



# 2024-2025 PRODUCT CATALOG

METALLOGRAPHIC EQUIPMENT AND CONSUMABLES

---

ABRASIVE & PRECISION CUTTING  
COMPRESSION & CASTABLE MOUNTING  
GRINDING & POLISHING  
MICROSCOPY & ANALYSIS  
HARDNESS TESTING  
LAB FURNITURE

# INTRODUCTION

INTRODUCTION



## MESSAGE FROM THE CEO: DONALD ZIPPERIAN, PhD

I am proud to introduce the next generation of excellence here at Pace Technologies!

As a dynamic industry leader, Pace Technologies has ceaselessly pushed the boundaries of quality and customer-centricity for over a quarter century. Our relentless pursuit of perfection has led to cutting-edge equipment that welds state-of-the-art performance with affordability.

This generation of equipment offers our customers enhanced flexibility and control of their sample preparation procedures. These technical upgrades are tempered by our expanding services team who stand ready to provide you with expert guidance for optimal results.

Embracing vertical integration, we've streamlined our supply chain, ensuring unmatched product quality, timeliness, and cost efficiency. Our grinding papers, diamond suspensions, and cutting-edge lubricants are produced in-house to ensure our products meet the highest standards.

It's my hope that our combination of precision, innovation, and customer centricity converges to demonstrate that **quality matters** at Pace Technologies, in every sense of the phrase.

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**Fax:** +1 (520) 882-6599  
**Email:** [pace@metallographic.com](mailto:pace@metallographic.com)

For product information, metallographic procedures, etchants & troubleshooting guidelines online, visit:

<https://www.metallographic.com>

**Safety Data Sheets (SDS):**  
All available on our website by **clicking here**.

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- ◆ Prices subject to change without notice
- ◆ Taxes added where applicable
- ◆ Prices and Shipping FOB factory
- ◆ **Payment Terms:** Net-30 with established credit, otherwise payment is required prior to shipping.

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DISCOVER

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# ABRASIVE CUTTING

## Manual MEGA Abrasive Cutter Options

| MODEL      | Blade Diameter   | Wheel Feed | Manual Y-Table | Voltage (options)                    | Max Motor Power                     |
|------------|------------------|------------|----------------|--------------------------------------|-------------------------------------|
| MEGA-M250S | 10-inch (250 mm) | Yes        | n.a.           | 220V single phase 208Y/380V/480V, 3φ | 3 hp (2.2KW)                        |
| MEGA-T250S | 10-inch (250 mm) | Yes        | Yes            | 208Y/380V,480V 3φ                    | 5.8 hp (4.5 KW)                     |
| MEGA-T300S | 12-inch (305 mm) | Yes        | Yes            | 208Y/380V/480V, 3φ<br>480V, 3φ       | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |
| MEGA-T350S | 14-inch (350 mm) | Yes        | Yes            | 208Y/380V/480V, 3φ<br>480V, 3φ       | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |
| MEGA-T400S | 16-inch (405 mm) | Yes        | Yes            | 480V, 3φ                             | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |

### MEGA M250S

10-inch MANUAL Wheel Feed  
Metallographic Abrasive Cutter



**NEW**

### MEGA T400S

16-inch MANUAL  
Metallographic Abrasive Cutter



### MEGA T350S

14-inch MANUAL  
Metallographic Abrasive Cutter



### MEGA T300S

12-inch MANUAL  
Metallographic Abrasive Cutter



### MEGA T250S

10-inch MANUAL Table/Wheel Feed  
Metallographic Abrasive Cutter



# METALLOGRAPHIC ABRASIVE CUTTERS

## Automated MEGA Abrasive Cutter Options

**2** year warranty  
Limited Warranty

| MODEL      | Blade Diameter   | Auto/Manual Y-Table | Auto X-Table | Voltage Options            | Max Motor Power                     |
|------------|------------------|---------------------|--------------|----------------------------|-------------------------------------|
| MEGA-T300A | 12-inch (305 mm) | Yes                 | Optional     | 208Y/380V/480V<br>480V, 3φ | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |
| MEGA-T350A | 14-inch (350 mm) | Yes                 | Optional     | 208Y/380V/480V<br>480V, 3φ | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |
| MEGA-T400A | 16-inch (405 mm) | Yes                 | Optional     | 208Y/380V/<br>480V, 3φ     | 5.8 hp (4.5 KW) OR<br>20 hp (15 KW) |

### Options:

- ◆ Choose the machine that accommodates your preferred blade diameter
- ◆ Add an automated X-axis Table for maximum flexibility on cuts
- ◆ Choose between voltage options to provide the exact amount of power you need

### Benefits:

- ◆ Constant torque variable speed Servo Motor (3-phase)
- ◆ Manual or automated Y-Axis table feed
- ◆ X-axis tables have automated X-axis control
- ◆ Programming options for constant feed rate or constant motor load for better control
- ◆ Twin t-slotted stainless steel table
- ◆ Electronic braking system

## MEGA T400A

16-inch AUTOMATED/MANUAL  
Metallographic Abrasive Cutter



## MEGA T350A

14-inch AUTOMATED/MANUAL  
Metallographic Abrasive Cutter



## MEGA T300A

12-inch AUTOMATED/MANUAL  
Metallographic Abrasive Cutter



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# ABRASIVE CUTTING

MEGA-M250S ABRASIVE CUTTER



MEGA-M250S

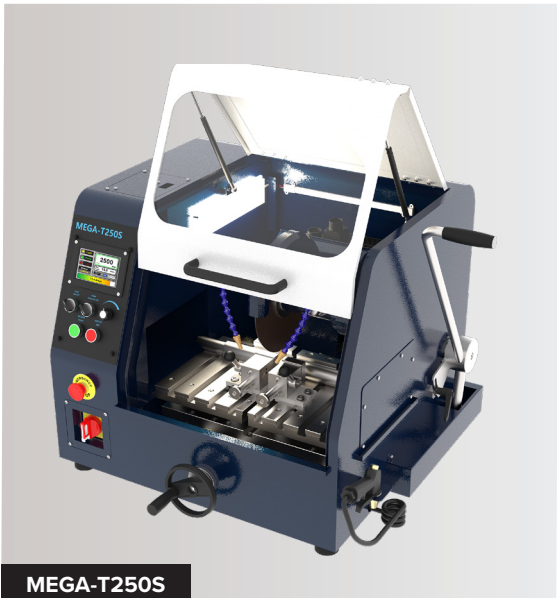
**NEW**

## MEGA M250S

10-inch **MANUAL** Wheel Feed  
Metallographic Abrasive Cutter

- Manual Cutting
- Economical
- 3-phase Asynchronous motor (220V single phase or 208Y/380V/480V, 3-phase)
- Variable speed cutting
- Wheel feed cutting
- T-slot table fixturing

MEGA-T250S ABRASIVE CUTTER

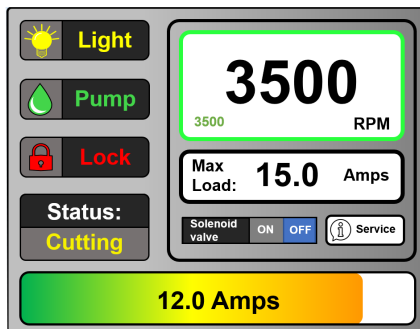


MEGA-T250S

## MEGA T250S

10-inch **MANUAL** Wheel / Table Feed  
Metallographic Abrasive Cutter

- Manual Cutting
- High torque servo motor
- Variable speed cutting
- Table and Wheel feed cutting
- T-slot table fixturing
- Non-Touch screen control (selector switch)



# METALLOGRAPHIC ABRASIVE CUTTERS

## 10-inch Metallographic Abrasive Cutter

**2** year warranty  
Limited Warranty

| FEATURE                                   | MEGA-M250S DESCRIPTION   | MEGA-T250S DESCRIPTION   |
|---|--|--|
| Cut-off blade size                        | 10-inch (~250 mm)  | 10-inch (~250 mm)  |
| Arbor size                                | 32 mm  | 32 mm  |
| Cutting capacity (H X D)                  | Maximum 2 x 4-inch (50 x 100 mm)   | Maximum 2 x 8-inch (50 x 200 mm)   |
| Cutting capacity                          | Maximum diameter 2.5-inch (65 mm)  | Maximum diameter 3-inch (75 mm)  |
| Wheel feed                                | Manual   | Manual   |
| Table feed                                | n.a.   | Manual   |
| Y pulse feed                              | n.a.   | Manual   |
| Y constant feed                           | n.a.   | Manual   |
| Vertical movement (z-axis)                | 3.25-inch (82 mm)  | 3.9-inch (100 mm)  |
| Table feed movement (y-axis)              | n.a.   | 3.3-inch (84 mm)   |
| Table movement (x-axis) for parallel cuts | n.a.   | n.a.   |
| T-slotted table dimensions                | 9.75 x 9-inch (250 x 230 mm)   | 11 x 18.25-inch (280 x 470 mm)   |
| T-slotted width                           | 0.5-inch (50 mm)   | 0.5-inch (50 mm)   |
| Operation                                 | Manual   | Manual   |
| Cooling unit                              | 14 gallons (53 liters)   | 14 gallons (53 liters)   |
| Motor power                               | Asynchronous 3 phase motor speed - 2.2 KW/(3 hp)   | Constant torque variable speed servo motor - 4.5 KW/(5.8 hp)   |
| Motor speed                               | Variable (1000-3000 rpm)   | Variable (1500-3500 rpm)   |
| Electrical specification                  | 220V single phase 380V or 480V, 3φ (50/60 Hz)  | 208Y / 380V or 480V, 3φ (50/60 Hz)   |
| Cutting force (current settings)          | 15 amps (max)  | 3-15 amps (Adjustable)   |
| Dimensions (WxDxH)                        | Hood closed: 29.5 x 27 x 28-inch (750 x 685 x 720 mm)<br>Hood open: 29.5 x 27 x 39-inch (750 x 685 x 990 mm) | Hood closed: 35.5 x 32 x 28-inch (900 x 815 x 710 mm)<br>Hood open: 35.5 x 32 x 39-inch (900 x 815 x 990 mm) |
| Weight                                    | 240 lbs (110 kg)   | 375 lbs (170 kg)   |
| Cutter Support Bench (optional)           | MEGA-T2-BENCH  | MEGA-T2-BENCH  |
| Catalog Number                            | MEGA-M250S   | MEGA-T250S   |

### Benefits:

- ◆ Non-touch screen control
- ◆ Wheel and table feed controlled cutting
- ◆ Cutting capacity up to 3-inches (75 mm) solid stock sample using 10-inch (250 mm) blade
- ◆ Variable speed control
- ◆ High leverage handle for better control
- ◆ Variable speed motors
- ◆ Twin t-slotted stainless steel table
- ◆ Electronic braking system

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# ABRASIVE CUTTING

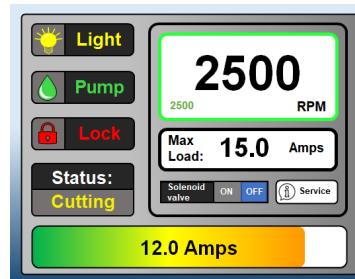
MEGA-T300S ABRASIVE CUTTER



## MEGA T300S

12-inch MANUAL  
Metallographic Abrasive Cutter

- Manual Cutting
- High torque servo motor
- Variable speed cutting
- Wheel and table feed cutting
- T-slot table fixturing
- Non-Touch screen control (selector switch)



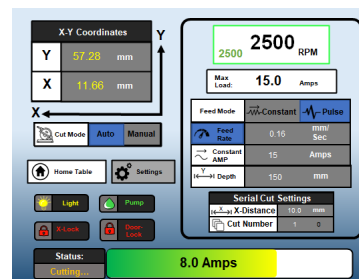
MEGA-T300A ABRASIVE CUTTER



## MEGA T300A

12-inch AUTOMATED  
Metallographic Abrasive Cutter

- Automated / Manual Cutting
- Auto / Manual y-axis feed (optional Auto X-axis feed)
- High torque servo motor
- Variable speed cutting
- Wheel and table feed cutting
- Constant feed or constant cutting force control
- T-slot table fixturing
- Non-Touch screen control (selector switch)





# METALLOGRAPHIC ABRASIVE CUTTERS

## 12-inch Metallographic Abrasive Cutter

**2** year warranty  
Limited Warranty

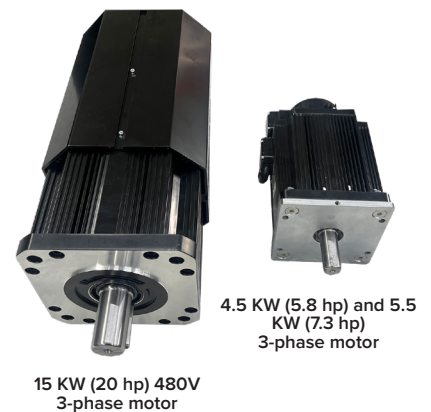
| FEATURE   | MEGA-T300S DESCRIPTION  | MEGA-T300A DESCRIPTION   |
|---|---|--|
| Cut-off blade size                                | 12-inch (305 mm)  | 12-inch (305 mm)   |
| Operation   | Manual  | Auto / Manual  |
| Screen  | Non-touch   | Non-touch  |
| Arbor size  | 32 mm   | 32 mm  |
| Cutting capacity (H X D)                          | Maximum 3 x 8-inch (70 x 200 mm)  | Maximum 3 x 8-inch (70 x 200 mm)   |
| Cutting capacity                                  | Maximum diameter 4-inch (100 mm)  | Maximum diameter 4-inch (100 mm)   |
| Wheel feed  | Manual  | Manual   |
| Table feed  | Manual  | Auto / Manual  |
| Y pulse feed                                      | Manual  | Auto   |
| Y-axis Table feed<br>-Range<br>-Speed (feed rate) | 7-inch (180 mm)<br>n.a.   | 7-inch (180 mm)<br>0.04 to 0.20-inch/second<br>(1-10 mm/second)  |
| X-axis Table feed<br>-Range<br>-Speed (feed rate) | n.a.<br>n.a.  | OPTIONAL:<br>1.8-inch (45 mm)<br>0.04 to 0.07-inch/second<br>(1-2 mm/second)                                 |
| Vertical movement (z-axis)                        | 7-inch (175 mm)   | 7-inch (175 mm)  |
| T-slotted table dimensions                        | 11 x 18.25-inch (280 x 470 mm)  | 11 x 18.25-inch (280 x 470 mm)   |
| T-slotted width                                   | 0.5-inch (50 mm)  | 0.5-inch (50 mm)   |
| Cooling unit                                      | 14 gallons (53 liters)  | 14 gallons (53 liters)   |
| Motor power                                       | Constant torque variable speed Servo Motor, 3φ (50/60 Hz):<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V | Constant torque variable speed Servo Motor, 3φ<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V  |
| Motor speed                                       | Variable (1500-3500 rpm)  | Variable (1500-3500 rpm)   |
| Cutting force (current settings)                  | 3-15 amps (208Y/380V)<br>5-25 amps (480V)   | 3-15 amps (208Y/380V)<br>5-25 amps (480V)  |
| Electrical specification                          | 208Y / 380V or 480V 3-phase (50/60 Hz)  | 208Y / 380V or 480V 3-phase (50/60 Hz)   |
| Dimensions (WxDxH)                                | Hood closed: 42 x 42 x 30-inch (1070 x 1070 x 760 mm)<br>Hood open: 42 x 42 x 36-inch (1070 x 1070 x 930 mm)            | Hood closed: 42 x 42 x 30-inch (1070 x 1070 x 760 mm)<br>Hood open: 42 x 42 x 36-inch (1070 x 1070 x 930 mm) |
| Weight  | 500-550 lbs (230-250 kg)  | 500-550 lbs (230-250 kg)   |
| Cutter Support Bench (optional)                   | MEGA-T3-BENCH   | MEGA-T3-BENCH  |
| Catalog Number                                    | MEGA-T300S  | MEGA-T300A   |

### Benefits:

- ◆ Non-touch screen control
- ◆ Wheel and table feed controlled cutting
- ◆ Cutting capacity up to 4-inches (110 mm) solid stock sample using 12-inch (300 mm) blade
- ◆ Variable speed control
- ◆ High leverage handle for better control
- ◆ Constant torque variable speed Servo Motor
- ◆ 5.8 hp (4.5 kW) (208V, 380V, 480V 3-phase)
- ◆ 20 hp (15 kW) (480V 3-phase)
- ◆ Twin t-slotted stainless steel table
- ◆ Electronic braking system

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# ABRASIVE CUTTING

MEGA-T350S ABRASIVE CUTTER

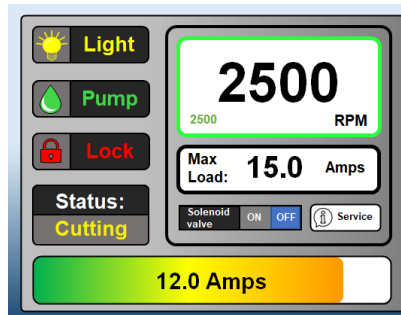


MEGA-T350S

## MEGA T350S

14-inch **MANUAL**  
Metallographic Abrasive Cutter

- Manual Cutting
- High torque servo motor
- Variable speed cutting
- Wheel and table feed cutting
- T-slot table fixturing
- Non-Touch screen control (selector switch)



MEGA-T350A ABRASIVE CUTTER

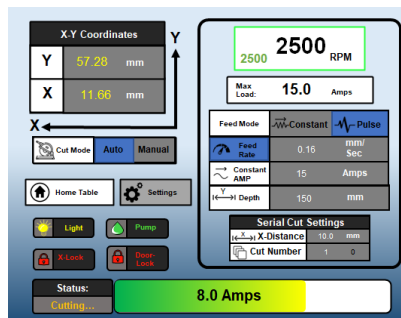


MEGA-T350A

## MEGA T350A

14-inch **AUTOMATED**  
Metallographic Abrasive Cutter

- Automated / Manual Cutting
- Auto / Manual y-axis feed (optional Auto X-axis feed)
- High torque servo motor
- Variable speed cutting
- Wheel and table feed cutting
- Constant feed or constant cutting force control
- T-slot table fixturing
- Non-Touch screen control (selector switch)



# METALLOGRAPHIC ABRASIVE CUTTERS

## 14-inch Metallographic Abrasive Cutter

**2** year warranty  
Limited Warranty

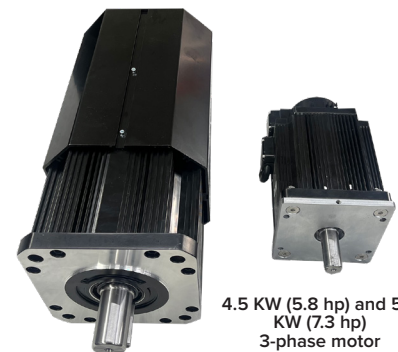
| FEATURE   | MEGA-T350S DESCRIPTION   | MEGA-T350A DESCRIPTION   |
|---|--|--|
| Cut-off blade size                                | 14-inch (350 mm)   | 14-inch (350 mm)   |
| Operation   | Manual   | Auto / Manual  |
| Screen  | Non-touch  | Non-touch  |
| Arbor size  | 32 mm  | 32 mm  |
| Cutting capacity (H X D)                          | Maximum 3 x 6-inch (70 x 150 mm)   | Maximum 3 x 6-inch (70 x 150 mm)   |
| Cutting capacity                                  | Maximum diameter 4.5-inch (115 mm)   | Maximum diameter 4.5-inch (115 mm)   |
| Wheel feed  | Manual   | Manual   |
| Table feed  | Manual   | Auto / Manual  |
| Y pulse feed                                      | Manual   | Auto   |
| Y-axis Table feed<br>-Range<br>-Speed (feed rate) | 7-inch (180 mm)<br>n.a.  | 7-inch (180 mm)<br>0.04 to 0.20-inch/second<br>(1-10 mm/second)  |
| X-axis Table feed<br>-Range<br>-Speed (feed rate) | n.a.<br>n.a.   | OPTIONAL:<br>1.8-inch (45 mm)<br>0.04 to 0.07-inch/second<br>(1-2 mm/second)                                   |
| Vertical movement (z-axis)                        | 3-inch (75 mm)   | 5.5inch (140 mm)   |
| T-slotted table dimensions (WxD)                  | 28 x 16-inch (710 x 400 mm)  | 28 x 16-inch (710 x 400 mm)  |
| T-slotted width                                   | 0.5-inch (50 mm)   | 0.5-inch (50 mm)   |
| Cooling unit                                      | 14 gallons (53 liters)   | 14 gallons (53 liters)   |
| Motor power                                       | Constant torque variable speed Servo Motor, 3φ<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V    | Constant torque variable speed Servo Motor, 3φ<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V    |
| Motor speed                                       | Variable (1000-3000 rpm)   | Variable (1000-3000 rpm)   |
| Cutting force (current settings)                  | 3-15 amps (208Y/380V)<br>5-25 amps (480V)  | 3-15 amps (208Y/380V)<br>5-25 amps (480V)  |
| Electrical specification                          | 208Y / 380V or 480V 3-phase (50/60 Hz)   | 208Y / 380V or 480V 3-phase (50/60 Hz)   |
| Dimensions (WxDxH)                                | Hood closed: 42 x 42 x 64-inch (1070 x 1070 x 1625 mm)<br>Hood open: 42 x 42 x 70-inch (1070 x 1070 x 1780 mm) | Hood closed: 42 x 42 x 64-inch (1070 x 1070 x 1625 mm)<br>Hood open: 42 x 42 x 70-inch (1070 x 1070 x 1780 mm) |
| Weight  | 650-700 lbs (300-320 kg)   | 650-700 lbs (300-320 kg)   |
| Catalog Number                                    | MEGA-T350S   | MEGA-T350A   |

### Benefits:

- ◆ Non-touch screen control
- ◆ Wheel and table feed controlled cutting
- ◆ Cutting capacity up to 4.5 inches (115 mm) solid stock sample using 14-inch (350 mm) blade
- ◆ Variable speed control
- ◆ High leverage handle for better control
- ◆ Constant torque variable speed Servo Motor
- ◆ 5.8 hp (4.5 kW) (208V, 380V, 480V 3-phase)
- ◆ 20 hp (15 KW) (480V 3-phase)
- ◆ Twin t-slotted stainless steel table
- ◆ Electronic braking system

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15 KW (20 hp) 480V  
3-phase motor

4.5 KW (5.8 hp) and 5.5  
KW (7.3 hp)  
3-phase motor



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2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ABRASIVE CUTTING

MEGA-T400S ABRASIVE CUTTER

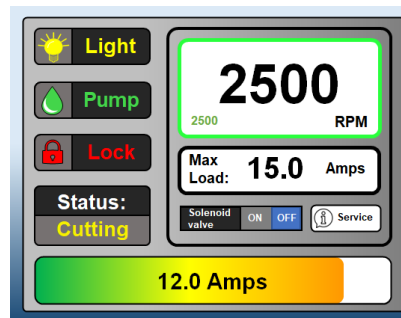


MEGA-T400S

## MEGA T400S

16-inch **MANUAL**  
Metallographic Abrasive Cutter

- Manual Cutting
- High torque servo motor
- Variable speed cutting
- Chop and table feed cutting
- T-slot table fixturing
- Touch screen control



MEGA-T400A ABRASIVE CUTTER

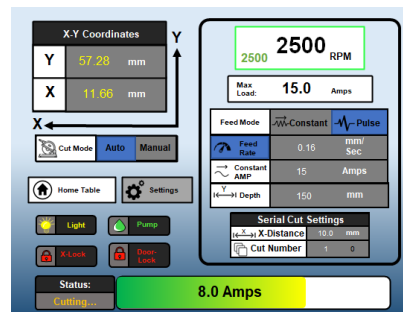


MEGA-T400A

## MEGA T400A

16-inch **AUTOMATED**  
Metallographic Abrasive Cutter

- Automated / Manual Cutting
- Auto / Manual y-axis feed (optional Auto X-axis feed)
- High torque servo motor
- Variable speed cutting
- Wheel and table feed cutting
- Constant feed or constant cutting force control
- T-slot table fixturing
- Touch screen control



# METALLOGRAPHIC ABRASIVE CUTTERS

## 16-inch Metallographic Abrasive Cutter

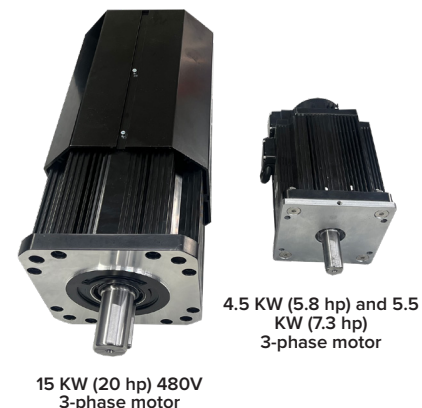
**2** year warranty  
Limited Warranty

| FEATURE                                     | MEGA-T400S DESCRIPTION   | MEGA-T400A DESCRIPTION  |
|---|--|---|
| Cut-off blade size                          | 16-inch (400 mm)   | 16-inch (400 mm)  |
| Operation                                   | Manual   | Auto / Manual   |
| Screen                                      | Touch  | Touch   |
| Arbor size                                  | 32 mm  | 32 mm   |
| Cutting capacity (H X D)                    | Maximum 3 x 6-inch (70 x 150 mm)   | Maximum 3 x 6-inch (70 x 150 mm)  |
| Cutting capacity                            | Maximum diameter 6-inch (150 mm)   | Maximum diameter 6-inch (150 mm)  |
| Wheel feed                                  | Manual   | Manual  |
| Table feed                                  | Manual   | Auto / Manual   |
| Y pulse feed                                | Manual   | Auto  |
| Y-axis Table feed -Range -Speed (feed rate) | 7-inch (180 mm)<br>n.a.  | 7-inch (180 mm)<br>0.04 to 0.20-inch/second<br>(1-10 mm/second)   |
| X-axis Table feed -Range -Speed (feed rate) | n.a.<br>n.a.   | OPTIONAL:<br>1.8-inch (45 mm)<br>0.04 to 0.07-inch/second<br>(1-2 mm/second)                                      |
| Vertical movement (z-axis)                  | 5-inch (125 mm)  | 5-inch (125 mm)   |
| T-slotted table dimensions                  | 11 x 18.25-inch (280 x 470 mm)   | 11 x 18.25-inch (280 x 470 mm)  |
| T-slotted width                             | 0.5-inch (50 mm)   | 0.5-inch (50 mm)  |
| Cooling unit                                | 14 gallons (53 liters)   | 14 gallons (53 liters)  |
| Motor power                                 | Constant torque variable speed Servo Motor, 3φ<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V    | Constant torque variable speed Servo Motor, 3φ<br>- 4.5 KW/(5.8 hp) 208Y, 380Y, 480V<br>-15 KW (20 hp) 480V       |
| Motor speed                                 | Variable (1000-3000 rpm)   | Variable (1000-3000 rpm)  |
| Cutting force (current settings)            | 5-25 amps (480V)   | 5-25 amps (480V)  |
| Electrical specification                    | 208Y / 380V or 480V 3-phase (50/60 Hz)   | 208Y / 380V or 480V 3-phase (50/60 Hz)  |
| Dimensions (WxDxH)                          | Hood closed: 48 x 51 x 64-inch (1220 x 1300 x 1610 mm)<br>Hood open: 48 x 51 x 66-inch (1200 x 1300 x 1700 mm) | Hood closed: 48 x 51 x 64.5-inch (1200 x 1300 x 16010 mm)<br>Hood open: 48 x 51 x 66-inch (1200 x 1300 x 1700 mm) |
| Weight                                      | 880-930 lbs (400-425 kg)   | 880 lbs (400 kg)  |
| Catalog Number                              | MEGA-T400S   | MEGA-T400A  |

### Benefits:

- ◆ Touch screen control
- ◆ Wheel and table feed controlled cutting
- ◆ Cutting capacity up to 6 inches (150 mm) solid stock sample using 16-inch (400 mm) blade
- ◆ Variable speed control
- ◆ High leverage handle for better control
- ◆ 5.8 hp (4.5 kW) (208V, 380V, 480V 3-phase)
- ◆ 20 hp (15 KW) (480V 3-phase)
- ◆ Twin t-slotted stainless steel table
- ◆ Electronic braking system

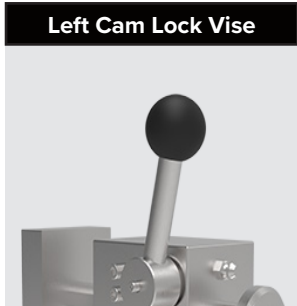
**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)



**CE** Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ABRASIVE CUTTING FIXTURES

## MEGA Vises



**Left Cam Lock Vise**

Quick release clamping vise (left hand)  
**Catalog no. QCL-1000-250 & QCL-1000**



**Right Cam Lock Vise**

Quick release clamping vise (right hand)  
**Catalog no. QCR-1000-250 & QCR-1000**



**Back Support**

Back support plate for Quick Release clamping vises  
**Catalog no. QCB-1000-250 & QCB-1000**



**Back Support**

Back support plate for Quick Release clamping vises  
**Catalog no. QCB-1000-300R**

| MEGA Cam Locking Vise Recommendations | MEGA-M250S    | MEGA-T250S   | MEGA-T300     | MEGA-T350     | MEGA-T400 |
|---------------------------------------|---------------|--------------|---------------|---------------|-----------|
| Left cam vise                         | QCL-1000      | QCL-1000-250 | QCL-1000      | QCL-1000      | QCL-1000  |
| Right cam vise                        | QCR-1000      | QCR-1000-250 | QCR-1000      | QCR-1000      | QCR-1000  |
| Left backstop                         | QCB-1000      | QCB-1000-250 | QCB-1000      | QCB-1000      | QCB-1000  |
| Right backstop                        | QCB-1000-300R | QCB-1000-250 | QCB-1000-300R | QCB-1000-300R | QCB-1000  |



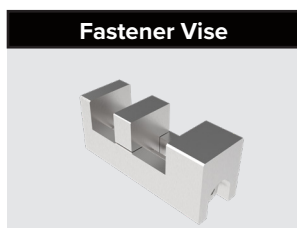
**Small Vertical Vise**

1.8-inch (45 mm) Vertical clamping vise with shoe for MEGA-T250/300/350  
**Catalog no. MG-01**



**Large Vertical Vise**

3-inch (75 mm) Vertical clamping vise with shoe for MEGA-T400S  
**Catalog no. MG-15**



**Fastener Vise**

MEGA fastener vise  
**Catalog no. MEGA-711**



**Saddle Vise**

MEGA saddle vise  
**Catalog no. MEGA-702**



**Universal Vertical Vise**

Universal Vertical clamping vise with 65 and extended 95 mm arm (2.5/3.75-inch) and shoe  
**Catalog no. MG-E**



**Universal Vertical Height Adapter Block**

57 mm (2.25-inch) height adapter for vertical clamping vise  
**Catalog no. MG-EH**

### Recommended Cutting Procedures:

- Select the appropriate abrasive blade (abrasive type, 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
- Adjust the abrasive cutter speed to optimize the cutting process. Typically softer metals are cut at slower speeds to reduce the cutting burr or smearing of the metal. Harder samples are cut at medium to high speeds in order to break down the wheel bond in order to expose new / sharp abrasives.
- 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

# ABRASIVE CUTTING CONSUMABLES

## Abrasive Cutting Fluid Recommendations

| CUTTING FLUID         | APPLICATION   | RECOMMENDED DILUTION | CHANGING FREQUENCY |
|-----------------------|---|----------------------|--------------------|
| MAXCUT cutting fluid  | As a replacement for competitors cutting fluids       | 25:1 (water)         | 50 cuts or weekly  |
| MAXCUT2 cutting fluid | Recommended for reducing corrosion in cutting chamber | 25:1 (water)         | 50 cuts or weekly  |



### Tips: Abrasive Cutter Care:

- ◆ Use clean/fresh MAXCUT2 cutting fluid; fluid should be changed weekly
- ◆ Rinse and dry table and vises after use
- ◆ When cutter is not in use open hood to prevent humidity build-up
- ◆ If cutter will not be used for an extended period of time, spray table and vises with a water displacement oil such as WD40®

## Abrasive Cutting Fluids

| PACE Product Name  | Catalog Number   | Qty        | Price (\$) |
|--|------------------|------------|------------|
| MAXCUT Abrasive Cutting Fluid (32 oz)                                    | MAXCUT-1000-32   | 32 oz      | 39.50      |
| MAXCUT Abrasive Cutting Fluid (1/2 gallon)                               | MAXCUT-1000-64   | 1/2 gallon | 58.00      |
| MAXCUT Abrasive Cutting Fluid (1 gallon)                                 | MAXCUT-1000-128  | 1 gallon   | 98.00      |
| MAXCUT Abrasive Cutting Fluid (5 gallons)                                | MAXCUT-1000-5G   | 5 gallons  | 260.00     |
| MAXCUT2 Abrasive Cutting Fluid with Anti-corrosion Additive (32 oz)      | MAXCUT2-1000-32  | 32 oz      | 41.50      |
| MAXCUT2 Abrasive Cutting Fluid with Anti-corrosion Additive (1/2 gallon) | MAXCUT2-1000-64  | 1/2 gallon | 60.00      |
| MAXCUT2 Abrasive Cutting Fluid with Anti-corrosion Additive (1 gallon)   | MAXCUT2-1000-128 | 1 gallon   | 105.00     |
| MAXCUT2 Abrasive Cutting Fluid with Anti-corrosion Additive (5 gallons)  | MAXCUT2-1000-5G  | 5 gallons  | 275.00     |
| Propylene Glycol Based Corrosion Inhibitor Additive (32 oz)              | PCC-5000-32      | 32 oz      | 28.00      |

# ABRASIVE CUTTING CONSUMABLES

## Abrasive Cutting Blades

### 10-inch (250 mm) MAXCUT Abrasive Blades (32 mm arbor)

| Blade Usage   | M.O.S. | Catalog Number | Qty    | Price (\$) |
|---|--------|----------------|--------|------------|
| Soft non-ferrous materials (aluminum, brass, zinc, etc.)            | 3440   | MAX-C250       | 10/box | 265.00     |
| Hard non-ferrous materials (titanium)                               | 3440   | MAX-C250       | 10/box | 265.00     |
| Soft steel  | 4500   | MAX-E250       | 10/box | 215.00     |
| General purpose resin bonded blade                                  | 4580   | MAX-D250       | 10/box | 215.00     |
| Nickel, Superalloys   | 4580   | MAX-A250       | 10/box | 265.00     |
| Very hard heat treated and case hardened ferrous materials (>50 Rc) | 3055   | MAX-VHS250     | 10/box | 355.00     |
| Universal Thin Blade  | 4580   | MAX-A250       | 10/box | 265.00     |
| General Industrial Blade  | 4500   | MAX-I250       | 10/box | 182.00     |
| 180 grit high concentration Diamond Abrasive Blade cutting wheel    | 6100   | DMAX-250       | each   | 790.00     |



10-inch MAX-A250 Abrasive Blade

### 12-inch (300 mm) MAXCUT Abrasive Blades (32 mm arbor)

| Blade Usage  | M.O.S. | Catalog Number | Qty    | Price (\$) |
|--|--------|----------------|--------|------------|
| Soft non-ferrous materials (aluminum, brass, zinc, etc.)         | 3800   | MAX-C300       | 10/box | 310.00     |
| Hard non-ferrous materials (titanium)                            | 3440   | MAX-C300       | 10/box | 310.00     |
| Soft steel   | 3800   | MAX-E300       | 10/box | 250.00     |
| General purpose resin bonded blade                               | 3820   | MAX-D300       | 10/box | 250.00     |
| Nickel, Superalloys  | 3945   | MAX-A300       | 10/box | 310.00     |
| Very hard ferrous materials (>50 Rc)                             | 2550   | MAX-VHS300     | 10/box | 380.00     |
| Universal Thin Blade   | 3945   | MAX-A300       | 10/box | 310.00     |
| General Industrial Blade   | 3800   | MAX-I300       | 10/box | 225.00     |
| 180 grit high concentration Diamond Abrasive Blade cutting wheel | 5000   | DMAX-305       | each   | 975.00     |



12-inch MAX-D300 Abrasive Blade



## 14-inch (350 mm) MAXCUT Abrasive Blades (32 mm arbor)



14-inch MAX-E350  
Abrasive Blade

| Blade Usage   | M.O.S. | Catalog Number | Qty    | Price (\$) |
|---|--------|----------------|--------|------------|
| Soft non-ferrous materials (aluminum, brass, zinc, etc.)            | 2460   | MAX-C350       | 10/box | 405.00     |
| Hard non-ferrous materials (titanium)                               | 2460   | MAX-C350       | 10/box | 405.00     |
| Soft steel  | 3200   | MAX-E350       | 10/box | 340.00     |
| General purpose resin bonded blade                                  | 3275   | MAX-D350       | 10/box | 340.00     |
| Nickel, Superalloys   | 2730   | MAX-A350       | 10/box | 405.00     |
| Very hard heat treated and case hardened ferrous materials (>50 Rc) | 2200   | MAX-VHS350     | 10/box | 450.00     |
| Universal Thin Blade  | 2730   | MAX-A350       | 10/box | 405.00     |
| General Industrial Blade  | 3200   | MAX-I350       | 10/box | 310.00     |
| 180 grit high concentration Diamond Abrasive Blade cutting wheel    | 4350   | DMAX-350       | each   | 1050.00    |

## 16-inch (400 mm) MAXCUT Abrasive Blades (32 mm arbor)



16-inch DMAX-400  
Diamond Blade

| Blade Usage   | M.O.S. | Catalog Number | Qty    | Price (\$) |
|---|--------|----------------|--------|------------|
| Soft non-ferrous materials (aluminum, brass, zinc, etc.)            | 2390   | MAX-C400       | 10/box | 465.00     |
| Hard non-ferrous materials (titanium)                               | 2390   | MAX-C400       | 10/box | 465.00     |
| Soft steel  | 3800   | MAX-E400       | 10/box | 445.00     |
| General purpose resin bonded blade                                  | 3800   | MAX-D400       | 10/box | 445.00     |
| Nickel, Superalloys   | 2860   | MAX-A400       | 10/box | 465.00     |
| Very hard heat treated and case hardened ferrous materials (>50 Rc) | 1925   | MAX-VHS400     | 10/box | 515.00     |
| Universal Thin Blade  | 2860   | MAX-A400       | 10/box | 465.00     |
| General Industrial Blade  | 3800   | MAX-I400       | 10/box | 415.00     |
| 180 grit high concentration Diamond Abrasive Blade cutting wheel    | 3800   | DMAX-400       | each   | 1495.00    |

# ABRASIVE CUTTING RECOMMENDATIONS

| APPLICATION   | ADVANTAGE  | DISADVANTAGE  | BLADE COMPOSITION           | RECOMMENDED BLADE   |
|---|--|---|-----------------------------|---|
| General cutting with universal thin resin / rubber bonded blades        | Thin durable longer lasting blade for cutting most materials.                                | Rubber bonded blades can produce a burning rubber smell   | Alumina resin-rubber bonded | MAX-A      |
| Hard non-ferrous metals (titanium, zirconium, etc.)                     | SiC abrasives are much more effective in cutting non-ferrous metals                          | Rubber bonded blades can produce a burning rubber smell   | SiC / resin-rubber bonded   | MAX-C      |
| General purpose blade for steels and ferrous metals                     | Resin bonded blades break down easily to expose fresh abrasives for cleaner cuts             | Generally thicker blades with shorter working life  | Alumina / resin bonded      | MAX-D     |
| Soft non-ferrous metals (aluminum, brass, zinc, etc.)                   | Resin bonded blades break down easily to expose fresh abrasives for cleaner cuts             | Generally thicker blades with shorter working life  | Alumina / resin bonded      | MAX-E    |
| Industrial general purpose reinforced blade                             | Lower cost, longer life resin bonded blades  | Harder resin bond which may result in damaging or burning of the sample during aggressive cutting | Alumina / resin-bonded      | MAX-I    |
| Heat treated and hardened steels  | Specifically designed metallographic abrasive blades to reduce heat damage during sectioning | Resin bonded blades break down faster and therefore have shorter cutting life                     | Alumina / resin bonded      | MAX-VHS  |
| Non-metallic materials such as glass, minerals, ceramics and composites | Diamond Blades do not wear down like ceramic abrasives blades                                | Relatively more expensive   | Diamond                     | DMAX     |

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

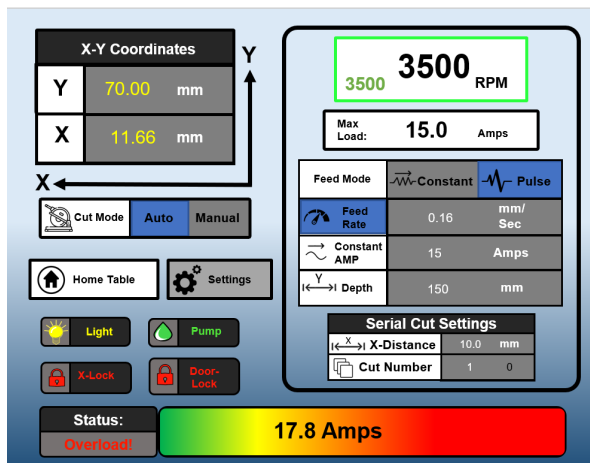
| BLADE (M.O.S.) | 10-INCH | 12-INCH | 14-INCH | 16-INCH |
|----------------|---------|---------|---------|---------|
| MAX-A          | 4580    | 3945    | 2730    | 2860    |
| MAX-C          | 3440    | 3440    | 2460    | 2390    |
| MAX-D          | 4580    | 3820    | 3275    | 3800    |
| MAX-E          | 4500    | 3800    | 3200    | 3800    |
| MAX-I          | 4500    | 3800    | 3200    | 3800    |
| MAX-VHS        | 3055    | 2550    | 2200    | 1925    |
| DMAX           | 6100    | 5000    | 4350    | 3800    |

### TIP: Abrasive Cutting

- ◆ Properly fixture or clamp the sample/specimen
- ◆ Select the proper abrasive blade
- ◆ Set the correct cutting speed
- ◆ Use appropriate cutting fluid and direct the flow to the cutting zone
- ◆ Cut specimen while monitoring motor amperage. The correct blade will minimize the current draw on the motor
- ◆ After completion of the cutting operation, clean and dry the cutter fixtures, table and cutting chamber
- ◆ When not in use clean/dry and leave the hood in the open position to prevent corrosion. The use of a water displacement oil cutting fluids will also help prevent corrosion

## Abrasive Blade Thickness

| BLADE THICKNESS | 10-INCH  | 12-INCH  | 14-INCH  | 16-INCH  |
|-----------------|----------|----------|----------|----------|
| MAX-A           | 0.039 in | 0.055 in | 0.063 in | 0.090 in |
| MAX-C           | 0.059 in | 0.078 in | 0.078 in | 0.100 in |
| MAX-D           | 0.059 in | 0.078 in | 0.078 in | 0.100 in |
| MAX-E           | 0.059 in | 0.078 in | 0.078 in | 0.100 in |
| MAX-I           | 0.059 in | 0.078 in | 0.078 in | 0.100 in |
| MAX-VHS         | 0.075 in | 0.078 in | 0.098 in | 0.100 in |
| DMAX            | 0.059 in | 0.060 in | 0.060 in | 0.075 in |



MEGA-A Abrasive Cutter Control Screen



MEGA-T400 t-slot table

# PRECISION SECTIONING

PICO-155S LOW TO MEDIUM SPEED SAW



PICO-155S

## PICO-155S

### Precision Cutter with Digital Control

- Precise cutting
- 0.17 hp (125 W) Dynamic torque motor
- Microprocessor controlled with touch screen control
- Internal coolant pump
- Digital feedback speed control
- LED interface display
- Highly reproducible, dependable and robust
- Easy to use

PICO-155P LOW TO MEDIUM SPEED SAW



PICO-155P

## PICO-155P

### Precision Cutter with Analog Control

- Precise cutting
- Internal coolant pump
- Digital feedback speed control
- LED speed display with analog control
- Highly reproducible, dependable and robust
- Flexible
- Ideal for all materials
- User friendly

PICO-200 VARIABLE SPEED TABLE SAW



PICO-200

## PICO-200

### Variable Speed Table Saw

- Digital feedback speed control
- LED speed display
- Highly reproducible, dependable and robust
- Easy to use
- Flexible
- Ideal for all materials
- User friendly
- Easy service access

# METALLOGRAPHIC WAFERING SAWS

## Low to Medium Speed Metallographic Precision Cutter

**2** year warranty  
Limited Warranty

| FEATURE                  | PICO-155S DESCRIPTION  | PICO-155P DESCRIPTION  |
|--------------------------|--|--|
| Control                  | 5-inch touchscreen with Digital LED display  | Analog Buttons and Speed Control   |
| Cutting capacity         | Max. diameter 2-inch (50 mm)   | Max. diameter 2-inch (50 mm)   |
| Coolant                  | Dual nozzle with pump  | Dual nozzle with pump  |
| Table feed               | 3-inch (75 mm) - 7-inch (175 mm)   | 3-inch (75 mm) - 7-inch (175 mm)   |
| Arbor size               | 0.5-inch (12.7 mm)   | 0.5-inch (12.7 mm)   |
| Variable Speed (rpm)     | 200-1500 rpm continuously adjustable with digital speed display                                      | 200-1500 rpm continuously adjustable with LED speed display  |
| Cutting Load             | 0-1500 gram load   | 0-1500 gram load   |
| Micrometer feed distance | 0 to 1-inch (0-25 mm)  | 0 to 1-inch (0-25 mm)  |
| Micrometer accuracy      | 2 microns  | 2 microns  |
| Electrical Specification | 110V/220V (50/60 Hz) (single phase)  | 110V/220V (50/60 Hz) (single phase)  |
| Motor power              | 125W (24V)   | 125W (24V)   |
| Dimensions (WxDxH)       | 19 x 23 x 14-inch (48 x 58 x 37 cm) (hood closed)<br>19 x 29 x 19-inch (48 x 74 x 37 cm) (hood open) | 19 x 23 x 14-inch (48 x 58 x 37 cm) (hood closed)<br>19 x 29 x 19-inch (48 x 74 x 37 cm) (hood open) |
| Weight                   | 66 lbs (30 kg)   | 66 lbs (30 kg)   |
| Catalog Number           | PICO-155S  | PICO-155P  |

### Benefits:

- ◆ Microprocessor controlled (PICO-155S)
- ◆ 200-1500 rpm speeds
- ◆ Accepts 3-7 inch (75-175 mm) wafering blades
- ◆ Built-in digital micrometer
- ◆ Counter balanced loading
- ◆ Sliding weight gravity feed loading up to 1500 grams
- ◆ Built-in coolant system with internal pump
- ◆ Magnetic safety switch
- ◆ Emergency stop switch
- ◆ Optional cutting table attachment

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

 Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

## Variable Speed Metallographic Table Saw

**2** year warranty  
Limited Warranty

| FEATURE                  | PICO-200 DESCRIPTION  |
|--------------------------|---|
| Cut-off blade size       | Max. diameter 8-inch (200 mm)                               |
| Cutting capacity         | 1.5-inches (38 mm)  |
| Specimen feed            | Table feed  |
| Coolant tank             | 3 Liters  |
| Arbor size               | 0.5-inch  |
| Variable Speed (rpm)     | 300-3000 rpm continuously adjustable with LED speed display |
| Motor power              | 0.5 hp (400 W)  |
| Electrical Specification | 110V/220V (50/60 Hz) (single phase)                         |
| Dimensions (WxDxH)       | 18 x 20 x 14-inch (46 cm x 50 cm x 35 cm)                   |
| Weight                   | 85 lbs (38 kg)  |
| Catalog Number           | PICO-200  |

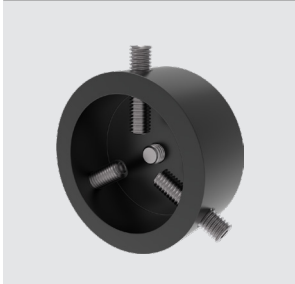
### Benefits:

- ◆ Variable cutting wheel speeds from 300-3000 rpm
- ◆ Hard anodized working table
- ◆ Dry or wet cutting
- ◆ T-slot clamping vises for mounting versatility

# PRECISION SECTIONING

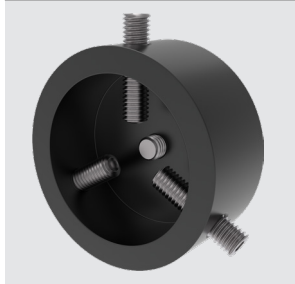
## PICO-155P/155S Accessories

### 32 mm Circular Vise



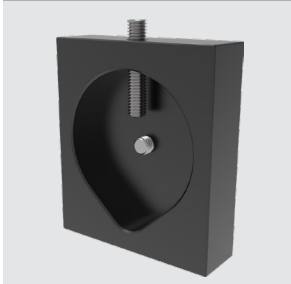
Sample holder for small round and mounted specimens (1.25-inch / 32 mm)  
**Catalog no. P150-707**

### 40 mm Circular Vise



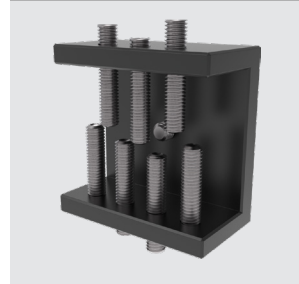
Sample holder for large round and mounted specimens (1.5-inch / 40 mm)  
**Catalog no. P150-708**

### Teardrop Vise



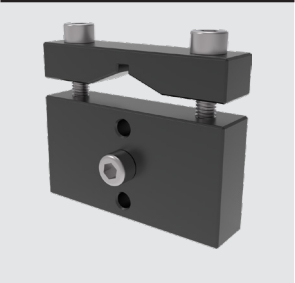
Specimen teardrop holder for 0.6-1.6-inch (18-40 mm)  
**Catalog no. P150-710**

### Irregular Sample Vise



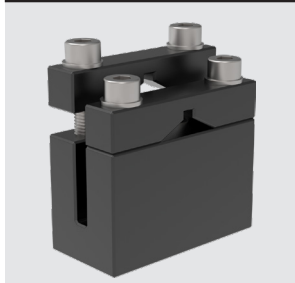
Sample vise for irregular shaped samples  
**Catalog no. P150-706**

### Single Saddle Vise



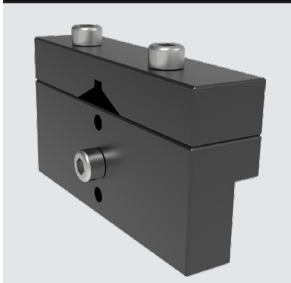
Universal specimen vise (single saddle)  
**Catalog no. P150-702**

### Double Saddle Vise



Sample holder with double parallel vise for long specimens (double saddle)  
**Catalog no. P150-703**

### Large Universal Vise



Large single saddle vise with support lip  
**Catalog no. P150-702b**

### Adhering Vise



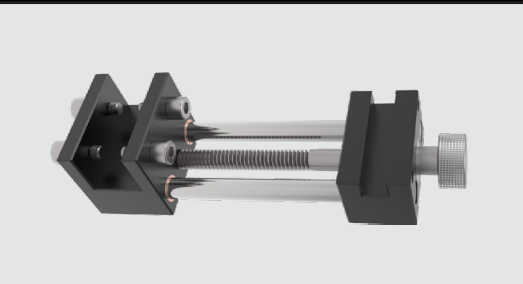
Specimen vise for adhering or gluing samples  
**Catalog no. P150-709**

### Fastener Vise



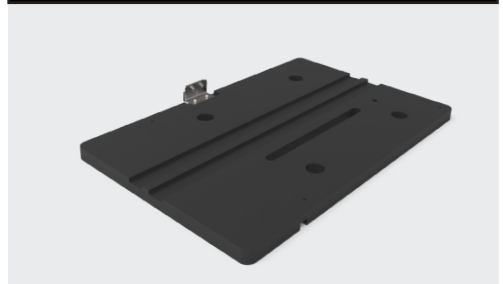
Fastener vise for longitudinal sectioning of fasteners, tubes, etc.  
**Catalog no. P150-711**

### Dressing Fixture

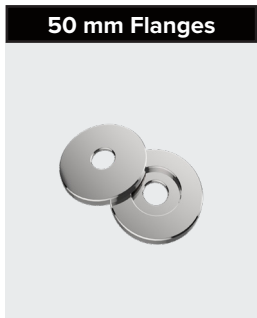


Dressing stone attachment  
**Catalog no. P150-701**

### Cutting Table



Cutting table attachment for manual cutting of flat specimens and PCB's  
**Catalog no. P150-601**



**50 mm Flanges**

50 mm diameter  
arbor flanges  
**Catalog no. P155-M-002**



**75 mm Flanges**

75 mm diameter  
arbor flanges  
**Catalog no. P155-M-003**



**100 mm Flanges**

100 mm diameter  
arbor flanges  
**Catalog no. P155-M-100**



**1x3-inch Glass Slide**

Vacuum glass slide holder for  
1x3-inch petrographic slides  
**Catalog no. P155-GHL**



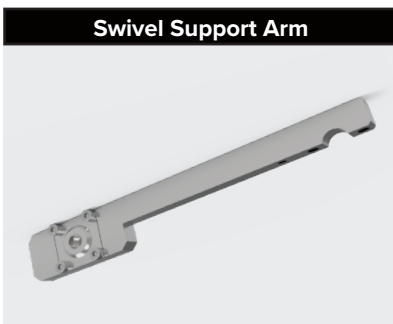
**27x46 mm Glass Slide**

Vacuum glass slide holder for  
27x46 mm petrographic slides  
**Catalog no. P155-GHS**



**Sample Support Arm**

Sample support arm with multiple specimen  
vise positioning locations  
**Catalog no. P150-407**



**Swivel Support Arm**

Sample support arm with  
swivel for angular cutting  
**Catalog no. P150-713**



**Weight Stack**

Stainless steel weight stack components:  
Counter balance rod **Catalog no. P150-411**  
Counter balance weight **Catalog no. P150-410**  
250 gram weight **Catalog no. P155-M-012**  
300 gram weight **Catalog no. P155-M-013**

## PICO-200 Accessories



**Vertical Clamping Vise**

PICO 200 vertical clamping vise  
**Catalog no. P200V**



**Cutting Guide**

PICO 200 cutting guide  
**Catalog no. P200-ANGLE**

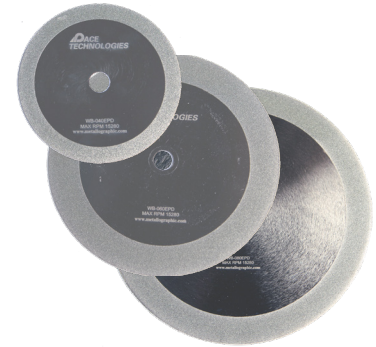
# PRECISION SECTIONING CONSUMABLES



Metallographic Copper Plated Diamond Blades



Metallographic Stainless Steel Diamond Blades



Electroplated Diamond Blades

## 3-inch (75 mm) Diamond Blades (1/2-inch arbor, 0.006-inch thick)



| PACE Product Name                                       | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 3-inch Diamond Wafering Blade (fine-grit, low conc.)    | <b>WB-0030LC</b> | each | 310.00     |
| 3-inch Diamond Wafering Blade (medium-grit, low conc.)  | <b>WB-0035LC</b> | each | 310.00     |
| 3-inch Diamond Wafering Blade (medium-grit, high conc.) | <b>WB-0035HC</b> | each | 310.00     |
| 3-inch CBN Wafering Blade (medium-grit, high conc.)     | <b>WCBN-0035</b> | each | 310.00     |

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



| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 4-inch Diamond Wafering Blade (fine-grit, low conc.)      | <b>WB-0040LC</b> | each | 325.00     |
| 4-inch Diamond Wafering Blade (medium-grit, low conc.)    | <b>WB-0045LC</b> | each | 325.00     |
| 4-inch Diamond Wafering Blade (medium-grit, high conc.)   | <b>WB-0045HC</b> | each | 325.00     |
| 4-inch CBN Wafering Blade (medium-grit, high conc.)       | <b>WCBN-0045</b> | each | 325.00     |
| 4 x 0.024 x 0.5-inch Electroplated 120-grit Diamond Blade | <b>WB-040EPD</b> | each | 190.00     |

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



| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 5-inch Diamond Wafering Blade (fine-grit, low conc.)      | <b>WB-0050LC</b> | each | 375.00     |
| 5-inch Diamond Wafering Blade (medium-grit, low conc.)    | <b>WB-0055LC</b> | each | 375.00     |
| 5-inch Diamond Wafering Blade (medium-grit, high conc.)   | <b>WB-0055HC</b> | each | 375.00     |
| 5-inch CBN Wafering Blade (medium-grit, high conc.)       | <b>WCBN-0055</b> | each | 375.00     |
| 5 x 0.024 x 0.5-inch Electroplated 120-grit Diamond Blade | <b>WB-050EPD</b> | each | 205.00     |



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

| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 6-inch Diamond Wafering Blade (fine-grit, low conc.)      | <b>WB-0060LC</b> | each | 465.00     |
| 6-inch Diamond Wafering Blade (medium-grit, low conc.)    | <b>WB-0065LC</b> | each | 465.00     |
| 6-inch Diamond Wafering Blade (medium-grit, high conc.)   | <b>WB-0065HC</b> | each | 465.00     |
| 6-inch CBN Wafering Blade (medium-grit, high conc.)       | <b>WCBN-0065</b> | each | 465.00     |
| 6 x 0.032 x 0.5-inch Electroplated 120-grit Diamond Blade | <b>WB-060EPD</b> | each | 225.00     |



## 7-inch (175 mm) Diamond Blades (1/2-inch arbor, 0.020-inch thick)

| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 7-inch Diamond Wafering Blade (fine-grit, low conc.)      | <b>WB-0070LC</b> | each | 605.00     |
| 7-inch Diamond Wafering Blade (medium-grit, low conc.)    | <b>WB-0075LC</b> | each | 605.00     |
| 7-inch Diamond Wafering Blade (medium-grit, high conc.)   | <b>WB-0075HC</b> | each | 605.00     |
| 7-inch CBN Wafering Blade (medium-grit, high conc.)       | <b>WCBN-0075</b> | each | 605.00     |
| 7 x 0.039 x 0.5-inch Electroplated 120-grit Diamond Blade | <b>WB-070EPD</b> | each | 250.00     |



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

| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 8-inch Diamond Wafering Blade (fine-grit, low conc.)      | <b>WB-0080LC</b> | each | 620.00     |
| 8-inch Diamond Wafering Blade (medium-grit, low conc.)    | <b>WB-0085LC</b> | each | 620.00     |
| 8-inch Diamond Wafering Blade (medium-grit, high conc.)   | <b>WB-0085HC</b> | each | 620.00     |
| 8-inch CBN Wafering Blade (medium-grit, high conc.)       | <b>WCBN-0085</b> | each | 620.00     |
| 8 x 0.039 x 0.5-inch Electroplated 120-grit Diamond Blade | <b>WB-080EPD</b> | each | 310.00     |



## Precision Abrasive Blades (1/2-inch arbor)

| PACE Product Name                                      | Catalog Number   | Qty | Price (\$) |
|--|------------------|-----|------------|
| 5 x 0.040-inch SiC Abrasive Blade (non-ferrous metals) | <b>MAX-C125</b>  | 10  | 155.00     |
| 6 x 0.038-inch SiC Abrasive Blade (non-ferrous metals) | <b>MAX-C150</b>  | 10  | 155.00     |
| 6 x 0.062-inch Alumina Abrasive Blade (ferrous metals) | <b>MAX-D150</b>  | 10  | 155.00     |
| 7 x 0.028-inch Abrasive Blade (general purpose)        | <b>MAX-7000S</b> | 10  | 205.00     |



# PRECISION SECTIONING CONSUMABLES

## Wafer Cutting Accessories

WAFER CUTTING ACCESSORIES



| PACE Product Name  | Catalog Number     | Qty   | Price (\$) |
|--|--------------------|-------|------------|
| DIACUT™ Dressing Stick (1/2 x 1/2 x 4-1/2-inch)            | <b>DRES-0010</b>   | each  | 14.50      |
| DIACUT™ Oil-based Cutting Fluid (16 oz)                    | <b>OL-3000-16</b>  | 16 oz | 12.50      |
| DIACUT™ Oil-based Cutting Fluid (32 oz)                    | <b>OL-3000-32</b>  | 32 oz | 22.50      |
| DIACUT™ Water-based Cutting Fluid (16 oz)                  | <b>WL-3000-16</b>  | 16 oz | 12.50      |
| DIACUT™ Water-based Cutting Fluid (32 oz)                  | <b>WL-3000-32</b>  | 32 oz | 22.50      |
| DIACUT™ 2 Water-based Anti-corrosion Cutting Fluid (16 oz) | <b>WL2-3000-16</b> | 16 oz | 12.50      |
| DIACUT™ 2 Water-based Anti-corrosion Cutting Fluid (32 oz) | <b>WL2-3000-32</b> | 32 oz | 22.50      |
| Propylene Glycol-based Anti-Corrosion Additive (32 oz)     | <b>PCC-5000-32</b> | 32 oz | 28.00      |

## Economical Stainless Steel Diamond Wafering Blades (Best Value)

METALLOGRAPHIC WAFERING BLADES WITH STAINLESS STEEL CORE



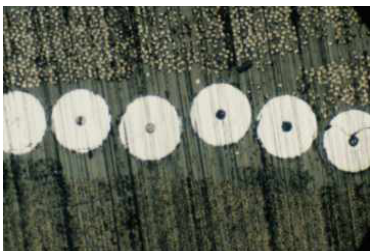
### Diamond / CBN Wafering Blades with Corrosion Resistant Stainless Steel Core (1/2-inch arbor) - General Purpose Blade

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 4-inch stainless steel general purpose diamond/CBN Wafering Blade | <b>WB-004GP</b> | each | 205.00     |
| 5-inch stainless steel general purpose diamond/CBN Wafering Blade | <b>WB-005GP</b> | each | 235.00     |
| 6-inch stainless steel general purpose diamond/CBN Wafering Blade | <b>WB-006GP</b> | each | 310.00     |
| 7-inch stainless steel general purpose diamond/CBN Wafering Blade | <b>WB-007GP</b> | each | 375.00     |
| 8-inch stainless steel general purpose diamond/CBN Wafering Blade | <b>WB-008GP</b> | each | 435.00     |

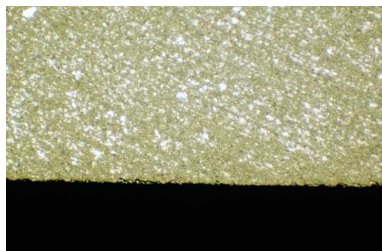
### Diamond Wafering Blades (low concentration) with Corrosion Resistant Stainless Steel Core (1/2-inch arbor)

| PACE Product Name   | Catalog Number   | Qty  | Price (\$) |
|---|------------------|------|------------|
| 4-inch stainless steel low concentration diamond Wafering Blade | <b>WB-004LCS</b> | each | 205.00     |
| 5-inch stainless steel low concentration diamond Wafering Blade | <b>WB-005LCS</b> | each | 235.00     |
| 6-inch stainless steel low concentration diamond Wafering Blade | <b>WB-006LCS</b> | each | 310.00     |
| 7-inch stainless steel low concentration diamond Wafering Blade | <b>WB-007LCS</b> | each | 375.00     |
| 8-inch stainless steel low concentration diamond Wafering Blade | <b>WB-008LCS</b> | each | 435.00     |

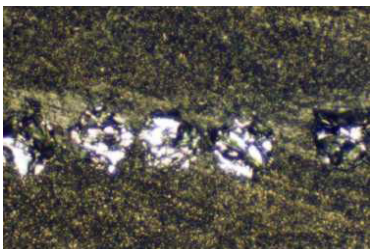
| MATERIAL                 | CHARACTERISTIC  | SPEED (RPM) | LOAD     | BLADE (grit/conc) |
|--------------------------|-----------------|-------------|----------|-------------------|
| Silicon substrates       | Soft/Brittle    | <300        | Low      | Fine/Low          |
| Gallium arsenide         | Soft/Brittle    | <200        | Low      | Fine/Low          |
| Boron composites         | Hard/Brittle    | 500         | Medium   | Fine/Low          |
| Ceramic fiber composites | Hard/Brittle    | 1000        | Medium   | Fine/Low          |
| Glass                    | Brittle         | 1000        | Medium   | Fine/Low          |
| Minerals                 | Friable/Brittle | Maximum     | High     | Fine/Low          |
| Alumina ceramic          | Hard/Tough      | Maximum     | High     | Medium/Low        |
| Zirconia (PSZ)           | Hard/Tough      | Maximum     | High     | Medium/Low        |
| Silicon nitride          | Hard/Tough      | Maximum     | High     | Medium/Low        |
| Metal matrix composites  | Hard/Tough      | Maximum     | High     | Medium/High       |
| General Purpose          |                 | Variable    | Variable | Medium/High       |



