

Note: Safety information is located in the back of the catalog.

TERMINOLOGY

- 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

BRUSH INFORMATION & TERMINOLOGY

HOW TO ORDER CATALOG ITEMS

+ Flex-Hone® Tools

The Flex-Hone® Tool is trademarked and registered in all major trading countries of the world.

The Flex-Hone® Tool is always used in an oversized condition. Our sizes are listed by the nominal bore in which the hone is intended to be used.

Example:

If you have a 4" bore, order a 4" Flex-Hone®

How to Create a Part Number:
GBD-4" 120 S/C - GBD=style,
4"=Diameter, 120=Grit Size,
S/C=Silicon Carbide Abrasive

These selections will create the part number GBD40012.

+ Power Brushes

Order by catalog number and specify wire size and arbor hole.

Example:

BTS-6 .014 1/2" AH
add "S" for stainless steel:
BTS-6S .014SS 1/2" AH

If an arbor, keyway or threaded nut other than those shown is required, please contact factory for availability.

+ Twisted-In-Wire Brushes

Order by Catalog Number and if required please specify stem type, i.e., cut end, ring handle, pipe nipple, wood handle.

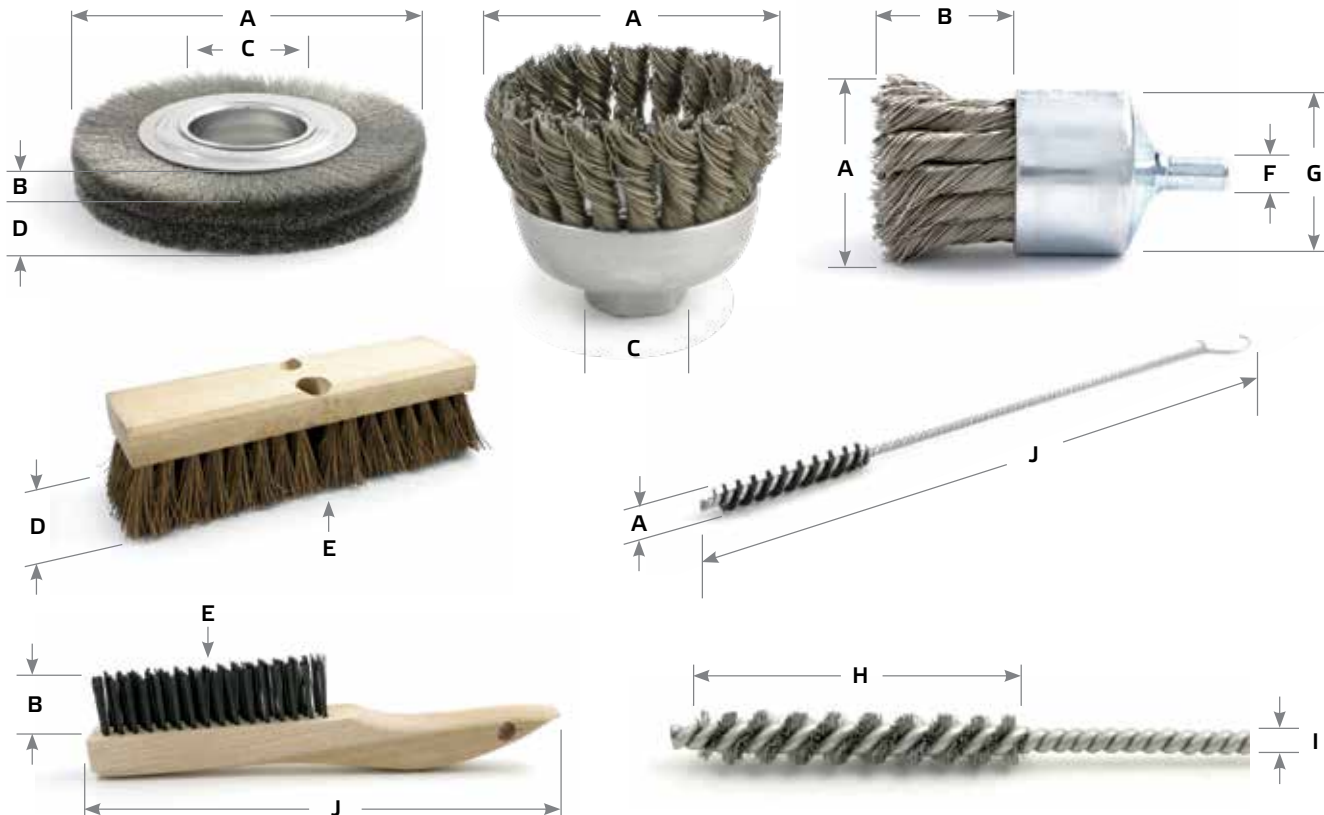
Example:

For plastic handle 85-N-500WH
For ring handle 85-N-500RH

+ Specials

Any item which is not shown in the Catalog will be considered a Special Order item. To order such an item:

1. Describe item fully
2. Furnish complete, detailed specifications
3. Send sample or blueprint



Brush Research provides cost-effective solutions for all of your application needs. With our many years of experience as brush manufacturers, we know that sometimes your application calls for brush tools with specific requirements and that is why we offer custom industrial brushes and brush tools. Our brush tools include the original Flex-Hone® Tool, twisted-in-wire brushes, automotive brushes and more! Custom brushes can be made to your exact specifications to ensure the perfect solution for your application.

There are a variety of ways to order your custom product:

CONTACT US OR PLACE AN ORDER ONLINE

Visit <http://www.brushresearch.com/custom-brushes.php> and choose one of the brush categories to fill out a custom order form online. You may also call our office at (323) 261-2193 to place an order over the phone. Our team is available to assist you and help you determine the best product for your needs. Our office hours are Monday–Friday, from 8:00 to 4:30 p.m. PST. You may also email us at info@brushresearch.com.

FILL OUT A CUSTOM PART FORM

Brush Research has custom forms available for the Flex-Hone and Twisted-in-Wire Brushes. Please fill out the custom Flex-Hone® form located on page 9 of the catalog to provide us with the exact specifications for your products. Forms for Flex-Hone and Twisted Wire products are also available on our website using the link provided above.

SEND IN YOUR PART

Brush Research Manufacturing also offers the option of sending us your components in order for us to evaluate them in our lab and determine the best custom tool for your needs. This allows us to test various elements and address issues such as cycle time and product lifespan without interrupting your production schedule. **See page 65 of the catalog to fill out the form to get started.**

OUR COMMITMENT TO EXCELLENCE

For over 60 years, BRM has been given the opportunity to help our customers with their polishing, metal surface finishing and deburring needs. At Brush Research, we understand that Quality and Performance are not a given. These are goals that we work towards everyday, with the primary focus being happy customers.

This Commitment to Excellence radiates all through the company, from our customer service to our production, to accounts receivable departments and on throughout our organization and distributors. We have always maintained the importance of keeping our manufacturing in the United States where we can ensure that our processes are followed exactly as they were designed. We also feel pride for supporting our local communities. We continually improve our systems through the implementation of our ISO quality program. Our customer service and tech support are available to our distributors and customers around the world and have their clientele's best interests at heart. BRM is continually reinvesting in ourselves by improving our tools and machinery as well as exploring new products that can be of benefit to our customers. We thank you for the past 60 years and look forward to making the next 60 even better.



NEED MORE INFORMATION?

VISIT US ONLINE!

www.brushresearch.com



The Following Booklets Are Available Upon Request at No Charge

The Use of Industrial Brushes



The most informative literature available on the use of industrial brushes for deburring, edge blending, edge radiusing, oxide or scale removal, weld cleaning, surface finishing, polishing or roughening.

