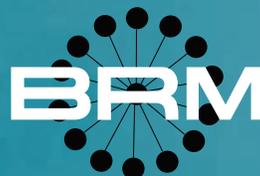




## THE USE OF INDUSTRIAL BRUSHES

Deburring, Edge Blending, RADIUSING Carbon. Weld, Oxide or Scale Removal. Cleaning, Surface Finishing, Polishing or Roughening. With some outside comments on standard deburring practices...  
Right or Wrong.



BRUSH RESEARCH MANUFACTURING CO., INC.

## THE BRUSH INDUSTRY

The brush manufacturing industry falls into three major categories:

1. Maintenance brushes including brooms, push brooms, paint brushes, etc.
2. Personal brushes such as hair brushes, tooth brushes, etc.
3. Industrial brushes

Because this is a field that is critical in manufacturing, production, refurbishing, maintaining, and finishing yet often overlooked or under-researched, we are producing this booklet in hopes that it may give some assistance in helping you determine whether or not a brush application would be suitable to your production needs.



## DEBURRING

Deburring operations cost American companies billions of dollars annually and it is a production headache and frequently the source of bottlenecks in production and refinishing. Brush Research Manufacturing owes its beginnings to the need for special industrial brushes for the aero-space industry where miniaturization of parts and high quality were demanded to be totally deburred and almost surgically clean. One of our very early customers manufactured a device which controlled the braking of aircraft landing wheels and in this controlling mechanism were nine different sizes of holes of which each had to be deburred at the cross holes and each thread had to be deburred and the whole unit had to be completely clean. These holes ran in diameters of .042; .063; .079, etc. and we supplied them with brushes exactly to size made entirely of stainless steel with the fill being .002 and .003 inch. This company's entire deburring section uses nothing but brushes. On the other side of the spectrum we make one large end brush 12" in diameter, of a disc configuration, of stainless steel to impart a particular surface finish in a fuel bail in a nuclear reactor. There are many related jobs where brushes perform extremely well.

We also make the patented Flex-Hone® tool for deburring and super-finishing. The Flex-Hone is a unique tool that, while technically not a brush, deserves a place in this manual.

Each type of job requires a specific tool to accomplish the desired results. This book is designed to help you understand what options are available and each tool's pros and cons. We are also always available to assist you with applications and suggestions.

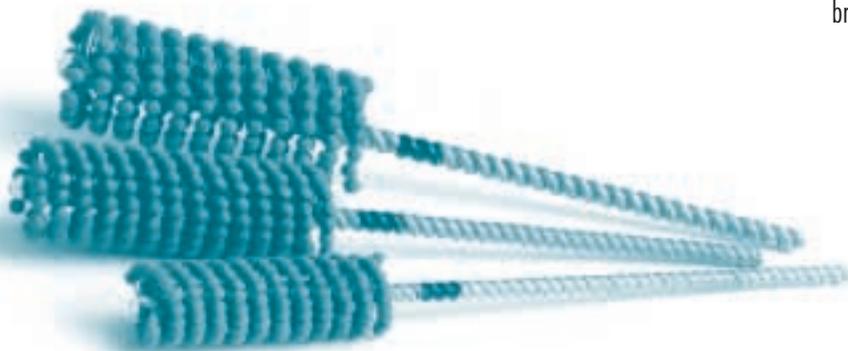
## INDUSTRIAL BRUSHES

Industrial brushes are really cutting tools or cleaning tools. Each filament in itself is a cutting tool or will be if it is worked on its tip. The proper effect will be realized by using the tips of these thousands of filaments at the proper speed with the proper pressure to the work piece. It is a false, though widely believed, theory that states there must be a "scrubbing action" coupled with a great deal of pressure or friction. An industrial brush will perform its best when it is exactly the right size and the right type for the job and is operated at its highest safe speed with the lowest possible pressure.

Supposing you have a very sharp edge on the part to be finished a wheel brush may work extremely well by removing the edge and creating the desired radius without damaging or removing the metal on either side of the edge. This will only be accomplished by having the right diameter of wheel brush, the proper wire size depending upon the type of material which is to be worked, the face width wide enough to give you sufficient product, sufficient power and speed with the brush rotating near its maximum safe limits and the brush wire tips applied only to the edge that requires the metal removal. The brush wires should not be deflected or bent. Flexing of the wires may cause them to bend and sometimes vibrate and will result in wire fatigue at the base, causing breakage.

Using a brush in excess of its maximum safe speed will cause the brush to "self-destruct," potentially damage the material being worked on, and most importantly, is dangerous to the operator and those around him.