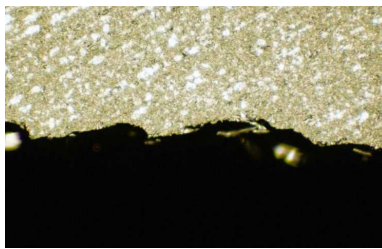
Boron-graphite composite sectioned with fine grit diamond wafering blade. Boron fibers damage minimal



Silicon edge intact after sectioning with fine grit diamond wafering blade



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



Silicon edge damaged after sectioning with medium grit diamond wafering blade

#### TIP: Precision Wafering

1. Properly fixture or clamp the sample/specimen
2. Select the proper wafering blade and cutting fluid
3. Set the blade speed and load
4. For samples with coatings orient the sample so the coating is cut in compression
5. Dress or condition the blade periodically when the cutting rate diminishes

### Diamond Wafering Blades (high concentration) with Corrosion Resistant Stainless Steel Core (1/2-inch arbor)

| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 4-inch stainless steel high concentration diamond Wafering Blade | WB-004HCS      | each | 205.00     |
| 5-inch stainless steel high concentration diamond Wafering Blade | WB-005HCS      | each | 235.00     |
| 6-inch stainless steel high concentration diamond Wafering Blade | WB-006HCS      | each | 310.00     |
| 7-inch stainless steel high concentration diamond Wafering Blade | WB-007HCS      | each | 375.00     |
| 8-inch stainless steel high concentration diamond Wafering Blade | WB-008HCS      | each | 435.00     |

#### Improved Precision Wafering Blades:

- ◆ Stainless steel core for improved corrosion resistance
- ◆ Economical Option
- ◆ High Quality Blade
- ◆ Available with a general purpose diamond / CBN hybrid abrasive and with the traditional low and high medium grit diamond concentration

# COMPRESSION MOUNTING

TERAPRESS TP-7100S MOUNTING PRESS



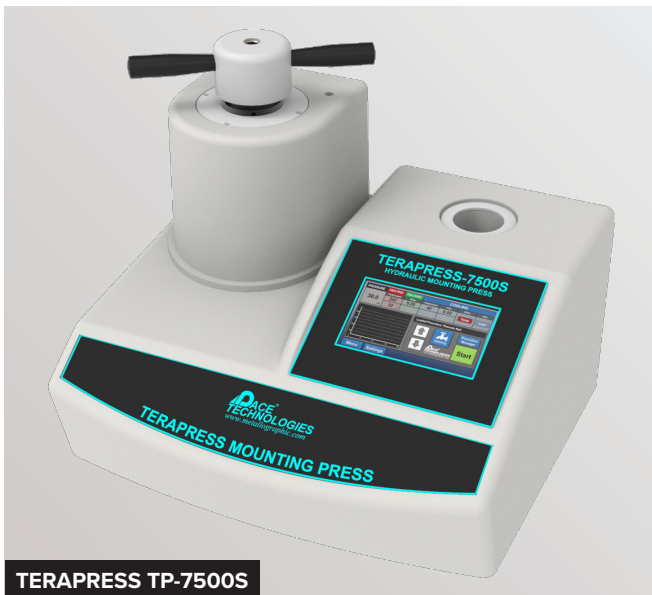
TERAPRESS TP-7100S

## TERAPRESS TP-7100S

Pneumatic Compression Mounting Press

- Pneumatic (air pressure) press
- Automatic
- Programmable
- 1000 & 2000 Watt heaters
- Water cooling (temperature, time and manual)
- Non-Interchangeable molds or Interchangeable mold cylinder (optional)
- Mold sizes (1, 1.25, 1.5 and 2-inch / 25, 30 and 40 mm)
- High resolution display
- Highly reproducible mounts
- Robust and durable design
- Economical

TERAPRESS TP-7500S MOUNTING PRESS



TERAPRESS TP-7500S

## TERAPRESS TP-7500S

Hydraulic Compression Mounting Press

- Hydraulic force
- Automatic
- Programmable
- 1000 & 2000 Watt heaters
- Water cooling (temperature, time and manual)
- Non-Interchangeable molds or Interchangeable mold cylinder (optional)
- Mold sizes (1, 1.25, 1.5 and 2-inch / 25, 30 and 40 mm)
- High resolution display
- Highly reproducible mounts
- Robust and durable design
- Economical

WTP-TANK Coolant System



TP-TANK

## TERAPRESS TP-TANK

Variable Speed Table Saw

- Eco-friendly recirculating tank
- Colling heat exchanger with programmable thermostat
- 24V pump (connected to 110V power supply)
- 1.3 GPM maximum flow
- Easy to operate
- Economical

# COMPRESSION MOUNTING PRESSES

## Pneumatic Metallographic Compression Mounting Press

| FEATURE              | TERAPRESS TP-7100S DESCRIPTION                                |
|----------------------|---|
| Control              | Touch screen  |
| Mount sizes          | 1, 1.25, 1.5 and 2-inch (25, 30 and 40 mm)                    |
| Mold Cylinders       | Single  |
| Force                | Pneumatic force   |
| Incoming Pressure    | Max. 95 psi   |
| Heater Specification | 1000 Watts (110V 15 amp), 2000 Watts (220V 10 amp)            |
| Maximum Temperature  | 392°F (200°C)   |
| Cooling System       | Water with manual, temperature or time control                |
| Dimensions (WxDxH)   | 21 x 19 x 19-inches (530 x 48 x 48 mm)                        |
| Weight               | 69 lbs (32 kg)  |
| TP-TANK              | Recirculating / Cooling Tank (14 gallon) with pump (optional) |
| Catalog Number       | TP-7100S-110V & TP-7100S-220V                                 |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Fast cycle times
- ◆ Interchangeable or fixed size molds
- ◆ 7-inch touchscreen
- ◆ Soft Start capabilities
- ◆ Custom procedures list
- ◆ Heating graph for monitoring temperature and cycle progress

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

## Hydraulic Metallographic Compression Mounting Press

| FEATURE              | TERAPRESS TP-7500S DESCRIPTION                                |
|----------------------|---|
| Control              | Touch screen  |
| Mount sizes          | 1, 1.25, 1.5 and 2-inch (25, 30 and 40 mm)                    |
| Mold Cylinders       | Single  |
| Force                | Hydraulic force   |
| Maximum Force        | 32 MPa (4500 psi)   |
| Heater Specification | 1000 Watts (110V 15 amp), 2000 Watts (220V 10 amp)            |
| Maximum Temperature  | 392°F (200°C)   |
| Cooling System       | Water with manual, temperature or time control                |
| Dimensions (WxDxH)   | 21 x 19 x 19-inches (530 x 480 x 480 mm)                      |
| Weight               | 108 lbs (50 kg)   |
| TP-TANK              | Recirculating / Cooling Tank (14 gallon) with pump (optional) |
| Catalog Number       | TP-7500S-110V & TP-7500S-220V                                 |

### Benefits:

- ◆ Fast cycle times
- ◆ Hydraulic
- ◆ Interchangeable or fixed size molds
- ◆ Up to 32 MPa pressure at the mount
- ◆ Soft start capabilities
- ◆ Quiet operation
- ◆ 7-inch touchscreen
- ◆ Custom procedures list
- ◆ Heating graph for monitoring temperature and cycle progress

## Recirculating / Coolant System

| FEATURE                  | TP-TANK DESCRIPTION                                 |
|--------------------------|---|
| Cooling                  | Programmable  |
| Pump                     | 24VDC, 75W Diaphragm Pump, 0.86 GPM (3.25L/ minute) |
| Dimensions (W x D x H)   | 16 x 28 x 26-inch (410 x 710 x 660 mm)              |
| Electrical specification | 110 / 240V (50/60 Hz)                               |
| Tank Volume              | 14 gallons (53 L)                                   |
| Weight                   | 28 lbs (13 kg)                                      |

### Benefits:

- ◆ Environmentally smart
- ◆ Allows for TP-7500S to be mobile
- ◆ More controlled cooling temperature



Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# COMPRESSION MOUNTING

## TERAPRESS Mold Assemblies

### 1-inch Mold Assembly



1.0-inch interchangeable mold assembly contains mold sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-0100**

### 1.25-inch Mold Assembly



1.25-inch interchangeable mold assembly contains mold sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-0125**

### 1.5-inch Mold Assembly



1.5-inch interchangeable mold assembly contains mold sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-0150**

### Interchangeable Molds:

- ◆ Allows for easy changing of mold size. Simply replace mold, sleeve and rams
- ◆ Available in 1, 1.25 and 1.5-inch as well as 25, 30 and 40 mm molds

### 25 mm Mold Assembly



25 mm interchangeable mold assembly contains sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-25**

### 30 mm Mold Assembly



30 mm interchangeable mold assembly contains sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-30**

### 40 mm Mold Assembly



40 mm interchangeable mold assembly contains sleeve, lower/upper ram (spacer optional)  
**Catalog no. TP75-40**

### Fixed Block Molds:

- ◆ The heater/cooler is manufactured to match the size of the mold (does not require a mold sleeve)
- ◆ Reduces cooling times for producing faster mounts
- ◆ Available in 1, 1.25, 1.5 and 2-inch as well as 25, 30, 40 and 50 mm sizes

### Mold Assemblies for Interchangeable Mold Heater

| TERAPRESS Molds                  | Flat Ram Catalog no. | Chamfered Ram Catalog no. |
|----------------------------------|----------------------|---------------------------|
| 1-inch diameter mold assembly    | TP75-0100            | TP75-0100C                |
| 1.25-inch diameter mold assembly | TP75-0125            | TP75-0125C                |
| 1.5-inch diameter mold assembly  | TP75-0150            | TP75-0150C                |
| 25 mm diameter mold assembly     | TP75-25              | TP75-25C                  |
| 30 mm diameter mold assembly     | TP75-30              | TP75-30C                  |
| 40 mm diameter mold assembly     | TP75-40              | TP75-40C                  |

### Mold Spacers

| TERAPRESS Spacers         | Flat Ram Catalog no. | Chamfered Ram Catalog no. |
|---------------------------|----------------------|---------------------------|
| 1-inch diameter spacer    | TPS-0100             | TPS-0100C                 |
| 1.25-inch diameter spacer | TPS-0125             | TPS-0125C                 |
| 1.5-inch diameter spacer  | TPS-0150             | TPS-0150C                 |
| 2-inch diameter spacer    | TPS-0200             | TPS-0200C                 |
| 25 mm diameter spacer     | TPS-25               | TPS-25C                   |
| 30 mm diameter spacer     | TPS-30               | TPS-30C                   |
| 40 mm diameter spacer     | TPS-40               | TPS-40C                   |
| 50 mm diameter spacer     | TPS-50               | TPS-50C                   |

# TERAPRESS Heating/Cooling Blocks



**1.0-inch Fixed Sized Heater / Mold Assembly**

1.0-inch Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-0100H**



**1.25-inch Fixed Sized Heater / Mold Assembly**

1.25-inch Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-0125H**



**1.5-inch Fixed Sized Heater / Mold Assembly**

1.5-inch Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-0150H**



**2.0-inch Fixed Sized Heater / Mold Assembly**

2.0-inch Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-0200H**



**25 mm Fixed Sized Heater / Mold Assembly**

25 mm Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-25H**



**30 mm Fixed Sized Heater / Mold Assembly**

30 mm Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-30H**



**40 mm Fixed Sized Heater / Mold Assembly**

40 mm Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-40H**



**50 mm Fixed Sized Heater / Mold Assembly**

50 mm Heating / Cooling block with lower & upper rams (spacer optional)  
**Catalog no. TP75-50H**

## Mold Assemblies for Interchangeable Mold Heater

| TERAPRESS Fixed sized Heater / Molds              | Flat Ram Catalog no. | Chamfered Ram Catalog no. |
|---|----------------------|---------------------------|
| 1-inch diameter fixed heater / cooler assembly    | TP75-0100H           | TP75-0100HC               |
| 1.25-inch diameter fixed heater / cooler assembly | TP75-0125H           | TP75-0125HC               |
| 1.5-inch diameter fixed heater / cooler assembly  | TP75-0150H           | TP75-0150HC               |
| 2-inch diameter fixed heater / cooler assembly    | TP75-0200H           | TP75-0200HC               |
| 25 mm diameter fixed heater / cooler assembly     | TP75-25H             | TP75-25HC                 |
| 30 mm diameter fixed heater / cooler assembly     | TP75-30H             | TP75-30HC                 |
| 40 mm diameter fixed heater / cooler assembly     | TP75-40H             | TP75-40HC                 |
| 50 mm diameter fixed heater / cooler assembly     | TP75-50H             | TP75-50HC                 |



**Recirculating / Cooling Tank**

Recirculating / Cooling tank for TERAPRESS-S Metallographic Compression Mounting Presses  
**Catalog no. TP-TANK**

# COMPRESSION MOUNTING CONSUMABLES



COMPRESSION MOUNTING RESINS

|   | PHENOLICS         | ACRYLIC       | EPOXY (glass-filled) | DIALLYL PHTHALATE |
|---|-------------------|---------------|----------------------|-------------------|
| Type  | Thermoset         | Thermoplastic | Thermoset            | Thermoset         |
| Cost  | Low               | Moderate      | Moderate             | Moderate          |
| Ease of Use   | Excellent         | Moderate      | Good                 | Good              |
| Color   | Black, red, green | Clear         | Gray                 | Blue              |
| Cycle Time (1.25-inch mount)<br>TERAPRESS TP-7500S<br>(minimum) | 4-5 minutes       | 8-10 minutes  | 5-7 minutes          | 5-7 minutes       |
| Edge Retention  | Fair              | Good          | Excellent            | Excellent         |
| Clarity   | None              | Excellent     | None                 | None              |
| Hardness  | Low               | Medium        | High                 | High              |

|                     | PHENOLICS                               | ACRYLIC                         | EPOXY (glass-filled)                 | DIALLYL PHTHALATE          |
|---------------------|---|---------------------------------|--------------------------------------|----------------------------|
| Shore-D hardness    | 82                                      | 80                              | 88                                   | 88                         |
| Shrinkage (in/in)   | 0.006                                   | 0.001-0.003                     | 0.001-0.003                          | 0.001-0.003                |
| Chemical resistance | Glycol, petrochemicals, solvents, acids | Alcohol, dilute acids, solvents | Solvents, acids, alkalis & oxidizers | Solvents, acid and alkalis |



## Phenolic Compression Mounting



| PACE Product Name              | Catalog Number     | Qty    | Price (\$) |
|--------------------------------|--------------------|--------|------------|
| Black Phenolic powder (5 lbs)  | <b>CM-2001B-5</b>  | 5 lbs  | 28.00      |
| Black Phenolic powder (25 lbs) | <b>CM-2001B-25</b> | 25 lbs | 125.00     |
| Red Phenolic powder (5 lbs)    | <b>CM-2001R-5</b>  | 5 lbs  | 30.00      |
| Red Phenolic powder (25 lbs)   | <b>CM-2001R-25</b> | 25 lbs | 135.00     |
| Green Phenolic powder (5 lbs)  | <b>CM-2001G-5</b>  | 5 lbs  | 30.00      |
| Green Phenolic powder (25 lbs) | <b>CM-2001G-25</b> | 25 lbs | 135.00     |

### TIP: Phenolic Colors

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

If the color dye in the mount bleeds out when rinsing with alcohol, this is an indication that the mount was not fully cured either at a high enough temperature or for the proper length of time

## Phenolic PREMIUM Compression Mounting with Mold Release Agent



PREMIUM Phenolic Powders

| PACE Product Name                      | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| Black PREMIUM Phenolic powder (2.5 kg) | <b>CM-2500B-2</b> | 2.5 kg | 38.00      |
| Black PREMIUM Phenolic powder (7.5 kg) | <b>CM-2500B-8</b> | 7.5 kg | 155.00     |
| Red PREMIUM Phenolic powder (2.5 kg)   | <b>CM-2500R-5</b> | 2.5 kg | 45.00      |
| Red PREMIUM Phenolic powder (7.5 kg)   | <b>CM-2500R-8</b> | 7.5 kg | 165.00     |
| Green PREMIUM Phenolic powder (2.5 kg) | <b>CM-2500G-5</b> | 2.5 kg | 45.00      |
| Green PREMIUM Phenolic powder (7.5 kg) | <b>CM-2500G-8</b> | 7.5 kg | 165.00     |

# COMPRESSION MOUNTING CONSUMABLES

## Acrylic Clear Compression Mounting

| PACE Product Name                                       | Catalog Number | Qty    | Price (\$) |
|---|----------------|--------|------------|
| TRANSACRYLIC clear compression mounting powder (5 lbs)  | CM-2101A-5     | 5 lbs  | 115.00     |
| TRANSACRYLIC clear compression mounting powder (25 lbs) | CM-2101A-25    | 25 lbs | 505.00     |



### TIP: Acrylic Mounts

A common problem with acrylic mounts, known as the "cotton ball" effect, can occur with thermoplastic acrylic resins. The cause is due to the following:

Heating the compression mounting resin too fast or to a temperature which causes a liquid layer to form around the non-melted powder. This creates trapped air that cannot escape. It is recommended for the high heating efficiency of PACE Technologies mounting presses, that the mounting press use a maximum curing temperature that does not to exceed 130°C. Note: All mounting presses provide a different rates of heating so results may vary from one manufacturer to another.

## Acrylic PREMIUM Clear Compression Mounting

| PACE Product Name                                       | Catalog Number | Qty    | Price (\$) |
|---|----------------|--------|------------|
| TRANSACRYLIC clear compression mounting powder (1 kg)   | CM-2101A-1     | 1 kg   | 52.50      |
| TRANSACRYLIC clear compression mounting powder (2.5 kg) | CM-2101A-2     | 2.5 kg | 125.00     |
| TRANSACRYLIC clear compression mounting powder (7.5 kg) | CM-2101A-8     | 7.5 kg | 365.00     |



## Diallyl Phthalate Compression Mounting



| PACE Product Name   | Catalog Number | Qty    | Price (\$) |
|---|----------------|--------|------------|
| Diallyl Phthalate blue compression mounting powder (5 lbs)  | DY-2301A-5     | 5 lbs  | 155.00     |
| Diallyl Phthalate blue compression mounting powder (25 lbs) | DY-2301A-25    | 25 lbs | 605.00     |

## Glass Filled Epoxy Compression Mounting



| PACE Product Name                        | Catalog Number | Qty    | Price (\$) |
|--|----------------|--------|------------|
| EPOCOMP Epoxy Resin powder (5 lbs)       | EP-2201A-5     | 5 lbs  | 145.00     |
| EPOCOMP Epoxy Resin powder (25 lbs)      | EP-2201A-25    | 25 lbs | 580.00     |
| EPOCOMP Fine Epoxy Resin powder (5 lbs)  | EPF-2201-5     | 5 lbs  | 155.00     |
| EPOCOMP Fine Epoxy Resin powder (25 lbs) | EPF-2201-25    | 25 lbs | 610.00     |

### TIP: Glass Filled Mounts

- ◆ Glass filled epoxies and diallyl phthalates are excellent mounting compounds for protecting the specimen edges during grinding and polishing
- ◆ Glass filled resins can be expensive, so to reduce the cost per mount, 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. A common combination is red phenolic / glass filled epoxy.

## PREMIUM Glass Filled Epoxy-Phenolic Compression Mounting



| PACE Product Name  | Catalog Number | Qty    | Price (\$) |
|--|----------------|--------|------------|
| PREMIUM Glass Filled Epoxy-Phenolic edge retention compression mounting resin (2.5 kg) | EPF-2500-2     | 2.5 kg | 195.00     |
| PREMIUM Glass Filled Epoxy-Phenolic edge retention compression mounting resin (8 kg)   | EPF-2500-8     | 7.5 kg | 725.00     |

# COMPRESSION MOUNTING CONSUMABLES

## Conductive Compression Mounting



| PACE Product Name                     | Catalog Number        | Qty    | Price (\$) |
|---------------------------------------|-----------------------|--------|------------|
| Conductive (graphite) powder (1 lb)   | <b>CONDUCTO-1P</b>    | 1 lb   | 40.50      |
| Conductive (graphite) powder (5 lbs)  | <b>CONDUCTO-5P</b>    | 5 lbs  | 195.00     |
| Conductive (graphite) powder (25 lbs) | <b>CONDUCTO-25P</b>   | 25 lbs | 760.00     |
| Conductive (copper) powder (1 lb)     | <b>CONDUCTO-CU-1</b>  | 1 lb   | 72.00      |
| Conductive (copper) powder (5 lbs)    | <b>CONDUCTO-CU-5</b>  | 5 lbs  | 295.00     |
| Conductive (copper) powder (25 lbs)   | <b>CONDUCTO-CU-25</b> | 25 lbs | 1350.00    |

### TIP: Conductive Mounts

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

## Conductive Premium Compression Mounting

| PACE Product Name                             | Catalog Number         | Qty    | Price (\$) |
|---|------------------------|--------|------------|
| Conductive Premium (graphite) powder (1 kg)   | <b>CONDUCTO-G1000</b>  | 1 kg   | 105.00     |
| Conductive Premium (graphite) powder (2.5 kg) | <b>CONDUCTO-G2500</b>  | 2.5 kg | 210.00     |
| Conductive Premium (graphite) powder (7.5 kg) | <b>CONDUCTO-G7500</b>  | 7.5 kg | 575.00     |
| Conductive Premium (copper) powder (1 kg)     | <b>CONDUCTO-CU1000</b> | 1 kg   | 135.00     |
| Conductive Premium (copper) powder (2.5 kg)   | <b>CONDUCTO-CU2500</b> | 2.5 kg | 295.00     |
| Conductive Premium (copper) powder (7.5 kg)   | <b>CONDUCTO-CU7500</b> | 7.5 kg | 815.00     |



## Miscellaneous Compression Mounting Accessories



MR-1000



GLOVES



MKLIP



SKLIP



KLIP



MULTIKLIP



UNIKLIP



MS-1000-30



SCRIBE



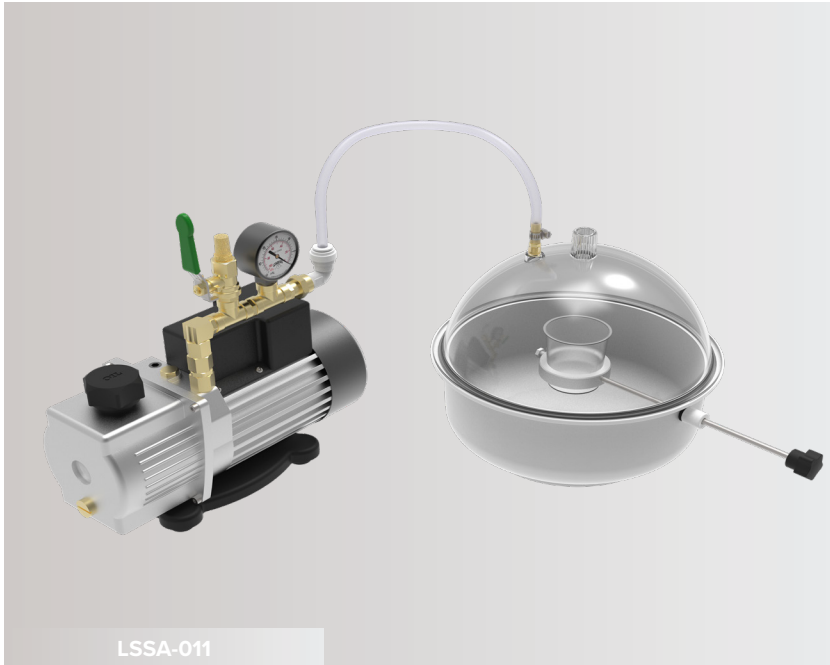
Disposable Gloves

| PACE Product Name                              | Catalog Number | Qty      | Price (\$) |
|--|----------------|----------|------------|
| Mold release (8 oz)                            | MR-1000-08     | 8 oz     | 19.50      |
| Mold release (16 oz)                           | MR-1000-16     | 16 oz    | 29.50      |
| Mold release (1 gallon)                        | MR-1000-128    | 1 gallon | 135.00     |
| Utility heat protective gloves (pair)          | GLOVES         | pair     | 12.50      |
| Small disposable protective gloves (100/box)   | GLOVES-S100    | 100/box  | 25.00      |
| Medium disposable protective gloves (100/box)  | GLOVES-M100    | 100/box  | 25.00      |
| Large disposable protective gloves (100/box)   | GLOVES-L100    | 100/box  | 25.00      |
| Metal MKLIP specimen clips (100/pkg)           | MKLIP-0100     | 100/pkg  | 70.50      |
| Plastic SKLIP spring specimen clips (100/pkg)  | SKLIP-0100     | 100/pkg  | 39.00      |
| Plastic SKLIP spring specimen clips (1000/pkg) | SKLIP-1000     | 1000/pkg | 305.00     |
| Plastic KLIP specimen clips (100/pkg)          | KLIP-0100      | 100/pkg  | 42.00      |
| Plastic MULTIKLIP specimen clips (100/pkg)     | MULTIKLIP-0100 | 100/pkg  | 55.50      |
| Plastic UNIKLIP specimen clips (100/pkg)       | UNIKLIP-0100   | 100/pkg  | 35.00      |
| 30 ml measuring scoop                          | MS-1000-30     | each     | 3.00       |
| Scribing tool                                  | SCRIBE         | each     | 35.00      |

### Compression Mounting Recommended Procedures:

- ◆ 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
- ◆ 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



## VACUUM CHAMBER LSSA-011

### Castable Vacuum Mounting Press

- Pour under vacuum
- Tilting, retractable pouring arm
- Cure at room pressure
- Easy to Use
- Robust and durable design
- Economical

|                         | ACRYLICS                   | EPOXY   | POLYESTER                    |
|-------------------------|----------------------------|---|------------------------------|
| <b>Type</b>             | Acrylic resin and hardener | Epoxy resin and hardener                      | Polyester resin and hardener |
| <b>Peak Temperature</b> | 150°F (65°C)               | 100°F-375°F (38-190°C)                        | 100°F (38°C)                 |
| <b>Shore-D Hardness</b> | 80 (90+ for SUPERMOUNT)    | 82  | 76                           |
| <b>Cure Time</b>        | 8-15 minutes               | 30 minutes for 8 hours                        | 6-8 hours                    |
| <b>Comments</b>         | Some shrinkage             | Moderate hardness, low shrinkage, transparent | Transparent and clear        |

| CASTABLE RESINS                                     | RESIN MIXTURE  | PROPERTIES   |
|---|--|--|
| <b>CASTAMOUNT Acrylic</b>                           | 3-parts powder and 2-parts liquid                      | Translucent, fast cure                                   |
| <b>PREMIUM Acrylic</b>                              | 3-parts powder and 2-parts liquid                      | Translucent, fast cure                                   |
| <b>ACRYLIC PLUS Acrylic</b>                         | 2-parts powder and 1-part liquid                       | Semi-clear, fast cure, lower cost                        |
| <b>SUPERMOUNT Acrylic</b>                           | 3-parts powder and 2-parts liquid                      | Grayish/Black, hard, low shrinkage, fast cure            |
| <b>Epoxy - standard<br/>Epoxy PLUS</b>              | 5:1 resin:hardener (wt.)<br>11:2 resin:hardener (wt.)  | Clear to translucent, low shrinkage, 4-8 hour cure       |
| <b>Quick Mount Epoxy</b>                            | Epoxy (2-liquids)<br>10:1 resin:hardener (wt.)         | Translucent, slightly yellow, 30 minute - 2 hour cure    |
| <b>ULTRATHIN 2 Epoxy<br/>ULTRATHIN 2 Epoxy PLUS</b> | 10:1 resin:hardener (wt.)<br>18:5 resin:hardener (wt.) | Clear, low viscosity for porous specimens, 2-6 hour cure |
| <b>POLYCAST Polyester</b>                           | Polyester (2-liquids)                                  | Clear and relatively inexpensive                         |

# CASTABLE MOUNTING CHAMBER

## Castable Metallographic Vacuum Mounting Chamber

**2** year warranty  
Limited Warranty

| FEATURE            | LSSA-011 DESCRIPTION                            |
|--------------------|---|
| Bell jar           | Tilting, retractable pouring arm                |
| Mount sizes        | 1, 1.25, 1.5 and 2-inch -- 25, 30, 40 and 50 mm |
| Vacuum             | Vacuum pump (sold separately)                   |
| Dimensions (WxDxH) | 12 x 12 x 12-inch (300 x 300 x 300 mm)          |
| Weight             | 2.2 lbs (1 kg)                                  |
| Catalog Number     | LSSA-011  |

### Benefits:

- ◆ Able to pull vacuum and pour under vacuum
- ◆ Pour multiple samples
- ◆ High visibility chamber
- ◆ Easy to Use
- ◆ Robust and Durable

| DESCRIPTION        | 110V VACUUM PUMP                                | 220V VACUUM PUMP                                |
|--------------------|---|---|
| Flow Rate          | 2 CFM (48 liters / minutes)                     | 2 CFM (48 liters / minutes)                     |
| Ultimate Vacuum    | 50 micron                                       | 50 micron                                       |
| Power              | 0.35 hp   | 0.35 hp   |
| Inlet Port         | 1/4" SAE and 1/2" ACME ports                    | 1/4" SAE and 1/2" ACME ports                    |
| Dimensions (WxDxH) | 5 x 12 x 9.6-inch<br>(130 cm x 310 cm x 240 cm) | 5 x 12 x 9.6-inch<br>(130 cm x 310 cm x 240 cm) |
| Weight             | 13.7 lbs (6.2 kg)                               | 13.7 lbs (6.2 kg)                               |
| Catalog Number     | VAC-110   | VAC-220   |

### 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, these include:

- ◆ Epoxy (2-part) liquid resins
- ◆ Acrylic (castable) resin powders with a liquid hardener
- ◆ Polyester (clear and can be used for large castings) 2-part liquid resin/hardener

**CE** Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ACRYLIC MOUNTING CONSUMABLES

## Acrylic Castable Mounting:

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 up to 25% with no adverse effects 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.



| PACE Product Name  | Catalog Number | Qty        | Price (\$) |
|--|----------------|------------|------------|
| CASTAMOUNT Acrylic kit (1 lb resin with 12 oz liquid hardener)       | AK-5000-K1     | 1 lb       | 65.00      |
| CASTAMOUNT Acrylic kit (5 lbs resin with 1/2 gallon liquid hardener) | AK-5000-K5     | 5 lbs      | 270.00     |
| <b>CASTAMOUNT Acrylic Powders</b>                                    |                |            |            |
| CASTAMOUNT Acrylic powder (1 lb)                                     | AR-5000-P1     | 1 lb       | 55.00      |
| CASTAMOUNT Acrylic powder (5 lbs)                                    | AR-5000-P5     | 5 lbs      | 240.00     |
| CASTAMOUNT Acrylic powder (25 lbs)                                   | AR-5000-P25    | 25 lbs     | 1075.00    |
| CASTAMOUNT Acrylic powder (100 lbs)                                  | AR-5000-P100   | 100 lbs    | 4050.00    |
| <b>CASTAMOUNT Acrylic Liquids</b>                                    |                |            |            |
| CASTAMOUNT Acrylic hardener (12 oz)                                  | AH-5000-H12    | 12 oz      | 28.50      |
| CASTAMOUNT Acrylic hardener (32 oz)                                  | AH-5000-H32    | 32 oz      | 48.50      |
| CASTAMOUNT Acrylic hardener (1/2 gallon)                             | AH-5000-H64    | 1/2 gallon | 72.50      |
| CASTAMOUNT Acrylic hardener (1 gallon)                               | AH-5000-H128   | 1 gallon   | 115.00     |
| CASTAMOUNT Acrylic hardener (5 gallon)                               | AH-5000-H640   | 5 gallon   | 505.00     |

### 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 also absorbs the odor.

## PREMIUM Acrylics (Castable Mounting)

| PACE Product Name   | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| PREMIUM Acrylic kit (1 kg resin with 500 ml liquid hardener)    | PAR-5000-K1    | 1 kg    | 195.00     |
| PREMIUM Acrylic kit (2.5 kg resin with 2 liter liquid hardener) | PAR-5000-K2    | 2.5 kg  | 405.00     |
| <b>PREMIUM Acrylic Powders</b>                                  |                |         |            |
| PREMIUM Acrylic powder (1 kg)                                   | PAR-5000-P1000 | 1 kg    | 170.00     |
| PREMIUM Acrylic powder (2.5 kg)                                 | PAR-5000-P2500 | 2.5 kg  | 370.00     |
| PREMIUM Acrylic powder (7.5 kg)                                 | PAR-5000-P7500 | 7.5 kg  | 945.00     |
| <b>PREMIUM Acrylic Liquids</b>                                  |                |         |            |
| PREMIUM Acrylic hardener (500 ml)                               | PAH-5000-H500  | 500 ml  | 74.00      |
| PREMIUM Acrylic hardener (1 liter)                              | PAH-5000-H1L   | 1 liter | 135.00     |
| PREMIUM Acrylic hardener (5 liters)                             | PAH-5000-H5L   | 5 liter | 525.00     |



## ACRYLIC PLUS Acrylics (Castable Mounting)



| PACE Product Name  | Catalog Number        | Qty        | Price (\$) |
|--|-----------------------|------------|------------|
| ACRYLIC PLUS Castable Mounting Resin Kit (1 lb resin with 12 oz liquid hardener)       | <b>ACYP-5000-K1</b>   | 1 lb       | 62.00      |
| ACRYLIC PLUS Castable Mounting Resin Kit (5 lbs resin with 1/2 gallon liquid hardener) | <b>ACYP-5000-K5</b>   | 5 lbs      | 245.00     |
| <b>ACRYLIC PLUS Acrylic Powders</b>  |                       |            |            |
| ACRYLIC PLUS Resin powder (1 lb)   | <b>ACYP-5000-P1</b>   | 1 lb       | 55.00      |
| ACRYLIC PLUS Resin powder (5 lbs)  | <b>ACYP-5000-P5</b>   | 5 lbs      | 235.00     |
| ACRYLIC PLUS Resin powder (25 lbs)   | <b>ACYP-5000-P25</b>  | 25 lbs     | 1105.00    |
| ACRYLIC PLUS Resin powder (100 lbs)  | <b>ACYP-5000-P100</b> | 100 lbs    | 2285.00    |
| <b>ACRYLIC PLUS Acrylic Liquids</b>  |                       |            |            |
| ACRYLIC PLUS Resin hardener (12 oz)  | <b>ACYP-5000-H12</b>  | 12 oz      | 28.50      |
| ACRYLIC PLUS Resin hardener (32 oz)  | <b>ACYP-5000-H32</b>  | 32 oz      | 48.50      |
| ACRYLIC PLUS Resin hardener (1/2 gallon)   | <b>ACYP-5000-H64</b>  | 1/2 gallon | 72.50      |
| ACRYLIC PLUS Resin hardener (1 gallon)   | <b>ACYP-5000-H128</b> | 1 gallon   | 115.00     |
| ACRYLIC PLUS Resin hardener (5 gallon)   | <b>ACYP-5000-H640</b> | 5 gallon   | 505.00     |

## SUPERMOUNT Glass Filled Acrylics (Castable Mounting)



| PACE Product Name  | Catalog Number        | Qty        | Price (\$) |
|--|-----------------------|------------|------------|
| SUPERMOUNT Glass Filled Acrylic Kit (gray) (1 lb resin with 12 oz liquid hardener)       | <b>GKAK-5000-K1</b>   | 1 lb       | 72.50      |
| SUPERMOUNT Glass Filled Acrylic Kit (gray) (5 lbs resin with 1/2 gallon liquid hardener) | <b>GKAK-5000-K5</b>   | 5 lbs      | 290.00     |
| <b>SUPERMOUNT PLUS Acrylic Powders</b>   |                       |            |            |
| SUPERMOUNT Resin powder (1 lb)   | <b>GRAR-5000-P1</b>   | 1 lb       | 62.00      |
| SUPERMOUNT Resin powder (5 lbs)  | <b>GRAR-5000-P5</b>   | 5 lbs      | 265.00     |
| SUPERMOUNT Resin powder (25 lbs)   | <b>GRAR-5000-P25</b>  | 25 lbs     | 1225.00    |
| SUPERMOUNT Resin powder (100 lbs)  | <b>GRAR-5000-P100</b> | 100 lbs    | 4095.00    |
| <b>SUPERMOUNT Acrylic Liquids</b>  |                       |            |            |
| SUPERMOUNT Resin hardener (12 oz)  | <b>GRAH-5000-H12</b>  | 12 oz      | 28.50      |
| SUPERMOUNT Resin hardener (32 oz)  | <b>GRAH-5000-H32</b>  | 32 oz      | 48.50      |
| SUPERMOUNT Resin hardener (1/2 gallon)   | <b>GRAH-5000-H64</b>  | 1/2 gallon | 72.50      |
| SUPERMOUNT Resin hardener (1 gallon)   | <b>GRAH-5000-H128</b> | 1 gallon   | 115.00     |
| SUPERMOUNT Resin hardener (5 gallon)   | <b>GRAH-5000-H640</b> | 5 gallon   | 505.00     |

# EPOXY MOUNTING CONSUMABLES

## Epoxy Castable Mounting:

The most common and best performing castable resins are epoxy based. Epoxy resins are typically two-part liquid systems consisting of a resin and 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 exotherm
- ◆ Excellent adhesion
- ◆ Excellent chemical resistance
- ◆ Good hardness
- ◆ Relatively inexpensive

## Epoxy Curing Characteristics:

- ◆ 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 times)
  - ◆ 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 and rubber molds absorb heat differently)

## Epoxy Standard Cure (5:2 Resin: Hardener) Castable Mounting



| PACE Product Name                | Catalog Number     | Qty       | Price (\$) |
|----------------------------------|--------------------|-----------|------------|
| <b>Standard Epoxy Resin</b>      |                    |           |            |
| Epoxy castable resin (32 oz)     | <b>EP-3000-32</b>  | 32 oz     | 44.50      |
| Epoxy castable resin (1-gallon)  | <b>EP-3000-128</b> | 1 gallon  | 132.00     |
| Epoxy castable resin (5-gallons) | <b>EP-3000-5G</b>  | 5 gallons | 605.00     |
| <b>Standard Epoxy Hardeners</b>  |                    |           |            |
| Epoxy hardener (8 oz)            | <b>EH-3000-08</b>  | 8 oz      | 27.50      |
| Epoxy hardener (32 oz)           | <b>EH-3000-32</b>  | 32 oz     | 55.00      |
| Epoxy hardener (1 gallon)        | <b>EH-3000-128</b> | 1 gallon  | 235.00     |

## Epoxy PLUS Standard Cure (11:2 Resin: Hardener) Castable Mounting

| PACE Product Name                | Catalog Number      | Qty       | Price (\$) |
|----------------------------------|---------------------|-----------|------------|
| <b>EPOXY PLUS Resin</b>          |                     |           |            |
| Epoxy castable resin (32 oz)     | <b>EP-3000-32P</b>  | 32 oz     | 44.50      |
| Epoxy castable resin (1-gallon)  | <b>EP-3000-128P</b> | 1 gallon  | 132.00     |
| Epoxy castable resin (5-gallons) | <b>EP-3000-5GP</b>  | 5 gallons | 605.00     |
| <b>EPOXY PLUS Hardeners</b>      |                     |           |            |
| Epoxy hardener (8 oz)            | <b>EH-3000-08P</b>  | 8 oz      | 38.00      |
| Epoxy hardener (32 oz)           | <b>EH-3000-32P</b>  | 32 oz     | 112.00     |
| Epoxy hardener (1 gallon)        | <b>EH-3000-128P</b> | 1 gallon  | 410.00     |

## Fast Curing Quick Mounting Epoxy (10:1 Resin: Hardener) Castable Mounting



| PACE Product Name                                    | Catalog Number      | Qty       | Price (\$) |
|--|---------------------|-----------|------------|
| <b>Quick Mounting Epoxy Resins</b>                   |                     |           |            |
| Quick Mounting fast epoxy castable resin (32 oz)     | <b>ERF-3000-32</b>  | 32 oz     | 63.00      |
| Quick Mounting fast epoxy castable resin (1-gallon)  | <b>ERF-3000-128</b> | 1 gallon  | 178.50     |
| Quick Mounting fast epoxy castable resin (5-gallons) | <b>ERF-3000-5G</b>  | 5 gallons | 795.00     |
| <b>Quick Mounting Epoxy Hardeners</b>                |                     |           |            |
| Quick Mounting fast epoxy hardener (8 oz)            | <b>EHF-3000-08</b>  | 8 oz      | 42.00      |
| Quick Mounting fast epoxy hardener (32 oz)           | <b>EHF-3000-32</b>  | 32 oz     | 128.00     |
| Quick Mounting fast epoxy hardener (1 gallon)        | <b>EHF-3000-128</b> | 1 gallon  | 450.00     |

## Low Viscosity ULTRATHIN 2 Epoxy (10:1 Resin: Hardener) Castable Mounting



| PACE Product Name                                | Catalog Number         | Qty       | Price (\$) |
|--|------------------------|-----------|------------|
| <b>ULTRATHIN 2 Low Viscosity Epoxy Resins</b>    |                        |           |            |
| Low Viscosity castable epoxy resin (32 oz)       | <b>ULTRA-3000R-32</b>  | 32 oz     | 78.00      |
| Low Viscosity castable epoxy resin (1-gallon)    | <b>ULTRA-3000R-128</b> | 1 gallon  | 190.00     |
| Low Viscosity castable epoxy resin (5-gallons)   | <b>ULTRA-3000R-5G</b>  | 5 gallons | 945.00     |
| <b>ULTRATHIN 2 Low Viscosity Epoxy Hardeners</b> |                        |           |            |
| Low Viscosity castable epoxy hardener (8 oz)     | <b>ULTRA-3000H-08</b>  | 8 oz      | 42.00      |
| Low Viscosity castable epoxy hardener (32 oz)    | <b>ULTRA-3000H-32</b>  | 32 oz     | 128.00     |
| Low Viscosity castable epoxy hardener (1 gallon) | <b>ULTRA-3000H-128</b> | 1 gallon  | 450.00     |

## Low Viscosity ULTRATHIN 2 PLUS Epoxy (18:5 Resin: Hardener) Castable Mounting

| PACE Product Name                                     | Catalog Number          | Qty       | Price (\$) |
|---|-------------------------|-----------|------------|
| <b>ULTRATHIN 2 PLUS Low Viscosity Epoxy Resins</b>    |                         |           |            |
| Low Viscosity castable epoxy resin (32 oz)            | <b>ULTRA-3000R-32P</b>  | 32 oz     | 78.00      |
| Low Viscosity castable epoxy resin (1-gallon)         | <b>ULTRA-3000R-128P</b> | 1 gallon  | 215.00     |
| Low Viscosity castable epoxy resin (5-gallons)        | <b>ULTRA-3000R-5GP</b>  | 5 gallons | 945.00     |
| <b>ULTRATHIN 2 PLUS Low Viscosity Epoxy Hardeners</b> |                         |           |            |
| Low Viscosity castable epoxy hardener (8 oz)          | <b>ULTRA-3000H-08P</b>  | 8 oz      | 42.00      |
| Low Viscosity castable epoxy hardener (32 oz)         | <b>ULTRA-3000H-32P</b>  | 32 oz     | 128.00     |
| Low Viscosity castable epoxy hardener (1 gallon)      | <b>ULTRA-3000H-128P</b> | 1 gallon  | 450.00     |

### TIP: Epoxies

- ◆ Preheat resin and sample to 35°C (95°F) to expedite the initial heating process and for decreasing overall curing time

# POLYESTER MOUNTING CONSUMABLES

## Polyester Castable Mounting:

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. The table to the right for Polyester catalyst mixing ratio's is based on ambient and resin temperatures of 70°F

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 "rubbery" polyester layer and another layer of the liquid polyester is poured. Multiple layers can be poured in this fashion if required.

| 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                                   | 1st layer                        | 4-5                                  |
| 1/4                                   | 8                                    | 2nd layer                        | 3-4                                  |
| 1/2                                   | 6                                    | 3rd layer                        | 2-3                                  |
| 3/4                                   | 5                                    | 4th layer                        | 1-2                                  |
| 1-1.5                                 | 4                                    | 5th layer or more                | 1                                    |

### Polyester Characteristics:

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

## Polyester Resin (Clear Castable Mounting)



| PACE Product Name                         | Catalog Number      | Qty      | Price (\$) |
|---|---------------------|----------|------------|
| Clear Polyester castable resin (1 gallon) | <b>POLYCAST-128</b> | 1 gallon | 125.00     |
| Polyester Hardener (2 oz)                 | <b>POLYHARD-02</b>  | 2 oz     | 11.00      |
| Polyester Color Dye Set (3 colors)        | <b>DYE-1000</b>     | 3 colors | 40.50      |

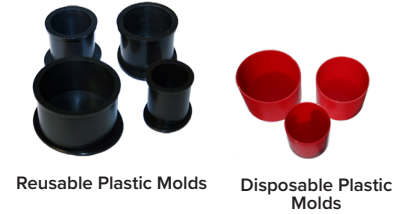
### TIP: Polyesters

Polyesters 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 also absorbs the odor.

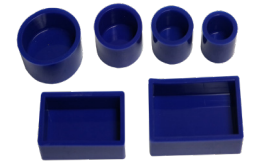
# CASTABLE MOLDS & ACCESSORIES

## Castable Mounting Molds

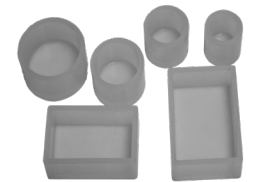
| PACE Product Name                                  | Catalog Number      | Qty    | Price (\$) |
|--|---------------------|--------|------------|
| <b>Reusable Plastic Molds</b>                      |                     |        |            |
| 1.0-inch reusable two piece plastic mold (12/pkg)  | <b>METPREP-0100</b> | 12/pkg | 31.00      |
| 1.25-inch reusable two piece plastic mold (12/pkg) | <b>METPREP-0125</b> | 12/pkg | 32.50      |
| 1.5-inch reusable two piece plastic mold (12/pkg)  | <b>METPREP-0150</b> | 12/pkg | 42.50      |
| 2.0-inch reusable two piece plastic mold (12/pkg)  | <b>METPREP-0200</b> | 12/pkg | 58.50      |
| <b>Disposable Plastic Molds</b>                    |                     |        |            |
| 1.0-inch disposable red mount cap - 50/pkg         | <b>MOUNT-0100</b>   | 50/pkg | 27.50      |
| 1.25-inch disposable red mount cap - 50/pkg        | <b>MOUNT-0125</b>   | 50/pkg | 28.50      |
| 1.5-inch disposable red mount cap - 50/pkg         | <b>MOUNT-0150</b>   | 50/pkg | 29.50      |



| PACE Product Name   | Catalog Number     |                     | Qty   | Price (\$) |
|---|--------------------|---------------------|-------|------------|
|   | Blue Molds         | Clear Molds         |       |            |
| <b>Silicon Rubber Molds</b>                                     |                    |                     |       |            |
| 1.0-inch diameter Silicone Rubber Molds - 3/pkg                 | <b>RMOUNT-0100</b> | <b>RMOUNT-0100C</b> | 3/pkg | 31.00      |
| 1.25-inch diameter Silicone Rubber Molds - 3/pkg                | <b>RMOUNT-0125</b> | <b>RMOUNT-0125C</b> | 3/pkg | 37.50      |
| 1.5-inch diameter Silicone Rubber Molds - 3/pkg                 | <b>RMOUNT-0150</b> | <b>RMOUNT-0150C</b> | 3/pkg | 48.50      |
| 2.0-inch diameter Silicone Rubber Molds - 3/pkg                 | <b>RMOUNT-0200</b> | <b>RMOUNT-0200C</b> | 3/pkg | 55.00      |
| 2.75 x 1-1/2 x 7/8-inch (70 x 39 x 22 mm) Silicone Rubber Molds | <b>RMOUNT-315R</b> | <b>RMOUNT-315C</b>  | each  | 17.50      |
| 3 x 2 x 7/8-inch (76 x 51 x 22 mm) Silicone Rubber Molds        | <b>RMOUNT-302R</b> | <b>RMOUNT-302C</b>  | each  | 19.50      |



Silicon Rubber Molds - Blue



Silicon Rubber Molds - Clear

## Castable Mounting Accessories



| PACE Product Name                             | Catalog Number        | Qty     | Price (\$) |
|---|-----------------------|---------|------------|
| 1-gallon castable pump dispenser              | <b>ED-3000-01</b>     | each    | 17.50      |
| 1.25-inch specimen storage container - 25/pkg | <b>STORE-0125</b>     | 25/pkg  | 42.00      |
| Mold release (8 oz)                           | <b>MR-1000-08</b>     | each    | 19.50      |
| Mold release (16 oz)                          | <b>MR-1000-16</b>     | each    | 29.50      |
| <b>Mixing Cups</b>                            |                       |         |            |
| 3 oz Graduated Paper Mixing cups (100/pkg)    | <b>MCUPS-0100</b>     | 100/pkg | 15.25      |
| 9 oz Plastic Mixing cups (50/pkg)             | <b>PCUPS-050</b>      | 50/pkg  | 7.75       |
| Vacuum Impregnator Pouring cups (50/pkg)      | <b>POUR-CUP-050</b>   | 50/pkg  | 52.00      |
| <b>Mounting Klips</b>                         |                       |         |            |
| Metal MKLIP Spring mounting clip (100/pkg)    | <b>MKLIP-0100</b>     | 100/pkg | 70.50      |
| Plastic SKLIP Spring mounting clip (100/pkg)  | <b>SKLIP-0100</b>     | 100/pkg | 39.00      |
| Plastic KLIP specimen mounting clip (100/pkg) | <b>KLIP-0100</b>      | 100/pkg | 42.00      |
| Plastic MULTIKLIP specimen clips (100/pkg)    | <b>MULTIKLIP-0100</b> | 100/pkg | 55.50      |
| Plastic UNIKLIP specimen clips (100/pkg)      | <b>UNIKLIP-0100</b>   | 100/pkg | 35.00      |
| <b>Disposable Gloves</b>                      |                       |         |            |
| Small Nitrile Gloves (100/box)                | <b>GLOVES-S100</b>    | 100/pkg | 25.00      |
| Medium Nitrile Gloves (100/box)               | <b>GLOVES-M100</b>    | 100/pkg | 25.00      |
| Large Nitrile Gloves (100/box)                | <b>GLOVES-L100</b>    | 100/pkg | 25.00      |



**NEW**

## PENTA-5000A

**Metallographic Hand Grinder**

- 5-station hand grinder
- Wet or dry grinding
- Manual grinder
- Easy to change abrasive rolls
- Robust and durable design
- Easy to use
- User friendly
- Low cost
- Easy to service



PENTA-5000A

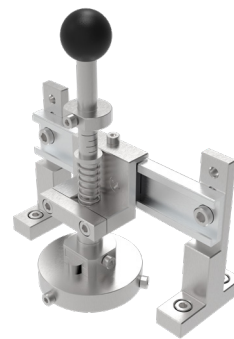


**NEW**

## PENTA-7500S

**Metallographic Belt Grinder**

- 4-inch x 36-inch belts
- Stainless steel belt adjustment mechanism
- Wet or dry grinding
- Manual grinder
- Features planarizing fixture
- Easy to change abrasive belts
- Robust and durable design
- Easy to use



PENTA-7500S Squaring and planarizing holder for metallographic mounts

**1-inch Holder**



Catalog no. P75S-SH-100

**1.25-inch Holder**



Catalog no. P75S-SH-125

**1.5-inch Holder**



Catalog no. P75S-SH-150

**2-inch Holder**



Catalog no. P75S-SH-200

**25 mm Holder**



Catalog no. P75S-SH-25

**30 mm Holder**



Catalog no. P75S-SH-30

**40 mm Holder**



Catalog no. P75S-SH-40

**50 mm Holder**



Catalog no. P75S-SH-50

# METALLOGRAPHIC HAND GRINDERS

## Manual Metallographic Hand Grinder

| FEATURE              | PENTA 5000A DESCRIPTION  |
|----------------------|--|
| Grinding stations    | 240, 360, 600, 800 and 1200 grit silicon carbide rolls   |
| Roll sizes           | 3-7/16-inch width x 60 feet length with 1-inch core  |
| Construction         | <ul style="list-style-type: none"> <li>• SMC molding and stainless steel</li> <li>• Hard coat anodized rollers and paper support plates</li> </ul> |
| Cooling rinse system | Water  |
| Dimensions (WxDxH)   | 22 x 24 x 9-inch<br>(550 mm x 610 mm x 230 mm)   |
| Weight               | 56 lbs (25 kg)   |
| Catalog Number       | PENTA-5000A  |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ 5-grit grinding stations, including one for 800 (P2400) and 1200 (P4000) grit fine SiC abrasives
- ◆ Easy paper advance for maintaining sharp fresh abrasive
- ◆ Low maintenance
- ◆ Simple and easy to use
- ◆ Ideal for low and high volume labs

## Planarizing Metallographic Belt Grinder

| FEATURE                  | PENTA 7500S DESCRIPTION                                      |
|--------------------------|--|
| Single belt              | 4 x 36-inch<br>(102 x 914 mm)                                |
| Electrical Specification | 110V / 220V 50/ 60 Hz  |
| Motor power              | 550 W (0.75 hp)  |
| Cooling / rinse system   | Water  |
| Construction             | Heavy duty welded steel / fabricated metal / Stainless steel |
| Dimensions (WxDxH)       | 20 x 25 x 15-inch<br>(510 x 630 x 380 mm)                    |
| Weight                   | 120 lbs (53 kg)  |
| Catalog Number           | PENTA-7500S  |

### REQUEST A QUOTE

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

### Benefits:

- ◆ High torque motor (110V or 220V)
- ◆ Heat treated wear surface plate
- ◆ Quick belt changing mechanism
- ◆ Fine adjustment tracking control
- ◆ Specimen square holding device for maintaining or for squaring mounted specimens
- ◆ Rinse sink
- ◆ Emergency Stop button
- ◆ Water-tight ON/OFF switch

| PENTA-7500S Accessories                   | Catalog Number |
|---|----------------|
| 1-inch sleeve for square holder (each)    | P75-SH-100     |
| 1.25-inch sleeve for square holder (each) | P75-SH-125     |
| 1.5-inch sleeve for square holder (each)  | P75-SH-150     |
| 2-inch sleeve for square holder (each)    | P75-SH-200     |
| 25 mm sleeve for square holder (each)     | P75-SH-25      |
| 30 mm sleeve for square holder (each)     | P75-SH-30      |
| 40 mm sleeve for square holder (each)     | P75-SH-40      |
| 50 mm sleeve for square holder (each)     | P75-SH-50      |



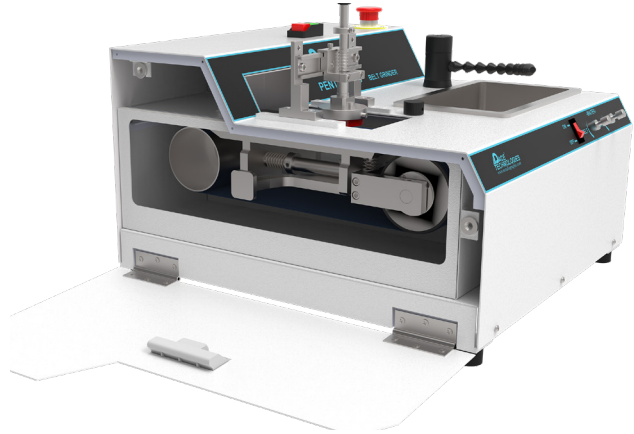
Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ABRASIVE BELTS, POWDERS & ROLLS

## Specimen Planar Grinding:

In general, it is better to cut as close to the areas to be investigated than to grind with very coarse abrasives such as 60, 80 and 120 grit grinding papers; however, if the 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 both 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 7500S belt grinder.



PENTA 7500S Metallographic Belt Grinder

## Abrasive Belts (4-inch x 36-inch)



Zirconia (blue), Alumina (red) & Silicon Carbide (black) Abrasive Grinding Belts

| PACE Product Name                | Catalog Number | Qty    | Price (\$) |
|----------------------------------|----------------|--------|------------|
| 60 grit Zirconia Abrasive Belts  | ZRO2-B060      | 5/pkg  | 80.00      |
| 120 grit Zirconia Abrasive Belts | ZRO2-B120      | 5/pkg  | 80.00      |
| 120 grit Alumina Abrasive Belts  | ALO-B120       | 5/pkg  | 75.00      |
| 60 grit SiC Abrasive Belts       | SIC-B060       | 10/pkg | 125.00     |
| 80 grit SiC Abrasive Belts       | SIC-B080       | 10/pkg | 125.00     |
| 120 grit SiC Abrasive Belts      | SIC-B120       | 10/pkg | 125.00     |
| 180 grit SiC Abrasive Belts      | SIC-B180       | 10/pkg | 125.00     |
| 240 grit SiC Abrasive Belts      | SIC-B240       | 10/pkg | 125.00     |

### ABRASIVE BELT TYPE

### BENEFIT

#### Alumina

Hard and durable abrasive, not as sharp as SiC; however, alumina lasts longer than SiC

#### Silicon Carbide

Very hard and friable. Fast initial cutting, however SiC abrasive breaks down very fast so it is a "short-lived" abrasive

#### Zirconia

Very durable and hard abrasive. It is a longer lasting abrasive and is an excellent choice for belt grinders. The only drawback is that it requires higher grinding forces as compared to SiC and alumina abrasives



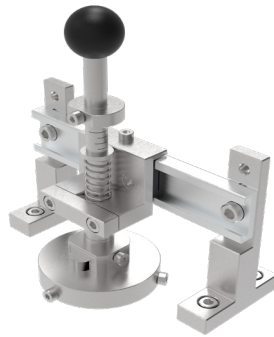
PENTA 5000A Metallographic Hand Grinder



## Silicon Carbide (SiC) Abrasive Powders



SiC Abrasive Powders



PENTA-7500S Squaring and planarizing holder for metallographic mounts

| PACE Product Name                         | Catalog Number     | Qty   | Price (\$) |
|---|--------------------|-------|------------|
| 120 grit (P120-grit) SiC Powder (1 lb)    | <b>SIC-120-P1</b>  | 1 lb  | 28.50      |
| 120 grit (P120-grit) SiC Powder (5 lbs)   | <b>SIC-120-P5</b>  | 5 lbs | 115.00     |
| 240 grit (P280-grit) SiC Powder (1 lb)    | <b>SIC-240-P1</b>  | 1 lb  | 27.50      |
| 240 grit (P280-grit) SiC Powder (5 lbs)   | <b>SIC-240-P5</b>  | 5 lbs | 110.00     |
| 320 grit (P400-grit) SiC Powder (1 lb)    | <b>SIC-320-P1</b>  | 1 lb  | 27.50      |
| 320 grit (P400-grit) SiC Powder (5 lbs)   | <b>SIC-320-P5</b>  | 5 lbs | 110.00     |
| 400 grit (P800-grit) SiC Powder (1 lb)    | <b>SIC-400-P1</b>  | 1 lb  | 27.50      |
| 400 grit (P800-grit) SiC Powder (5 lbs)   | <b>SIC-400-P5</b>  | 5 lbs | 110.00     |
| 600 grit (P1200-grit) SiC Powder (1 lb)   | <b>SIC-600-P1</b>  | 1 lb  | 27.50      |
| 600 grit (P1200-grit) SiC Powder (5 lbs)  | <b>SIC-600-P5</b>  | 5 lbs | 110.00     |
| 800 grit (P2400-grit) SiC Powder (1 lb)   | <b>SIC-800-P1</b>  | 1 lb  | 35.50      |
| 800 grit (P2400-grit) SiC Powder (5 lbs)  | <b>SIC-800-P5</b>  | 5 lbs | 145.00     |
| 1000 grit (P3000-grit) SiC Powder (1 lb)  | <b>SIC-1000-P1</b> | 1 lb  | 35.50      |
| 1000 grit (P3000-grit) SiC Powder (5 lbs) | <b>SIC-1000-P5</b> | 5 lbs | 145.00     |
| 1200 grit (P4000-grit) SiC Powder (1 lb)  | <b>SIC-1200-P1</b> | 1 lb  | 35.50      |
| 1200 grit (P4000-grit) SiC Powder (5 lbs) | <b>SIC-1200-P5</b> | 5 lbs | 145.00     |

### Silicon Carbide Powders:

- ◆ The main application for grinding with silicon carbide particles is in conjunction with 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 Rolls (3-7/16-inch width, 60-foot length, 1-inch core)

| PACE Product Name                  | Catalog Number      | Qty  | Price (\$) |
|------------------------------------|---------------------|------|------------|
| 120 grit SiC Abrasive Roll (each)  | <b>SIC-120R-60</b>  | each | 88.00      |
| 240 grit SiC Abrasive Roll (each)  | <b>SIC-240R-60</b>  | each | 62.00      |
| 320 grit SiC Abrasive Roll (each)  | <b>SIC-320R-60</b>  | each | 62.00      |
| 360 grit SiC Abrasive Roll (each)  | <b>SIC-360R-60</b>  | each | 62.00      |
| 400 grit SiC Abrasive Roll (each)  | <b>SIC-400R-60</b>  | each | 62.00      |
| 600 grit SiC Abrasive Roll (each)  | <b>SIC-600R-60</b>  | each | 62.00      |
| 800 grit SiC Abrasive Roll (each)  | <b>SIC-800R-60</b>  | each | 90.00      |
| 1200 grit SiC Abrasive Roll (each) | <b>SIC-1200R-60</b> | each | 90.00      |



SiC Abrasive Rolls

# MANUAL METALLOGRAPHIC POLISHERS



**NANO-1000S**

## NANO-1000S

**8-10 inch Single Wheel  
Manual Grinder/Polisher**

- Single wheel
- 8 and 10-inch wheel diameter options
- 1 hp dynamic torque servo motor (100-1000 rpm)
- Three programmable preset speeds and times for quick speed or time changes
- Easy to use control panel with 3-inch LCD screen
- Auto timer control
- User friendly, robust and durable



**NANO-2000S**

## NANO-2000S

**8-10 inch Dual Wheel  
Manual Grinder/Polisher**

- Dual wheel
- 8 and 10-inch wheel diameter options
- 1 hp dynamic torque servo motor (100-1000 rpm)
- Three programmable preset speeds and times for quick speed or time changes
- Easy to use control panel with 3-inch LCD screen
- Auto timer control
- User friendly, robust and durable

NANO-S 8 & 10-INCH POLISHING MACHINES



High Torque Dynamic Servo Motor

**8-inch Working Wheel**



Anodized 8-inch working wheel for NANO-S polishers  
Catalog no. PW-800A

**10-inch Working Wheel**



Anodized 10-inch working wheel for NANO-S polishers  
Catalog no. PW-1000A

**8 /10-inch Splash Guard**



Splash Guard for NANO-S Polisher  
Catalog no. PTM-125-001

**8 / 10-inch Cover**



Polishing wheel cover for NANO-S polishers  
Catalog no. PTM-125-007

## 8 & 10-inch Metallographic Polishers

**2** year warranty  
Limited Warranty

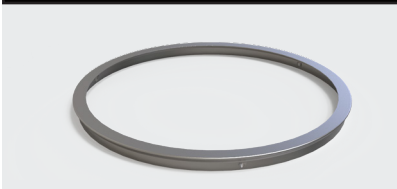
| FEATURE                                       | NANO-1000S DESCRIPTION  | NANO-2000S DESCRIPTION  |
|---|---|---|
| Motor power                                   | 1 hp (750 W) dynamic torque servo motor   | 1 hp (750 W) dynamic torque servo motor   |
| Power head upgrade                            | FEMTO-1100S / FEMTO-1500S   | FEMTO-1100S / FEMTO-1500S   |
| Polishing wheels                              | Single - 8 & 10-inch diameter   | Double - 8 & 10-inch diameter   |
| Electrical specification                      | 110 / 220V (50/60 Hz)   | 110 / 220V (50/60 Hz)   |
| Speed (rpm)                                   | Variable (100 - 1000 rpm)<br>- Grinding (600-1000 rpm)<br>- Polishing (100-600 rpm) | Variable (100 - 1000 rpm)<br>- Grinding (600-1000 rpm)<br>- Polishing (100-600 rpm) |
| Anodized Working wheels:<br>8-inch<br>10-inch | Part no. PW-800A<br>Part no. PW-1000A   | Part no. PW-800A<br>Part no. PW-1000A   |
| Dimensions<br>(W x D x H)                     | 16 x 15 x 15-inch<br>(420 x 380 x 380 mm)   | 30 x 22 x 15-inch<br>(750 x 570 x 380 mm)   |
| Weight  | 63 lbs (29 kg)  | 80 lbs (36 kg)  |
| Catalog Number                                | NANO-1000S  | NANO-2000S  |
| Optional                                      | Recirculating filtering tank<br>(RC-1000A)  | Recirculating filtering tank<br>(RC-1000A)  |

### Benefits:

- ◆ Variable speed 100-1000 rpm, 1 rpm increments
- ◆ CCW and CW direction control
- ◆ Rapid programmable speed and time selection
- ◆ Timer (count down to zero and turns off) range from 1 second up to 99 minutes and 60 seconds
- ◆ Emergency stop switch
- ◆ Flexible / retractable water spout
- ◆ 1 hp (750W) high torque dynamic servo motor for constant torque over the full range of motor speeds
- ◆ Splash guard and cover
- ◆ Electrical connections for FEMTO-1100S/1500S auto polishing

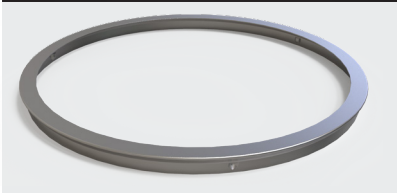
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### 8-inch Paper Ring



Paper rings for plain-backed papers  
Catalog no. PTM-125-005 (8-inch)

### 10-inch Paper Ring



Paper rings for plain-backed papers  
Catalog no. PTM-125-006 (10-inch)

| NANO-S 8 & 10-inch Polisher Accessories                      | Catalog 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 304 stainless steel plain-backed grinding paper ring  | PTM-125-005    |
| 10-inch 304 stainless steel plain-backed grinding paper ring | PTM-125-006    |



Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# MANUAL METALLOGRAPHIC POLISHERS

**NEW**

## NANO-1200S

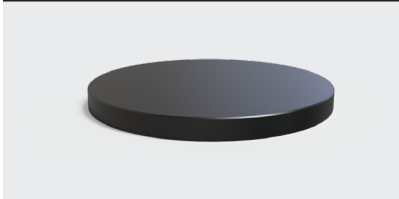


### 12-14 inch Single Wheel Manual Grinder/Polisher

- Single wheel
- 12 and 14-inch wheel diameter options
- 1.3 hp (1000W) motor (100-1000 rpm)
- Three programmable preset speeds and times for quick speed or time changes
- Easy to use control panel
- Auto timer control
- User friendly, robust and durable

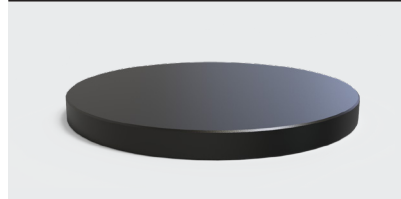
NANO-1200S

#### 12-inch Working Wheel



Anodized 12-inch working wheel for NANO-1200S polishers  
Catalog no. PW-1200A

#### 14-inch Working Wheel



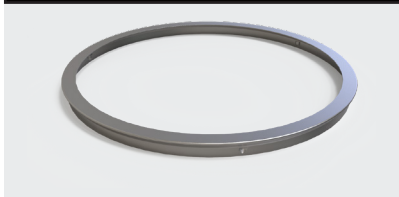
Anodized 14-inch working wheel for NANO-1200S polishers  
Catalog no. PW-1400A

#### NANO-1200S Splash Guard



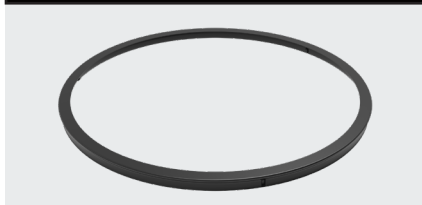
Splash Guard for NANO-1200S Polisher  
Catalog no. PTM-225-207

#### 12-inch Paper Ring

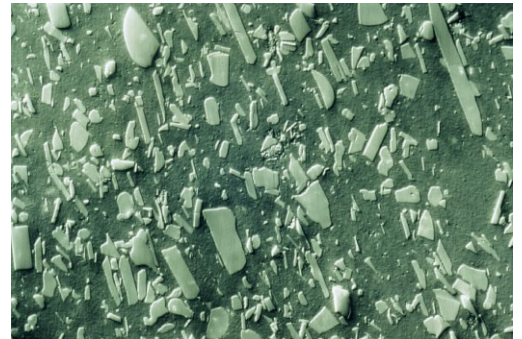


12-inch Paper ring for plain-backed papers  
Catalog no. PTM-225-005 (12-inch)

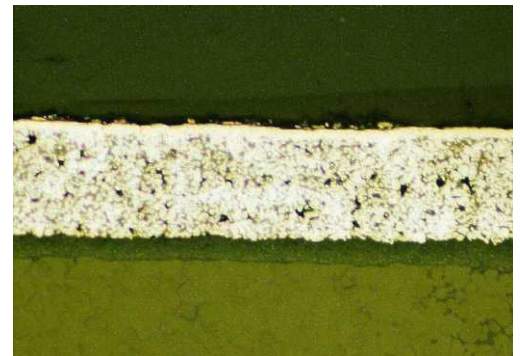
#### 14-inch Paper Ring



14-inch Paper ring for plain-backed papers  
Catalog no. PTM-225-006 (14-inch)



SiC particles in a Si<sub>3</sub>N<sub>4</sub> matrix , 1000X (DIC)



AlN substrate with a molybdenum/ nickel, gold coating  
400X (B.F.)

