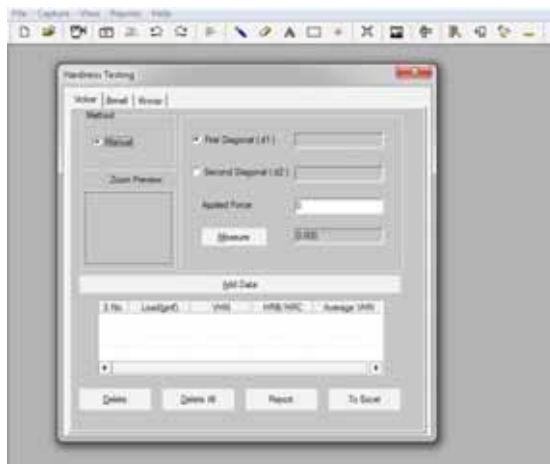
MICROHARDNESS PRO Software

Microhardness Pro 4.2 is an easy to use image analysis software for measuring microhardness and for generating easy to distribute Excel reports. It is a single screen Windows based system.

The **Microhardness Pro 4.2** software can handle both gray monochrome (8 bit) and color (24 bit) images. Multiple images of any size can be opened and displayed on the screen for analysis or comparison. The software supports the most common formats such as BMP, JPEG, TIFF, PNG, GIF and PSD. Live images also can be observed and captured on the same platform. Since the system is in a Windows environment, graphs and charts displayed on the monitor can be quickly transferred into other Windows based programs such as, MS Word, MS Excel or any other commercial Windows based software for the purpose producing reports and presentations.



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Laboratory Furniture



Flammable Cabinet

Safety Cabinets
-Flammable
-Chemical



Chemical Storage Cabinet

Lab Furniture
-Fume Hoods
-Lab Benches
-Microscope
Benches
-Specimen Storage
Cabinet



Laboratory Benches



SPEC-STORE
Specimen Storage Cabinet



MEGA Cutter Bench



FUME HOOD

Lab Furniture Specimen Storage Cabinets



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information scan code.

Specimen Storage Cabinet

The Specimen Storage Cabinet is a durable, practical cabinet (Part No. SPEC-STORE) specifically designed to store metallographic specimen mounts securely in an organized fashion.

Features:

- 10 stainless steel storage drawers / shelves
- Removable and interchangeable trays so the user can design the cabinet's interior to their personalized needs
- Trays store 1-inch, 1.25-inch, 1.5 inch or 2-inch diameter specimens
- User can remove trays from a drawer to store polishing pads if desired



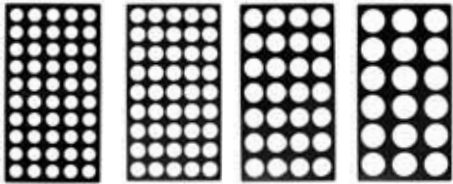
SPEC-STORE with 10 shelves



SPEC-STORE Secure Storage



SPEC-STORE multiple specimen sizes



1-inch 1.25-inch 1.5-inch 2-inch
Specimen Trays (2 per drawer)

Description	Specification
Dimensions (W x D x H)	21.75 x 18.5 x 27-inches (552 x 470 x 686 mm)
Drawer size (W x D x H)	16 x 15 x 2-inches (406 x 381 x 51 mm)
Weight	100 lbs (46 kg)
Specimen spacer trays (2 per drawer)	1-inch and 25 mm - 50 mounts/tray (cat. no. CST-ABS-0100) 1.25-inch and 30 mm - 45 mounts/tray (cat. no. CST-ABS-0125) 1.5-inch - 28 mounts/tray (cat. no. CST-ABS-0150) 40 mm - 28 mounts/tray (cat. no. CST-ABS-40M) 2-inch and 50 mm - 18 mounts/tray (cat. no. CST-ABS-0200)
Part No.	SPEC-STORE

Lab Safety Cabinets



For quick online information scan code.

Safety Cabinets

Our safety yellow ventilated cabinet (Part No. CAB-F) is a secure, highly visible cabinet designed specifically to store flammable substances.

Features:

- With the bright safety yellow color and clear signage it is an optimal cabinet for easily distinguishable, safe storage in the metallographic lab
- Additional security provided by the lock and key



Our safety blue ventilated cabinet (Part No. CAB-C) is designed for safe storage of chemicals.