Brush Research's Gold Booklet



Our first booklet on some common practices in Cylinder Boring, Honing and Wall Finishing. An educational comparison of various rigid honed and Flex-Honed cylinder wall surfaces.

We have a wide array of resources and training videos available to assist you. Follow our blog here: blog.brushresearch.com

-  <http://www.facebook.com/BrushResearch>
-  <http://www.twitter.com/brushresearch>
-  <http://www.linkedin.com/company/225267>
-  <http://www.youtube.com/user/BrushResearch>
-  <http://www.pinterest.com/brushresearch>
-  <https://plus.google.com/+Brushresearch/posts>
-  <https://www.instagram.com/brushresearch>

DOWNLOAD AND VIEW VIDEOS ONLINE!

www.brushresearch.com



Check out our **instructional videos** on **YouTube®** to learn tips and procedures for proper equipment use!



**How To Use The Flex-Hone® Tool
Step-by-Step Instructions**



**Flex-Hone for Firearms Instruction
Video-Polish and Finish Barrels,
Chambers & Cylinders**



**Flex-Hone®- In Machine Setup for
Surface Finishing and Deburring**



**How To Automate Deburring &
Finishing- Nampower Abrasive
Disc Brushes**

The Following Booklets Are Available Upon Request at No Charge

The Necessity Of A Plateaued Cylinder Wall Finish

A detailed presentation of several test run engines with performance results of lower blow-by, increased compression, less ring and cylinder wall wear with the Flex-Hone® Process.



A Study of Cylinder Wall Micro-Structure

An extensive study using a Scanning Electron Microscope to examine and compare the results of cylinder honing using rigid hones versus the Flex-Hone® Tool. Truly an exposé of what the honed cylinder wall surface should and should not look like. Three different studies are presented USA, UK and France for comparison.



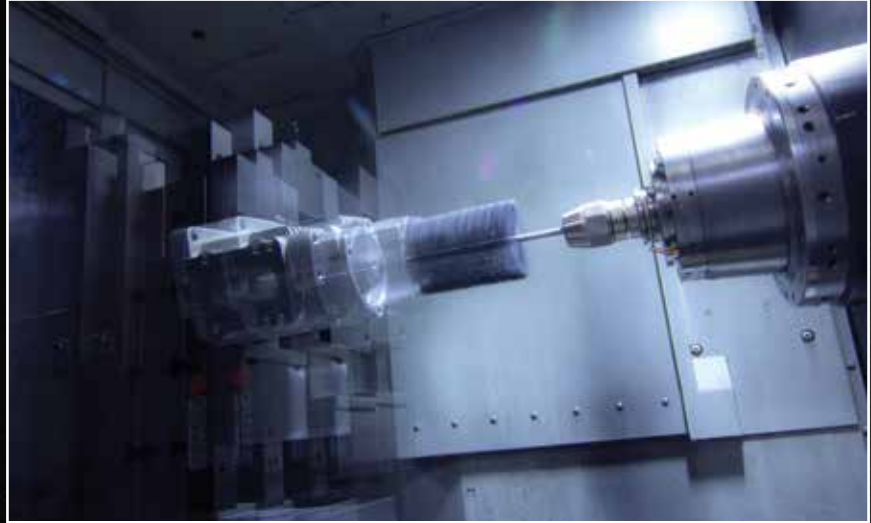
®

FLEX-HONE

FLEX-HONE® TOOL

For Any Type and Size of Cylinder

The Flex-Hone® Process (Super finishing) produces a controlled surface condition unobtainable by any other method. It involves finish, geometry and metallurgical structure. A high percentage plateaued surface is produced free of cut, torn and folded metal.