## 12 & 14-inch Metallographic Polishers

**2** year warranty  
Limited Warranty

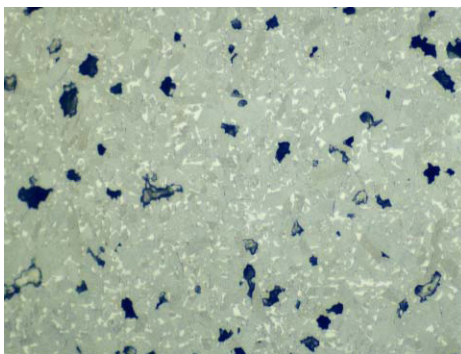
| FEATURE  | NANO-1200S DESCRIPTION  |
|--|---|
| Motor power                                    | 1.3 hp (1000 W)   |
| Power head upgrade                             | FEMTO-2200S / FEMTO-2500S   |
| Polishing wheels                               | Single - 12 & 14-inch diameter  |
| Electrical specification                       | 110 or 220V (50/60 Hz) pre wired at factory   |
| Speed (rpm)                                    | Variable (100 - 1000 rpm)<br>- Grinding (600-1000 rpm)<br>- Polishing (100-600 rpm) |
| Anodized Working wheels:<br>12-inch<br>14-inch | Part no. PW-1200A<br>Part no. PW-1400A  |
| Dimensions (W x D x H)                         | 20 x 16 x 25-inch<br>(510 x 420 x 640 mm)   |
| Weight   | 95 lbs (43 kg)  |
| Catalog Number                                 | NANO-1200S  |
| Optional                                       | Recirculating filtering tank (RC-1000A)   |

| NANO-1200S 12 & 14-inch Polisher Accessories                 | Catalog 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-225-207    |
| 12-inch 304 stainless steel plain-backed grinding paper ring | PTM-225-005    |
| 14-inch plastic plain-backed grinding paper ring             | PTM-225-006    |

### Benefits:

- ◆ Variable speed 100-1000 rpm
- ◆ CCW and CW direction control
- ◆ Rapid programmable speed and time selection
- ◆ Timer (count down to zero and turns off) range from 1 second up to 99 minutes and 60 seconds
- ◆ Emergency stop switch
- ◆ Swinging water spout
- ◆ 1.3 hp (1000W) motor
- ◆ Splash guard
- ◆ Electrical connections for FEMTO-2200S/2500S auto polishing

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)



BeO, 400X (B.F.) as polished condition



NANO-1200S / FEMTO-2200S  
Autopolisher



Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ANCILLARY POLISHING SYSTEMS

ZETA-2000S ABRASIVE DISPENSER / RC-1000A RECIRCULATING FILTER SYSTEM

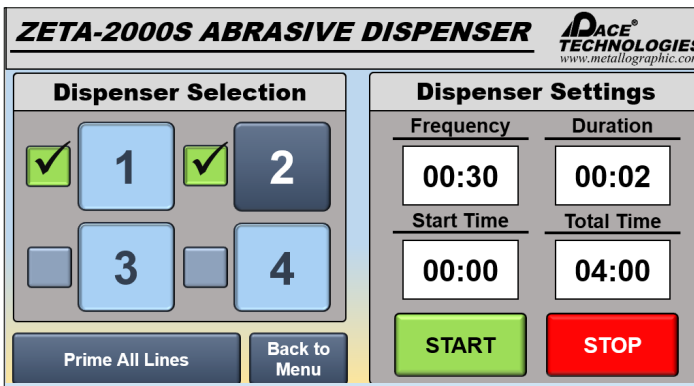


**NEW**

## ZETA-2000S

### Abrasive and Lubricant Dispenser

- 4 (24v) dedicated, programmable peristaltic pumps.
- Setting adjustments for frequency, duration, start time, total time
- 7-inch touchscreen interface
- Compatible with NANO polishing machines as well as competitors' polishing devices
- Controlled priming for each pump and dispensing lines for more immediate application of the abrasive / lubricant
- Flushing/ priming sequence for changing of abrasive/lubricant options
- Variable flow 1.2~90 ml/minute
- Flex line for easy adjustment of dispensing nozzles
- 110/220V compatible
- Easy to use, robust and durable



## RC-1000A

### Recirculating / Filter System

- Series of three replaceable filters (0.2, 0.5 and 1 micron)
- Positive pressure 24V pump (40W) (connected to 110V/220V power supply)
- 1.3 GPM (5 liters/min) maximum flow
- Easy to operate

## ZETA-2000S Metallographic Abrasive Dispenser



| FEATURE                  | ZETA-2000S DESCRIPTION   |
|--------------------------|--|
| Pumps                    | 4 (24v) dedicated, programmable peristaltic pumps<br>Setting adjustments for:<br>- Frequency<br>- Duration<br>- Start time<br>- Total time |
| Flow rates               | 1.2 - 90 ml/minute   |
| Cleaning                 | Water flushing   |
| Electrical specification | 110 / 220V (50/60 Hz)  |
| Dimensions (W x D x H)   | 9.5 x 11 x 12-inch<br>(240 x 70 x 300 mm)  |
| Weight                   | 20 lbs (9.1 kg)  |
| Catalog Number           | ZETA-2000S   |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Microprocessor controlled
- ◆ Can be used manually on competitors' equipment
- ◆ Interfaces with the FEMTO-S Auto Polishing heads for automated abrasive fluid dispensing
- ◆ Capable of dispensing NANOMETER alumina and SIAMAT colloidal silica and subsequently back flushing the lines to keep them clean and reusable

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

## RC-1000A Recirculating / Filter System



| FEATURE                  | RC-1000A DESCRIPTION   |
|--------------------------|--|
| Filtering                | Coarse (2-straining filters)<br>Fine Filters (0.2, 0.5 and 1 µm) |
| Tank capacity            | 14 gallons (53 L)  |
| Pump                     | 24VDC Diaphragm Pump<br>(1.3 GPM, 5 liters/min)                  |
| Electrical specification | 110 / 220V (50/60 Hz)  |
| Pressure                 | 60 psi (0.42 MPa)  |
| Dimensions (W x D x H)   | 32 x 16 x 20-inch<br>(800 x 420 x 500 mm)                        |
| Weight                   | 30 lbs (14 kg)   |
| Catalog Number           | RC-1000A   |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Eliminates need for water and sewer hook-up
- ◆ Allows the polishing machine to be mobile
- ◆ Environmentally friendly
- ◆ Self-contained system

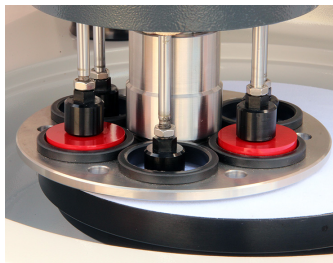


Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# AUTOMATED METALLOGRAPHIC POLISHERS



**Central Fixed Force**

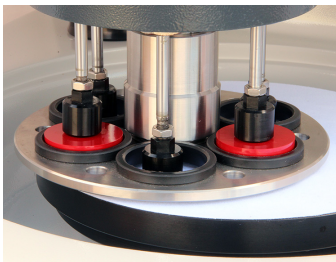


**Individual Force**

## FEMTO-1500S

### Individual / Central Force Autopolishing Head

- FEMTO-1500S is a dual Individual and Central force specimen polishing head
- Compatible with the NANO-1000S and NANO-2000S polishers
- 7-inch touchscreen interface
- 0-300 rpm Variable Speed Head
- 0.5 hp (400W) high torque dynamic servo motor
- Contra or Complementary Direction with NANO-S polisher
- User friendly / Easy to Use
- Robust and Durable



**Individual Force**

## FEMTO-1100S

### Individual Force Autopolishing Head

- FEMTO-1100S is an Individual force polishing head
- Compatible with the NANO-1000S and NANO-2000S polishers
- 7-inch touchscreen interface
- 0-300 rpm Variable Speed Head
- 0.54 hp (400W) high torque dynamic servo motor
- Contra or Complementary Direction with NANO-S polisher
- User friendly / Easy to Use
- Robust and Durable

**CE** Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive



## FEMTO 1500S Automated Metallographic Polishers

| FEATURE                      | NANO-1000S / FEMTO-1500S DESCRIPTION                            | NANO-2000S / FEMTO-1500S DESCRIPTION                            |
|------------------------------|---|---|
| Polishing Wheels             | 8 & 10-inch single wheel  | 8 & 10-inch double wheel  |
| Force application            | Individual pistons (1-6 samples)<br>Central force (3-6 samples) | Individual pistons (1-6 samples)<br>Central force (3-6 samples) |
| Sample Holder                | Quick release chuck   | Quick release chuck   |
| Motor power (FEMTO)          | 0.5 hp (400 W) dynamic torque servo motor                       | 0.5 hp (400 W) dynamic torque servo motor                       |
| Motor power (NANO)           | 1 hp (750 W) dynamic torque servo motor                         | 1 hp (750 W) dynamic torque servo motor                         |
| Electrical specification     | 110 / 220V (50/60 Hz)   | 110 / 220V (50/60 Hz)   |
| Speed (rpm)                  | 0-300 rpm   | 0-300 rpm   |
| Relative Head:Base Direction | Complementary and Contra  | Complementary and Contra  |
| Dimensions (W x D x H)       | 16 x 21 x 26-inch<br>(410 x 530 x 670 mm)                       | 29 x 22 x 26-inch<br>(750 x 560 x 670 mm)                       |
| Weight                       | 128 lbs (58.2 kg) with polisher base                            | 185 lbs (84 kg) with polisher base                              |
| Optional                     | ZETA-2000S abrasive dispenser                                   | ZETA-2000S abrasive dispenser                                   |
| Optional                     | RC-1000A filter/recirculating tank                              | RC-1000A filter/recirculating tank                              |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Central and Individual polishing force
- ◆ Produces flatter specimens with central force, especially useful for specimens having materials of different hardness (e.g. thermal spray coatings, electronic components, heat treated steels, etc.)
- ◆ Individual force procedures require fewer initial grinding steps and the samples can be removed and reinserted with the need to planarize
- ◆ Specimens can be polished in both the contra and complementary head / base directions

## FEMTO 1100S Automated Metallographic Polishers

| FEATURE                      | NANO-1000S / FEMTO-1100S DESCRIPTION      | NANO-2000S / FEMTO-1100S DESCRIPTION      |
|------------------------------|---|---|
| Polishing Wheels             | 8 & 10-inch single wheel                  | 8 & 10-inch double wheel                  |
| Force application            | Individual pistons (1-6 samples)          | Individual pistons (1-6 samples)          |
| Sample Holder                | Fixed holder                              | Fixed holder                              |
| Motor power (FEMTO)          | 0.5 hp (400 W) dynamic torque servo motor | 0.5 hp (400 W) dynamic torque servo motor |
| Motor power (NANO)           | 1 hp (750 W) dynamic torque servo motor   | 1 hp (750 W) dynamic torque servo motor   |
| Force                        | 1.1 - 13.5 lbs (5- 60 N)                  | 1.1 - 13.5 lbs (5- 60 N)                  |
| Speed (rpm)                  | 0-300 rpm                                 | 0-300 rpm                                 |
| Relative Head:Base Direction | Complementary and Contra                  | Complementary and Contra                  |
| Electrical specification     | 110 / 220V (50/60 Hz)                     | 110 / 220V (50/60 Hz)                     |
| Dimensions (W x D x H)       | 16 x 21 x 26-inch<br>(410 x 530 x 670 mm) | 29 x 22 x 26-inch<br>(750 x 560 x 670 mm) |
| Weight                       | 130 lbs (60 kg) with polisher base        | 185 lbs (85 kg) with polisher base        |
| Optional                     | ZETA-2000S abrasive dispenser             | ZETA-2000S abrasive dispenser             |
| Optional                     | RC-1000A filter/recirculating tank        | RC-1000A filter/recirculating tank        |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Individual specimen polishing force
- ◆ Reduced number of preparation steps and lower cost for consumables
- ◆ Samples can be re-polished without having to planarize specimens in holder

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

## FEMTO 1100S/1500S Individual Holder

**1-inch Rings**



1-inch diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-0100

**1.25-inch Rings**



1.25-inch diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-0125

**1.5-inch Rings**



1.5-inch diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-0150

**2-inch Rings**



2.0-inch diameter rings for FEMTO-1100S / 1500S (3/set)  
Catalog no. SR-0200

**25 mm Rings**



25 mm diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-25mm

**30 mm Rings**



30 mm diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-30mm

**40 mm Rings**



40 mm diameter rings for FEMTO-1100S / 1500S (6/set)  
Catalog no. SR-40mm

**50 mm Rings**



50 mm diameter rings for FEMTO-1100S / 1500S (3/set)  
Catalog no. SR-50mm

## FEMTO 1500S Central Holders

**FEMTO-1500S 1-inch / 25 mm  
Central Sample Holder**



Central 1-inch or 25 mm specimen holder for FEMTO-1500S  
Catalog no. QRC-SH100A-1500

**FEMTO-1500S 1.25-inch / 30 mm  
Central Sample Holder**



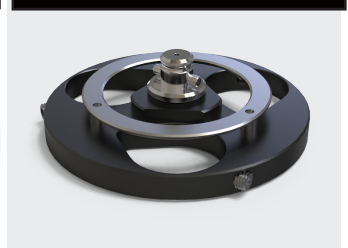
Central 1.25-inch or 30 mm specimen holder for FEMTO-1500S  
Catalog no. QRC-SH125A-1500

**FEMTO-1500S 1.5-inch / 40 mm  
Central Sample Holder**



Central 1.5-inch or 40 mm specimen holder for FEMTO-1500S  
Catalog no. QRC-SH150A-1500

**FEMTO-1500S 2-inch / 50 mm  
Central Sample Holder**



Central 2-inch or 50 mm specimen holder for FEMTO-1500S  
Catalog no. QRC-SH200A-1500

**FEMTO-1100S 6-Ring Sample Holder**



FEMTO-1100S individual specimen holder, requires 6 plastic rings ranging from 1-inch up to 1.5-inch or 25 mm up to 40 mm (ordered separately) **Catalog no. SH-1100**

**FEMTO-1500S 6-Ring Sample Holder**



FEMTO-1500S individual specimen holder, requires 6 plastic rings ranging from 1-inch up to 1.5-inch or 25 mm up to 40 mm (ordered separately) **Catalog no. SH-1150**

| Individual Specimen Holder                                   | FEMTO-1100S | FEMTO-1500S |
|--|-------------|-------------|
| Individual holder (6-ring) (1 to 1.5-inch & 25-40 mm mounts) | SH-1100     | SH-1150     |
| 1-inch diameter rings (6/pkg)                                | SR-0100     | SR-0100     |
| 1.25-inch diameter rings (6/pkg)                             | SR-0125     | SR-0125     |
| 1.5-inch diameter rings (6/pkg)                              | SR-0150     | SR-0150     |
| 25 mm diameter rings (6/pkg)                                 | SR-25mm     | SR-25mm     |
| 30 mm diameter rings (6/pkg)                                 | SR-30mm     | SR-30mm     |
| 40 mm diameter rings (6/pkg)                                 | SR-40mm     | SR-40mm     |

**FEMTO-1100S 3-Ring Sample Holder**



2-inch single specimen holder mounting fixture for FEMTO-1100S, requires one set of 3, 2-inch or 50 mm plastic rings (ordered separately) **Catalog no. SH-1200**

**FEMTO-1500S 3-Ring Sample Holder**



2-inch single specimen holder mounting fixture for FEMTO-1500S, requires one set of 3, 2-inch or 50 mm plastic rings (ordered separately) **Catalog no. SH-1250**

| Individual Specimen Holder                                    | FEMTO-1100S     | FEMTO-1500S     |
|---|-----------------|-----------------|
| Individual holder (3-ring) (2-inch & 50 mm mounts)            | SH-1200         | SH-1250         |
| 2-inch diameter rings (3/pkg)                                 | SR-0200         | SR-0200         |
| 50 mm diameter rings (3/pkg)                                  | SR-50mm         | SR-50mm         |
| Individual holder for glass slide fixtures                    | SH-GHOLDER-1100 | SH-GHOLDER-1500 |
| Glass slide fixture for 27 x 47 mm & 1 x 3-inch slides (each) | SR-G            | SR-G            |

**FEMTO-1500S Central Sample Loading Plate**



Central force loading plate **Catalog no. CF-LP-1500**

**Central Specimen Holder**

**FEMTO-1500S**

|   |                 |
|---|-----------------|
| 1-inch / 25 mm central specimen holder (3-6 samples)    | QRC-SH100A-1500 |
| 1.25-inch / 30 mm central specimen holder (3-6 samples) | QRC-SH125A-1500 |
| 1.5-inch / 40 mm central specimen holder (3-6 samples)  | QRC-SH150A-1500 |
| 2-inch / 50 mm central specimen holder (3 samples)      | QRC-SH200A-1500 |
| Central Force Loading plate                             | CF-LP-1500      |

# AUTOMATED METALLOGRAPHIC POLISHERS

**NEW**

## FEMTO-2200S/2500S



NANO-1200S/FEMTO-2200S

### Autopolishing Head for Larger Working Areas

- FEMTO-2500S is a dual Individual and Central force specimen polishing head
- FEMTO-2200S is an Individual force polishing head
- Compatible with the NANO-1200S polisher
- 0-300 rpm Variable Speed Head
- Contra or Complementary Direction
- User friendly / Easy to Use
- Robust and Durable

## Individual vs. Central Force Automated Polishing

| APPLICATION             | ADVANTAGES  | DISADVANTAGES  |
|-------------------------|---|--|
| <b>Individual Force</b> | <p>Reduced number of preparation steps and lowers cost for consumables</p> <p>Sample can be re-polished without having to planarize specimens in the holder</p> | <p>Can result in loss of flatness across the specimen if heavy duty coarse grinding is required</p> <p>It is recommended that the grinding and polishing steps only be done at matching head and base speeds with the rotation being in the same direction</p>   |
| <b>Central Force</b>    | <p>Flatter specimens</p> <p>Specimens can be polished in both the contra and complementary head / base directions</p>   | <p>Minimum of 3-samples are required in the holder</p> <p>Typically requires 1-3 additional coarser grinding steps to planarize all specimens</p> <p>Additional grinding steps increase both consumables cost and total preparation time</p> <p>Coarser grinding can result in more surface and subsurface damage to the specimen</p> <p>Need to planarize specimens again if they are removed from the fixed holder</p> |

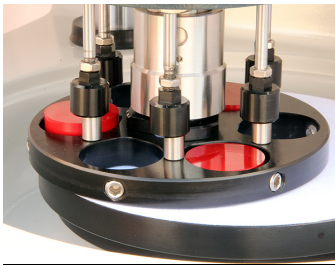
## FEMTO 2200S/2500S Automated Metallographic Polishers

**2** year warranty  
Limited Warranty

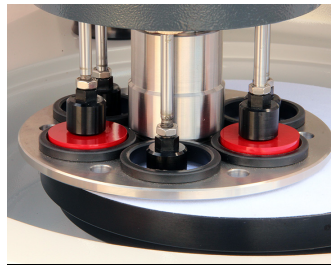
| FEATURE                      | NANO-1200S / FEMTO-2500S DESCRIPTION                           | NANO-1200S / FEMTO-2200S DESCRIPTION      |
|------------------------------|--|---|
| Polishing Wheels             | 12 & 14-inch single wheel                                      | 12 & 14-inch single wheel                 |
| Force application            | Individual pistons (1-6 samples)<br>Central force (3+ samples) | Individual pistons (1-6 samples)          |
| Electrical specification     | 110 / 220V (50/60 Hz)<br>1000 W (1.33 hp)                      | 110 / 220V (50/60 Hz)<br>1000 W (1.33 hp) |
| Speed (rpm)                  | 0-300 rpm  | 0-300 rpm                                 |
| Relative Head:Base Direction | CW and CCW   | CW and CCW                                |
| Dimensions (W x D x H)       | 33 x 27 x 28-inch<br>(845 x 680 x 710 mm)                      | 33 x 27 x 28-inch<br>(845 x 680 x 710 mm) |
| Weight                       | 150 lbs (68 kg) with polisher base                             | 150 lbs (68 kg) with polisher base        |
| Optional                     | RC-1000A filter/recirculating tank                             | RC-1000A filter/recirculating tank        |

### Benefits:

- ◆ Central and Individual polishing force
- ◆ Produces flatter specimens with central force, especially useful for specimens having materials of different hardness (e.g. thermal spray coatings, electronic components, heat treated steels, etc.)
- ◆ Individual force procedures require fewer initial grinding steps and the samples can be removed and reinserted with the need to planarize
- ◆ Specimens can be polished in both the contra and complementary head / base directions



**Central Fixed Force**



**Individual Force**

**REQUEST A QUOTE**

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

### Individual vs. Central Force Typical Preparation Requirements

| STEP                   | INDIVIDUAL FORCE                                | CENTRAL FORCE                                   |
|------------------------|---|---|
| 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   |



Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# AUTOMATED METALLOGRAPHIC POLISHERS

## FEMTO-2200S/2500S Individual Holder

**1-inch Rings**



1-inch diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-0100**

**1.25-inch Rings**



1.25-inch diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-0125**

**1.5-inch Rings**



1.5-inch diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-0150**

**2-inch Rings**



2.0-inch diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-0200**

**25 mm Rings**



25 mm diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-25mm**

**30 mm Rings**



30 mm diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-30mm**

**40 mm Rings**



40 mm diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-40mm**

**50 mm Rings**



50 mm diameter rings for FEMTO-2200S / 2500S (6/set)  
**Catalog no. SR-50mm**

## FEMTO-2500S Central Holders

**FEMTO-2500S 1-inch / 25 mm  
Central Sample Holder**



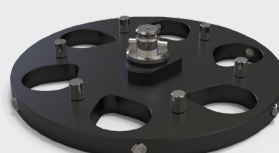
Central 1-inch or 25 mm specimen holder for FEMTO-2500S (3-12 samples)  
**Catalog no. QRC-SH100A-2500**

**FEMTO-2500S 1.25-inch / 30 mm  
Central Sample Holder**



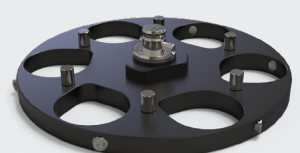
Central 1.25-inch or 30 mm specimen holder for FEMTO-2500S (3-12 samples)  
**Catalog no. QRC-SH125A-2500**

**FEMTO-2500S 1.5-inch / 40 mm  
Central Sample Holder**



Central 1.5-inch or 40 mm specimen holder for FEMTO-2500S (3-6 samples)  
**Catalog no. QRC-SH150A-2500**

**FEMTO-2500S 2-inch / 50 mm  
Central Sample Holder**



Central 2.0-inch or 50 mm specimen holder for FEMTO-2500S (3-6 samples)  
**Catalog no. QRC-SH200A-2500**

**FEMTO-2200S 6-Ring Sample Holder**



FEMTO-2200S individual specimen holder, requires 6 plastic rings ranging from 1-inch up to 1.5-inch or 25 mm up to 40 mm (ordered separately) **Catalog no. SH-2100**

**FEMTO-2500S 6-Ring Sample Holder**



FEMTO-2500S individual specimen holder, requires 6 plastic rings ranging from 1-inch up to 1.5-inch or 25 mm up to 40 mm (ordered separately) **Catalog no. SH-2150**

| Individual Specimen Holder                                   | FEMTO-2200S | FEMTO-2500S |
|--|-------------|-------------|
| Individual holder (6-ring) (1 to 1.5-inch & 25-40 mm mounts) | SH-2200     | SH-2250     |
| 1-inch diameter rings (6/pkg)                                | SR-0100     | SR-0100     |
| 1.25-inch diameter rings (6/pkg)                             | SR-0125     | SR-0125     |
| 1.5-inch diameter rings (6/pkg)                              | SR-0150     | SR-0150     |
| 25 mm diameter rings (6/pkg)                                 | SR-25mm     | SR-25mm     |
| 30 mm diameter rings (6/pkg)                                 | SR-30mm     | SR-30mm     |
| 40 mm diameter rings (6/pkg)                                 | SR-40mm     | SR-40mm     |

**FEMTO-2200 6-Ring Sample Holder**



2-inch single specimen holder mounting fixture for FEMTO -2200S, requires one set of 3, 2-inch or 50 mm plastic rings (ordered separately) **Catalog no. SH-2200**

**FEMTO-2500 6-Ring Sample Holder**



2-inch single specimen holder mounting fixture for FEMTO 2500S, requires one set of 6, 2-inch or 50 mm plastic rings (ordered separately) **Catalog no. SH-2250**

| Individual Specimen Holder                                    | FEMTO-2200S     | FEMTO-2500S     |
|---|-----------------|-----------------|
| Individual holder (3-ring) (2-inch & 50 mm mounts)            | SH-2200         | SH-2250         |
| 2.0-inch diameter rings (3/pkg)                               | SR-0200         | SR-0200         |
| 50 mm diameter rings (3/pkg)                                  | SR-50mm         | SR-50mm         |
| Individual holder for glass slide fixtures                    | SH-GHOLDER-2200 | SH-GHOLDER-2500 |
| Glass slide fixture for 27 x 47 mm & 1 x 3-inch slides (each) | SR-G            | SR-G            |

**FEMTO-2500S Central Sample Loading Plate**



Central force loading plate **Catalog no. CF-LP-2500**

| Central Specimen Holder                                  | FEMTO-2500S     |
|--|-----------------|
| 1-inch / 25 mm central specimen holder (3-12 samples)    | QRC-SH100A-2500 |
| 1.25-inch / 30 mm central specimen holder (3-12 samples) | QRC-SH125A-2500 |
| 1.5-inch / 40 mm central specimen holder (3-6 samples)   | QRC-SH150A-2500 |
| 2-inch / 50 mm central specimen holder (3-6 samples)     | QRC-SH200A-2500 |
| Central Force Loading plate                              | CF-LP-2500      |

# VIBRATORY METALLOGRAPHIC POLISHERS



## GIGA-S

### Vibratory Polisher

- Interchangeable bowl for the ability to polish on a 9 or 12-inch surface
- Utilizes a piezoelectric (PZT) motor for true electronic vibration
- Easy magnetic locking bowl attachment for quick cleaning and change out of polishing medium
- Two part bowl design for leak free operation
- New Pulse Mode feature for stain free polishing if left unattended after procedure has ended
- Removable, hinged, lid for easy cleaning
- Simple to use
- Robust and Durable

GIGA-S

### 1-inch Holders



1-inch diameter GIGA holder  
Catalog no. VIB-0100

### 1.25-inch Holders



1.25-inch diameter GIGA holder  
Catalog no. VIB-0125

### 1.5-inch Holders



1.5-inch diameter GIGA holder  
Catalog no. VIB-0150

### 2-inch Holders



2-inch diameter GIGA holder  
Catalog no. VIB-0200

### 1-inch Weights



1-inch diameter GIGA weight  
Catalog no. VIB-WT-0100

### 1.25-inch Weights



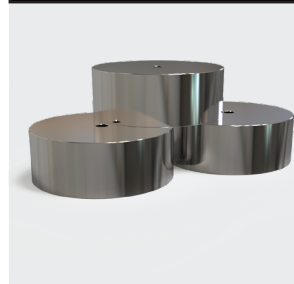
1.25-inch diameter GIGA weight  
Catalog no. VIB-WT-0125

### 1.5-inch Weights



1.5-inch diameter GIGA weight  
Catalog no. VIB-WT-0150

### 2-inch Weights



2-inch diameter GIGA weight  
Catalog no. VIB-WT-0200



## GIGA-S Vibratory Metallographic Polishers

**2** year warranty  
Limited Warranty

| FEATURE  | GIGA-S DESCRIPTION   |
|--|--|
| Polishing Bowl size  | 9 or 12-inch   |
| Drive Mechanism  | PZT Motor  |
| Electrical specification                                   | 110 / 220V (50/60 Hz)  |
| Construction   | Aluminum casting with SMC cover (injection molded)   |
| Frequency  | 0~220Hz  |
| Motor voltage  | 200V (600 W)   |
| Dimensions (W x D x H)<br>(note: hood can also be removed) | Hood closed: 16 x 20 x 16-inch<br>(420 x 500 x 410 mm)<br>Hood open: 16 x 20 x 30-inch<br>(420 x 500 x 750 mm) |
| Weight   | 135 lbs (62 kg)  |

### Benefits:

- ◆ Superior surface finishes
- ◆ Eliminates subsurface damage (has been shown to produce the best surface finish for EBSD sample preparation)
- ◆ Able to polish multiple samples simultaneously
- ◆ With correct CMP polishing abrasive, flatter or more planar finishes can be obtained over materials having a wide range of hardness'

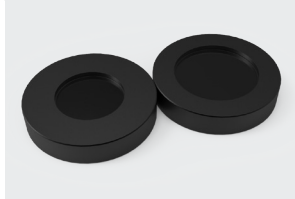
**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

### 1 / 1.25-inch Mounting Plate



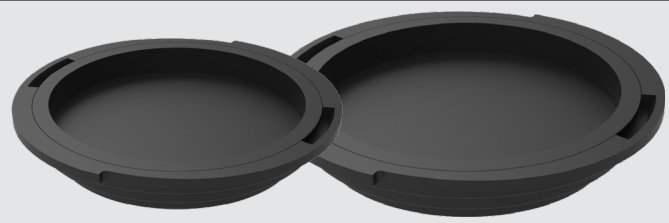
Mounting plate for 1 & 1.25-inch specimen holders  
**Catalog no. PLATE-0100**

### 1.5 / 2-inch Mounting Plate



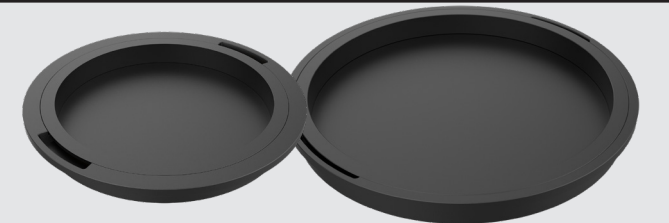
Mounting plate for 1.5 & 2-inch specimen holders  
**Catalog no. PLATE-0200**

### Plastic 9 & 12-inch Polishing Bowls



Plastic 2-piece Interchangeable GIGA-S Polishing Bowls

### Anodized Aluminum 9 & 12-inch Polishing Bowls



Anodized Aluminum 2-piece Interchangeable GIGA-S Polishing Bowls

### Vibratory Polishing Holder

### Catalog Number

|  |                        |
|--|------------------------|
| 1-inch diameter 304 stainless steel specimen holders (each)    | <b>VIB-0100</b>        |
| 1.25-inch diameter 304 stainless steel specimen holders (each) | <b>VIB-0125</b>        |
| 1.5-inch diameter 304 stainless steel specimen holders (each)  | <b>VIB-0150</b>        |
| 2-inch diameter 304 stainless steel specimen holders (each)    | <b>VIB-0200</b>        |
| 1-inch weight, 304 stainless steel (each)                      | <b>VIB-WT-0100</b>     |
| 1.25-inch weight, 304 stainless steel (each)                   | <b>VIB-WT-0125</b>     |
| 1.5-inch weight, 304 stainless steel (each)                    | <b>VIB-WT-0150</b>     |
| 2-inch weights 304 stainless steel (each)                      | <b>VIB-WT-0200</b>     |
| Mounting plate for 1-inch and 1.25-inch holders                | <b>PLATE-0100</b>      |
| Mounting plate for 1.5-inch and 2-inch holders                 | <b>PLATE-0200</b>      |
| 9-inch plastic Interchangeable bowl                            | <b>GS-9IN-BOWL</b>     |
| 12-inch plastic Interchangeable bowl                           | <b>GS-12IN-BOWL</b>    |
| 9-inch aluminum Interchangeable bowl                           | <b>GS-9IN-BOWL-AL</b>  |
| 12-inch aluminum Interchangeable bowl                          | <b>GS-12IN-BOWL-AL</b> |



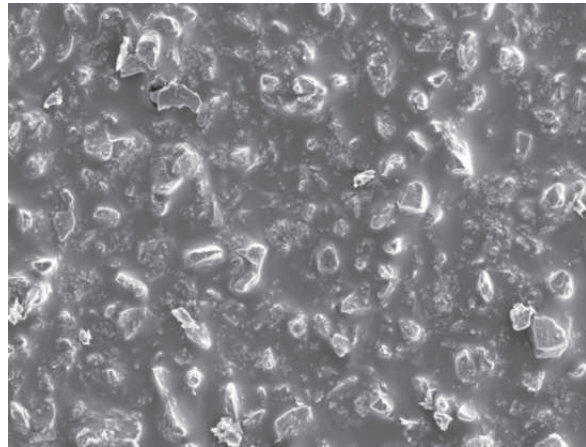
Machinery Directive 2006/42/EC  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# GRINDING CONSUMABLES

## Silicon Carbide Abrasives:

SiC is a manufactured abrasive produced by a high temperature reaction between silica and carbon. It has a hexagonal-rhombohedral crystal structure and a hardness of approximately 2500 HV. It is an ideal abrasive for cutting and grinding metallographic specimens 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 for coated abrasive grinding papers ranging from very coarse 60 grit to very fine 1200 (P4000) grit sizes.

Bonded or coated abrasive papers of SiC are designed so that the abrasive will have a large number of cutting points (negative abrasive rank angle). This is achieved by aligning the abrasive particles approximately normal to the backing. Note that coated abrasives are not quite coplanar, thus SiC papers produce the maximum efficiency (cut rate, stock removal and minimal damage) because new abrasive is exposed as the old abrasive breaks down.



### SiC Grinding Characteristics:

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

## 8-inch SiC Papers with Adhesive Backing, PSA (25/pkg)



120 grit 8-inch SiC Paper with PSA (25/pkg)  
Catalog no. SIC-120P8-25

| PACE Product Name   | Catalog Number | Qty    | Price (\$) |
|---|----------------|--------|------------|
| 8-inch Combo Pack<br>(5 each - 240, 360, 600, 800, 1200 grit SiC) (PSA) | SIC-P08C       | 5 each | 65.00      |
| 8-inch 60 grit SiC (PSA)-25/pkg   | SIC-060P8-25   | 25/pkg | 55.00      |
| 8-inch 80 grit SiC (PSA)-25/pkg   | SIC-080P8-25   | 25/pkg | 55.00      |
| 8-inch 120 grit SiC (PSA)-25/pkg  | SIC-120P8-25   | 25/pkg | 45.00      |
| 8-inch 180 grit SiC (PSA)-25/pkg  | SIC-180P8-25   | 25/pkg | 45.00      |
| 8-inch 240 grit SiC (PSA)-25/pkg  | SIC-240P8-25   | 25/pkg | 36.00      |
| 8-inch 320 grit SiC (PSA)-25/pkg  | SIC-320P8-25   | 25/pkg | 36.00      |
| 8-inch 360 grit SiC (PSA)-25/pkg  | SIC-360P8-25   | 25/pkg | 36.00      |
| 8-inch 400 grit SiC (PSA)-25/pkg  | SIC-400P8-25   | 25/pkg | 36.00      |
| 8-inch 600 grit SiC (PSA)-25/pkg  | SIC-600P8-25   | 25/pkg | 36.00      |
| 8-inch 800 grit SiC (PSA)-25/pkg  | SIC-800P8-25   | 25/pkg | 69.00      |
| 8-inch 1000 grit SiC (PSA)-25/pkg                                       | SIC-1000P8-25  | 25/pkg | 69.00      |
| 8-inch 1200 grit SiC (PSA)-25/pkg                                       | SIC-1200P8-25  | 25/pkg | 69.00      |

# SILICON CARBIDE ABRASIVE PAPER

## 8-inch Premium SiC Papers with Adhesive Backing, PSA (50/pkg)



1200 grit 8-inch SiC Paper with PSA (50/pkg)  
Catalog no. **SIC-1200P8-50**

| PACE Product Name                             | Catalog Number       | Qty    | Price (\$) |
|---|----------------------|--------|------------|
| 8-inch 60 grit Premium (PSA)-50/pkg           | <b>SIC-060P8-50</b>  | 50/pkg | 120.00     |
| 8-inch 80 grit Premium (PSA)-50/pkg           | <b>SIC-080P8-50</b>  | 50/pkg | 120.00     |
| 8-inch 120 grit Premium (PSA)-50/pkg          | <b>SIC-120P8-50</b>  | 50/pkg | 110.00     |
| 8-inch 180 grit Premium (PSA)-50/pkg          | <b>SIC-180P8-50</b>  | 50/pkg | 110.00     |
| 8-inch 240 / P220 grit Premium (PSA)-50/pkg   | <b>SIC-240P8-50</b>  | 50/pkg | 105.00     |
| 8-inch 320 / P400 grit Premium (PSA)-50/pkg   | <b>SIC-320P8-50</b>  | 50/pkg | 105.00     |
| 8-inch 360 / P500 grit Premium (PSA)-50/pkg   | <b>SIC-360P8-50</b>  | 50/pkg | 105.00     |
| 8-inch 400 / P800 grit Premium (PSA)-50/pkg   | <b>SIC-400P8-50</b>  | 50/pkg | 105.00     |
| 8-inch 600 / P1200 grit Premium (PSA)-50/pkg  | <b>SIC-600P8-50</b>  | 50/pkg | 105.00     |
| 8-inch 800 / P2400 grit Premium (PSA)-50/pkg  | <b>SIC-800P8-50</b>  | 50/pkg | 165.00     |
| 8-inch 1000 / P3000 grit Premium (PSA)-50/pkg | <b>SIC-1000P8-50</b> | 50/pkg | 165.00     |
| 8-inch 1200 / P4000 grit Premium (PSA)-50/pkg | <b>SIC-1200P8-50</b> | 50/pkg | 165.00     |

## 8-inch SiC Papers with Adhesive Backing, PSA (100/pkg)

| PACE Product Name                  | Catalog Number        | Qty     | Price (\$) |
|------------------------------------|-----------------------|---------|------------|
| 8-inch 60 grit SIC (PSA)-100/pkg   | <b>SIC-060P8-100</b>  | 100/pkg | 150.00     |
| 8-inch 80 grit SIC (PSA)-100/pkg   | <b>SIC-080P8-100</b>  | 100/pkg | 145.00     |
| 8-inch 120 grit SIC (PSA)-100/pkg  | <b>SIC-120P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 180 grit SIC (PSA)-100/pkg  | <b>SIC-180P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 240 grit SIC (PSA)-100/pkg  | <b>SIC-240P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 320 grit SIC (PSA)-100/pkg  | <b>SIC-320P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 360 grit SIC (PSA)-100/pkg  | <b>SIC-360P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 400 grit SIC (PSA)-100/pkg  | <b>SIC-400P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 600 grit SIC (PSA)-100/pkg  | <b>SIC-600P8-100</b>  | 100/pkg | 122.00     |
| 8-inch 800 grit SIC (PSA)-100/pkg  | <b>SIC-800P8-100</b>  | 100/pkg | 215.00     |
| 8-inch 1000 grit SIC (PSA)-100/pkg | <b>SIC-1000P8-100</b> | 100/pkg | 215.00     |
| 8-inch 1200 grit SIC (PSA)-100/pkg | <b>SIC-1200P8-100</b> | 100/pkg | 215.00     |



1200 grit 8-inch SiC Paper with PSA (100/pkg)  
Catalog no. **SIC-1200P8-100**

# 8-inch SILICON CARBIDE ABRASIVE PAPER

## 8-inch Premium SiC Papers Plain-backed Non-Adhesive Backed (50/pkg)



360 grit 8-inch SiC Plain-backed Paper (50/pkg)  
Catalog no. **SIC-2208-360**

| PACE Product Name                               | Catalog Number       | Qty    | Price (\$) |
|---|----------------------|--------|------------|
| 8-inch 60 grit Premium (Plain)-50/pkg           | <b>SIC-2208-060</b>  | 50/pkg | 62.00      |
| 8-inch 80 grit Premium (Plain)-50/pkg           | <b>SIC-2208-080</b>  | 50/pkg | 62.00      |
| 8-inch 120 grit Premium (Plain)-50/pkg          | <b>SIC-2208-120</b>  | 50/pkg | 55.00      |
| 8-inch 180 grit Premium (Plain)-50/pkg          | <b>SIC-2208-180</b>  | 50/pkg | 55.00      |
| 8-inch 240 / P220 grit Premium (Plain)-50/pkg   | <b>SIC-2208-240</b>  | 50/pkg | 55.00      |
| 8-inch 320 / P400 grit Premium (Plain)-50/pkg   | <b>SIC-2208-320</b>  | 50/pkg | 55.00      |
| 8-inch 360 / P500 grit Premium (Plain)-50/pkg   | <b>SIC-2208-360</b>  | 50/pkg | 55.00      |
| 8-inch 400 / P800 grit Premium (Plain)-50/pkg   | <b>SIC-2208-400</b>  | 50/pkg | 55.00      |
| 8-inch 600 / P1200 grit Premium (Plain)-50/pkg  | <b>SIC-2208-600</b>  | 50/pkg | 55.00      |
| 8-inch 800 / P2400 grit Premium (Plain)-50/pkg  | <b>SIC-2208-800</b>  | 50/pkg | 110.00     |
| 8-inch 1000 / P3000 grit Premium (Plain)-50/pkg | <b>SIC-2208-1000</b> | 50/pkg | 110.00     |
| 8-inch 1200 / P4000 grit Premium (Plain)-50/pkg | <b>SIC-2208-1200</b> | 50/pkg | 110.00     |
| 8-inch Double-sided adhesive -10/pkg            | DSA-08               | 10/pkg | 35.00      |

## 8-inch SiC Papers Plain-backed Non-Adhesive Backed (100/pkg)

| PACE Product Name                    | Catalog Number       | Qty     | Price (\$) |
|--------------------------------------|----------------------|---------|------------|
| 8-inch 60 grit SiC (Plain)-100/pkg   | <b>SIC-2108-060</b>  | 100/pkg | 122.00     |
| 8-inch 80 grit SiC (Plain)-100/pkg   | <b>SIC-2108-080</b>  | 100/pkg | 122.00     |
| 8-inch 120 grit SiC (Plain)-100/pkg  | <b>SIC-2108-120</b>  | 100/pkg | 78.00      |
| 8-inch 180 grit SiC (Plain)-100/pkg  | <b>SIC-2108-180</b>  | 100/pkg | 78.00      |
| 8-inch 240 grit SiC (Plain)-100/pkg  | <b>SIC-2108-240</b>  | 100/pkg | 72.00      |
| 8-inch 320 grit SiC (Plain)-100/pkg  | <b>SIC-2108-320</b>  | 100/pkg | 72.00      |
| 8-inch 360 grit SiC (Plain)-100/pkg  | <b>SIC-2108-360</b>  | 100/pkg | 72.00      |
| 8-inch 400 grit SiC (Plain)-100/pkg  | <b>SIC-2108-400</b>  | 100/pkg | 72.00      |
| 8-inch 600 grit SiC (Plain)-100/pkg  | <b>SIC-2108-600</b>  | 100/pkg | 72.00      |
| 8-inch 800 grit SiC (Plain)-100/pkg  | <b>SIC-2108-800</b>  | 100/pkg | 155.00     |
| 8-inch 1000 grit SiC (Plain)-100/pkg | <b>SIC-2108-1000</b> | 100/pkg | 155.00     |
| 8-inch 1200 grit SiC (Plain)-100/pkg | <b>SIC-2108-1200</b> | 100/pkg | 155.00     |
| 8-inch Double-sided adhesive -10/pkg | DSA-08               | 10/pkg  | 35.00      |



360 grit 8-inch SiC Plain-backed Paper (100/pkg)  
Catalog no. **SIC-2108-360**

## Abrasive Grinding

### Process Description

The machining parameters which affect the preparation of metallographic specimens include: grinding/polishing pressure, relative velocity distribution and the direction of grinding/polishing.

Preston's Equation has been used to describe the mechanical contributions of pressure and velocity to removal rates. Preston's Equation states that the removal rate is proportional to the velocity times the pressure.

#### Preston's Equation $R = kPV$

R= material removal rate

k= Preston coefficient

P= normal lapping force

V= relative tangential velocity between the lapping plate and work piece

### Grinding Pressure

Grinding and polishing pressure is dependent upon the applied force (pounds or Newtons) and the area of the specimen and mounting material. Pressure is defined as the Force/Area (psi, N/m<sup>2</sup> or Pa). For specimens significantly harder than the mounting compound, pressure is better defined as the force divided by the specimen surface area. Thus, for larger hard specimens higher grinding/polishing pressures increase stock removal rates, however higher pressure also increases the amount of surface and subsurface damage. Note for SiC grinding papers, as the abrasive grains dull and cut rates decrease, increasing grinding pressures can extend the life of the SiC paper.

Higher grinding and polishing pressures can also generate additional frictional heat which may actually be beneficial for the chemical mechanical polishing (CMP) of ceramics, minerals and composites. Likewise for extremely friable specimens such as nodular cast iron, higher pressures and lower relative velocity distributions can aid in retaining inclusions and secondary phases.

### Grinding Direction

The orientation of the specimen can have a significant impact on the preparation results, especially for specimens with coatings. In general, when grinding and polishing materials with coatings the brittle component should be kept in compression. In other words, for brittle coatings the direction of the abrasive should be through the coating and into the substrate. Conversely, for brittle substrates with ductile coatings, the direction of the abrasive should be through the brittle substrate into the ductile coating.



Proper alignment and machine conditions produce flat planar samples

Improper alignment and machine conditions produce MRD

### Material Removal Differential (MRD)

The term MRD (material removal differential) has been used to describe the negative affect that occurs when the sample does not grind equally across the entire surface of the sample and to some extent the entire surface of the sample mount (see example).

A number of factors contribute the MRD, these include:

- Uneven wear on the abrasive paper, film or foil
- Mount does not track over the edge and/or center of the grinding paper
- Wide range in velocity distributions (contra direction)
- Large differences in hardness between the mount and the sample

MRD is typically more pronounced for SiC papers as the SiC abrasive is very hard and brittle and breaks down relatively fast.

To eliminate MRD:

- Align the sample holder on the FEMTO polishing head so that the sample tracks across the entire radius of the grinding paper.
- Rotate the FEMTO and NANO head at the same velocity and in the same direction.

# 10-inch SILICON CARBIDE ABRASIVE PAPERS

## Silicon Carbide Converter:

PACE Technologies is an actual metallographic supplier that converts its own SiC papers, which provides better quality control, distribution and flexibility for supplying metallographic silicon carbide papers.

## SiC Conversion Characteristics:

- ◆ PSA laminating
- ◆ Die cutting
- ◆ Relatively lower cost to produce
- ◆ Focus on metallographic vs. industrial graded products



## 10-inch SiC Papers with Adhesive Backing, PSA (25/pkg)



60 grit 10-inch SiC Paper with PSA (25/pkg)  
Catalog no. **SIC-060P10-25**

| PACE Product Name  | Catalog Number        | Qty    | Price (\$) |
|--|-----------------------|--------|------------|
| 10-inch Combo Pack<br>(5 each - 240, 360, 600, 800, 1200 grit SiC) (PSA) | <b>SIC-P10C</b>       | 5 each | 88.00      |
| 10-inch 60 grit SiC (PSA)-25/pkg   | <b>SIC-060P10-25</b>  | 25/pkg | 72.00      |
| 10-inch 80 grit SiC (PSA)-25/pkg   | <b>SIC-080P10-25</b>  | 25/pkg | 72.00      |
| 10-inch 120 grit SiC (PSA)-25/pkg  | <b>SIC-120P10-25</b>  | 25/pkg | 59.00      |
| 10-inch 180 grit SiC (PSA)-25/pkg  | <b>SIC-180P10-25</b>  | 25/pkg | 59.00      |
| 10-inch 240 grit SiC (PSA)-25/pkg  | <b>SIC-240P10-25</b>  | 25/pkg | 55.00      |
| 10-inch 320 grit SiC (PSA)-25/pkg  | <b>SIC-320P10-25</b>  | 25/pkg | 55.00      |
| 10-inch 360 grit SiC (PSA)-25/pkg  | <b>SIC-360P10-25</b>  | 25/pkg | 55.00      |
| 10-inch 400 grit SiC (PSA)-25/pkg  | <b>SIC-400P10-25</b>  | 25/pkg | 55.00      |
| 10-inch 600 grit SiC (PSA)-25/pkg  | <b>SIC-600P10-25</b>  | 25/pkg | 55.00      |
| 10-inch 800 grit SiC (PSA)-25/pkg  | <b>SIC-800P10-25</b>  | 25/pkg | 79.00      |
| 10-inch 1000 grit SiC (PSA)-25/pkg                                       | <b>SIC-1000P10-25</b> | 25/pkg | 79.00      |
| 10-inch 1200 grit SiC (PSA)-25/pkg                                       | <b>SIC-1200P10-25</b> | 25/pkg | 79.00      |

## 10-inch Premium SiC Papers with Adhesive Backing, PSA (50/pkg)



240 grit 10-inch SiC Paper with PSA (50/pkg)  
Catalog no. SIC-240P10-50

| PACE Product Name                              | Catalog Number | Qty    | Price (\$) |
|--|----------------|--------|------------|
| 10-inch 60 grit Premium (PSA)-50/pkg           | SIC-060P10-50  | 50/pkg | 175.00     |
| 10-inch 80 grit Premium (PSA)-50/pkg           | SIC-080P10-50  | 50/pkg | 175.00     |
| 10-inch 120 grit Premium (PSA)-50/pkg          | SIC-120P10-50  | 50/pkg | 155.00     |
| 10-inch 180 grit Premium (PSA)-50/pkg          | SIC-180P10-50  | 50/pkg | 155.00     |
| 10-inch 240 / P220 grit Premium (PSA)-50/pkg   | SIC-240P10-50  | 50/pkg | 130.00     |
| 10-inch 320 / P400 grit Premium (PSA)-50/pkg   | SIC-320P10-50  | 50/pkg | 130.00     |
| 10-inch 360 / P400 grit Premium (PSA)-50/pkg   | SIC-360P10-50  | 50/pkg | 130.00     |
| 10-inch 400 / P800 grit Premium (PSA)-50/pkg   | SIC-400P10-50  | 50/pkg | 130.00     |
| 10-inch 600 / P1200 grit Premium (PSA)-50/pkg  | SIC-600P10-50  | 50/pkg | 130.00     |
| 10-inch 800 / P2400 grit Premium (PSA)-50/pkg  | SIC-800P10-50  | 50/pkg | 190.00     |
| 10-inch 1000 / P3000 grit Premium (PSA)-50/pkg | SIC-1000P10-50 | 50/pkg | 190.00     |
| 10-inch 1200 / P4000 grit Premium (PSA)-50/pkg | SIC-1200P10-50 | 50/pkg | 190.00     |

## 10-inch SiC Papers with Adhesive Backing, PSA (100/pkg)



240 grit 10-inch SiC Paper with PSA (100/pkg)  
Catalog no. SIC-240P10-100

| PACE Product Name                   | Catalog Number  | Qty     | Price (\$) |
|-------------------------------------|-----------------|---------|------------|
| 10-inch 60 grit SIC (PSA)-100/pkg   | SIC-060P10-100  | 100/pkg | 205.00     |
| 10-inch 80 grit SIC (PSA)-100/pkg   | SIC-080P10-100  | 100/pkg | 205.00     |
| 10-inch 120 grit SIC (PSA)-100/pkg  | SIC-120P10-100  | 100/pkg | 162.00     |
| 10-inch 180 grit SIC (PSA)-100/pkg  | SIC-180P10-100  | 100/pkg | 162.00     |
| 10-inch 240 grit SIC (PSA)-100/pkg  | SIC-240P10-100  | 100/pkg | 155.00     |
| 10-inch 320 grit SIC (PSA)-100/pkg  | SIC-320P10-100  | 100/pkg | 155.00     |
| 10-inch 360 grit SIC (PSA)-100/pkg  | SIC-360P10-100  | 100/pkg | 155.00     |
| 10-inch 400 grit SIC (PSA)-100/pkg  | SIC-400P10-100  | 100/pkg | 155.00     |
| 10-inch 600 grit SIC (PSA)-100/pkg  | SIC-600P10-100  | 100/pkg | 155.00     |
| 10-inch 800 grit SIC (PSA)-100/pkg  | SIC-800P10-100  | 100/pkg | 242.00     |
| 10-inch 1000 grit SIC (PSA)-100/pkg | SIC-1000P10-100 | 100/pkg | 242.00     |
| 10-inch 1200 grit SIC (PSA)-100/pkg | SIC-1200P10-100 | 100/pkg | 242.00     |

# 10-inch SILICON CARBIDE ABRASIVE PAPERS

## Grinding Relative Velocity

Current autopolishing grinding and polishing machines are designed with the specimens mounted in a disk holder and machined on a disk platen surface. This disk on disk rotation allows for a variable velocity distribution depending upon the head speed relative to the base speed.

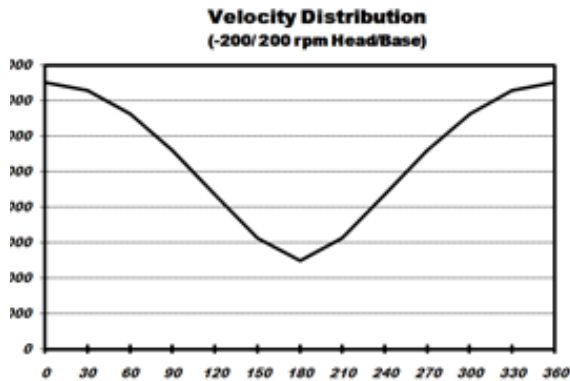
NOTE: Matching the head and base speed, while running in the same direction produces better flatness and lower surface damage because this minimizes the velocity distribution across the sample as it rotates.

For high stock removal, a slower head speed relative to a higher base speed produces the most aggressive grinding and polishing operation. The drawback to high velocity distributions is that the abrasive (especially SiC papers) may not breakdown uniformly, this can result in non-uniform removal across the specimen surface. Another disadvantage is that the high velocity

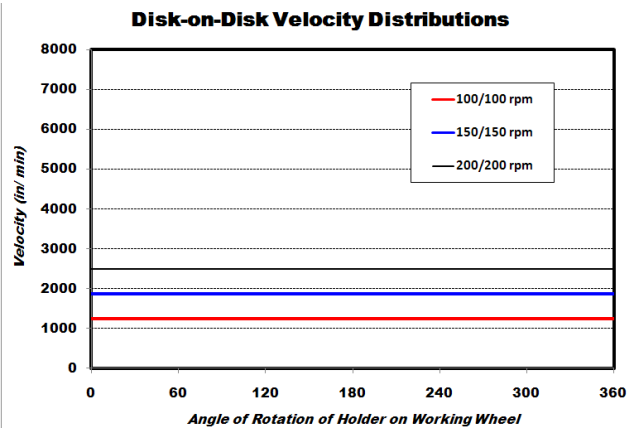
distributions can create substantially more specimen damage, especially in brittle phases. In all cases, it is not recommended to have the head rotating contra direction to the base because of the non-uniform removal and abrasive break-down which occurs.

Minimal relative velocity distributions can be obtained by rotating the head specimen disk at the same rpm and same direction as the base platen. This condition is best for retaining inclusions and brittle phases as well as for obtaining a uniform finish across the entire specimen. The disadvantage to low relative velocity distributions is that stock removal rates can be quite low.

In practice, the best condition to run the polishing machine is by matching the head and base speeds at 200-300 rpm and in the same direction. For polishing it is recommended that the speed be reduce to 100/100 rpm base/head speed. For final polishing under chemical mechanical polishing (CMP) conditions where frictional heat can enhance the chemical process, high speeds and high relative velocity distributions can be useful as long as brittle phases are not present (e.g. monolithic ceramics such as silicon nitride and alumina).



High relative velocity distribution for non-matching head and base speeds.