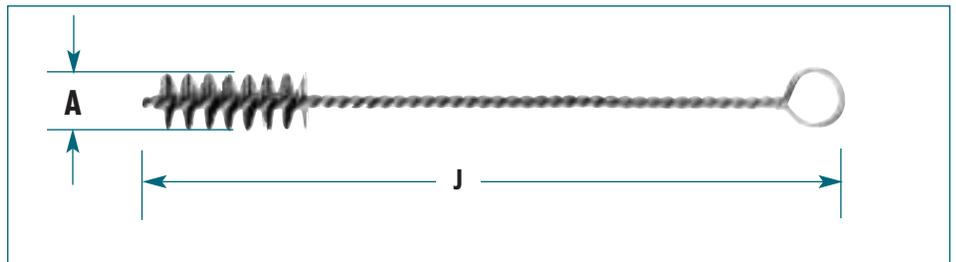
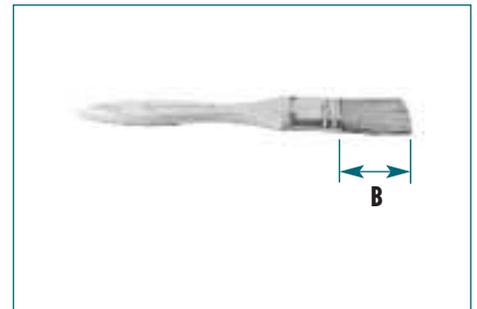
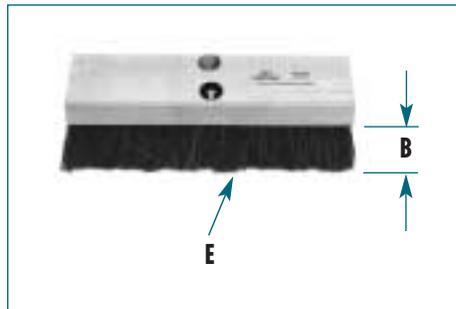
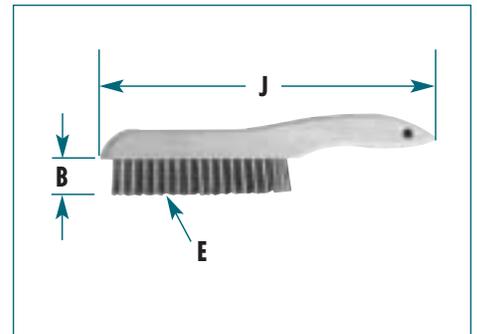
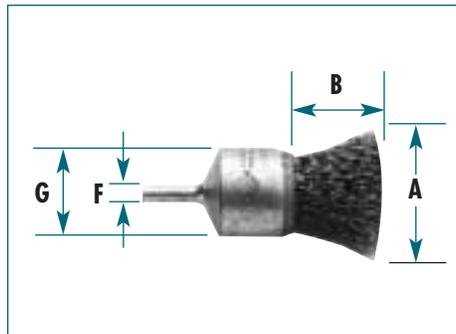
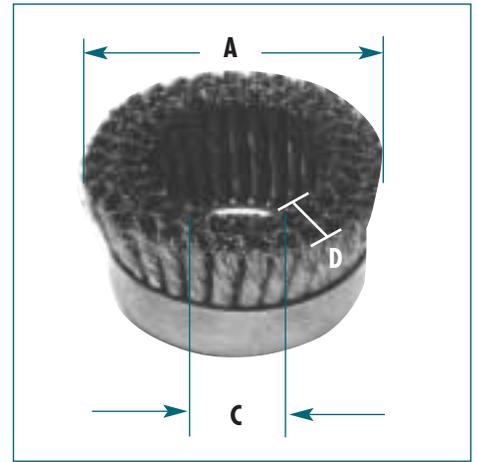
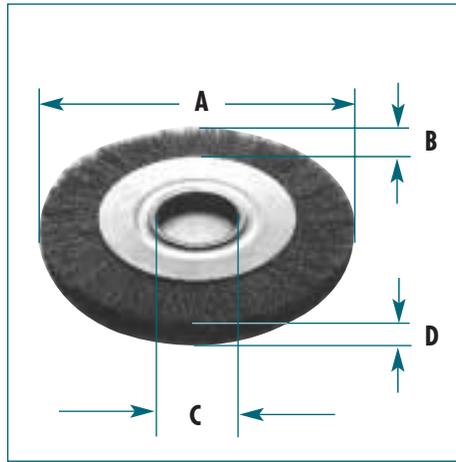
Please read on and learn about the industrial brushes available. Thank you, and enjoy!



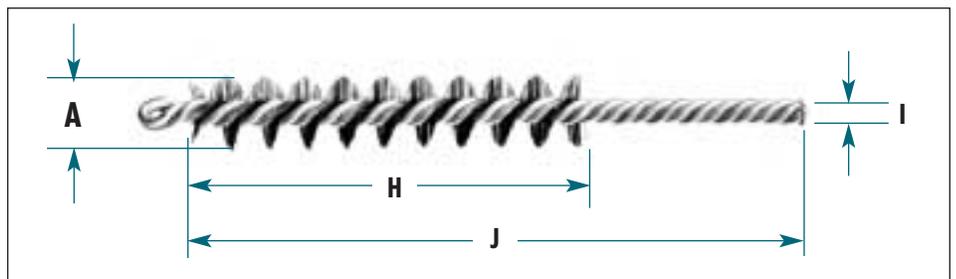
## TERMINOLOGY

These terms may be used throughout this literature, and are important to know when you are looking to order your tools.