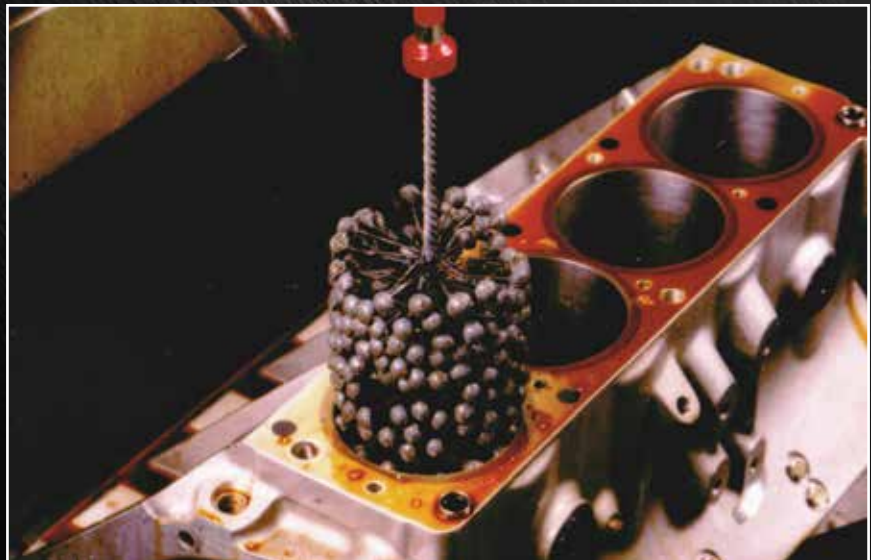


The Flex-Hone® Tool is a resilient, flexible, honing tool with a soft cutting action. The abrasive globules each have independent suspension that assures the Flex-Hone® to be self-centering, self-aligning to the bore, and self-compensating for wear.

Specifically, it is a low-temperature abrading process that exposes the undistributed base metal structure to produce a long wearing surface. It is a method of developing a surface on a metal part which is optically smooth and metallurgically free of any fragmented, amorphous or smeared metal from previous operations. It is accomplished at a low pressure where the "stones" float.

See and read the various booklets of actual tests covering almost every situation that will ensure a superior performance on surface finishes.

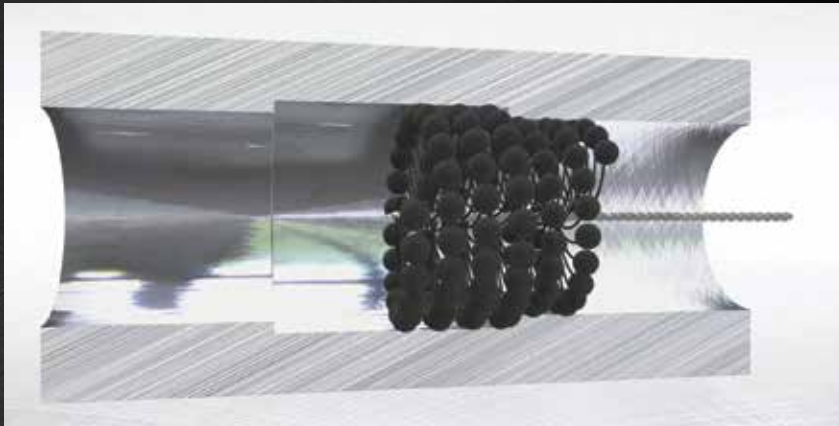
The particular type of Flex-Hone® crosshatch is extremely efficient in providing a multiplicity of oil grooves or valleys for oil retention as opposed to the often unidirectional or uneven valleys common to the conventional type rigid hone. A crosshatch remains as the cylinder wall has been wear-reduced by the Flex-Hone®.



Flex-Hone® Benefits Include:

+ Surface Finishing

The Flex-Hone® Tool is available in a variety of abrasive types and grit selections to provide the optimum surface finish on any base material. The Flex-Hone® is commonly used to reduce Ra, Rk and Rpk values while maintaining Rvk and Vo volume for oil retention. Using the Flex-Hone® Tool for surface finishing allows the sizing tools to do their jobs quickly and accurately without fighting surface finish. The Flex-Hone® is also used in adhesive bonding applications where a rougher surface is desired for bonding integrity.