Constant relative velocity distribution for-matching head and base speeds

| Head Speed (rpm) | Base Speed (rpm) | Relative Velocity Distribution | Characteristic   | Application  |
|------------------|------------------|--------------------------------|--|--|
| 100-150          | 300-600          | High                           | -Aggressive stock removal<br>-Differential grinding across the specimen surface  | Useful for gross removal on hard specimens   |
| 200-300          | 200-300          | Low                            | -Matching head and base speed in the same direction eliminates relative velocity distributions<br>-Uniform stock removal<br>-Low stock removal<br>-Produces minimal damage | -Provides superior flatness over the specimen<br><br>-Useful for retaining inclusions and brittle phases |



## 250 mm (~10-inch) Premium SiC Papers Plain-backed Non-Adhesive Backed (50/pkg)



800 grit 10-inch SiC Plain-backed Paper (50/pkg)  
Catalog no. **SIC-2210-800**

| PACE Product Name                                | Catalog Number       | Qty    | Price (\$) |
|--|----------------------|--------|------------|
| 10-inch 60 grit Premium (Plain)-50/pkg           | <b>SIC-2210-060</b>  | 50/pkg | 120.00     |
| 10-inch 80 grit Premium (Plain)-50/pkg           | <b>SIC-2210-080</b>  | 50/pkg | 120.00     |
| 10-inch 120 grit Premium (Plain)-50/pkg          | <b>SIC-2210-120</b>  | 50/pkg | 120.00     |
| 10-inch 180 grit Premium (Plain)-50/pkg          | <b>SIC-2210-180</b>  | 50/pkg | 120.00     |
| 10-inch 240 / P220 grit Premium (Plain)-50/pkg   | <b>SIC-2210-240</b>  | 50/pkg | 105.00     |
| 10-inch 320 / P400 grit Premium (Plain)-50/pkg   | <b>SIC-2210-320</b>  | 50/pkg | 105.00     |
| 10-inch 360 / P500 grit Premium (Plain)-50/pkg   | <b>SIC-2210-360</b>  | 50/pkg | 105.00     |
| 10-inch 400 / P800 grit Premium (Plain)-50/pkg   | <b>SIC-2210-400</b>  | 50/pkg | 105.00     |
| 10-inch 600 / P1200 grit Premium (Plain)-50/pkg  | <b>SIC-2210-600</b>  | 50/pkg | 105.00     |
| 10-inch 800 / P2400 grit Premium (Plain)-50/pkg  | <b>SIC-2210-800</b>  | 50/pkg | 155.00     |
| 10-inch 1000 / P3000 grit Premium (Plain)-50/pkg | <b>SIC-2210-1000</b> | 50/pkg | 155.00     |
| 10-inch 1200 / P4000 grit Premium (Plain)-50/pkg | <b>SIC-2210-1200</b> | 50/pkg | 155.00     |
| 10-inch Double-sided adhesive -10/pkg            | <b>DSA-10</b>        | 10/pkg | 55.00      |

## 250 mm (~10-inch) SiC Papers Plain-backed Non-Adhesive Backed (100/pkg)



800 grit 10-inch SiC Plain-backed Paper (100/pkg)  
Catalog no. **SIC-2110-800**

| PACE Product Name                     | Catalog Number       | Qty     | Price (\$) |
|---------------------------------------|----------------------|---------|------------|
| 10-inch 60 grit SiC (Plain)-100/pkg   | <b>SIC-2110-060</b>  | 100/pkg | 170.00     |
| 10-inch 80 grit SiC (Plain)-100/pkg   | <b>SIC-2110-080</b>  | 100/pkg | 170.00     |
| 10-inch 120 grit SiC (Plain)-100/pkg  | <b>SIC-2110-120</b>  | 100/pkg | 145.00     |
| 10-inch 180 grit SiC (Plain)-100/pkg  | <b>SIC-2110-180</b>  | 100/pkg | 145.00     |
| 10-inch 240 grit SiC (Plain)-100/pkg  | <b>SIC-2110-240</b>  | 100/pkg | 138.00     |
| 10-inch 320 grit SiC (Plain)-100/pkg  | <b>SIC-2110-320</b>  | 100/pkg | 138.00     |
| 10-inch 360 grit SiC (Plain)-100/pkg  | <b>SIC-2110-360</b>  | 100/pkg | 138.00     |
| 10-inch 400 grit SiC (Plain)-100/pkg  | <b>SIC-2110-400</b>  | 100/pkg | 138.00     |
| 10-inch 600 grit SiC (Plain)-100/pkg  | <b>SIC-2110-600</b>  | 100/pkg | 138.00     |
| 10-inch 800 grit SiC (Plain)-100/pkg  | <b>SIC-2110-800</b>  | 100/pkg | 192.00     |
| 10-inch 1000 grit SiC (Plain)-100/pkg | <b>SIC-2110-1000</b> | 100/pkg | 192.00     |
| 10-inch 1200 grit SiC (Plain)-100/pkg | <b>SIC-2110-1200</b> | 100/pkg | 192.00     |
| 10-inch Double-sided adhesive -10/pkg | <b>DSA-10</b>        | 10/pkg  | 55.00      |

# 12-inch SILICON CARBIDE ABRASIVE PAPERS

## 12-inch SiC Papers with Adhesive Backing, PSA (25/pkg)



240 grit 12-inch SiC Paper with PSA (25/pkg)  
Catalog no. **SIC-240P12-25**

| PACE Product Name   | Catalog Number        | Qty    | Price (\$) |
|---|-----------------------|--------|------------|
| 12-inch Combo Pack (5 each - 240, 360, 600, 800, 1200 grit SiC) (PSA) | <b>SIC-P12C</b>       | 5 each | 125.00     |
| 12-inch 60 grit SiC (PSA)-25/pkg                                      | <b>SIC-060P12-25</b>  | 25/pkg | 108.00     |
| 12-inch 80 grit SiC (PSA)-25/pkg                                      | <b>SIC-080P12-25</b>  | 25/pkg | 108.00     |
| 12-inch 120 grit SiC (PSA)-25/pkg                                     | <b>SIC-120P12-25</b>  | 25/pkg | 90.00      |
| 12-inch 180 grit SiC (PSA)-25/pkg                                     | <b>SIC-180P12-25</b>  | 25/pkg | 90.00      |
| 12-inch 240 grit SiC (PSA)-25/pkg                                     | <b>SIC-240P12-25</b>  | 25/pkg | 84.00      |
| 12-inch 320 grit SiC (PSA)-25/pkg                                     | <b>SIC-320P12-25</b>  | 25/pkg | 84.00      |
| 12-inch 360 grit SiC (PSA)-25/pkg                                     | <b>SIC-360P12-25</b>  | 25/pkg | 84.00      |
| 12-inch 400 grit SiC (PSA)-25/pkg                                     | <b>SIC-400P12-25</b>  | 25/pkg | 84.00      |
| 12-inch 600 grit SiC (PSA)-25/pkg                                     | <b>SIC-600P12-25</b>  | 25/pkg | 84.00      |
| 12-inch 800 grit SiC (PSA)-25/pkg                                     | <b>SIC-800P12-25</b>  | 25/pkg | 130.00     |
| 12-inch 1000 grit SiC (PSA)-25/pkg                                    | <b>SIC-1000P12-25</b> | 25/pkg | 130.00     |
| 12-inch 1200 grit SiC (PSA)-25/pkg                                    | <b>SIC-1200P12-25</b> | 25/pkg | 130.00     |

## 12-inch Premium SiC Papers with Adhesive Backing, PSA (50/pkg)



600 grit 12-inch SiC Paper with PSA (50/pkg)  
Catalog no. **SIC-600P12-50**

| PACE Product Name                      | Catalog Number        | Qty    | Price (\$) |
|--|-----------------------|--------|------------|
| 12-inch 60 grit Premium (PSA)-50/pkg   | <b>SIC-060P12-50</b>  | 50/pkg | 245.00     |
| 12-inch 80 grit Premium (PSA)-50/pkg   | <b>SIC-080P12-50</b>  | 50/pkg | 245.00     |
| 12-inch 120 grit Premium (PSA)-50/pkg  | <b>SIC-120P12-50</b>  | 50/pkg | 210.00     |
| 12-inch 180 grit Premium (PSA)-50/pkg  | <b>SIC-180P12-50</b>  | 50/pkg | 210.00     |
| 12-inch 240 grit Premium (PSA)-50/pkg  | <b>SIC-240P12-50</b>  | 50/pkg | 195.00     |
| 12-inch 320 grit Premium (PSA)-50/pkg  | <b>SIC-320P12-50</b>  | 50/pkg | 195.00     |
| 12-inch 360 grit Premium (PSA)-50/pkg  | <b>SIC-360P12-50</b>  | 50/pkg | 195.00     |
| 12-inch 400 grit Premium (PSA)-50/pkg  | <b>SIC-400P12-50</b>  | 50/pkg | 195.00     |
| 12-inch 600 grit Premium (PSA)-50/pkg  | <b>SIC-600P12-50</b>  | 50/pkg | 195.00     |
| 12-inch 800 grit Premium (PSA)-50/pkg  | <b>SIC-800P12-50</b>  | 50/pkg | 285.00     |
| 12-inch 1000 grit Premium (PSA)-50/pkg | <b>SIC-1000P12-50</b> | 50/pkg | 285.00     |
| 12-inch 1200 grit Premium (PSA)-50/pkg | <b>SIC-1200P12-50</b> | 50/pkg | 285.00     |

## 12-inch SiC Papers with Adhesive Backing, PSA (100/pkg)



600 grit 12-inch SiC Paper with PSA (100/pkg)  
Catalog no. **SIC-600P12-100**

### Abrasive Grinding Recommend Procedures Application (Fixed-abrasive Grinding)

- Start with the finest abrasive possible (typically 240 or 320 grit abrasive paper) Note: Only use coarser grit for very heavy stock removal
- Apply lubricant to abrasive surface
- Most commonly water
- Water soluble oils for water sensitive specimens
- Rinse specimens thoroughly before proceeding to the next finer abrasive

### Grinding Surface Backing

Grinding papers come with different types of backing

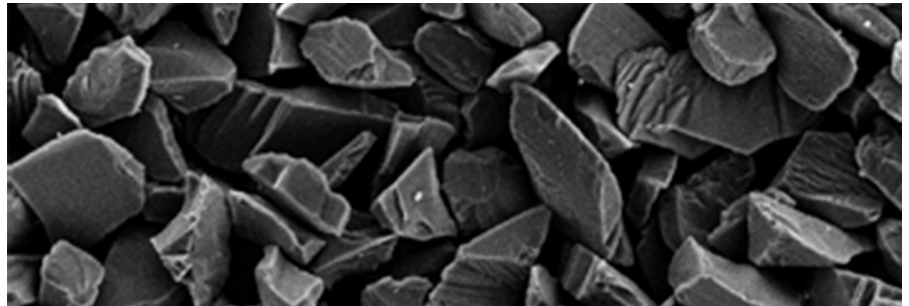
- Plain-backed or non-adhesive backing
- PSA or pressure sensitive backing
- Foil or polyester plastic backing

Plain-backed papers are the least expensive, however, they require either a double sided adhesive or a paper holding ring. The disadvantage to using a paper holding ring is that the mounted specimen cannot track over the edge of the grinding paper. Thus the paper does not break down uniformly and thus can produce over grinding of the mount away from the sample. This artifact results in the polished mount exhibiting a crescent moon which can affect the edge of the specimen. This artifact has also been known as "mooning" or MRD (material removal differential).

PSA-backed or adhesive backed papers are removable grinding papers. They are more expensive than the plain-backed papers and the foil papers. They are very easy to use and avoid the problems with "mooning" and MRD if the sample tracks over both the center and edge of the grinding papers.

Foil-backed or polyester backed grinding papers are easy to use and are more economical than adhesive backed papers. The system uses a receiver adhesive disk that can be washed in order to extend its life.

| PACE Product Name                   | Catalog Number         | Qty     | Price (\$) |
|-------------------------------------|------------------------|---------|------------|
| 12-inch 60 grit SIC (PSA)-100/pkg   | <b>SIC-060P12-100</b>  | 100/pkg | 275.00     |
| 12-inch 80 grit SIC (PSA)-100/pkg   | <b>SIC-080P12-100</b>  | 100/pkg | 275.00     |
| 12-inch 120 grit SIC (PSA)-100/pkg  | <b>SIC-120P12-100</b>  | 100/pkg | 240.00     |
| 12-inch 180 grit SIC (PSA)-100/pkg  | <b>SIC-180P12-100</b>  | 100/pkg | 240.00     |
| 12-inch 240 grit SIC (PSA)-100/pkg  | <b>SIC-240P12-100</b>  | 100/pkg | 230.00     |
| 12-inch 320 grit SIC (PSA)-100/pkg  | <b>SIC-320P12-100</b>  | 100/pkg | 230.00     |
| 12-inch 360 grit SIC (PSA)-100/pkg  | <b>SIC-360P12-100</b>  | 100/pkg | 230.00     |
| 12-inch 400 grit SIC (PSA)-100/pkg  | <b>SIC-400P12-100</b>  | 100/pkg | 230.00     |
| 12-inch 600 grit SIC (PSA)-100/pkg  | <b>SIC-600P12-100</b>  | 100/pkg | 230.00     |
| 12-inch 800 grit SIC (PSA)-100/pkg  | <b>SIC-800P12-100</b>  | 100/pkg | 360.00     |
| 12-inch 1000 grit SIC (PSA)-100/pkg | <b>SIC-1000P12-100</b> | 100/pkg | 360.00     |
| 12-inch 1200 grit SIC (PSA)-100/pkg | <b>SIC-1200P12-100</b> | 100/pkg | 360.00     |



Silicon Carbide Powder with Sharp Friable Edges

| Standard grit | Median Diameter (microns) | Surface Roughness on Steel, Rc 30 (Ra -nm) |
|---------------|---------------------------|--|
| 60            | 250                       | -  |
| 80            | 180                       | 1140                                       |
| 120           | 106                       | 1050                                       |
| 180           | 75                        | 880  |
| 220           | 63                        | 300  |
| 320           | 40.5                      | 230  |
| 400           | 25.8                      | 120  |
| 600           | 15.3                      | 110  |
| 800           | 6.5                       | 25   |
| 1200          | 2.5                       | 20   |

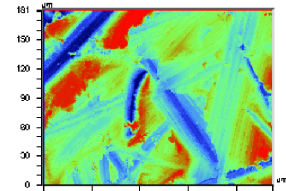
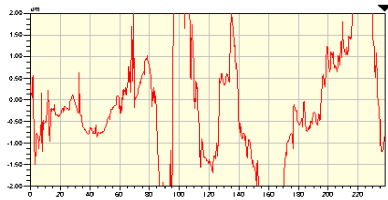
# 12-inch SILICON CARBIDE ABRASIVE PAPERS

Abrasive / Surface

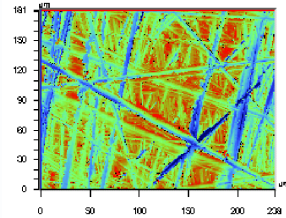
2-Line Profile

3-D Optical Contour Mapping

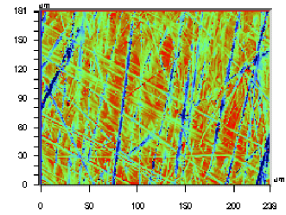
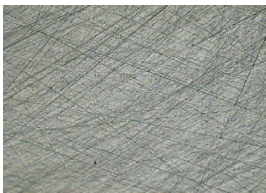
60-grit SiC



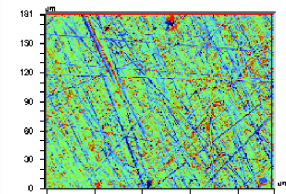
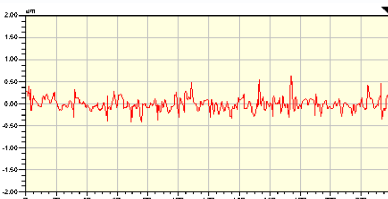
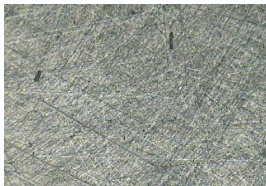
240-grit SiC



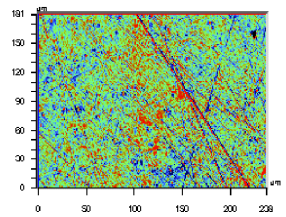
400-grit SiC



600-grit SiC



1200-grit SiC



## 12-inch Premium SiC Papers Plain-backed Non-Adhesive Backed (50/pkg)



1000 grit 12-inch SiC Plain-backed Paper (50/pkg)  
Catalog no. SIC-2212-1000

| PACE Product Name                                | Catalog Number | Qty    | Price (\$) |
|--|----------------|--------|------------|
| 12-inch 60 grit Premium (Plain)-50/pkg           | SIC-2212-060   | 50/pkg | 145.00     |
| 12-inch 80 grit Premium (Plain)-50/pkg           | SIC-2212-080   | 50/pkg | 145.00     |
| 12-inch 120 grit Premium (Plain)-50/pkg          | SIC-2212-120   | 50/pkg | 120.00     |
| 12-inch 180 grit Premium (Plain)-50/pkg          | SIC-2212-180   | 50/pkg | 120.00     |
| 12-inch 240 / P220 grit Premium (Plain)-50/pkg   | SIC-2212-240   | 50/pkg | 120.00     |
| 12-inch 320 / P400 grit Premium (Plain)-50/pkg   | SIC-2212-320   | 50/pkg | 120.00     |
| 12-inch 360 / P500 grit Premium (Plain)-50/pkg   | SIC-2212-360   | 50/pkg | 120.00     |
| 12-inch 400 / P800 grit Premium (Plain)-50/pkg   | SIC-2212-400   | 50/pkg | 120.00     |
| 12-inch 600 / P1200 grit Premium (Plain)-50/pkg  | SIC-2212-600   | 50/pkg | 120.00     |
| 12-inch 800 / P2400 grit Premium (Plain)-50/pkg  | SIC-2212-800   | 50/pkg | 225.00     |
| 12-inch 1000 / P3000 grit Premium (Plain)-50/pkg | SIC-2212-1000  | 50/pkg | 225.00     |
| 12-inch 1200 / P4000 grit Premium (Plain)-50/pkg | SIC-2212-1200  | 50/pkg | 225.00     |
| 12-inch Double-sided adhesive -10/pkg            | DSA-12         | 10/pkg | 67.50      |

## 12-inch SiC Papers Plain-backed Non-Adhesive Backed (100/pkg)



1000 grit 12-inch SiC Plain-backed Paper (100/pkg)  
Catalog no. SIC-2112-1000

| PACE Product Name                     | Catalog Number | Qty     | Price (\$) |
|---------------------------------------|----------------|---------|------------|
| 12-inch 60 grit SiC (Plain)-100/pkg   | SIC-2112-060   | 100/pkg | 185.00     |
| 12-inch 80 grit SiC (Plain)-100/pkg   | SIC-2112-080   | 100/pkg | 185.00     |
| 12-inch 120 grit SiC (Plain)-100/pkg  | SIC-2112-120   | 100/pkg | 170.00     |
| 12-inch 180 grit SiC (Plain)-100/pkg  | SIC-2112-180   | 100/pkg | 170.00     |
| 12-inch 240 grit SiC (Plain)-100/pkg  | SIC-2112-240   | 100/pkg | 158.00     |
| 12-inch 320 grit SiC (Plain)-100/pkg  | SIC-2112-320   | 100/pkg | 158.00     |
| 12-inch 360 grit SiC (Plain)-100/pkg  | SIC-2112-360   | 100/pkg | 158.00     |
| 12-inch 400 grit SiC (Plain)-100/pkg  | SIC-2112-400   | 100/pkg | 158.00     |
| 12-inch 600 grit SiC (Plain)-100/pkg  | SIC-2112-600   | 100/pkg | 158.00     |
| 12-inch 800 grit SiC (Plain)-100/pkg  | SIC-2112-800   | 100/pkg | 295.00     |
| 12-inch 1000 grit SiC (Plain)-100/pkg | SIC-2112-1000  | 100/pkg | 295.00     |
| 12-inch 1200 grit SiC (Plain)-100/pkg | SIC-2112-1200  | 100/pkg | 295.00     |
| 12-inch Double-sided adhesive -10/pkg | DSA-12         | 10/pkg  | 67.50      |

# 14-inch SILICON CARBIDE ABRASIVE PAPERS

## 14-inch SiC Papers with Adhesive Backing, PSA (25/pkg)



120 grit 14-inch  
SiC Paper with PSA (25/pkg)  
Catalog no. **SIC-120P14-25**

| PACE Product Name  | Catalog Number        | Qty    | Price (\$) |
|--|-----------------------|--------|------------|
| 14-inch Combo Pack<br>(5 each - 240, 360, 600, 800, 1200 grit SiC) (PSA) | <b>SIC-P14C</b>       | 5 each | 170.00     |
| 14-inch 60 grit SiC (PSA)-25/pkg   | <b>SIC-060P14-25</b>  | 25/pkg | 155.00     |
| 14-inch 80 grit SiC (PSA)-25/pkg   | <b>SIC-080P14-25</b>  | 25/pkg | 155.00     |
| 14-inch 120 grit SiC (PSA)-25/pkg  | <b>SIC-120P14-25</b>  | 25/pkg | 130.00     |
| 14-inch 180 grit SiC (PSA)-25/pkg  | <b>SIC-180P14-25</b>  | 25/pkg | 130.00     |
| 14-inch 240 grit SiC (PSA)-25/pkg  | <b>SIC-240P14-25</b>  | 25/pkg | 115.00     |
| 14-inch 320 grit SiC (PSA)-25/pkg  | <b>SIC-320P14-25</b>  | 25/pkg | 115.00     |
| 14-inch 360 grit SiC (PSA)-25/pkg  | <b>SIC-360P14-25</b>  | 25/pkg | 115.00     |
| 14-inch 400 grit SiC (PSA)-25/pkg  | <b>SIC-400P14-25</b>  | 25/pkg | 115.00     |
| 14-inch 600 grit SiC (PSA)-25/pkg  | <b>SIC-600P14-25</b>  | 25/pkg | 115.00     |
| 14-inch 800 grit SiC (PSA)-25/pkg  | <b>SIC-800P14-25</b>  | 25/pkg | 195.00     |
| 14-inch 1000 grit SiC (PSA)-25/pkg                                       | <b>SIC-1000P14-25</b> | 25/pkg | 195.00     |
| 14-inch 1200 grit SiC (PSA)-25/pkg                                       | <b>SIC-1200P14-25</b> | 25/pkg | 195.00     |

## 14-inch Premium SiC Papers with Adhesive Backing, PSA (50/pkg)



400 grit 14-inch  
SiC Paper with PSA (100/pkg)  
Catalog no. **SIC-400P14-50**

| PACE Product Name                      | Catalog Number        | Qty    | Price (\$) |
|--|-----------------------|--------|------------|
| 14-inch 60 grit Premium (PSA)-50/pkg   | <b>SIC-060P14-50</b>  | 50/pkg | 285.00     |
| 14-inch 80 grit Premium (PSA)-50/pkg   | <b>SIC-080P14-50</b>  | 50/pkg | 285.00     |
| 14-inch 120 grit Premium (PSA)-50/pkg  | <b>SIC-120P14-50</b>  | 50/pkg | 245.00     |
| 14-inch 180 grit Premium (PSA)-50/pkg  | <b>SIC-180P14-50</b>  | 50/pkg | 245.00     |
| 14-inch 240 grit Premium (PSA)-50/pkg  | <b>SIC-240P14-50</b>  | 50/pkg | 235.00     |
| 14-inch 320 grit Premium (PSA)-50/pkg  | <b>SIC-320P14-50</b>  | 50/pkg | 235.00     |
| 14-inch 360 grit Premium (PSA)-50/pkg  | <b>SIC-360P14-50</b>  | 50/pkg | 235.00     |
| 14-inch 400 grit Premium (PSA)-50/pkg  | <b>SIC-400P14-50</b>  | 50/pkg | 235.00     |
| 14-inch 600 grit Premium (PSA)-50/pkg  | <b>SIC-600P14-50</b>  | 50/pkg | 235.00     |
| 14-inch 800 grit Premium (PSA)-50/pkg  | <b>SIC-800P14-50</b>  | 50/pkg | 540.00     |
| 14-inch 1000 grit Premium (PSA)-50/pkg | <b>SIC-1000P14-50</b> | 50/pkg | 540.00     |
| 14-inch 1200 grit Premium (PSA)-50/pkg | <b>SIC-1200P14-50</b> | 50/pkg | 540.00     |

## 14-inch SiC Papers with Adhesive Backing, PSA (100/pkg)



600 grit 14-inch  
SiC Paper with PSA (25/pkg)  
Catalog no. **SIC-600P14-100**

| PACE Product Name                   | Catalog Number         | Qty     | Price (\$) |
|-------------------------------------|------------------------|---------|------------|
| 14-inch 60 grit SIC (PSA)-100/pkg   | <b>SIC-060P14-100</b>  | 100/pkg | 350.00     |
| 14-inch 80 grit SIC (PSA)-100/pkg   | <b>SIC-080P14-100</b>  | 100/pkg | 350.00     |
| 14-inch 120 grit SIC (PSA)-100/pkg  | <b>SIC-120P14-100</b>  | 100/pkg | 320.00     |
| 14-inch 180 grit SIC (PSA)-100/pkg  | <b>SIC-180P14-100</b>  | 100/pkg | 320.00     |
| 14-inch 240 grit SIC (PSA)-100/pkg  | <b>SIC-240P14-100</b>  | 100/pkg | 310.00     |
| 14-inch 320 grit SIC (PSA)-100/pkg  | <b>SIC-320P14-100</b>  | 100/pkg | 310.00     |
| 14-inch 360 grit SIC (PSA)-100/pkg  | <b>SIC-360P14-100</b>  | 100/pkg | 310.00     |
| 14-inch 400 grit SIC (PSA)-100/pkg  | <b>SIC-400P14-100</b>  | 100/pkg | 310.00     |
| 14-inch 600 grit SIC (PSA)-100/pkg  | <b>SIC-600P14-100</b>  | 100/pkg | 310.00     |
| 14-inch 800 grit SIC (PSA)-100/pkg  | <b>SIC-800P14-100</b>  | 100/pkg | 720.00     |
| 14-inch 1000 grit SIC (PSA)-100/pkg | <b>SIC-1000P14-100</b> | 100/pkg | 720.00     |
| 14-inch 1200 grit SIC (PSA)-100/pkg | <b>SIC-1200P14-100</b> | 100/pkg | 720.00     |

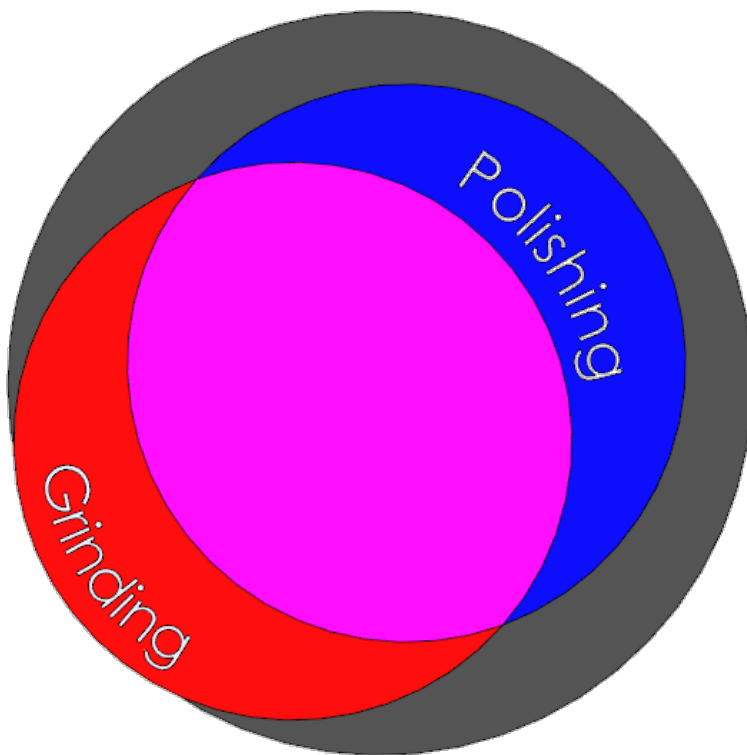


NANO-S / FEMTO-S Auto Polishers

# 14-inch SILICON CARBIDE ABRASIVE PAPERS

## 14-inch Premium SiC Papers Plain-backed Non-Adhesive Backed (50/pkg)

| PACE Product Name                                | Catalog Number | Qty    | Price (\$) |
|--|----------------|--------|------------|
| 14-inch 60 grit Premium (Plain)-50/pkg           | SIC-2214-060   | 50/pkg | 175.00     |
| 14-inch 80 grit Premium (Plain)-50/pkg           | SIC-2214-080   | 50/pkg | 175.00     |
| 14-inch 120 grit Premium (Plain)-50/pkg          | SIC-2214-120   | 50/pkg | 160.00     |
| 14-inch 180 grit Premium (Plain)-50/pkg          | SIC-2214-180   | 50/pkg | 160.00     |
| 14-inch 240 / P220 grit Premium (Plain)-50/pkg   | SIC-2214-240   | 50/pkg | 160.00     |
| 14-inch 320 / P400 grit Premium (Plain)-50/pkg   | SIC-2214-320   | 50/pkg | 160.00     |
| 14-inch 360 / P500 grit Premium (Plain)-50/pkg   | SIC-2214-360   | 50/pkg | 160.00     |
| 14-inch 400 / P800 grit Premium (Plain)-50/pkg   | SIC-2214-400   | 50/pkg | 160.00     |
| 14-inch 600 / P1200 grit Premium (Plain)-50/pkg  | SIC-2211-600   | 50/pkg | 160.00     |
| 14-inch 800 / P2400 grit Premium (Plain)-50/pkg  | SIC-2214-800   | 50/pkg | 365.00     |
| 14-inch 1000 / P3000 grit Premium (Plain)-50/pkg | SIC-2214-1000  | 50/pkg | 365.00     |
| 14-inch 1200 / P4000 grit Premium (Plain)-50/pkg | SIC-2214-1200  | 50/pkg | 365.00     |
| 14-inch Double-sided adhesive -10/pkg            | DSA-14         | 10/pkg | 80.00      |

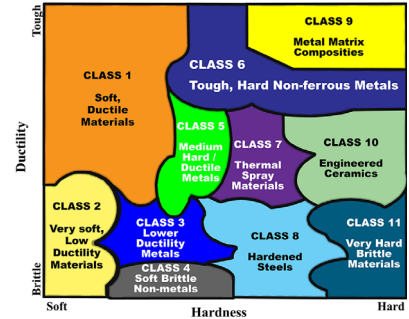
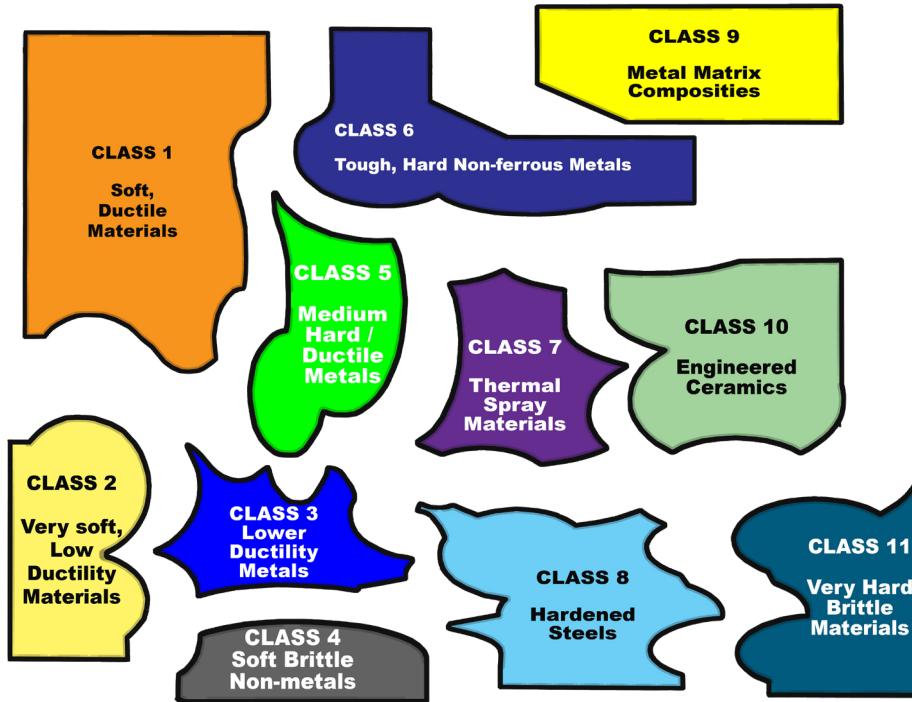


### Relative Position of the Auto Head to the Polishing Wheel

The FEMTO is equipped with an auto locating positioning feature. This feature ensures proper utilization and breakdown of grinding papers; it also extends the lifetime of polishing cloths. The FEMTO head is swung over the working wheel of the NANO polishing machine. Once dropped, it auto corrects and drops into the selected location. Auto positioning removes the non-repeatability of standard hand positioning of a polishing head.



# Metallographic Sample Preparation



## Metallographic CLASS Procedures Chart

Metallographic sample preparation can be broken down into specific preparation Classes based on the materials hardness and ductility.

## 14-inch SiC Papers Plain-backed Non-Adhesive Backed (100/pkg)



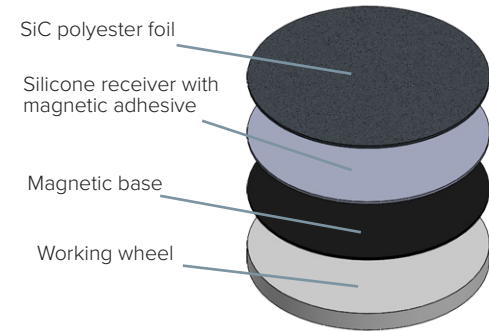
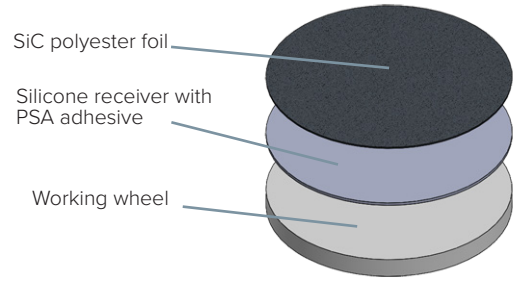
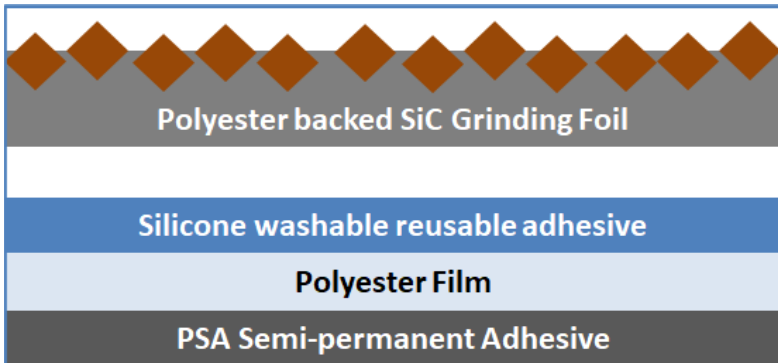
1200 grit 14-inch SiC Plain-backed Paper (100/pkg)  
Catalog no. SIC-2114-1200

| PACE Product Name                     | Catalog Number | Qty     | Price (\$) |
|---------------------------------------|----------------|---------|------------|
| 14-inch 60 grit SiC (Plain)-100/pkg   | SIC-2114-060   | 100/pkg | 245.00     |
| 14-inch 80 grit SiC (Plain)-100/pkg   | SIC-2114-080   | 100/pkg | 245.00     |
| 14-inch 120 grit SiC (Plain)-100/pkg  | SIC-2114-120   | 100/pkg | 225.00     |
| 14-inch 180 grit SiC (Plain)-100/pkg  | SIC-2114-180   | 100/pkg | 225.00     |
| 14-inch 240 grit SiC (Plain)-100/pkg  | SIC-2114-240   | 100/pkg | 195.00     |
| 14-inch 320 grit SiC (Plain)-100/pkg  | SIC-2114-320   | 100/pkg | 195.00     |
| 14-inch 360 grit SiC (Plain)-100/pkg  | SIC-2114-360   | 100/pkg | 195.00     |
| 14-inch 400 grit SiC (Plain)-100/pkg  | SIC-2114-400   | 100/pkg | 195.00     |
| 14-inch 600 grit SiC (Plain)-100/pkg  | SIC-2114-600   | 100/pkg | 195.00     |
| 14-inch 800 grit SiC (Plain)-100/pkg  | SIC-2114-800   | 100/pkg | 490.00     |
| 14-inch 1000 grit SiC (Plain)-100/pkg | SIC-2114-1000  | 100/pkg | 490.00     |
| 14-inch 1200 grit SiC (Plain)-100/pkg | SIC-2114-1200  | 100/pkg | 490.00     |
| 14-inch Double-sided adhesive -10/pkg | DSA-14         | 10/pkg  | 80.00      |

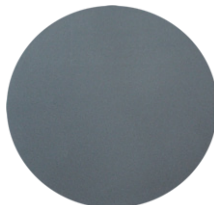
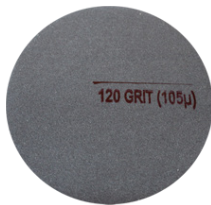
# SILICON CARBIDE FOIL SYSTEM

## Grinding Foils (alternative to PSA backed papers):

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



120 grit (105 micron) front / back side SiC foil



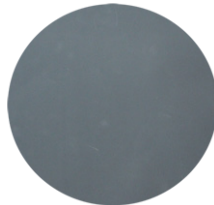
600 grit (15 micron) front / back side SiC foil



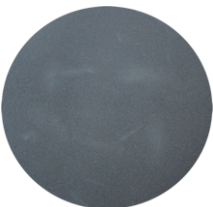
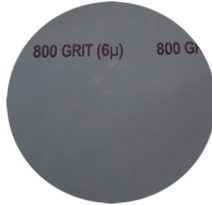
Silicone (adhesive) Receiver Disk with PSA backing



240 grit (63 micron) front / back side SiC foil



800 grit (6 micron) front / back side SiC foil



360 grit (30 micron) front / back side SiC foil



1200 grit (2 micron) front / back side SiC foil



### SiC Foil Characteristics:

- ◆ Lower cost compared to PSA backed papers
- ◆ Reusable / Washable Silicone backing material
- ◆ Easy to use
- ◆ Compatible with competitors products

## Receiver Disks for SiC Foils (2/pkg)



Silicon Receiver Disks with PSA backing

| PACE Product Name                                 | Catalog Number   | Qty   | Price (\$) |
|---|------------------|-------|------------|
| 8-inch Receivers for SiC Foils (PSA-backed)       | <b>REC-5008</b>  | 2/pkg | 105.00     |
| 10-inch Receivers for SiC Foils (PSA-backed)      | <b>REC-5010</b>  | 2/pkg | 135.00     |
| 12-inch Receivers for SiC Foils (PSA-backed)      | <b>REC-5012</b>  | 2/pkg | 165.00     |
| 8-inch Receivers for SiC Foils (magnetic-backed)  | <b>MREC-5008</b> | 2/pkg | 125.00     |
| 10-inch Receivers for SiC Foils (magnetic-backed) | <b>MREC-5010</b> | 2/pkg | 160.00     |
| 12-inch Receivers for SiC Foils (magnetic-backed) | <b>MREC-5012</b> | 2/pkg | 185.00     |

## 8-inch SiC Foils with Polyester Film Backing (50/pkg)

| PACE Product Name                                  | Catalog Number       | Qty    | Price (\$) |
|--|----------------------|--------|------------|
| 8-inch 120 grit (105 micron) - SiC Foils (50/pkg)  | <b>SIC-5108-120</b>  | 50/pkg | 62.00      |
| 8-inch 240 grit (63 micron) - SiC Foils (50/pkg)   | <b>SIC-5108-240</b>  | 50/pkg | 57.50      |
| 8-inch 360 grit (30 micron) - SiC Foils (50/pkg)   | <b>SIC-5108-360</b>  | 50/pkg | 57.50      |
| 8-inch 600 grit (15 micron) - SiC Foils (50/pkg)   | <b>SIC-5108-600</b>  | 50/pkg | 57.50      |
| 8-inch 800 grit (6.5 micron) - SiC Foils (50/pkg)  | <b>SIC-5108-800</b>  | 50/pkg | 72.50      |
| 8-inch 1200 grit (2.5 micron) - SiC Foils (50/pkg) | <b>SIC-5108-1200</b> | 50/pkg | 72.50      |



## 10-inch SiC Foils with Polyester Film Backing (50/pkg)



| PACE Product Name                                   | Catalog Number       | Qty    | Price (\$) |
|---|----------------------|--------|------------|
| 10-inch 120 grit (105 micron) - SiC Foils (50/pkg)  | <b>SIC-5110-120</b>  | 50/pkg | 92.50      |
| 10-inch 240 grit (63 micron) - SiC Foils (50/pkg)   | <b>SIC-5110-240</b>  | 50/pkg | 88.50      |
| 10-inch 360 grit (30 micron) - SiC Foils (50/pkg)   | <b>SIC-5110-360</b>  | 50/pkg | 88.50      |
| 10-inch 600 grit (15 micron) - SiC Foils (50/pkg)   | <b>SIC-5110-600</b>  | 50/pkg | 88.50      |
| 10-inch 800 grit (6.5 micron) - SiC Foils (50/pkg)  | <b>SIC-5110-800</b>  | 50/pkg | 110.00     |
| 10-inch 1200 grit (2.5 micron) - SiC Foils (50/pkg) | <b>SIC-5110-1200</b> | 50/pkg | 110.00     |

## 12-inch SiC Foils with Polyester Film Backing (50/pkg)

| PACE Product Name                                   | Catalog Number       | Qty    | Price (\$) |
|---|----------------------|--------|------------|
| 12-inch 120 grit (105 micron) - SiC Foils (50/pkg)  | <b>SIC-5112-120</b>  | 50/pkg | 112.00     |
| 12-inch 240 grit (63 micron) - SiC Foils (50/pkg)   | <b>SIC-5112-240</b>  | 50/pkg | 112.00     |
| 12-inch 360 grit (30 micron) - SiC Foils (50/pkg)   | <b>SIC-5112-360</b>  | 50/pkg | 112.00     |
| 12-inch 600 grit (15 micron) - SiC Foils (50/pkg)   | <b>SIC-5112-600</b>  | 50/pkg | 112.00     |
| 12-inch 800 grit (6.5 micron) - SiC Foils (50/pkg)  | <b>SIC-5112-800</b>  | 50/pkg | 140.00     |
| 12-inch 1200 grit (2.5 micron) - SiC Foils (50/pkg) | <b>SIC-5112-1200</b> | 50/pkg | 140.00     |



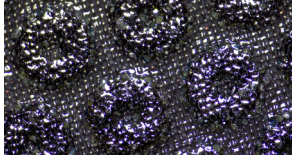
# DIAMOND GRINDING

## Diamond Grinding Disks:

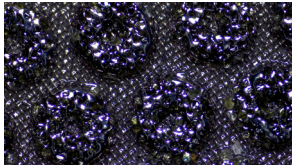
Diamond grinding is most commonly used for grinding very hard brittle materials such as engineered ceramics. In practice, diamond grinding disks are also used to planar grind a wide range of other metals and minerals.

## Diamond Bonding:

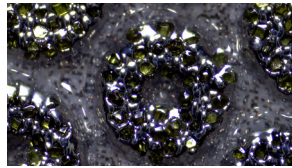
There are two types of bonding for diamond grinding disks: metal and resin. Metal bonded diamond grinding disks are more aggressive and can produce more damage. Resin bonded disks will break down easier to produce a better surface finish, however, they typically have lower life.



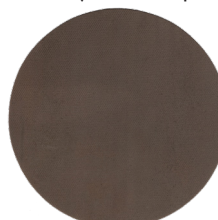
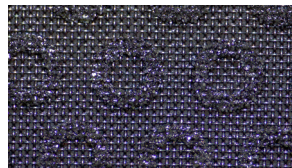
250 micron Metal Bonded Diamond Disk (20X close-up on left)



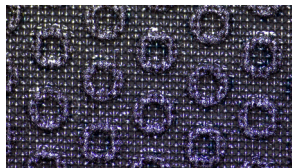
125 micron Metal Bonded Diamond Disk (20X close-up on left)



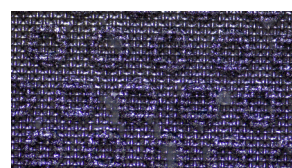
75 micron Metal Bonded Diamond Disk (20X close-up on left)



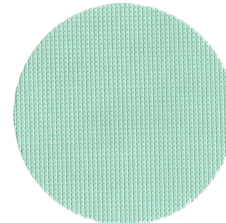
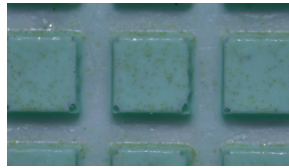
40 micron Metal Bonded Diamond Disk (20X close-up on left)



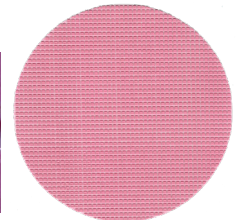
30 micron Metal Bonded Diamond Disk (20X close-up on left)



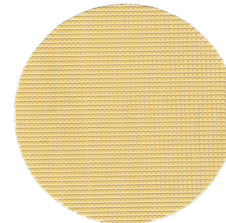
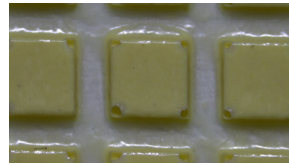
15 micron Metal Bonded Diamond Disk (20X close-up on left)



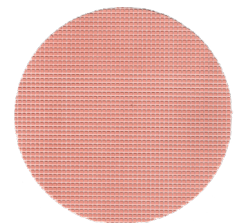
125 micron Resin Bonded Diamond Disk (10X close-up on left)



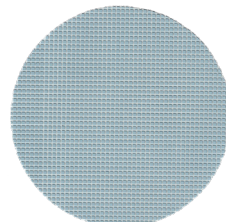
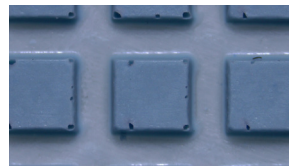
70 micron Resin Bonded Diamond Disk (10X close-up on left)



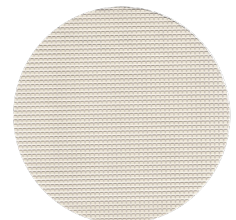
35 micron Resin Bonded Diamond Disk (10X close-up on left)



25 micron Resin Bonded Diamond Disk (10X close-up on left)



15 micron Resin Bonded Diamond Disk (10X close-up on left)

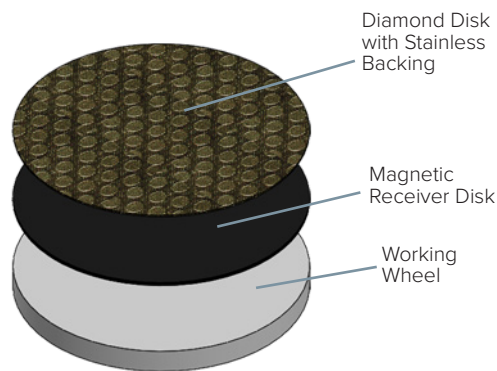


9 micron Resin Bonded Diamond Disk (10X close-up on left)

# MAGNETIC BACKED DISKS

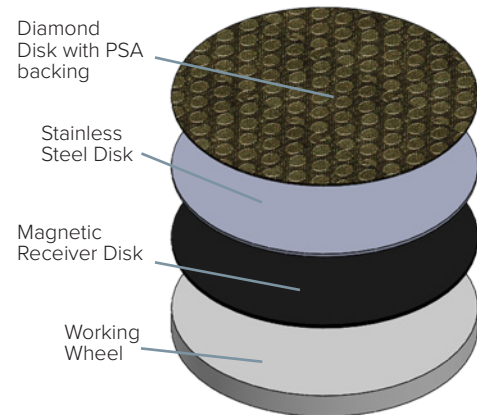
## Diamond MD Grinding Disks:

As an alternative to PSA (pressure sensitive adhesives) 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.



## MD Grinding Disks:

- ◆ Easy to change disks
- ◆ More convenient for storage
- ◆ Do not need to dedicate a working wheel for each abrasive size



## Magnetic Base Disks and Plates

| PACE Product Name                         | Catalog No. (in) | Catalog No. (mm) | Qty  | Price (\$) |
|---|------------------|------------------|------|------------|
| 8-in / 200 mm MAGNETON Base Disk (PSA)    | MAG-B08          | MAG-B200         | each | 52.00      |
| 10-in / 250 mm MAGNETON Base Disk (PSA)   | MAG-B10          | MAG-B250         | each | 58.00      |
| 12-inch / 300 mm MAGNETON Base Disk (PSA) | MAG-B12          | MAG-B300         | each | 65.00      |
| 14-inch MAGNETON Base Disk (PSA)          | MAG-B14          | n.a.             | each | 85.00      |



MAGNETON Base Disk



MAGNEPAD Stainless Steel Magnetic Plate

| PACE Product Name   | Catalog No. (inch) | Catalog No. (mm) | Qty  | Price (\$) |
|---|--------------------|------------------|------|------------|
| 8-in / 200 mm MAGNEPAD Stainless Steel Magnetic Base Plate    | SSMAG-P08          | SSMAG-P200       | each | 58.00      |
| 10-in / 250 mm MAGNEPAD Stainless Steel Magnetic Base Plate   | SSMAG-P10          | SSMAG-P250       | each | 62.00      |
| 12-inch / 300 mm MAGNEPAD Stainless Steel Magnetic Base Plate | SSMAG-P12          | SSMAG-P300       | each | 68.00      |
| 14-inch MAGNEPAD Stainless Steel Magnetic Base Plate          | SSMAG-P14          | n.a.             | each | 95.00      |

| PACE Product Name                                  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 8-inch MAGNEPAD Teflon Coated Magnetic Base Plate  | MAG-P08        | each | 60.00      |
| 10-inch MAGNEPAD Teflon Coated Magnetic Base Plate | MAG-P10        | each | 65.00      |
| 12-inch MAGNEPAD Teflon Coated Magnetic Base Plate | MAG-P12        | each | 80.00      |
| 14-inch MAGNEPAD Teflon Coated Magnetic Base Plate | MAG-P14        | each | 120.00     |



MAGNEPAD Teflon Coated Magnetic Plate

# DIAMOND GRINDING ABRASIVES (8-inch)

## 8-inch Metal Bonded Diamond Grinding Disk with PSA Adhesive

| PACE Product Name  | Catalog Number  | Qty  | Price (\$) |
|--|-----------------|------|------------|
| 8-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M250-08-PSA | each | 215.00     |
| 8-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M125-08-PSA | each | 215.00     |
| 8-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M075-08-PSA | each | 199.50     |
| 8-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M040-08-PSA | each | 199.50     |
| 8-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M030-08-PSA | each | 199.50     |
| 8-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M015-08-PSA | each | 199.50     |

## 8-inch Diamond Resin Bonded Grinding Disk with PSA Adhesive

| PACE Product Name  | Catalog Number  | Qty  | Price (\$) |
|--|-----------------|------|------------|
| 8-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-R125-08-PSA | each | 135.00     |
| 8-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R070-08-PSA | each | 135.00     |
| 8-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R035-08-PSA | each | 135.00     |
| 8-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R025-08-PSA | each | 135.00     |
| 8-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R015-08-PSA | each | 135.00     |
| 8-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing   | DIA-R009-08-PSA | each | 135.00     |

## 8-inch Composite Grinding Disks

| PACE Product Name   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 8-inch MD ORION Composite Disk for 3-6 micron diamond suspensions   | ORION-MD08     | each | 150.00     |
| 8-inch MD SIRIUS Composite Disk for 6-15 micron diamond suspensions | SIRIUS-MD08    | each | 150.00     |



8-inch ORION Composite Disk

## 8-inch Magnetic Plates

| PACE Product Name                                   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 8-inch MAGNETON Base Disk (PSA)                     | MAG-B08        | each | 52.00      |
| 8-inch MAGNEPAD Stainless Steel Magnetic Base Plate | SSMAG-P08      | each | 58.00      |
| 8-inch MAGNEPAD Teflon Coated Magnetic Base Plate   | MAG-P08        | each | 60.00      |



8-inch MAGNEPAD Teflon Base Plate

## 8-inch Metal Bonded Diamond Grinding Disk with Magnetic Backing



75 micron PSA Metal Bonded Diamond Disk



15 micron MAG Metal Bonded Diamond Disk

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 8-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with Magnetic backing       | DIA-M250-08-MAG | each | 225.00     |
| 8-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing       | DIA-M125-08-MAG | each | 225.00     |
| 8-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing        | DIA-M075-08-MAG | each | 199.50     |
| 8-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing (each) | DIA-M040-08-MAG | each | 199.50     |
| 8-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing        | DIA-M030-08-MAG | each | 199.50     |
| 8-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing        | DIA-M015-08-MAG | each | 199.50     |

## 8-inch Diamond Resin Bonded Grinding Disk with Magnetic Backing

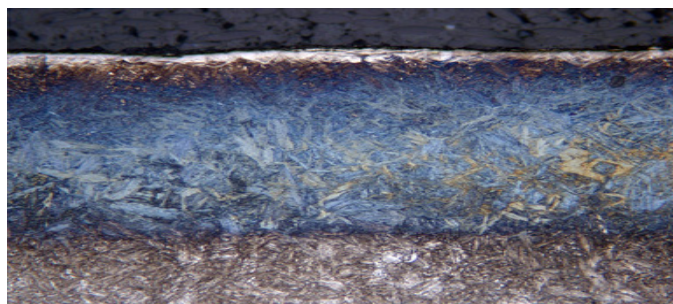


35 micron PSA Resin Bonded Diamond Disk



9 micron MAG Resin Bonded Diamond Disk

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 8-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing | DIA-R125-08-MAG | each | 155.00     |
| 8-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R070-08-MAG | each | 155.00     |
| 8-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R035-08-MAG | each | 155.00     |
| 8-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R025-08-MAG | each | 155.00     |
| 8-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R015-08-MAG | each | 155.00     |
| 8-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing   | DIA-R009-08-MAG | each | 155.00     |



Nitrided Steel with White Layer, Mag. 200X

# DIAMOND GRINDING ABRASIVES (10-inch)

## 10-inch Metal Bonded Diamond Grinding Disk with PSA Adhesive

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 10-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M250-10-PSA | each | 335.00     |
| 10-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M125-10-PSA | each | 335.00     |
| 10-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M075-10-PSA | each | 270.00     |
| 10-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M040-10-PSA | each | 270.00     |
| 10-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M030-10-PSA | each | 270.00     |
| 10-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M015-10-PSA | each | 270.00     |

## 10-inch Diamond Resin Bonded Grinding Disk with PSA Adhesive

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 10-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-R125-10-PSA | each | 178.00     |
| 10-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R070-10-PSA | each | 178.00     |
| 10-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R035-10-PSA | each | 178.00     |
| 10-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R025-10-PSA | each | 178.00     |
| 10-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R015-10-PSA | each | 178.00     |
| 10-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing   | DIA-R009-10-PSA | each | 178.00     |

## 10-inch Composite Grinding Disks

| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 10-inch MD ORION Composite Disk for 3-6 micron diamond suspensions   | ORION-MD10     | each | 175.00     |
| 10-inch MD SIRIUS Composite Disk for 6-15 micron diamond suspensions | SIRIUS-MD10    | each | 175.00     |



10-inch SIRIUS Composite Disk

## 10-inch Magnetic Plates

| PACE Product Name                                    | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 10-inch MAGNETON Base Disk (PSA)                     | MAG-B10        | each | 58.00      |
| 10-inch MAGNEPAD Stainless Steel Magnetic Base Plate | SSMAG-P10      | each | 62.00      |
| 10-inch MAGNEPAD Teflon Coated Magnetic Base Plate   | MAG-P10        | each | 65.00      |



10-inch MAGNEPAD Stainless Steel Base Plate



## 10-inch Metal Bonded Diamond Grinding Disk with Magnetic Backing



125 micron PSA Metal Bonded Diamond Disk



30 micron MAG Metal Bonded Diamond Disk

| PACE Product Name  | Catalog Number  | Qty  | Price (\$) |
|--|-----------------|------|------------|
| 10-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing | DIA-M250-10-MAG | each | 375.00     |
| 10-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing | DIA-M125-10-MAG | each | 375.00     |
| 10-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-M075-10-MAG | each | 290.00     |
| 10-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-M040-10-MAG | each | 290.00     |
| 10-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-M030-10-MAG | each | 290.00     |
| 10-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-M015-10-MAG | each | 290.00     |

## 10-inch Diamond Resin Bonded Grinding Disk with Magnetic Backing

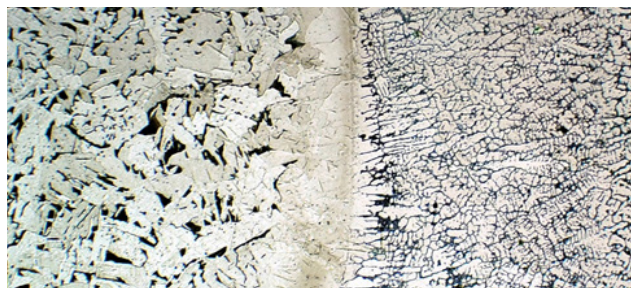


70 micron PSA Resin Bonded Diamond Disk



15 micron MAG Resin Bonded Diamond Disk

| PACE Product Name  | Catalog Number  | Qty  | Price (\$) |
|--|-----------------|------|------------|
| 10-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing | DIA-R125-10-MAG | each | 199.50     |
| 10-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R070-10-MAG | each | 199.50     |
| 10-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R035-10-MAG | each | 199.50     |
| 10-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R025-10-MAG | each | 199.50     |
| 10-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | DIA-R015-10-MAG | each | 199.50     |
| 10-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing   | DIA-R009-10-MAG | each | 199.50     |



Steel - Titanium Weld, Mag. 1000X

# DIAMOND GRINDING ABRASIVES (12-inch)

## 12-inch Metal Bonded Diamond Grinding Disk with PSA Adhesive

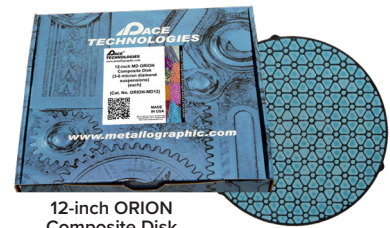
| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 12-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M250-12-PSA | each | 415.00     |
| 12-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-M125-12-PSA | each | 415.00     |
| 12-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M075-12-PSA | each | 395.00     |
| 12-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M040-12-PSA | each | 395.00     |
| 12-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M030-12-PSA | each | 395.00     |
| 12-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-M015-12-PSA | each | 395.00     |

## 12-inch Diamond Resin Bonded Grinding Disk with PSA Adhesive

| PACE Product Name   | Catalog Number  | Qty  | Price (\$) |
|---|-----------------|------|------------|
| 12-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing | DIA-R125-12-PSA | each | 265.00     |
| 12-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R070-12-PSA | each | 265.00     |
| 12-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R035-12-PSA | each | 265.00     |
| 12-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R025-12-PSA | each | 265.00     |
| 12-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing  | DIA-R015-12-PSA | each | 265.00     |
| 12-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with PSA backing   | DIA-R009-12-PSA | each | 265.00     |

## 12-inch Composite Grinding Disks

| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 12-inch MD ORION Composite Disk for 3-6 micron diamond suspensions   | ORION-MD12     | each | 195.00     |
| 12-inch MD SIRIUS Composite Disk for 6-15 micron diamond suspensions | SIRIUS-MD12    | each | 195.00     |



12-inch ORION Composite Disk

## 12-inch Magnetic Plates

| PACE Product Name                                    | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 12-inch MAGNETON Base Disk (PSA)                     | MAG-B12        | each | 65.00      |
| 12-inch MAGNEPAD Stainless Steel Magnetic Base Plate | SSMAG-P12      | each | 68.00      |
| 12-inch MAGNEPAD Teflon Coated Magnetic Base Plate   | MAG-P12        | each | 80.00      |



12-inch MAGNEPAD Teflon Base Plate

## 12-inch Metal Bonded Diamond Grinding Disk with Magnetic Backing



250 micron PSA Metal Bonded Diamond Disk



40 micron MAG Metal Bonded Diamond Disk

| PACE Product Name  | Catalog Number         | Qty  | Price (\$) |
|--|------------------------|------|------------|
| 12-inch 250 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing | <b>DIA-M250-12-MAG</b> | each | 450.00     |
| 12-inch 125 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing | <b>DIA-M125-12-MAG</b> | each | 450.00     |
| 12-inch 75 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-M075-12-MAG</b> | each | 385.00     |
| 12-inch 40 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-M040-12-MAG</b> | each | 385.00     |
| 12-inch 30 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-M030-12-MAG</b> | each | 385.00     |
| 12-inch 15 micron metal bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-M015-12-MAG</b> | each | 385.00     |

## 12-inch Diamond Resin Bonded Grinding Disk with Magnetic Backing

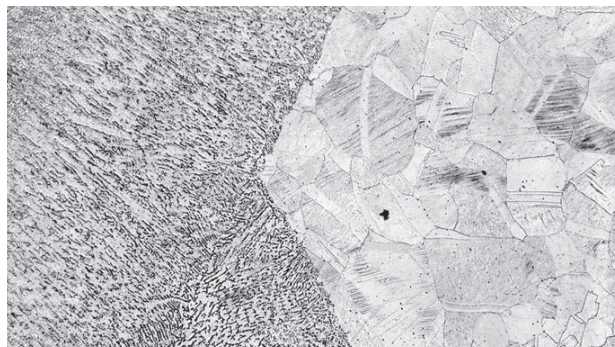


125 micron PSA Resin Bonded Diamond Disk



25 micron MAG Resin Bonded Diamond Disk

| PACE Product Name  | Catalog Number         | Qty  | Price (\$) |
|--|------------------------|------|------------|
| 12-inch 125 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing | <b>DIA-R125-12-MAG</b> | each | 295.00     |
| 12-inch 70 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-R070-12-MAG</b> | each | 295.00     |
| 12-inch 35 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-R035-12-MAG</b> | each | 295.00     |
| 12-inch 25 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-R025-12-MAG</b> | each | 295.00     |
| 12-inch 15 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing  | <b>DIA-R015-12-MAG</b> | each | 295.00     |
| 12-inch 9 micron resin bonded Diamond Abrasive Grinding Disk with magnetic backing   | <b>DIA-R009-12-MAG</b> | each | 295.00     |



Perfect Weld Joint, 50X

# PREMIUM DIAMOND GRINDING DISKS

## 8-inch Premium Metal Bonded Diamond Grinding Disk with PSA Adhesive

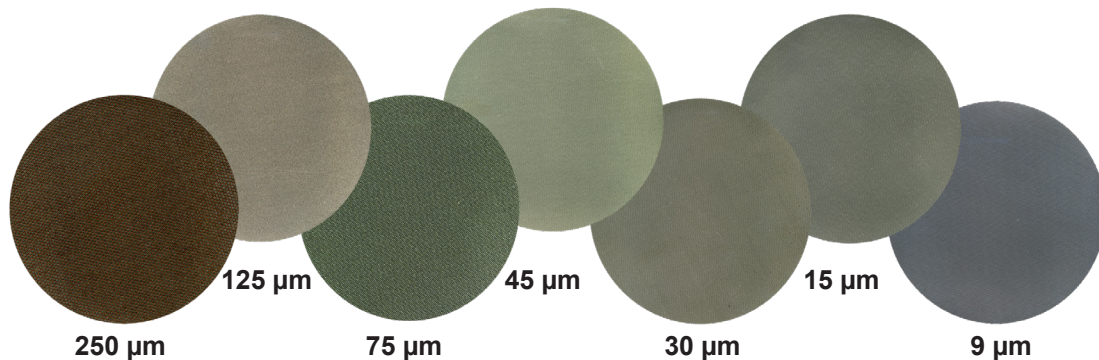
| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 8-inch 250 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-8250  | each | 450.00     |
| 8-inch 125 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-8125  | each | 395.00     |
| 8-inch 75 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-8075  | each | 395.00     |
| 8-inch 45 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-8045  | each | 345.00     |
| 8-inch 30 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-8030  | each | 345.00     |
| 8-inch 15 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-8015  | each | 345.00     |
| 8-inch 9 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive   | DIA-DISK-8009  | each | 345.00     |

## 10-inch Premium Metal Bonded Diamond Grinding Disk with PSA Adhesive

| PACE Product Name   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 10-inch 250 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-10250 | each | 765.00     |
| 10-inch 125 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-10125 | each | 710.00     |
| 10-inch 75 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-10075 | each | 710.00     |
| 10-inch 45 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-10045 | each | 710.00     |
| 10-inch 30 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-10030 | each | 655.00     |
| 10-inch 15 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-10015 | each | 655.00     |
| 10-inch 9 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive   | DIA-DISK-10009 | each | 655.00     |

## 12-inch Premium Metal Bonded Diamond Grinding Disk with PSA Adhesive

| PACE Product Name   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 12-inch 250 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-12250 | each | 1080.00    |
| 12-inch 125 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive | DIA-DISK-12125 | each | 1015.00    |
| 12-inch 75 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-12075 | each | 870.00     |
| 12-inch 45 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-12045 | each | 870.00     |
| 12-inch 30 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-12030 | each | 870.00     |
| 12-inch 15 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive  | DIA-DISK-12015 | each | 870.00     |
| 12-inch 9 micron Premium Diamond Abrasive Grinding Disk with PSA adhesive   | DIA-DISK-12009 | each | 870.00     |



## Magnetic Plates

| Magnetic Plates                              | 8-inch           |            | 10-inch          |            | 12-inch          |            |
|--|------------------|------------|------------------|------------|------------------|------------|
| PACE Product Name                            | Cat. No.         | Price (\$) | Cat. No.         | Price (\$) | Cat. No.         | Price (\$) |
| MAGNETON Base Disk (PSA)                     | <b>MAG-B08</b>   | 52.00      | <b>MAG-B10</b>   | 58.00      | <b>MAG-B12</b>   | 65.00      |
| MAGNEPAD Stainless Steel Magnetic Base Plate | <b>SSMAG-P08</b> | 58.00      | <b>SSMAG-P10</b> | 62.00      | <b>SSMAG-P12</b> | 68.00      |
| MAGNEPAD Teflon Coated Magnetic Base Plate   | <b>MAG-P08</b>   | 60.00      | <b>MAG-P10</b>   | 65.00      | <b>MAG-P12</b>   | 80.00      |

## 8-inch Premium Metal Bonded Diamond Grinding Disk with Magnetic Backing

| PACE Product Name  | Catalog Number    | Qty  | Price (\$) |
|--|-------------------|------|------------|
| 8-inch 250 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD8-250M</b> | each | 475.00     |
| 8-inch 125 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD8-125M</b> | each | 420.00     |
| 8-inch 75 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD8-75M</b>  | each | 420.00     |
| 8-inch 45 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD8-45M</b>  | each | 370.00     |
| 8-inch 30 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD8-30M</b>  | each | 370.00     |
| 8-inch 15 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD8-15M</b>  | each | 370.00     |
| 8-inch 9 micron Premium Diamond Abrasive Grinding Disk with magnetic backing   | <b>PDGD8-09M</b>  | each | 370.00     |

## 10-inch Premium Metal Bonded Diamond Grinding Disk with Magnetic Backing

| PACE Product Name   | Catalog Number     | Qty  | Price (\$) |
|---|--------------------|------|------------|
| 10-inch 250 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD10-250M</b> | each | 790.00     |
| 10-inch 125 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD10-125M</b> | each | 735.00     |
| 10-inch 75 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD10-75M</b>  | each | 735.00     |
| 10-inch 45 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD10-45M</b>  | each | 735.00     |
| 10-inch 30 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD10-30M</b>  | each | 685.00     |
| 10-inch 15 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD10-15M</b>  | each | 685.00     |
| 10-inch 9 micron Premium Diamond Abrasive Grinding Disk with magnetic backing   | <b>PDGD10-09M</b>  | each | 685.00     |

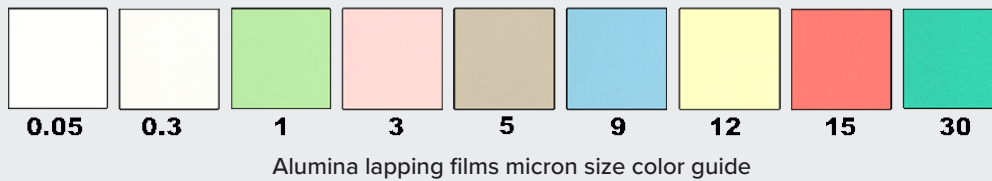
## 12-inch Premium Metal Bonded Diamond Grinding Disk with Magnetic Backing

| PACE Product Name   | Catalog Number     | Qty  | Price (\$) |
|---|--------------------|------|------------|
| 12-inch 250 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD12-250M</b> | each | 1100.00    |
| 12-inch 125 micron Premium Diamond Abrasive Grinding Disk with magnetic backing | <b>PDGD12-125M</b> | each | 1050.00    |
| 12-inch 75 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD12-75M</b>  | each | 895.00     |
| 12-inch 45 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD12-45M</b>  | each | 895.00     |
| 12-inch 30 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD12-30M</b>  | each | 895.00     |
| 12-inch 15 micron Premium Diamond Abrasive Grinding Disk with magnetic backing  | <b>PDGD12-15M</b>  | each | 895.00     |
| 12-inch 9 micron Premium Diamond Abrasive Grinding Disk with magnetic backing   | <b>PDGD12-09M</b>  | each | 895.00     |

# ABRASIVE LAPPING

## Lapping Films (Superior Flatness):

The primary advantage of coated abrasives on lapping films is improved flatness across the specimen surface. This is especially true for specimens that have a large variation in the hardness for 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, alumina and diamond. Diamond lapping films are quite common for grinding and polishing of electronic components, including silicon dies. Alumina is very useful for softer materials, such as aluminum, tin, lead, zinc; refractory materials such as rhenium, tungsten and niobium; as well as specimens having solder joints or soft coatings.



