



UKAM Industrial Superhard Tools Division of LEL Diamond Tools International, Inc.
28231 Avenue Crocker, Unit 80 Valencia, CA 91355 USA
Phone: (661) 257-2288 Fax: (661) 257-3833 www.ukam.com

SMART CUT™ LP Grinding / Polishing Machine

SMART CUT™ LP is a Variable Speed Precision Polishing, Grinding, Lapping Machine. Designed for Mechanical Sample Preparation. **SMART CUT™ LP** Provides equal Precision, Productivity and Versatility as High Cost Fully Automatic Grinding/Polishing Machines, at a small fraction of the price. Compare to Brand Name Grinding / Polishing Machines for Sample Preparation & Materials Research. **Perfect for Manufacturing and R & D facilities on a Budget.**



Made in USA



SPECIFICATIONS:

- Motor: 6" & 8" Machines - 1/4 HP
- equivalent Ball Bearing DC with 115
- VAC Converter.
- Variable Speed 500 to 3,000 RPM
- Drive: Direct Drive on 2" Flange

Dimensions:

SMART CUT™ LP 6" - 12" x 12" x 7"

SMART CUT™ LP 8" - 12" x 12" x 7"

Weight:

SMART CUT™ LP 6" - 16 lbs including consumables

SMART CUT™ LP 8" - 18 lbs including consumables

- **ADVANCED MATERIALS**
- **ULTRA HARD & BRITTLE**
- **MATERIALS**
- **OPTICS, GLASS & QUARTZ**
- **COMPOSITES**
- **METALS**
- **MANY OTHER MATERIALS**

*Its Variable Speed allows the operator the flexibility to move from high speed rough grinding to low speed final polishing. It's molded plastic housing will never rust. **Capable of withstanding more exploitation, requires less maintenance, and much easier** to use that Fully Automatic Polishing, Lapping, & Grinding Equipment. Preferred by thousands of Universities, Government Research Laboratories, Commercial Laboratories & Advanced Material fabrication facilities. **What you will save on cost of Consumables will more than pay for SMART CUT™ LP in short period of time.***



SMART CUT™ LP is Perfect for coarse & fine grinding and polishing of Advanced and Optical Materials. High hardness materials including metals, ceramics, refractories, cement, and petrographic thin sections. As well as full range of optical materials, such as: Bk7, Fused Silica, Zeroder, Quartz, Soda Lime Glass, Yag, Sapphire, and Many Others.

ADVANTAGES:

- VARIABLE SPEED
- EASY TO USE
- QUIET
- CLEAN
- PORTABLE / COMPACT
- VERY AFFORDABLE
- REQUIRES MINIMUM MAINTENANCE
- CAN BE USED IN JUST ABOUT ANY APPLICATION
- PERFECT FOR LABORATORY USE & SMALL PRODUCTION

Runs very quietly - Perfect for laboratory or production environment.

Runs cleanly - No plastic aprons and cold, coolant-soaked hands are required. Specially designed coolant spray shield keeps coolant in the work area and not on you. The finishing process uses a modest supply of coolant - in most cases, a quart of coolant will last all day.

Clean up is easy - Just remove the coolant spray shield and tray, wash, and you are ready to work again.

Most Affordable Grinding / Polishing Machine for Sample Preparation

INDUSTRIES USED IN:

- Automotive / Diesel
- Aerospace
- Compressor & Valve
- Pumps
- Tool & Die
- Bearings
- Precision Optics
- Precious & Semi Precious Stone

- Technical Ceramics
- Data Storage
- Semiconductor
- Medical Devices
- Specially Materials / Products
- Mechanical Seals
- Composites
- Glass
- Stone
- Metallography

USED FOR:

- Sample Preparation
- Quality Control
- R & D
- Failure Analysis
- Manufacturing
- Industry
- Material Rework