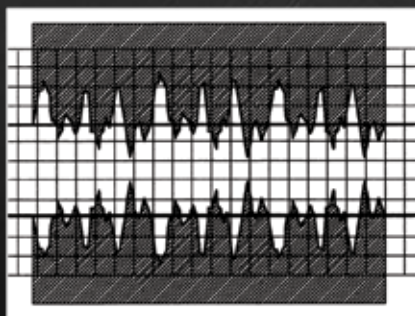
+ Deburring

Deburring of cross drilled holes is an expensive, time-consuming operation. The Flex-Hone® Tool can be used to remove burrs from cross drilled holes leaving a clean, radiused intersection. Because of its unique construction, the Flex-Hone® can be used online in machine tool applications or offline as a secondary operation.

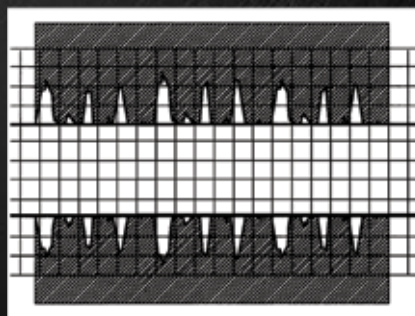
The tool is self-centering and self-aligning to the bore so elaborate, rigid set-ups are not required. It is advisable to use the tool in the main bore into which the cross holes break. Best results are obtained by rotating and stroking the tool a few strokes in a clockwise direction, removing the tool from the part, reversing the spindle and then rotating and stroking the tool in a counter-clockwise direction for a few more strokes. This forward and reverse rotation creates a more symmetrical deburring pattern.

+ Plateau Finishing

Brush Research pioneered the concept of a plateau finish and is a strong proponent of the benefits of a cross hatch, plateaued finish. The concept involves removing the peaks produced by prior machining operations and creating a substantially flat or plateau finish. A plateau finish created by the elimination of peaks allows rings and seals to seat without damaging their edges. The cross hatch pattern will aid in lubrication control and retention, reduce seepage in hydraulic and pneumatic applications and promote longer seal life.



A: Before Flex-Hone®



B: After Flex-Hone®

If Your Specifications Call For:

Developing a surface plateau of over 60%,
Producing an oil holding cross-hatch pattern,
Reducing Ra, Rpk and Rvk values,
Increased bearing area...

If You Want Benefits of:

Lowered oil consumption,
Less blow-by,
Less friction,
Improved sealing surface...

Then Flex-Hone® it!



INDUSTRY APPLICATIONS

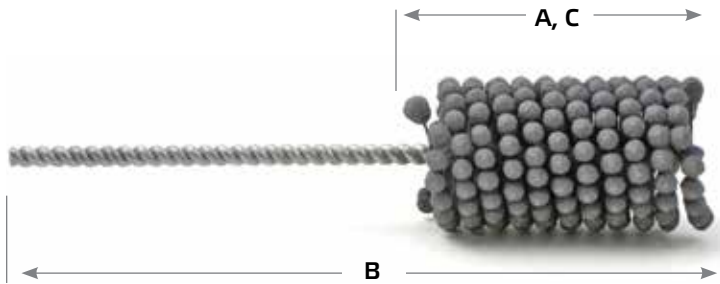
The Flex-Hone® Tool provides the ideal surface finish in any type or size of cylinder. The benefits of the Flex-Hone® Tool are enjoyed across an extensive range of applications including:

- + AUTOMOTIVE
- + MILITARY
- + AEROSPACE
- + MARINE
- + GENERAL INDUSTRIAL
- + MANUFACTURING
- + OIL AND GAS APPLICATIONS
- + FIREARMS
- + MUSICAL INSTRUMENTS
- + FLUID POWER APPLICATIONS
- + HYDRAULICS
- + ALUMINUM EXTRUSIONS
- + EARTH MOVING EQUIPMENT
- + ...AND MORE!



BE CREATIVE!