Features:

- Clearly signed and colored
- Lock and key safety feature

Description		Specification	
Cabinet Type	Chemical	Flammable	
Dimensions (W x D x H)	43 x 18 x 44 inches (1092 x 457 x 1118 mm)	43 x 18 x 65 inches (1092 x 457 x 1651 mm)	
Weight	220 lbs (100 kg)	304 lbs (140 kg)	
Stainless Steel Shelve	part no. C-SHELVE	part no. C-SHELVE	
Color	Blue	Yellow	
Part No.	CAB-C	CAB-F	

Fume Hood

Fume Hood

Limit exposure to toxic or hazardous fumes, vapors, and dust with this fume hood (Part No. FUME-HOOD), a valuable addition to any lab.

Features:

- High air exhaust air flow
- Built-in sink
- Multiple air and gas supply line with programmable control.



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Description	Specification
Fan Speed (RPM)	1450 rpm
Air Flow (CFM)	1175-1470 cfm
Sound Level (dBA)	65 dBA
Power	110 V/ 60 Hz
Wattage	300W
Phase	Single Phase
Weight	585 lbs (266 kg)
Color	Black
Lighting Type	LED
Blub Wattage	20 W 12 V
Overall Dimensions (W x D x H)	47x 33 x 100-inches (1194x 838 x 2540 mm)
Sink Dimensions (W x D x H)	4.25 x 8.75 x 4.75-inches (107 x 222 x 121 mm)
Chamber Dimensions (W x D x H)	36 x 24 x 44 inches (914 x 610 x 1118 mm)
Stand (W x D x H)	47 x 28.75 x 32.25- inches (1194 x 705 x 819 mm)
Cabinet	42 x 12.5 x 26.25-inches (1067 x 318 x 667 mm)
Working Space	37 x 24 x 34 -inches (940 x 610 x 864 mm)
Working Top Height	35-inches (889 mm)
Part No.	FUME-HOOD



MEGA Abrasive Cutter Benches



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information scan code.

The MEGA Cutter Bench is a versatile bench designed to support the MEGA M250, M300, and T300 bench top abrasive saws (Part No. MEGA-BENCH).

Features:

- One drawer and double door cabinet for coolant tank
- Can hold up to 661 lbs (300 kgs)
- Engineered to support the MEGA M250, M300 and T300 abrasive cutters
- Optional replaceable protective bench cover available (Part No. BC-M)

Description	Specification
Overall Dimensions (W x D x H)	39.4 x 29.5 x 33.5-inches (1000 x 750 x 851 mm)
Weight	133 lbs (60 kg)
Color	Black
Part No.	MEGA-BENCH
Protective Cover (optional)	BC-M



Lab Equipment Benches

With a single 39.25-inch width equipment bench (Part No. S-BENCH), a double 78.75-inch equipment bench (Part No. D-BENCH) and a corner bench (Part No. C-BENCH) to connect them, these three benches combine to create a cost-effective, organized laboratory with ample space for your metallographic equipment.

Lab Equipment Bench Features:

- Built for fitting metallographic lab equipment
- Rugged steel design with durable Winsinate table top
- Designed to flawlessly fit with one another or stand-alone
- Double door cabinets and single drawer on the S and L Benches, one cabinet on the C-bench



L-BENCH With Two Double Unit Cabinets



Corner Unit Bench

Description	Specification		
Part No.	S-BENCH	D-BENCH	C-BENCH
Dimensions (W x D x H)	39.25 x 29.5 x 33.5-inches (997 x 749 x 851 mm)	78.75 x 29.5 x 33.5-inches (2000 x 749 x 851 mm)	55.5 x 48.75 x 33.5-inches (1388 x 1238 x 851 mm)
Cabinets	Single Double	Dual Double	Corner
Weight	153 lbs (70 kg)	297 lbs (135 kg)	120 lbs (55 kg)
Color	Black	Black	Black
Protective Cover (optional)	Part No. BC-S	Part No. BC-D	Part No. BC-C
Backing Panel (1 meter) (optional)	Part No. BENCH-BP	Part No. BENCH-BP	Part No. BENCH-CP

Microscope Benches

For setting up microscopes and microhardness testers the 78-inch (2000 mm) wide single (S-MBENCH) and double 103-inch (2610 mm) wide cabinet (D-MBENCH) microscope benches allow space for using a chair/

Microscope Bench Features:

- Designed to include cut-out for chair
- Double door cabinets and single drawer on the S-MBENCH and D-MBENCH Benches
- Optional replaceable protective bench covers and back panels available



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S-MBENCH Two Single Unit Cabinets



D-MBENCH Two Double Unit Cabinets

Description	Specification	
	S-MBENCH	D-MBENCH
Part No.		
Dimensions (W x D x H)	78.75 x 29.5 x 33.5 -inches (2000 x 749 x 851 mm)	102.75x 29.5 x 33.5-inches (2610 x 749 x 851 mm)
Chair space	39-inches (1000 mm)	24-inches (610 mm)
Cabinets	Single/Single	Double/Double
Weight	246 lbs (112 kg)	337 lbs (153 kg)
Color	Black	Black
Protective Cove (optional)	Part No. BC-SM	Part No. BC-DM
Backing Panel (1 meter) (optional)	Part No. BENCH-SMP	Part No. BENCH-DMP

Metrology Equipment



High Accuracy Manual Vision Measuring Systems

(iVision series)

The iVision series of measuring tools are 2.5D high accuracy, manual vision measuring machines. Includes Dell PC and optional 22-inch monitor.

Features:

- Accurate optical linear scale with precision working stage that ensures the accuracy is within $3 + \text{length (mm)} / 200 \mu\text{m}$
- Granite base for stability
- Precision light pole and fast moving locking device which ensures that the error of return travel is within $2 \mu\text{m}$
- Granite base and pillar
- High definitive detented zoom lens
- High resolution color digital camera to produce clear images without distortion
- Automatically controls the brightness in the 4-ring 8-division with contour LED parallel illumination and internal light adjustment
- Powerful iMeasuring 2.1 software
- Optional 3D measuring software to upgrade the system capability to 3D measuring



	IMS-2010	IMS-2515	IMS-3020	IMS-4030	IMS-5040
Metal Table	16x12-inch 408x300 mm	16x12-inch 408x300 mm	18x14-inch 458x358 mm	24x18.5-inch 608x470 mm	28x18.5-inch 708x470 mm
Glass Table	12x8-inch 300x200 mm	12x8-inch 300x200 mm	14x10-inch 356x250 mm	18x13.7-inch 456x348 mm	22x13.7-inch 556x348 mm
XY-axis Travel	8x4-inch 200x100 mm	10x6-inch 250x150 mm	12x8-inch 300x200 mm	16x12-inch 400x300 mm	20x16-inch 500x400 mm
Dimensions (WxDxH)	31.1x24.3x39.4-inch 790x617x1000 mm	31.1x24.3x39.4-inch 790x617x1000 mm	33x26.2x39.4-inch 838x667x1000 mm	39.4x32.2x41-inch 1002x817x1043 mm	39.4x34.1x41-inch 1002x867x1043 mm
Net Weight	385 lbs (175 kg)	385 lbs (175 kg)	410 lbs (185 kg)	770 lbs (350 kg)	840 lbs (380 kg)

Description	Specification
Z-axis Travel	High-precision linear guide, working travel 8-inch (200 mm)
X/Y/Z Travel	0.0005 mm
X/Y- axis Accuracy	Less than or equal to $3 + \text{Length (mm)} / 200 \mu\text{m}$
Repeatability	2 μm
Base and Pillar	Granite
Illumination System (Software Adjustment)	Surface: Adjustable 4-ring 8-division LED Cold Illumination Contour: LED Parallel Illumination LED Laser Navigation Lights
CCD	High Resolution 700TV color CCD camera
Zoom Lens	6.5X high resolution detented zoom lens Magnification: 0.7X~4.5X Video Magnification: 26X~172X
Working Environment	Temperature: $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, change range $<2^{\circ}\text{C/hr}$ Humidity: 30~80% Vibration $<0.002\text{g}$, $<15\text{Hz}$
Measuring Software	iMeasuring 2.1
Operation System	Support XP, WIN7, WIN10, 32/64 operating system
Electrical Requirements	110V/60 Hz; 220V/50 Hz

High Accuracy Semi-Automated Vision Measuring Systems

(iFocus series)

The iFocus Series of vision measuring tools is a highly accurate, semi-automated vision measuring system with motorized auto focus.