- A. Outside Brush Diameter
- B. Trim Length
- C. Arbor Hole
- D. Face Width
- E. Number of Rows
- F. Shank Diameter
- G. Cup Diameter
- H. Brush Part Length
- I. Stem Diameter
- J. Overall Length



**Single Stem** - Single Spiral (Specify if stainless stem desired)



**Double Stem** - Double or Single Spiral (Specify if stainless stem desired)

## POWER BRUSH SAFETY REQUIREMENTS

Warning: In normal power brushing operations, the material being removed, such as burrs, scale, dirt, weld slag or other residue, will fly off the brush with considerable force along with brush filaments which break off due to fatigue.

The POTENTIAL OF SERIOUS INJURY EXISTS for both the brush operator and others in the work area (possible 50 or more feet from the brush). To protect against this hazard, WEAR SAFETY GOGGLES or FULL FACE SHIELDS WORN OVER SAFETY GLASSES WITH SIDE SHIELDS, along with PROTECTIVE CLOTHING.

You must follow all operator and safety instructions, as well as all common safety practices which reduce the likelihood of physical injury, or reduce its severity.

## SUMMARY-POWER BRUSH SAFETY REQUIREMENTS

Safety Goggles- Safety goggles or full face shields worn over safety glasses with side shields MUST BE WORN BY ALL OPERATORS and OTHERS IN THE AREA of power brush operations. Comply with the requirements of ANSI Z87.1-1989 "Occupational Eye and Face Protection."

Guards- Keep all machine guards in place.

Safety Standard Speeds- Observe all speed restrictions indicated on brushes, containers, labels, or printed in pertinent literature. "MSFS" means Maximum Safe Free Speed (RPM) — spinning free with no work applied. For reasons of safety "MSFS" should not be exceeded under any circumstances.

Safety Standard- Comply with the Safety Standards of the Industrial Division of the American Brush Manufacturers' Association and the American National Standards Institute ANSI B165.1-2000 — Safety Requirements — Power Brushes and ANSI B165.2-1982" Safety Requirements- Power Brushes — Wood, Plastic, or Composition Hubs.

**WARNING!**  
FAILURE TO OBSERVE SAFETY PRECAUTIONS MAY RESULT IN INJURY.

## BRUSH USAGE RECOMMENDATIONS

Pressure- Avoid excessive pressure when using a power brush. Excessive pressure causes over-bending of the filaments and heat build-up resulting in filament breakage, rapid dulling, and reduced brush life. Instead of greater pressure on a brush, it is suggested that you try: 1) a brush with a more aggressive cutting action or 2) higher speed.

Brushing Problems — DO NOT ALLOW UNSAFE CONDITIONS TO CONTINUE. Occasionally, due to worn bearings, a bent spindle, an unusual application, operator abuse, or inappropriate use, a brush may fail. A brush which is not received in acceptable condition for trouble-free operation may also fail. Do not use or continue to use a failed brush or one which is functioning improperly as this increases the possibility for further brush failure and hazard of injury. The cause of the failure should be evaluated and corrected.

**CORRECT**  
Tips for doing the work.



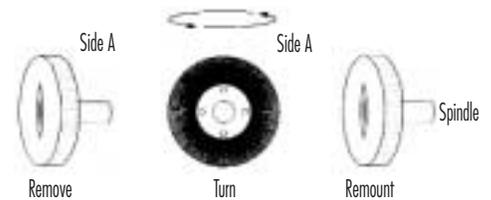
**INCORRECT**  
Excessive pressure can cause wire breakage.



## SELF-SHARPENING

When using wire wheel brushes, periodically reverse the direction of rotation to take advantage of the self-sharpening action that will result.

This information is based on the collective experience of the ABMA Industrial Division members and provided solely as a public service for the guidance of the users of the members' products. These recommendations are not necessarily complete with respect to any particular application and common sense safety considerations should be adhered to generally. Any applicable federal, state, or local law or regulation must be strictly adhered to, and is controlling over any recommendation contained herein.



## WHEEL BRUSHES

The most widely used wheel brush is called the standard wheel brush and the most popular diameters are 6 and 8 inches, although they are available anywhere from 3 to 15 inches. They come in many wire sizes depending upon the work piece and the type of finish that you want. The wire fill is invariable crimped. Crimping is done for mainly two purposes:

1. To make the wires stand apart from each other
2. To absorb the flexing and the vibrations and help prevent wire fatigue and wire breakage

Less expensive wheel brushes may be of untempered wire. You should be careful in ordering a very inexpensive brush made with untempered wire may last only 30% as long as high tempered, quality brush wire. The majority of wheel brushes come with a 2" arbor hole in which adapters are inserted to go on shafts ranging from 1/2" up to 1".