At Brush Research Manufacturing, we understand that some of your deburring and surface finishing applications require non-standard Flex-Hone solutions. This is why we're happy to provide you with custom Flex-Hone® Tools. With the outstanding reputation our standard tools have received, you can be sure that your custom Flex-Hone® will live up to that reputation as well. We will gladly manufacture Flex-Hone® Tools according to your exact specifications. To get started, fill out the project information below to supply us with the details we need to manufacture your custom Flex-Hone®.



Please Provide All Dimensions

Bore Diameter: _____

Abrasive Type:

- SC (Silicon Carbide) AO (Aluminum Oxide) BC (Boron Carbide)
- Z Grain 1525 (Alumina Zirconia) Z Grain 1549 (Alumina Zirconia)
- LA (Levigated Alumina) Diamond
- CBN Ceramic

Grit Selection:

- 20 40 60 80 120 180 240 320 400 600 800

Diamond Mesh Sizes:

- 170/200 800 2500

A. Brush Part Length: _____ B. Overall Length: _____

C. Form: Cylindrical Tapered Stepped Segmented

Company: _____

Attention: _____

Mailing Address: _____

Phone Number: _____ Fax Number: _____

Email: _____

CUSTOM FLEX-HONE® SPECIFICATIONS



Flex-Hones for Adhesion Applications

The Flex-Hone® can be manufactured in grits as coarse as 20. This is a fast and effective solution to roughen the surface for adhesive bonding.

FLEX-HONE® APPLICATIONS



The Flex-Hone® Tool is always used in an oversized condition. Our sizes are listed by the nominal bore in which the hone is intended to be used. Order by bore size. For more information, please see the bottom of pg. 13.

FLEX-HONE® TOOL

Typical Applications Include:

Automotive Applications

- + Piston Pin Bore
- + Engine Cylinders
- + Block Liners
- + Valve Guides
- + Cam Bearing Bore
- + Crank Bores
- + Brake Cylinders
- + Clutch and Brake Master Cylinders
- + Brake Rotors
- + Connecting Rods

Marine Applications

- + Main Engines
- + Generator Engines
- + Hydraulic Cylinders
- + Air Intake Lines

Firearms Applications

- + Barrels
- + Chambers
- + Forcing Cones
- + Paintball Barrels

Industrial Applications

- + Air Compressors
- + Hydraulic Ram Cylinders
- + Hydraulic Motor Bodies
- + Pneumatic Cylinders
- + Valve Housings
- + Pump Housings
- + Surface Finishing of Boiler Components
- + Compressed Air Tool Bodies
- + Finishing of Stainless Steel Tubing
- + Mechanical Decontamination of Nuclear Tube Sheets
- + Roughening Hossel Holes in Golf Clubs for Adhesion

Musical Instruments

Oil and Gas Applications

Fluid Power Applications

Aerospace Applications

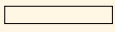




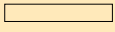



FLEX-HONE® KITS







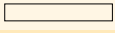







*Kits have a savings of 10% over individual purchases.