Features:

- High precision granite base and pillar for increased stability
- High precision toothless rod and fast moving locking device to ensure that hysteresis error is within 2 μ m
- Optical linear scale with precision working stage, to ensure accuracy
- Definitive detented zoom lens and high resolution color digital camera, to ensure clear image without distortion
- Programmable surface 4-ring 8-division LED Cold Illumination and contour LED parallel illumination and internal auto-light adjustment.
- Z-axis equipped with high accuracy linear guide and servo motor control system
- Powerful iMeasuring 2.2 software



	iMS-2010F	iMS-2515F	iMS-3020F	iMS-4030F	iMS-5040F
Metal Table	16x12-inch 408x300 mm	16x12-inch 408x300 mm	18x14-inch 458x358 mm	24x18.5-inch 608x470 mm	28x18.5-inch 708x470 mm
Glass Table	12x8-inch 306x200 mm	12x8-inch 300x200 mm	14x10-inch 356x250 mm	18x13.7-inch 456x348 mm	22x13.7-inch 556x348 mm
XY-axis Travel	8x4-inch 200x100 mm	10x6-inch 250x150 mm	12x8-inch 300x200 mm	16x12-inch 400x300 mm	20x16-inch 500x400 mm
Dimensions (WxDxH)	31.1x24.3x39.4-inch 790x617x1000 mm	31.1x24.3x39.4-inch 790x617x1000 mm	33x26.2x39.4-inch 838x667x1000 mm	39.4x32.2x41-inch 1002x817x1043 mm	39.4x34.1x41-inch 1002x867x1043 mm
NetWeight	385 lbs (175 kg)	385 lbs (175 kg)	410lbs (185 kg)	770 lbs (350 kg)	840 lbs (380 kg)

Description	Specification
Z-axis Travel	High-precision linear guide, working travel 8-inch (200mm)
X/Y/Z-axis Travel	0.0005 mm
X/Y-axis Accuracy	Less than or equal to 3 + Length (mm) / 200 μ m
Repeatability	2 μ m
Base and Pillar	Granite
Illumination System (Software Adjustment)	Surface: Stepless Adjustable 4-right 8-division LED Cold Illumination
CCD	High Resolution 700TV Color CCD Camera
Zoom lens	6.5X High Resolution Detented Zoom Lens Magnification: 0.7X ~4.5X; Video Magnification: 26X~172X
Working Environment	Temperature: 20° C \pm 2° C, Change Range < 2° C/hr Humidity: 30-80% Vibration: <0.002g, <15 Hz
Measuring Software	iMeasuring 2.2
Operation System	Support XP, WIN7, WIN10, 32/64 operating system
Electrical Requirements	110V/60 Hz; 220V/50 Hz

3D High Accuracy Manual Vision Measuring Systems

(iTouch series)

The iTouch is a combined 3D vision measuring and stylus probe measuring instrument. Includes Dell PC and optional 22-inch monitor.

Features:

- Accurate optical linear scale with precision working stage that ensures the accuracy is within $3 + \text{length (mm)} / 200 \mu\text{m}$
- Granite base for stability
- Precision light pole and fast moving locking device which ensures that the error of return travel is within 2 μm
- Granite base and pillar
- High definitive detented zoom lens
- High resolution color digital camera to produce clear images without distortion
- Automatically controls the brightness in the 4-ring 8-division with contour LED parallel illumination and internal light adjustment
- Powerful iMeasuring 3.1 3D measuring software.



	IMS-2010P	IMS-2515P	IMS-3020P	IMS-4030P	IMS-5040P
Metal Table	16x12-inch 408x300 mm	16x12-inch 408x300 mm	18x14-inch 458x358 mm	24x18.5-inch 608x470 mm	28x18.5-inch 708x470 mm
Glass Table	12x8-inch 300x200 mm	12x8-inch 300x200 mm	14x10-inch 356x250 mm	18x13.7-inch 456x348 mm	22x13.7-inch 556x348 mm
XY-axis Travel	8x4-inch 200x100 mm	10x6-inch 250x150 mm	12x8-inch 300x200 mm	16x12-inch 400x300 mm	20x16-inch 500x400 mm
Dimensions (WxDxH)	31.1x24.3x39.4-inch 790x617x1000 mm	31.1x24.3x39.4-inch 790x617x1000 mm	33x26.2x39.4-inch 838x667x1000 mm	39.4x32.2x41-inch 1002x817x1043 mm	39.4x34.1x41-inch 1002x867x1043 mm
Net Weight	385 lbs (175 kg)	385 lbs (175 kg)	410lbs (185 kg)	770 lbs (350 kg)	840 lbs (380 kg)