In addition, most manufacturers offer wheel brushes in heavy duty wide face and super duty extra wide face wheels.

When you are comparing brushes between one manufacturer and another, you should always pay attention to the length of trim, which is the length of the wire from the hub, and also the running face width. The running face width is the width of the brush when it is in operation and normally is a different dimension than when you get it out of the box.

It is important to reverse the brush from time to time so that the brush is then running in an opposite direction which will extend the life of the brush and improve its cutting action.

Once again, **a wheel brush should be operated at the highest possible safe speed within its quoted safe speed limits and the lightest possible pressure applied by the work piece to the brush face.**

Wheel diameters are important because of surface speeds. With a 3,450 RPM motor, the surface speed of a 4" brush has a speed of 3,600 linear feet per minute while a 6" brush has 5,400 LFM and a 10" diam. brush would run at 9,000 LFM. Check the free running speed and make sure it is under the recommended maximum safe free speed. A softer or smaller gauge wire might perform better with the proper speed than a heavier wire brush at a slower speed.



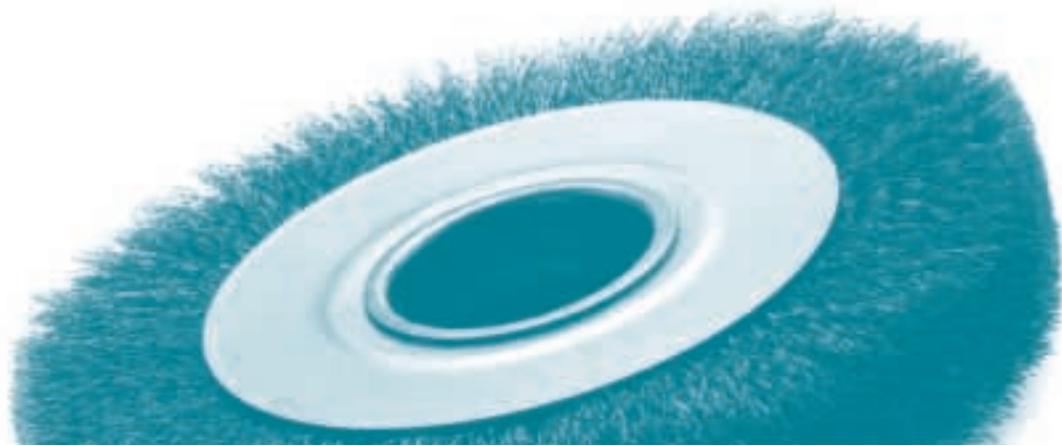
**HEAVY DUTY WIDE FACE WHEEL**  
CATALOG LINE- BDH



**SUPER DUTY, EXTRA WIDE FACE WHEEL**  
CATALOG LINE- BDS



**STANDARD DUTY, MEDIUM FACE WHEEL**  
CATALOG LINE- BDA



## NARROW FACE WHEEL BRUSH

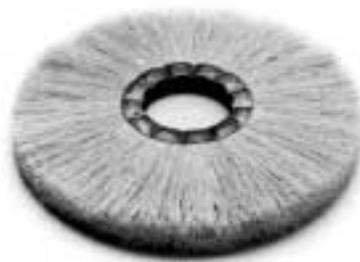
The narrow face wheel brush is normally one with a much longer trim which is used against irregular surfaces enabling the wire to get down into the crevices. This longer trim is also used for polishing because of the softer brushing action. As with all wheel brushes, you should use the largest diameter spindle possible because with a large wheel brush at the proper RPM, a great deal of force is exerted at its periphery.



**MULTI-DUTY NARROW FACE WHEEL**  
CATALOG LINE- BDM

## TAMPICO WHEELS

Tampico used to be the standard in the polishing trade. A fiber from a cactus plant that grows in northern Mexico, it is tough, resistant to oils and heat. Used with a grease-type abrasive stick it does a fine job. Treated tampico brushes are made by coating the wheel with a sticky type of varnish that will hold dry abrasives. Tampico wheels can be used to polish such items as chromed parts, eye-glass frames, etc.



**TAMPICO WHEEL**  
CATALOG LINE- CT AND TWA

## COPPER CENTERS

Copper centers are small wheel brushes from 1" to 4" in diameter. The copper centers are normally available from  $\frac{1}{8}$ " up to  $\frac{1}{2}$ " arbor holes. Small diameters in this type of work have the advantage of being much easier to control by hand by an operator as the rotary motion does not have the same tendency to push itself away from the work area as larger diameters. These also make excellent tube brushes and can be stacked together or spaced apart by putting washers in between the brushes in order to give an area in which dirt, scale, and other debris can accumulate.