Part Number	Flex-Hone Sizes Included in the Kits	Grit/ Abrasive
10 Piece Automotive Kit		
14353	10mm, 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 1 3/4", 2"	180SC
10 Piece Deburring Starter Kit		
BCKDBR12	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	120SC
BCKDBR120AO	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	120AO
10 Piece Finishing Starter Kit		
BCKFIN24	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	240SC
BCKFIN240AO	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	240AO
10 Piece Fine Finishing Starter Kit		
BCKFIN600	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	600SC
BCKFIN600AO	1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2", 2"	600AO
For Japanese and European Cars		
BCKA	18mm, 7/8" (22mm), 1 1/8" (29mm)	320AO
BCKA240AO	18mm, 7/8" (22mm), 1 1/8" (29mm)	240AO
BCKB	1" (25.4mm), 1 1/8" (29mm), 1 3/8" (35mm)	320AO
BCKB240AO	1" (25.4mm), 1 1/8" (29mm), 1 3/8" (35mm)	240AO
BCKC	1 5/8" (41mm), 2" (51mm), 2 3/8" (60mm)	240SC
BCKC240AO	1 5/8" (41mm), 2" (51mm), 2 3/8" (60mm)	240AO
For Compact, Medium and Large Cars		
BCKD	18mm, 20mm, 7/8" (22mm), 1" (25mm), 1 1/8" (29mm)	180SC
BCKD240AO	18mm, 20mm, 7/8" (22mm), 1" (25mm), 1 1/8" (29mm)	240AO
BCK12	7/8" (22mm), 1 1/8" (29mm), 1 3/8" (35mm)	120SC
BCK18	7/8" (22mm), 1 1/8" (29mm), 1 3/8" (35mm)	180SC
BCK24	7/8" (22mm), 1 1/8" (29mm), 1 3/8" (35mm)	320SC
Disc Brake Caliper Kits		
DBCKE	38mm, 45mm, 54mm, 64mm	320SC
DBCK	45mm, 54mm, 64mm, 70mm, 79mm	180SC
Valve Guide Kits - Transmission Bodies		
VGFB24	6.4mm, 7mm, 8mm, 9mm, 9.5mm, 10mm, 11mm	240SC

Abrasive Types	20	40	60	80	120	180	240	320	400	600	800
SC = Silicon Carbide	x	x	x	x		Standard			x	x	x
AO = Aluminum Oxide	x	x	x	x	x	x	x	x	x	x	x
BC = Boron Carbide	x	x	x	x	x	x	x	x	x	x	x
Z Grain - Alumina Zirconia No. 1525 (25% Zirconia / 75% Alumina)			x	x	x	x	x				
Z Grain - Alumina Zirconia No. 1549 (40% Zirconia / 60% Alumina)					x	x	x				
Levigated Alumina	Available in extra fine grit only										
Diamond	Available in mesh 170/200, 800, 2500										
CBN	Available in mesh 170/200, 800, 2500										
Ceramic	Available in 60, 120, 220										

Stem Marking	Type of Abrasive
No Color 	Silicon Carbide (SC)
Black 	Aluminum Oxide (AO)
Gold 	Boron Carbide (BC)
Red 	Zirconia Alumina (Z-Grain #1525)
White 	Zirconia Alumina (Z-Grain #1549)
No Color 	Levigated Alumina (LA)
Yellow 	Diamond (CD)
Purple 	CBN (CCBN)
Pink 	Ceramic (CG)

*Order by actual cylinder I.D. All Flex-Hone® are produced oversized.

End Marking	Grit Sizes	Mesh Sizes (Diamond/CBN)
Brown 	20	
Purple 	40	
Grey 	60	
Orange 	80	
Silver (no color) 	120	
Cardinal Red 	180	170/200
Navy Blue 	240	
White 	320	
Yellow 	400	800
Pink 	600	
Light Blue 	800	2500
Green 	Levigated Alumina available in extra fine grit only	

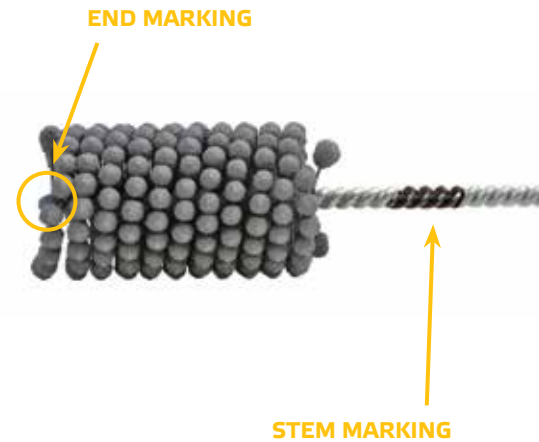
The Flex-Hone® Tool should be securely held in a collet, chuck, or similar holding device. It is best to use the shortest shank possible for your application. Always wear eye protection. The Flex-Hone® Tool should be well coated with a good quality cutting oil or honing fluid and rotating prior to entry and should continue rotating until fully removed from the part. RPM from 60 to 1200 depending on diameter. Never exceed 1200 RPM. Start with a spindle speed between 350-800 RPM. You may need to experiment to find the optimum speed for your application. 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. Use the minimum honing time needed to achieve the required finish. Average honing time is 10-45 seconds, (5-60 strokes). DO NOT over hone. Clean the cylinder after honing using hot, soapy water and brush the cylinder walls 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. SEE OUR FLEX-HONE® RESOURCE GUIDE FOR MORE RPM RECOMMENDATIONS.

