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Kramer Industries, Inc.

Solutions, Systems & Supplies

Right From The Start

Resource & Reference Guide

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We specialize in customizing systems, products and procedures.
There are many options and custom equipment available.
If you don't see something in our catalog, please contact us.

Right From The Start Guarantee

Right From The Start

At Kramer Industries, we recognize the difficulty, expense and lost time that you face in finding the precise combination of equipment, supplies and processes to achieve your desired results.

We have systems in place that guarantee you will see the end results right from the start. We call this the Right From The Start Guarantee.

Introduction: We always introduce ourselves by name. We treat you honestly, courteously and fairly. When we introduce you to our company, we strive to ensure that your precise requirements are understood and met.

Understand Your Needs: To ensure that we understand exactly what you need and that you are aware of all of your alternatives, we engage you in a thorough dialogue. We try to identify all your key issues and concerns to understand exactly what you are expecting to accomplish.

Analysis Phase: Once you have provided us with the information to assure that we thoroughly understand your needs, our entire team analyzes our findings to develop the best possible solution or recommendation for your application. If necessary, our laboratory will process your sample parts in our testing equipment under a variety of conditions in order to fine tune our recommendations.

Lifetime Support: After you agree to the solution and products that will meet all your requirements, we will make ourselves available for unlimited technical and administrative support. We look forward to answering any questions you have by phone, fax or e-mail. Forever. We enjoy talking about new projects you are working on and finding out how we can help you grow your business and improve your profitability.

Order Experience: When you are ready to place an order with us, you will find that our no-hassle, no pressure, stress- free ordering experience will be enjoyable and thorough. All costs will be explained; there will never be any hidden or add-on charges. Our Order Processing Department will always process your order with professionalism.

Delivery as Promised: We will discuss all shipping options with you and keep you informed of the processing status of all machines, equipment and supplies you order, making sure that all items arrive when requested. We employ the latest methods available to keep track of your shipment at all times, assuring that it reaches you precisely when you need it.

Satisfaction Assurance: You can expect that we will continue to remain in touch with you, monitoring your experience with us to make sure that you are satisfied with our products. Any time we find that we are not performing up to your expectations, we take immediate corrective action. Even more, we always look forward, seeking to continuously improve and find better ways to assure your satisfaction today and tomorrow. Our goal is to create customers for a lifetime.

Our Guarantee: The Right From The Start Guarantee is about absolute customer satisfaction. Creating a high-value, mutually satisfying relationship is our only measurement of success. If you are dissatisfied with your experience, we will take every action possible to remedy the situation – 100% guaranteed!

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At www.KramerIndustriesOnline.com, you'll find our most up-to-date information, get the scoop on new products and specials, and technical materials that can be applied to a wide variety of industries.

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We can do it!

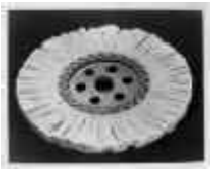
We specialize in customizing systems, products and procedures. There are many options and custom equipment available. If you don't see something in our catalog, please contact us.

About Kramer Industries

Our Story

In 1911, Harry Kramer set up a small factory in the basement of his home to manufacture chamois cases for pocket watches. (Chamois is soft leather that is obtained from a mountain goat.) At that time, the better watches were sold in chamois cases to protect the watch inside and also act as a polishing device. His cases were very well liked and business flourished.

After many years, a man who desperately needed chamois buffing wheels to polish jewelry approached Harry Kramer. Harry's supplier was not able to meet the demand, leaving Harry to produce the buffing wheels himself. Harry had never made a buffing wheel before, but accepted the challenge.



When pocket watches went out of style, Harry began to make chamois and cloth polishing wheels for the jewelry industry. His son Herbert, then in his late teens, suggested that since they were already calling on the jewelry trade to sell their polishing wheels, why not build the polishing machines also? And so the production of Kramer machines began.

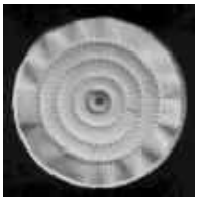
Over the years, The Kramers earned a reputation for quality repairs of tumbling barrels and other machines. Plastic jewelry was now more popular and tumbling was promoted as an economical means of mass finishing. Herb was a natural-born machinist and soon decided that they themselves could fabricate better machines than the ones being sent to them to repair. By the late 1940's, HW Kramer Company was producing a full line of tumbling machines that were greatly admired for their strength and durability.

Herb Kramer knew the importance of respecting his customers and his employees. He also recognized the benefit in knowing the details of his products and the processes surrounding them. With this philosophy, Herb Kramer achieved a high degree of customer loyalty and an incredible amount of referral business.

In 1971, the Kramer factory moved to larger quarters to accommodate its 22 employees. Harry slowly turned over the company reigns to his son Herb, who by this time had two of his own sons working in the factory. One son, Charles, developed tumbling compounds to be used in the machines. His other son, Robert, developed the Kramer machinery.

Harry retired in the late 1960's. By this time, vibratory finishing equipment was starting to show up in the market, offering much faster cycle times and a controlled action that was safer for the parts being finished. It was then decided that Kramer must produce vibratory finishing machines to stay competitive. They would have to be of the highest quality to maintain the reputation already established by Kramer's tumbling machines. Robert studied engineering and machine design in college and used this knowledge to design a series of vibratory finishing machines. It took three years of prototypes and study to produce the final product.

Our Story, continued



In 1972, having outgrown their facility once again, Kramer moved to larger quarters. Herb Kramer soon retired, leaving his two sons in charge. Success with the tumbling and vibratory machines continued through the 1970's. True to their heritage, the two Kramer "grandchildren" pursued new opportunities and expanded Kramer Industries' market share into the metal finishing industry through the 1980's and 1990's.

The 21st century has seen new challenges and opportunities. Building off our nearly 100 year history, Kramer Industries has fully embraced our expertise in surface finishing. Alongside the high value barrel and vibratory tumblers, Kramer has significantly expanded the line of abrasive blasting systems and abrasive blasting media - both portable and cabinet systems. Kramer Industries remains a full service company, offering media, compounds, advice, solutions and a full line of barrel finishing, vibratory finishing, parts separating equipment and abrasive blasting equipment. It is expected that Kramer Industries will continue to prosper in the surface finishing industry for years to come, *Right From The Start*.

Our Mission

To promote an environment for our customers, employees and industry that advances learning, creativity and satisfaction and continuously increases the true value for all stakeholders of the company.

The Experience our Customers will have…

- Stress-free and satisfying purchasing process
- Honest and open communication
- Treated with respect, integrity and trust
- Offered products and services which exceed expectations every time

The Environment our Employees will work in…

- A pleasant and comfortable workplace
- Independence to take advantage of new opportunities
- Encouraged to take risks without the anxiety of failure
- Continuous learning in a non-stifling atmosphere
- Freedom to be expressive and creative

The Contributions to our Industry will be…

- Readily available, practical, educational information
- Open dialogue to encourage learning and information sharing
- Leverage our experience to facilitate economic growth
- Cooperative environment among all in the industry

Barrel Finishing

Barrel tumblers work well for jobs requiring heavy burr removal. They are also good for burnishing, rapid radiusing of edges, heavy deburring with or without media and tumbling die-castings to break the parts off the runner. Barrel tumblers are a good choice for very heavy loads that will not run well in a vibratory finisher, such as steel shot for polishing operations, where the media can weigh up to 300 lb per cubic foot. When estimating the capacity required, keep in mind that barrel tumblers run best 50% full. Screened barrels are available for use as a plastic or die-casting deflashing machine. By adding screen doors, parts can be separated.

Wet barrel finishing is a batch system for removing excess material or polishing parts, employing water and other agents to form radii, remove burrs, improve surface appearance, polish and clean. Wet barrel finishing works well for processing metal. Wet barrel finishing equipment may sometimes be used in dry tumbling operations.

Dry barrel finishing is a batch system for mass polishing or removing excess material from plastic or metal parts without liquids by tumbling them in a media and compound mixture. Dry barrel tumblers form radii, deflash, polish and grind. Dry tumbling is valuable for finishing very delicate parts that would be damaged in a wet barrel. A dry system produces a smoother and higher finish. The finished parts have more of a hand-buffed appearance with greater uniformity in the end product - something very difficult to do with hand finishing methods.

Although most methods for barrel finishing employ a wet process, dry tumbling has some definite advantages in particular cases. Some factories are not set up to handle large quantities of water, making wet tumbling impossible. Dry tumbling may be used under such circumstances to eliminate hand finishing.

For more information on barrel finishing, refer to our *Barrel Finishing Guide* on page 115.

Our most popular media bonds…

Ceramic: KM used for general deburring in most standard applications
Plastic: KX used for general metal removal

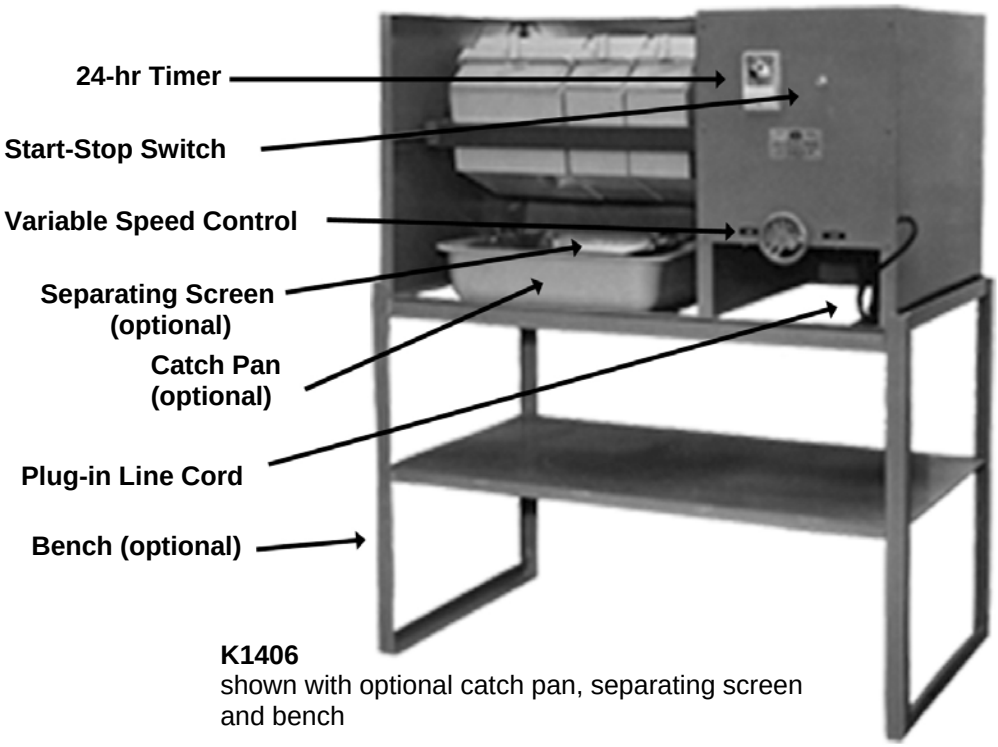
For a more detailed description of our media bonds, refer to page 76 for ceramic media and page 83 for plastic media.

K14 Series

Heavy-Duty, Variable-Speed, Wet Barrel Tumblers Bench Models

The K14 Series system is a small, heavy-duty, bench-top, wet barrel tumbler with standard capacities ranging from 0.75 to 1.5 cubic feet. The K14 system is a deburring machine solution that features a timer, variable speed, a heavy chain drive, and removable, interchangeable barrels. The barrels are mounted high enough to allow a screen and pan underneath so the barrel can be emptied without lifting and dumping. This deburring turn-key machine can handle loads of up to 200 pounds. The barrels are mounted in a cradle and can be interchanged to divide up a load. The K14 is very useful for small machine shops and for jewelry processing. The small footprints of these wet barrel tumblers make them easy to fit in a crowded shop, even under a bench. The sturdy construction of this deburring machine solution guarantees many years of useful service.

- Ideal for deburring or burnishing
- The right barrel for the right job - 3 sizes available
- Quick-change barrels add to its versatility and handling
- All the features of larger equipment with small model economy
- Useful for production runs for small jobs or test runs for large plants
- Variable speed drive
- 24-hour timer included



K1406
shown with optional catch pan, separating screen and bench

K14 Series, continued

Heavy-Duty, Variable-Speed, Wet Barrel Tumblers
Bench Models

SPECIFICATIONS	
CAPACITY	**K1401 to K1402**: 0.758 ft³ **K1404 to K1408**: 1.625 ft³
BARRELS	Six-sided seamless plastic or steel. Steel barrels are lined with a durable polyurethane lining. Three widths available: 5¼", 10½" and 22½" wide. 14" diameter across corners. Quick-action lock on covers. Solid, watertight doors. One solid door included with each size barrel ordered.
DRIVE	Variable speed control 25-50 RPM.
CONTROLS	24-hour timer. Start-stop switch.
BENCH SPACE	**K1401 to K1402**: 33½" w x 25" d x 24" h **K1404 to K1408**: 44½" w x 25" d x 24" h
OPTIONAL ACCESSORIES	Bench. Catch pan. Separating screen. Drain door. Guard. Extra barrels.
MODELS	**K1401** - one 10½" barrel
	K1402 - two 5¼" barrels
	K1404 - one 22½" barrel
	K1405 - two 10½" barrels
	K1406 - one 10½" & two 5¼" barrels
	K1408 - four 5¼" barrels

Are your parts getting scratched?

If your parts are getting scratched, the load level may be too low, there may be foreign metal matter in the barrel, there may be too many parts in the barrel or the barrel lining may need to be replaced.

K Series

Heavy-Duty, Variable-Speed, Wet Barrel Tumblers Floor Models

The K Series system is a large, horizontal, floor model, wet barrel tumbler. These full-featured, heavy-duty barrel tumbler systems come with standard capacities ranging from 5 to 30 cubic feet. The K Series barrel tumblers feature a timer, overload protection, variable speed control, heavy chain drive, swing down guard with safety interlock and sturdy wrap-around housing with an “A”-frame reinforcement.

FEATURES	
BARRELS	Multiple barrel units are actually individual barrels. Solid, watertight doors and drain doors included for each size barrel. Barrels are available unlined or with a durable polyurethane lining.
DRIVE	Variable speed system.
CONTROLS	12- or 24-hour timer, reversing switch, start-stop switch, flip-up guard, reset buttons and magnetic starter switch with overload protection.
MOTOR	3 phases/60 cycles/220V standard (440V and 550V also available)
HOUSING	Sheet metal with reinforced "A"-frame and flip-up barrel guard.
OPTIONAL ACCESSORIES	Screened barrels for use as a plastics or die-casting deflashing machine. Electric separating machine. Water tank.

K3036-2

K3060-1

K Series, continued

Heavy-Duty, Variable-Speed, Wet Barrel Tumblers
Floor Models

MODEL SPECIFICATIONS				
MODEL	**CAPACITY**	**COMPARTMENTS**	**HP**	**FLOOR SPACE** (depth x width x height)
K2024-1	4.80 ft³	one 24"	3/4	32" x 58" x 50"
K2024-2	4.80 ft³	two 12"	3/4	32" x 58" x 50"
K3036-1	15.54 ft³	one 36"	2	42" x 73" x 60"
K3036-2	15.54 ft³	two 18"	2	42" x 73" x 60"
K3060-1	25.92 ft³	one 60"	5	42" x 99" x 60"
K3060-2	25.92 ft³	two 30"	5	42" x 99" x 60"
K3060-3	25.92 ft³	two 18" & one 24"	5	42" x 99" x 60"
K3060-4	25.92 ft³	four 15"	5	42" x 99" x 60"

The K Series Heavy-Duty Barrel Tumblers can be customized to include barrel sizes other than noted above. Please call us at 888-515-9443 to discuss your specific application and requirements.

Discuss your finishing topics with others!

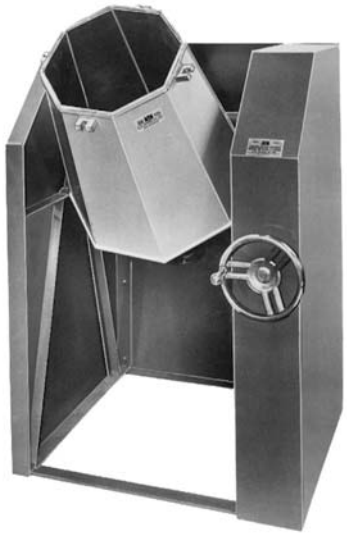
Visit the Kramer Industries' Shop Talk forum at www.KramerIndustriesOnline.com to discuss finishing techniques, ask questions, offer advice and meet others in your industry.

At www.KramerIndustriesOnline.com, you'll find our most up-to-date company information, get the scoop on new products and specials, and technical materials that can be applied to a wide variety of industries.

TT Series

Heavy-Duty Tilting Tumblers
Floor Models

The Barrel Finishing TT Series Tilting Tumblers are a series of open-ended, oblique tumblers - a special type of barrel finishing machine in which the barrel is open at the end and is mounted cantilever on a tilting shaft. The tilting tumbler is a versatile machine suitable for wet or dry barrel finishing processes. This particular system features a tapered octagonal shaped barrel for maximum tumbling action.



TTM

The design of the TT Series oblique tumblers is most desirable for its ease of handling. It is usually run without a door, so parts can be inspected as the machine is running. The big open mouth of the barrel makes it easy to load. It unloads rapidly by tilting the barrel down. It is an excellent barrel finishing machine to use for self-tumbling or drying parts. The barrel is metal and watertight. The barrel can be either unlined or lined with a durable polyurethane lining. The tilting device will swing the barrel a full 180°. The barrel automatically locks in any position. The machines are equipped with a manual or optional power tilt, fixed speed or optional variable speed, timer and overload protection.

An old favorite for finishing, the TT Series offers the advantage of fast loading and unloading as well as rapid inspection, which is especially useful with runs of short duration. These tilting tumblers are also useful for doing many short runs because they are so easy to load and unload.

This type of barrel does not work as well with media as the standard horizontal barrel. The media and parts tend to segregate because of the vortex action, causing the media to stay toward the rear of the barrel as the parts migrate toward the opening. Hence, this type of machine should not be chosen for sophisticated deburring.

Did you know?

Some simple deflashing operations, as is often done with compression-molded parts, can be performed without media by tumbling the parts against each other in a screen barrel that permits the scrap to fall out.

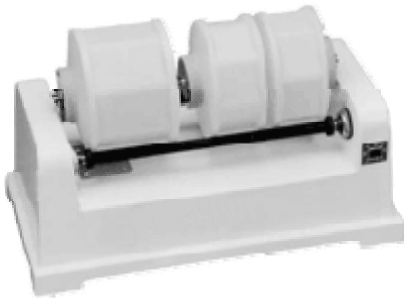
TT Series, continued
Heavy-Duty Tilting Tumblers
Floor Models

SPECIFICATIONS	
DRIVE	Direct from motor to barrel via a quiet chain and sprocket system.
CONTROLS	Magnetic starter with overload protection, timer and knife switch.
MOTOR	Gear type: 3 phases/60 cycles/220V.
HOUSING	Enclosed steel frame braced with an angle iron.
BARREL	Barrels are available unlined or with a durable polyurethane lining.
OPTIONAL ACCESSORIES	Variable speed drive. Unlined or polyurethane-lined additional barrels. Watertight door for barrel. Drain door for barrel. Safety swing down guard with safety interlock. Power tilt (included with model TTM-3).

MODEL	TTM-1	TTM-2	TTM-3
VOLUME	2.38 ft^3	4.60 ft^3	9.30 ft^3
BARREL DIAMETER (bottom & top)	20" & 12"	24" & 16"	30" & 22"
BARREL DEPTH	20"	25"	30"
STEEL BOTTOM OF BARREL	$^3/_{16}$"	$^1/_4$"	$^3/_8$"
THICKNESS OF BARREL SIDE	12-gauge	$^3/_{16}$"	$^1/_4$"
# OF BARREL SIDES	8	8	8
BARREL RPM	28	28	28
HP	$^1/_4$	$^1/_2$	1
FLOOR SPACE (width x depth)	34" x 32"	38" x 37"	44" x 42"
WEIGHT	700 lb	830 lb	950 lb

MT Series
Roller Barrel Tumblers
Bench Models

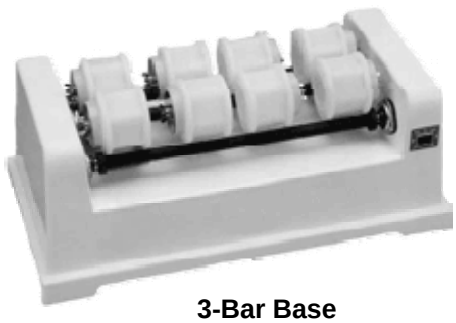
The Mini-Tumbler industrial roller barrel tumbler system is designed for small parts and/or small batch runs. This roller barrel tumbler system is ideal for sensitive or fragile parts. This bench-top rotary tumbler system can accommodate barrels ranging in capacity from 22 ounces to 8 gallons. The heavy-duty plastic barrels are equipped with stainless-steel doors and neoprene expansion plugs. The three different finishing tumbler base sizes offer different bar lengths and distances between the bars to allow for multiple barrels/batches on each base. The standard tumbler base is supplied with two speeds, but can be upgraded to variable speed for your ideal deburring equipment.



2-Bar Base shown with 1 MT-4 barrel and 2 MT-2 barrels

TUMBLER BASE SPECIFICATIONS			
MODEL	**Mini-Base**	**2-Bar Base**	**3-Bar Base**
DIMENSIONS (l x w x h)	23" x 16" x 13"	36" x 19" x 13"	36" x 19" x 13"
BAR LENGTH	$9\frac{1}{4}$"	24"	24"
BAR DISTANCE	$4\frac{1}{2}$"	$7\frac{1}{2}$"	$3\frac{1}{2}$"
ELECTRICAL	$\frac{1}{3}$ HP, RPM 1725/1140, 115V @ 60Hz 2-speed or variable speed		
OPTIONS	Available in 220V @ 50Hz		
FEATURES	Seamless reinforced fiberglass base. Precision ground urethane bars. Standard 2-speed drive. 2-Bar and 3-Bar Bases available in variable speed. Available in domestic and international voltages.		

Mini-Base
shown with 2 MT-2 barrels



3-Bar Base
shown with 8 MT-1 barrels

MT Series, continued
Roller Barrel Tumblers
Bench Models

BARREL SPECIFICATIONS						
MODEL	**MT-1**	**MT-2**	**MT-3**	**MT-4**	**MT-6**	**MDT-1**
DIMENSIONS (diameter x height)	4 3/4" x 4 3/4"	8 1/4" x 4 3/8"	7" x 10"	10 1/2" x 10 3/4"	15 3/4" x 14 3/4"	5" x 4 1/2"
BARREL OPENING	3"	4"	4"	4"	7 1/4"	3"
TOTAL CAPACITY	22 fl oz	3.5 quarts	1.5 gallons	2.5 gallons	8 gallons	22 fl oz
RPM (Low/High)	90/127	52/80	42/56	38/53	25/40	1/120
CERAMIC MEDIA NEEDED TO FILL EACH BARREL	1 lb	5 lbs	10 lbs	20 lbs	65 lbs	1 lb
FEATURES	Barrels: molded from heavy-duty plastic (HDPE). Barrel Covers: stainless steel; neoprene expansion plugs; positive lock and seal for easy access. MDT-1 features Delrin plug-type cover with silicone "o" ring seal.					
MAXIMUM NUMBER OF BARRELS THAT FIT ON BASE						
MINI-BASE	2	2	1	1	0	2
2-BAR BASE	0	4	3	2	1	0
3-BAR BASE	8	0	0	0	0	8

Did you know?

Plastics require a soft media such as wood pegs to avoid damage, but a soft media does not cut enough. Adding either corn cob grit or walnut shell grit treated with pumice to a dry tumbling load greatly speeds up the cutting time and creates an extremely efficient surface finishing operation.

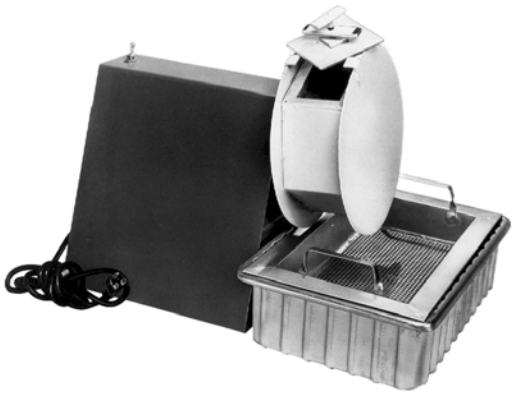
For additional information on abrasive tumbling media, refer to page 92.

For additional information on dry barrel finishing, refer to our Barrel Finishing Guide on page 120.

K9 Jewelry Finishing Machine

Heavy-Duty Mini-Tumbler
Bench Model

The K9 Series systems are bench-top, wet barrel tumblers that perform the same tasks as larger units, such as deburring, descaling, forming radii, improving surface finishes, burnishing, and cleaning, yet are compact enough to fit virtually anywhere. These barrel tumblers are a favorite within the jewelry industry.



K9 shown with catch pan and separating screen

How can it be used?
Manufacturers of small parts such as jewelry and screw machine products will find the K9 ideal for their production needs. Tumbling methods and materials can be readily tested on a small scale without endangering large quantities of parts.

Why select the Kramer K9 machine?
Although small, the K9 is sturdily constructed for industrial usage. Even the smallest manufacturing plant can find a place for the K9. Polishing and abrasive procedures can be done in the same barrel because the barrel is made of plastic. The barrel is easily removed for ease of handling. Optional separating screens and catch pans that fit under the barrel are available.

SPECIFICATIONS	
BARREL	Horizontal. Closed. Hexagonal shape. Plastic. 9" diameter x 4" wide. 1 1/2 quarts capacity.
DRIVE	Direct drive via gear motor. 1 phase/60 cycles/115V.
CONTROLS	On-Off switch plus line cord and plug.
BENCH SPACE	11" wide x 18" deep. 15" high including barrel.
OPTIONAL ACCESSORIES	K9 catch pan - fits under barrel. K9 separating screen - fits in pan. Screen is constructed of 1/4" perforated metal (other screen sizes available).

Vibratory Finishing

Vibratory finishing systems produce a cutting action by shaking the processing vessel (the tub) at a high speed, causing the media and parts to scrub against each other. This scrubbing action precisely abrades the parts to remove burrs. A shaft with rotating eccentric weights mounted on the tub produces the shaking action.

MB Series E Class
Mini Bowl Vibratory System
Bench Model

Vibratory finishing systems produce a cutting action that is very thorough. They remove material from pockets and recesses and inside bores, which cannot be done in a barrel tumbler, so they can be used for very delicate or intricate parts. With high speeds and a short stroke, they can also run large bulky parts without damage. Large wingspans and landing struts are routinely run in these systems. Vibratory finishing systems also lend themselves to be automated easily. They can be fully automated for a flow-through operation or used as a basic batch operation. The action is that of a small orbit at a high speed and thus is very powerful, yet causes little stress on the parts.

For more information on vibratory finishing, refer to our *Vibratory Finishing Guide* on page 125.

Did you know?

Ceramic preformed media is used for ferrous metals. Plastic and synthetic preformed media are used for non-ferrous metals. Non-metals can normally use either plastic or synthetic depending upon the results to be achieved. Steel or ceramic media is used to achieve bright shiny burnished finishes on all materials. Dry treated organic media is used for smooth, polished mirror finishes on all materials. Refer to our *Tumbling Media Selection Guide* on page 130 for more information.

MB Series
Mini Bowl Vibratory Systems

The MB Series mini bowl vibratory finishing equipment systems are available in three bench model sizes and two heavy-duty floor model sizes. A bowl vibratory finisher can be used for small delicate parts without the concern of damage often found in large, tub-style vibratory equipment systems.

Bench Model E Class

Bench Models:

The bench model MB Series mini bowl vibratory finishing systems includes a dump chute for easy discharge. This vibratory finishing equipment also has an optional stand with a vibratory recirculating system. The toroidal-shaped bowl is suspended on multiple springs to allow for three-dimensional vibratory finishing, thus reducing part-to-part interaction during processing.

Floor Model F Class

Floor Models:

The heavy-duty floor model MB Series mini bowl vibratory finishing systems are designed for larger batch sizes and 24/7 industrial processing. These bowl vibrators include a 3/8-inch-thick, polyurethane-lined steel bowl with adjustable amplitude. The 1.0-hp, 1,800-rpm motor can be upgraded to allow for vibratory burnishing and polishing operations using steel tumbling media.

Vibratory Finishing Tips

The maximum part size that goes into a tub should be at least an inch or two shorter than the total length of the tub. In a bowl machine, the part length should not exceed the short width of the channel for uniform finishing.

Common speeds for vibratory deburring range from 1400 RPM for large machines to 1725 RPM for smaller machines; greater speeds may result in part damage or impingement. However, a higher RPM (3600) may be desirable for a heavy weight-to-load ratio processing or when burnishing, since steel media requires a lot of energy to start it in motion and continue to move.

MB Series, continued
Mini Bowl Vibratory Systems

Bench Model MB Series E Class Mini Bowl Vibratory Systems

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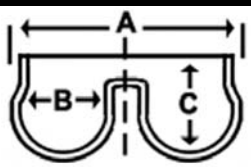
<tr><th colspan="9">SPECIFICATIONS</th></tr>
<tr><td rowspan="5">BOWL</td><td colspan="8"> 

Toroidal shaped bowl with curved sides.
Bowl is suspended on multiple springs.</td></tr>
<tr><td rowspan="2">MODEL</td><td colspan="3">BOWL DIMENSIONS</td><td rowspan="2">CAPACITY</td><td rowspan="2">HP</td><td rowspan="2">DUMP CHUTE</td><td rowspan="2">WEIGHT</td><td rowspan="2">OVERALL HEIGHT</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>E25</td><td>14 1/2"</td><td>4"</td><td>6 1/2"</td><td>0.25 ft³ / 2 gallons</td><td>1/4</td><td>2"</td><td>40 lb</td><td>19 1/2"</td></tr>
<tr><td>E50</td><td>17 1/4"</td><td>6"</td><td>7 1/2"</td><td>0.50 ft³ / 4 gallons</td><td>1/2</td><td>2 1/2"</td><td>61 lb</td><td>26 1/2"</td></tr>
<tr><td>E75</td><td>19 1/2"</td><td>7"</td><td>9 1/2"</td><td>0.75 ft³ / 6 gallons</td><td>1/2</td><td>3"</td><td>81 lb</td><td>29"</td></tr>
<tr><td>DRIVE</td><td colspan="8">Direct.
110V @ 60Hz or 220V @ 50Hz.
Adjustable amplitude to vary vibratory action.</td></tr>
<tr><td>HOUSING & BOWLS</td><td colspan="8">Constructed of durable plastic and metal for lightweight portable use.</td></tr>
<tr><td>FEATURES</td><td colspan="8">Standard units feature a dump chute with a polyurethane expansion plug, ribbed heavy-duty polymer bowl, adjustable amplitude, sound cover and bowl drain.</td></tr>
<tr><td>OPTIONAL ACCESSORIES</td><td colspan="8">Stand (shown on right).
Recirculating System: submersible pump, metering valve and 6-gallon container.
Timer (12 hr; stand or wall-mounted)

E75 shown with optional stand and timer
  </td></tr>
</table>

MB Series, continued
Mini Bowl Vibratory Systems

Floor Model MB Series F Class Mini Bowl Vibratory Systems

SPECIFICATIONS								
BOWL	Toroidal shaped bowl with straight walls. Bowl is suspended on multiple springs.							
	MODEL	BOWL DIMENSIONS			CAPACITY	HP	WEIGHT	OVERALL HEIGHT
		A	B	C				
	F10HD	20"	6"	7"	1.0 ft^3	1	200 lb	35"
	F20HD	29"	$8\frac{1}{2}$"	$8\frac{1}{2}$"	2.0 ft^3	1	275 lb	35"
DRIVE	110V waterproof on/off switch. Adjustable amplitude to vary vibratory action.							
HOUSING & BOWLS	Constructed of high grade steel and lined with $\frac{3}{8}$" durable polyurethane.							
FEATURES	Standard units feature adjustable amplitude system, $\frac{3}{8}$" durable polyurethane lined steel bowl and flow-through solution control flow meter.							
OPTIONAL ACCESSORIES	Motor upgrade for steel media vibratory processing (230V, 3 phase motor upgrade with inverter for 110V, 1 phase operation).							

So many choices.
Which media best suits your job?

To find out, check out our *Tumbling Media Selection Guide* on page 127.

DB Series

Vibratory Tub Systems
Floor Models

The DB Series vibratory finishing machines are designed as regular use tub vibrators. These finishing system machines make great "starter" machines for those unfamiliar with mass finishing or on a limited budget. The vibratory tumbler is typically used for deburring and polishing operations. A DB Series vibratory finishing machine is constructed of heavy-gauge steel and rust-preventive enamel paint. Each of the tub vibrators are lined with durable polyurethane. All systems come equipped with a complete fluid recirculating system. A variety of optional Tubular Rotary Separator Attachments (refer to page 24) can be easily attached to the DB tub outlet.

SPECIFICATIONS		
MODEL	**DB300**	**DB650**
INSIDE TANK DIMENSIONS (l x w x d)	31" x 13 1/2" x 13"	35" x 18" x 18 3/4"
CAPACITY	3.0 ft^3	6.5 ft^3
MOTOR	1 HP, 1 Phase, 110V @ 60Hz, 12.2 FLA or 220V @ 60Hz, 6.2 FLA	3 HP, 3 Phase, 230V @ 60Hz, 8.8 FLA or 440V @ 60Hz, 4.4 FLA
OPTIONS	Available in 220V @ 50Hz.	
FEATURES	5" round discharge door, with discharge trough. Heavy-gauge steel construction coated with rust-preventive enamel paint. Sound reduction cover and anchor bolts. Polyurethane liner made from the finest quality material available and oven cured. Complete fluid circulation system including pump, fluid container and all necessary hoses and fittings.	

DB300

DB650

EV Series

Heavy-Duty Vibratory Tub Systems
Floor Models

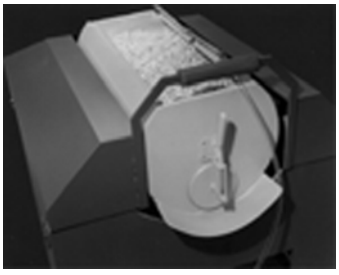
EV systems are a series of heavy-duty tub type vibrators designed for high efficiency and durability. They are primarily used as a deburring vibrator to improve surface finish, deflash, remove tool marks, and polish. The EV durable tub vibrators are available in six tub sizes ranging from $1^{1}/_{2}$ to 20 cubic feet. All systems come equipped with a direct drive, separate control panel with overload protection, pump and timer controls. A variety of optional Tubular Rotary Separator Attachments (refer to page 24) can be easily attached to the EV deburring vibrator's tub outlet.

EV 150

FEATURES OF THESE DURABLE TUB VIBRATORS:

- **Unique tub shape** which forces load turnover: Unlike toroidal bowls, the EV generates considerable force by lifting the entire load, whereas toroidal bowls create a rolling action. The round contours of the EV wrap around the load to increase load pressure. The curved shape produces good circulation by forcing the load to turn over.
- **Controlled action** that dissipates load pressure: The action of most tub vibrators tends to form an elongated elliptical path in an almost horizontal plane, which dissipates the load pressure. The EV achieves an almost circular path by employing a unique suspension system, which prevents power loss through tipping of the tub as it lifts the load.
- **Heavy-duty welded construction** with a hinged top hood for quick accessibility and easy access to all drive components.
- **Shaft support** with double row spherical bearings for extra durability.
- **Noise reduction**: Vibration isolating pads to set the machine on, thereby reducing unwanted noise. Thick steel plate housing to minimize noise and floor vibrations.

EV 300
with TRS-1



EV 150
filled with media

EV 150

EV Series, continued
Heavy-Duty Vibratory Tub Systems
Floor Models

SPECIFICATIONS	
TUB	Circular, with urethane lining. Door for end unloading.
DRIVE	Direct from motor to eccentric weight through flexible coupling; eccentric weight drive is adjustable. 0 - $^{3}/_{8}$" amplitude range. Sealed ball bearing pillow blocks.
CONTROLS	Magnetic starter with overload protection; separate pump control switch; timer controls complete system electrical line supplied. All controls are mounted on separate stand.
WATER SYSTEM	Separate pump and tank placed under the tub's bottom drain. Water hose leads from pump to tub. Water and compound can be recirculated between tub and tank, or a flow through operation can be set up.
HOUSING	$^{3}/_{8}$" thick welded steel plate construction. Top hood hinged and opens for complete accessibility to the drive.
OPTIONAL ACCESSORIES	TRS - Tubular Rotary Screen Separator. Sound Dampening Cover. Digital Timer.