**TAMPICO WHEEL**  
CATALOG LINE- CT AND TWA

## TABLE OF SURFACE SPEEDS (FT/MIN)

RPM	1" Dia.	2" Dia.	3" Dia.	4" Dia.	6" Dia.	7" Dia.	8" Dia.	10" Dia.	12" Dia.	14" Dia.	15" Dia.
900	236	471	707	942	1414	1649	1885	2356	2827	3299	3534
1150	301	602	903	1204	1806	2107	2409	3011	3613	4215	4516
1200	314	628	942	1257	1885	2199	2513	3142	3770	4398	4712
1500	393	785	1178	1571	2356	2749	3142	3927	4712	5498	5891
1750	458	916	1374	1833	2749	3207	3665	4582	5498	6414	6872
2000	524	1047	1571	2094	3142	3665	4189	5236	6283	7330	7854
2400	628	1257	1885	2513	3770	4398	5027	6283	7540	8796	9425
2800	733	1466	2199	2932	4398	5131	5864	7330	8796	10263	10996
3000	785	1571	2356	3142	4712	5498	6283	7854	9425	10996	11781
3200	838	1676	2513	3351	5027	5864	6702	8378	10053	11729	12566
3400	890	1780	2670	3560	5341	6231	7121	8901	10681	12462	13352
3750	982	1964	2945	3927	5891	6872	7854	9818	11781	13745	
4000	1047	2094	3142	4189	6283	7330	8378	10472	12566		
4500	1178	2536	3534	4712	7069	8247	9425	11781	14137		
5000	1309	2618	3927	5236	7854	9163	10472	13090			
5400	1414	2827	4241	3655	8482	9896	11310				
6000	1571	3142	4712	6283	9425	10996	12566				

## TWISTED TUFT OR KNOT

This wheel brush is made in tufts with the tufts being twisted approximately  $\frac{2}{3}$  of their length with the top third being slightly flared. The purpose of this is to make the brush more rugged so that the cutting action can be more aggressive. The tufts will also absorb the vibration which helps eliminate the bending and, therefore, reduce wire fatigue. When the wire sizes get up to around the .020 and .030 inch sizes, you will find that the tufts are often twisted almost their entire lengths. These are used a lot in the oil fields where very heavy brushing action is required. An extra wide face is also available.



**TWISTED TUFT**  
CATALOG LINE- BTS, B AND TW (WIDE)

## CABLE TWIST

A cable twist is much like a twisted tuft, only the tufts are twisted their entire length, no matter of the filament sizes. There is also a very narrow face width, called "Stringer Bead," for getting into very small channels such as required in the welding of pipe when you must properly clean and prepare the surface.



**CABLE TWIST**  
CATALOG LINE- BTC, BSTCM (NARROW)

## CUP BRUSH

The cup brush is very similar to a wheel brush except that they are formed into a cup fashion. These can be made in very small diameters with a  $\frac{1}{4}$ " shank with diameters down to  $1\frac{1}{4}$ ". The light duty cup brushes are made with crimped wire, while the tufted cup brushes, which are available in a single or double row, are used in heavier-duty applications. These come in all the various wire sizes and again, you should consider the type of work that you want the brush to do. Picking the heaviest wire size is not always the right answer. We also make certain cup brushes made with a phosphor bronze wire, to be used in areas where a non-sparking brush is required.



**CUP BRUSH**  
CATALOG LINE- BUC, BUS, BUSC, BUDX, BUDXC

## END BRUSHES

All End Brushes come with a  $\frac{1}{4}$ " shank and the size is the diameter of the brush as it comes out of the retaining cup and can be supplied in crimped fill or a knot type tuft. These are normally stocked in high tempered fatigue resistant carbon steel and stainless steel. We are also able to make them in brass, for special applications. They have many uses and can be attached to extensions in order to reach into deep recesses.

The knot type variety is used universally by engine rebuilders for removing carbon from heads. It is essential to operate these within their maximum safe speeds. They should not be operated on an unrestricted, high speed air drill. The tufts will flare outwards which may destroy the tool and could cause injury to the operator.



**KNOT TYPE END BRUSH**  
CATALOG LINE- BNH

We also make an End Brush which we call a deep well end brush. The wire is inside of a tube and as the end wears down, the tube can be cut back to expose new wire. This is invaluable for cleaning small crevices.

Although it is customary to put these brushes into a hand-held electric drill motor or a speed controlled air drill, they might also be used in drill presses. There are many machine shops which have inserted a brush of the right configuration on their turret lathe and used it as their final operation for cleaning, deburring, or finishing.



**SOLID END BRUSH**  
CATALOG LINE- BNS



## ENCAPSULATED BRUSHES

Encapsulated wire wheel, cup and end brushes provide remarkably strong brushing action for fast burr removal and uniform surface blending. The encapsulation holds the wire rigid, prevents fatigue and breakage, and provides for a short trim configuration that gives the fast cutting action characteristic with minimum pressure. The combination of these features creates a substantial increase in safety.