Description

Specification

Z-axis Travel	High-precision linear guide, working travel 8-inch (200 mm)
X/Y/Z Travel	0.0005 mm
X/Y- axis Accuracy	Less than or equal to $3 + \text{Length (mm)} / 200 \mu\text{m}$
Repeatability	2 μm
Base and Pillar	Granite
Illumination System (Software Adjustment)	Surface: Adjustable 4-ring 8-division LED Cold Illumination Contour: LED Parallel Illumination LED Laser Navigation Lights
CCD	High Resolution 700TV color CCD camera
Zoom Lens	6.5X high resolution detented zoom lens Magnification: 0.7X-4.5X Video Magnification: 26X-172X
Working Environment	Temperature: $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, change range $<2^{\circ}\text{C/hr}$ Humidity: 30-80% Vibration $<0.002\text{g}$, $<15\text{Hz}$
Measuring Software	iMeasuring 3.1
Operation System	Support XP, WIN7, WIN10, 32/64 operating system
Electrical Requirements	110V/60 Hz; 220V/50 Hz

High Accuracy Automatic Vision Measuring Systems

(MVS series)

The MVS series (Part No. MVS-3020) are economic, 2.5D fully automatic, vision measuring instruments for basic measurements.

Features:

- High precision X/Y/Z- axis CNC fully auto control, high position accuracy
- Fixed head, workpiece moves
- Stable and reliable granite base and pillar
- Precision linear guide, ball screw and AC servo motor
- 0.5 um high precision linear scale
- High definition color digital camera
- 6.5X click zoom lens
- Powerful fully automatic measuring software iMeasuring 4.0
- Capable of producing automated measurements
- Capable of batch measurements

Applications: This instrument is widely used to measure metal molds, electronic devices, medical equipment and flat panel displays. These instruments are used by research institutes, colleges and universities, metrology institutes and for dimensional inspection on production lines.



	MVS-3020	MVS-4030	MVS-5040
X-Y Axis Travel	11.8 x 7.9-inches (300 x 200 mm)	15.7 x 11.8-inches (400 x 300 mm)	19.7 x 15.7-inches (500 x 400 mm)
Dimensions (WxDxH)	30.7 x 47.2 x 65-inch (780 x 1200 x 1650 mm)	34.6 x 53.1 x 65-inch (880 x 1350 x 1650 mm)	38.6 x 55.9 x 65-inch (980 x 1420 x 1650 mm)
Load Capacity	55 lbs (25 Kg)	55 lbs (25 Kg)	44 lbs (20 Kg)
Weight	840 lbs (380 kg)	990 lbs (450 kg)	1320 lbs (600 kg)

Description		Specification					
X/Y-axis Travel		11.8 x 8-inches (300 x 200 mm)					
Z-axis Travel		7.9-inches (200mm)					
X/Y/ Z 3-axis Linear Scale		High precision linear scale, resolution: 0.0005 mm					
Guidance Mode		Precision linear guide, double-track double slider guide					
Operation Mode		Joystick controller, mouse operation, automatic detection program					
Measurement Accuracy		XY-axis: Less than or equal to 3 + Length (mm)/ 200 micron Z axis: Less than or equal to 3 + Length (mm)/ 200 micron					
Repeatability		±2 micron					
Video System		High definition 1/3-inch color CCD Camera 6.5X click zoom lens Optical magnification: 0.7X-4.5X Video Magnification: 26X~172X (21.5 inch monitor)					
Lens Magnification	0.7X	1X	2.0X	3.0X	4X	4.5X	
Field of View (D x H x V)	(8.57 x 6.86 x 5.14)	(6 x 4.8 x 3.6)	(3 x 2.4 x 1.8)	(2 x 1.6 x 1.2)	(1.5 x 1.2 x .9)	(1.33 x 1.07 x .8)	
Illumination		LED parallel contour illumination 5-ring 8-division 0~255 grade continuously adjustable					
Software System		iMeasuring 4.0 Fully automatic measuring software					
Working environment		Temperature: 20°C± 2° C Humidity Range: <2°C/hr Humidity: 30~80% Vibration: <0.002g, <15 Hz					
Electrical Requirements		110V/60 Hz; 220V/50 Hz					

AutoVision Automatic Measuring Systems

(AutoVision series)

The AutoVision series is a fully automated gantry driven measuring machine. The workpiece is fixed and the measurements are made from a movable bridge structure.