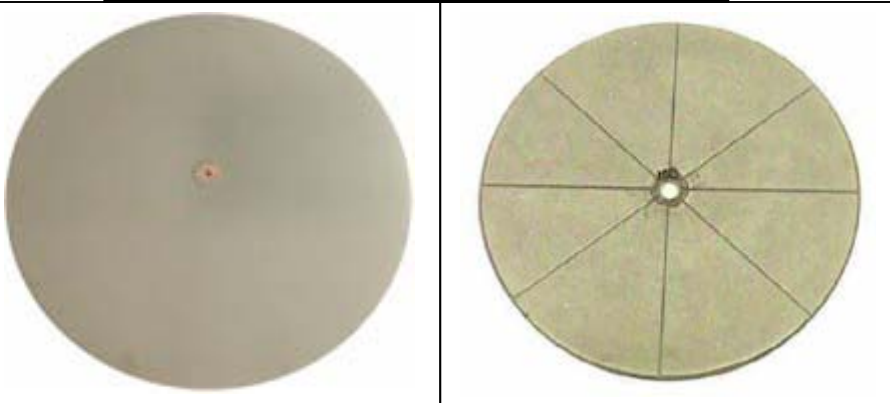


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DIAMOND GRINDING & POLISHING CONSUMABLES

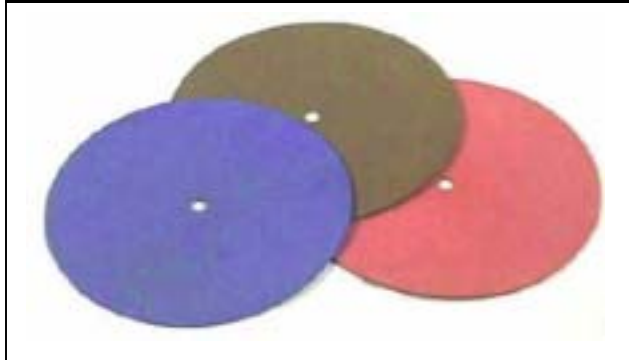
*UKAM Industrial Superhard Tools produces diamond grinding, polishing discs and consumables for large variety of applications, industries, lapping, grinding & polishing machines. Metal & Resin Bond Diamond Discs are available from as **coarse as 40 grit to fine as 1 micron**. All Diamond Discs are interchangeable and come with either magnetic or adhesive backing. Other consumables such as diamond powder, cerium oxide, alumina powder, diamond compounds, diamond polishing coolant & diamond films are available upon request.*

Metal Bond Diamond Discs



Metal Bond Diamond Discs have diamond particles held firmly in place on a rigid backing by electroplated erosion resisting nickel for maximum bond strength and heat dissipation. A hard nickel alloy is used to rigidly bond a layer of sharp, blocky diamond to a steel backing. The sharp diamond particles cut cleanly with no edge rounding. Metal Bond Diamond Grinding Discs radically reduce the time required for material lapping/grinding process.