## Lapping Film Characteristics:

- ◆ Produces flatter or more planar surfaces for materials having large variations in hardness
- ◆ Alternative to paper backed abrasive products

## 8-inch Alumina Lapping Films with Plain-Backing

| PACE Product Name  | Catalog Number | Qty     | Price (\$) |
|--|----------------|---------|------------|
| 0.05 micron alumina plain-backed lapping film (8-inch) - 100/pkg | ALO-8105PB     | 100/pkg | 135.00     |
| 0.3 micron alumina plain-backed lapping film (8-inch) - 100/pkg  | ALO-8103PB     | 100/pkg | 135.00     |
| 1 micron alumina plain-backed lapping film (8-inch) - 100/pkg    | ALO-8001PB     | 100/pkg | 122.00     |
| 3 micron alumina plain-backed lapping film (8-inch) - 100/pkg    | ALO-8003PB     | 100/pkg | 122.00     |
| 5 micron alumina plain-backed lapping film (8-inch) - 100/pkg    | ALO-8005PB     | 100/pkg | 122.00     |
| 9 micron alumina plain-backed lapping film (8-inch) - 100/pkg    | ALO-8009PB     | 100/pkg | 122.00     |
| 12 micron alumina plain-backed lapping film (8-inch) - 100/pkg   | ALO-8012PB     | 100/pkg | 122.00     |
| 15 micron alumina plain-backed lapping film (8-inch) - 100/pkg   | ALO-8015PB     | 100/pkg | 122.00     |
| 30 micron alumina plain-backed lapping film (8-inch) - 100/pkg   | ALO-8030PB     | 100/pkg | 122.00     |



1 micron Alumina PB Lapping Film



5 micron Alumina PB Lapping Film

## 8-inch Alumina Lapping Films with PSA Adhesive-Backing

| PACE Product Name   | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| 0.05 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg | ALO-8105PSA    | 100/pkg | 185.00     |
| 0.3 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg  | ALO-8103PSA    | 100/pkg | 185.00     |
| 1 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg    | ALO-8001PSA    | 100/pkg | 168.00     |
| 3 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg    | ALO-8003PSA    | 100/pkg | 168.00     |
| 5 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg    | ALO-8005PSA    | 100/pkg | 168.00     |
| 9 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg    | ALO-8009PSA    | 100/pkg | 168.00     |
| 12 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg   | ALO-8012PSA    | 100/pkg | 168.00     |
| 15 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg   | ALO-8015PSA    | 100/pkg | 168.00     |
| 30 micron alumina PSA adhesive-backed lapping film (8-inch) - 100/pkg   | ALO-8030PSA    | 100/pkg | 168.00     |



3 micron Alumina PSA Lapping Film



9 micron Alumina PSA Lapping Film

# ABRASIVE LAPPING FILMS (8-inch)

## 8-inch Diamond Lapping Films with Plain-backing



1 micron Diamond PB Lapping Film



6 micron Diamond PB Lapping Film

| PACE Product Name   | Catalog Number | Qty   | Price (\$) |
|---|----------------|-------|------------|
| 0.10 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg | DA-01P8        | 5/pkg | 125.00     |
| 0.25 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg | DA-025P8       | 5/pkg | 125.00     |
| 0.50 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg | DA-05P8        | 5/pkg | 125.00     |
| 1 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg    | DA-1P8         | 5/pkg | 125.00     |
| 3 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg    | DA-3P8         | 5/pkg | 125.00     |
| 6 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg    | DA-6P8         | 5/pkg | 125.00     |
| 9 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg    | DA-9P8         | 5/pkg | 125.00     |
| 15 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg   | DA-15P8        | 5/pkg | 125.00     |
| 30 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg   | DA-30P8        | 5/pkg | 199.50     |
| 45 micron diamond lapping film, (plain-backed) (8-inch) - 5/pkg   | DA-45P8        | 5/pkg | 199.50     |

## 8-inch Diamond Lapping Films with Adhesive (PSA) Backing



0.10 micron Diamond PSA Lapping Film



9 micron Diamond PSA Lapping Film

| PACE Product Name  | Catalog Number | Qty   | Price (\$) |
|--|----------------|-------|------------|
| 0.10 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg | DAA-01P8       | 5/pkg | 145.00     |
| 0.25 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg | DAA-025P8      | 5/pkg | 145.00     |
| 0.50 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg | DAA-05P8       | 5/pkg | 145.00     |
| 1 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg    | DAA-1P8        | 5/pkg | 145.00     |
| 3 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg    | DAA-3P8        | 5/pkg | 145.00     |
| 6 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg    | DAA-6P8        | 5/pkg | 145.00     |
| 9 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg    | DAA-9P8        | 5/pkg | 145.00     |
| 15 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg   | DAA-15P8       | 5/pkg | 145.00     |
| 30 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg   | DAA-30P8       | 5/pkg | 225.00     |
| 45 micron diamond PSA adhesive-backed lapping film (8-inch)- 5/pkg   | DAA-45P8       | 5/pkg | 225.00     |



Diamond lapping films micron size color guide

DIAMOND LAPPING FILMS (8-INCH)

# ABRASIVE LAPPING FILMS (10-inch)

## 10-inch Alumina Lapping Films with Plain-Backing

| PACE Product Name   | Catalog Number     | Qty     | Price (\$) |
|---|--------------------|---------|------------|
| 0.05 micron alumina plain-backed lapping film (10-inch) - 100/pkg | <b>ALO-10105PB</b> | 100/pkg | 215.00     |
| 0.3 micron alumina plain-backed lapping film (10-inch) - 100/pkg  | <b>ALO-10103PB</b> | 100/pkg | 215.00     |
| 1 micron alumina plain-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1001PB</b>  | 100/pkg | 195.00     |
| 3 micron alumina plain-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1003PB</b>  | 100/pkg | 178.50     |
| 5 micron alumina plain-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1005PB</b>  | 100/pkg | 178.50     |
| 9 micron alumina plain-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1009PB</b>  | 100/pkg | 178.50     |
| 12 micron alumina plain-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1012PB</b>  | 100/pkg | 178.50     |
| 15 micron alumina plain-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1015PB</b>  | 100/pkg | 178.50     |
| 30 micron alumina plain-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1030PB</b>  | 100/pkg | 178.50     |



3 micron Alumina PB Lapping Film



9 micron Alumina PB Lapping Film

## 10-inch Alumina Lapping Films with PSA Adhesive-Backing

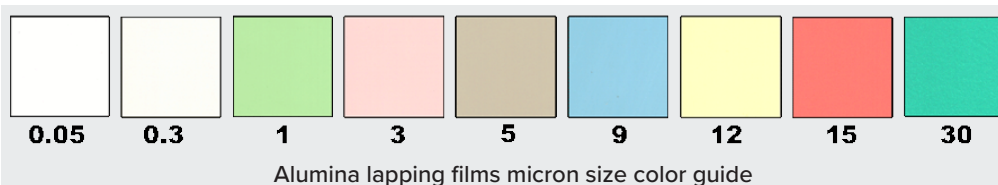
| PACE Product Name  | Catalog Number      | Qty     | Price (\$) |
|--|---------------------|---------|------------|
| 0.05 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg | <b>ALO-10105PSA</b> | 100/pkg | 320.00     |
| 0.3 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg  | <b>ALO-10103PSA</b> | 100/pkg | 320.00     |
| 1 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1001PSA</b>  | 100/pkg | 310.00     |
| 3 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1003PSA</b>  | 100/pkg | 299.00     |
| 5 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1005PSA</b>  | 100/pkg | 299.00     |
| 9 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg    | <b>ALO-1009PSA</b>  | 100/pkg | 299.00     |
| 12 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1012PSA</b>  | 100/pkg | 299.00     |
| 15 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1015PSA</b>  | 100/pkg | 299.00     |
| 30 micron alumina PSA adhesive-backed lapping film (10-inch) - 100/pkg   | <b>ALO-1030PSA</b>  | 100/pkg | 299.00     |



12 micron Alumina PSA Lapping Film



30 micron Alumina PSA Lapping Film







## 10-inch Diamond Lapping Films with Plain-backing



3 micron Diamond  
PB Lapping Film



9 micron Diamond  
PB Lapping Film

| PACE Product Name  | Catalog Number | Qty   | Price (\$) |
|--|----------------|-------|------------|
| 0.10 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg | DA-01P10       | 5/pkg | 185.00     |
| 0.25 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg | DA-025P10      | 5/pkg | 185.00     |
| 0.50 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg | DA-05P10       | 5/pkg | 185.00     |
| 1 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg    | DA-1P10        | 5/pkg | 185.00     |
| 3 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg    | DA-3P10        | 5/pkg | 185.00     |
| 6 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg    | DA-6P10        | 5/pkg | 185.00     |
| 9 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg    | DA-9P10        | 5/pkg | 185.00     |
| 15 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg   | DA-15P10       | 5/pkg | 185.00     |
| 30 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg   | DA-30P10       | 5/pkg | 225.00     |
| 45 micron diamond lapping film, (plain-backed) (10-inch) - 5/pkg   | DA-45P10       | 5/pkg | 225.00     |

## 10-inch Diamond Lapping Films with Adhesive (PSA) Backing



0.25 micron Diamond  
PSA Lapping Film



15 micron Diamond  
PSA Lapping Film

| PACE Product Name   | Catalog Number | Qty   | Price (\$) |
|---|----------------|-------|------------|
| 0.10 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg | DAA-01P10      | 5/pkg | 215.00     |
| 0.25 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg | DAA-025P10     | 5/pkg | 215.00     |
| 0.50 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg | DAA-05P10      | 5/pkg | 215.00     |
| 1 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg    | DAA-1P10       | 5/pkg | 215.00     |
| 3 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg    | DAA-3P10       | 5/pkg | 215.00     |
| 6 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg    | DAA-6P10       | 5/pkg | 215.00     |
| 9 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg    | DAA-9P10       | 5/pkg | 215.00     |
| 15 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg   | DAA-15P10      | 5/pkg | 215.00     |
| 30 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg   | DAA-30P10      | 5/pkg | 260.00     |
| 45 micron diamond PSA adhesive-backed lapping film (10-inch)- 5/pkg   | DAA-45P10      | 5/pkg | 260.00     |

# ABRASIVE LAPPING FILMS (12-inch)

## 12-inch Alumina Lapping Films with Plain-Backing

| PACE Product Name   | Catalog Number     | Qty     | Price (\$) |
|---|--------------------|---------|------------|
| 0.05 micron alumina plain-backed lapping film (12-inch) - 100/pkg | <b>ALO-12105PB</b> | 100/pkg | 240.00     |
| 0.3 micron alumina plain-backed lapping film (12-inch) - 100/pkg  | <b>ALO-12103PB</b> | 100/pkg | 240.00     |
| 1 micron alumina plain-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1201PB</b>  | 100/pkg | 225.00     |
| 3 micron alumina plain-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1203PB</b>  | 100/pkg | 215.00     |
| 5 micron alumina plain-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1205PB</b>  | 100/pkg | 215.00     |
| 9 micron alumina plain-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1209PB</b>  | 100/pkg | 215.00     |
| 12 micron alumina plain-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1212PB</b>  | 100/pkg | 215.00     |
| 15 micron alumina plain-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1215PB</b>  | 100/pkg | 215.00     |
| 30 micron alumina plain-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1230PB</b>  | 100/pkg | 215.00     |



5 micron Alumina PB Lapping Film



12 micron Alumina PB Lapping Film

## 12-inch Alumina Lapping Films with PSA Adhesive-Backing

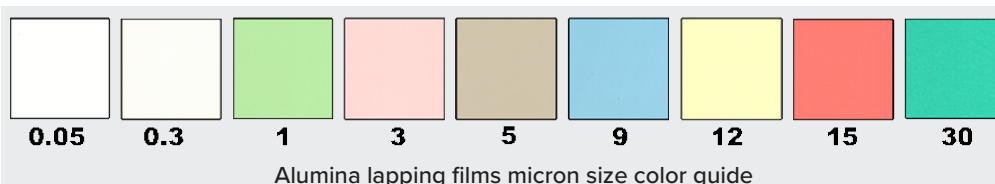
| PACE Product Name  | Catalog Number      | Qty     | Price (\$) |
|--|---------------------|---------|------------|
| 0.05 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg | <b>ALO-12105PSA</b> | 100/pkg | 355.00     |
| 0.3 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg  | <b>ALO-12103PSA</b> | 100/pkg | 355.00     |
| 1 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1201PSA</b>  | 100/pkg | 345.00     |
| 3 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1203PSA</b>  | 100/pkg | 345.00     |
| 5 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1205PSA</b>  | 100/pkg | 345.00     |
| 9 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg    | <b>ALO-1209PSA</b>  | 100/pkg | 345.00     |
| 12 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1212PSA</b>  | 100/pkg | 345.00     |
| 15 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1215PSA</b>  | 100/pkg | 345.00     |
| 30 micron alumina PSA adhesive-backed lapping film (12-inch) - 100/pkg   | <b>ALO-1230PSA</b>  | 100/pkg | 345.00     |



9 micron Alumina PSA Lapping Film



30 micron Alumina PSA Lapping Film





## 12-inch Diamond Lapping Films with Plain-backing



6 micron Diamond  
PB Lapping Film



15 micron Diamond  
PB Lapping Film

| PACE Product Name  | Catalog Number | Qty   | Price (\$) |
|--|----------------|-------|------------|
| 0.10 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg | DA-01P12       | 3/pkg | 225.00     |
| 0.25 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg | DA-025P12      | 3/pkg | 225.00     |
| 0.50 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg | DA-05P12       | 3/pkg | 225.00     |
| 1 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg    | DA-1P12        | 3/pkg | 225.00     |
| 3 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg    | DA-3P12        | 3/pkg | 225.00     |
| 6 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg    | DA-6P12        | 3/pkg | 225.00     |
| 9 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg    | DA-9P12        | 3/pkg | 225.00     |
| 15 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg   | DA-15P12       | 3/pkg | 225.00     |
| 30 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg   | DA-30P12       | 3/pkg | 275.00     |
| 45 micron diamond lapping film, (plain-backed) (12-inch) - 3/pkg   | DA-45P12       | 3/pkg | 275.00     |

## 12-inch Diamond Lapping Films with Adhesive (PSA) Backing



0.5 micron Diamond  
PSA Lapping Film



30 micron Diamond  
PSA Lapping Film

| PACE Product Name   | Catalog Number | Qty   | Price (\$) |
|---|----------------|-------|------------|
| 0.10 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg | DAA-01P12      | 3/pkg | 265.00     |
| 0.25 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg | DAA-025P12     | 3/pkg | 265.00     |
| 0.50 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg | DAA-05P12      | 3/pkg | 265.00     |
| 1 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg    | DAA-1P12       | 3/pkg | 265.00     |
| 3 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg    | DAA-3P12       | 3/pkg | 265.00     |
| 6 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg    | DAA-6P12       | 3/pkg | 265.00     |
| 9 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg    | DAA-9P12       | 3/pkg | 265.00     |
| 15 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg   | DAA-15P12      | 3/pkg | 265.00     |
| 30 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg   | DAA-30P12      | 3/pkg | 310.00     |
| 45 micron diamond PSA adhesive-backed lapping film (12-inch)- 3/pkg   | DAA-45P12      | 3/pkg | 310.00     |

# SPECIALTY ABRASIVE GRINDING SURFACES

## Alumina Grinding Abrasives (Reduced Embedded Abrasives):

Alumina abrasives are typically used for grinding specimens that have a tendency to embed abrasive particles such as friable silicon carbide. 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 more durable and do not fracture as easily.



Alumina Grinding Papers

## 8-inch Alumina Grinding Papers with Plain-Backing

| PACE Product Name   | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| P120 grit ALO plain-backed grinding paper (8-inch)-100/pkg  | ALO-2108-P120  | 100/pkg | 78.00      |
| P220 grit ALO plain-backed grinding paper (8-inch)-100/pkg  | ALO-2108-P220  | 100/pkg | 78.00      |
| P500 grit ALO plain-backed grinding paper (8-inch)-100/pkg  | ALO-2108-P500  | 100/pkg | 78.00      |
| P1200 grit ALO plain-backed grinding paper (8-inch)-100/pkg | ALO-2108-P1200 | 100/pkg | 78.00      |

## 10-inch Alumina Grinding Papers with Plain-Backing

| PACE Product Name  | Catalog Number | Qty     | Price (\$) |
|--|----------------|---------|------------|
| P120 grit ALO plain-backed grinding paper (10-inch)-100/pkg  | ALO-2110-P120  | 100/pkg | 132.00     |
| P220 grit ALO plain-backed grinding paper (10-inch)-100/pkg  | ALO-2110-P220  | 100/pkg | 132.00     |
| P500 grit ALO plain-backed grinding paper (10-inch)-100/pkg  | ALO-2110-P500  | 100/pkg | 132.00     |
| P1200 grit ALO plain-backed grinding paper (10-inch)-100/pkg | ALO-2110-P1200 | 100/pkg | 132.00     |

## 12-inch Alumina Grinding Papers with Plain-Backing

| PACE Product Name  | Catalog Number | Qty     | Price (\$) |
|--|----------------|---------|------------|
| P120 grit ALO plain-backed grinding paper (12-inch)-100/pkg  | ALO-2112-P120  | 100/pkg | 142.00     |
| P220 grit ALO plain-backed grinding paper (12-inch)-100/pkg  | ALO-2112-P220  | 100/pkg | 142.00     |
| P500 grit ALO plain-backed grinding paper (12-inch)-100/pkg  | ALO-2112-P500  | 100/pkg | 142.00     |
| P1200 grit ALO plain-backed grinding paper (12-inch)-100/pkg | ALO-2112-P1200 | 100/pkg | 142.00     |

## Zirconia Grinding Abrasives (Very Durable Abrasive):

Zirconia is a very durable and hard abrasive. It is a longer lasting abrasive and is an excellent choice for belts grinders and for planar grinding steps on rotary grinder/polishers. The primary drawback is that zirconia grinding requires higher grinding forces as compared to SiC and alumina abrasives. It is also only available in coarser grit sizes.

## 8-inch Alumina Grinding Papers with PSA Adhesive-Backing



P220 grit 8-inch Alumina PSA-backed Paper (100/pkg)  
Catalog no. ALO-220P8-100

| PACE Product Name  | Catalog Number        | Qty     | Price (\$) |
|--|-----------------------|---------|------------|
| P120 grit ALO PSA adhesive-backed grinding paper (8-inch)-100/pkg  | <b>ALO-120P8-100</b>  | 100/pkg | 132.00     |
| P220 grit ALO PSA adhesive-backed grinding paper (8-inch)-100/pkg  | <b>ALO-220P8-100</b>  | 100/pkg | 132.00     |
| P500 grit ALO PSA adhesive-backed grinding paper (8-inch)-100/pkg  | <b>ALO-500P8-100</b>  | 100/pkg | 132.00     |
| P1200 grit ALO PSA adhesive-backed grinding paper (8-inch)-100/pkg | <b>ALO-1200P8-100</b> | 100/pkg | 132.00     |

## 10-inch Alumina Grinding Papers with PSA Adhesive-Backing



P500 grit 10-inch Alumina Plain-backed Paper (100/pkg)  
Catalog no. ALO-2110-P500

| PACE Product Name   | Catalog Number         | Qty     | Price (\$) |
|---|------------------------|---------|------------|
| P120 grit ALO PSA adhesive-backed grinding paper (10-inch)-100/pkg  | <b>ALO-120P10-100</b>  | 100/pkg | 158.00     |
| P220 grit ALO PSA adhesive-backed grinding paper (10-inch)-100/pkg  | <b>ALO-220P10-100</b>  | 100/pkg | 158.00     |
| P500 grit ALO PSA adhesive-backed grinding paper (10-inch)-100/pkg  | <b>ALO-500P10-100</b>  | 100/pkg | 158.00     |
| P1200 grit ALO PSA adhesive-backed grinding paper (10-inch)-100/pkg | <b>ALO-1200P10-100</b> | 100/pkg | 158.00     |

## 12-inch Alumina Grinding Papers with PSA Adhesive-Backing



P1200 grit 12-inch Alumina PSA-backed Paper (100/pkg)  
Catalog no. ALO-1200P12-100

| PACE Product Name   | Catalog Number         | Qty     | Price (\$) |
|---|------------------------|---------|------------|
| P120 grit ALO PSA adhesive-backed grinding paper (12-inch)-100/pkg  | <b>ALO-120P12-100</b>  | 100/pkg | 265.00     |
| P220 grit ALO PSA adhesive-backed grinding paper (12-inch)-100/pkg  | <b>ALO-220P12-100</b>  | 100/pkg | 265.00     |
| P500 grit ALO PSA adhesive-backed grinding paper (12-inch)-100/pkg  | <b>ALO-500P12-100</b>  | 100/pkg | 265.00     |
| P1200 grit ALO PSA adhesive-backed grinding paper (12-inch)-100/pkg | <b>ALO-1200P12-100</b> | 100/pkg | 265.00     |

## Zirconia Grinding Papers with PSA Adhesive-Backing



Zirconia Grinding Papers

| PACE Product Name   | Catalog Number      | Qty    | Price (\$) |
|---|---------------------|--------|------------|
| 120 grit Zirconia PSA adhesive-backed grinding paper (8-inch)-25/pkg  | <b>ZR-120P08-25</b> | 25/pkg | 140.00     |
| 220 grit Zirconia PSA adhesive-backed grinding paper (8-inch)-25/pkg  | <b>ZR-220P08-25</b> | 25/pkg | 140.00     |
| 120 grit Zirconia PSA adhesive-backed grinding paper (10-inch)-25/pkg | <b>ZR-120P10-25</b> | 25/pkg | 215.00     |
| 220 grit Zirconia PSA adhesive-backed grinding paper (10-inch)-25/pkg | <b>ZR-220P10-25</b> | 25/pkg | 215.00     |
| 120 grit Zirconia PSA adhesive-backed grinding paper (12-inch)-25/pkg | <b>ZR-120P12-25</b> | 25/pkg | 245.00     |
| 220 grit Zirconia PSA adhesive-backed grinding paper (12-inch)-25/pkg | <b>ZR-220P12-25</b> | 25/pkg | 245.00     |

# METALLOGRAPHIC POLISHING

## 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, as well as, utilizing proper polishing machine conditions (speed, direction and force).

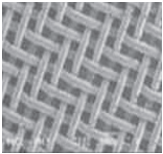

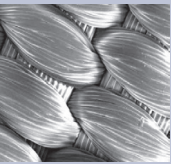

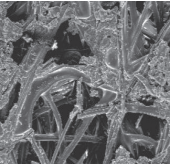

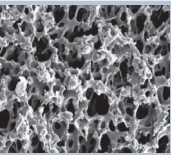

### Minimizing Polishing Artifacts

To minimize polishing artifacts such as edge rounding, phase relief, smeared metal, grain pull-out and inclusion pull-out, the polishing time should be kept to a minimum. This can be accomplished by:

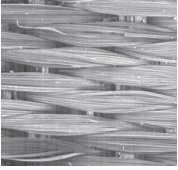

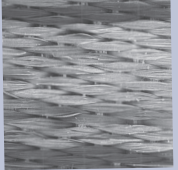

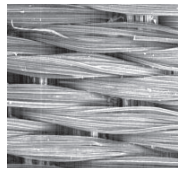
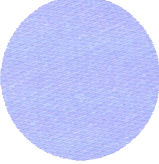
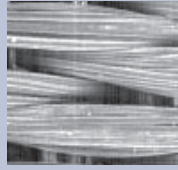

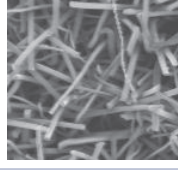

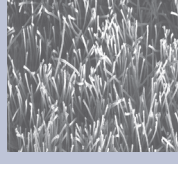

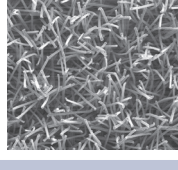

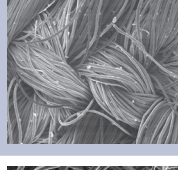

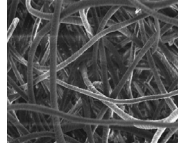

- ◆ minimizing sectioning damage
- ◆ grinding with the finest feasible abrasives
- ◆ using flat polishing base plates

Minimizing sectioning damage and using the correct grinding abrasives are fairly obvious. However, using a flat supporting plate is generally overlooked by most suppliers of metallographic equipment, and if they do consider plate flatness they generally do not go far enough. As a guideline, an 8-inch plate should have no more than a 0.0001 inch (2.5 micron) run out, which represents a 0.6 micron run out over a 1-inch diameter specimen. Recognize that final polishing abrasives have a typical size of 0.05-0.06 micron, thus these tolerances are required to minimize polishing times. In addition, if the specimen is not flat on the polishing plate then a differential pressure occurs across the specimen, which causes polishing relief. Likewise for a 12-inch diameter plate the run out should not exceed 0.0002 inches (5 micron). As a result both polishing times and differential polishing pressures can be minimized.

**Suggestion:** If your polishing plate is not flat within these tolerances they should be lapped to these tighter tolerances.

| SEM Image   | Polishing Pad Description   | Abrasive Application  | Product Image   |
|---|---|---|---|
|  | <b>CERMESH</b> Metal Mesh cloth - this is a wire mesh material 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 or 15 micron diamond suspensions                               |  |
|  | <b>POLYPAD</b> Polishing Pad - this cloth is a synthetic polyester polishing pad which has a similar action to a nylon pad, with the exception that it is much more durable. It is used in the intermediate polishing steps   | 15, 9 or 6 micron diamond suspensions                                 |  |
|  | <b>TEXPAN</b> Polishing Pad - this is the most commonly used polishing cloth material for the intermediate diamond polishing steps. TEXPAN Polishing pad is a non-woven polishing pad   | 9 or 6 micron diamond and 3 or 1 micron diamond with colloidal silica |  |
|  | <b>Black CHEM 2</b> Polishing Pad this is a porometric polymer pad which has a consistency similar to a rubber type of pad. Black CHEM 2 pad has a low nap but behaves as an intermediate polishing pad with a performance between low napped and high napped pads          | Colloidal silica or diamond and colloidal silica mixtures             |  |

# METALLOGRAPHIC POLISHING PADS

| SEM Image   | Polishing Pad Description  | Abrasive Application  | Product Image   |
|---|--|---|---|
|    | <b>GOLDPAD</b> Polishing Pad is a woven polishing pad for intermediate polishing primarily with 1-9 micron diamond   | 9 or 6 micron diamond and 3 or 1 micron diamond with colloidal silica |    |
|    | <b>NYPAD</b> Polishing Pad - this is a woven silk polishing pad for intermediate polishing primarily with intermediate diamond abrasives   | 9 or 6 micron diamond and 3 or 1 micron diamond with colloidal silica |    |
|    | <b>DACRON II</b> Polishing Cloth - this is a woven polishing pad for polishing primarily with 1-15 micron diamond abrasives. The DACRON II pad is the most popular intermediate polishing pad in Europe and is used mostly for polishing metals. Its higher nap provides a very soft and gentle polishing action | 3 or 1 micron diamond or alumina                                      |    |
|   | <b>ATLANTIS</b> Polishing Pad - is a woven low polishing pad with a foam backing for better matting to the specimen sample. It is an excellent polishing pad for 1-6 micron diamond  | 3 or 1 micron diamond or alumina                                      |   |
|  | <b>MICROPAD</b> Polishing Cloth - this is the most common high napped final polishing pad for most metals and polymers. Its high nap provides it a very soft and gentle polishing action   | 1 micron or finer final polishing diamond or alumina                  |  |
|  | <b>TRICOTE</b> Polishing Pad - a tight high napped final polishing pad for most metals. It has a tighter nap than the MICROPAD Polishing Pads  | 1 micron or finer final polishing diamond or alumina                  |  |
|  | <b>NAPPAD</b> Polishing Pad - this is another high napped final polishing pad useful for most metals and polymers. It has a higher nap than MICROPAD, providing it with a very gentle polishing action which is very useful for polishing soft materials such as copper, aluminum and austenitic steels          | Alumina or colloidal silica polishing                                 |  |
|  | <b>MOLTEC 2</b> Polishing Pad - this is wool polishing cloth used for final polishing and has a very high nap. It is most commonly used for final polishing metals where edge retention is a minimal consideration   | Alumina or colloidal silica polishing                                 |  |
|  | <b>FELT PAD</b> Polishing Pad - this is a thick felt pad used for final polishing glass and large surface area parts   | Alumina or colloidal silica polishing                                 |  |

# METALLOGRAPHIC POLISHING PADS (8 & 9-inch)

## 8-inch Polishing Pads with PSA Adhesive-Backing

| PACE Product Name                          | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| <b>Rough Polishing</b>                     |                   |        |            |
| 8-inch CERMESH metal mesh cloth (5/pkg)    | <b>CMESH-2008</b> | 5/pkg  | 102.00     |
| 8-inch POLYPAD polishing pad (10/pkg)      | <b>PP-6008</b>    | 10/pkg | 68.00      |
| <b>Intermediate Diamond Polishing</b>      |                   |        |            |
| 8-inch TEXPAN polishing pad (10/pkg)       | <b>TP-5008</b>    | 10/pkg | 60.00      |
| 8-inch DACRON II® polishing pad (5/pkg)    | <b>DC2-3008</b>   | 5/pkg  | 90.00      |
| 8-inch NYPAD polishing pad (10/pkg)        | <b>NY-3008</b>    | 10/pkg | 70.00      |
| 8-inch GOLDPAD polishing pad (10/pkg)      | <b>GP-4008</b>    | 10/pkg | 68.00      |
| 8-inch ATLANTIS polishing pad (5/pkg)      | <b>ATL-3008</b>   | 5/pkg  | 55.00      |
| <b>Final Polishing</b>                     |                   |        |            |
| 8-inch TRICOTE polishing pad (10/pkg)      | <b>TRI-4008</b>   | 10/pkg | 55.00      |
| 8-inch MICROPAD polishing pad (10/pkg)     | <b>MP-9008</b>    | 10/pkg | 55.00      |
| 8-inch NAPPAD polishing pad (10/pkg)       | <b>NP-7008</b>    | 10/pkg | 55.00      |
| 8-inch MOLTEC 2 polishing pad (5/pkg)      | <b>MT2-7008</b>   | 5/pkg  | 62.00      |
| 8-inch FELTPAD polishing pad (5/pkg)       | <b>FP-8125-08</b> | 5/pkg  | 62.00      |
| <b>CMP Polishing</b>                       |                   |        |            |
| 8-inch Black CHEM 2 polishing pad (10/pkg) | <b>BC2-8008</b>   | 10/pkg | 135.00     |



8-inch CERMESH Pad  
Catalog no. CERMESH-2008



8-inch POLYPAD Pad  
Catalog no. PP-6008

## 8-inch Polishing Pads with Magnetic Rubber-Backing

| PACE Product Name   | Catalog Number        | Qty   | Price (\$) |
|---|-----------------------|-------|------------|
| <b>Rough Polishing</b>                                    |                       |       |            |
| 8-inch CERMESH magnetic rubber metal mesh cloth (5/pkg)   | <b>CMESH-2008-MAG</b> | 5/pkg | 122.00     |
| 8-inch POLYPAD magnetic rubber polishing pad (5/pkg)      | <b>PP-6008-MAG</b>    | 5/pkg | 75.00      |
| <b>Intermediate Diamond Polishing</b>                     |                       |       |            |
| 8-inch TEXPAN magnetic rubber polishing pad (5/pkg)       | <b>TP-5008-MAG</b>    | 5/pkg | 62.00      |
| 8-inch DACRON II® magnetic rubber polishing pad (5/pkg)   | <b>DC2-3008-MAG</b>   | 5/pkg | 125.00     |
| 8-inch NYPAD magnetic rubber polishing pad (5/pkg)        | <b>NY-3008-MAG</b>    | 5/pkg | 65.00      |
| 8-inch GOLDPAD magnetic rubber polishing pad (5/pkg)      | <b>GP-4008-MAG</b>    | 5/pkg | 62.00      |
| 8-inch ATLANTIS magnetic rubber polishing pad (5/pkg)     | <b>ATL-3008-MAG</b>   | 5/pkg | 68.00      |
| <b>Final Polishing</b>                                    |                       |       |            |
| 8-inch TRICOTE magnetic rubber polishing pad (5/pkg)      | <b>TRI-4008-MAG</b>   | 5/pkg | 78.00      |
| 8-inch MICROPAD magnetic rubber polishing pad (5/pkg)     | <b>MP-9008-MAG</b>    | 5/pkg | 62.00      |
| 8-inch NAPPAD magnetic rubber polishing pad (5/pkg)       | <b>NP-7008-MAG</b>    | 5/pkg | 60.00      |
| 8-inch MOLTEC 2 magnetic rubber polishing pad (5/pkg)     | <b>MT2-7008-MAG</b>   | 5/pkg | 72.00      |
| 8-inch FELTPAD magnetic rubber polishing pad (5/pkg)      | <b>FP-8125-08-MAG</b> | 5/pkg | 75.00      |
| <b>CMP Polishing</b>                                      |                       |       |            |
| 8-inch Black CHEM 2 magnetic rubber polishing pad (5/pkg) | <b>BC2-8008-MAG</b>   | 5/pkg | 135.00     |



8-inch DACRON MAG Pad  
Catalog no. DC2-3008-MAG



8-inch MOLTEC MAG Pad  
Catalog no. MT2-7008-MAG



## 8-inch Polishing Pads with Magnetic Stainless Steel-Backing

| PACE Product Name  | Catalog Number          | Qty   | Price (\$) |
|--|-------------------------|-------|------------|
| <b>Rough Polishing</b>   |                         |       |            |
| 8-inch CERMESH magnetic stainless steel metal mesh cloth (5/pkg)             | <b>CMESH-2008-SSMAG</b> | 5/pkg | 135.00     |
| 8-inch POLYPAD magnetic stainless steel polishing pad (5/pkg)                | <b>PP-6008-SSMAG</b>    | 5/pkg | 92.00      |
| <b>Intermediate Diamond Polishing</b>  |                         |       |            |
| 8-inch TEXPAN magnetic stainless steel polishing pad (5/pkg)                 | <b>TP-5008-SSMAG</b>    | 5/pkg | 85.00      |
| 8-inch DACRON II <sup>®</sup> magnetic stainless steel polishing pad (5/pkg) | <b>DC2-3008-SSMAG</b>   | 5/pkg | 155.00     |
| 8-inch NYPAD magnetic stainless steel polishing pad (5/pkg)                  | <b>NY-3008-SSMAG</b>    | 5/pkg | 90.00      |
| 8-inch GOLDPAD magnetic stainless steel polishing pad (5/pkg)                | <b>GP-4008-SSMAG</b>    | 5/pkg | 80.00      |
| 8-inch ATLANTIS magnetic stainless steel polishing pad (5/pkg)               | <b>ATL-3008-SSMAG</b>   | 5/pkg | 80.00      |
| <b>Final Polishing</b>   |                         |       |            |
| 8-inch TRICOTE magnetic stainless steel polishing pad (5/pkg)                | <b>TRI-4008-SSMAG</b>   | 5/pkg | 85.00      |
| 8-inch MICROPAD magnetic stainless steel polishing pad (5/pkg)               | <b>MP-9008-SSMAG</b>    | 5/pkg | 80.00      |
| 8-inch NAPPAD magnetic stainless steel polishing pad (5/pkg)                 | <b>NP-7008-SSMAG</b>    | 5/pkg | 82.00      |
| 8-inch MOLTEC 2 magnetic stainless steel polishing pad (5/pkg)               | <b>MT2-7008-SSMAG</b>   | 5/pkg | 80.00      |
| 8-inch FELTPAD magnetic stainless steel polishing pad (5/pkg)                | <b>FP-8125-08-SSMAG</b> | 5/pkg | 80.00      |
| <b>CMP Polishing</b>   |                         |       |            |
| 8-inch Black CHEM 2 magnetic stainless steel polishing pad (5/pkg)           | <b>BC2-8008-SSMAG</b>   | 5/pkg | 155.00     |

## 9-inch Polishing Pads with PSA Adhesive-Backing



**GIGA-S Vibratory Polisher  
with 9-inch polishing bowl**

| PACE Product Name                          | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| <b>Rough Polishing</b>                     |                   |        |            |
| 9-inch CERMESH metal mesh cloth (5/pkg)    | <b>CMESH-2009</b> | 5/pkg  | 155.00     |
| 9-inch POLYPAD polishing pad (10/pkg)      | <b>PP-6009</b>    | 10/pkg | 90.00      |
| <b>Intermediate Diamond Polishing</b>      |                   |        |            |
| 9-inch TEXPAN polishing pad (10/pkg)       | <b>TP-5009</b>    | 10/pkg | 78.00      |
| 9-inch NYPAD polishing pad (10/pkg)        | <b>NY-3009</b>    | 10/pkg | 80.00      |
| 9-inch GOLDPAD polishing pad (10/pkg)      | <b>GP-4009</b>    | 10/pkg | 80.00      |
| 9-inch ATLANTIS polishing pad (5/pkg)      | <b>ATL-3009</b>   | 5/pkg  | 65.00      |
| <b>Final Polishing</b>                     |                   |        |            |
| 9-inch TRICOTE polishing pad (10/pkg)      | <b>TRI-4009</b>   | 10/pkg | 72.00      |
| 9-inch MICROPAD polishing pad (10/pkg)     | <b>MP-9009</b>    | 10/pkg | 65.00      |
| 9-inch NAPPAD polishing pad (10/pkg)       | <b>NP-7009</b>    | 10/pkg | 70.00      |
| 9-inch MOLTEC 2 polishing pad (5/pkg)      | <b>MT2-7009</b>   | 5/pkg  | 80.00      |
| 9-inch FELTPAD polishing pad (5/pkg)       | <b>FP-8125-09</b> | 5/pkg  | 80.00      |
| <b>CMP Polishing</b>                       |                   |        |            |
| 9-inch Black CHEM 2 polishing pad (10/pkg) | <b>BC2-8009</b>   | 10/pkg | 158.00     |

# METALLOGRAPHIC POLISHING PADS (10-inch)

## 10-inch Polishing Pads with PSA Adhesive-Backing

| PACE Product Name                                    | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| <b>Rough Polishing</b>                               |                   |        |            |
| 10-inch CERMESH metal mesh cloth (5/pkg)             | <b>CMESH-2010</b> | 5/pkg  | 175.00     |
| 10-inch POLYPAD polishing pad (10/pkg)               | <b>PP-6010</b>    | 10/pkg | 105.00     |
| <b>Intermediate Diamond Polishing</b>                |                   |        |            |
| 10-inch TEXPAN polishing pad (10/pkg)                | <b>TP-5010</b>    | 10/pkg | 95.00      |
| 10-inch DACRON II <sup>®</sup> polishing pad (5/pkg) | <b>DC2-3010</b>   | 5/pkg  | 115.00     |
| 10-inch NYPAD polishing pad (10/pkg)                 | <b>NY-3010</b>    | 10/pkg | 90.00      |
| 10-inch GOLDPAD polishing pad (10/pkg)               | <b>GP-4010</b>    | 10/pkg | 90.00      |
| 10-inch ATLANTIS polishing pad (5/pkg)               | <b>ATL-3010</b>   | 5/pkg  | 70.00      |
| <b>Final Polishing</b>                               |                   |        |            |
| 10-inch TRICOTE polishing pad (10/pkg)               | <b>TRI-4010</b>   | 10/pkg | 90.00      |
| 10-inch MICROPAD polishing pad (10/pkg)              | <b>MP-9010</b>    | 10/pkg | 78.00      |
| 10-inch NAPPAD polishing pad (10/pkg)                | <b>NP-7010</b>    | 10/pkg | 90.00      |
| 10-inch MOLTEC 2 polishing pad (5/pkg)               | <b>MT2-7010</b>   | 5/pkg  | 80.00      |
| 10-inch FELTPAD polishing pad (5/pkg)                | <b>FP-8125-10</b> | 5/pkg  | 80.00      |
| <b>CMP Polishing</b>                                 |                   |        |            |
| 10-inch Black CHEM 2 polishing pad (10/pkg)          | <b>BC2-8010</b>   | 10/pkg | 168.00     |



10-inch Black CHEM 2 Pad  
Catalog no. **BC2-8010**



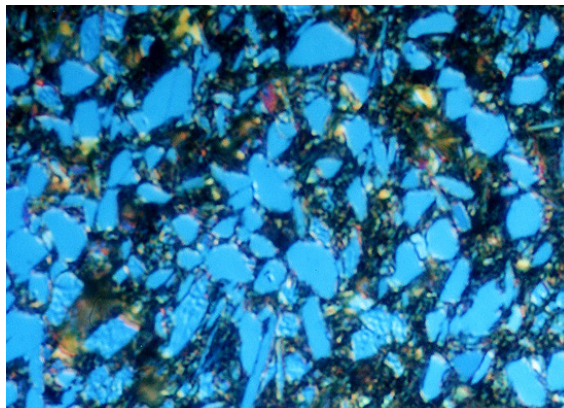
10-inch GOLDPAD Pad  
Catalog no. **GP-4010**

## 10-inch Polishing Pads with Magnetic Rubber-Backing

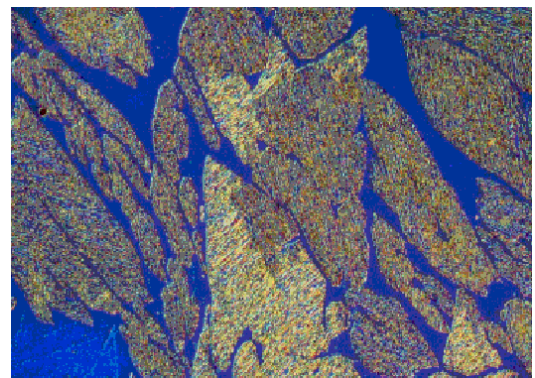
| PACE Product Name  | Catalog Number        | Qty   | Price (\$) |
|--|-----------------------|-------|------------|
| <b>Rough Polishing</b>   |                       |       |            |
| 10-inch CERMESH magnetic rubber metal mesh cloth (5/pkg)             | <b>CMESH-2010-MAG</b> | 5/pkg | 205.00     |
| 10-inch POLYPAD magnetic rubber polishing pad (5/pkg)                | <b>PP-6010-MAG</b>    | 5/pkg | 95.00      |
| <b>Intermediate Diamond Polishing</b>                                |                       |       |            |
| 10-inch TEXPAN magnetic rubber polishing pad (5/pkg)                 | <b>TP-5010-MAG</b>    | 5/pkg | 90.00      |
| 10-inch DACRON II <sup>®</sup> magnetic rubber polishing pad (5/pkg) | <b>DC2-3010-MAG</b>   | 5/pkg | 165.00     |
| 10-inch NYPAD magnetic rubber polishing pad (5/pkg)                  | <b>NY-3010-MAG</b>    | 5/pkg | 90.00      |
| 10-inch GOLDPAD magnetic rubber polishing pad (5/pkg)                | <b>GP-4010-MAG</b>    | 5/pkg | 80.00      |
| 10-inch ATLANTIS magnetic rubber polishing pad (5/pkg)               | <b>ATL-3010-MAG</b>   | 5/pkg | 98.00      |
| <b>Final Polishing</b>   |                       |       |            |
| 10-inch TRICOTE magnetic rubber polishing pad (5/pkg)                | <b>TRI-4010-MAG</b>   | 5/pkg | 115.00     |
| 10-inch MICROPAD magnetic rubber polishing pad (5/pkg)               | <b>MP-9010-MAG</b>    | 5/pkg | 80.00      |
| 10-inch NAPPAD magnetic rubber polishing pad (5/pkg)                 | <b>NP-7010-MAG</b>    | 5/pkg | 80.00      |
| 10-inch MOLTEC 2 magnetic rubber polishing pad (5/pkg)               | <b>MT2-7010-MAG</b>   | 5/pkg | 110.00     |
| 10-inch FELTPAD magnetic rubber polishing pad (5/pkg)                | <b>FP-8125-10-MAG</b> | 5/pkg | 112.00     |
| <b>CMP Polishing</b>   |                       |       |            |
| 10-inch Black CHEM 2 magnetic rubber polishing pad (5/pkg)           | <b>BC2-8010-MAG</b>   | 5/pkg | 165.00     |

## 10-inch Polishing Pads with Magnetic Stainless Steel-Backing

| PACE Product Name   | Catalog Number          | Qty   | Price (\$) |
|---|-------------------------|-------|------------|
| <b>Rough Polishing</b>  |                         |       |            |
| 10-inch CERMESH magnetic stainless steel metal mesh cloth (5/pkg)             | <b>CMESH-2010-SSMAG</b> | 5/pkg | 220.00     |
| 10-inch POLYPAD magnetic stainless steel polishing pad (5/pkg)                | <b>PP-6010-SSMAG</b>    | 5/pkg | 135.00     |
| <b>Intermediate Diamond Polishing</b>   |                         |       |            |
| 10-inch TEXPAN magnetic stainless steel polishing pad (5/pkg)                 | <b>TP-5010-SSMAG</b>    | 5/pkg | 125.00     |
| 10-inch DACRON II <sup>®</sup> magnetic stainless steel polishing pad (5/pkg) | <b>DC2-3010-SSMAG</b>   | 5/pkg | 180.00     |
| 10-inch NYPAD magnetic stainless steel polishing pad (5/pkg)                  | <b>NY-3010-SSMAG</b>    | 5/pkg | 135.00     |
| 10-inch GOLDPAD magnetic stainless steel polishing pad (5/pkg)                | <b>GP-4010-SSMAG</b>    | 5/pkg | 105.00     |
| 10-inch ATLANTIS magnetic stainless steel polishing pad (5/pkg)               | <b>ATL-3010-SSMAG</b>   | 5/pkg | 125.00     |
| <b>Final Polishing</b>  |                         |       |            |
| 10-inch TRICOTE magnetic stainless steel polishing pad (5/pkg)                | <b>TRI-4010-SSMAG</b>   | 5/pkg | 130.00     |
| 10-inch MICROPAD magnetic stainless steel polishing pad (5/pkg)               | <b>MP-9010-SSMAG</b>    | 5/pkg | 112.00     |
| 10-inch NAPPAD magnetic stainless steel polishing pad (5/pkg)                 | <b>NP-7010-SSMAG</b>    | 5/pkg | 112.00     |
| 10-inch MOLTEC 2 magnetic stainless steel polishing pad (5/pkg)               | <b>MT2-7010-SSMAG</b>   | 5/pkg | 125.00     |
| 10-inch FELTPAD magnetic stainless steel polishing pad (5/pkg)                | <b>FP-8125-10-SSMAG</b> | 5/pkg | 125.00     |
| <b>CMP Polishing</b>  |                         |       |            |
| 10-inch Black CHEM 2 magnetic stainless steel polishing pad (5/pkg)           | <b>BC2-8010-SSMAG</b>   | 5/pkg | 180.00     |



Zirconium Diboride particles in a Titanium Matrix, etched, 1000X (DIC)



431 Stainless Steel, mag. 400X, etched with Modified Murakami's

# METALLOGRAPHIC POLISHING PADS (12-inch)

## 12-inch Polishing Pads with PSA Adhesive-Backing

| PACE Product Name                                    | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| <b>Rough Polishing</b>                               |                   |        |            |
| 12-inch CERMESH metal mesh cloth (5/pkg)             | <b>CMESH-2012</b> | 5/pkg  | 215.00     |
| 12-inch POLYPAD polishing pad (10/pkg)               | <b>PP-6012</b>    | 10/pkg | 120.00     |
| <b>Intermediate Diamond Polishing</b>                |                   |        |            |
| 12-inch TEXPAN polishing pad (10/pkg)                | <b>TP-5012</b>    | 10/pkg | 125.00     |
| 12-inch DACRON II <sup>®</sup> polishing pad (5/pkg) | <b>DC2-3012</b>   | 5/pkg  | 165.00     |
| 12-inch NYPAD polishing pad (10/pkg)                 | <b>NY-3012</b>    | 10/pkg | 125.00     |
| 12-inch GOLDPAD polishing pad (10/pkg)               | <b>GP-4012</b>    | 10/pkg | 125.00     |
| 12-inch ATLANTIS polishing pad (5/pkg)               | <b>ATL-3012</b>   | 5/pkg  | 90.00      |
| <b>Final Polishing</b>                               |                   |        |            |
| 12-inch TRICOTE polishing pad (10/pkg)               | <b>TRI-4012</b>   | 10/pkg | 125.00     |
| 12-inch MICROPAD polishing pad (10/pkg)              | <b>MP-9012</b>    | 10/pkg | 105.00     |
| 12-inch NAPPAD polishing pad (10/pkg)                | <b>NP-7012</b>    | 10/pkg | 105.00     |
| 12-inch MOLTEC 2 polishing pad (5/pkg)               | <b>MT2-7012</b>   | 5/pkg  | 102.00     |
| 12-inch FELTPAD polishing pad (5/pkg)                | <b>FP-8125-12</b> | 5/pkg  | 102.00     |
| <b>CMP Polishing</b>                                 |                   |        |            |
| 12-inch Black CHEM 2 polishing pad (10/pkg)          | <b>BC2-8012</b>   | 10/pkg | 215.00     |



12-inch ATLANTIS Pad  
Catalog no. ATL-3012



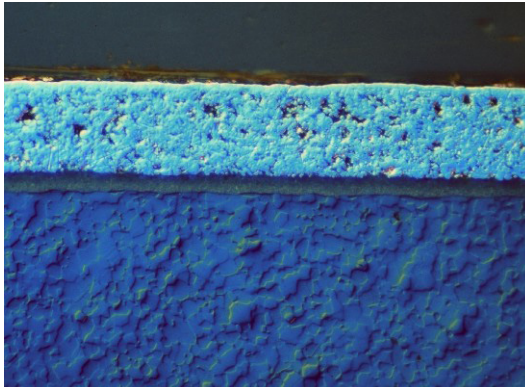
12-inch TRICOTE Pad  
Catalog no. TRI-4012

## 12-inch Polishing Pads with Magnetic Rubber-Backing

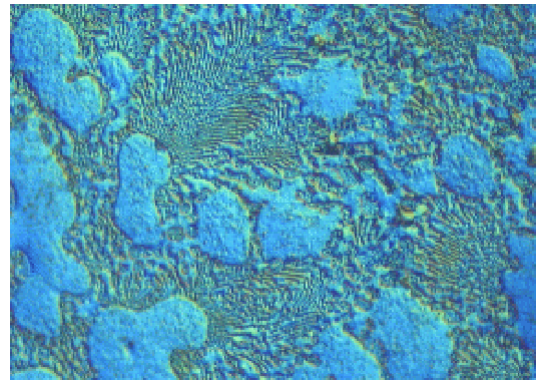
| PACE Product Name  | Catalog Number        | Qty   | Price (\$) |
|--|-----------------------|-------|------------|
| <b>Rough Polishing</b>   |                       |       |            |
| 12-inch CERMESH magnetic rubber metal mesh cloth (5/pkg)             | <b>CMESH-2012-MAG</b> | 5/pkg | 310.00     |
| 12-inch POLYPAD magnetic rubber polishing pad (5/pkg)                | <b>PP-6012-MAG</b>    | 5/pkg | 125.00     |
| <b>Intermediate Diamond Polishing</b>                                |                       |       |            |
| 12-inch TEXPAN magnetic rubber polishing pad (5/pkg)                 | <b>TP-5012-MAG</b>    | 5/pkg | 115.00     |
| 12-inch DACRON II <sup>®</sup> magnetic rubber polishing pad (5/pkg) | <b>DC2-3012-MAG</b>   | 5/pkg | 220.00     |
| 12-inch NYPAD magnetic rubber polishing pad (5/pkg)                  | <b>NY-3012-MAG</b>    | 5/pkg | 112.00     |
| 12-inch GOLDPAD magnetic rubber polishing pad (5/pkg)                | <b>GP-4012-MAG</b>    | 5/pkg | 105.00     |
| 12-inch ATLANTIS magnetic rubber polishing pad (5/pkg)               | <b>ATL-3012-MAG</b>   | 5/pkg | 185.00     |
| <b>Final Polishing</b>   |                       |       |            |
| 12-inch TRICOTE magnetic rubber polishing pad (5/pkg)                | <b>TRI-4012-MAG</b>   | 5/pkg | 145.00     |
| 12-inch MICROPAD magnetic rubber polishing pad (5/pkg)               | <b>MP-9012-MAG</b>    | 5/pkg | 115.00     |
| 12-inch NAPPAD magnetic rubber polishing pad (5/pkg)                 | <b>NP-7012-MAG</b>    | 5/pkg | 112.00     |
| 12-inch MOLTEC 2 magnetic rubber polishing pad (5/pkg)               | <b>MT2-7012-MAG</b>   | 5/pkg | 155.00     |
| 12-inch FELTPAD magnetic rubber polishing pad (5/pkg)                | <b>FP-8125-12-MAG</b> | 5/pkg | 160.00     |
| <b>CMP Polishing</b>   |                       |       |            |
| 12-inch Black CHEM 2 magnetic rubber polishing pad (5/pkg)           | <b>BC2-8012-MAG</b>   | 5/pkg | 210.00     |

## 12-inch Polishing Pads with Magnetic Stainless Steel-Backing

| PACE Product Name   | Catalog Number          | Qty   | Price (\$) |
|---|-------------------------|-------|------------|
| <b>Rough Polishing</b>  |                         |       |            |
| 12-inch CERMESH magnetic stainless steel metal mesh cloth (5/pkg)   | <b>CMESH-2012-SSMAG</b> | 5/pkg | 265.00     |
| 12-inch POLYPAD magnetic stainless steel polishing pad (5/pkg)      | <b>PP-6012-SSMAG</b>    | 5/pkg | 165.00     |
| <b>Intermediate Diamond Polishing</b>                               |                         |       |            |
| 12-inch TEXPAN magnetic stainless steel polishing pad (5/pkg)       | <b>TP-5012-SSMAG</b>    | 5/pkg | 142.00     |
| 12-inch DACRON II ® magnetic stainless steel polishing pad (5/pkg)  | <b>DC2-3012-SSMAG</b>   | 5/pkg | 210.00     |
| 12-inch NYPAD magnetic stainless steel polishing pad (5/pkg)        | <b>NY-3012-SSMAG</b>    | 5/pkg | 155.00     |
| 12-inch GOLDPAD magnetic stainless steel polishing pad (5/pkg)      | <b>GP-4012-SSMAG</b>    | 5/pkg | 122.00     |
| 12-inch ATLANTIS magnetic stainless steel polishing pad (5/pkg)     | <b>ATL-3012-SSMAG</b>   | 5/pkg | 145.00     |
| <b>Final Polishing</b>  |                         |       |            |
| 12-inch TRICOTE magnetic stainless steel polishing pad (5/pkg)      | <b>TRI-4012-SSMAG</b>   | 5/pkg | 155.00     |
| 12-inch MICROPAD magnetic stainless steel polishing pad (5/pkg)     | <b>MP-9012-SSMAG</b>    | 5/pkg | 122.00     |
| 12-inch NAPPAD magnetic stainless steel polishing pad (5/pkg)       | <b>NP-7012-SSMAG</b>    | 5/pkg | 125.00     |
| 12-inch MOLTEC 2 magnetic stainless steel polishing pad (5/pkg)     | <b>MT2-7012-SSMAG</b>   | 5/pkg | 150.00     |
| 12-inch FELTPAD magnetic stainless steel polishing pad (5/pkg)      | <b>FP-8125-12-SSMAG</b> | 5/pkg | 145.00     |
| <b>CMP Polishing</b>  |                         |       |            |
| 12-inch Black CHEM 2 magnetic stainless steel polishing pad (5/pkg) | <b>BC2-8012-SSMAG</b>   | 5/pkg | 235.00     |



AlN substrate with a molybdenum/ nickel, gold coating, 400X (DIC)



Zinc-Aluminum Alloy, 1000X DIC (etchant CrO<sub>3</sub>, Na<sub>2</sub>SO<sub>4</sub>)

# METALLOGRAPHIC POLISHING PADS (14-inch)

## 14-inch Polishing Pads with PSA Adhesive-Backing

| PACE Product Name                                    | Catalog Number    | Qty    | Price (\$) |
|--|-------------------|--------|------------|
| <b>Rough Polishing</b>                               |                   |        |            |
| 14-inch CERMESH metal mesh cloth (5/pkg)             | <b>CMESH-2014</b> | 5/pkg  | 299.00     |
| 14-inch POLYPAD polishing pad (10/pkg)               | <b>PP-6014</b>    | 10/pkg | 175.00     |
| <b>Intermediate Diamond Polishing</b>                |                   |        |            |
| 14-inch TEXPAN polishing pad (10/pkg)                | <b>TP-5014</b>    | 10/pkg | 185.00     |
| 14-inch DACRON II <sup>®</sup> polishing pad (5/pkg) | <b>DC2-3014</b>   | 5/pkg  | 240.00     |
| 14-inch NYPAD polishing pad (10/pkg)                 | <b>NY-3014</b>    | 10/pkg | 195.00     |
| 14-inch GOLDPAD polishing pad (10/pkg)               | <b>GP-4014</b>    | 10/pkg | 195.00     |
| 14-inch ATLANTIS polishing pad (5/pkg)               | <b>ATL-3014</b>   | 5/pkg  | 135.00     |
| <b>Final Polishing</b>                               |                   |        |            |
| 14-inch TRICOTE polishing pad (10/pkg)               | <b>TRI-4014</b>   | 10/pkg | 175.00     |
| 14-inch MICROPAD polishing pad (10/pkg)              | <b>MP-9014</b>    | 10/pkg | 135.00     |
| 14-inch NAPPAD polishing pad (10/pkg)                | <b>NP-7014</b>    | 10/pkg | 185.00     |
| 14-inch MOLTEC 2 polishing pad (5/pkg)               | <b>MT2-7014</b>   | 5/pkg  | 145.00     |
| 14-inch FELTPAD polishing pad (5/pkg)                | <b>FP-8125-14</b> | 5/pkg  | 150.00     |
| <b>CMP Polishing</b>                                 |                   |        |            |
| 14-inch Black CHEM 2 polishing pad (10/pkg)          | <b>BC2-8014</b>   | 10/pkg | 305.00     |



12-inch MICROPAD  
Catalog no. MP-9012



12-inch FELTPAD  
Catalog no. FP-8125-12

## 14-inch Polishing Pads with Magnetic Rubber-Backing

| PACE Product Name  | Catalog Number        | Qty   | Price (\$) |
|--|-----------------------|-------|------------|
| <b>Rough Polishing</b>   |                       |       |            |
| 14-inch CERMESH magnetic rubber metal mesh cloth (5/pkg)             | <b>CMESH-2014-MAG</b> | 5/pkg | 360.00     |
| 14-inch POLYPAD magnetic rubber polishing pad (5/pkg)                | <b>PP-6014-MAG</b>    | 5/pkg | 175.00     |
| <b>Intermediate Diamond Polishing</b>                                |                       |       |            |
| 14-inch TEXPAN magnetic rubber polishing pad (5/pkg)                 | <b>TP-5014-MAG</b>    | 5/pkg | 175.00     |
| 14-inch DACRON II <sup>®</sup> magnetic rubber polishing pad (5/pkg) | <b>DC2-3014-MAG</b>   | 5/pkg | 305.00     |
| 14-inch NYPAD magnetic rubber polishing pad (5/pkg)                  | <b>NY-3014-MAG</b>    | 5/pkg | 195.00     |
| 14-inch GOLDPAD magnetic rubber polishing pad (5/pkg)                | <b>GP-4014-MAG</b>    | 5/pkg | 175.00     |
| 14-inch ATLANTIS magnetic rubber polishing pad (5/pkg)               | <b>ATL-3014-MAG</b>   | 5/pkg | 185.00     |
| <b>Final Polishing</b>   |                       |       |            |
| 14-inch TRICOTE magnetic rubber polishing pad (5/pkg)                | <b>TRI-4014-MAG</b>   | 5/pkg | 205.00     |
| 14-inch MICROPAD magnetic rubber polishing pad (5/pkg)               | <b>MP-9014-MAG</b>    | 5/pkg | 165.00     |
| 14-inch NAPPAD magnetic rubber polishing pad (5/pkg)                 | <b>NP-7014-MAG</b>    | 5/pkg | 180.00     |
| 14-inch MOLTEC 2 magnetic rubber polishing pad (5/pkg)               | <b>MT2-7014-MAG</b>   | 5/pkg | 195.00     |
| 14-inch FELTPAD magnetic rubber polishing pad (5/pkg)                | <b>FP-8125-14-MAG</b> | 5/pkg | 195.00     |
| <b>CMP Polishing</b>   |                       |       |            |
| 14-inch Black CHEM 2 magnetic rubber polishing pad (5/pkg)           | <b>BC2-8014-MAG</b>   | 5/pkg | 320.00     |

## 14-inch Polishing Pads with Magnetic Stainless Steel-Backing

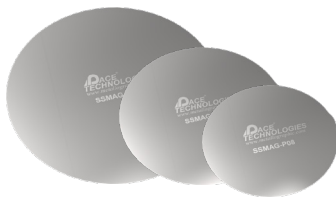
| PACE Product Name   | Catalog Number          | Qty   | Price (\$) |
|---|-------------------------|-------|------------|
| <b>Rough Polishing</b>  |                         |       |            |
| 14-inch CERMESH magnetic stainless steel metal mesh cloth (5/pkg)   | <b>CMESH-2014-SSMAG</b> | 5/pkg | 370.00     |
| 14-inch POLYPAD magnetic stainless steel polishing pad (5/pkg)      | <b>PP-6014-SSMAG</b>    | 5/pkg | 225.00     |
| <b>Intermediate Diamond Polishing</b>                               |                         |       |            |
| 14-inch TEXPAN magnetic stainless steel polishing pad (5/pkg)       | <b>TP-5014-SSMAG</b>    | 5/pkg | 205.00     |
| 14-inch DACRON II® magnetic stainless steel polishing pad (5/pkg)   | <b>DC2-3014-SSMAG</b>   | 5/pkg | 305.00     |
| 14-inch NYPAD magnetic stainless steel polishing pad (5/pkg)        | <b>NY-3014-SSMAG</b>    | 5/pkg | 205.00     |
| 14-inch GOLDPAD magnetic stainless steel polishing pad (5/pkg)      | <b>GP-4014-SSMAG</b>    | 5/pkg | 175.00     |
| 14-inch ATLANTIS magnetic stainless steel polishing pad (5/pkg)     | <b>ATL-3014-SSMAG</b>   | 5/pkg | 185.00     |
| <b>Final Polishing</b>  |                         |       |            |
| 14-inch TRICOTE magnetic stainless steel polishing pad (5/pkg)      | <b>TRI-4014-SSMAG</b>   | 5/pkg | 215.00     |
| 14-inch MICROPAD magnetic stainless steel polishing pad (5/pkg)     | <b>MP-9014-SSMAG</b>    | 5/pkg | 170.00     |
| 14-inch NAPPAD magnetic stainless steel polishing pad (5/pkg)       | <b>NP-7014-SSMAG</b>    | 5/pkg | 170.00     |
| 14-inch MOLTEC 2 magnetic stainless steel polishing pad (5/pkg)     | <b>MT2-7014-SSMAG</b>   | 5/pkg | 205.00     |
| 14-inch FELTPAD magnetic stainless steel polishing pad (5/pkg)      | <b>FP-8125-14-SSMAG</b> | 5/pkg | 205.00     |
| <b>CMP Polishing</b>  |                         |       |            |
| 14-inch Black CHEM 2 magnetic stainless steel polishing pad (5/pkg) | <b>BC2-8014-SSMAG</b>   | 5/pkg | 305.00     |

## Magnetic Base Disks and Plates

| PACE Product Name                 | Catalog Number | Qty  | Price (\$) |
|-----------------------------------|----------------|------|------------|
| 8-inch MAGNETON Base Plate (PSA)  | <b>MAG-B08</b> | each | 52.00      |
| 10-inch MAGNETON Base Plate (PSA) | <b>MAG-B10</b> | each | 58.00      |
| 12-inch MAGNETON Base Plate (PSA) | <b>MAG-B12</b> | each | 65.00      |
| 14-inch MAGNETON Base Plate (PSA) | <b>MAG-B14</b> | each | 85.00      |



**MAGNETON**  
Base Plate



**MAGNEPAD** Stainless  
Steel Base Plate

| PACE Product Name                                    | Catalog Number   | Qty  | Price (\$) |
|--|------------------|------|------------|
| 8-inch MAGNEPAD Stainless Steel Magnetic Base Plate  | <b>SSMAG-P08</b> | each | 58.00      |
| 10-inch MAGNEPAD Stainless Steel Magnetic Base Plate | <b>SSMAG-P10</b> | each | 62.00      |
| 12-inch MAGNEPAD Stainless Steel Magnetic Base Plate | <b>SSMAG-P12</b> | each | 68.00      |
| 14-inch MAGNEPAD Stainless Steel Magnetic Base Plate | <b>SSMAG-P14</b> | each | 95.00      |

| PACE Product Name                                  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 8-inch MAGNEPAD Teflon Coated Magnetic Base Plate  | <b>MAG-P08</b> | each | 60.00      |
| 10-inch MAGNEPAD Teflon Coated Magnetic Base Plate | <b>MAG-P10</b> | each | 65.00      |
| 12-inch MAGNEPAD Teflon Coated Magnetic Base Plate | <b>MAG-P12</b> | each | 80.00      |
| 14-inch MAGNEPAD Teflon Coated Magnetic Base Plate | <b>MAG-P14</b> | each | 120.00     |



**MAGNEPAD** Coated  
Base Plate

# DIAMOND POLISHING

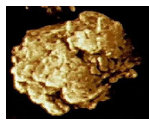
## Diamond Polishing:

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 is used in a paste form. For metallography, diamond is coded by the following color scheme:

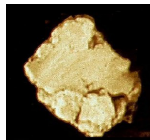


### Polycrystalline Diamond:

Diamond is the hardest known material (Mohs 10, 8000 HV). It has a cubic crystal structure and is available in either 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 particle sizes.