MODEL	TUB CAPACITY	TUB SIZE (w x l)	TOP TUB OPENING	MOTOR	SHIPPING WEIGHT	FLOOR SPACE (w x l) without stand
EV 150	$1^{1}/_{2}$ ft³	13" x 20"	$7^{1}/_{2}$"	$^{1}/_{2}$ HP 1 phase	400 lb	28" x 34"
EV 300	3 ft³	15" x 28"	$9^{1}/_{2}$"	1 HP 1 phase	700 lb	34" x 41"
EV 600	6 ft³	20" x 30"	14"	3 HP 3 phases	1100 lb	44" x 44"
EV 1000	10 ft³	24" x 40"	16"	5 HP 3 phases	1400 lb	52" x 56"
EV 1500	15 ft³	28" x 42"	20"	$7^{1}/_{2}$ HP 3 phases	2100 lb	60" x 58"
EV 2000	20 ft³	30" x 48"	$24^{1}/_{2}$"	10 HP 3 phases	2600 lb	64" x 64"

VH-ULE Series Large Vibratory Bowls

Large Bowl Vibratory Systems

The VH-ULE Series, compact, state-of-the-art, high-energy large bowl vibratory system features an extended screen deck plus a low-profile, curved-wall construction. These floor model, high-frequency, vibratory tumblers feature a heavy-duty motor and an integral inverter/controller deliver flexible operation with excellent overall machine performance, reliability and efficiency all within a compact, space-saving footprint.

VH-ULE

MODEL	VH85ULE	VH150ULE	VH300ULE
Working Capacity	3 ft^3	5.3 ft^3	10.6 ft^3
Channel Width	8.5"	10.2"	12.8"
Bowl Outside Diameter	39.2"	44.3"	54.3"
Bowl Height	35.4"	38.2"	42.5"
Discharge Height	31.4"	32.3"	35.6"
Overall Dimensions* (l x w x h)	65"x47"x46"	54"x51.6"x38.2"	64.6"x61.4"x42.5"
Maximum Load	330 lb	660 lb	1100 lb
Motor	1.1 KW 1.5 HP	1.5 KW 2.0 HP	2.2 KW 3.0 HP
Screen Deck	1/2" or 1" square holes standard. 3/4" and 1 1/4" square holes available. Additional sizes can be special ordered.		

* Other size units available. Please contact us toll-free at 1-888-515-9443

VH-ULE Series Large Vibratory Bowls, continued

Large Bowl Vibratory Systems

FEATURES AND BENEFITS

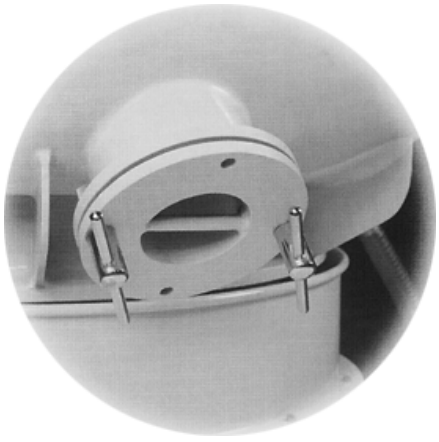
- High Frequency/High Amplitude Vibratory Bowl for Mass Finishing
- (3) Models 3, 5.3 & 10.6 CU. FT. Capacities
- Heavy-Duty Motor
- AC Tech Inverter/Controller
- 230V/460V Dual Voltage with Waterproof ON/OFF Switch
- Rugged U.S. Made Uniroyal Polyurethane Liner
- Variable Speed Control for fine-tune process control and uploading
- Adjustable Amplitude and Lead Angle
- Manual Hand Dam Control
- Convenient Discharge Door
- Unique Curved-Wall Construction
- Low-Profile Design
- Extended Screen Deck
- Easily Changeable Drain Plug

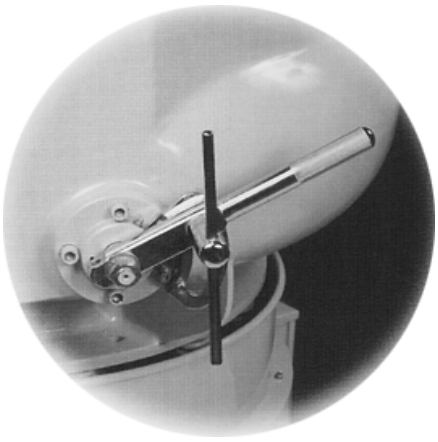
Low Profile Design
The low-profile vibratory bowl design, together with variable speed control, supports fine-tuned operation along with efficient processing and part unloading.

Curved, Polyurethane-Lined Bowl
Maximizes machine channel utilization and offers higher cutting pressures while keeping parts in contact with media for more efficient processing and reduced impingement. High-quality, polyurethane construction for longer bowl life.

Extended Screen Deck
Increases part separation time, and together with variable speed control and curved wall construction, assists in providing 100% parts separation under most operating conditions.

Direct Drive Motor - 1800 RPM
Rugged 1.5 HP, 2.0 HP or 3.0 HP motor, heavy-duty springs, variable speed control, and low center of gravity produce high-frequency, high-amplitude action ideal for fast cutting and high intensity burnish.





VH-ULN Series Large Vibratory Bowls

Large Bowl Vibratory Systems with Integral Sound Damping Cover

The VH-ULN Series heavy-duty vibratory bowl tumblers feature an integrated sound dampening cover to keep noise level low, a heavy-duty motor and an integral inverter/controller, an extended screen deck, plus a low-profile, curved-wall construction. These floor model vibratory bowl tumblers deliver flexible operation with excellent overall machine performance, reliability and efficiency, all within a compact, space-saving footprint.

MODEL	VH150ULN	VH300ULN	VH600ULN
Sound Cover	Yes	Yes	Yes
Working Capacity	5 ft^3	10 ft^3	20 ft^3
Channel Width	10.2"	14.6"	18.5"
Bowl Outside Diameter	44.5"	50.5"	62.7"
Bowl Height	37"	45.7"	52.8"
Motor	3.0 HP	6.5 HP	7.5 HP
Screen Deck	1/2" or 1" square holes standard. 3/4" and 1 1/4" square holes available. Additional sizes can be special ordered.		

VH-ULN

VH-ULN Series Large Vibratory Bowls, continued

Large Bowl Vibratory Systems with Integral Sound Damping Cover

FEATURES AND BENEFITS

- High Frequency/High Amplitude Vibratory Mass Finishing Bowl
- (4) Models 5-20 CU. FT. Capacities
- 1800 RPM Direct Drive Motor
- Martin Engineering Heavy-Duty Motor
- AC Tech Inverter/Controller
- 230V/460V Dual Voltage with Waterproof ON/OFF Switch
- Rugged U.S. Made UniRoyal Polyurethane Liner
- Variable Speed Control
- Adjustable Amplitude and Lead Angle
- Full or Semi-Automatic Air Dam
- Convenient Discharge Door
- Unique Curved-Wall Construction
- Low-Profile Design
- Extended Screen Deck
- Integral Sound Cover
- Easily Changeable Drain Plug

Low Profile Design
The low-profile vibratory bowl design, together with variable speed control, supports fine-tuned operation along with efficient processing and part unloading.

Curved, Polyurethane-Lined Bowl
Maximizes machine channel utilization and offers higher cutting pressures while keeping parts in contact with media for more efficient processing and reduced impingement. High-quality, polyurethane construction for longer bowl life.

Extended Screen Deck
Increases part separation time, and together with variable speed control and curved wall construction, assists in providing 100% parts separation under most operating conditions.

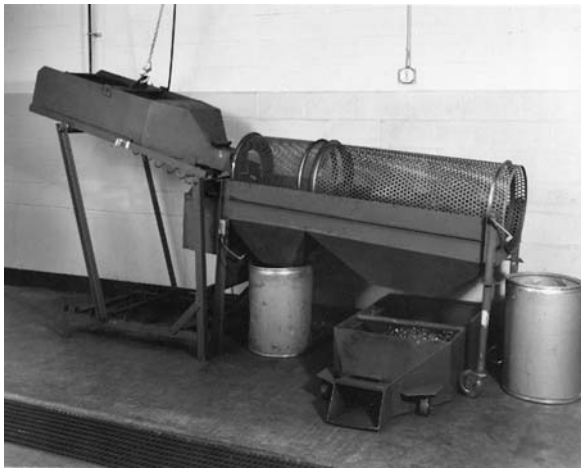
Direct Drive Motor - 1800 RPM
Rugged motor, heavy-duty springs, variable speed control, and low center of gravity produce high-frequency, high-amplitude action ideal for fast cutting and high intensity burnish.

TRS Series
Tubular Rotary Screen Separators

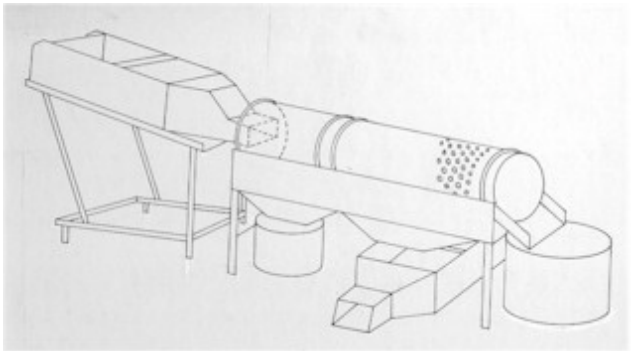
The TRS Series of rotary separator systems offer a big advantage over traditional flatbed screen units since media and parts cannot blind the screen openings. The rotating action of the screen turns the parts over, emptying the media out of the part recesses, thereby performing complete, rapid separation of the parts and media.

The TRS tubular rotary screen separator is a flow-through operation and can be fed directly from the vibrator opening. A whole load can be dumped into a pan and fed slowly to the screener. This frees the vibrator rapidly, allowing it to be quickly reloaded with a new batch. The entire TRS tube is made of perforated metal, with openings customized to the parts being processed. The TRS' legs are adjustable to control the tilt.

TRS systems are available in three sizes: (1) The TRS-1 for vibrators up to six cubic feet; (2) The TRS-2 for large vibrators; and (3) The TRS-2D two-stage separator for removing fines and separating at the same time or for separating flash runners and parts from die-cast or molded plastic parts.



TRS-2D Two Stage Separator
(shown with optional loading stand and pans)



TRS Series, continued
Tubular Rotary Screen Separators

SPECIFICATIONS			
	TRS-1	**TRS-2**	**TRS-2D**
TUBE SIZE	12" X 36"	20" X 36"	one 20" X 36" one 20" X 24"
FLOOR SPACE	17" X 36"	24" X 39"	24" X 64"
INLET HEIGHT	24"	40"	40"
DISCHARGE HEIGHT	15"	36" maximum 24" minimum	36" maximum 24" minimum
MAXIMUM RATE	300 lb per minute at 20 RPM	800 lb per minute at 20 RPM	800 lb per minute at 20 RPM
OPTIONAL ACCESSORIES	Additional screen tubes. Catch pan.		

TRS-1 with transfer pan

Catch Pan & Screen Separators

- Metal catch pan with rails to hold screen
- Chute door
- Reinforced metal edge
- Wood framed screen that fits on rails of catch pan
- 24" wide x 29 1/2" deep x 4" high
- Metal screens

Blasting Systems

TB1

There are two basic types of blasting equipment. While these systems are traditionally known as sand blasting equipment, all of these types of blasting machines can handle a variety of blast media. The blasting cabinet system is divided into tumble blasters which are a semi-automated, multi-part batch process and the traditional blasting cabinet used by an operator to blast one part at a time. Portable sand blasters come in a variety of sizes and types. The most versatile and valuable portable blasting equipment can blast all types of dry blast media without requiring changes in hardware.

Tumble Blasters

The Tumble Blasters are enclosed cabinet systems that have a rotating basket with a sandblast gun aimed into it. The random tumbling action insures that all parts in the basket are completely sandblasted when the cycle is finished. The TB1 (Mini-Blaster) is a bench top unit that can process about 1 quart of parts; the TB2 can process 2 cubic feet of parts and the TB3 can process 3 cubic feet of parts.

The TB1412 and TB2424 tumbler blasters are designed for high volume automatic tumble blasting of small parts. The large 14" x 12" barrel holds approximately 50 pounds of parts and turns at 6 RPM. The extra-large 24" x 24" barrel holds approximately 150 pounds of parts and turns at 2 RPM. Simply load the barrel, close the door, set the timer, and turn on the dust collector. The barrel slowly turns, gently exposing all parts to the blast stream. When the timer expires, parts are finished and ready for unloading!

All systems feature an automatic timer, an air pressure regulator, an air line filter, a dust collector, one sandblast gun with carbide nozzle and one blow off gun (TB2 & TB3 only) to remove dust from parts. The systems work with glass beads, aluminum oxide and many other types of organic blasting media. Tumble blasting systems remove rust and scale, remove hard to reach burrs, produce either bright or dull texture finishes and prepare a surface for bonding. The process is very simple: load the parts, set the timer and, at the end of the cycle, open the trap door to unload the parts, which drop onto a sloped ramp and discharge into a tote pan.

Cabinet Blasters

Sandblast cabinets can perform such operations as scaling and rust removal, deburring, frosting, and surface preparation for coating. Sandblasting cabinets are offered in three styles - standard, split-level and portable. The standard cabinets have door openings on the side as well as a large opening in the front. The split-level style is hinged in the center; the entire top half opens to give access to the work stage, somewhat like a clamshell. This has an advantage when handling large heavy parts. Portable units provide an economical and practical sandblasting option, featuring remote control operation.

Kramer offers two basic types of blast systems. The suction machine, also known as a siphon, is most commonly used for light production and general-purpose cleanup. In this type of unit, air passes through the gun, creating a siphon action that sucks up

Blasting Systems, continued

abrasive and delivers it to the nozzle where it is propelled out to the target.

The second type of unit is a direct pressure machine. In this type of unit, the abrasive is held in a pressurized vessel and is pushed from behind, out of the nozzle and onto the target. Air is used to push the abrasive at a much higher flow rate than the suction system. Most jobs will be finished 30 to 50% faster in a pressure blaster. Pressure blasters also have the advantage of allowing much lower pressures to be used for delicate jobs.

MM4824C

All Kramer blasting cabinets feature either ceramic or tungsten carbide nozzles, fluorescent lighting, a pressure regulator and a door safety interlock.

Portable Blasting Systems

Portable blasting systems are available in two types – pressure fed and siphon or gravity-fed. Portable pressure blast systems (PPB Series and HDPPB Series) use a pressurized pot of varying sizes to push media through a hose and out a nozzle. These systems are manufactured for industrial applications but can also be used by small shops and individuals for economical and efficient blasting of a variety of applications. Siphon-type portable blasters are typically used for small, light-duty blasting applications. These systems are generally very inexpensive but are not made to last.

A portable pressure blast system can be used to strip rust, paint, dirt, mold and other unwanted deposits of a variety of surfaces. Using portable blasting equipment to pressure blast allows abrasives to penetrate into the deepest pitted areas of a part or surface. The PPB Series of portable sandblasting equipment is ideal for body, paint and welding shops and for use in refinishing vehicles, boats, log homes, monuments, brick buildings and industrial equipment.

Portable pressure blasters come in many sizes and feature a portable tank design for ease of movement. Both the size of the pressure pot and the size of the nozzle will determine the length of continuous blasting available. The length of the blast hose can be up to 50 feet before the drop in air pressure is a factor. Lengths up to 100 feet can be managed with the appropriate air supply.

All of the portable pressure blasters offered by Kramer Industries can handle any type of dry blast media. Aggressive applications, such as heavy rust and paint stripping off large areas, may require media such as aluminum oxide or crushed glass grit. Moderate applications, such as auto restoration and mold removal, will demand media such as walnut shells, abrasive plastic or glass beads. On softer surfaces such as wood and log homes, the pressure blasters will work best with a media such as corn cob.

Blasting Systems, continued

The Multiple Uses of Blast Finishing Systems

DP4040S

Blast cabinet applications are virtually limitless, including cleaning, deburring, decorating, deflashing, etching, finishing, honing and peening. All of these uses and more can be accomplished easily with quick sweeps of the blast finishing gun nozzle. Scale, corrosion, old paint and other surface materials are removed in minutes, leaving metal surfaces free of foreign matter and contamination. Even tough mill scale is quickly and efficiently removed.

The usual operating pressure for the dry blast cabinets is 85 PSI. A 5 HP air compressor is sufficient for most work. The blast finishing system utilizes a variety of abrasives such as aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot.

A multitude of finishes are possible, ranging from a micro-finish to a coarse-grade finish, depending upon the specific media used. Our blast cabinets can apply the proper abrasive to provide the desired finish for each specific application.

Cleans...
...Applications include cleaning precision parts such as small gears, stampings, forgings and extruding dies, molds for glass, plastic, rubber and metal castings, pistons, valves, cylinder heads, armatures, brushes and rotors in the overhaul of electric motors and generators and machine parts.

Removes...
...Applications include removal of heat treat scale, carbon deposits, slag, oxides and discolorations, scale from high speed drills and other cutting tools, light machine burrs, paint, varnish and lacquer.

Prepares...
...Blasting is useful in preparing surfaces for painting, plating, anodizing, welding and the bonding of coatings.

Peens...
...Applications include peening to increase fatigue resistance of critical parts, to increase resistance of parts which operate in a corrosive environment and to provide stress relief at weld points.

Reclaims...
...Items such as rusted tools, used files, saw blades and hardware parts can be reclaimed with a blast finishing system.

Finishes...
...Provides decorative quality finishes useful in industries including automotive, appliance, photographic and jewelry industries. Applications include improving the appearance of castings by removing scale and thin edges and blending minor defects, dimpling surfaces to improve adhesion for plastic, rubber and paint and improving lube holding ability of running parts by creating uniform lubrication pockets

SS Series

Suction System Dry Blasting Cabinet Systems

Suction system dry blasting cabinet systems work by using a high-pressure air line and an abrasive feeder line that both connect to a nozzle or gun type device. Air and abrasive particles are mixed at a ratio of 2 parts air to 1 part abrasive. Media is recycled from the gun system to the hopper and back to the gun system.

The applications for a suction system dry blasting cabinet are virtually limitless, including cleaning, deburring, decorating, deflashing, etching, finishing, honing and peening. All of these uses and more can be accomplished easily with quick sweeps of the suction blasting cabinet's gun nozzle. Scale, corrosion, old paint and other surface materials are removed in minutes, leaving metal surfaces free of foreign matter and contamination. Even tough mill scale is quickly and efficiently removed.

The usual operating pressure for Kramer Suction System Dry Blasters is 85 PSI. These systems utilize a variety of abrasives such as aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot. A multitude of finishes are possible, ranging from a micro-finish to a coarse-grade finish, depending upon the specific media used.

The standard cabinets have door openings on the side as well as a large opening in the front. The split-level style is hinged in the center; the entire top half opens to give access to the work stage, somewhat like a clamshell. This has an advantage when handling large heavy parts.

MM4040S

MM4836C

SS Series, continued
Suction System Dry Blasting Cabinet Systems

SPECIFICATIONS	
CABINET	Tapered media hopper with bottom. Trap door for easy disposal of spent media. Top & side loading doors on most models. 14-gauge welded steel construction. 8" armholes on all models 40" x 40" and larger. MM models have a double floor - 1/8" steel plus carbon screen.
WINDOW	Easy change window frame. Safety glass windows for excellent visibility and increased efficiency.
LIGHTING	SM models have incandescent lighting. MM models have fluorescent interior lighting to eliminate shadows and minimize energy consumption.
GLOVES	Heavyweight rubber gloves (neoprene gloves optional) built into front of cabinet.
GUN SYSTEM	Tungsten carbide nozzle. Model SM20B: 1/4" ID nozzle and 1/8" air jet gun (12 CFM). Models SM24C and SM30C: 5/16" ID nozzle and 1/8" air jet gun (12 CFM). All MM Models: 5/16" ID nozzle and 5/32" air jet gun (25 CFM). Safety enclosed foot valve blasting control.
DUST COLLECTOR	All models except SM20B include a BP Dust Collector that vacuums dust and contamination from the cabinet. SM20B includes a 100 CFM dust collector. BP Dust Collector measures 57 1/2" high and 14" in diameter. Separates broken-down abrasives. Self-cleaning bag.
AIR PRESSURE GAUGE	Included with all MM models; optional with all SM models.
ELECTRICAL	115V, 1 phase, 60 cycle motor

Did you know?

The first requirement of effective sandblasting is an adequate air compressor. While smaller units will handle very small jobs, most cannot generate air at the same rate it is blown from the nozzle. The compressor must be able to maintain its storage or reserve tank pressure to continue to operate efficiently. If the compressor has insufficient capacity, it will starve the nozzle and reduce the performance and effectiveness of the unit.

Blasting Systems

SS Series, continued
Suction System Dry Blasting Cabinet Systems

MODEL NUMBER	SM20B	SM24C	SM30C	MM3624C	MM4040S
STYLE	bench (stand optional)	cabinet	cabinet	cabinet	split-level cabinet
DIMENSIONS (width x height x depth)	Inside: 20" x 18" x 18" Overall: 21" x 38 1/2" x 33"	Inside: 24" x 23" x 18" Overall: 26" x 62" x 18"	Inside: 30" x 23" x 20" Overall: 32" x 62" x 20"	Inside: 36" x 23" x 24" Overall: 38" x 64" x 25"	Inside: 40" x 31" x 40" Overall: 45" x 71" x 66" closed / 71" open
DOORS	one 20" x 13" front-opening lid	one 24" x 15" front-opening lid	one 30" x 13" front-opening lid	one 36" x 13" front -opening lid and one 17" x 11" side door	one 40" x 40" flip-top lid and one 20" x 30" side door
WINDOWS	one 18" x 10"	one 19 1/2" x 12"	one 19 1/2" x 12"	one 12" x 24"	one 12" x 24"
FEATURES AND OPTIONS	Ideal for cleaning small parts. 100 CFM Dust Collector included.	Carbon screen work floor. BP Dust Collector included.	Carbon screen work floor. BP Dust Collector included.	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional. MM3630C also available.	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional. Includes Neoprene gloves.
PHOTO					

Blasting Systems

SS Series, continued
Suction System Dry Blasting Cabinet Systems

MODEL NUMBER	MM4224S	MM4824C	MM4824S	MM4836C	MM4848S
STYLE	split-level cabinet	cabinet	split-level cabinet	cabinet	split-level cabinet
DIMENSIONS (width x height x depth)	Inside: 42" x 24" x 24" Overall: 70" x 65" x 38" closed / 50" open	Inside: 48" x 23" x 24" Overall: 52" x 64" x 25"	Inside: 48" x 24" x 24" Overall: 53" x 65" x 38" closed / 50" open	Inside: 48" x 36" x 36" Overall: 53" x 78" x 37"	Inside: 48" x 31" x 48" Overall: 53" x 71" x 74" closed / 77" open
DOORS	one 42" x 24" flip-top lid and one 11" x 11" side door	one 48" x 13" front-opening lid and two 17" x 16" side doors	one 48" x 24" flip-top lid and one 11" x 11" side door	two 28" x 30" side doors	one 48" x 48" flip-top lid and one 20" x 36" side door
WINDOWS	one 12" x 24"	one 12" x 24"	one 12" x 24"	one 12" x 24"	one 12" x 24"
FEATURES AND OPTIONS	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional. MM4230S also available.	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional..	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional. MM4830S also available.	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional.	Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional.
PHOTO					

SS Series, continued
Suction System Dry Blasting Cabinet Systems

MODEL NUMBER	MM6024S	MM6048S	MM9648S
STYLE	split-level cabinet	split-level cabinet	split-level cabinet
DIMENSIONS (width x height x depth)	Inside: 60" x 24" x 24" Overall: 65" x 65" x 38" closed / 50" open	Inside: 60" x 31" x 48" Overall: 65" x 71" x 74" closed / 77" open	Inside: 96" x 31" x 48" Overall: 101" x 71" x 74" closed / 77" open
DOORS	one 60" x 24" flip-top lid and one 17" x 16" side door	one 60" x 48" flip-top lid and one 20" x 36" side door	one 96" x 48" flip-top lid and one 20" x 36" side door
WINDOWS	one 12" x 24"	two 12" x 24"	two 12" x 24"
FEATURES AND OPTIONS	Two work stations. Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional.	Two work stations. Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional. Includes Neoprene gloves.	Jumbo split-level for very large parts. Two work stations. Standard with BP Dust Collector. PT (pull-through) Dust Collector or Abrasive Separator optional.
PHOTO			

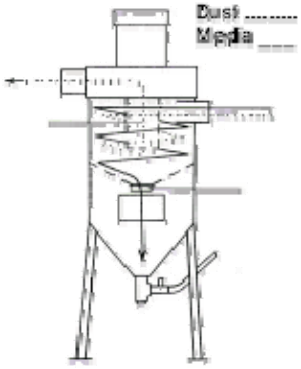
DELUXE PACKAGES
Deluxe packages are available on MM3624C and larger models and include: 600CFM Abrasive Separator — Water Filter Enclosed Dust Collector — Air Vibrator 16 Tubular Filter Bags — Blow-Off Gun

SS Series, continued

Suction System Dry Blasting Cabinet Systems

Abrasive Separators

Optional abrasive separators are designed to keep blast media free of contaminants, thereby extending media life and minimizing media waste. During operation, media from the blast cabinet is suctioned through a hose into the abrasive separator. As the media spiral in a downward vortex, the heavier, reusable media particles are thrown to the outside, passing through a filter bag or optional deluxe dust collector that traps any debris. Dust and fine particles collect in the center of the vortex where they are pulled out through the suction tube and exhausted into a filter bag or dust collector. The cleaned media is then returned to the cabinet to be used again. Free of contaminants, the media is more efficient and provides more consistent results. Abrasive separators are ideal when blasting painted, rusted or corroded parts.



FEATURES:

- 11-gauge welded steel construction
- Easy installation (welding required)
- Tunable for different media
- 300, 450 & 600 CFM sizes available
- Internal filter screen
- Front-loading media door
- 110V motor (other voltages available)
- Zippered dust bag

SPECIFICATIONS	
300 CFM	Available on models SM36C, MM4824C, MM4224S, MM4230S and MM4824S. Suited for medium to heavy amounts of blasting where media separation is needed. Suited for use with glass beads or other fine media only. Optional enclosed dust collector available.
450 CFM	Available on models SM36C, MM4824C, MM4224S, MM4230S, MM4824S and MM4830S. Suited for medium to heavy amounts of blasting where media separation is needed. Suited for most types of media, including glass beads and aluminum oxide. Optional enclosed dust collector available.
600 CFM	Available on models MM4040S, MM6024S, MM4848S, MM6048S, MM7248S and MM9648S. Suited for medium to heavy amounts of blasting where media separation is needed. Suited for most types of media, including glass beads and aluminum oxide. Optional enclosed dust collector available.
RETROFIT PACKAGES	Retrofit abrasive separators are available in 300, 450 and 600 CFM. All retrofit packages come complete with all components, hoses and fittings necessary to adapt to most existing cabinets, such as media pick-up hose, air intake baffles for blast cabinet, 5/8" ID siphon hose, media pick-up hose port and zippered dust bag. Optional enclosed dust collector available.

SS Series, continued
Suction System Dry Blasting Cabinet Systems

Dust Collectors

SPECIFICATIONS	
BENCH MODEL	Available only on model SM20B.
BP (standard)	Standard on all models. Suited for light to medium amounts of blasting. Suited for use with most types of media. 57 1/2" high x 14" diameter. 2 1/2" or 4" hose.
DELUXE ENCLOSED	Available on models with abrasive separators. Standard on Deluxe models. Replaces standard dust bag on abrasive separators. Suited for use with most types of media. 16 tubular bags included. To be used with abrasive separators only.
DC400PT	400 CFM. Pull-through. Motor: 1/2 HP, 3450 RPM, TEFC. Electrical: 115V/60 Hz/1 phase. Fan: 9" diameter. Filter surface area: 40 ft². Dimensions: 20" wide x 64" high x 22" deep. Available on all MM models 36 and larger without abrasive separators. Can be added to cabinets already in use. The adjustable intake damper and compact size allow it to be easily adapted and tuned to most any size system. Not available on models SM20B, SM24C and SM30C. Suitable for medium to heavy amounts of blasting. Recommended for use when cabinet usage exceeds two hours per day, where dusty media is used or where multiple gun systems are used in one cabinet. Ideal for applications requiring a highly efficient dust collector. Features include superior dust filtration, removable drawer for convenient dust disposal, manual shaker mechanism for efficient filter bag cleaning, 14-gauge welded steel construction, full size access door, 9 tubular bags, exhaust muffler and adjustable damper.

SM20B shown with 100 CFM dust collector and work stand

BP

SS Series, continued
Suction System Dry Blasting Cabinet Systems

Dust Collectors, continued

SPECIFICATIONS, continued	
DC800PT	800 CFM. Pull-through. Motor: 1 HP, 3450 RPM, TEFC. Electrical: 115V/60 Hz/1 phase. Fan: 12 1/2" diameter. Filter surface area: 52 ft². Dimensions: 20" wide x 72" high x 28" deep. Available on all MM models 4040S and larger without abrasive separators. Can be added to cabinets already in use. The adjustable intake damper and compact size allow it to be easily adapted and tuned to most any size system. Not available on models SM20B, SM24C and SM30C. Suitable for medium to heavy amounts of blasting. Recommended for use when cabinet usage exceeds two hours per day, where dusty media is used or where multiple gun systems are used in one cabinet. Ideal for applications requiring a highly efficient dust collector. Features include superior dust filtration, removable drawer for convenient dust disposal, manual shaker mechanism for efficient filter bag cleaning, 14-gauge welded steel construction, full size access door, 12 tubular bags, exhaust muffler and adjustable damper.

DC400PT

DC800PT

DP Series
Direct Pressure Cabinet Systems

Direct pressure cabinets utilize an ASME coded pressure pot to hold abrasive media. When the foot pedal control is depressed, air pressure is released into the pressure pot, pressurizing the pot and then forcing the media from the pot through the blasting hose to the blast gun and nozzle.

Most direct pressure blast cleaning is done at 40-60 PSI. Due to these lower pressures, abrasive media breakdown is greatly reduced even though a high volume of media is being directed at the part to be cleaned. Most of the media is recovered through the recycling process of this abrasive blasting system.

Direct pressure blast cleaning is ideal for tough jobs, applications where large surfaces must be cleaned quickly, production blast cleaning or jobs that require the use of heavy media or large mesh sizes. Popular media that are used in direct pressure cabinet systems are aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot.

Kramer Direct Pressure Cabinets feature large dust collectors, heavy-duty blast hoses, tungsten carbide nozzles and heavy-duty mixing valves. Designed for speed, pressure cabinets produce high media velocities and volumes. You get 2-3 times the production speed with a pressure system as with a conventional suction system. The use of a pressure tank forces media through the blast hose rather than siphoning it, resulting in more efficient use of air and greater control of media flow.

These cabinets can be used with a wide selection of media and pressure...pressures low enough to blast delicate parts and high enough to handle the most demanding cleaning and finishing operations. With pressure blasting, you get top performance at both ends of the pressure scale!

In pressure blasting, a controlled quantity of media is pressurized by drawing through a special ASME pressure tank. It is joined by compressed air entering the system from your air compressor. The air and media mixture are then propelled together through a single hose to the nozzle at an extremely high speed. The media is recovered and reclaimed for reuse. Broken down media and debris are removed and trapped in the dust collector.

DP3630

DP4848S

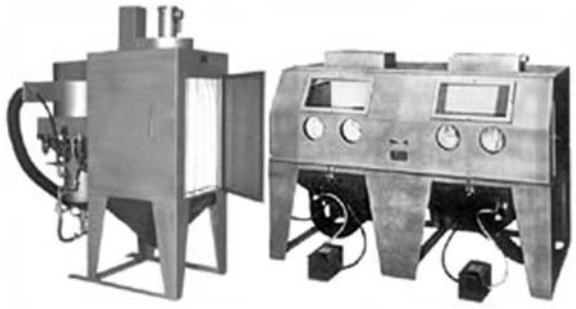
DP6048S
Split-Level Cabinet with
Dual Workstations for a Single Operator

DP Series, continued
Direct Pressure Cabinet Systems

SPECIFICATIONS	
CABINET	14-gauge welded steel construction. Double floor - 1/8" expanded steel plus carbon screen. 3/4" pipes and heavy-duty mixing valve. ASME Coded pressure vessel with easy access clean-out port, automatic sealing plunger and pneumatic vibrator. Pressure tank mounted at the bottom of the cabinet allows for the use of heavy steel abrasives. Optional deluxe counter balance available on all split-level cabinet models.
WINDOW	Easy change window frame. Safety glass windows for excellent visibility and increased efficiency.
LIGHTING	Fluorescent lighting to eliminate shadows and minimize energy usage.
GLOVES	Neoprene
GUN SYSTEM	Equipped with tungsten carbide nozzles. (1/4" diameter nozzle is standard. 1/8", 3/16", and 5/16" diameter nozzles are also available. 30-120 PSI pressure range. 1/2" ID heavy duty blast hose. Safety enclosed foot pedal.
ABRASIVE CAPACITY	100 lb standard unless otherwise noted.
DUST COLLECTORS	All models except DP3630 feature a pull-through type dust collector with motor and impeller on clean-air side, 10-gauge welded steel construction, 30 tubular filter bags (145 ft² surface area) and a manual bag shaker. Model DP3630 features a pull-through type dust collector with motor and impeller on clean air side, 14-gauge welded steel construction, full size access door, 12 tubular filter bags, removable dust drawer and exhaust muffler. The 900RPC reverse pulse dust collector is available on models DP4040S and larger. Refer to page 41 for details.
AIR PRESSURE GAUGE	Included with all models.
AIR LINE WATER FILTER	Included with all models.
ELECTRICAL	All models except DP3630 feature a 230V/60 Hz/1 phase motor. Model DP3630 features a 115V/60 Hz/1 phase motor.
ABRASIVE SEPARATOR	10-gauge welded steel. Vibrating particle screen. 850 CFM. Motor: 2 HP/3450 RPM/230V/1 phase/60 Hz. Not available on DP3630.

DP Series, continued
Direct Pressure Cabinet Systems

MODEL SPECIFICATIONS				
MODEL NUMBER	STYLE	DIMENSIONS (width x height x depth) floor space includes dust collector	DOORS	WINDOWS
DP3630	cabinet	Inside: 36" x 23" x 30" Overall: 41" x 68" x 35" Floor Space: 41" x 67"	two 14" x 20" side doors one 36" x 13" lid opening	one 12" x 24"
DP4040S	split-level cabinet	Inside: 40" x 31" x 40" Overall: 44" x 71" x 66" closed 44" x 77" x 66" open Floor Space: 96" x 71"	one 20" x 30" side door one 40" x 40" flip-top lid	one 12" x 24"
DP4836	cabinet	Inside: 48" x 36" x 36" Overall: 53" x 78" x 37" Floor Space: 104" x 90"	two 28" x 30" side doors	one 12" x 24"
DP4848S	split-level cabinet	Inside: 48" x 31" x 48" Overall: 52" x 71" x 74" closed 52" x 71" x 77" open Floor Space: 100" x 77"	one 20" x 36" side door one 48" x 48" flip-top lid	one 12" x 24"



DP9648S
Split-Level Cabinet with
Dual Workstations for Dual Operators

DP Series, continued
Direct Pressure Cabinet Systems

MODEL SPECIFICATIONS, continued				
MODEL NUMBER	STYLE	DIMENSIONS (width x height x depth) floor space includes dust collector	DOORS	WINDOWS
DP6030S	split-level cabinet dual workstations for a single operator	Inside: 60" x 31" x 30" Overall: 64" x 71" x 56" closed 64" x 71" x 60" open Floor Space: 111" x 77"	one 20" x 36" side door one 60" x 48" flip-top lid	two 12" x 24"
DP6048S	split-level cabinet dual workstations for a single operator	Inside: 60" x 31" x 48" Overall: 65" x 71" x 74" closed 65" x 71" x 77" open Floor Space: 111" x 77"	one 20" x 36" side door one 60" x 48" flip-top lid	two 12" x 24"
DP7248S	split-level cabinet dual workstations for a single operator	Inside: 72" x 31" x 48" Overall: 75" x 71" x 74" closed 75" x 71" x 77" open Floor Space: 127" x 90"	one 20" x 36" side door one 72" x 48" flip-top lid	two 12" x 24"
DP9648S	split-level cabinet dual workstations / dual operator model	Inside: 96" x 31" x 48" Overall: 102" x 71" x 74" closed 102" x 71" x 77" open Floor Space: 200" x 90"	two 36" x 20" side doors one 96" x 48" flip-top lid	two 12" x 24"

DP850 Retrofit Package

Converts a siphon type cabinet to a direct pressure unit. Can be adapted to any standard siphon-type cabinet with a minimum of effort to afford you the speed and efficiency of direct pressure blasting. Includes 850 CFM abrasive separator. Abrasive capacity: 150 lb.
Overall dimensions: 70" x 104" x 40"

DP Series, continued
Direct Pressure Cabinet Systems

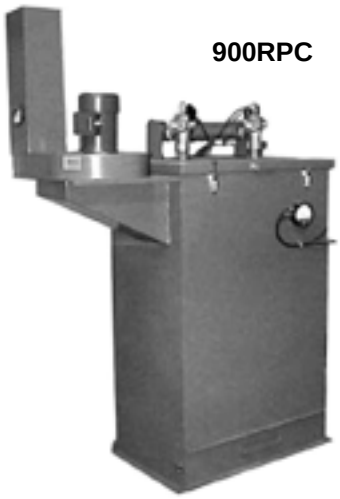
900RPC Dust Collector

The 900RPC reverse-pulse dust collector is suitable for medium to heavy amounts of blasting. It is available on Direct Pressure Models DP4040S and larger and is recommended for use with dusty media, multiple guns or very fine media.