Features:

- Moving gantry structure
- Fixed workpiece
- Four-axis CNC fully auto closed loop control with auto measurement
- Granite base for stability
- Open type linear scale with 0.1 micron resolution
- H-grade linear guide, precision ball screw and AC servo motor for accurate system positioning
- High resolution camera
- 6.5X continuous zoom lens
- Programmable 5-ring, 8-division LED surface illumination, contour parallel LED illumination with 256 grade brightness adjustment



	AutoVision 432	AutoVision 542	AutoVision 652	AutoVision 862
X-Y Axis Travel	15.7x11.8-inches (400x300 mm)	19.7x15.7-inch (500x400 mm)	23.6x15.7-inch (600x500 mm)	31.5x23.6-inch (800x600 mm)
Dimensions (WxDxH)	31.1x24.3x39.4-inch (800x1160x1650 mm)	31.1x24.3x39.4-inch (950x1450x1650 mm)	33x26.2x39.4-inch (1050x1600x1650 mm)	39.4x32.2x41-inch (1200x2000x1650 mm)
Load Capacity	1430 lbs (650 kg)	1720 lbs (780 kg)	3040 lbs (1380 kg)	4400 lbs (2000 kg)

Description		Specification
Z-axis Travel		7.9-inches (200 mm)
Load Capacity		66 lbs (30 Kg)
Measurement Accuracy		XY-axis: < 2 + L/200 (micron) Z-axis < 5 + L/200 (micron)
Repeatability		+/- 200 microns
Stage Weight Capacity		22 lbs (10 Kg)
Video system		1/2-inch Color CCD Camera 6.5x Automatic Zoom Lens; Optical Magnification: 0.7X ~ 4.5X Video Magnification: 20X ~ 129X (21.5-inch monitor)
Lens Magnification	0.7X 1X 2.0X 3.0X 4X 4.5X	
Field of View (D x H x V)	(11.43 x 9.14 x 6.86) (8.0 x 6.4 x 4.8) (4.0 x 3.2 x 2.4) (2.67 x 2.13 x 1.6) (2.0 x 1.6 x 1.2) (1.78 x 1.42 x 1.07)	
Illuminating System (Software control)		Adjustable 4-ring 8-division 0~255 grade LED Cold Illumination Contour: LED Parallel illumination
Working Environment		Temperature: 20°C ± 2° C Humidity Range: <2°C/hr Humidity: 30~80% Vibration: <0.002g, <15 Hz
Software System		iMeasuring 4.1
Electrical Requirements		110V/60 Hz; 220V/50 Hz



Digital Vertical Profile Projectors (300 mm)

(VP300 series)

The VP300 series are digital vertical profile projectors.

Features:

- Vertical adjustment of focus
- Granite base for stability
- Coating process reflector
- Adjustable contour and surface illumination
- Bright light and long life LED illumination
- High resolution optical system with clear image with a magnification error less than 0.08%
- Powerful bi-axial fax cooling system which highly increases the life of the system
- Built-in mini-printer which allows user to print and save data
- With standard 10X objective (optional 20X, 50X, 100X objective), rotary table, foot switch, clamp, etc.

Description

Reverse Image	VP300-1510	VP300-2010
Obverse Image	VP300-1510Z	VP300-2010Z
Metal Stage Size	10.1 x 12.1-inches (258 x 308 mm)	10.1 x 14.1-inches (258 x 358 mm)
Glass Stage Size	5.8 x 8.1-inches (148 x 206 mm)	5.8 x 10-inches (148 x 256 mm)
Stage Travel	5.9 x 3.9-inches (150 x 100 mm)	7.9 x 3.9-inches (200 x 100 mm)
Dimensions (W x D x H)	22.1 x 38.9 x 48.1-inches (563 x 988 x 1224 mm)	22.1 x 38.9 x 48.1-inches (563 x 988 x 1224 mm)
Gross/ Net Weight	462 / 363 lbs (210/165 kg)	440 / 375 lbs (200/170 kg)
Focusing	3.54-inches (90 mm)	
Accuracy	Less than or equal to 3 + Length/200 micron	
Resolution	0.0005 mm	
Screen	Dia: 12.28 inches (312 mm) Measurement Range: Greater than or equal to Ø300 Rotation angle: 0~360° Resolution of Rotary Indicator: 0.01°	
Stage Weight Capacity	22 lbs (10 Kg)	
Digital Readout	DP400 (510-340) Multifunction colorful LCD digital readout	
Working Environment	Temp: 20° C ± 5° C Humidity: 40-70% RH	
Illumination	Contour Illumination: 3.2V/10W LED Surface Illumination: 3.2 V/10W LED	
Cooling System	3-axis powerful fan	
Electrical Requirements	110V/60 Hz; 220V/50 Hz	