Polycrystalline Diamond



Monocrystalline Diamond

### Polycrystalline Diamond Advantages:

- Higher cut rates (self-sharpening abrasive)
- Uniform surface finish
- More uniform particle size distribution
- Harder / tougher particles
- Blocky shaped cutting edges
- Higher surface area (300% greater than monocrystalline diamond)
- Hexagonal microcrystallites (equally hard in all directions)

## Polycrystalline Diamond Suspensions (1-liter Color Coded)

| PACE Product Name                              | Catalog Number | Qty     | Price (\$) |
|--|----------------|---------|------------|
| 1 micron (blue) DIAMAT PC diamond (1 liter)    | PC-1001-1L     | 1-liter | 195.00     |
| 3 micron (green) DIAMAT PC diamond (1 liter)   | PC-1003-1L     | 1-liter | 215.00     |
| 6 micron (yellow) DIAMAT PC diamond (1 liter)  | PC-1006-1L     | 1-liter | 220.00     |
| 9 micron (red) DIAMAT PC diamond (1 liter)     | PC-1009-1L     | 1-liter | 220.00     |
| 15 micron (brown) DIAMAT PC diamond (1 liter)  | PC-1015-1L     | 1-liter | 225.00     |
| 30 micron (orange) DIAMAT PC diamond (1 liter) | PC-1030-1L     | 1-liter | 245.00     |
| 45 micron (purple) DIAMAT PC diamond (1 liter) | PC-1045-1L     | 1-liter | 245.00     |



1 liter Dyed PC Diamond

## Polycrystalline Diamond Suspensions (1-gallon Color Coded)

| PACE Product Name                               | Catalog Number | Qty      | Price (\$) |
|---|----------------|----------|------------|
| 1 micron (blue) DIAMAT PC diamond (1 gallon)    | PC-1001-1GLB   | 1-gallon | 525.00     |
| 3 micron (green) DIAMAT PC diamond (1 gallon)   | PC-1003-1GLG   | 1-gallon | 540.00     |
| 6 micron (yellow) DIAMAT PC diamond (1 gallon)  | PC-1006-1GLY   | 1-gallon | 545.00     |
| 9 micron (red) DIAMAT PC diamond (1 gallon)     | PC-1009-1GLR   | 1-gallon | 545.00     |
| 15 micron (brown) DIAMAT PC diamond (1 gallon)  | PC-1015-1GLBR  | 1-gallon | 560.00     |
| 30 micron (orange) DIAMAT PC diamond (1 gallon) | PC-1030-1GLO   | 1-gallon | 560.00     |
| 45 micron (purple) DIAMAT PC diamond (1 gallon) | PC-1045-1GLP   | 1-gallon | 560.00     |



1 gallon Dyed PC Diamond



# POLYCRYSTALLINE DIAMOND (HIGH VISCOSITY)

## High Viscosity Polycrystalline Diamond Suspensions



0.05 micron High Viscosity Polycrystalline Diamond



0.25 micron High Viscosity Polycrystalline Diamond



1 micron High Viscosity Polycrystalline Diamond

| PACE Product Name                                       | Catalog Number | Qty      | Price (\$) |
|---|----------------|----------|------------|
| 0.05 micron high viscosity DIAMAT PC diamond (250 ml)   | PC-0105-250    | 250 ml   | 58.00      |
| 0.05 micron high viscosity DIAMAT PC diamond (500 ml)   | PC-0105-500    | 500 ml   | 97.00      |
| 0.05 micron high viscosity DIAMAT PC diamond (1 gallon) | PC-0105-1GL    | 1 gallon | 525.00     |
| 0.05 micron high viscosity DIAMAT PC diamond (5 liters) | PC-0105-5L     | 5 liter  | 850.00     |
| 0.10 micron high viscosity DIAMAT PC diamond (250 ml)   | PC-0110-250    | 250 ml   | 58.00      |
| 0.10 micron high viscosity DIAMAT PC diamond (500 ml)   | PC-0110-500    | 500 ml   | 97.00      |
| 0.10 micron high viscosity DIAMAT PC diamond (1 gallon) | PC-0110-1GL    | 1 gallon | 525.00     |
| 0.10 micron high viscosity DIAMAT PC diamond (5 liters) | PC-0110-5L     | 5 liter  | 850.00     |
| 0.25 micron high viscosity DIAMAT PC diamond (250 ml)   | PC-0125-250    | 250 ml   | 58.00      |
| 0.25 micron high viscosity DIAMAT PC diamond (500 ml)   | PC-0125-500    | 500 ml   | 97.00      |
| 0.25 micron high viscosity DIAMAT PC diamond (1 gallon) | PC-0125-1GL    | 1 gallon | 525.00     |
| 0.25 micron high viscosity DIAMAT PC diamond (5 liters) | PC-0125-5L     | 5 liter  | 850.00     |
| 0.50 micron high viscosity DIAMAT PC diamond (250 ml)   | PC-0150-250    | 250 ml   | 58.00      |
| 0.50 micron high viscosity DIAMAT PC diamond (500 ml)   | PC-0150-500    | 500 ml   | 97.00      |
| 0.50 micron high viscosity DIAMAT PC diamond (1 gallon) | PC-0150-1GL    | 1 gallon | 525.00     |
| 0.50 micron high viscosity DIAMAT PC diamond (5 liters) | PC-0150-5L     | 5 liter  | 850.00     |
| 1 micron high viscosity DIAMAT PC diamond (250 ml)      | PC-1001-250    | 250 ml   | 58.00      |
| 1 micron high viscosity DIAMAT PC diamond (500 ml)      | PC-1001-500    | 500 ml   | 97.00      |
| 1 micron high viscosity DIAMAT PC diamond (1 gallon)    | PC-1001-1GL    | 1 gallon | 525.00     |
| 1 micron high viscosity DIAMAT PC diamond (5 liters)    | PC-1001-5L     | 5 liter  | 850.00     |
| 3 micron high viscosity DIAMAT PC diamond (250 ml)      | PC-1003-250    | 250 ml   | 64.00      |
| 3 micron high viscosity DIAMAT PC diamond (500 ml)      | PC-1003-500    | 500 ml   | 115.00     |
| 3 micron high viscosity DIAMAT PC diamond (1 gallon)    | PC-1003-1GL    | 1 gallon | 535.00     |
| 3 micron high viscosity DIAMAT PC diamond (5 liters)    | PC-1003-5L     | 5 liter  | 995.00     |
| 6 micron high viscosity DIAMAT PC diamond (250 ml)      | PC-1006-250    | 250 ml   | 72.00      |
| 6 micron high viscosity DIAMAT PC diamond (500 ml)      | PC-1006-500    | 500 ml   | 125.00     |
| 6 micron high viscosity DIAMAT PC diamond (1 gallon)    | PC-1006-1GL    | 1 gallon | 545.00     |
| 6 micron high viscosity DIAMAT PC diamond (5 liters)    | PC-1006-5L     | 5 liter  | 1050.00    |

# POLYCRYSTALLINE DIAMOND (HIGH VISCOSITY)

## High Viscosity Polycrystalline Diamond Suspensions

| PACE Product Name                                     | Catalog Number     | Qty      | Price (\$) |
|---|--------------------|----------|------------|
| 9 micron high viscosity DIAMAT PC diamond (250 ml)    | <b>PC-1009-250</b> | 250 ml   | 72.00      |
| 9 micron high viscosity DIAMAT PC diamond (500 ml)    | <b>PC-1009-500</b> | 500 ml   | 125.00     |
| 9 micron high viscosity DIAMAT PC diamond (1 gallon)  | <b>PC-1009-1GL</b> | 1 gallon | 545.00     |
| 9 micron high viscosity DIAMAT PC diamond (5 liters)  | <b>PC-1009-5L</b>  | 5 liter  | 1050.00    |
| 15 micron high viscosity DIAMAT PC diamond (250 ml)   | <b>PC-1015-250</b> | 250 ml   | 72.00      |
| 15 micron high viscosity DIAMAT PC diamond (500 ml)   | <b>PC-1015-500</b> | 500 ml   | 125.00     |
| 15 micron high viscosity DIAMAT PC diamond (1 gallon) | <b>PC-1015-1GL</b> | 1 gallon | 545.00     |
| 15 micron high viscosity DIAMAT PC diamond (5 liters) | <b>PC-1015-5L</b>  | 5 liter  | 1200.00    |
| 30 micron high viscosity DIAMAT PC diamond (250 ml)   | <b>PC-1030-250</b> | 250 ml   | 85.00      |
| 30 micron high viscosity DIAMAT PC diamond (500 ml)   | <b>PC-1030-500</b> | 500 ml   | 142.00     |
| 30 micron high viscosity DIAMAT PC diamond (1 gallon) | <b>PC-1030-1GL</b> | 1 gallon | 565.00     |
| 30 micron high viscosity DIAMAT PC diamond (5 liters) | <b>PC-1030-5L</b>  | 5 liter  | 1200.00    |
| 45 micron high viscosity DIAMAT PC diamond (250 ml)   | <b>PC-1045-250</b> | 250 ml   | 85.00      |
| 45 micron high viscosity DIAMAT PC diamond (500 ml)   | <b>PC-1045-500</b> | 500 ml   | 142.00     |
| 45 micron high viscosity DIAMAT PC diamond (1 gallon) | <b>PC-1045-1GL</b> | 1 gallon | 565.00     |
| 45 micron high viscosity DIAMAT PC diamond (5 liters) | <b>PC-1045-5L</b>  | 5 liter  | 1200.00    |



9 micron High Viscosity Polycrystalline Diamond



45 micron High Viscosity Polycrystalline Diamond

### ZETA 2000S Diamond Dispenser

- ◆ 4 (24v) dedicated, programmable peristaltic pumps
- ◆ Setting adjustments for frequency, duration, start time, total time
- ◆ 7-inch touchscreen interface
- ◆ Compatible with NANO polishing machines as well as competitors' polishing devices
- ◆ Controlled priming for each pump and dispensing lines for more immediate application of the abrasive / lubricant
- ◆ Flow 1.2~90 ml/minute
- ◆ Flex line for easy adjustment



ZETA-2000S Dispenser

## Polycrystalline Diamond Paste (5 gram syringes)



5 gram PC Diamond Paste

| PACE Product Name                                   | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| 0.10 micron polycrystalline diamond paste (5 grams) | PC-0210-05     | 5 grams | 42.00      |
| 0.25 micron polycrystalline diamond paste (5 grams) | PC-0225-05     | 5 grams | 42.00      |
| 0.50 micron polycrystalline diamond paste (5 grams) | PC-0250-05     | 5 grams | 42.00      |
| 1 micron polycrystalline diamond paste (5 grams)    | PC-2001-05     | 5 grams | 44.00      |
| 3 micron polycrystalline diamond paste (5 grams)    | PC-2003-05     | 5 grams | 64.00      |
| 6 micron polycrystalline diamond paste (5 grams)    | PC-2006-05     | 5 grams | 64.00      |
| 9 micron polycrystalline diamond paste (5 grams)    | PC-2009-05     | 5 grams | 64.00      |
| 15 micron polycrystalline diamond paste (5 grams)   | PC-2015-05     | 5 grams | 72.00      |
| 30 micron polycrystalline diamond paste (5 grams)   | PC-2030-05     | 5 grams | 72.00      |
| 45 micron polycrystalline diamond paste (5 grams)   | PC-2045-05     | 5 grams | 72.00      |

## Polycrystalline Diamond Paste (20 gram syringes)



20 gram PC Diamond Paste

| PACE Product Name                                    | Catalog Number | Qty      | Price (\$) |
|--|----------------|----------|------------|
| 0.10 micron polycrystalline diamond paste (20 grams) | PC-0210-20     | 20 grams | 102.00     |
| 0.25 micron polycrystalline diamond paste (20 grams) | PC-0225-20     | 20 grams | 102.00     |
| 0.50 micron polycrystalline diamond paste (20 grams) | PC-0250-20     | 20 grams | 102.00     |
| 1 micron polycrystalline diamond paste (20 grams)    | PC-2001-20     | 20 grams | 125.00     |
| 3 micron polycrystalline diamond paste (20 grams)    | PC-2003-20     | 20 grams | 205.00     |
| 6 micron polycrystalline diamond paste (20 grams)    | PC-2006-20     | 20 grams | 205.00     |
| 9 micron polycrystalline diamond paste (20 grams)    | PC-2009-20     | 20 grams | 205.00     |
| 15 micron polycrystalline diamond paste (20 grams)   | PC-2015-20     | 20 grams | 220.00     |
| 30 micron polycrystalline diamond paste (20 grams)   | PC-2030-20     | 20 grams | 220.00     |
| 45 micron polycrystalline diamond paste (20 grams)   | PC-2045-20     | 20 grams | 220.00     |

### 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 can be better charged or fixed into 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 a glycol or alcohol based solution.

# POLYCRYSTALLINE DIAMOND (LOW VISCOSITY)

## Polycrystalline Diamond Suspensions (Low Viscosity)

| PACE Product Name                                      | Catalog Number      | Qty      | Price (\$) |
|--|---------------------|----------|------------|
| 0.05 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-0105-250</b> | 250 ml   | 58.00      |
| 0.05 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-0105-500</b> | 500 ml   | 97.00      |
| 0.05 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-0105-1GL</b> | 1 gallon | 525.00     |
| 0.05 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-0105-5L</b>  | 5 liter  | 850.00     |
| 0.10 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-0110-250</b> | 250 ml   | 58.00      |
| 0.10 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-0110-500</b> | 500 ml   | 97.00      |
| 0.10 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-0110-1GL</b> | 1 gallon | 525.00     |
| 0.10 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-0110-5L</b>  | 5 liter  | 850.00     |
| 0.25 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-0125-250</b> | 250 ml   | 58.00      |
| 0.25 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-0125-500</b> | 500 ml   | 97.00      |
| 0.25 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-0125-1GL</b> | 1 gallon | 525.00     |
| 0.25 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-0125-5L</b>  | 5 liter  | 850.00     |
| 0.50 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-0150-250</b> | 250 ml   | 58.00      |
| 0.50 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-0150-500</b> | 500 ml   | 97.00      |
| 0.50 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-0150-1GL</b> | 1 gallon | 525.00     |
| 0.50 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-0150-5L</b>  | 5 liter  | 850.00     |
| 1 micron low viscosity DIAMAT PC diamond (250 ml)      | <b>GPC-1001-250</b> | 250 ml   | 58.00      |
| 1 micron low viscosity DIAMAT PC diamond (500 ml)      | <b>GPC-1001-500</b> | 500 ml   | 97.00      |
| 1 micron low viscosity DIAMAT PC diamond (1 gallon)    | <b>GPC-1001-1GL</b> | 1 gallon | 525.00     |
| 1 micron low viscosity DIAMAT PC diamond (5 liters)    | <b>GPC-1001-5L</b>  | 5 liter  | 850.00     |
| 3 micron low viscosity DIAMAT PC diamond (250 ml)      | <b>GPC-1003-250</b> | 250 ml   | 64.00      |
| 3 micron low viscosity DIAMAT PC diamond (500 ml)      | <b>GPC-1003-500</b> | 500 ml   | 115.00     |
| 3 micron low viscosity DIAMAT PC diamond (1 gallon)    | <b>GPC-1003-1GL</b> | 1 gallon | 535.00     |
| 3 micron low viscosity DIAMAT PC diamond (5 liters)    | <b>GPC-1003-5L</b>  | 5 liter  | 995.00     |
| 6 micron low viscosity DIAMAT PC diamond (250 ml)      | <b>GPC-1006-250</b> | 250 ml   | 72.00      |
| 6 micron low viscosity DIAMAT PC diamond (500 ml)      | <b>GPC-1006-500</b> | 500 ml   | 125.00     |
| 6 micron low viscosity DIAMAT PC diamond (1 gallon)    | <b>GPC-1006-1GL</b> | 1 gallon | 545.00     |
| 6 micron low viscosity DIAMAT PC diamond (5 liters)    | <b>GPC-1006-5L</b>  | 5 liter  | 1050.00    |



0.10 micron Low Viscosity Polycrystalline Diamond



1 micron Low Viscosity Polycrystalline Diamond



3 micron Low Viscosity Polycrystalline Diamond



9 micron Low Viscosity Polycrystalline Diamond

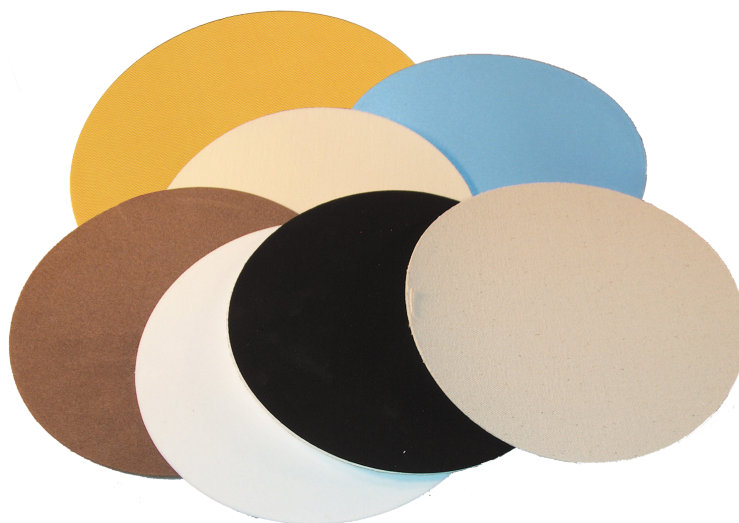


30 micron Low Viscosity Polycrystalline Diamond

| PACE Product Name                                    | Catalog Number      | Qty      | Price (\$) |
|--|---------------------|----------|------------|
| 9 micron low viscosity DIAMAT PC diamond (250 ml)    | <b>GPC-1009-250</b> | 250 ml   | 72.00      |
| 9 micron low viscosity DIAMAT PC diamond (500 ml)    | <b>GPC-1009-500</b> | 500 ml   | 125.00     |
| 9 micron low viscosity DIAMAT PC diamond (1 gallon)  | <b>GPC-1009-1GL</b> | 1 gallon | 545.00     |
| 9 micron low viscosity DIAMAT PC diamond (5 liters)  | <b>GPC-1009-5L</b>  | 5 liter  | 1050.00    |
| 15 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-1015-250</b> | 250 ml   | 72.00      |
| 15 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-1015-500</b> | 500 ml   | 125.00     |
| 15 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-1015-1GL</b> | 1 gallon | 545.00     |
| 15 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-1015-5L</b>  | 5 liter  | 1050.00    |
| 30 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-1030-250</b> | 250 ml   | 85.00      |
| 30 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-1030-500</b> | 500 ml   | 142.00     |
| 30 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-1030-1GL</b> | 1 gallon | 565.00     |
| 30 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-1030-5L</b>  | 5 liter  | 1200.00    |
| 45 micron low viscosity DIAMAT PC diamond (250 ml)   | <b>GPC-1045-250</b> | 250 ml   | 85.00      |
| 45 micron low viscosity DIAMAT PC diamond (500 ml)   | <b>GPC-1045-500</b> | 500 ml   | 142.00     |
| 45 micron low viscosity DIAMAT PC diamond (1 gallon) | <b>GPC-1045-1GL</b> | 1 gallon | 565.00     |
| 45 micron low viscosity DIAMAT PC diamond (5 liters) | <b>GPC-1045-5L</b>  | 5 liter  | 1200.00    |

### Polishing Pad Applications

- ◆ Rough Polishing: Coarse polishing with 15-45 micron abrasives  
-CERMESH Metal Mesh cloth, POLYPAD Pad
- ◆ Intermediate Polishing: For removing most surface damage with 1-9 micron abrasives  
-TEXPAN Pad, DACRON II Pad, NYPAD Pad, GOLDPAD Pad, ATLANTIS Pad (most popular)
- ◆ Final Polishing: For removing subsurface damage with 0.05-1 micron abrasives  
-TRICOTE Pad, MICROPAD (most popular), NAPPAD Pad, MOLTEC 2 Pad, FELTPAD Pad
- ◆ CMP Polishing: CMP (chemical mechanical polishing with colloidal silica abrasives  
-BLACK CHEM 2



# MONOCRYSTALLINE DIAMOND (HIGH VISCOSITY)

## Monocrystalline Diamond Suspensions (High Viscosity)

| PACE Product Name                                     | Catalog Number     | Qty      | Price (\$) |
|---|--------------------|----------|------------|
| 1 micron high viscosity DIAMAT MA diamond (250 ml)    | <b>MA-1001-250</b> | 250 ml   | 33.00      |
| 1 micron high viscosity DIAMAT MA diamond (500 ml)    | <b>MA-1001-500</b> | 500 ml   | 64.00      |
| 1 micron high viscosity DIAMAT MA diamond (1 gallon)  | <b>MA-1001-1GL</b> | 1 gallon | 342.00     |
| 1 micron high viscosity DIAMAT MA diamond (5 liters)  | <b>MA-1001-5L</b>  | 5 liter  | 550.00     |
| 3 micron high viscosity DIAMAT MA diamond (250 ml)    | <b>MA-1003-250</b> | 250 ml   | 37.50      |
| 3 micron high viscosity DIAMAT MA diamond (500 ml)    | <b>MA-1003-500</b> | 500 ml   | 75.00      |
| 3 micron high viscosity DIAMAT MA diamond (1 gallon)  | <b>MA-1003-1GL</b> | 1 gallon | 360.00     |
| 3 micron high viscosity DIAMAT MA diamond (5 liters)  | <b>MA-1003-5L</b>  | 5 liter  | 595.00     |
| 6 micron high viscosity DIAMAT MA diamond (250 ml)    | <b>MA-1006-250</b> | 250 ml   | 42.00      |
| 6 micron high viscosity DIAMAT MA diamond (500 ml)    | <b>MA-1006-500</b> | 500 ml   | 80.00      |
| 6 micron high viscosity DIAMAT MA diamond (1 gallon)  | <b>MA-1006-1GL</b> | 1 gallon | 375.00     |
| 6 micron high viscosity DIAMAT MA diamond (5 liters)  | <b>MA-1006-5L</b>  | 5 liter  | 625.00     |
| 9 micron high viscosity DIAMAT MA diamond (250 ml)    | <b>MA-1009-250</b> | 250 ml   | 42.00      |
| 9 micron high viscosity DIAMAT MA diamond (500 ml)    | <b>MA-1009-500</b> | 500 ml   | 80.00      |
| 9 micron high viscosity DIAMAT MA diamond (1 gallon)  | <b>MA-1009-1GL</b> | 1 gallon | 375.00     |
| 9 micron high viscosity DIAMAT MA diamond (5 liters)  | <b>MA-1009-5L</b>  | 5 liter  | 625.00     |
| 15 micron high viscosity DIAMAT MA diamond (250 ml)   | <b>MA-1015-250</b> | 250 ml   | 42.00      |
| 15 micron high viscosity DIAMAT MA diamond (500 ml)   | <b>MA-1015-500</b> | 500 ml   | 80.00      |
| 15 micron high viscosity DIAMAT MA diamond (1 gallon) | <b>MA-1015-1GL</b> | 1 gallon | 385.00     |
| 15 micron high viscosity DIAMAT MA diamond (5 liters) | <b>MA-1015-5L</b>  | 5 liter  | 625.00     |
| 30 micron high viscosity DIAMAT MA diamond (250 ml)   | <b>MA-1030-250</b> | 250 ml   | 48.00      |
| 30 micron high viscosity DIAMAT MA diamond (500 ml)   | <b>MA-1030-500</b> | 500 ml   | 88.00      |
| 30 micron high viscosity DIAMAT MA diamond (1 gallon) | <b>MA-1030-1GL</b> | 1 gallon | 385.00     |
| 30 micron high viscosity DIAMAT MA diamond (5 liters) | <b>MA-1030-5L</b>  | 5 liter  | 675.00     |
| 45 micron high viscosity DIAMAT MA diamond (250 ml)   | <b>MA-1045-250</b> | 250 ml   | 48.00      |
| 45 micron high viscosity DIAMAT MA diamond (500 ml)   | <b>MA-1045-500</b> | 500 ml   | 88.00      |
| 45 micron high viscosity DIAMAT MA diamond (1 gallon) | <b>MA-1045-1GL</b> | 1 gallon | 385.00     |
| 45 micron high viscosity DIAMAT MA diamond (5 liters) | <b>MA-1045-5L</b>  | 5 liter  | 675.00     |



**1 micron High Viscosity Monocrystalline Diamond**



**3 micron High Viscosity Monocrystalline Diamond**



**6 micron High Viscosity Monocrystalline Diamond**

# MONOCRYSTALLINE DIAMOND (PASTES)

## Monocrystalline Diamond Paste (5 gram syringes)



5 gram Monocrystalline Diamond Paste

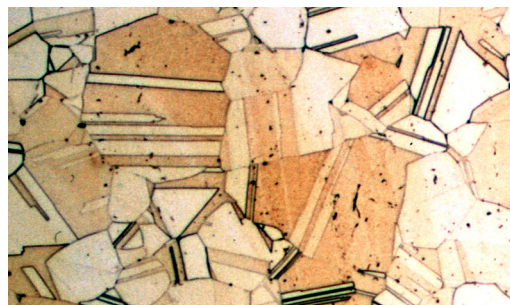
| PACE Product Name                                   | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| 0.25 micron monocrystalline diamond paste (5 grams) | MA-0225-05     | 5 grams | 18.00      |
| 0.50 micron monocrystalline diamond paste (5 grams) | MA-0250-05     | 5 grams | 18.00      |
| 1 micron monocrystalline diamond paste (5 grams)    | MA-2001-05     | 5 grams | 18.00      |
| 3 micron monocrystalline diamond paste (5 grams)    | MA-2003-05     | 5 grams | 22.00      |
| 6 micron monocrystalline diamond paste (5 grams)    | MA-2006-05     | 5 grams | 22.00      |
| 9 micron monocrystalline diamond paste (5 grams)    | MA-2009-05     | 5 grams | 22.00      |
| 15 micron monocrystalline diamond paste (5 grams)   | MA-2015-05     | 5 grams | 24.00      |
| 30 micron monocrystalline diamond paste (5 grams)   | MA-2030-05     | 5 grams | 24.00      |
| 45 micron monocrystalline diamond paste (5 grams)   | MA-2045-05     | 5 grams | 24.00      |

## Monocrystalline Diamond Paste (20 gram syringes)



20 gram Monocrystalline Diamond Paste

| PACE Product Name                                    | Catalog Number | Qty      | Price (\$) |
|--|----------------|----------|------------|
| 0.25 micron monocrystalline diamond paste (20 grams) | MA-0225-20     | 20 grams | 55.00      |
| 0.50 micron monocrystalline diamond paste (20 grams) | MA-0250-20     | 20 grams | 55.00      |
| 1 micron monocrystalline diamond paste (20 grams)    | MA-2001-20     | 20 grams | 55.00      |
| 3 micron monocrystalline diamond paste (20 grams)    | MA-2003-20     | 20 grams | 64.00      |
| 6 micron monocrystalline diamond paste (20 grams)    | MA-2006-20     | 20 grams | 64.00      |
| 9 micron monocrystalline diamond paste (20 grams)    | MA-2009-20     | 20 grams | 64.00      |
| 15 micron monocrystalline diamond paste (20 grams)   | MA-2015-20     | 20 grams | 70.00      |
| 30 micron monocrystalline diamond paste (20 grams)   | MA-2030-20     | 20 grams | 70.00      |
| 45 micron monocrystalline diamond paste (20 grams)   | MA-2045-20     | 20 grams | 70.00      |



Twin Boundries in Brass

# MONOCRYSTALLINE DIAMOND (LOW VISCOSITY)

## Monocrystalline Diamond Suspensions (Low Viscosity)

| PACE Product Name                                    | Catalog Number      | Qty      | Price (\$) |
|--|---------------------|----------|------------|
| 1 micron low viscosity DIAMAT MA diamond (250 ml)    | <b>GMA-1001-250</b> | 250 ml   | 33.00      |
| 1 micron low viscosity DIAMAT MA diamond (500 ml)    | <b>GMA-1001-500</b> | 500 ml   | 64.00      |
| 1 micron low viscosity DIAMAT MA diamond (1 gallon)  | <b>GMA-1001-1GL</b> | 1 gallon | 342.00     |
| 1 micron low viscosity DIAMAT MA diamond (5 liters)  | <b>GMA-1001-5L</b>  | 5 liter  | 550.00     |
| <hr/>  |                     |          |            |
| 3 micron low viscosity DIAMAT MA diamond (250 ml)    | <b>GMA-1003-250</b> | 250 ml   | 37.50      |
| 3 micron low viscosity DIAMAT MA diamond (500 ml)    | <b>GMA-1003-500</b> | 500 ml   | 75.00      |
| 3 micron low viscosity DIAMAT MA diamond (1 gallon)  | <b>GMA-1003-1GL</b> | 1 gallon | 360.00     |
| 3 micron low viscosity DIAMAT MA diamond (5 liters)  | <b>GMA-1003-5L</b>  | 5 liter  | 725.00     |
| <hr/>  |                     |          |            |
| 6 micron low viscosity DIAMAT MA diamond (250 ml)    | <b>GMA-1006-250</b> | 250 ml   | 42.00      |
| 6 micron low viscosity DIAMAT MA diamond (500 ml)    | <b>GMA-1006-500</b> | 500 ml   | 80.00      |
| 6 micron low viscosity DIAMAT MA diamond (1 gallon)  | <b>GMA-1006-1GL</b> | 1 gallon | 375.00     |
| 6 micron low viscosity DIAMAT MA diamond (5 liters)  | <b>GMA-1006-5L</b>  | 5 liter  | 625.00     |
| <hr/>  |                     |          |            |
| 9 micron low viscosity DIAMAT MA diamond (250 ml)    | <b>GMA-1009-250</b> | 250 ml   | 42.00      |
| 9 micron low viscosity DIAMAT MA diamond (500 ml)    | <b>GMA-1009-500</b> | 500 ml   | 80.00      |
| 9 micron low viscosity DIAMAT MA diamond (1 gallon)  | <b>GMA-1009-1GL</b> | 1 gallon | 375.00     |
| 9 micron low viscosity DIAMAT MA diamond (5 liters)  | <b>GMA-1009-5L</b>  | 5 liter  | 625.00     |
| <hr/>  |                     |          |            |
| 15 micron low viscosity DIAMAT MA diamond (250 ml)   | <b>GMA-1015-250</b> | 250 ml   | 42.00      |
| 15 micron low viscosity DIAMAT MA diamond (500 ml)   | <b>GMA-1015-500</b> | 500 ml   | 80.00      |
| 15 micron low viscosity DIAMAT MA diamond (1 gallon) | <b>GMA-1015-1GL</b> | 1 gallon | 385.00     |
| 15 micron low viscosity DIAMAT MA diamond (5 liters) | <b>GMA-1015-5L</b>  | 5 liter  | 625.00     |
| <hr/>  |                     |          |            |
| 30 micron low viscosity DIAMAT MA diamond (250 ml)   | <b>GMA-1030-250</b> | 250 ml   | 48.00      |
| 30 micron low viscosity DIAMAT MA diamond (500 ml)   | <b>GMA-1030-500</b> | 500 ml   | 88.00      |
| 30 micron low viscosity DIAMAT MA diamond (1 gallon) | <b>GMA-1030-1GL</b> | 1 gallon | 385.00     |
| 30 micron low viscosity DIAMAT MA diamond (5 liters) | <b>GMA-1030-5L</b>  | 5 liter  | 675.00     |
| <hr/>  |                     |          |            |
| 45 micron low viscosity DIAMAT MA diamond (250 ml)   | <b>GMA-1045-250</b> | 250 ml   | 48.00      |
| 45 micron low viscosity DIAMAT MA diamond (500 ml)   | <b>GMA-1045-500</b> | 500 ml   | 88.00      |
| 45 micron low viscosity DIAMAT MA diamond (1 gallon) | <b>GMA-1045-1GL</b> | 1 gallon | 385.00     |
| 45 micron low viscosity DIAMAT MA diamond (5 liters) | <b>GMA-1045-5L</b>  | 5 liter  | 675.00     |



15 micron Low Viscosity Monocrystalline Diamond



30 micron Low Viscosity Monocrystalline Diamond



45 micron Low Viscosity Monocrystalline Diamond

MONOCRYSTALLINE DIAMOND SUSPENSIONS (LOW VISCOSITY)



# DIAMOND EXTENDERS / LUBRICANTS

## 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 fall out of suspension and therefore embed into the polishing pad surface. Extenders / lubricants are typically glycol or alcohol based products.



## Diamond Extenders / Lubricants

| PACE Product Name                              | Catalog Number | Qty        | Price (\$) |
|--|----------------|------------|------------|
| DIALUBE water based lube (16 oz)               | DL-3000-16     | 16 oz      | 12.50      |
| DIALUBE water based lube (32 oz)               | DL-3000-32     | 32 oz      | 24.00      |
| DIALUBE water based lube (1/2 gallon)          | DL-3000-64     | 1/2 gallon | 45.00      |
| DIALUBE water based lube (1 gallon)            | DL-3000-128    | 1 gallon   | 80.00      |
| DIALUBE Blue alcohol based lube (32 oz)*       | AOD-3000-32    | 32 oz      | 19.00      |
| DIALUBE Blue alcohol based lube (1 gallon)*    | AOD-3000-128   | 1 gallon   | 65.00      |
| DIALUBE Blue alcohol based lube (5 gallons)*   | AOD-3000-640   | 5 gallons  | 295.00     |
| DIALUBE Purple alcohol based lube (32 oz)*     | ADL-3000-32    | 32 oz      | 19.50      |
| DIALUBE Purple alcohol based lube (1 gallon)*  | ADL-3000-128   | 1 gallon   | 65.00      |
| DIALUBE Purple alcohol based lube (5 gallons)* | ADL-3000-640   | 5 gallons  | 295.00     |
| POLYLUBE non-aqueous lube (32 oz)              | PDL-3000-32    | 32 oz      | 19.50      |
| POLYLUBE non-aqueous lube (1 gallon)           | PDL-3000-128   | 1 gallon   | 65.00      |
| POLYLUBE Red (anti-corrosion lube) (32 oz)     | PDL-3000R-32   | 32 oz      | 19.50      |
| POLYLUBE Red (anti-corrosion lube) (1 gallon)  | PDL-3000R-128  | 1 gallon   | 65.00      |

\* May required dangerous goods shipping, extra charges may apply

# FINAL POLISHING

## Final Polishing:

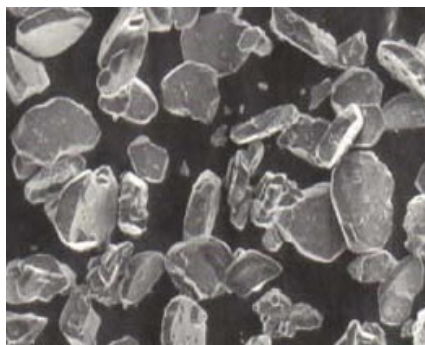
Final polishing can be accomplished with alumina, diamond, colloidal silica, ceria (cerium oxide) and rouge (iron oxide). However, the most commonly used abrasive for final polishing metals is alumina. Alumina abrasives are classified as calcined, levigated or polycrystalline based on their manufacturing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

## Characteristics of Alumina Abrasives

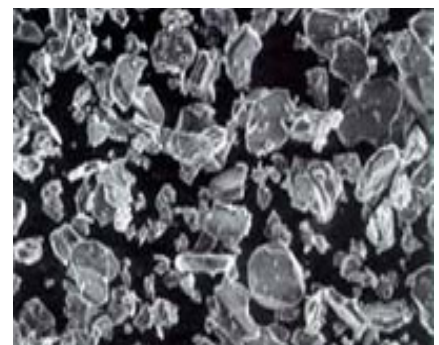
| PROPERTY          | POLYCRYSTALLINE  | CALCINED   | LEVIGATED   |
|-------------------|--|--|---|
| Crystal structure | Polycrystalline alpha alumina  | Monocrystalline alpha alumina                                  | Monocrystalline gamma or alpha alumina  |
| Shape             | Rough spherical particles  | 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<br>Linde A (0.3 micron)<br>Linde B (0.05 micron)<br>Linde C (1 micron) |



Polycrystalline Alumina



Calcined Alumina



Levigated Alumina



NANOMETER Polycrystalline Alumina



Low Viscosity Alumina Slurry



Deagglomerated Alumina Powder

# POLYCRYSTALLINE ALUMINA

## Polycrystalline Alumina:

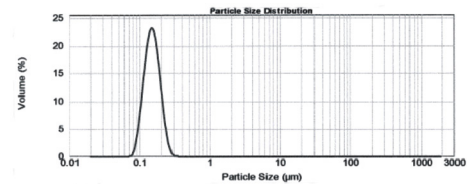
Polycrystalline or nanometer alumina is a colloidal alumina manufactured by a proprietary process. Polycrystalline abrasives are milled at either a low or higher pH value in order to avoid agglomeration which occurs near the point of zero charge (PZC). For alumina the PZC is around pH 7. This processing offers two significant improvements over conventional calcined alumina processes:

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

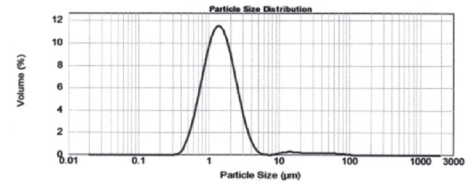
A tighter, more controlled particle size distribution is the result of less particle aggregation. For example, standard calcined 0.05 micron gamma alumina products form aggregate sizes as large as 5 microns. In some cases, these aggregates can be broken down during polishing with harder specimens; however,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

Nanometer polycrystalline alumina is specifically milled to produce a much smaller aggregate particle size distribution (<0.5 micron)(see PSD charts). 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 as 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.



Particle size distribution for 0.05 micron NANOMETER Alumina



Particle size distribution for 0.05 micron Deagglomerated Alumina

## Benefits 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 easier dispensing
- ◆ Semi-permanent suspensions

## NANOMETER 0.05 micron Polycrystalline Alpha Alumina Slurries

| PACE Product Name                          | Catalog Number | Qty        | Price (\$) |
|--|----------------|------------|------------|
| 16 oz Nanometer alumina (pH 10)            | NA-1005-16     | 16 oz      | 45.00      |
| 32 oz Nanometer alumina (pH 10)            | NA-1005-32     | 32 oz      | 76.00      |
| 1/2 gallon Nanometer alumina (pH 10)       | NA-1005-64     | 1/2 gallon | 135.00     |
| 1 gallon Nanometer alumina (pH 10)         | NA-1005-128    | 1 gallon   | 225.00     |
| 16 oz Acidic Nanometer alumina (pH 4)      | NA-1020-16     | 16 oz      | 52.50      |
| 32 oz Acidic Nanometer alumina (pH 4)      | NA-1020-32     | 32 oz      | 90.00      |
| 1/2 gallon Acidic Nanometer alumina (pH 4) | NA-1020-64     | 1/2 gallon | 145.00     |
| 1 gallon Acidic Nanometer alumina (pH 4)   | NA-1020-128    | 1 gallon   | 265.00     |

# ALUMINA SLURRIES

## Alumina Suspensions (For Electronics and Soft Materials - High Viscosity)

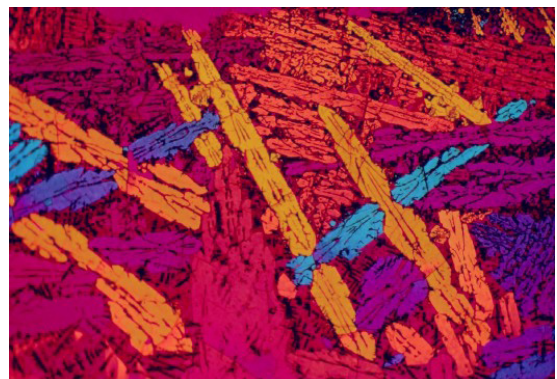
| PACE Product Name   | Catalog Number         | Qty      | Price (\$) |
|---|------------------------|----------|------------|
| 0.05 micron Electronics Grade Deagglomerated Alumina (6 oz)     | <b>NANO2-1005-06E</b>  | 6 oz     | 58.00      |
| 0.05 micron Electronics Grade Deagglomerated Alumina (16 oz)    | <b>NANO2-1005-16E</b>  | 16 oz    | 135.00     |
| 0.05 micron Electronics Grade Deagglomerated Alumina (32 oz)    | <b>NANO2-1005-32E</b>  | 32 oz    | 245.00     |
| 0.05 micron Electronics Grade Deagglomerated Alumina (1 gallon) | <b>NANO2-1005-128E</b> | 1 gallon | 905.00     |
| <hr/>   |                        |          |            |
| 0.3 micron Electronics Grade Deagglomerated Alumina (6 oz)      | <b>NANO2-1003-06E</b>  | 6 oz     | 58.00      |
| 0.3 micron Electronics Grade Deagglomerated Alumina (16 oz)     | <b>NANO2-1003-16E</b>  | 16 oz    | 135.00     |
| 0.3 micron Electronics Grade Deagglomerated Alumina (32 oz)     | <b>NANO2-1003-32E</b>  | 32 oz    | 245.00     |
| 0.3 micron Electronics Grade Deagglomerated Alumina (1 gallon)  | <b>NANO2-1003-128E</b> | 1 gallon | 905.00     |
| <hr/>   |                        |          |            |
| 1 micron Electronics Grade Deagglomerated Alumina (6 oz)        | <b>NANO2-1010-06E</b>  | 6 oz     | 58.00      |
| 1 micron Electronics Grade Deagglomerated Alumina (16 oz)       | <b>NANO2-1010-16E</b>  | 16 oz    | 135.00     |
| 1 micron Electronics Grade Deagglomerated Alumina (32 oz)       | <b>NANO2-1010-32E</b>  | 32 oz    | 245.00     |
| 1 micron Electronics Grade Deagglomerated Alumina (1 gallon)    | <b>NANO2-1010-128E</b> | 1 gallon | 905.00     |



Deagglomerated NANO2 Alumina Suspensions

### Alumina Suspensions for Electronics and Soft Materials:

- ◆ Double deagglomerated processing
- ◆ Less random scratching
- ◆ More uniform surface finish
- ◆ Tighter particle size distributions
- ◆ High viscosity for manual dispensing
- ◆ Semi-permanent suspensions



Slag, 100X (Polarized light), as polished condition

### Low Viscosity Alumina Suspensions:

- ◆ Low viscosity for easier dispensing
- ◆ Basic alumina polishing suspension ranging from 0.05 micron to 5 micron sizes
- ◆ Reasonably priced
- ◆ Traditional polishing compounds



Low Viscosity NANO Alumina Suspensions

## Alumina Slurries (NANO Low Viscosity)

| PACE Product Name   | Catalog Number       | Qty      | Price (\$) |
|---|----------------------|----------|------------|
| 0.05 micron Alumina Low Viscosity Polishing Suspension (6 oz)     | <b>NANO-1005-06</b>  | 6 oz     | 25.00      |
| 0.05 micron Alumina Low Viscosity Polishing Suspension (16 oz)    | <b>NANO-1005-16</b>  | 16 oz    | 55.00      |
| 0.05 micron Alumina Low Viscosity Polishing Suspension (32 oz)    | <b>NANO-1005-32</b>  | 32 oz    | 102.00     |
| 0.05 micron Alumina Low Viscosity Polishing Suspension (1 gallon) | <b>NANO-1005-128</b> | 1 gallon | 215.00     |
| <hr/>   |                      |          |            |
| 0.3 micron Alumina Low Viscosity Polishing Suspension (6 oz)      | <b>NANO-1003-06</b>  | 6 oz     | 25.00      |
| 0.3 micron Alumina Low Viscosity Polishing Suspension (16 oz)     | <b>NANO-1003-16</b>  | 16 oz    | 55.00      |
| 0.3 micron Alumina Low Viscosity Polishing Suspension (32 oz)     | <b>NANO-1003-32</b>  | 32 oz    | 102.00     |
| 0.3 micron Alumina Low Viscosity Polishing Suspension (1 gallon)  | <b>NANO-1003-128</b> | 1 gallon | 215.00     |
| <hr/>   |                      |          |            |
| 0.50 micron Alumina Low Viscosity Polishing Suspension (6 oz)     | <b>NANO-1105-06</b>  | 6 oz     | 25.00      |
| 0.50 micron Alumina Low Viscosity Polishing Suspension (16 oz)    | <b>NANO-1105-16</b>  | 16 oz    | 55.00      |
| 0.50 micron Alumina Low Viscosity Polishing Suspension (32 oz)    | <b>NANO-1105-32</b>  | 32 oz    | 102.00     |
| 0.50 micron Alumina Low Viscosity Polishing Suspension (1 gallon) | <b>NANO-1105-128</b> | 1 gallon | 215.00     |
| <hr/>   |                      |          |            |
| 1 micron Alumina Low Viscosity Polishing Suspension (6 oz)        | <b>NANO-1010-06</b>  | 6 oz     | 25.00      |
| 1 micron Alumina Low Viscosity Polishing Suspension (16 oz)       | <b>NANO-1010-16</b>  | 16 oz    | 55.00      |
| 1 micron Alumina Low Viscosity Polishing Suspension (32 oz)       | <b>NANO-1010-32</b>  | 32 oz    | 102.00     |
| 1 micron Alumina Low Viscosity Polishing Suspension (1 gallon)    | <b>NANO-1010-128</b> | 1 gallon | 215.00     |
| <hr/>   |                      |          |            |
| 3 micron Alumina Low Viscosity Polishing Suspension (6 oz)        | <b>NANO-1030-06</b>  | 6 oz     | 25.00      |
| 3 micron Alumina Low Viscosity Polishing Suspension (16 oz)       | <b>NANO-1030-16</b>  | 16 oz    | 55.00      |
| 3 micron Alumina Low Viscosity Polishing Suspension (32 oz)       | <b>NANO-1030-32</b>  | 32 oz    | 102.00     |
| 3 micron Alumina Low Viscosity Polishing Suspension (1 gallon)    | <b>NANO-1030-128</b> | 1 gallon | 215.00     |
| <hr/>   |                      |          |            |
| 5 micron Alumina Low Viscosity Polishing Suspension (6 oz)        | <b>NANO-1050-06</b>  | 6 oz     | 25.00      |
| 5 micron Alumina Low Viscosity Polishing Suspension (16 oz)       | <b>NANO-1050-16</b>  | 16 oz    | 55.00      |
| 5 micron Alumina Low Viscosity Polishing Suspension (32 oz)       | <b>NANO-1050-32</b>  | 32 oz    | 102.00     |
| 5 micron Alumina Low Viscosity Polishing Suspension (1 gallon)    | <b>NANO-1050-128</b> | 1 gallon | 215.00     |

# ALUMINA POWDERS

## Deagglomerated Alumina Powders (For Electronics and Soft Materials)

| PACE Product Name   | Catalog Number                       | Qty   | Price (\$) |
|---|--------------------------------------|-------|------------|
| 0.05 micron electronics grade deagglomerated alumina powder (1 lb)  | ALD-1005-01E (formerly ALR-1005-01E) | 1 lb  | 205.00     |
| 0.05 micron electronics grade deagglomerated alumina powder (5 lbs) | ALD-1005-05E (formerly ALR-1005-05E) | 5 lbs | 945.00     |
| 0.3 micron electronics grade deagglomerated alumina powder (1 lb)   | ALD-0103-01E (formerly ALR-0103-01E) | 1 lb  | 205.00     |
| 0.3 micron electronics grade deagglomerated alumina powder (5 lbs)  | ALD-0103-05E (formerly ALR-0103-05E) | 5 lbs | 945.00     |
| 1 micron electronics grade deagglomerated alumina powder (1 lb)     | ALD-0110-01E (formerly ALR-0110-01E) | 1 lb  | 205.00     |
| 1 micron electronics grade deagglomerated alumina powder (5 lbs)    | ALD-0110-05E (formerly ALR-0110-05E) | 5 lbs | 945.00     |

## Alumina Powders

| PACE Product Name                                 | Catalog Number                             | Qty   | Price (\$) |
|---|--|-------|------------|
| 0.05 micron deagglomerated alumina powder (1 lb)  | <b>ALD-1005-01 (formerly ALR-1005-01)</b>  | 1 lb  | 105.00     |
| 0.05 micron deagglomerated alumina powder (5 lbs) | <b>ALD-1005-05 (formerly ALR-1005-05)</b>  | 5 lbs | 475.00     |
| 0.3 micron deagglomerated alumina powder (1 lb)   | <b>ALD-0103-01 (formerly ALD-0103B-01)</b> | 1 lb  | 92.50      |
| 0.3 micron deagglomerated alumina powder (5 lbs)  | <b>ALD-0103-05 (formerly ALD-0103B-05)</b> | 5 lbs | 395.00     |
| 0.3 micron alumina powder (high density) (1 lb)   | <b>ALR-0103-01</b>                         | 1 lb  | 62.00      |
| 0.3 micron alumina powder (high density) (5 lbs)  | <b>ALR-0103-05</b>                         | 5 lbs | 275.00     |
| 0.5 micron alumina powder (1 lb)                  | <b>ALR-0105-01</b>                         | 1 lb  | 65.00      |
| 0.5 micron alumina powder (5 lbs)                 | <b>ALR-0105-05</b>                         | 5 lbs | 290.00     |
| 1 micron alumina powder (1 lb)                    | <b>ALR-0110-01</b>                         | 1 lb  | 65.00      |
| 1 micron alumina powder (5 lbs)                   | <b>ALR-0110-05</b>                         | 5 lbs | 290.00     |
| 3 micron alumina powder (1 lb)                    | <b>ALR-0130-01</b>                         | 1 lb  | 29.50      |
| 3 micron alumina powder (5 lbs)                   | <b>ALR-0130-05</b>                         | 5 lbs | 95.00      |
| 5 micron alumina powder (1 lb)                    | <b>ALR-0150-01</b>                         | 1 lb  | 29.50      |
| 5 micron alumina powder (5 lbs)                   | <b>ALR-0150-05</b>                         | 5 lbs | 95.00      |
| 9 micron alumina powder (5 lbs)                   | <b>ALR-0190-05</b>                         | 5 lbs | 58.00      |
| 12 micron alumina powder (5 lbs)                  | <b>ALR-1200-05</b>                         | 5 lbs | 58.00      |
| 15 micron alumina powder (5 lbs)                  | <b>ALR-1500-05</b>                         | 5 lbs | 58.00      |
| 20 micron alumina powder (5 lbs)                  | <b>ALR-2000-05</b>                         | 5 lbs | 58.00      |
| 30 micron alumina powder (5 lbs)                  | <b>ALR-3000-05</b>                         | 5 lbs | 58.00      |
| 40 micron alumina powder (5 lbs)                  | <b>ALR-4000-05</b>                         | 5 lbs | 58.00      |



Deagglomerated Fine Alumina Powders



Calcined Colloidal (<1 micron) Powders



Calcined Fine Alumina Powders



Coarse Alumina Powders

# CMP ABRASIVES

## 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.



CMP Polishing Slurries

## CMP Slurry (Polycrystalline Alumina - Colloidal Silica Mixture)

| PACE Product Name  | Catalog Number      | Qty        | Price (\$) |
|--|---------------------|------------|------------|
| 16 oz Chemical Mechanical Alumina-Silica Slurry - pH 10      | <b>CMP-1005-16</b>  | 16 oz      | 36.00      |
| 32 oz Chemical Mechanical Alumina-Silica Slurry - pH 10      | <b>CMP-1005-32</b>  | 32 oz      | 62.00      |
| 1/2 gallon Chemical Mechanical Alumina-Silica Slurry - pH 10 | <b>CMP-1005-64</b>  | 1/2 gallon | 105.00     |
| 1 gallon Chemical Mechanical Alumina-Silica Slurry - pH 10   | <b>CMP-1005-128</b> | 1 gallon   | 170.00     |

## Colloidal Silica and CMP Polishing Procedures:

Colloidal silica polishing can be used by itself as a polishing abrasive, or in combination with other harder abrasives (CMP Polishing). For polishing hard, and oftentimes 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 CMP polishing with colloidal silica abrasives, the porous **BLACK CHEM 2** Polishing Pad works well because it allows for the polishing process to generate more heat and thus enhances the chemical polishing rate. **GOLDPAD** and **TEXPAN** polishing pads are also useful for polishing glass, ceramics and composites utilizing a combination of colloidal silica and diamond.

Colloidal silica suspensions also have very good dispersion characteristics, 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 as this would effectively result in producing much larger crystallized abrasive particles.

The other key to successful polishing with colloidal silica and CMP abrasives 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 or CMP abrasive crystallizes on the specimen surface, then either the polishing process should be repeated or the sample can be cleaned with a caustic cleaning solution. A commonly used cleaning solution for most materials after polishing with colloidal silica is a mixture of ammonium hydroxide (NH<sub>4</sub>OH) with 30% hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>).

**Note:** This solution may adversely react and etch copper and copper alloys.

# COLLOIDAL SILICA

## Colloidal Silica Polishing:

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 between 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.

## Characteristics of Colloidal Silica Abrasives

| PROPERTY                | SIAMAT COLLOIDAL SILICA  | SIAMAT 2 COLLOIDAL SILICA   | SIAMAT BLUE COLLOIDAL SILICA   |
|-------------------------|--|---|--|
| <b>Particle Size</b>    | 0.06 micron  | 0.02 micron   | 0.05 micron  |
| <b>pH</b>               | 9.5-10.0   | 9.2-10.0  | 9.5-10.0   |
| <b>Concentration</b>    | 45-50% solids  | 45-50% solids   | 45-50% solids  |
| <b>Specific gravity</b> | 1.39   | 1.25  | 1.39   |
| <b>Viscosity</b>        | 15 cP  | 20 cP   | 15 cP  |
| <b>Applications</b>     | Precision surface finishing abrasive for ceramics and glass. Ideal as a CMP abrasive when used by itself or with diamond polishing abrasives | Precision surface finishing abrasive for metals and microelectronic materials | Similar to SIAMAT colloidal silica with blue dye added to distinguish the product from other abrasives suspensions |

## Colloidal Silica Polishing Suspensions

| PACE Product Name                                     | Catalog Number | Qty        | Price (\$) |
|---|----------------|------------|------------|
| 16 oz SIAMAT colloidal silica (0.06 micron)           | SI-100A-16     | 16 oz      | 27.50      |
| 32 oz SIAMAT colloidal silica (0.06 micron)           | SI-100A-32     | 32 oz      | 48.00      |
| 1/2 gallon SIAMAT colloidal silica (0.06 micron)      | SI-100A-64     | 1/2 gallon | 78.00      |
| 1 gallon SIAMAT colloidal silica (0.06 micron)        | SI-100A-128    | 1 gallon   | 135.00     |
| 5 gallons SIAMAT colloidal silica (0.06 micron)       | SI-100A-640    | 5 gallons  | 610.00     |
| <hr/>   |                |            |            |
| 16 oz SIAMAT Blue colloidal silica (0.05 micron)      | SI-100B-16     | 16 oz      | 27.50      |
| 32 oz SIAMAT Blue colloidal silica (0.05 micron)      | SI-100B-32     | 32 oz      | 48.00      |
| 1/2 gallon SIAMAT Blue colloidal silica (0.05 micron) | SI-100B-64     | 1/2 gallon | 78.00      |
| 1 gallon SIAMAT Blue colloidal silica (0.05 micron)   | SI-100B-128    | 1 gallon   | 135.00     |
| 5 gallons SIAMAT Blue colloidal silica (0.05 micron)  | SI-100B-640    | 5 gallons  | 575.00     |
| <hr/>   |                |            |            |
| 16 oz SIAMAT 2 colloidal silica (0.02 micron)         | SI2-100A-16    | 16 oz      | 27.50      |
| 32 oz SIAMAT 2 colloidal silica (0.02 micron)         | SI2-100A-32    | 32 oz      | 48.00      |
| 1/2 gallon SIAMAT 2 colloidal silica (0.02 micron)    | SI2-100A-64    | 1/2 gallon | 78.00      |
| 1 gallon SIAMAT 2 colloidal silica (0.02 micron)      | SI2-100A-128   | 1 gallon   | 135.00     |
| 5 gallons SIAMAT 2 colloidal silica (0.02 micron)     | SI2-100A-640   | 5 gallons  | 610.00     |



SIAMAT Colloidal Silica



SIAMAT Blue Colloidal Silica



Low Crystallizing SIAMAT 2 Colloidal Silica



# CLEANING

## UCLEAN-012 Ultrasonic Cleaner

| FEATURE                        | UCLEAN-012 DESCRIPTION                   |
|--------------------------------|--|
| Ultrasonic Frequency           | 40 KHz transducers                       |
| Ultrasonic Power               | 240 Watts                                |
| Timer                          | 1-30 minutes                             |
| Heater                         | 250W heating power                       |
| Maximum Temperature            | 176°F (80°C)                             |
| Volume of Tank                 | 2.6 gallons (10 L)                       |
| Electrical specification       | 110 / 220V (50/60 Hz)                    |
| Volume of Tank                 | 2.5 gallons (9.5 L)                      |
| Overall Dimensions (W x D x H) | 13 x 11 x 11-inches (330 x 270 x 270 mm) |
| Tank Dimensions (W x D x H)    | 12 x 9.4 x 5.9 (300 x 240 x 150 mm)      |
| Weight                         | 14 lbs (6.3 kg)                          |
| Catalog Number                 | UCLEAN-012                               |



### Benefits:

- ◆ Reduces abrasive contamination in-between sample preparation steps
- ◆ With an IPA corrosion inhibitor specimens have less staining and etching

### Cleaning:

Cleaning and drying are perhaps the most underrated processing steps in specimen preparation. Yet improper cleaning can lead to misleading results. Cleaning is required to remove polishing residue as well as particulates on the surface. Cleaning can be classified into two categories:

#### Intermediate Cleaning:

Intermediate cleaning is important in order to minimize cross contamination of abrasives and swarf material. Intermediate cleaning is best accomplished with rinsing and ultrasonics. For the best results the specimen and holder should be pre cleaned with water and a cotton swab to remove excess abrasive and swarf.

#### Final Cleaning:

Final cleaning is the most important cleaning step for removing residue prior to specimen examination. For difficult to clean specimens, ultrasonic cleaning in alcohol can be very helpful.