This dust collector is designed for continuous duty blasting operations, providing optimum dust filtration efficiency with minimum maintenance. Cartridge filters are automatically pulsed clean during operation. This unit may be ordered separately or as part of a direct pressure or large siphon cabinet system.

900 CFM. Motor: 2 HP. Electrical: 230V/60 Hz/1 phase. Filter surface area: 472 ft². Dimensions: 61" wide x 90" high x 32" deep.

The 900RPC features include dual high-efficiency, abrasion-resistant cartridge filters, automatic reverse-pulse cartridge cleaning, Magnehelic® pressure-sensing gauge, convenient slide-out dust drawer for dust removal, adjustable airflow damper, exhaust fan silencer and a 110V sequencer.



900RPC

Media Hints for Blasting

Glass beads can be used to texturize, descale, or remove light burrs and die-cast flash leaving a smooth bright satin finish.
Use at 40 to 80 PSI.

Abrasive grits can be used for more aggressive work, leave a dull satin finish and are useful for creating a good surface for bonding. Use up to 120 PSI.

Walnut shell grit can be used for deflashing thermoset plastics without destroying the original polish.
Use 30 to 80 PSI.

HDP Series

Heavy-Duty Direct Pressure Cabinet Systems

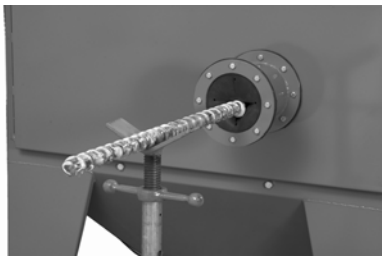
The HDP Series Heavy-Duty Direct Pressure Blasting Cabinet Systems are designed for maximum productivity and operating efficiency and engineered for high performance. The HDP Blast Cabinet Systems are efficient and easy to use. This series is the optimal choice for compression mold cleaning, extrusion die cleaning and stripping applications. Built to last, these heavy-duty units incorporate system features to enhance part cleaning, such as an improved dust collection system for better visibility and an optional intake port to handle the difficult task of blasting long parts such as tubing, framing and feed screws.

HDP6048

The HDP Series Direct Pressure Blast Cabinets can be used with a variety of media including Plastic Abrasive Blast Media, Walnut Shell Grit, Glass Beads, Aluminum Oxide, Silicon Carbide and Corn Cob Grit. Each HDP Series Direct Pressure Blasting Cabinet features rugged construction (continuously welded 12 gauge steel) and a heavy-duty turntable with extensions (2,500 pound capacity) to accommodate heavy and difficult-to-handle parts. Combining the media reclaimer and dust collection system into one unit frees up valuable floor space. A vertical door provides access for easy part entry and exit.

The HDP Series Direct Pressure Blasting Cabinet's dust collection system is designed to keep dust away from the operator's window for increased visibility and accuracy when cleaning. Each model (except Model HDP2424) comes standard with a 1,210 CFM dust collection system that can be easily upgraded to a 5 HP, 1,585 CFM system (standard on Model HDP9648). The high-capacity, 1.6 ft^3 pressure pot allows for extended blasting times relative to the 1.0 ft^3 industry norm.

Five models of the HDP Series Direct Pressure Blasting Cabinets are available, depending on your specific applications.



Dust collector and media reclaimer redesigned to fit into compact footprint.

Specialized port allows easy cleaning of feed screws.

HDP Series, continued
Heavy-Duty Direct Pressure Cabinet Systems

SPECIFICATIONS	
CABINET	12-gauge reinforced continuously welded steel construction. 60 degree minimum sump media flow. 1 swing side door and 1 vertical side door (only 1 door on HDP2424) Durable enamel finish - primed, painted and corrosion resistant. Moveable foot valve. Dust collector and media reclaimer redesigned to fit into compact footprint.
WORKING CHAMBER	Safety door interlocks. Self adjusting door latch. Knife-edge, self-sealing, full gaskets. Full-length hinges. Turntable. Track assembly (not included on Model HDP2424).
DOORS	Two doors (1 swing side door and 1 vertical door) are standard on most models, except Model HDP424, which has just one door on the right side.
VIEW WINDOW	Front-round corner $13^{1}/_{2}$" x $28^{1}/_{2}$" Side-round corner $7^{1}/_{2}$" x 11"
PRESSURE POT	ASME coded, 1.6 ft^3 capacity. Remote controlled. Automatic refilling. Sight glass to view media level.
GLOVES	Abrasive resistant, full length 8". Static resistant gauntlet.
HOSES	$^{1}/_{2}$" 4-ply heavy-duty. Whip end blast hose.
BLAST NOZZLE	$^{1}/_{4}$" long boron carbide with an aluminum jacket. Silicon liner, urethane jacket. Approximate Air Requirements (CFM) $^{3}/_{16}$" nozzle: 22 CFM at 40 PSI and 30 CFM at 60 PSI $^{1}/_{4}$" nozzle: 40 CFM at 40 PSI and 55 CFM at 60 PSI $^{5}/_{16}$" nozzle: 70 CFM at 40 PSI and 90 CFM at 60 PSI
BLOW-OFF NOZZLE	Fingertip control blow-off nozzle.
DUST COLLECTOR	2 HP, 2 cartridge, 1210 CFM dust collector standard. Model HDP9648 comes standard with a 5HP, 4 cartridge, 1585 CFM dust collector.
ADDITIONAL UPGRADES	Silencer Easel Porthole - specialized port to allow for easy cleaning of feed screws (see picture above) Auto Pulse Jet Filter Cleaning Automatic Rotating Turntable Automatic Chain Driven In/Out Turntable 5 HP, 4 Cartridge Dust Collector Upgrade to 4,000 pound capacity Automated Open/Close Vertical Door

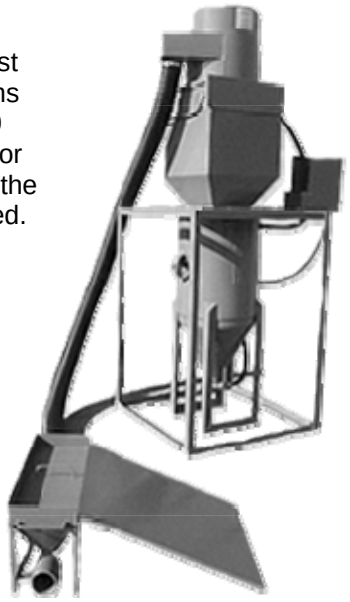
HDP Series, continued

Heavy-Duty Direct Pressure Cabinet Systems

MODEL NUMBER	DIMENSIONS (width x height x depth) floor space includes dust collector	SWING DOOR OPENING (width x height)	VERTICAL DOOR OPENING (width x height)	HEIGHT CLEARANCE (from top of turntable)
HDP2424	Inside: 24" x 24" x 24" 2Floor Space: 84" x 127" x 92"	19½" x 17½"	N/A	N/A
HDP4836S	Inside: 48" x 36" x 36" 2Floor Space: 108" x 127" x 104"	31/2" x 29½"	32" x 27½"	20"
HDP6048	Inside: 60" x 48" x 48" 2Floor Space: 120" x 127" x 116"	43½" x 41½"	44" x 39½"	32"
HDP6060	Inside: 60" x 60" x 60" 2Floor Space: 120" x 127" x 128"	55½" x 53½"	56" x 51½"	44"
HDP9648	Inside: 96" x 48" x 48" 2Floor Space: 156" x 127" x 116"	43½" x 41½"	44" x 39½"	32"

MODEL NUMBER	FLOOD LIGHTS	DUST COLLECTOR FILTER AREA	BLOWER HP AND CFM AT 1" S.P.	ELECTRICAL
HDP2424	2 lights; 180 watts total	DC100 75 ft²	1 HP 775 CFM	115/208-230 V 1 Phase, 60 Hz 12/6 FLA
HDP4836S	4 lights; 360 watts total	DC200 150 ft²	2 HP 1210 CFM	208-230/460 V 3 Phase, 60 Hz 5.6/2.8 FLA
HDP6048	4 lights; 360 watts total	DC200 150ft²	2 HP 1210 CFM	208-230/460 V 3 Phase, 60 Hz 5.6/2.8 FLA
HDP6060	4 lights; 360 watts total	DC200 150 ft²	2 HP 1210 CFM	208-230/460 V 3 Phase, 60 Hz 5.6/2.8 FLA
HDP9648	8 lights; 1080 watts total	DC500 225 ft²	5 HP 1585 CFM	208-230/460 V 3 Phase, 60 Hz 14.0/7.0 FLA

Blast Room Package



The Kramer Blast Room Package is an economical and efficient blend of the Heavy Duty Portable Pressure Blast Series and Direct Pressure Blast Cabinet Series systems technologies. The media is held in an ASME coded 600 pound pressure pot. The remote control handle allows for safe control of the blasting process with a valve to stop the flow of the media at the tank when the handle is released.

Since most pressure blasting is done at lower pressures, abrasive media breakdown is greatly reduced. The Blast Room Package provides an effective process to recover the media, clean and recycle the media and allow for re-blasting. This Package offers the ability to use a re-usable blast media (outside an integrated and expensive blast room) on large parts or surfaces with the benefits of the quick, simple and easy recyclability inherent in an enclosed blast cabinet.

Blasting Media that are ideal for use with the Blast Room Package are those that can be re-used multiple times and include aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice and silicon carbide.

The unique feature of this Package is the Sweep-In Media Feed Hopper. The operator simply sweeps the media into the feed hopper where it is conveyed automatically to the abrasive separator and dust collection system and then into the pressure pot for re-blasting. The Blast Room Package includes a high volume, 1500 CFM dust collector, 6 cubic foot pressure pot, heavy-duty, 1" ID, 50 foot blast hose, durable tungsten carbide nozzle and abrasive separator.

In pressure blasting, a controlled quantity of media is pressurized by drawing through a special ASME pressure tank. It is joined by compressed air entering the system from your air compressor. The air and media mixture are then propelled together through a single hose to the nozzle at an extremely high speed.

Optional items include a 55 gallon Dust Drum Package which will automatically collect and store the accumulated dust in a sealed container. An Air Fed Helmet, Air Line Filter and Air Hose are also available to provide a clean air supply to the operator during the blasting operation.

FEATURES:

- $^{3}/_{16}$" ID Venturi tungsten carbide blast nozzle
- Quick depressurization system for pressure blast tank
- 50 ft blast hose with couplings
- Remote control for easy on/off operation of blasting
- Sweep-in media feed hopper sits on blast room floor
- 6 ft^3 pressure tank
- Heavy-duty media valve
- Abrasive separator with $^{3}/_{16}$" perforated vibrating screen
- 1500 RPC dust collector
- 1" piping, moisture filter and pressure regulator
- Optional items: 55 Gallon Dust Drum Package, Helmet Package (Air Fed Helmet, Air Line Filter and Air Hose)

Blast Room Package, continued

Sweep-in Media Feed Hopper

Operator sweeps abrasive from blast room floor, up ramp and into the feed hopper. The abrasive then falls into the air stream and is carried through a heavy duty conveying hose to the abrasive separator for cleaning. The removable $^{3}/_{16}$" screen traps debris. 14" high.

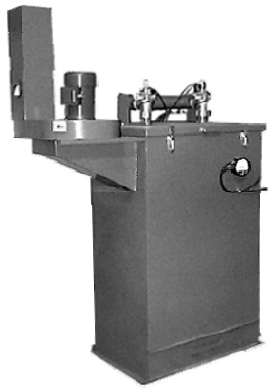
Abrasive Separator Specifications

Abrasive Separator to remove dust and debris from media: $^{3}/_{16}$" perforated vibrating screen, heavy-duty 11 gallon construction, vibrating particle screen, tunable air wash, 6 ft^3 media storage hopper.

Dust Collector Specifications

1500 RPC Cartridge Dust Collector designed for continuous duty blasting operations. Provides optimum dust filtration efficiency with minimum maintenance. Cartridge filters are automatically pulsed clean during operation.

1500 CFM rated airflow at 14.0" SP.
Dual high-efficiency, abrasion-resistant cartridge filters.
Pull-thru type with motor and fan on clean air side.
Two filter cartridges - 472 ft^2 of filter surface area.
99.7% efficiency to 0.5 microns.
Automatic reverse pulse air filter cartridge cleaning.
Magnehelic pressure differential gauge.
Convenient slide out drawer for dust removal.
Exhaust fan silencer.
5 HP, 230/460 V, 3 PH magnetic motor with starter.
Adjustable air flow damper.
Exhaust fan silencer.
110 Volt sequencer.
Overall Dimensions: 61" wide, 32" deep, 90" high



Blast Room Package, continued

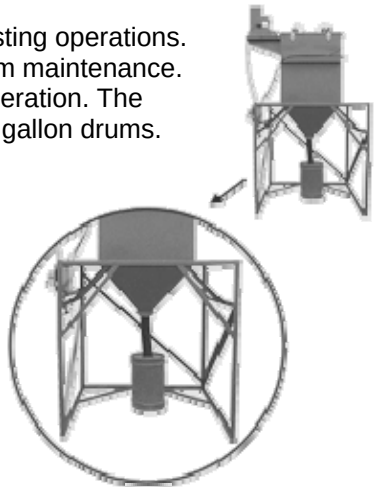
Accessories

55 Gallon Dust Drum Package

Designed for continuous duty blasting operations. Provides optimum dust filtration efficiency with minimum maintenance. Cartridge filters are automatically pulsed clean during operation. Dust is stored in sealed 30 or 55 gallon drum.

Dust Drum Package is designed for continuous duty blasting operations. It provides optimum dust filtration efficiency with minimum maintenance. Cartridge filters are automatically pulsed clean during operation. The dust is automatically collected and stored in a sealed 55 gallon drums.

- 1500 CFM Rated airflow
- Two high efficiency cartridge filters
- 472 Square feet total surface filter area
- 99.7% efficiency to 0.5 microns
- Automatic reverse pulse cartridge cleaning
- Magnehelic pressure sensing gauge
- 5 HP, 230/460V 3Phase motor
- 30 gallon steel dust drum with lid
- Adjustable air flow damper
- Exhaust fan silencer
- 110 Volt sequencer
- 30 or 55 gallon drum available



Dust Collector shown with 55 Gallon Dust Drum Package

Helmet Package: Air Fed Helmet, Air Line Filter, 50' Air Hose

Helmets are designed for operations in blast cleaning rooms, inside of tanks and other confined areas and are required on many open-air operations of heavy duty and lengthy work periods to meet OSHA standards.

Made of refined, the helmet is a one-piece molded high-density polyethylene with special coated nylon cape for durability.

Adjustable dihedral headband suspension affords user sizing range comfort.

Hinged gasket-sealed vision frame affords maximum vision range with easy change of vision lens.

Air Line Filter Assembly provides clean breathing air to the user because it removes dusts, moisture, oil, fumes and scale from compressed air.

Meets ASME Code requirements.

Component compounds are entirely separate from the water and oil condensation changer to prolong the life of the replaceable filtering compound unit.

PPB Series

Portable Pressure Blasting Systems

KF100DM

With portable sandblasting equipment, you can blast away rust, paint and other unwanted deposits. Using portable sand blasting equipment to pressure blast allows abrasives, such as aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot to penetrate into the deepest pitted areas of a part to remove rust, paint and debris. This is cost-efficient professional portable sand blasting equipment at its best! The PPB Series of portable sandblast equipment is ideal for body, paint and welding shops and for use in refinishing vehicles, boats, monuments, brick buildings and industrial equipment.

Kramer Portable Pressure Blasters come in seven popular sizes and feature a portable tank design for ease of movement. As premium model portable sandblast equipment, the Model KF300 handles the big, heavy production jobs with its 250-300 lb abrasive capacity and 1 to $2^{1}/_{2}$ hour blasting time. A solid portable sandblast machine, the Model KF110 is the ideal time and labor saver with 90-110 lb abrasive capacity and a 35-50 minute blasting time. Model KF65 is small and efficient with a 50-65 lb abrasive capacity and a 20-30 minute blasting time.

An Air Filter Moisture Separator is included with some models of the PPB portable sandblast machines and is optional on others. A moisture separator will filter excess water from the incoming air supply.

Our quality sandblasting equipment is designed with safety in mind. A pressure gauge monitors internal vessel pressure. The abrasive material metering valve is easily closed for operator safety. Shut-off is quick and simple. All tips and nozzles are tough and durable.

For the utmost in operator safety, we recommend using the special light-duty vented blast hood that is supplied with all pressure blasters. Heavy-duty canvas and air-supplied hoods are optional, available protection. Gloves provide an extra margin of safety.

Features:

- Portable tank design for ease of movement
- Seven popular sizes
- Recessed top for easy loading
- Semi-automatic, pull-up tank closure
- Adjustable abrasive flow valve
- Choke valve and pressure gauges
- Hood and extra nozzles included
- Just add air and abrasive
- Can be operated at 7 CFM with $^{3}/_{32}$" nozzle; 25-30 CFM recommended for optimal performance
- Two control systems
- A pressure relief valve and a pressure relieving ball valve that meet OSHA requirements

PPB Series, continued
Portable Pressure Blasting Systems

Pressure Blaster Handles

DEADMAN SYSTEM (DM)

Automatic shut off if handle is dropped.
Abrasive flow is **sealed at the nozzle** end by a square sealing block.
Abrasive hose remains pressurized.
Full control of blasting at the handle.
Heavy-duty design, few wear components, economical.

REMOTE SYSTEM (R)

Automatic shut off if handle is dropped.
Abrasive flow is **sealed at the tank** using a diaphragm abrasive valve.
Abrasive hose is relieved of pressure during shut-off.
Shut-off is pneumatically operated at the handle.
Full control of blasting at the handle.
Recommended minimum blasting pressure of 70 psi for optimal performance.

Did you know?

Aluminum Oxide is a high quality abrasive blasting media. It leaves a smooth textured finish without pits or burrs.

Glass Beads should generally be used in blast rooms and cabinets where it can be more easily recycled because it is more expensive than other media. Glass Beads are used to create a satin or matte finish.

Plastic Abrasives are generally used for removing paint without damaging the substrate, such as on fiberglass.

PPB Series, continued

Portable Pressure Blasting Systems

MODEL NUMBER	KF45DM	KF65DM KF65R	KF100DM	KF110DM KF110R	KF150DM KF150R	KF300DM KF300R
CONTROL SYSTEM	Deadman	Deadman or Remote	Deadman	Deadman or Remote	Deadman or Remote	Deadman or Remote
AIR PRESSURE	80-125 PSI	80-125 PSI	80-125 PSI	80-125 PSI	80-125 PSI	80-125 PSI
AIR VOLUME	25-30 CFM recommended	25-30 CFM recommended	25-30 CFM recommended	25-30 CFM recommended	25-30 CFM recommended	25-30 CFM recommended
HEIGHT	35"	29.5"	34"	32"	37"	40"
TANK SIZE	10" x 14"	12" x 17"	10" x 25"	12" x 22"	12" x 27"	16" x 28"
TANK VOLUME	0.45 ft^3	0.65 ft^3	0.9 ft^3	1.1 ft^3	1.5 ft^3	2.5 ft^3
CAPACITY	35-40 lbs	50-60 lbs	90-100 lbs	90-110 lbs	150-160 lbs	225-250 lbs
ASME CERTIFIED TANK	No	Yes	No	Yes	Yes	Yes
TANK CLOSURE	Manual pull up	Manual pull up	Manual pull up	Manual pull up	Manual pull up	Manual pull up

PPB Series, continued
Portable Pressure Blasting Systems

MODEL NUMBER	KF45DM	KF65DM KF65R	KF100DM	KF110DM KF110R	KF150DM KF150R	KF300DM KF300R
BLAST TIME	15-25 min	20-30 min	30-45 min	35-50 min	45-60 min	1-2 hrs
PLUMBING CONNECTION	None	None	None	None	None	None
BLAST HOSE	1/2" ID x 8 ft	1/2" ID x 10 ft	1/2" ID x 8 ft	1/2" ID x 10 ft	1/2" ID x 15 ft with quick disconnect coupling	1/2" ID x 25 ft with quick disconnect coupling
CERAMIC NOZZLE SIZE	one 1/8" one 3/32"	two 1/8" one 3/32"	one 1/8" one 3/32"	two 1/8" one 3/32"	two 1/8" one 5/32"	two 1/8" three 5/32"
VALVES	Pressure relief valve - 125 PSI Pressure relieving ball valve that meets OSHA requirements Pressure choke valve (included on models Adjustable abrasive flow valve (KF300DMand KF300R only)					

PPB Series, continued
Portable Pressure Blasting Systems

MODEL NUMBER	KF45DM	KF65DM KF65R	KF100DM	KF110DM KF110R	KF150DM KF150R	KF300DM KF300R
PRESSURE GAUGE	Yes	Yes	Yes	Yes	Yes	Yes
SEALING BLOCKS	3	3	3	3	3	3
WHEELS	6"	6"	6"	8"	8"	10"
HOUSING	rugged tubular steel cart	welded steel frame	welded steel frame	welded steel frame	welded steel frame	welded steel frame
BLAST HOOD	soft hood	soft hood	soft hood	blast hood with bump hat	blast hood with bump hat	blast hood with bump hat
MOISTURE SEPARATOR	Optional	Optional	Optional	Optional	Included	Included

PPB Series, continued
Portable Pressure Blasting Systems

Pressure Blaster Nozzles
Available in Ceramic or Tungsten Carbide

AIR CONSUMPTION (cubic feet per minute at pressures shown)								
NOZZLE BORE SIZE	50#	60#	70#	80#	90#	100#	ABRASIVE CONSUMPTION* (pounds per hour)	BLAST AREA* (feet per minute)
					(general blasting pressures)			
3/32"	8	9	11	12	13	15	70-100	0.5
1/8"	15	17	19	21	24	26	125-175	1-1.5
5/32"	26	30	34	38	43	47	175-250	2-2.5
3/16"	33	38	43	48	53	58	275-400	3-3.5
1/4"	58	67	76	85	94	103	500-700	4-4.5
5/16"	91	105	119	133	146	161	800-1100	5-5.5
3/8"	130	151	171	191	211	232	1200-1600	6-6.5
7/16"	178	206	233	260	286	315	1700-2200	7-7.5
1/2"	232	268	304	340	376	412	2300-2800	8-8.5

* Note: Blast area coverage per/minute and abrasive consumption are approximate guidelines. Abrasive material used and surface blasted may alter coverage and consumption.

An abrasive blaster is an efficient timesaving piece of equipment, but like other machinery, you must observe specific safety procedures when operating it. Always wear proper eye protection, respiratory protection, and proper protective clothing when operating an abrasive blaster. Never point an abrasive blaster at another person.

When first assembling an abrasive blaster, be sure to tighten all connections. Check all connections every 10 operating hours for worn parts. Replace any worn parts with original Kramer parts. Do not exceed 125 PSI in pressure blasters and never touch the pull-up closure while the tank is pressurized.

KF150DM

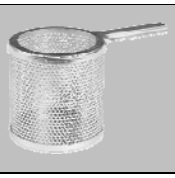
PPB Series, continued
Portable Pressure Blasting Systems

Accessories

Screens separate debris from any media. Prevent clogging nozzles from paint chips, rust and other particles. Great for reusing abrasives. Fit on concave top of PPB Series pressure pots.

Coarse Media Screen: Ideal for 36 Mesh or 20/40 mesh and finer abrasives.
Fine Media Screen: Ideal for 60 Mesh or finer abrasives.

Metal Blasting Basket: Used for blasting small parts such as nuts and bolts. Can be used with the PPB Series or inside blasting cabinets.



Ceramic Nozzle: Additional nozzles available in $^{3}/_{32}$", $^{1}/_{8}$", $^{5}/_{32}$", $^{3}/_{16}$", $^{1}/_{4}$", $^{7}/_{32}$".

Blast Hose: Available in any length necessary - 10', 15', 25' and 50' most common.

Moisture Separator: Removes moisture from incoming air. Standard with KF150DM and larger systems.

Air Supplied Helmet: Affords use with full comfort and protection against abrasive ricochet and dust. Bears NIOSH approval number TC-19C-84. Helmets of this design are necessary for operations in blast cleaning rooms, inside of tanks and other confined areas and are required on many open-air operations of heavy duty and lengthy work periods to meet OSHA standards.

Compressed Air Line Filter Assembly: Type "A" Air Line Filter Assembly provides clean breathing air to the user because it removes dusts, moisture, oil, fumes and scale from compressed air. Meets ASME Code requirements. Its component compounds are entirely separate from the water and oil condensation changer to prolong the life of the replaceable filtering compound unit. Type "A" Air Line Filter Assembly is recommended for all air supplied helmets and has a capacity to afford clean breathing air to as many as six helmets.

Caution: Compressed Air Line Filters do not remove carbon monoxide.

Oil-less Air Pumps: Oil-less air pumps are available for one or more operators with electric motor or air-driven power. Air pumps are designed for MSHA and NIOSH approved air supplied helmets that operated less than 1 PSIG Ref: S-77-FA and 1094-35. The air pump's inlet must be placed in a clean, breathable location. The air pump will not remove carbon monoxide or toxic gases from incoming air pumps to the helmets.
EDP-10 available in $^{3}/_{4}$" HP model
EDP-16 available in $1^{1}/_{2}$" HP model

HDPPB Series

Heavy-Duty Portable Pressure Blasting Systems

The HDPPB Heavy Duty Portable Pressure Blast Series are contractor grade abrasive blast systems designed for high performance, versatile removal of contamination, corrosion, mill scale and coatings from most surfaces. Using all types of dry abrasive blast media, the HDPPB Series systems can be used for sensitive paint striping off this metals to heavy duty blasting to create surface texture and profiling improving bonding surfaces for coatings. The remote control handle allows the operator to control the blasting at the nozzle. Once the handle is released the media flow stops and the blast hose depressurizes. The pressure pot is built to ASME specifications for up to 150 psi working pressure.

The HDPPB Series Systems are all supplied with an Air Fed Helmet and all the fittings and hoses. A variety of sizes from $^{3}/_{32}$" to $^{1}/_{2}$" of durable, tungsten carbide nozzles are available for each system. The Deluxe Package is also supplied with a Moisture Separator, Pressure Regulator and Leather Blast Suit.

Standard Features

- Concave top (no funnel needed)
- Mixing valve
- Couplings
- Inlet, choke and exhaust valves
- Pressure relief valve

HDPPB Series, continued
Heavy-Duty Portable Pressure Blasting Systems

MODEL	FEATURES
PPB-1R (for 3 HP and larger air compressors)	• 1 Model 1.5 CAPBRB 100 lb abrasive capacity, portable, remote control blast machine • 1 25' C-19 1/2" I.D. blast hose • 1 KF-2A hose coupling • 1 C-20 nozzle holder • 1 CNT series tungsten carbide blast nozzle (only one blast nozzle furnished per package unit): CNT-8 1/8" supplied for 7 1/2 HP air compressor OR CNT-12 3/16" supplied for 15 HP air compressor • 1 S-77 air fed helmet • 1 25' length helmet air hose • 1 Type A-1 helmet air line filter • 25 Extra helmet lenses
PPB-3R (for 100 CFM and larger air compressors)	• 1 Model 3 CAPBRB 300 lb abrasive capacity portable, remote control blast machine • 1 Extra 25' length remote control hose • 1 50' AB-19 1" I.D. blast hose • 1 KF-4 hose coupling • 1 TH-125-31 nozzle holder • 1 SLV series tungsten carbide blast nozzle (only one blast nozzle furnished per package unit): SLV-4 1/4" supplied for 100 CFM air compressor OR SLV-5 5/16" supplied for 160 CFM air compressor • 1 S-77 air fed helmet • 1 50' length helmet air hose • 1 Type A-1 helmet air line filter • 25 Extra helmet lenses
PPB-6R (for 160 CFM and larger air compressors)	• 1 Model 6 CAPBRB system, 600 lb capacity, portable, remote control blast machine • 1 Extra 25' length remote control hose • 1 50' AB-125 1 1/4" I.D. blast hose • 1 KF-5 hose coupling • 1 TH-125-35 nozzle holder • 1 SLV series tungsten carbide blast hose (only one blast nozzle furnished per package unit): SLV-5 5/16" supplied for 160 CFM air compressor OR SLV-6 3/8" supplied for 220 CFM air compressor • 1 S-77 air fed helmet • 1 50' length helmet air hose • 1 Type A-1 helmet air line filter • 25 Extra helmet lenses

HDPPB Series, continued
Heavy-Duty Portable Pressure Blasting Systems

DELUXE PACKAGES

Deluxe packages are available on all HDPPB models and include everything in the Standard Package plus a moisture separator, pressure regulator and leather blast suit.

Leather Blast Suit
(see page 59 for sizing information)

Moisture Separator

Pressure Blaster Nozzles
Available in Ceramic or Tungsten Carbide

AIR CONSUMPTION (cubic feet per minute at pressures shown)								
NOZZLE BORE SIZE	50#	60#	70#	80#	90#	100#	ABRASIVE CONSUMPTION* (pounds per hour)	BLAST AREA* (feet per minute)
					(general blasting pressures)			
3/32"	8	9	11	12	13	15	70-100	0.5
1/8"	15	17	19	21	24	26	125-175	1-1.5
5/32"	26	30	34	38	43	47	175-250	2-2.5
3/16"	33	38	43	48	53	58	275-400	3-3.5
1/4"	58	67	76	85	94	103	500-700	4-4.5
5/16"	91	105	119	133	146	161	800-1100	5-5.5
3/8"	130	151	171	191	211	232	1200-1600	6-6.5
7/16"	178	206	233	260	286	315	1700-2200	7-7.5
1/2"	232	268	304	340	376	412	2300-2800	8-8.5

* Note: Blast area coverage per/minute and abrasive consumption are approximate guidelines. Abrasive material used and surface blasted may alter coverage and consumption.

HDPPB Series, continued
Heavy-Duty Portable Pressure Blasting Systems

Accessories

Moisture Separator
A heavy-duty moisture separator that is designed to dry the air supplied by the compressor. These air line filters can handle up to 250 psi and 525 cfm air flow. The bowl will hold up to 32 ounces of liquid and includes a site glass. The water is drained through a valve on the bottom of metal bowl. The Moisture Separator is attached to the pressure pot easily with a pipe nipple.

Pressure Regulator
The Pressure Regulator is designed to monitor and modify the air pressure inside the pressure pot. This upgrade will allow for more control over the actual blasting pressure at the nozzle. Pressure drops with long air hoses from the compressor can be found and adjusted to provide a consistent blasting pressure over time leading to more consistent blasting performance and results.

Media Screens
Available in two different sizes, these screens will separate debris from any media. Keeping the media clean will prevent clogging nozzles from paint chips, rust and other particles. Longer lifetime of the media can be achieved by reusing abrasives. The screens can be placed on top of the concave top of the pressure pots. The Coarse Media Screen is ideal for 36 Mesh or 20/40 mesh and finer abrasives. The Fine Media Screen is designed for 60 Mesh or finer abrasives.

Metal Blasting Basket
The metal blasting basket is used for blasting small parts such as nuts and bolts. The basket will hold parts as small as $^{3}/_{16}$" and allow blasting with media as large at 6 Mesh. The basket has a durable, metal handle for ease of use during blasting. The Metal Blasting Basket can be used with the Heavy Duty PPB Series, PPB Series and inside blasting cabinets.

Air Supplied Helmet
Affords use with full comfort and protection against abrasive ricochet and dust. Bears NIOSH approval number TC-19C-84. Helmets of this design are necessary for operations in blast cleaning rooms, inside of tanks and other confined areas and are required on many open-air operations of heavy duty and lengthy work periods to meet OSHA standards.

Made of refined, one-piece molded high-density polyethylene with special coated nylon cape for durability. Adjustable dihedral headband suspension affords user sizing range comfort. Hinged gasket-sealed vision frame affords maximum vision range with easy change of vision lens. Supplied with S-46-4 HP belt and brake valve assembly.

HDPPB Series, continued
Heavy-Duty Portable Pressure Blasting Systems

Venturi Blast Nozzles
The Venturi suction system allows high velocity air pressure to pass over the abrasive feeder line, which sucks the abrasive through the smaller hose and combines it with air pressure at the back of a nozzle. The gun nozzle is a tapered smaller orifice that speeds up the combined flow and sprays out the abrasive in a relatively narrow or fixed pattern of discharge. The SLV Series Nozzles are our latest design of high production blast nozzles. These nozzles are manufactured with a one-piece sintered tungsten carbide liner for extended production life. The liner also allows for slow and even wear throughout the life of the nozzle. A new combination of aluminum and polyurethane adds proven advantages in weight balance, strength and shock absorbent features not found in metal cased nozzles. The long venture design will maximize production requirements as well as give added abrasive impact when needed for tough, hard to clean surfaces.

MODEL	BORE SIZE	LENGTH	THREAD SIZE	AIR REQUIRED PER MINUTE (ft^3)	NOZZLE HOLDER SERIES
SLV-4	1/4"	4 1/4"	1/4" male straight pipe thread	94	TH-125-KF-20
SLV-5	5/16"	5 1/4"		146	TH-125-KF-20
SLV-6	3/8"	6 1/4"		211	TH-125-KF-20
SLV-7	7/16"	7 1/4"		286	TH-125-KF-20
SLV-8	1/2"	8 1/4"		376	TH-125-KF-20

Compressed Air Line Filter Assembly
Type "A" Air Line Filter Assembly provides clean breathing air to the user because it removes dusts, moisture, oil, fumes and scale from compressed air. Meets ASME Code requirements. Its component compounds are entirely separate from the water and oil condensation changer to prolong the life of the replaceable filtering compound unit. Type "A" Air Line Filter Assembly is recommended for all air supplied helmets and has a capacity to afford clean breathing air to as many as six helmets.

Caution: Compressed Air Line Filters do not remove carbon monoxide.

Oil-less Air Pumps
Oil-less air pumps are available for one or more operators with electric motor or air-driven power. Air pumps are designed for MSHA and NIOSH approved air supplied helmets that operated less than 1 PSIG Ref: S-77-FA and 1094-35. The air pump's inlet must be placed in a clean, breathable location. The air pump will not remove carbon monoxide or toxic gases from incoming air pumps to the helmets.
EDP-10 available in 3/4" HP model
EDP-16 available in 1 1/2" HP model

Did you know?

HDPPB Heavy-Duty Portable Pressure Blasting Systems can be used with steel grit (page 112) and steel shot (page 113). Refer to our *Blasting Media Selection Guide* on page 135 for more information.

HDPPB Series, continued
Heavy-Duty Portable Pressure Blasting Systems

Leather Blast Suit

SIZE CHART						
	S	M	L	XL	XXL	XXXL
CHEST	30	40	44	52	60	62
SHOULDER	20	22	24	27.5	30.5	32
SLEEVE	23	25	26	27	28	28
WAIST	25	32-36	36-40	40-45	45-49	52
INSEAM	27	30	33	35	37	37
FULL LENGTH	57	60	67-71	71-75	75-79	81

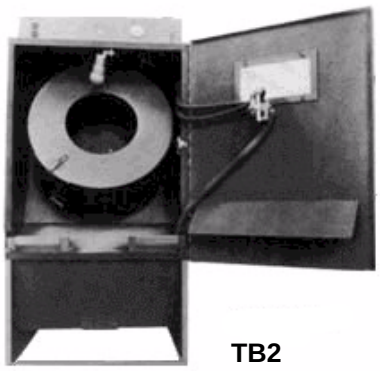
Carbon Monoxide Monitor
The ISA-34RAL respiratory air line CO Monitor/Alarm automatically and continuously monitors respiratory air lines for carbon monoxide levels and provides audible and visual alarms when the air line CO concentration rises above a preset limit. When the level of CO in the air passing the sensor increases to the preset value, the equipment alarms and relays activate. The preset calibration level may be as low as 20 PPM. The equipment operates from either 117 VAC or 12 VDC, at the option of the user, with terminals for either mode of operation located on a barrier strip inside the unit. Due to its electronic voltage regulation, the ISA-34RAL maintains precision gas calibration despite input voltage variations as great as –10% to +20% of rated supply (either AC or DC).

Machine Depressurization System
Places complete on-off control machine in hands of operator at blast nozzle. Provides added safety to the operator and others because the machine is automatically depressurized if the operator loses control of the blast hose. Reduces abrasive consumption when the operator changes position or is performing spot blasting work, because the operator can start or stop the abrasive blast at will. A machine depressurization system makes blasting economical and practical for safe one-man operation. Serves as a signaling device between operator and helper when blasting tank interiors, and other confined areas or when operator works out of helper's sight. Delivers "fail safe" remote control performance because the blast machine will not operate in the event either or both control hoses are accidentally crushed, pinched or severed.