When using encapsulated brushes, it is important to avoid applications to surfaces over 180°F. Excessive temperature will soften or melt the encapsulation material, and may leave a residue that might be very difficult to remove.



**ENCAPSULATED CUP BRUSH**  
CATALOG LINE- BDM-E, BNS-E, BUC-E, CE

## TUBE BRUSHES

As the name implies these are for tubes or cylinders. These are cleaning tools and are available in almost any size of wire in all filament types. It is easy to engineer this brush type to your particular job. It is a fallacy to think that you need one of these brushes grossly oversize or it won't give you a good cleaning job. In fact, you want the brush to fit just right, as it is the tips of the wires that provide the cutting action. Furthermore, you do not need an excessively long brush part. A long brush part will only give you a tool which creates a lot of friction and, therefore, is very difficult to use.

The standard brush terminology for tube brushes is diameter by the length of the brush part by the overall length. A 2x4x8 brush would have a 2" diameter with a 4" long brush part, and an overall length of 8".



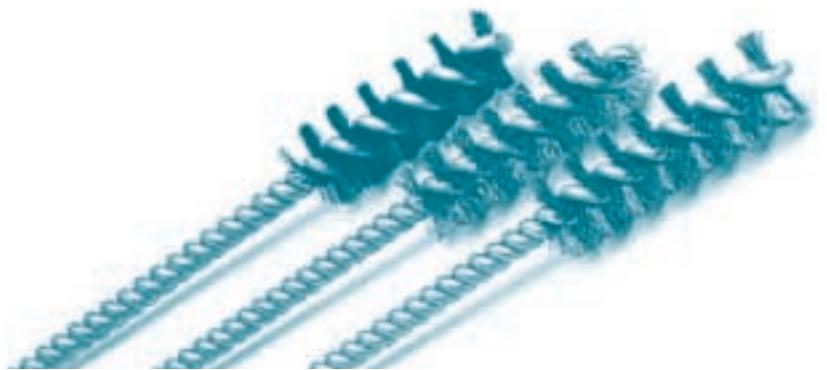
**SERIES 84 TUBE**  
CATALOG LINE- 84



**SERIES 85 TUBE**  
CATALOG LINE- 85

The stainless steel brushes have a tendency to work harden. The stainless stem, in being twisted, work hardens very quickly, and so you will have a stem wire which is extremely hard and relatively flexible. With a nylon tube brush there is a tendency for the filament tips to become sharp after much use, which reduces its cleaning power. Nylon can be used in almost all cleaning solvents and mild acids without damage.

For very fine and delicate work, natural bristle or pig bristle is important because not only will it not scratch, but the ends of the bristle will split or flag, and are excellent in picking up and removing small particles of dust. The natural bristles will not pick up and carry static electricity as the nylon brush is apt to do.



## FLUE BRUSHES

These brushes, once mainly used for cleaning the tubes in boilers, come with either a single spiral of filaments, which is the stiffer type, or a double spiral (porcupine) fill. Both are a four wire construction, but the double spiral fill has each wire separated from the other and is widely used in the plastic extrusion industry. A standard extension may be attached to these for any length needed. These brushes typically come with a pipe nipple adaptor for precisely this reason.



**SERIES 89 FLUE**  
CATALOG LINE- 90

## RADIAL COIL BRUSHES

These may also be wrapped around a shaft or around a drum in order to develop a cylinder brush, designated a "radial coil" brush. The wider the backing is then the larger the drum it must have in order to be able to complete the circle it ruining the backing strip. They can be ordered in almost any length and any diameter. When your brush is worn out, you may then order the coil only and replace your brush on the drum. These have wide and varied uses for the cleaning of conveyor belts, steel plates, plaster board, etc.



**RADIAL COIL BRUSH**  
CATALOG LINE- RADIAL COIL

## HAND SCRATCH BRUSHES

A wide variety of brushes, with a variety of handles are available. Most of the hand scratch brushes can be made with any filament material. These are to be used by hand for any manner of cleaning and polishing.

One of the most popular hand scratch brush is the tooth brush type, Series 93. They are available with a variety of filaments, from stainless steel to horsehair. These are available in either wood or plastic handles.



**SHOE HANDLE HAND SCRATCH**  
CATALOG LINE- B

## STRIP BRUSHES

A very versatile brush that is made almost entirely by machine, whereby the material is held down inside of the channel with a retaining wire and the channels themselves are roll formed over this wire. The channels are either of steel or aluminum. They are size classified by the size of the strip before forming.

It is possible to have the base made with stainless steel retaining wire.