WARRANTY

Terms and Conditions applying to all PACE Technologies Products

1. LIMITED WARRANTY AND DISCLAIMER:

PACE Technologies Products are warranted for one year from the purchase date to be free from defects in material and workmanship under correct use, normal operating conditions, and proper application. PACE Technologies obligation under this warranty shall be limited to the repair or exchange, at PACE Technologies option, of any PACE Technologies Product or part which proves to be defective as provided herein. PACE Technologies reserves the right to either inspect the product at Buyer's location or require it to be returned to the factory for inspection. Buyer is responsible for freight to and from factory on all warranty claims. The above warranty does not extend to goods damaged or subjected to accident, abuse or misuse after release from PACE Technologies warehouse, nor goods altered or repaired by anyone other than specifically authorized PACE Technologies representatives. PACE Technologies shall not in any way be responsible for the consequences of any alteration, modification or misuse unless previously approved in writing by an officer of PACE Technologies. Note: Corrosion is considered a maintenance issue and not a warranty issue.

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PACE Technologies maximum aggregate liability for loss and damage arising under, resulting from or in connection with the supply or use of the Equipment and Consumables provided under this purchase, or from the performance or breach of any obligation (s) imposed hereunder, whether such liability arises from any one or more claims or actions for breach of contract, tort, (including negligence), delayed completion, warranty, indemnity, strict liability or otherwise, unless otherwise limited by the terms hereof, shall be limited to one hundred percent (100%) of the purchase price.

3. DELIVERY:

Customer assumes and shall bear the risk of all loss or damage to the Products from every cause whatsoever, whether or not insured, and title to such Products shall pass to Customer upon PACE Technologies delivery of the Products to the common carrier of Pace Technologies choice, or the carrier specified in writing by Customer, for shipment to Customer. Any claims for breakage, loss, delay, or damage shall be made to the carrier by the Customer and Pace Technologies will render customer reasonable assistance in prosecuting such claims.

4. ACCEPTANCE:

Customer shall inspect the Products promptly upon receipt of delivery. Unless customer objects in writing within thirty (30) business days thereafter, customer shall be deemed to have accepted the Products. All claims for damages, errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

5. PAYMENT:

In consideration for the extension of credit, said business promises to pay for all purchases within the terms agreed (30-days unless otherwise agreed) and agrees to pay a service charge per month of 1-1/2% per month (18% annual percentage rate) on all past due balances.

6. DEFAULT:

If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to PACE Technologies) under the work or purchase order or any other agreement between Buyer and PACE Technologies, Buyer's rights under the warranty shall be suspended during any period of such default and the original warranty period will not be extended beyond its original expiration date despite such suspension of warranty rights. In the event any third parties are employed to collect any outstanding monies owed by said business the undersigned agrees to pay reasonable collection costs, including attorney fees, whether or not litigation has commenced, and all costs of litigation incurred (see Credit Application for more details).

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This agreement has been made in and shall be governed by the laws of the State of Arizona. These terms and conditions and the description of the Products on the reverse side hereof or in any proposal submitted herewith constitute the entire agreement and understanding of the parties with respect to this sale and supersede all prior and contemporaneous agreements or understandings, inducements or representations, expressed or implied, written or oral, between the parties with respect hereto. Any term or provision of this Agreement may be amended, and any observance of any term of this Agreement may be waived, only by a writing signed by the party to be bound. The waiver by a party of any breach shall not be deemed to constitute a waiver of any other breach. Should suit be brought on this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs of suit including costs and attorneys' fees incurred on appeal or in collection of any judgment.

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www.metallographic.com

3601 E. 34th St., Tucson, AZ 85713
Telephone: +1 520-882-6598 FAX: +1 520-882-6599
email: pace@metallographic.com