TB Series

Semi-Automatic Tumble Blasting Systems

The Tumble Blaster Series are enclosed tumble blasting cabinet systems with a sandblast gun aimed into a rotating basket. The random tumbling action insures that all parts in the basket are completely sandblasted when the cycle is finished. The TB Series ranges in capacity from a 1 quart table top model to a 150 pound, 3 cubic foot capacity model. The number and orifice size of the blast guns are balanced to ensure efficient blast coverage of the entire load during tumbling.



TB2

The TB1 (Mini-Tumble Blaster) is a bench top unit that can process about 1 quart of parts; the TB2 can process 2 cubic feet of parts and the TB3 can process 3 cubic feet of parts. The TB1412 and TB2424 tumbler blasters are designed for high volume automatic tumble blasting of small parts. The large 14" x 12" barrel holds approximately 50 pounds of parts and turns at 6 RPM. The extra-large 24" x 24" barrel holds approximately 150 pounds of parts and turns at 2 RPM. Simply load the barrel, close the door, set the timer, and turn on the dust collector. The barrel slowly turns, gently exposing all parts to the blast stream. When the timer expires, parts are finished and ready for unloading!

All tumble blasting systems feature an automatic timer, an air pressure regulator, an air line filter, a dust collector, one sandblast gun with carbide nozzle, and one blow off gun (TB2 & TB3 only) to remove dust from parts. The tumble blast systems work with aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot. Tumble blasting systems remove rust and scale, remove hard to reach burrs, produce either bright or dull texture finishes and prepare a surface for bonding. The process is very simple: load the parts, set the timer and, at the end of the cycle, open the trap door to unload the parts, which drop onto a sloped ramp and discharge into a tote pan.

Tumble blasters can remove tough flash, light burrs and heavy scale or rust from recesses, create even, texturized surfaces, perform tough cleaning jobs and mask imperfections. Tumble Blasters can replace hand operations and do the jobs tumblers and vibrators cannot do, such as die-castings with internal flash, encapsulated and thermoset plastic parts with flash and precision parts with hard to reach burrs.

Here's how simple it is:

1. Load parts through the front opening.
2. Close the door, which places the gun in position.
3. Set the timer and start.
4. When complete, open the cabinet door and the bottom tumbler door. The parts will drop down into a catch pan.

While tumble blasting is restricted to relatively small parts, it can perform the same tasks as standard blasting equipment. It also has the advantage of processing many parts at the same time, unattended. The random tumbling action presents all reachable areas to the blast stream, producing even results. By controlling the pressure, blast media, and time cycle, a broad range of jobs can be done, achieving consistent, predictable results.

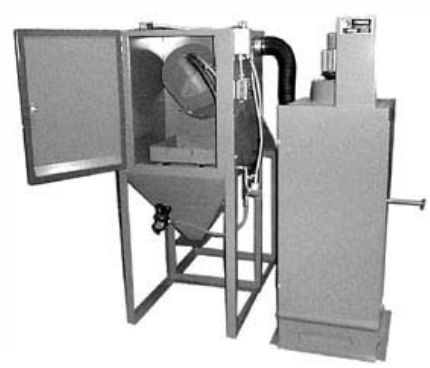
TB Series, continued
Semi-Automatic Tumble Blasting Systems

- The TB1 Mini-Blaster can deflash, deburr and descale, since the blast stream is directed into the tumble basket.
- Tumble Blasting is faster than vibratory and tumble finishing. It will reach areas that other methods cannot touch. There is less labor because no separation from media is necessary.
- Some of the materials that can be used in the machine are: aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot.
- The TB1 is an inexpensive machine specifically made to solve small part problems utilizing minimal production space.

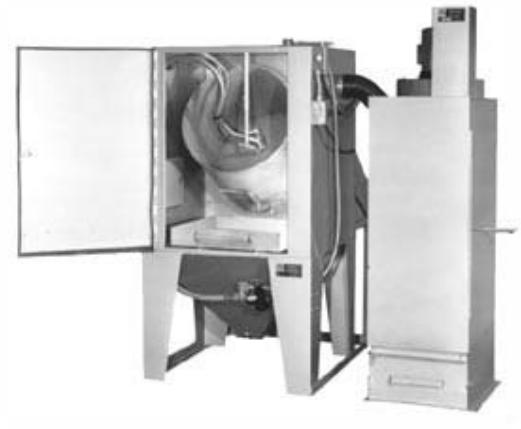
TB1

TB1 SPECIFICATIONS	
CABINET	Door opening. 18" x 12" constructed with tapered bottom hopper.
INSIDE WORK AREA	18" x 18", with clean-out door on bottom, inspection window and light.
MEASUREMENTS	18" wide x 24" deep.
CONTROLS	On/Off timer switch for tumbler & blaster, pressure regulator gauge and safety interlock for door.
AIR GUN	12 CFM; 1/4" carbide nozzle.
AIR PRESSURE	40-120 PSI range requires a 2 HP compressor.
BARREL	1/8" perforated oblique metal. Open-ended. 12" diameter x 8" high.
CAPACITY	1 quart
DRIVE	6 RPM fractional gear motor, 1 phase/60 cycles/115V.
DUST COLLECTOR	Self-contained, enclosed

TB Series, continued
Semi-Automatic Tumble Blasting Systems



TB1412



TB2424

TB1412 & TB2424 TUMBLER SPECIFICATIONS		
MODEL	**TB1412**	**TB2424**
BARREL	0.5 ft^3 14" diameter x 12" deep perforated steel barrel with unloading door.	1.0 ft^3 24" x 24" perforated steel barrel with unloading door.
CAPACITY	50 lbs of parts	150 lbs of parts
DRIVE	6 RPM, 1 phase/115V Heavy duty gear motor	2 RPM, 1 phase/220V Heavy duty gear motor
TB1412 & TB2424 BLASTER SPECIFICATIONS		
MODEL	**TB1412**	**TB2424**
CABINET	Drawer for easy parts unloading Heavy duty construction	Drawer for easy parts unloading
DUST COLLECTOR	400 PT dust collector (refer to page 58)	800 PT dust collector (refer to page 58)
CONTROLS	Safety door shut-off 1 blast gun (25 CFM standard, 45 CFM optional) with timer	Safety door shut-off 2 blast guns (45 CFM standard, 25 CFM optional) with timer
AIR PRESSURE	Pressure regulator with gauge	$^3/_4$" pressure regulator and moisture filter
FLOOR SPACE	65" high, 45" deep, 30" wide	75" high, 60" deep, 45" wide

TB Series, continued
Semi-Automatic Tumble Blasting Systems

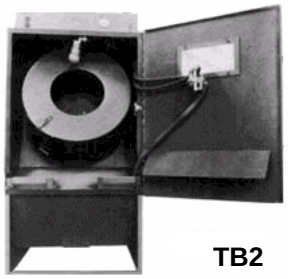
SPECIFICATIONS	
DC400PT	400 CFM. Pull-through. Motor: 1/2 HP, 3450 RPM, TEFC. Electrical: 115V/60 Hz/1 phase. Fan: 9" diameter. Filter surface area: 40 ft². Dimensions: 20" wide x 64" high x 22" deep. Available on all MM models 36 and larger without abrasive separators. Can be added to cabinets already in use. The adjustable intake damper and compact size allow it to be easily adapted and tuned to most any size system. Suitable for medium to heavy amounts of blasting. Recommended for use when cabinet usage exceeds two hours per day, where dusty media is used or where multiple gun systems are used in one cabinet. Ideal for applications requiring a highly efficient dust collector. Features include superior dust filtration, removable drawer for convenient dust disposal, manual shaker mechanism for efficient filter bag cleaning, 14-gauge welded steel construction, full size access door, 9 tubular bags, exhaust muffler and adjustable damper.
DC800PT	800 CFM. Pull-through. Motor: 1 HP, 3450 RPM, TEFC. Electrical: 115V/60 Hz/1 phase. Fan: 12 1/2" diameter. Filter surface area: 52 ft². Dimensions: 20" wide x 72" high x 28" deep. Suitable for medium to heavy amounts of blasting. Recommended for use when cabinet usage exceeds two hours per day, where dusty media is used or where multiple gun systems are used in one cabinet. Ideal for applications requiring a highly efficient dust collector. Features include superior dust filtration, removable drawer for convenient dust disposal, manual shaker mechanism for efficient filter bag cleaning, 14-gauge welded steel construction, full size access door, 12 tubular bags, exhaust muffler and adjustable damper.

DC400PT

DC800PT

TB Series, continued
Semi-Automatic Tumble Blasting Systems

TB3



TB2

TB2 & TB3 TUMBLER SPECIFICATIONS	
BARREL	Round. Constructed of perforated metal. Large opening in front (center) for loading; quick acting door on side for unloading.
CAPACITY	TB2: 2 ft³, 24" diameter x 12" wide. TB3: 3 ft³, 30" diameter x 17" wide.
DRIVE	2 RPM fractional HP motor, 1 phase/60 cycles/115V.
TB2 & TB3 BLASTER SPECIFICATIONS	
CABINET	14-gauge steel construction with full-length front door. Tapered bottom hopper to hold blasting materials. Inspection window in door. Inspection light.
DUST COLLECTOR	Separate from cabinet with self-cleaning bag.
CONTROLS	Pressure regulator and water trap. 1-hour timer to permit tumbler to run without blaster. Separate air only switch to blow off parts before unloading. Door safety interlock switch to prevent air blasting when door is open. All circuits are 110V, single phase and grounded as per OSHA requirements. Total amperage - 10 for blaster and dust collector.
AIR PRESSURE	Each model has two guns. The TB-2 uses 12 CFM per gun. The TB-3 uses 25 CFM per gun. Gun has $^{5}/_{16}$" orifice. Minimum air compressor requirement is $5^{1}/_{2}$ HP, though 10 HP is recommended, with a total air supply of 25 CFM needed for the TB-2 and 50 CFM needed for the TB-3.
NOISE LEVEL	65 Decibels.
FLOOR SPACE	TB2 and TB3 - 39" x 40" Dust Collector - 20" diameter

Finishing Compounds

A vibratory or barrel tumbling chemical compound can...

- Improve media efficiency by preventing glaze formation
- Add extra abrasive to the load
- Maintain good metal color
- Create a polished finish
- Prevent rust or corrosion
- Clean and/or bleach metal
- Deburr or form radii

Types of compounds used in conjunction with mass finishing equipment are pH-balanced, alkaline-based or acid-based compounds. They are formulated to perform specific functions when used with media. It is important to balance the ratio of flow rate to media volume to achieve optimal finishing performance.

Acid burnishing compounds and alkaline deburring compounds can be specially formulated to enhance a particular property, thereby performing best in all applications. A barrel or vibratory tumbling chemical compound will perform the following basic functions:

- Increase lubrication and/or foam to produce a shine and protect delicate parts
- Enhance grinding
- Emulsify and suspend
- Degrease
- Clean heavy soil
- Descale
- Pickle
- Polish
- Brighten
- Remove oxide skins
- Cushion fragile components
- Chemically accelerate grinding
- Protect from rust and corrosion using agents for reactive metals
- Add a mild acid for faster cutting and bleaching power

Can't decide which machine to use for the job?

Let us help. Read our section on *Where Do I Start?* *Barrel or Vibratory Finishing: Choosing the Right System for the Job* on page 117, and then refer to our *Barrel Finishing Guide* on page 120.

Powdered Finishing Compounds

For Barrel Tumbling Systems

Kramco 150 — DEBURRING

Abrasive deburring powder compound. Mildly alkaline pH. Rust inhibitor. Off-white color. Ceramic or plastic media suggested. For use with all metals. Provides a medium cut. Non-impinging. Good color. Also for use as a rust inhibitor. Usage Guidelines: 1/2 to 1 lb per gallon of water.

Kramco 160 — DEBURRING

Abrasive deburring tumbling compound. Mildly acidic pH. Off-white color. Plastic or ceramic media suggested. For use with non-ferrous metals only. Provides a medium cut. Mild bleaching agent. Non-impinging. Faster than Kramco 150. Usage Guidelines: 1/2 to 1 lb per gallon of water.

Kramco 180 — DEBURRING

Abrasive deburring powder compound. Alkaline pH. Rust inhibitor. Dark color. Plastic or ceramic media suggested. For use with all metals. Provides an extra fast cut. Rust inhibitor, protecting all types of metals against corrosion to produce good color. Good for extra-long cycles. Excellent hard metal compound. Usage Guidelines: 1/2 to 1 lb per gallon of water.

Kramco 510 — CLEANING

Rust inhibitor with a light cutting action and shine. Metal safe. White color. Ceramic or carbon steel media suggested. Powerful rust inhibitor for steel. Can be used to protect shot when storing for up to 3 months. Can be used for jewelry processing. Usage Guidelines: 3 to 4 oz per gallon of water.

Kramco 750 — CLEANING

Cleaning compound with a light cutting action and shine. Balanced pH. Rust inhibitor. White color. Plastic, ceramic or carbon steel media suggested. A barrel and shot cleaner for use with all metals. Used to clean parts before burnishing and to restore shot to a bright clean finish. Contains a rust inhibitor to protect shot. Shot may require two treatments. Can be used for jewelry processing. Usage Guidelines: 2 to 3 oz per gallon of water.

Kramco 820 — BLEACHING

Bleaching compound with a light cutting action and shine. Mildly acidic pH. Off-white color. Plastic or ceramic media suggested. Mild acid cleaner and bleaching agent for non-ferrous metals. May cause steel to rust. Can be used for jewelry processing. Usage Guidelines: 2 to 3 oz per gallon of water.

Powdered Finishing Compounds, continued
For Barrel Tumbling Systems

Kramco 910
Burnishing compound for a bright polish. Balanced pH. Rust inhibitor. Yellow color. Carbon steel media suggested. For use with all metals. Usually used with steel shot for gold and silver. Contains a rust inhibitor to protect shot. Can be used for jewelry processing. Usage Guidelines: 2 to 3 oz per gallon of water.

BURNISHING

Kramco 920
Burnishing compound for a bright polish. Balanced pH. Yellow color. Carbon steel or stainless steel media suggested. For use with all metals. Similar to Kramco 910, but better for white metal (such as silver or pot metals), die-cast, aluminum and stainless steel, as it produces a whiter finish. Can be used for jewelry processing. Usage Guidelines: 2 to 3 oz per gallon of water.

BURNISHING

Kramco 930
Burnishing compound for a bright polish. High pH. Off-white color. Carbon steel or stainless steel media suggested. Higher pH for a brighter finish on steel. Similar to Kramco 910, but better for steel. Produces a whiter finish. Usage Guidelines: 2 to 3 oz per gallon of water.

BURNISHING

Kramco 940
Burnishing compound for a bright polish. Mildly alkaline pH. Off-white color. Ceramic media suggested. High lubrication for burnishing with ceramic media. Good for polishing plastics in a tumbler. Usage Guidelines: 2 to 3 oz per gallon of water.

BURNISHING

Liquid Finishing Compounds
For Vibratory Finishing Systems

Kramco 1010
General purpose liquid finishing compound and metal degreaser for light cutting, deburring and shine. Mildly alkaline pH. Off-white/opalescent color. Plastic or ceramic media suggested. For use with all metals. Provides corrosion protection and degreases. Can be used for jewelry processing. Usage Guidelines: 1 to 2 oz per gallon of water.

DEBURRING

Kramco 1030
This liquid vibratory compound is a mild acid cleaner for cutting and deburring. Mildly acidic pH. Non-corrosive. Colorless. Plastic or ceramic media suggested. For use with all but ferrous metals. May cause steel to rust. Cuts faster than Kramco 1010. Bleaches brass, stainless steel and aluminum. Can be used for jewelry processing. Usage Guidelines: 1 to 2 oz per gallon of water.

DEBURRING

Kramco 1060
Aluminum safe vibratory compound and metal degreaser. Highly buffered alkaline pH. Colorless. Plastic, ceramic, carbon steel or stainless steel media suggested. Aluminum safe cleaner and degreaser that can be used for all metals and applications. Unlike some other liquid vibratory compounds, Kramco 1060 will not corrode or pit aluminum, copper, brass or other sensitive metals. In addition to its cleaning properties, it is biodegradable, economical and environmentally safe. With hundreds of proven uses, it is considered to be a major breakthrough for aerospace, automotive, industrial marine and offshore applications. Usage Guidelines: 1 to 2 oz per gallon of water.

DEGREASER

Kramco 1510
Light cutting action and shine. Buffered alkaline pH. Rust inhibitor. Straw color. Plastic or ceramic media suggested. This liquid finishing compound is an effective rust inhibitor for ferrous metals. Used to protect during storage. Also good for soaking. Usage Guidelines: 1 to 2 oz per gallon of water.

CLEANING

Kramco 2010
General-purpose burnisher with a light cutting action and shine. Thick blue liquid. Rust inhibitor. High detergency. Blue/opalescent color. Ceramic media suggested. For use with all metals. Lubricates the media to cause a glaze which produces a very light cut with a polish. Use with ceramic media to produce a brighter finish than Kramco 1010. Can be used for jewelry processing. Usage Guidelines: 1 to 2 oz per gallon of water.

BURNISHING

Liquid Finishing Compounds, continued
For Vibratory Finishing Systems

Kramco 2020
Vibratory burnishing compound for a bright polish. Mildly alkaline pH. Inhibits rust during processing and long-term. Amber/bronze color. K-Polish Precision Ceramic media recommended for optimal finish. Removes no metal but produces a very bright polish. Can be used in magnetic needle burnishing equipment. Can be used for jewelry processing. Usage Guidelines: 1 to 2 oz per gallon of water.

BURNISHING

Kramco 2030
Neutral cleaner for a bright polish. Neutral pH during usage. Straw color. Stainless steel media suggested. Neutral mixture for brightening stainless steel, aluminum and red metals. Can be used for jewelry processing. Usage Guidelines: 1 to 2 oz per gallon of water.

CLEANING

Kramco 5100
General cleaner and metal degreaser for cutting and deburring. Mildly alkaline pH. Light yellow color. Plastic or ceramic media suggested. Similar to Kramco 1010, but with added grease-cutting properties. Usage Guidelines: 1 to 2 oz per gallon of water.

CLEANING

EV 150 Vibratory Finishing System
page 18

Finishing Creams

Cutting Creams for Dry Barrel Finishing Systems

Dry Cutting Cream
Color: Gray
Used to Process: Metal Parts

A combination of abrasives, chemicals, oils and waxes, designed to remove machining and sanding marks and lightly deburr metals. Leaves a soft satin finish.

Usage Guidelines:

- 70% plastic preforms/30% corn cob:
  2 cups to treat 50 lbs (total) of new media;
  1/4 cup for each run thereafter
- 100% wood pegs:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter
- 100% corn cob:
  1 quart to treat 50 lbs of new media;
  1/2 cup for each run thereafter

Average Run: 24 hours or overnight

Dry Abrasive Cream
Color: Gray
Used to Process: Plastic or Wood Parts

A combination of abrasives, chemicals, oils and waxes, designed to remove machining, sanding and tool marks. Also rounds edges. Can be used for light deburring of metals.

Usage Guidelines:

- 70% wood pegs/30% corn cob:
  3 cups to treat 50 lbs (total) of new media;
  1/4 cup for each run thereafter
- 100% corn cob or walnut shells:
  1 quart to treat 50 lbs of new media;
  1/4 cup for each run thereafter
- 100% wood pegs:
  3 cups to treat 50 lbs of new media;
  3 Tbsp for each run thereafter

Average Run: 24 hours or overnight

Finishing Creams, continued

Pre-Polishing & Light Deburring Creams for Dry Barrel Finishing Systems

Metashyne Pre-Polishing Cream

Color: Red
Used to Process: Metal Parts

A cream composed of waxes and fine abrasives designed for removing minor surface imperfections. Produces a slightly polished surface. Leaves a very fine cut on pre-plate items before polishing.

Usage Guidelines:

- 100% wood pegs:
  1/2 cup to treat 50 lbs of new media;
  3 Tbsp for each run thereafter
- 100% corn cob or walnut shells:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter

Average Run: 24 hours or overnight

Shynolyte Pre-Polishing Cream

Color: Yellow/White
Used to Process: Plastic or Wood Parts

A combination of fine abrasives, chemicals and waxes in a cream form, designed to impart a smooth finish and remove the roughness produced by the first operation. Removes scratches and prepares items for polishing. Will not clog holes.

Usage Guidelines:

- 100% wood pegs:
  1/2 cup to treat 50 lbs of new media;
  3 Tbsp for each run thereafter
- 100% corn cob or walnut shells:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter

Average Run: 24 hours or overnight

Finishing Creams, continued

Polishing Creams

Metaglos Polishing Cream

Color: Green
Used to Process: Metal Parts

A polishing cream containing waxes and very fine abrasives, producing a highly buffed finish.

Usage Guidelines:

- 100% wood pegs:
  1 1/2 cup to treat 50 lbs of new media;
  3 Tbsp for each run thereafter
- 70% wood pegs/30% corn cob (for soft metals such as aluminum):
  1 1/2 cups to treat 50 lbs (total) of new media;
  3 Tbsp for each run thereafter
- 100% corn cob or walnut shells:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter

Average Run: 24 hours or overnight

Microlyte Polishing Cream

Color: White
Used to Process: Plastic Parts

A polishing cream specifically formulated to abrade the surface of the plastic until a natural, clear, polished finish is produced, rather than a coated one.

Usage Guidelines:

- 100% wood pegs:
  1 1/2 cups to treat 50 lbs of new media;
  3 Tbsp for each run thereafter
- 100% corn cob or walnut shells:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter

Average Run: 24 hours or overnight

Did you know?

Keep a close eye on your polishing barrels. Dirty wood pegs will not polish and may scratch your parts.

Finishing Creams, continued
Wipe Off & Quick Shine Creams

Hi-Glos Final Cream
Color: White
Used to Process: Plastic Parts

Designed to remove the film created in the polishing operation and give the parts a quick shine. Will brighten dyed plastics without removing color.

Usage Guidelines:

- 100% wood pegs:
  1 1/2 cup to treat 50 lbs of new media;
  3 Tbsp for each run thereafter
- 100% corn cob or walnut shells:
  2 cups to treat 50 lbs of new media;
  1/4 cup for each run thereafter

Average Run: 1/2 hour

We can help!

Are you tired of hand polishing your jewelry or small parts? Our K9 Jewelry Finishing System performs the same tasks as larger machines in a compact unit. Still not convinced it will work? Send us your parts for a small-scale test run! For more information on the K9 Jewelry Finishing System, refer to page 12.

Ceramic Media

Ceramic media is recommended for general purpose polishing, light and heavy deburring, fast and extra fast deburring and ultra aggressive metal removal. Ceramic media is best for heavy cutting and hard metals. When a small media is required (under 3/4"), ceramics offer the best selection. Ceramic media supports very heavy parts better than plastic media.

Durable, inexpensive and highly versatile, ceramic finishing media is the most common media used in mass finishing. It can be manufactured in a wide variety of precise shapes, which assists in separation and elimination of lodging problems.

Ceramic finishing media is made of silica and other minerals and abrasives that are combined, formed and fired at a high temperature, producing a very hard, cement-like product. Most ceramic preformed shapes, such as triangles, stars and ellipses, are extruded and cut to the desired length.

The density of ceramic preformed shapes is usually determined by the amount of abrasive incorporated into the mix prior to firing - the more abrasive, the higher the density. This is important because the higher the density, the more "aggressive" the ceramic media will be (faster cutting, rougher surface) and the quicker it will wear. Therefore, dense media is only practical where the objectives cannot be achieved any other way or where the reduction in cycle time brings a greater value than the extra cost in media consumption.

Angle Cut Cylinders

Angle Cut Triangles

Angle Cut Ellipses

Straight Cut Triangles

Angle Cut Tristars

Cylindrical Wedges

The type and quantity of abrasive grain can be varied to accomplish particular tasks, depending on the bond selected.

We can help!

Once you have provided us with the information to assure that we thoroughly understand your needs, our entire team analyzes our findings to develop the best possible solution or recommendation for your application. If necessary, our laboratory will process your sample parts in our testing equipment under a variety of conditions in order to fine tune our recommendations.

Ceramic Media Bond Descriptions

KP - POLISH (WHITE)
A ceramic media without any abrasives. For burnishing, polishing and driving loose abrasive.

KLC - LIGHT CUT (TAN)
For general finishing, light cut and low to medium wear. Leaves a bright finish when used with proper compounds.

KM - GENERAL PURPOSE (GRAY)
For general finishing, good metal removal and exceptional wear. Performs in a wide variety of deburring, deflashing and radiusing applications. Our most popular formulation.

KSF - FAST CUTTING (GRAY)
Fast cutting media that provides a good finish with a tough longwearing bond.

KXF - EXTRA FAST CUTTING (TAN)
A media designed for fast metal removal, surface improvements and a low rms finish. Matte finish and moderate wear rate, but very efficient due to reduced cycle times.

KUF - ULTRA FAST CUTTING (GRAY)
A media engineered for metal removal, radiusing and short cycle times.

KDF - DENSE SUPER FAST CUTTING (BROWN)
Extremely resistant to fracturing. Ideal for high-energy applications. A very fast cut facilitated by heavier weight per cubic foot.

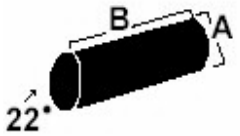
KSC - SILICON CARBIDE (GRAY)
A media used where aluminum oxide impregnation cannot be tolerated, such as braising, welding or soldering. Good cutting characteristics and good wear.

KUFX - ULTRA AGGRESSIVE (BLUE GRAY)
Our most aggressive media formulation where metal removal, radiusing and cycle times are primary concerns.

So many choices.
Which media best suits your job?

To find out, check out our *Tumbling Media Selection Guide* on page 127.

Ceramic Angle Cut Cylinders



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
1/8"	11/32"	NS	NS	NS	NS	NS	NS	NS	NS
5/32"	5/16"	NS	NS	NS	NS	NS	NS	NS	NS
3/16"	3/8"	S	NS	S	S	NS	NS	NS	NS
1/4"	5/8"	NS	NS	S	S	NS	NS	NS	NS
5/16"	5/8"	NS	NS	S	S	NS	NS	NS	NS
3/8"	5/8"	S	NS	S	NS	NS	NS	S	S
7/16"	7/8"	NS	NS	S	NS	NS	NS	NS	NS
1/2"	7/8"	NS	NS	S	NS	NS	NS	NS	NS
5/8"	1 1/8"	NS	NS	S	S	NS	NS	NS	NS
5/8"	1 1/2"	NS	NS	S	NS	NS	NS	NS	NS
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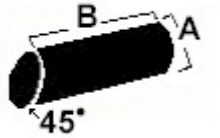
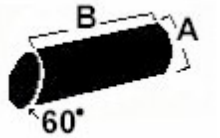
7/8"	1 3/4"	NS	NS	S	NS	NS	NS	NS	NS



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
3/8"	5/8"	NS	NS	S	NS	NS	NS	NS	NS
5/8"	1 1/8"	NS	NS	S	NS	NS	NS	NS	NS



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
1/4"	9/16"	NS	NS	NS	NS	NS	NS	NS	NS

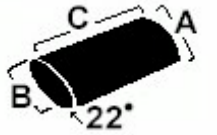
S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Ceramic Angle Cut Triangles

Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
1/4"	3/16"	NS	NS	NS	NS	NS	NS	NS	NS
1/4"	1/4"	NS	NS	S	NS	NS	NS	NS	NS
3/8"	1/4"	NS	NS	S	S	NS	NS	NS	NS
3/8"	3/8"	NS	NS	S	S	NS	S	NS	NS
5/8"	3/8"	NS	NS	S	NS	NS	NS	NS	NS
5/8"	5/8"	NS	NS	S	S	NS	S	NS	NS
7/8"	5/16"	NS	NS	NS	NS	NS	NS	NS	NS
7/8"	3/8"	NS	NS	S	S	S	NS	NS	NS
7/8"	7/8"	NS	NS	S	S	S	S	S	NS
1 1/8"	3/8"	NS	NS	S	S	NS	NS	NS	NS
1 1/8"	5/8"	NS	NS	NS	NS	NS	NS	NS	NS
1 1/8"	7/8"	NS	NS	S	NS	NS	NS	NS	NS
1 1/8"	1 1/8"	NS	NS	S	NS	NS	S	NS	NS
1 3/8"	1/2"	NS	NS	S	NS	NS	NS	NS	NS
1 1/2"	1 1/2"	NS	NS	NS	NS	NS	NS	NS	NS
1 7/8"	5/8"	NS	NS	S	NS	NS	NS	NS	NS
2"	7/8"	NS	NS	NS	NS	NS	NS	NS	NS

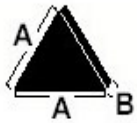
S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Ceramic Angle Cut Ellipses



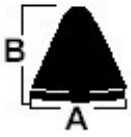
Dimensions			Formulations / Bonds							
A	B	C	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
3/8"	5/8"	5/8"	NS	NS	NS	NS	NS	NS	NS	NS
3/8"	5/8"	7/8"	NS	NS	NS	NS	NS	NS	NS	NS

Ceramic Straight Cut Triangles



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
1/4"	1/4"	NS	NS	NS	NS	NS	NS	NS	NS
7/8"	5/8"	NS	NS	NS	NS	NS	NS	NS	NS

Ceramic Cones



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
1/2"	5/8"	NS	NS	NS	NS	NS	NS	NS	NS
3/4"	7/8"	NS	NS	S	S	NS	NS	NS	NS
1	1 1/4"	NS	NS	S	NS	NS	NS	NS	NS
1 3/16"	1 3/16"	NS	NS	S	NS	NS	NS	NS	NS

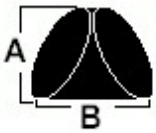
S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Ceramic Angle Cut Tristars

Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
5/8"	1/4"	NS	NS	S	S	NS	NS	NS	NS
7/8"	5/16"	NS	NS	S	S	NS	NS	NS	NS
7/8"	3/8"	NS	NS	S	S	NS	NS	NS	NS
1 1/8"	3/8"	NS	NS	S	S	NS	NS	NS	NS
1 1/8"	5/8"	NS	NS	NS	NS	NS	NS	NS	NS
1 7/8"	5/8"	NS	NS	S	NS	NS	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Ceramic Cylindrical Wedges



Dimensions		Formulations / Bonds							
A	B	KP polish (white)	KLC light cut (tan)	KM general purpose (gray)	KSF fast cutting (gray)	KXF extra fast cutting (tan)	KUFX ultra aggressive (brown)	KDF dense super fast cutting (gray)	KSC silicon carbide (blue gray)
7/16"	7/16"	NS	NS	NS	NS	NS	NS	NS	NS
5/8"	5/8"	NS	NS	S	S	NS	NS	NS	NS
3/4"	3/4"	NS	NS	S	S	NS	S	NS	NS
1"	1"	NS	NS	S	S	NS	NS	S	NS
1 1/2"	1 1/2"	NS	NS	S	S	NS	NS	NS	NS
2"	2"	NS	NS	NS	NS	NS	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Precision Ceramic Media

Precision media is a type of ceramic tumbling media that is used when small and precise size is an issue. The super small sizes available are ideal for intricate finishing jobs, such as jewelry.

Balls

Cylinders

Triangles

K-Polish Bond (Polishing)
This type of ceramic polishing media is made of high alumina and does not contain abrasives. Use with burnishing compounds to burnish metals or with loose abrasives or compounds for deburring. Produces a high luster finish and is suitable for use in all types of finishing equipment.

K-Fast Cut Bond (Fast Cutting)
Ceramic tumbling media for brass and other metals is made for fast cutting and deburring in all types of finishing equipment.

Precision Ceramic Balls

Bond: K-Polish Color: White Application: Polish / Light Deburr Media Wear: Excellent Surface Finish: Bright Diameters Available: 2 mm, 3 mm, 4 mm, 5 mm, 6 mm, 8 mm, 10 mm, 12 mm Packaged in 55lb bags.	Bond: K-Fast Cut Color: Gray Application: Fast Cut Media Wear: Good Surface Finish: Good Diameters Available: 2 mm, 4 mm, 5 mm, 6 mm, 9 mm Packaged in 55lb bags.

MT Series
Mini Roller Barrel Tumblers

The Mini-Tumbler industrial roller barrel tumbling system is designed for small parts and/or small batch runs. With barrels ranging in capacity from 22 ounces to 8 gallons, this rotary tumbler system is ideal for sensitive or fragile parts.

To learn more about our MT Series, refer to page 10.

Precision Ceramic Cylinders

Bond: K-Polish Color: White Application: Polish / Light Deburr Media Wear: Excellent Surface Finish: Bright Sizes Available (diameter x length): 1.3 x 3 mm, 1.7 x 5.2 mm, 2.5 x 8 mm, 3 x 10 mm, 4.5 x 14 mm, 7 x 23 mm Packaged in 55lb bags.	Bond: K-Fast Cut Color: Gray Application: Fast Cut Media Wear: Good Surface Finish: Good Sizes Available (diameter x length): 1.5 x 5 mm, 2.5 x 8 mm, 3 x 6 mm Packaged in 55lb bags.

Precision Ceramic Triangles

Bond: K-Polish Color: White Application: Polish / Light Deburr Media Wear: Excellent Surface Finish: Bright Sizes Available (length x depth): 2 x 2 mm, 3 x 3 mm, 4 x 4 mm, 6 x 6 mm Packaged in 55lb bags.	Bond: K-Fast Cut Color: Gray Application: Fast Cut Media Wear: Good Surface Finish: Good Sizes Available (length x depth): 2 x 2 mm, 3 x 2.5 mm, 3 x 3 mm, 3 x 6 mm, 4 x 4 mm, 4 x 8 mm Packaged in 55lb bags.

We can do it!

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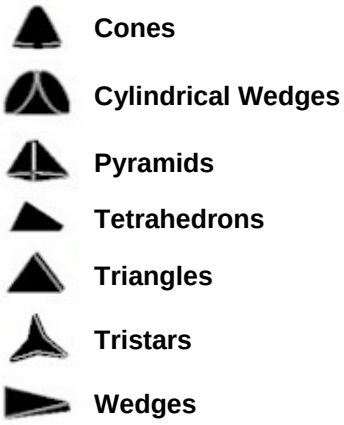
Plastic Media

Plastic preformed media shapes, also known as tumbling stones, are a man-made media available in a variety of shapes and abrasive content. Plastic preformed media shapes are not as aggressive as ceramics, but can create better surface finishes. Being considerably lighter in weight than ceramics, plastic tumbling stones can process parts that ceramics might damage.



Cones
Cylindrical Wedges
Pyramids
Tetrahedrons
Triangles
Tristars
Wedges

Plastic media is recommended for general metal removal, pre-painted or pre-plated finishing, polishing, and fast and heavy cutting. Plastic media is used for soft metals (such as brass and aluminum) or stringy materials to avoid rolling the burr over into a hole. Plastic media produces a very smooth finish, but very little shine.

Plastic media is safe for parts with threads and is good for preparing parts for anodizing. The tetrahedron and cone shapes are good for parts with holes. The triangle shape is good for corners and flats. Combinations of media can be used to process geometrically complex parts.

Plastic Media Bond Descriptions

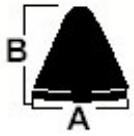
KV - PRE-PLATE (LIGHT GREEN)
A lightweight media that produces a very smooth finish. An excellent pre-plate finish. Long wearing.

KX - GENERAL PURPOSE (GREEN)
This formulation is used in most standard applications. Great metal removal with a minimum amount of media loss.

KXV - FAST CUT (BLUE)
A fast cutting media that leaves excellent finishes ready for anodizing or painting.

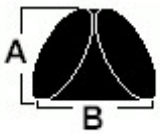
KZ1 - FAST CUT (TAN)
Heavy zircon-molded media. A general purpose, fast cutting media with good wear designed to produce an excellent finish with reduced cycle times.