FLEX-HONE® ABRASIVE OPTIONS

Flex-Hone® now available in DIAMOND and CBN!

NEW

FLEX-HONE® COLOR GUIDE



FLEX-HONE® INSTRUCTIONS



Check out our video tutorial on the proper use of the Flex-Hone® Tool!
www.brushresearch.com/videos.php

HEAVY DUTY FLEX-HONE®

Order by Bore Size, Grit and Abrasive Type



FLEX-HONE® TOOLS

34" OAL STOCKED IN 120 & 180 SC

Catalog Number 3" Core (½" Hex Shaft)		Catalog Number 5" Core (⅝" Hex Shaft)	
GBDH 8"	(203mm)	GBD 12½"	(318mm)
GBD 8½"	(216mm)	GBD 13"	(330mm)
GBD 9"	(228mm)	GBD 13½"	(344mm)
GBD 9½"	(241mm)	GBD 14"	(355mm)
GBD 10"	(254mm)	6" Core (⅝" Hex Shaft)	
4" Core (½" Hex Shaft)		GBD 15"	(381mm)
GBD 10½"	(267mm)	GBD 16"	(406mm)
GBD 11"	(280mm)	8" Core (⅝" Hex Shaft)	
GBD 11½"	(292mm)	GBD 17"	(432mm)
GBD 12"	(305mm)	GBD 18"	(457mm)

* NOTE- See Grit and Abrasive Options on Page 11.

All Heavy Duty Wood Core Flex-Hones (8" - 18") require a steel hex drive shaft that is 34" OAL. **Shafts sold separately.**

Part Number	Part Number With Nipple Adapter	Description
SHAFT3	SHAFT3W12NPT (½" NPT)	GBDH 8" - GBD 10"
SHAFT4	SHAFT4W12NPT (½" NPT)	GBD 10-1/2" - GBD 12"
SHAFT5	SHAFT5W34NPT (¾" NPT)	GBD 12-1/2" - GBD 14"
SHAFT6	SHAFT6W34NPT (¾" NPT)	GBD 15" - GBD 18"

SOLUTION SHOWCASE

LARGE DIAMETER FLEX-HONE®



PROBLEM: Servicing large diameter bores in the field

SOLUTION: Large diameter Flex-Hones are an affordable and portable solution

When it comes to servicing big bore diesel engines, the Flex-Hone® is a portable and low-cost tool that can be used to speed up cylinder servicing in the shop or in the field – deglazing, de-burring and cross-hatching in one smooth operation.

Clarence Mayers, coordinator for Diesel Supply Company (Odessa, Texas) says, "Getting top-to-bottom cylinder or liner wall coverage is difficult to do with other tools. The Flex-Hones that we sell are approximately 12-18 inches wide. So, if the hone is ran two or three inches past the bottom of the liner, that's not a problem. Most of the hone is still inside the cylinder, so it can go down and complete the bottom of the piston travel area. The same applies to the top of the liner, where it gets chamfered because of where the top ring travel ends. The Flex-Hone® can blend that area quite easily."

In addition to diesel engines, large diameter hones are often used for decontamination of large pipes, finishing and cleaning of pumps, valves and generators. Flex-Hones are available up to 36" standard.