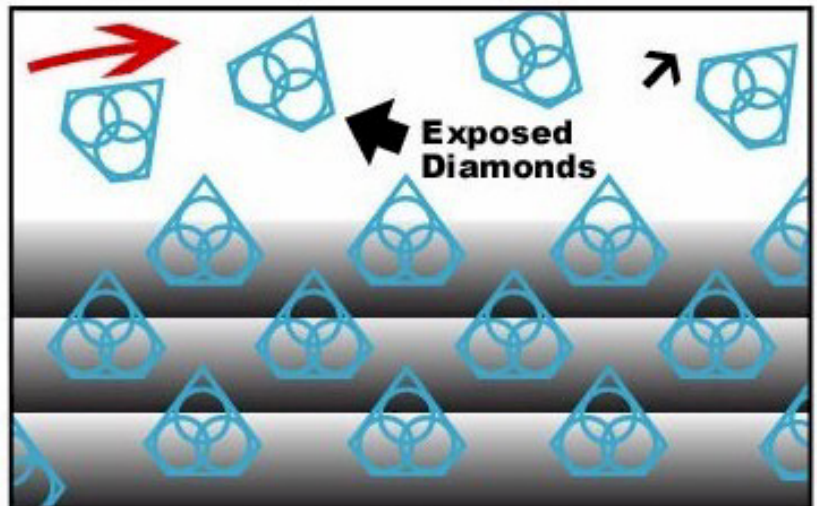
Resin Bond Diamond Discs



Resin Bond Diamond Discs have diamonds locked into a multi level resin material.. Resin Bond Discs are designed for smoothing and pre-polishing of material samples and removing chips & scratches. Perfect for improved lapping, grinding, and pre-polish finishing of materials above 60 on the Rockwell C scale. Not recommended for heavy stock material removal.

UKAM Industrial Superhard Tools produces diamond polishing discs for large variety of applications, industries, lapping, grinding & polishing machines. Diamond Discs are produced for our own SMART CUT machines, as well as well known brand name grinding/polishing machines used for sample preparation. Such as **BUEHLER, STRUERS, LECO & Many Others.**

Diamond Discs are available from **6" to 30" (150mm to 762mm) in Diameter**. Diamond discs can be produced with any inside diameter (ID) hole size. Diamond mesh size/grit sizes available from as **coarse as 40 grit to fine as 1 micron**. Diamond Discs can be placed on either **magnetic, adhesive PSA backing, or no backing.**



The newly exposed diamonds don't effect diamonds already working on the material. Unlike many other diamond bonds, diamonds in a Smart Cut remain sharp and grow sharper with each cut. Prolonging product life and consistent performance.



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Backing Plates for Diamond Discs – Provide backing support for metal bond and resin bond diamond discs. Diamond discs are easily attached to backing plates by their PSA backing. Backing Plates are available in either composite material or aluminum. Manufactured to exact precision; flat and parallel within TIR .001. Arbor hole is 1/2".



CONSUMABLES PACKAGE



What is the difference between Lapping, Grinding, & Polishing ?

Lapping, Grinding, & Polishing processes are very similar. Main differences lie on the end users objectives. Such as removing a certain amount of material or removing scratches and micro cracks caused by prior machining operations. Usually the same machine can be used for all three operations. Some of the major differences include the type and diamond mesh size of diamond discs used, type and size of abrasives used and their holding method. Other factors include RPM's (speed) used and pressure applied to material workpiece.

Another important difference between lapping and more finer polishing is the composition of diamond disc backing plate. Typically cast iron is used as a backing plate for lapping. Backing plates made from aluminum, bronze, or composites are more frequently used for polishing.

Lapping Process

Lapping and polishing are precision finishing processes which involve different mechanical arrangements. Lapping is a slow material removal operation. Though lapping tends to decrease the original surface roughness, its main purpose is to remove material and modify the shape. Lapping is used primarily to improve form accuracy rather than to reduce surface roughness. Polishing on the other hand deals with material surface finish and pays little attention to form accuracy.

Lapping and polishing are used for many materials such as glass, ceramic, plastic, metals and their alloys, sintered materials, stellite, ferrite, copper, iron, steel and etc.

The relative speeds in lapping and polishing are much lower than in grinding. Consequently the concentration of energy in the contact area is much lower than in grinding.

Most Popular Diamonds Discs suited for most applications are available in set (package) at significantly reduced price, than purchased separately. **PACKAGE INCLUDES:**

- 180 Mesh (81 microns) Metal Bond Diamond Disc, hydraulically pressed to a backing plate
- 325 Mesh (45 microns) Resin Bond Diamond Disc
- 600 Mesh (30 microns) Resin Bond Diamond Disc
- 1200 Mesh (12 microns) Resin Bond Diamond Disc
- White Polish pad with 14,000 mesh
- diamond compound
- 4 units of disc backing plates

Please inquire, we can recommend the right consumables for your particular application.

Diamond / Abrasive Size & Distribution

The size and size distribution of diamond particles plays an important role in surface obtained by lapping, grinding, & polishing.