Plastic Cones



Dimensions		Formulations / Bonds			
A	B	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
3/8"	3/8"	**S**	**S**	**S**	NS
1/2"	9/16"	NS	**S**	**S**	**S**
5/8"	7/8"	NS	NS	NS	NS
3/4"	3/4"	**S**	**S**	NS	**S**
1"	1"	NS	**S**	NS	NS
1 1/4"	1 1/4"	**S**	**S**	**S**	NS
1 3/4"	1 3/4"	NS	NS	NS	NS
2 1/2"	3"	NS	NS	NS	NS

Plastic Cylindrical Wedges



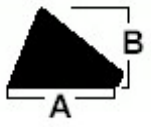
Dimensions		Formulations / Bonds			
A	B	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
1/2"	5/8"	NS	NS	NS	NS
3/4"	3/4"	NS	NS	NS	**S**
1 1/2"	1 1/2"	NS	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Plastic Pyramids

Dimensions			Formulations / Bonds			
A	B	C	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
1/4"	1/4"	1/4"	**S**	**S**	NS	**S**
5/16"	5/16"	5/16"	NS	NS	NS	NS
3/8"	3/8"	3/8"	NS	**S**	NS	**S**
3/8"	5/8"	3/8"	NS	**S**	NS	**S**
1 5/8"	1"	1"	NS	**S**	NS	**S**
2"	1 1/8"		NS	NS	NS	NS
2"	1 1/2"	1"	NS	NS	NS	NS
2 1/2"	1 7/8"	1 1/4"	NS	**S**	NS	NS

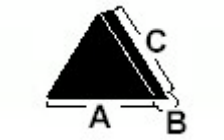
Plastic Tetrahedrons



Dimensions		Formulations / Bonds			
A	B	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
3/4"	3/4"	NS	**S**	**S**	**S**
1 1/8"	1 1/8"	NS	**S**	NS	NS
1 1/2"	1 1/2"	NS	NS	NS	NS

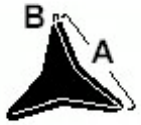
S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Plastic Triangles



Dimensions			Formulations / Bonds			
A	B	C	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
5/8"	3/8"	1/2"	NS	**S**	NS	NS
1 1/4"	5/8"	7/8"	NS	**S**	NS	NS

Plastic Tristars



Dimensions		Formulations / Bonds			
A	B	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
1 3/4"	3/4"	NS	**S**	**S**	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

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Plastic Wedges

Dimensions		Formulations / Bonds			
A	B	KV pre-plate (light green)	KX general purpose (green)	KXV fast cut (blue)	KZ1 fast cut with zircon (tan)
1"	3/4"	NS	**S**	NS	**S**
1 1/2"	1"	NS	**S**	NS	NS
2"	1 1/4"	NS	NS	NS	NS
2 1/2"	1 1/2"	NS	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

TRS-1 with transfer pan
page 24

Did you know?

Odd shaped parts often have different finishing needs for each section of the part. Our technical services department can recommend blends of media sizes, shapes and bonds to optimize your finishing process.

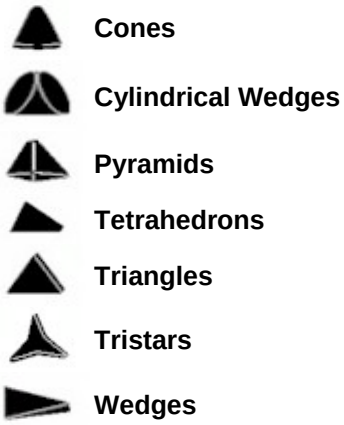
Mixing media is a way to reduce the number of steps required to finish a part. Send us your parts or call to discuss your part specifications.

For more tumbling media tips, refer to page 127.

Synthetic Media

Synthetic preformed shapes are a man-made media that offer a long wear and an aggressive cut. As with plastic media, synthetic media also weighs less than ceramic media, thus reducing surface hammering and offering greater volume per pound, resulting in lower costs and very clean finishes. Synthetic media is an excellent alternative to standard plastic media due to the increased wear resistance, lowered residue during processing and reduced cost.

Synthetic tumbling media is recommended for general metal removal, pre-painted or pre-plated finishing, and fast and heavy cutting. Synthetic media is especially good for high-energy machines such as centrifugal barrels and disc finishers, since synthetic tumbling media is resistant to chipping and breaking under high pressure.



Cones
Cylindrical Wedges
Pyramids
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Wedges

Synthetic Media Bond Descriptions

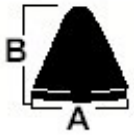
KSY – GENERAL PURPOSE (TAN)
Designed as an alternative to KX Plastic Media. Offers good cutting properties with similar media lifetime and surface finish properties as KX Plastic Media. Synthetic formula keeps costs lower than plastic media.

KSV - PRE-PLATE (GREEN)
A long-lasting media that produces extremely fine finishes and excellent color.

KSX - GENERAL PURPOSE (PINK)
Good cutting ability yet leaves a finish that can be plated or painted. Formulated for high-energy equipment.

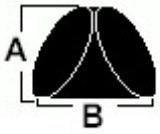
KSJ - FAST CUT (TANGERINE)
A lightweight, long-lasting media formulated for non-ferrous parts, where the parts are deburred, radiused or cleaned using vibratory or high-energy equipment.

Synthetic Cones



Dimensions		Formulations / Bonds			
A	B	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
3/8"	3/8"	NS	**S**	**S**	NS
7/16"	5/8"	NS	NS	**S**	NS
1/2"	9/16"	**S**	**S**	**S**	NS
5/8"	7/8"	NS	NS	NS	**S**
3/4"	3/4"	**S**	**S**	**S**	NS
1 1/4"	1 1/4"	**S**	**S**	NS	NS

Synthetic Cylindrical Wedges



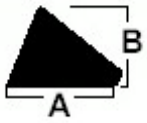
Dimensions		Formulations / Bonds			
A	B	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
3/4"	3/4"	NS	NS	NS	NS
1 1/8"	1"	NS	NS	NS	**S**
1 1/2"	1 1/2"	NS	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Synthetic Pyramids

Dimensions			Formulations / Bonds			
A	B	C	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
3/8"	3/8"	3/8"	NS	NS	NS	NS
3/8"	5/8"	3/8"	NS	NS	**S**	NS
1 5/8"	1"	1"	NS	NS	NS	NS

Synthetic Tetrahedrons



Dimensions		Formulations / Bonds			
A	B	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
3/4"	3/4"	NS	NS	NS	NS
1 1/8"	1 1/8"	**S**	NS	NS	NS

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

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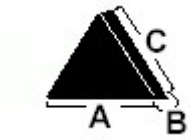
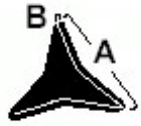
Synthetic Triangles



Dimensions			Formulations / Bonds			
A	B	C	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
5/8"	3/8"	1/2"	NS	NS	NS	NS
1 1/4"	7/8"	5/8"	NS	NS	**S**	NS

Synthetic Tristars



Dimensions		Formulations / Bonds			
A	B	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
2"	1"	NS	NS	NS	NS

Synthetic Wedges

Dimensions		Formulations / Bonds			
A	B	KSY general purpose (tan)	KSV pre-plate (green)	KSX general purpose (pink)	KSJ fast cut (tangerine)
1"	3/4"	NS	NS	**S**	NS
1 1/2"	1"	**S**	NS	NS	**S**
2"	1 1/4"	NS	NS	NS	**S**

S = Standard stock item (50 lb minimum order)
NS = Non-Standard stock item (if not in stock, a minimum order of 800 lb is required for manufacture)
Packaged in 50 lb boxes.

Aluminum Oxide

Aluminum oxide grit (or aluminium oxide grit) is a sharp, durable tumbling abrasive. Aluminum oxide is a cost effective and efficient media for tumbling operations that require quick edge rounding, surfacing finishing or cleaning. The hardness of aluminum oxide grit allows it to be recycled many times. It is the most widely used abrasive in surface preparation because of its cost, longevity and hardness. Harder and more cost effective than other commonly used abrasive tumbling media, aluminum oxide grit powder will provide efficient deburring and edge rounding on even the most difficult parts. Be sure to consider the size of perforations or holes through which the grit must pass when screen separating parts from media after use.

In addition to using aluminum oxide grit powder for surface finishing, aluminum oxide is also used as a durable and efficient non-skid media. The angular shape of aluminum oxide makes it an ideal grit for use in a variety of non-skid applications including concrete floors, stairs and boat decks. The inert nature of aluminum oxide allows it to be used with a variety of coating materials. The hardness of the grit particle creates a durable, long-lasting surface that requires minimal maintenance.

STANDARD MESH SIZES*

12
16
20
24
30
36
46
54
60
80
100
120
150
180
220
240
280
320
400

*The smaller the mesh number, the coarser the grit. Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 400 lb drums.

Did you know?

White Aluminum Oxide is an ultra-pure form of aluminum oxide. If concerns about contamination from metal oxides and iron are an issue, use White Aluminum Oxide. See page 93 for details.

White Aluminum Oxide

White aluminum oxide (or white aluminium oxide) grit is a 99.5% ultra pure grade media. White aluminum oxide is used in applications where critical, high performance processes where cleanliness is required. This sharp, durable abrasive provide excellent edge rounding, surface finishing and cleaning. The purity of the product means that contamination from other metal oxides is significantly reduced and parts come out of the process clean and ready for further processing. White aluminum oxide is an extremely sharp, long-lasting abrasive that can be recycled many times. Harder than other commonly used abrasive tumbling media, aluminum oxide grit powder will provide efficient deburring and edge rounding on even the most difficult parts. Be sure to consider the size of perforations or holes through which the grit must pass when screen separating parts from media after use.

In addition to using white aluminum oxide grit powder for surface finishing, white aluminum oxide tumbling media is also used as a durable and efficient non-skid media. The white color minimizes the 'darkening' or 'dilution' of colored coatings. The angular shape of aluminum oxide makes it an ideal grit for use in a variety of non-skid applications including concrete floors, stairs and boat decks. The inert nature of aluminum oxide allows it to be used with a variety of coating materials. The hardness of the grit particle creates a durable, long-lasting surface that requires minimal maintenance.

STANDARD MESH SIZES*

16
20
24
30
36
46
54
60
80
100
120
150
180
220
240
280
320
400

*The smaller the mesh number, the coarser the grit.
Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 400 lb drums.

Corn Cob Grit

Corn cob tumbling grit is an environmentally safe, smooth flowing abrasive made from the hard woody ring of the cob. Corn cob tumbling grit is used as a tumbling and vibratory media to absorb dirt and oils and to dry parts, without affecting the surface of the parts. Corn cob grit also serves as a burnishing grit to burnish soft metals such as bronze and brass in tumbling operations.

Advantages to Corn Cob Grit Abrasive:

- Long-lasting; highly resistant to breakdown; reusable in barrel and vibratory tumblers
- Biodegradable; can be incinerated
- Organic and natural
- No health or environmental hazards
- Clean – virtually dust-free
- Effective polishing on metals and plastics
- Highly absorbent of both water and oils
- Reduces cost of finishing operations
- Preserves micro-finishes

Size of corn grit needed is generally determined by the weight and character of the parts to be processed. Consider the size of perforations or holes through which the corn cob tumbling grit abrasive must pass when screen separating parts from media after use.

DESCRIPTION	MESH
Extra Fine	**40/60**
Fine	**20/40**
Medium	**14/20**
Coarse	**10/14**
Extra Coarse	**5/8**

Packaged in 50 lb, 20 lb, 10 lb and 4 lb packages.

Did you know?

The process of spent firearm cartridge polishing and shell casing polishing is fairly simple and quick. Spent cartridge polishing and brass cartridge case polishing become attractive cost-saving options and allow for bullet customization. Read more about firearm cartridge polishing with corn cob grit or walnut shell grit on page 145.

Silicon Carbide

Silicon carbide is a highly durable tumbling media for hardened metal parts. Parts can be self-tumbled with silicon carbide tumbling grit when aggressive deburring, scale removal and edge rounding is required. Silicon carbide deburring grit will resist fracturing allowing for extended tumbling cycles or multi-batch uses with excellent results.

High-quality silicon carbide media is manufactured to create an angular, blocky shape. Silicon carbide tumbling abrasives have sharp edges ideal for use in tumbling barrels for 'sanding' edges and softening burrs. Silicon carbide has a very fast cutting speed and can be recycled and reused many more times than sand.

Silicon carbide grit is brittle and sharp and can be used on wheels for grinding metal and nonmetallic materials of low tensile strength such as gray cast iron, brass, aluminum, stone materials, leather and rubber.

STANDARD MESH SIZES*

16
20
24
30
36
46
60
80
100
120
150
180
220
240
280
320

*The smaller the mesh number, the coarser the grit.
Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 330 lb drums.

Walnut Shell Grit

Walnut shells are ground into various grit sizes to be used for cleaning and polishing. Size of grit needed is generally determined by the weight and character of the parts to be processed. Consider the size of perforations or holes through which the walnut shells must pass when screen separating parts from media after use. Walnut shell blasting media is ideal for general purpose deflashing of plastic parts and for tumble polishing of metals such as aluminum, bronze and brass.

Crushed walnut shells can be used in a variety of other applications such as to prevent lost circulation in oil well drilling. Walnut shell grit is also used heavily as a non-skid enhancer in abrasive paints around swimming pools, walkways, dock boards and paddleball courts. Walnut shell media is the hard fibrous product made from crushed walnut. When used as a tumbling media, crushed walnut shells are extremely durable, angular and multi-faceted, yet considered a 'soft abrasive'.

Advantages:

- Excellent durability; reusable
- Biodegradable
- Non-toxic - no health or environmental hazards
- Excellent media for tumbling and vibratory operations
- Reduces cycle time of finishing operations
- Preserves micro-finishes
- Allows preservation of base or primer coats while removing top coats of paint

DESCRIPTION	MESH
Flour Grades	-325
	-200
	-100
	60/100
	40/100
Extra Fine	40/60
Fine	20/40
Medium	12/20
Coarse	8/12
Extra Coarse	4/6

Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages.

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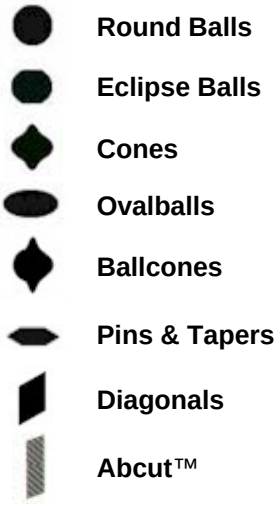
Carbon Steel Tumbling Media

Also available in corrosion-resistant stainless steel

Steel shot is a polishing and burnishing media that produces a bright shine. It is available in a variety of shapes and sizes. Its substantial weight, with a density of approximately 320 pounds per cubic foot (three times the density of ceramic media), exerts added pressure to a mass of components and is especially effective in reducing finishing times.

As steel media impinges on a part, its surface is work-hardened. The working action imparts compressive stress as a beneficial byproduct of the finishing process. In many instances, the process can replace steel shot blasting as a work-hardening step. Parts processed with steel media have longer cycle lives and greater resistance to wear as a result of this compressive stress action. Most steel shot does not remove metal from parts, though our Abcut™ shape is designed for metal removal.



Round Balls

Eclipse Balls

Cones

Ovalballs

Ballcones

Pins & Tapers

Diagonals

Abcut™

Jewelry Mix

Parts that appear smooth are actually characterized by micro-imperfections, which cause plating problems. The weight of steel media flattens these minute irregularities and prepares the surface for more satisfactory plating. This action is especially critical during the deposition of nickel or other solutions that typically do not fill the depressions, but follow the higher contours of the metal.

When plated parts are finished using steel media, a compacting action rolls down and spreads the surface of the softer plate to fill any pinpoint holes. This process helps eliminate porosity and increases the corrosion resistance created by the plating process.

Steel shot is a non-consumable media, so wastewater treatment is limited to removal of the soils from your parts only since steel does not create or absorb soils from wear, as do other media. Steel media is considered a capitalized investment instead of a consumable expense.

So many choices.
Which media best suits your job?

To find out, check out our *Tumbling Media Selection Guide* on page 127.

Carbon Steel Tumbling Media, continued

	
ROUND BALLS	**ECLIPSE BALLS**
1/16" 3/32" 1/8" 5/32" 3/16" 7/32" 1/4" 5/16" 3/8" 1/2" 1"	3/32" 1/8" 5/32" 3/16"
Round balls without flats for more critical finishing requirements. Produces the best finish. It also creates the best surface.	Round balls with slight flattening at pole ends. Precise roundness is not required for the majority of steel media finishing applications. Thus, two small flat spots at opposite poles are not objectionable. Pole-flattened balls are less expensive to manufacture and customers benefit through lower prices.

Packaged in 50 lb boxes. Additional sizes available upon request.

	
JEWELRY MIX	**ABCUT™**
40% 5/32" Eclipse Balls 40% 1/8" Diagonals 20% 1/16" x 1/2" Pins	7/32" x 7/8" 5/32" x 7/8" 1/8" x 1/2" 50/50 Mixture (7/32" x 7/8" and 5/32" x 7/8")
A balanced blend of three media shapes to provide optimal polishing action on flat areas, recesses, grooves and corners.	The abrasive surface of this media puts teeth into finishing for fast, heavy deburring, burnishing and material removal.

Packaged in 50 lb boxes. Additional sizes available upon request.

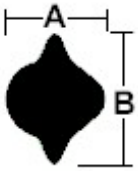
Are you finishing jewelry? We can help!

Have you ever tried tumble-polishing your handmade metal jewelry? It is a much cleaner process than buffing on a wheel and saves time. Tumbling cleans the jewelry, burnishing even hard-to-reach places, leaving a uniform finish.

Carbon Steel Tumbling Media, continued

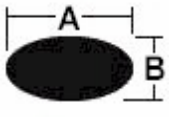
CONES		
Overall Size	Size A	Size B
3/16"	.155"	.200"
5/16"	.265"	.315"
1/2"	.470"	.535"
25/32"	.630"	.781"

Center flange and tapered crowns provide contact angles on curved surfaces. Small sizes are ideal for ornamental designs.



BALLCONES		
Overall Size	Size A	Size B
1/8"	.125"	.170"
5/32"	.215"	.270"
3/16"	.270"	.300"
1/4"	.320"	.400"
5/16"	.375"	.465"

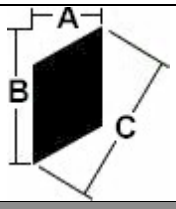
This design combines the burnishing abilities of balls and cones into one scientifically proportioned shape. Good burnishing action with the ability to reach corners and recesses.



OVALBALLS		
Overall Size	Size A	Size B
1/8"	.245"	.125"
5/32"	.320"	.156"
3/16"	.380"	.187"
1/4"	.445"	.250"
5/16"	.535"	.312"

This shape introduces an oscillating motion to the finishing mass and provides more surface-to-surface contact than balls.

Packaged in 50 lb boxes. Additional sizes available upon request.



DIAGONALS			
Overall Size	Size A	Size B	Size C
3/32"	.093"	.093"	.170"
1/8"	.125"	.125"	.225"
5/32"	.156"	.156"	.275"
3/16"	.187"	.187"	.325"
7/32"	.218"	.218"	.380"
1/4"	.250"	.250"	.445"
5/16"	.312"	.312"	.545"
3/8"	.375"	.375"	.655"
1/16" x 1/16"	.062"	.062"	N/A
1/16" x 3/32"	.062"	.093"	N/A

Beveled edges of diagonally cut ends provide effective finishing action in corners. Cylindrical body offers wide area contacts. Good burnishing action with the ability to reach corners and recesses.

PINS & TAPERS	
Slim (S)	Taper (T)
3/64" x 1/2"	3/32" x 3/8"
1/16" x 9/32"	1/8" x 3/8"
1/16" x 1/2"	1/8" x 1/2"
	5/32" x 1/2"

Tapering to pointed ends, pins reach into recesses and grooves, deflash through-holes and clean threaded areas. Strictly for reaching recesses. Must be mixed with other shapes to produce good results.

Packaged in 50 lb boxes. Additional sizes available upon request.

Stainless Steel Tumbling Media

Stainless steel media allows for faster finishing times, eliminates the need for expensive, consumable compound solutions and rust inhibitors, and reduces the storage, maintenance and handling costs of carbon steel media. Rust inhibitors are usually unnecessary and maintenance procedures for overnight and longer-term shutdowns are considerably simplified. Stainless steel media more effectively resists damage should the compound delivery system fail and the vibratory process continue. It also eliminates iron impregnation of components from the chemical interactions that take place during some finishing processes.

Stainless steel media is used for polishing and burnishing and is recommended for aggressive processes. Its substantial weight (heavier than carbon steel) exerts added pressure and increased resistance to effectively reduce finishing time. Stainless steel media imparts compressive stress, improves pre-plate finish and reduces porosity on plated parts. It also eliminates or reduces the need for compounds and rust inhibitors and eliminates iron contamination.

MT Series
Bench Model Mini Tumblers
2-Bar Base shown with 1 MT-4 barrel and 2 MT-2 barrels
page 10

Round Balls
Eclipse Balls
Ovalballs
Cones
Ballcones
Pins & Tapers
Diagonals
Jewelry Mix

Discuss your finishing topics with others!

Visit the Kramer Industries' Shop Talk forum at www.KramerIndustriesOnline.com to discuss finishing techniques, ask questions, offer advice and meet others in your industry.

At www.KramerIndustriesOnline.com, you'll find our most up-to-date company information, get the scoop on new products and specials, and technical materials that can be applied to a wide variety of industries.

Stainless Steel Tumbling Media, continued

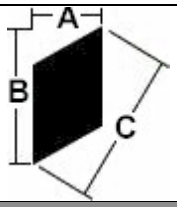
	
ROUND BALLS	**ECLIPSE BALLS**
3/32" 1/8" 5/32" 3/16" 7/32" 1/4" 5/16" 3/8" 1/2"	3/32" 1/8" 5/32" 3/16" 7/32"
Round balls without flats for more critical finishing requirements. Produces the best finish. It also creates the best surface.	Round balls with slight flattening at pole ends. Precise roundness is not required for the majority of steel media finishing applications. Thus, two small flat spots at opposite poles are not objectionable. Pole-flattened balls are less expensive to manufacture and customers benefit through lower prices.

Packaged in 50 lb boxes. Additional sizes available upon request.

BALLCONES			CONES		
Overall Size	**Size A**	**Size B**	**Overall Size**	**Size A**	**Size B**
1/8" 5/32" 3/16" 1/4" 5/16"	.125" .215" .270" .320" .375"	.170" .270" .300" .400" .465"	3/16"	.155"	.200"
This design combines the burnishing abilities of balls and cones into one scientifically proportioned shape. Good burnishing action with the ability to reach corners and recesses.			Center flange and tapered crowns provide contact angles on curved surfaces. Small sizes are ideal for ornamental designs.		

Packaged in 50 lb boxes. Additional sizes available upon request.

Stainless Steel Tumbling Media, continued



DIAGONALS				JEWELRY MIX
Overall Size	**Size A**	**Size B**	**Size C**	**Size and Shape**
3/32"	.093"	.093"	.170"	40% 5/32" Eclipse Balls
1/8"	.125"	.125"	.225"	40% 1/8" Diagonals
5/32"	.156"	.156"	.275"	20% 1/16" x 1/2" Pins
3/16"	.187"	.187"	.325"	
1/4"	.250"	.250"	.445"	
5/16"	.312"	.312"	.545"	
Beveled edges of diagonally cut ends provide effective finishing action in corners. Cylindrical body offers wide area contacts. Good burnishing action with the ability to reach corners and recesses.				A balanced blend of three media shapes to provide optimal polishing action on flat areas, recesses, grooves and corners.

Packaged in 50 lb boxes. Additional sizes available upon request.

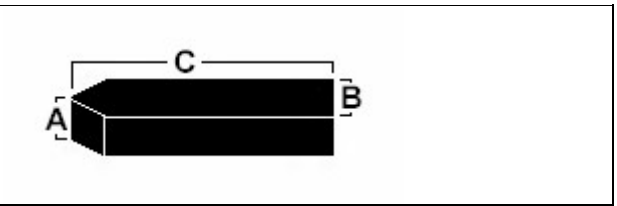
PINS & TAPERS		OVALBALLS		
Slim (S)	**Taper (T)**	**Overall Size**	**Size A**	**Size B**
3/64" x 1/2"	3/32" x 3/8"	1/8"	.245"	.125"
1/16" x 9/32"	1/8" x 3/8"	5/32"	.320"	.156"
1/16" x 1/2"	1/8" x 1/2"	3/16"	.380"	.187"
Tapering to pointed ends, pins reach into recesses and grooves, deflash through-holes and clean threaded areas. Strictly for reaching recesses. Must be mixed with other shapes to produce good results.		This shape introduces an oscillating motion to the finishing mass and provides more surface-to-surface contact than balls.		

Packaged in 50 lb boxes. Additional sizes available upon request.

Hardwood Media

Preformed hardwood media shapes, such as peg shaped media, are generally used in conjunction with abrasive or polishing compounds in dry barrel and vibratory finishing applications. Hardwood finishing media shapes can be utilized for smoothing and finishing plastic and for light deburring and finishing of metal. Hardwood media is effective and durable in a variety of mass finishing applications for materials as diverse as plastics, ceramics, wood, metals and other materials. Hardwood finishing media is also suitable for dry tumbling, finishing, polishing and deburring.

Pegs

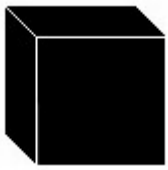


SIZE A	SIZE B	SIZE C	ITEM #
5/16"	5/16"	3/4"	KP-1
1/4"	1/4"	3/4"	KP-2
1/8"	1/8"	3/8"	KP-3
1/4"	1/4"	1/2"	KP-4
1/5"	1/5"	5/8"	KP-5
1/6"	1/6"	5/8"	KP-6
1/8"	1/8"	1/2"	KP-7
1/8"	1/8"	1/2"	KP-8
1/8"	1/8"	5/8"	KP-9
1/10"	1/10"	3/8"	KP-10
1/11"	1/11"	1/2"	KP-11
1/11"	1/11"	5/8"	KP-12
1/11"	1/11"	3/4"	KP-13
1/12"	1/12"	3/4"	KP-15
1/16"	1/16"	7/16"	KP-16*
1/4"	1/4"	1"	KP-17*
1/5"	1/5"	3/8"	KP-18*
1/8"	1/8"	1 1/8"	KP-19*

Packaged in 50 lb quantities.
*500lb minimum for KP-16, KP-17, KP-18 and KP-19.

Hardwood Media, continued

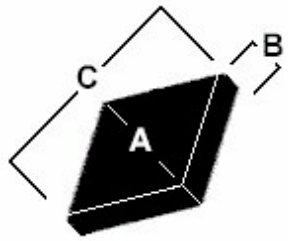
Cubes



SIZE A	SIZE B	SIZE C	ITEM #
1/6"	1/6"	1/6"	KC-1
1/4"	1/4"	1/4"	KC-2
1/2"	1/2"	1/2"	KC-3

Packaged in 50 lb quantities.

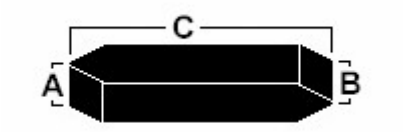
Diamonds



SIZE A	SIZE B	SIZE C	ITEM #
7/8"	5/16"	1/4"	KD-1
1 1/8"	7/16"	5/16"	KD-2
1 1/2"	1/2"	7/16"	KD-3

Packaged in 50 lb quantities.

Wedges



SIZE A	SIZE B	SIZE C	ITEM #
1/5"	1/5"	1"	KW-1
1/6"	1/6"	7/8"	KW-2

Packaged in 50 lb quantities.

Aluminum Oxide

As an angular, durable blasting abrasive, aluminum oxide (or aluminium oxide) can be recycled many times. It is the most widely used abrasive grain in sand blast finishing and surface preparation because of its cost, longevity and hardness. Harder than other commonly used blasting materials, aluminum oxide grit powder penetrates and cuts even the hardest metals and sintered carbide.

Approximately 50% lighter than metallic media, aluminum oxide abrasive grain has twice as many particles per pound. The fast-cutting action minimizes damage to thin materials by eliminating surface stresses caused by heavier, slower cutting media.

Aluminum oxide grit powder has a wide variety of applications, from cleaning engine heads, valves, pistons and turbine blades in the aircraft industry to lettering in monument and marker inscriptions. It is also commonly used for matte finishing, as well as cleaning and preparing parts for metalizing, plating and welding. Aluminum oxide abrasive grain is the best choice for an abrasive sand blasting and polishing grain as well as preparing a surface for painting.

As a premier aluminum oxide abrasive grain supplier, Kramer Industries recommends using virgin, brown aluminum oxide for optimal performance versus reprocessed or remanufactured product. Virgin, brown aluminum oxide contains less than 1.5% free silica and is therefore safer to use than sand. The grit size is consistent and cuts much faster than sand, leaving a smoother surface. Generally, the larger the grit size, the faster aluminum oxide will cut.

STANDARD MESH SIZES*

12
16
20
24
30
36
46
54
60
80
100
120
150
180
220
240
280
320
400

*The smaller the mesh number, the coarser the grit.
Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 400 lb drums.

Can't decide which machine to use for the job?

Let us help. Read our section on *Where Do I Start?* *Barrel or Vibratory Finishing: Choosing the Right System for the Job* on page 117, and then refer to our *Barrel Finishing Guide* on page 120.

White Aluminum Oxide

White aluminum oxide grit is a 99.5% ultra pure grade of blasting media. White aluminum oxide is increasingly being used in critical, high-performance microdermabrasion equipment. The purity of this media along with the variety of grit sizes available make it ideal for both traditional microdermabrasion processes as well as high-quality exfoliating creams.

White aluminum oxide is an extremely sharp, long-lasting blasting abrasive that can be recycled many times after the initial media blasting. It is the most widely used abrasive in blast finishing and surface preparation because of its cost, longevity and hardness. Harder than other commonly used blasting materials, white aluminum oxide grains penetrate and cut even the hardest metals and sintered carbide.

Approximately 50% lighter than metallic media, white aluminum oxide has twice as many particles per pound. The fast-cutting action minimizes damage to thin materials by eliminating surface stresses caused by heavier, slower-cutting media blasting grits.

White aluminum oxide blasting media has a wide variety of applications, including cleaning engine heads, valves, pistons and turbine blades in the aircraft and automotive industries. White aluminum oxide is also an excellent choice for preparing a hard surface for painting.

White aluminum oxide contains less than 0.2% free silica and is therefore safer to use than sand. The grit size is consistent and cuts much faster than other sand blasting media, leaving a smoother surface.

STANDARD MESH SIZES*

16
20
24
30
36
46
60
80
100
120
150
180
220
240
280
320

*The smaller the mesh number, the coarser the grit.
Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 400 lb drums.

Corn Cob Grit

Corn cob blasting grit is a safe blasting media for delicate parts in addition to use as the preferred blasting grit for log homes and other wood surfaces. Corn cob grit abrasive will remove surface contamination, debris and coatings with little to no impact on the substrate.

Corn cob is a biodegradable, organic blasting media that is obtained from the hard woody ring of the cob. It is resistant to break down and can be re-used multiple times in the blasting process. Corn cob is available in a variety of grit sizes and presents no health or environmental hazards. Virtually dust-free blasting with no sparking leaves a clean and dry surface.

Proper selection of grit size is important in blasting operations to balance aggressiveness with desired results.

DESCRIPTION	MESH
Extra Fine	**40/60**
Fine	**20/40**
Medium	**14/20**
Coarse	**10/14**
Extra Coarse	**5/8**

Packaged in 50 lb, 20 lb, 10 lb and 4 lb packages.

Did you know?

Log home blasting with corn cob grit is the best technique to maintain and preserve the interior and exterior wood of your log home. By cob blasting (cleaning) the surface of the logs with our PPB-6R Heavy-Duty Portable Pressure Blasting System (page 55), you will not only remove dirt and debris, you will restore the original appearance to your log home. Read more about log home blasting on page 156.

Crushed Glass Grit

Crushed Glass Grit is manufactured from 100% post-consumer, recycled bottle glass. This glass grit delivers superior performance relative to mineral/slag abrasives. Crushed glass grit contains no free silica, is non-toxic and inert and contains no heavy metals typically found in coal and copper slags.

Blasting with Crushed Glass Grit
The angular particles in crushed glass grit allow for aggressive surface profiling and removal of coatings such as epoxy, paint, alkyds, vinyl, polyurea, coal tar and elastomers. Glass grit is lighter weight than many slags, allowing for increased consumption efficiency and production time – up to 30-50% less glass grit used. Crushed glass grit delivers very low particle embedment, which produces a whiter, cleaner finish. Similar to many slags, crushed glass grit has a hardness of 5.0 – 6.0 on the Moh's Hardness Scale.

Crushed Glass Grit and the Environment
Since crushed glass grit is manufactured from recycled bottle glass, it contains no free silica which is commonly found in blasting sand. The use of post-consumer glass directly benefits the environment by diverting waste from landfills. Crushed glass grit is free of heavy metals such as arsenic, lead, asbestos, beryllium, titanium, etc., all typically found in coal and mineral slags.

SIZE	MESH
Coarse Grit	**10-40**
Medium Grit	**40-70**
Fine Grit	**70-100**

Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages.

Crushed Glass has been added to the Qualified Products List by the US Navy. Crushed Glass is qualified under MIL-A-22262-B, Amendment-2 - Abrasive Blasting Media Ship Hull, Blast Cleaning. Based on toxicological safety evaluations by the Naval Environmental Health Center (NEHC), Crushed Glass Grit could be safely used for its intended purpose. The addition of Crushed Glass to QPL includes Coarse (10-40 mesh) and Medium (40-70 mesh).

So many choices.
Which media best suits your job?

To find out, check out our *Blasting Media Selection Guide* on page 135.

Glass Beads

Glass beads are manufactured from lead-free, soda lime-type glass, containing no free silica that is made into preformed ball shapes. Glass beads produce a much smoother and brighter finish than angular abrasives. Glass beads can be recycled approximately 30 times. Chemically inert and environmentally friendly, glass beads are an acceptable method of metal cleaning or surface finishing when properly controlled.

Glass Bead Blasting

Glass bead blasting produces a clean, bright, satin finish, without dimensional change of the parts. Available in a wide range of sizes, glass beads are primarily used in blasting cabinets for honing, polishing, peening, blending, finishing, removing light burrs and cleaning most light foreign matter. For delicate thin-walled parts and thin welds, peening with glass bead abrasive material provides the right balance of stress relief without over-stressing and causing damage. Consider the size of perforations or holes through which the glass beads must pass when screen separating parts from media after use.

SIZE	DESCRIPTION	MESH
#3	Extra Course	20/30
#4	#4 Grade	30/40
#5	#5 Grade	40/50
#6	Coarse Beads	50/70
#8	Medium	70/100
#10	Medium-Fine	100/170
#13	Fine Beads	170/325

Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages.

We can do it!

We specialize in customizing systems, products and procedures. There are many options and custom systems available. If you don't see something in our catalog, please contact us.

Pumice

Pumice is a natural mineral - volcanic ash formed by the solidification of lava that is permeated with gas bubbles. Pumice powder is used chiefly as an abrasive and is among the softest of all media. Use pumice powder for less aggressive operations where the protection of the surface is of supreme importance. Pumice is the best media choice for tumbling plastics.

FFF, $0^1/_2$ and 3 grades are most popular and are standard stock items.

Typical Screen Analyses of Grades

US STANDARD MESH			Percentages on each Mesh note T = Trace (less than 0.5 grams) GRADES							
SIZE #	OPENING	MICRONS	FFFF	FFF	FF	0	$0^1/_2$	$^1/_2$	3	4
10	0.0787"	2000								
14	0.0555"	1400								1-40
20	0.0331"	850								25-55
30	0.0234"	600							T-5	5-30
40	0.0165"	425							20-60	5-30
50	0.0117"	300						T-10	40-60	1-20
60	0.0098"	250						1-10	10-30	T-5
80	0.0070"	180				T-5	T-10	30-60	1-10	
100	0.0059"	150				T-5	1-10	20-35	T-5	
120	0.0049"	125				1-10	1-15	10-25		
140	0.0041"	106				1-15	10-30	1-10		
170	0.0035"	90			T-10	1-15	10-30			
200	0.0029"	75	T	T-2	5-10	1-15	10-35			
325	0.0017"	45	10-20	10-25	10-25	10-25	20-40			
Pan			80-90	75-90	70-80	40-70	1-10	T-10	T-5	T-10
		Totals	100%	100%	100%	100%	100%	100%	100%	100%
Oil Absorption (ASTM D281)		Actual	45	45	45	45	45	45	45	N/A
		Saturation	45	45	45	45	45	75	105	N/A
Apparent Bulk Density lbs/ft^3 poured loose and leveled per ASTM C29 as dry powder			48	47	45	44	37	34	29	28

Actual Oil Absorption is the number of pounds of oil per 100 pounds of pumice to completely coat the particle surface.
Saturation Oil Absorption is the number of pounds of oil per 100 pounds of pumice to completely fill the voids between particles.

Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages.

Silicon Carbide

Silicon carbide is the hardest blasting media available. High-quality silicon carbide media is manufactured to a blocky grain shape that splinters. The resulting silicon carbide abrasives have sharp edges for blasting. Silicon carbide has a very fast cutting speed and can be recycled and reused many more times than sand. The hardness of silicon carbide allows for much shorter blast times relative to softer blast media.

Silicon carbide grit is the ideal media for use on glass and stone in both suction or siphon and direct pressure blast systems. The ability to be recycled multiple times results in a cost-effective silicon carbide grit blast media with optimal etching results.

Since silicon carbide grit is harder than aluminum oxide, it can be used efficiently for glass engraving and stone etching. Silicon carbide grit blast media has no free silica, does not generate static electricity and is manufactured to contain minimal magnetic content.

STANDARD MESH SIZES*

16
20
24
30
36
46
60
80
100
120
150
180
220
240
280
320

*The smaller the mesh number, the coarser the grit.
Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages or 330 lb drums.