## Cleaning / Drying / Storage Products

| PACE Product Name   | Catalog Number | Qty        | Price (\$) |
|---|----------------|------------|------------|
| ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (32 oz)      | UC2-1000-32    | 32 oz      | 17.50      |
| ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (1/2 gallon) | UC2-1000-64    | 1/2 gallon | 32.00      |
| ULTRACLEAN 2 Ultrasonic Degreasing / Cleaning Solution (1 gallon)   | UC2-1000-128   | 1 gallon   | 62.00      |
| Compressed Non-flammable gas  | AIR-0100       | each       | 13.50      |
| Organic Corrosion Inhibitor (100X concentrate in IPA)               | PCC-7500-32    | 32 oz      | 22.00      |
| Urethane Spray Coating  | URE-1000       | each       | 25.00      |
| 1.25-inch Plastic Storage Container                                 | STORE-0125     | 25/pkg     | 42.00      |

# ETCHING

## Etching:

Etching is a process for revealing the structure of the material, common etching techniques include: Chemical, Electrolytic, Thermal, Plasma, Molten salt and Magnetic etching. The two most common techniques are chemical and electrochemical etching. Chemical etching is typically a combination of either an acid or base with an oxidizing or reducing agent in a solute such as alcohol. Electrochemical etching is a combination of chemical etching with an electrical voltage/current.

| ETCHANT                         | COMPOSITION  | CONC.  | CONDITIONS  | COMMENTS   |
|---------------------------------|--|--|---|--|
| ASTM No. 30                     | Ammonia<br>Hydrogen Peroxide (3%)<br>DI Water  | 62.5 ml<br>125 ml<br>62.5 ml                       | Mix Ammonia and water before adding peroxide. Must be used fresh. Swab 5-45 seconds | For etching copper, copper alloys and copper-silver alloys   |
| Adlers Etchant                  | Copper ammonium chloride<br>Hydrochloric acid<br>Ferric chloride, hydrated<br>DI Water | 9 grams<br>150 ml<br>45 grams<br>5 ml              | Immersion is recommended for 1-5 seconds  | For etching 300 series stainless steel and other superalloys   |
| Carpenters Stainless Steel Etch | FeCl <sub>3</sub><br>CuCl <sub>2</sub><br>Hydrochloric acid<br>Nitric acid<br>Ethanol  | 8.5 grams<br>2.4 grams<br>122 ml<br>6 ml<br>122 ml | Immersion etching at 20°C   | For etching duplex and 300 series stainless steels   |
| Inconel Etch                    | Distilled water<br>Nitric acid<br>Hydrochloric acid<br>Hydrogen Peroxide               | 90 ml<br>50 ml<br>75 ml<br>35 ml                   | Immersion etching at 20°C   | For etching Inconel alloys   |
| Kalling's No. 2                 | CuCl <sub>2</sub><br>Hydrochloric acid<br>Ethanol                                      | 5 grams<br>100 ml<br>100 ml                        | Immersion or swabbing etch at 20°C  | For etching duplex and 400 series stainless steels and Ni-Cu alloys and superalloys  |
| Kellers Etch                    | Distilled water<br>Nitric acid<br>Hydrochloric acid<br>Hydrofluoric acid               | 190 ml<br>5 ml<br>3 ml<br>2 ml                     | 10-30 second immersion. Use only fresh etchant                                      | Excellent for aluminum and titanium alloys   |
| Klemm's Reagent                 | Sodium thiosulfate solution<br>Potassium metabisulfite                                 | 250 ml<br>Saturated<br>5 grams                     | Etch for a few seconds to minutes   | For etching alpha-beta brass, bronze, tin, cast iron phosphides, ferrite, martensite, retained austenite, zinc and steel temper embrittlement  |
| Kroll's Reagent                 | Distilled water<br>Nitric acid<br>Hydrofluoric acid                                    | 92 ml<br>6 ml<br>2 ml                              | Swab specimen up to 20 seconds  | Excellent for titanium and alloys  |
| Nital                           | Ethanol<br>Nitric acid   | 100 ml<br>1-10 ml                                  | Immersion up to a few minutes.  | Most common etchant for iron, carbon and alloys steels and cast iron - Immerse sample for seconds to minutes; Mn-Fe, MnNi, Mn-Cu, Mn-Co alloys.  |
| Marbles Reagent                 | CuSO <sub>4</sub><br>Hydrochloric acid<br>Water  | 10 grams<br>50 ml<br>50 ml                         | Immerse or swab for 5-60 seconds.   | For etching Ni, Ni-Cu and Ni-Fe alloys and superalloys. Add a few drops of H <sub>2</sub> SO <sub>4</sub> to increase activity   |
| Murakami's                      | K <sub>3</sub> Fe(CN) <sub>6</sub><br>KOH<br>Water                                     | 10 grams<br>10 grams<br>100 ml                     | CAUTION: Pre-mix KOH and water before adding K <sub>3</sub> Fe(CN) <sub>6</sub>     | Cr and alloys (use fresh and immerse); iron and steels reveals carbides; Mo and alloys uses fresh and immerse; Ni-Cu alloys for alpha phases use at 75°C; WC and alloys use fresh and immerse; WC-Co and complex sintered carbides |
| Picral                          | Ethanol<br>Picric acid   | 100 ml<br>2-4 grams                                | Seconds to minutes<br>Do not let etchant crystallize or dry                         | Recommended for microstructures containing ferrite, carbide, pearlite, martensite and bainite. Also useful for magnetic alloys, cast iron, high alloy stainless steels and magnesium   |
| Vilella's Reagent               | Picric Acid<br>Hydrochloric acid<br>Ethanol  | 1 gram<br>5 ml<br>100 ml                           | Seconds to minutes  | Good for ferrite-carbide structures (tempered martensite) in iron and steel  |

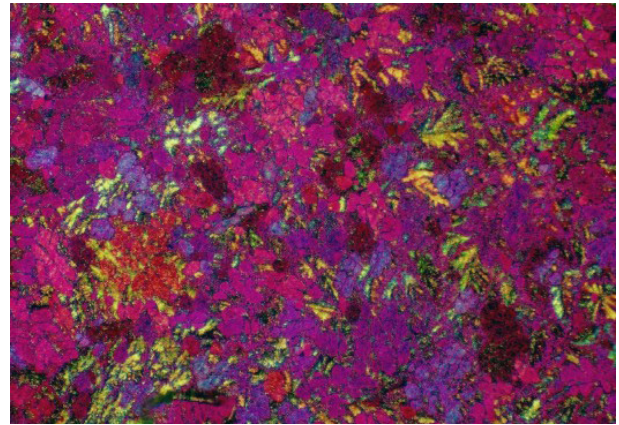
## Common Aluminum and Titanium Etchants



| PACE Product Name      | Applications                                  | Catalog Number | Qty    | Price (\$) |
|------------------------|---|----------------|--------|------------|
| Kellers                | Most common etchant for aluminum alloys       | Kellers        | 250 ml | 110.00     |
| Kroll's                | Most common etchant for titanium              | Krolls         | 250 ml | 110.00     |
| Titanium Attack Polish | Used as a CMP polishing compound for titanium | TI-AP-16       | 16 oz  | 110.00     |



Zinc-Aluminum Alloy, 200X B.F. (etchant CrO<sub>3</sub>, Na<sub>2</sub>SO<sub>4</sub>)



Zinc-Aluminum Alloy, 100X Polarized (etchant CrO<sub>3</sub>, Na<sub>2</sub>SO<sub>4</sub>)

## Common Nickel, Iron, Chromium Alloy Etchants



| PACE Product Name    | Applications                | Catalog Number     | Qty    | Price (\$) |
|----------------------|-----------------------------|--------------------|--------|------------|
| Adlers               | Fe-based Superalloys        | Adlers             | 250 ml | 110.00     |
| Inconel Etch         | Inconel alloys              | Inconel            | 250 ml | 110.00     |
| Marble's             | Nickel, nickel-iron alloys  | Marbles            | 250 ml | 110.00     |
| Murakami's           | Chromium alloys             | Murakamis          | 250 ml | 110.00     |
| Waterless Kallings's | Iron and nickel base alloys | Waterless Kallings | 250 ml | 110.00     |




Inconel 625, Etched with Adlers, Mag 200X

## Etching database:

The purpose of etching is to optically enhance the microstructural features such as grain size, phase identification and other microstructural features. Etching selectively alters these microstructural features based on composition, stress or crystal structure.

PACE Technologies has compiled a database of over 3000 etchants which can be accessed at:

<https://database.metallographic.com/pace-etchant.php>



www.metallographic.com

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 Phone +1-520-882-6598  
 Fax +1-520-882-6599

### Etchant Database

**- Material**

Name:

Specific Alloy:

**- Etchant**

Etchant Name:

Etchant Type:

Micro/Macro:

**- Keyword Search**

Enter a keyword:

**- Browse Product: 3 results.**

Result 1

**Primary Material:** Stainless steel  
**Specific Alloy:** Austenitic PH  
**Micro/Macro:** Micro  
**Etchant Type:** Electrolytic  
**Etchant Name:**  
**Etchant Composition:**  
 10N KOH (56 g KOH in 100 ml Water)  
**Condition:**  
 Electrolytic; use 2 V dc for 5 seconds.  
**Comments and Warning:**  
 For austenitic PH grades; ferrite and sigma dark brown, alpha prime brown to pale blue to outlined. Ni3(Al, Ti) and Ni(Al, Ti) outlined. M23C6 pale yellow, austenite unattacked.  
**Reference:**  
 G. Vander Voort. Metallography Principles and Practice. McGraw-Hill

**PRINT REPORT**

## Common Stainless Steel Etchants

| ETCHANT                 | Applications  | Catalog Number        | Qty    | Price (\$) |
|-------------------------|---|-----------------------|--------|------------|
| <b>Adlers etchant</b>   | Very effective for etching austenitic 300 series stainless steels | <b>Adlers</b>         | 250 ml | 110.00     |
| <b>Carpenters</b>       | 300 Series Stainless Steel Etchant                                | <b>Carpenters</b>     | 250 ml | 110.00     |
| <b>Kallings's No. 2</b> | Martensitic 400 series stainless steels                           | <b>Kallings No. 2</b> | 250 ml | 110.00     |
| <b>Frys Reagent</b>     | Precipitation hardened stainless steels                           | <b>Frys Reagent</b>   | 250 ml | 110.00     |
| <b>V2A etchant</b>      | Austenitic stainless steels                                       | <b>V2A Etchant</b>    | 250 ml | 110.00     |



## Common Copper and Brass Etchants

| ETCHANT             | Applications                              | Catalog Number      | Qty    | Price (\$) |
|---------------------|---|---------------------|--------|------------|
| <b>ASTM No. 30</b>  | Copper etchant                            | <b>ASTM No. 30</b>  | 250 ml | 110.00     |
| <b>Copper No. 1</b> | Copper & Brass (nitric acid and DI water) | <b>Copper No. 1</b> | 250 ml | 110.00     |
| <b>Copper No. 2</b> | Copper & Brass (HCl and ferric chloride)  | <b>Copper No. 2</b> | 250 ml | 110.00     |
| <b>Klemms</b>       | Stain etch for brass                      | <b>Klemms</b>       | 250 ml | 110.00     |



## Miscellaneous Etching Supplies

| PACE Product Name                       | Catalog Number | Qty     | Price (\$) |
|---|----------------|---------|------------|
| 6-inch Cotton Tipped Etchant Applicator | <b>AP-SWAB</b> | 100/pkg | 7.50       |



## Common Steel Etchants



| ETCHANT          | Applications  | Catalog Number   | Qty    | Price (\$) |
|------------------|---|------------------|--------|------------|
| <b>2% Nital</b>  | 2% is the most common etchant for non-heat treated or welded steels | <b>Nital-2</b>   | 250 ml | 110.00     |
| <b>3% Nital</b>  |   | <b>Nital-3</b>   | 250 ml | 110.00     |
| <b>5% Nital</b>  |   | <b>Nital-5</b>   | 250 ml | 110.00     |
| <b>8% Nital</b>  |   | <b>Nital-8</b>   | 250 ml | 110.00     |
| <b>Picral</b>    | Heat treated steels   | <b>Picral</b>    | 250 ml | 110.00     |
| <b>Vilella's</b> | Most common etchant for carburized/heat treated steels              | <b>Vilella's</b> | 250 ml | 110.00     |

## Oxide Ceramic Etchants

| ETCHANT                                    | CONCENTRATION                    | CONDITIONS   | COMMENTS   |
|--|----------------------------------|--|--|
| <b>Thermal etching</b>                     | Air                              | Minutes to hours at 100-200° Celsius below the sintering temperature | Al <sub>2</sub> O <sub>3</sub> , Al <sub>2</sub> O <sub>3</sub> -MgO |
| <b>Molten Salt</b>                         | Potassium hydrogen fluoride melt | 5-10 minutes in Pt crucible  | Al <sub>2</sub> O <sub>3</sub> , Al <sub>2</sub> SiO <sub>5</sub>    |
| <b>Distilled water<br/>Phosphoric acid</b> | 15 ml<br>85 ml                   | Boiling for 5 minutes to 2 hours                                     | Al <sub>2</sub> O <sub>3</sub>                                       |
| <b>Distilled water<br/>Sulfuric acid</b>   | 50 ml<br>50 ml                   | Boiling for 1-5 minutes  | ZrO <sub>2</sub>   |

## Carbide Ceramic Etchants

| ETCHANT  | CONCENTRATION                        | CONDITIONS                | COMMENTS |
|--|--------------------------------------|---------------------------|----------|
| <b>Molten Salt</b>                                   | Sodium or potassium bicarbonate melt | 10 minutes in Pt crucible | SiC      |
| <b>Hydrochloric acid<br/>Hydrogen peroxide (30%)</b> | 10 ml<br>10 ml                       | Seconds to minutes        | WC       |

## Nitride Ceramic Etchants

| ETCHANT                  | CONCENTRATION            | CONDITIONS                        | COMMENTS                       |
|--------------------------|--------------------------|-----------------------------------|--------------------------------|
| <b>Thermal etching</b>   | High purity Nitrogen     | Several hours at 1600° Celsius    | Si <sub>3</sub> N <sub>4</sub> |
| <b>Molten Salt</b>       | Potassium hydroxide melt | Seconds to minutes in Pt crucible | Si <sub>3</sub> N <sub>4</sub> |
| <b>Hydrofluoric acid</b> | 100%                     | 10-15 minutes                     | Si <sub>3</sub> N <sub>4</sub> |

# HARDNESS TESTING

ALPHA-MHT-1000Z MICROHARDNESS TESTER



ALPHA-MHT-1000Z

## ALPHA-MHT-1000Z

- Vickers or Knoop
- Auto-turret
- Built-in printer
- Load range 10-1000 grams
- Scales (HV, HK)
- LED display
- User friendly
- Robust and durable design



ALPHA-MHT-1000Z Control Panel

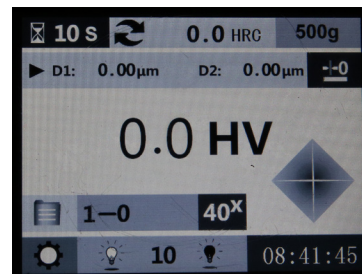
ALPHA-MHT-2000Z2 MICROHARDNESS TESTER



ALPHA-MHT-2000Z2

## ALPHA-MHT-2000Z2

- Vickers or Knoop
- Auto-turret
- Built-in printer
- Load range 10-2000 grams
- Scales (HV, HK)
- Auto hardness conversion to other scales (HRA, HRB, HRC, HV, HK, HBW, etc)
- Long lasting Halogen lamp
- Touch screen display
- Robust and durable design



ALPHA-MHT-2000Z2 Touch Screen

CE EN 61000-6-1:2007, EN 61000-6-3:2007+A1:2011+AC:2012, EN 61000-3-2:2014, EN 61000-3-3:2013 Electromagnetic Compatibility directive 2014/30/EU

# MICROHARDNESS TESTERS

## Microhardness Testers

**2** year warranty  
Limited Warranty

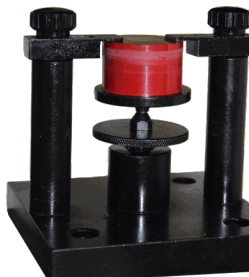
| FEATURE   | ALPHA-MHT-1000Z   | ALPHA-MHT-2000Z2  |
|---|---|---|
| Indenter types  | Vickers or Knoop  | Vickers or Knoop  |
| Objective Magnification                                   | 10X (observation) & 40X (measurement)   | 10X (observation) & 40X (measurement)   |
| Indenter Positioning                                      | Auto turret   | Auto turret   |
| Testing force (gf)  | 10, 25, 50, 100, 200, 300, 400, 500, 1000   | 10, 25, 50, 100, 200, 300, 400, 500, 1000, 2000   |
| Auto Hardness Conversion                                  | HK, HRA, HRBW, HRC, HRD, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HBW | HK, HRA, HRBW, HRC, HRD, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW |
| 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  | 1 x 1-inch (25 x 25 mm)   | 1 x 1-inch (25 x 25 mm) <sup>1</sup>  |
| Dwell Time  | 5-60 seconds  | 5-60 seconds  |
| Maximum Sample Height                                     | 3.5-inches (90 mm)  | 3.5-inches (90 mm)  |
| Throat Depth  | 4-inches (100 mm)   | 4-inches (100 mm)   |
| Illumination  | Halogen   | Halogen   |
| Dimensions (W x D x H)                                    | 12.8 x 19 x 21.5-inch (325 x 480 x 545 mm)  | 12.8 x 19 x 21.5-inch (325 x 480 x 545 mm)  |
| Electrical Specifications                                 | 110V / 220V 50/60 Hz  | 110V / 220V 50/60 Hz  |
| Weight  | 68 lbs (31 kg)  | 70 lbs (32 kg)  |
| Microhardness indentation measurement software (optional) | HARDNESS PRO  | HARDNESS PRO  |
| C-Mount camera attachment (optional)                      | 823-361   | 823-361   |
| Sample leveler (optional)                                 | 823-741   | 823-741   |
| Direct Certification (optional)                           | 3rd Party   | 3rd Party   |
| Catalog Number  | ALPHA-MHT-1000Z   | ALPHA-MHT-2000Z2  |

### Benefits:

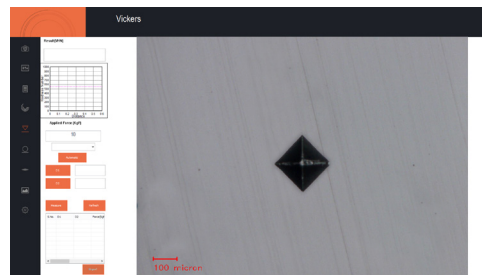
- ◆ Auto Turret to avoid indenter damage
- ◆ User friendly
- ◆ Built-in digital micrometer
- ◆ Counter balanced loading
- ◆ Economical
- ◆ 3rd party Direct Certification (optional)

### REQUEST A QUOTE

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



Sample Leveler (part no. 823-741)



HARDNESS PRO Measurement Software



C-Mount camera adapter (part no. 823-361)

# MICROHARDNESS TESTERS

ALPHA-MHT-1000VK DUAL MICROHARDNESS TESTER



ALPHA-MHT-1000VK

**NEW**

## ALPHA-MHT-1000VK

- Dual Vickers AND Knoop
- Auto-turret
- Load range 10-1000 grams
- Scales (HV and HK)
- Dwell time 0-95 seconds
- Auto hardness conversion to other scales (HRA, HRB, HRC, HV, HK, HBW, etc)
- Robust and durable design



Dual Vickers and Knoop Indenters with individual 40X (2) objectives

ALPHA-MHT-AUTO MICROHARDNESS TESTER



ALPHA-MHT-AUTO

## ALPHA-MHT-AUTO

- Automated Microhardness Testing
- Vickers or Knoop
- Auto-turret
- Load range 10-1000 grams
- Scales (HV, HK)
- Dwell time 0-60 seconds
- Maximum sample height 6.7-inches (170 mm)
- X-Y Anvil travel range 4.3 x 4.3-inches (110 x 110 mm)
- Auto hardness conversion to other scales (HV, HK, HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW)
- Robust and durable design



## Microhardness Testers

**2** year warranty  
Limited Warranty

| FEATURE   | ALPHA-MHT-1000VK  | ALPHA-MHT-AUTO  |
|---|---|---|
| Indenter types  | Dual Vickers and Knoop  | Vickers or Knoop  |
| Objective Magnification                                   | 10X (observation) and 20X & 40X (2)(measurement)  | 10X and 40X   |
| Indenter Positioning                                      | Auto turret   | Automatic (Loading/Dwell/Unloading)   |
| Testing force (gf)  | 10, 25, 50, 100, 200, 300, 400, 500, 1000   | 10, 25, 50, 100, 200, 300, 400, 500, 1000   |
| Auto Hardness Conversion                                  | HV, HK, HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW | HV, HK, HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW |
| Testing Range   | 1 HV ~ 3000 HV  | 1 HV ~ 3000 HV  |
| X-Y Anvil Size  | 4 x 4-inch (100 x 100 mm)   | 4.3 x 4.3-inch (110 x 110 mm)   |
| X-Y Anvil Travel  | 1 x 1-inch (25 x 25 mm)   | 2 x 1-inch (50 x 50 mm)   |
| Dwell Time  | 0-95 seconds  | 0-60 seconds  |
| Maximum Sample Height                                     | 3.5-inches (90 mm)  | 6.7-inches (170 mm)   |
| Throat Depth  | 4-inches (100 mm)   | 5.1-inches (130 mm)   |
| Illumination  | Halogen   | Halogen   |
| Dimensions (W x D x H)                                    | 17 x 19 x 17-inch (425 x 490 x 425mm)   | 13.2 x 22 x 26.6-inch (335 x 560 x 675 mm)  |
| Electrical Specifications                                 | 110V / 220V 50/60 Hz  | 110V / 220V 50/60 Hz  |
| Weight  | 77 lbs (35 kg)  | 115 lbs (52 kg)   |
| Microhardness indentation measurement software (optional) | HARDNESS PRO  | Built-in  |
| C-Mount camera attachment (optional)                      | 823-361   | Built-in  |
| Sample leveler (optional)                                 | 823-741   | 823-741   |
| Direct Certification (optional)                           | 3rd Party   | 3rd Party   |
| Catalog Number  | ALPHA-MHT-1000VK  | ALPHA-MHT-AUTO  |

### Benefits:

- ◆ Fully automated ALPHA-MHT-AUTO
- ◆ Dual Vickers AND Knoop indenters ALPHA-MHT-1000VK
- ◆ Auto Turret to avoid indenter damage
- ◆ User friendly
- ◆ Built-in digital micrometer
- ◆ Counter balanced loading
- ◆ Economical
- ◆ 3rd party Direct Certification (optional)

### REQUEST A QUOTE

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

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# HARDNESS TESTING CONSUMABLES

## Microhardness Test Blocks and Accessories

| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| Vickers (1 gram to 1000 grams) for all microhardness hardness ranges | <b>MV010</b>   | each | 675.00     |
| Knoop (1 gram to 1000 grams) for all microhardness hardness ranges   | <b>MK010</b>   | each | 675.00     |
| Vickers microhardness Diamond Penetrator -certified                  | <b>P1110</b>   | each | 1400.00    |
| Knoop microhardness Diamond Penetrator - certified                   | <b>P1120</b>   | each | 1400.00    |

## Rockwell Hardness Test Blocks

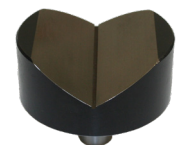
| PACE Product Name   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| A-Scale, C diamond, 60 kg, A60-A84, Steel Rockwell hardness test block              | <b>RA10</b>    | each | 115.00     |
| A-Scale, C diamond, 60 kg, A20-A59, Brass Rockwell hardness test block              | <b>RA20</b>    | each | 115.00     |
| A-Scale, A diamond (carbide), 60 kg, A88 & up, Carbide Rockwell hardness test block | <b>RA30</b>    | each | 460.00     |
| B-Scale, 1/16-inch ball, 100 kg, B10-B92, Steel Rockwell hardness test block        | <b>RB10</b>    | each | 115.00     |
| B-Scale, 1/16-inch ball, 100 kg, B90-B130, Steel Rockwell hardness test block       | <b>RB20</b>    | each | 115.00     |
| C-Scale, C Diamond, 150 kg, All, Steel Rockwell hardness test block                 | <b>RC10</b>    | each | 115.00     |
| D-Scale, C Diamond, 100 kg, All, Steel Rockwell hardness test block                 | <b>RD10</b>    | each | 115.00     |
| E-Scale, 1/8-inch ball, 100 kg, All, Brass Rockwell hardness test block             | <b>RE10</b>    | each | 115.00     |
| F-Scale, 1/16-inch ball, 60 kg, All, Brass Rockwell hardness test block             | <b>RF10</b>    | each | 115.00     |
| G-Scale, 1/16-inch ball, 150 kg, G82-91, Brass Rockwell hardness test block         | <b>RG10</b>    | each | 115.00     |
| H-Scale, 1/8-inch ball, 60 kg, All, Brass Rockwell hardness test block              | <b>RH10</b>    | each | 115.00     |
| K-Scale, 1/8-inch ball, 150 kg, All, Brass Rockwell hardness test block             | <b>RK10</b>    | each | 115.00     |
| L-Scale, 1/4-inch ball, 60 kg, All, Brass Rockwell hardness test block              | <b>RL10</b>    | each | 115.00     |
| M-Scale, 1/4-inch ball, 100 kg, All, Brass Rockwell hardness test block             | <b>RM10</b>    | each | 115.00     |
| P-Scale, 1/4-inch ball, 150 kg, All, Brass Rockwell hardness test block             | <b>RP10</b>    | each | 115.00     |
| R-Scale, 1/2-inch ball, 60 kg, All, Brass Rockwell hardness test block              | <b>RR10</b>    | each | 115.00     |
| S-Scale, 1/2-inch ball, 100 kg, All, Brass Rockwell hardness test block             | <b>RS10</b>    | each | 115.00     |
| V-Scale, 1/2-inch ball, 150 kg, All, Brass Rockwell hardness test block             | <b>RV10</b>    | each | 115.00     |

## Rockwell Anvils

| PACE Product Name                       | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| Pedestal Spot (1/4-inch) Rockwell Anvil | <b>A1010</b>   | each | 265.00     |
| 1-1/2-inch Flat Rockwell Anvil          | <b>A1020</b>   | each | 265.00     |
| 2-1/2-inch Flat Rockwell Anvil          | <b>A1030</b>   | each | 305.00     |
| Shallow V Rockwell Anvil                | <b>A1040</b>   | each | 305.00     |
| Standard V Rockwell Anvil               | <b>A1050</b>   | each | 305.00     |



Rockwell Flat Anvil



Rockwell V-Anvil

## Rockwell Ball Penetrators

| PACE Product Name                                     | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 1/16-inch Carbide Ball Penetrator Indentron Certified | P20101         | each | 390.00     |
| 1/16-inch Carbide Ball, Certified                     | P20150         | each | 24.00      |
| 1/8-inch Carbide Ball Penetrator Indentron Certified  | P20201         | each | 328.00     |
| 1/8-inch Carbide Ball, Certified                      | P20250         | each | 55.00      |
| 1/4-inch Carbide Ball Penetrator Indentron Certified  | P20301         | each | 395.00     |
| 1/4-inch Carbide Ball, Certified                      | P20350         | each | 55.00      |
| 1/2-inch Carbide Ball Penetrator Indentron Certified  | P20401         | each | 440.00     |
| 1/2-inch Carbide Ball, Certified                      | P20450         | each | 78.00      |

## Superficial Rockwell Hardness Test Blocks

| PACE Product Name   | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 15 N Scale, N Diamond, 15 kg, All, Steel, Superficial hardness test blocks      | S15N10         | each | 115.00     |
| 30 N Scale, N Diamond, 30 kg, All, Steel, Superficial hardness test blocks      | S30N10         | each | 115.00     |
| 45 N Scale, N Diamond, 45 kg, All, Steel, Superficial hardness test blocks      | S45N10         | each | 115.00     |
| 15 T Scale, 1/16-inch Ball, 15 kg, All, Brass, Superficial hardness test blocks | S15T10         | each | 115.00     |
| 30 T Scale, 1/16-inch Ball, 30 kg, All, Brass, Superficial hardness test blocks | S30T10         | each | 115.00     |
| 45 T Scale, 1/16-inch Ball, 45 kg, All, Brass, Superficial hardness test blocks | S45T10         | each | 115.00     |
| 15 W Scale, 1/8-inch Ball, 15 kg, All, Brass, Superficial hardness test blocks  | S15W10         | each | 115.00     |
| 30 W Scale, 1/8-inch Ball, 30 kg, All, Brass, Superficial hardness test blocks  | S30W10         | each | 115.00     |
| 45 W Scale, 1/8-inch Ball, 45 kg, All, Brass, Superficial hardness test blocks  | S45W10         | each | 115.00     |
| 15 X Scale, 1/4-inch Ball, 15 kg, All, Brass, Superficial hardness test blocks  | S15X10         | each | 115.00     |
| 30 X Scale, 1/4-inch Ball, 30 kg, All, Brass, Superficial hardness test blocks  | S30X10         | each | 115.00     |
| 45 X Scale, 1/4-inch Ball, 45 kg, All, Brass, Superficial hardness test blocks  | S45X10         | each | 115.00     |
| 15 Y Scale, 1/2-inch Ball, 15 kg, All, Brass, Superficial hardness test blocks  | S15Y10         | each | 115.00     |
| 30 Y Scale, 1/2-inch Ball, 30 kg, All, Brass, Superficial hardness test blocks  | S30Y10         | each | 115.00     |
| 45 Y Scale, 1/2-inch Ball, 45 kg, All, Brass, Superficial hardness test blocks  | S45Y10         | each | 115.00     |

# ROCKWELL HARDNESS TESTERS

OMEGA-RT2 MANUAL ROCKWELL TESTER



OMEGA-RT2

## OMEGA-RT2

- Manual Rockwell Tester
- 60 Kgf, 100 Kgf and 150 Kgf loading
- Analog display
- Robust and durable design
- Manual loading control
- User friendly
- Economical

OMEGA-RT-60/150 ROCKWELL TESTER



OMEGA-RT-60/150

## OMEGA-RT-60/150

- Semi-Automated Rockwell Tester
- Initial test force 10 Kgf loading
- Total test force 60, 100 and 150 Kgf loading
- Automatic conversion to 18 different hardness scales
- LCD displays hardness
- Robust and durable design
- Loading time and dwell time (1-60 seconds)
- Auto hardness conversion
- User friendly
- Economical

OMEGA-RST-15/150 SUPERFICIAL ROCKWELL TESTER



OMEGA-RST-15/150

## OMEGA-RST-15/150

- Semi-Automated Dual Rockwell / Superficial Tester
- Total test force 15, 30, 45, 60, 100 and 150 Kgf loading
- Automatic conversion to 18 different hardness scales
- LCD displays hardness
- Robust and durable design
- Loading time and dwell time (1-60 seconds)
- Auto hardness conversion
- User friendly
- Economical

## Manual Rockwell Hardness Tester

**2** year warranty  
Limited Warranty

| FEATURE                  | OMEGA-RT2                                     |
|--------------------------|---|
| Rockwell Scales          | HRA, HRB, HRC                                 |
| Preliminary test force   | 10 Kgf (98.07N)                               |
| Full test force          | 60 Kgf, 100 Kgf, 150 Kgf                      |
| Loading control          | Manual  |
| Instrument Throat Height | 6.5-inch (165 mm)                             |
| Maximum Sample Height    | 7.3-inch (185 mm)                             |
| Hardness Resolution      | 0.5 HR  |
| Dimensions (W x D x H)   | 9.6 x 20.5 x 27.6-inch<br>(245 x 520 x 700mm) |
| Weight                   | 172 lbs (78 kg)                               |

### Benefits:

- ◆ Basic Rockwell Tester
- ◆ Economical
- ◆ Easy to Use

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

## Semi-Automated Rockwell Hardness Testers

**2** year warranty  
Limited Warranty

| FEATURE                         | OMEGA-RT-60/150   | OMEGA-RST-15/150   |
|---------------------------------|---|--|
| Rockwell Tester                 | Standard Rockwell Tester  | Dual Rockwell / Superficial Rockwell Tester  |
| Automation                      | Semi-Automated  | Semi-Automated   |
| Rockwell Scales                 | HRA, HRD, HRC, HRFW, HRBW, HRGW, HRHW, HREW, HRKW, HRL, HRM, HRR, HRP, HRS, HRV                           | HRA, HRD, HRC, HRFW, HRBW, HRGW, HREW, HRKW, HRM, HRP, HRR, HRS, HRV, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HR15W, HR30W, HR45W, HR15X, HR30X, HR45X, HR15T, HR30Y, HR45Y |
| Preliminary test force          | 10 Kgr (98.07N)   | 3 Kgr (Superficial)<br>10 Kgr (Rockwell)   |
| Full test force                 | 60 Kgf, 100 Kgf, 150 Kgf  | 15, 30, 45, 60, 100, and 150 Kgf   |
| Hardness resolution             | 0.1 HR  | 0.1 HR   |
| Dwell time                      | Adjustable 0-60 seconds   | Adjustable 0-60 seconds  |
| Auto Hardness conversion        | HV, HK, HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW | HV, HK, HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRKW, HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW, HS, HBW  |
| Instrument Throat Height        | 6.5-inch (165 mm)   | 6.3-inch (165 mm)  |
| Power                           | 110 or 220V   | 110 or 220V  |
| Dimensions (W x D x H)          | 8.5 x 20 x 28 inch<br>(215 x 520 x 700mm)   | 8.5 x 20 x 28 inch<br>(215 x 520 x 700mm)  |
| Weight                          | 172 lbs (78 kg)   | 175 lbs (80 Kg)  |
| Direct Certification (optional) | 3rd Party   | 3rd Party  |

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# ROCKWELL HARDNESS TESTERS

OMEGA-RT MANUAL ROCKWELL TESTER



OMEGA-RT

## OMEGA-RT

- Manual Rockwell Tester
- Initial test force 10 Kgf loading
- Total test force 60, 100 and 150 Kgf loading
- Analog display
- Robust and durable design
- Manual loading control
- Easy to use
- Economical

OMEGA-DIGI-RT ROCKWELL TESTER



OMEGA-DIGI-RT

## OMEGA-DIGI-RT

- Digital Semi-Automated Rockwell Tester
- Initial test force 10 Kgf loading
- Total test force 60, 100 and 150 Kgf loading
- Automatic conversion to 16 different hardness scales
- Touch screen display
- Robust and durable design
- Loading time and dwell time (1-60 seconds)
- Auto hardness conversion
- User friendly
- Economical

OMEGA-DIGI-RST SUPERFICIAL ROCKWELL TESTER



OMEGA-DIGI-RST

## OMEGA-DIGI-RST

- Digital Semi-Automated Dual Rockwell / Superficial Tester
- Total test force 15, 30, 45, 60, 100 and 150 Kgf loading
- Automatic conversion to 16 different hardness scales
- Touch screen display
- Robust and durable design
- Loading time and dwell time (1-60 seconds)
- Auto hardness conversion
- User friendly
- Economical

## Manual Rockwell Hardness Tester

| FEATURE                  | OMEGA-RT<br>(Rockwell)                         | OMEGA-ST<br>(Superficial Rockwell)             |
|--------------------------|--|--|
| Rockwell Scales          | HRA, HRB,HRC                                   | HR15N, HR30N, HR45N,<br>HR15T, HR30T, HR45T    |
| Preliminary test force   | 10 Kgf (98.07N)                                | 3 Kgf (29.4N)                                  |
| Full test force          | 60 Kgf, 100 Kgf, 150 Kgf                       | 15 Kgf, 30 Kgf, 45 Kgf                         |
| Loading control          | Manual   | Manual   |
| 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<br>(182 x 546 x 755 mm) | 7.2 x 21.5 x 29.7 inch<br>(182 x 546 x 755 mm) |
| Weight                   | 200 lbs (90 kg)                                | 200 lbs (90 kg)                                |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Basic Rockwell Tester
- ◆ Economical
- ◆ Easy to Use

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

## Semi-Automated Rockwell Hardness Testers

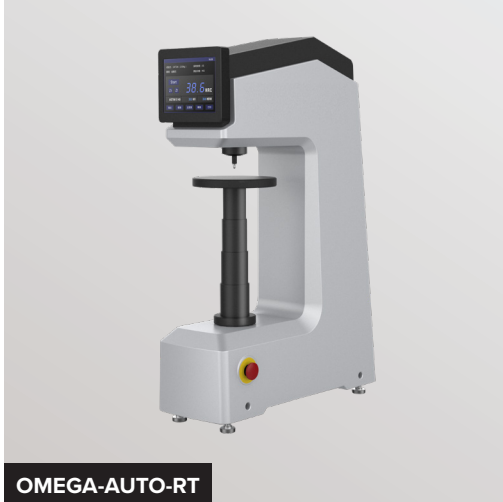
| FEATURE                         | OMEGA-DIGI-RT  | OMEGA-DIGI-RST   |
|---------------------------------|--|--|
| Rockwell Tester                 | Standard Rockwell Tester   | Dual Rockwell / Superficial Rockwell Tester  |
| Automation                      | Semi-Automated   | Semi-Automated   |
| Hardness Scales                 | Rockwell: HRA, HRB,HRC,HRD,HRE, HRF,<br>HRG, HRH, HRK, HRL, HRM, HRR, HRP,<br>HRS,HRV                | Rockwell: HRA, HRB,HRC,HRD,HRE, HRF,<br>HRG, HRH, HRK, HRL, HRM, HRR, HRP,<br>HRS,HRV<br>Superficial Rockwell: HR15N,HR30N,HR45N<br>,HR15T,HR30T,HR45T |
| Preliminary test force          | 10 Kgr (98.07N)  | 3 Kgr (Superficial)<br>10 Kgr (Rockwell)   |
| Full test force                 | 60 Kgf, 100 Kgf, 150 Kgf   | 15, 30, 45, 60, 100, and 150 Kgf   |
| Hardness resolution             | 0.1 HR   | 0.1 HR   |
| Dwell time                      | Adjustable 1-60 seconds  | Adjustable 1-60 seconds  |
| Auto Hardness conversion        | HRC, HV, HBS, HBW, HK, HRA, HRD,<br>HR15N, HR30N, HR45N, HS, HRF, HR15T,<br>HR30T, HR45T, HR15Y, HRB | HRC, HV, HBS, HBW, HK, HRA, HRD,<br>HR15N, HR30N, HR45N, HS, HRF, HR15T,<br>HR30T, HR45T, HR15Y, HRB   |
| Maximum Height of Specimen      | 6.9-inch (175 mm)  | 11.0-inch (280 mm)   |
| Power                           | 110 or 220V  | 110 or 220V  |
| Dimensions (W x D x H)          | 7 x 21.5 x 30 inches<br>182 x 546 x 755 mm)  | 8.8 x 24 x 35 inches<br>225 x 615 x 885 mm)  |
| Weight                          | 198 lbs (90 Kg)  | 265 lbs (120 Kg)   |
| Direct Certification (optional) | 3rd Party  | 3rd Party  |

**2** year warranty  
Limited Warranty

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# AUTOMATED ROCKWELL TESTERS

OMEGA-AUTO-RT HARDNESS TESTER



OMEGA-AUTO-RT

## OMEGA-AUTO-RT

- Fully-automated Rockwell Tester
- Initial test force 10 Kgf loading
- Total test force 60, 100 and 150 Kgf loading
- One touch operation
- Auto load change
- Auto lifting
- Auto loading
- Auto measuring
- Auto conversion
- Ability to set upper and lower limits
- Robust and durable design

OMEGA-AUTO-ST HARDNESS TESTER



OMEGA-AUTO-ST

## OMEGA-AUTO-ST

- Fully-automated Superficial Rockwell Tester
- Total test force 15 Kgf, 30 Kgf and 45 Kgf loading (Superficial)
- One touch operation
- Auto load change
- Auto lifting
- Auto loading
- Auto measuring
- Auto conversion
- Color touch screen
- Ability to set upper and lower limits
- Robust and durable design

OMEGA-AUTO-RST HARDNESS TESTER



OMEGA-AUTO-RST

## OMEGA-AUTO-RST

- Fully-automated Dual Rockwell / Superficial Rockwell Tester
- 15 Kgf, 30 Kgf and 45 Kgf loading (Superficial)  
60 Kgf, 100 Kgf and 150 Kgf loading (Rockwell)
- One touch operation
- Auto load change
- Auto lifting
- Auto loading
- Auto measuring
- Auto conversion
- Color touch screen
- Ability to set upper and lower limits
- Robust and durable design



## Automated Rockwell Hardness Testers

**2** year warranty  
Limited Warranty

| FEATURE                                | OMEGA-AUTO-RT   | OMEGA-AUTO-ST   | OMEGA-AUTO-RST  |
|--|---|---|---|
| <b>Rockwell Type</b>                   | Rockwell  | Superficial Rockwell  | Dual Rockwell / Superficial Rockwell  |
| <b>Rockwell Scales</b>                 | 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                      | HRA, HRB,HRC,HRD,HRE, HRF, HRG,HRH,HRK,HRL, HRM, HRR, HRP, HRS,HRV                      |
| <b>Preliminary Test Force</b>          | 10 Kgr (Rockwell)   | 3 Kgr (Superficial)   | 3 Kgr (Superficial)<br>10 Kgr (Rockwell)  |
| <b>Full Test Force</b>                 | 60 Kgf, 100 Kgf, 150 Kgf (Rockwell)   | 15 Kgf, 30 Kgf, 45 Kgf (Superficial)  | 15 Kgf, 30 Kgf 45 Kgf (Superficial)<br>60 Kgf, 100 Kgf, 150 Kgf (Rockwell)              |
| <b>Hardness resolution</b>             | 0.1 HR  | 0.1 HR  | 0.1 HR  |
| <b>Dwell Time</b>                      | Adjustable 1-60 seconds   | Adjustable 1-60 seconds   | Adjustable 1-60 seconds   |
| <b>Auto Hardness conversion</b>        | HRC, HV, HBS, HBW, HK, HRA, HRD, HR15N, HR30N, HR45N, HS, HRF, HR15T, HR30T, HR45T, HRB | HRC, HV, HBS, HBW, HK, HRA, HRD, HR15N, HR30N, HR45N, HS, HRF, HR15T, HR30T, HR45T, HRB | HRC, HV, HBS, HBW, HK, HRA, HRD, HR15N, HR30N, HR45N, HS, HRF, HR15T, HR30T, HR45T, HRB |
| <b>Max Height of Specimen</b>          | 11 inches (280 mm)  | 11 inches (280 mm)  | 11 inches (280 mm)  |
| <b>Power</b>                           | 110 or 220V   | 110 or 220V   | 110 or 220V   |
| <b>Dimensions (W x D x H)</b>          | 9 x 24 x 34.8 inches (225 x 615 x 885 mm)   | 9 x 24 x 34.8 inches (225 x 615 x 885 mm)   | 9 x 24 x 34.8 inches (225 x 615 x 885 mm)   |
| <b>Weight</b>                          | 275.6 lbs (125 Kg)  | 275.6 lbs (125 Kg)  | 275.6 lbs (125 Kg)  |
| <b>Direct Certification (optional)</b> | 3rd Party   | 3rd Party   | 3rd Party   |
| <b>Catalog Number</b>                  | OMEGA-AUTO-RT   | OMEGA-AUTO-ST   | OMEGA-AUTO-RST  |

### Benefits:

- ◆ Automated Testers
- ◆ One touch operation
- ◆ Stores up to 2000 single test measurements
- ◆ Stores 1000 groups of test results
- ◆ Eliminates user error for more reproduceable results

### REQUEST A QUOTE

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

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# BRINELL TESTERS

OMEGA-HB BRINELL HARDNESS TESTER



OMEGA-HB

## OMEGA-HB

- Manual Brinell Tester
- Test Forces 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500 and 3000 Kgf
- Test range (~3.2 to 650 HBW)
- User friendly
- Robust and durable design

**REQUEST A QUOTE**  
[www.metallographic.com](http://www.metallographic.com)

OMEGA-HB-3000 BRINELL HARDNESS TESTER



OMEGA-HB-3000

## OMEGA-HB-3000

- Digital Brinell Tester with Built-In Optics
- Semi-automated
- Built-in eyepiece filar
- Test Forces 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500 and 3000 Kgf
- Test range (~3.2 to 650 HBW)
- LCD display
- User friendly
- Robust and durable design

OMEGA-AUTO-HB BRINELL HARDNESS TESTER



OMEGA-AUTO-HB

## OMEGA-AUTO-HB

- Fully-automated BRINELL Tester
- Testing range of ~3.2 to 650 HBW
- 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 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 500, 3000 Kgf
- Robust and durable design

## Brinell Hardness Testers

**2** year warranty  
Limited Warranty

| FEATURE                        | OMEGA-HB   | OMEGA-HB-3000  | OMEGA-AUTO-HB  |
|--------------------------------|--|--|--|
| <b>Brinell Tester</b>          | Manual   | Semi-Automated   | Automated  |
| <b>Optical Measurement</b>     | Manual 20X Optical Scope                               | Built-in 20X eyepiece filar                            | Built-in 20X eyepiece filar                            |
| <b>Test forces (Kgf)</b>       | 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000 | 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000 | 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000 |
| <b>Testing range</b>           | ~3.2 to 650 HBW  | ~3.2 to 650 HBW  | ~3.2 to 650 HBW  |
| <b>Max. height of specimen</b> | 8.1-inch (205 mm)                                      | 8.8-inch (225 mm)                                      | 10 inches (260 mm)                                     |
| <b>Max. throat depth</b>       | 5.3-inch (135 mm)                                      | 5.3-inch (135 mm)                                      | 6 inches (150 mm)                                      |
| <b>Power</b>                   | 110 or 220V  | 110 or 220V  | 110 or 220V  |
| <b>Dimensions (W x H x D)</b>  | 9.3 x 21.5 x 29.7-inch (235 x 545 x 755 mm)            | 9.3 x 21.5 x 31.1-inch (235 x 545 x 790 mm)            | 12 x 24.5 x 39-inch (313 x 622 x 992 mm)               |
| <b>Weight</b>                  | 290 lbs (130 kg)                                       | 290 lbs (130 kg)                                       | 375 lbs (170 kg)                                       |
| <b>Catalog Number</b>          | OMEGA-HB   | OMEGA-HB-3000  | OMEGA-AUTO-HB  |

## Brinell Consumable Test Blocks

| PACE Product Name  | Catalog Number | Qty  | Price (\$) |
|--|----------------|------|------------|
| 3000 kg load, 10 mm ball Brinell test block for all hardness ranges  | <b>B3000</b>   | each | 210.00     |
| 2000 kg load, 10 mm ball Brinell test block for all hardness ranges  | <b>B2000</b>   | each | 210.00     |
| 1500 kg load, 10 mm ball Brinell test block for all hardness ranges  | <b>B1500</b>   | each | 210.00     |
| 1000 kg load, 10 mm ball Brinell test block for all hardness ranges  | <b>B1000</b>   | each | 210.00     |
| 500 kg load, 10 mm ball Brinell test block for all hardness ranges   | <b>B0500</b>   | each | 210.00     |
| 250 kg load, 10 mm ball Brinell test block for all hardness ranges   | <b>B0250</b>   | each | 210.00     |
| 187.5 kg load, 10 mm ball Brinell test block for all hardness ranges | <b>B0187</b>   | each | 210.00     |

## Brinell Indenters / Carbide Balls

| PACE Product Name                                     | Catalog Number | Qty  | Price (\$) |
|---|----------------|------|------------|
| 2.5 mm Brinell carbide balls (each) - certified       | <b>P3032</b>   | each | 38.00      |
| 5 mm Brinell carbide balls (each) - certified         | <b>P3031</b>   | each | 65.00      |
| 10 mm Brinell carbide balls (each) - certified        | <b>P3020</b>   | each | 80.00      |
| 2.5 mm Brinell Indenter with carbide ball - certified | <b>P3132</b>   | each | 480.00     |
| 5 mm Brinell Indenter with carbide ball - certified   | <b>P3131</b>   | each | 565.00     |
| 10 mm Brinell Indenter with carbide ball - certified  | <b>P3134</b>   | each | 675.00     |

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# MACRO VICKERS TESTERS

## OMEGA Macro Vickers Hardness Testers

**2** year warranty  
Limited Warranty



OMEGA-5000-HV

**REQUEST A QUOTE**

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

## OMEGA-5000-HV

- Semi-automated Macro Vickers Tester
- 1, 2, 2.5, 3, 5, 10, 20, 30 and 50 Kgf loading
- 10X and 20X objectives
- Touch screen control
- Auto turret
- Auto focusing
- Auto measurement
- Robust and durable design

| FEATURE                                 | OMEGA-5000-VZ  |
|---|--|
| Test forces                             | 1kgf, 2kgf, 2.5kgf, 3kgf, 5kgf, 10kgf, 20kgf, 30kgf, 50kgf |
| Eyepieces                               | 10X  |
| Objectives                              | 10X, 20X   |
| Total Magnification                     | 100X, 200X   |
| Loading Method                          | Automatic (Loading/Dwell/Unloading)                        |
| Dwell time                              | Adjustable 5-60 seconds                                    |
| Shifting between Objective and Indenter | Automatic Shifting   |
| Resolution                              | 0.25µm / 0.125µm   |
| Illumination                            | Halogen  |
| Maximum Sample Height                   | 6.7-inch (170 mm)  |
| Power                                   | 110 or 220V  |
| Dimensions (W x H x D)                  | 11 x 21 x 25 inch (280 x 530 x 630mm)                      |
| Weight                                  | 77 lbs (35 kg)   |
| Part No.                                | OMEGA-5000-HV  |

## Macro Vickers Test Blocks

| PACE Product Name                  | Catalog Number | Qty  | Price (\$) |
|------------------------------------|----------------|------|------------|
| Heavy Load Vickers (1 kg to 50 kg) | MV020          | each | 675.00     |

### Steel Hardness Conversion Table:

This table compares the relative tensile strength to the approximate hardness of steel for the Brinell, Rockwell B, Rockwell C and Vickers scales.

| Brinell Hardness (HB) | Rockwell (HRC)    | Rockwell (HRB)           | Vickers (HV)      | Tensile Strength (N/mm <sup>2</sup> ) |
|-----------------------|-------------------|--------------------------|-------------------|---------------------------------------|
| 3000 kg<br>10 mm Ball | 150 kg<br>Diamond | 100 kg<br>1/16-inch Ball | Diamond<br>120 kg | Approx.                               |
| 800                   | 72                |                          |                   |                                       |
| 745                   | 68                |                          |                   |                                       |
| 695                   | 64                |                          |                   |                                       |
| 641                   | 61                |                          |                   |                                       |
| 592                   | 57                |                          | 727               |                                       |
| 552                   | 55                |                          | 649               |                                       |
| 504                   | 52                | 118                      | 549               |                                       |
| 456                   | 48                | 116                      | 490               | 1569                                  |
| 402                   | 43                | 114                      | 424               | 1390                                  |
| 348                   | 38                | 110                      | 361               | 1187                                  |
| 300                   | 32                | 107                      | 303               | 1020                                  |
| 255                   | 26                | 102                      | 258               | 870                                   |
| 203                   | 16                | 94                       | 201               | 680                                   |
| 154                   | 1                 | 82                       | 152               | 515                                   |
| 105                   |                   | 62                       | 112               | 378                                   |


 EN 61000-1:2010, EN 61000-3-3:2013  
 2014/35/ EU Low Voltage Directive  
 2014/30/EU Electromagnetic Compatibility Directive

# METALLOGRAPHIC MICROSCOPY

IM-3000B INVERTED METALLURGICAL MICROSCOPE



IM-3000B Microscope

**REQUEST A QUOTE**

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

## IM-3000B Microscope

- Basic Metallurgical Microscope
  - Brightfield Illumination
  - Polarized Light Illumination
- 5 position turret for 4.5X, 10X, 20X, 50X and 100X Infinite Plan Achromatic Objectives
- Dual widefield eyepieces
- Mechanical X-Y stage control
- Bright Halogen Light Source
- Multiple camera ports
- Robust and durable design
- Economical Basic Metallurgical Microscope

IM-5000 INVERTED METALLURGICAL MICROSCOPE



IM-5000 Microscope

**REQUEST A QUOTE**

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

## IM-5000 Microscope

- Powerful Metallurgical Microscope
  - Brightfield Illumination
  - Darkfield Illumination
  - Polarized Light
  - Differential Interference Contrast (DIC) Illumination
- 5 position turret for 5X, 10X, 20X, 50X and 100X DIC Objectives
- Dual widefield eyepieces
- Mechanical X-Y stage control
- Bright Halogen Light Source
- Multiple camera ports
- Robust and durable design
- Economical High Performance Metallurgical Microscope

# METALLOGRAPHIC MICROSCOPES

## IM-3000B Brightfield Metallographic Microscope

| FEATURE                  | IM-3000B DESCRIPTION  |
|--------------------------|---|
| Illumination Techniques  | Brightfield and Polarized Light   |
| Objectives:              | Infinite Plan Achromatic 4.5X/0.1<br>Infinite Plan Achromatic 10X/0.25<br>Infinite Plan Achromatic 20X/0.4<br>Infinite Plan Achromatic 50X/0.75<br>Infinite Plan Achromatic 100X/0.90 |
| Eyeiece:                 | Wide field WF 10X (field no. 22 mm)   |
| Trinocular Head:         | Trinocular, 45 degree inclination ratio Observation: 80%, photo 20%   |
| Focusing System:         | Coaxial coarse/fine focus (2 micron) ravel (stage to focal plane) up 1 mm, down 7 mm  |
| Nosepiece:               | Quintuple   |
| Mechanical Stage:        | X-Y stage Travel range: 1.6 x 1.6-inches (40 x 40 mm)<br>Size: 8.9 x 7-inch (226 x 178 mm)  |
| Illumination:            | 12V/50W Halogen Lamp  |
| Color Filters:           | Grey, Blue, Green color filters & ground glass  |
| Electrical Specification | 110V/220V (50/60 Hz) (single phase)   |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Brightfield illumination
- ◆ Polarized light illumination
- ◆ X-Y Stage control
- ◆ Multiple camera ports

**REQUEST A QUOTE**

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



IM-3000B Infinite Plan Achromatic Objectives

## IM-5000 Brightfield, Darkfield & DIC Microscope

| FEATURE                  | IM-5000 DESCRIPTION  |
|--------------------------|--|
| Illumination Techniques  | Brightfield, Darkfield, Polarized Light & Differential Interference contrast (DIC)   |
| Objectives:              | PL L5X/0.12 BD (working distance 10 mm)<br>PL L10X/0.25 BD (working distance 10 mm)<br>PL L20/0.40 BD (working distance 5 mm)<br>PL L50X/0.70 BD (working distance 1.3 mm)<br>PL L100X/0.90 BD (working distance 0.7 mm) |
| Eyeiece:                 | Wide field WF 10X (field no. 22 mm)  |
| Trinocular Head:         | Trinocular, 45 degree inclination ratio Observation: 80%, photo 20%  |
| Focusing System:         | Coaxial coarse/fine focus (2 micron) Travel (stage to focal plane) up 1 mm, down 7 mm  |
| Nosepiece:               | Quintuple  |
| Mechanical Stage:        | X-Y stage Travel range: 1.6 x 1.6-inches (40 x 40 mm)<br>Size: 8.9 x 7-inch (226 x 178 mm)   |
| Illumination:            | 12V/50W Halogen Lamp   |
| Color Filters:           | Grey, Blue, Green color filters & ground glass   |
| Electrical Specification | 110V/220V (50/60 Hz) (single phase)  |

**2** year warranty  
Limited Warranty

### Benefits:

- ◆ Brightfield illumination
- ◆ Darkfield illumination
- ◆ Polarized light illumination
- ◆ Differential interference contrast
- ◆ X-Y Stage control
- ◆ Multiple camera ports



IM-5000 Objectives

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

# STEREO MICROSCOPES

ZMS0745T STEREO METALLURGICAL MICROSCOPE



ZMS0745T Microscope

**REQUEST A QUOTE**

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

## ZMS0745T Stereo Microscope

- Stereo imaging for better 3-dimensional viewing (excellent for weld analysis)
- Dual eyepieces
- 10X zoom
- High depth of focus
- X-Y stage (optional)
- Trinocular head for camera attachment
- Robust and durable design
- Economical Stereographic Metallurgical Microscope

VM-100 DIGITAL STEREO MICROSCOPE



VM-100 Microscope

## VM-100 Digital Stereo Microscope

- Digital High Resolution Stereo Microscope
- Photo and video recording capability
- Built-in zoom
- Unit includes monitor
- Adjustable bottom and top LED illumination
- Robust and durable design

VM-500-PLUS DIGITAL STEREO MICROSCOPE



VM-500-PLUS Microscope

## VM-500-PLUS Digital Stereo Microscope

- Digital High Resolution Stereo Microscope
- Auto Focus
- Photo and video recording capability
- Built-in zoom
- Unit includes monitor
- Adjustable bottom and top LED illumination
- Includes built-in measuring software
- Robust and durable design



## ZMS07475T Stereo Metallographic Microscope

**2** year warranty  
Limited Warranty

| FEATURE                   | ZMS0745T DESCRIPTION                                     | ACCESSORIES   | CATALOG NUMBER                                      |
|---------------------------|--|---|---|
| Illumination Techniques   | Oblique Illumination                                     | Eyepieces:<br>SWH10X/23mm<br>SWH15X/17mm<br>SWH20X/14mm   | 416-101<br>416-151<br>416-201                       |
| Total Magnification       | 7-45X (with 10X eyepieces)                               | Magnifiers:<br>0.37X magnifying objective<br>0.5X magnifying objective<br>0.7X magnifying objective<br>1.5X magnifying objective<br>2X magnifying objective | 416-311<br>416-321<br>416-331<br>416-341<br>416-351 |
| Eyepiece Options          | 10X (standard), 15X and/or 20X (optional)                | Digital camera  | CAM-31 or CAM-91                                    |
| Trinocular Head           | Inclined 45 degrees from main body (360 degree rotation) | 1X CCD adapter  | 417-101   |
| Diopter Adjustment        | +/- 6 degrees  | 4-Division LED Lightsouce (ML-144D)   | 413-136   |
| Interpupillary Adjustment | 2 ~ 3-inch (52 ~ 76 mm)                                  | Fiber optic light source (150 W)  | 413-227   |
| Focus Range               | 3-inch (76 mm)   | Mechanical stage with X-Y micrometers   | 419-162   |
| Stage Size                | 5-inch (125 mm)  |   |   |
| Color Filters:            | Grey, Blue, Green color filters & ground glass           |   |   |
| Catalog Number            | ZMS0745T   |   |   |

## VM Digital Stereo Metallographic Microscope

**2** year warranty  
Limited Warranty

| FEATURE                   | VM-100 DESCRIPTION   | VM-500-PLUS DESCRIPTION  |
|---------------------------|--|--|
| Illumination Techniques   | Oblique Illumination   | Oblique Illumination with Auto Focus   |
| Optical Objective         | 0.7 X ~ 4.5X Horizontal zoom lens (Zoom ratio: 6.5:1)  | 0.7 X ~ 4.5X Horizontal zoom lens (Zoom ratio: 6.5:1)  |
| Camera Parameter          | 2 million pixel (1920 x 1080)<br>Image size: 1/2.86-inch<br>Frames per second: 30 fps  | 2 million pixel (1920 x 1080)<br>Image size: 1/2.86-inch<br>Frames per second: 1080P@60 fps  |
| Measuring Function        | <ul style="list-style-type: none"> <li>White balance, brightness control, digital noise reduction</li> <li>Photograph and video recording</li> <li>VGA/USB Out put, SD card storage</li> <li>Cross hairline, Picture frozen, 10 X digital magnification</li> </ul> | <ul style="list-style-type: none"> <li>White balance, brightness control, digital noise reduction</li> <li>Photograph and video recording</li> <li>VGA/USB Out put,</li> <li>Cross hairline, Picture frozen, 10 X digital magnification</li> </ul> |
| Measuring Function        | Optional PC System and measuring software can measure image in field of view   | Linear dimensions such as distance, perimeter, area, angle, radian, width, height, and radius elements are measured  |
| Interpupillary Adjustment | 2 ~ 3-inch (52 ~ 76 mm)  |  |
| Microscope Stand          | Z-axis Travel: 6-inch (150 mm), Coarse/fine lifting system   | Z-axis Travel: 4-inch (100 mm), Coarse/fine lifting system   |
| Electrical Parameters     | 90~240 V; 50~60 Hz   | 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)   | 14.8 x 11.2 x 19.7 inches (375 x 285 x 500 mm)   |
| Weight                    | 10 lbs (4.7 kg)  | 14 lbs (6.5 kg)  |
| Catalog Number            | VM-100   | VM-500-PLUS  |

**CE** EN 61000-1:2010, EN 61000-3-3:2013  
2014/35/ EU Low Voltage Directive  
2014/30/EU Electromagnetic Compatibility Directive

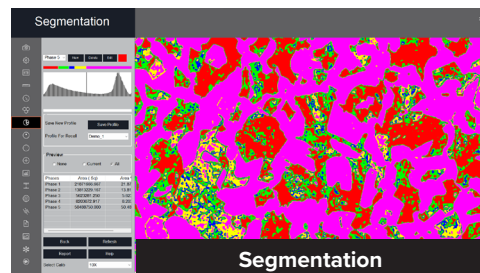
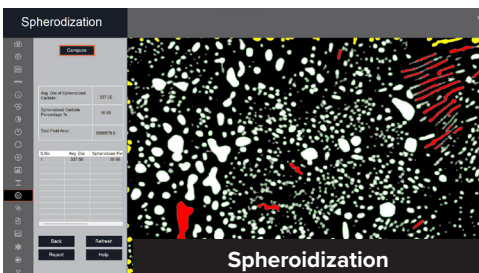
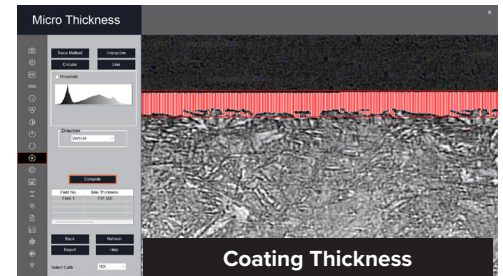
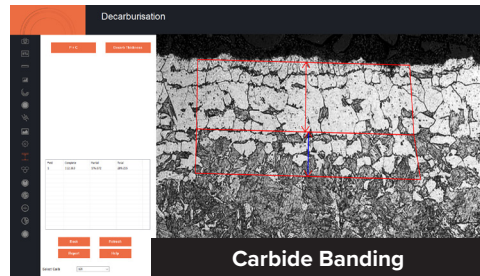
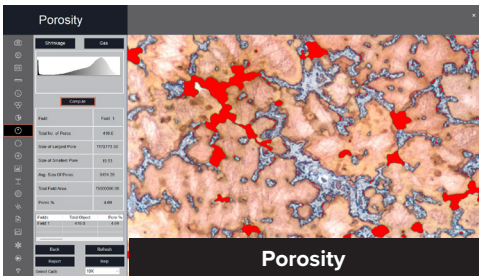
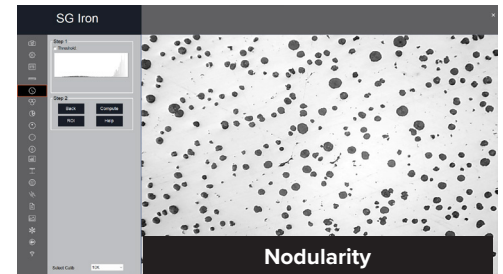
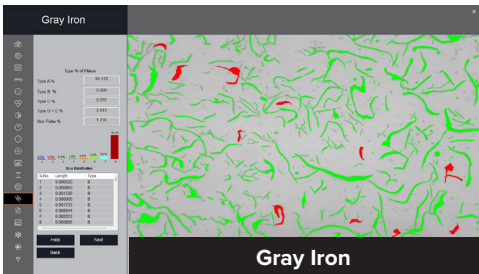
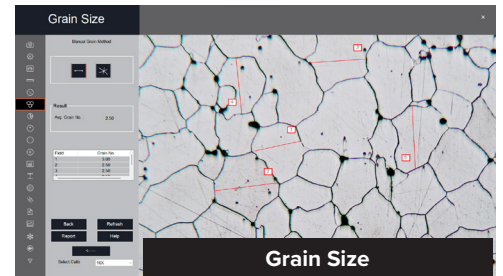
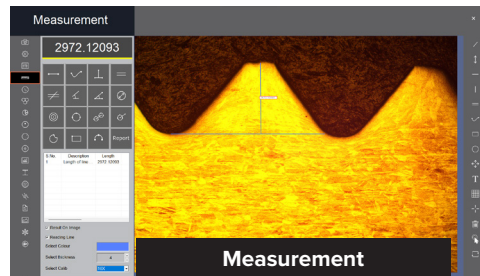
# IMAGE ANALYSIS SOFTWARE

## MATERIALS PLUS

- Metallographic Image Analysis Modules
- Basic Measurements
- Grain Size
- Gray Iron
- Spheroidal or Ductile Gray Iron
- Carbide
- Porosity
- Inclusion Rating
- Coating Thickness
- Spheroidization
- Decarburization
- Segmentation
- DAS - Dendritic Spacing
- Stitching