Whatever your goal or objective UKAM Industrial Superhard Tools can help you optimize your Diamond Lapping, Grinding, & Polishing operation to ultimate level of efficiency.



Polishing Process

Polishing is a surface smoothing operation. Polishing typically involves removing or smoothing out grinding or lapping lines, scratches, and other surface defects in order to decrease the surface roughness of material. Emphasis is placed in obtaining best surface finish without much regard for shape and form accuracy. As well as removing damage (such as microcracks, voids, and inclusions) caused by previous machining operations such as cutting and grinding.

CONSUMABLES:

There is a large variety of abrasives that can be used for lapping, grinding, & polishing. Below is a description of various lapping, grinding, and polishing media/powders that is typically used for most lapping, grinding, and polishing operations.

Diamond – typically used for ultra hard materials and tungsten carbide. A disc embedded with diamond will cut fast and produce fine finish. Diamond is the hardest material known to man kind.

Cubic Boron Nitride (CBN) – typically used for lapping ferrous metals, including 52100 bearing steel, cast iron, tool steel, stellite, super alloys, and occasionally ceramic materials.

Aluminum Oxide – for general lapping, grinding, & polishing with low surface roughness. Typically used for high tensile strength materials, rough lapping operations, hardened gears, ball bearing grooves, and lapping operations where pressure can be exerted to break down the crystals.

Silicon Carbide – fast stock removal for hard to soft materials. Typically used for rough lapping and grinding operations, forged or hardened gears, valves, tool room work and general maintenance where polish is not essential.

Boron Carbide – for use with ceramic, carbide, and other hard materials.

Calcined Alumina – for use with metals, optics, silicon wafers, and other semiconductor materials

Unfused Alumina (hydrate-calcined) – Relatively soft and used for polishing. Calcined aluminas are produced by heat treatment and the degree of calcinations determines the characteristics of the product. Unfused alumina abrasives are recommended for lapping and polishing of harder materials (Rockwell C 45-63). The shape, unlike the blocky crystals, is composed of flat or plated crystals with a thickness about one sixth the diameter. Unfused aluminas allow more equal pressure to be distributed over a large surface area than the fused ones because of their plated shape. The disc shaped particles work with a shaving action rather than the rolling and gouging action of blocky abrasives and are less likely to produce deep scratches on the workpiece.

Diamond / Abrasive Size & Distribution

The size and size distribution of diamond / abrasive plays an important role in surface obtained by lapping, grinding, & polishing. The size of diamond / abrasive is directly proportional to material removal rate and surface roughness. Larger diamond particle sizes have a higher material removal rate. However smaller diamond particles will produce a lower surface roughness.

Another factor that may affect your lapping, grinding, & polishing operation is the concentration of diamond / abrasive used. Number of diamond / abrasive grains in contact with surface of material being worked on. Change in diamond / abrasive concentration will affect distribution of load. Hence increasing the number of diamond particles, load per particle decreases due to larger number of contact points.



UKAM Industrial produces mechanical diamond lapping, grinding, polishing equipment from 6" to 24" diameter. Used for sample preparation & many other applications.



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HOW TO ORDER



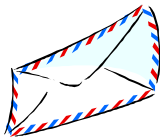
Order by Phone:

Call: (661) 257-2288 Monday through Friday 8:30 a.m. to 5:30 p.m.



Order by Fax:

Fax: (661) 257-3833, available 24 hours a day.



Order by Mail:

send your orders to: 28231 Avenue Crocker, Unit 80 Valencia, CA 91355 U.S.A.

please include product item number, description, and payment.

Accepted forms of payment



We accept Visa, MasterCard, and American Express. Organizations located in State of California add 8.25% sales tax. Net 30 terms on approved credit. Credit terms are only available to eligible organizations in USA and Canada.

Pre Payment is requested from all customers outside North America. Payment by wire transfer is preferred. If paying by wire transfer, please add \$35.00 USD to total. This is how much our bank charges us for each incoming wire transfer.