Steel Grit

Steel grit blasting is ideal for aggressive cleaning applications. Steel grit will quickly strip many types of surface contaminants from steel and other foundry metals. Steel grit is softer than aluminum oxide and does not fracture as easily, making it ideal for aircraft and aero-space applications. The angular nature of steel grit produces an etched surface on metal for superior adhesion of paint, epoxy, enamel, rubber and other coatings.

Different chemistries will lead to different operating results, depending on the size and hardness of the grit. Steel grit that is formulated as a softer (40-50 HRC) metal will round off rapidly, making it ideal for quick stripping of oxides and cleaning of molds. Harder steel grit (55-65 HRC) will maintain the angular nature of the grit to provide continuous cutting action.

GRIT SIZE	APPROXIMATE SIZE	FINISH PRODUCED
G-120	0.005”	Light etch
G-80	0.007”	Medium etch
G-50	0.011”	
G-40	0.017”	
G-25	0.023”	Sharp etch
G-18	0.039”	Deep etch rough
G-16	0.046”	
G-14	0.055”	
G-12	0.066”	Very rough

SIZE	All material is screened to meet or exceed SAE and SFS specifications.
CHEMISTRY	Carbon: > 0.80% (depends on hardness) Sulfur: < 0.05% Phosphorous: < 0.05%
MINIMUM DENSITY	7.3 g/cc (445 lbs/ft^3)
BULK DENSITY	230-260 lbs/ft^3
HARDNESS	(based on chemistry) KGS: 40-50 HRC KGM: 50-55 HRC KGL: 55-60 HRC KGH: 60+ HRC

The most popular hardness is KGM. If a hardness other than KGM is required, please specify this when the order is placed.

Scrap surcharge variance in effect at time of shipment. Please call for current surcharge.

Re-manufactured steel grit is available at a reduced cost.

Packaged in 50 lb bags (2000 lb minimum) or 55 gallon drums and 2200 lb super sacks.

Steel Shot

Steel shot blasting is the most widely used process for cleaning, stripping and improving a metal surface. The grade or size of steel shot will determine the ultimate finish achieved on the surface of the metal. The round ball shape of the steel shot produces a clean, smooth and polished surface through a peening action created by the acceleration of the shot. In a peening application, steel shot is also used to impart compressive strength to torque or load bearing metal parts such as crankshafts, engine turbine blades and heavy-duty springs.

Smaller steel shot will result in a smoother and more polished surface. Larger shot will clean more aggressively but produce a rougher surface. Both air powered and wheel blast systems can be used to accelerate the steel shot onto the surface of the part. Due to the hardness and density of steel shot, it can be recycled as much as 3000 times before replacement. Since steel shot does not use an abrasive process a minimal amount of dust is created in the blasting process.

GRIT SIZE	APPROXIMATE SIZE	FINISH	APPLICATIONS
S-70	0.007"	Fine, smooth shot finish. Excellent coverage.	Blasting of relatively small ferrous and non-ferrous castings. Removal of light scale from foreign and heat treated parts. Blasting of machined parts. Removal of mill scale, rust and other deposits.
S-110	0.011"		
S-170	0.017"		
S-230	0.023"	Medium, light shot finish. Good coverage.	Blasting of grey iron, malleable iron, light steel castings, medium forgings, heat-treated parts and heavy mill scale - rust and other deposits.
S-280	0.028"		
S-330	0.033"		
S-390	0.039"	Average to heavy shot finish. Average coverage.	Blasting of steel, heavy malleable iron and grey iron castings. Removal of scale from large billets, slabs - rust and other deposits.
S-460	0.046"		
S-550	0.055"		
S-660	0.066"	Rough coverage. Adequate for most applications.	Heavy steel castings. Removal of tough, heavy scale.
S-780	0.078"		

SIZE	All material is screened to meet or exceed SAE and SFS specifications.
CHEMISTRY	Carbon: 0.80 - 1.20% Sulfur: < 0.05% Phosphorous: < 0.05%
MINIMUM DENSITY	7.0 g/cc (430 lbs/ft^3)
BULK DENSITY	230-260 lbs/ft^3
HARDNESS	40 - 51 HRC

Scrap surcharge variance in effect at time of shipment. Please call for current surcharge.

Re-manufactured steel shot available at reduced cost.

Packaged in 50 lb bags (2000 lb minimum) or 55 gallon drums.

Walnut Shell Grit

Walnut shell grit is the hard fibrous product made from ground or crushed walnut shells. When used as a blasting media, walnut shell grit is extremely durable, angular and multi-faceted, yet is considered a 'soft abrasive'. Walnut shell blasting grit is an excellent replacement for sand (free silica) to avoid inhalation health concerns.

Cleaning by walnut shell blasting is particularly effective where the surface of the substrate under its coat of paint, dirt, grease, scale, carbon, etc. should remain unchanged or otherwise unimpaired. Walnut shell grit can be used as a soft aggregate in removing foreign matter or coatings from surfaces without etching, scratching or marring cleaned areas.

When used with the right walnut shell blasting equipment, common blast cleaning applications include stripping auto and truck panels, cleaning delicate molds, jewelry polishing, armatures and electric motors prior to rewinding, deflashing plastics and watch polishing. When used as a blast cleaning media, walnut shell grit removes paint, flash, burrs and other flaws in plastic and rubber molding, aluminum and zinc die-casting and electronics industries. Walnut shell can replace sand in paint removal, graffiti removal and general cleaning in restoration of buildings, bridges and outdoor statuaries. Walnut shell is also used to clean aircraft engines and steam turbines.

DESCRIPTION	MESH
Flour Grades	-325
	-200
	-100
	60/100
	40/100
Extra Fine	40/60
Fine	20/40
Medium	12/20
Coarse	8/12
Extra Coarse	4/6

Packaged in 50 lb, 25 lb, 10 lb and 5 lb packages.

Did you know?

In addition to being used in abrasive blasting operations, walnut shell girt can also be used in tumbling systems for cleaning and polishing. Crushed walnut shells can be used in a variety of other applications as well, such as to prevent lost circulation in oil well drilling and as a non-skid enhancer in abrasive paints around swimming pools, walkways, dock boards and paddleball courts.

Plastic Abrasives

Plastic abrasives deliver a high stripping rate and consistent performance, ideal for paint stripping, mold cleaning, deflashing and deburring.

Sandblasting, using compressed air, is traditionally used to prepare surfaces for coatings. The sharp particles of aluminum oxide or other media abrade the surface. Incidental corrosion, rust, and old coatings are removed in the process, leaving a good surface for paint adhesion.

However, substrates other than steel can often not tolerate this aggressive surface preparation and, as a consequence, wet chemical strippers are employed to remove coatings. Aluminum, brass and plastic composites, including fiberglass, are often treated in this way.

Using plastic abrasives has been proven to significantly reduce the generation of hazardous waste that using wet chemical strippers can cause. In addition, the use of plastic abrasives has proven to be faster, less damaging to the substrate and much less expensive than wet chemicals. Since the plastic abrasive is harder than the coatings to be removed, yet softer than the substrate, coatings can actually be stripped three or four times without damage to the surface.

Plastic abrasives are sensitive to substrates, including aluminum and other delicate metals, composites and plastics, yet tough enough to take care of the most demanding decoating and surface finishing needs efficiently.

Consider the size of perforations or holes through which the plastic abrasives must pass when screen separating parts from media after use.

Recyclable. Call for details.

Applications include:

- Rubber molds
- Urethane bumpers
- Aircraft engine components
- Auto/bus/truck bodies
- Helicopters
- Tanks
- Wheels
- Surface sealants
- Airframes
- Aircraft components
- Fiberglass components
- Printed circuit boards
- Semiconductors
- Soft metals such as aluminum and magnesium
- Carbon graphite composites
- Axial lead diodes/capacitors/clear optical sensors
- Computer housing panels
- Copper armature wires
- Metal die-castings
- Steel
- Gears
- Tire Molds
- Actuator assemblies
- and more!

Plastic Abrasives, continued

Acrylic

Acrylic media is the longest lasting media on the market. It is very gentle on the substrate and engineered for stripping the most sensitive surfaces while providing an effective stripping rate. Acrylic media offers an excellent range of stripping capabilities and is termed a multipurpose media by its users. Standard mesh sizes 16-20, 20-30 and 30-40. Packaged in 50 lb boxes or bags or 250 lb drums.

Melamine

Melamine is engineered for stripping the most difficult surfaces while providing an effective stripping rate. Melamine is the most aggressive plastic abrasive, offering an excellent range of stripping capabilities. Melamine can be used as a replacement for glass beads and other harsh abrasives. Standard mesh sizes 8-12, 12-16, 16-20, 20-30, 30-40 and 60-80. Sizes 12-20, 20-40 and 40-60 can be specially ordered. Packaged in 50 lb boxes or bags or 250 lb drums.

MESH DESCRIPTION
8-12 mesh / 1.70-2.36 mm
10-20 mesh / 0.85-2.00 mm
12-16 mesh / 1.20-1.70 mm
16-20 mesh / 0.85-1.20 mm
20-30 mesh / 0.56-0.85 mm
30-40 mesh / 0.42-0.56 mm
40-60 mesh / 0.25-0.42 mm
60-80 mesh / 0.16-0.25 mm

Note: Consider the size of perforations or holes through which the grit must pass when screen separating parts from media after use.

Urea

Urea is a plastic grain stripping abrasive used in sandblasting operations. It is the most widely used plastic media. Urea is environmentally friendly and recyclable - an alternative to chemical stripping. Urea is formulated to meet an increased level of stripping performance where stripping speed outweighs other considerations. Urea is able to strip tough coatings with an impressive strip rate. Urea is typically used for less sensitive applications. Standard mesh sizes 8-12, 10-20, 12-16, 16-20, 20-30, 30-40 and 40-60. Sizes 12-20, 20-40 and 60-80 can be specially ordered. Packaged in 50 lb boxes or bags or 250 lb drums.

Where Do I Start? Deburring or Surface Finishing? Barrel or Vibratory Finishing:

Choosing the Right System for the Job

Many parts need deburring or surface finishing work. In order to keep costs down, manufacturers look to mass finishing. The tumbling barrel and the vibratory tumbler are as versatile as a Boy Scout knife, but to use them properly one must understand how they work.

The Barrel Tumbler

Barrel tumblers have an action similar to that of a rock tumbling and skidding down the slope of a hill. The barrel tumbler's corners lift the load as the barrel rotates until it reaches a point where it slides down the side of the barrel. The parts are abraded as they bump and scrape against the media and the other parts.

The Vibratory Tumbler

Vibratory tumblers have an action that is similar to filing. The cutting media surrounds the parts. The eccentric, rotating weight shakes the tub in a circular path during which the entire load is lifted up at an angle and then dropped. As the load is falling (but not actually airborne) the tub returns to an upward position, applying an upward and angular force that causes a shearing action where the parts and media rub against each other.

Cutting Action

While the barrel tumbler is grinding at an applied force, the vibratory tumbler is moving faster than a free fall. The barrel tumbler's applied force is normally 5 to 10 times the vibratory tumbler's free fall force. In the barrel tumbler, the entire cutting action is restricted to the slide area or 20 to 30% of the total load. In the vibratory tumbler, the entire load is being cut with each pulse, about 1800 times a minute, explaining why the vibratory tumbler has such short cycle times compared to the barrel tumbler.

The parts in a vibratory finishing system are actually moving only about $^{1}/_{16}$" in relation to each other. The parts in a barrel finishing system move across the entire diameter of the barrel. These movements cause large radii to form in a barrel tumbler, but relatively small radii to form in a vibratory tumbler. The tumbling barrel can form a one-eighth radius on a part, while removing very little material from the flat sections. The vibratory tumbler must be set for violent action with large blocky media to produce a sizable radius, but due to its scrubbing action, it will remove an appreciable amount of material from the flats.

Generally speaking, vibratory finishing systems tend to produce a very smooth flat finish because it really laps the parts. The vibratory tumbler will also cut inside a tube or cup shaped piece or any spot the stone can reach. Since the load is moving as a unit, very fragile parts are quite safe in a vibrator. There is no tearing action or unequal forces that tend to bend and distort parts. The larger the parts or media are, the faster the cutting action. However, the weight of either does not seem to have as much effect as size, since plastic media, 50% lighter than ceramic media, can provide a good cut.

Barrel finishing systems produce a more uneven surface and generally round off corners before removing much material from surfaces. There are times when this is desirable. For brute stock removal, the barrel tumbler excels. Foundry castings and parts with heavy radii are usually run in a barrel tumbler. The barrel tumbler's peening action can be used to work tougher parts and stress relief machined parts. Hardened and polished steel shot is used extensively in a barrel tumbler for producing a quick luster on parts. While this media may be used in a vibratory

Where Do I Start? Deburring or Surface Finishing? Barrel or Vibratory Finishing:

Choosing the Right System for the Job, continued

machine, the barrel tumbler yields a denser surface and more luster.

Speed and Amplitude

The speed and amplitude of vibration is variable on most machines. High speeds (1800 cycles per minute) and small amplitudes are used for fine finishes or delicate parts. Large amplitudes are used for heavier cutting, varying the speed according to the finish requirement. High speeds with large amplitudes can roll burrs in and even peen metal into holes and mushroom edges. The circulation of parts is best at higher speeds; therefore, heavy pieces are run best at higher speeds with moderate amplitudes of $^{1}/_{8}$" to $^{3}/_{32}$".

Cost

Cost is one factor that may decide the choice in some cases. Vibratory systems, due to their massive construction, are much more expensive pieces of equipment. Barrel tumbling systems wear out tumbling media at half the pace of vibratory systems, but have to run longer to do the same job.

Media

The tendency is to use ceramic preformed media or plastic preformed media in a vibratory finishing system. Ceramic tumbling media is made with abrasive filler, much as a grinding wheel is made. For plastic tumbling media, plastic is mixed with abrasive and cast to shape. Ceramic media uses aluminum oxide as filler and plastic media uses quartz or silica for cleaner results. Randomly shaped media, either man-made or natural, are rarely used for precision work, because they tend to jam in the holes and do not deburr into corners or recessed areas. When using ceramic media, care should be taken to avoid glazing or loading of the surface.

It is a good practice to run the media with an abrasive grain occasionally to roughen the surface and clean the pores.

Plastic tumbling media is self-cleaning due to its relatively soft bond. Since adding an abrasive to plastic media materially reduces its life, this media should only be used for mild cutting jobs that do not require adding an abrasive to the run. Plastic tumbling media produces large amounts of foam and residue, making it unsuitable for use in an enclosed tumbling barrel. Plastic tumbling media is mainly used for fragile parts or soft metals. Since this media is less than half the weight of stone or ceramic tumbling media, it is safer to use in such cases.

Water

In both systems, water is added to the load to absorb soils and lubricate the media. To help the water keep the parts clean, chemical compounds are added. An abrasive is sometimes added to enhance the cutting ability of the tumbling media. Most people assume it is the abrasive that does the cutting, but this is not so. The abrasive is used mainly to keep the stone rough enough to do the cutting.

Much of the finesse of using finishing equipment effectively can only be gained by actually working with the equipment. It is important to keep careful records of each run to learn its effect and also to allow the results to be duplicated later.

Thus, there is no easy answer to the question, "Which system is best?" We have found through many years of experience that to arrive at the proper choice, the particular requirement of the job must be studied and the characteristics of the performance of each system must be known.

Where Do I Start? Deburring or Surface Finishing? Barrel or Vibratory Finishing:

Choosing the Right System for the Job, continued

MACHINE TYPE	ACTION	CHARACTERISTIC RESULTS	SPECIAL COMMENTS
Tumbling Equipment	Rotates loads to cascade downhill.	Large radii. Poor in recesses. Good for large exposed burrs.	Requires good handling equipment. Long cycles.
Vibratory Equipment	Vibrations cause a scrubbing action of media against parts.	Usually small radius (0.010" to 0.020"). Very smooth surface. Very effective in recessed areas. Twice the speed of a barrel tumbler.	Can process very large parts. Lends itself to feed-through automation. Best system for delicate and close tolerance work.
Centrifugal Equipment	Action same as a barrel tumbler, but augmented by centrifugal force.	Results similar to a barrel tumbler, but very much faster. High pressure can roll over burrs.	Multiple small barrels require a high degree of handling, but with a very fast cutting cycle. Best used for small parts and with small media.
Tumble Blasting Equipment	Parts are tumbled slowly to provide random exposure to a sandblasting gun using an abrasive.	Removes light burrs, or texturizes for an attractive finish. Penetrates the smallest crevices and goes through holes to get cross drill burrs.	Performs best with parts around two inches or less. Large heavy parts can be dented. Low labor factor.

Did you know?

The more symmetrical or uniform the shape of the media, such as cylinders, balls and cones, the greater the mobility of the media. These shapes work extremely well on parts with a lot of holes, but do not work very well inside corners or angles.

Angular shapes, such as triangles, tristars, pyramids, tetrahedrons and straight wedges, have the ability to penetrate into holes and work corners and sharp recesses very well and usually work faster on outside surface areas. The sharper the angle, the deeper the penetration and the tighter the area or detail it can work.

Barrel Finishing Guide

Producing good surface finishes using barrel finishing depends on the right selection and use of tumblers, abrasives, lubricating agents, carrying agents and polishing agents.

Barrel finishing, also known as tumbling, is a surface improving operation in which a mixture of parts, media and compounds are placed in a six- or eight-sided barrel and rotated at a predetermined speed for the purpose of rounding corners, deburring, grinding, descaling, deflashing, improving surface finish, burnishing, polishing and radiusing parts in bulk. It works by tumbling parts in a rotating barrel, thus creating friction by tumbling parts against each other and against other materials, such as media and compounds.

Tumbling Highlights

- Parts can be finished less expensively than by hand.
- Many parts can be processed at one time.
- Requires very little handling.
- Parts are tougher and stronger after tumbling.
- Tumbling provides a certain amount of stress relief.
- Forgings and castings can be blended.
- Machine parts and stampings can be deburred and burnished to a high finish.
- On long runs, the systems can run overnight.
- Careful and proper machining of your parts will save tumbling time.

There are two types of barrel finishing: wet tumbling and dry tumbling. Wet tumbling is used almost exclusively for removal of excess stock. Dry tumbling is used for all phases, including polishing.

Wet Tumbling

Horizontal and oblique barrels are commonly used in wet tumbling. The horizontal barrel is generally octagonal or hexagonal in shape. Though the oblique barrel is easier to load and unload, the horizontal is preferred because of its larger capacity and better tumbling action.

Barrels are made of steel, often with linings of wood, rubber, neoprene, urethane, PVC or vinyl. The lining cushions the impact of the tumbling parts against the barrel, thus prolonging the life of the barrel. The most popular barrel dimensions vary in diameter (18" to 36") and in length (18" to 42"). Usually, the diameter is smaller than the length. Horizontal barrel speeds vary from 20 to 38 RPM, depending on the barrel size and the items to be tumbled. Fragile parts, for example, require slower speeds to prevent possible damage.

After a barrel is filled up to about half of its capacity with parts and media, water is added to within three to five inches below the load. This can be varied either way. The lower the water level, the faster the cut. The more water used, the finer the finish and the slower the cutting rate. For burnishing, the water should be about level with the load.

The compound is put into the barrel last. Depending upon the amount of material to be removed from the parts, tumbling will take anywhere from 6 to 24 hours. Very light plastic parts require adding smooth ceramic or hardwood media in a dry process to increase the load weight.

After a run, the parts and the barrel should be rinsed thoroughly with fresh water. Parts are then removed and dried by one of several methods, such as tumbling with corn cob grit, sitting under heat lamps or spinning dry. Rinsing media after it has been used can

Barrel Finishing Guide, continued

prevent contamination or undesirable results if reused later.

Most mass finishing methods employ the use of water to lubricate and carry away the cutting residue. Without water, the parts would be scratched and black from embedded abrasives. When combined with our compounds, the water not only carries the abrasives and keeps the media clean, but also acts as a cushion to help protect the parts.

However, there are times when water can be a hindrance, such as when processing thin, flat parts (where the water surface tension makes the parts cling together) or when trying to polish or smooth a plastic part (that can absorb the water and become too soft to resist scratching or deformation). There are also polishing operations on jewelry that are limited to the smoothness of the shine that is produced when the media is too heavy and hard. So, how do we run parts safely without the help of water?

Dry Tumbling

For dry tumbling, the horizontal octagonal barrel is used almost exclusively. This barrel sometimes has a metal skin, and a hardwood lining which can be replaced when necessary. A barrel that is 30" in diameter by either 36" or 42" in length is considered standard. For versatility, these barrels may be divided into two compartments. Dry barrels are often double-decked so that one barrel is above the other, although both are set in the same frame. This saves floor space, especially when operating multiple barrels. Barrel speeds in dry tumbling are generally kept at 28 to 32 RPM.

Over the years, several techniques have been developed. In the earliest tumbling operations, water was not used. Sand was used with smooth stones. The sand not only aided the cutting, but also provided an extraordinary amount of surface area to carry the dirty residue. This avoided having the residue embedded into the surface of the parts. Thus, if something is provided to carry the dirt instead of water, parts can be run successfully.

The addition of an organic material such as corn cob grit or walnut shell grit proves more absorbent than sand, therefore carrying more dirt and even oils. Organic materials are also very good carriers of abrasives.

Plastics require a soft media, such as wood pegs, to avoid damage. However, a soft media does not cut much. Adding corn cob grit treated with pumice to the load greatly speeds up cutting. Pumice is silica that is a volcanic ash product. It is a friable, very sharp, long crystal. Because it is soft, it will fracture into smaller sharp crystals even under the light load of wood media. Harder abrasives will not fracture and, therefore, will stop cutting when they get dull. Hence, pumice is the abrasive of choice for dry cutting.

Self-tumbling metal parts with ceramic or plastic media will work very well with pumice added as an abrasive and with corn cob grit added to absorb the dirt.

Extremely high, bright finishes can be achieved by using wood pegs or walnut shells treated with a wax and an abrasive. The abrasive used should be one micron or less in size. There are ready-made polishing creams for this type of work, such as Metaglos and Microlyte. Metal parts can be finished in a tumbling barrel overnight, or in an hour or less in a high-energy machine. Most wire eyeglass frames and quite a bit of gold jewelry are polished in this process.

Plastic parts, such as buttons and plastic eyeglass frames, are usually run with wood pegs or sometimes extra large corn cob grit. If given time and

Barrel Finishing Guide, continued

careful handling, plastic parts can be polished to a finish that approaches hand buffing. Since the media is comparatively light, it takes a 10 to 15 hour run to get results. Since there is no burnishing effect, the whole job is done by the abrasives. A plastic eyeglass frame must go through three to four steps (progressively finer) and it could take one day for each step. Still, compared to hand polishing, mass finishing is a lot more economical.

Although the barrel-finishing cycle described here will suffice in the majority of cases, some simple deflashing operations, as is often done with plastic compression-molded parts, can be performed by just tumbling the parts against each other in a screened barrel that will permit the scrap to fall out. This type of operation does not usually require media. The action of part against part will remove the flash while the holes in the barrel will permit the waste to escape, keeping the parts clean. Vinyl molded parts cannot be deflashed this way because the flash will bend rather than break. Freezing the vinyl can overcome this. Tumbling with dry ice in either liquid or solid form will do the job in a standard wet barrel.

Parts
The number of parts which will fit safely into a barrel will be determined by the barrel size, size of the part, the part's fragility, shape and weight and the end result desired.

Parts usually account for $^{1}/_{3}$ of the total barrel load. The amount of parts that can be put into the barrel in relation to the amount of media is a compromise between maximum economy and maximum finish. Good surfaces will not be obtained if there are too many parts in the barrel. On the other hand, stock removal will be slowed down if there are too few parts in the barrel. The fewer parts there are in the barrel, the better the finish. The more parts there are in the barrel, the more economical.

As a general rule, simple shapes, such as balls and squares, can be barrel-finished with little fear of damage. Assuming that two parts are of a similar size, it is possible to process more of a simple shape than an intricate one. This is also true when considering weight, since larger quantities of lighter items as opposed to heavier items can be barrel finished in one operation.

Barrel Load
Barrel load heights (parts and media) should not be less than 45% or more than 60% of capacity. Load heights between 40% and 45% produce more action but a poorer finish. The optimum load height is 50%, with approximately three parts media to one of parts to keep parts from impinging. On large or fragile parts, the ratio may have to increase to as much as 6:1. As the load height increases, the action is slowed. Raising the load height may be used to soften the action; lowering the height speeds up cutting but can cause a coarser finish. However, it is at times possible to tumble very large parts if the barrel is overloaded to 80% with additional media and run at a slower speed.

For more information, refer to *Estimating Machine Capacity* on page 129.

Carrying Agents
The purpose of abrasive operations is to remove tool marks and flash, to smooth rough surfaces and to form radii. In dry tumbling, it is advisable to use a carrying agent in addition to abrasive powders.

A carrying agent, by acting as a buffer between the parts, will prevent them from damaging each other and produce smoother surfaces. The carrying agent will also carry the abrasive into recesses that would not be reached otherwise.

Barrel Finishing Guide, continued

Carrying agents include corn cob grit, walnut shell grit and wood pegs.

The majority of abrasive operations are carried out with wood pegs, since corn cob grit and walnut shell grit are too light to create sufficient friction. All carrying agents should be of a size which makes part separation easy and which will not lodge in any holes or crevices. Therefore, carrying agents come in a variety of sizes.

Media
Media is any material that is added to the load of parts to act as a cushion, keeping the parts from hitting one another, and to act as a carrier for the compound. Normally media is used in a ratio of three parts media to one part parts by volume. Using more media and fewer parts per load can protect large or fragile parts.

In barrel finishing, the size and type of media depends on the material, size and holes in the part. The media should be small enough to freely pass through holes, recesses and prongs, or large enough not to lodge. The larger the media is, the faster the cut; the smaller the media is, the finer the cut.

- Wood pegs are usually used in "dry tumbling", but denser or coarser media, such as walnut shell or corn cob grit, can be used for faster cutting action if the finish is not important.
- Aluminum oxide is used for deburring and honing where irregular shape and size is not important. Aluminum oxide is economical and long lasting.
- Preformed plastic media is a lightweight, resilient media, excellent for finishing aluminum, die-cast and delicate parts. It will give little or no impingement on parts.
- Preformed ceramic media is an abrasive media used where regularity in size and shape are important. It cuts faster than aluminum oxide, but also wears faster.
- Steel burnishing balls and shapes are used only in burnishing and brightening. They will not remove metal, but will dull light burrs. Very high finishes can be obtained with the addition of a burnishing compound. Use three to five parts of media to one part of work pieces by volume for general ferrous work (3:1 for steel, 5:1 for magnesium or aluminum). By increasing the ratio or the media, the finish will be finer. Do not use or mix steel burnishing shot with abrasive media.

In self-tumbling (tumbling the parts without media), only deburring or burnishing compounds and water are used. If the parts are not too delicate or intricate in shape and the burrs are fully exposed, self-tumbling is possible. It is economical, because more parts can be loaded in the barrel. An additional benefit is that there is not a separation problem.

Compounds
An abrasive compound is the next consideration. This is the additive that determines the type of operation that will be performed. If the media is treated with a cutting compound, there will be a grinding action; with a polishing cream, a smooth luster will appear. Do not mix acidic compounds with alkaline compounds, since undesirable pressure may result in the barrel.

Cutting & Pre-Polishing (Dry Tumbling)
Our Dry Abrasive Cream and Dry Cutting Cream produce smooth cutting without caking on parts or clogging

Barrel Finishing Guide, continued

recesses. This abrasive compound must be removed from the barrel after each run of 16 to 24 hours because the pumice in the cream breaks down after approximately 20 hours of running time. If it is not removed, the broken down compound will dirty the plastic and barrel and retard the action of any new compound introduced. Automatic removal of the compound can be achieved by running the barrel with a screen door.

There will be times when a pumice and compound mixture should not be used since it will clog holes or recesses in the parts. In such a situation, Shynolyte Pre-Polishing Cream can be applied directly to wood pegs.

Although the abrasive process creates a smooth surface, the surface will not be smooth enough to take a polish and further abrasive operations are necessary.

Polishing (Dry Tumbling)
This is the most critical operation in the finishing of plastic parts. Should the surface of the plastic parts be too rough, a satisfactory finish cannot be obtained.

As a general rule, a cream is used as the polishing agent and applied directly to wood pegs. Finishing creams consist of waxes and/or abrasives. The drawback of a cream made with waxes is that the wax is removed during handling, thus eliminating the polish. It is wise to polish with a combination cream of wax and abrasives such as our Microlyte Polishing Cream or our Metaglos Polishing Cream for metals. Waxes can be mixed with an abrasive, serving as a lubricant while receiving some protection during handling.

Plastic parts should be relatively clean before going into the barrel for polishing. Enough cream should be placed in the barrel or the wood pegs will scratch the parts. The wood pegs must be watched for cream and dirt build-up. When there is an excessive build-up, the plastic parts scrape the cream and dirt from the pegs, creating a powder. This powder then nullifies any lubricating agents and the pegs scratch the plastics parts. Placing too many parts in the barrel will also produce this condition as well as cause damage from parts colliding against other parts.

Speed
The RPM of the barrel is very important. Speeds that are too slow will not create enough friction between parts. The best results can be achieved at 28 to 30 RPM, depending on the work to be done and the size of the barrel. Greater speeds will result in a faster action, but a poorer finish. Slower speeds will take longer to do the job, but will be safer for large or delicate parts. When deburring parts, it is best to start at a low RPM to cut the burr instead of rolling it over. The RPM can be increased when this danger has passed. For burnishing, a higher RPM can be used.

Small barrels require faster speeds to equal the same amount of surface feet per minute as larger barrels. Faster speeds may be desirable for deburring parts, but these faster speeds may overcome the force of gravity and interrupt the constant even slide zone within the barrel, causing part impingement, pitting, or damage to the parts being processed. Instead of the parts tumbling, they may become airborne and get pounded or showered with heavy particles, causing impact damage. Where the part surface finish is not important and shorter cycle times are more desirable, this may be an acceptable process, but it is not the best use of the equipment. Continued use at a high RPM will shorten the life of the media by breaking it up faster or it may affect the inner walls or liner of the work chamber.

Barrel Finishing Guide, continued

Slide and Slope
The standard barrel system's efficiency to deburr or polish depends on the ability of the parts and media to slide down a slope created by gravity. If the slope is broken up by too fast of a speed, the parts may become airborne causing part damage and/or the barrel system to become ineffective. Too slow a speed does not hurt the parts, but makes the cycle time longer. When faster speeds are desirable, there should be a greater quantity of water and chemical compound in the barrel to give more cohesion to the mass; this will also soften or buffer the impact or hammering effect of the media on the parts.

If the barrel is turning too fast, the desired sliding action will be adversely affected. Parts will be carried toward the top of the barrel and dropped. This can damage the plastics. The slide of the workload depends on the diameter of the barrel, the RPM of the barrel, the height of the load level and the height of the water level. With a 60% load level and a water level one inch below load level, the greatest slide is obtained at about 150 surface feet per minute (SFPM). At the beginning of the tumbling cycle, a low SFPM will avoid the rolling over of some burrs. The SFPM can be raised after ten or fifteen minutes. A low SFPM will also help protect delicate parts. Too much SFPM will cause the load to fly around in the barrel and create impinging and pitting.

Did you know?

Stainless steel media (page 100) is used for jewelry polishing and silverware burnishing.

Instituting mass finishing and jewelry polishing systems, jewelry manufacturers will save time and money as compared to the more traditional hand finishing techniques. Find out how on page 146.

Burnishing silverware is an economical resolution to repairing the nicks, scratches and scraps received daily in the restaurant business. Commercial burnishing systems will extend the life of your tableware, restore the beauty and shine and save you money. Read more on page 153.

Options to Process Wastewater in a Deburring System

In most cases, modern compounds are designed for safe disposal, although a few may require some pH adjustments before disposal. The main focus is generally on the solids portion of the wastewater. The wastewater will contain the residue from the media which is comprised of the binder, a ceramic or plastic, and whatever abrasive it contains. There will also be fine particles of the metal being cut. Filtering systems, gravity systems and centrifugal separators are suitable processes for recirculating systems or flow-through systems.

Filtering
The filters employed must be capable of removing particles in the five-micron range as a minimum requirement. The least expensive is the bag or sock filter. Bag filters are easy to use, but do not have a large surface area, thus will have to be changed or cleaned more often. Wound filament filters have tremendous surface area and therefore a large capacity for residue. The filter is put in-line and requires a pump to force the wastewater through it. Careful analysis must be made to be aware of the ongoing running costs of these systems, especially in processes that involve heavy cutting and produce large amounts of sludge.

Gravity
Gravity has an inherent advantage over a filter in that no matter how much sludge is produced, the efficiency does not dwindle. The basic principle is to have a large reservoir of water to give gravity time to pull down the solids so the cleaner water can be tapped off the top. The tank will usually contain upright baffles to cause the water to flow up over the baffle and drop out the heavier particles. It can be as simple as a few fifty-gallon drums interconnected or a long stainless steel tank with removable baffles for cleaning. The water must be either pumped up to a raised tank and gravity fed to the deburring machine or gravity fed to the tank and returned to the deburring machine by a pump. Systems have been set up that can run the same few hundred gallons of water in a closed loop for one month.

Centrifugal Separation
Centrifugal separators spin at high speeds to accelerate the gravitational effect. Water enters a spinning bowl in the center and exits out the top. The sludge clings to the outer wall as the water is forced out from the center opening. The advantage of this system is that it is very compact and needs very little reserve water. Since it works ten times faster than gravity alone, much less water is required. The centrifuge can also be used first to remove most of the sludge, followed by the use of a filter for further refinement.

Tumbling Media Selection Guide

The following guide will help to give basic tumbling media information on ceramic media, plastic media and hardwood media selection.

All media perform some basic functions:

- Cushions and supports parts to prevent damage
- Keeps parts separate
- Improves tumbling or vibratory action
- Supplies abrasive
- Performs work such as cleansing, polishing and drying
- Burnishes surfaces
- Deburrs or forms radii
- Works on recesses
- Serves as a carrier for the compound

Which stone size to use is determined by the ability to separate the stone from the part, holes the stone could jam and the ability of the stone to get at the desired surface. Large stones give a rapid cut, but coarser surface and more rounding of edges. Small stones give a slower cut, smaller edge break and a finer surface.

Ceramic Media Selection Guide

Ceramic media is best for heavy cutting and hard metals. Ceramic media will better support very heavy parts than plastic media. Fine threads or a hanging burr can be peened over by ceramics, whereas plastics won't peen. When a small media is required, ceramics offer the best selection.

Plastic Media Selection Guide

Plastic media is used for soft metals (brass and aluminum) or stringy materials to produce a better surface finish and to avoid rolling the burr over into a hole. Plastic media will produce a very smooth finish, but very little shine. Plastic media is good to use when preparing parts for anodizing. Tetrahedrons or cones are good for parts with holes. Triangles are good for corners and flats. Plastic media gives the best surface quality. It does not discolor metal and does not peen over burrs. Plastic media is 30% lighter than ceramic media.

Hardwood Media Selection Guide

When using hardwood media, using larger wood pegs in the cutting step can speed up the operation. Smaller wood pegs are better for polishing. However, consider using the same size wood pegs for all of your jobs, since the dirty pegs from polishing cream barrels can be reused in a cutting step. Dirty wood pegs can be cleaned during dry cutting operations when run with Shynolyte or by running with mineral spirits and corn cob grit.

Tumbling Media Selection Guide, continued

Consider the following factors when selecting media:

I. What shape and size is required to reach the burr?

A. Use sizes that will not lodge in holes or recesses and shapes that have the ability to get at all surfaces.

B. If using small media, does it have to be helped by mixing with a large media to push it and/or help it cut faster? Media is usually mixed at two parts small stone to one part large stone.

C. Which media size to use is determined by:

1. The ability to separate the media from the part.
2. Holes the stone could jam.
3. The ability of the stone to get at the desired surface.

II. Which bond?

A. How bad is the burr?
What is the required surface of the finished part?

1. Large media will give a rapid cut, but a coarser surface and more rounding of edges. Use large media for rapid burr removal if finish is not important.
2. Small media provide a slower cut, a smaller edge break and a finer surface. Use small and well-worn media where a high finish is required.

B. How aggressive does the media need to be?

1. Fine cut vs. coarse cut.
2. Use small media on fragile parts. Large media may bend or damage fragile parts.

C. Are the parts ferrous or non-ferrous?

III. *Can the media chosen be separated out from the part?*

If not, go back to step 1.

A. Choose a size that can be screened or separated from the parts.

B. Screen media often to keep sizing uniform.

C. Consider wear of the media when checking for hole-jamming potential.

Did you know?

Ceramic preformed media is used for ferrous metals. Plastic and synthetic preformed media are used for non-ferrous metals. Non-metals can normally use either depending upon the results to be achieved. Steel or ceramic media is used to achieve a bright shiny burnished finish on all materials. Dry, treated organic media is used for a smooth, polished mirror finish on all materials.