**STRIP BRUSH**  
CATALOG LINE- S



## ABRASIVE NYLON BRUSHES

Abrasive nylon brushes utilize a homogeneous structure that is developed by extruding a combination of stabilized nylon with abrasive grain into a single filament. The abrasives are typically aluminum oxide or silicon carbide, though a silicate is also available.



**SOLID END BRUSH  
(ABRASIVE NYLON)**  
CATALOG LINE- BNSAY

Abrasive nylon, like all other materials, has its advantages and disadvantages as a surface finishing tool. One major advantage is the filament's ability to cut along its entire length, rather than solely with the tips of the filaments. Its other main advantage is the flexibility of its filaments, which allows the brush to finish uneven surfaces with greater ease.



**WHEEL BRUSH  
(ABRASIVE NYLON)**  
CATALOG LINE- NY

The disadvantages to abrasive nylon are mainly its limited applications and heat sensitivity. What is meant by limited applications is that abrasive nylon is primarily a deburring tool for small burrs only, and a polishing tool, but not as well suited for more aggressive applications. Furthermore, the heat sensitivity is an issue, as the nylon heats up and has the possibility of "smudging" or leaving traces of plastic on the material being worked on. To avoid this, apply the least amount of pressure needed to achieve the desired result, check the surface speed which should not exceed 3,000SFPM, and consider using a coolant if necessary. The calculation for surface speed is:

$$SFPM = \frac{\text{Dia. (inches)} \times \text{RPM}}{12}$$

For the proper applications, abrasive nylon can be an extraordinary tool for its combination of features and price.

The abrasive nylon filaments are used to make end brushes, different types of wheel brushes, cup brushes, tube type brushes, and our Nampower™ tools.



**DEBURRING BRUSHES  
(ABRASIVE NYLON)**  
CATALOG LINE- 81AY, 85AY, 90AY

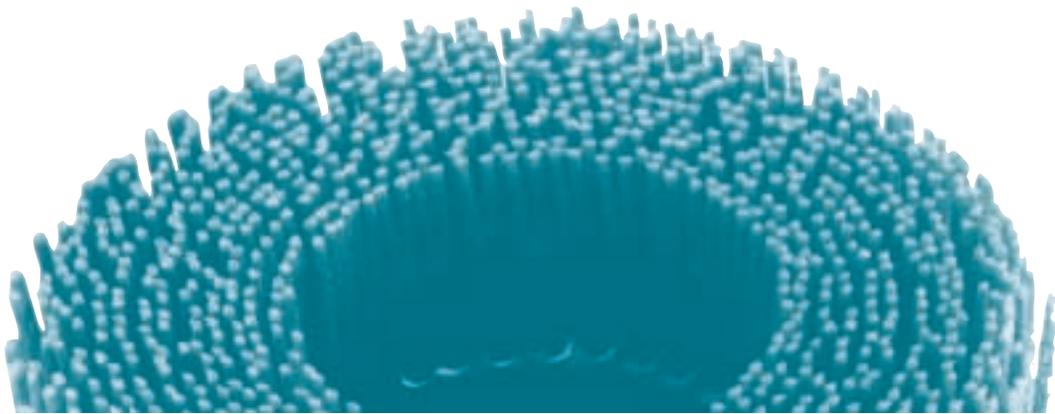
## NAMPOWER

Our Nampower tools are designed for manual and automated finishing machinery. They are used in extrusion, automotive and appliance plants, as well as fine blanking and other industrial applications. The Nampower tools come in two varieties:

1. Abrasive disc brushing tools with a  $\frac{7}{8}$ " arbor
  2. Abrasive Hex-Drive™ tools
- The Hex-Drive versions of Nampower are designed for used with Hex-Drive systems on machinery including NC, CNC and robotic systems. The Hex-Drive system allows the tools to be turned in both directions for 360° finishing. Typical applications include deburring, edge radiusing and general surface finishing for all of the Nampower tools.



**NAMPOWER**  
CATALOG LINE- AD, AHX



## FLARE BRUSHES

Our flare brushes are tools that are designed for serious removal of contaminants. Our patented tools are made from a cobalt base hard facing that is flame-coated to the ends of stainless steel aircraft cable.

We make these tools to cover ID's from 1" up to 8". These tools can be used to remove carbon build up from ports, remove rust and scale from pipe IDs. Our flare brush tools have long lives, as long as it does not get hung up and twist the cables. These tools will work on curved pipe. Recommended RPM for our flare brushes is 2,000 RPM.



**FLARE BRUSH**  
CATALOG LINE- DEB

## MINIATURE DEBURRING BRUSHES

We make miniature deburring tools, with cross-hole deburring tools that go as small as .024" diameter. The filament is .003" and .002" stainless steel, and twisted-in stem wires down to .015 in diameter. These miniatures take up where our other tools leave off, going as large as .250" in the miniatures, then from .250" to 2" for our larger deburring brushes.