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MATERIALS PLUS METALLOGRAPHIC IMAGE ANALYSIS SOFTWARE

# METALLOGRAPHIC SOFTWARE

## Measurement Modules

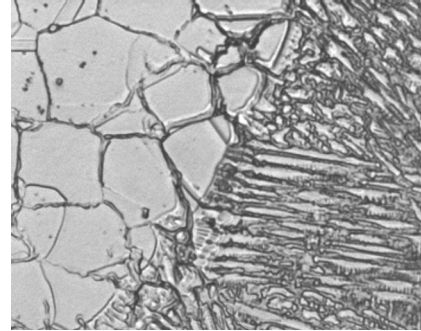
| MODULE                         | MEASUREMENT  | MEASUREMENT BASIS   | ICON / web link   |
|--------------------------------|--|---|---|
| Measurement                    | Manually draw lines on traces, shapes  | Straight length, angle, curved length, width, area, radius, perimeter, area by keyboard |    |
| Grain Size                     | Heyn lineal intercept procedure, Abrams Three-Circle Procedure, Random Line Intersection Methods, Jeffries Planimetric Method, Comparison Procedure Method   | ASTM E112   |    |
| Gray Iron                      | Graphite flakes are described by the type and distribution of graphite in cast iron with the following three classifications: Type VII for graphite form, A-E distribution of graphite and graphite size (1-largest to 8-smallest)   | ASTM A-247  |    |
| SG Iron                        | Nodularity describes the type and distribution of graphite in cast iron with the following three classifications: Types I-VI for graphite form, A-E distribution of graphite and graphite size (1-largest to 8-smallest)   | ASTM A-247-67   |    |
| Carbide Banding                | Estimates the amount of iron carbide or cementation in steels and cast irons. Carbide is measured as a volume fraction   | ASTM E562 & E1245   |    |
| Porosity                       | Porosity are voids in the material caused by entrapped air and incomplete or poor sintering. Porosity can be measured as a volume fraction   | ASTM E562 & E1245   |   |
| Inclusion                      | Characterizes the type, size and severity of the inclusion in wrought steel. The types include: SULFIDE (A TYPE), ALUMINA (B TYPE) SILICATE (C TYPE), GLOBULAR (D TYPE). Size is characterized as H-heavy or T-thin. Severity Level is based on the number or length         | ASTM E45  |  |
| Coating Thickness              | Measures a coating thickness after cross sectioning the specimen   | ASTM B487   |  |
| Spheroidization                | Nodules acquire blue color and non-nodules are set to a red color. Nodules are designated by Roman numbers from I to VI and by size using Arabic numbers 1 to 8. The results are reported along with the calculated nodules/sq mm  | ASTM A892   |  |
| Decarburization                | Decarburization is the loss of carbon at the metal surface due to chemical reaction(s) with the contacting media. The analysis estimates the average or greatest depth of decarburization in hardened or non-hardened steel products   | ASTM E1077  |  |
| Segmentation or Phase Analysis | Phases are defined as physically homogenous and distinct constituents of the material. The phases are partitioned or segmented based on the intensity / gray scale of the various constituents and are characterized and measured using area or volume fraction measurements | ASTM E562 & E1245   |  |
| DAS (Dendrites)                | Dendritic Arm Spacing (DAS) measures the mean spacing, minimum and maximum spacing as well as the standard distribution.   |   |  |
| Stitching                      | Stitching is the process of combining multiple images together for higher magnification analysis over a larger area. For example, this would be very useful for analyzing the thickness of a thin coating over a larger range.   |   |  |

## WELD CHECK

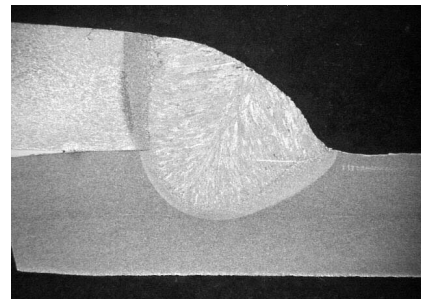
- Welding Features
- Leg Lengths
- Depth of Penetration
- Throat Height
- Root size
- Angle measurements
- Plate thickness and % weld penetration
- Toe undercut
- Face and Root reinforcement thickness

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Inconel 625 Weld, 500X (B.F.),  
INCONEL Etch for a few seconds



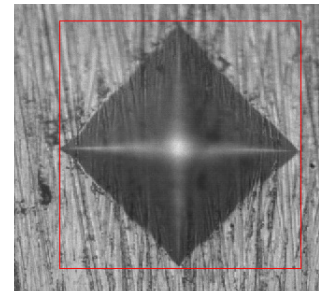
Plain Carbon Steel Weld, 50X (B.F.),  
2% Nital for a few seconds

## HARDNESS PRO

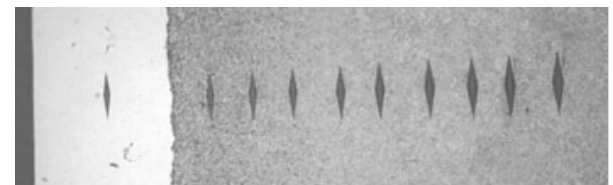
- Automatic or Interactive measurement of Vickers, Knoop and Brinell Indents
- Manual measurement on live image or acquired image
- Automated calculation of the best circumference minimizes the average quadratic error
- Image acquisition in high resolution 64-bit Colors
- In the event, that the automatic measurement fails, the program offers the possibility to manually measure through the acquisition of three points in Brinell, D1 and D2 in Vickers and Simple L in Knoop
- Accuracy up to 0.001  $\mu\text{m}$
- Multi-field analysis
- Case Hardness depth (CHD) measurement is automatic

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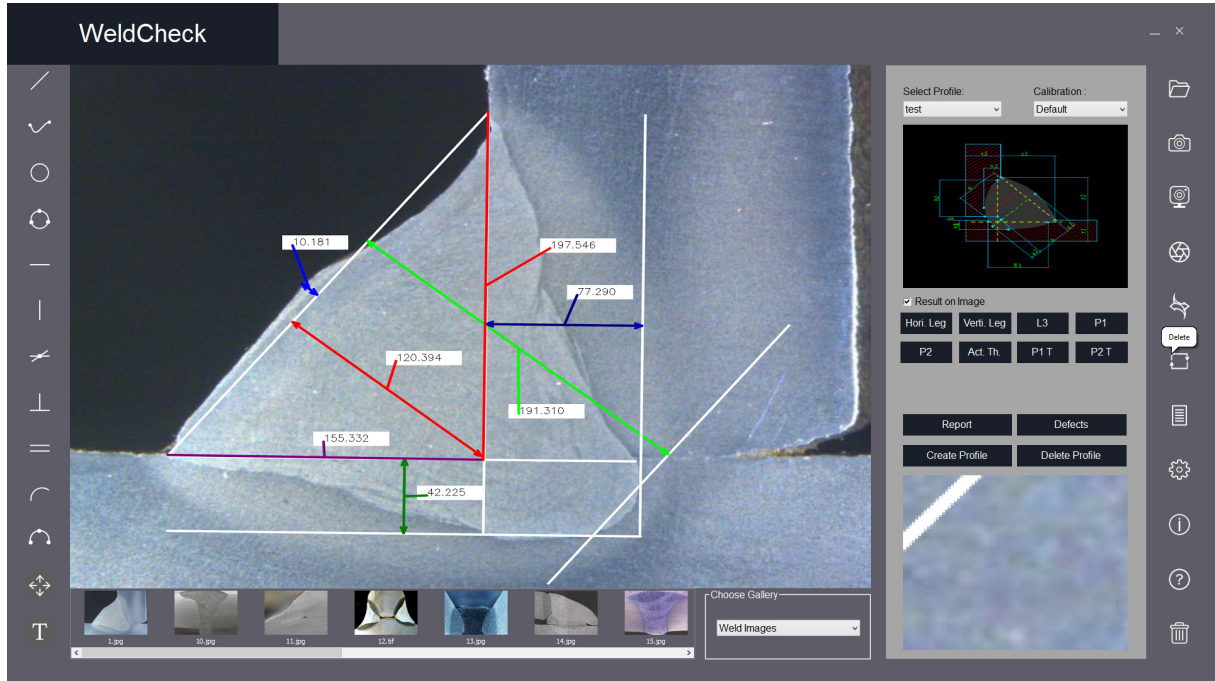


Vickers indent

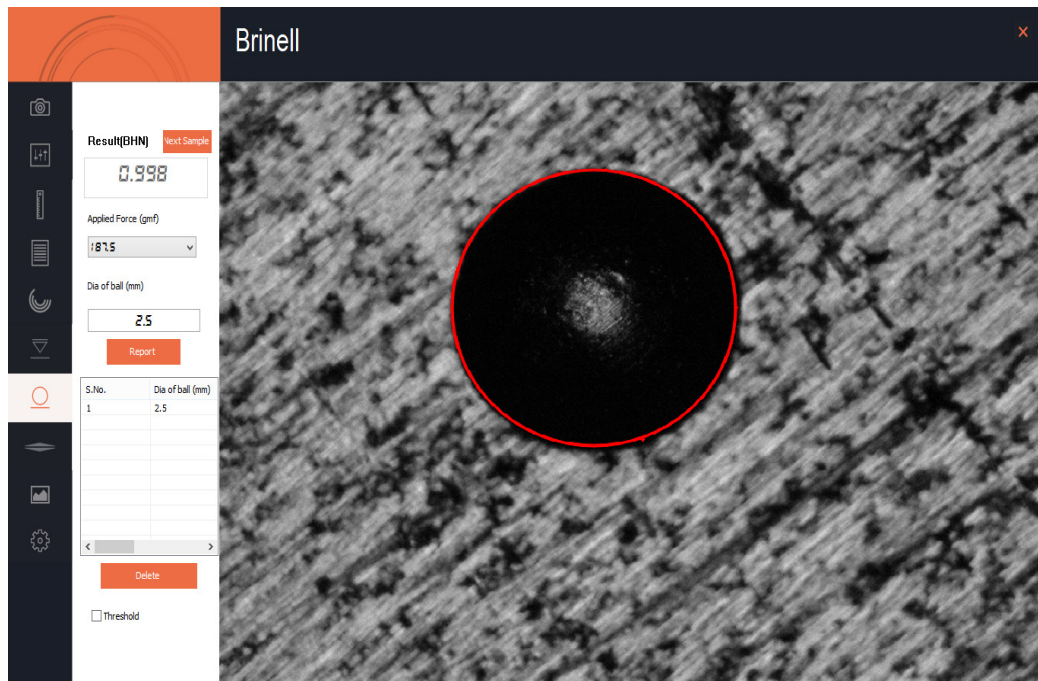


Knoop Indent

## WELD CHECK Measurement Module



## HARDNESS PRO Measurement Module



# LABORATORY FURNITURE

SPECIMEN STORAGE CABINET



SPEC-STORE

## SPEC-STORE

- 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 (sold separately)
- User can remove trays from a drawer to store polishing pads if desired
- Robust and durable design

LABORATORY SAFETY CABINETS



CAB-C

CAB-F

## SAFETY CABINETS

- Heavy Duty Steel Cabinets
- Yellow Ventilated Flammable Cabinet
- Blue Ventilated Chemical Cabinet
- Corrosion resistant shelves
- Robust and durable design

LABORATORY FUME HOOD



FUME-HOOD

## FUME HOOD

- Digital feedback speed control
- LED speed display
- Easy to use
- Flexible
- Ideal for all materials
- User friendly
- Easy service access
- Sink with water tap
- Built-in plumbing for air/gas
- Large storage cabinet
- Built-in 110 VAC outlets
- Robust and durable design

## Specimen Storage Cabinet

| DESCRIPTION                             | SPECIFICATIONS  |
|---|---|
| Cabinet                                 | Specimen Storage  |
| Drawers / Shelves                       | 10 stainless steel drawers  |
| Specimen spacer trays<br>(2 per drawer) | 1-inch and 25 mm - 50 mounts/tray<br>1.25-inch and 30 mm - 45 mounts/tray<br>1.5-inch - 28 mounts/tray<br>40 mm - 28 mounts/tray<br>2-inch and 50 mm - 18 mounts/tray |
| Dimensions<br>(WxDxH)                   | 21.75 x 18 x 27-inches<br>(552 x 470 x 686 mm)  |
| Weight                                  | 100 lbs (46 kgs)  |
| Catalog Number                          | SPEC-STORE  |

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## Safety Storage Cabinets

| CABINET               | CHEMICAL                                      | FLAMMABLE                                     |
|-----------------------|---|---|
| Dimensions<br>(WxDxH) | 43 x 18 x 44-inches<br>(1092 x 457 x 1118 mm) | 43 x 18 x 65-inches<br>(1092 x 457 x 1651 mm) |
| Weight                | 220 lbs (100 kg)                              | 304 lbs (140 kg)                              |
| Color                 | Blue  | Yellow  |
| Catalog Number        | CAB-C   | CAB-F   |

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## Fume Hood

| DESCRIPTION                | SPECIFICATIONS                                    |
|----------------------------|---|
| Overall Dimensions (WxDxH) | 47.2 x 32 x 118-inches<br>(1200 x 810 x 3000 mm)  |
| Chamber Dimensions (WxDxH) | 37 x 26 x 47-inches<br>(940 x 660 x 1200 mm)      |
| Sink Dimensions (WxDxH)    | 4.25 x 8.75 x 4.75-inches<br>(120 x 220 x 120 mm) |
| Electrical Specification   | 110V  |
| Weight                     | 540 lbs (245 kg)                                  |
| Catalog Number             | FUME-HOOD   |

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# LABORATORY BENCHES

MEGA ABRASIVE CUTTER BENCH



MEGA-BENCH

## MEGA-BENCH

- One drawer and double door cabinet
- Can support up to 661 lbs (300 kgs)
- Engineered to support the MEGA bench top abrasive cutters
- Optional replaceable protective bench cover available
- Robust and durable design

LABORATORY EQUIPMENT BENCHES



BENCHES

## LAB EQUIPMENT BENCHES

- Designed to fit with one another or stand-alone
- Double door cabinets and single drawer on the S-Benches and D-Benches, one cabinet on the C-bench
- Supports up to 661 lbs (300 kgs)
- Optional replaceable protective bench covers and back panels available
- Robust and durable design

MICROSCOPE BENCHES



MBENCHES

## MICROSCOPE BENCHES

- Excellent for microscopes and microhardness testers
- Designed to include chair access
- Optional replaceable protective bench covers and back panels available
- Robust and durable design

WALL CABINET



WALL-CAB

## Wall Cabinets

- Excellent for storage of metallographic consumables
- Robust and durable design



## MEGA Abrasive Cutter Bench

| DESCRIPTION        | SPECIFICATIONS                                     |
|--------------------|--|
| Cabinet            | Designed for MEGA Abrasive Cutters                 |
| Dimensions (WxDxH) | 39.4 x 29.5 x 33.5-inches<br>(1000 x 750 x 851 mm) |
| Weight             | 133 lbs (60 kg)                                    |
| Catalog Number     | MEGA-T2-BENCH & MEGA-T3-BENCH                      |

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## Laboratory Equipment Benches

| DESCRIPTION        | SPECIFICATIONS                                      |   |   |
|--------------------|---|---|---|
| Cabinet            | Short Equipment Bench                               | Long Equipment Bench                                | Corner Bench                                  |
| Dimensions (WxDxH) | 39.25 x 29.5 x 33.5 -inches<br>(997 x 749 x 851 mm) | 78.75 x 29.5 x 33.5-inches<br>(2000 x 749 x 851 mm) | 55.5 x 48.75 x 33.5<br>(1388 x 1238 x 851 mm) |
| Weight             | 153 lbs (70 kg)                                     | 297 lbs (135 kg)                                    | 120 lbs (55 kg)                               |
| Catalog Number     | S-BENCH   | D-BENCH   | C-BENCH                                       |

## Microscope Benches

| DESCRIPTION        | SPECIFICATIONS                                    |   |
|--------------------|---|---|
| Cabinet            | Short Microscope Bench                            | Long Microscope Bench                             |
| Dimensions (WxDxH) | 78 x 29.5 x 33.5 -inches<br>(2000 x 749 x 851 mm) | 103 x 29.5 x 33.5-inches<br>(2610 x 749 x 851 mm) |
| Weight             | 153 lbs (70 kg)                                   | 337 lbs (153 kg)                                  |
| Catalog Number     | S-MBENCH  | D-MBENCH  |

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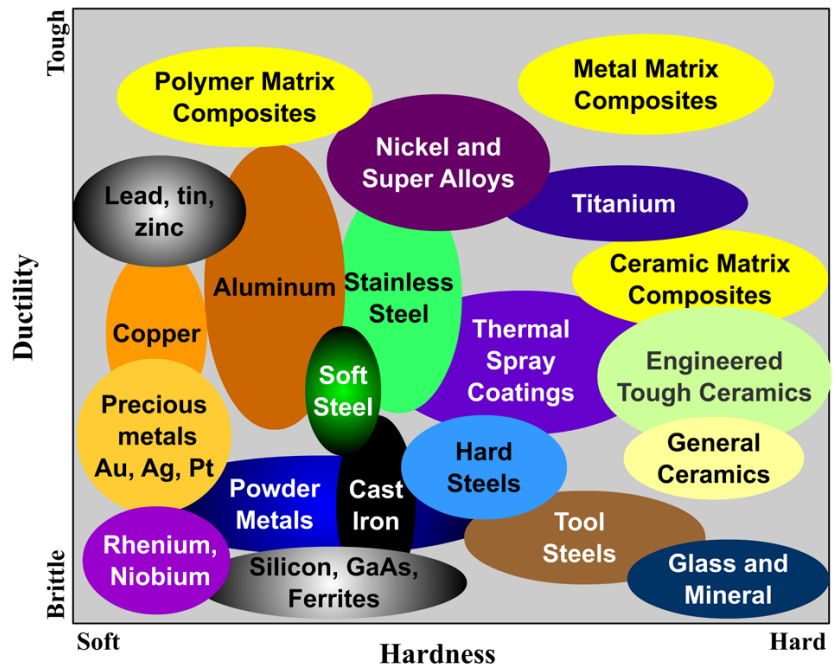
## Wall Cabinets

| DESCRIPTION        | SPECIFICATIONS                              |
|--------------------|---|
| Dimensions (WxDxH) | 35 x 12 x 24-inches<br>(900 x 300 x 600 mm) |
| Weight             | 55 lbs (25 kg)                              |
| Catalog Number     | WAL-CAB                                     |

# METALLOGRAPHIC PROCEDURES

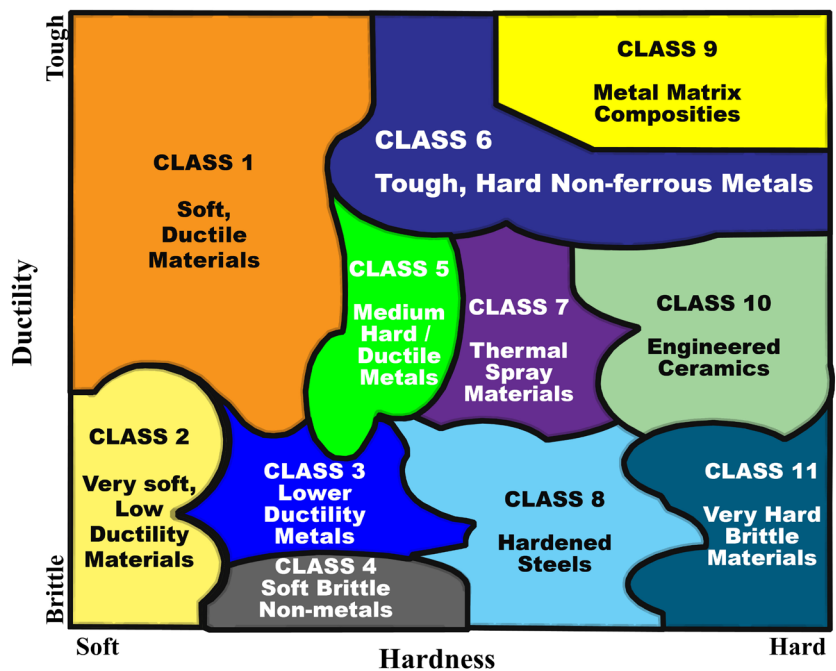
## SAMPLE PREPARATION BASICS:

Metallographic specimen preparation requires a knowledge of the specimen properties, the most important characteristics being hardness and ductility of the metallographic specimen. Based on these material properties, the proper metallographic consumables and equipment parameters can be determined. The following charts plot the relative hardness and ductility for most metallographic materials.



## SAMPLE PREPARATION CLASSES:

From this chart the hardness / ductility is categorized into eleven different classes. Each of these classes then represents a sample preparation method based on the mechanical properties of the material.



PREPARATION GUIDELINES

| Class           | Materials  | Overview  |
|-----------------|--|---|
| <b>CLASS 1</b>  | Soft, ductile materials (e.g. 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   |
| <b>CLASS 2</b>  | Very soft, low ductility materials (e.g. rhenium, niobium, gold, silver)   | Can be difficult to prepare because these materials are very soft and abrasives can become embedded into the specimen   |
| <b>CLASS 3</b>  | Low ductility metals (e.g. powder metals and cast irons)                   | Initial grinding with SiC abrasives is recommended, however, rough polishing must minimize pull-out   |
| <b>CLASS 4</b>  | Soft, brittle nonmetals (e.g. 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 |
| <b>CLASS 5</b>  | Medium hard, ductile metals (e.g. soft steels, stainless steels)           | Relatively easy to prepare most materials in this Class with the use of SiC abrasives and 1-2 polishing steps   |
| <b>CLASS 6</b>  | Tough, hard, non-ferrous metals (e.g. super alloys, titanium)              | Relatively easy to prepare most materials in this Class with the use of SiC abrasives and 1-2 polishing steps   |
| <b>CLASS 7</b>  | Thermal spray materials  | Can pose significant preparation challenges depending upon the properties of the coating. See specific preparation procedures                                 |
| <b>CLASS 8</b>  | Hardened steels (e.g. 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   |
| <b>CLASS 9</b>  | Metal Matrix Composites  | Very dependent upon both the matrix and filler materials properties. See specific preparation procedures  |
| <b>CLASS 10</b> | Engineered Ceramics (e.g. zirconia, silicon nitride)                       | Successful preparation is typically accomplished with colloidal silica by CMP polishing   |
| <b>CLASS 11</b> | Very hard, brittle materials (e.g. glass, minerals, CERMETS)               | Minimize initial damage and use CMP polishing with colloidal silica abrasives   |



NANO-FEMTO-ZETA

# PROCEDURE RECOMMENDATIONS

## CLASS 1 - Ductile Materials

Examples include aluminum, copper, tin, lead, zinc and polymer matrix composites (PMC's).

### Description:

CLASS 1 materials are relatively soft materials which have a wide range of industrial uses.

### Preparation Challenges:

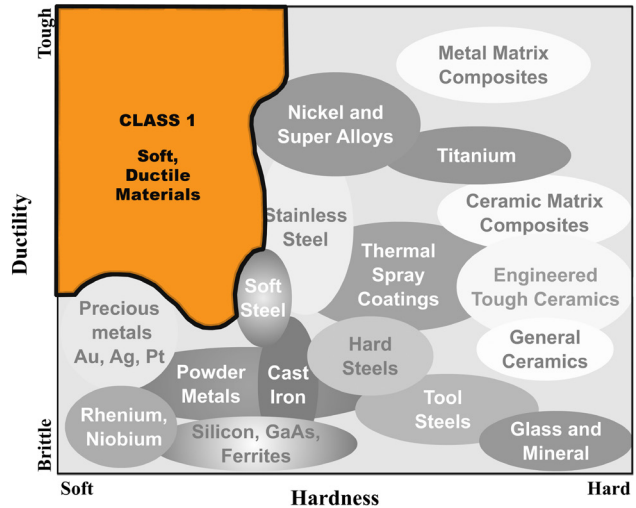
The difficulty in preparing these materials arises from the fact that these materials are very soft and often have oxide inclusions (aluminum and copper). Proper specimen preparation minimizes abrasive embedding and retains the specimen oxides, thus eliminating scratching and smearing. If the specimen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

### Sectioning:

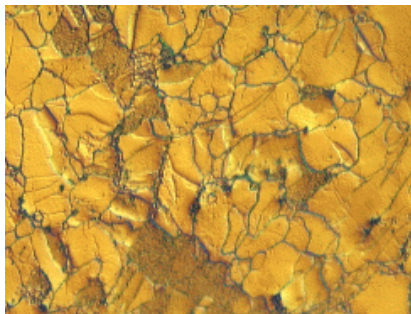
MAXCUT abrasive blade (MAX-C or MAX-E series)

### Mounting:

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



| Abrasive / Surface  | Lubricant                     | Force / sample | Speed (Head / base) | Time (minutes)   | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------------|----------------|---------------------|------------------|----------------------------------|-----------------------|--------------------|
| P120 grit ALO paper<br>P240 grit ALO paper                  | Water                         | 5-10 lbs       | 100/100             | Planar<br>1 min. | Off<br>Off                       | N/A                   |                    |
| P500 grit ALO paper<br>P1200 grit ALO paper                 | Water                         | 5-10 lbs       | 100/100             | 1 min.<br>1 min. | Off<br>Off                       |                       |                    |
| 1 micron DIAMAT<br>diamond on ATLANTIS<br>polishing pad     | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 100/100             | 2 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 0.05 micron<br>Nanometer alumina on<br>NAPPAD polishing pad | -                             | 5-10 lbs       | 100/100             | 1 min.           | 15 seconds /<br>5 seconds        |                       |                    |



Pure zinc, 100X (DIC), Etchant 10 grams NaOH in 100 ml D.I. water for 5 seconds



Tough Pitch Copper, 100X (B.F.), Etchant NH4OH/H2O2 for 5 seconds

## CLASS 2 - Very Soft, Ductile Materials

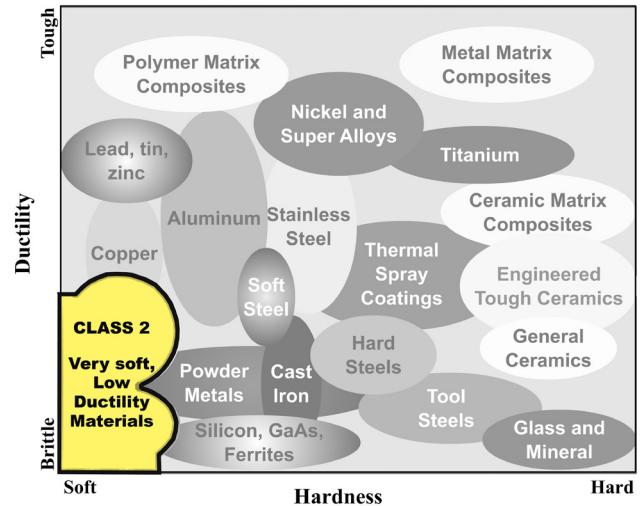
Examples include refractory metals (tungsten, rhenium, niobium, molybdenum), rare earths, precious metals.

### Description:

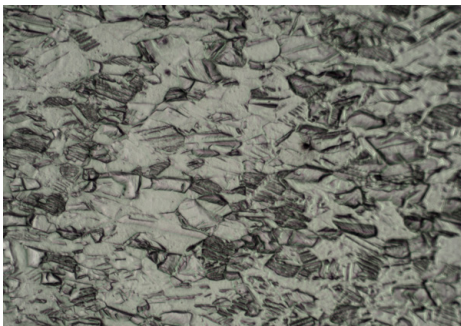
CLASS 2 materials include refractory metals such as rhenium, niobium and tungsten which have very high melting temperatures; however, they are typically very soft and require the same specimen preparation considerations as other very soft metals.

### Preparation Challenges:

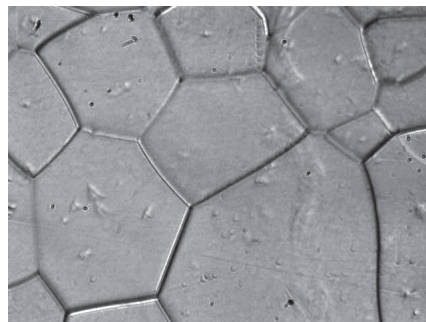
For very soft materials, any loose or fractured abrasive particles can become easily embedded. This makes specimen preparation very difficult because it gums up diamond grinding disks or the specimen can become embedded with fractured SiC particles when ground with SiC papers. The key to preparation 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.



| Abrasive / Surface                                      | Lubricant               | Force / sample | Speed (Head / base) | Time (minutes)   | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------|----------------|---------------------|------------------|----------------------------------|-----------------------|--------------------|
| P120 grit ALO paper<br>P240 grit ALO paper              | Water                   | 5-10 lbs       | 100/100             | Planar<br>1 min. | Off<br>Off                       | N/A                   |                    |
| P500 grit ALO paper<br>P1200 grit ALO paper             | Water                   | 5-10 lbs       | 100/100             | 1 min.<br>1 min. | Off<br>Off                       |                       |                    |
| 1 micron DIAMAT diamond on ATLANTIS polishing pad       | DIALUBE Purple Extender | 5-10 lbs       | 100/100             | 2 min.           | 15 seconds / 3 seconds           |                       |                    |
| 0.05 micron Nanometer alumina on MICROPAD polishing pad | -                       | 5-10 lbs       | 100/100             | 1 min.           | 15 seconds / 5 seconds           |                       |                    |



99.9% Silver, etched with ammonia peroxide, 200X B.F



Rhenium (BF), etched

# PROCEDURE RECOMMENDATIONS

## CLASS 3 - Lower Ductility Metals

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

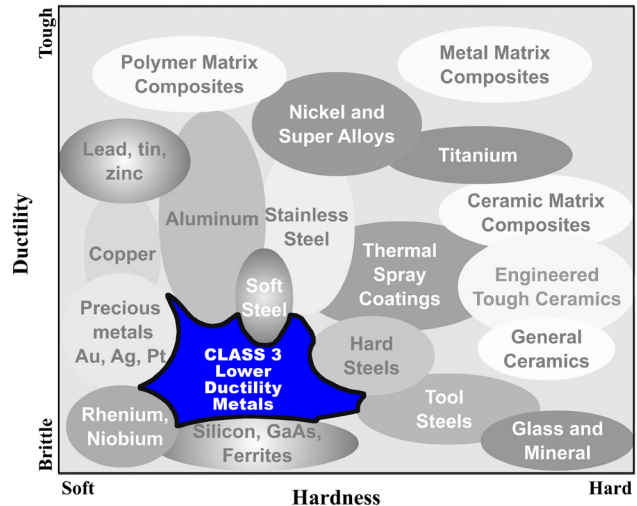
### Description:

Powder metallurgy is an example of a CLASS 3 low ductility materials which 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 Challenges:

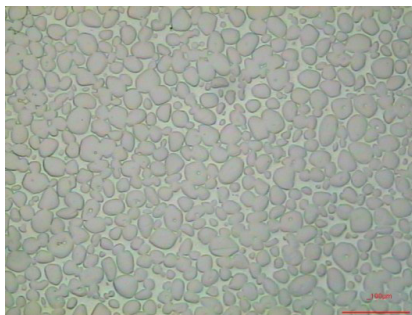
The metallographic specimen preparation of powder metallurgy samples is affected by the specimen's composition, packing and sintering conditions. Microstructural features of interest include: porosity, grain size, inclusions and orientation of voids. Proper metallurgical preparation takes into account 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.

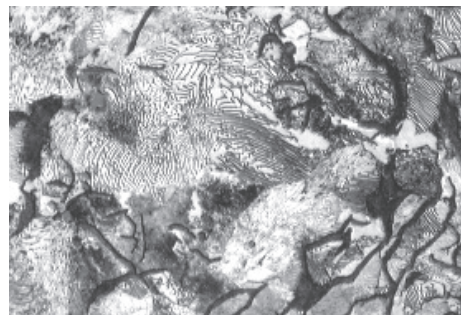


PREPARATION GUIDELINES (CLASS 3)

| Abrasive / Surface  | Lubricant                     | Force / sample | Speed (Head / base) | Time (minutes)                       | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------------|----------------|---------------------|--------------------------------------|----------------------------------|-----------------------|--------------------|
| 120 grit SiC paper<br>240 grit SiC paper  | Water                         | 5-10 lbs       | 200/200             | Planar<br>1 min.                     | Off<br>Off                       | N/A                   |                    |
| 360 grit SiC paper<br>600 grit SiC paper<br>800 grit SiC paper<br>1200 grit SiC paper | Water                         | 5-10 lbs       | 200/200             | 1 min.<br>1 min.<br>1 min.<br>1 min. | Off<br>Off<br>Off<br>Off         |                       |                    |
| 1 micron DIAMAT<br>diamond on GOLDPAD<br>polishing pad                                | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 200/200             | 2 min.                               | 15 seconds /<br>3 seconds        |                       |                    |
| 0.05 micron Nanometer<br>alumina on TRICOTE<br>polishing pad                          | -                             | 5-10 lbs       | 100/100             | 30 sec.                              | 15 seconds /<br>5 seconds        |                       |                    |



Tungsten refractory metal, 200X (DIC), etched with Murakami's reagent



Graphite cast iron, 2% nital etchant, 500X

## CLASS 4 - Soft, Brittle Nonmetals (Electronics)

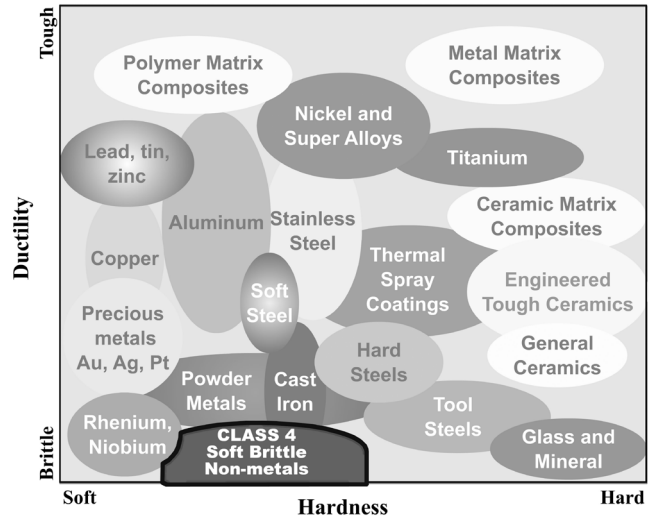
Examples include ceramic capacitors, silicon, GaAs, ferrites, PZT's, MEMS devices.

### Description:

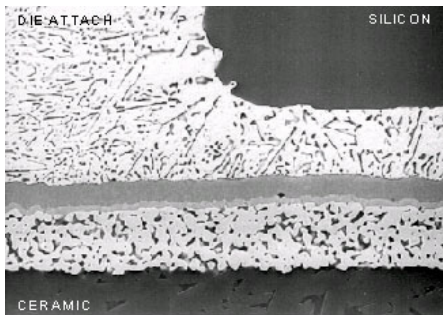
Ceramic capacitors are an example of a CLASS 4 softer more brittle types of material. These materials are typically very small, inexpensive devices used in cell phones, computers and other electronic products. MLC devices are constructed of alternating layers of metal and ceramic, with the ceramic material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

### Preparation Challenges:

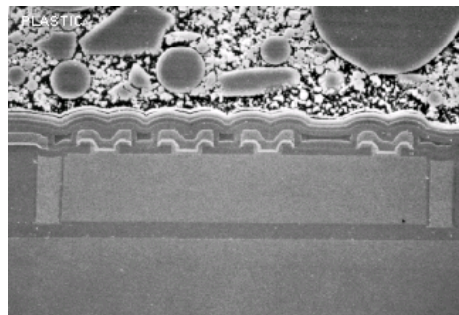
Microstructural analysis of a BaTiO<sub>3</sub> ceramic capacitor includes looking for missing metal layers, as well as examining for gaps and voids in the ceramic substrate. Microstructural preparation of multi-layer BaTiO<sub>3</sub> ceramic capacitors requires minimizing polishing relief and damage 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 woven polishing pads using diamond and colloidal silica, respectively.



| Abrasive / Surface  | Lubricant                       | Force / sample | Speed (Head / base) | Time (minutes)             | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|---------------------------------|----------------|---------------------|----------------------------|----------------------------------|-----------------------|--------------------|
| 30 micron Diamond Film<br>15 micron Diamond Film                        | POLYLUBE<br>Diamond<br>Extender | 5-10 lbs       | 200/200             | Planar<br>3 min.           | Off<br>Off                       | N/A                   |                    |
| 9 micron Diamond Film<br>6 micron Diamond Film<br>3 micron Diamond Film | POLYLUBE<br>Diamond<br>Extender | 5-10 lbs       | 200/200             | 2 min.<br>2 min.<br>2 min. | Off<br>Off<br>Off                |                       |                    |
| 1 micron DIAMAT<br>diamond on ATLANTIS<br>polishing pad                 | DIALUBE<br>Purple<br>Extender   | 5-10 lbs       | 200/200             | 1 min.                     | 15 seconds /<br>3 seconds        |                       |                    |
| MICROPAD polishing pad  | Colloidal Silica                | 5-10 lbs       | 200/200             | 30 sec.                    | 15 seconds /<br>5 seconds        |                       |                    |



Electronic die cross section



Electronic die cross section

# PROCEDURE RECOMMENDATIONS

## CLASS 5 -Medium Hard, Ductile Metals

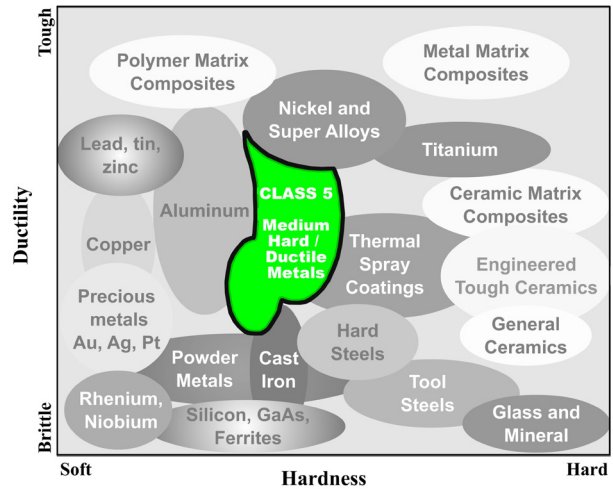
Examples include stainless steel, soft and medium hard steels.

### Description:

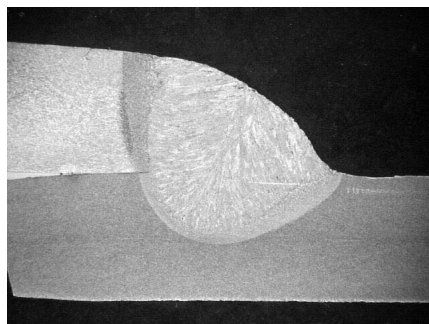
CLASS 5 steels are ferrous alloys of iron containing relatively low concentrations of carbon (<2%). Steels also have a wide range of properties due to their ability to be heat treated and annealed. Depending upon the carbon concentration and other alloying elements, the microstructure of steel can be 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 Challenges:

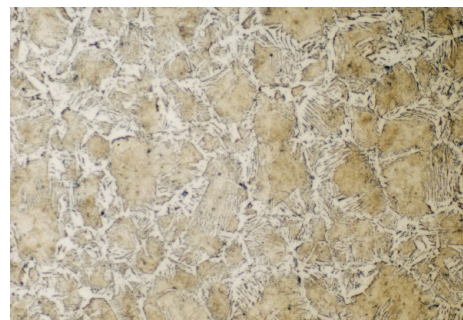
Metallographic specimen preparation is relatively straight forward.



| Abrasive / Surface  | Lubricant                     | Force / sample | Speed (Head / base) | Time (minutes)                       | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------------|----------------|---------------------|--------------------------------------|----------------------------------|-----------------------|--------------------|
| 120 grit SiC paper<br>240 grit SiC paper  | Water                         | 5-10 lbs       | 200/200             | Planar<br>1 min.                     | Off<br>Off                       | N/A                   |                    |
| 360 grit SiC paper<br>600 grit SiC paper<br>800 grit SiC paper<br>1200 grit SiC paper | Water                         | 5-10 lbs       | 200/200             | 1 min.<br>1 min.<br>1 min.<br>1 min. | Off<br>Off<br>Off<br>Off         |                       |                    |
| 1 micron DIAMAT<br>diamond on GOLDPAD<br>polishing pad                                | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 200/200             | 2 min.                               | 15 seconds /<br>3 seconds        |                       |                    |
| 0.05 micron Nanometer<br>alumina on TRICOTE<br>polishing pad                          | -                             | 5-10 lbs       | 100/100             | 30 sec.                              | 15 seconds /<br>5 seconds        |                       |                    |



Carbon Steel Weld, mag. 50X, Etched 2% Nital



1018 Water Quenched steel, 400X (B.F.), etched with 2% nital, Structure is Bainite



## CLASS 6 - Tough, Hard Nonferrous Metals

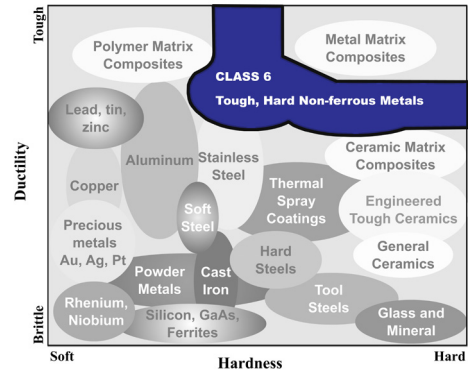
Examples include titanium, Inconel, Ni-Cr alloys, superalloys, nickel and cobalt alloys.

### Description:

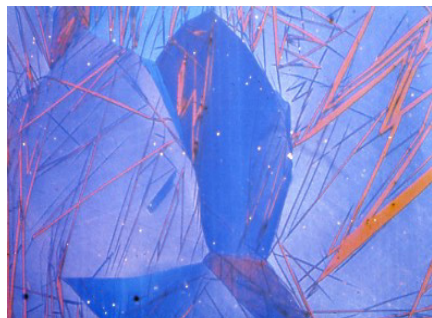
CLASS 6 materials include titanium alloys which are very useful because they have a good strength-to-weight ratio. This makes them ideal for use in areas ranging from aerospace to sports equipment.

### Preparation Challenges:

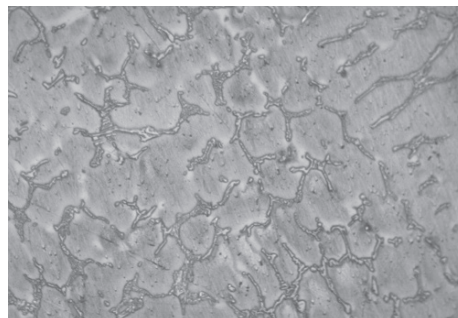
Metallographic preparation of titanium and titanium alloys is fairly straight forward by conventional metallographic techniques.



| Abrasive / Surface   | Lubricant                     | Force / sample | Speed (Head / base) | Time (minutes)   | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|--|-------------------------------|----------------|---------------------|------------------|----------------------------------|-----------------------|--------------------|
| 120 grit SiC paper<br>240 grit SiC paper                     | Water                         | 5-10 lbs       | 300/300             | Planar<br>1 min. | Off<br>Off                       | N/A                   |                    |
| 360 grit SiC paper<br>600 grit SiC paper                     | Water                         | 5-10 lbs       | 300/300             | 1 min.<br>1 min. | Off<br>Off                       |                       |                    |
| 9 micron DIAMAT<br>diamond on POLYPAD<br>polishing pad       | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 6 micron DIAMAT<br>diamond on TEXPAN<br>polishing pad        | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 1 micron DIAMAT<br>diamond on GOLDPAD<br>polishing pad       | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 0.05 micron<br>Nanometer alumina on<br>TRICOTE polishing pad | -                             | 5-10 lbs       | 200/200             | 30 sec.          | 15 seconds /<br>5 seconds        |                       |                    |



Fe-Ni-Co-Al Alloy, 400X (Polarized Light)



Inconel-625, Mag. 100X, Etchant-Carpenters

# PROCEDURE RECOMMENDATIONS

## CLASS 7 - Thermal Spray Materials

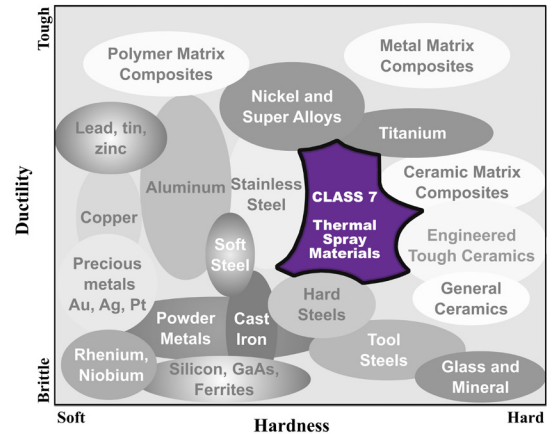
Examples include powder spray coatings, ceramic coatings, intermetallic coatings.

### Description:

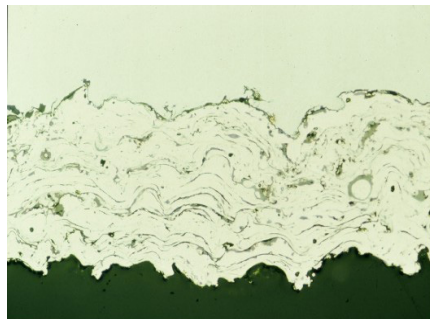
CLASS 7 Thermal spraying techniques are coating processes in which melted (or heated) materials are sprayed onto a surface. Thermal spraying can provide various coating thicknesses (20 microns to several mm) over a large area. Coating materials available for thermal spraying include metals, alloys, ceramics, plastics and composites.

### Preparation Challenges:

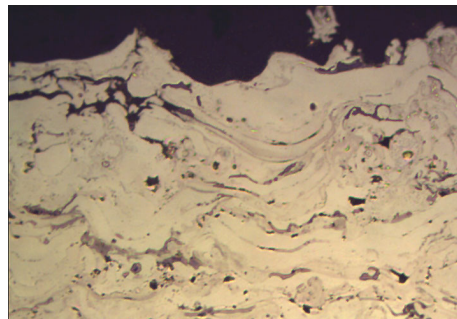
Metallographic preparation of thermal spray coatings can be tricky; however, minimizing damage and understanding the chemical and mechanical properties of the coating and substrate will greatly improve successful specimen preparation. Note for WC-Co coatings, the cobalt is reactive with water so final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



| Abrasive / Surface  | Lubricant               | Force / sample | Speed (Head / base) | Time (minutes)                                 | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------|----------------|---------------------|--|----------------------------------|-----------------------|--------------------|
| 240 grit SiC paper  | Water                   | 5-10 lbs       | 200/200             | Planar   | Off                              | N/A                   |                    |
| 320 grit SiC paper<br>400 grit SiC paper<br>600 grit SiC paper<br>800 grit SiC paper<br>1200 grit SiC paper | Water                   | 5-10 lbs       | 200/200             | 1 min.<br>1 min.<br>1 min.<br>1 min.<br>1 min. | Off<br>Off<br>Off<br>Off<br>Off  |                       |                    |
| 3 micron DIAMAT diamond on GOLDPAD polishing pad  | DIALUBE Purple Extender | 5-10 lbs       | 200/200             | 2 min.   | 15 seconds / 3 seconds           |                       |                    |
| 1 micron DIAMAT diamond on ATLANTIS polishing pad   | DIALUBE Purple Extender | 5-10 lbs       | 200/200             | 2 min.   | 15 seconds / 3 seconds           |                       |                    |
| 0.05 micron Nanometer alumina on MICROPAD polishing pad   | Vibratory Polishing     |                |                     | 15-30 minutes                                  |                                  |                       |                    |



Nickel Chrome Thermal Spray Coating, as polished, Mag 1000x (B.F.)



Nickel-Aluminum Thermal Spray Coating, as polished, Mag 500x (B.F.)

## CLASS 8 - Hardened Steels

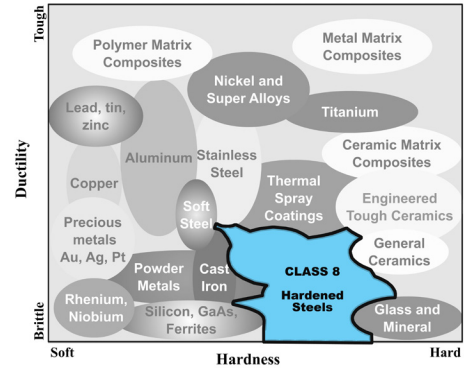
Examples include case hardened steels, tool steels, and through-hardened steels.

### Description:

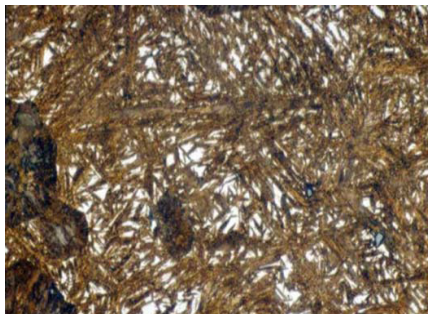
CLASS 8 Iron and steels play an important role in the world of structural and mechanical metals. Steel, in particular, is very useful because its hardness, wearability and toughness can be altered significantly by heat treating and annealing processes. Tool steels have high hardness ( $R_c > 60$ ) and generally are used with alloying metals such as vanadium, molybdenum and manganese.

### Preparation Challenges:

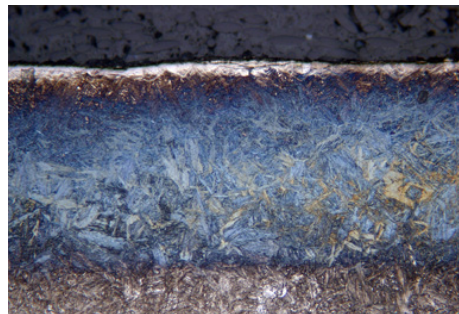
Metallographic specimen preparation is relatively straight forward.



| Abrasive / Surface  | Lubricant                     | Force / sample | Speed (Head / base) | Time (minutes)   | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------------|----------------|---------------------|------------------|----------------------------------|-----------------------|--------------------|
| 120 grit SiC paper<br>240 grit SiC paper                    | Water                         | 5-10 lbs       | 300/300             | Planar<br>1 min. | Off<br>Off                       | N/A                   |                    |
| 360 grit SiC paper<br>600 grit SiC paper                    | Water                         | 5-10 lbs       | 300/300             | 1 min.<br>1 min. | Off<br>Off                       |                       |                    |
| 9 micron DIAMAT<br>diamond on POLYPAD<br>polishing pad      | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 6 micron DIAMAT<br>diamond on TEXPAN<br>polishing pad       | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 1 micron DIAMAT<br>diamond on GOLDPAD<br>polishing pad      | DIALUBE<br>Purple<br>Extender | 5-10 lbs       | 300/300             | 3 min.           | 15 seconds /<br>3 seconds        |                       |                    |
| 0.05 micron Nanometer<br>alumina on NAPPAD<br>polishing pad | -                             | 5-10 lbs       | 200/200             | 30 sec.          | 15 seconds /<br>5 seconds        |                       |                    |



1095 Steel, Water Quenched, etched with Picral, 1000X B.F. Martensite structure



Nitrided steel, 200X (BF), Etchant Picral

# PROCEDURE RECOMMENDATIONS

## CLASS 9 - Metal Matrix Composites

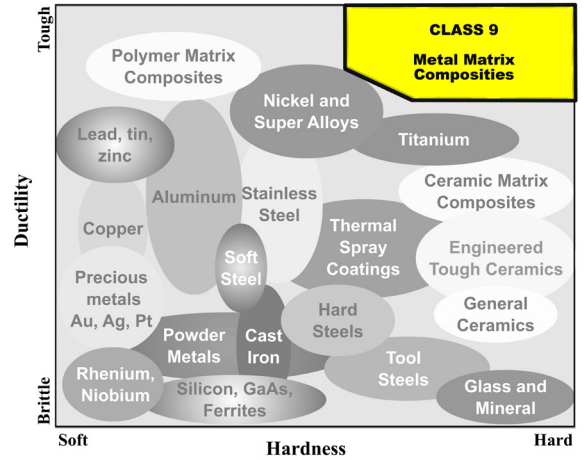
Examples include ceramic fibers in a metal matrix and/or ceramic particles in a metal matrix.

### Description:

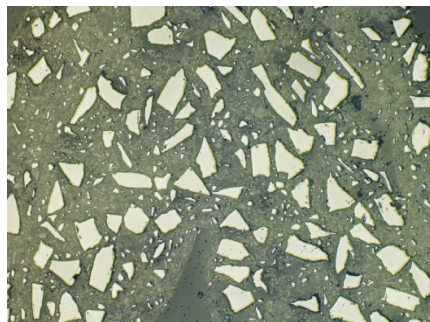
CLASS 9 Metal matrix composite applications have been found in high performance sporting goods and high performance military applications. They are primarily used to combine the hardness and energy absorbing characteristics of the ceramic with the bonding and ductility characteristics of the metal.

### Preparation Challenges:

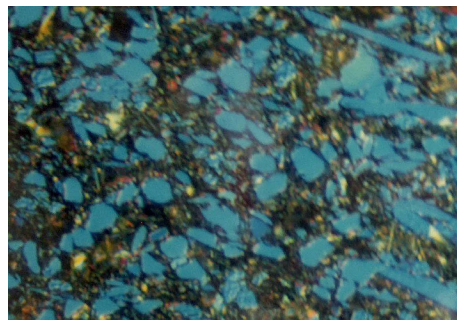
Hard particles in a metal matrix can be difficult to microstructurally prepare because of particle pull-out, as well as excessive polishing relief between the hard particles and the softer matrix.



| Abrasive / Surface  | Lubricant               | Force / sample | Speed (Head / base) | Time (minutes) | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------|----------------|---------------------|----------------|----------------------------------|-----------------------|--------------------|
| 75 micron diamond grinding disk                                 | Water                   | 5-10 lbs       | 300/300             | Planar         | Off                              | N/A                   |                    |
| 30 micron DIAMAT diamond suspension on CERMESH Metal Mesh cloth | -                       | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 9 micron DIAMAT diamond on POLYPAD polishing pad                | DIALUBE Purple Extender | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 3 micron DIAMAT diamond on GOLDPAD or ATLANTIS polishing pad    | DIALUBE Purple Extender | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| SIAMAT Colloidal silica on TEXPAN polishing pad                 | -                       | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |



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



Zirconium Diboride particles in a Titanium Matrix Etched, 1000X (DIC)

PREPARATION GUIDELINES (CLASS 9)

## CLASS 10 - Engineered Ceramics

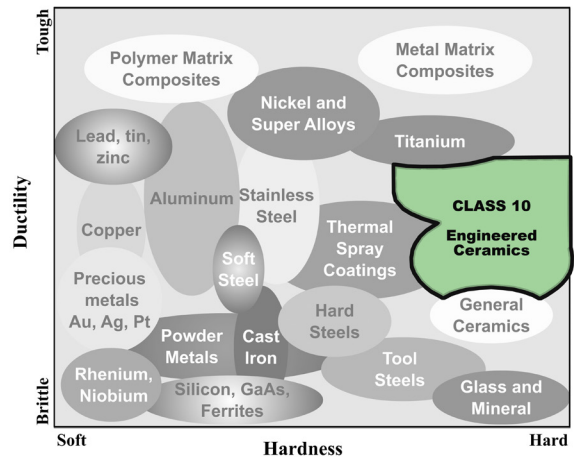
Examples include silicon nitride, zirconia, SiSiC, silicon carbide, boron carbide, alumina and ceramic matrix composites

### Description:

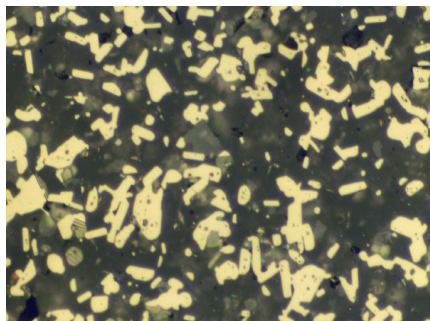
CLASS 10 Engineered ceramics have found increasing applications for high temperature, corrosion resistance, low wearability and a number of other applications. An example of a CLASS 10 specimen preparation technique is for aluminum oxynitride (AlON) which is a ceramic composed of aluminum, oxygen and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

### Preparation Challenges:

Engineered ceramics are 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.



| Abrasive / Surface  | Lubricant               | Force / sample | Speed (Head / base) | Time (minutes) | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|---|-------------------------|----------------|---------------------|----------------|----------------------------------|-----------------------|--------------------|
| 75 micron diamond grinding disk                                 | Water                   | 5-10 lbs       | 300/300             | Planar         | Off                              | N/A                   |                    |
| 30 micron DIAMAT diamond suspension on CERMESH Metal Mesh cloth | -                       | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 6 micron DIAMAT diamond on TEXPAN polishing pad                 | SIAMAT colloidal silica | 10 lbs         | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 1 micron DIAMAT diamond on GOLDPAD or ATLANTIS polishing pad    | SIAMAT colloidal silica | 10 lbs         | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| SIAMAT Colloidal silica on TEXPAN polishing pad                 | -                       | 10 lbs         | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |



AlON ceramic, B.F. 1000x (as polished)



SiAlON ceramic, etched in molten KOH, Mag 20 KX

# PROCEDURE RECOMMENDATIONS

## CLASS 11 - Very Hard Hard Brittle Materials & CERMETS

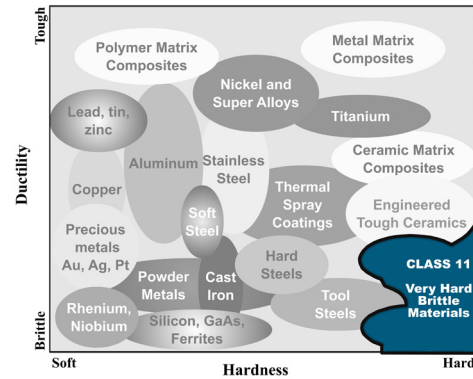
Examples include cermets such as tungsten carbide, glass and minerals.

### Description:

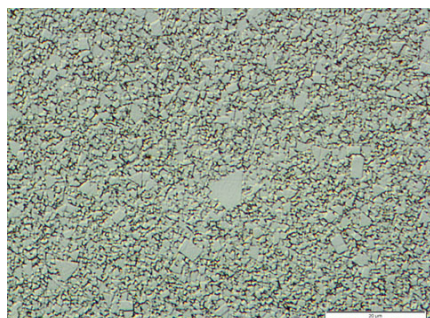
CLASS 11 CERMETS, glass and minerals are typically very hard. CERMETS are typically very wear resistant and very tough materials, whereas minerals and glass tend to be more brittle.

### Preparation Challenges:

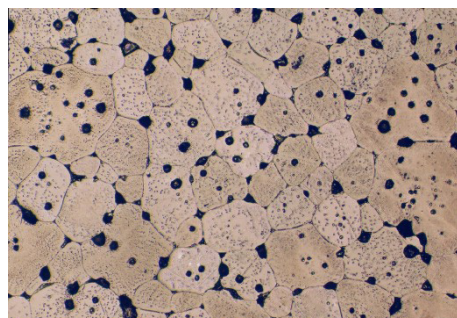
The key to proper specimen preparation of CERMET materials such as tungsten carbide is to grind with a semi-fixed abrasive (polycrystalline diamond on a metal mesh cloth), followed by combining diamond abrasives with a CMP (chemical mechanical polishing) abrasive such as SIAMAT™ colloidal silica.



| Abrasive / Surface   | Lubricant               | Force / sample | Speed (Head / base) | Time (minutes) | Dispenser (frequency / duration) | Individual Force Mode | Central Force Mode |
|--|-------------------------|----------------|---------------------|----------------|----------------------------------|-----------------------|--------------------|
| 75 micron diamond grinding disk                              | Water                   | 5-10 lbs       | 300/300             | Planar         | Off                              | N/A                   |                    |
| 30 micron DIAMAT diamond suspension on CERMESH Mesh cloth    | -                       | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 9 micron DIAMAT diamond on POLYPAD polishing pad             | DIALUBE Purple Extender | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| 3 micron DIAMAT diamond on GOLDPAD or ATLANTIS polishing pad | DIALUBE Purple Extender | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |
| SIAMAT Colloidal silica on TEXPAN polishing pad              | -                       | 5-10 lbs       | 300/300             | 5 min.         | 15 seconds / 3 seconds           |                       |                    |



Tungsten carbide, 2000X (DIC), etched with 50% HNO<sub>3</sub> and 50% HCl



Periclase, 200X (B.F.) Thermal etching at 1200 Celsius for 2 hours

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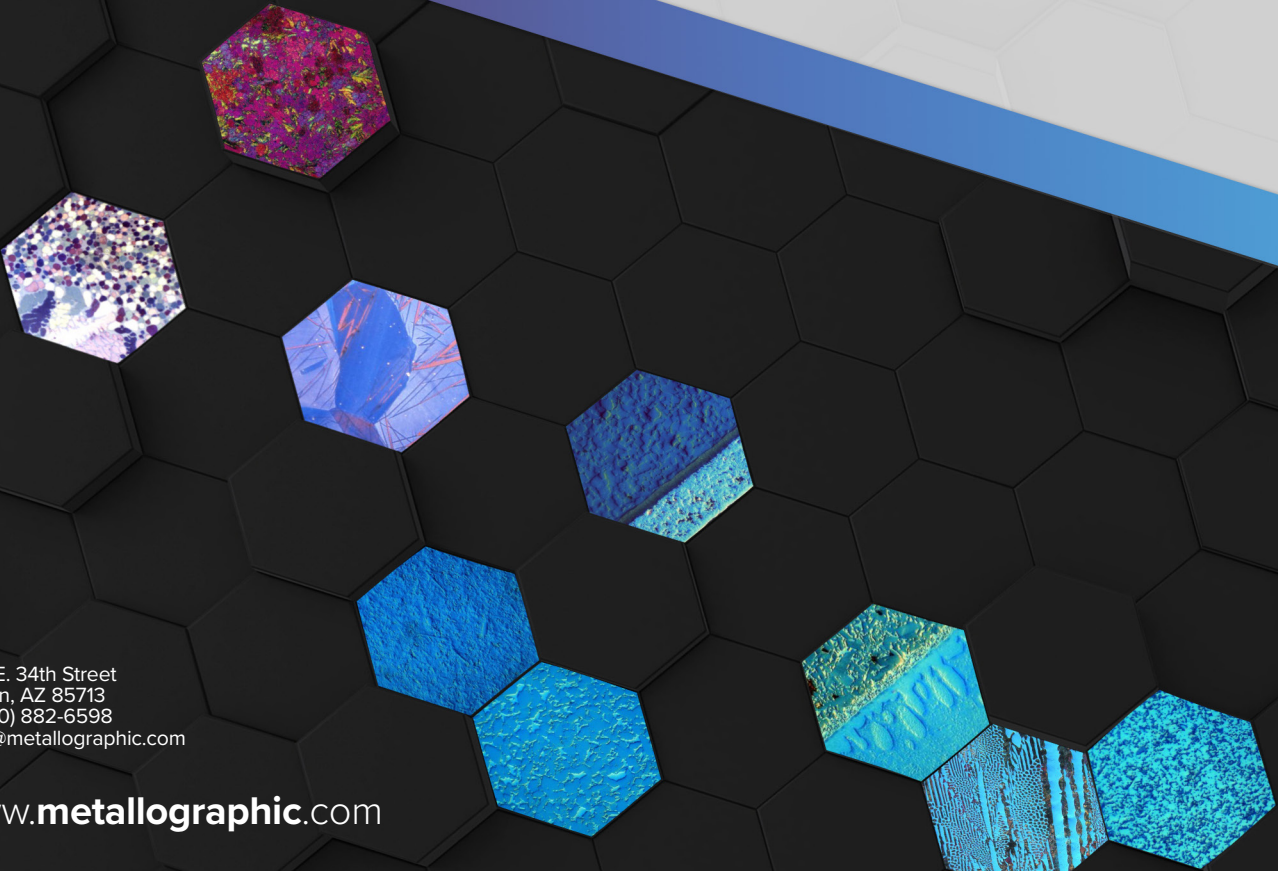
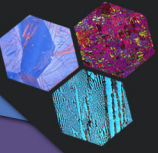
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