Estimating Machine Capacity

One of the most often asked finishing questions is how to estimate capacity. Given a specific size tumbling machine or vibratory machine, it is necessary to determine the number of parts that can be finished at one time. Conversely, if production requirements are known, barrel tumbler or vibratory tumbler size must be determined. In either case, the number of parts that occupy one cubic foot as well as the length of the finishing cycle must be known. With this information, all capacity problems can be solved.

A few tests can establish the cycle time; however, it is more difficult to estimate the volumetric count since a small error in the measured quantity is magnified when it is multiplied out to actual machine size. With all measurements and calculations carefully made, it may happen that a machine twice the size of another can handle more than twice the number of parts. This phenomenon occurs because the larger barrel (or vibrator) allows more room for the larger parts to rotate past one another. The result is a change in the effective media to parts ratio.

A large part in a small barrel may require a 5:1 media to parts ratio. Put the same part in a larger machine and this ratio may drop to 4:1 or even 3:1. In such a case, the actual ratio would be higher than necessary. This can be used as an advantage. We recommend a minimum ratio of 3:1 for most parts.

Total barrel volume is generally used to determine the load for a tumbling barrel. Half the total volume is considered to be the useable volume, since barrels are usually run 50% full. Ideally, three times more media (if media is used) than parts should be present in the barrel. This provides a proper cushion to protect the parts. Using these proportions, the rule of thumb is that the parts should comprise $^{1}/_{8}$ of the total barrel volume. However, the media to parts ratio can be smaller when using barrels of 15 cubic feet and larger. A typical ratio for large barrels is $2^{1}/_{2}$:1.

Vibratory machines are usually run 90 to 95% full with a media to parts ratio of 3:1. Here again, the larger machines allow closer ratios. A rule of thumb for vibratory finishing equipment capacity is to divide the total volume by four to obtain the volume of parts that can be processed. Use water sparingly since too much water will stop the action in the machine.

When trying to select a machine to fit a production requirement, first establish the daily requirement of finished parts in cubic feet. Determine the cycle time and then add 15 minutes for handling. Divide this time into an eight-hour shift (taking into account coffee and lunch breaks) to obtain the number of runs possible per day. Divide the daily requirement by the number of runs possible to determine the volume of the parts to be processed in each machine. Multiply the volume of parts to be processed by each machine by eight for a barrel tumbler or by four for a vibratory tumbler to determine the machine size needed.

TTM
Barrel Finishing
Tilting Tumbling Machine
page 8

Vibratory Finishing Guide

Although vibratory finishing techniques are similar to barrel finishing and usually involves the same components (water, compound and media), the equipment is different. The vibratory finishing process creates smoother surfaces and can abrade inside deep cavities or tubular parts. A vibratory finishing process can finish a variety of parts (e.g. fragile or extra large) which the barrel tumbler is incapable of finishing. Vibratory tumblers are safer for delicate parts or large parts that could be damaged in a barrel tumbler, since the part only moves a fraction of an inch per stroke, as opposed to sliding the full diameter of a barrel tumbler. Vibratory machines are easier to load and unload, will abrade or polish in less time, keep parts cleaner and maintain a better color. They are also more easily automated or semi-automated, can process more parts than a barrel tumbler of the same size, can recirculate water and compound, cause less media wear in proportion to the amount of work performed and permit faster inspection of parts. Listed below are a variety of factors that make for a successful vibratory finishing process.

Media
Use the largest possible media for fast abrasive action and best circulation of parts. Of course, the problems of lodging, separation and damaging parts must be included in media selection. Small stones ($^{3}/_{8}$" or less) should not be run at speeds lower than 1600 RPM. Lower speeds will separate parts from media. Plastic media abrades faster when a minimum amount of water is employed and produces a better finish as the quantity of water is increased.

Compound
Plastic media usually requires only a cleaning compound. Ceramic media requires occasional runs with abrasive compound to remove glaze. When using a heavy abrasive compound, do not recirculate water.

Water
Use the minimum amount of water possible to achieve the best cutting action. As the water flow increases, the cutting action is nil. At this point, the media will burnish (shine) the parts.

If two different types of metals are being processed in the same tub, a heavy flow of water will prevent contamination. Small media generally will hold large amounts of water after it has been running for some time, reducing circulation. (When this occurs, turn off the machine and the pump for a few minutes to permit excess water to drain off. Restart without the pump.) Abrasive action increases as water use decreases. However, surface finishes become worse. Large amounts of water are generally necessary for polishing.

Frequency and Amplitude
Bulky or fragile parts should run at fast speeds, but low amplitudes. This is also true if a low part to media ratio is employed. Fast speeds and small amplitudes produce the best surface finishes and should be used for polishing operations or internal deburring. Increasing the amplitude of the vibrator improves circulation of the parts and creates a more abrasive action to speed the cutting rate.

Vibratory Load
Vibrators work best when they are 75-90% full. A volume ratio of three parts media to one part metal will prevent injury to critical parts. A "rough" job can be run on parts without using media. Thin flat pieces can tend to stick together. Adding very small media will help keep them separated.

For more information, refer to *Estimating Machine Capacity* on page 129.

Speed
Very few vibrators have a variable speed control. The usual frequency is 1700 vibrations per second. Once the speed drops much below this, the parts can sink to the bottom.

Small Vibratory Finishers

There are two basic types of small vibratory finishers, the tub finisher, which is a rectangular tank with a rounded bottom, and the bowl finisher, which is shaped like a doughnut. The tub finishers are more aggressive than the bowl finishers, but the tubs are usually more expensive to build and are not as popular due to high prices.

There are two drive designs available in the bowl machines. The most common design has a single weight mounted on a motor that is fastened under the bowl. As the weight spins, it causes the bowl to wobble at a high speed. The other drive available has a two-weight system where the second weight is on the top of the motor in the cone center hub. The single-weight system produces a nice rolling action from the outer edge to the center, but very little spiral action. The two-weight finishing equipment system, which is usually more expensive, produces both the rolling action and the spiral movement around the bowl, which is the same action achieved in the large machines. The spiral action keeps the parts spread out around the bowl.

Since things are scaled down, water flow must be carefully regulated, as too much water can bring the cutting action to a halt. Machines with a drain in the bowl will allow a constant flow of solution to flush the parts clean. Use the least amount of water that will still keep the parts clean. Bowls that do not have a drain will require a compromise between cutting time and clean parts. If you can, add a drain to the bowl.

Always be very careful when measuring compounds for use in small vibrators. A few extra drops of cleaner could cause excessive sudsing, which will slow down the action. Follow the compound manufacturer's recommendation for usage.

Small machines will work better if the load is at least 3/4 full. Not enough of a load causes poor circulation of the parts as well as 'ding' marks.

If small media must be used for a job, it should be mixed with a large media to push it around. Small media by itself tends to cling together due to the surface tension of the water. By adding some large media to the load, the small media will circulate much better. The best ratio is one part large media to 2-3 parts small media.

The cutting action in a small machine can also be aided by using a mildly acidic compound when possible. The acidic compound lowers the surface tension of the solution and reduces the lubricating properties of the water.

With small vibrators, careful measuring can produce a big difference in the results.

Note: All rules and advice here are aimed at vibratory finishing systems that have over one cubic foot capacity and are driven by at least a 1/2 HP motor. When working with less powerful motors, generally less than 1/4 HP or one cubic foot, the system is less forgiving of mistakes. Since there is less power per cubic foot in these small systems, an error in the setup could cause extremely long cycles or 'ding' marks on the parts.

E50 MB Series
page 18

Tumble Blasting Guide

Tumble blasting removes hard-to-get-at flash and burrs. Finishing small parts with recesses or blind- or cross-holes can pose problems. Tumble blasting can do the job consistently and economically.

How can you remove flash and burrs located in part areas that are inaccessible to tumbling and vibratory media? Many jobs can be deflashed and deburred by sandblasting. Small particle size can penetrate restricted areas, but doing this in large volume has often been a problem in the past. Systems with conveyors are expensive to build and require many blast guns, consuming large volumes of compressed air. "Wheel machines", which sling the grit at parts, are even more expensive to purchase and operate.

TB2 page 65

Kramer Industries has devised a tumble-blasting machine that can finish large volumes of small parts consistently and economically.

- Random tumbling action provided by a slowly rotating screen basket presents all reachable part areas to a steady stream of media blasted by compressed air from a single gun.
- The basket rotates at only 2 RPM to avoid damaging delicate parts. Even die-cast parts with external threads can be finished without peening the threads.
- Variable blast pressure, blast media and cycle time provide consistent results for a wide range of jobs.
- Part finishing is thorough. Drill burrs from intersecting holes and flashed-over holes as small as .010 inch in diameter can be removed. In addition, surfaces can be easily texturized to produce a more appealing surface finish.
- While cycle times vary, experience has shown that most jobs can be done in about a 20-minute cycle. The addition of an extra blast gun can be provided for very stubborn flash.

Presently, five Kramer tumble-blasting models are available:

- A bench unit for lab work or miniature parts – the TB1 on page 62.
- A 0.5 cubic foot capacity for loads up to 48 lbs – the TB1412 on page 63.
- A 1.0 cubic foot capacity for loads up to 150 lbs – the TB2424 on page 63.
- A 2-cubic foot capacity machine for loads up to 80 lbs – the TB2 on page 65.
- A 3-cubic foot model that can handle 150 lb loads – the TB3 on page 65.

Stated capacities are the actual volume of parts each unit can hold.

Abrasive Blasting Guide

Abrasive blasting will produce an effect that may combine both a cleaning and finishing action. The finishing effect may vary by controlling such factors as hardness of the abrasive, abrasive particle size, velocity of abrasive stream, angle of abrasive gun, distance from the work, method of application and work flow.

As it is applied to preparation of surfaces prior to finishing, abrasive blasting is generally used to replace sanding, wire brushing and pickling. Ordinarily, no other cleaning is necessary because the blasted surface is chemically and mechanically cleaned.

Abrasive blasting can save from 25% to 75% of the time normally required by hand cleaning. Blasting is considered economical. The abrasives are relatively inexpensive and reusable. The general economical advantages of abrasive blasting lie in the reduction of man-hours required to clean and finish parts and needing only minimally trained personnel, yet still having high productivity per hour per dollar of equipment.

Abrasive blasting can make a good finish better and cleaner. It also produces a better tooth for bonding. It is estimated that the surface area of metal increases as much as ten times as a result of the abrasive impact action. This increases the surface to which paint, coating or plating can adhere.

Pressure
Direct pressure machines require less pressure. Whereas a siphon machine is normally operated at 60-90 PSI, the direct pressure machines can function at 15-80 PSI. Operating at lower pressure reduces the work hardening of the surface and reduces warping of thin parts.

Most people sandblast at an air pressure that is too high. When you blast at pressures above 90 PSI, there is an excessive breakdown of the media and very little improvement of the cutting rate.

The Sandblast Gun
Abrasive blasting is supposed to be a scrubbing action, not a peening process. Therefore, the gun should always be aimed at a 60° to 45° angle to the surface being cleaned. When the gun is aimed at 90°, peening occurs and, due to the abrasive particles colliding with the abrasive bouncing off the surface, a very high rate of media wear occurs.

The gun in a siphon machine should be kept at least six inches from the surface being blasted. This allows the spray to spread out and cover a larger area. Blasting a larger circle allows for better overlap of the pattern and yields a more even and appealing finish. The direct pressure units can effectively operate at distances of one foot or more.

KF150DM

PPB Series
Portable Pressure Blasting System
page 48

Abrasive Blasting Guide, continued

The Gun Nozzle
Nozzles made of tungsten carbide are the best choice. Settling for a less expensive, lower quality nozzle ultimately increases operational costs. If your compressor cannot keep up with the blaster, chose a smaller nozzle for the gun. If you have plenty of pressure at the gauge, but don't seem to feel it at the gun, look for an obstruction in the abrasive pick-up line or something stuck in the nozzle.

In a siphon machine, remember to change the air jet (behind the nozzle) every few nozzle changes. A worn air jet will deflect the flow in the gun and cause the abrasive to wear a hole in the side of the gun. If you have enough pressure at the gun, but very poor flow of abrasive, your nozzle is worn, there is a hole in the siphon tube pick-up hose, or the abrasive is so fine that it won't flow down to the pick up area.

The Hose
Replace the siphon hose on a regular basis. When the walls get too thin the hose will collapse and obstruct the flow.

Media
Many types of finish may be obtained by the selection of abrasive and by the adjustment of air pressure in the blasting unit. The more commonly used abrasives are aluminum oxide, white aluminum oxide, urea and other plastic abrasives, corn cob grit, walnut shell grit, glass beads, pumice, crushed glass grit, silicon carbide, steel grit and steel shot.

For the most efficient performance, when the abrasive in the machine has broken down too much, the entire load should be replaced. Adding new material to the old load greatly reduces the performance of the abrasive and increases the amount of dust.

If you are getting a sporadic flow of abrasive, it is being caused by fine material not flowing down to the pick-up area or too much pressure. Banging on the side of the cabinet hopper can test this. If the flow is good after this, your material is too fine or may be moist.

Grounding
Blasting machines occasionally cause shocks from static electricity. If the operator stands on a mat grounded to the machine and the gun is grounded to the cabinet, this will be eliminated. The cabinet can also be grounded to any conduit for insurance.

The Window
Try not to hold a part up to the window. This will cause frosting of the window and make it difficult to see inside.

Did you know?

Walnut shells and corn cob grit are gentle, organic, abrasive blast-finishing media, used to finish delicate non-ferrous metals, such as aluminum and plastics. Corn cob grit's absorption qualities make it ideal to soak up, retain and transfer polishing compounds.

Plastic media, such as urea and melamine, are the most effective media for paint stripping.

Blasting Media Selection Guide

It is important to know the differences in blasting media, since different abrasive blasting media are required for different applications. Blasting media can be used for purposes such as cleaning, stripping, etching, strengthening and polishing. In addition to the media type, grit or mesh size is another factor to consider for your application. The final choice of media depends on the nature of the work required and on the blasting equipment that is employed. The blasting media selection guide below contains a list of the common blasting media and the differences in blasting media.

Aluminum Oxide
Aluminum oxide is the most widely used abrasive in blast finishing and surface preparation Aluminum oxide is an extremely sharp, long-lasting blasting abrasive that can be recycled many times. In addition to the standard brown, aluminum oxide is available in 99.5% pure white grades. Hardness 8-9; Grit size range 12-220; Angular shape.

Crushed Glass Grit
The angular nature of crushed glass grit allows for aggressive surface profiling and removal of coatings and surface contamination. Crushed glass grit contains no free silica, is non-toxic and inert and contains no heavy metals typically found in coal and copper slags. Since crushed glass grit is lighter than many slags up to 50% less media can be used. Hardness 5-6; Grit size range Coarse to Extra Fine; Angular shape; Consumable.

Glass Beads
Manufactured from lead-free, soda lime-type glass, containing no free silica, glass beads are manufactured into preformed ball shapes. Glass beads produce a much smoother and brighter finish than angular abrasives. Glass beads can be recycled approximately 30 times. Hardness 5-6; Grit size range 50-325; Round shape.

Silicon Carbide
As the hardest blasting media available, silicon carbide is has a very fast cutting speed. Manufactured to a blocky grain shape that splinters, silicon carbide grit can be recycled many more times that other blasting media. The hardness of silicon carbide is ideal for etching of glass and stone. Hardness 9-9.5; Grit size range 16-240; Angular shape.

Plastic Abrasive
Plastic abrasives are available in a variety of types that deliver quick stripping rates and consistent performance. This media is ideal for stripping coatings and paint from substrates, including aluminum and other delicate metals, composites and plastics. The relative softness of plastic abrasive media makes it ideal for automotive and aerospace blasting applications. Hardness 3-4; Grit size range 12-80; Soft, angular shape; Urea, Melamine, Acrylic compositions.

DP Series
Direct Pressure Blasting Cabinet
page 37

Blasting Media Selection Guide, continued

Pumice
Pumice is a light, natural mineral that is used chiefly as a mild abrasive. Pumice is ideal for less aggressive operations where protection of the surface is of supreme importance. Hardness 6-7; Grit size range 14-325+.

Steel Shot
Blasting with steel shot is a popular method for cleaning, stripping and improving a metal surface. Steel shot is manufactured into a round ball shape that results in a smooth and polished surface. The peening action of the steel shot produces improved compressive strength to metal surfaces. Hardness 40-51 HRC; Grit size range S-70 to S-780; Spherical shape.

Steel Grit
High-demand, aggressive applications are ideal for steel grit. Steel grit offers a very fast stripping action for many types of surface contaminants from steel and other foundry metals. Softer than 65 HRC; Grit size range G-12 to G-80; Angular shape aluminum oxide, but still angular in shape, steel grit will not fracture as easily making it perfect for creating an etched surface on metal. Hardness 40-

Corn Cob
Corn cob is an organic, soft blasting grit that is safe for delicate parts and soft substrates. As the preferred blasting media for log homes and other wood surfaces, corn cob offers excellent cleaning and stripping properties without damage to the substrate. Hardness 4-4.5; Grit size range Extra Coarse to Extra Fine; Ground, Angular shape.

Walnut Shell
Walnut shell grit is used for applications that require aggressive stripping or cleaning without damage or effect on the underlying substrate. Organic and biodegradable, walnut shell is extremely durable, angular in shape but is considered a soft abrasive. Walnut shell sees utility in applications such as cleaning hard woods and aircraft and automotive stripping. Hardness 4.5-5; Grit size range Extra Coarse to Extra Fine; Angular shape.

Heavy Duty Portable Pressure Blasters

Blast away rust, paint and other unwanted deposits using portable sandblasting equipment. Pressure blasting allows abrasive media to penetrate into the deepest pitted areas of a part to remove rust, paint and debris.

To learn more about our HDPPB Heavy-Duty Portable Pressure Blasting Series, refer to page 56.

For information on selecting the right abrasive blasting media for your parts, refer to our *Blasting Media Selection Guide* on page 135.

Blasting Media Selection Guide, continued

BLASTING MEDIA	Aluminum Oxide	Crushed Glass Grit	Glass Beads	Silicon Carbide
DESCRIPTION	Sharp, long lasting media for fast etching & profiling; Brown/black or White	Silica-free, 100% recycled glass; Efficient, economical stripping	Round, soda-lime glass to produce a bright, satin finish; Minimizes stress on part	Very hard, aggressive cutting media; Ideal for stone, glass and hard surfaces
SURFACE PROFILE	High etch	Medium-high etch	No etch, satin finish	Very high etch
WORKING SPEED	Fast	Fast	Med-fast	Very fast
RECYCLABILITY	High	None; consumable	High	High
SURFACE REMOVAL	Yes	Slight	Slight	Yes
HARDNESS, MOH	8 - 9	5 - 6	5 - 6	9 - 9.5
BULK DENSITY	110 lbs/ft^3	100 lbs/ft^3	95 lbs/ft^3	90 lbs/ft^3

BLASTING MEDIA	Plastic Abrasives	Pumice	Steel Shot	Steel Grit
DESCRIPTION	Abrasive, soft media designed for automotive & aerospace applications	Natural volcanic ash; light-weight, mild abrasiveness	Carbon steel, round spheres designed for polishing and peening applications	Angular, carbon steel for fast stripping & aggressive cleaning
SURFACE PROFILE	No etch, stripping	Low etch	No etch	High etch
WORKING SPEED	Medium	Medium-slow	Medium	Medium-fast
RECYCLABILITY	High	Low	Very high	Very high
SURFACE REMOVAL	Slight	No	No	Moderate
HARDNESS. MOH	3 - 4	6 – 7	40-51 HRC	40-65 HRC
BULK DENSITY	50 lbs/ft^3	35-40 lbs/ft^3	230 lbs/ft^3	260 lbs/ft^3

BLASTING MEDIA	Corn Cob	Walnut Shells
DESCRIPTION	Organic, soft media ideal for soft surfaces such as wood	Angular, organic grit for mildly aggressive stripping w/out damage to surface
SURFACE PROFILE	None	Low etch
WORKING SPEED	Slow	Medium-slow
RECYCLABILITY	Low	Low
SURFACE REMOVAL	No	Very slight
HARDNESS. MOH	4 - 4.5	4.5 – 5
BULK DENSITY	40 lbs/ft^3	50 lbs/ft^3

Burnishing with Steel Shot

Burnishing with Steel Shot in a Vibratory Finishing Machine

- Vibration setting should be set at a maximum or close to maximum.
- The tub or bowl should be filled 55-75% with steel shot and parts.
- Use a volume ratio of three parts steel shot to one part of parts.
- Use a mixture of large shot ($^{3}/_{16}$" - 50-70%) and small shot ($^{1}/_{8}$" - 30-50%). Large shot increases action.
- A small quantity of water should be pumped into the tub or bowl.
- A ratio of one ounce of liquid compound to each gallon of water is advised.
- Compounds that contain soap (usually powders) should not be used. Instead, a liquid compound with a detergent component is recommended.
- Steel shot will not burnish if it is not polished.
- Change compound and water every 4 hours of operating time.

Burnishing with Steel Shot in a Barrel Tumbler

- The most effective action in a barrel tumbler is achieved when the barrel tumbler is filled to 50% of its total capacity. At this level, you will also find that your parts are less likely to damage each other. With this in mind, fill the barrel halfway with steel shot and parts. Use a volume ratio of three parts steel shot to one part of parts (i.e. jewelry).
- Place sufficient water in the barrel tumbler to cover the load (shot and parts) by 1 to 2 inches.
- Add 1 teaspoon of Kramco 910 Burnishing Compound for each quart of water. The barrel should be rinsed out after every run. Fresh water and compound should be used for the next run.
- Processing time for burnishing can be from 1 to 20 hours. Soft metals will take less time than hard metals. When the object of burnishing is to brighten recessed areas or produce a smooth surface, the run will take a minimum of three to four hours.
- Store steel shot in a barrel or plastic container. Cover steel shot with water and a rust-inhibiting compound.
- Steel shot will only polish if it is bright and light colored.

Procedure for cleaning dark or lightly rusted steel shot:

Rinse out barrel. Add sufficient fresh water to cover the shot by one or two inches. Add one teaspoon of Kramco 750 to the barrel for each gallon of water. Run for one or two hours. Repeat if shot is not bright and light colored. Rinse out after run. You can now begin normal burnishing process.

Pre-plate Finishing with a Vibratory Finishing Machine

Competition is forcing management to eliminate costly labor operations. Many jobs can no longer justify the expense of hand polishing. Management is relying heavily on the knowledge and advice of their finishing and plating operators to help choose new systems.

One of the major sectors of mass finishing systems is the vibratory machine. While there are automatic buffers, barrel tumblers and centrifuge finishing systems, none can approach vibratory finishing for the low production cost per piece. With the proper application of media and compounds, finishes in the 10 to 4 micro-inch range can be produced in a vibrator. The system can also be automated to eliminate virtually all hand labor. Die-castings can now go from casting machines to vibrator and then to plating without being touched by human hands.

Generally, vibratory finishers can remove flash or burrs and refine surfaces. Vibratory finishers can also be used as a super active degreasing and chip remover or roughen plastics and metals for good adhesion of coatings.

The vibrator works by causing the media to rub against the pieces. This action is induced by shaking the tub in a circular motion or in the case of the doughnut shaped machines, wobbling. While the load is scrubbing, the vibratory action also causes the load to circulate in the tub at a slow rate. This circulation keeps the pieces apart to avoid impinging on each other. The rubbing activity is not only produced on the outer surface of the piece, but even inside a cup shape or a blind hole. Cleaners or soaps can be pumped through the tub for cleaning or burnishing operations. The action is very rapid due to the high G-force and the fact that the entire load is being cut at the same time and not just a small slide area, such as that which occurs in a barrel tumbler.

The type of finishing operation is determined mainly by the choice of media and compound. Polishing or refining operations for die-castings are usually performed in plastic media with a mild, alkaline compound. The plastic media can provide a 4 RMS finish on soft metals. The media, being soft and lightweight, can cut without gouging or scratching. Even though the parts have a low RMS, there is not much glitter and almost no reflected image. Copper plate is heavy enough to fill the fine microscopic scratch pattern of this media. After chrome plating, the parts appear to have been hand rubbed. This media is not a very aggressive cutting chip; therefore, do not rely on it to remove heavy flash or burrs or bad imperfections.

Heavy cutting is better done with ceramic media. It is more aggressive, but does not produce the flatness achieved with plastic media. To obtain a maximum finish on parts with heavy flash or burrs or bad imperfections, first rough cut with ceramic media and then refine the surface with a short run in plastic media.

Die-castings or rubber-molded parts that are to have finishes other than chrome, such as paint or vacuum plating, must be treated differently. The thin coatings will not show up well over the dull finish of plastic. Ceramic media is used in a heavily glazed condition. When run with the proper soap, the stones take on a glossy surface, causing the stones to burnish somewhat like steel shot, while maintaining a slight degree of cutting ability. Costume jewelry and boutique decorative items with a large degree of detail are run in this manner.

Steel parts, such as seat buckles, requiring a good finish prior to plating, are also run this way, but with highly alkaline compounds. Harder metals will be polished to a very high luster and be

Pre-plate Finishing with a Vibratory Finishing Machine, continued

in the 10 RMS range. Soft metals will have a good shine, but not as bright as the steel parts.

Small die-castings can be run piece against piece, without media, in a dry operation. Parts like electrical fittings or trophy parts are run in this manner. The pieces are run in a vibrator with a small amount of corn cob or sawdust to pick up dirt. In the vibrator, you can expect good flash removal without damaging the details or threads. This process is a good preparation for vacuum plating.

Sometimes parts to be plated have burrs or need the edges radiused. Usually, ceramic media is recommended for steel or stainless steel parts and when practical, plastic media for soft metals. Ceramics have a good cutting rate and are available in many diverse shapes and sizes. Plastic media is not an effective cutting agent below the 1/2" size. Most of the time, non-abrasive compounds can be used, but occasionally an abrasive compound must be added to cut fast enough to avoid rolling over burrs.

The vibratory finisher is also useful as a degreaser. The energy developed in a vibratory finisher far exceeds the power range of ultrasonic cleaners. Soils, such as silicone oil or lapping compounds, can be removed, defying an ultrasonic or a vapor degreaser's capabilities. The pieces can be run with media or, if the part permits, without media.

While the parts vibrate, a cleaning compound is circulated through the tub. The vibrating action rubs the parts while churning the cleaner into all crevices. The chips and dirt are flushed out of the tub as the machine is running.

In order to get a good plating or bonding on plastic, it is necessary to roughen the surface to accept the conductive material or cement. The pieces can be self-vibrated with quartz or pumice added as an abrasive. Ceramic media is added when the part has recesses or pockets. The run is normally only about ten to fifteen minutes long. The parts can be thoroughly rinsed in the vibrator before dumping. This process is an alternative to chemically etching the surface, which can be rather difficult to handle. The vibratory method is an attractive, uncomplicated solution since it does not produce fumes and will handle any plastic.

Since most of these processes use water to carry away dirt or lubricants, consideration must be given to the various methods of drying and rust protection.

The most common drying method is a centrifuge with forced hot air. This process is best for small parts. Water displacing dips can be used when the parts are large, but usually leave a film that must be removed before plating. Vapor degreasers can be used instead of a dip, thus avoiding the extra cleaning operation. When the parts have pockets that hold water, it is best to tumble the parts in hot corn cob grit. When the corn cob is kept hot enough, it can absorb the water rapidly without clinging to the parts.

Rust is usually not a problem when the parts go directly into plating, but when they must sit for hours or days, there must be some additional care. The displacing dip usually contains an inhibitor, such as a wax or oil. The other methods require that a chemical rust inhibitor be added to the rinse water or into the water solution in the vibrator. Kramco 1510 rust inhibitor and light cutting compound can provide rust protection for weeks, even on wet parts, and can be rinsed off in plain water. All parts run through any of the processes described here will require at least one hot rinse to remove the soap or alkali film used, with the exception of those dried in the vapor degreaser.

Degating and Separating Die-castings

Aside from using trim dies, the usual method of degating is to tumble in an open mouth oblique barrel then screen separate the parts. Working with small pieces in very large tumblers means a densely packed load that is too heavy to move easily and has poor flow properties. Too much time is spent moving and screening the parts. One solution is to alter a standard horizontal enclosed tumbler by adding an extra large door opening. The load is then tumble-degated. This process also removes flash and polishes. The solid door can then be removed and replaced by a screen door. As the barrel rotates, the parts fall out, leaving all the gates in the barrel. The parts are degated, deflashed and separated at one station, completely eliminating moving the parts.

This type of unit can also solve another problem that often plagues die-casters when working with small parts. The sprue and runner must be kept on the screen as the parts go through and the sprue often covers or fills in the holes. Since the sprue is heavy, it usually cannot be bounced out of the holes again. The rotating barrel eliminates this problem because it empties the hole every time it revolves.

This principle can also be applied to the oblique (tilt) tumbler. Locks can be added to the mouth of the barrel to clamp on a screen door. The barrel is loaded then the screen door is put in place. The barrel is run at a 45º upward tilt until the pieces are broken off and smoothed out. The barrel is then tilted down 45º, bringing the load forward to the screen. This is a good solution if you already have tilt tumblers, but if a choice can be made, the horizontal barrels will prove faster and more thorough. It should be noted that if a machine has bronze bearings instead of roller bearings, the bronze bearings would need copious lubrication to handle the extra load. Slotted screens or parallel bars have proven successful in allowing thin parts such as loops or zipper pulls to fit through while holding back the thicker gate.

Generally, barrel tumblers are run at a high surface feet per minute (SFPM) rate - approximately 250-300 SFPM. Do not add more fins for more aggressive action. Adding fins will shorten the cycle, but they can severely damage the surface of the parts and close up holes. It is better to increase the speed to get a shorter run.

When planning molds, always minimize the thickness of the sprue at the point of junction. The best configuration is a smooth radius or taper rather than a notch or step. Width is not critical, but thickness is, for a good clean break. The parts should be cool for this type of degating. Warm parts are not brittle enough for a clean break. Temperature should be considered when planning an automated line.

TRS-1 shown with transfer pan
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Degating and Separating Die-castings, continued

Sometimes flash is in an area where self-tumbling or tumbling parts in media will not remove it. If the parts are run in a screen basket in a sandblaster using glass shot, flash can be removed from every crevice without worrying about crushing a fragile part.

There are various machines that are built specifically for the separation operation. One such type has a set of rollers at a slight angle to each other. The rollers rotate counter to each other, spinning the parts to give them a chance to fall through the gap. The gap widens as they move down and each part falls through at the appropriate point. This type of system is very good for small parts that are thinner than the sprue, but cannot handle a large volume of parts.

Large parts can be handled in any volume using a drop-off screen. These are vibrating screens that feed the load to the far end, dropping the scrap through the screen. The parts drop off the end into catch pans. These systems work better than batch screens, where parts can cover the holes. The rotation is utilized to keep the screen clear. The parts feed off the top of the screen while the tabs and scrap fall through into a bin. This type of unit can fit into an automated line.

One thing to remember: it is simpler to plan your shot selection to provide for easy separation from parts when making the mold than to set up elaborate separation equipment later.

Auto & Truck Restoration

Auto and truck restoration has become a booming industry. Whether you are a "DIY" enthusiast, paint and body technician or body shop owner, having effective portable blasting equipment is a necessity. Considering the prices being garnered for impeccably restored muscle cars, vintage sports cars and antique autos, becoming an old car restoration technician could be a very lucrative enterprise.

Pressure Blasting vs. Hand Sanding

Both blasting and hand sanding have their place and purpose in auto and truck restoration. But they are not interchangeable methods and for obvious reasons. The following list will illustrate the advantages of pressure blasting instead of hand sanding:

1. Time and labor savings
2. Removal of pits and rust spots
3. Cleaning of engine parts
4. Accessing hard to reach areas
5. Removal of road grime and gunk from the undercarriage

Pressure blasting is typically for large areas, hard to reach places and when hand sanding would require an excessive amount of work and time.

Classic Car Restoration Equipment and Application
Regardless of the reason for blasting, there is a basic equipment list needed to tackle any old car restoration project.

1. Portable Pressure Blast machine
2. Blasting media
3. Protective clothing, gloves, goggles, mask
4. Wire brush
5. Scraping tools

Obviously the most important component is the blasting system itself. The capacity and duration of blasting time will depend upon your own project. If you are doing a frame-off restoration which includes cleaning the frame and all component pieces, you will want a blasting system with a higher capacity like the Kramer Industries PPB Series Model KF300DM or KF300R. If your auto restoration project is the frame-on method or just general sand blasting to clean off the visible areas, then the Kramer PPB Model KF110DM will handle the job nicely.

The type of media to use will depend upon what particular car pieces you are blasting and what you are trying to accomplish. Walnut shell grit, plastic abrasives and glass beads each offer different finishing characteristics. All of these blasting media come in various grit sizes so be sure to use the proper size and type to get the desired results for your restoration project.

How to Use a Pressure Blaster
When using portable pressure blast equipment for auto restoration, you want to be careful and use an even, steady pattern when blasting the metal. If you stay in one spot for very long or set the air pressure too high, you could blast straight through the car part. Use nice, smooth, steady and even back and forth motions. Keep doing this until the substance is removed and the part is clean and clear.

With auto restoration, your finished project will only be as good as the time and effort you take to prep the vehicle. By blasting away the old dirt, debris and rust, you will make sure your restored car looks better than it did on the show room floor.

Blast Stripping Boats

Regardless of how much fun a boat is, keeping it in great shape requires many hours of maintenance and care. Pressure blasting a boat is an effective way to strip the paint off of the hull in order to prepare the body for refinishing.

Boat Blasting vs. Chemical Stripping, Hand Scraping or Other Boat Stripping Methods
More traditional and time-consuming methods for boat stripping include chemicals, acids and a lot of scraping. Not only is this environmental damaging, it was hard work and often resulted in cramped hands, stiff backs and contaminated water around the area.

Using a portable pressure blasting system will alleviate all of these problems and leave the boat's hull cleaner and completely prepared for fiberglass boat refinishing and repair. Blast-stripping boats dramatically reduces the time needed for refinishing, thus giving you more fun time to use your boat.

How to Blast the Hull of Your Boat
You should have the following items on hand prior to starting your boat blasting project:

1. Portable Pressure Blaster
2. Blasting media
3. Gloves, goggles, mask and protective clothing
4. The boat dry docked or on shore

You will need a good quality pressure blaster, preferably with a 45 - 60 minute blasting time. The Kramer PPB Model KF150DM is ideal for saving time and labor as well as easily removing scale, dirt, debris and old paint.

The blasting media to be used will depend upon a few factors:

1. The composition of the boat's hull
2. The amount of build up on the hull
3. Whether you used your boat in fresh or salt water

Although most boats are made of fiberglass, there are a few wood boats still being used and these gorgeous wooden wonders, which are quite sought after by collectors, do require a softer media for blasting. If you hull is wood, you should only use walnut shell grit and if the hull is fiberglass, you can use Plastic Abrasives or Walnut Shell Grit. Both media types come in an array of particle sizes designed for various removal requirements. Choose the media carefully to achieve the desired surface finish and preparation.

You will want to use broad, smooth strokes are you are using the blasting system on the boat. Do not leave the nozzle on any single spot, otherwise you will blast through the hull and create a repair problem. Always start from the top of the boat hull and work your way down, back and forth across from bow to stern.

Once you are done blasting the hull of your boat, you should now have a smooth, clean surface to refinish. Boat blasting will not only save you time, expense and labor; it will add years to the life span of your vessel.

Regardless of how much fun a boat is, keeping it in great shape requires many hours of maintenance and care. Pressure blasting a boat is an effective way to strip the paint off of the hull in order to prepare the body for refinishing.

Firearm Cartridge Polishing

Ammunition reloading is an economical alternative to purchasing ready-made bullets. Especially if you are an avid marksman or target shooter - professional or amateur - the cost of ammunition can become astronomical. Spent cartridge polishing and brass cartridge case polishing become attractive options in these cases.

Reloading vs. Ready-Made Bullets
Besides the cost savings, reloading your own shells and cartridges allows the enthusiast to customize the bullet with heavier or lighter grain balls and more gun powder for additional acceleration. With ready-made bullets, the selection is limited and high-powered loads are not easily found. However, you can collect your spent casings and begin reloading immediately.

Firearm Cartridge Polishing and Cleaning
If you have ever seen a spent bullet casing, you know it is a filthy-looking mess. One of the steps for reloading cartridges involves brass cartridge case polishing. This is to remove the gun powder marks and dirt while restoring the casing to its pre-fired shine.

This process of spent cartridge polishing and shell casing polishing is fairly simple and quick. This is due to the casings being made from brass. Brass is a soft metal and does not require too much effort to clean and polish. The following list of equipment is necessary to completely and properly polish spent brass cartridges and shell casings:

1. Vibratory Bowl Machine
2. Walnut Shell Grit
3. Corn Cob Grit

You want to purchase a good quality vibratory machine that will handle the amount of spent brass casings you need to polish for reloading. Kramer Industries offers three sizes in their Mini-Bowl Series Vibratory Machines. Any one of these bench model systems is excellent at cleaning and polishing spent cartridges and shells.