**MINIATURE TWISTED-IN WIRE**  
CATALOG LINE- SERIES 81, SERIES 83

We also offer miniature cup brushes, miniature wheel brushes, miniature mandrel mounted wheel brushes and miniature end brushes. These tools come in crimped or straight steel, stainless steel, brass, or natural bristle.

The uses for these tools are limitless. Anywhere there is a small cross hole, a small end hole, or a burr that needs to be removed from the surface of a delicate part, these tools will do the job.

Many of these can be used by hand or mounted on a Dremel-type tool. Be careful with the miniature twisted-in wire brushes to not bend the stems as they are very delicate, but used properly can be extremely successful, and often times the only hope for extremely small cross holes.



**MINIATURE WHEELS**  
CATALOG LINE-SERIES 82A



**MINIATURE CUP BRUSHES**  
CATALOG LINE- 82B



## THE FLEX-HONE® TOOL

Although this tool looks like a brush, it is actually exactly what its name implies: a flexible honing tool. The Flex-Hone tool creates a plateau finish, free of cut, torn and folded metal while producing the ideal crosshatch finish for oil retention which is exactly what engineers require.

The Flex-Hone process is a low-temperature, low pressure abrading process that exposes the undisturbed base metal structure to produce a long wearing surface. It is a method of developing a surface on a part which is free of fragmented, amorphous or smeared metal from previous manufacturing operations.



**FLEX-HONE TOOL**  
CATALOG LINE-BC,

The Flex-Hone tool will refine a peaked finish very rapidly without excessive metal removal. The elimination of peaks will aid in rapid ring seating, oil control, and reduce seepage in hydraulics, provide longer ring or seal life, finish firearm chambers and barrels, provide a plateau finish, deburr wind instruments, and the list goes on and on. The Flex-Hone tool is used the world over by professionals, amateurs, rebuilders, and original equipment manufacturers.

The Flex-Hone tool is very effective for deburring cross holes, radiusing ports and providing a complete cylinder finish in one operation. The Flex-Hone tool is self-centering, self-aligning, and self-compensating for wear so it does not require an elaborate set-up or special training.

To determine which Flex-Hone you require answer the following questions:

1. What is the bore I.D.?
2. What is the base material being finished?
3. What are your existing finish parameters?
4. What are your desired finish parameters?

**FLEX-HONE TOOL**  
CATALOG LINE-GBDX



With the answers to those questions, our knowledgeable sales and technical departments will be able to provide you with the answers you need to get the right tool for your job.

The Flex-Hone is available in sizes to finish bore diameters from 4mm to 36". The tool is always supplied oversized and is listed for the nominal bore in which it is intended to be used. If a bore is between our standard sizes, the next larger Flex-Hone should be selected. The Flex-Hone tool is available in a variety of abrasive types including Silicon Carbide, Aluminum Oxide, Boron Carbide, Tungsten Carbide, Levigated Alumina and Zirconia Alumina. Abrasive selection depends on the base material being finished. The Flex-Hone tool is produced in grits as coarse as 20 to as fine as 800. Grit selection depends on finish requirements and the amount of work required achieving them. The Flex-Hone tool can be easily customized for tapered and multi-diameter bores.

## INSTRUCTIONS FOR USE

The Flex-Hone tool should be well coated with lubricant and rotating prior to entry and should continue rotating until fully removed from the part. The tool can be run from 1200 to 60 RPM, depending on tool diameter. The smaller the



**FLEX-HONE FOR ROTORS**  
CATALOG LINE- RMFH

diameter, the higher the spindle speeds. Start with a spindle speed between 500-800RPM. You may need to experiment to find the optimum speed for your application. Never exceed 1200 RPM.

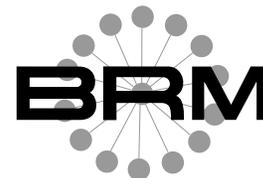
The Flex-Hone tool should have a continuous stroke rate between 120 to 180 inches per minute. Final stroking may be accelerated to develop a 45° crosshatch finish. To achieve a more symmetrical deburring pattern on cross holes, stroke the tool clockwise first, then reverse the spindle and stroke the tool counterclockwise.

The Flex-Hone tool must always be used with a good quality cutting oil or honing fluid to keep heat to a minimum, prevent the tool from loading and to suspend the material being removed. We offer a specially formulated Flex-Hone Oil for this tool. Although many lubricants are satisfactory including water soluble fluids, we highly recommend using Flex-hone Oil for the finest finish and longest tool life possible.

Use the minimum honing time needed to achieve the required finish. Average honing time is 10-45 seconds, (5-60 strokes).

The Flex-Hone tool should be securely held in a collet, chuck, or similar holding device. It is best to use the shortest shank possible for your application.

Clean the cylinder using hot, soapy water and brush the cylinder wall with a cleaning brush. Dry the cylinder and continue to clean with a lint free cloth coated with a light oil or mineral spirits. Continue to clean until the lint free cloth remains clean.



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