There are two different polishing media used in the polishing process: walnut shell grit and corn cob grit. Both come in a variety of particle sizes; which one to use and in what size will depend upon the number of shells being polished as well as the type (i.e.: rifle, shotgun, pistol) and caliber size.

Once the vibratory machine is finished with the cleaning and polishing cycle, your brass is beautiful and ready for the next step in the reloading process.

Always make sure to read the directions carefully before loading the vibratory machine will casings and grit. Also double check that you properly closed and locked the machine prior to turning it on. Don't over load the compartment with brass or grit; the shell casings will not be adequately cleaned.

Reloading spent cartridges and shells is a relaxing way to spend some time saving money and doing something for you as well. It's a hobby anyone can try; all you have to do is pick up after yourself at the end of target practice.

Jewelry Polishing

Jewelry polishing and burnishing by hand is a labor intensive craft which although very beautiful and detailed, is far too expensive to use in a mass production environment. Instituting mass finishing and jewelry polishing systems, jewelry manufacturers will save time and money as compared to the more traditional hand finishing techniques.

Mass Jewelry Burnishing and Finishing
In the jewelry manufacturing industry, mass jewelry polishing systems and jewelry burnishing of pieces has quickly and quietly become the most effective tool and yet many still do not use it or understand the process. Once the manufacturer takes the time to learn about jewelry mass finishing and implement the system in the production flow, the results are as follows:

1. Dramatic reduction in labor costs vs. hand polishing
2. Significant increase in quality control
3. Increased productivity
4. Reduced loss of precious alloy

The purpose of the process is to polish/finish jewelry in a quick and convenient manner in order to get the pieces to market sooner.

What equipment is needed to set up a mass jewelry finishing system?
There are generally 3 items required in setting up a mass jewelry finishing system:

1. Barrel Tumbler and/or Vibratory Bowl Machine
2. Stainless Steel Burnishing Media
3. Walnut Shell Grit
4. Polishing Compound

The primary component to purchase is the jewelry polishing machines themselves, the two most common being sold are a barrel tumbling system and a vibratory bowl system. Both are more than capable of handling a variety of jewelry finishing needs.

The Barrel Tumbling System rotates the jewelry pieces and media inside a cylindrical barrel causing the items to tumble over and over again. This tumbling action combined with the proper media will polish the jewelry pieces to a beautiful brilliance. Kramer Industries MT Series Wet Barrel Mini-Tumbler System or the K14 Series Wet Barrel Tumbler System is ideal for this application and both come in a various sizes to accommodate any capacity needs.

The Vibratory Bowl System is a widely used type because it is very effective and cost efficient. These systems are very low maintenance, high quality finishing of all of the jewelry pieces and can polish virtually any item suitable for mass polishing. The Kramer MB Series Mini-Bowl Vibratory Systems offer a wide range of capacities suitable for any size operation.

The preferred media will either be stainless steel media for burnishing and walnut shell grit or corn cob grit for polishing. The stainless steel media will make the metal surface very hard and very shiny while the walnut shell or corn cob grit will finish the jewelry pieces to a high luster.

For a truly deep brilliance, use a burnishing compound with the stainless steel media. The Kramer Kramco 910 Burnishing Compound is a terrific product designed with jewelry polishing in mind.

Having the right equipment for mass jewelry finishing will save time, money and enable you to provide a high quality product for your customers.

Microdermabrasion

Microdermabrasion treatment is taking the cosmetic industry by storm. Everywhere you look another company is releasing their version of this super-exfoliating product. News media outlets, both traditional and online, have been extolling the beauty benefits of spa microdermabrasion.

And yet there are still many, many people who do not know what it is, why they should use this excellent facial exfoliating product and, more importantly, how to use a microdermabrasion cream or system.

What is Microdermabrasion Treatment?
Microdermabrasion is a procedure in which the skin is "blasted" with micro-fine particles of white aluminum oxide or corundum particles. As the area of the face, neck or chest is being pelted with corundum particles, it is also being "vacuumed" to remove the dead skin cells and the just-used white aluminum oxide.

The typical microdermabrasion procedure lasts about 25 minutes but may take up to an hour if you include the neck and upper chest area in treatment. Both dermatologists and spas offer traditional microdermabrasion procedures.

An alternative to the traditional blast procedure is a cream or two-step home system. Most cosmetic companies use the white aluminum oxide particles for the abrasive component in their products. The results can be very similar to the spa or medical procedure; it just takes more treatments.

It is critical that the abrasion media be a material which contaminate free, thus the reason why white aluminum oxide is the preferred choice of most manufacturers. White aluminum oxide is an ultra-pure grade - 99.5% contaminate free and contains less that 0.2% silica making it safer to use than even sand.

Why try Microdermabrasion?
As we get older, our body no longer has the ability to effectively slough off the dead top layer of skin (stratum corneum) as it did when we were young. Because of this our skin starts looking dull, lifeless and rough while the pores can become clogged causing breakouts.

If you have mild or light scarring from acne or fine lines and wrinkles, you may be a candidate for Microdermabrasion. By having a series of treatments, many fine lines, wrinkles, skin discolorations and light scars will be lessened if not removed.

Most people see results after their first microdermabrasion treatment; their skin looks fresher, revived, and more alive. With each treatment, your skin will become clearer, softer and regain the youthful appearance it once had.

Although the at-home creams and the office or spa microdermabrasion procedures have some basic similarities, there are very specific and important differences.

Microdermabrasion, continued

Similarities include:

1. Exfoliating dead skin cells
2. Improving skins appearance
3. Use of white aluminum oxide media as the abrasive

Differences are:

1. Office or spa procedures are performed with equipment by a technician
2. The corundum is a much finer (smaller) grade than in creams
3. The traditional procedure is more effective
4. Only one procedure every two months traditionally vs. every two days with cream
5. The degree of abrasion can be regulated with office and spa procedures

Tips and Hints on Microdermabrasion
Be sure to apply toner, moisturizer and sun screen immediately after a microdermabrasion treatment - whether it was a procedure or at home products.

Avoid exposing the treated skin to direct sunlight (7 days if procedure, 1 day if at home).

Expect some redness after microdermabrasion; it should go away within a few hours.

Do not use a complete face of make-up for 24 hours after having the procedure.

Do not use alpha-hydroxy acid or glycolic acid products or skin exfoliation scrubs for at least 72 hours after a microdermabrasion procedure.

The one thing to remember is take care of your skin - always. Microdermabrasion gives you the chance to help erase the mistakes of poor skin care. Use a good skin care regimen and protect your skin from the sun and weather. This coupled with regular microdermabrasion treatments using high quality products and procedures will restore the youthful appearance and glow your skin once had.

Did you know?

Using a high purity white aluminum oxide will offer the best results. Whether in a traditional microdermabrasion blasting procedure or in an exfoliating cream, 99.5% pure white aluminum oxide is ideal.

Non-Skid Flooring

Just about any floor surface that routinely gets doused with water, oil and other slippery substances should be treated with non-skid coatings to prevent falls and injuries. Applying non-skid flooring is very easy, and considering the increased safety factor, well worth the investment of your time and money.

Uses for Non-Skid Coatings/Flooring
The number of places to use concrete floor coating is almost endless; in fact just about any surface that is walked has a need for an anti-slip floor treatment. Here are just a few places where concrete floor coating would be useful:

1. Public building entrances and exits (inside and out)
2. Boats
3. Garages – homes and businesses
4. Pools
5. Ramps
6. Loading docks
7. Utility rooms
8. Laundromats
9. Daycare centers

The entire floor does not have to be made non-skid, just the areas most likely to have water or slippery substance spills occur.

Application of Anti-slip Floor Coatings
The secret to industrial floor coating for a non-skid floor is the use of media or particles in between the layers of coating. Generally there are three types or kinds of media used for the particle layer:

1. Walnut Shell Grit
2. Plastic Abrasives
3. Aluminum Oxide

Which media to choose when making your non-skid floor depends upon where the floor is located and what kind of liquid will be spilled, dripped or dropped on it. You will also need to consider the amount of traffic the floor will receive as well as aesthetic concerns.

You will need the following items in order to do your non-skid flooring project:

1. Floor coating base and top coat
2. Abrasive media
3. Paint brush and/or roller
4. Gloves, goggles, mask and protective clothing

Non-Skid Flooring, continued

Before you apply the base coat to the floor, you will want to thoroughly clean and completely dry the area you plan to apply the non-skid floor coating to. Then you will apply the base coat using either a brush or roller depending upon the size of the floor you are coating.

While the base coat is still wet, apply the media all over the coated floor; it doesn't have to be pretty, evenly dispersed or heavily applied. Just make sure you get the some of the media over the entire wet base coat.

Let the media sprinkled base coat dry completely and then apply the top or sealer coat for a beautiful non-skid floor. Be sure to keep the freshly treated floor roped off until it is totally dry.

You don't have to spend a lot of money on a non-skid flooring application system that uses little confetti circles in order to have a slip resistant floor. With a little planning you can have the peace of mind knowing you are protecting yourself, your family and/or your customers by using an effective and simple procedure to make your slippery floor safe and skid proof.

So many choices.
Which media best suits your job?

An angular shaped, cost-effective grit, crushed walnut shell is the most popular for non-skid surfaces. A large range of particle sizes offers flexibility and economy for use with different coating materials and procedures.

The ideal grit for non-skid flooring, aluminum oxide is hard and abrasive. A durable, long-lasting non-slip surface can be achieved using aluminum oxide with almost any floor coating material.

To achieve a soft but durable non-skid surface, Plastic Grit Media is the perfect choice. Available in different mesh sizes and hardnesses, the proper balance will lead to a safe and durable non-skid surface.

Pumice Powder Media

Pumice granules have been used in abrasive hand pumice soap for decades - remember those old "Lava" soap commercials? Today pumice powder particles are used in foot scrubs, abrasive pumice hand cleaner, body & shower gels, facial scrubs and even kitchen counter cleaners.

What is Pumice?
Pumice is a volcanic ash which is formed when lava is permeated with gas bubbles during the solidification process. Pumice is very fragile and breaks apart quite easily into small particles. Because lava has similar properties and chemical make-up as glass, pumice is very abrasive but unlike glass, it is very soft. Pumice is the softest abrasive media in use today.

What is the purpose of using pumice in consumer and commercial applications?
Pumice is used as a mild but effective abrasion suitable for a multitude of uses, including in hand pumice soap and pumice hand cleaner. In soap, pumice gives it a light abrasive quality which easily removes almost any grease or grime imaginable. Because pumice is a soft media and a natural mineral, it isn't harsh or toxic to people or the environment.

For commercial applications, Pumice has become the most widely used grit in many manufacturing processes which require a mild abrasive characteristic. Couple this with the fact that pumice can be ground down into a micro-fine powder for handling the lightest of abrasion needs.

Regardless of the application, it is important to perform tests and formulation procedures in order to determine the best grade of pumice to use. The grain sizes required in hand soaps differ from facial uses. Using the incorrect grain size would prove ineffective and possibly damaging to the applied surface.

One other very important key to achieving the desired results is consistency during manufacturing and grading of the particle size from one batch to the next. Select a supplier that constantly monitors and checks for particle size and shape conformity, in this way you can be sure of the quality of your products as well.

Various Applications for pumice include:

1. Facial and body scrubs – to exfoliate dead skin cells
2. Abrasive soaps – to remove dirt and grime
3. Dental supplies and paste – teeth cleaning and polishing
4. Television glass – grinding and polishing
5. Electronics – circuit board metal preparation and cleaning
6. Calcium silicate insulation – ceramic and tile raw material
7. Foot and hand scrubs – to slough off calluses, dead skin and cuticles
8. Kitchen countertops – to remove stubborn stains and polish the surface
9. Car polish – to remove old wax build-up and polish the painted surface

Pumice Powder Media, continued

The one thing to remember is pumice is an abrasive and you do not want to use any product containing it for too long. For maximum effect and proper use, you will use circular motions when applying abrasive soap, scrubs, cleaners or polishers so as prevent "burning" an area from concentrating your actions.

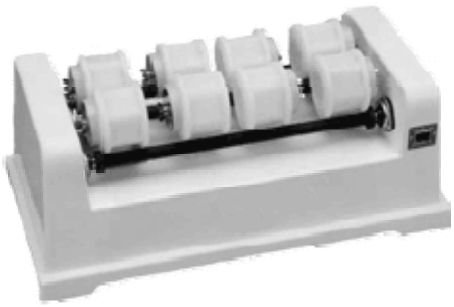
You also do not want to put a lot of effort or "elbow grease" into applying the abrasive cleaner. It is not necessary and will only cause scratches or redness. Instead use a very light application of the scrub and wash and dry the cleansed area thoroughly. If you are polishing the finish on your car, just remove any residue with a soft lint-free cloth.

Moderation and a light touch are the keys to using any abrasive soap, cleaner or polisher.

Today, pumice is used in more than just abrasive soap and its ability as a versatile and mild abrasion additive is continually being expanded and innovated.

Did you know?

Specifying a high standard for Pumice particle size distribution is critical to a high quality product. Choosing the proper mesh size of angular, abrasive Pumice will result is a wide range of high quality consumer and commercial products.



MT Series
Bench Model Mini Tumblers
3-Bar Base shown with 8 MT-1 barrels
page 10

Burnishing Silverware

Burnishing silverware is an economical resolution to repairing the nicks, scratches and scraps received daily in the restaurant business. Commercial burnishing systems will extend the life of your tableware, restore the beauty and shine and save you money.

How Do Commercial Silverware Burnishing Machines Work? Commercial burnishing systems are referred to as barrel tumbling systems, in that the actual device is a hexagonal-shaped barrel and, during use, there is a tumbling motion. The movement causes the tumbling media to roll or meld into the nicks and scraps of the silverware. When completed, the silverware is sparkling, shiny and perfectly smooth again.

You will need the following items for silverware burnishing:

1. Commercial barrel finishing system
2. Tumbling media
3. Polishing compounds

There are a variety of sizes and options available in commercial silverware burnishing machines. The Kramer Industries K Series and K14 Series barrel finishing systems are excellent machines designed specifically for commercial use. The K14 Series commercial barrel finishing system is a smaller bench or tabletop model, and the K Series is the larger floor-model size.

K14 heavy-duty, bench model wet barrel tumbler
page 4

Stainless steel shot is the tumbling media used in the silverware burnishing systems. It is recommended for aggressive or faster processes because the particles are substantially heavier than other media; it exerts added pressure and increased resistance which reduces finishing time. Stainless steel shot also eliminates the need for rust inhibitors.

Polishing compounds burnish the finish of the silverware and tableware. Kramer Kramco 910 burnishing compound adds the final brightness and shine during the final phase of the silverware repair and restoration process.

Commercial Uses for Silverware Burnishing Machines

1. Repair and restore flatware and hollowware
2. Repair and restore metal serving dishes
3. Repair and restore metal tableware
4. Polish silverware, flatware, hollowware and tableware

Burnishing Silverware, continued

Do not place dissimilar pieces together in the barrel tumbling machine; it could cause scratches and marring of the items. When loading the pieces in to the burnishing machine do not put hollowware in the barrel finishing machine in the same compartment with flatware or tableware.

Do not try to burnish knives at it usually does not work and can cause more scratches to the finish and can dull the blade edge.

Always carefully read the directions for the silverware burnishing system in order operate it properly. Do not overfill it with pieces or media.

The size of burnishing system to purchase will depend solely upon the amount of traffic your restaurant has on a daily basis and your hours of operation. You will need to determine the number of times the silverware is used, washed and reused each day in order to calculate the barrel tumbling capacity needed as well as the amount of stainless steel shot to have in storage.

Purchasing a commercial silverware burnishing system is a sound business investment for a restaurant and will improve the customer service and appearance of the food presentation impact.

Finishing Buttons and Small Plastics

Buttons are manufactured in several different plastics or can be made from animal horns. It is important to determine the material used in order to apply the correct finishing procedure.

The operations involved include:

- Cutting to remove tool marks or parting lines;
- Refining the surface to remove scratches or roughness;
- Polishing to produce luster;
- Wiping off to remove excess waxes and deposit a sealing coat.

Cutting

Wet cutting is used for heavy stock removal, using pumice as the abrasive along with a few ounces of Kramco 1010 General Purpose Cleaner to prevent the residue from sticking to the button or clogging its holes. Often a ceramic triangle media 1/4" x 1/4" is added to smooth inside the depressed center. Triangles are added at a rate of 1/3 of the load of buttons. Pumice is added at a rate of 1 1/2 lb per gross of buttons. Water is added to cover the load by about 2". Time of run is overnight in a standard 30" x 36" wet barrel tumbler or 24 hours in a smaller barrel. When using this process to produce a dull finish on a processed button, the run can be reduced to 2-3 hours and should be followed by a 1-2 hour run in corn cob grit treated with silicone oil.

Dry cutting is used for softer plastics, such as acetate, or materials that will not tolerate an extended exposure to water, such as animal horns or urea. Wood pegs are loaded into the barrel at a volume rate of three parts wood pegs to one part buttons, filling the barrel to the 50% level. Dry Abrasive Cream should be added at a rate of 1/4 cup per 50 lbs of media. Run time is overnight. When using this process to produce a dull finish on a processed button, the run can be reduced to 2-3 hours and should be followed by a 1 hour run in corn cob grit treated with a small amount of silicone oil.

Refining

This operation fixes the surface and prepares it for polishing. Shynolyte Pre-Polishing Cream is added to the wood pegs at a rate of 1/4 cup per 50 lbs of wood pegs. The buttons are added at a rate of 3 parts media to one part button to bring the barrel load to the 50% level. The run is overnight. For harder plastics, such as urea, walnut shell grit is substituted for wood pegs because it is heavier and harder.

Polishing

This operation abrasively polishes the surface of the button so that if the wax is removed the button does not lose its shine. The wood pegs (or walnut shell grit for harder plastic) are treated with 1/4 cup of Microlyte Polishing Cream per 50 lbs of wood pegs. Add 3 parts media to one part buttons and run overnight to 24 hours.

Wiping

After polishing, there will be a wax film residue on the button that must be removed. Hi-Glos Final Cream is used most commonly with cob corn grit since wood pegs will sometimes remove the wax, but deposit a hard film of its own. Using three parts media to one part buttons and running 1-2 hours will finish the button and restore the shine to buttons that have been dyed.

Tips

Make sure your barrel is filled to the 50% level. Running a barrel less than 50% full produces more action and may scratch the buttons. Your buttons should have a film at the end of the run. If you do not see a film, use more finishing cream.

Log Home Blasting

Log home blasting with corn cob blasting grit is the best technique to maintain and preserve the interior and exterior wood of your log home. By cob blasting (cleaning) the surface of the logs, you will not only remove dirt and debris, you will restore the original appearance to your log home.

Why Blast a Log Home?
It does seem like a silly idea; who cleaned their log home in the Pioneer era - right? Do you see any of those log homes still in existence? Now, this doesn't mean that if they had this capability and a corn cob blaster, there would be thousands of log homes still standing. But it does mean that proper care and maintenance is crucial to the longevity of your house, be it a log home or not.

If you allow dust, dirt and debris to collect on the logs, this could create a moist area that causes decay and rot, leading to degradation of your log home. This can happen inside the home as well as outside. By log home blasting the exterior of your log home at least once a year, you'll clean and maintain your logs for years to come. For the interior, you will want to use the corn cob blaster about every two or three years.

How Do You Blast a Log Home?
You will need a few items to properly clean your Log Home -

1. Portable Pressure Blaster
2. Corn Cob Blasting Media
3. Gloves, goggles, protective clothing
4. Cover or remove furniture and other items that will trap the used media

A high quality portable sand blaster, with at least a 35 - 50 minute blasting time is ideal for saving time and labor. The Kramer PPB Model KF110DM is perfect for log home blasting applications.

Corn cob blast media is the most effective blast media for cleaning log homes without damaging the wood surface. It is virtually dust free, is biodegradable and highly cost effective. Corn cob media comes in 5 different grit sizes from extra fine to extra course. The grit size and amount needed for log home blasting will depend upon several factors:

1. Condition of wood logs to be cleaned
2. Surface area to be blasted - size and interior vs. exterior application
3. Degree of cleaning required

For safety reasons, handle the log home blasting equipment as you would the wand at a car wash. Do not point the nozzle at people, animals or plants and be sure to wear your goggles to protect your eyes.

Do not fixate on one particular area for very long as you could "eat" through the log. Use long back and forth strokes in a repetitious manner. Start from the top log and work down one log at a time. If you encounter a problem area (stains, rot, mold), use very quick, short strokes over and over the area until the damage is removed. When blasting the interior of your log home, use very long strokes only one or two times per log.

Once you are finished blasting your log home, inspect the entire area to make sure all the dust, dirt and debris was removed. By blasting your log home, once a year outside and every 2- 3 years inside, you will maintain the beauty and strength of the logs and remind yourself just how gorgeous a log home really is.

Pool Blasting & Cleaning

Owning a swimming pool requires a lot of patience, knowledge, care, maintenance and constant cleaning. Part of this involves blasting the tile and deck area of your pool. Pool blasting is a relatively easy and fast way to remove calcium and mineral deposits left from the water line on the tile edging. In addition, the deck area will also benefit from being blasted regularly.

Blasting vs. Chemicals and Scrubbing
Let's face it: We barely have enough time to swim, let alone do pool cleaning. So why not dump some extra chemicals or get to scrubbing with a strong lime and dirt cleaner? Adding more chemicals and scrubbing will actually take longer than pool cleaning with a portable pressure blasting system. Besides, who wants to swim in even more chemicals?

Pool blasting is a safe and effective technique to completely remove the calcium and scale deposits on your pool tile - plus it is the quickest method to clean the deck area.

Cleanup is a breeze, and the results are far better than using harsh acids or chemicals.

How to Go About Blasting with Glass Beads and Walnut Shell Grit
Unlike chemical methods, using a blasting system to clean you pool tile means you can go swimming as soon as you finish. For cleaning the pool tile and deck area, you should select a small high-quality portable blasting system. The Kramer Industries PPB Series KF65DM is perfect.

In purchasing the blasting media, you will need glass beads and walnut shell grit. The glass beads are used to clean the pool tile and the walnut shells to blast the deck.

Glass bead media is ideal for blasting pool tile since there is no clean up! The glass beads will sink to the pool bottom where the cleaning skimmer will pick them up during the next cleaning cycle. Plus the glass beads will not harm the tile or the glaze and will leave sparkling results.

Walnut shells are the preferred media for deck cleaning because it is a soft, organic blast media and will not damage wood, pebble topped cement or tile. Walnut shells are biodegradable, making disposable a breeze. Blasting the entire deck is necessary to remove dirt and debris that will cause the surface to become slick and slippery when wet feet go running across it.

The quantity of glass beads and walnut shells your pool blasting project requires will depend upon the size of the area you are cleaning. Always purchase more than enough blasting media - too much is better than not enough.

Be sure to wear gloves, goggles and protective clothing when using the blasting system to clean your pool. Also have everyone get out of the pool and off the deck prior to starting your pool blasting - this includes your pets as well.

Keeping the pool tile and deck area clean by blasting periodically will not only help maintain your pool but also increase its longevity. For ease and quickness, pool blasting beats chemical treatments hands down.

Frequently Asked Questions

How do I pick a system to finish or deburr my parts?

Each type of deburring system has special characteristics. If you know the strong points of a system, you can select the most suitable system for a job. The most common options are:

Sandblasting Systems
Sandblasting propels abrasives at the part via a high-pressure air stream. It can abrade into the minutest details and produce a very even finish. The finish can range from a dull satin using abrasives or a bright satin using glass beads. Sandblasting removes small burrs but not heavy burrs (burrs which are too thick to bend or break off using a fingernail or pencil). Inexpensive manual systems as well as automated systems are available. Use sandblasting for light deburring or scale removal and to provide an even finish for painting or plating.

Barrel Tumbling Systems
Parts can be self-tumbled or tumbled with media. Tumbling is an aggressive system for heavy cutting with abrasives or for producing a shine with polishing media. Tumbling tends to attack edges and round corners more than other surfaces and does not penetrate into recesses well. Tumble parts to remove heavy burrs, round edges or create quick 'safe edges' on stampings.

Vibratory Finishing Systems
Vibratory finishers shake parts and media at high speeds, causing the media to scrub the surface of the parts in an action similar to lapping. Since the parts and the media are moving at small increments on each stroke, the parts are not subject to severe stress or damage. Vibratory finishers produce very smooth surfaces, are safe for delicate parts, and have very good action inside recesses and holes. Vibratory finishing is the preferred choice for general deburring/finishing, deburring/finishing delicate parts and for precision deburring/finishing. Vibratory finishing is also safer for threaded parts, though it is not as good as barrel tumbling for rounding edges or removing tough, heavy burrs.

Which compound should I use?

The compound determines how the media will perform. Kramer's 700 series powder compounds for barrel finishing systems and 1000 series of liquid compounds for vibratory finishing systems work best to protect metal from corrosion. To produce more shine and brightness, Kramer's 900 series powder compounds for barrel tumblers or 2000 series liquid compounds for vibratory finishers work best. Consult our compound selector guide on page 66 for details.

Should I use ceramic or plastic media?

General burr removal can be performed using ceramic media. Ceramic media ranges from very hard for light deburring or polishing to softer media with more abrasive content for fast cutting. Plastic media is used when a part needs a good smooth surface finish, for delicate parts or when harder ceramic media would gouge a soft metal. Plastic media is considerably lighter than ceramic media so it will not distort a delicate part. Consult our *Tumbling Media Selection Guide* on page 127 for more details.

Frequently Asked Questions, continued

Why is my media wearing out so fast?

A ceramic burnishing media can lose 1% of its weight every eight operating hours. An aggressive cutting media can lose 1-2% of its weight every four operating hours. Plastic media will generally lose more than ceramic media due to its softer bond. Aggressive cutting media will wear out more rapidly than burnishing media due to the amount of abrasive added to the composition.

A compromise must be made between long life and fast cutting. Too little load in the machine causes a pounding action that greatly accelerates media wear; adding more media will smooth out the flow.

Why are my parts getting damaged?

Usually most damage is from one part hitting another. Generally, using too little media for the load damages parts. Try to maintain three parts media to one part of parts (by volume), which surrounds the parts in a matrix of media to prevent one part from hitting another.

Increasing the total load height will also help. A barrel tumbler should be run 50% full and a vibratory finisher 80-90% full for optimum cutting and a good finish. In a wet system, adding water will also soften the action.

Why do my parts get dark?

When parts are getting dark, it is usually a case of improper choice of compound or too little compound. Most Kramer compounds are formulated for use at a rate of 1-2 ounces per gallon of water. The ratio should be raised to 2-3 ounces per gallon if the solution is being re-circulated, providing extra chemicals to neutralize the higher load of residue. If the solution is being re-circulated, at some point it must be replaced so protection is not lost. Consult our compound selector guide on page 57 for specific recommendations.

How do I handle waste products?

The wastewater from a deburring system is comprised of cleaning agents, solid residue from the media and particles abraded from the parts. Modern cleaning agents are biodegradable; however, the solids can harm the environment and clog pipes. The solids can be separated out using a gravity settling tank, a filter or a centrifuge. The gravity-settling tank is the least expensive option, but consumes the most space. Filter units and centrifuges take up much less space. Most small systems require only a settling tank and a pump to remove the usable water from the top of the tank.

Why are my parts warping?

Thin parts are sensitive to the compression stress load of glass beads. When blasting only one side, the parts will be unequally stressed and, therefore, warp. This can be avoided by blasting both sides of the part or by switching to an abrasive such as aluminum oxide that will scrub without imparting a compressive stress. It is also possible to minimize the effect by reducing the pressure.

Frequently Asked Questions, continued

Why is my tumbler taking so long to process the parts?

- It could be mechanical. The motor could be running slow due to age or a belt could be slipping.
- Loading the barrel past the 50% level also slows down the action.
- Adding too much compound can produce foam that will slow down the process.
- Adding more water can soften the action.
- Burrs may have increased due to worn tooling.
- Media may have worn down and no longer has the weight to do the cutting anymore. Using fresh media will speed up the cutting process.

Why is my vibratory finisher taking so long to process the parts?

The same rules apply as with barrel tumblers above. In addition, vibratory finishers are particularly sensitive to the water flow through the tub. Reducing the water flow will speed up the action.

Why is my sandblaster not producing finished parts as fast as it used to?

A worn nozzle will reduce the velocity of the abrasive, thus requiring more time to do the job. Replacing the nozzle will speed up the process.

The hose of nozzle may be clogged with a foreign object. Try passing a wire through the hose or nozzle to check.

Working too close to the part reduces the size of the blast pattern and pulverizes the abrasive, reducing its life. Blasting should be done at least six to eight inches from the part if using a suction system and ten to fourteen inches away when using a direct pressure system. Adding fresh abrasive to the machine without removing the old spent abrasive will make the operation very dusty and slow down the action of the fresh abrasive. When adding fresh abrasive, always remove the old material from the machine first. In a suction system there is an air jet behind the nozzle. If this is not replaced regularly, it will cause the air to deflect to one side and not accurately enter the center of the nozzle. This will eventually blast a hole through the side of the gun as well as slow the abrasive pick-up. Replace the air jet every two nozzles.

Operators often tend to hold the blast gun at a 90º angle to the work surface in hope that it will be more aggressive. However, this actually slows down the performance and pulverizes the abrasive. The gun should be held at a 30-45º angle to the work surface. This allows the abrasive to scrub the surface with the least abrasive wear.

If a visible stream of abrasive cannot be seen, one of the above conditions may apply or there may be a hole worn in the abrasive pick-up tube. Check the tube. The wrong blast material might be being used for the job. To remove material or scale, aluminum oxide is fastest. To remove scale and leave a shiny satin finish, glass beads are recommended, but it will take 40% longer than using aluminum oxide.

Services

Repairs and Services

Finishing Equipment Analytical (Lab) Services
Since Kramer Industries has been designing equipment and compounds for the surface finishing industry for three generations, we have accumulated the knowledge to provide the most effective products and guidance to get you the results that you desire. We offer free test runs of your parts in our laboratory. The parts will be returned finished with a report on the process, helpful instruction sheets and the estimated cost to process them.

Call us for instructions on how to send your parts to our laboratory. Tell us about your finishing requirements, then sit back and let us do the work – Right From The Start!

Periodic Maintenance & Repairs
Kramer Industries can reline all of your plastic (PVC) or urethane-lined metal barrels and tubs and your wood-lined barrels. If the lining in your barrel has deteriorated, the barrel can be shipped to our facility and will be returned after being stripped and relined. Please call for more details on barrel finishing or vibratory tumbling repair.

Periodically, the machines manufactured by Kramer Industries require readjustment and recalibration in order to return them to their original specifications. Repairs to a barrel finishing or vibratory tumbling machine can sometimes be performed on premises or in one of our production shops, depending on the work required.

OEM Parts
Kramer Industries maintains records on all machines manufactured for our customers. If a barrel or vibratory tumbling machine requires replacement parts, Kramer can ship most OEM parts within 48 hours. The model and serial number are all that is required to recall all records regarding exactly which parts are required for a specific machine.

Refurbished Machines
Kramer Industries' machines are designed Right From The Start. We have previously owned machines that are refurbished by our production shops as close as possible to original Kramer specifications. These vibratory tumbling or barrel finishing machines are sold quickly so please call us to obtain a list of currently available machines.

Sell Your Finishing Machines
If you are upgrading or no longer in need of your Kramer equipment, Kramer Industries can market your current Kramer equipment for sale on consignment through our marketing efforts. Please call us to discuss our consignment program.

Custom Orders
We build products to your specifications. At Kramer Industries, we specialize in customizing systems, products and procedures. There are many options and custom equipment available. If you don't see something in our catalog, please contact us.

Web Site Information and Support
Visit our Web Site at http://www.KramerIndustriesOnline.com for the most up to date information on Kramer products.

Notes

Ordering Information

CUSTOMER SERVICE & SALES: Call us toll-free at 1-888-515-9443, Monday-Friday 8AM-5PM EST. For orders, questions, information and solutions 24 hours a day, visit us on the web at www.KramerIndustriesOnline.com, e-mail us at Sales@KramerIndustriesOnline.com or fax us at 1-732-650-0556.

ADDRESS: Mail or Ship to:
140 Ethel Road West, Suite U, Piscataway, NJ 08854-5951

CREDIT/PAYMENT TERMS: We accept Visa®, MasterCard®, American Express® and Discover®. We will invoice on a net 30 basis to open accounts with approved credit. To set up an account with us or to review terms, please contact our Credit Department at 1-888-515-9443. Orders may be subject to submission of a credit card prior to processing. Your credit card will be charged as your item(s) ship from our warehouse. Personal and business checks accepted. Payment must be made in U.S. funds and drawn from U.S. banks. An account service charge of $1^{1}/_{2}$% per month (18% per year) will be applied after net payment date. Accounts exceeding payment date of invoice will be put on hold and/or C.O.D. basis until the account is in good standing and reviewed by our Credit Department. Accounts that have to be referred to collections are subject to being charged additional collection fees and/or any applicable legal fees.

MINIMUM MEDIA ORDER: 50 lb minimum for most standard in stock media; 55 lb minimum for most precision media; 500 lb to 800 lb minimum on most custom orders.

MEDIA PACKAGING FEE: There is a $7.00 packaging fee per box for all UPS orders of ceramic, plastic, synthetic and precision media. This fee is included in prepaid freight charges. If an order is shipped collect, an additional charge will be shown on the invoice.

PALLET CHARGE: There is a $10.00 charge for each pallet shipped. Shrink-wrap is included in this charge.

SHIPPING YOUR ORDER: We will process your order through our nearest distribution center for the fastest delivery. We make every effort to ship your order within 24 hours. Items are assessed a shipping and handling fee based on weight. Most orders are shipped via UPS Ground unless you instruct us otherwise. Oversized or heavy items are shipped via motor freight. If overnight or next day delivery is needed, we will be happy to ship your merchandise by any available express service you choose; additional shipping charges will apply. Prices are quoted F.O.B., Origin. Drop shipments to your customers are prepaid and billed directly to you. Our name will not appear on the bill of lading if requested.

SHIPMENTS OUTSIDE THE US: Orders will be quoted at current rates. Any special handling costs or shipping fees will be added to your order.

DAMAGE IN SHIPMENT: Despite our best efforts, items may occasionally be damaged in transit. Freight carriers are liable for damage only when damage is indicated on the bill of lading before you sign for the shipment. Therefore, we recommend that you inspect the outside and contents of all cartons received. If any damage is found, write details on the bill of lading and save the shipment, including the outside container and inside packing material. Ask the delivery carrier to make an inspection immediately. These notations will allow us to make a claim on your behalf for shipping damage. Failure to make such notations makes it extremely difficult to make a claim. For assistance and replacement information, please contact our Customer Service Department at 1-888-515-9443.

BACK ORDERS: Out of stock items will automatically be placed on back order and shipped immediately when made available. Credit cards will not be charged until the item(s) ships.

RETURNS: Most items may be returned within 30 days of receipt, excluding special orders. Please call our Customer Service Department at 1-888-515-9443 for shipping instructions prior to return. Returns cannot be accepted unless written authorization has been obtained. All returns must be in original packing, unused and in resalable condition. Merchandise must be shipped to us prepaid; our warehouse cannot accept COD's. Item(s) will be subject to a 25% restocking and repackaging fee. A merchandise credit will be issued for returned goods; cash refunds will not be issued. Shipping and handling charges are nonrefundable.

TECHNICAL SERVICE: Please contact our Customer Service Department at 1-888-515-9443 before sending or bringing any item back for service. If it is determined that the best course of action is to send that item back to us for service, we will make every effort to repair and return that item to you in a timely manner. For items not under warranty, shipping and handling charges will be applied.

RIGHT FROM THE START GUARANTEE: We want your business, not just once, but for an extended relationship. To make sure we deserve your continued patronage, we promise you 100% satisfaction in every transaction.

LIMITED WARRANTY: Kramer Industries warrants every product it sells to be free of manufacturer's defects for a period of one year to the original purchaser from the date of purchase unless otherwise specified or in accordance with the expiration date of any perishable item. Proof of purchase must accompany the merchandise. The information and suggestions in our technical literature is, to the best of our knowledge, reliable. Due to continuing improvements, actual products may differ slightly from photos. Buyer assumes all risk and liability whatsoever in connection with these products beyond the original purchase price. It is the user's responsibility to determine the suitability of any material for its intended use and to adopt any safety precautions that may be necessary. Since conditions and usage are beyond our control, neither seller nor manufacturer shall be liable for injury, loss or damage, direct or coincidental, arising from the use or misuse of our materials or equipment, including consequential damages, inconvenience or interruption of operation. The above is made in lieu of all other warranties, express or implied. In no event shall Kramer Industries' liability under this warranty exceed the purchase price paid for the product. Any legal actions brought against Kramer Industries shall be tried in the State of New Jersey, County of Middlesex.

Your Online Connection To Surface Finishing

Search our product line, view color photos of machines in action, watch a video of our vibratory finishing equipment and request quotes and additional information.

www.KramerIndustriesOnline.com

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